2010 TRANSMISSION

Automatic Transmission - 6L45/6L50/6L80/6L90 - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

AUTOMATIC TRANSMISSION CONTROLS SCHEMATICS

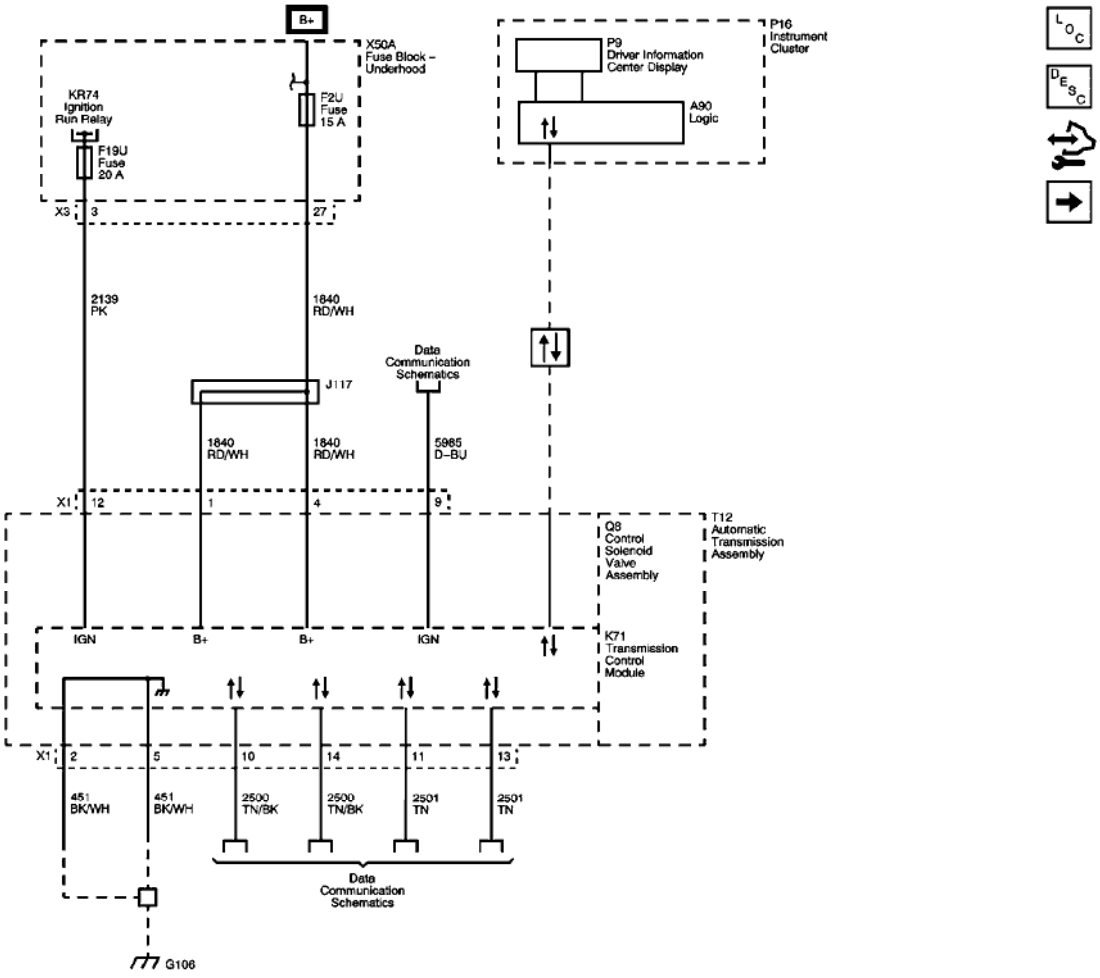


Fig. 1: Module Power, Ground, Data Communication, and MIL
Courtesy of GENERAL MOTORS CORP.

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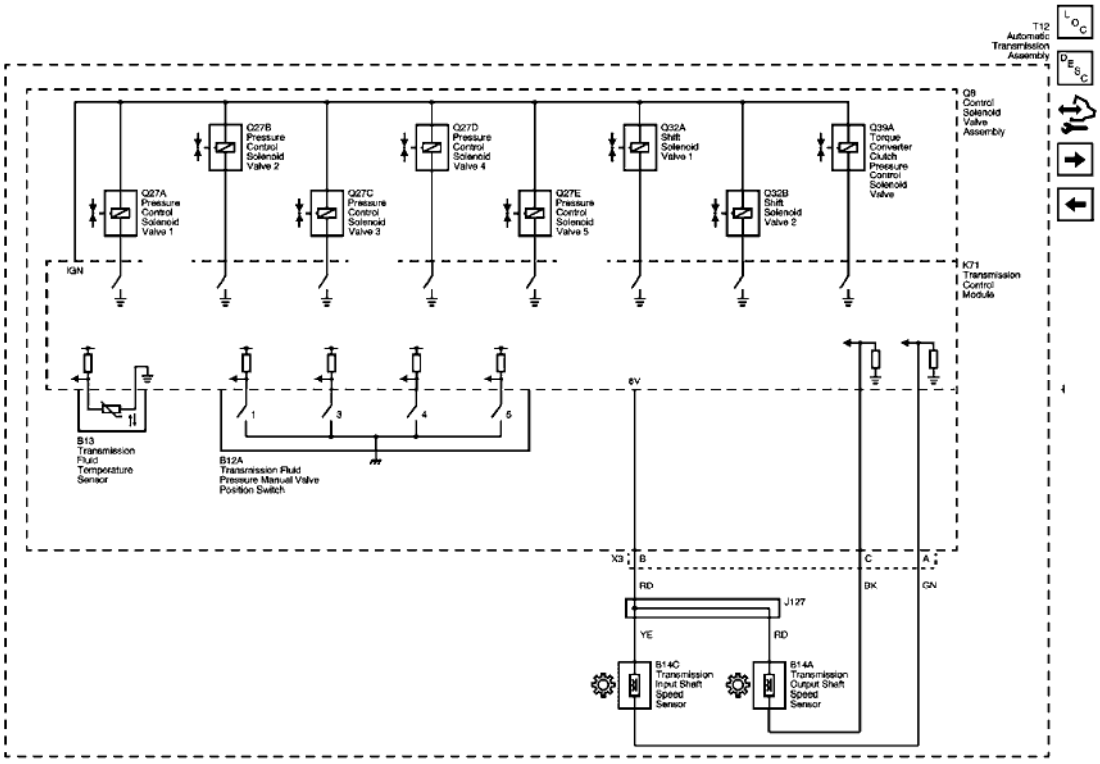


Fig. 2: ISS, OSS, TFP, TFT, Pressure Controls, and Shift Controls
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

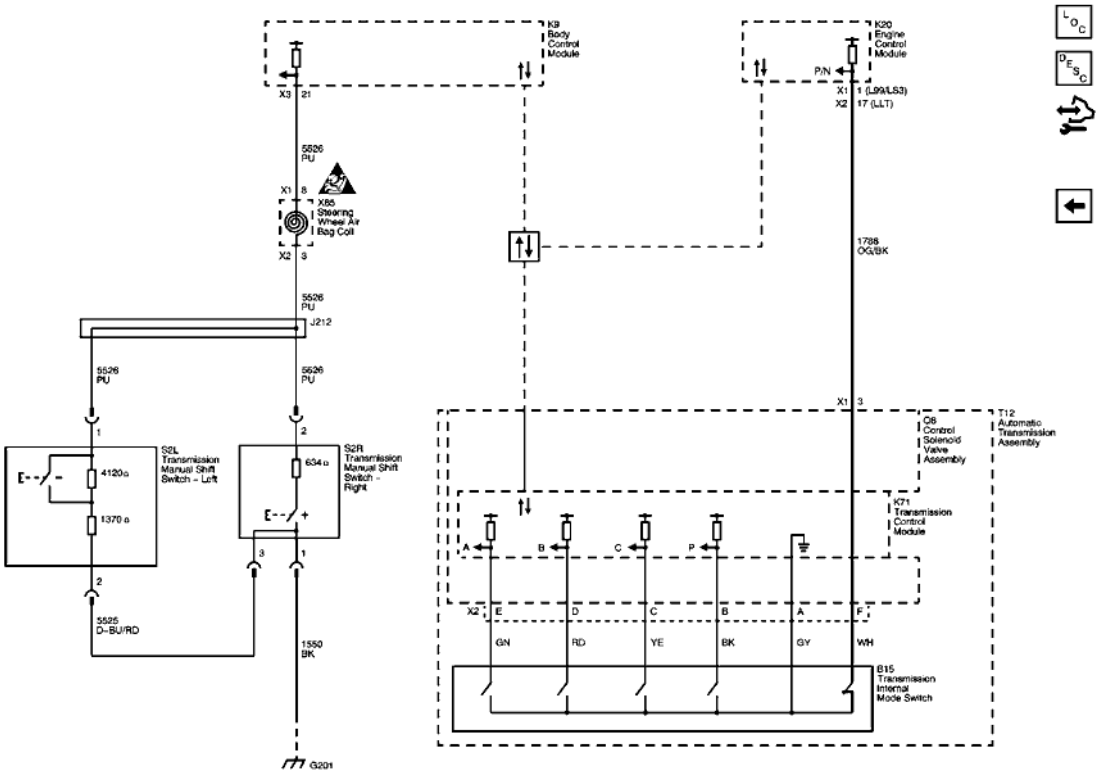


Fig. 3: IMS and Tap Up/Tap Down
Courtesy of GENERAL MOTORS CORP.

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2010 ENGINE PERFORMANCE

Engine Controls and Fuel - 4.8L, 5.3L, 6.0L, 6.2L, or 7.0L - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

ENGINE CONTROLS SCHEMATICS

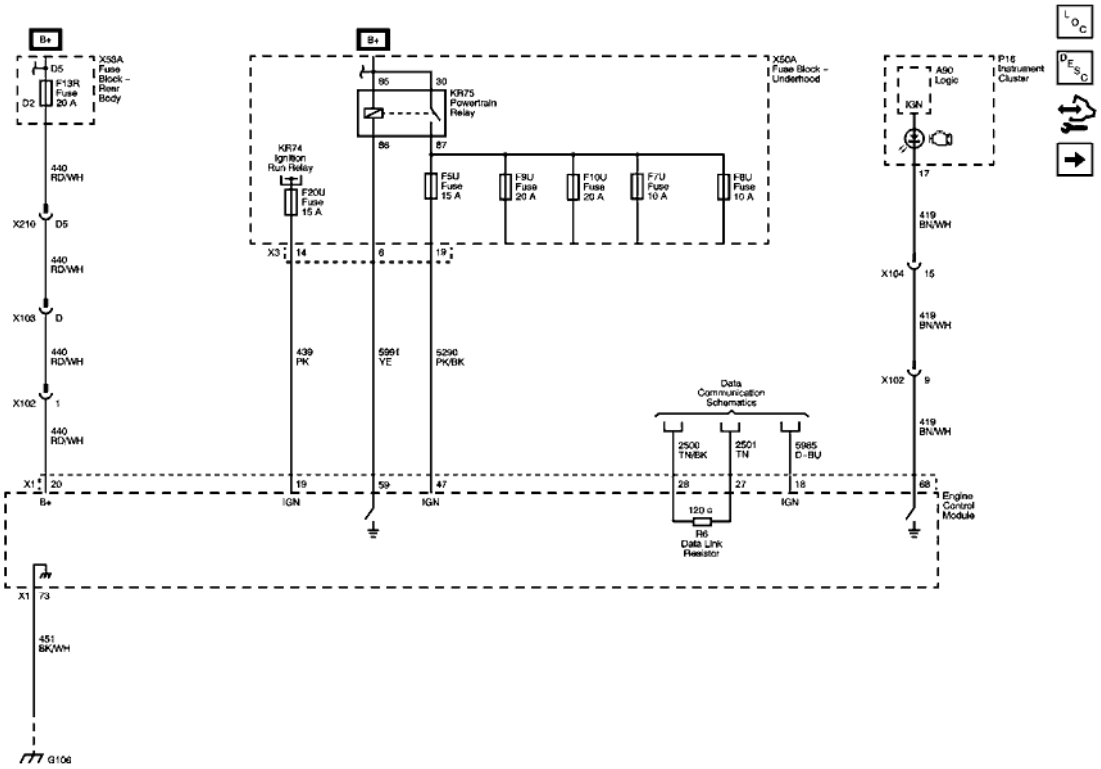


Fig. 1: ECM Power, Ground, MIL, and Serial Data
Courtesy of GENERAL MOTORS CORP.

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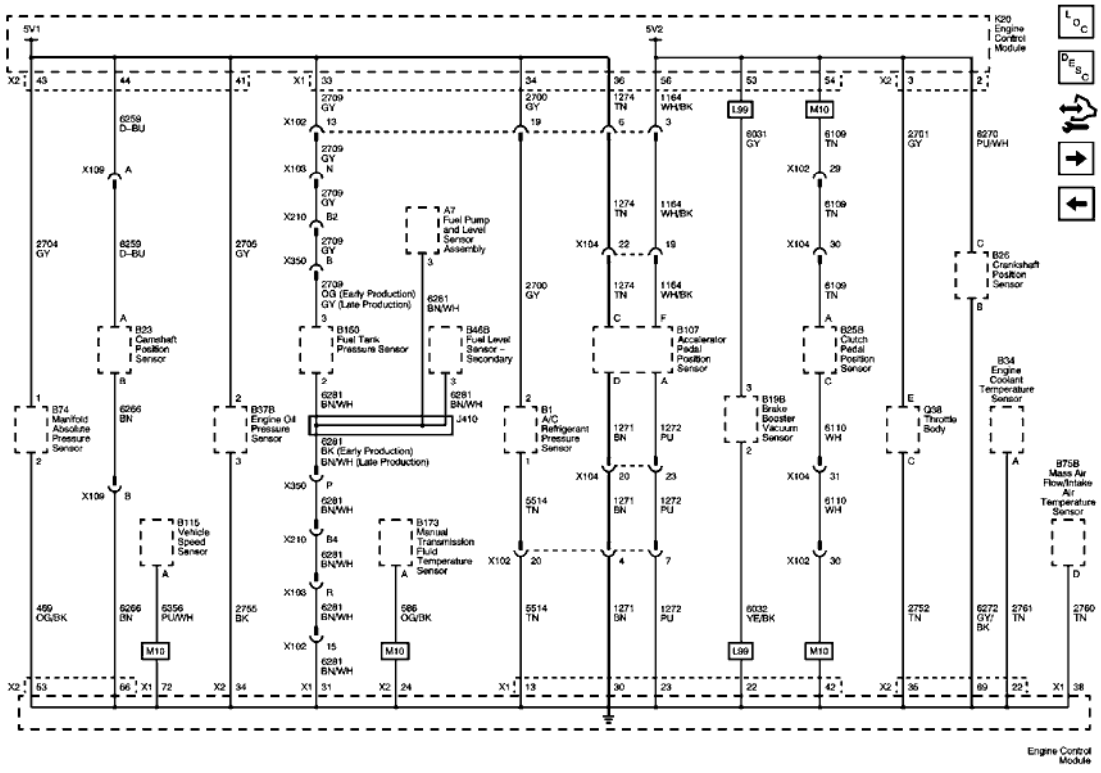


Fig. 2: 5-Volt and Low Reference Bussing
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

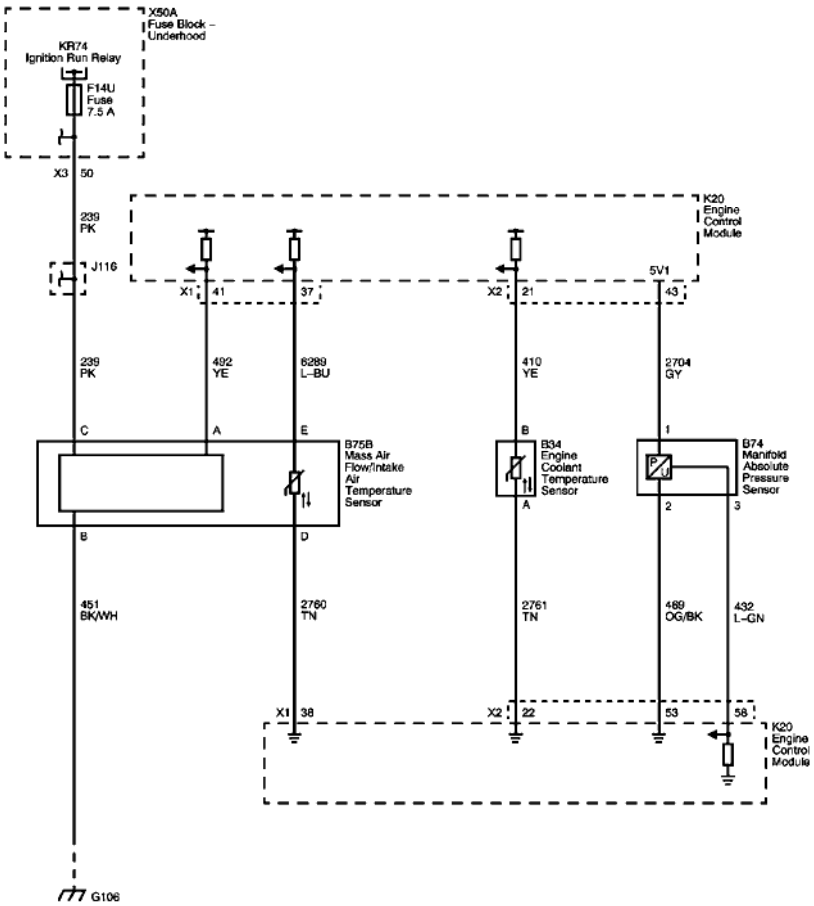


Fig. 3: MAP, ECT, and MAF/IAT Sensors
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

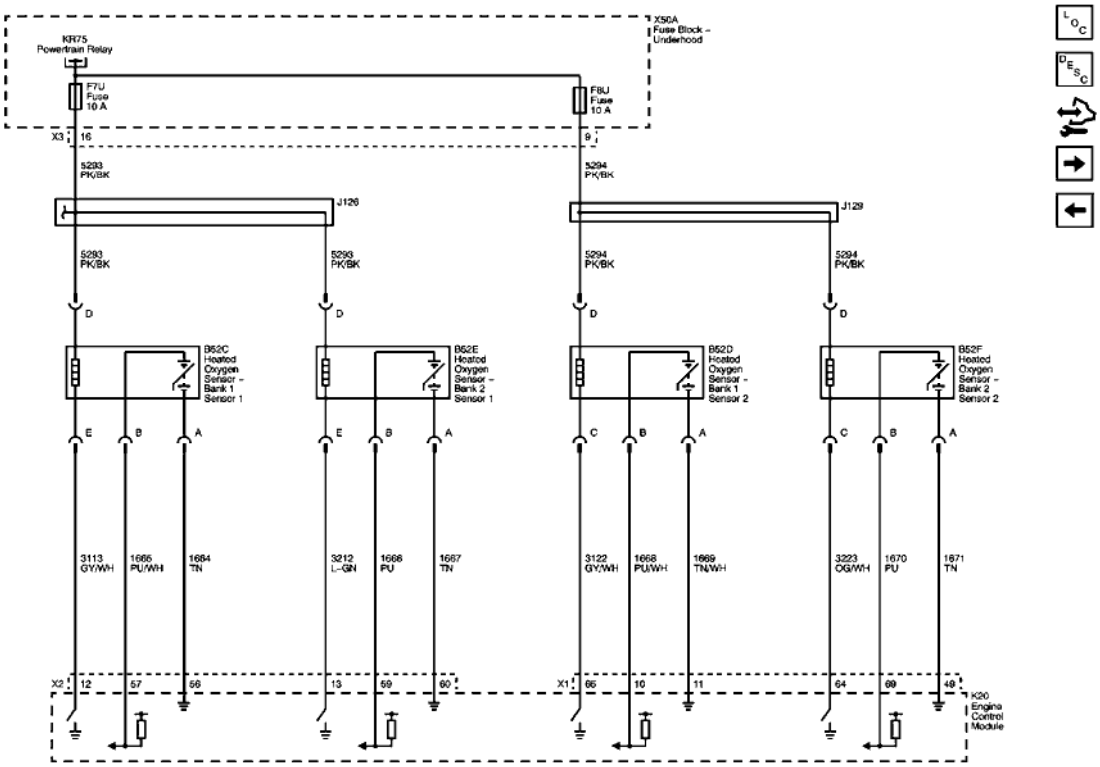


Fig. 4: Heated Oxygen Sensors
Courtesy of GENERAL MOTORS CORP.

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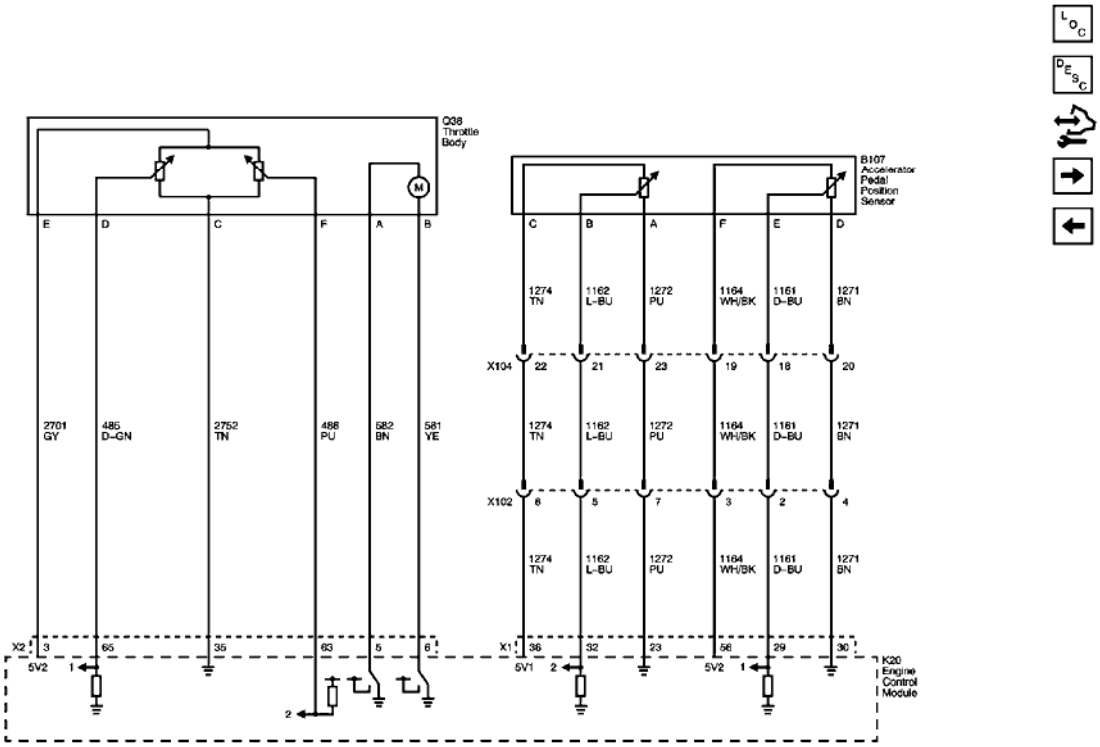


Fig. 5: Electronic Throttle Controls
Courtesy of GENERAL MOTORS CORP.

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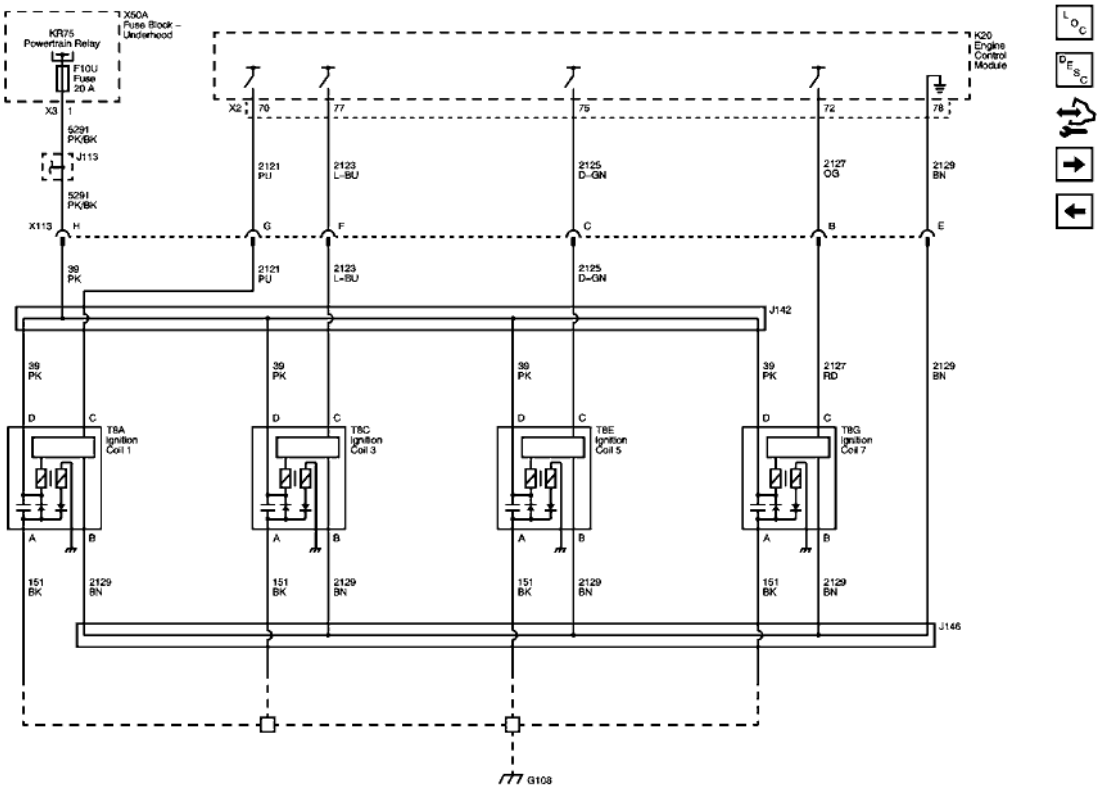


Fig. 6: Ignition Controls Bank 1 (Odd) Ignition Coils
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

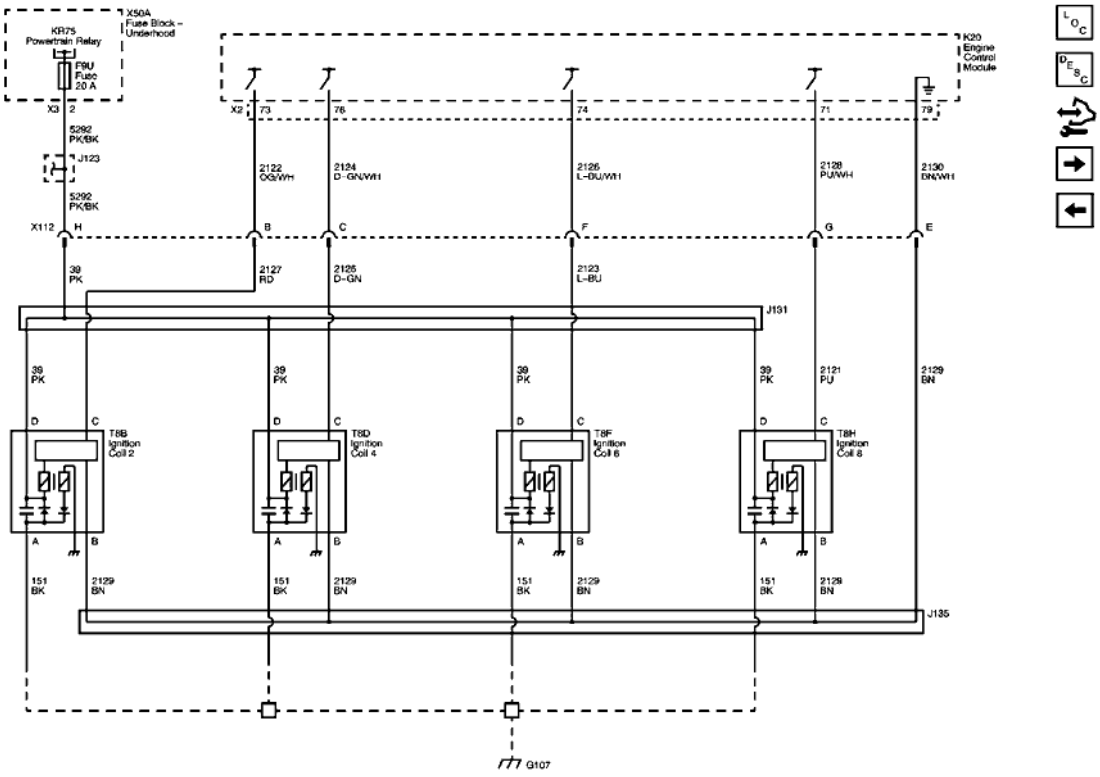


Fig. 7: Ignition Controls Bank 2 (EVEN) Ignition Coils
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

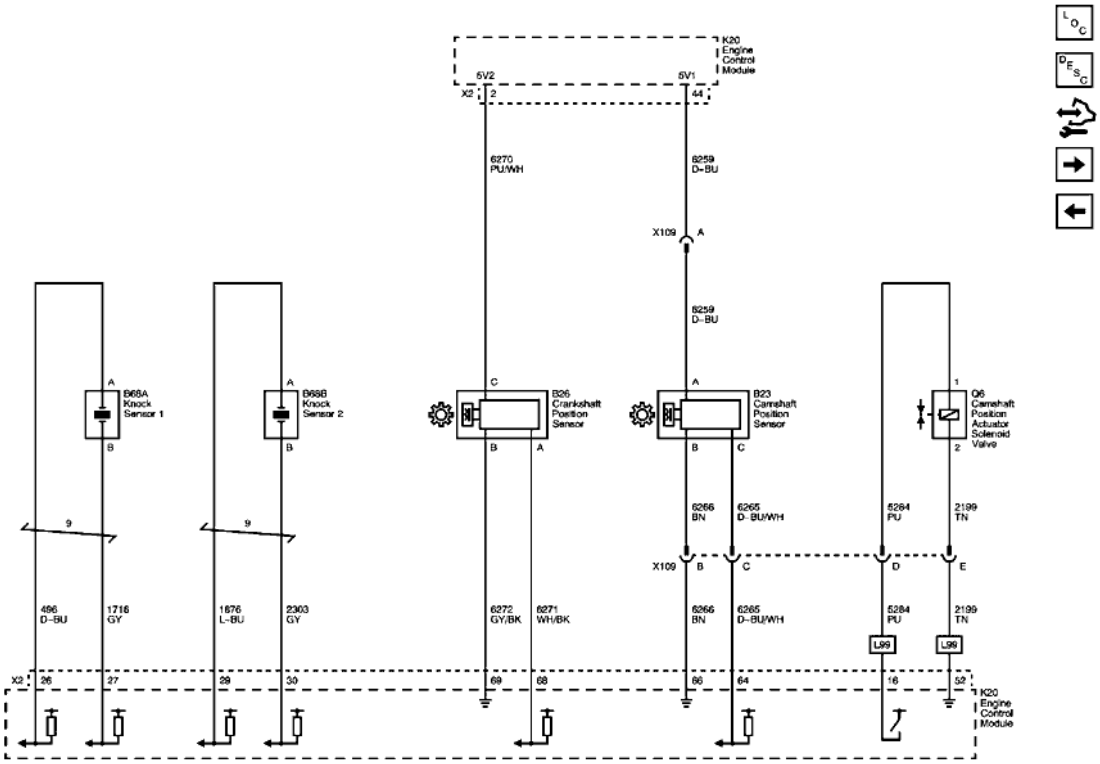


Fig. 8: Ignition Controls, Knock, CMP, and CKP Sensors
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

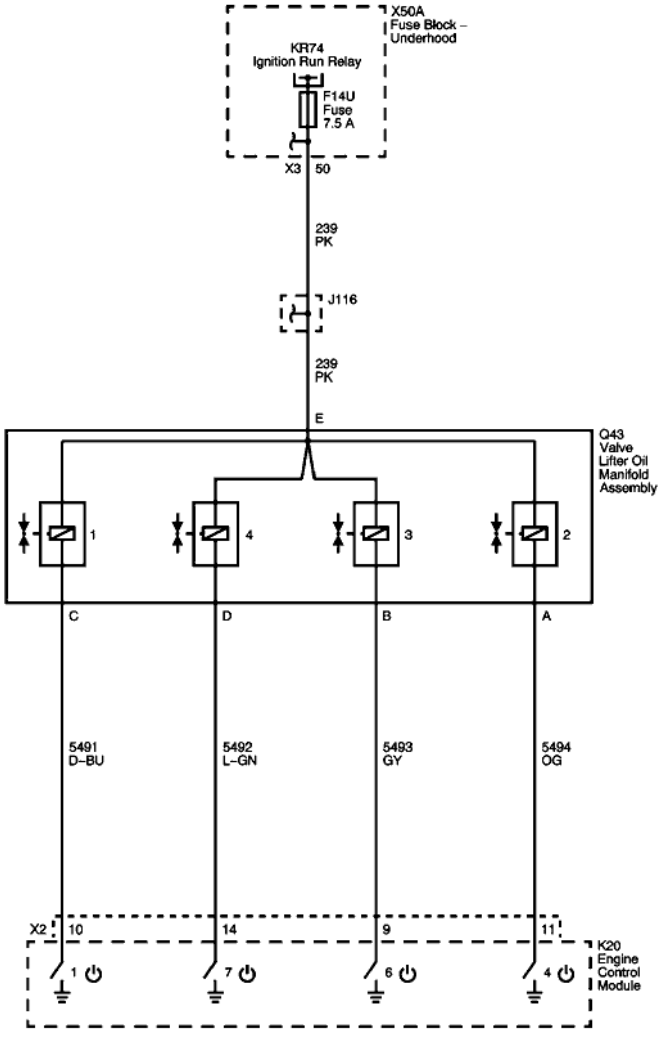


Fig. 9: Valve Lifter Oil Manifold (VLOM) Assembly
Courtesy of GENERAL MOTORS CORP.

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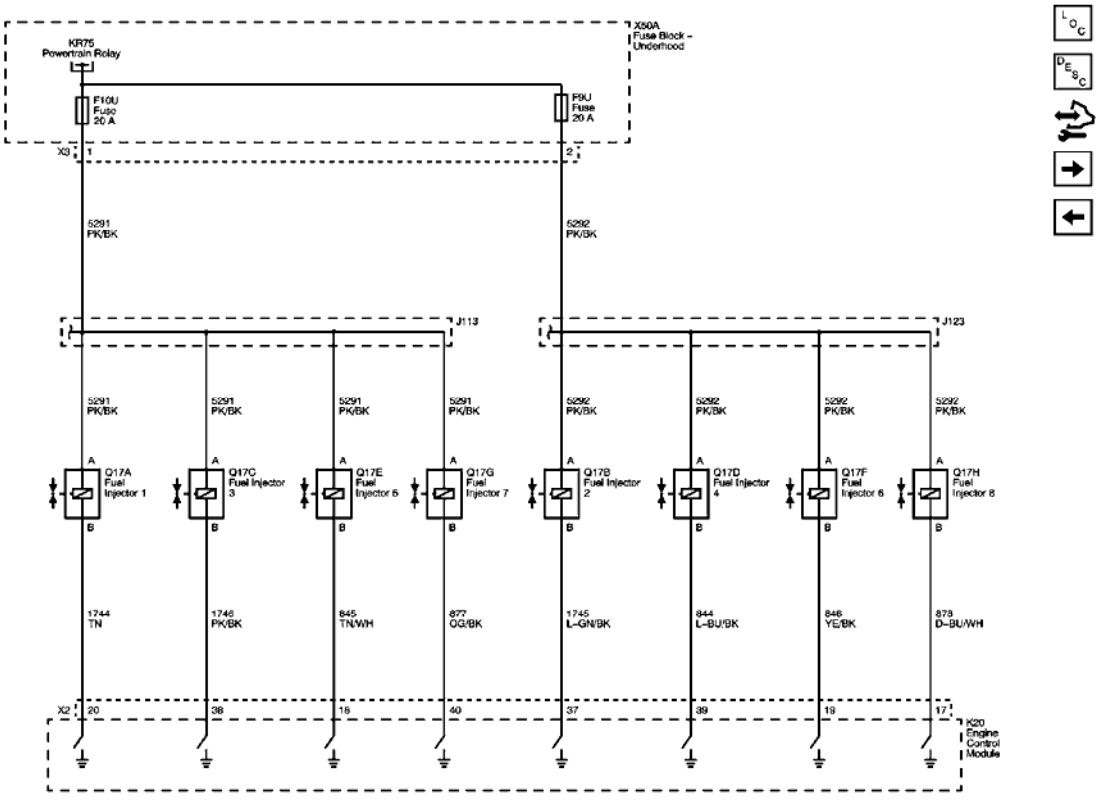


Fig. 10: Fuel Injectors
Courtesy of GENERAL MOTORS CORP.

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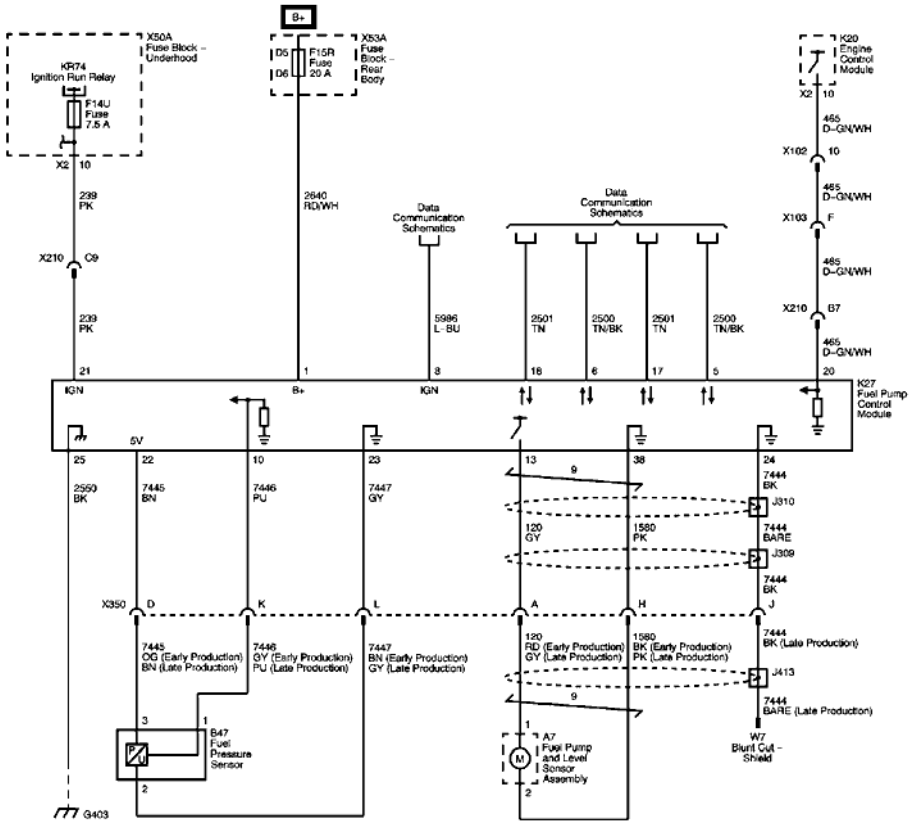


Fig. 11: Fuel Controls - Fuel Pump Flow Control
Courtesy of GENERAL MOTORS CORP.

cardiagn.com

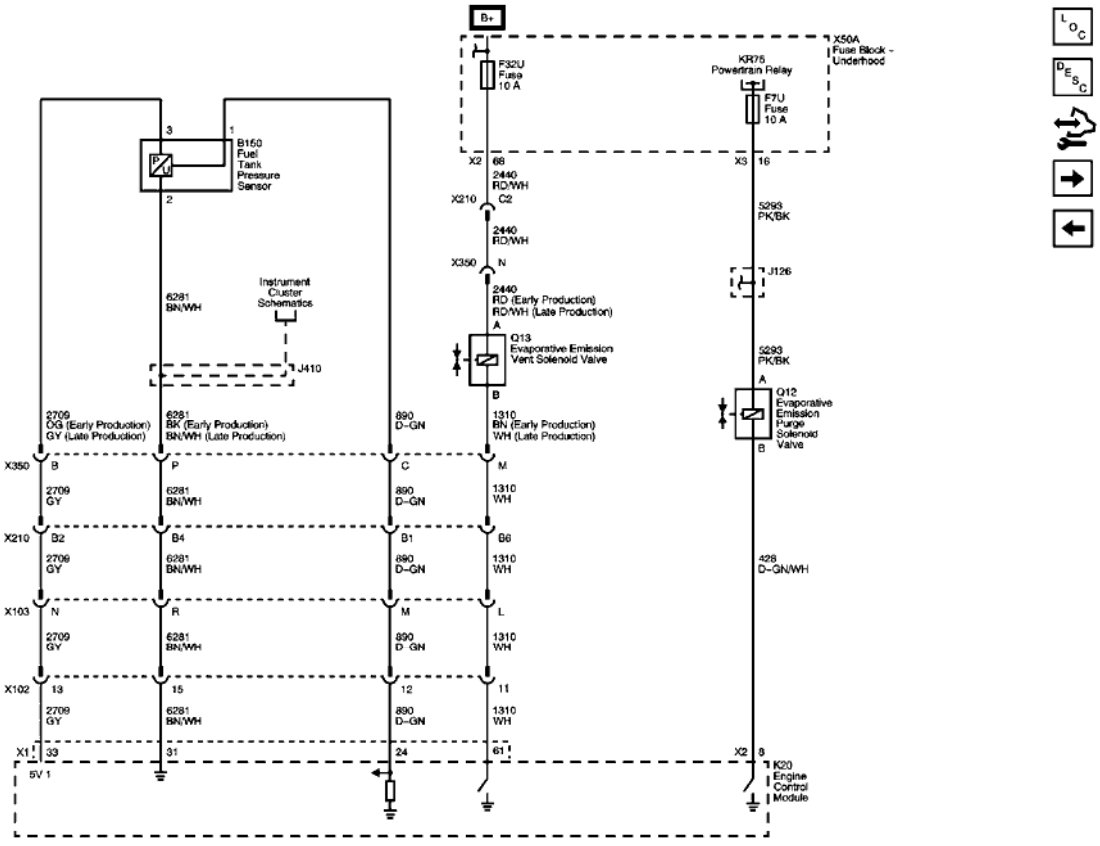


Fig. 12: Fuel Controls - EVAP Controls and Manifold Tuning
Courtesy of GENERAL MOTORS CORP.

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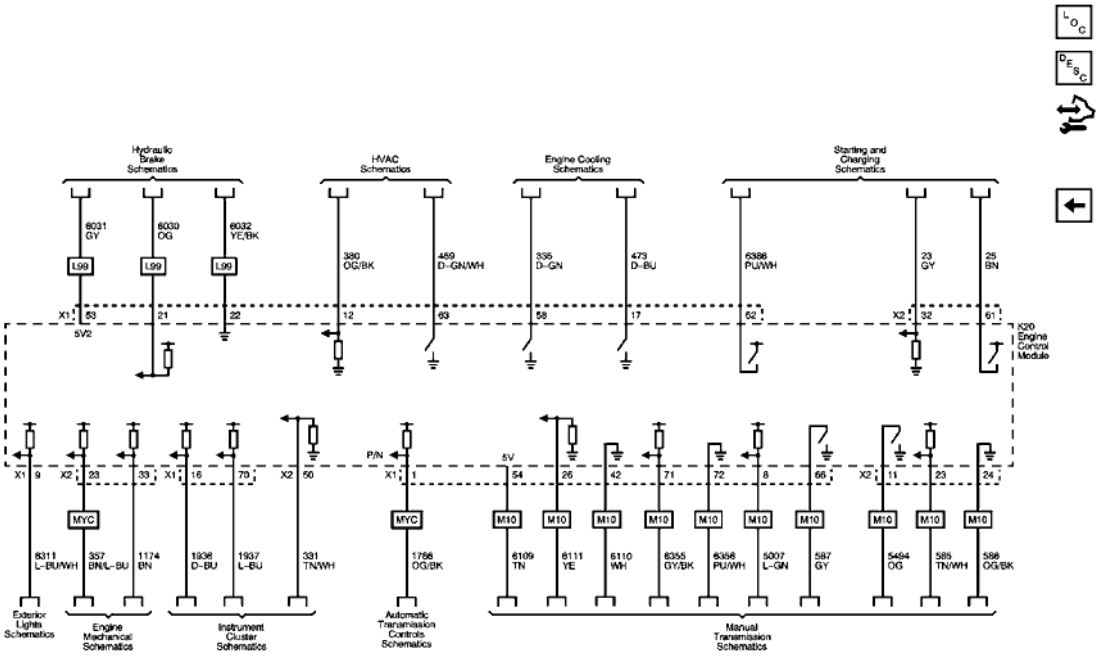


Fig. 13: Controlled/Monitored Subsystem References
Courtesy of GENERAL MOTORS CORP.

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2010 ENGINE PERFORMANCE

Engine Controls and Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

ENGINE CONTROLS SCHEMATICS

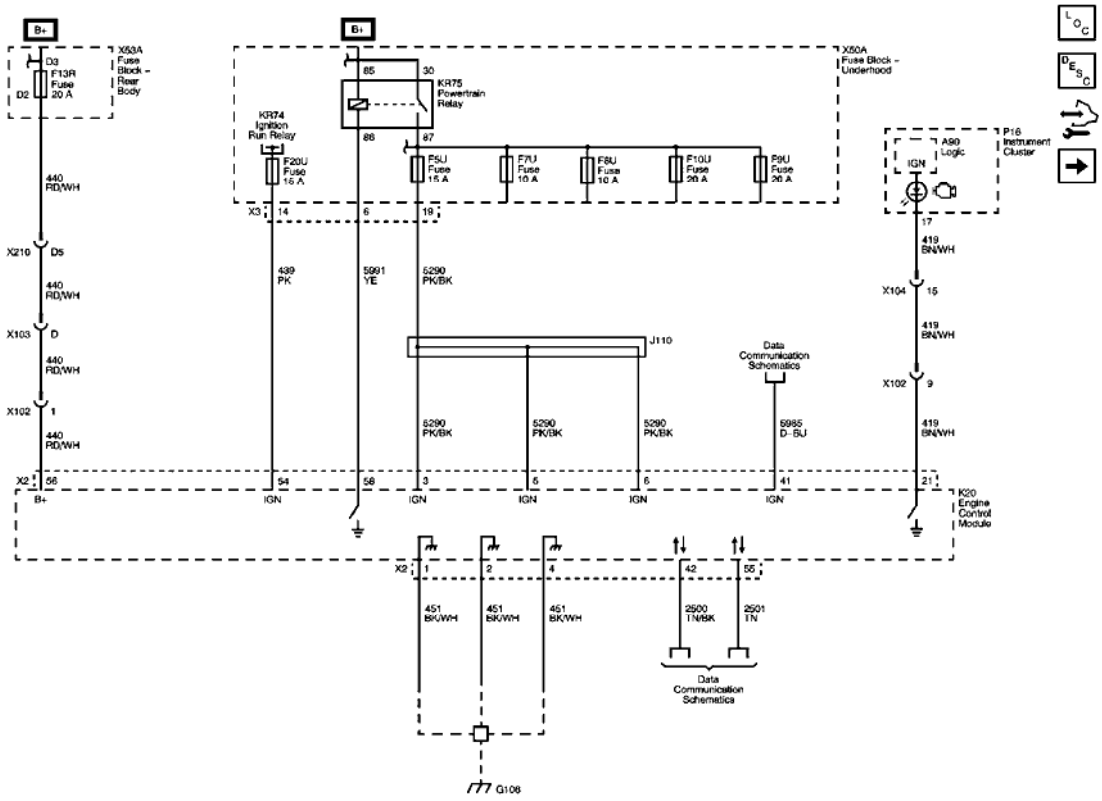


Fig. 1: Module Power, Ground, Serial Data, and MIL
Courtesy of GENERAL MOTORS CORP.

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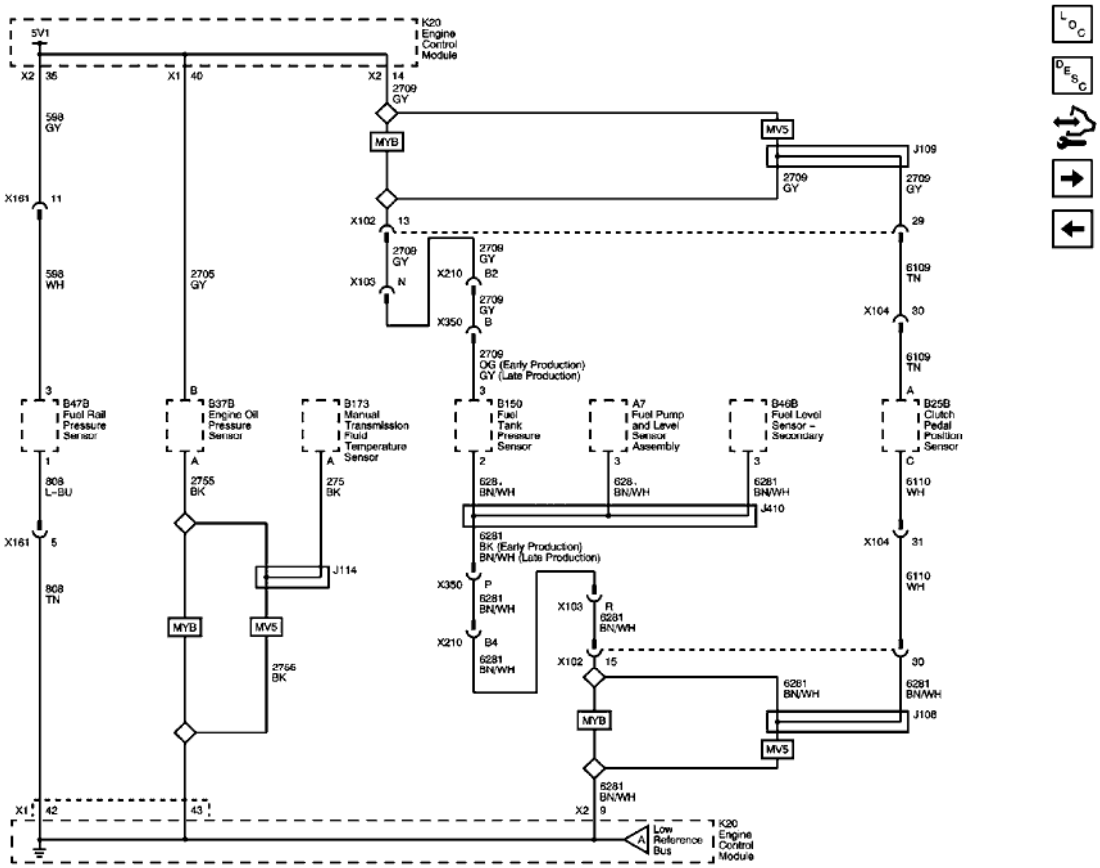


Fig. 2: 5-Volt and Low Reference - 1 of 2
Courtesy of GENERAL MOTORS CORP.

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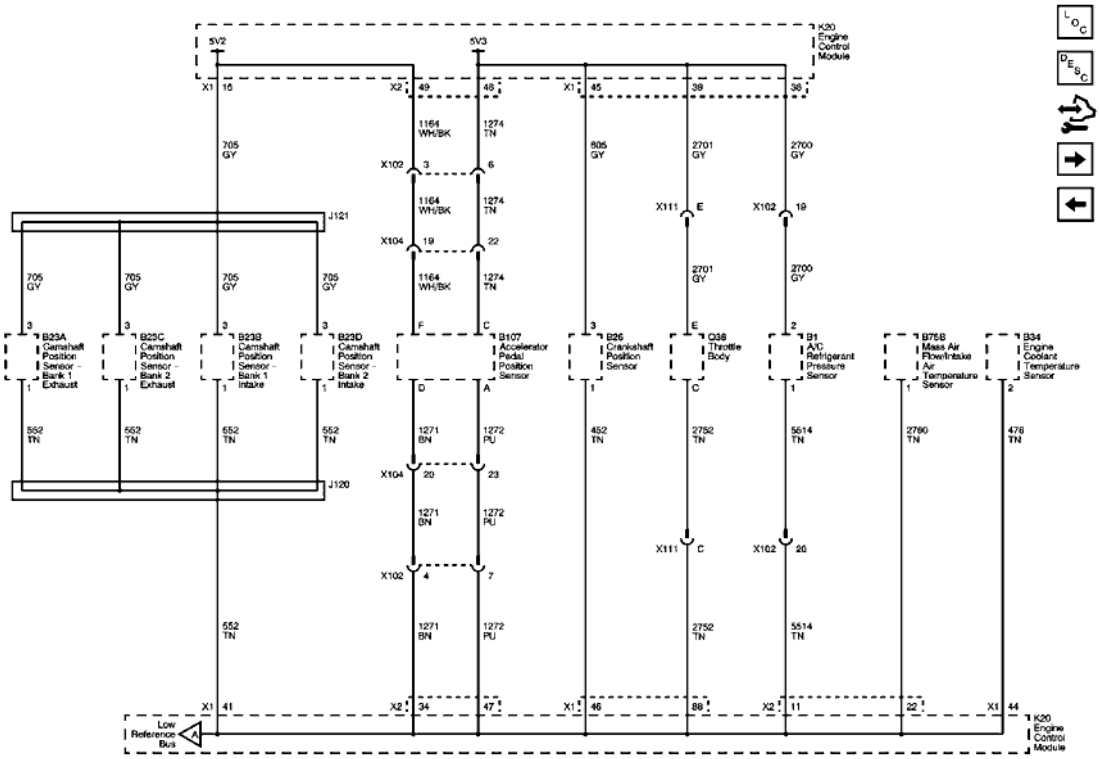


Fig. 3: 5-Volt and Low Reference - 2 of 2
Courtesy of GENERAL MOTORS CORP.

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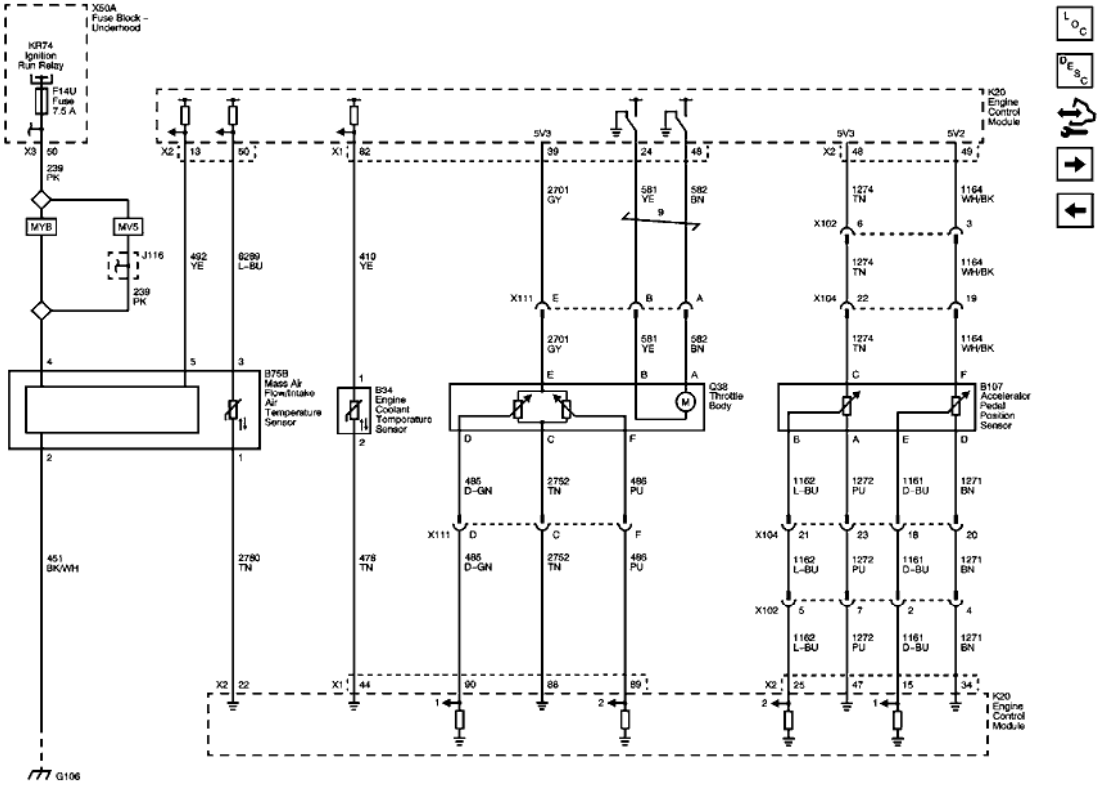


Fig. 4: Engine Data Sensors - Pressure, Temperature, and Throttle Controls
Courtesy of GENERAL MOTORS CORP.

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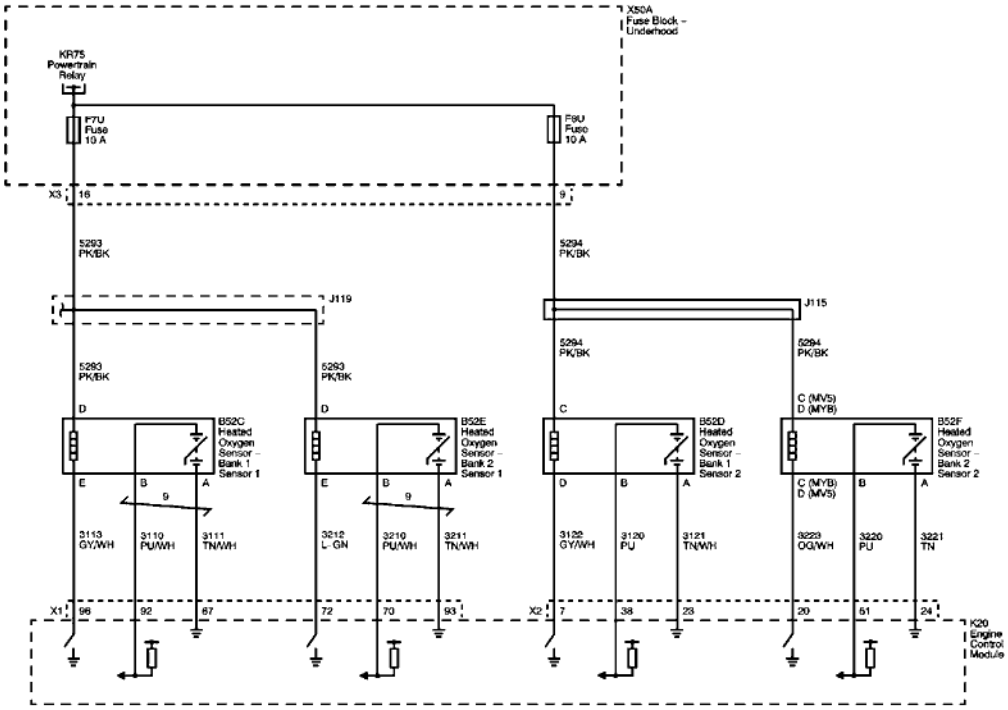


Fig. 5: Engine Data Sensors - Oxygen Sensors
Courtesy of GENERAL MOTORS CORP.

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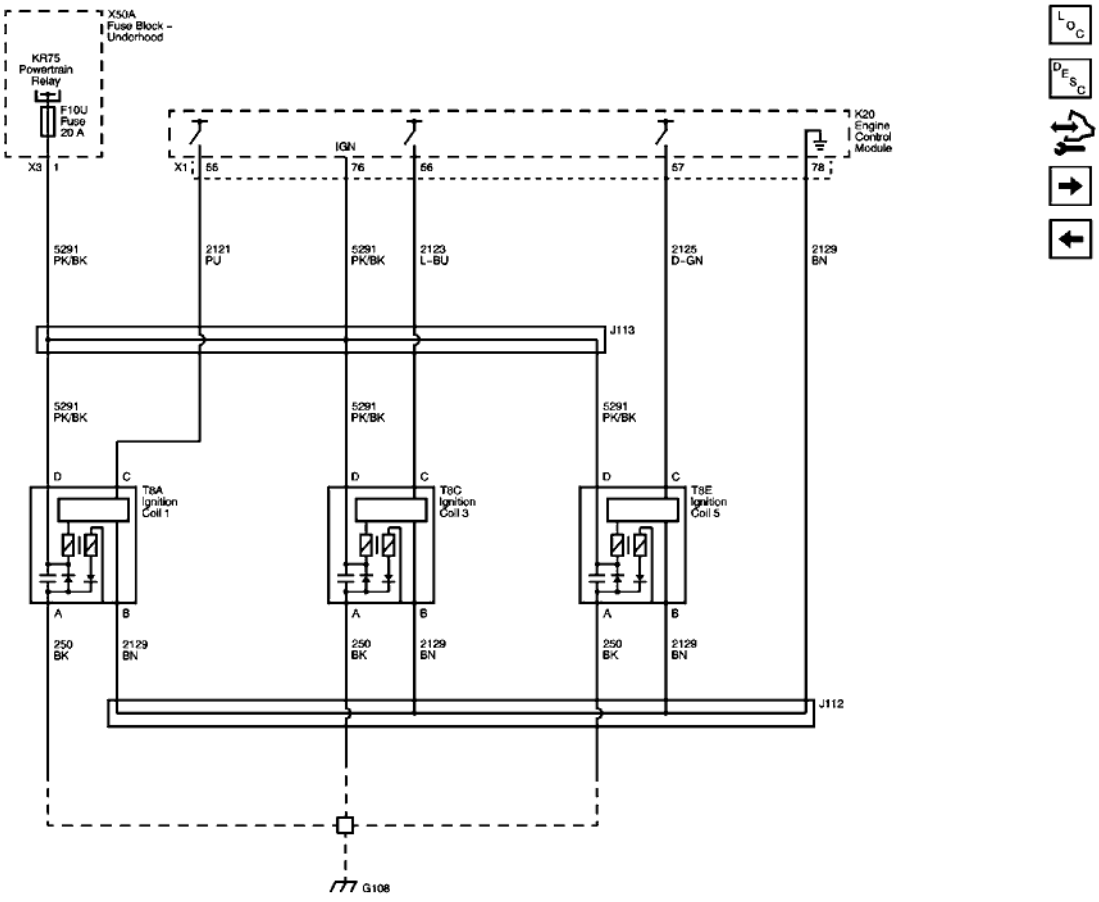


Fig. 6: Ignition Controls - Bank 1 Ignition System
Courtesy of GENERAL MOTORS CORP.

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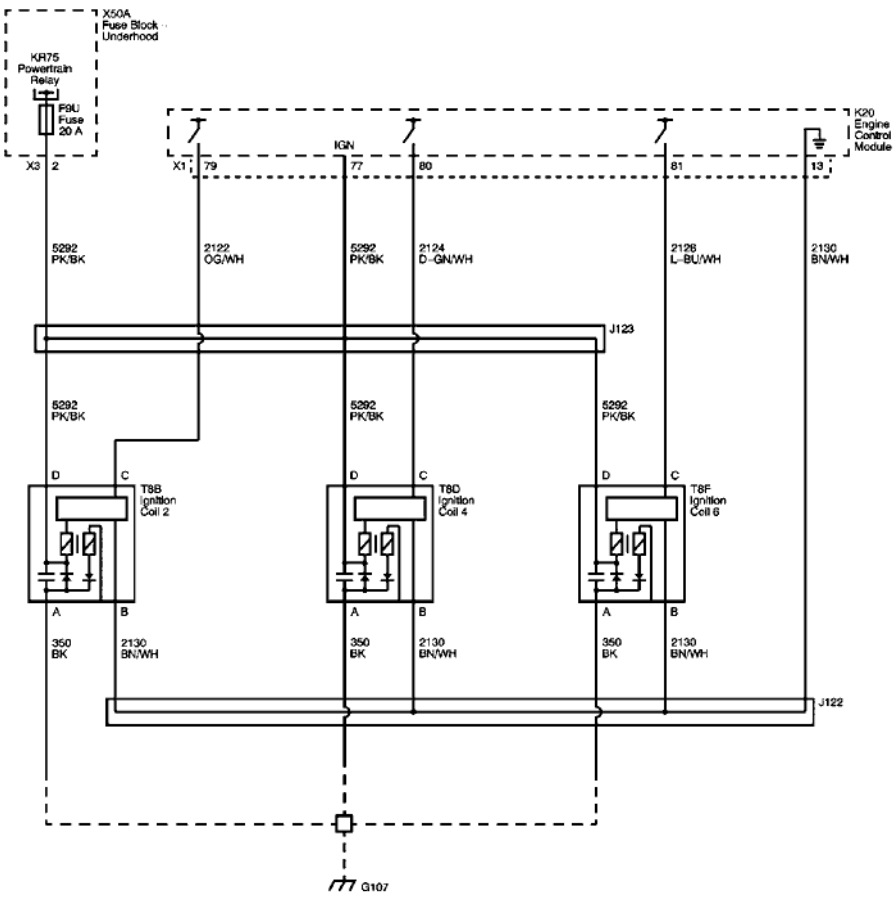


Fig. 7: Ignition Controls - Bank 2 Ignition System
Courtesy of GENERAL MOTORS CORP.

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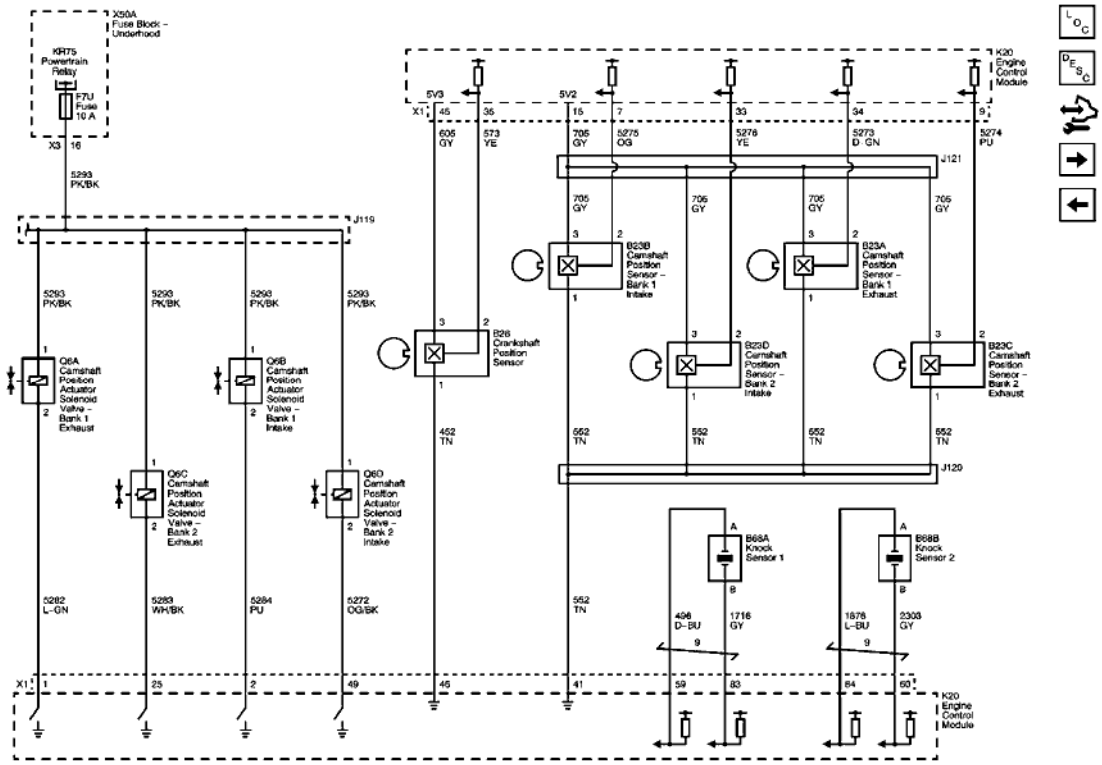
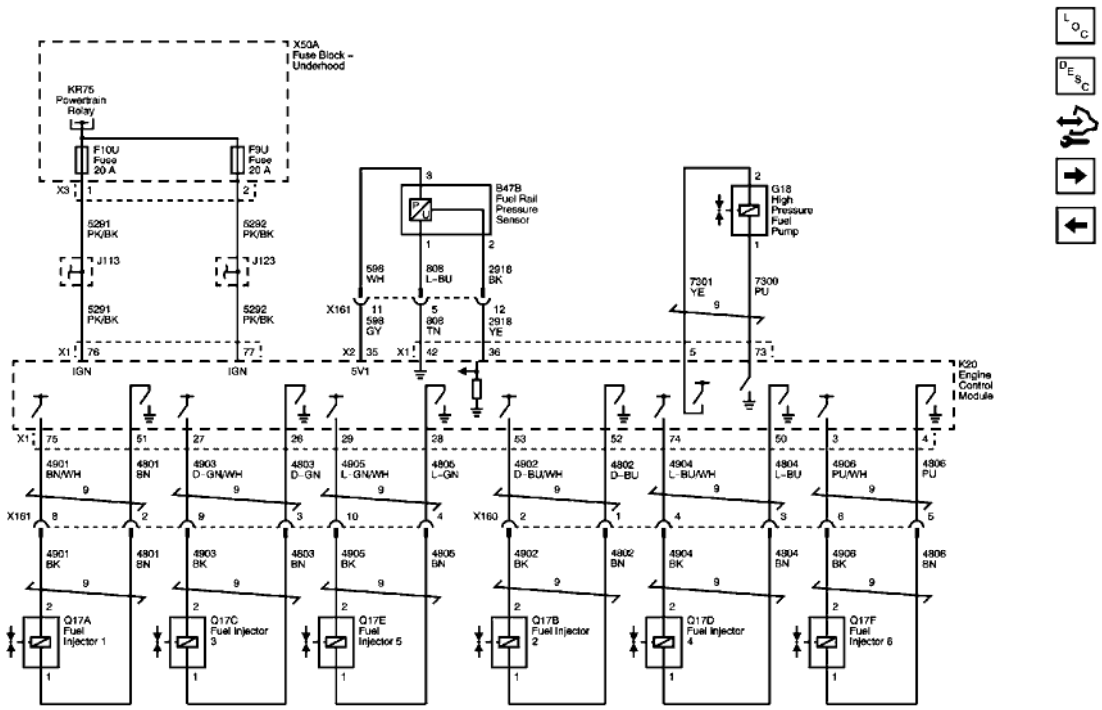


Fig. 8: Ignition Controls - CKP/CMP/KS Sensors and CMP Actuator Solenoids
Courtesy of GENERAL MOTORS CORP.



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Fig. 9: Fuel Controls - Fuel Injectors
Courtesy of GENERAL MOTORS CORP.

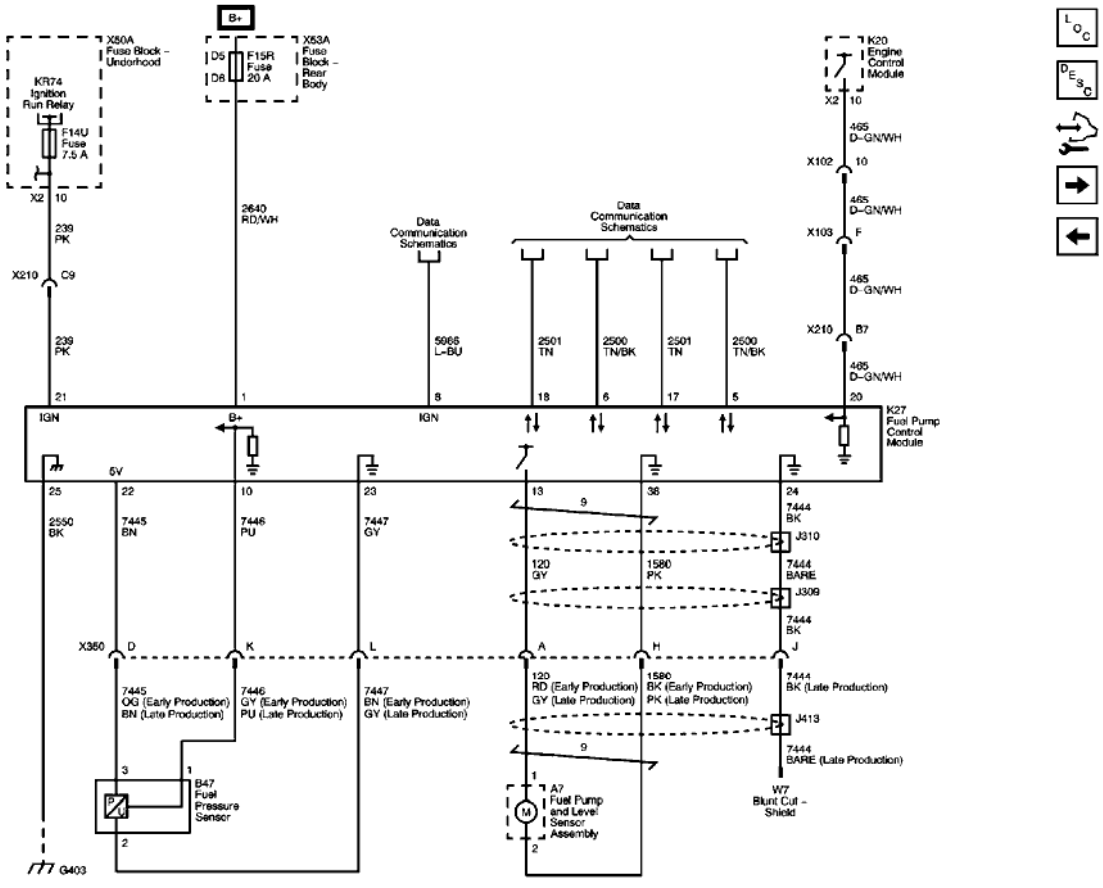


Fig. 10: Fuel Controls - Fuel Pump Flow Control
Courtesy of GENERAL MOTORS CORP.

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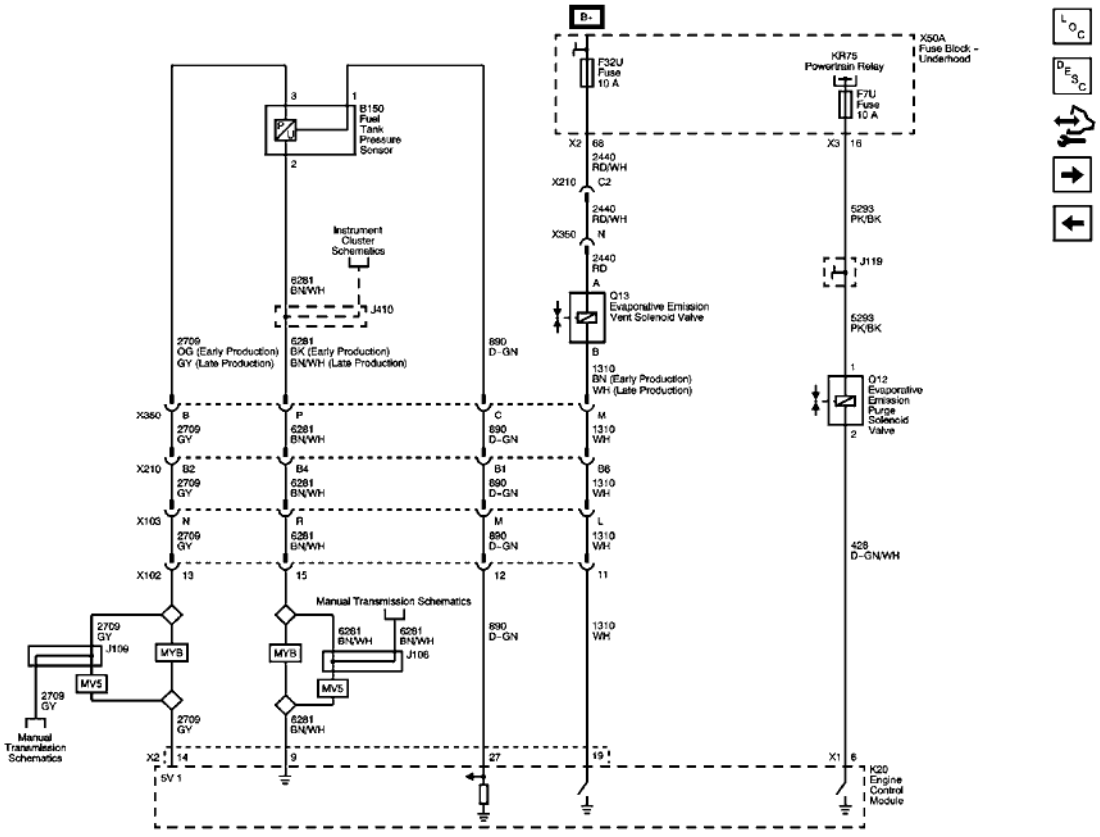


Fig. 11: Fuel Controls - EVAP Controls
Courtesy of GENERAL MOTORS CORP.

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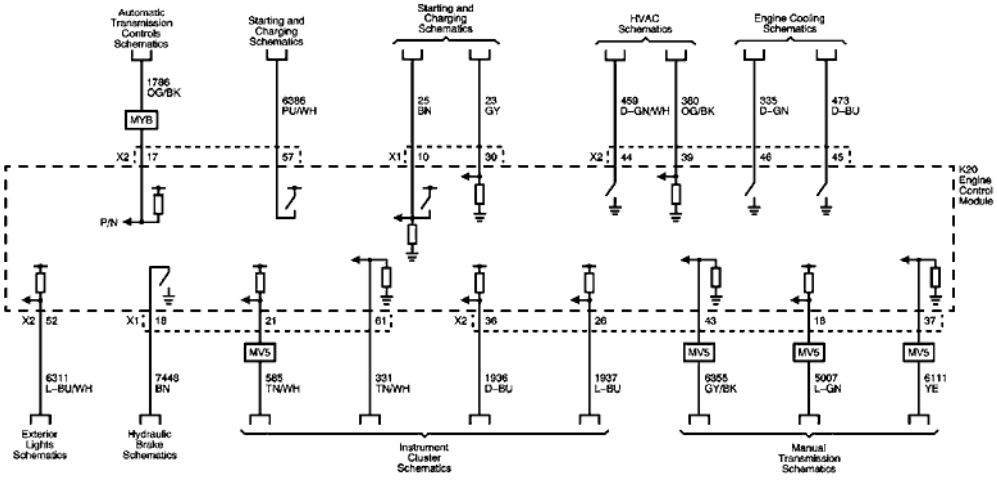


Fig. 12: Subsystem References
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AIR CONDITIONING

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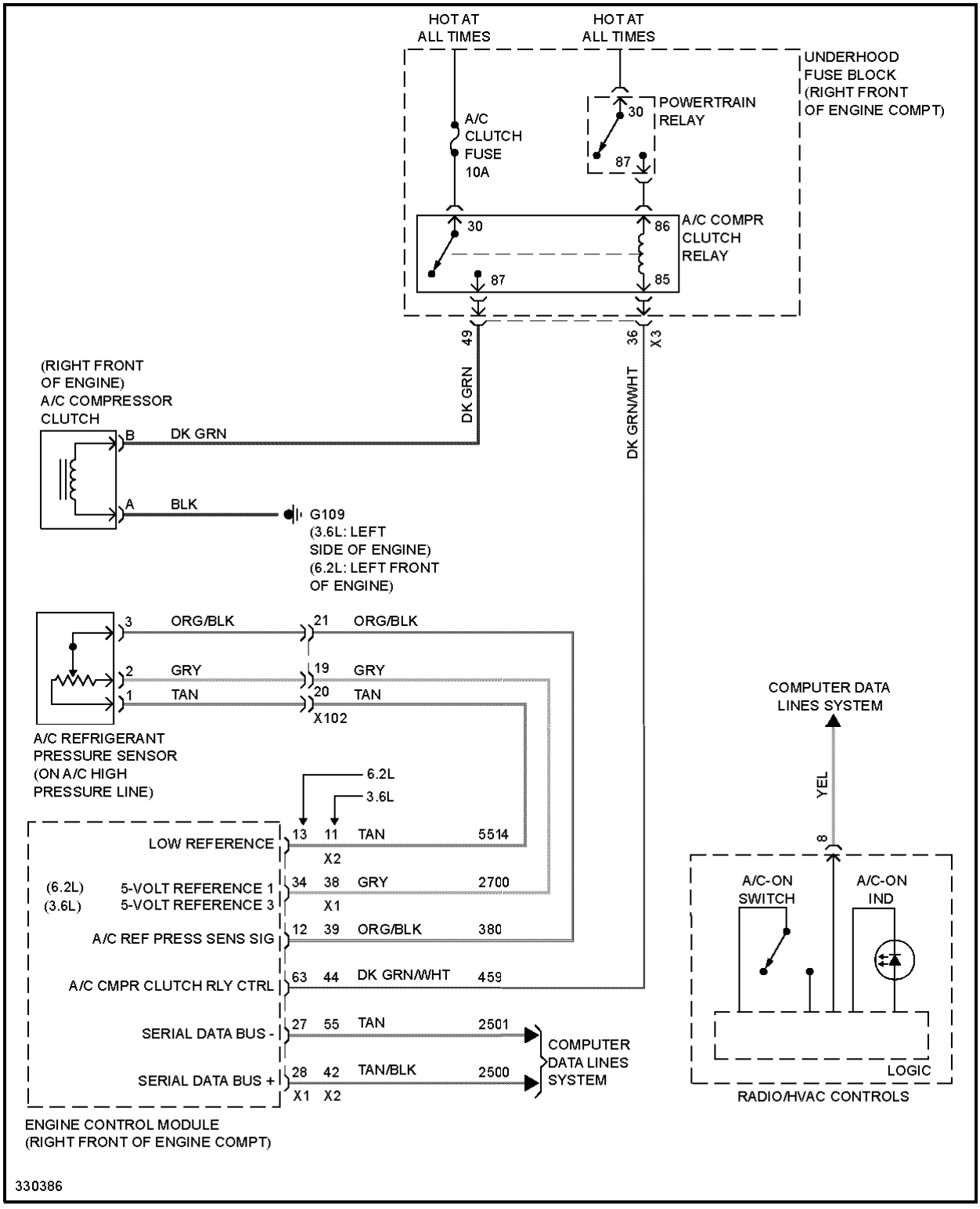


Fig. 1: Compressor Circuit

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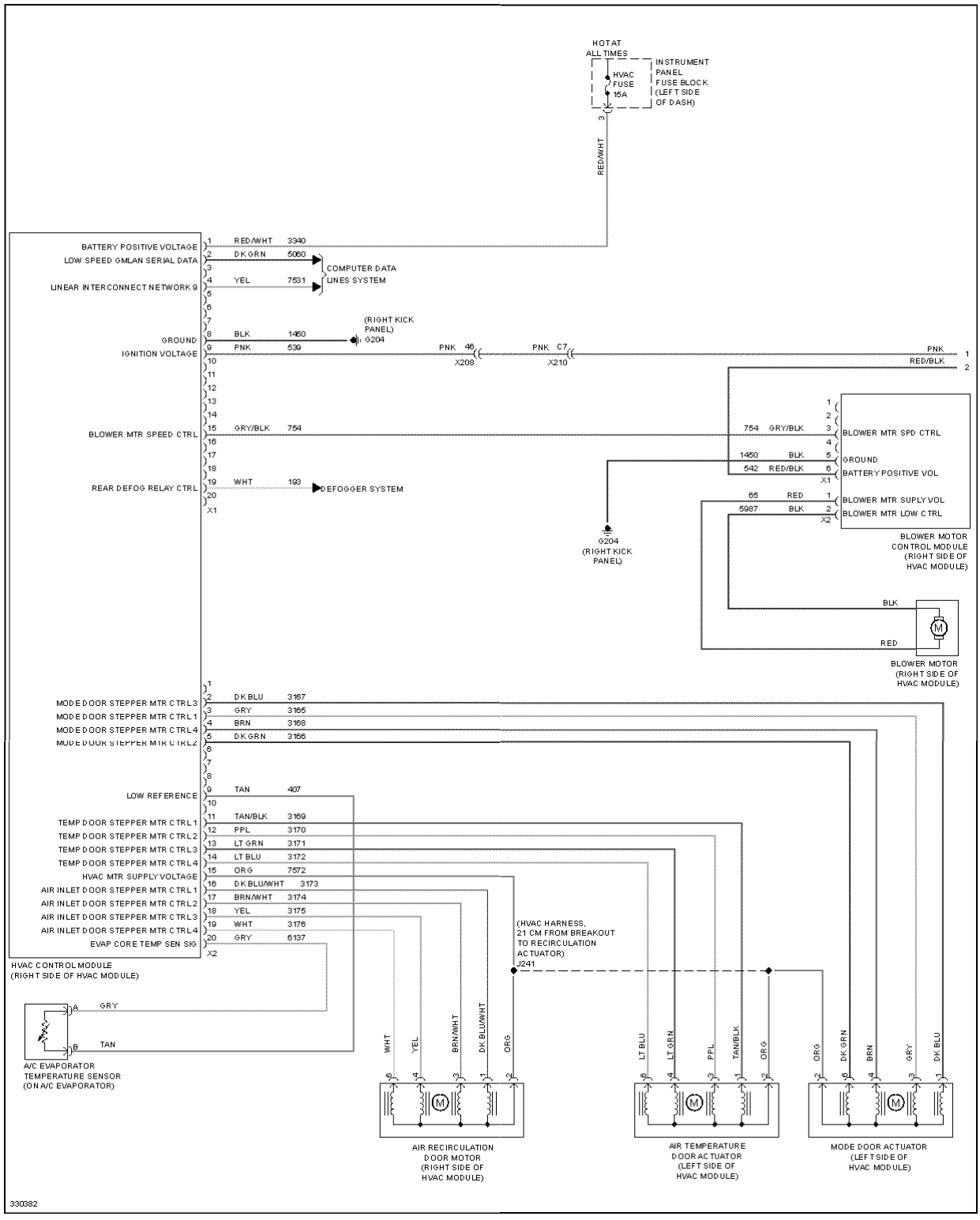


Fig. 2: Manual A/C Circuit (1 of 2)

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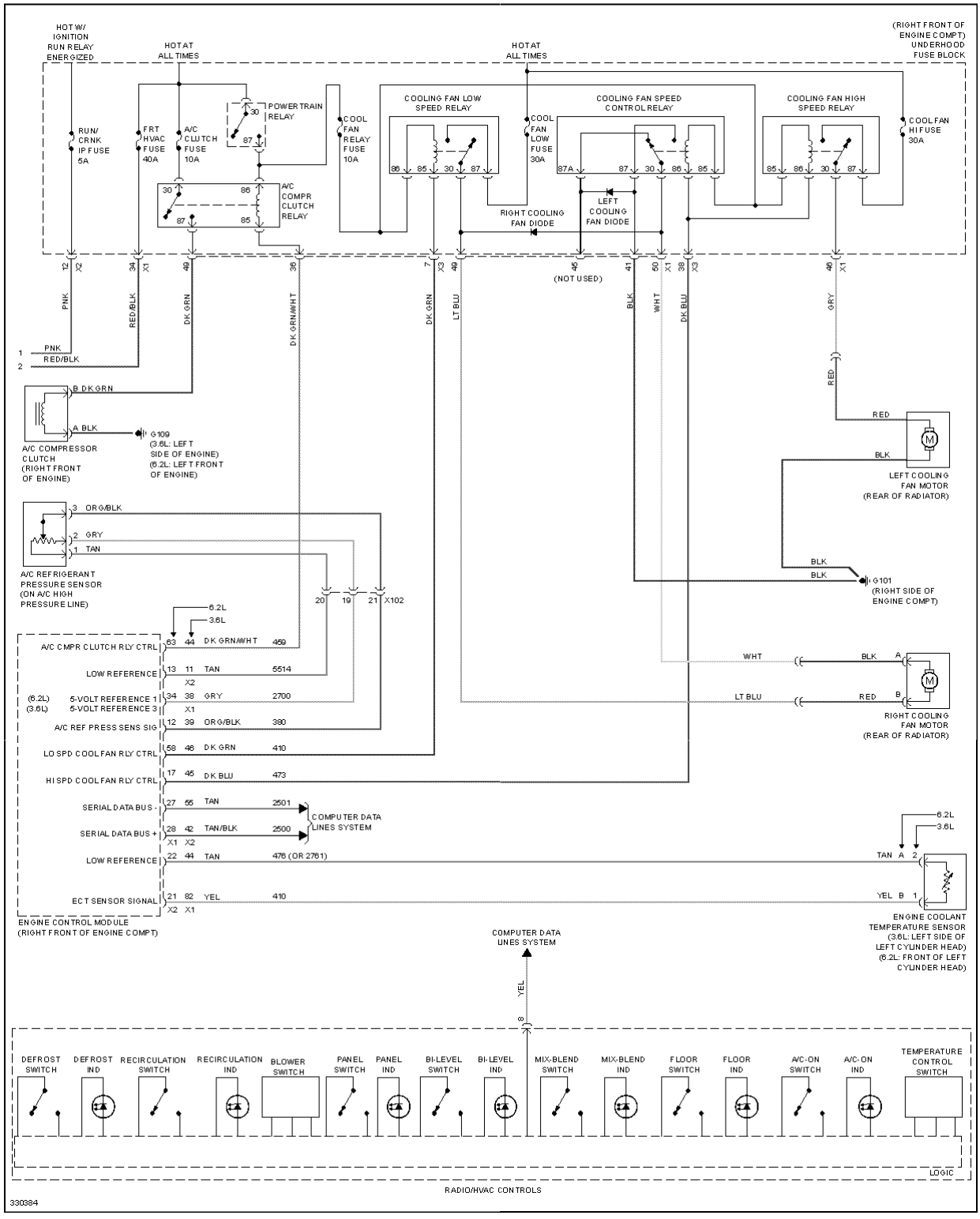


Fig. 3: Manual A/C Circuit (2 of 2)

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ANTI-LOCK BRAKES

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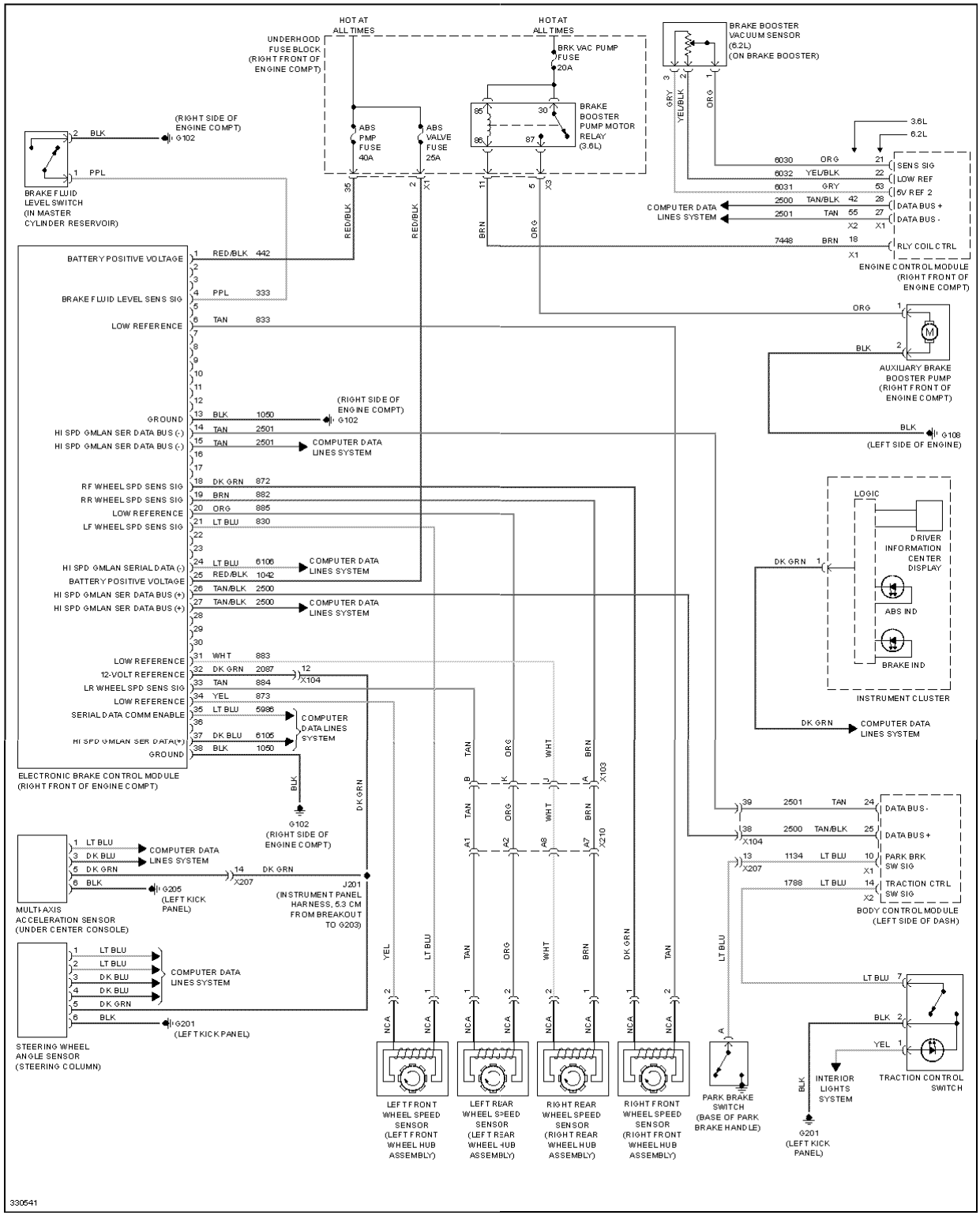


Fig. 4: Anti-lock Brakes Circuit

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ANTI-THEFT

cardiagn.com

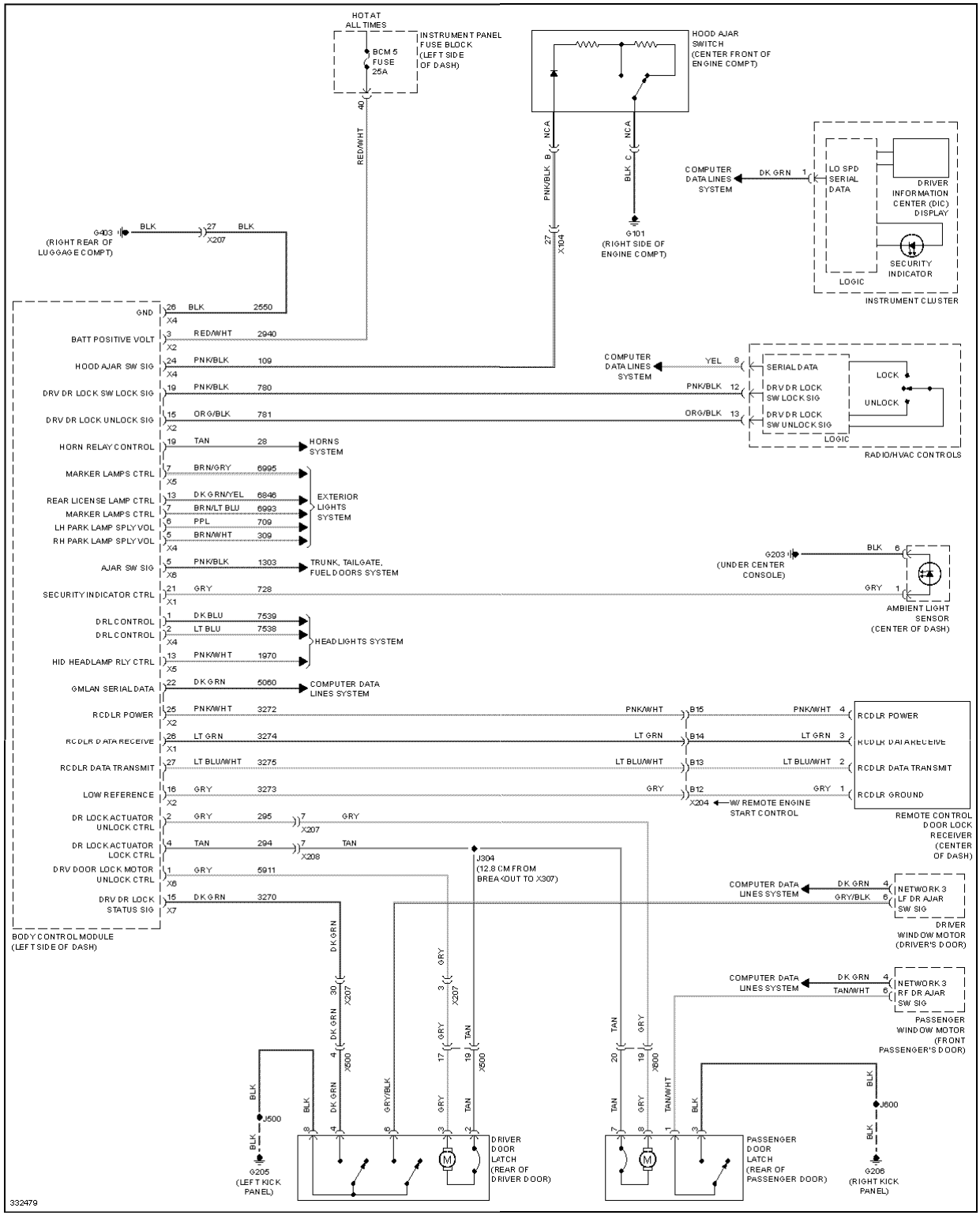


Fig. 5: Forced Entry Circuit

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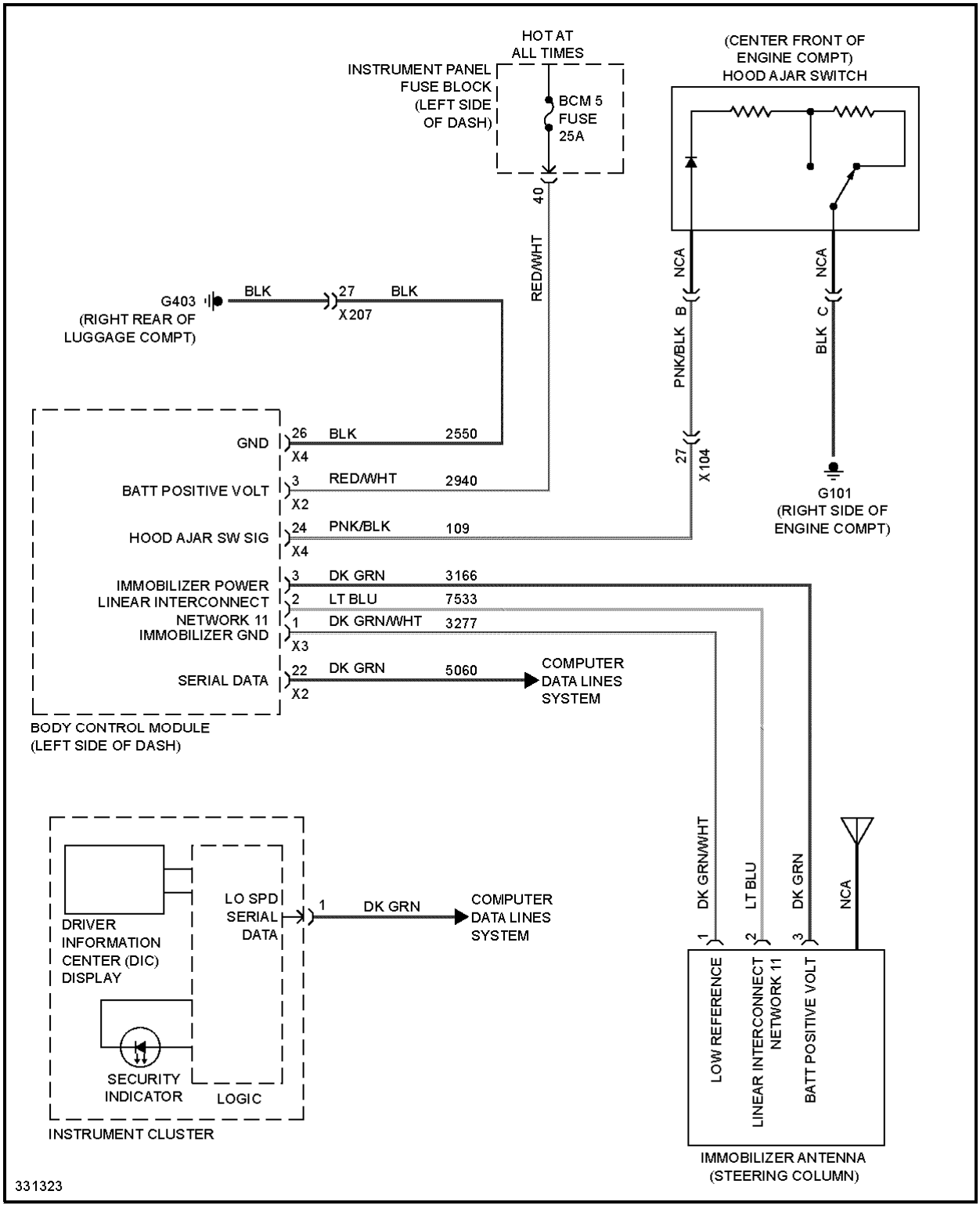


Fig. 6: Pass-Key Circuit

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BODY CONTROL MODULES

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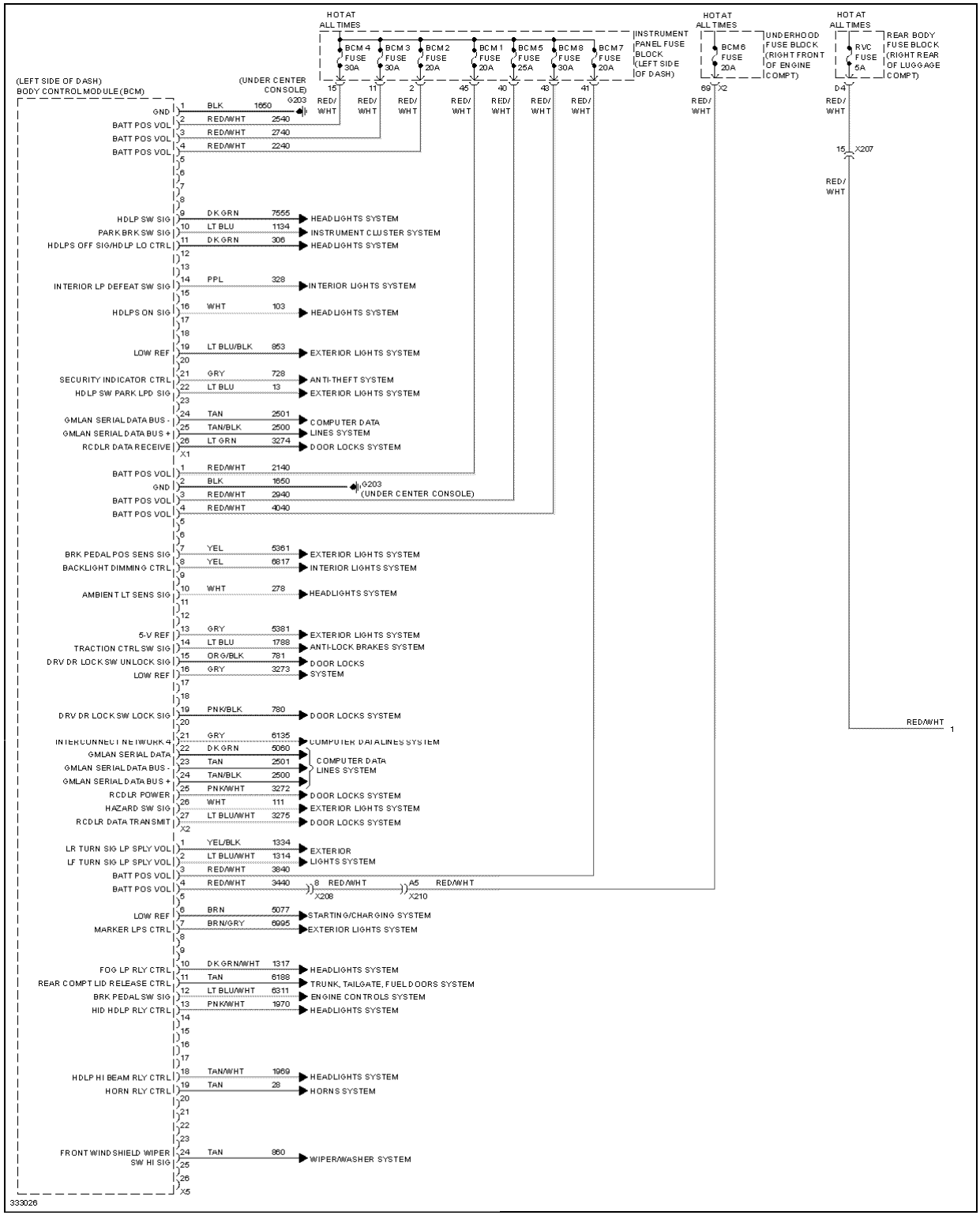


Fig. 7: Body Control Modules Circuit (1 of 2)

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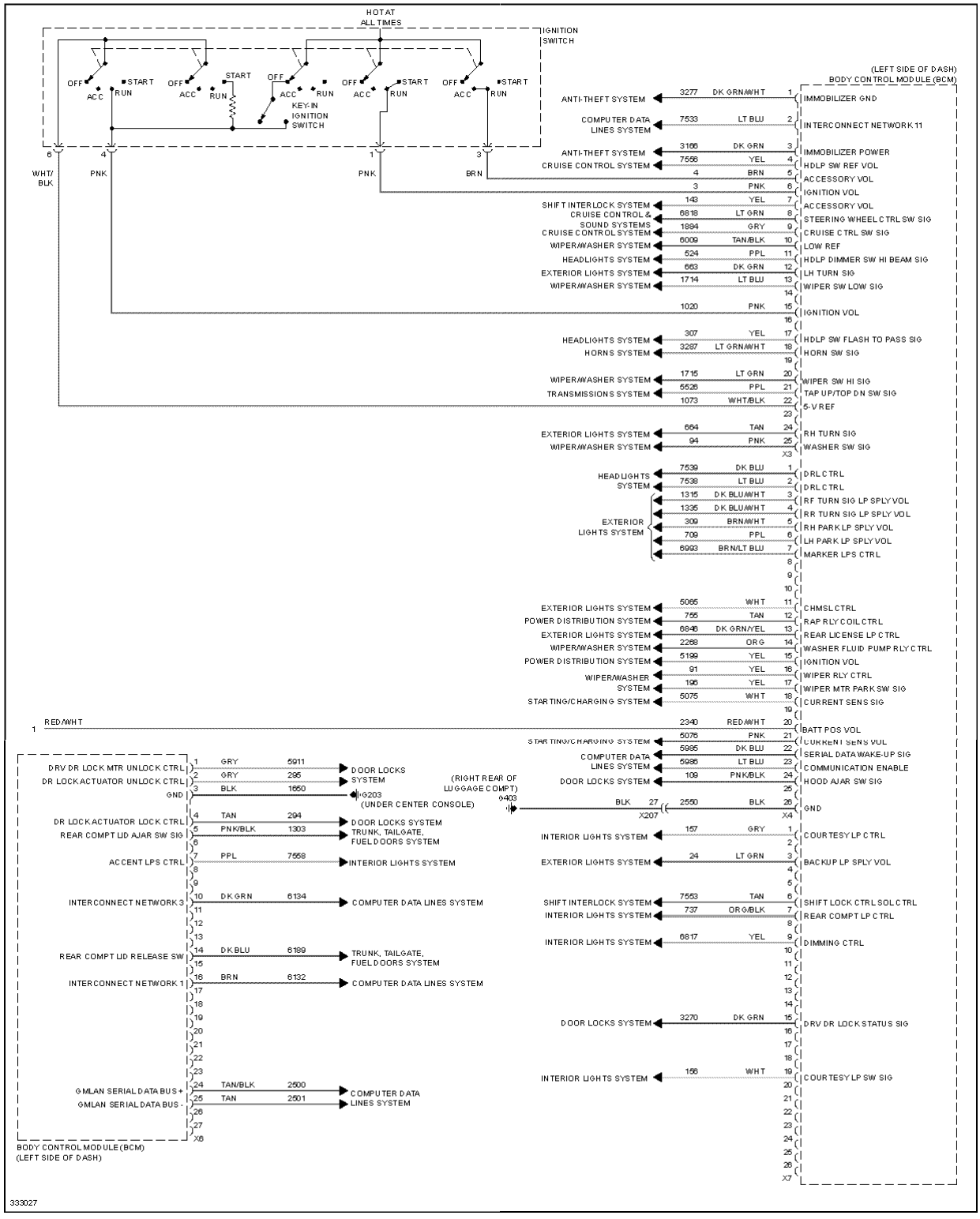


Fig. 8: Body Control Modules Circuit (2 of 2)

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COMPUTER DATA LINES

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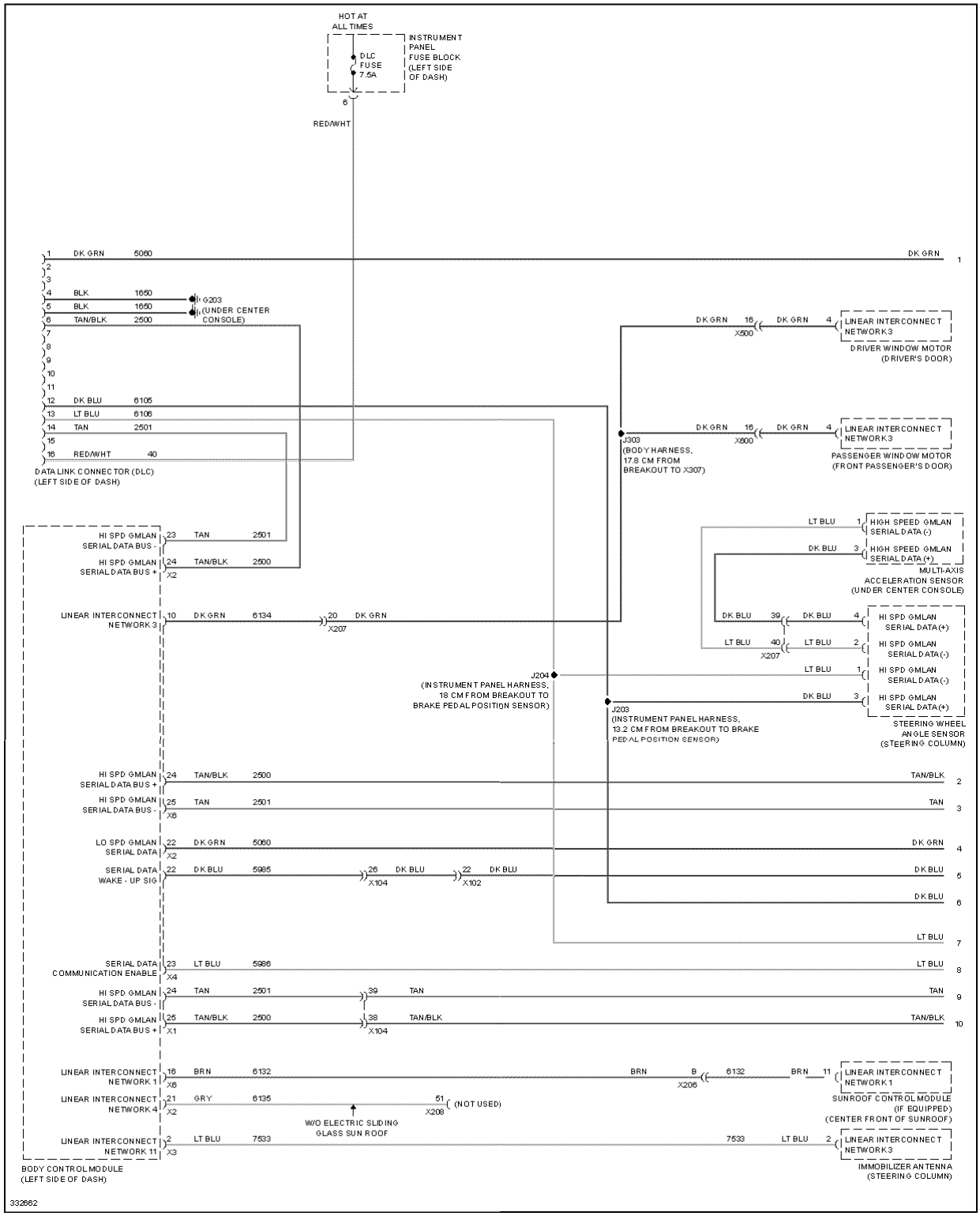


Fig. 9: Computer Data Lines Circuit (1 of 2)

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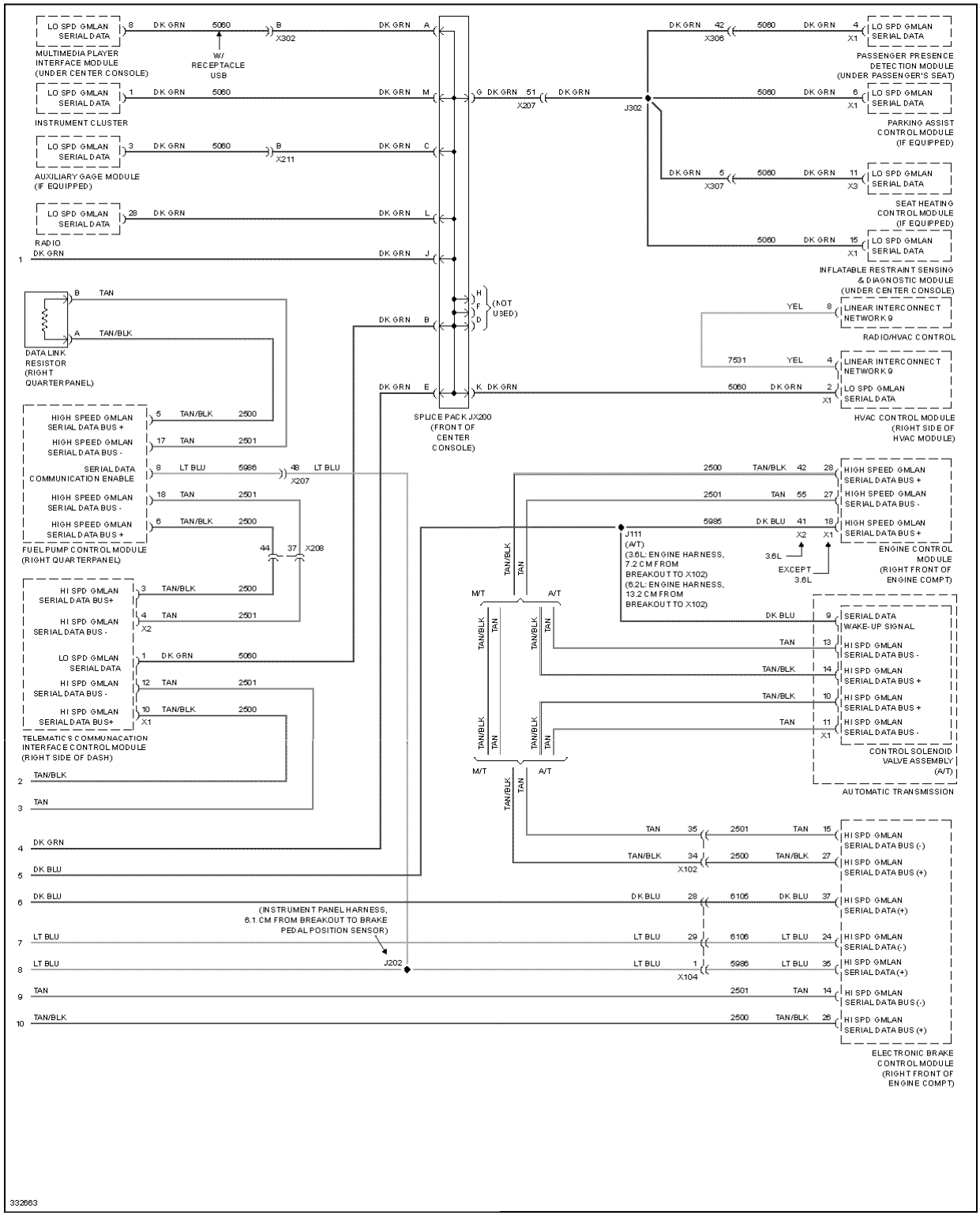


Fig. 10: Computer Data Lines Circuit (2 of 2)

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COOLING FAN

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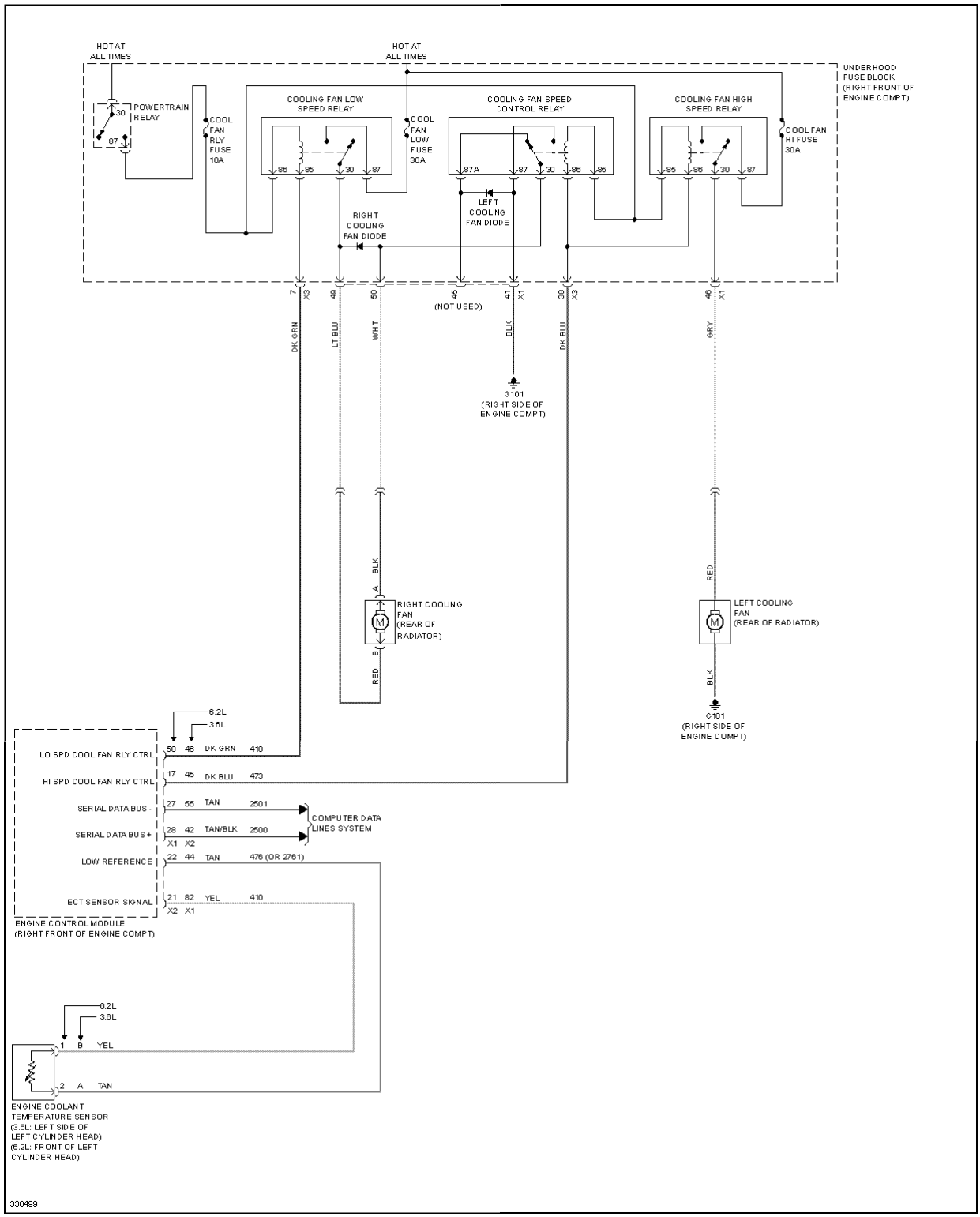


Fig. 11: Cooling Fan Circuit

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CRUISE CONTROL

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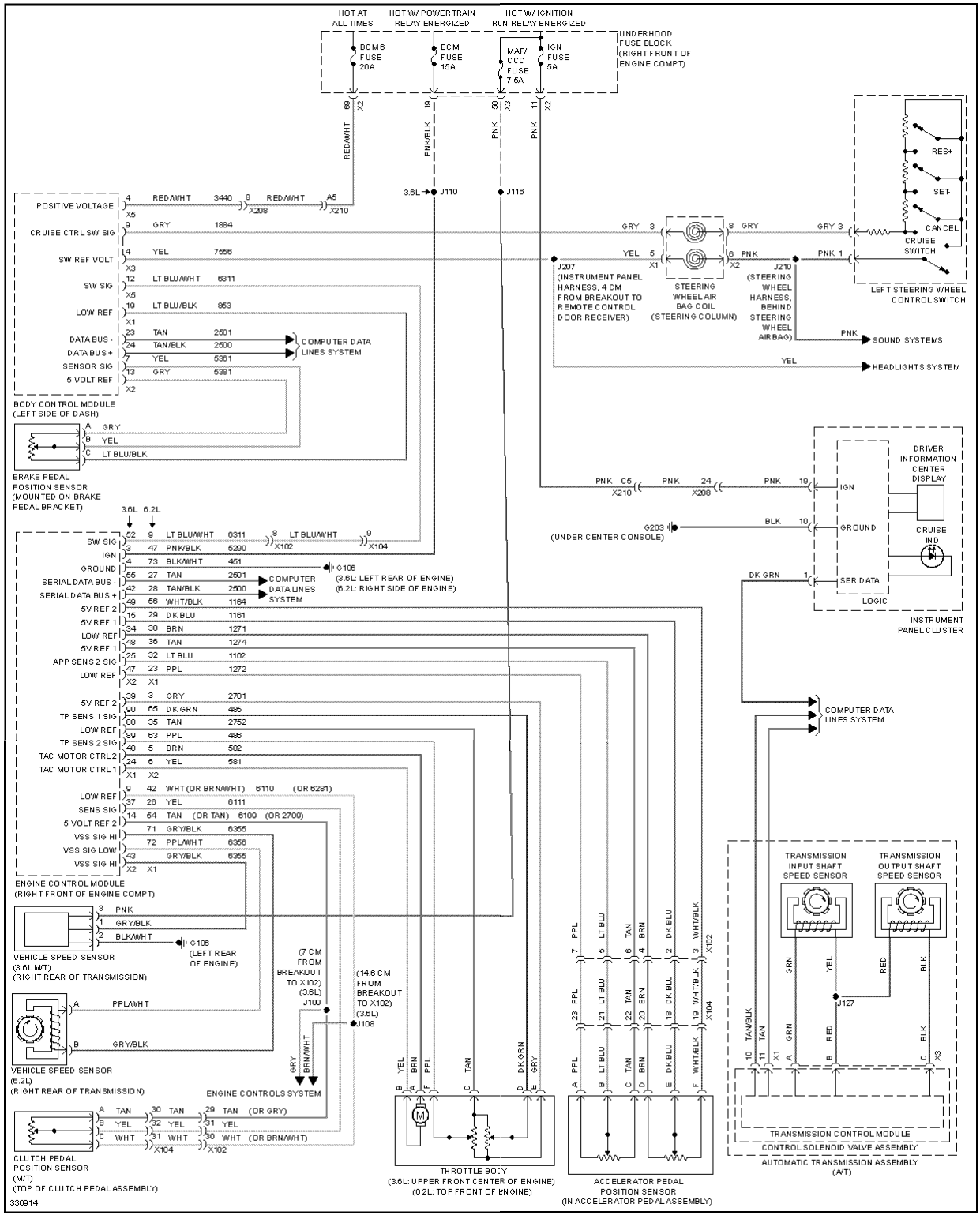


Fig. 12: Cruise Control Circuit

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DEFOGGERS

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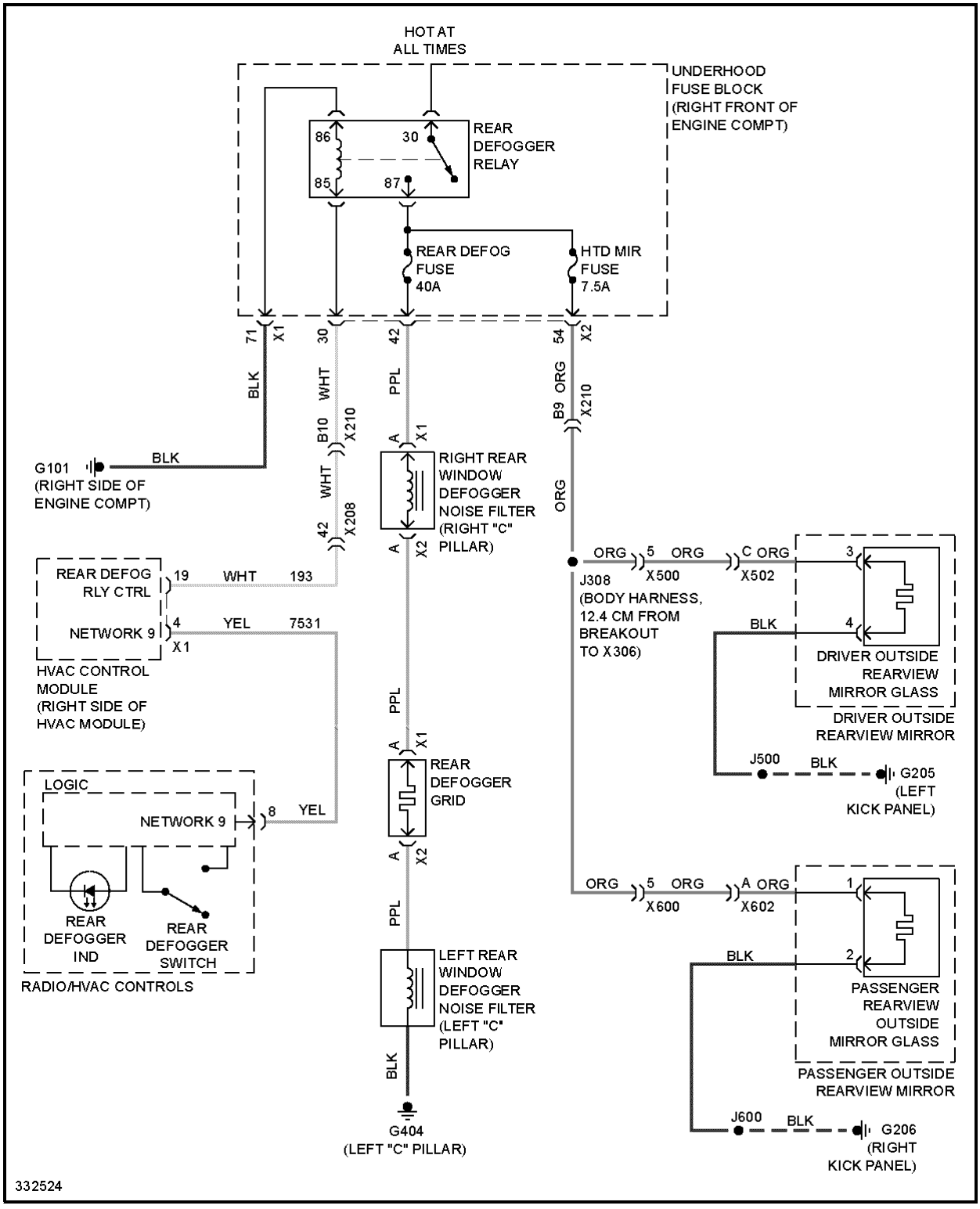


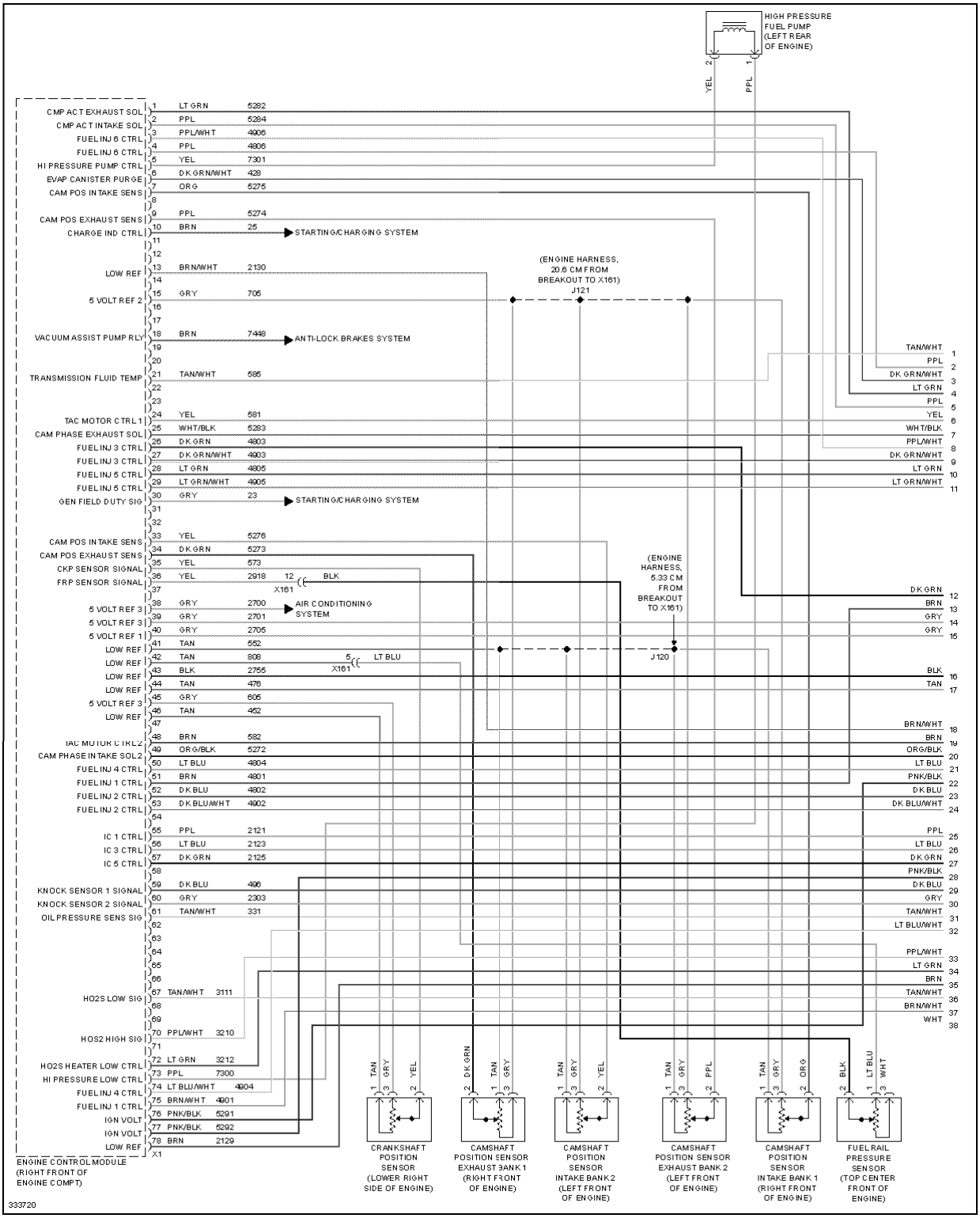
Fig. 13: Defoggers Circuit

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ENGINE PERFORMANCE

3.6L VIN V

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Fig. 14: 3.6L VIN V, Engine Performance Circuit (1 of 6)

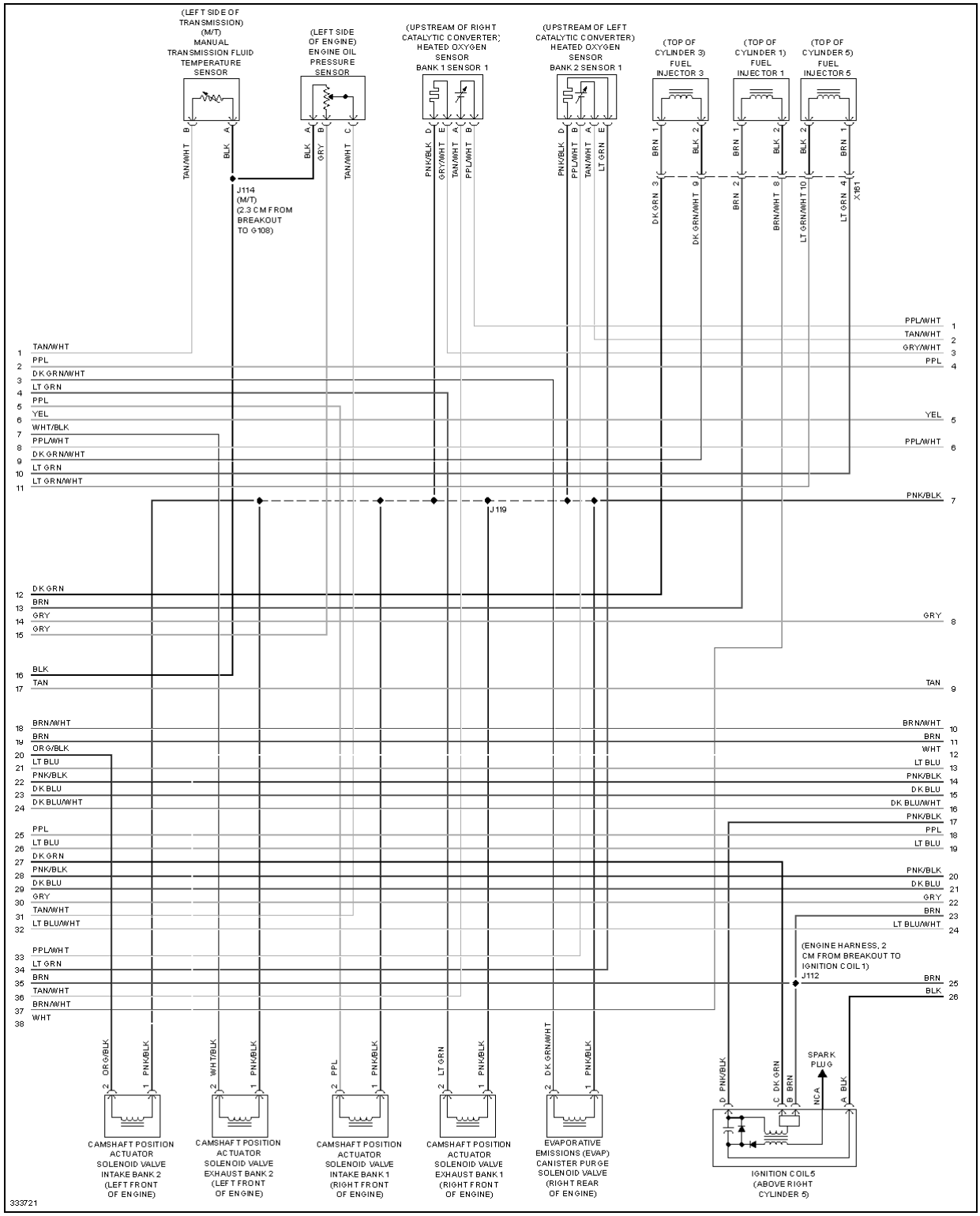


Fig. 15: 3.6L VIN V, Engine Performance Circuit (2 of 6)

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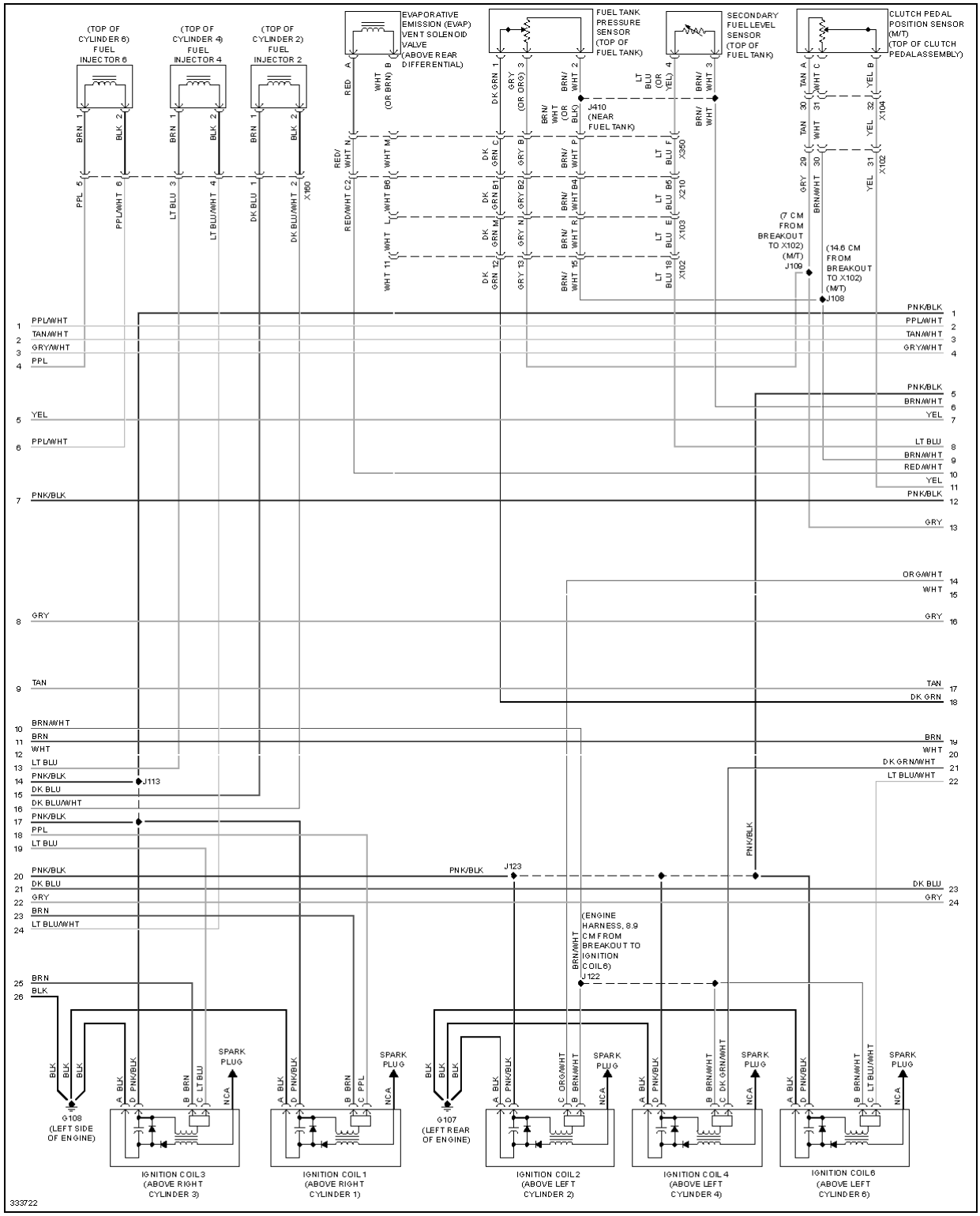


Fig. 16: 3.6L VIN V, Engine Performance Circuit (3 of 6)

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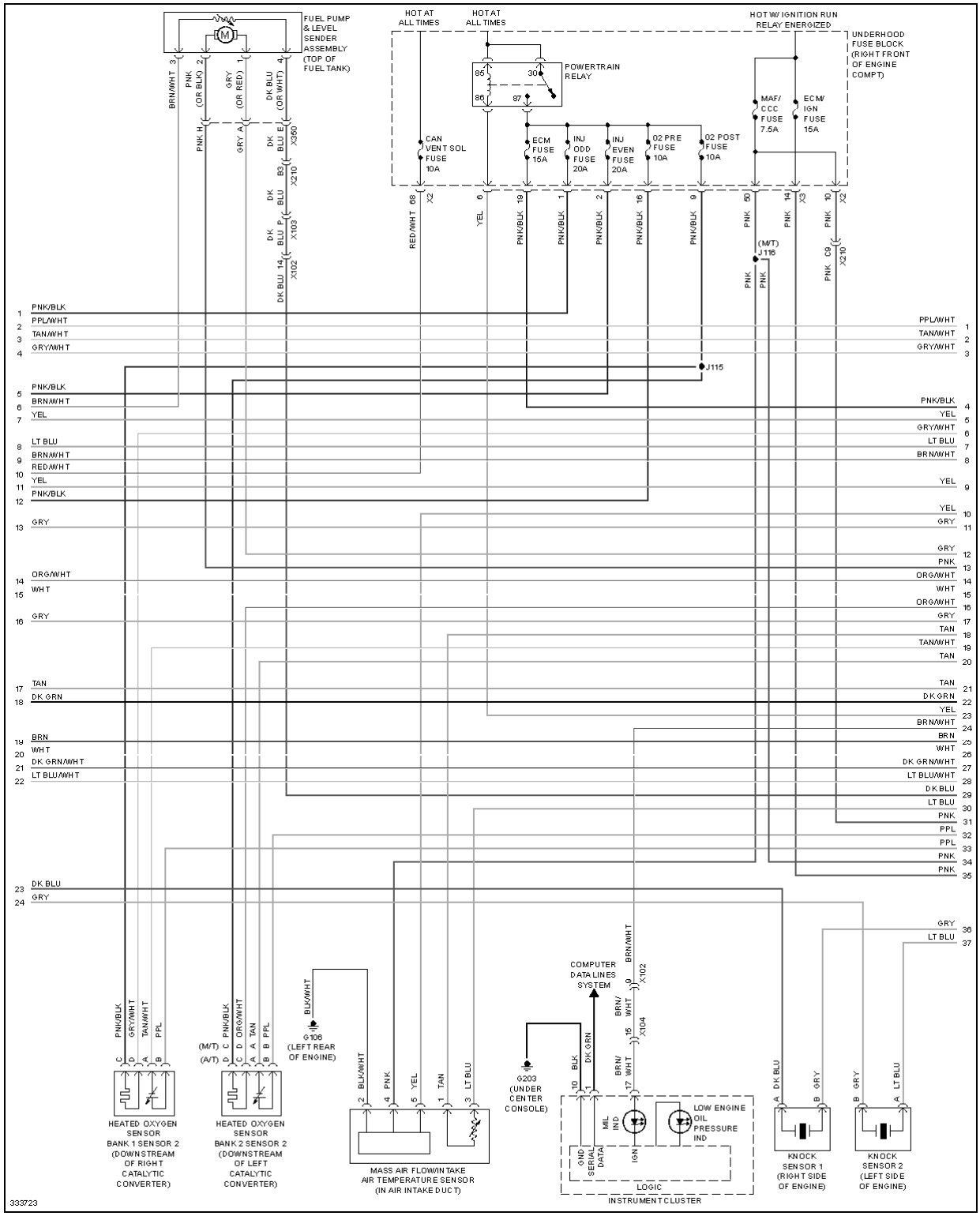


Fig. 17: 3.6L VIN V, Engine Performance Circuit (4 of 6)

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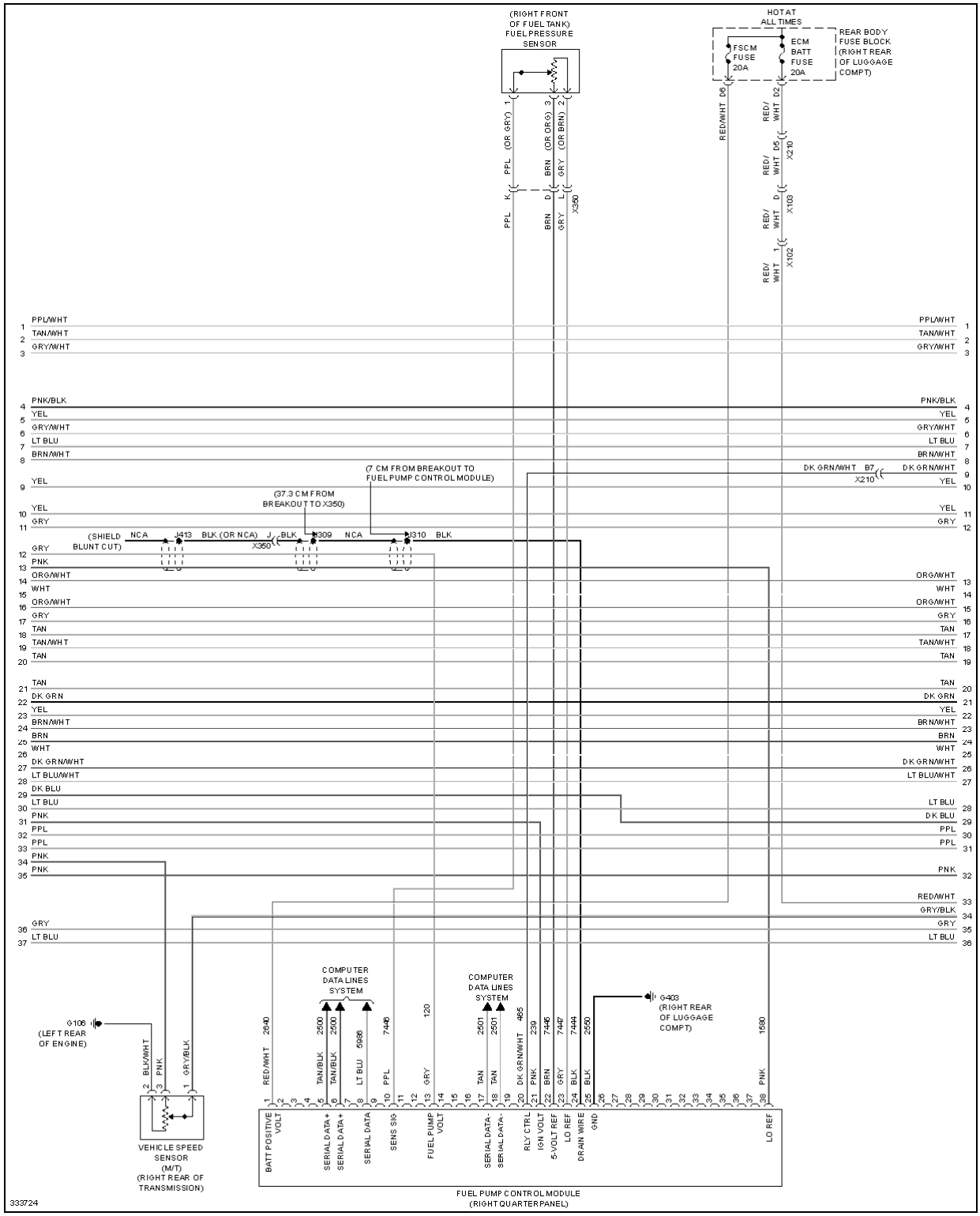


Fig. 18: 3.6L VIN V, Engine Performance Circuit (5 of 6)

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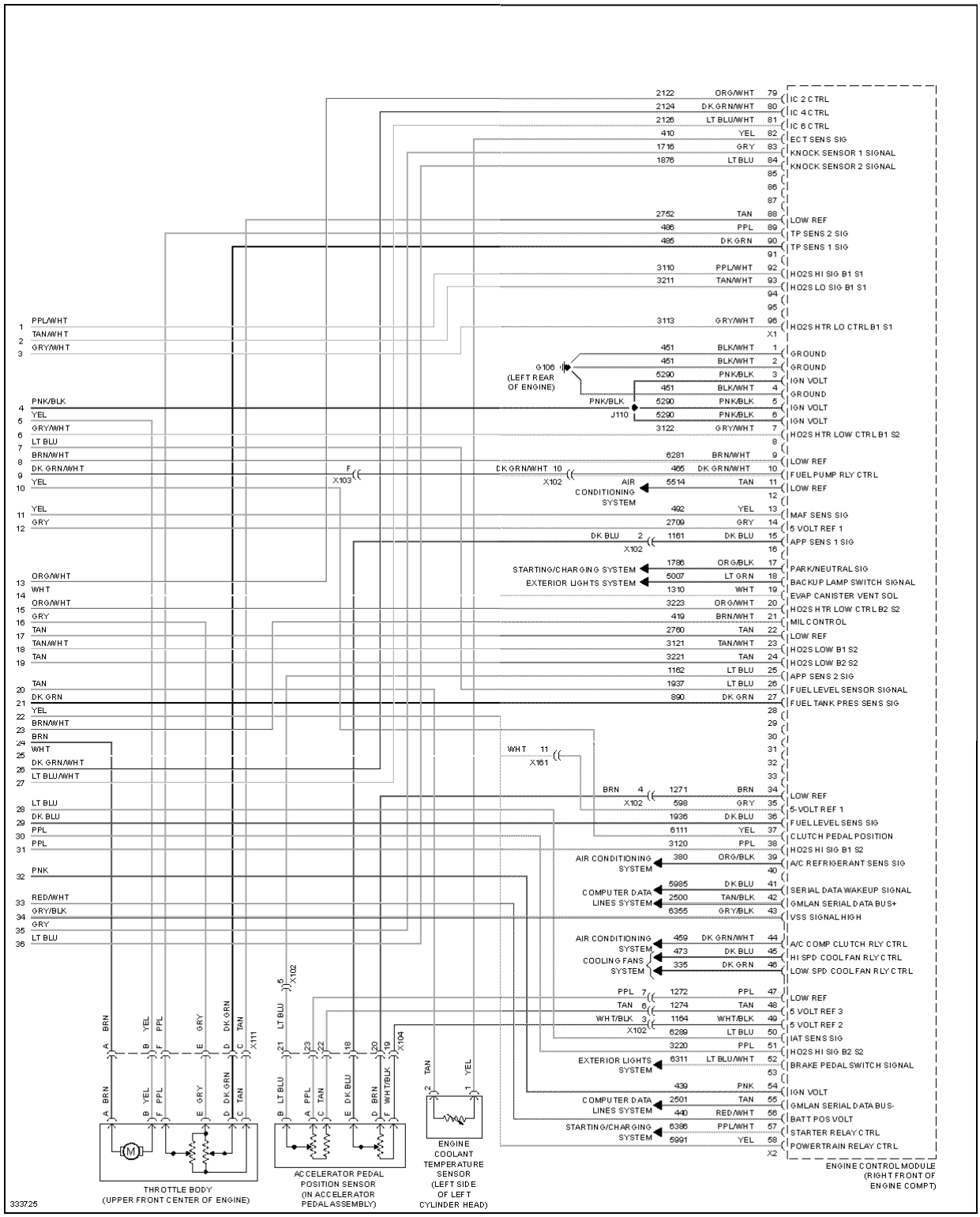


Fig. 19: 3.6L VIN V, Engine Performance Circuit (6 of 6)

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6.2L VIN J

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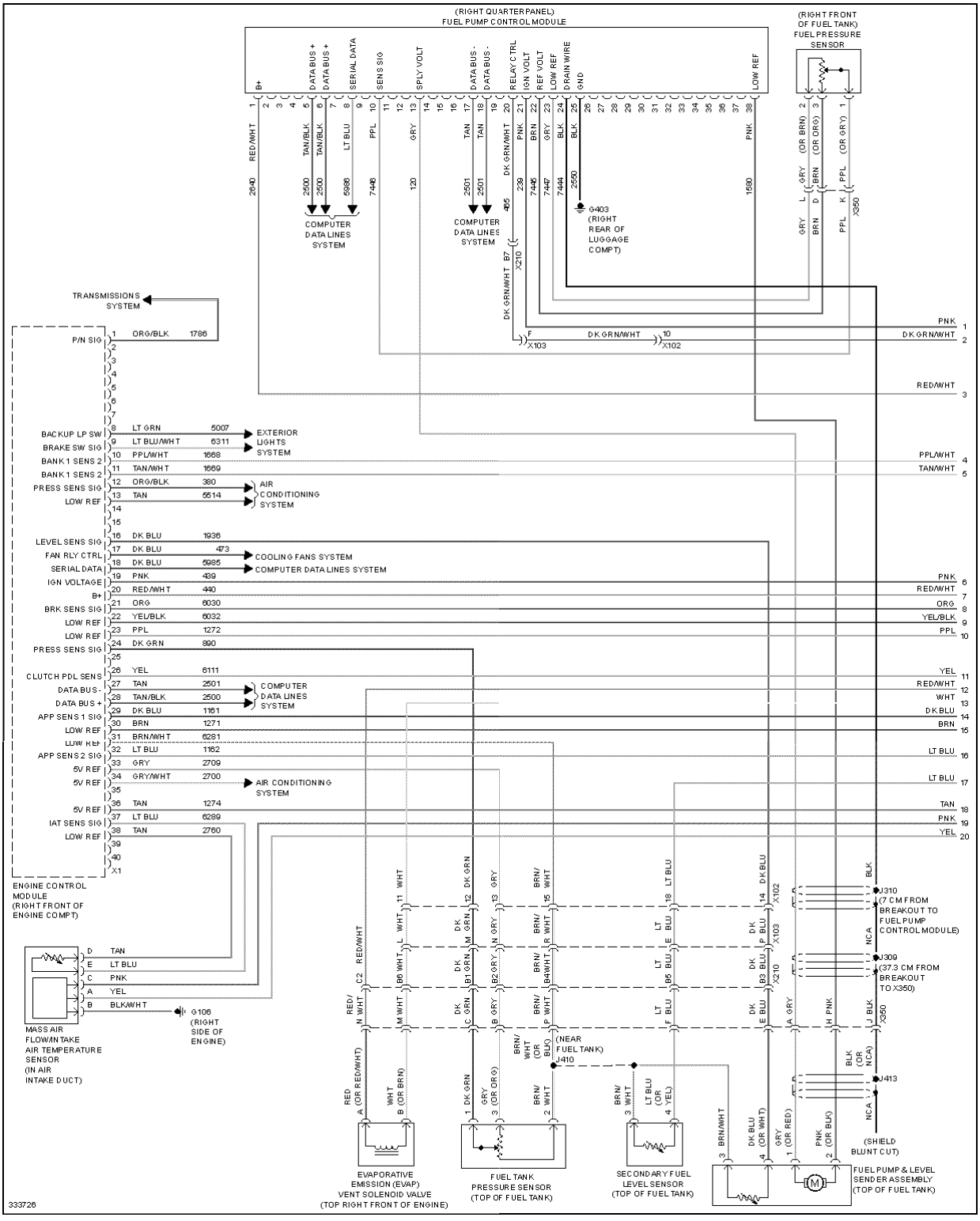


Fig. 20: 6.2L VIN J, Engine Performance Circuit (1 of 6)

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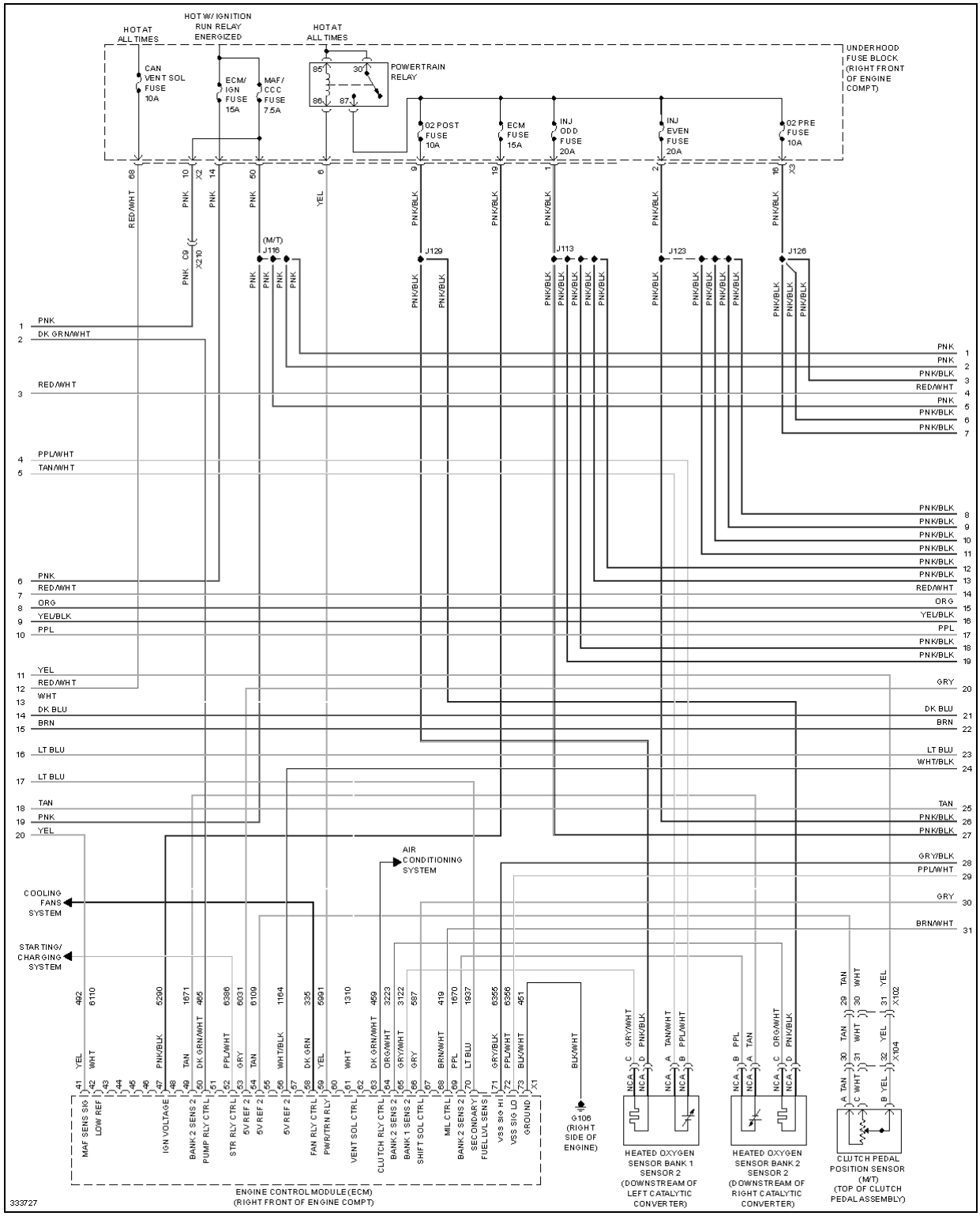
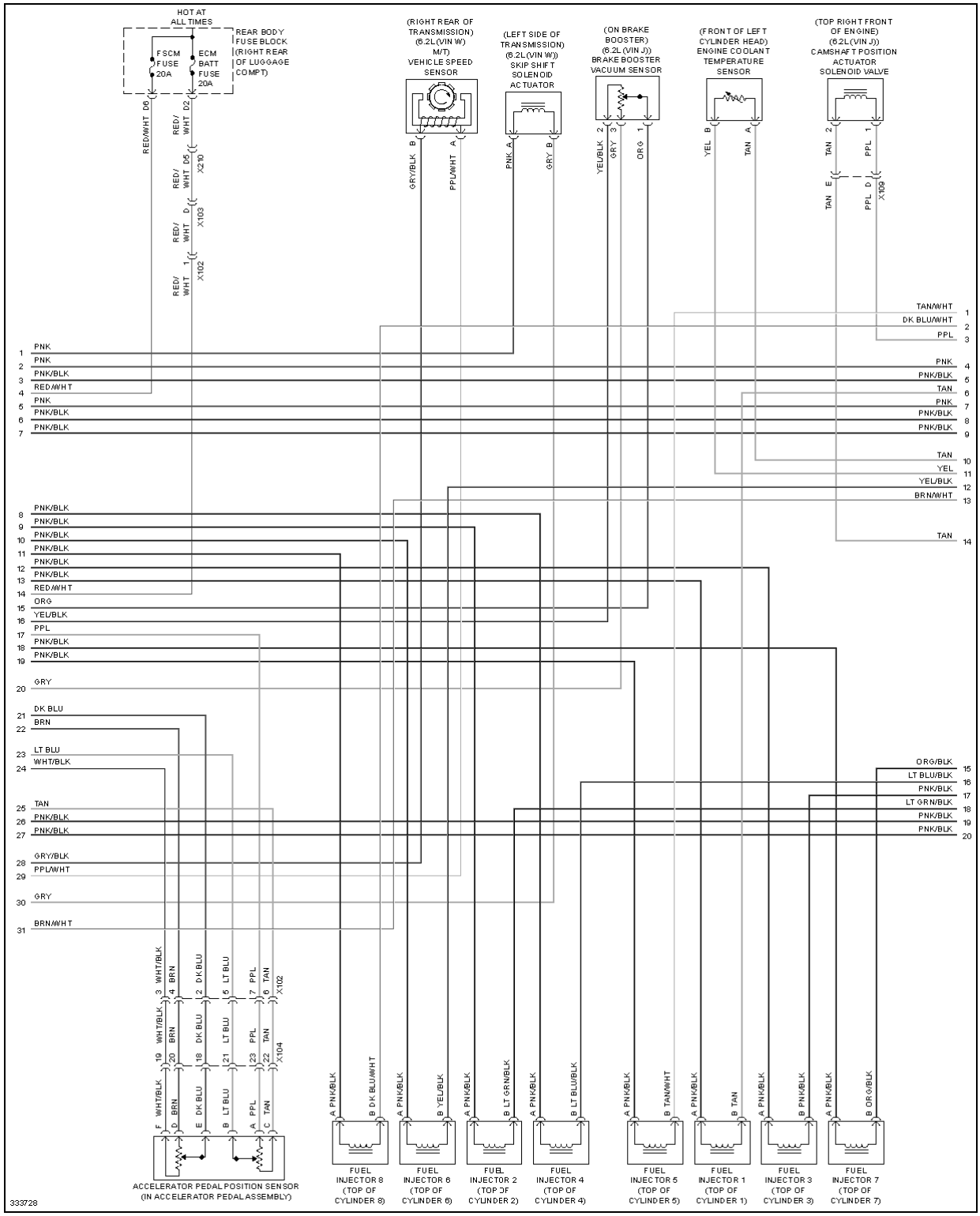


Fig. 21: 6.2L VIN J, Engine Performance Circuit (2 of 6)

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Fig. 22: 6.2L VIN J, Engine Performance Circuit (3 of 6)

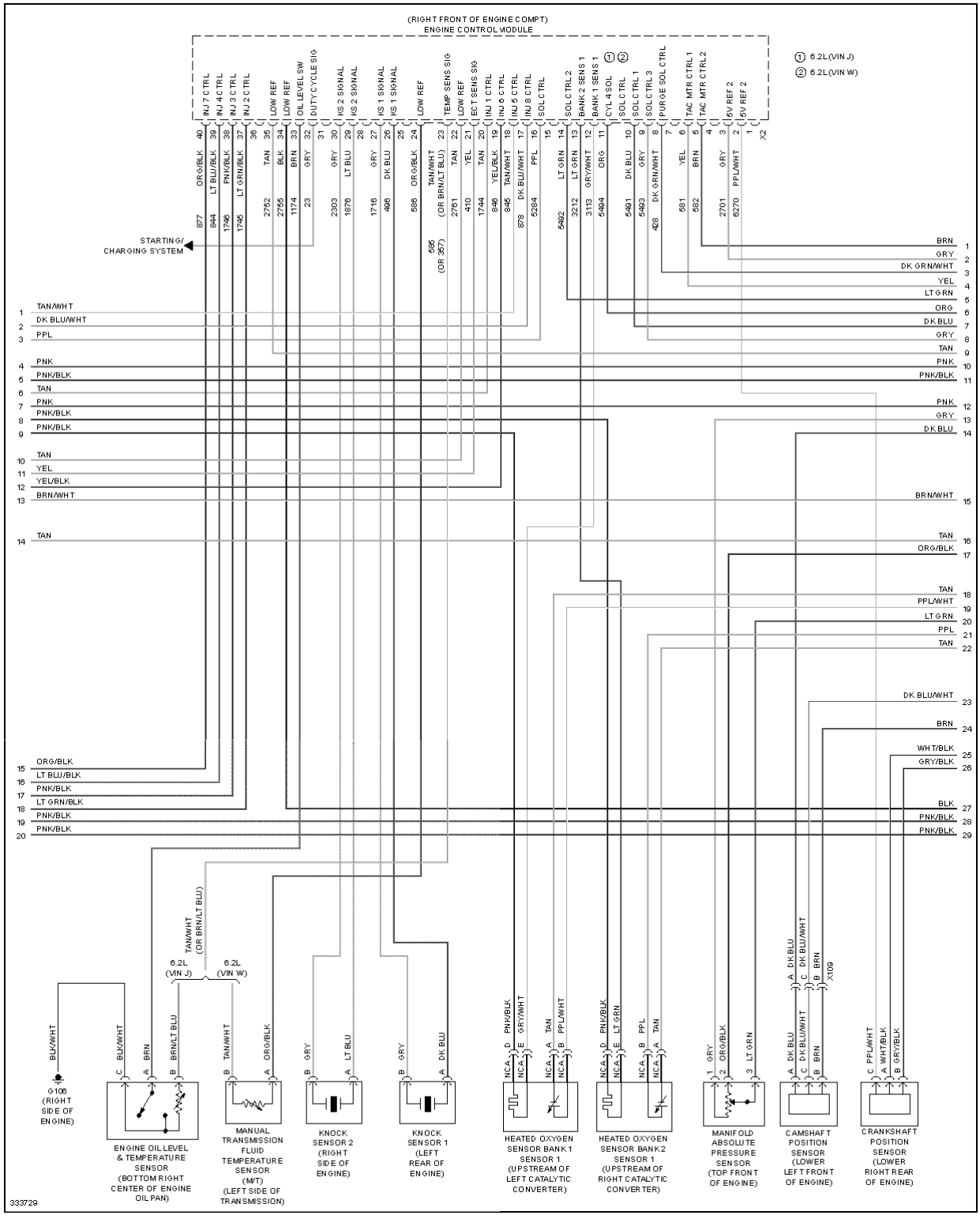
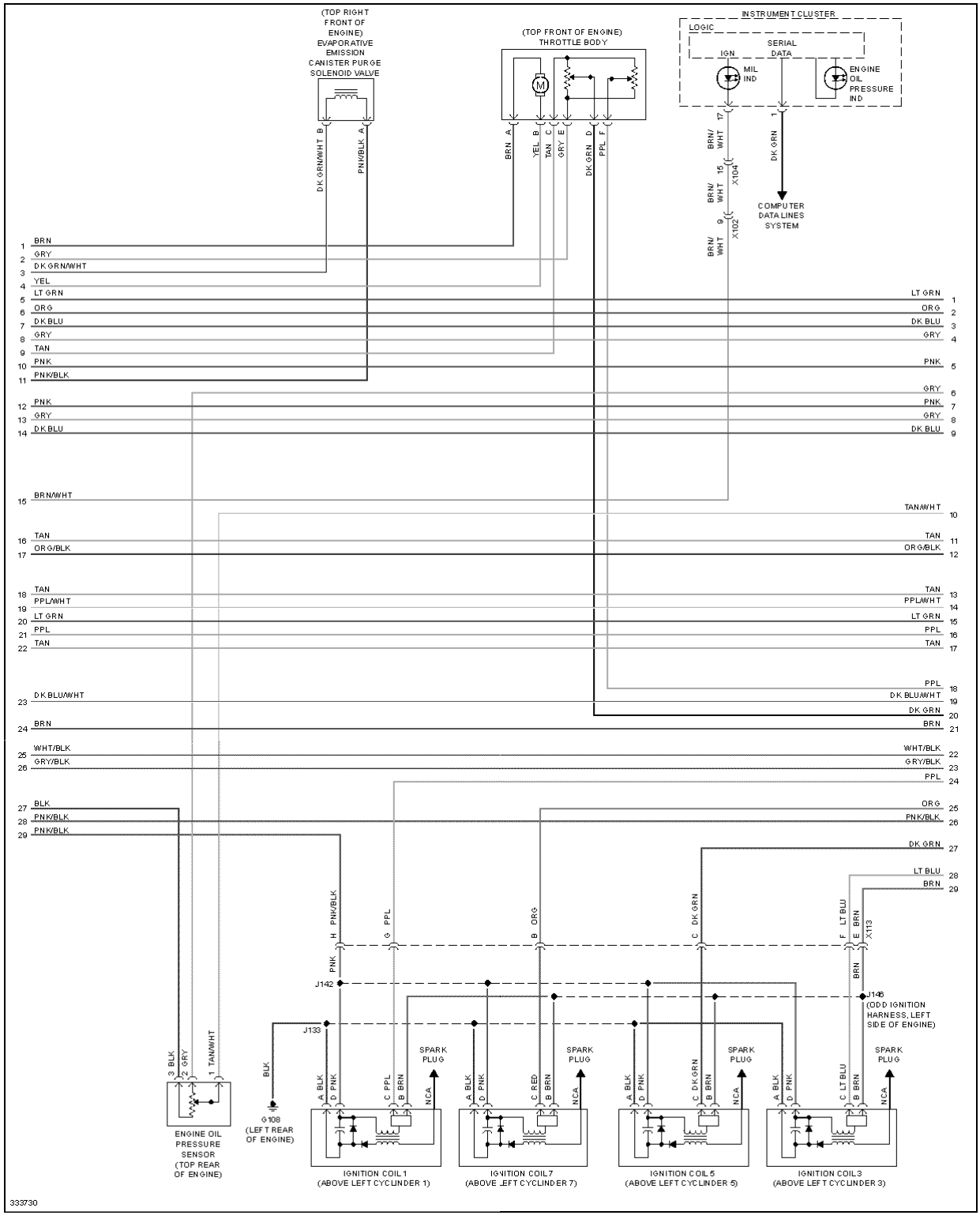


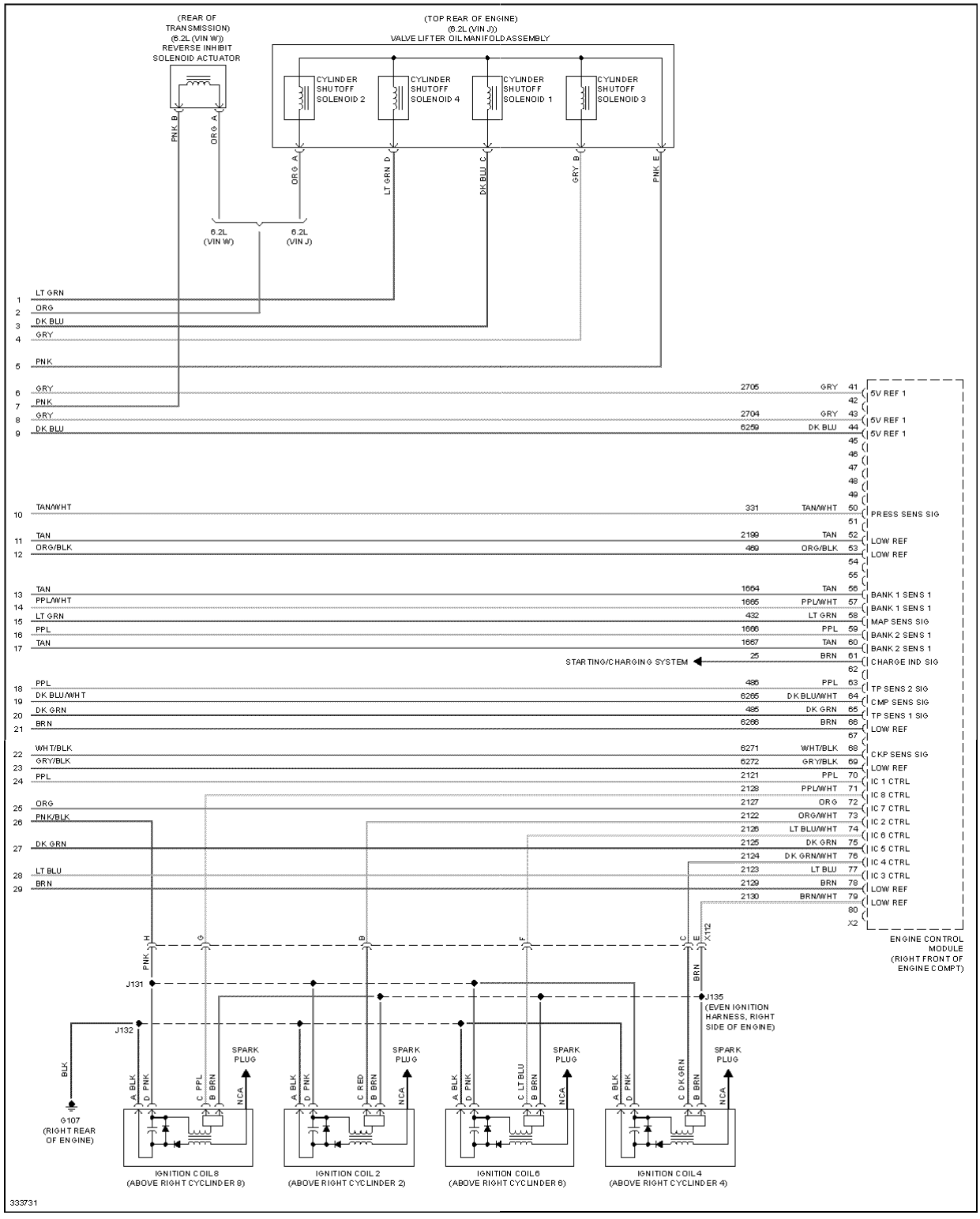
Fig. 23: 6.2L VIN J, Engine Performance Circuit (4 of 6)

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Fig. 24: 6.2L VIN J, Engine Performance Circuit (5 of 6)



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Fig. 25: 6.2L VIN J, Engine Performance Circuit (6 of 6)

6.2L VIN W

cardiagn.com

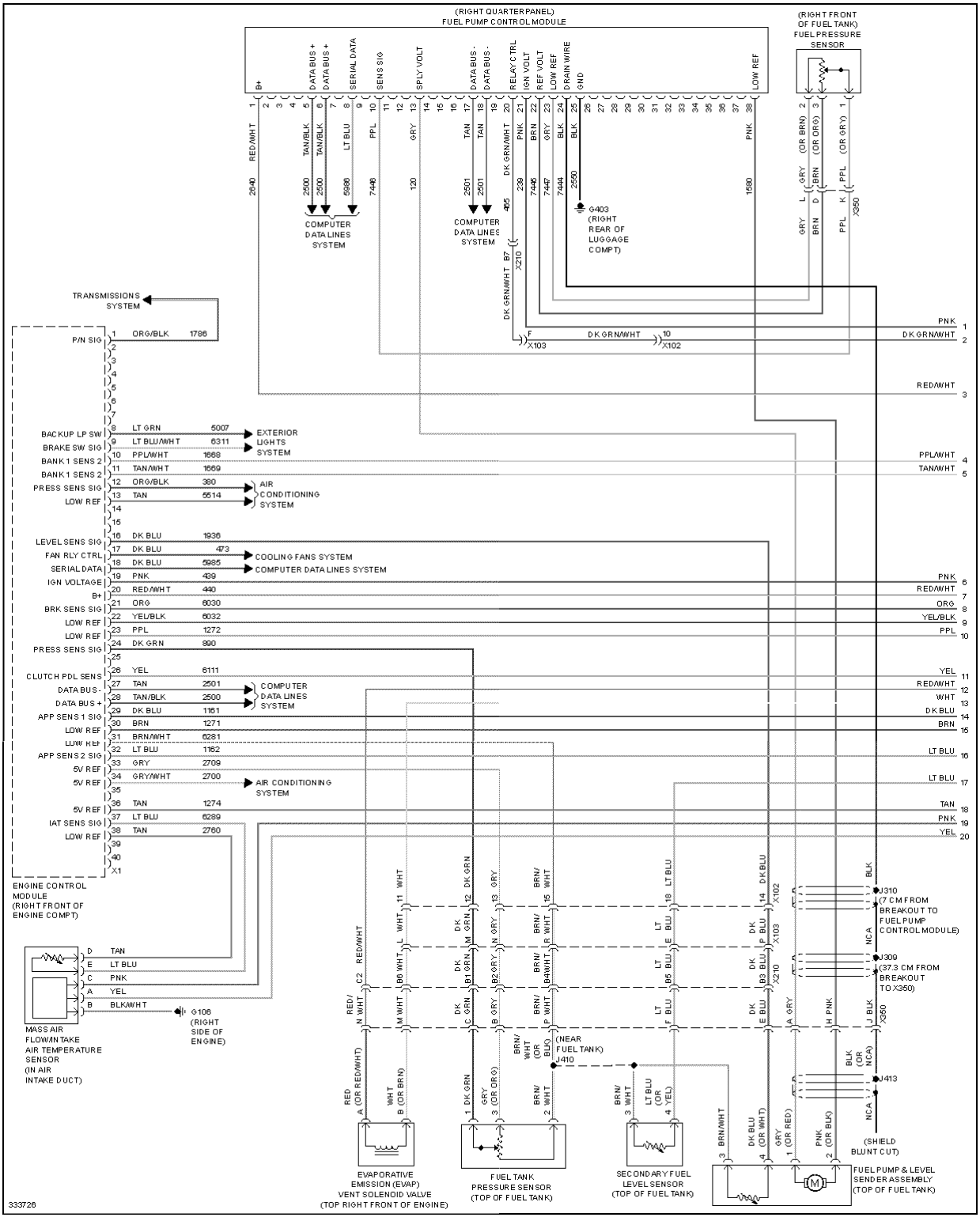


Fig. 26: 6.2L VIN W, Engine Performance Circuit (1 of 6)

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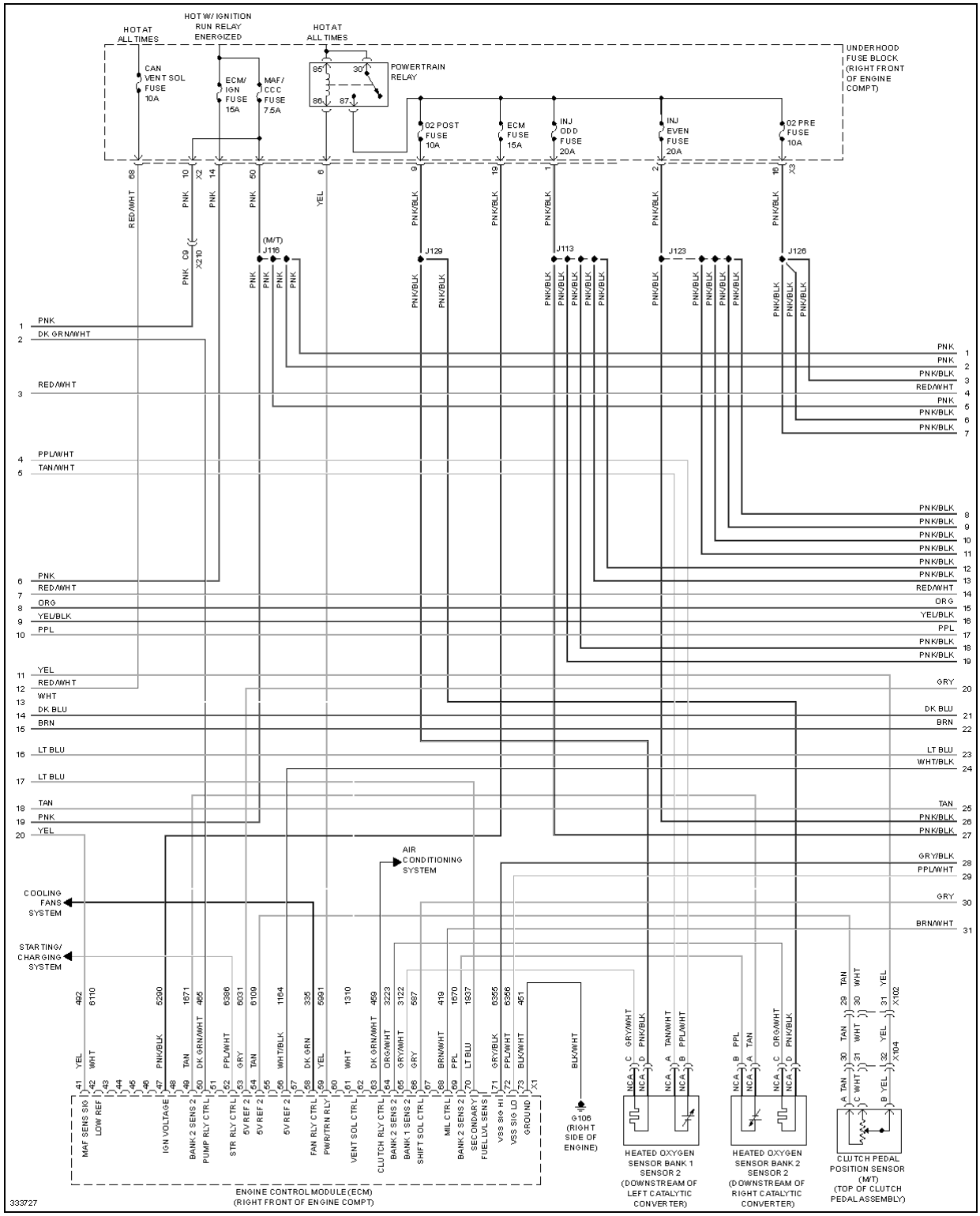
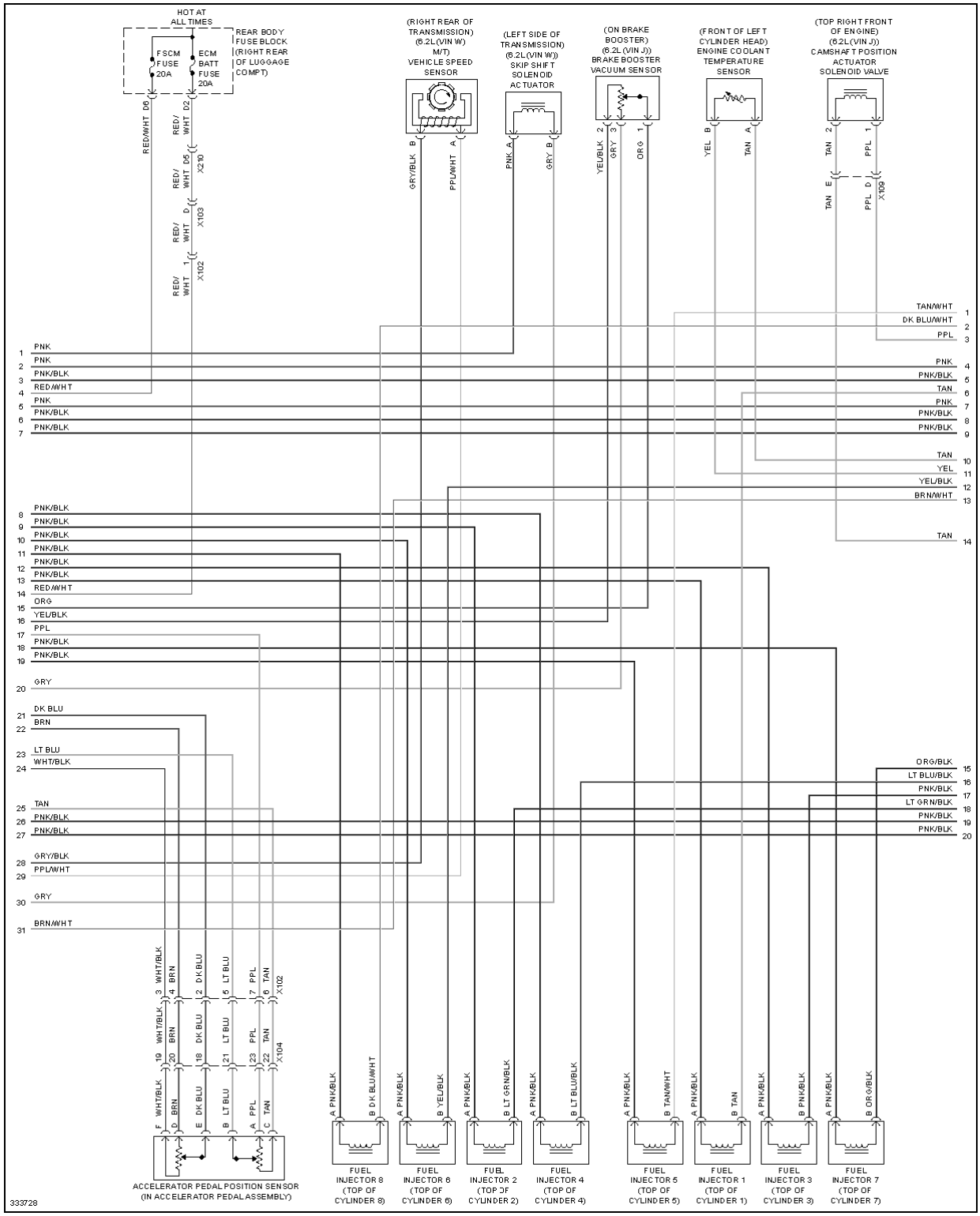


Fig. 27: 6.2L VIN W, Engine Performance Circuit (2 of 6)

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Fig. 28: 6.2L VIN W, Engine Performance Circuit (3 of 6)

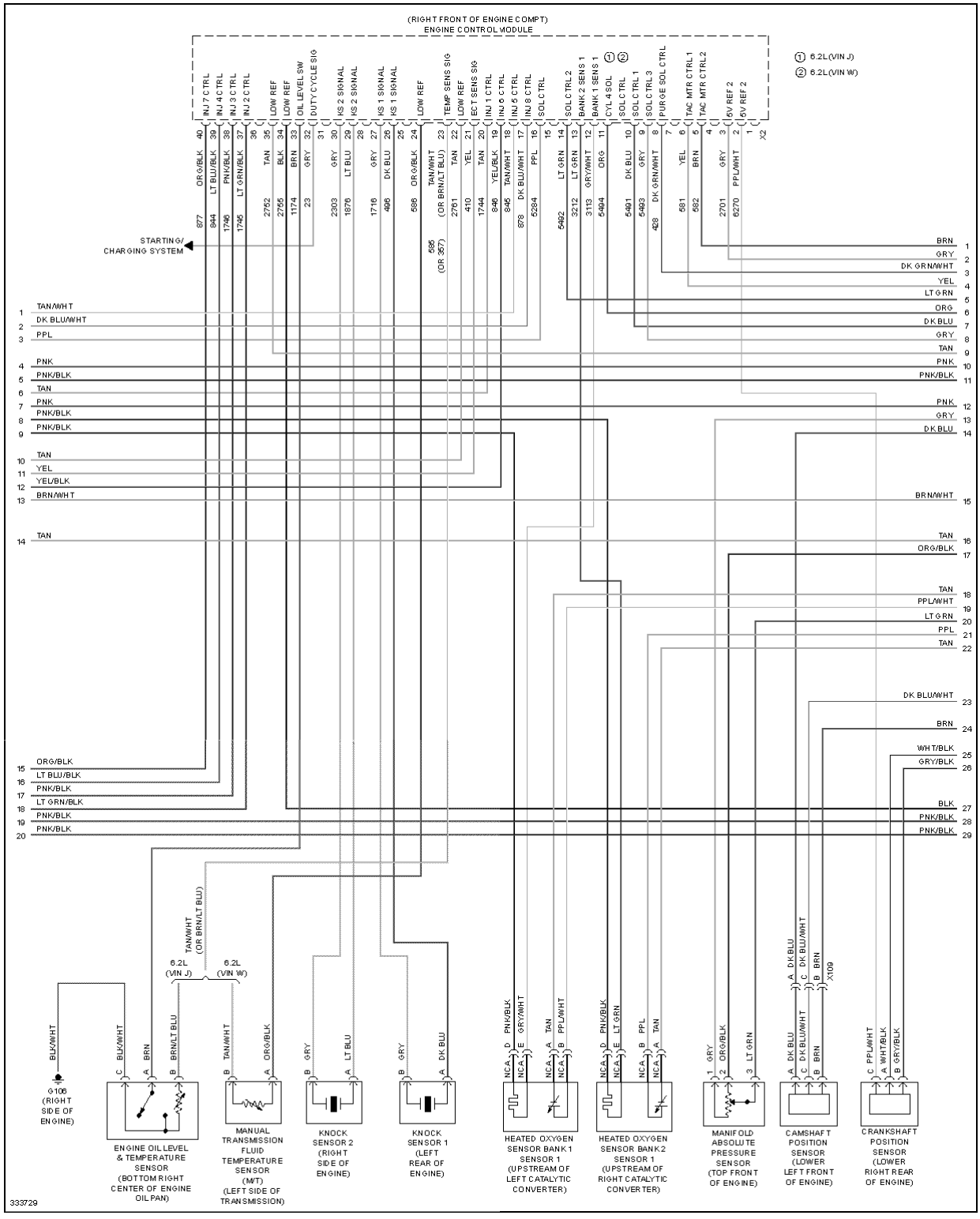
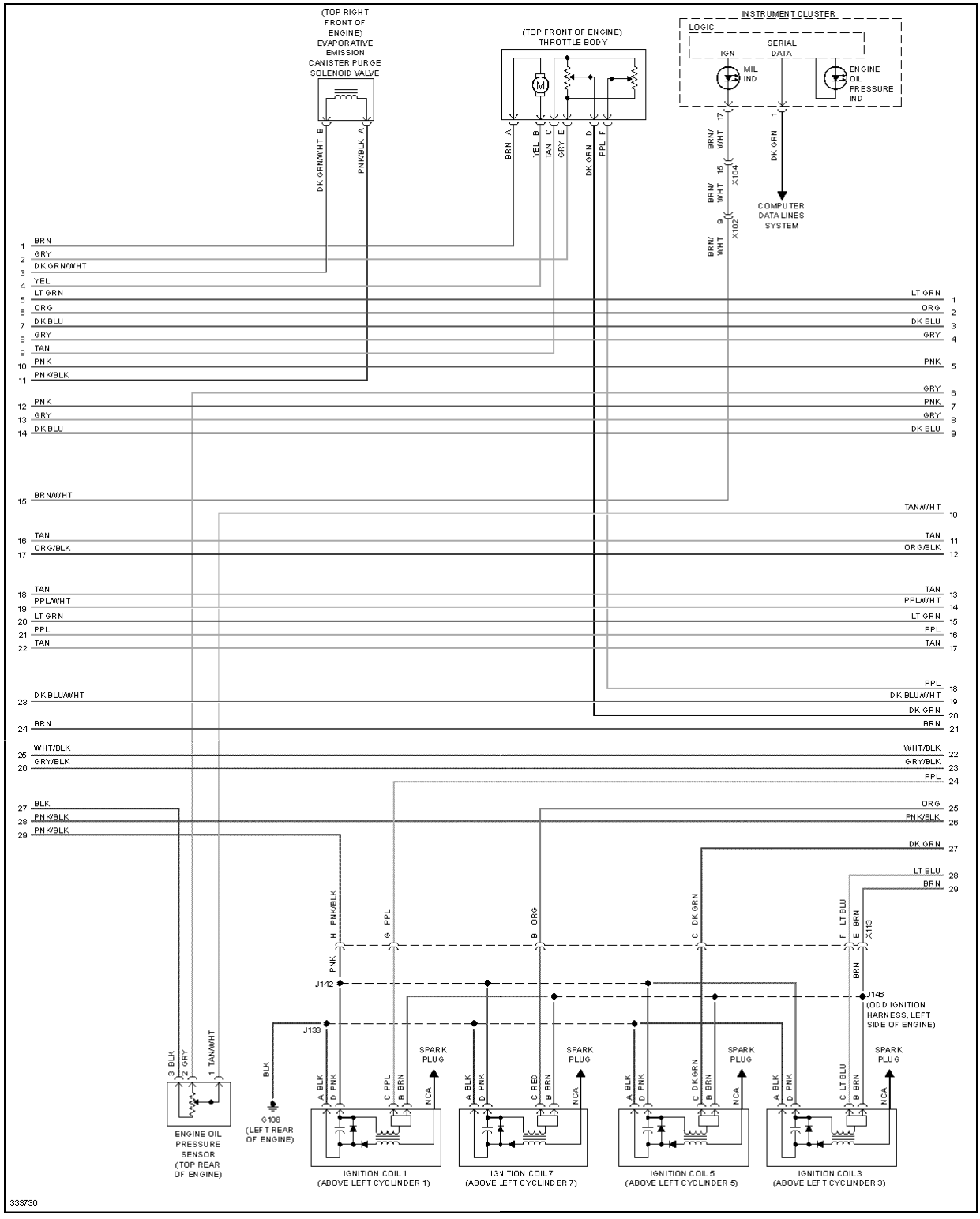


Fig. 29: 6.2L VIN W, Engine Performance Circuit (4 of 6)

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Fig. 30: 6.2L VIN W, Engine Performance Circuit (5 of 6)

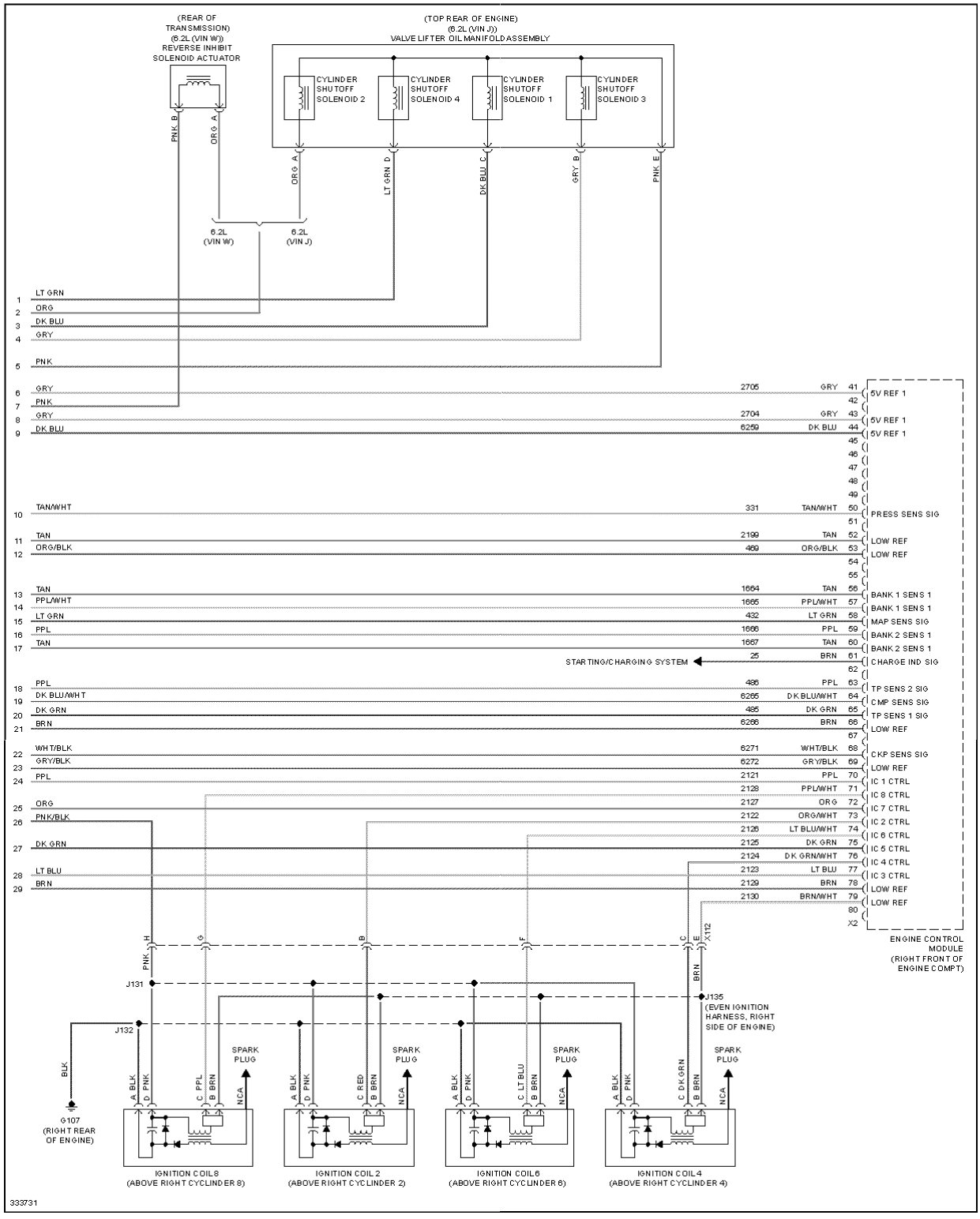


Fig. 31: 6.2L VIN W, Engine Performance Circuit (6 of 6)

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EXTERIOR LIGHTS

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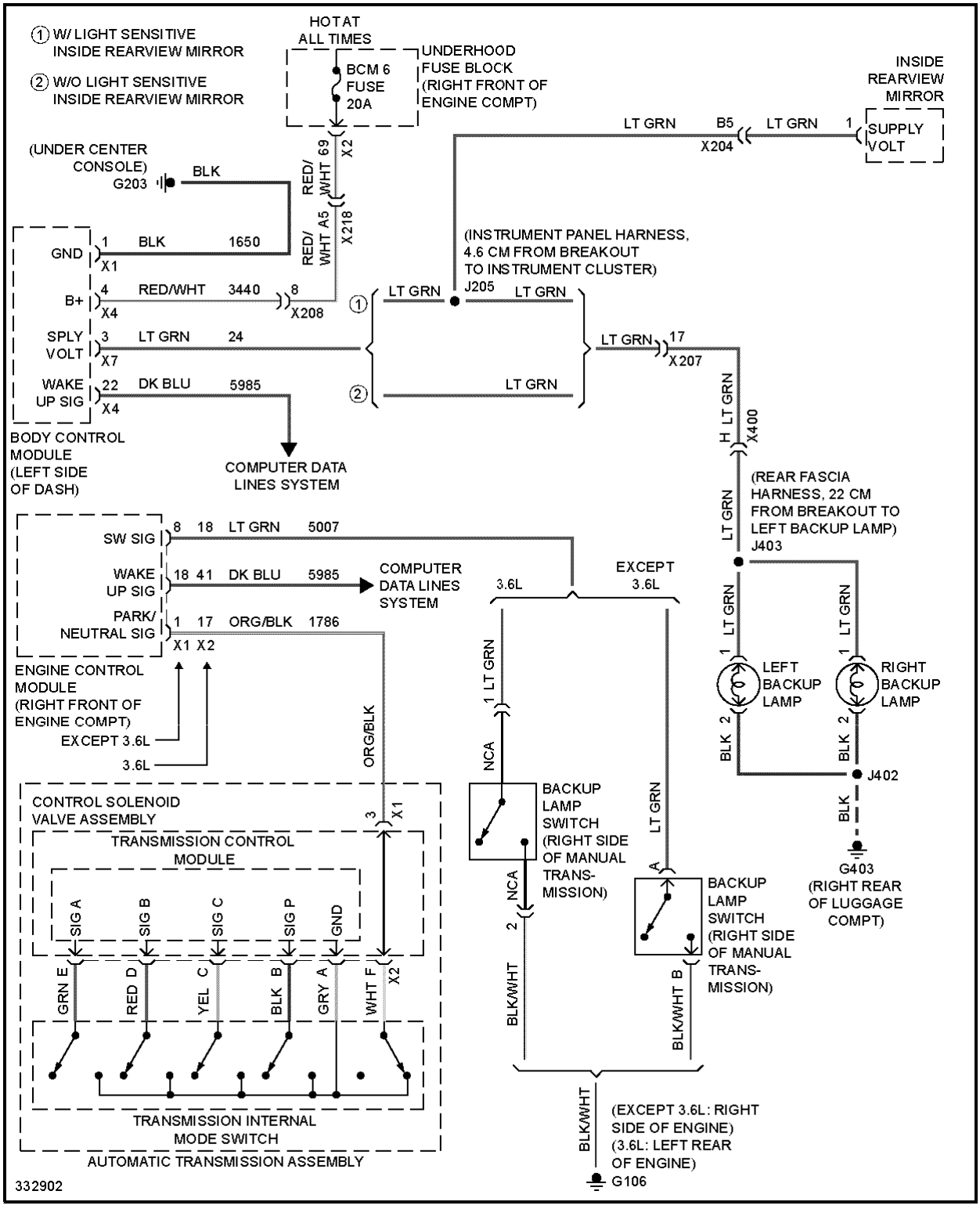


Fig. 32: Backup Lamps Circuit

cardiagn.com

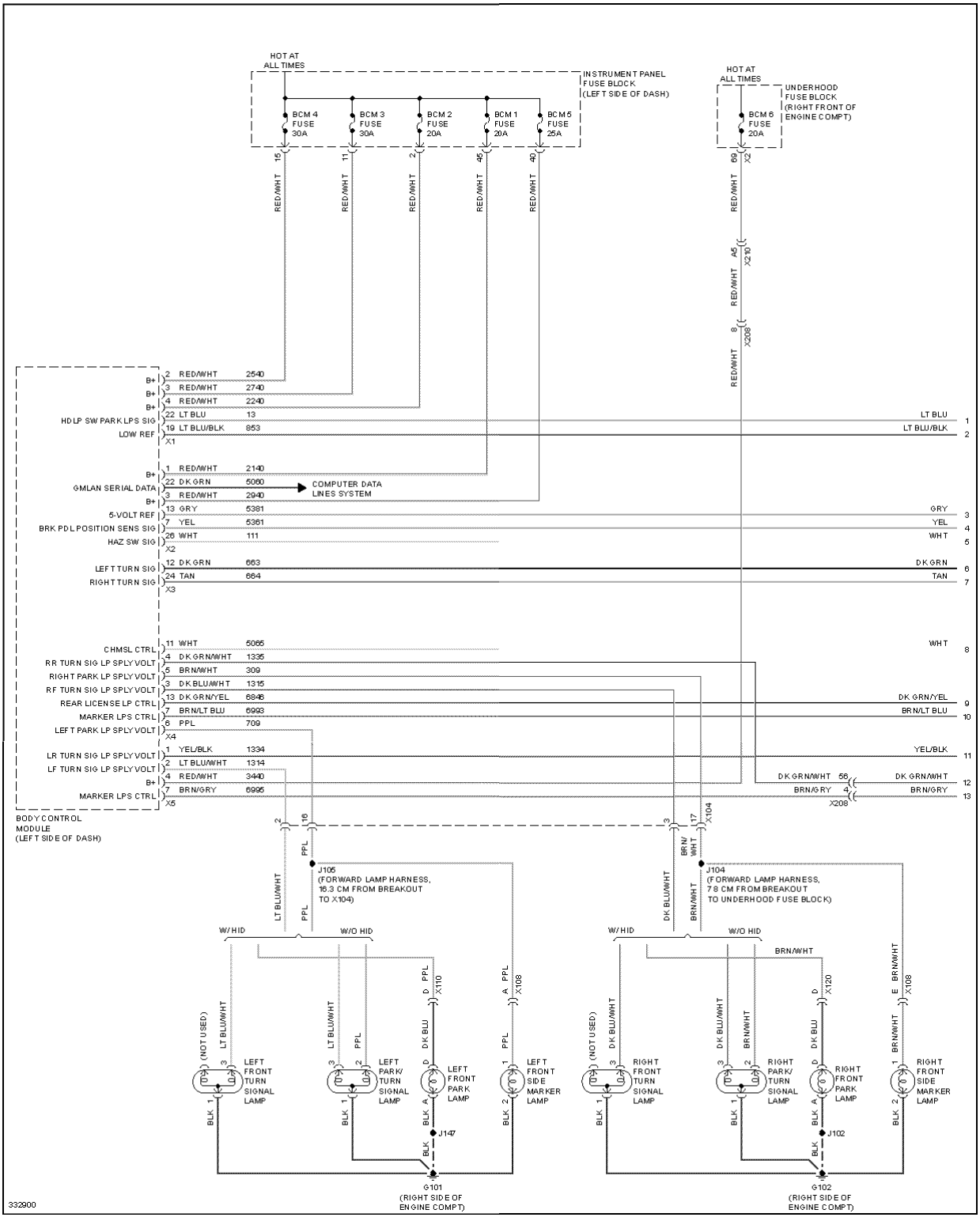


Fig. 33: Exterior Lamps Circuit (1 of 2)

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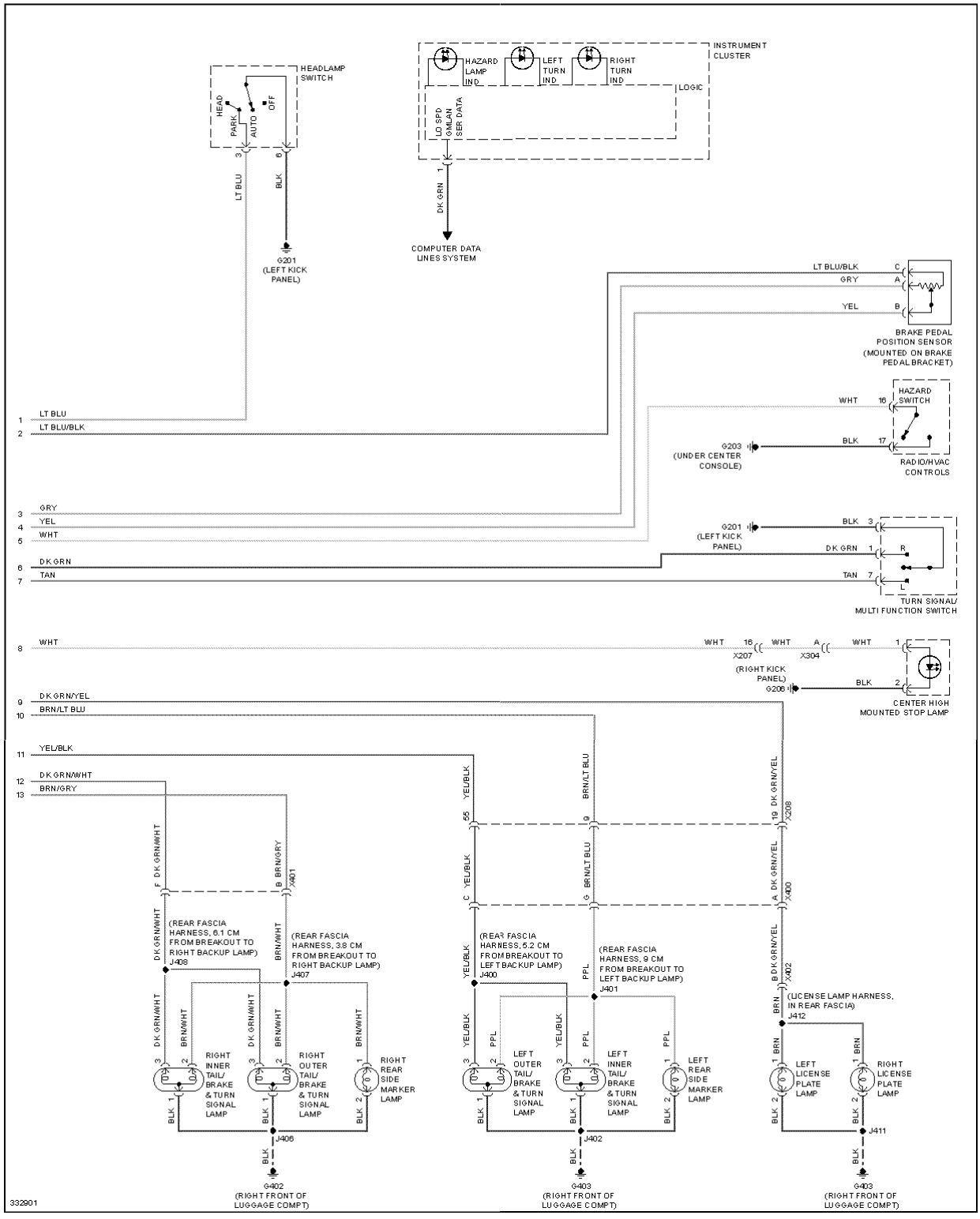


Fig. 34: Exterior Lamps Circuit (2 of 2)

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GROUND DISTRIBUTION

cardiagn.com

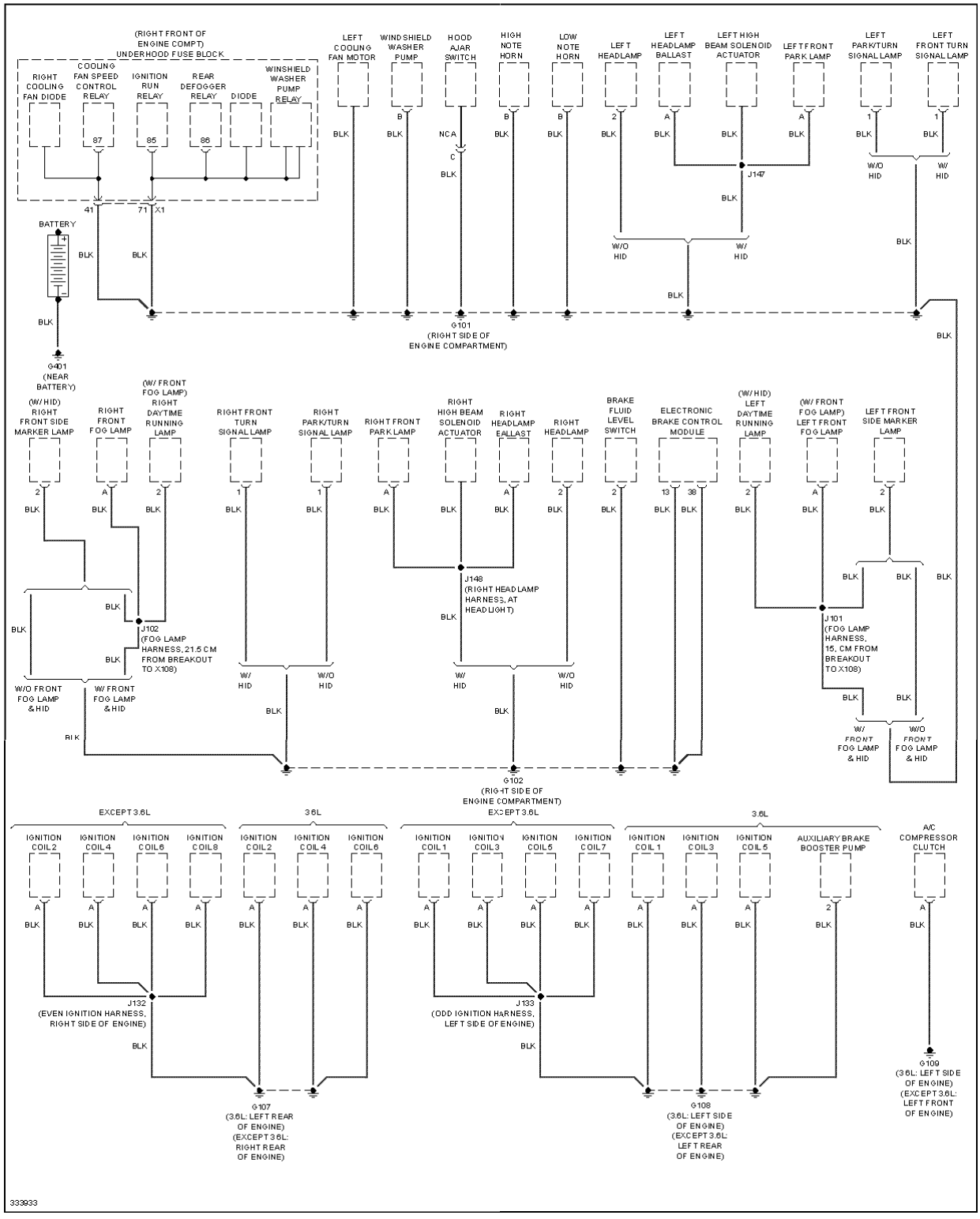


Fig. 35: Ground Distribution Circuit (1 of 3)

cardiagn.com

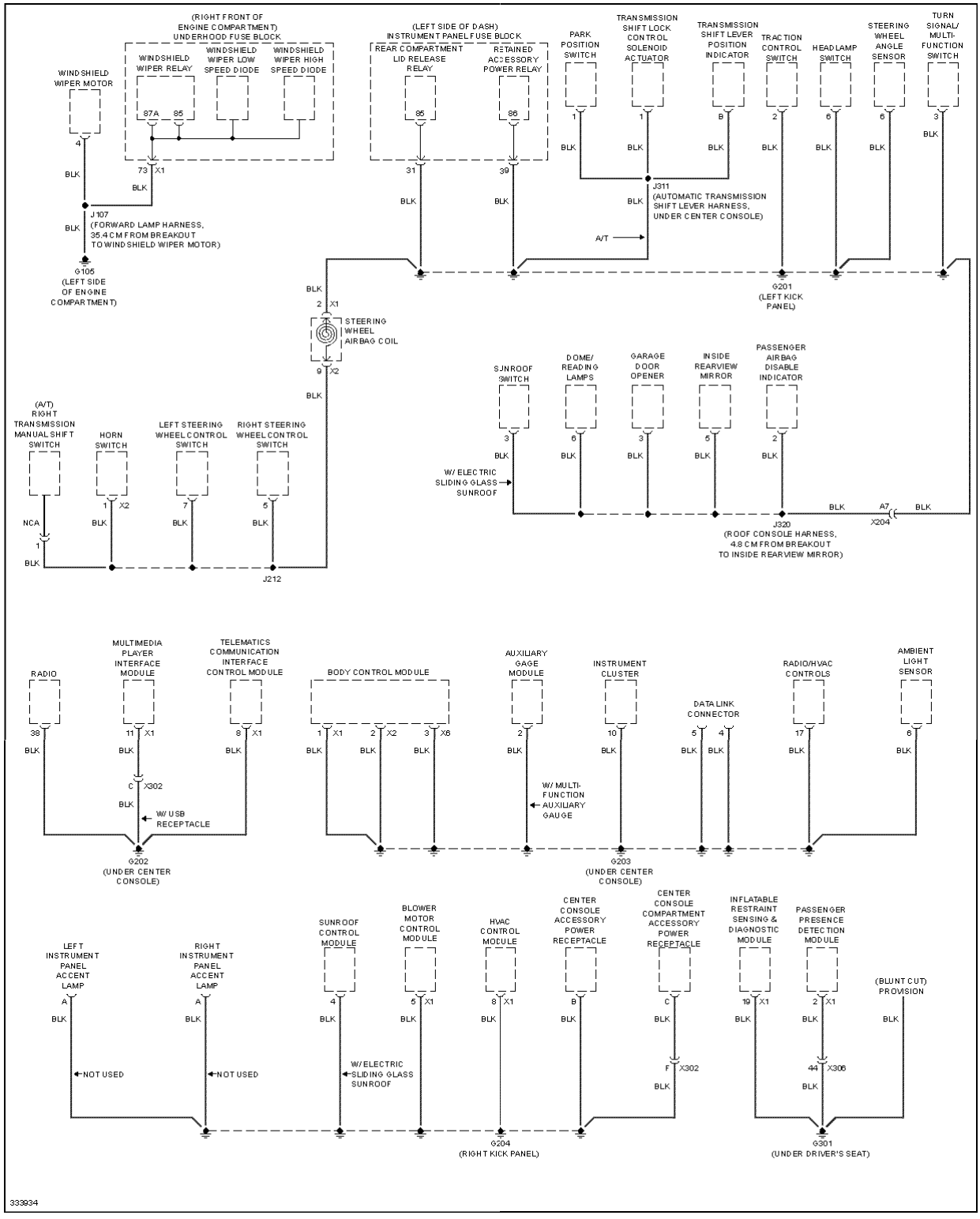


Fig. 36: Ground Distribution Circuit (2 of 3)

cardiagn.com

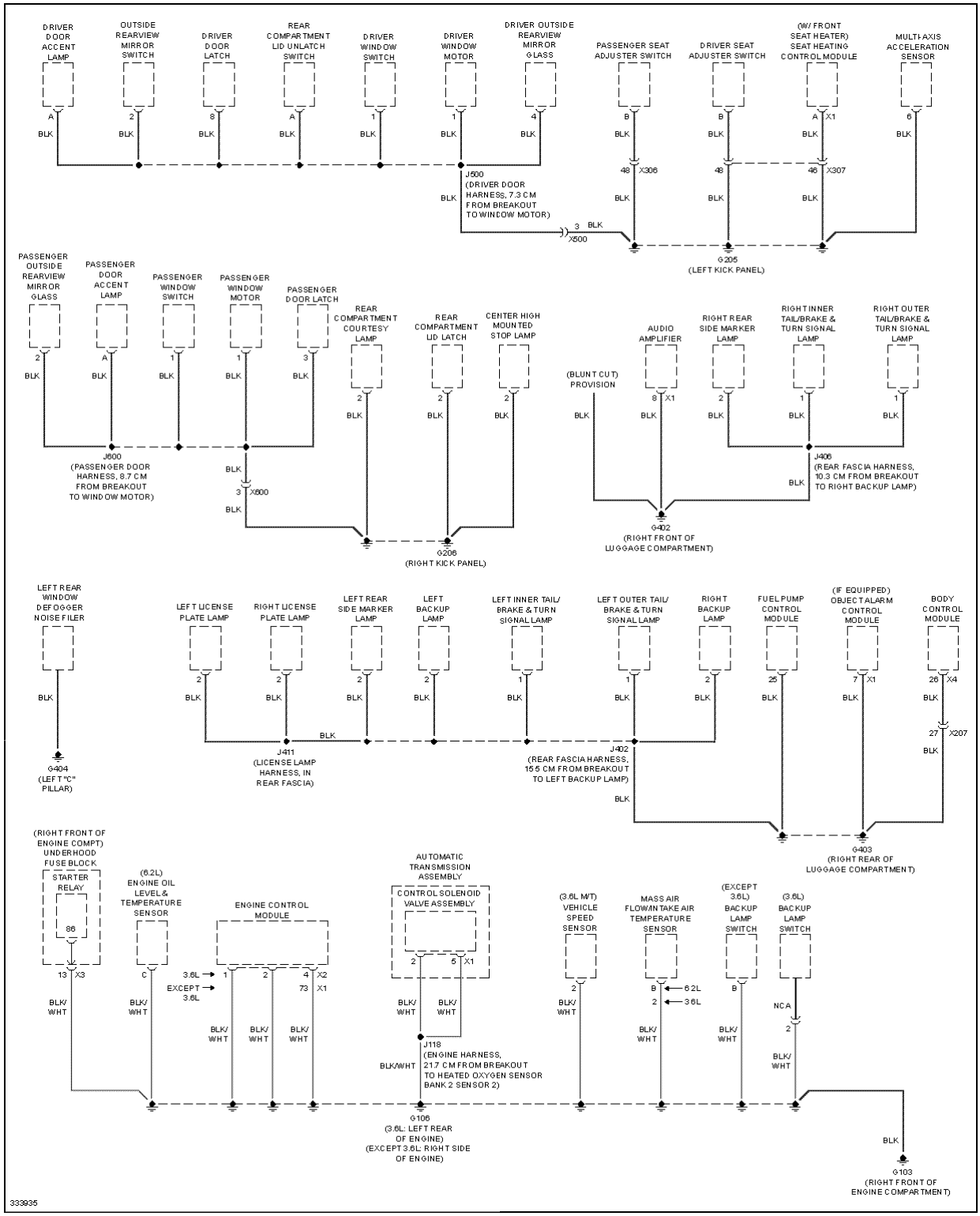


Fig. 37: Ground Distribution Circuit (3 of 3)

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HEADLIGHTS

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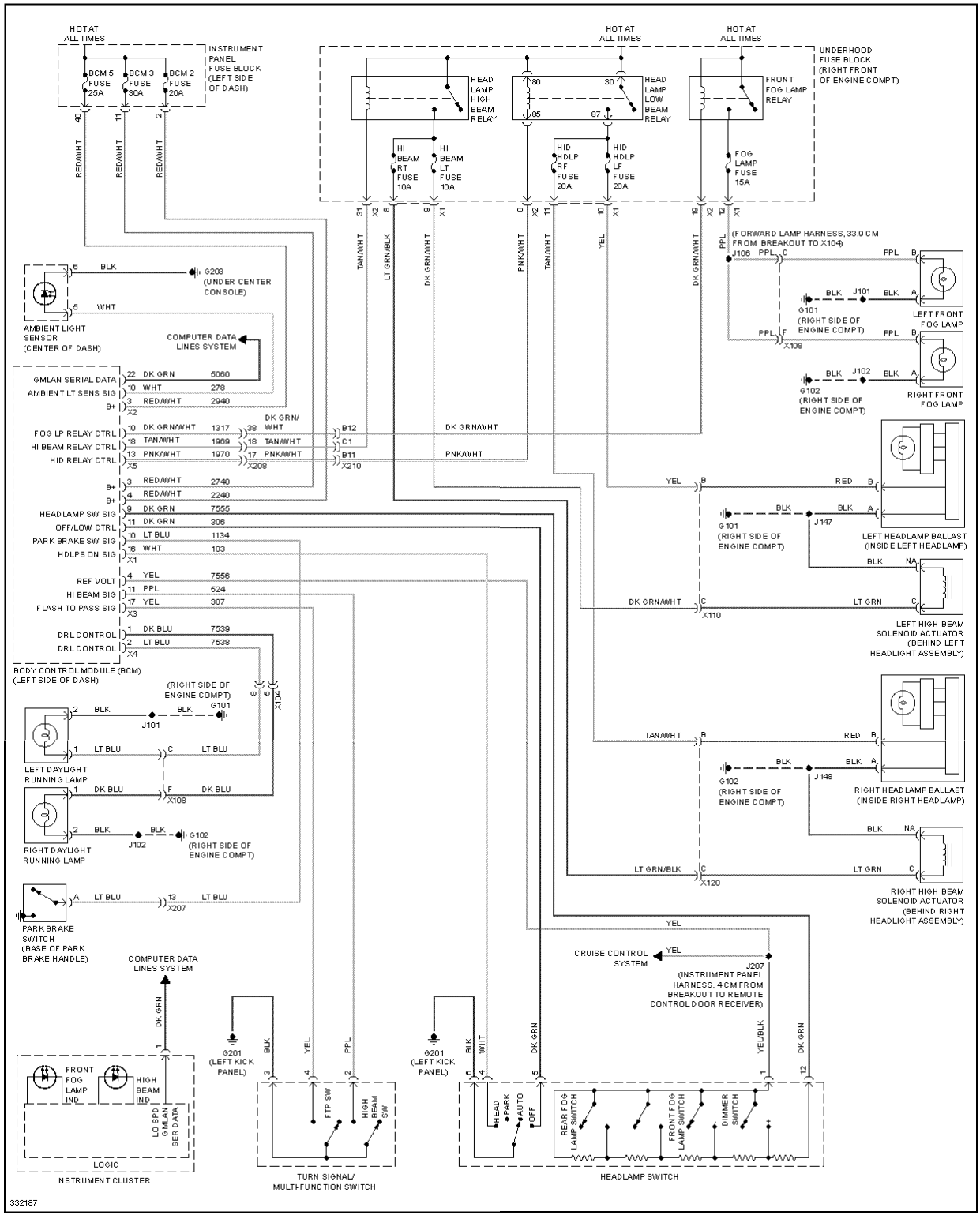


Fig. 38: Headlights Circuit, W/ High Intensity Discharge

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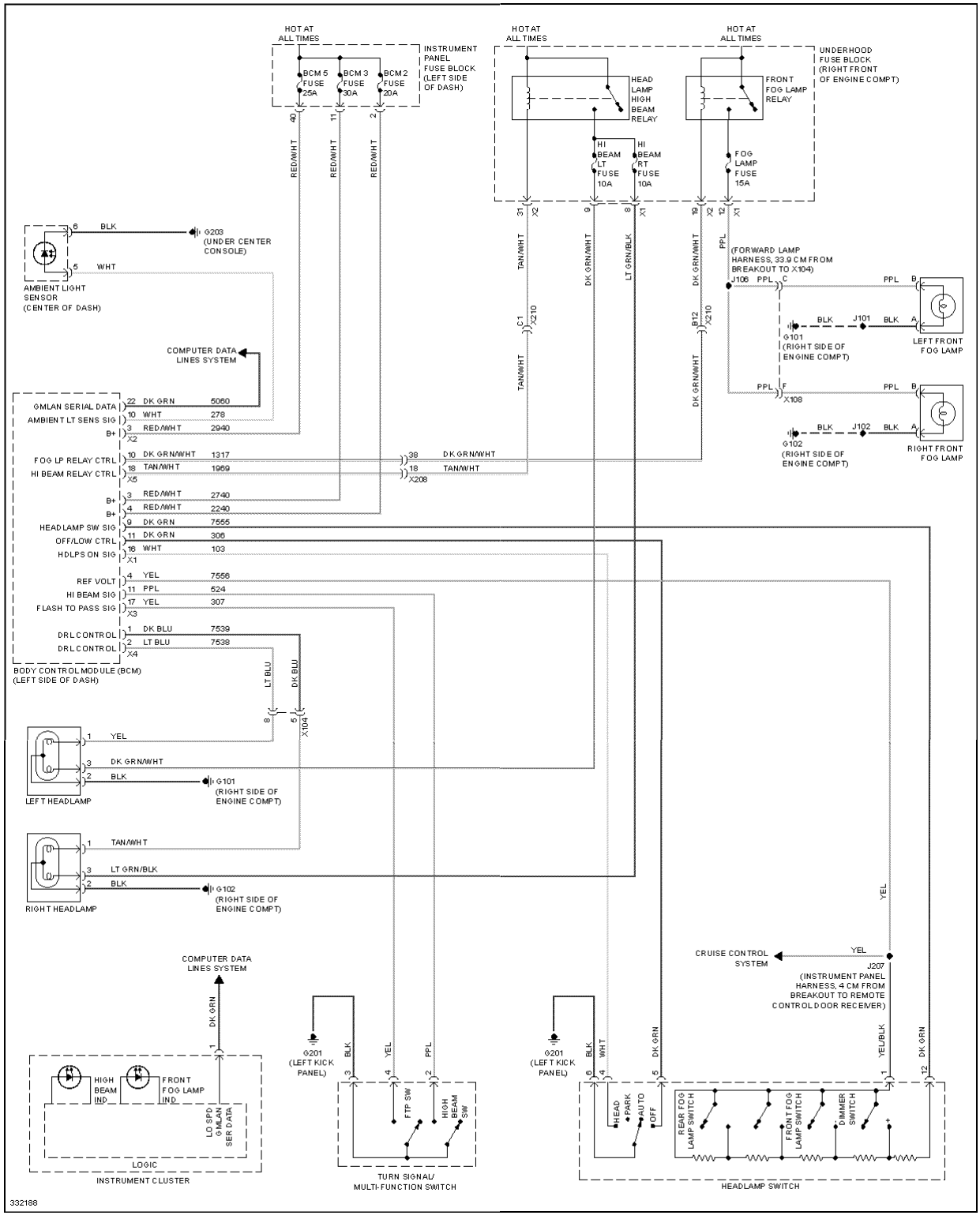


Fig. 39: Headlights Circuit, W/O High Intensity Discharge

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HORN

cardiagn.com

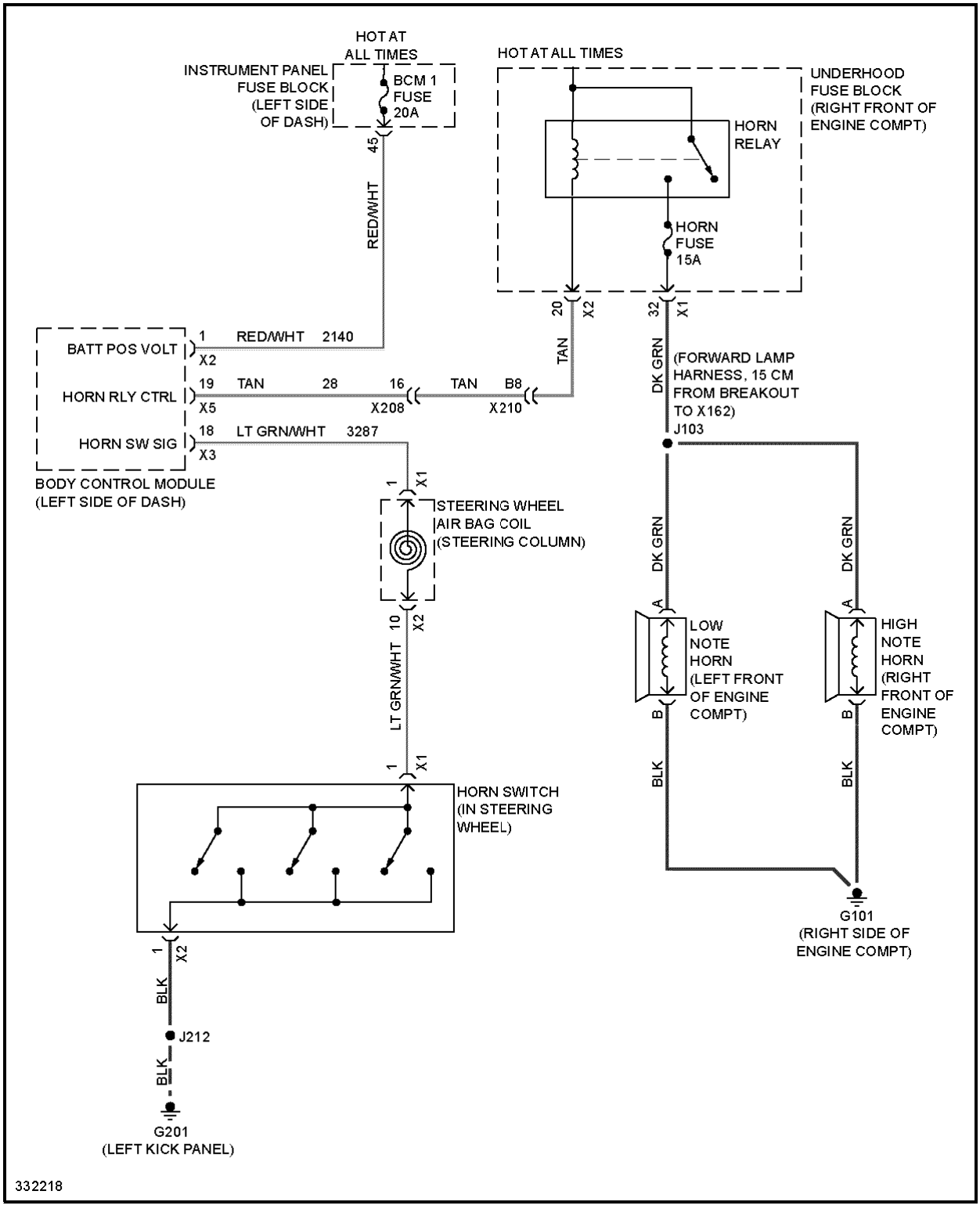


Fig. 40: Horn Circuit

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INSTRUMENT CLUSTER

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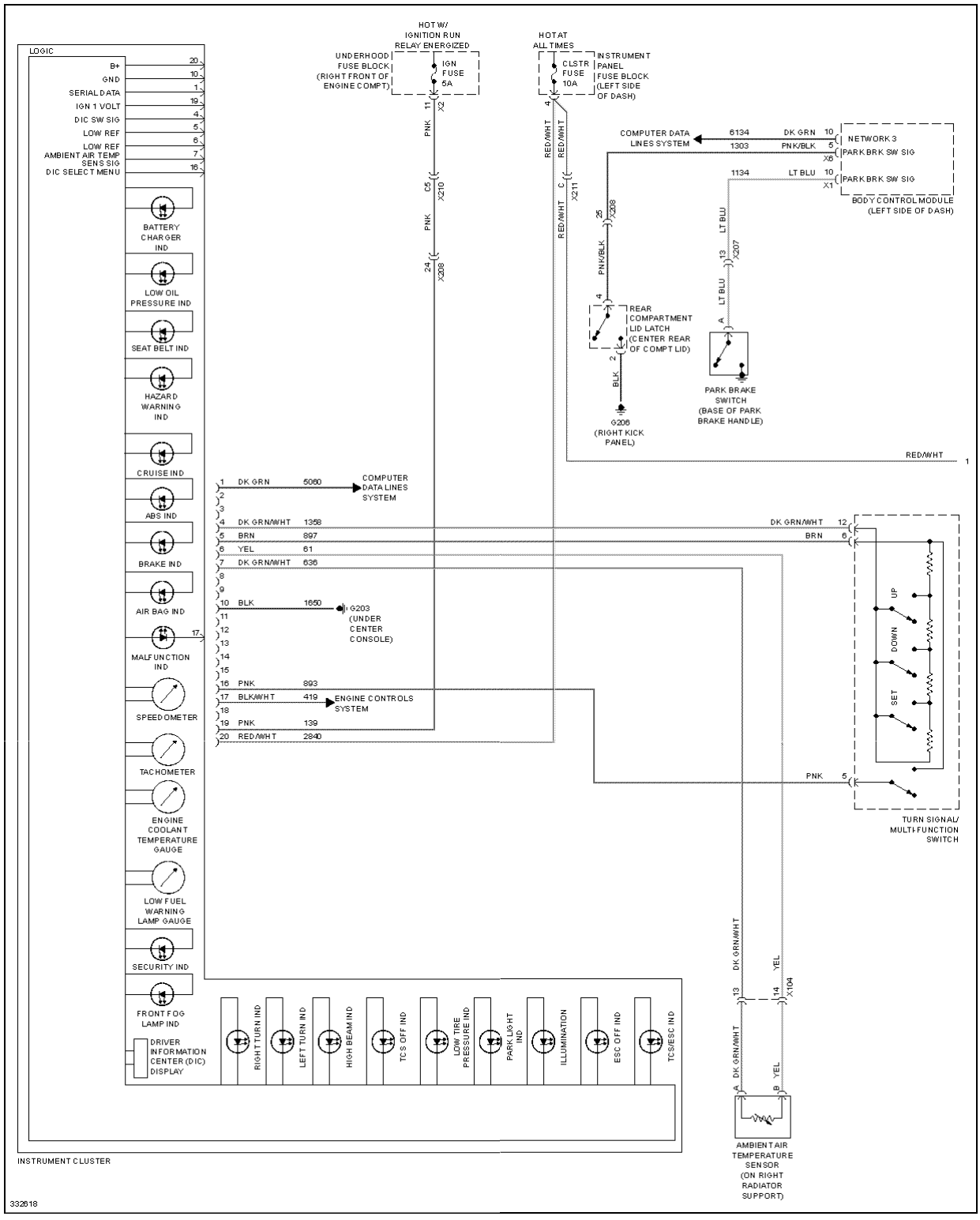


Fig. 41: Instrument Cluster Circuit (1 of 2)

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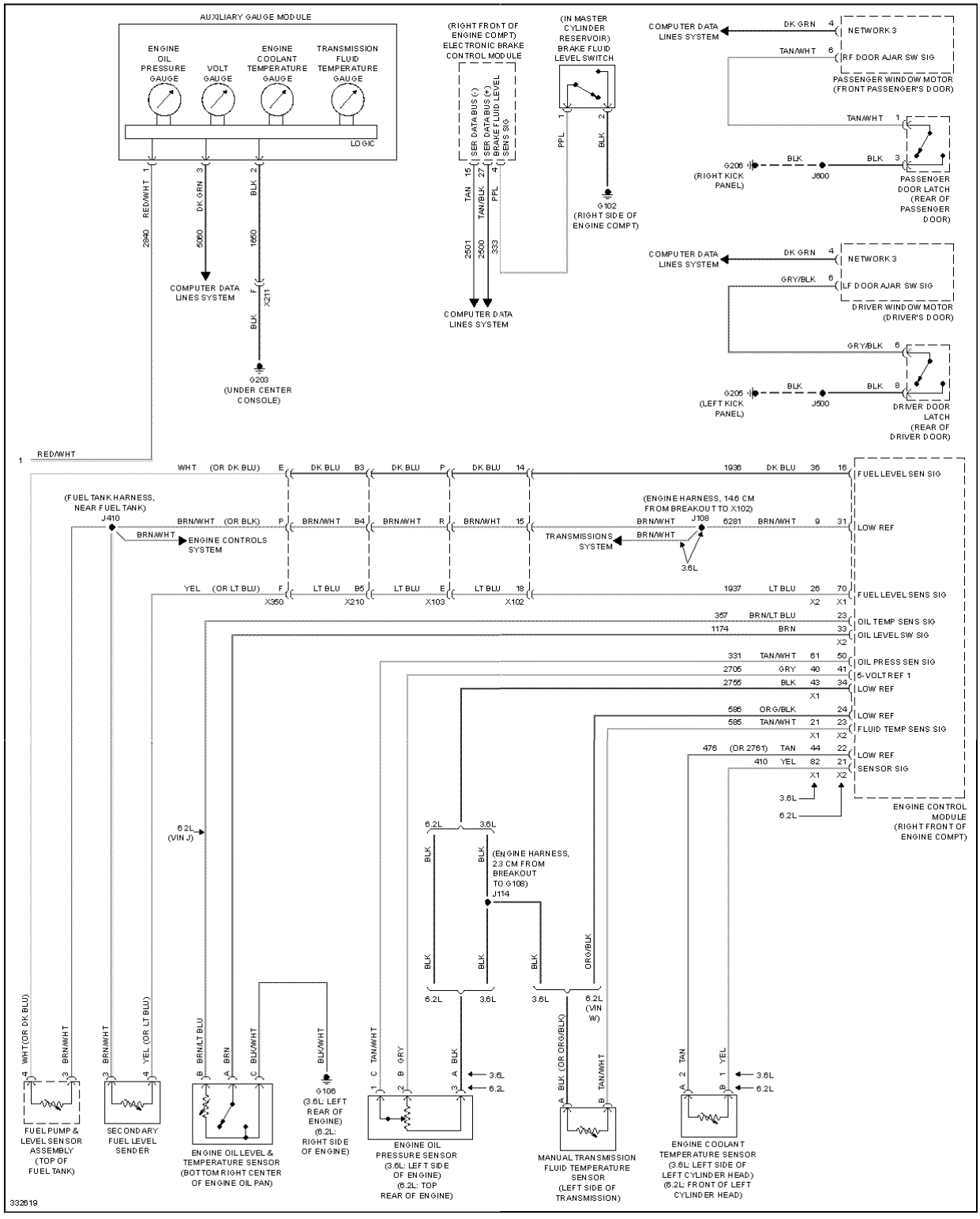


Fig. 42: Instrument Cluster Circuit (2 of 2)

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INTERIOR LIGHTS

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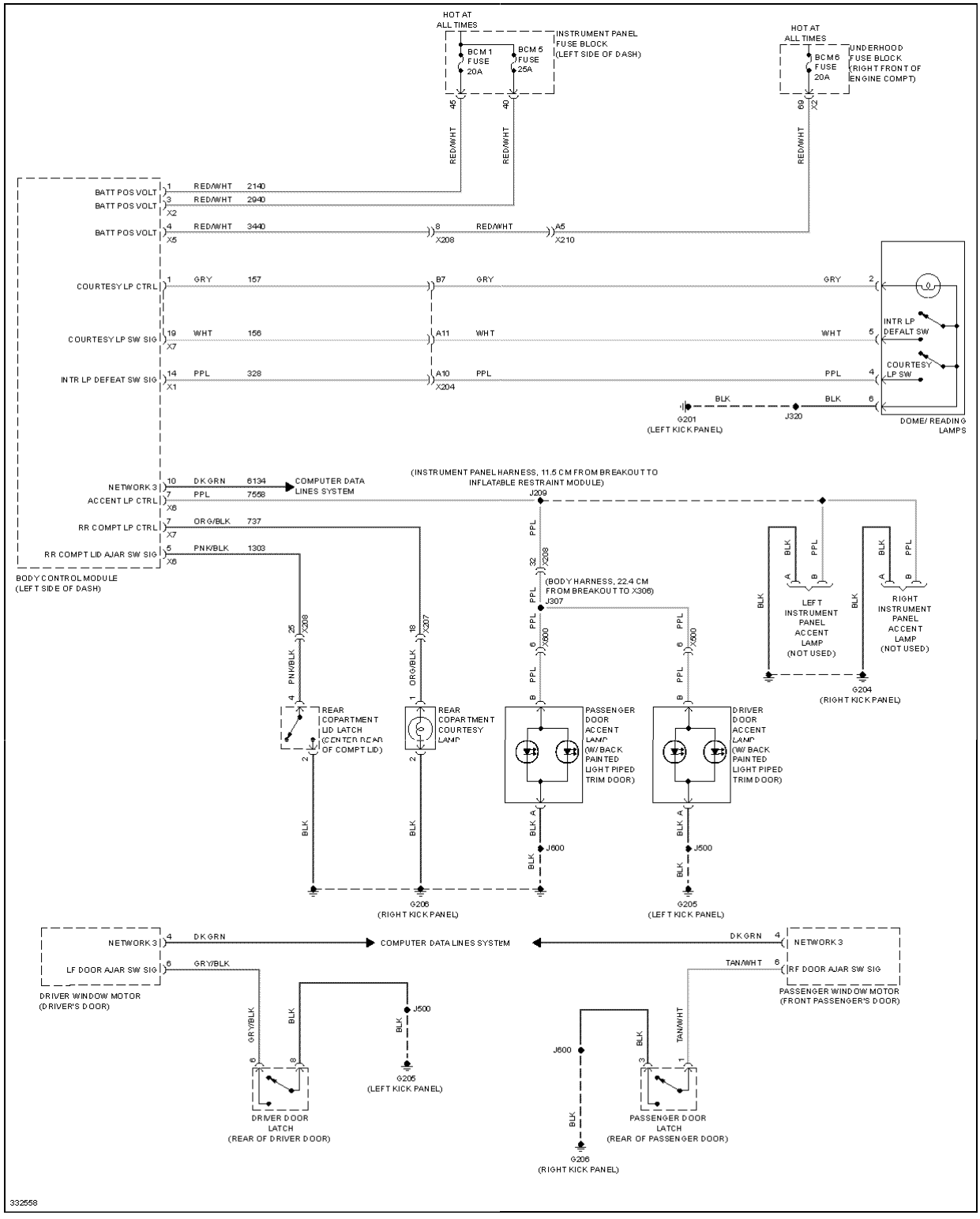


Fig. 43: Courtesy Lamps Circuit

cardiagn.com

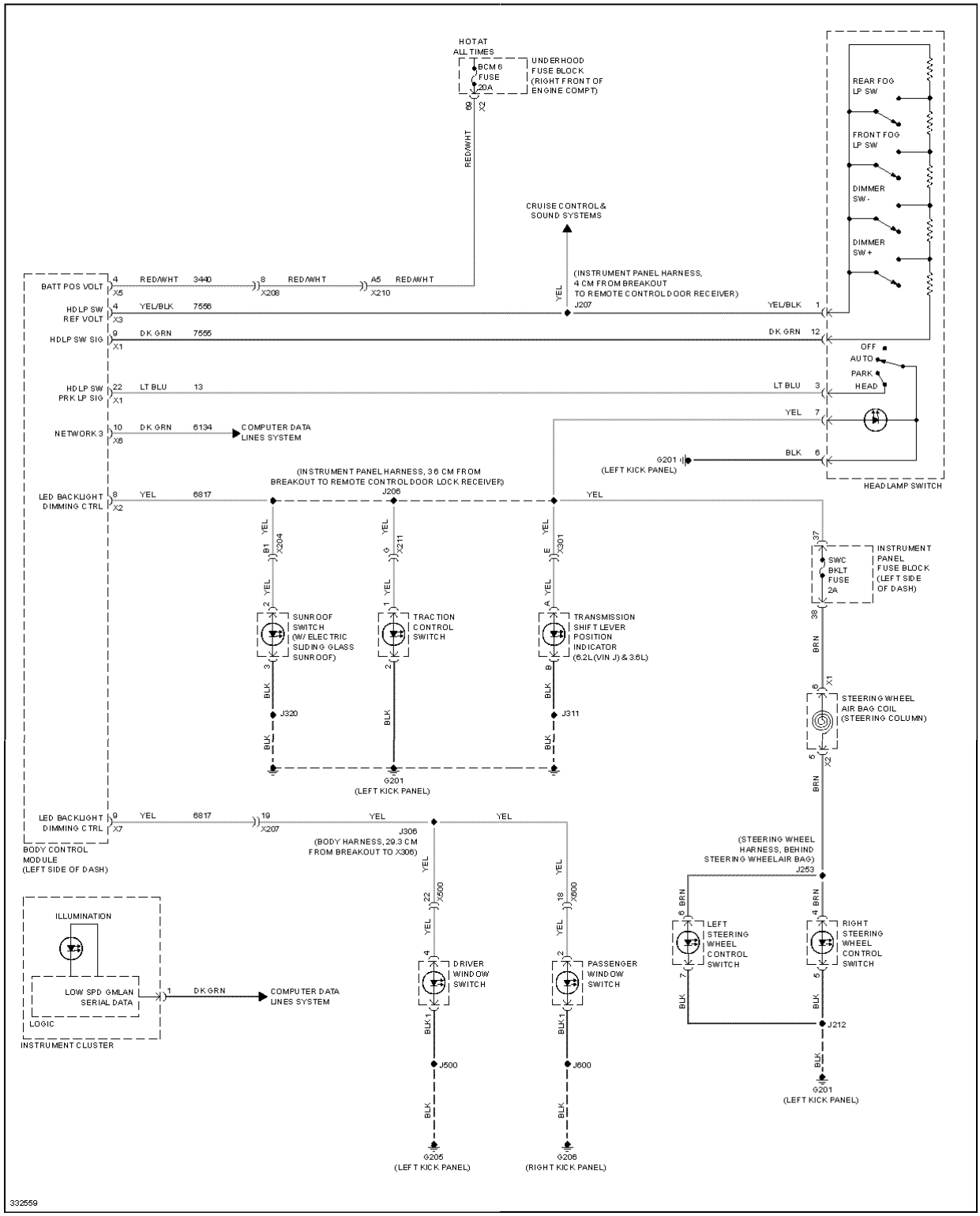


Fig. 44: Instrument Illumination Circuit

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NAVIGATION

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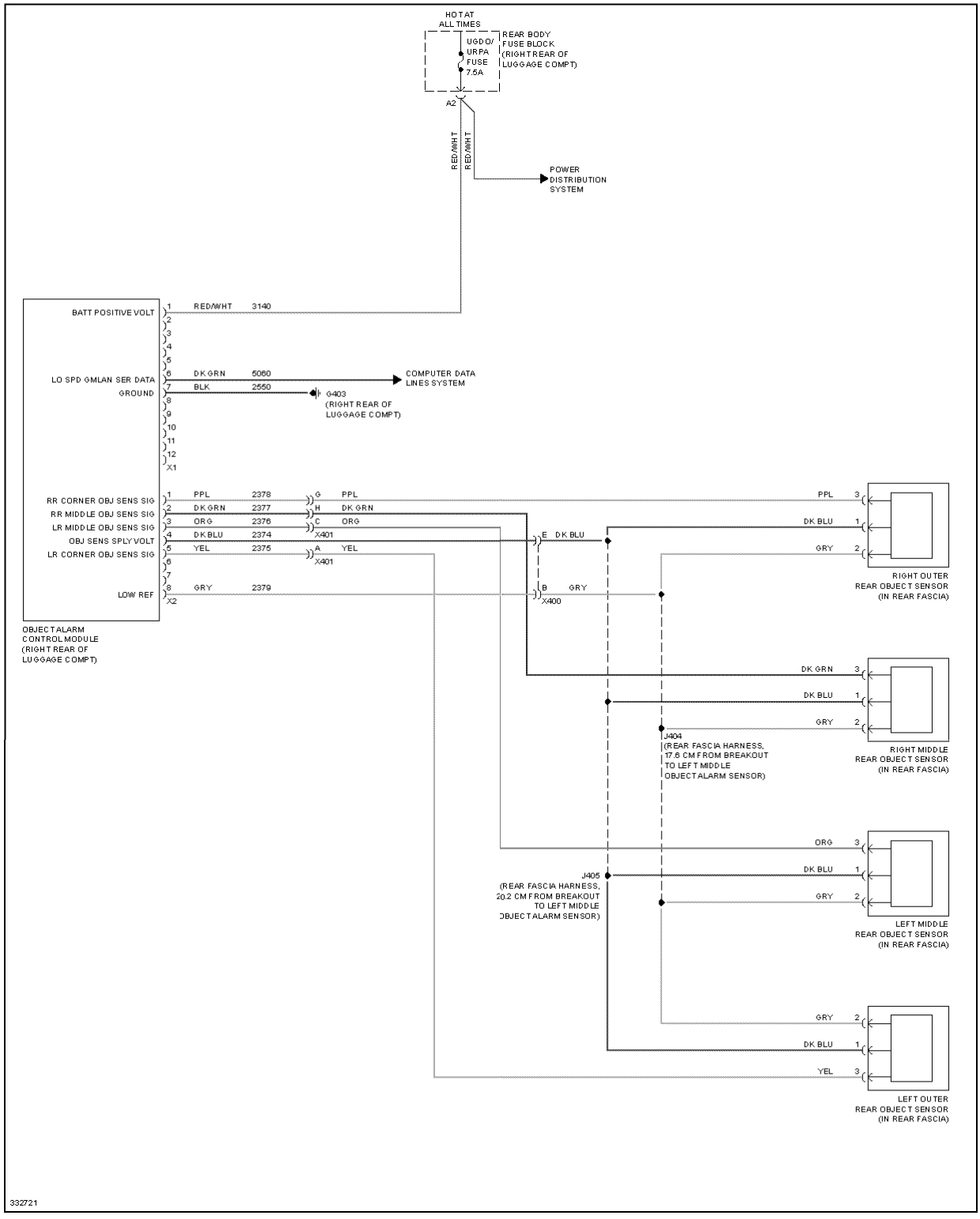


Fig. 45: Parking Assistant Circuit

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POWER DISTRIBUTION

cardiagn.com

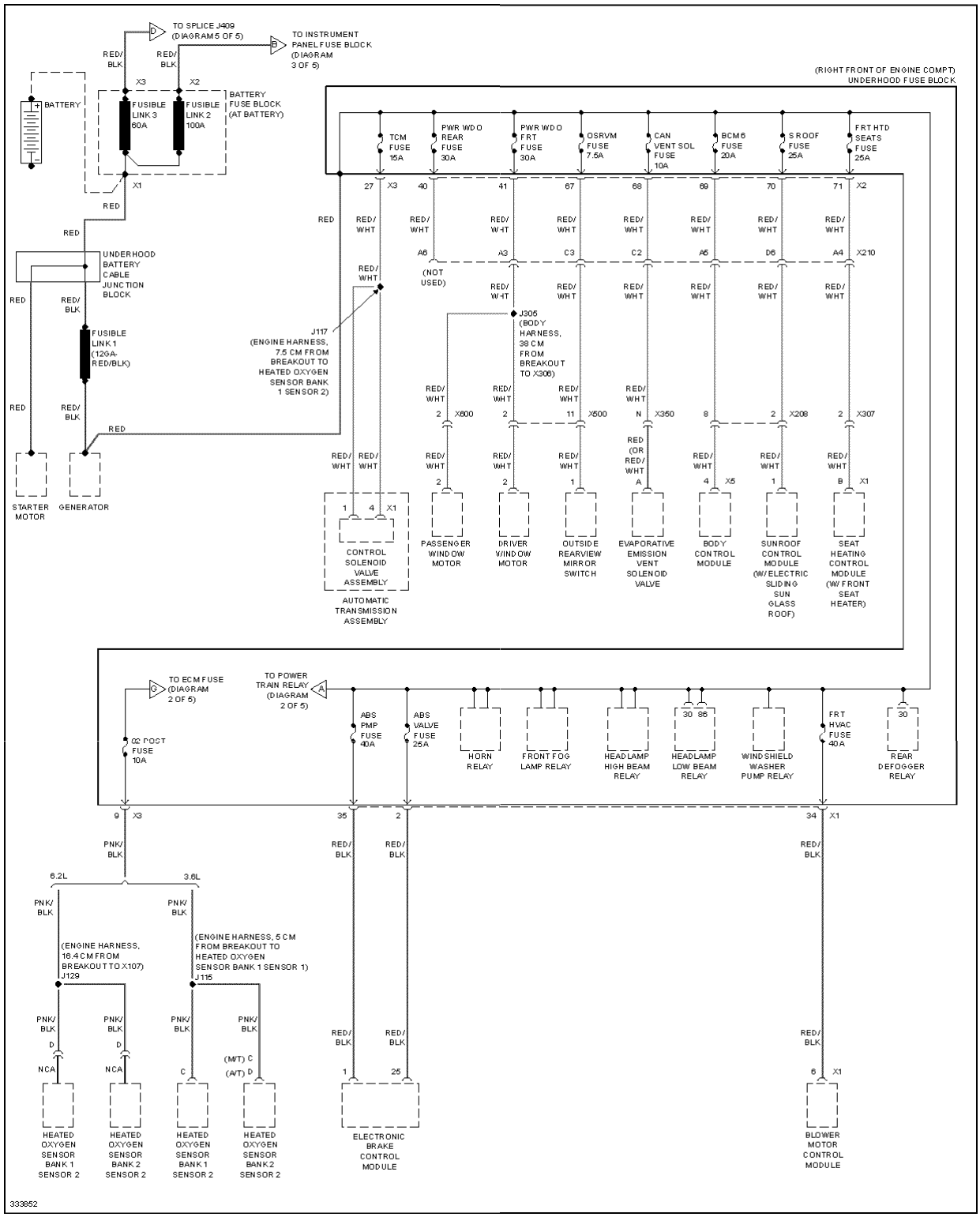


Fig. 46: Power Distribution Circuit (1 of 5)

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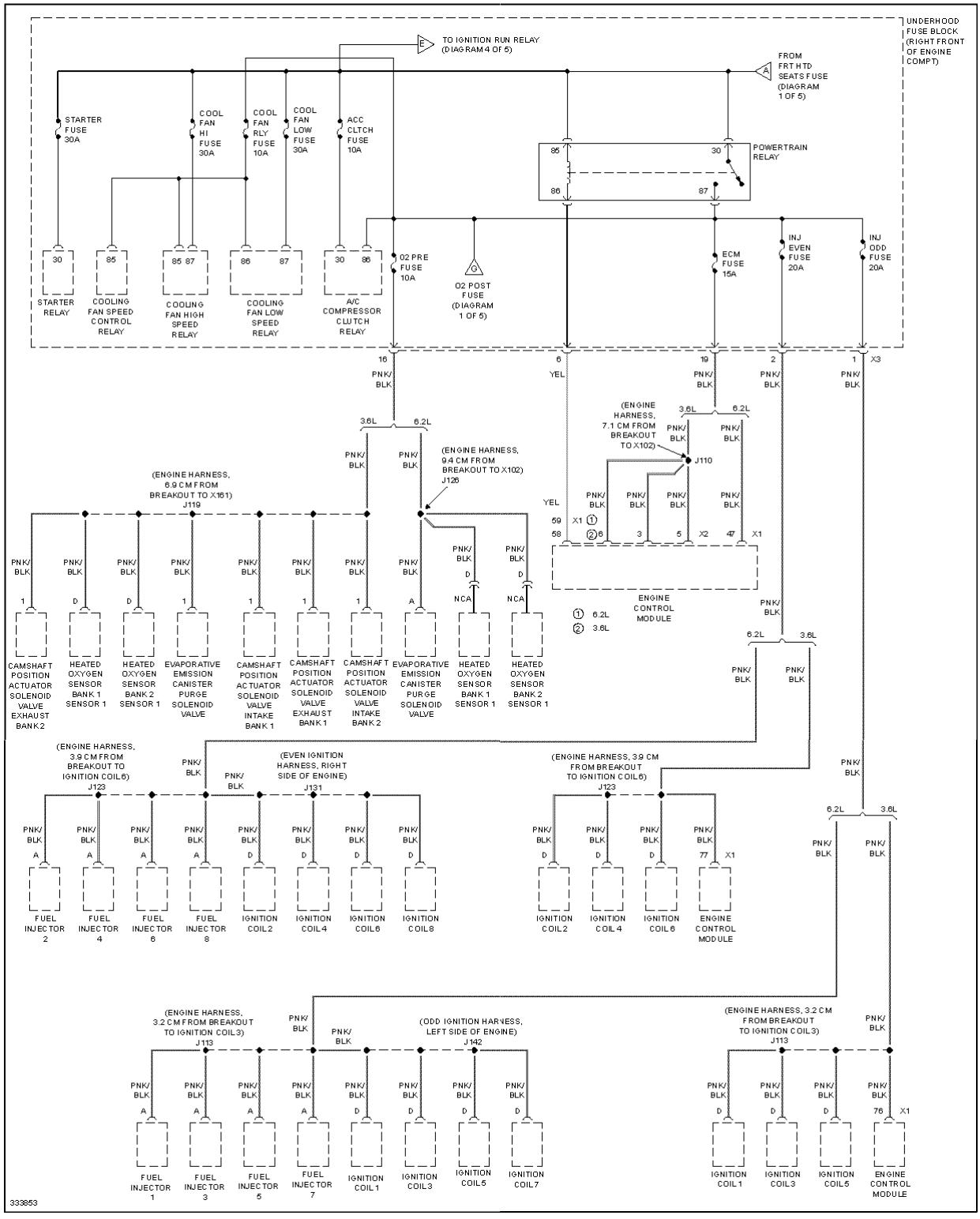


Fig. 47: Power Distribution Circuit (2 of 5)

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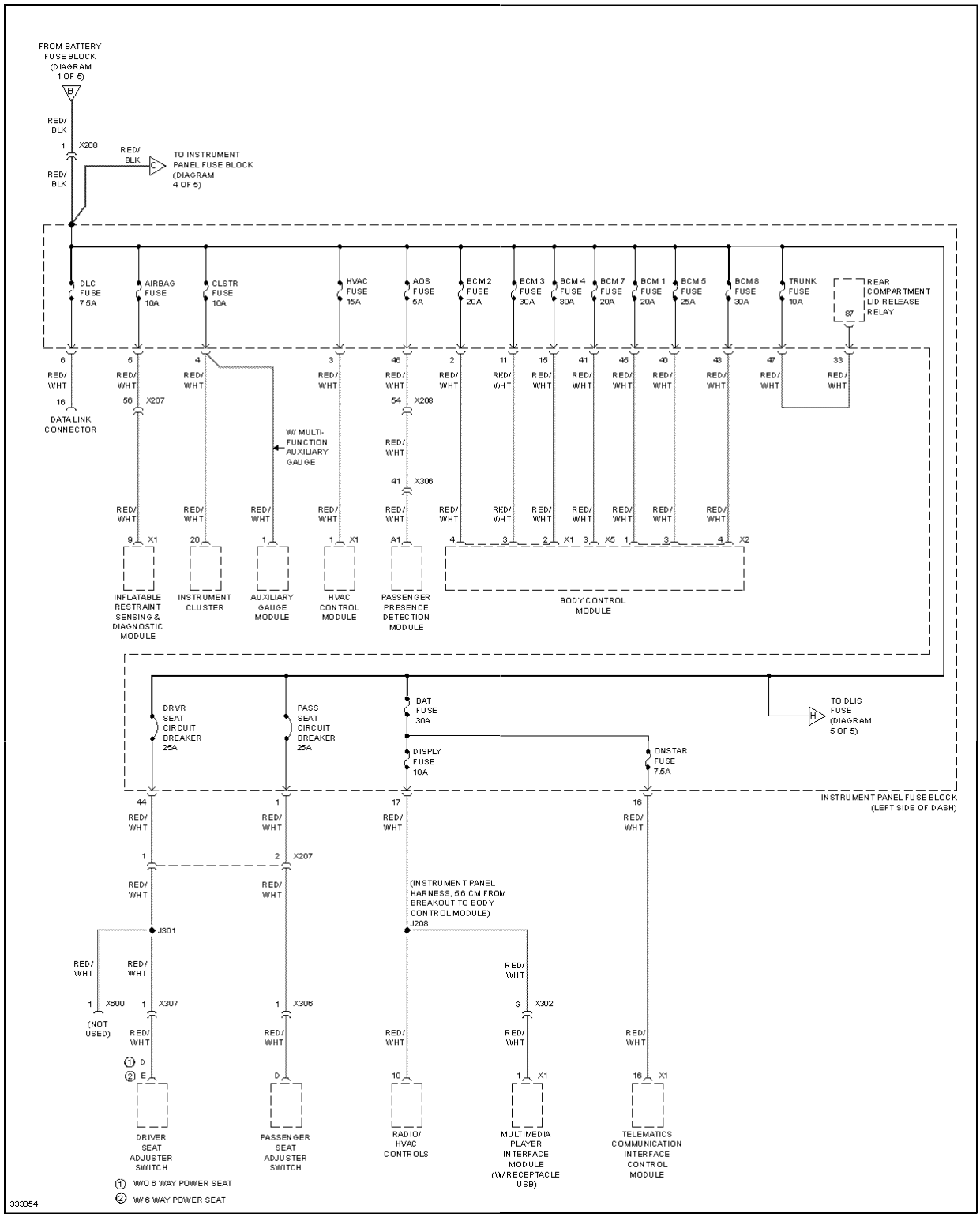


Fig. 48: Power Distribution Circuit (3 of 5)

cardiagn.com

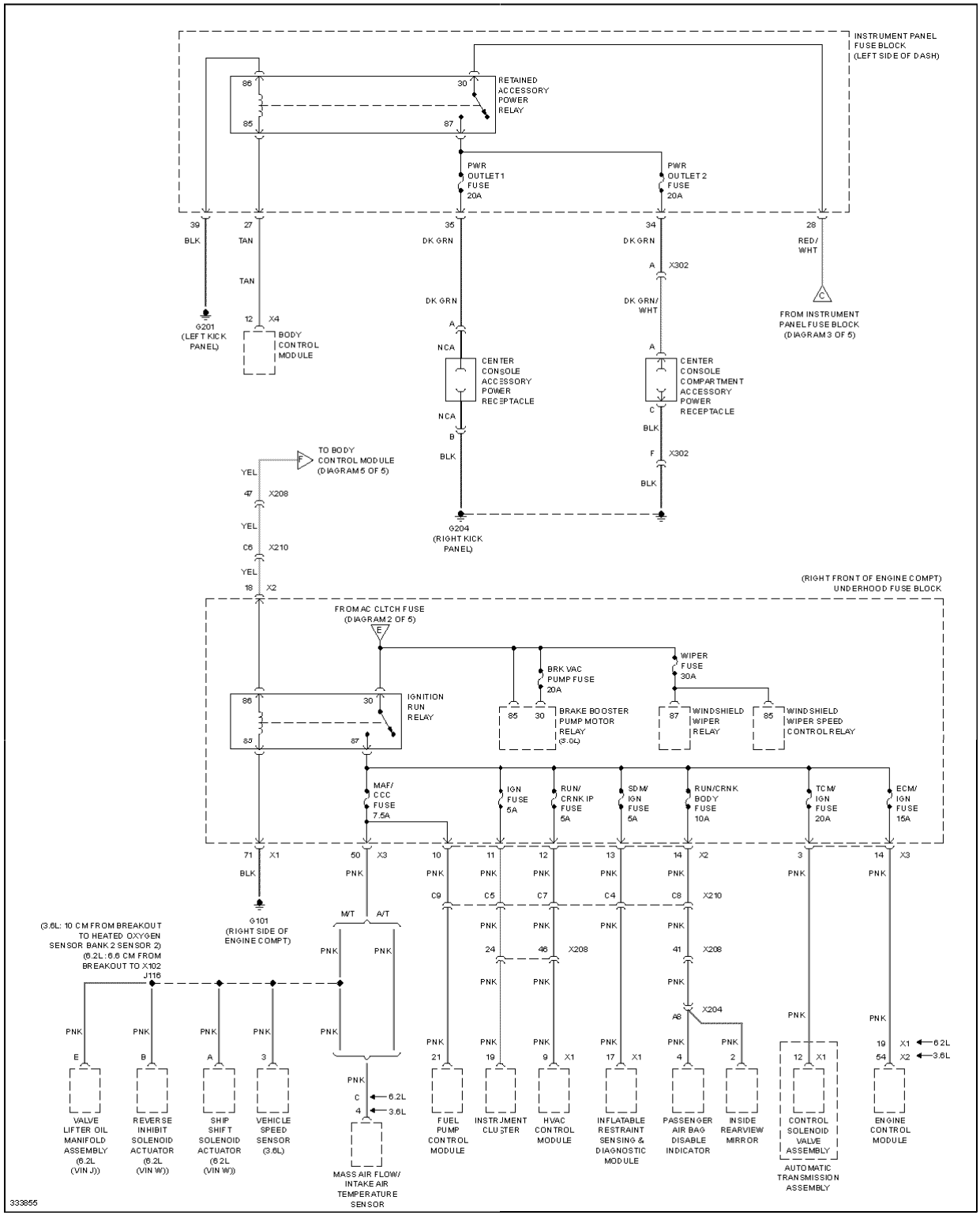


Fig. 49: Power Distribution Circuit (4 of 5)

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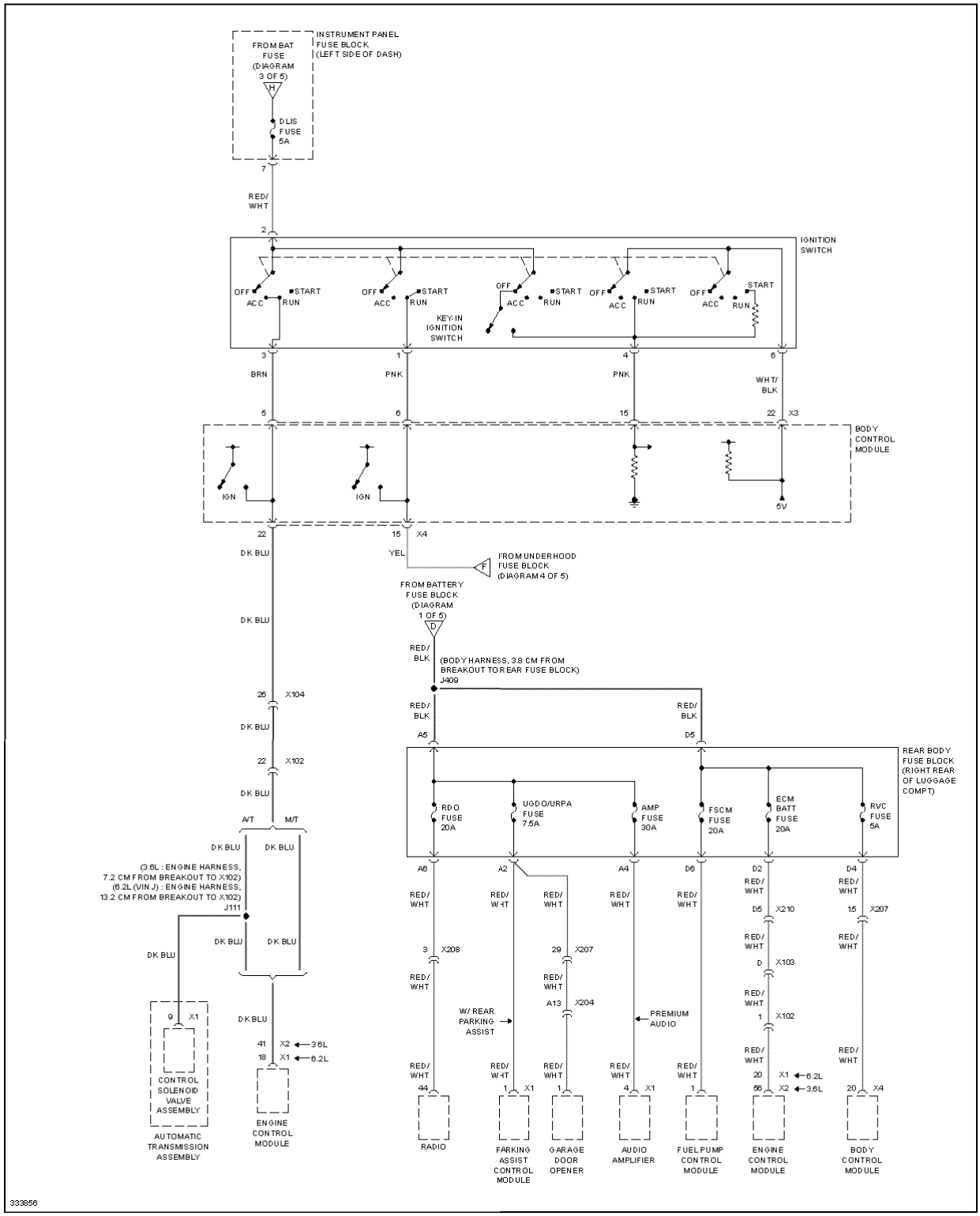


Fig. 50: Power Distribution Circuit (5 of 5)

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POWER DOOR LOCKS

cardiagn.com

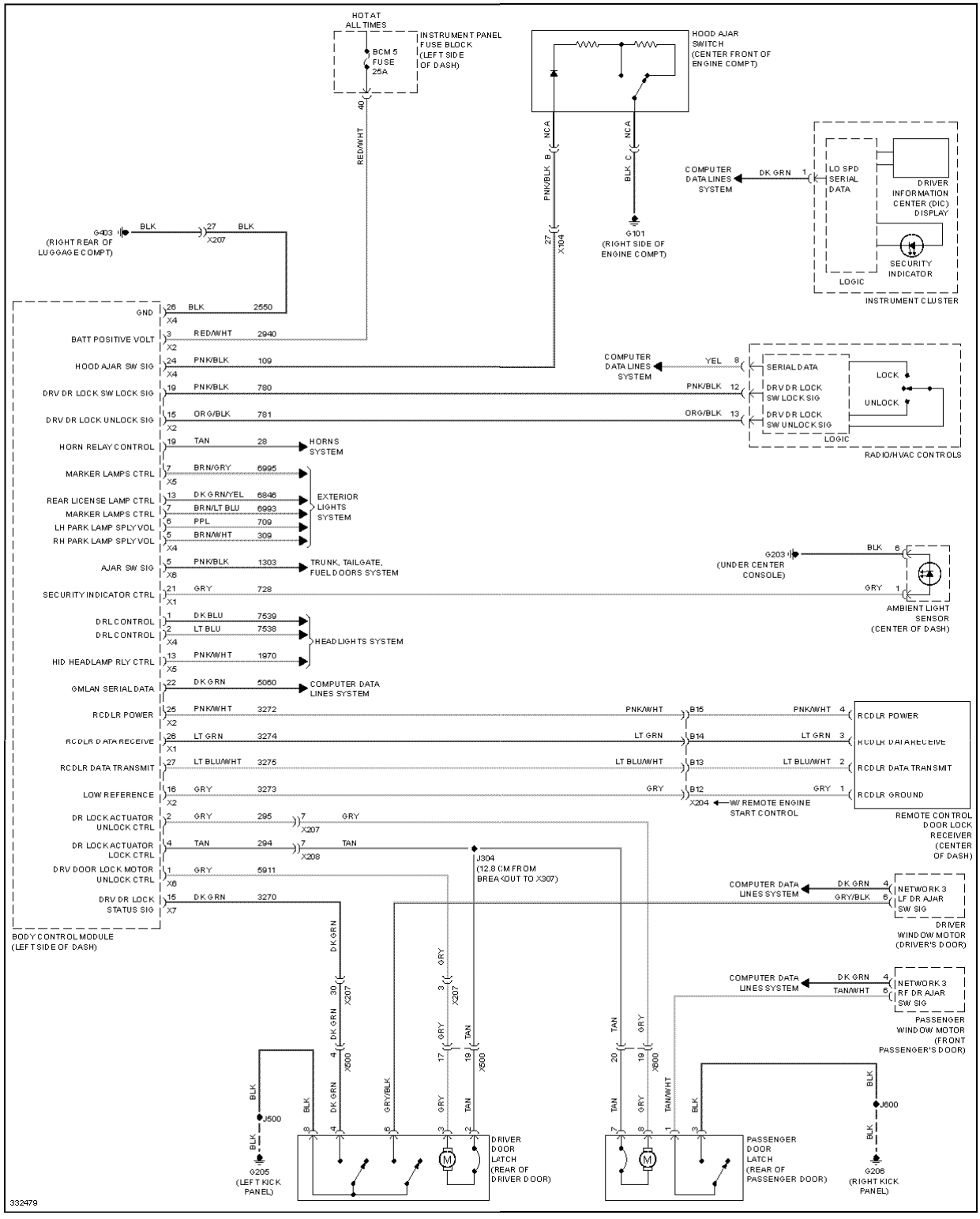


Fig. 51: Power Door Locks Circuit

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POWER MIRRORS

cardiagn.com

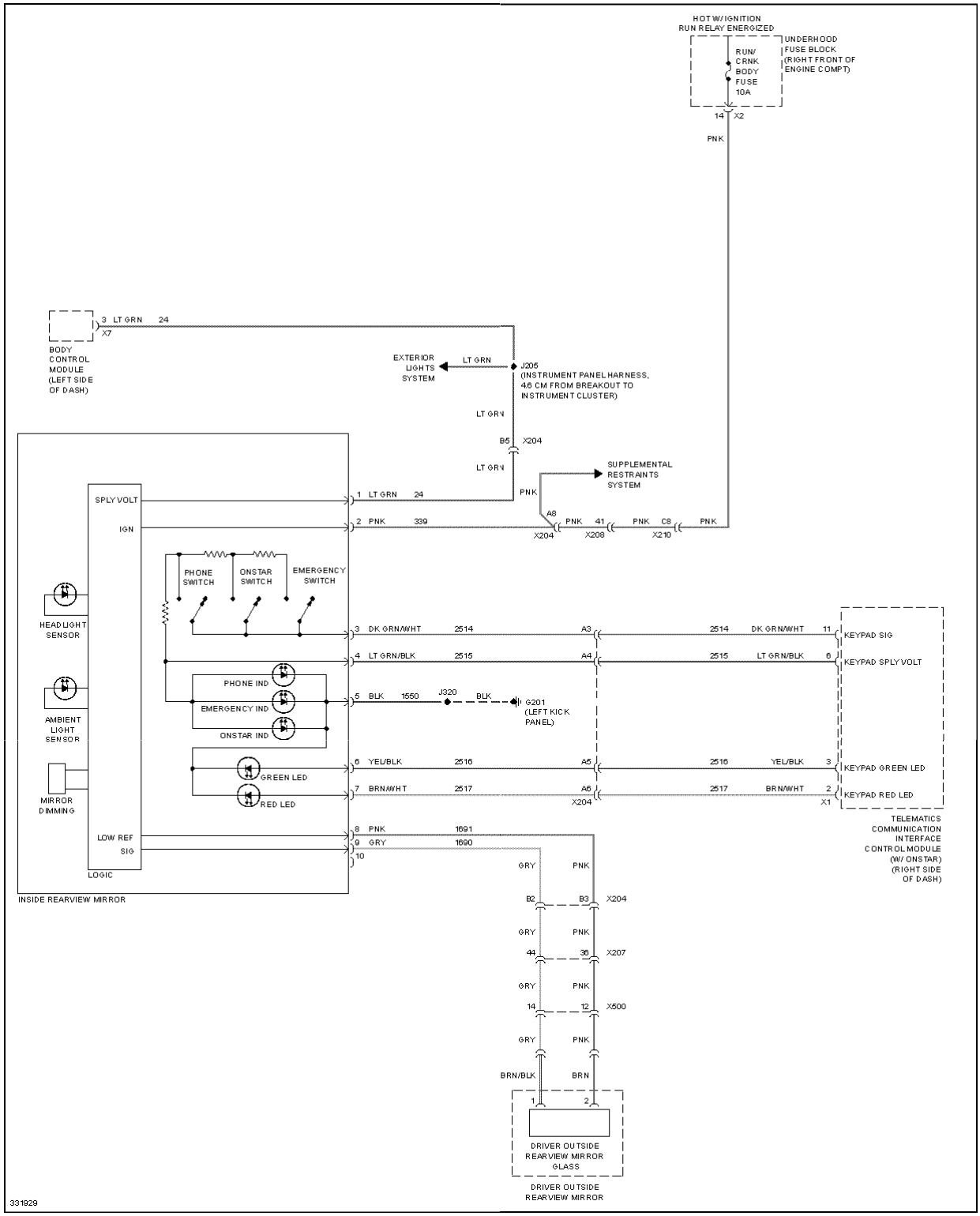


Fig. 52: Electrochromic Mirror Circuit

cardiagn.com

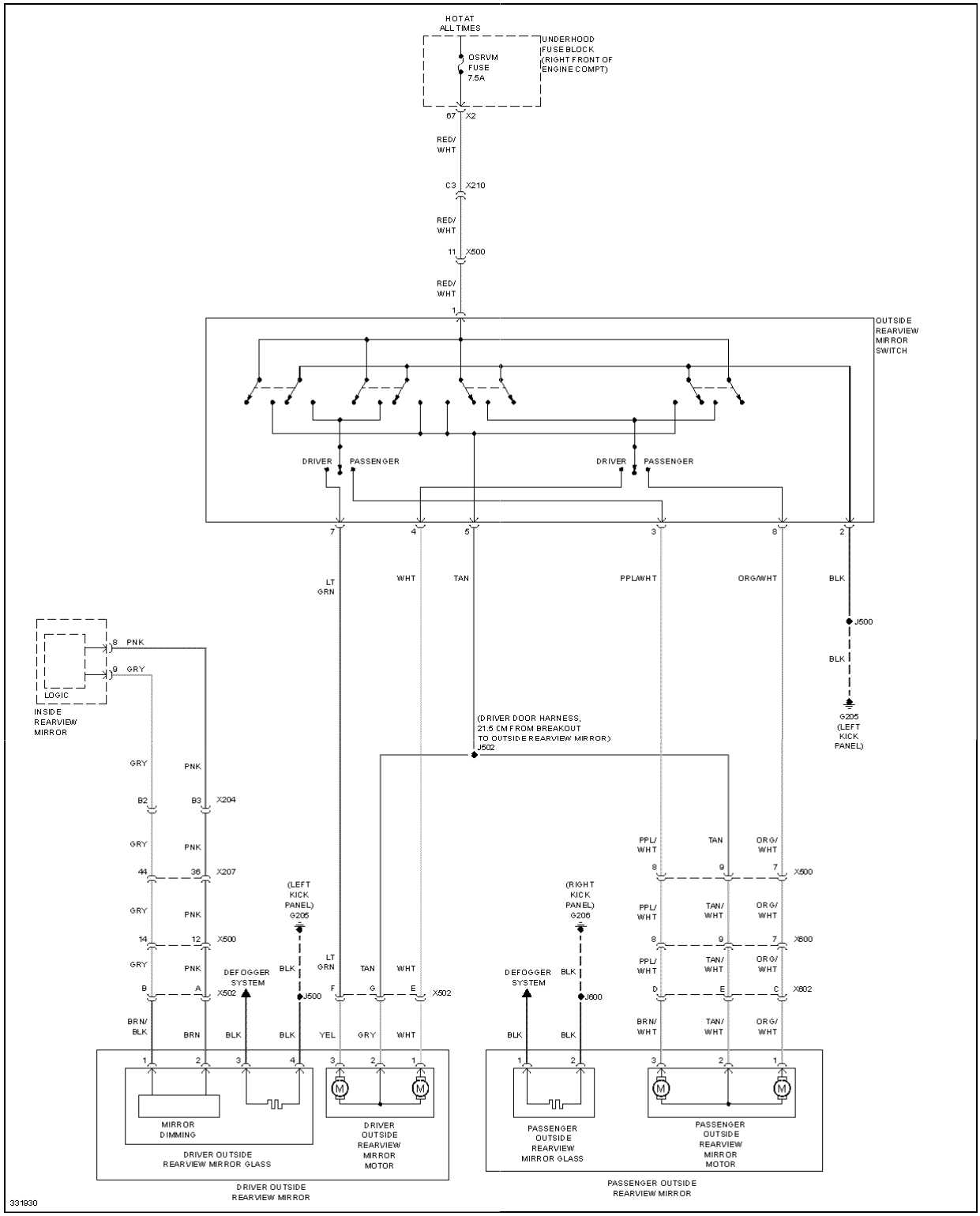


Fig. 53: Power Mirrors Circuit

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POWER SEATS

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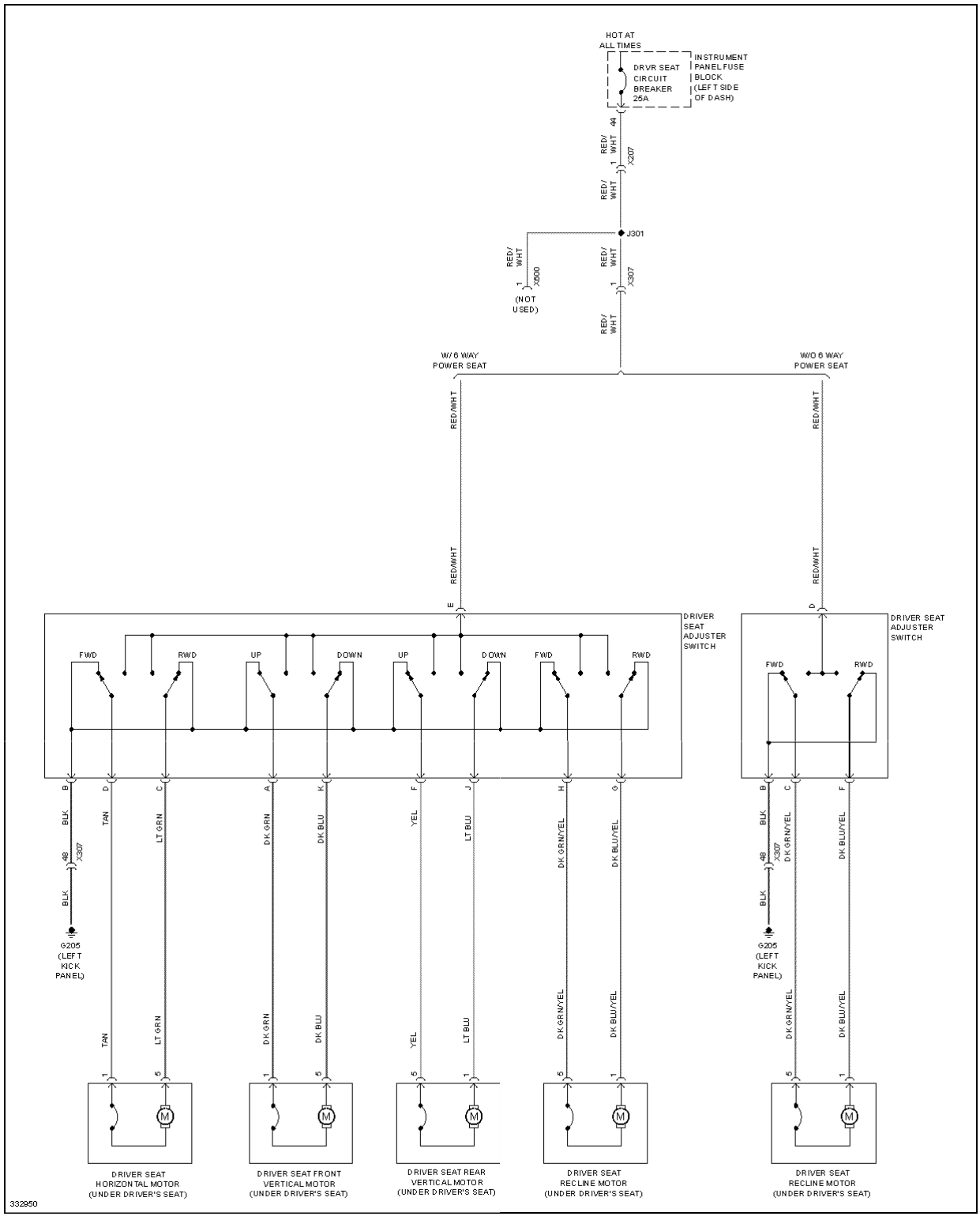


Fig. 54: Driver Power Seat Circuit

cardiagn.com

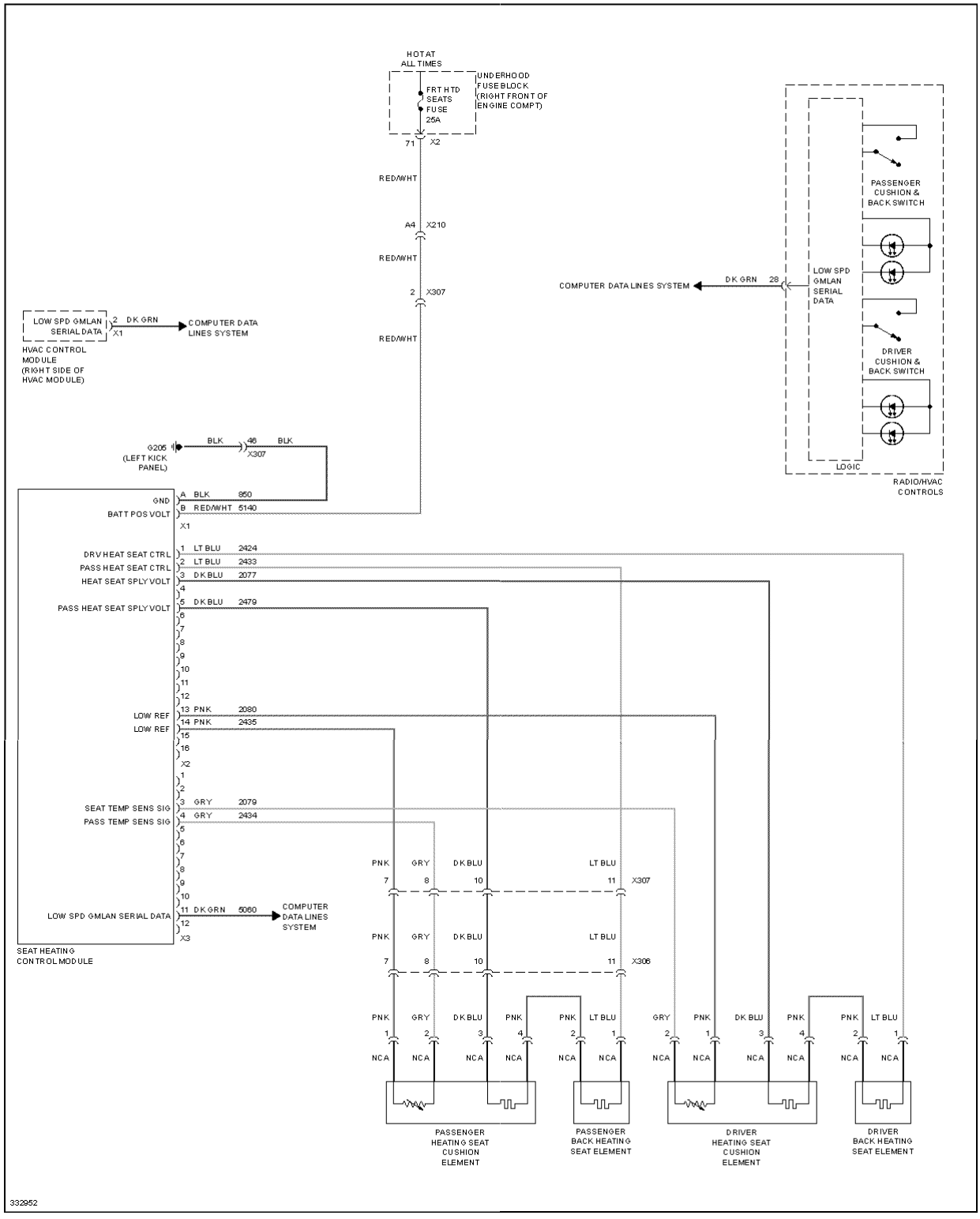


Fig. 55: Heated Seats Circuit

cardiagn.com

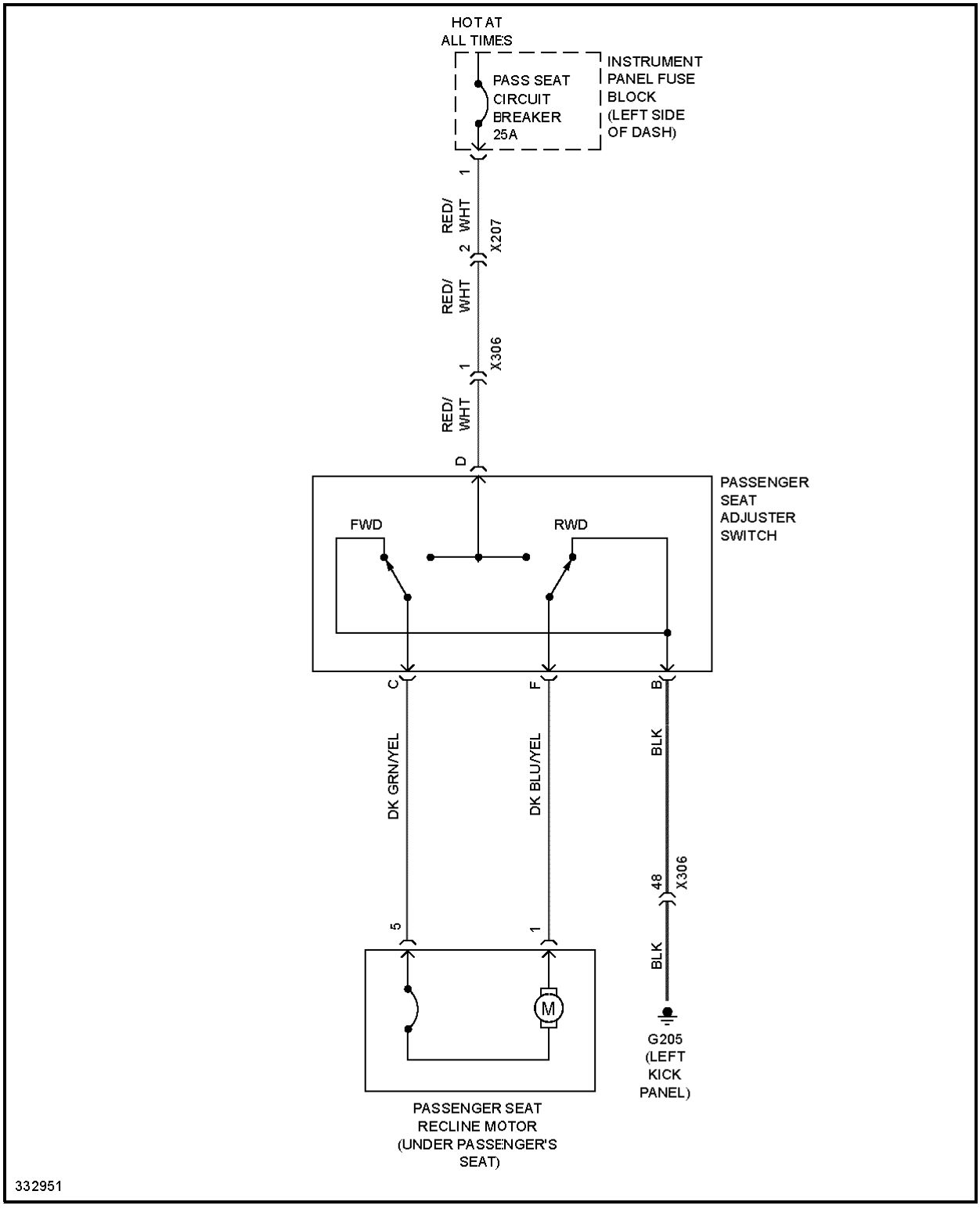


Fig. 56: Passenger Power Seat Circuit

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POWER TOP/SUNROOF

cardiagn.com

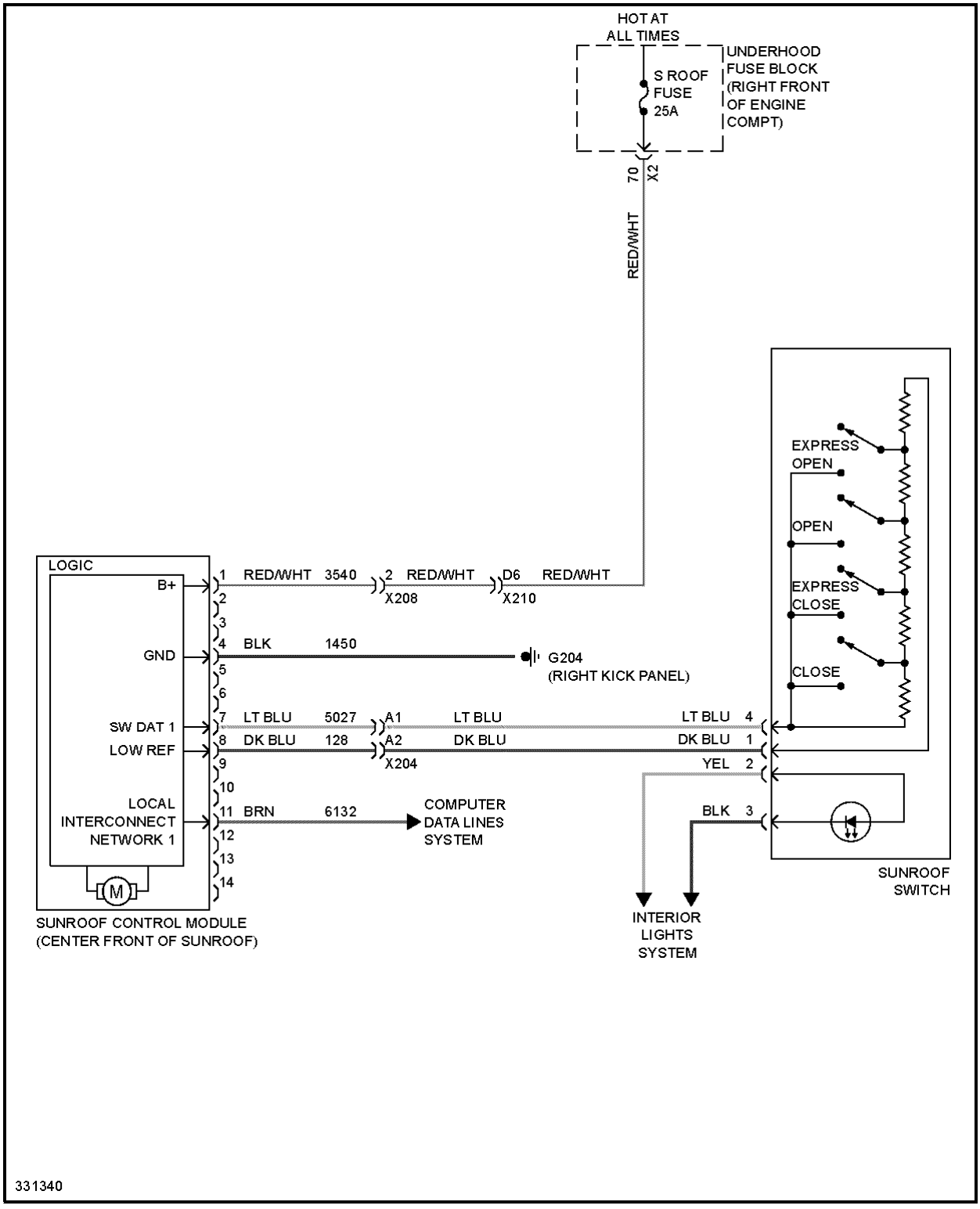


Fig. 57: Power Top/Sunroof Circuit

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POWER WINDOWS

cardiagn.com

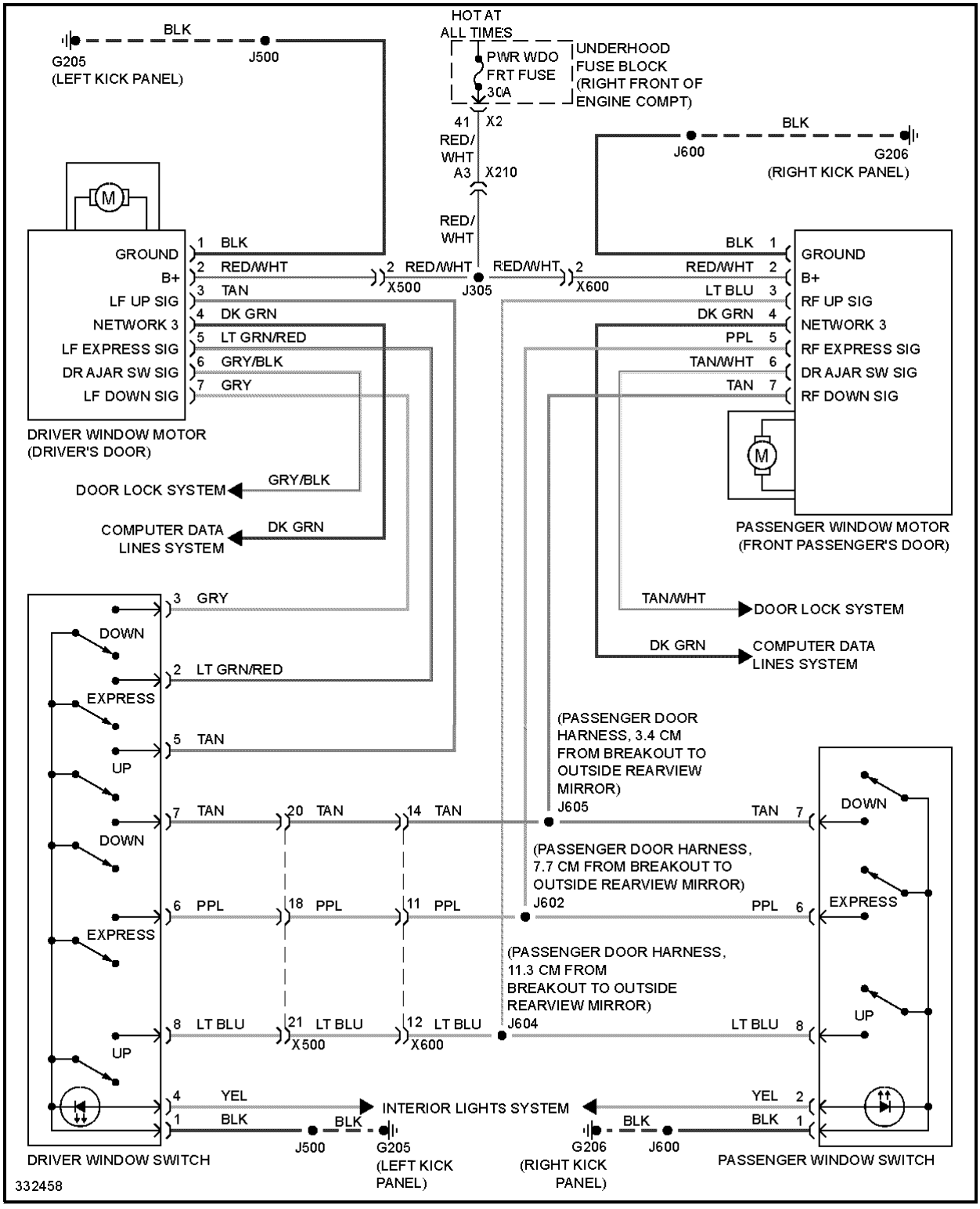


Fig. 58: Power Windows Circuit

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RADIO

cardiagn.com

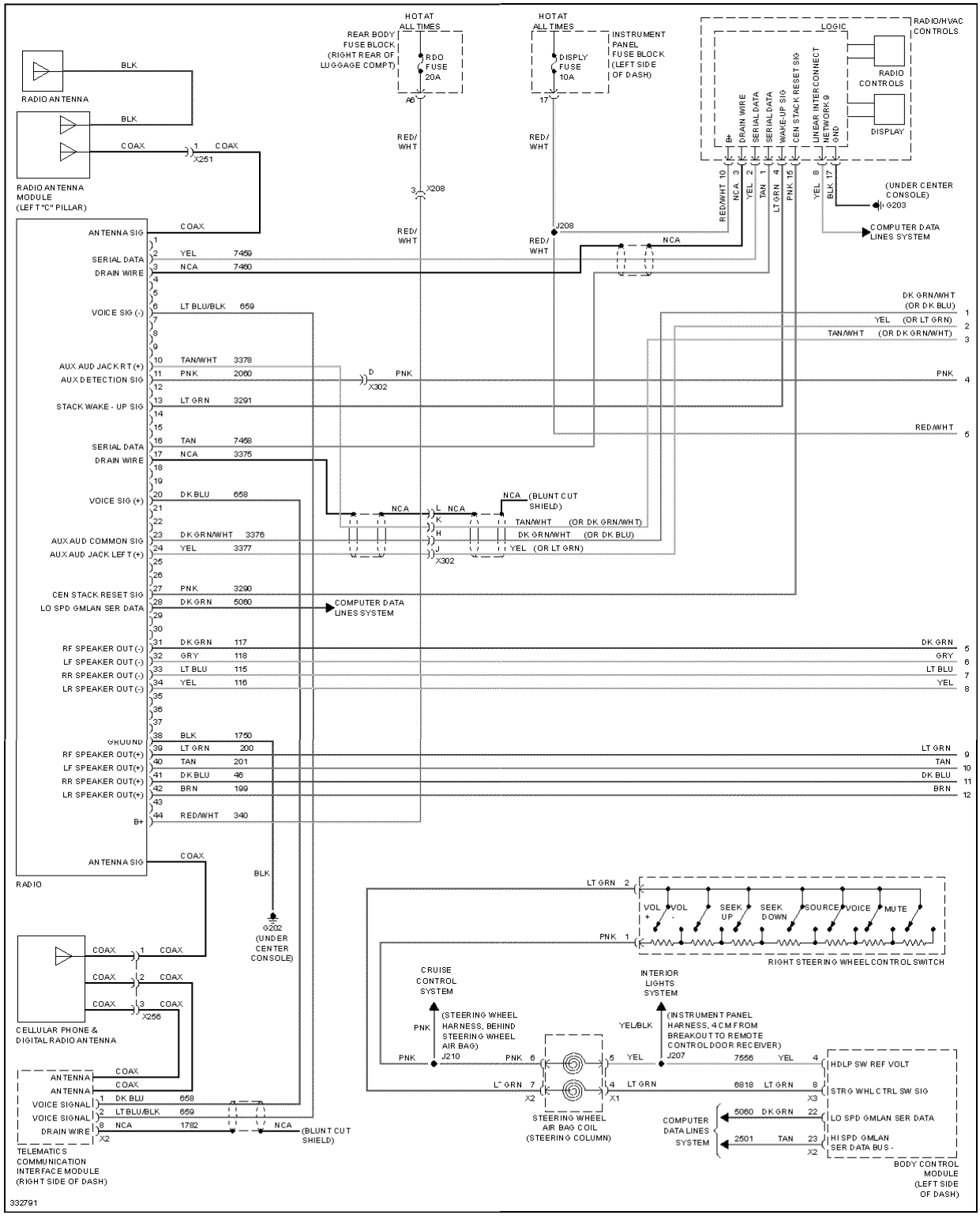


Fig. 59: Base Radio Circuit (1 of 2)

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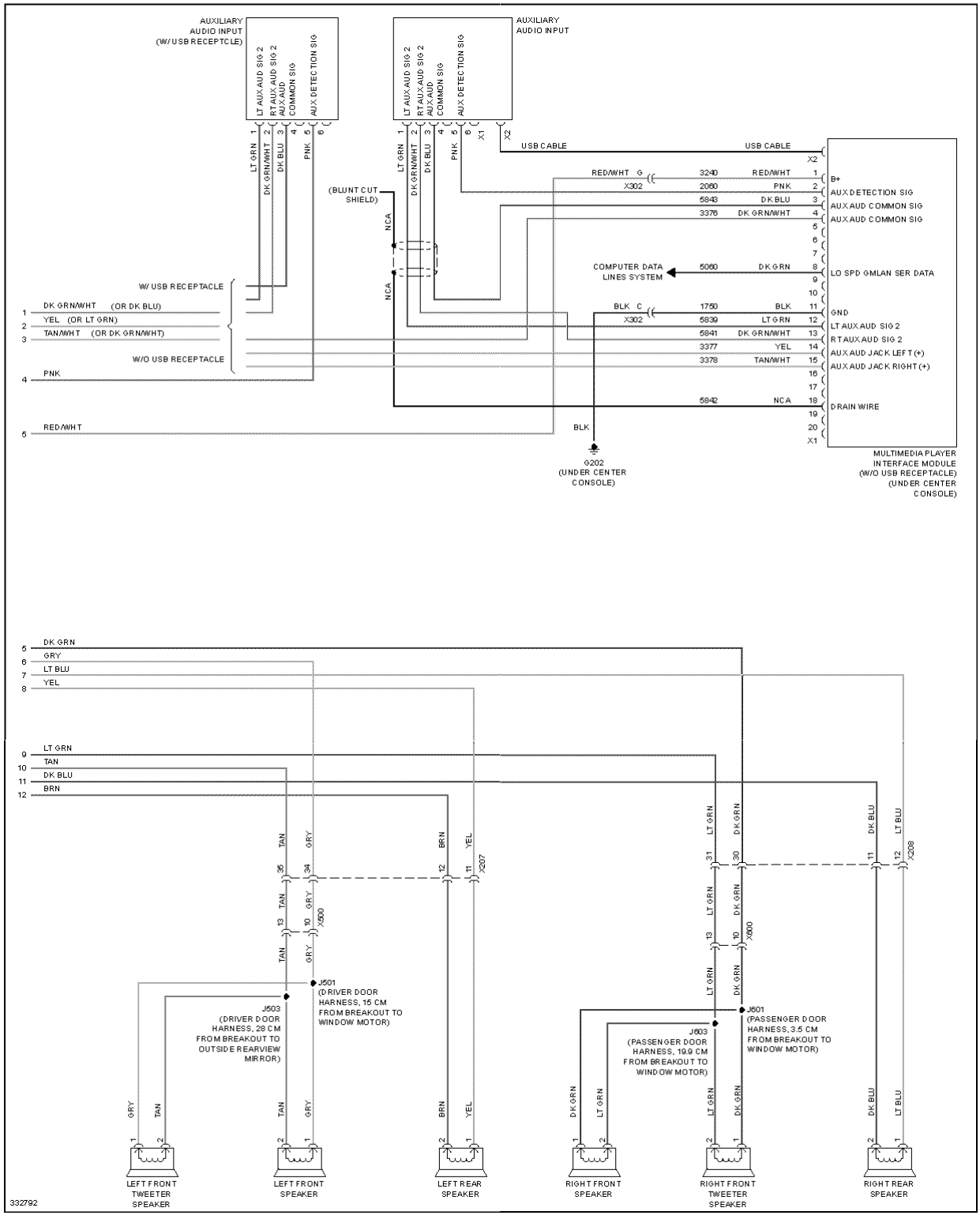


Fig. 60: Base Radio Circuit (2 of 2)

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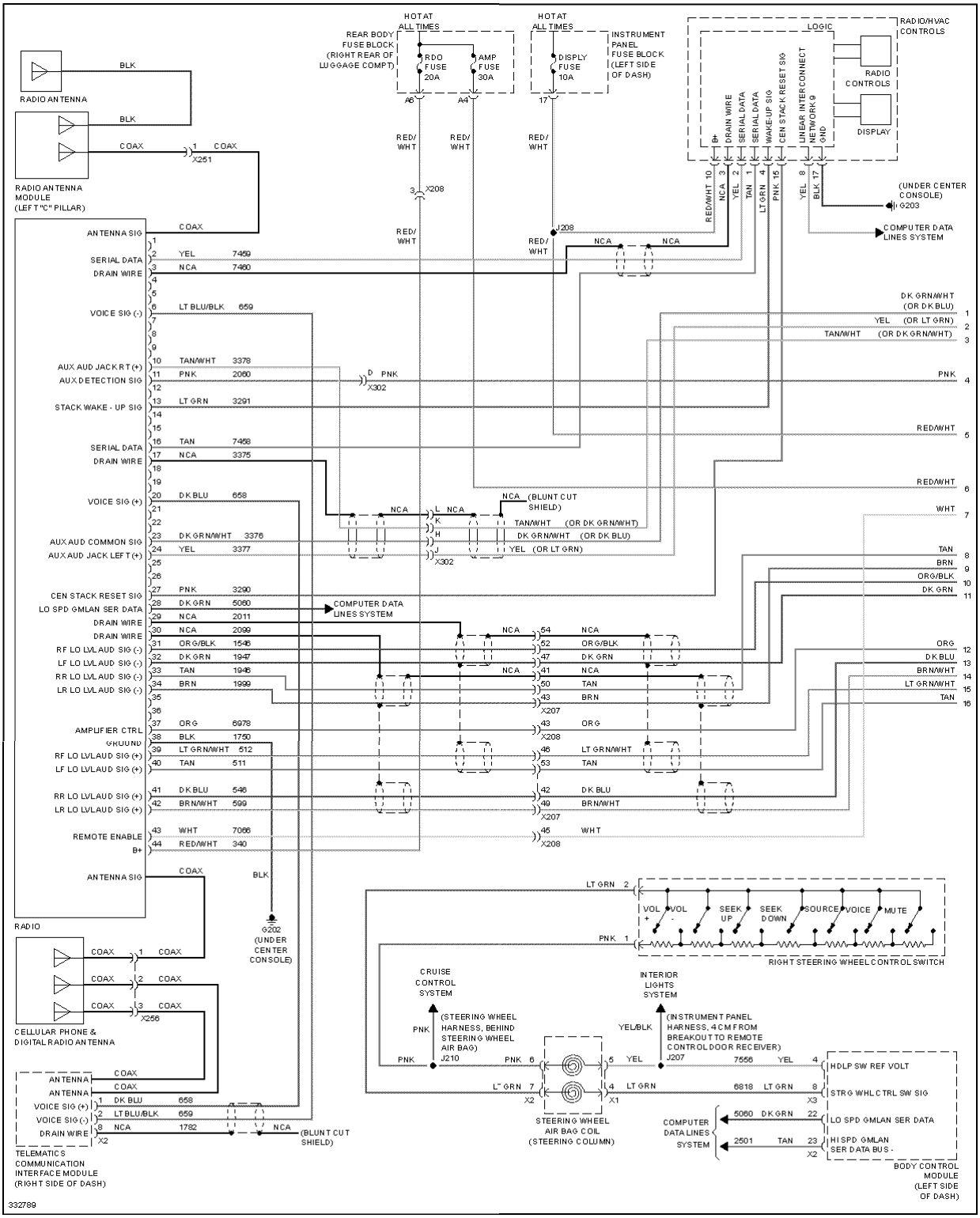


Fig. 61: Premium Radio Circuit (1 of 2)

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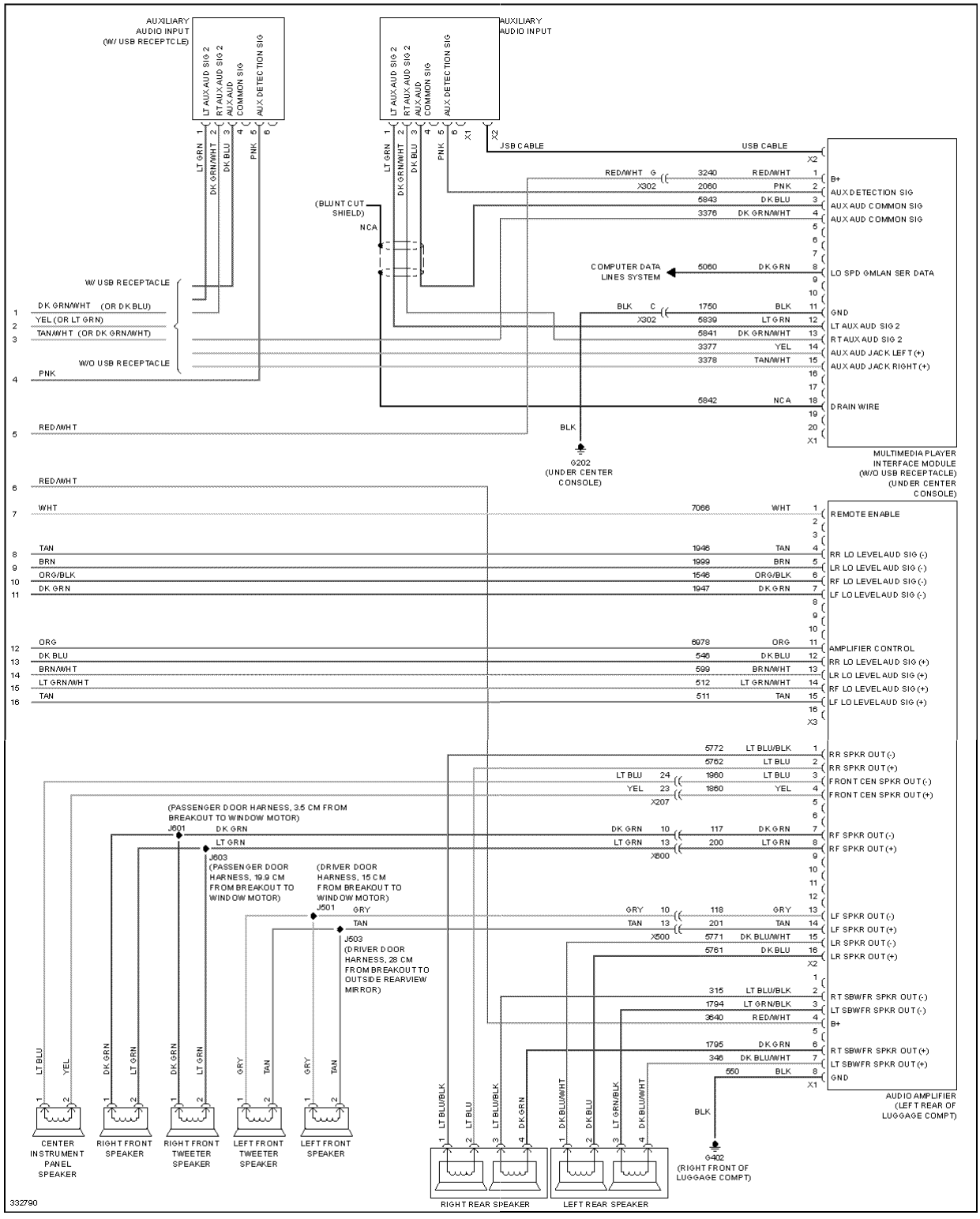


Fig. 62: Premium Radio Circuit (2 of 2)

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SHIFT INTERLOCK

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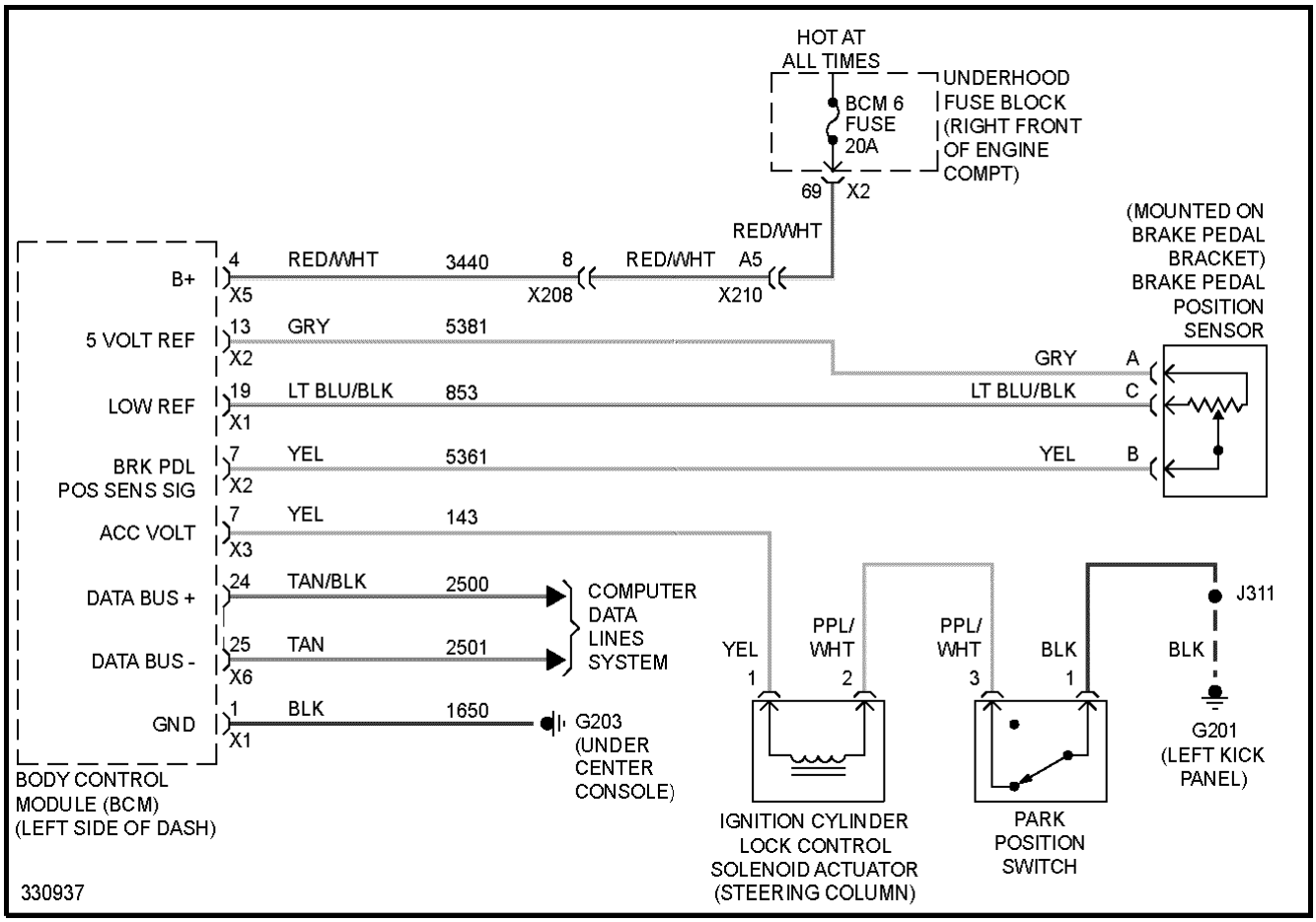


Fig. 63: Ignition Lock Solenoid Circuit

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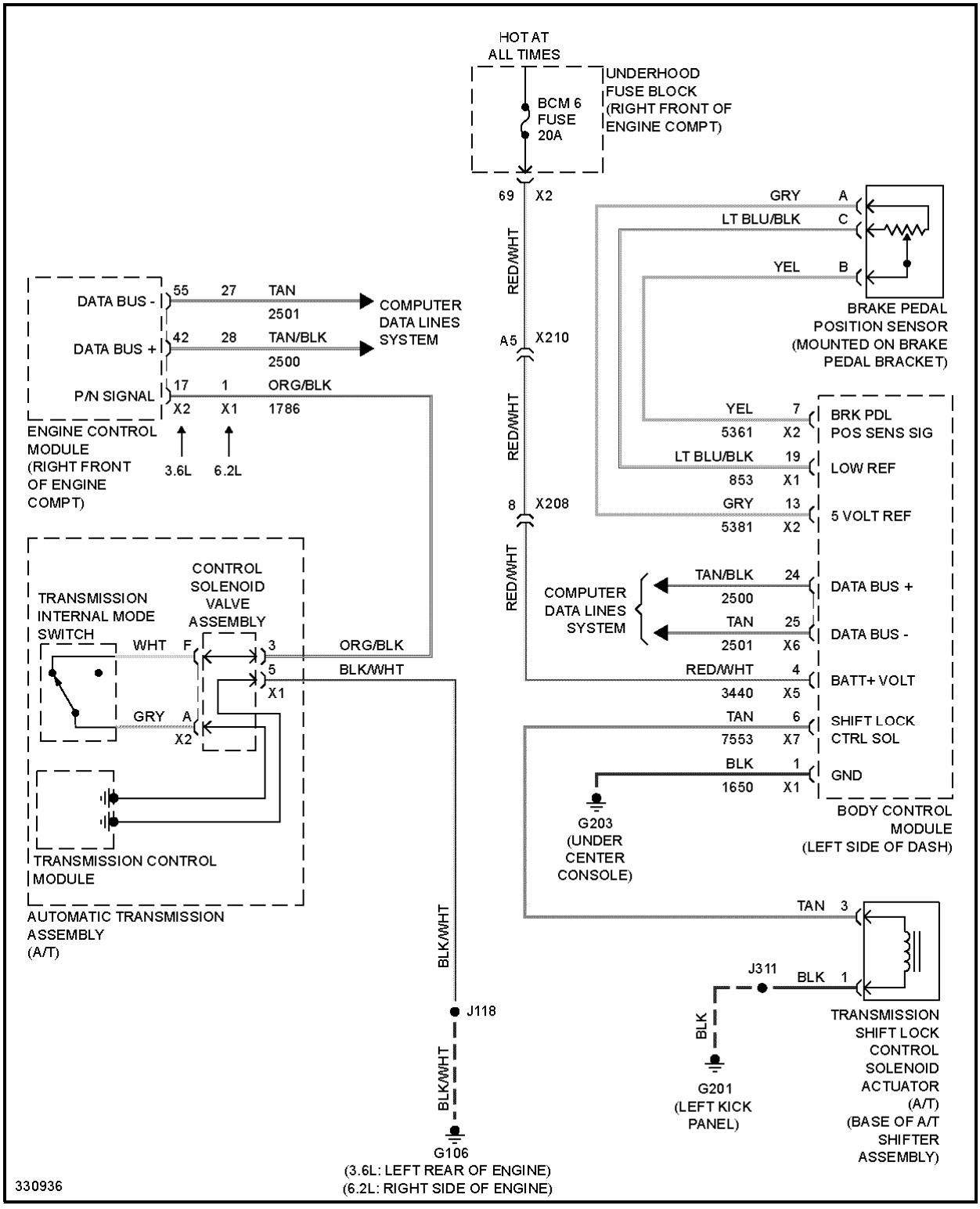


Fig. 64: Shift Interlock Circuit

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STARTING/CHARGING

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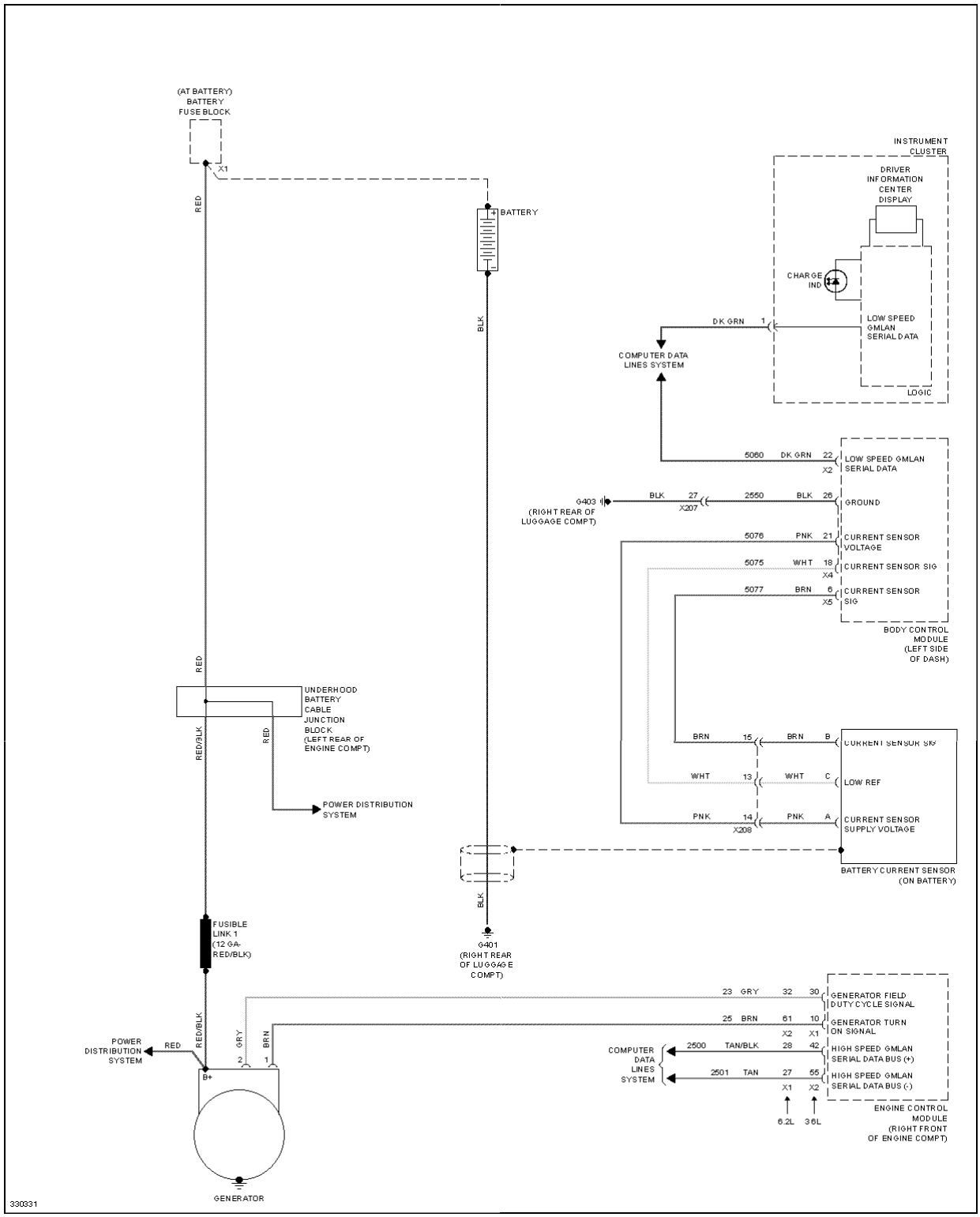


Fig. 65: Charging Circuit

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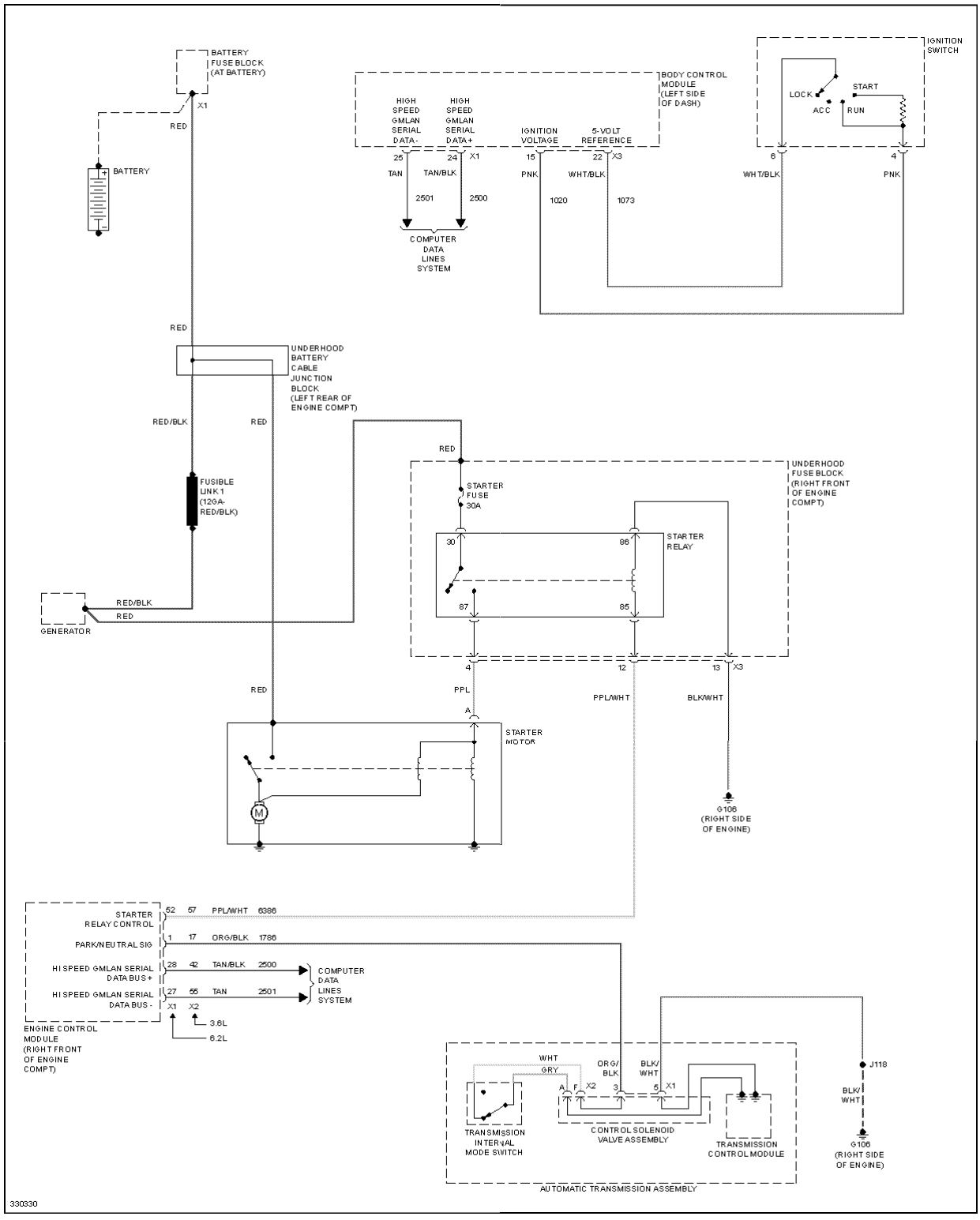


Fig. 66: Starting Circuit

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SUPPLEMENTAL RESTRAINTS

cardiagn.com

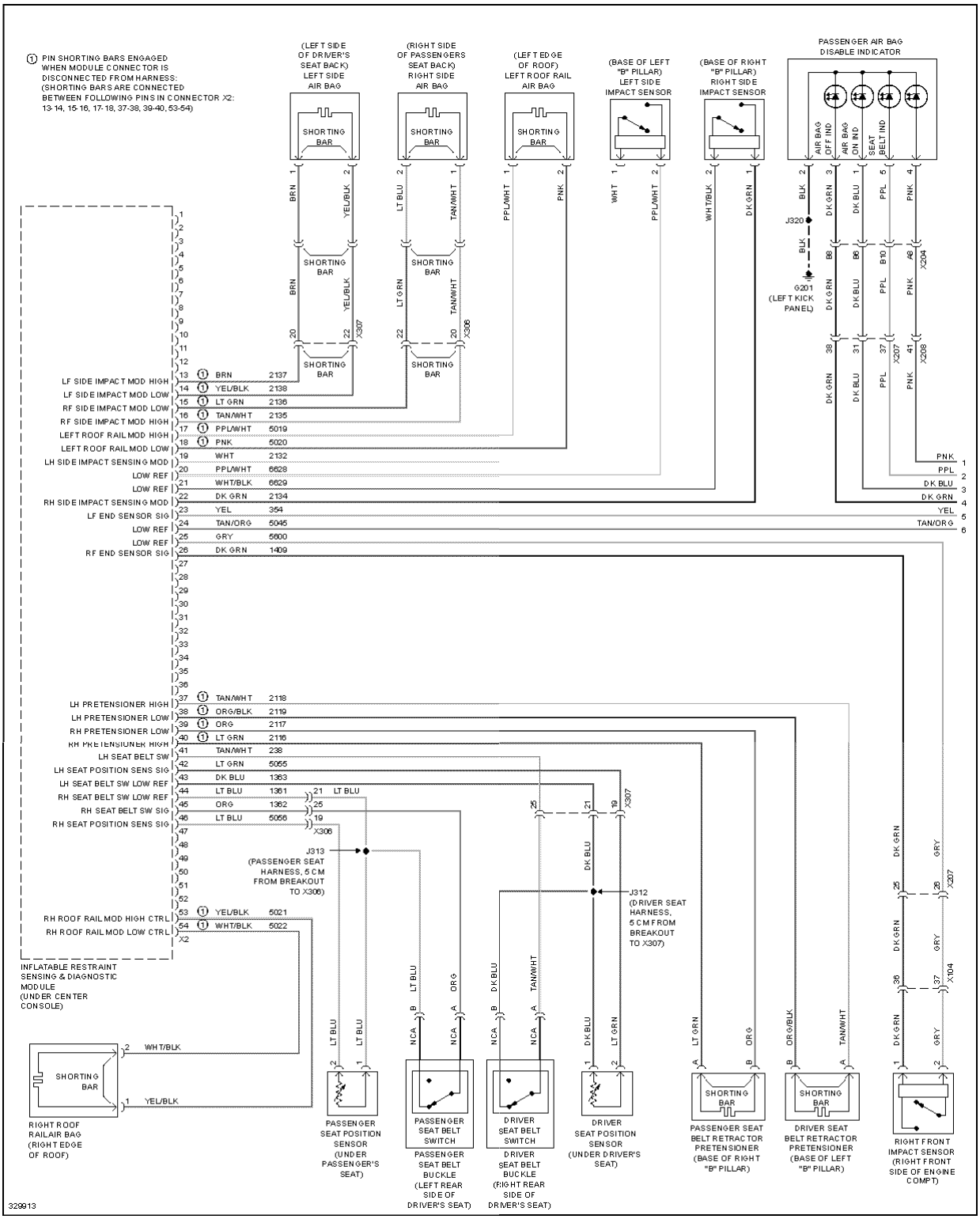


Fig. 67: Supplemental Restraints Circuit (1 of 2)

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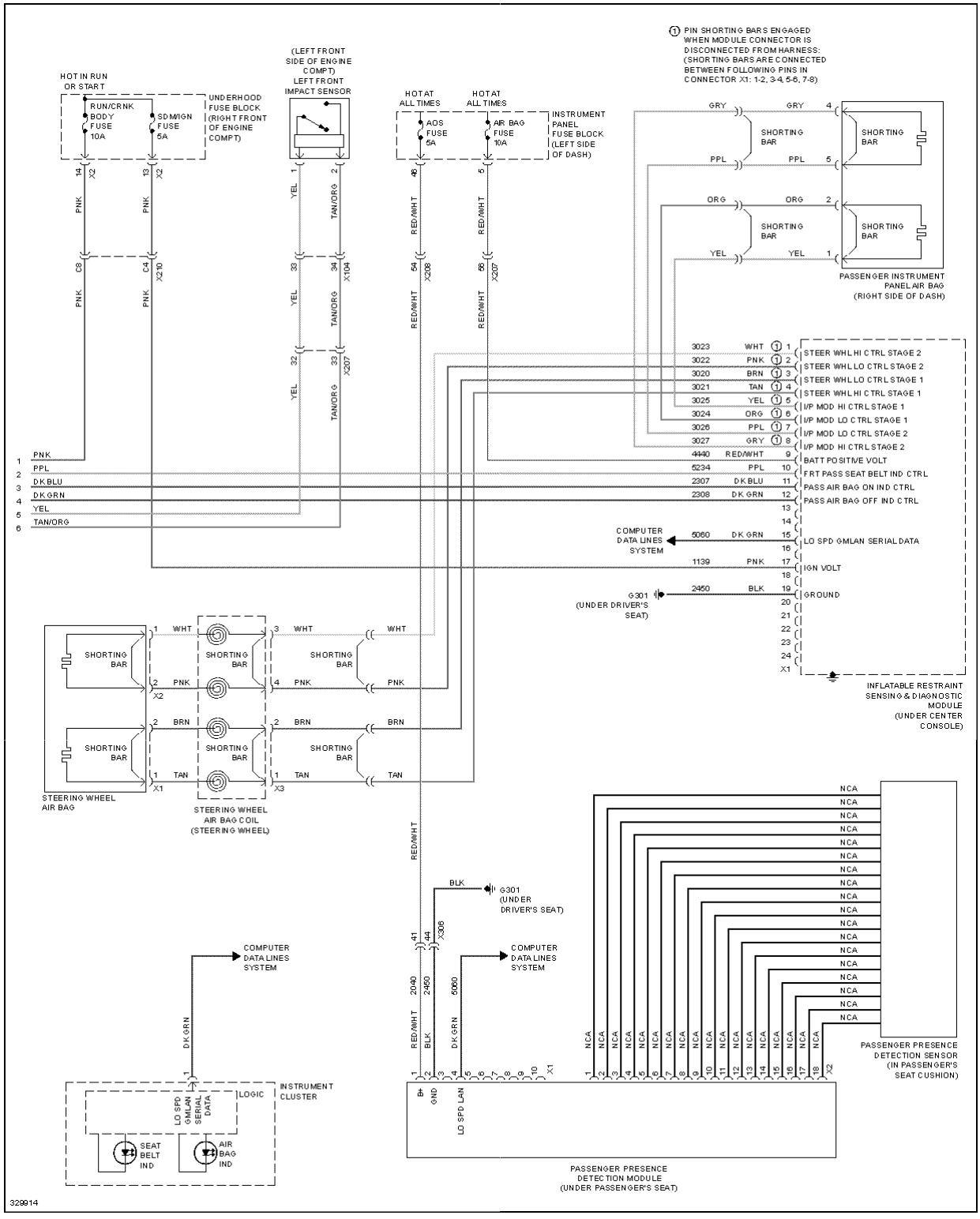


Fig. 68: Supplemental Restraints Circuit (2 of 2)

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TRANSMISSION

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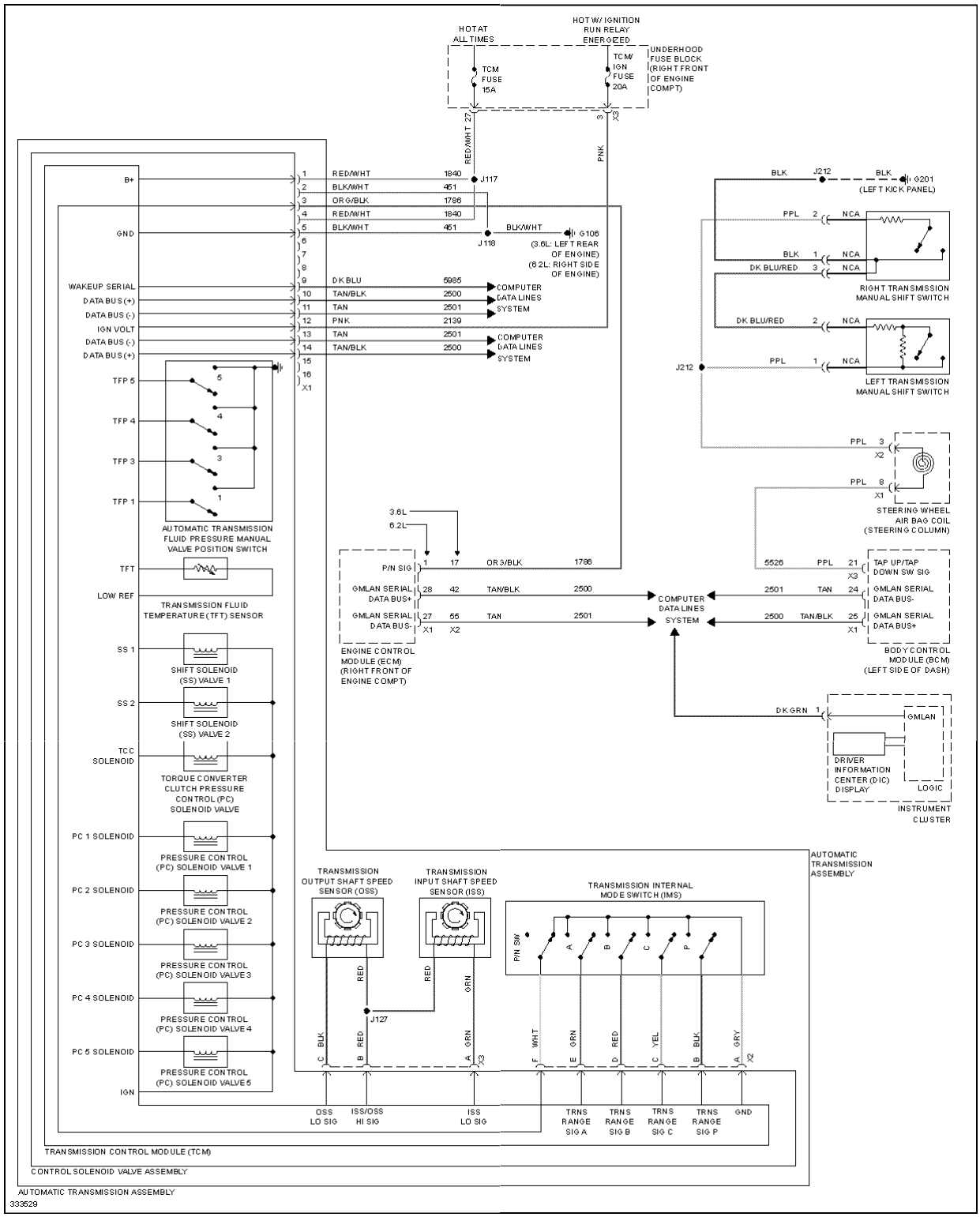


Fig. 69: Transmission Circuit

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TRUNK, TAILGATE, FUEL DOOR

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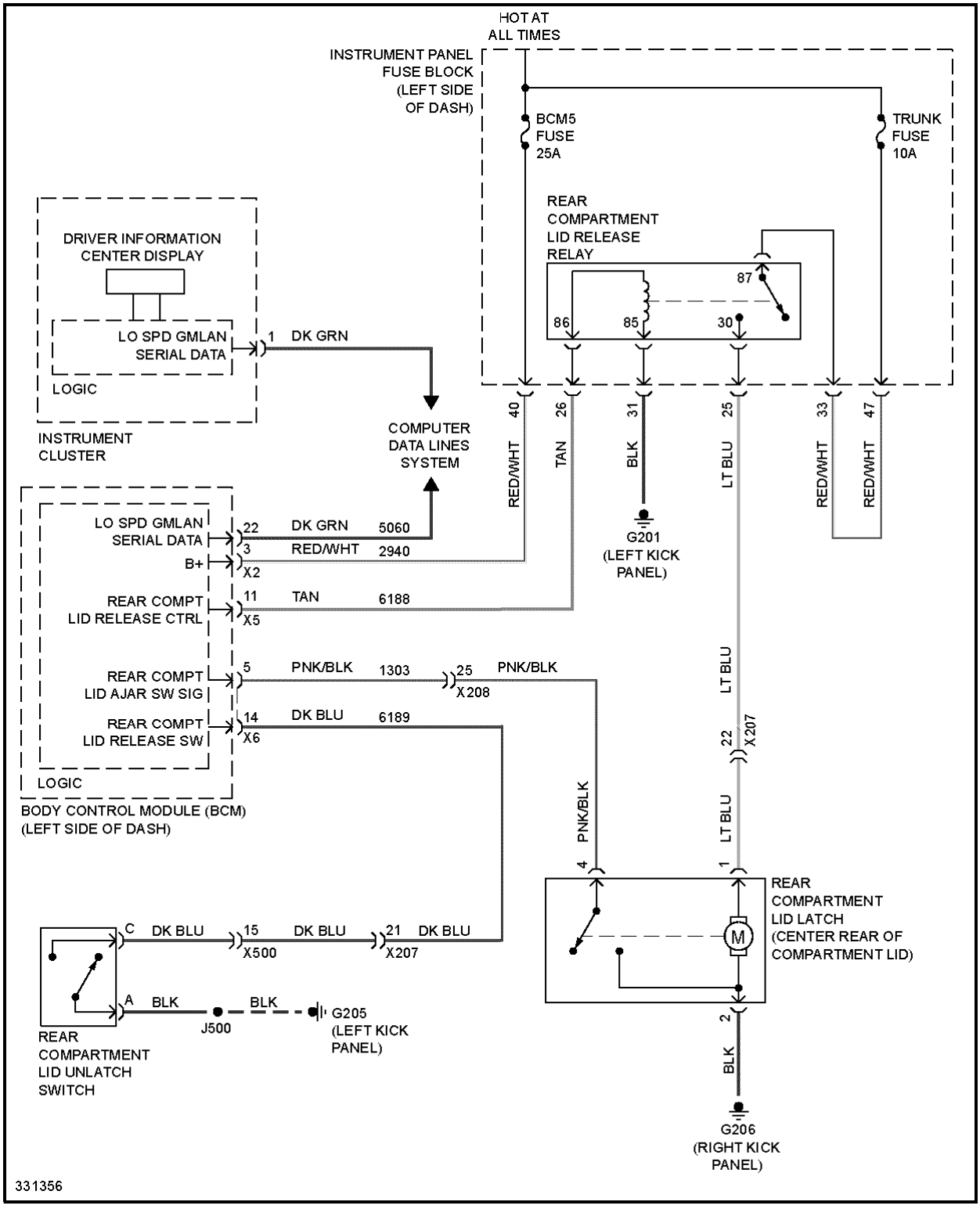


Fig. 70: Trunk Release Circuit

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WARNING SYSTEMS

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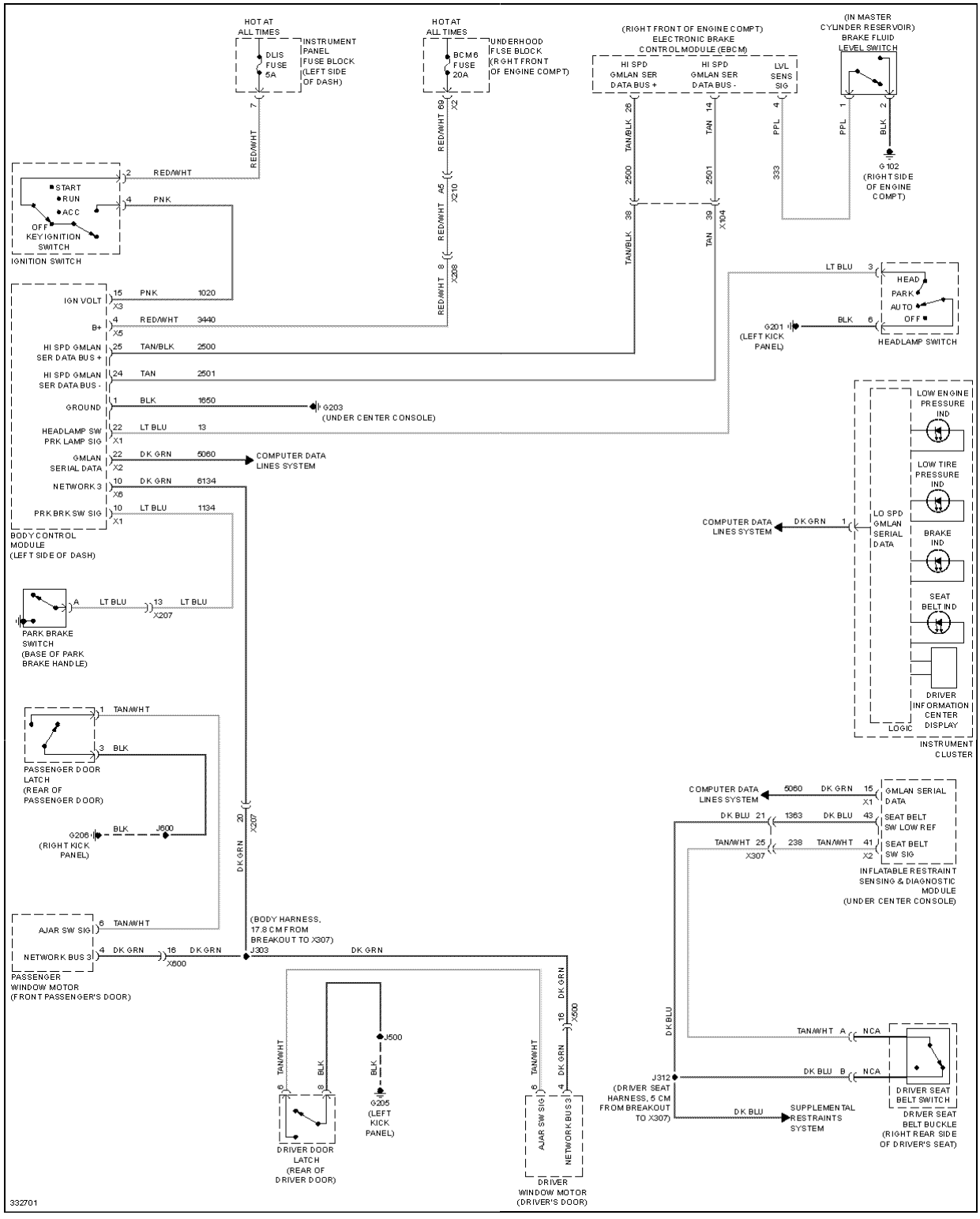


Fig. 71: Warning Systems Circuit

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WIPER/WASHER

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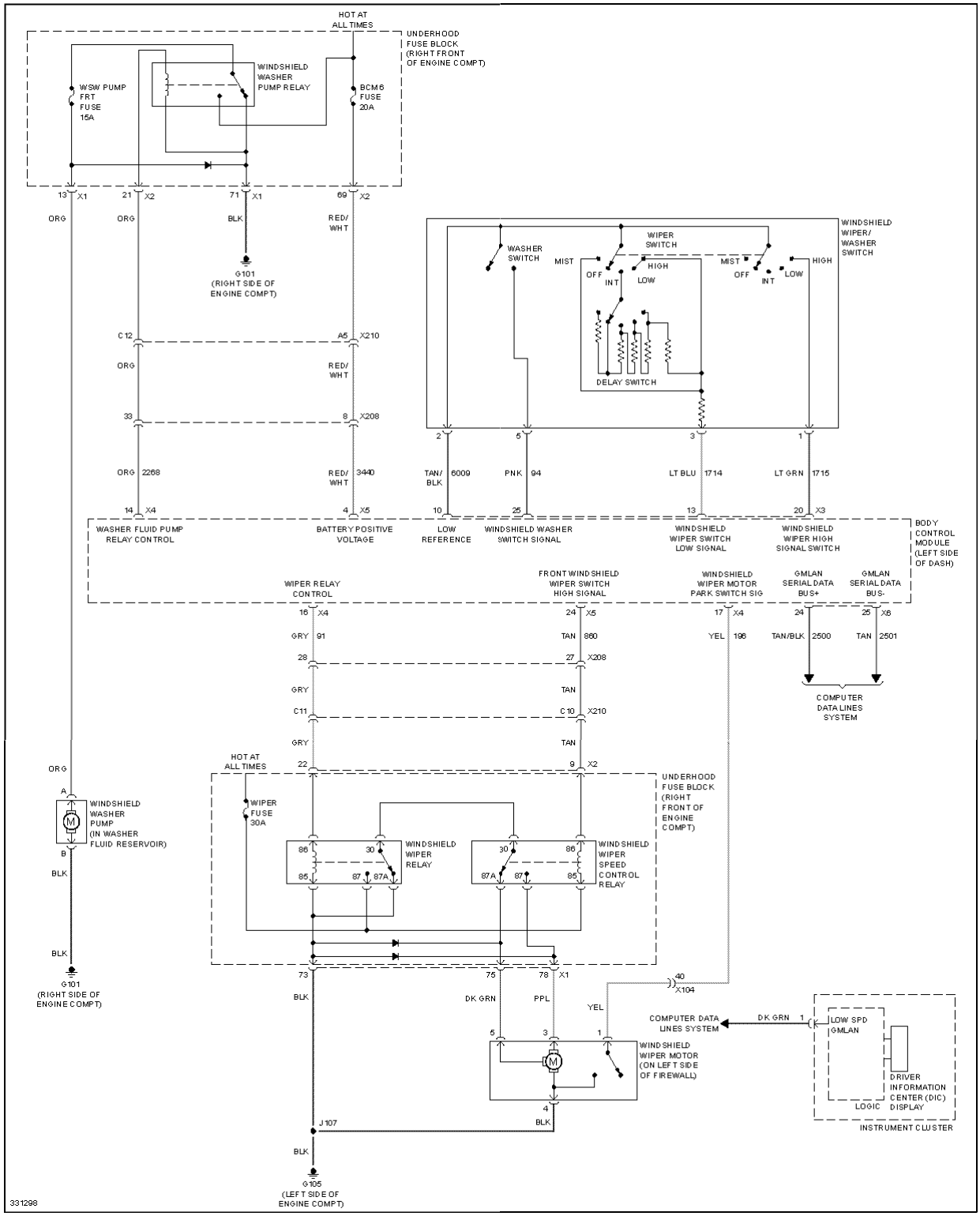


Fig. 72: Wiper/Washer Circuit

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Wiring Systems and Power Management - Component Connector End Views - Index - Camaro

COMPONENT CONNECTOR END VIEWS - INDEX

NOTE: **Use the following tables to locate the connector end view for the desired component. These are in alphabetical sequence as supplied by the manufacturer. Connector end views are identified by manufacturer using an alpha/numeric naming convention, starting with A10 and ending with X85. In system testing, component connector may be identified using the alpha/numeric convention or using the actual component name. Example: Q17B is the connector identifier for fuel injector 2.**

COMPONENT CONNECTOR END VIEWS - A10 THROUGH B52F

COMPONENT CONNECTOR END VIEWS - A10 THROUGH B52F

Description
A10 Inside Rearview Mirror
A11 Radio
A20 Radio/HVAC Controls
A23D Door Latch Assembly - Driver
A23P Door Latch Assembly - Passenger
A7 Fuel Pump and Level Sensor Assembly
A9A Outside Rearview Mirror - Driver
A9B Outside Rearview Mirror - Passenger
B1 A/C Refrigerant Pressure Sensor
B101 Immobilizer Antenna
B107 Accelerator Pedal Position Sensor
B10 Ambient Light Sensor
B115 Vehicle Speed Sensor (MV5)
B115 Vehicle Speed Sensor (M10)
B119 Multi-Axis Acceleration Sensor
B150 Fuel Tank Pressure Sensor
B16 Backup Lamp Switch (MV5)
B16 Backup Lamp Switch (M10)
B173 Manual Transmission Fluid Temperature Sensor (MV5 or M10)
B18 Battery Current Sensor
B19B Brake Booster Vacuum Sensor (L99)
B20 Brake Fluid Level Switch
B22 Brake Pedal Position Sensor
B23 Camshaft Position Sensor (L99/LS3)
B23A Camshaft Position Sensor - Bank 1 Exhaust (LLT)

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B23B Camshaft Position Sensor - Bank 1 Intake (LLT)
B23C Camshaft Position Sensor - Bank 2 Exhaust (LLT)
B23D Camshaft Position Sensor - Bank 2 Intake (LLT)
B24 Cellular Phone Microphone (UE1)
B25B Clutch Pedal Position Sensor (MV5 or M10)
B26 Crankshaft Position Sensor (L99 or LS3)
B26 Crankshaft Position Sensor (LLT)
B34 Engine Coolant Temperature Sensor (L99 or LS3)
B34 Engine Coolant Temperature Sensor (LLT)
B35C Engine Oil Level and Temperature Sensor (L99 or LS3)
B37B Engine Oil Pressure Sensor (L99 or LS3)
B37B Engine Oil Pressure Sensor (LLT)
B39 A/C Evaporator Temperature Sensor
B46B Fuel Level Sensor - Secondary
B47 Fuel Pressure Sensor
B47B Fuel Rail Pressure Sensor (LLT)
B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L99 or LS3)
B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (LLT)
B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L99 or LS3)
B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (LLT)
B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L99 or LS3)
B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (LLT)
B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L99 or LS3)
B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MV5)
B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MYB)

COMPONENT CONNECTOR END VIEWS - B55 THROUGH E4C

COMPONENT CONNECTOR END VIEWS - B55 THROUGH E4C

Description
B55 Hood Ajar Switch
B59L Front Impact Sensor - Left
B59R Front Impact Sensor - Right
B5LF Wheel Speed Sensor - Left Front
B5LR Wheel Speed Sensor - Left Rear
B5RF Wheel Speed Sensor - Right Front
B5RR Wheel Speed Sensor - Right Rear
B62D Seat Position Sensor - Driver
B62P Seat Position Sensor - Passenger
B63L Side Impact Sensor - Left
B63R Side Impact Sensor - Right

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B68A Knock Sensor 1
B68B Knock Sensor 2
B74 Manifold Absolute Pressure Sensor (L99 or LS3)
B75B Mass Air Flow/Intake Air Temperature Sensor (L99 or LS3)
B75B Mass Air Flow/Intake Air Temperature Sensor (LLT)
B78E Rear Object Sensor - Left Middle (UD7)
B78F Rear Object Sensor - Right Middle (UD7)
B78G Rear Object Sensor - Left Outer (UD7)
B78H Rear Object Sensor - Right Outer (UD7)
B80 Park Brake Switch
B88D Seat Belt Switch - Driver
B88P Seat Belt Switch - Passenger
B9 Ambient Air Temperature Sensor
B99 Steering Wheel Angle Sensor
C1 Battery +
C1 Battery -
C3 Telematics Communication Interface Control Module Battery (UE1)
E1D Accent Lamp - Driver Door (SRK/SRM)
E13L Headlamp - Left (T4A)
E13R Headlamp - Right (T4A)
E14A Seat Heating Element - Driver Back (KA1)
E14B Seat Heating Element - Driver Cushion (KA1)
E14C Seat Heating Element - Passenger Back (KA1)
E14D Seat Heating Element - Passenger Cushion (KA1)
E18 Rear Defogger Grid X1
E18 Rear Defogger Grid X2
E1G Accent Lamp - Left I/P (SRK or SRM)
E1H Accent Lamp - Right I/P (SRK or SRM)
E1P Accent Lamp - Passenger Door (SRK/SRM)
E17D Outside Rearview Mirror Glass - Driver
E17P Outside Rearview Mirror Glass - Passenger
E29LF Fog Lamp - Left Front (T3U)
E29RF Fog Lamp - Right Front (T3U)
E2LF Side Marker Lamp - Left Front
E2LR Side Marker Lamp - Left Rear
E2RF Side Marker Lamp - Right Front
E2RR Side Marker Lamp - Right Rear
E37A Dome/Reading Lamps
E4C Daytime Running Lamp - Left (T4F)

COMPONENT CONNECTOR END VIEWS - E4D THROUGH K77

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COMPONENT CONNECTOR END VIEWS - E4D THROUGH K77

Description
E4D Daytime Running Lamp - Right (T4F)
E4LF Turn Signal Lamp - Left Front (T4F)
E4N Park/Turn Signal Lamp - Left (T4A)
E4P Park/Turn Signal Lamp - Right (T4A)
E4RF Turn Signal Lamp - Right Front (T4F)
E5A Backup Lamp - Left
E5AE Tail/Stop and Turn Signal Lamp - Left Inner
E5AF Tail/Stop and Turn Signal Lamp - Right Inner
E5B Backup Lamp - Right
E5W Tail/Stop and Turn Signal Lamp - Left Outer
E5X Tail/Stop and Turn Signal Lamp - Right Outer
E6 Center High Mounted Stop Lamp
E7L License Plate Lamp - Left
E7R License Plate Lamp - Right
E8S Rear Compartment Courtesy Lamp
F105 Passenger Instrument Panel Air Bag
F105L Roof Rail Air Bag - Left
F105R Roof Rail Air Bag - Right
F106L Side Air Bag - Left
F106R Side Air Bag - Right
F107 Steering Wheel Air Bag X1
F107 Steering Wheel Air Bag X2
F112D Seat Belt Retractor Pretensioner - Driver
F112P Seat Belt Retractor Pretensioner - Passenger
G10R Cooling Fan Motor - Right
G13 Generator X1 (L99 or LS3)
G13 Generator X1 (LLT)
G13 Generator X2
G18 High Pressure Fuel Pump (LLT)
G24 Windshield Washer Pump
G6 Brake Booster Pump - Auxiliary (LLT)
K17 Electronic Brake Control Module (EBCM)
K20 Engine Control Module X1 (L99 or LS3)
K20 Engine Control Module X1 (LLT)
K20 Engine Control Module X2 (L99 or LS3)
K20 Engine Control Module X2 (LLT)
K27 Fuel Pump Control Module
K29 Seat Heating Control Module X1 (KA1)
K29 Seat Heating Control Module X2 (KA1)

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K29 Seat Heating Control Module X3 (KA1)
K33 HVAC Control Module X1
K33 HVAC Control Module X2
K36 Inflatable Restraint Sensing and Diagnostic Module X1
K36 Inflatable Restraint Sensing and Diagnostic Module X2
K41 Object Alarm Control Module X1 (UD7)
K41 Object Alarm Control Module X2 (UD7)
K61 Sunroof Control Module (CF5)
K73 Telematics Communication Interface Control Module X1 (UE1)
K73 Telematics Communication Interface Control Module X2 (UE1)
K77 Remote Control Door Lock Receiver

COMPONENT CONNECTOR END VIEWS - K8 THROUGH Q17A

COMPONENT CONNECTOR END VIEWS - K8 THROUGH Q17A

Description
K8 Blower Motor Control Module X1
K8 Blower Motor Control Module X2
K85 Passenger Presence Detection Module X1
K85 Passenger Presence Detection Module X2
K9 Body Control Module X1
K9 Body Control Module X2
K9 Body Control Module X3
K9 Body Control Module X4
K9 Body Control Module X5
K9 Body Control Module X6
K9 Body Control Module X7
M37 Mode Door Actuator
M40 Rear Compartment Lid Latch
M46 Air Recirculation Door Motor
M47 Reverse Inhibit Solenoid Actuator (M10)
M50D Seat Front Vertical Motor - Driver (AMM)
M51D Seat Horizontal Motor - Driver (AMM)
M55D Seat Rear Vertical Motor - Driver (AMM)
M56D Seat Recline Motor - Driver
M56P Seat Recline Motor - Passenger
M6 Air Temperature Door Actuator
M64 Starter Motor X1
M64 Starter Motor X2
M7 Transmission Shift Lock Control Solenoid Actuator (MYB or MYC)
M74D Window Motor - Driver

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M74P Window Motor - Passenger
M75 Windshield Wiper Motor
M93 Ignition Cylinder Lock Control Solenoid Actuator (MYB or MYC)
P12A Horn - High Note
P12B Horn - Low Note
P14 Passenger Air Bag Disable Indicator
P16 Instrument Cluster
P19A Speaker - Center Instrument Panel (UQA)
P19G Speaker - Left Front (UQA)
P19G Speaker - Left Front (UQ3)
P19H Speaker - Left Front Tweeter
P19K Speaker - Left Rear (UQA)
P19K Speaker - Left Rear (UQ3)
P19U Speaker - Right Front (UQA)
P19U Speaker - Right Front (UQ3)
P19V Speaker - Right Front Tweeter
P19X Speaker - Right Rear (UQA)
P19X Speaker - Right Rear (UQ3)
P2 Transmission Shift Lever Position Indicator (MYB or MYC)
P26 Auxiliary Gage Module (UMQ)
Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (L99 or LS3)
Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (LLT)
Q13 Evaporative Emission (EVAP) Vent Solenoid Valve
Q17A Fuel Injector 1 (L99 or LS3)
Q17A Fuel Injector 1 (LLT)

COMPONENT CONNECTOR END VIEWS - Q17B THROUGH T3

COMPONENT CONNECTOR END VIEWS - Q17B THROUGH T3

Description
Q17B Fuel Injector 2 (L99 or LS3)
Q17B Fuel Injector 2 (LLT)
Q17C Fuel Injector 3 (L99 or LS3)
Q17C Fuel Injector 3 (LLT)
Q17D Fuel Injector 4 (L99 or LS3)
Q17D Fuel Injector 4 (LLT)
Q17E Fuel Injector 5 (L99 or LS3)
Q17E Fuel Injector 5 (LLT)
Q17F Fuel Injector 6 (L99 or LS3)
Q17F Fuel Injector 6 (LLT)
Q17G Fuel Injector 7 (L99 or LS3)

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Q17H Fuel Injector 8 (L99 or LS3)
Q2 A/C Compressor Clutch
Q34 Skip Shift Solenoid Actuator (M10)
Q38 Throttle Body (L99 or LS3)
Q38 Throttle Body (LLT)
Q43 Valve Lifter Oil Manifold Assembly (L99)
Q6 Camshaft Position Actuator Solenoid Valve (L99)
Q6A Camshaft Position Actuator Solenoid Valve - Bank 1 Exhaust (LLT)
Q6B Camshaft Position Actuator Solenoid Valve - Bank 1 Intake (LLT)
Q6C Camshaft Position Actuator Solenoid Valve - Bank 2 Exhaust (LLT)
Q6D Camshaft Position Actuator Solenoid Valve - Bank 2 Intake (LLT)
Q8 Control Solenoid Valve Assembly X1 (MYB or MYC)
Q8 Control Solenoid Valve Assembly X2 (MYB or MYC)
Q8 Control Solenoid Valve Assembly X3 (MYB or MYC)
R14R Rear Window Defogger Noise Filter - Right X1
R14R Rear Window Defogger Noise Filter - Right X2
R6 Data Link Resistor
S25 Garage Door Opener (UG1)
S2L Transmission Manual Shift Switch - Left (MYB or MYC)
S2R Transmission Manual Shift Switch - Right (MYB or MYC)
S30 Headlamp Switch
S39 Ignition Switch
S52 Outside Rearview Mirror Switch
S58 Rear Compartment Lid Unlatch Switch
S64D Seat Adjuster Switch - Driver (AH3)
S64D Seat Adjuster Switch - Driver (AMM)
S64P Seat Adjuster Switch - Passenger
S70L Steering Wheel Controls Switch - Left
S70R Steering Wheel Controls Switch - Right (NZL)
S72 Sunroof Switch (CF5)
S75 Traction Control Switch
S78 Turn Signal/Multifunction Switch
S79D Window Switch - Driver
S79P Window Switch - Passenger
S82 Windshield Wiper/Washer Switch
T11 Multimedia Player Interface Module X1 (USR)
T3 Audio Amplifier X1 (UQA)
T3 Audio Amplifier X2 (UQA)
T3 Audio Amplifier X3 (UQA)

COMPONENT CONNECTOR END VIEWS - T8A THROUGH X85

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COMPONENT CONNECTOR END VIEWS - T8A THROUGH X85

Description
T8A Ignition Coil 1 (L99 or LS3)
T8A Ignition Coil 1 (LLT)
T8B Ignition Coil 2 (L99 or LS3)
T8B Ignition Coil 2 (LLT)
T8C Ignition Coil 3 (L99 or LS3)
T8C Ignition Coil 3 (LLT)
T8D Ignition Coil 4 (L99 or LS3)
T8D Ignition Coil 4 (LLT)
T8E Ignition Coil 5 (L99 or LS3)
T8E Ignition Coil 5 (LLT)
T8F Ignition Coil 6 (L99 or LS3)
T8F Ignition Coil 6 (LLT)
T8G Ignition Coil 7 (L99 or LS3)
T8H Ignition Coil 8 (L99 or LS3)
X80D Accessory Power Receptacle - Center Console Compartment
X80H Accessory Power Receptacle - Center Console
X83 Auxiliary Audio Input (USR)
X84 Data Link Connector
X85 Steering Wheel Air Bag Coil X1
X85 Steering Wheel Air Bag Coil X2
X85 Steering Wheel Air Bag Coil X3

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Wiring Systems and Power Management - Component Locator - Camaro

SPLICE PACK CONNECTOR END VIEWS

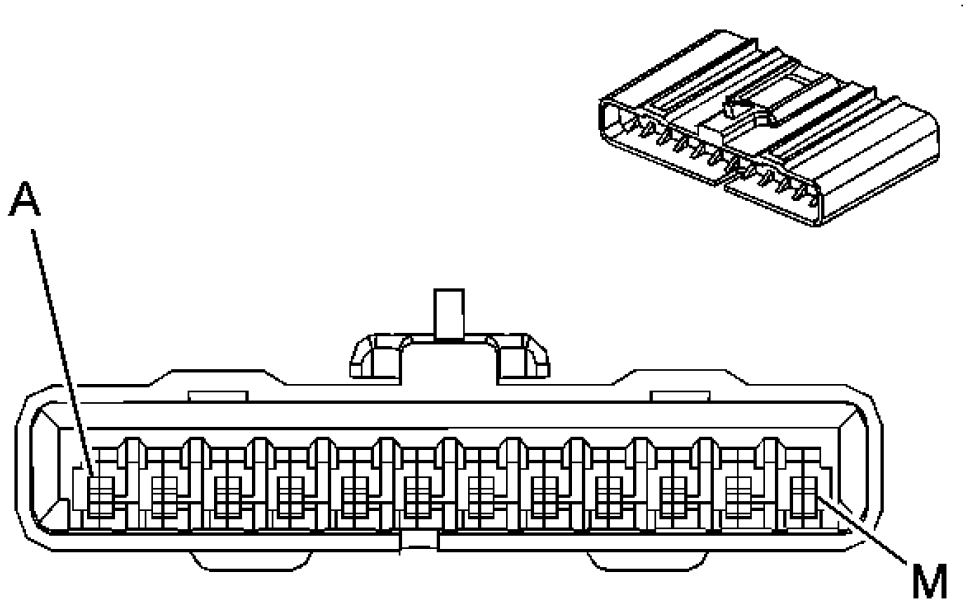


Fig. 1: JX200 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 12176461
- Service: 15305914
- Description: 12-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247

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- Test Probe: J-35616-2A (GY)

JX200

Pin	Wire	Circuit	Function
A	0.35 D-GN	5060	Low Speed GMLAN Serial Data
B	0.35 D-GN	5060	Low Speed GMLAN Serial Data
C	0.35 D-GN	5060	Low Speed GMLAN Serial Data (UMQ or UXQ)
D	-	-	Not Used
E	0.35 D-GN	5060	Low Speed GMLAN Serial Data
F	-	-	Not Used
G	0.35 D-GN	5060	Low Speed GMLAN Serial Data
H	-	-	Not Used
J	0.35 D-GN	5060	Low Speed GMLAN Serial Data
K	0.35 D-GN	5060	Low Speed GMLAN Serial Data
L	0.35 D-GN	5060	Low Speed GMLAN Serial Data
M	0.35 D-GN	5060	Low Speed GMLAN Serial Data

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Wiring Systems And Power Management - Component Connector End Views - A10 Through B52D - Camaro

COMPONENT CONNECTOR END VIEWS - A10 THROUGH B52D

A10 INSIDE REARVIEW MIRROR

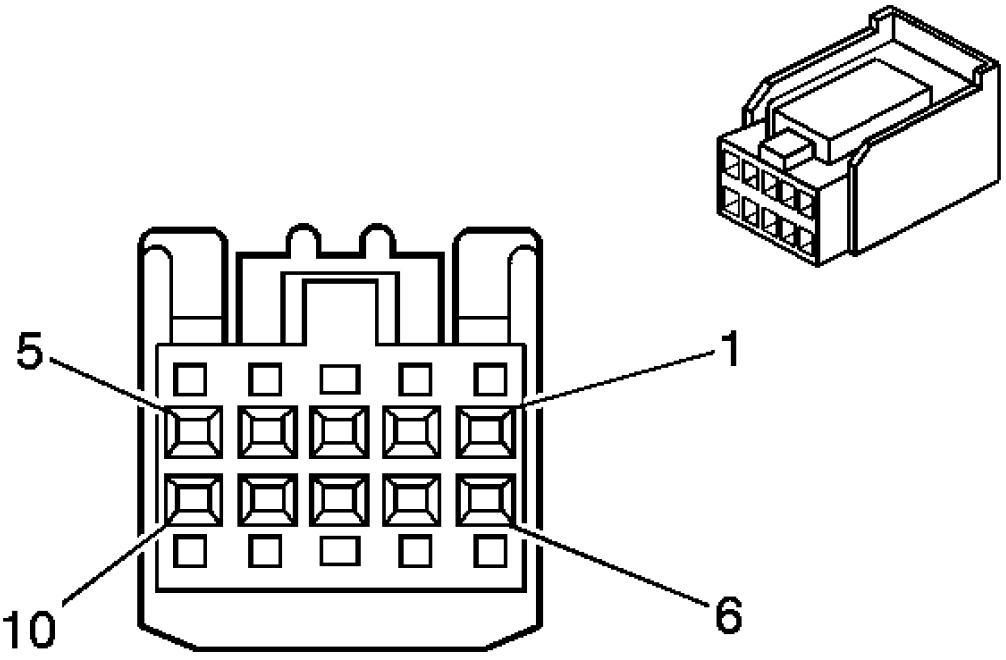


Fig. 1: A10 Inside Rearview Mirror
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 13641322
- Service: 19177676
- Description: 10-Way F Kaizen 0.64 Series (BK)

Terminal Part Information

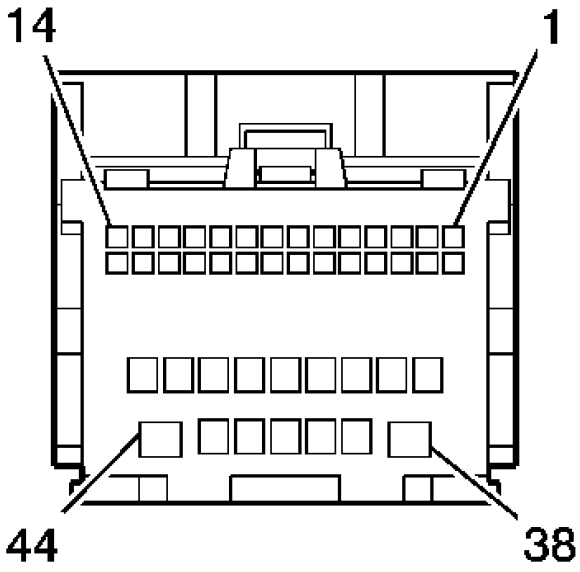
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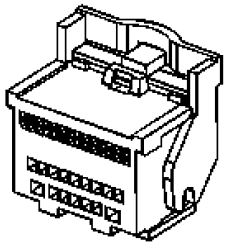
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

A10 Inside Rearview Mirror

Pin	Wire	Circuit	Function
1	0.35 L-GN	24	Backup Lamp Supply Voltage
2	0.35 PK	339	Ignition Voltage
3	0.35 D-GN/WH	2514	Keypad Signal (UE1)
4	0.35 L-GN/BK	2515	Keypad Supply Voltage (UE1)
5	0.35 BK	1550	Ground
6	0.35 YE/BK	2516	Keypad Green LED Signal (UE1)
7	0.35 BN/WH	2517	Keypad Red LED Signal (UE1)
8	0.35 PK	1691	Low Reference
9	0.35 GY	1690	Automatic Day/Night Mirror Signal
10	-	-	Not Used

A11 RADIO





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Fig. 2: A11 Radio
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13589609
- Service: 88988902
- Description: 44-Way F GT 150/280 64 Series (BK)

Terminal Part Information

- Pins: 2, 3, 6, 10, 11, 13, 16, 17, 20, 23, 24, 27, 28
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

- Pins: 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: Pins 29, 30, 31, 32, 33, 34, 37, 39, 40, 41, 42, 43 - E/C
- Core/Insulation Crimp: Pins 31, 32, 33, 34, 39, 40, 41, 42 - C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Pins: 38, 44
- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: 2/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

A11 Radio

Pin	Wire	Circuit	Function
1	-	-	Not Used
2	0.35 YE	7459	Serial Data
3	0.35 BARE	7460	Drain Wire
4-5	-	-	Not Used
6	0.35 L-BU/BK	659	Cellular Telephone Voice Signal (-)
7-9	-	-	Not Used
10	0.35 TN/WH	3378	Auxiliary Audio Jack Right (+)
11	0.35 PK	2060	Auxiliary Detection Signal
12	-	-	Not Used

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13	0.35 L-GN	3291	Center Stack Wake - Up Signal
14-15	-	-	Not Used
16	0.35 TN	7458	Serial Data
17	0.35 BARE	3375	Drain Wire
18-19	-	-	Not Used
20	0.35 D-BU	658	Cellular Telephone Voice Signal (+)
21-22	-	-	Not Used
23	0.35 D-GN/WH	3376	Auxiliary Audio Common Signal
24	0.35 YE	3377	Auxiliary Audio Jack Left (+)
25-26	-	-	Not Used
27	0.35 PK	3290	Center Stack Reset Signal
28	0.35 D-GN	5060	Low Speed GMLAN Serial Data
29	0.35 BARE	2011	Drain Wire (UQA)
30	0.35 BARE	2099	Drain Wire (UQA)
31	0.8 D-GN	117	Right Front Speaker Output (-) (UQ3)
	0.35 OG/BK	1546	Right Front Low Level Audio Signal (-) (UQA)
32	0.8 GY	118	Left Front Speaker Output (-) (UQ3)
	0.35 D-GN	1947	Left Front Low Level Audio Signal (-) (UQA)
33	0.8 L-BU	115	Right Rear Speaker Output (-) (UQ3)
	0.35 TN	1946	Right Rear Low Level Audio Signal (-) (UQA)
34	0.8 YE	116	Left Rear Speaker Output (-) (UQ3)
	0.35 BN	1999	Left Rear Low Level Audio Signal (-) (UQA)
35-36	-	-	Not Used
37	0.35 OG	6978	Amplifier Control (UQA)
38	1 BK	1750	Ground
39	0.8 L-GN	200	Right Front Speaker Output (+) (UQ3)
	0.35 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQA)
40	0.8 TN	201	Left Front Speaker Output (+) (UQ3)
	0.35 TN	511	Left Front Low Level Audio Signal (+) (UQA)
41	0.8 D-BU	46	Right Rear Speaker Output (+) (UQ3)
	0.35 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA)
42	0.8 BN	199	Left Rear Speaker Output (+) (UQ3)
	0.35 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA)
43	0.35 WH	7066	Remote Enable (UQA)

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44	1 RD/WH	340	Battery Positive Voltage

A20 RADIO/HVAC CONTROLS

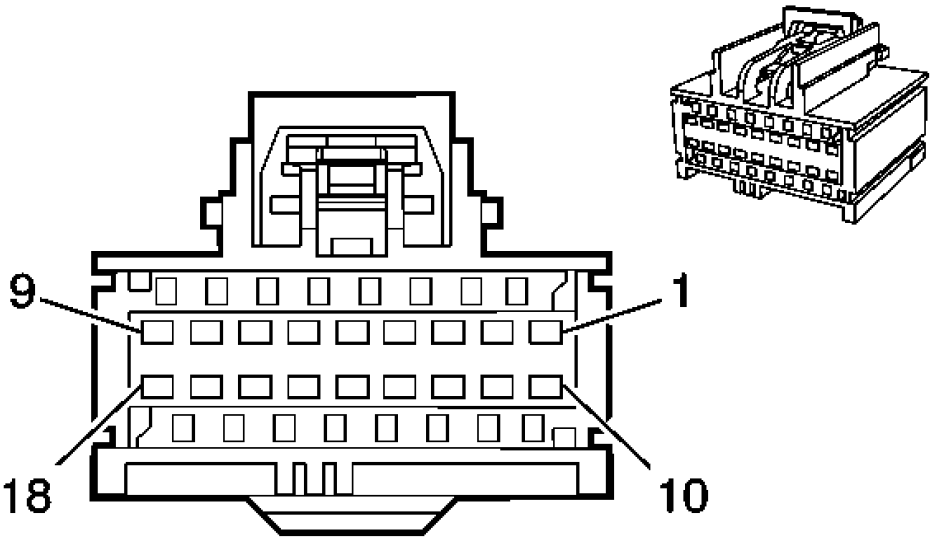


Fig. 3: A20 Radio/HVAC Controls
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13607274
- Service: 13317844
- Description: 18-Way F Kaizen 64 Series (NA)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

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A20 Radio/HVAC Controls

Pin	Wire	Circuit	Function
1	0.35 TN	7458	Serial Data
2	0.35 YE	7459	Serial Data
3	0.35 BARE	7460	Drain Wire
4	0.35 L-GN	3291	Center Stack Wake - Up Signal
5-7	-	-	Not Used
8	0.35 YE	7531	Linear Interconnect Network 9
9	-	-	Not Used
10	0.5 RD/WH	3240	Battery Positive Voltage
11	-	-	Not Used
12	0.35 PK/BK	780	Driver Door Lock Switch Lock Signal
13	0.35 OG/BK	781	Driver Door Lock Switch Unlock Signal
14	-	-	Not Used
15	0.35 PK	3290	Center Stack Reset Signal
16	0.35 WH	111	Hazard Switch Signal
17	0.5 BK	1650	Ground
18	-	-	Not Used

A23D DOOR LATCH ASSEMBLY - DRIVER

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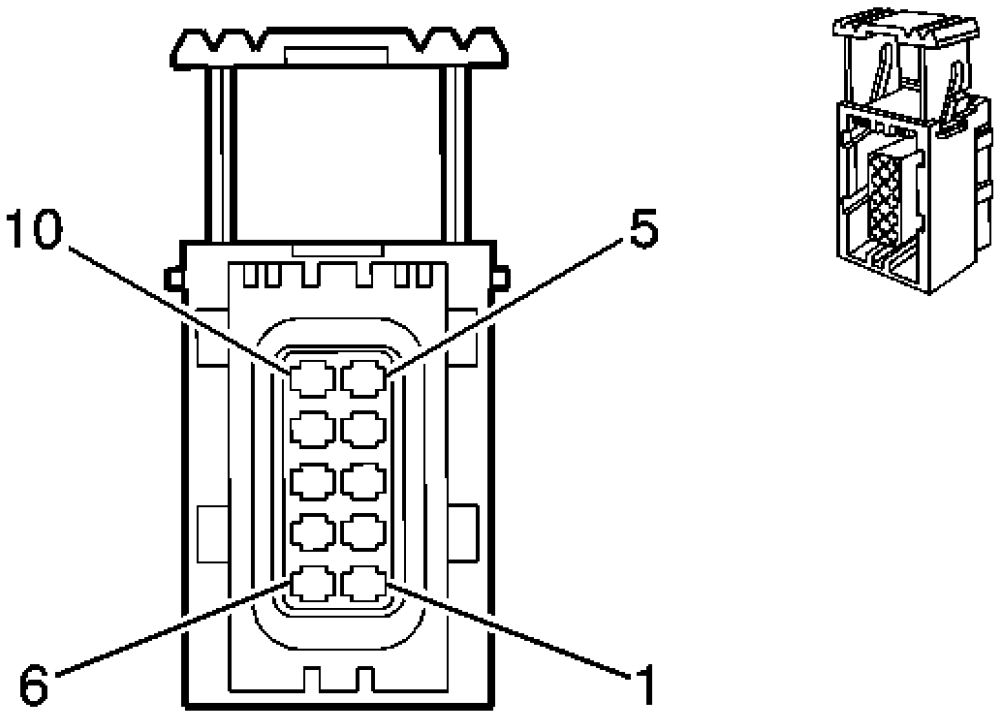


Fig. 4: A23D Door Latch Assembly - Driver
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 10768367
- Service: 88952463
- Description: 10-Way F Sealed (BK)

Terminal Part Information

- Pins: 2, 3
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

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- Pins: 4, 6, 8
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

A23D Door Latch Assembly - Driver

Pin	Wire	Circuit	Function
1	-	-	Not Used
2	0.8 TN	294	Door Lock Actuator Lock Control
3	0.8 GY	5911	Driver Door Lock Motor Unlock Control
4	0.35 D-GN	3270	Driver Door Lock Status Signal
5	-	-	Not Used
6	0.35 GY/BK	745	Left Front Door Ajar Switch Signal
7	-	-	Not Used
8	0.35 BK	850	Ground
9-10	-	-	Not Used

A23P DOOR LATCH ASSEMBLY - PASSENGER

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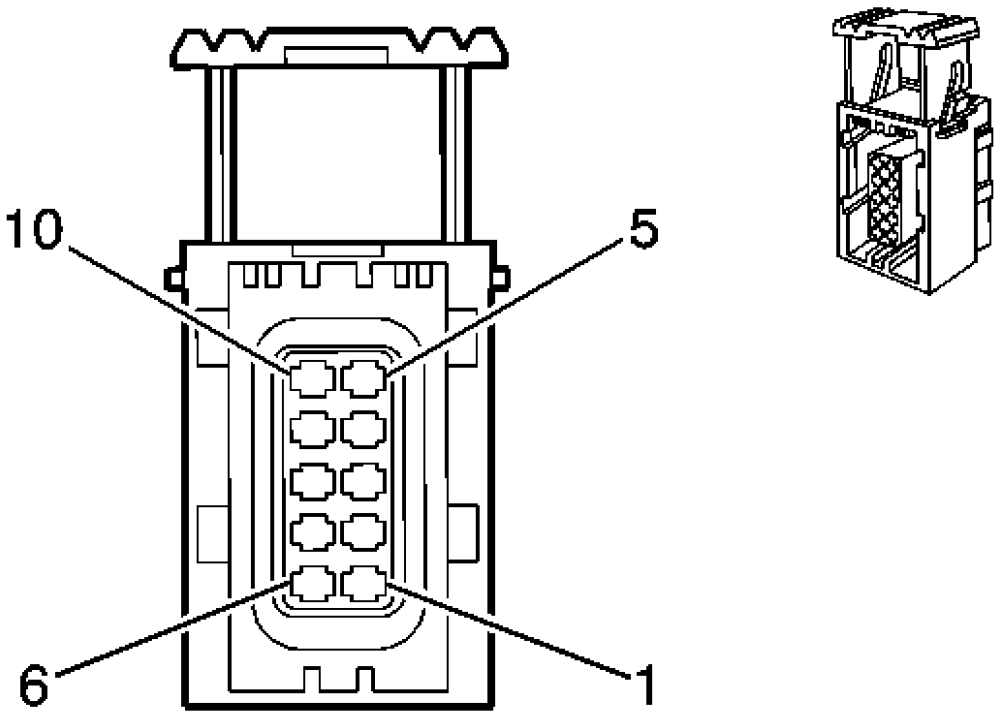


Fig. 5: A23P Door Latch Assembly - Passenger
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Door
- OEM: 10768367
- Service: 88952463
- Description: 10-Way F Sealed (BK)

Terminal Part Information

- Pins: 1, 3
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

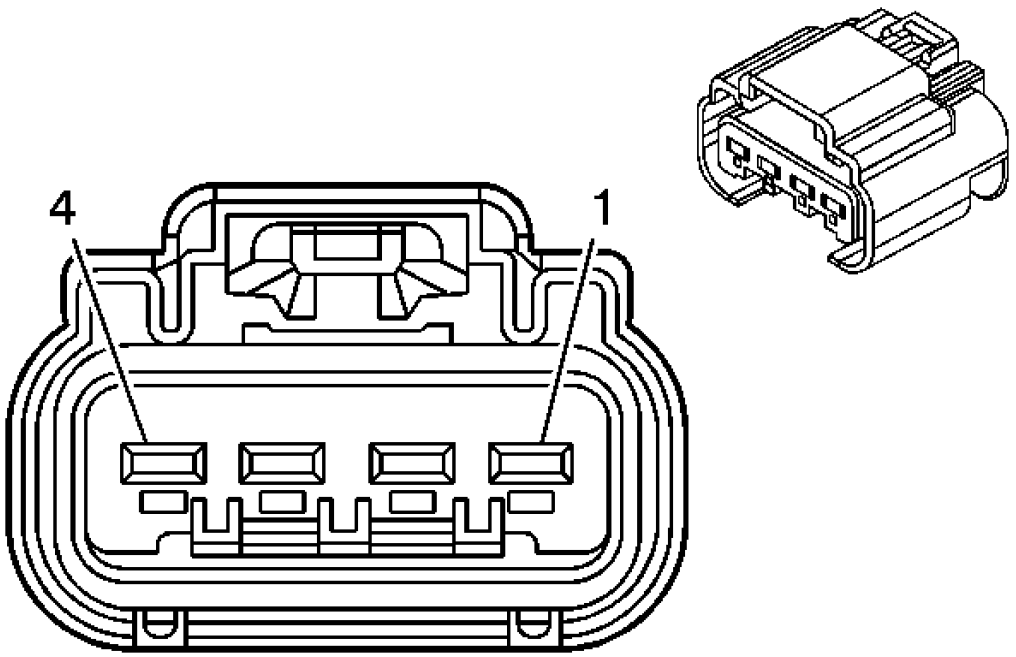
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- Pins: 7, 8
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

A23P Door Latch Assembly - Passenger

Pin	Wire	Circuit	Function
1	0.35 TN/WH	746	Right Front Door Ajar Switch Signal
2	-	-	Not Used
3	0.35 BK	2350	Ground
4-6	-	-	Not Used
7	0.8 TN	294	Door Lock Actuator Lock Control
8	0.8 GY	295	Passenger Door Unlock Actuator Lock Control
9-10	-	-	Not Used

A7 FUEL PUMP AND LEVEL SENSOR ASSEMBLY



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Fig. 6: A7 Fuel Pump and Level Sensor Assembly
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fuel Tank
- OEM: 13527865
- Service: Service by Harness - See Part Catalog
- Description: 4-Way F GT 280 Series, Sealed (NA)

Terminal Part Information

- Pins: 1, 2
- Terminal/Tray: 15304720/19
- Core/Insulation Crimp: 4/5
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pins: 3, 4
- Terminal/Tray: 15304719/19
- Core/Insulation Crimp: E/5
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

A7 Fuel Pump and Level Sensor Assembly

Pin	Wire	Circuit	Function
1	2 RD	120	Fuel Pump Supply Voltage (Early Production)
	2 GY	120	Fuel Pump Supply Voltage (Late Production)
2	2 BK	1580	Low Reference (Early Production)
	2 PK	1580	Low Reference (Late Production)
3	0.5 BN/WH	6281	Low Reference
4	0.5 WH	1936	Fuel Level Sensor Signal (Early Production)
	0.5 D-BU	1936	Fuel Level Sensor Signal (Late Production)

A9A OUTSIDE REARVIEW MIRROR - DRIVER

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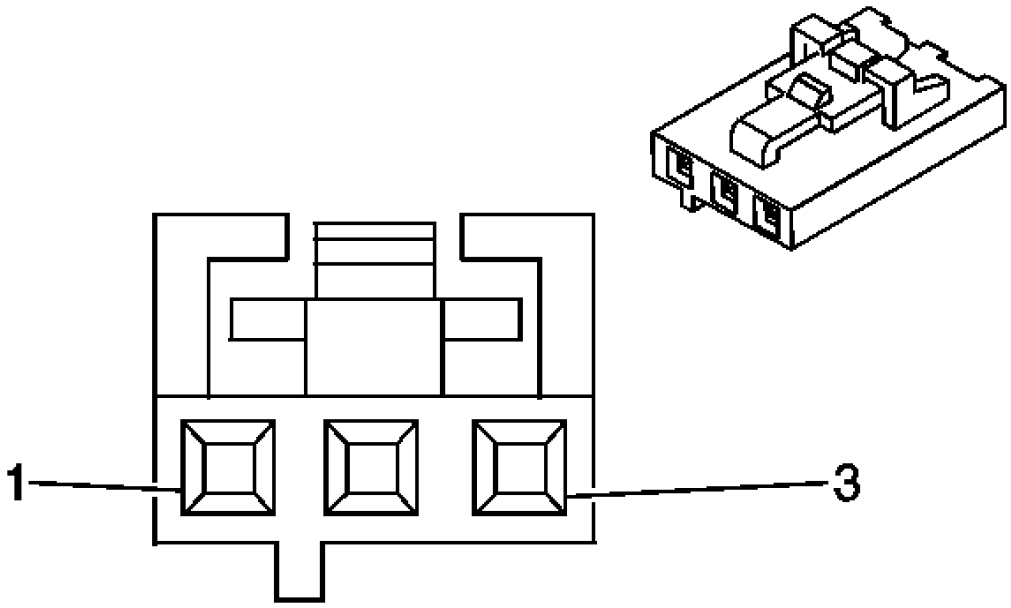


Fig. 7: A9A Outside Rearview Mirror - Driver
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Outside Rearview Mirror - Driver
- OEM: 50-57-9403
- Service: 21019417
- Description: 3-Way F SL Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 50-57-9403
- Core/Insulation Crimp: Not Available
- Release Tool/Test Probe: Pending

A9A Outside Rearview Mirror - Driver

Pin	Wire	Circuit	Function
1	0.5 WH	81	Driver Mirror Motor Right Control
2	0.5 GY	329	Driver Mirror Motor Left/Up Control
3	0.5 YE	89	Driver Mirror Motor Down Control

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A9B OUTSIDE REARVIEW MIRROR - PASSENGER

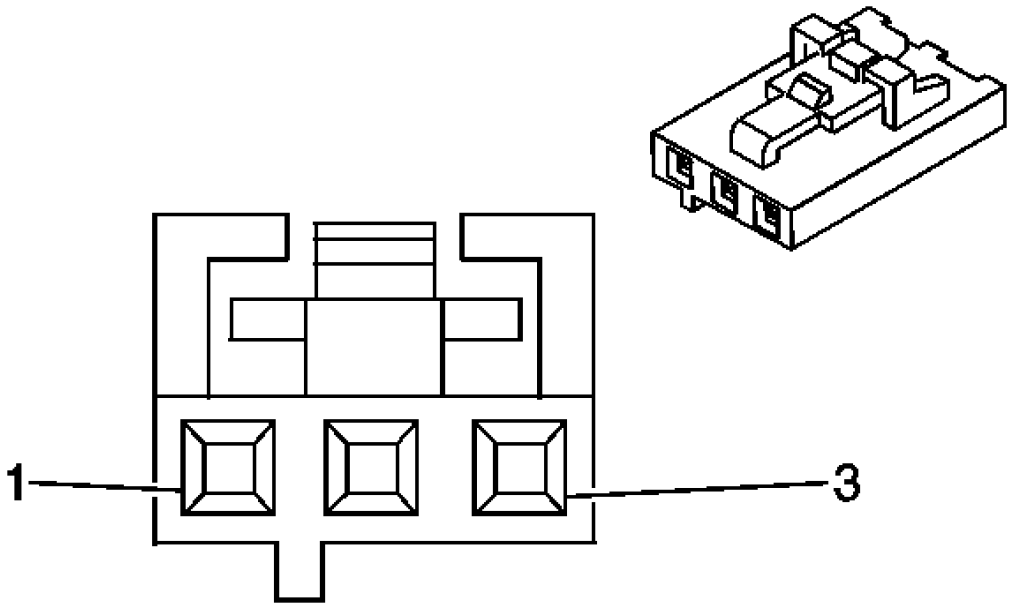


Fig. 8: A9B Outside Rearview Mirror - Passenger
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Outside Rearview Mirror - Passenger
- OEM: 50-57-9403
- Service: 21019417
- Description: 3-Way F SL Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 50-57-9403
- Core/Insulation Crimp: Not Available
- Release Tool/Test Probe: Pending

A9B Outside Rearview Mirror - Passenger

Pin	Wire	Circuit	Function
1	0.5 OG/WH	881	Passenger Mirror Motor Right Control
2	0.5 TN/WH	330	Passenger Mirror Motor Left/Up Control

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3	0.5 BN/WH	889	Passenger Mirror Motor Down Control

B1 A/C REFRIGERANT PRESSURE SENSOR

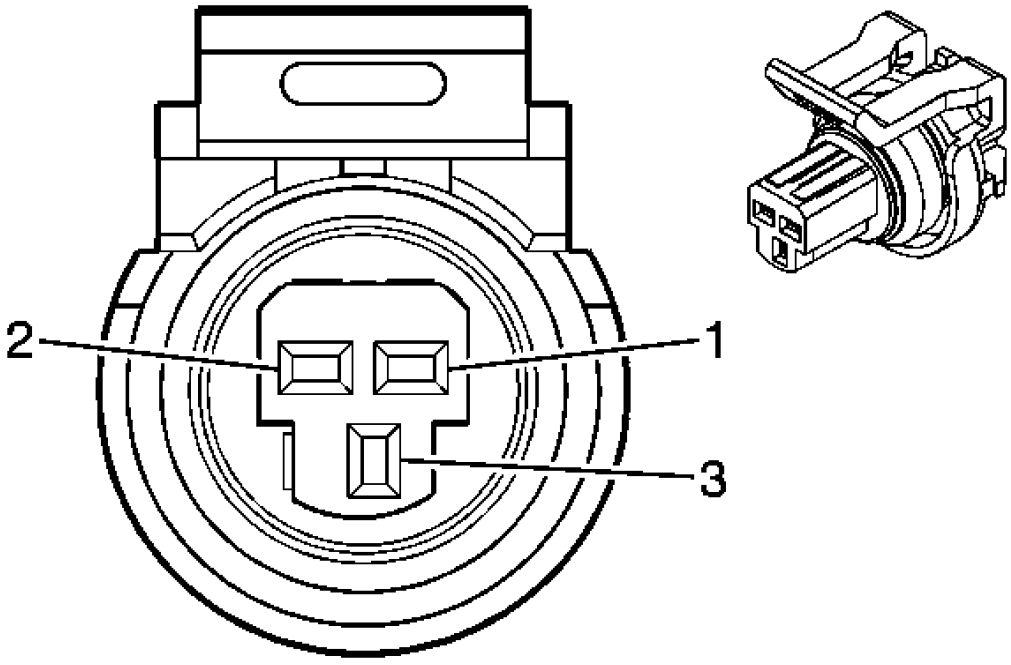


Fig. 9: B1 A/C Refrigerant Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13602480
- Service: 8898301
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

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B1 A/C Refrigerant Pressure Sensor

Pin	Wire	Circuit	Function
1	0.5 TN	5514	Low Reference
2	0.5 GY	2700	5-Volt Reference 1
3	0.5 OG/BK	380	A/C Refrigerant Pressure Sensor Signal

B101 IMMOBILIZER ANTENNA

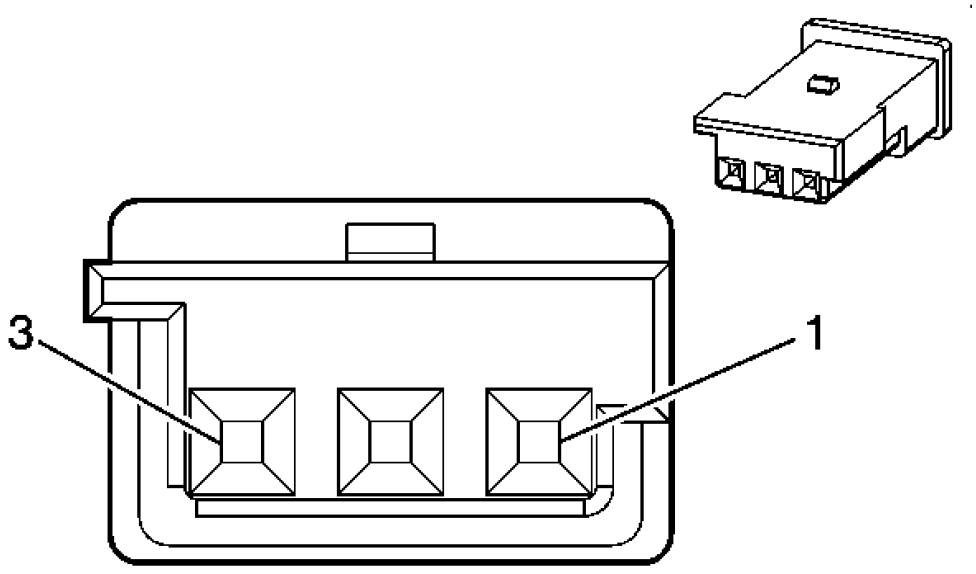


Fig. 10: B101 Immobilizer Antenna
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13604026
- Service: 13316117
- Description: 3-Way F Micro Quadlok Series (PU)

Terminal Part Information

- Terminal/Tray: 928999-5/15

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- Core/Insulation Crimp: H/H
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

B101 Immobilizer Antenna

Pin	Wire	Circuit	Function
1	0.35 D-GN/WH	3277	Low Reference
2	0.35 L-BU	7533	Linear Interconnect Network 11
3	0.35 D-GN	3166	Battery Positive Voltage

B107 ACCELERATOR PEDAL POSITION SENSOR

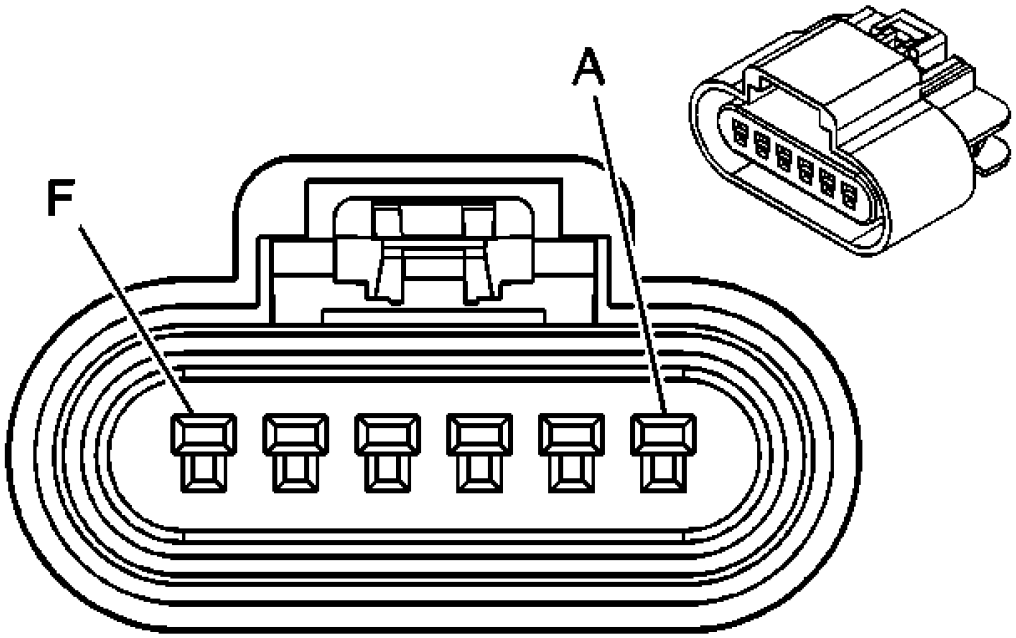


Fig. 11: B107 Accelerator Pedal Position Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15397577
- Service: 88988944

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- Description: 6-Way F GT 150 Series, Sealed (BK)

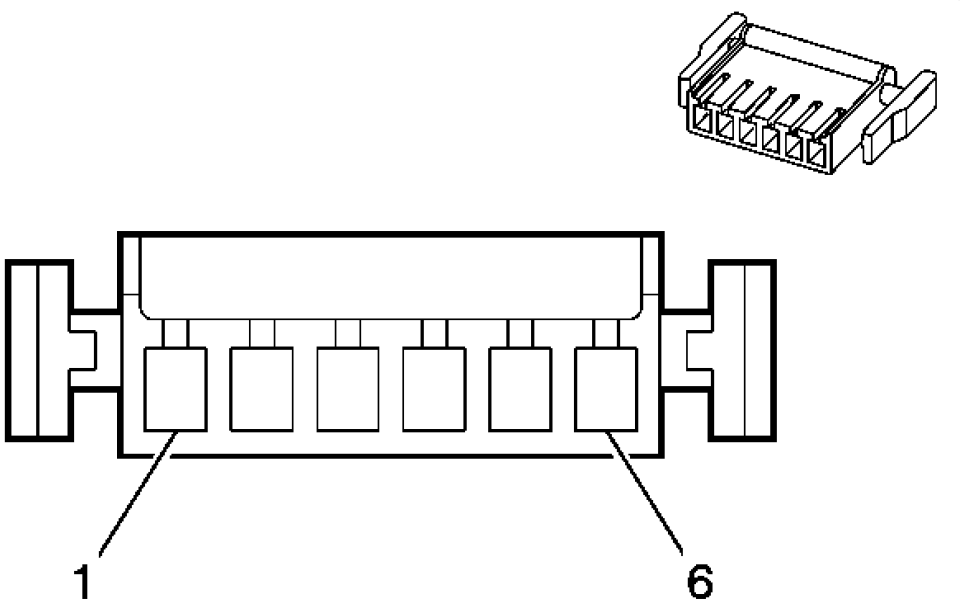
Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B107 Accelerator Pedal Position Sensor

Pin	Wire	Circuit	Function
A	0.35 PU	1272	Low Reference
B	0.35 L-BU	1162	APP Sensor 2 Signal
C	0.35 TN	1274	5-Volt Reference 3 (LLT)
			5-Volt Reference 1 (L99/LS3)
D	0.35 BN	1271	Low Reference
E	0.35 D-BU	1161	APP Sensor 1 Signal
F	0.35 WH/BK	1164	5-Volt Reference 2

B10 AMBIENT LIGHT SENSOR



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Fig. 12: B10 Ambient Light Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15344190
- Service: 24419225
- Description: 6-Way F 0.64 MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 5 - H/H
- Core/Insulation Crimp: Pin 6 - J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

B10 Ambient Light Sensor

Pin	Wire	Circuit	Function
1	0.35 GY	728	Security Indicator Control
2-4	-	-	Not Used
5	0.35 WH	278	Ambient Light Sensor Signal
6	0.5 BK	1650	Ground

B115 VEHICLE SPEED SENSOR (MV5)

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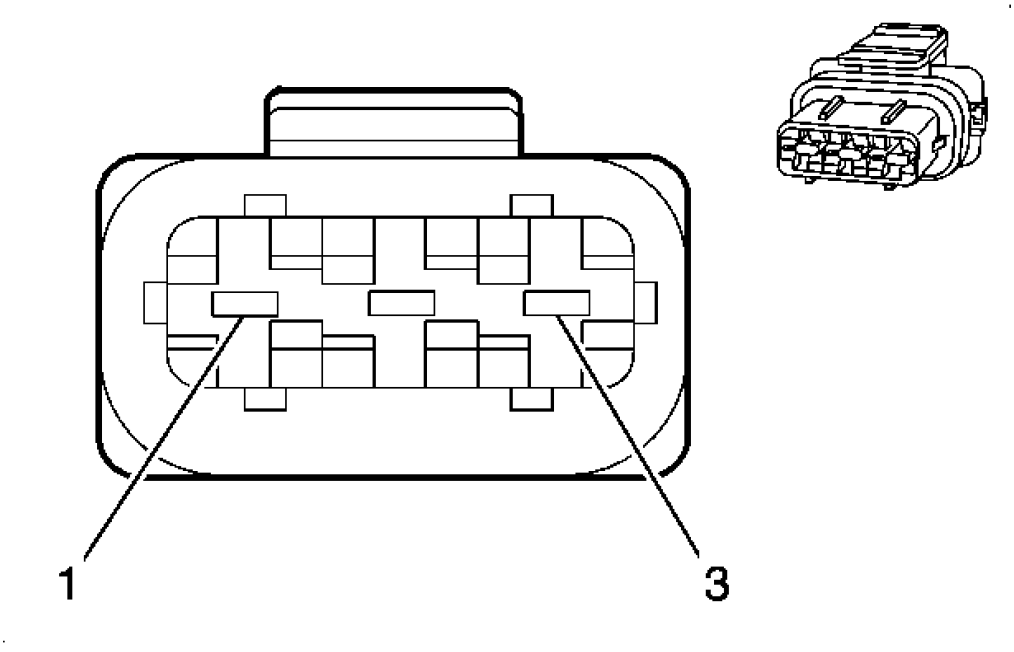


Fig. 13: B115 Vehicle Speed Sensor (MV5)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12185331
- Service: 15306391
- Description: 3-Way F 2.8 Timer Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 4-964286-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

B115 Vehicle Speed Sensor (MV5)

Pin	Wire	Circuit	Function
1	0.5 GY/BK	6355	VSS Signal High
2	0.5 BK/WH	451	Ground

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3	0.5 PK	239	Ignition Voltage

B115 VEHICLE SPEED SENSOR (M10)

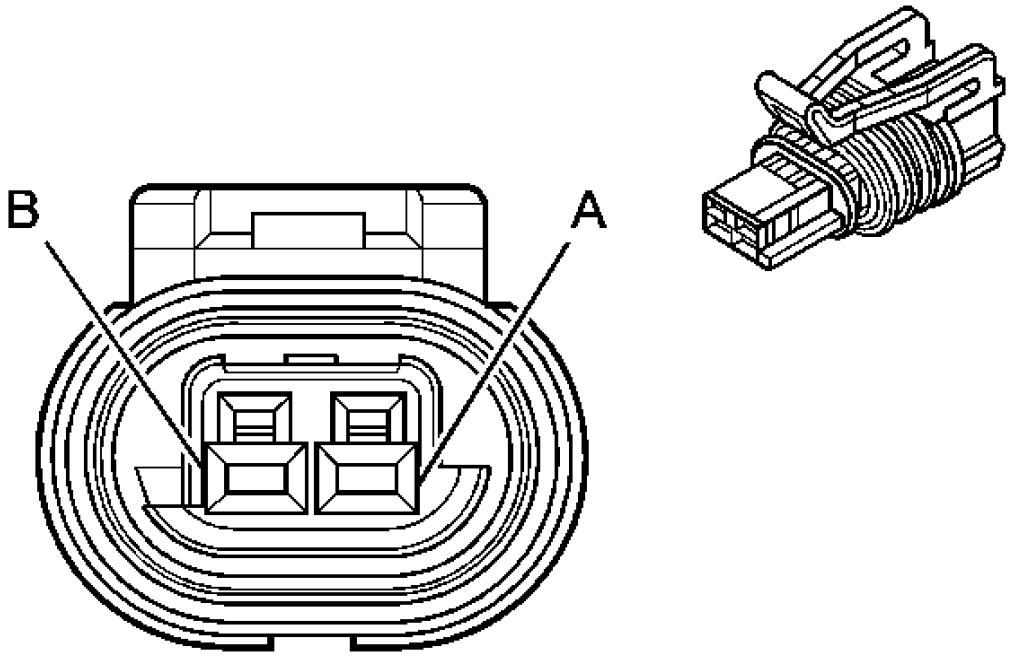


Fig. 14: B115 Vehicle Speed Sensor (M10)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15449028
- Service: 88987993
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

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B115 Vehicle Speed Sensor (M10)

Pin	Wire	Circuit	Function
A	0.5 PU/WH	6356	VSS Signal Low
B	0.5 GY/BK	6355	VSS Signal High

B119 MULTI-AXIS ACCELERATION SENSOR

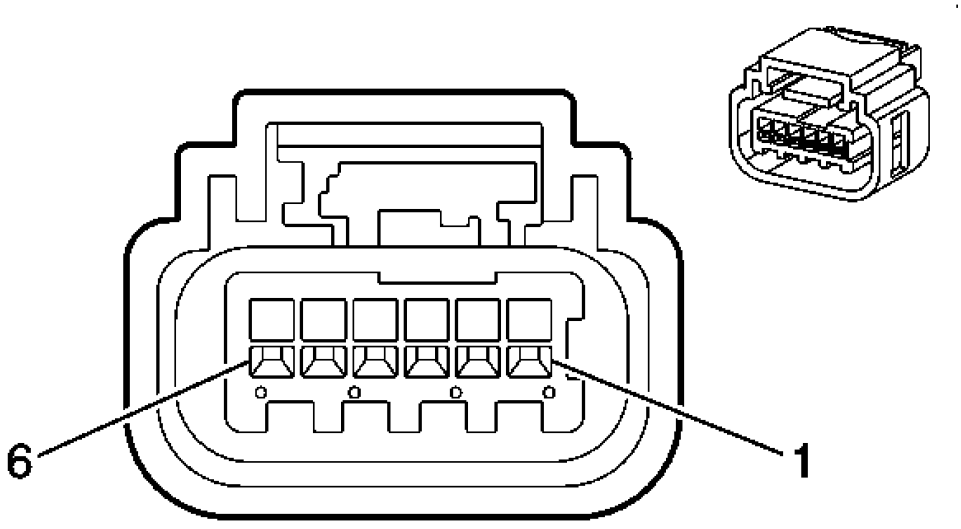


Fig. 15: B119 Multi-Axis Acceleration Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13654947
- Service: 19178521
- Description: 6-Way F 0.64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P

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- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B119 Multi-Axis Acceleration Sensor

Pin	Wire	Circuit	Function
1	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
2	-	-	Not Available
3	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
4	-	-	Not Available
5	0.35 D-GN	2087	12-Volt Reference
6	0.5 BK	850	Ground

B150 FUEL TANK PRESSURE SENSOR

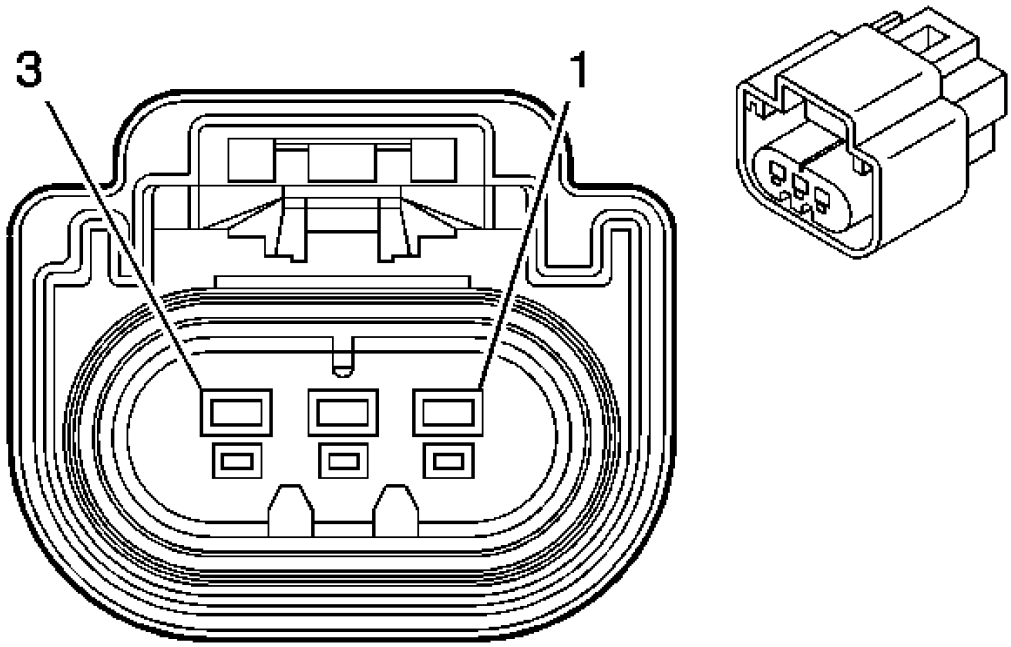


Fig. 16: B150 Fuel Tank Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fuel Tank

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- OEM: 13511996
- Service: Service by Harness - See Part Catalog
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B150 Fuel Tank Pressure Sensor

Pin	Wire	Circuit	Function
1	0.5 D-GN	890	Fuel Tank Pressure Sensor Signal
2	0.5 BN/WH	6281	Low Reference
3	0.5 OG	2709	5-Volt Reference 1 (Early Production)
	0.5 GY	2709	5-Volt Reference 1 (Late Production)

B16 BACKUP LAMP SWITCH (MV5)

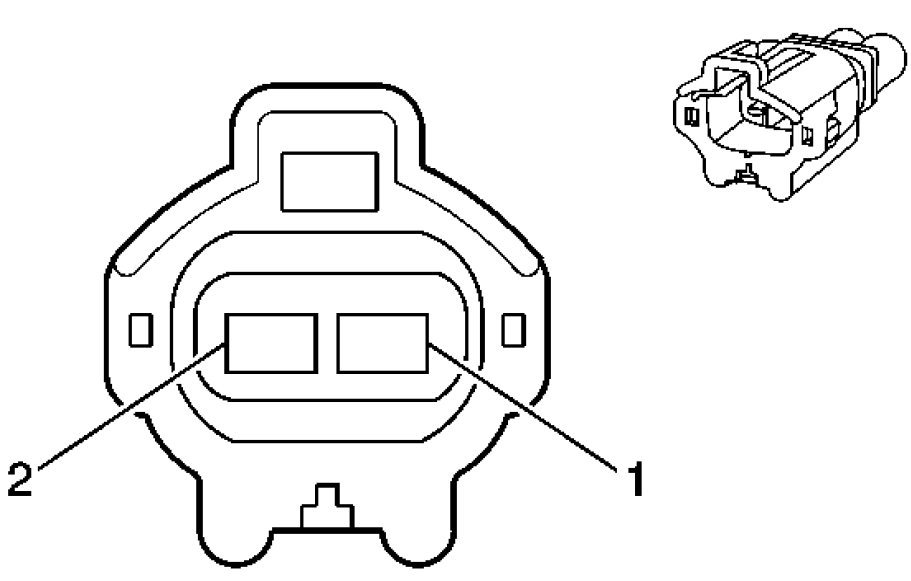


Fig. 17: B16 Backup Lamp Switch (MV5)

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Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13655976
- Service: 13505906
- Description: 2-Way M 090 II Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7114-4025/11
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-19 (BK)

B16 Backup Lamp Switch (MV5)

Pin	Wire	Circuit	Function
1	0.35 L-GN	5007	Backup Lamp Switch Signal
2	0.35 BK/WH	451	Ground

B16 BACKUP LAMP SWITCH (M10)

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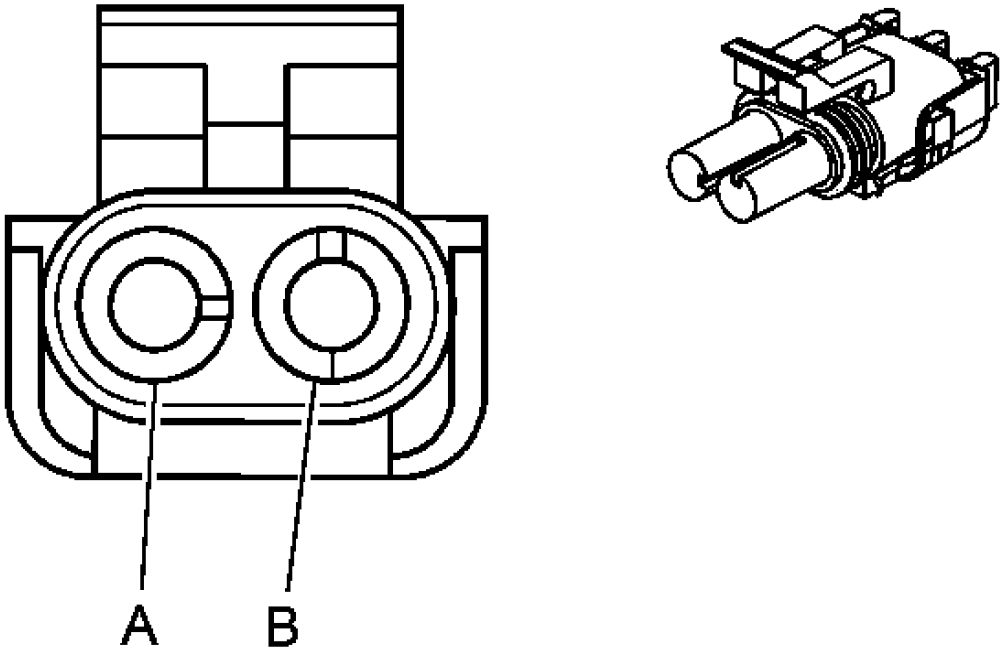


Fig. 18: B16 Backup Lamp Switch (M10)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12015792
- Service: 12126452
- Description: 2-Way F Weather Pack Series (BK)

Terminal Part Information

- Terminal/Tray: 12089188/3
- Core/Insulation Crimp: Pin A - See Terminal Repair Kit
- Core/Insulation Crimp: Pin B - E/5
- Release Tool: 12014012-1
- Test Probe: J-35616-8 (OG)

B16 Backup Lamp Switch (M10)

Pin	Wire	Circuit	Function

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A	0.35 L-GN	5007	Backup Lamp Switch Signal
B	0.5 BK/WH	451	Ground

B173 MANUAL TRANSMISSION FLUID TEMPERATURE SENSOR (MV5 OR M10)

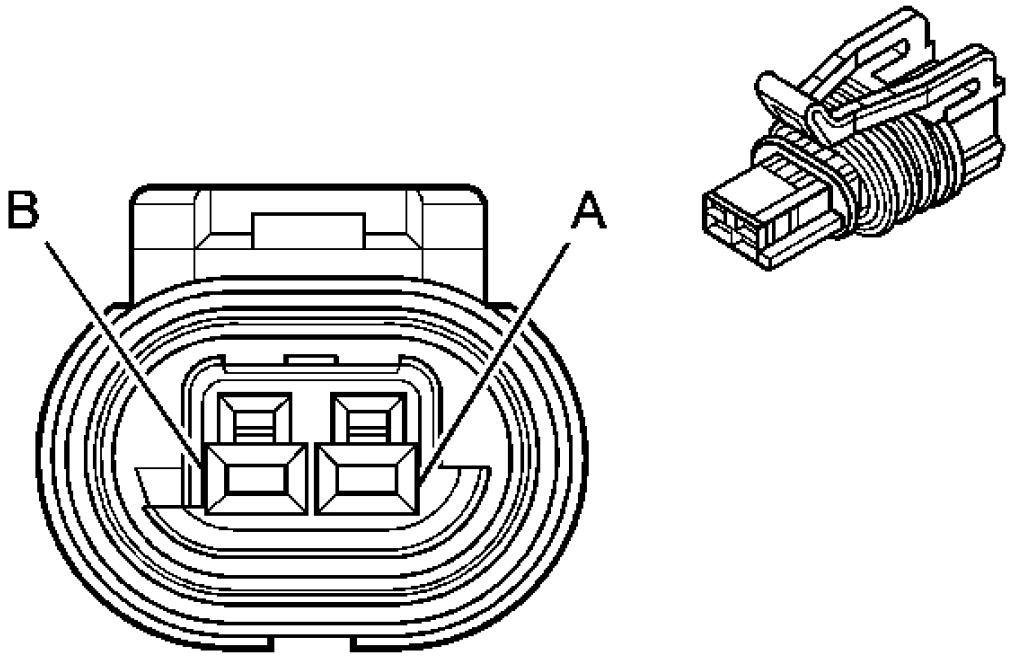


Fig. 19: B173 Manual Transmission Fluid Temperature Sensor (MV5 or M10)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15449028
- Service: 88987993
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247

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- Test Probe: J-35616-2A (GY)

B173 Manual Transmission Fluid Temperature Sensor (MV5 or M10)

Pin	Wire	Circuit	Function
A	0.5 BK	2755	Low Reference (MV5)
	0.5 OG/BK	586	Low Reference (M10)
B	0.35 TN/WH	585	Transmission Fluid Temperature Sensor Signal (MV5)
	0.5 TN/WH	585	Transmission Fluid Temperature Sensor Signal (M10)

B18 BATTERY CURRENT SENSOR

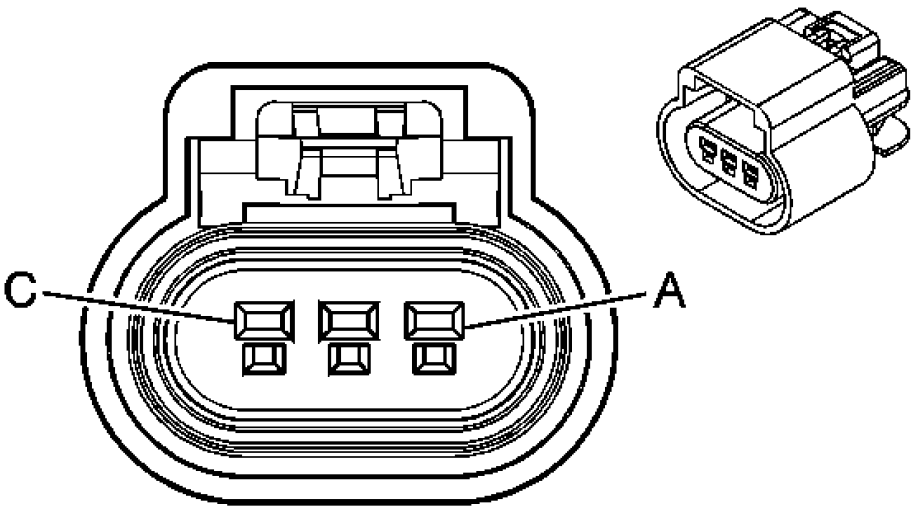


Fig. 20: B18 Battery Current Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 15326808

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- Service: 19177527
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B18 Battery Current Sensor

Pin	Wire	Circuit	Function
A	0.5 PK	5076	Current Sensor Voltage
B	0.5 BN	5077	Low Reference
C	0.5 WH	5075	Current Sensor Signal

B19B BRAKE BOOSTER VACUUM SENSOR (L99)

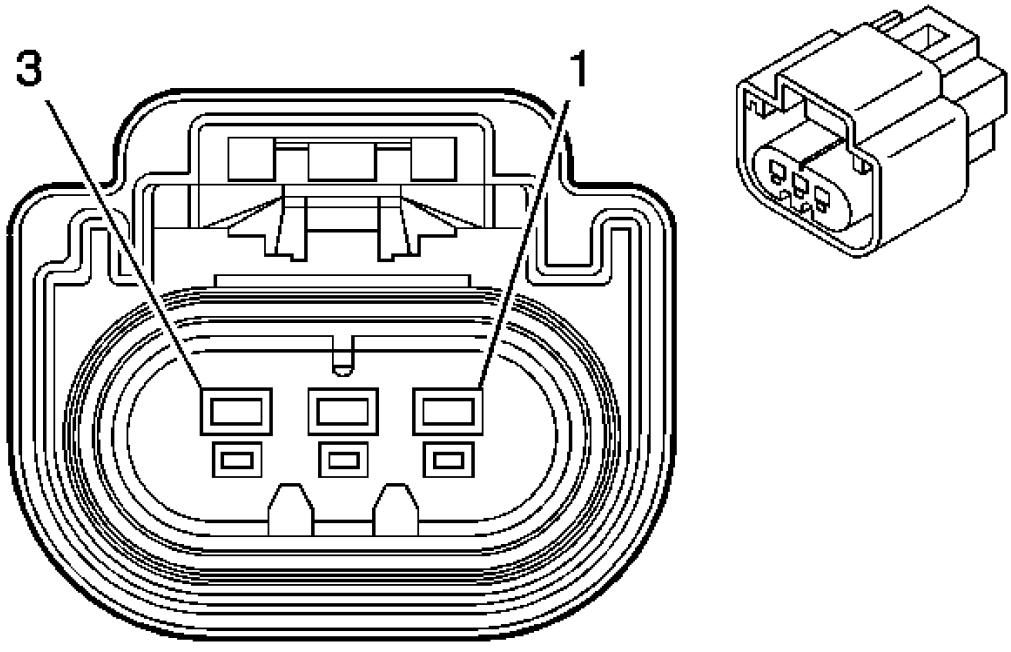


Fig. 21: B19B Brake Booster Vacuum Sensor (L99)
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 13511996
- Service: 19149288
- Description: 3-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B19B Brake Booster Vacuum Sensor (L99)

Pin	Wire	Circuit	Function
1	0.5 OG	6030	Brake Booster Vacuum Sensor Signal
2	0.5 YE/BK	6032	Low Reference
3	0.5 GY	6031	5-Volt Reference 2

B20 BRAKE FLUID LEVEL SWITCH

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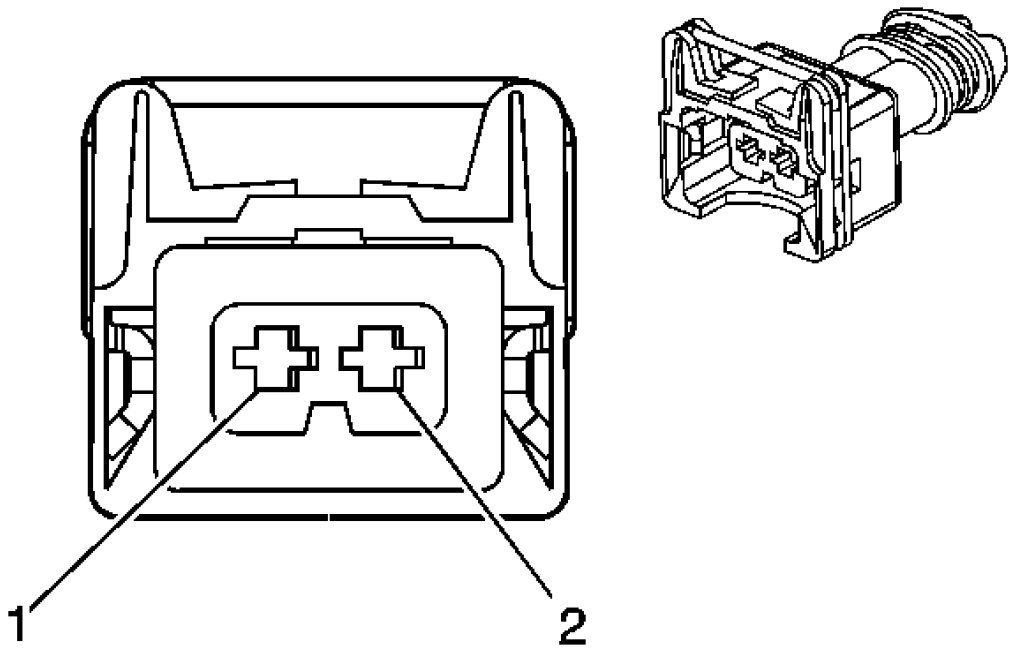


Fig. 22: B20 Brake Fluid Level Switch
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 12196895
- Service: 13505904
- Description: 2-Way F 2.8 Timer Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 60012941/21
- Core/Insulation Crimp: C/1
- Release Tool: J-38125-557
- Test Probe: J-35616-4A (PU)

B20 Brake Fluid Level Switch

Pin	Wire	Circuit	Function
1	0.5 PU	333	Brake Fluid Level Sensor Signal
2	0.5 BK	1050	Ground

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B22 BRAKE PEDAL POSITION SENSOR

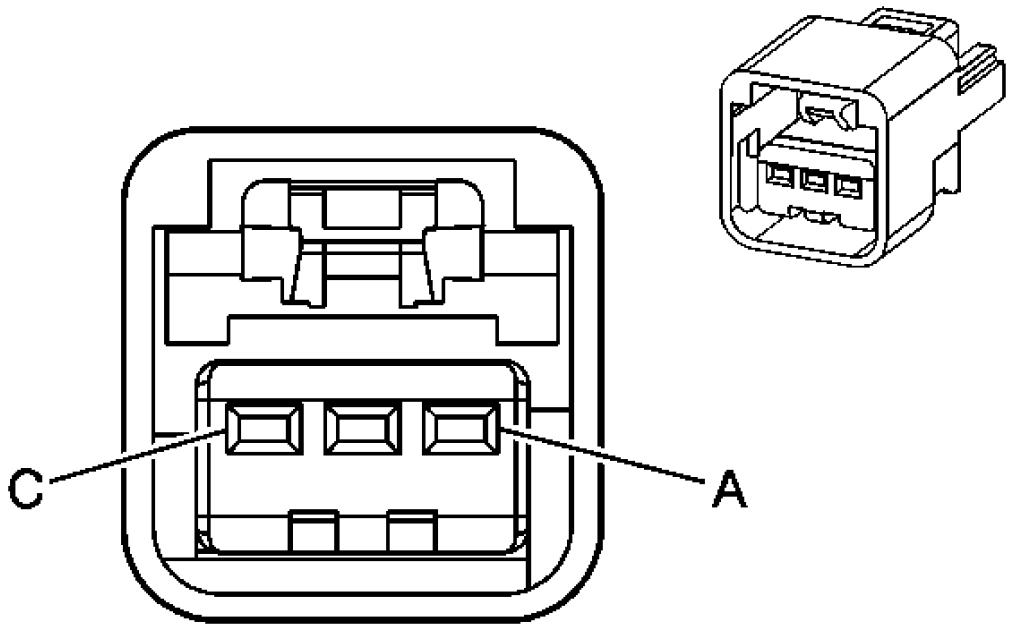


Fig. 23: B22 Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15332132
- Service: 88953364
- Description: 3-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B22 Brake Pedal Position Sensor

Pin	Wire	Circuit	Function

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A	0.35 GY	5381	5-Volt Reference
B	0.35 YE	5361	Brake Pedal Position Sensor Signal
C	0.35 L-BU/BK	853	Low Reference

B23 CAMSHAFT POSITION SENSOR (L99/LS3)

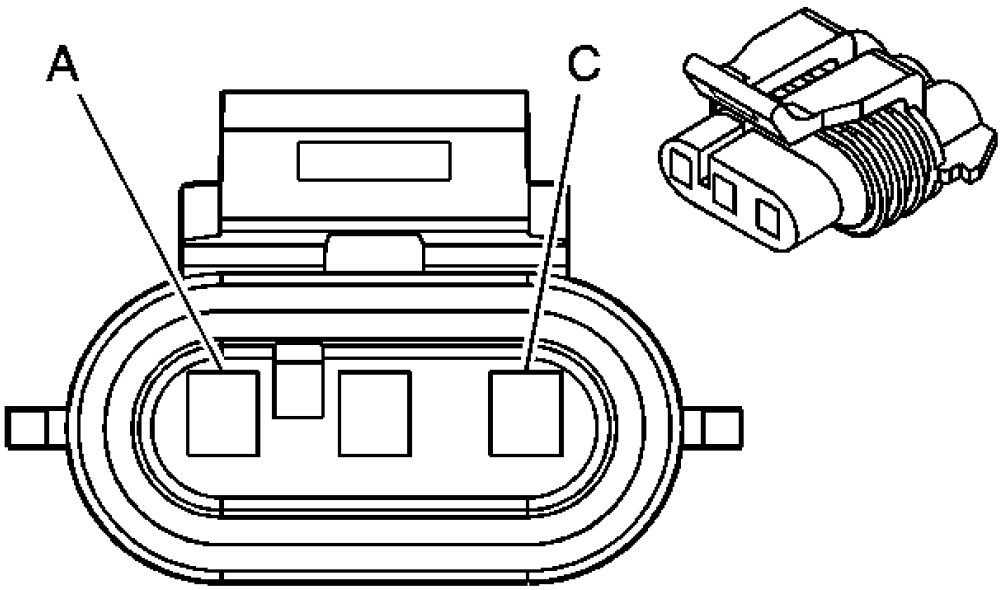


Fig. 24: B23 Camshaft Position Sensor (L99/LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Camshaft Position (CMP) Sensor and Camshaft Position (CMP) Actuator Solenoid Valve
- OEM: 12059595
- Service: 88986451
- Description: 3-Way F Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

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B23 Camshaft Position Sensor (L99/LS3)

Pin	Wire	Circuit	Function
A	0.5 D-BU	6259	5-Volt Reference 1
B	0.5 BN	6266	Low Reference
C	0.5 D-BU/WH	6265	Camshaft Position Signal

B23A CAMSHAFT POSITION SENSOR - BANK 1 EXHAUST (LLT)

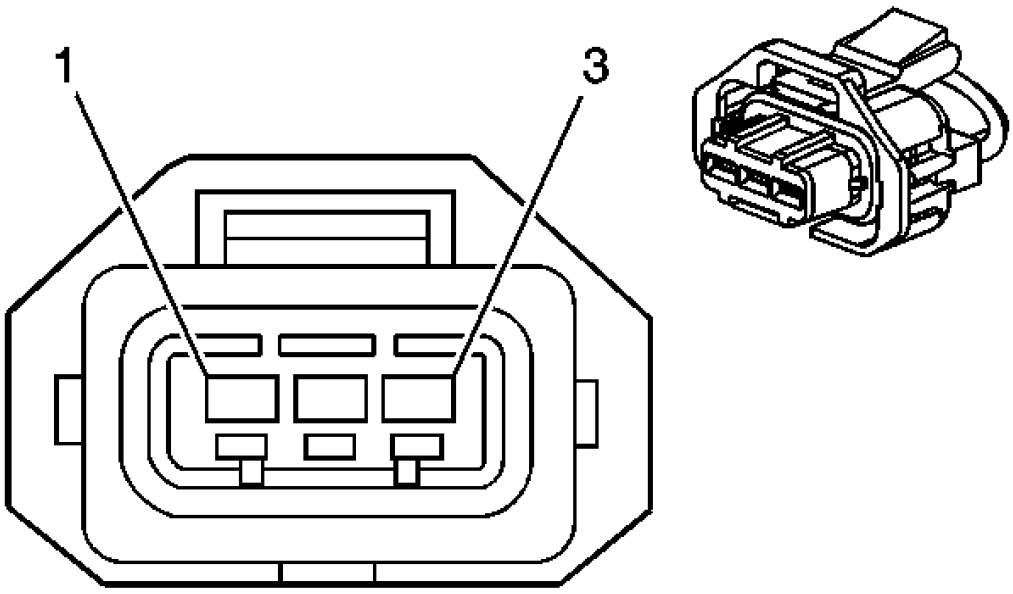


Fig. 25: B23A Camshaft Position Sensor - Bank 1 Exhaust (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15339753
- Service: 88988595
- Description: 3-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561

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- Test Probe: J-35616-35 (VT)

B23A Camshaft Position Sensor - Bank 1 Exhaust (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	552	Low Reference
2	0.5 D-GN	5273	Camshaft Position (CMP) Sensor - Exhaust Bank 1 Signal
3	0.5 GY	705	5-Volt Reference 2

B23B CAMSHAFT POSITION SENSOR - BANK 1 INTAKE (LLT)

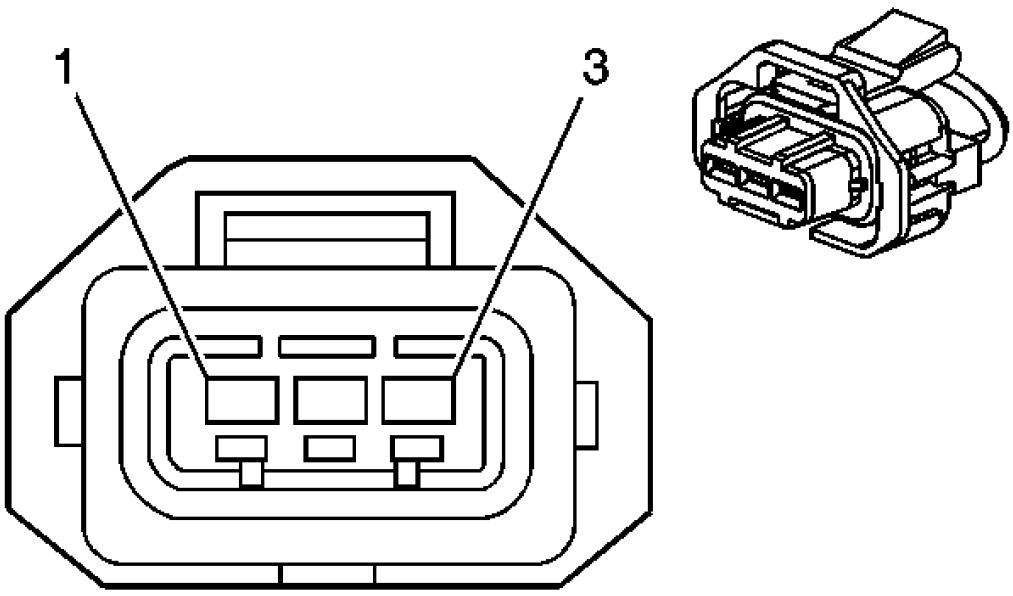


Fig. 26: B23B Camshaft Position Sensor - Bank 1 Intake (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15339753
- Service: 88988595
- Description: 3-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

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- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

B23B Camshaft Position Sensor - Bank 1 Intake (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	552	Low Reference
2	0.5 OG	5275	Camshaft Position (CMP) Sensor - Intake Bank 1 Signal
3	0.5 GY	705	5-Volt Reference 2

B23C CAMSHAFT POSITION SENSOR - BANK 2 EXHAUST (LLT)

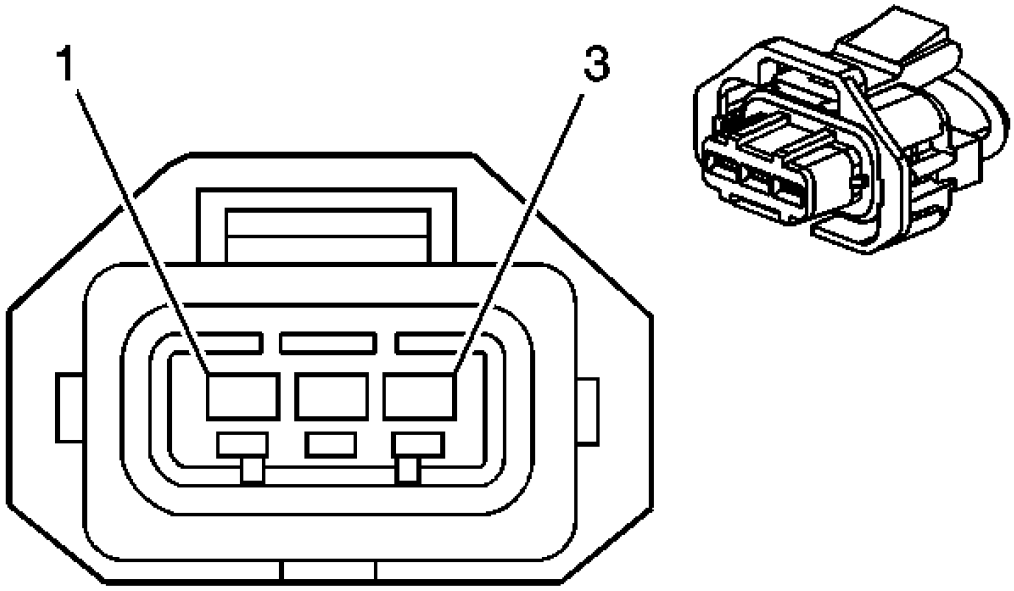


Fig. 27: B23C Camshaft Position Sensor - Bank 2 Exhaust (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15339753

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- Service: 88988595
- Description: 3-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

B23C Camshaft Position Sensor - Bank 2 Exhaust (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	552	Low Reference
2	0.5 PU	5274	Camshaft Position (CMP) Sensor - Exhaust Bank 2 Signal
3	0.5 GY	705	5-Volt Reference 2

B23D CAMSHAFT POSITION SENSOR - BANK 2 INTAKE (LLT)

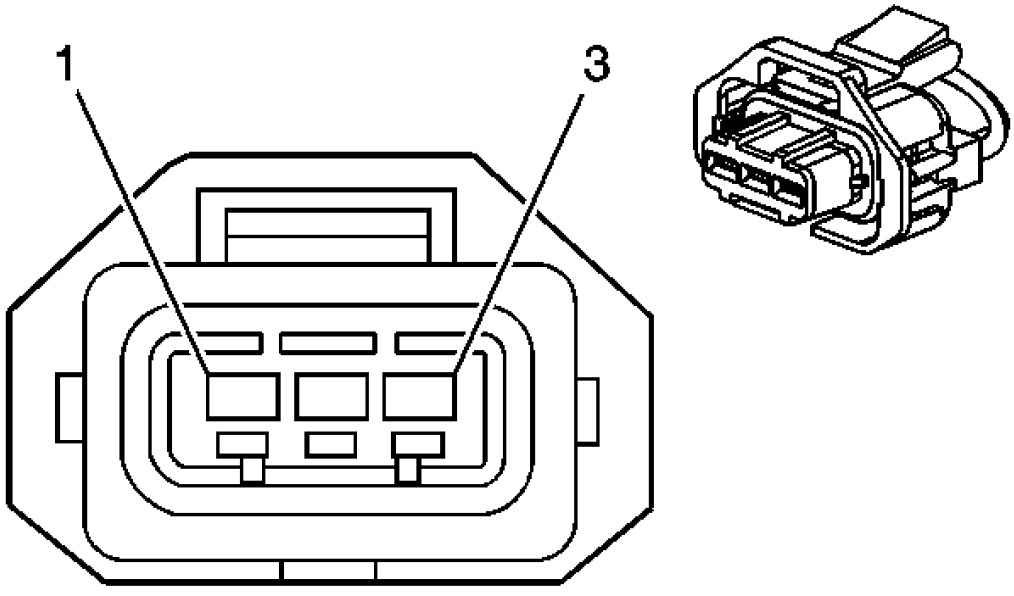


Fig. 28: B23D Camshaft Position Sensor - Bank 2 Intake (LLT)
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 15339753
- Service: 88988595
- Description: 3-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

B23D Camshaft Position Sensor - Bank 2 Intake (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	552	Low Reference
2	0.5 YE	5276	Camshaft Position (CMP) Sensor - Intake Bank 2 Signal
3	0.5 GY	705	5-Volt Reference 2

B24 CELLULAR PHONE MICROPHONE (UE1)

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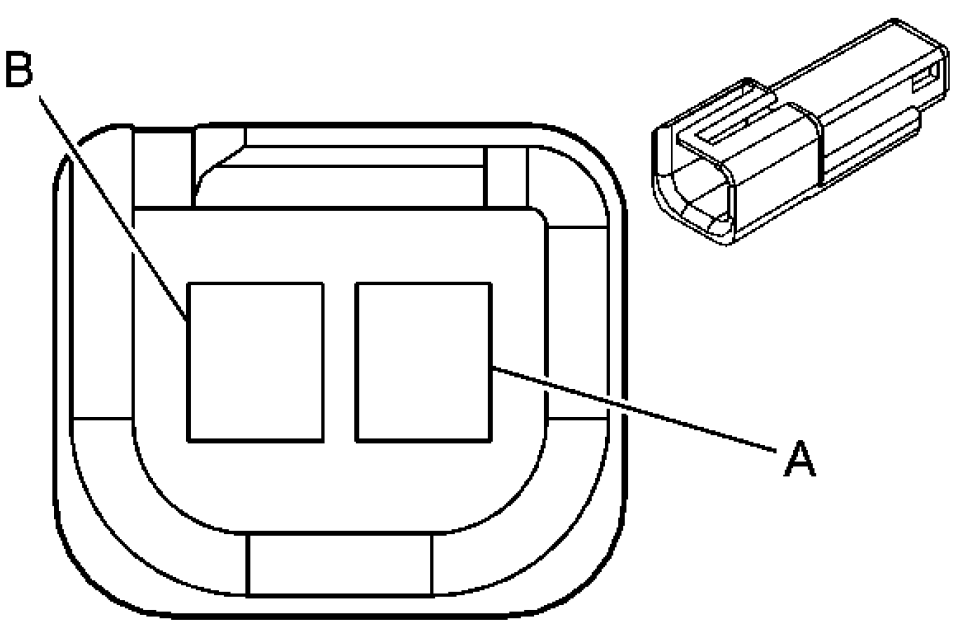


Fig. 29: B24 Cellular Phone Microphone (UE1)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 12047663
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B24 Cellular Phone Microphone (UE1)

Pin	Wire	Circuit	Function
A	0.35 BARE	654	Cellular Microphone Signal
B	0.35 GY	655	Cellular Microphone Signal

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B25B CLUTCH PEDAL POSITION SENSOR (MV5 OR M10)

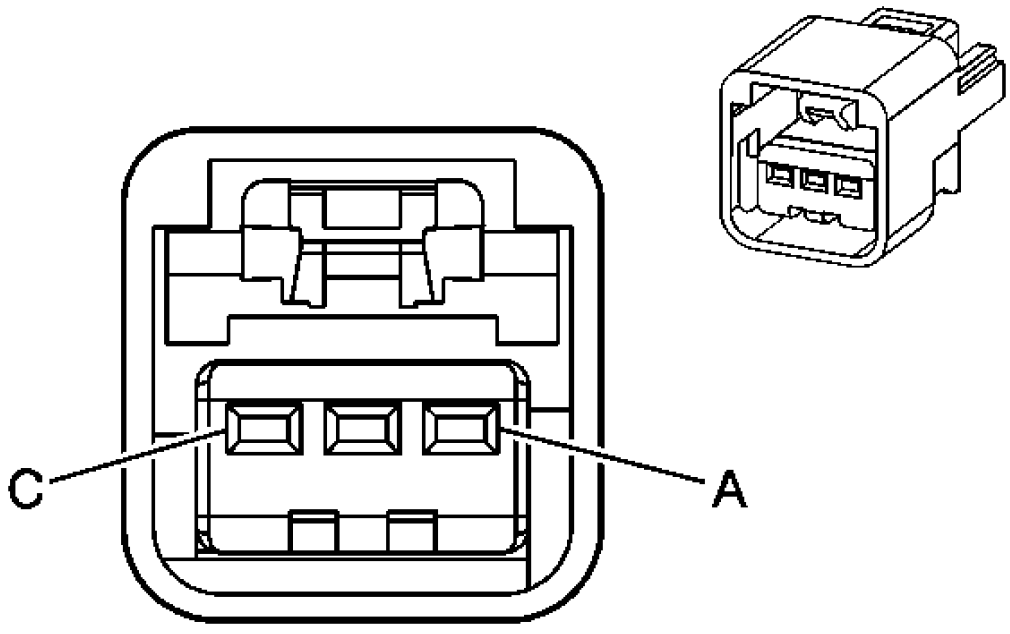


Fig. 30: B25B Clutch Pedal Position Sensor (MV5 or M10)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15332132
- Service: 88953364
- Description: 3-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B25B Clutch Pedal Position Sensor (MV5 or M10)

Pin	Wire	Circuit	Function

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A	0.35 TN	6109	5-Volt Reference 1 (MV5)
			5-Volt Reference 2 (M10)
B	0.35 YE	6111	Clutch Pedal Position Sensor Signal
C	0.35 WH	6110	Low Reference

B26 CRANKSHAFT POSITION SENSOR (L99 OR LS3)

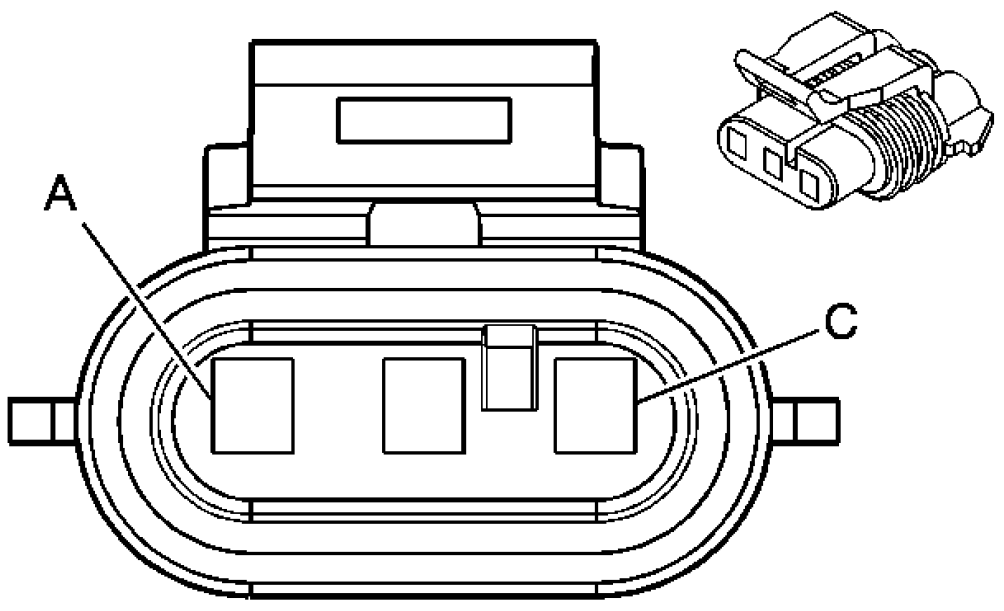


Fig. 31: B26 Crankshaft Position Sensor (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12129946
- Service: 88987997
- Description: 3-Way F Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1

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- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

B26 Crankshaft Position Sensor (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 WH/BK	6271	Crankshaft Position Sensor Signal
B	0.5 GY/BK	6272	Low Reference
C	0.5 PU/WH	6270	5-Volt Reference 2

B26 CRANKSHAFT POSITION SENSOR (LLT)

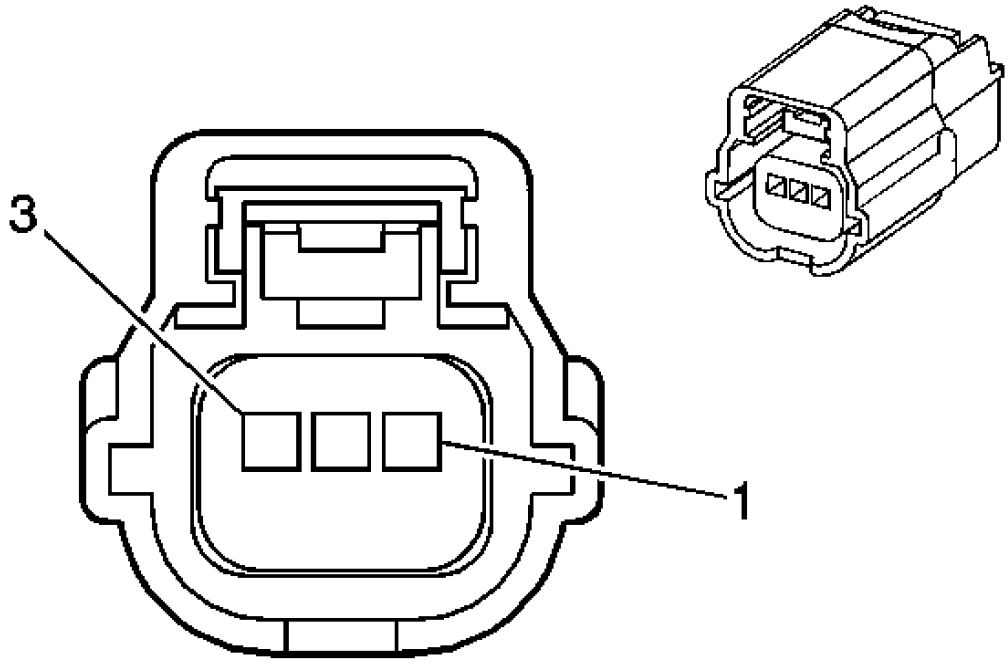


Fig. 32: B26 Crankshaft Position Sensor (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13599025
- Service: 19206250

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- Description: 3-Way F 64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03GF-M064/27
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B26 Crankshaft Position Sensor (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	452	Low Reference
2	0.5 YE	573	CKP Sensor Signal
3	0.5 GY	605	5-Volt Reference 3

B34 ENGINE COOLANT TEMPERATURE SENSOR (L99 OR LS3)

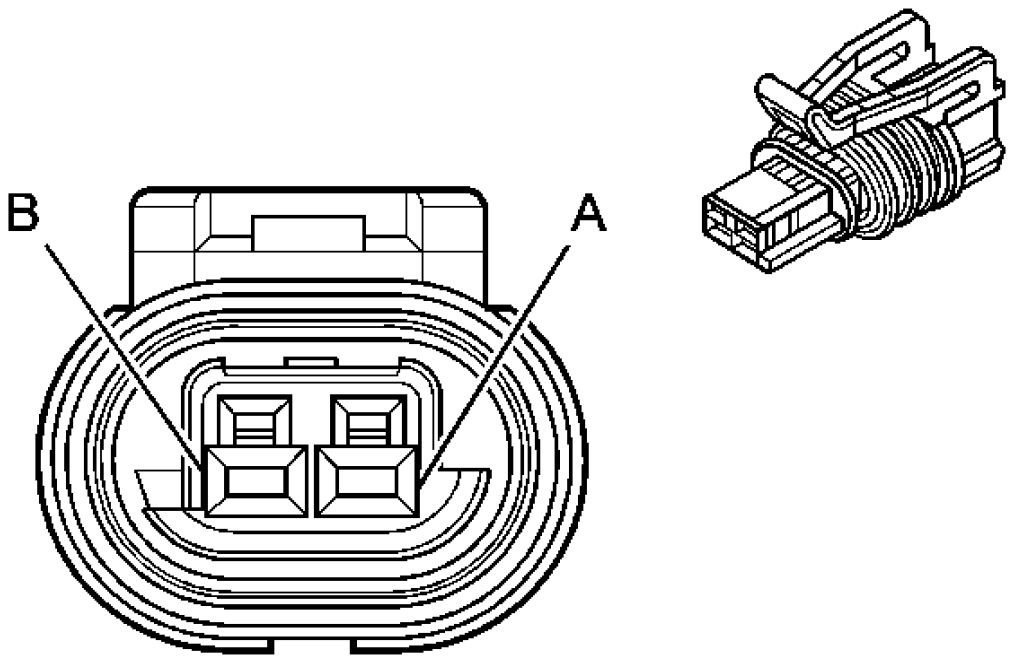


Fig. 33: B34 Engine Coolant Temperature Sensor (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 15449028
- Service: 88987993
- Description: 2-Way F GT 150 Series, Sealed (BK)

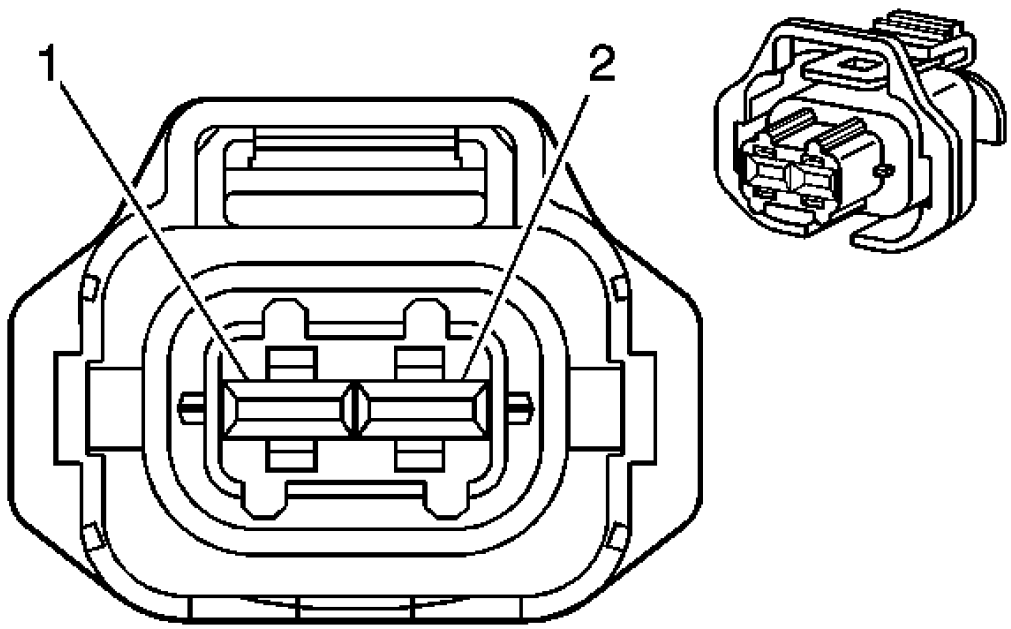
Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B34 Engine Coolant Temperature Sensor (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 TN	2761	Low Reference
B	0.5 YE	410	ECT Sensor Signal

B34 ENGINE COOLANT TEMPERATURE SENSOR (LLT)



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Fig. 34: B34 Engine Coolant Temperature Sensor (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15339756
- Service: 88988963
- Description: 2-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498054/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

B34 Engine Coolant Temperature Sensor (LLT)

Pin	Wire	Circuit	Function
1	0.5 YE	410	ECT Sensor Signal
2	0.5 TN	476	Low Reference

B35C ENGINE OIL LEVEL AND TEMPERATURE SENSOR (L99 OR LS3)

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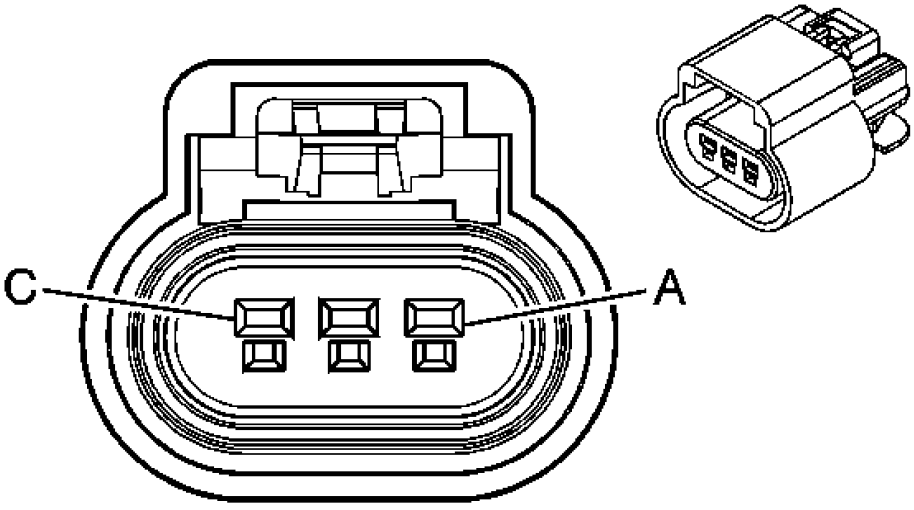


Fig. 35: B35C Engine Oil Level and Temperature Sensor (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13519047
- Service: 19153104
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B35C Engine Oil Level and Temperature Sensor (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 BN	1174	Oil Level Switch Signal
B	-	-	Not Used (M10)

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	0.5 BN/L-BU	357	Oil Temperature Sensor Signal (MYC)
C	0.5 BK/WH	451	Ground

B37B ENGINE OIL PRESSURE SENSOR (L99 OR LS3)

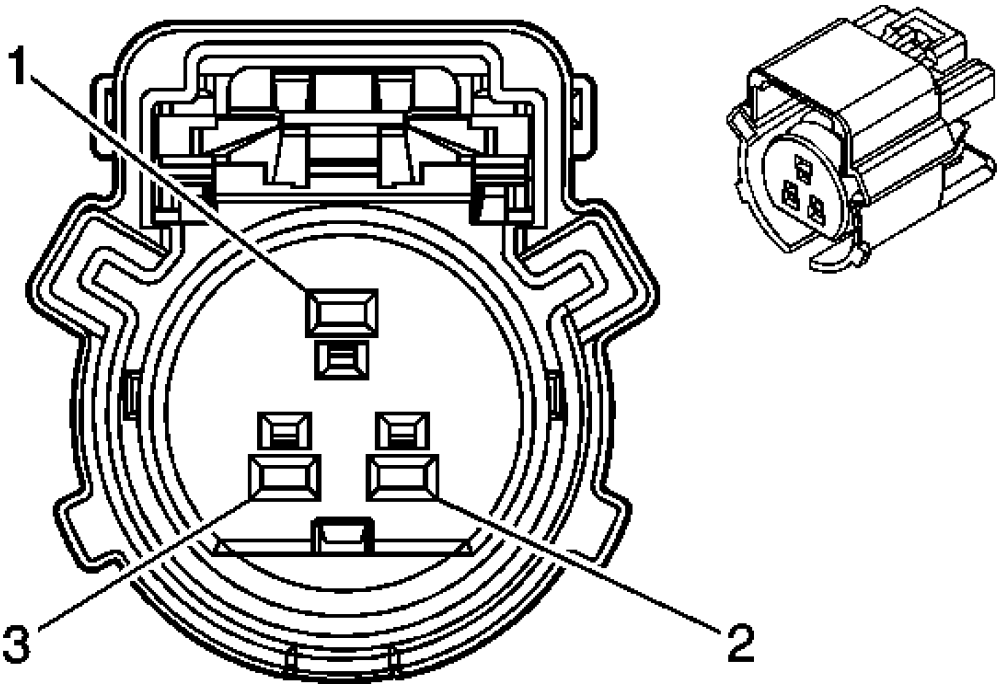


Fig. 36: B37B Engine Oil Pressure Sensor (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13589761
- Service: 19207215
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1

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- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B37B Engine Oil Pressure Sensor (L99 or LS3)

Pin	Wire	Circuit	Function
1	0.5 TN/WH	331	Oil Pressure Sensor Signal
2	0.5 GY	2705	5-Volt Reference 1
3	0.5 BK	2755	Low Reference

B37B ENGINE OIL PRESSURE SENSOR (LLT)

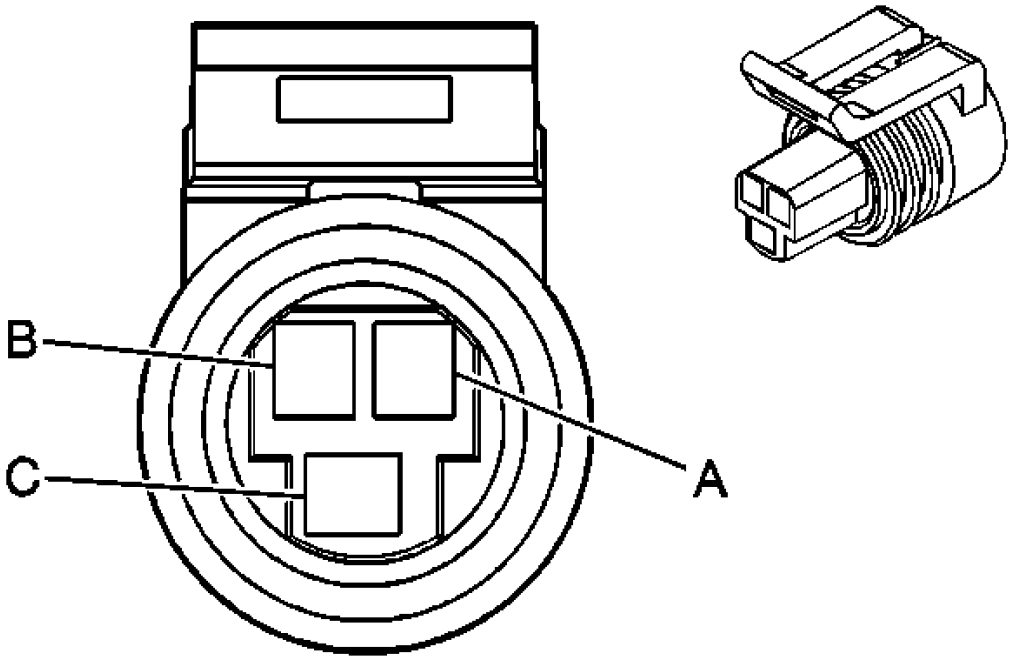


Fig. 37: B37B Engine Oil Pressure Sensor (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12065287
- Service: 88988301

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- Description: 3-Way F Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12103881/2
- Core/Insulation Crimp: E/C
- Release Tool: 12180559-1
- Test Probe: J-35616-14 (GN)

B37B Engine Oil Pressure Sensor (LLT)

Pin	Wire	Circuit	Function
A	0.5 BK	2755	Low Reference
B	0.5 GY	2705	5-Volt Reference 1
C	0.5 TN/WH	331	Oil Pressure Sensor Signal

B39 A/C EVAPORATOR TEMPERATURE SENSOR

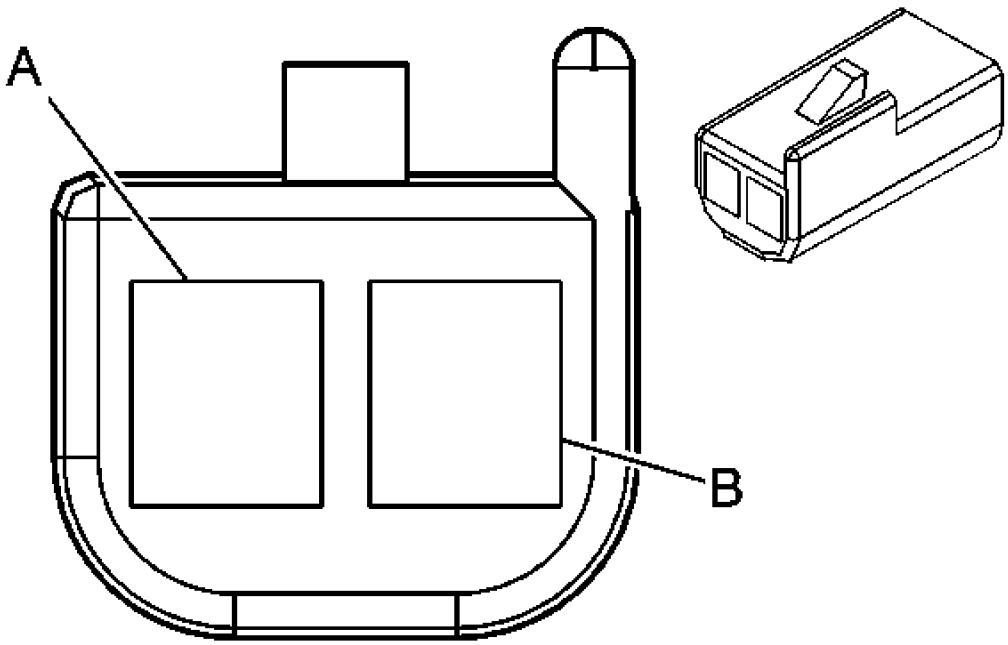


Fig. 38: B39 A/C Evaporator Temperature Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: HVAC
- OEM: 12047662
- Service: 12085535
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 15326030/2
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

B39 A/C Evaporator Temperature Sensor

Pin	Wire	Circuit	Function
A	0.35 GY	6137	EVAP Core Temperature Sensor Signal
B	0.35 TN	407	Low Reference

B46B FUEL LEVEL SENSOR - SECONDARY

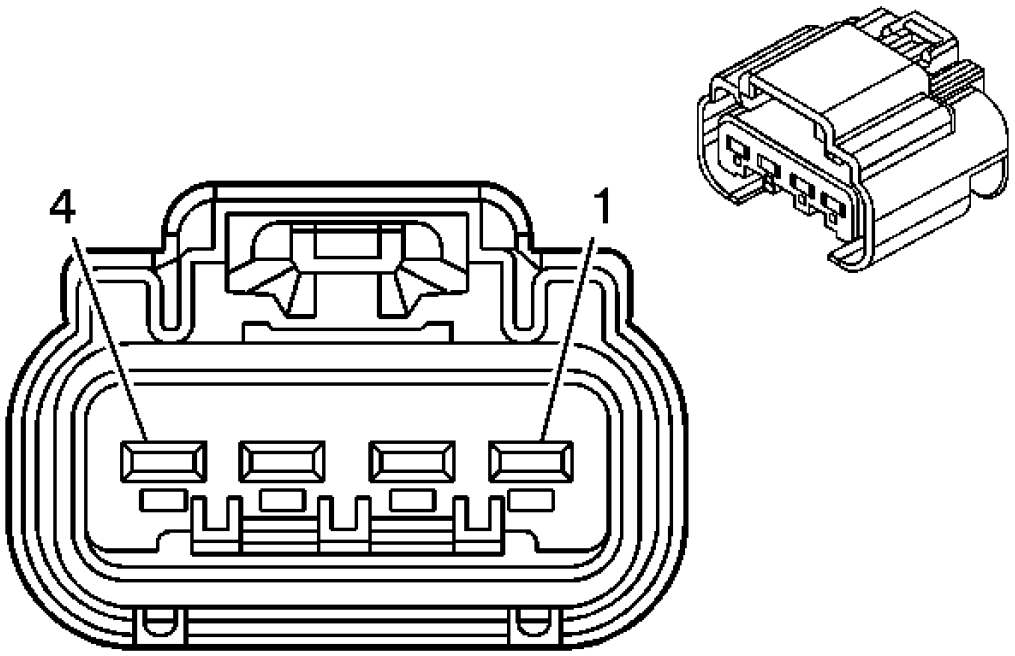


Fig. 39: B46B Fuel Level Sensor - Secondary

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Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fuel Tank
- OEM: 13527865
- Service: Service by Harness - See Part Catalog
- Description: 4-Way F GT 280 Series, Sealed (NA)

Terminal Part Information

- Terminal/Tray: 15304719/19
- Core/Insulation Crimp: E/5
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

B46B Fuel Level Sensor - Secondary

Pin	Wire	Circuit	Function
1-2	-	-	Not Used
3	0.5 BN/WH	6281	Low Reference
4	0.5 YE	1937	Fuel Level Sensor Signal - Secondary (Early Production)
	0.5 L-BU	1937	Fuel Level Sensor Signal - Secondary Late Production)

B47 FUEL PRESSURE SENSOR

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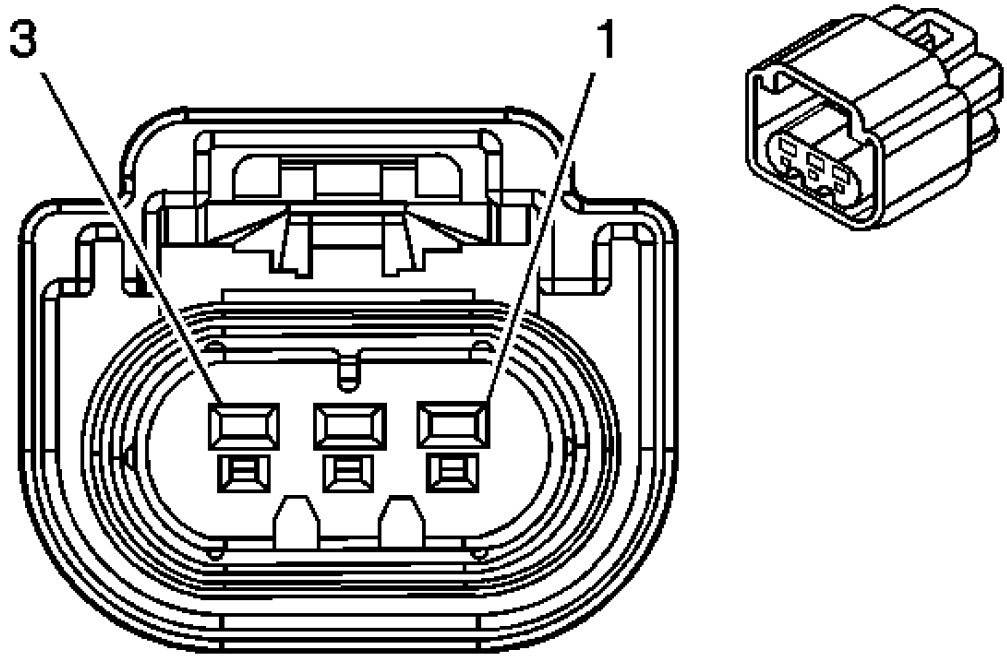


Fig. 40: B47 Fuel Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fuel Tank
- OEM: 13511131
- Service: 19168035
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B47 Fuel Pressure Sensor

Pin	Wire	Circuit	Function
	0.5 GY	7446	Fuel Pressure Sensor Signal (Early

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1			Production)
	0.5 PU	7446	Fuel Pressure Sensor Signal (Late Production)
2	0.5 BN	7447	Low Reference (Early Production)
	0.5 GY	7447	Low Reference (Late Production)
3	0.5 OG	7445	5-Volt Reference (Early Production)
	0.5 BN	7445	5-Volt Reference (Late Production)

B47B FUEL RAIL PRESSURE SENSOR (LLT)

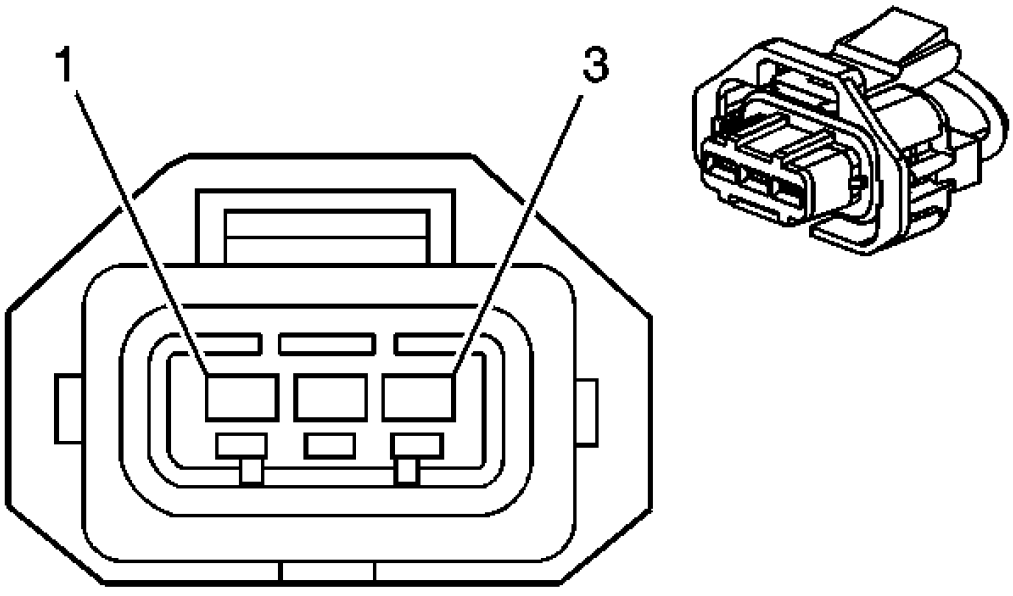


Fig. 41: B47B Fuel Rail Pressure Sensor (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Odd)
- OEM: 1928403966
- Service: Service by harness - See Part Catalog
- Description: 3-Way F Kompakt 280 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: Service by harness - See Part Catalog

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- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

B47B Fuel Rail Pressure Sensor (LLT)

Pin	Wire	Circuit	Function
1	0.5 L-BU	808	Low Reference
2	0.5 BK	2918	FRP Sensor Signal
3	0.5 WH	598	5-Volt Reference 1

B52C HEATED OXYGEN SENSOR - BANK 1 SENSOR 1 (L99 OR LS3)

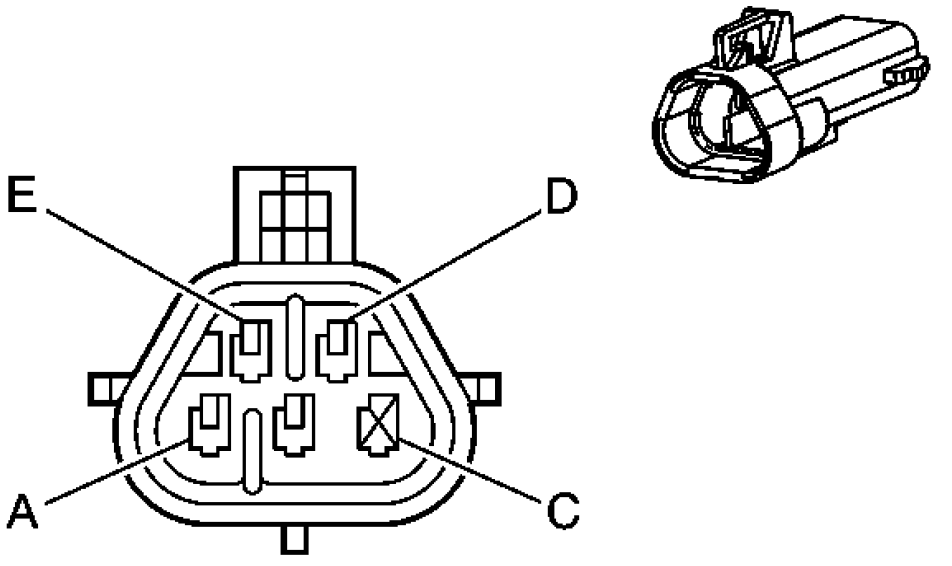


Fig. 42: B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12092839
- Service: 88987991

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- Description: 5-Way M Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 TN	1664	HO2S Low Signal - Bank 1 Sensor 1
B	0.5 PU/WH	1665	HO2S High Signal Bank 1 Sensor 1
C	-	-	Not Used
D	0.5 PK/BK	5293	Ignition Voltage
E	0.5 GY/WH	3113	HO2S Heater Low Control Bank 1 Sensor 1

B52C HEATED OXYGEN SENSOR - BANK 1 SENSOR 1 (LLT)

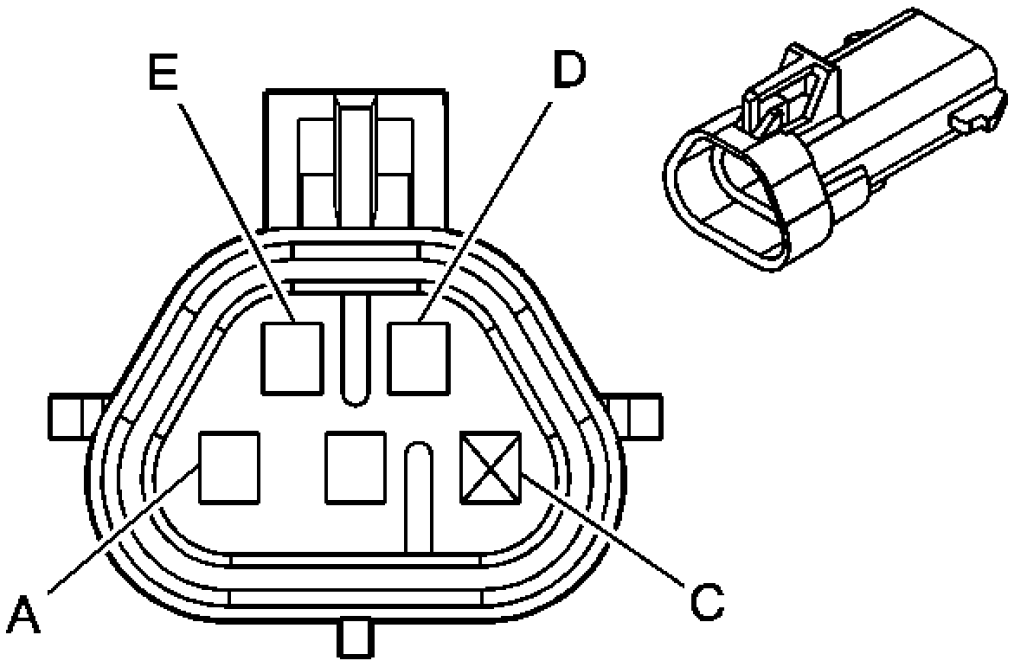


Fig. 43: B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (LLT)

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Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12092840
- Service: 15306311
- Description: 5-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12177150/4
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (LLT)

Pin	Wire	Circuit	Function
A	0.5 TN/WH	3111	HO2S Low Signal Bank 1 Sensor 1
B	0.5 PU/WH	3110	HO2S High SignalBank 1 Sensor 1
C	-	-	Not Used
D	0.8 PK/BK	5293	Ignition Voltage
E	0.8 GY/WH	3113	HO2S Heater Low Control Bank 1 Sensor 1

B52D HEATED OXYGEN SENSOR - BANK 1 SENSOR 2 (L99 OR LS3)

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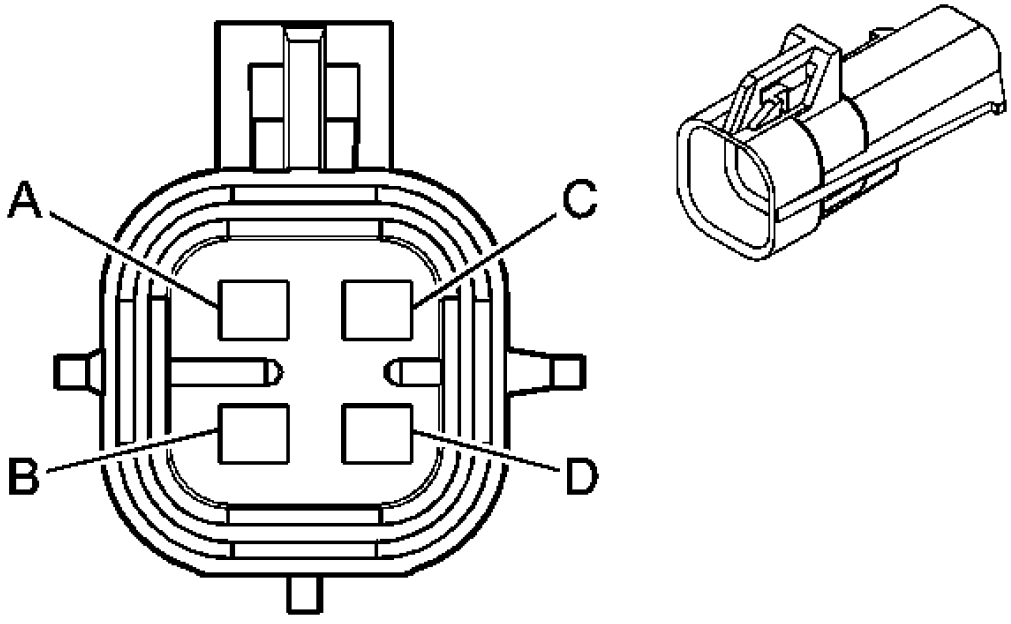


Fig. 44: B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15326423
- Service: 15326423
- Description: 4-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 TN/WH	1669	HO2S Low Signal Bank 1 Sensor 2
B	0.5 PU/WH	1668	HO2S High Signal Bank 1 Sensor 2

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C	0.5 GY/WH	3122	HO2S Heater Low Control Bank 1 Sensor 2
D	0.5 PK/BK	5294	Ignition Voltage

B52D HEATED OXYGEN SENSOR - BANK 1 SENSOR 2 (LLT)

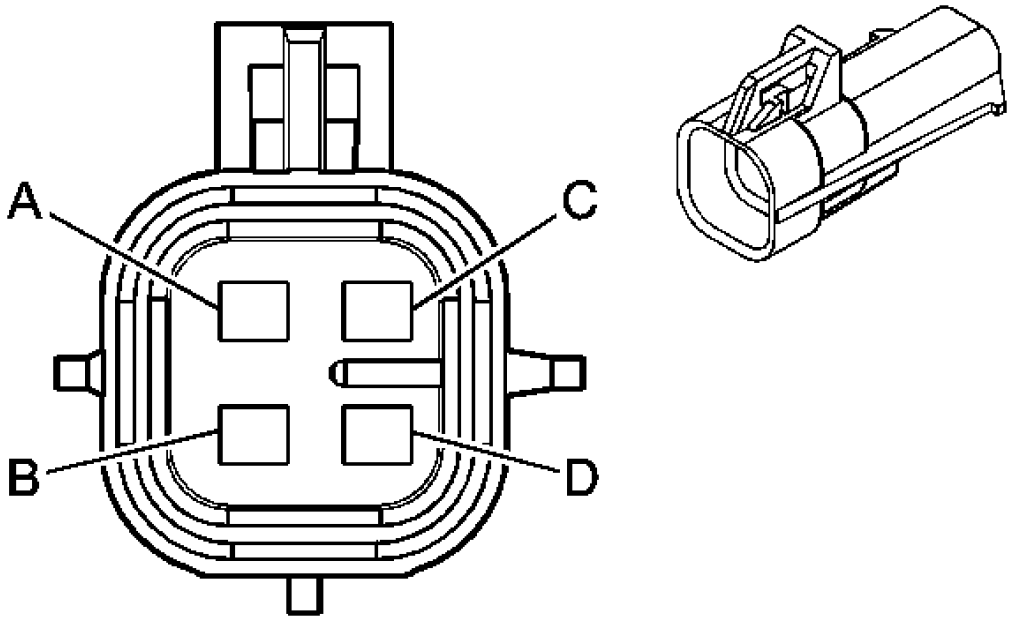


Fig. 45: B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12160825
- Service: 15305801
- Description: 4-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

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B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (LLT)

Pin	Wire	Circuit	Function
A	0.5 TN/WH	3121	HO2S Low Signal Bank 1 Sensor 2
B	0.5 PU	3120	HO2S High Signal Bank 1 Sensor 2
C	0.8 PK/BK	5294	Ignition Voltage
D	0.8 GY/WH	3122	HO2S Heater Low Control Bank 1 Sensor 2

B52E HEATED OXYGEN SENSOR - BANK 2 SENSOR 1 (L99 OR LS3)

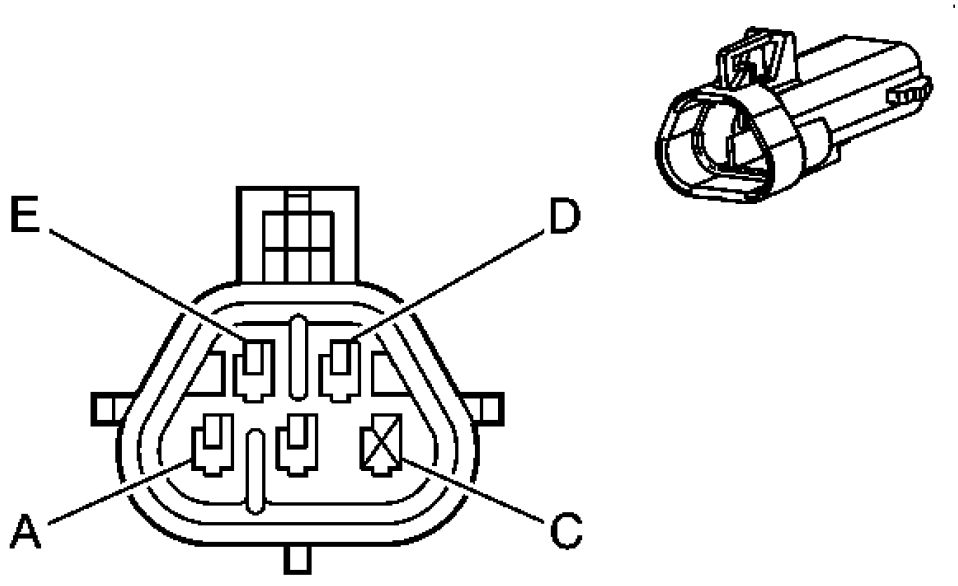


Fig. 46: B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12092839
- Service: 88987991
- Description: 5-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12045773/2

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- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 TN	1667	HO2S Low Signal Bank 2 Sensor 1
B	0.5 PU	1666	HO2S High Signal Bank 2 Sensor 1
C	-	-	Not Used
D	0.5 PK/BK	5293	Ignition Voltage
E	0.5 L-GN	3212	HO2S Heater Low Control Bank 2 Sensor 1

B52E HEATED OXYGEN SENSOR - BANK 2 SENSOR 1 (LLT)

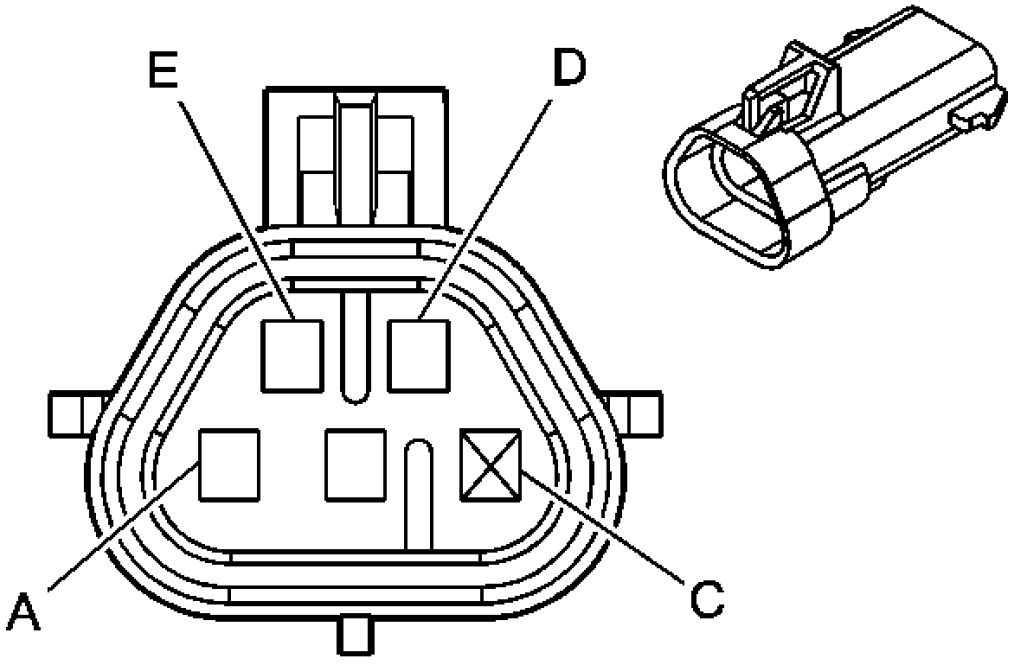


Fig. 47: B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (LLT)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Engine
- OEM: 12092840
- Service: 15306311
- Description: 5-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12177150/4
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (LLT)

Pin	Wire	Circuit	Function
A	0.5 TN/WH	3211	HO2S Low Signal Bank 2 Sensor 1
B	0.5 PU/WH	3210	HO2S High Signal Bank 2 Sensor 1
C	-	-	Not Used
D	0.8 PK/BK	5293	Ignition Voltage
E	0.8 L-GN	3212	HO2S Heater Low Control Bank 2 Sensor 1

B52F HEATED OXYGEN SENSOR - BANK 2 SENSOR 2 (L99 OR LS3)

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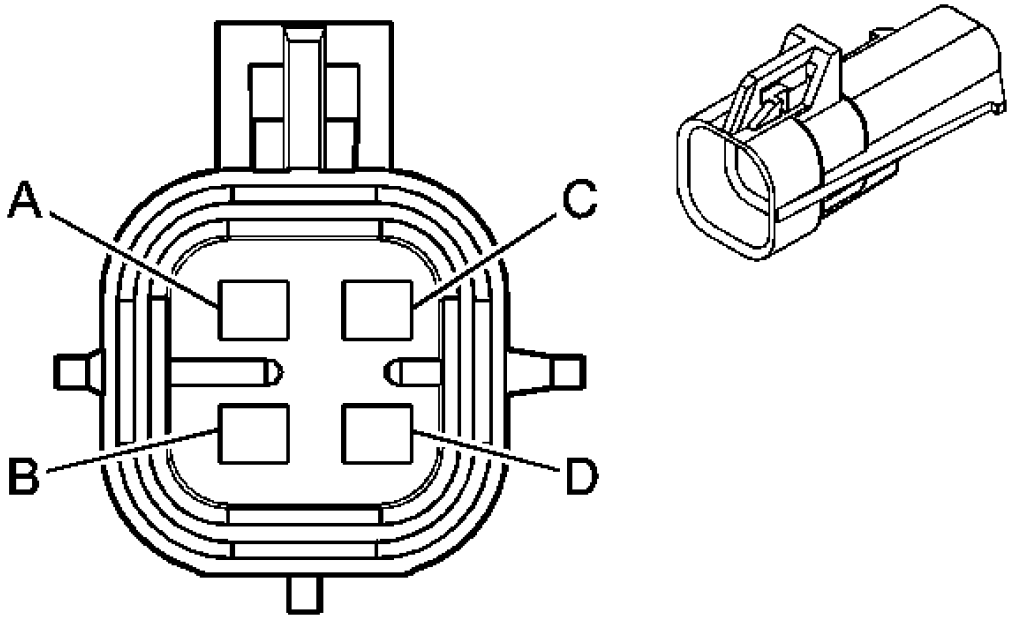


Fig. 48: B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15326423
- Service: 15326423
- Description: 4-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 TN	1671	HO2S Low Signal Bank 2 Sensor 2
B	0.5 PU	1670	HO2S High Signal Bank 2 Sensor 2

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C	0.5 OG/WH	3223	HO2S Heater Low Control Bank 2 Sensor 2
D	0.5 PK/BK	5294	Ignition Voltage

B52F HEATED OXYGEN SENSOR - BANK 2 SENSOR 2 (LLT WITH MV5)

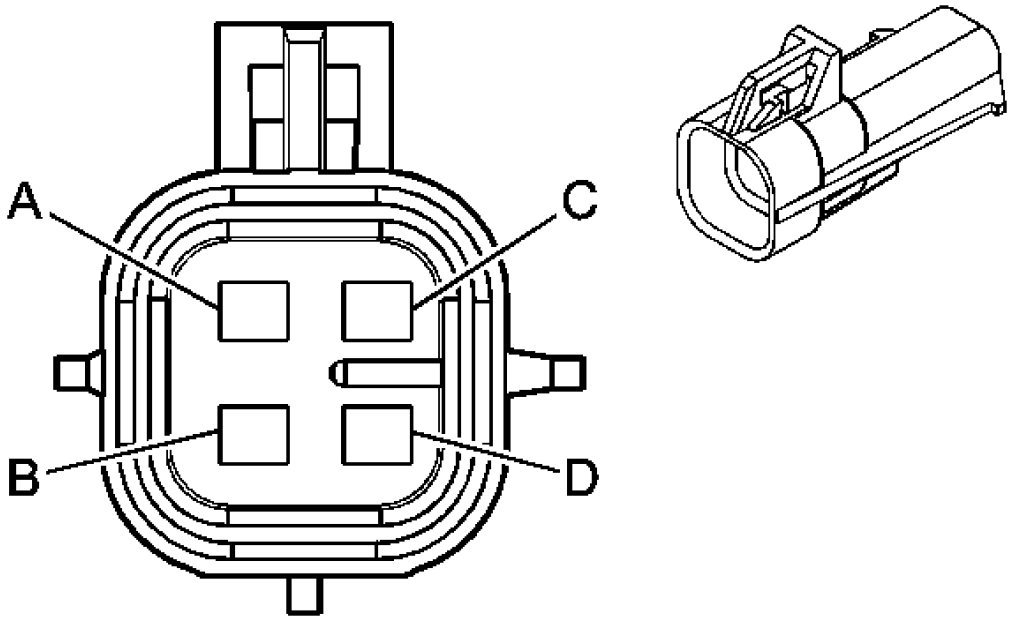


Fig. 49: B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MV5)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12160825
- Service: 15305801
- Description: 4-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

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B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MV5)

Pin	Wire	Circuit	Function
A	0.5 TN	3221	HO2S Low Signal Bank 2 Sensor 2
B	0.5 PU	3220	HO2S High Signal Bank 2 Sensor 2
C	0.8 PK/BK	5294	Ignition Voltage
D	0.8 OG/WH	3223	HO2S Heater Low Control Bank 2 Sensor 2

B52F HEATED OXYGEN SENSOR - BANK 2 SENSOR 2 (LLT WITH MYB)

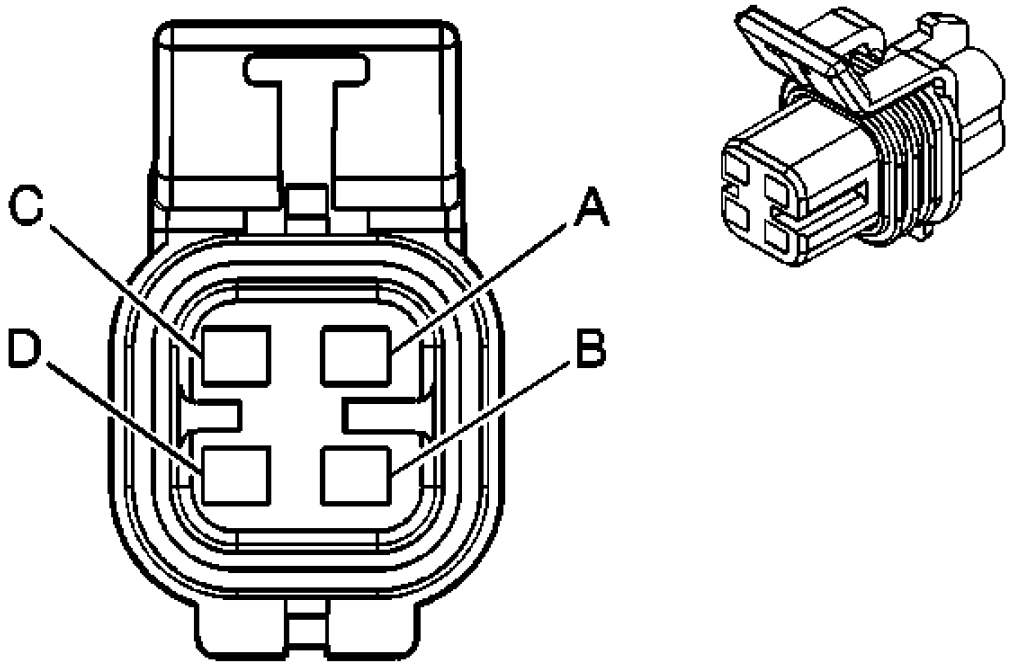


Fig. 50: B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MYB)
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12176897
- Service: 15305960
- Description: 4-Way F Metri-Pack 150 Sealed (L-GY)

Terminal Part Information

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- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (LLT with MYB)

Pin	Wire	Circuit	Function
A	0.5 TN	3221	HO2S Low Signal Bank 2 Sensor 2
B	0.5 PU	3220	HO2S High Signal Bank 2 Sensor 2
C	0.8 OG/WH	3223	HO2S Heater Low Control Bank 2 Sensor 2
D	0.8 PK/BK	5294	Ignition Voltage

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Wiring Systems and Power Management - Component Locator - Component Connector End Views - Camaro

COMPONENT CONNECTOR END VIEWS

B55 HOOD AJAR SWITCH

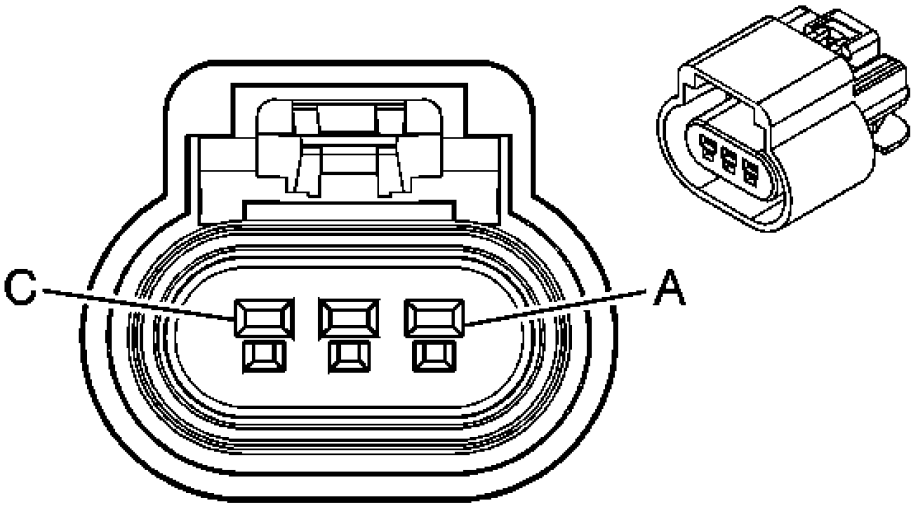


Fig. 1: B55 Hood Ajar Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13519047
- Service: 19153104
- Description: 3-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8

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- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B55 Hood Ajar Switch

Pin	Wire	Circuit	Function
A	-	-	Not Used
B	0.5 PK/BK	109	Hood Ajar Switch Signal
C	0.5 BK	1150	Ground

B59L FRONT IMPACT SENSOR - LEFT

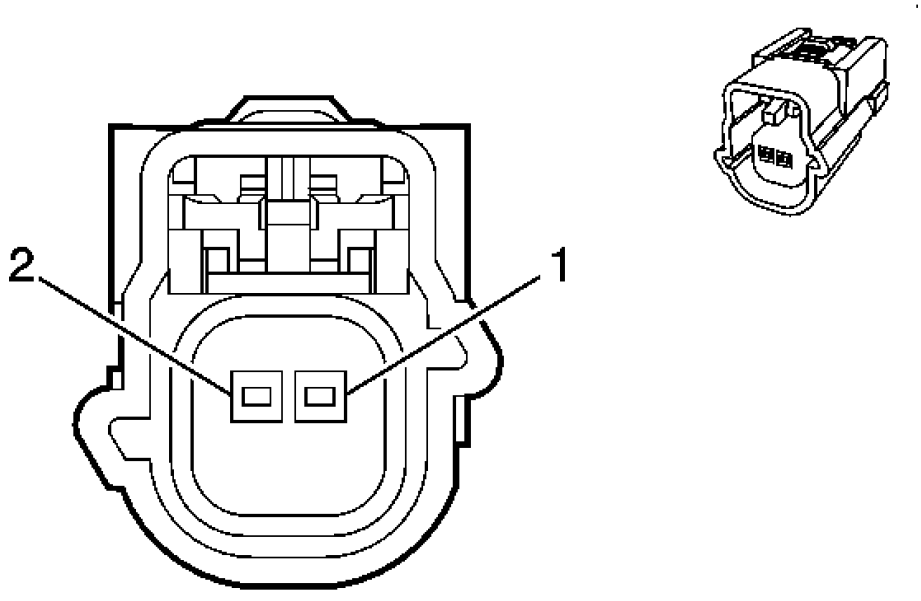


Fig. 2: B59L Front Impact Sensor - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13610095
- Service: 13314084

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- Description: 2-Way F Kaizen 0.64 Series, Sealed (D-GY)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B59L Front Impact Sensor - Left

Pin	Wire	Circuit	Function
1	0.35 YE	354	Front End Sensor - Left - Signal
2	0.35 TN/OG	5045	Low Reference

B59R FRONT IMPACT SENSOR - RIGHT

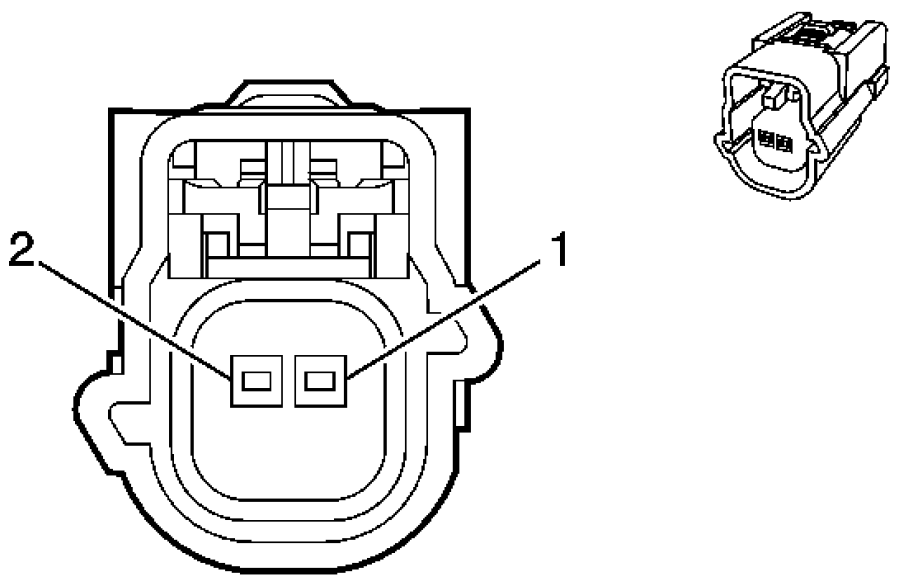


Fig. 3: B59R Front Impact Sensor - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Forward Lamp
- OEM: 13610095
- Service: 13314084
- Description: 2-Way F Kaizen 0.64 Series, Sealed (D-GY)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B59R Front Impact Sensor - Right

Pin	Wire	Circuit	Function
1	0.35 D-GN	1409	Front End Sensor - Right - Signal
2	0.35 GY	5600	Low Reference

B5LF WHEEL SPEED SENSOR - LEFT FRONT

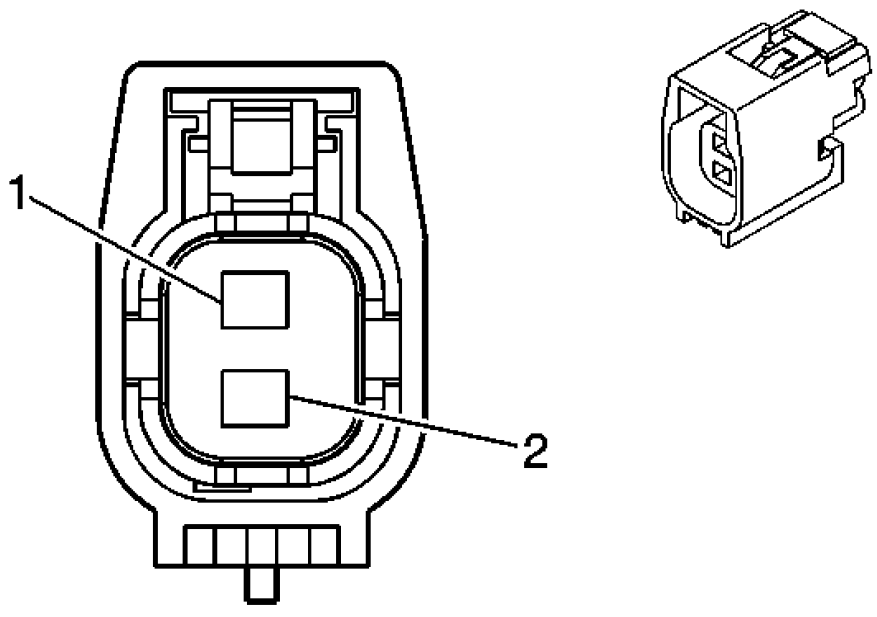


Fig. 4: B5LF Wheel Speed Sensor - Left Front Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Forward Lamp
- OEM: 13612509
- Service: 19178097
- Description: 2-Way F GT 1.5 Series Sealed (BK)

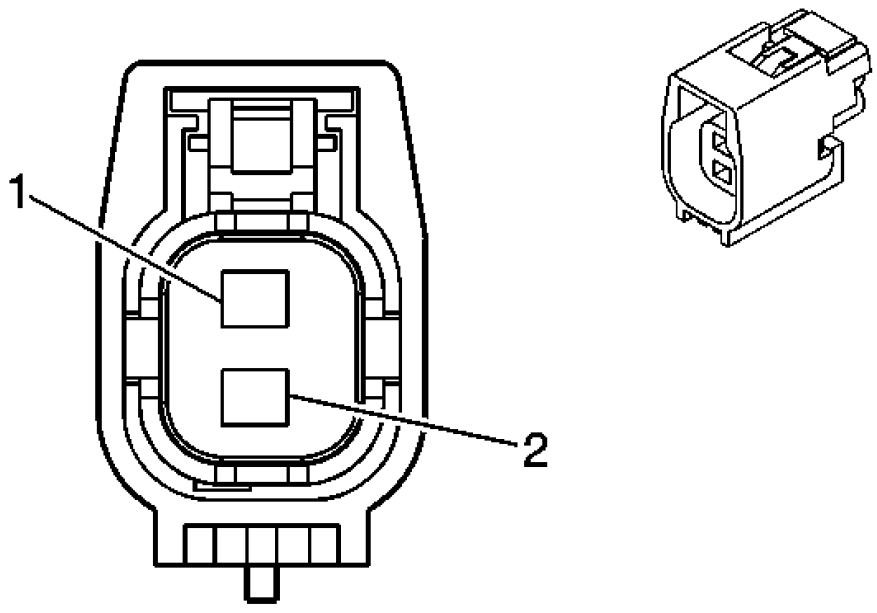
Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B5LF Wheel Speed Sensor - Left Front

Pin	Wire	Circuit	Function
1	0.5 L-BU	830	Left Front Wheel Speed Sensor Signal
2	0.5 YE	873	Low Reference

B5LR WHEEL SPEED SENSOR - LEFT REAR



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Fig. 5: B5LR Wheel Speed Sensor - Left Rear Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Axle
- OEM: 13612509
- Service: 19178097
- Description: 2-Way F GT 1.5 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B5LR Wheel Speed Sensor - Left Rear

Pin	Wire	Circuit	Function
1	0.8 TN	884	Left Rear Wheel Speed Sensor Signal
2	0.8 OG	885	Low Reference

B5RF WHEEL SPEED SENSOR - RIGHT FRONT

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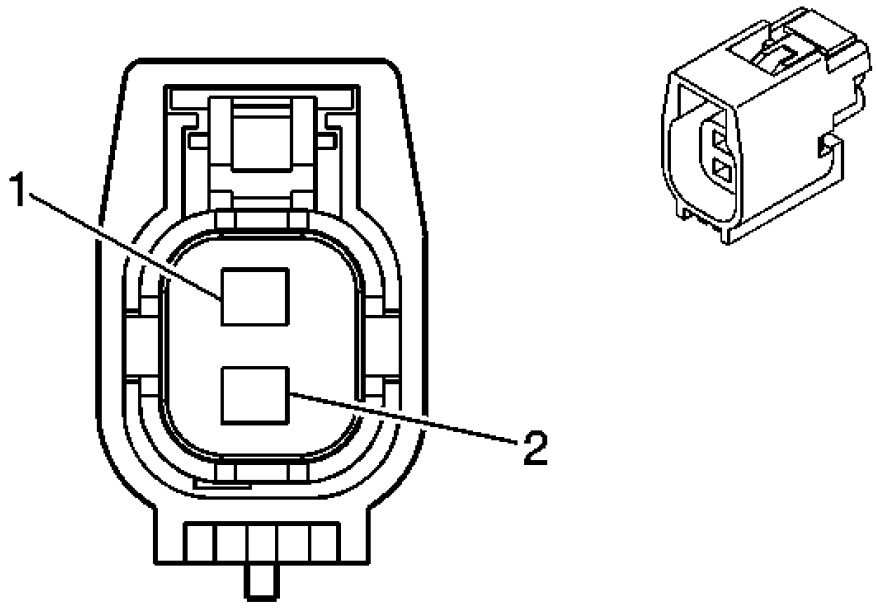


Fig. 6: B5RF Wheel Speed Sensor - Right Front Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13612509
- Service: 19178097
- Description: 2-Way F GT 1.5 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B5RF Wheel Speed Sensor - Right Front

Pin	Wire	Circuit	Function
1	0.5 D-GN	872	Right Front Wheel Speed Sensor Signal
2	0.5 TN	833	Low Reference

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B5RR WHEEL SPEED SENSOR - RIGHT REAR

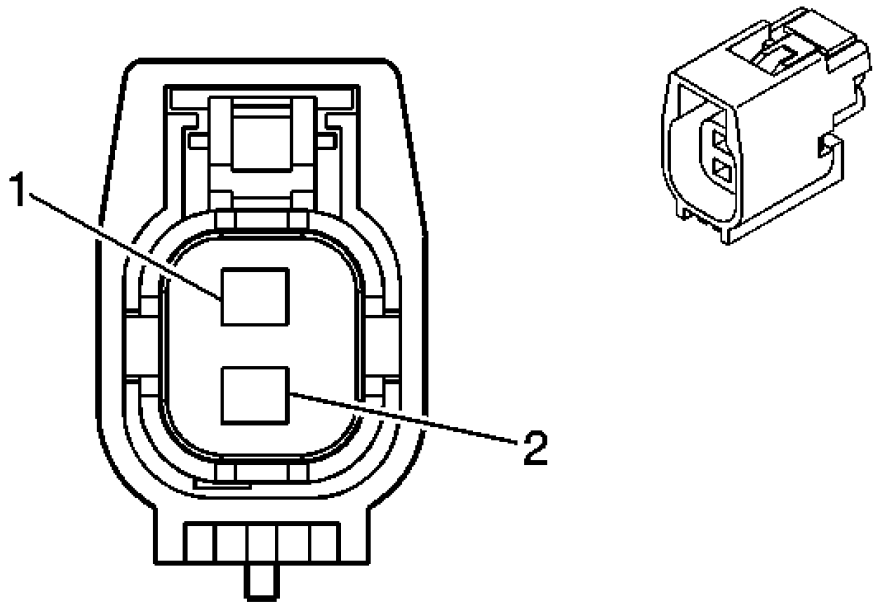


Fig. 7: B5RR Wheel Speed Sensor - Right Rear Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Axle
- OEM: 13612509
- Service: 19178097
- Description: 2-Way F GT 1.5 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B5RR Wheel Speed Sensor - Right Rear

Pin	Wire	Circuit	Function

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1	0.8 BN	882	Right Rear Wheel Speed Sensor Signal
2	0.8 WH	883	Low Reference

B62D SEAT POSITION SENSOR - DRIVER

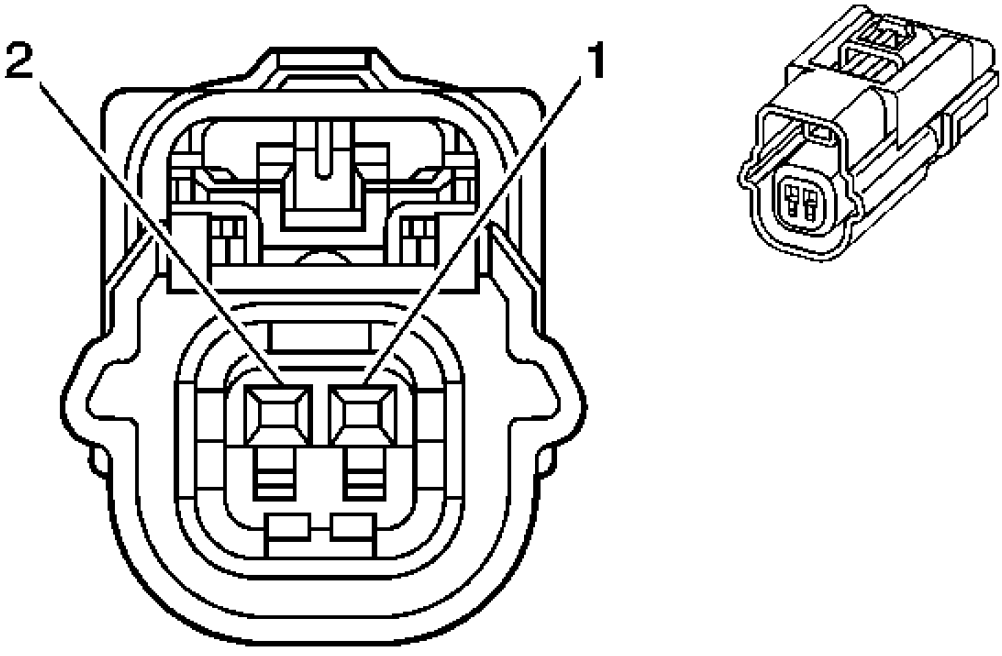


Fig. 8: B62D Seat Position Sensor - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 54390239
- Service: 19178174
- Description: 2-Way F Kaizen 64 Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A

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- Test Probe: J-35616-64B (L-BU)

B62D Seat Position Sensor - Driver

Pin	Wire	Circuit	Function
1	0.35 D-BU	1363	Low Reference
2	0.35 L-GN	5055	Seat Position Sensor- Left - Signal

B62P SEAT POSITION SENSOR - PASSENGER

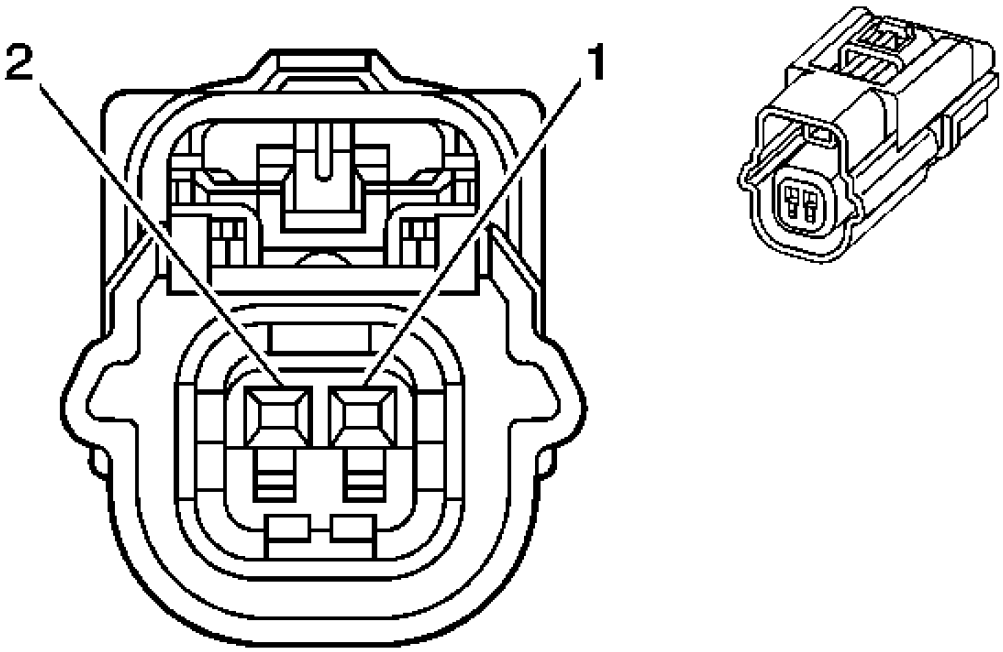


Fig. 9: B62P Seat Position Sensor - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Seat
- OEM: 54390239
- Service: 19178174
- Description: 2-Way F Kaizen 64 Series (BK)

Terminal Part Information

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- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B62P Seat Position Sensor - Passenger

Pin	Wire	Circuit	Function
1	0.35 L-BU	1361	Low Reference
2	0.35 L-BU	5056	Seat Position Sensor- Right - Signal

B63L SIDE IMPACT SENSOR - LEFT

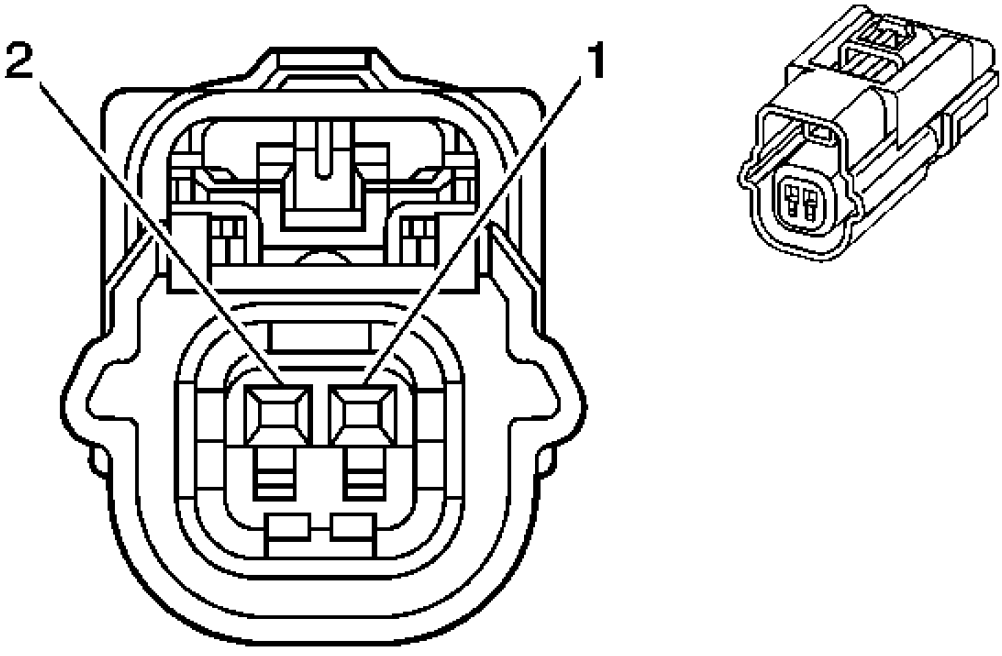


Fig. 10: B63L Side Impact Sensor - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13528494

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- Service: 19178174
- Description: 2-Way F Kaizen 64 Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B63L Side Impact Sensor - Left

Pin	Wire	Circuit	Function
1	0.35 WH	2132	Side Impact Sensing Module - Left - Signal
2	0.35 PU/WH	6628	Low Reference

B63R SIDE IMPACT SENSOR - RIGHT

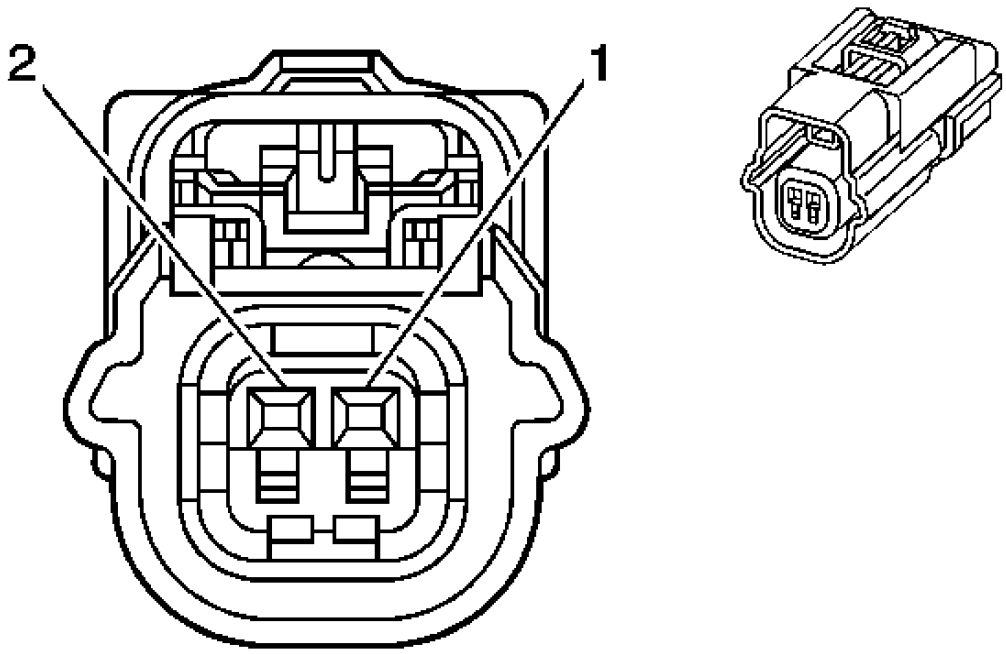


Fig. 11: B63R Side Impact Sensor - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Body
- OEM: 13528494
- Service: 19178174
- Description: 2-Way F Kaizen 64 Series (BK)

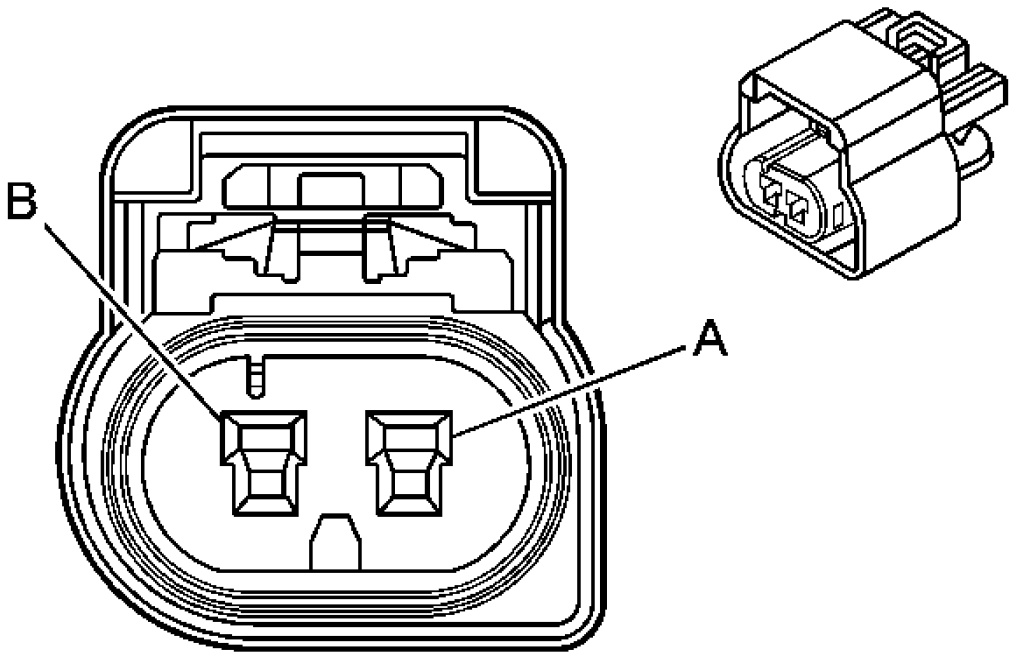
Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B63R Side Impact Sensor - Right

Pin	Wire	Circuit	Function
1	0.35 D-GN	2134	Side Impact Sensing Module - Right - Signal
2	0.35 WH/BK	6629	Low Reference

B68A KNOCK SENSOR 1



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Fig. 12: B68A Knock Sensor 1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15374222
- Service: 88986864
- Description: 2-Way F GT 150 Sealed (NA)

Terminal Part Information

- Terminal/Tray: 15326427/5
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B68A Knock Sensor 1

Pin	Wire	Circuit	Function
A	0.5 D-BU	496	Knock Sensor (KS) 1 Signal
B	0.5 GY	1716	Knock Sensor (KS) 1 Signal

B68B KNOCK SENSOR 2

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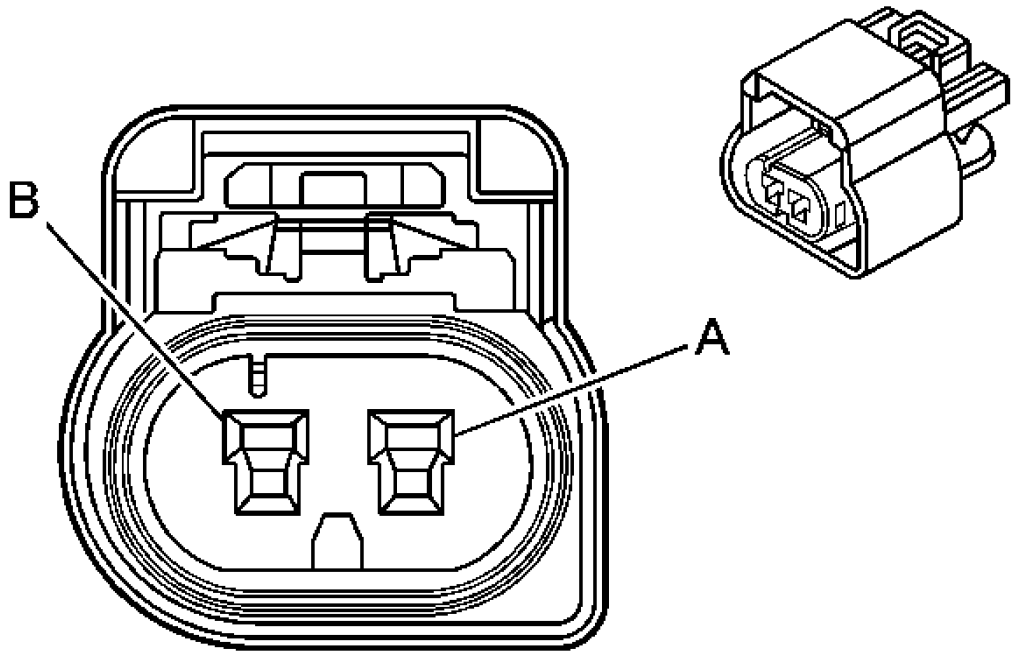


Fig. 13: B68B Knock Sensor 2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15374222
- Service: 88986864
- Description: 2-Way F GT 150 Sealed (NA)

Terminal Part Information

- Terminal/Tray: 15326427/5
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B68B Knock Sensor 2

Pin	Wire	Circuit	Function
A	0.5 L-BU	1876	Knock Sensor (KS) 2 Signal

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B	0.5 GY	2303	Knock Sensor (KS) 2 Signal

B74 MANIFOLD ABSOLUTE PRESSURE SENSOR (L99 OR LS3)

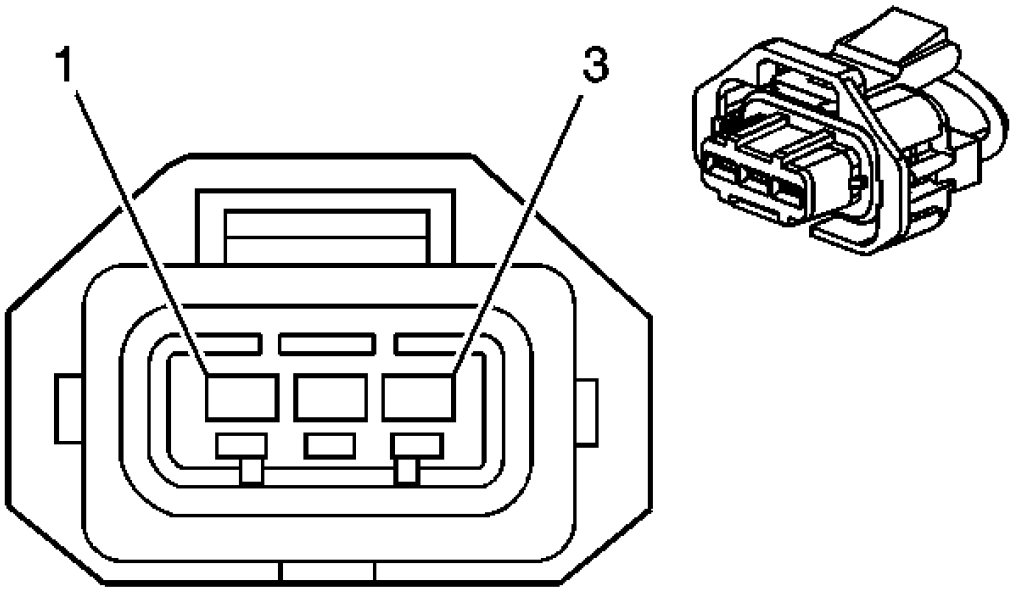


Fig. 14: B74 Manifold Absolute Pressure Sensor (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15365614
- Service: 88988583
- Description: 3-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

B74 Manifold Absolute Pressure Sensor (L99 or LS3)

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Pin	Wire	Circuit	Function
1	0.5 GY	2704	5-Volt Reference 1
2	0.5 OG/BK	469	Low Reference
3	0.5 L-GN	432	MAP Sensor Signal

B75B MASS AIR FLOW/INTAKE AIR TEMPERATURE SENSOR (L99 OR LS3)

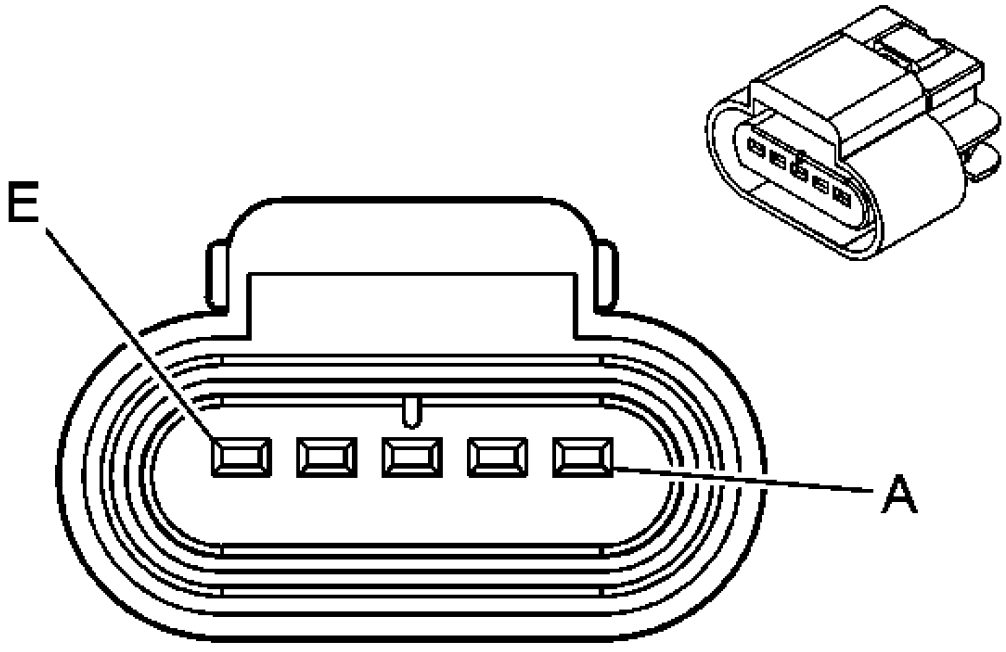


Fig. 15: B75B Mass Air Flow/Intake Air Temperature Sensor (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13519912
- Service: 19207214
- Description: 5-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1

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- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

B75B Mass Air Flow/Intake Air Temperature Sensor (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 YE	492	MAF Sensor Signal
B	0.5 BK/WH	451	Ground
C	0.5 PK	239	Ignition Voltage
D	0.5 TN	2760	Low Reference
E	0.5 L-BU	6289	Intake Air Temperature Sensor Signal

B75B MASS AIR FLOW/INTAKE AIR TEMPERATURE SENSOR (LLT)

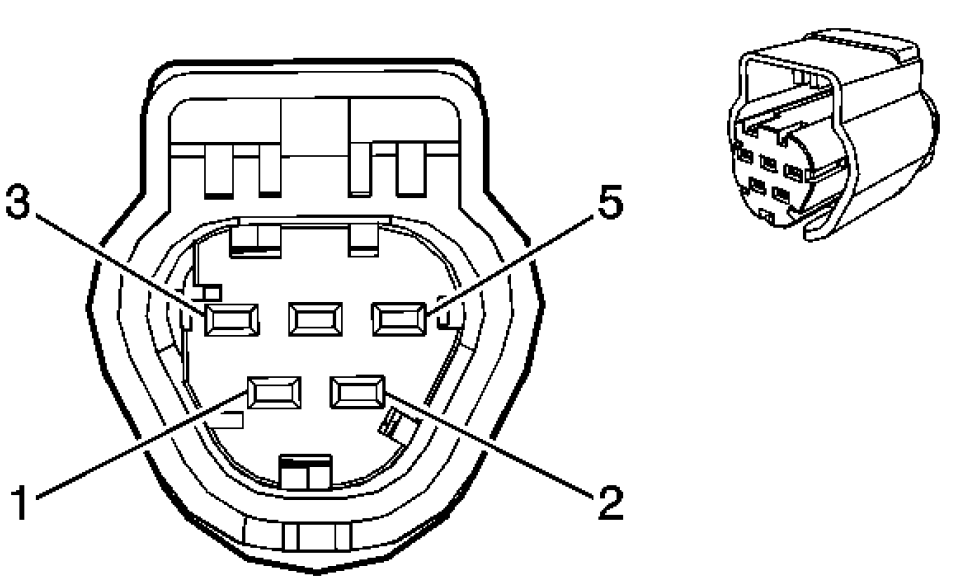


Fig. 16: B75B Mass Air Flow/Intake Air Temperature Sensor (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13610794

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- Service: 13505905
- Description: 5-Way F 090 II Series, Sealed (BK)

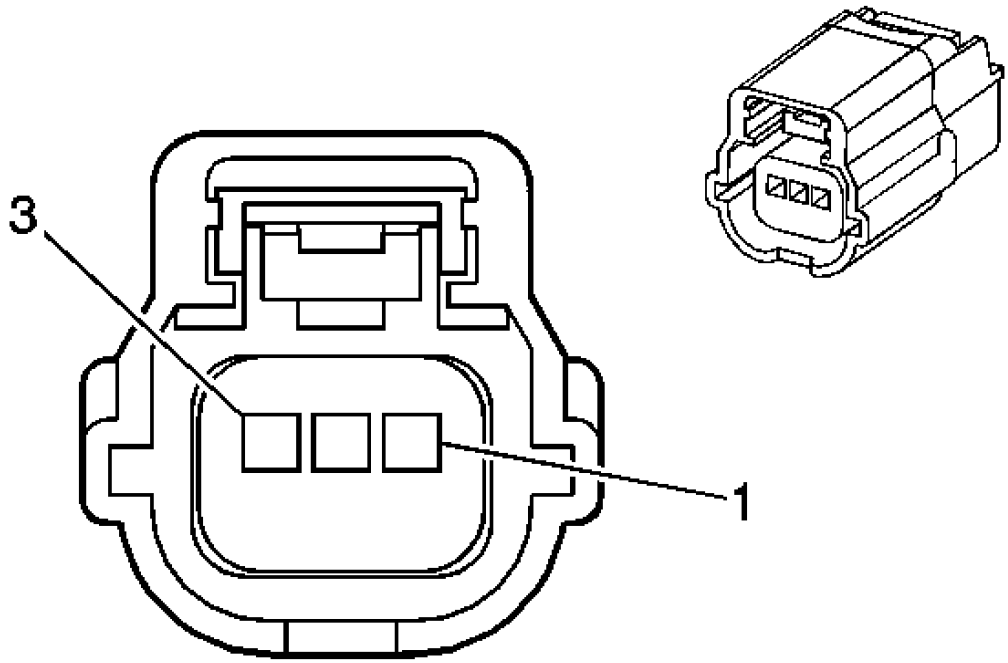
Terminal Part Information

- Terminal/Tray: 13610487/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

B75B Mass Air Flow/Intake Air Temperature Sensor (LLT)

Pin	Wire	Circuit	Function
1	0.5 TN	2760	Low Reference
2	0.5 BK/WH	451	Ground
3	0.5 L-BU	6289	Intake Air Temperature Sensor Signal
4	0.5 PK	239	Ignition Voltage
5	0.5 YE	492	MAF Sensor Signal

B78E REAR OBJECT SENSOR - LEFT MIDDLE (UD7)



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Fig. 17: B78E Rear Object Sensor - Left Middle (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 13521095
- Service: 88988337
- Description: 3-Way F 64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B78E Rear Object Sensor - Left Middle (UD7)

Pin	Wire	Circuit	Function
1	0.35 D-BU	2374	Object Sensor Supply Voltage
2	0.35 GY	2379	Low Reference
3	0.35 OG	2376	Left Rear Middle Object Sensor Signal

B78F REAR OBJECT SENSOR - RIGHT MIDDLE (UD7)

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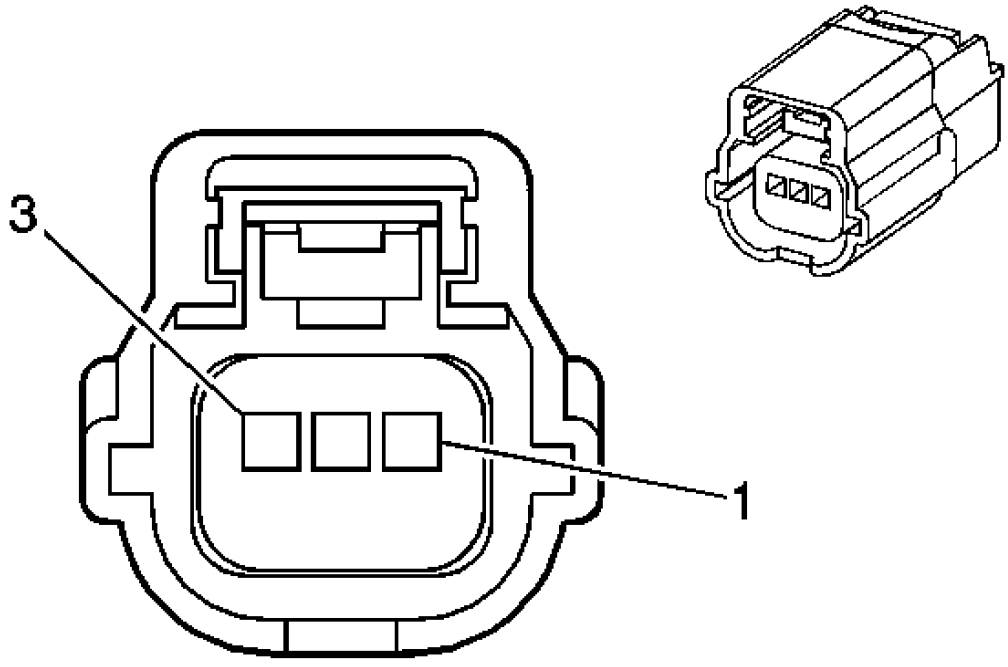


Fig. 18: B78F Rear Object Sensor - Right Middle (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 13521095
- Service: 88988337
- Description: 3-Way F 64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B78F Rear Object Sensor - Right Middle (UD7)

Pin	Wire	Circuit	Function
1	0.35 D-BU	2374	Object Sensor Supply Voltage

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2	0.35 GY	2379	Low Reference
3	0.35 D-GN	2377	Right Rear Middle Object Sensor Signal

B78G REAR OBJECT SENSOR - LEFT OUTER (UD7)

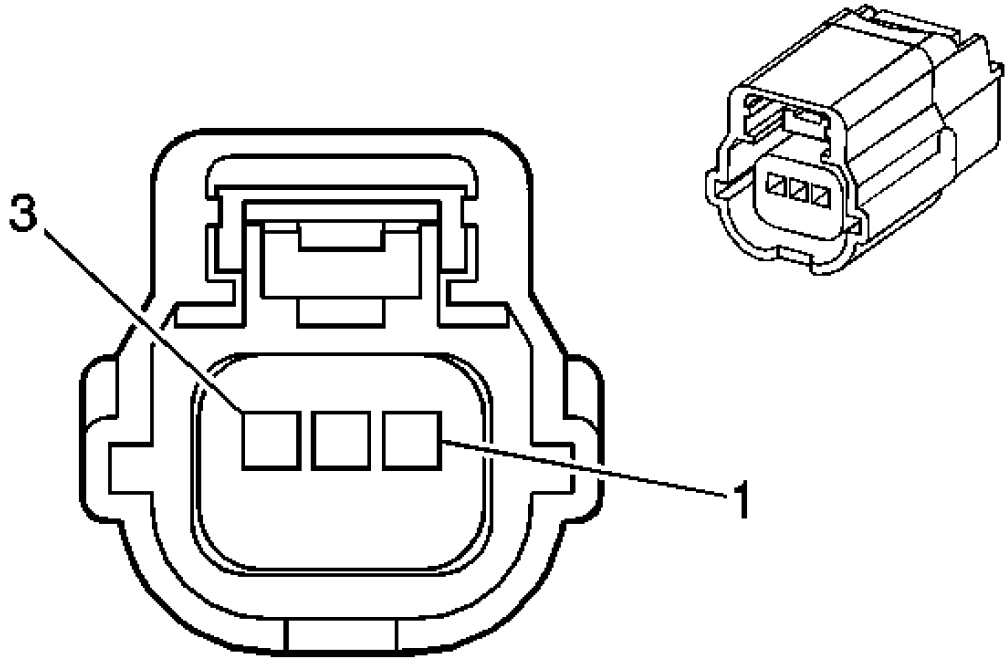


Fig. 19: B78G Rear Object Sensor - Left Outer (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 13521095
- Service: 88988337
- Description: 3-Way F 64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A

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- Test Probe: J-35616-64B (L-BU)

B78G Rear Object Sensor - Left Outer (UD7)

Pin	Wire	Circuit	Function
1	0.35 D-BU	2374	Object Sensor Supply Voltage
2	0.35 GY	2379	Low Reference
3	0.35 YE	2375	Left Rear Corner Object Sensor Signal

B78H REAR OBJECT SENSOR - RIGHT OUTER (UD7)

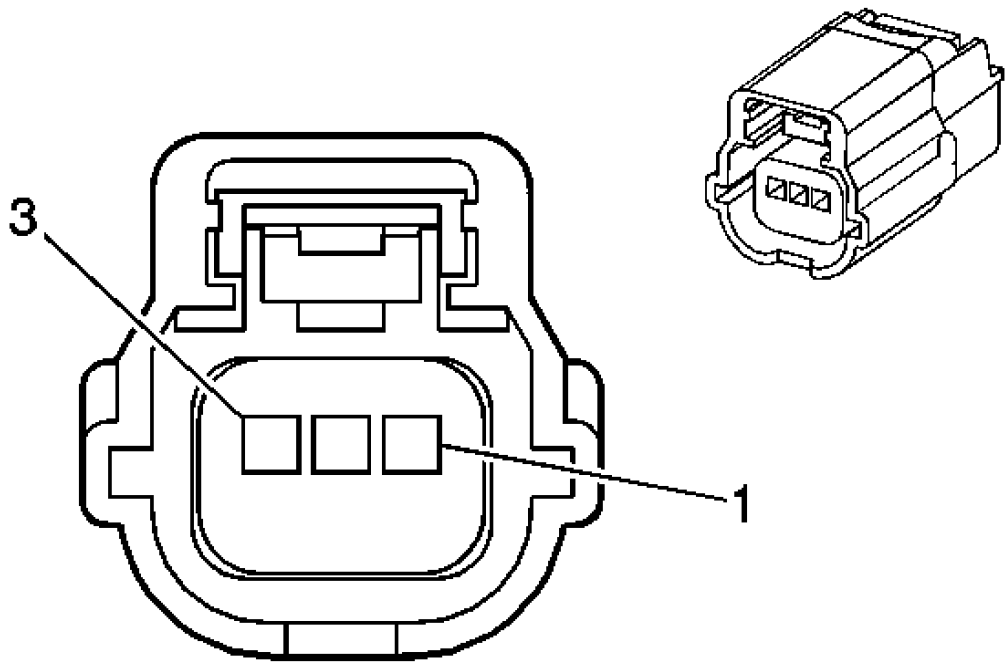


Fig. 20: B78H Rear Object Sensor - Right Outer (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 13521095
- Service: 88988337
- Description: 3-Way F 64 Series, Sealed (BK)

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Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

B78H Rear Object Sensor - Right Outer (UD7)

Pin	Wire	Circuit	Function
1	0.35 D-BU	2374	Object Sensor Supply Voltage
2	0.35 GY	2379	Low Reference
3	0.35 PU	2378	Right Rear Corner Object Sensor Signal

B80 PARK BRAKE SWITCH

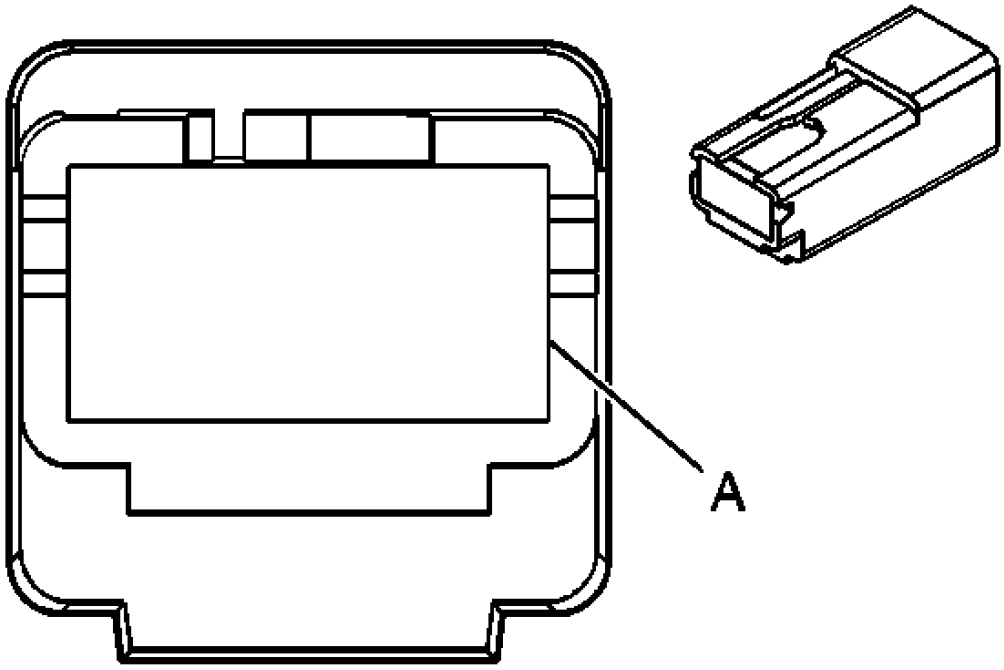


Fig. 21: B80 Park Brake Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Body
- OEM: 12092133
- Service: 12167133
- Description: 1-Way F Metri-Pack 630 Series Self Lock (BK)

Terminal Part Information

- Terminal/Tray: 12103325/3
- Core/Insulation Crimp: E/A
- Release Tool: 12094430
- Test Probe: J-35616-42 (RD)

B80 Park Brake Switch

Pin	Wire	Circuit	Function
A	0.5 L-BU	1134	Park Brake Switch Signal

B88D SEAT BELT SWITCH - DRIVER

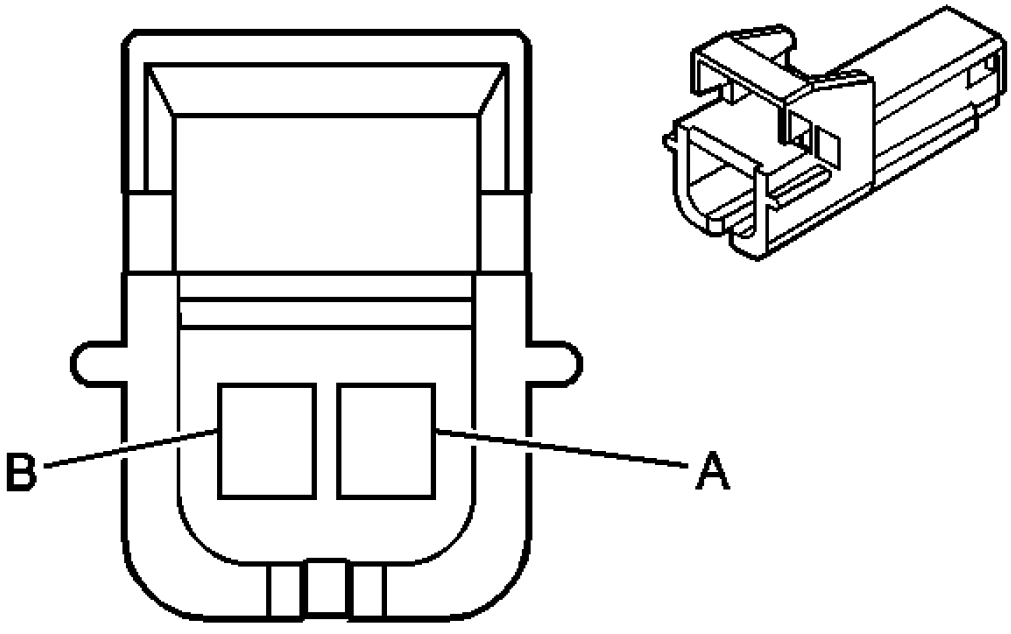


Fig. 22: B88D Seat Belt Switch - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Driver Seat
- OEM: 12052833
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series (BK)

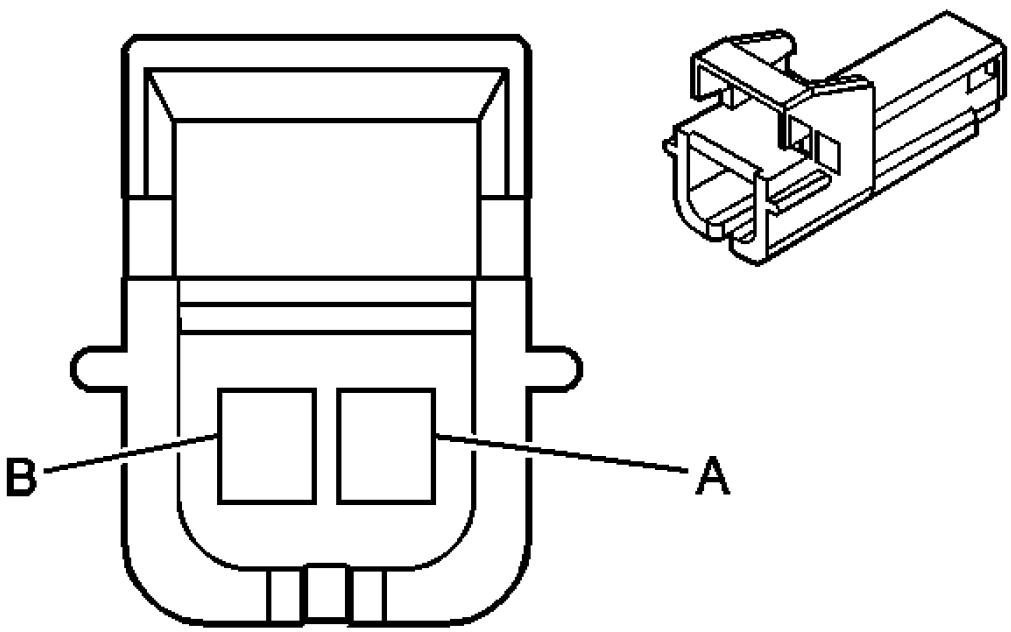
Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B88D Seat Belt Switch - Driver

Pin	Wire	Circuit	Function
A	0.35 TN/WH	238	Seat Belt Switch - Left - Signal
B	0.35 D-BU	1363	Low Reference

B88P SEAT BELT SWITCH - PASSENGER



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Fig. 23: B88P Seat Belt Switch - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Seat
- OEM: 12052833
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

B88P Seat Belt Switch - Passenger

Pin	Wire	Circuit	Function
A	0.35 OG	1362	Seat Belt Switch - Right - Signal
B	0.35 L-BU	1361	Low Reference

B9 AMBIENT AIR TEMPERATURE SENSOR

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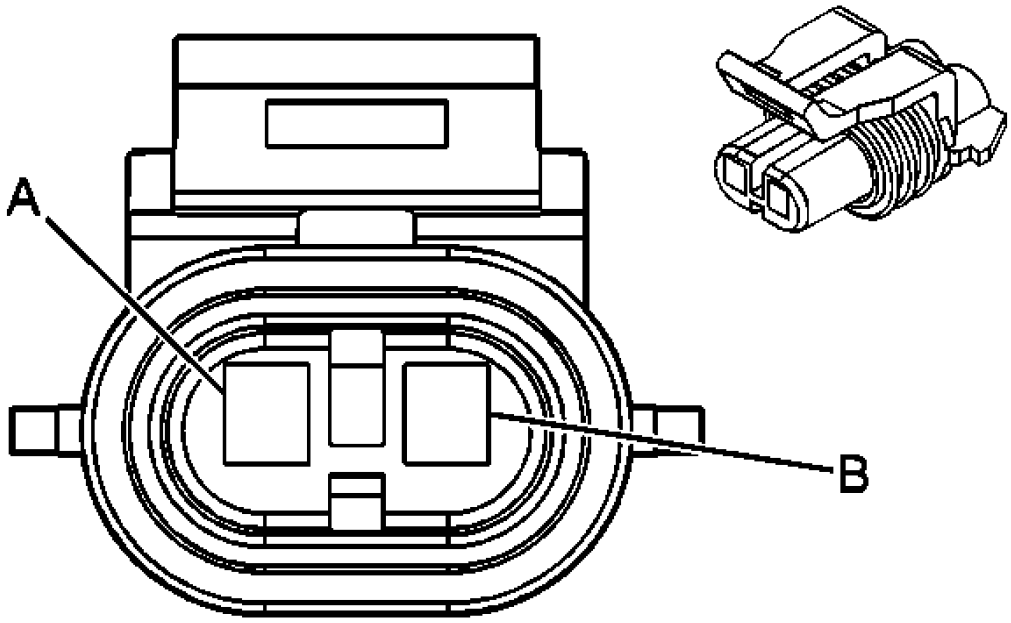


Fig. 24: B9 Ambient Air Temperature Sensor Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Foward Lamp
- OEM: 13543521
- Service: 12101856
- Description: 2-Way F Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

B9 Ambient Air Temperature Sensor

Pin	Wire	Circuit	Function
A	0.5 D-GN/WH	636	Ambient Air Temperature Sensor Signal
B	0.5 YE	61	Low Reference

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B99 STEERING WHEEL ANGLE SENSOR

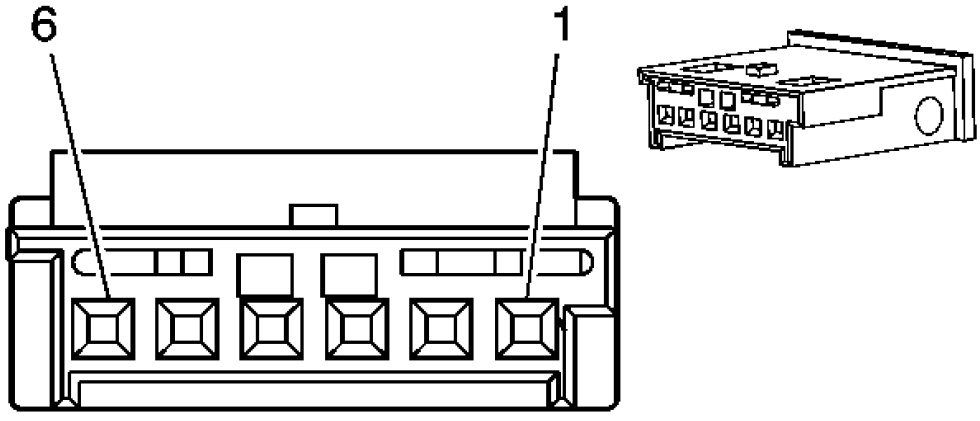


Fig. 25: B99 Steering Wheel Angle Sensor Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 10820415
- Service: 19151551
- Description: 6-Way F MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 2, 3, 4, 5 - H/H
- Core/Insulation Crimp: Pin 6 - K/K
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

B99 Steering Wheel Angle Sensor

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Pin	Wire	Circuit	Function
1	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
2	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
3	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
4	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
5	0.35 D-GN	2087	12-Volt Reference
6	0.8 BK	1550	Ground

C1 BATTERY +

Connector Part Information

- Terminal: K523C085
- Core/Insulation Crimp: N/A
- Description: Ring Terminal

C1 Battery +

Pin	Wire	Circuit	Function
+	50 RD	1	Battery Positive Voltage

C1 BATTERY -

Connector Part Information

- Terminal: K3125085
- Core/Insulation Crimp: N/A
- Description: Ring Terminal

C1 Battery -

Pin	Wire	Circuit	Function
-	50 BK	50	Ground

C3 TELEMATICS COMMUNICATION INTERFACE CONTROL MODULE BATTERY (UE1)

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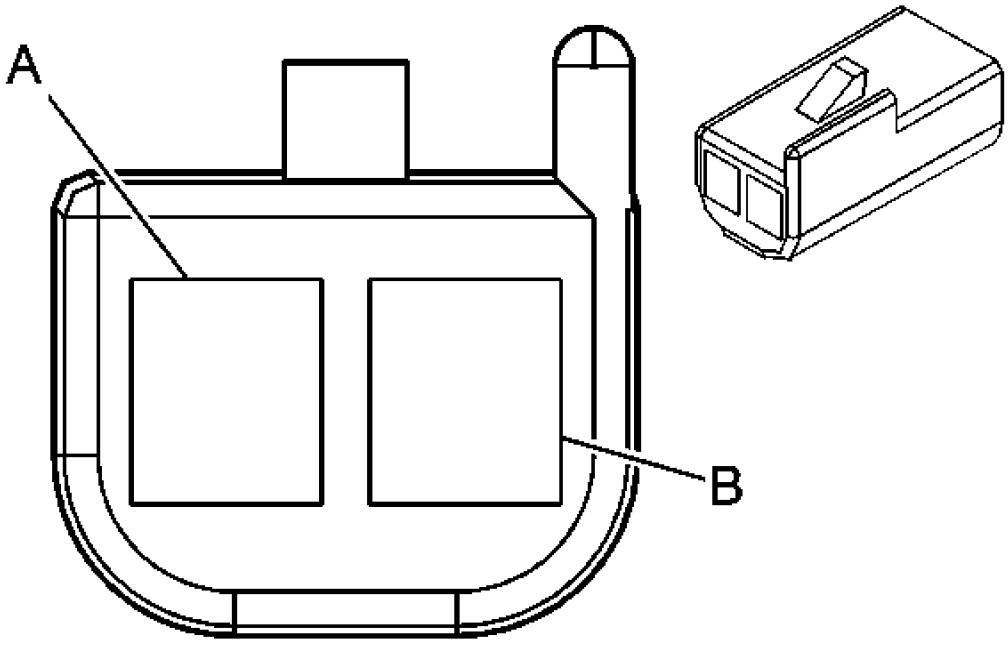


Fig. 26: C3 Telematics Communication Interface Control Module Battery (UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 12047662
- Service: 12085535
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

C3 Telematics Communication Interface Control Module Battery (UE1)

Pin	Wire	Circuit	Function
A	0.35 RD/WH	5235	OnStar Backup Battery (+)
B	0.35 GY/BK	5167	OnStar Backup Battery (-)

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E1D ACCENT LAMP - DRIVER DOOR (SRK/SRM)

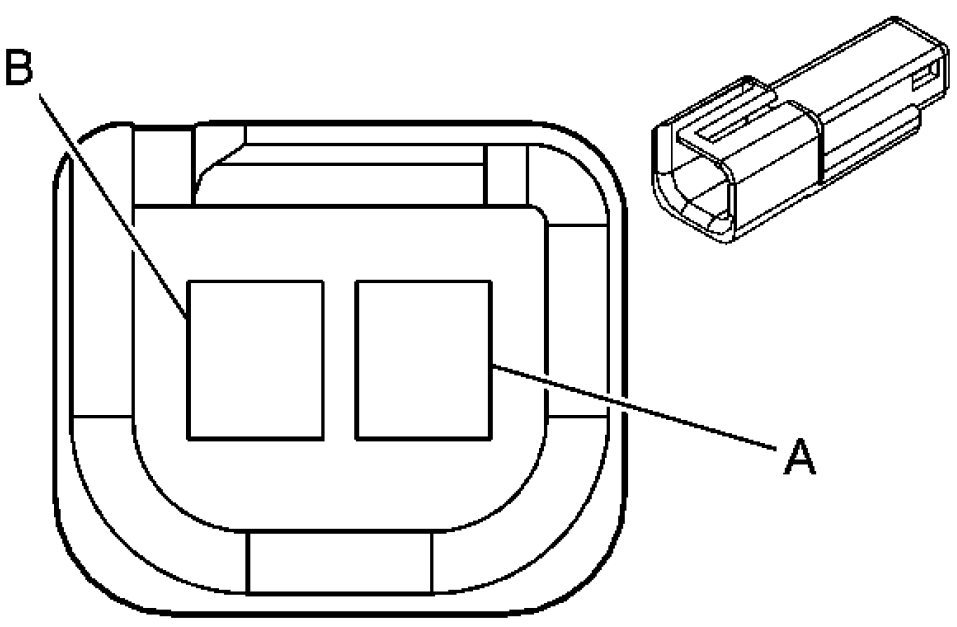


Fig. 27: E1D Accent Lamp - Driver Door (SRK/SRM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 12047663
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

E1D Accent Lamp - Driver Door (SRK/SRM)

Pin	Wire	Circuit	Function

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A	0.35 BK	850	Ground
B	0.35 PU	7558	Accent Lamps Control

E13L HEADLAMP - LEFT (T4A)

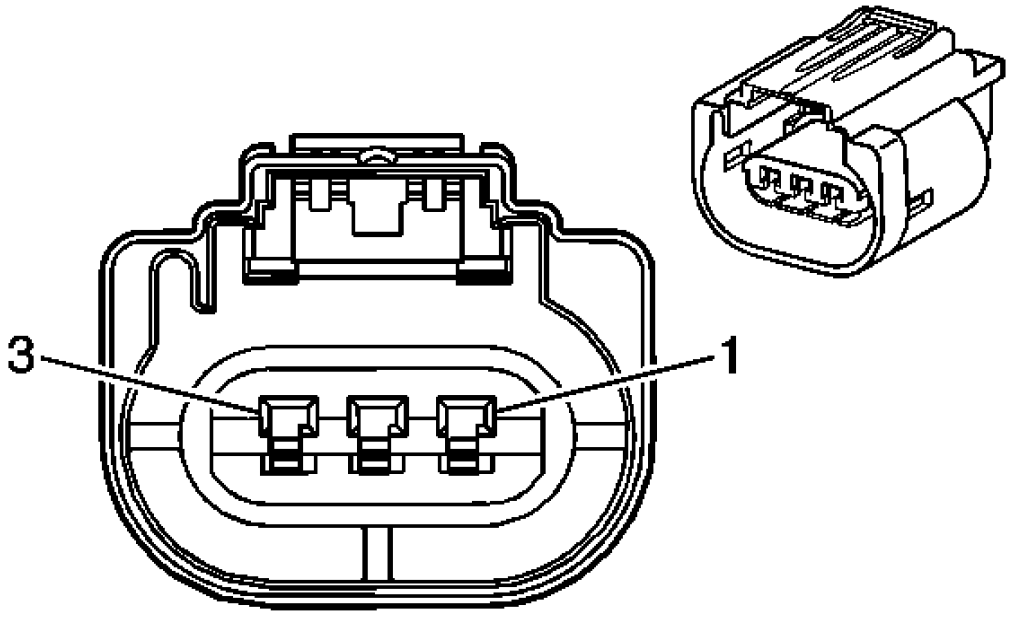


Fig. 28: E13L Headlamp - Left (T4A) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 10867142
- Service: 88988364
- Description: 3-Way F Lamp Socket, Sealed (D-GN)

Terminal Part Information

- Pins: 1
- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430

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- Test Probe: J-35616-2A (GY)

- Pins: 2, 3
- Terminal/Tray: 7116-4103-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E13L Headlamp - Left (T4A)

Pin	Wire	Circuit	Function
1	0.5 YE	712	Left Headlamp Low Beam Supply Voltage
2	0.8 BK	1150	Ground
3	0.8 D-GN/WH	711	Left Headlamp High Beam Supply Voltage

E13R HEADLAMP - RIGHT (T4A)

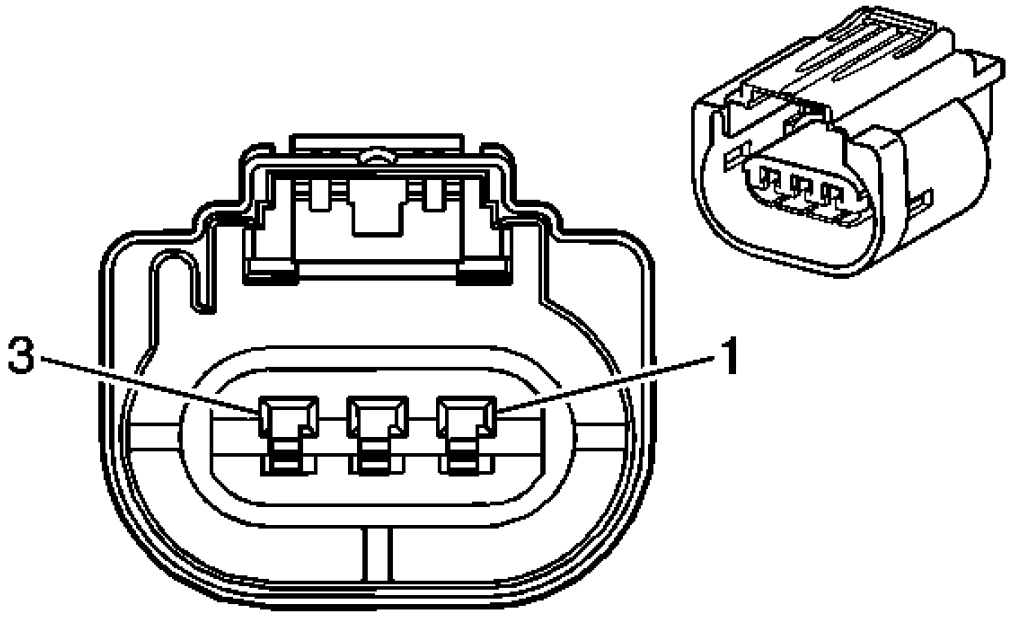


Fig. 29: E13R Headlamp - Right (T4A) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Forward Lamp
- OEM: 10867142
- Service: 88988364
- Description: 3-Way F Lamp Socket, Sealed (D-GN)

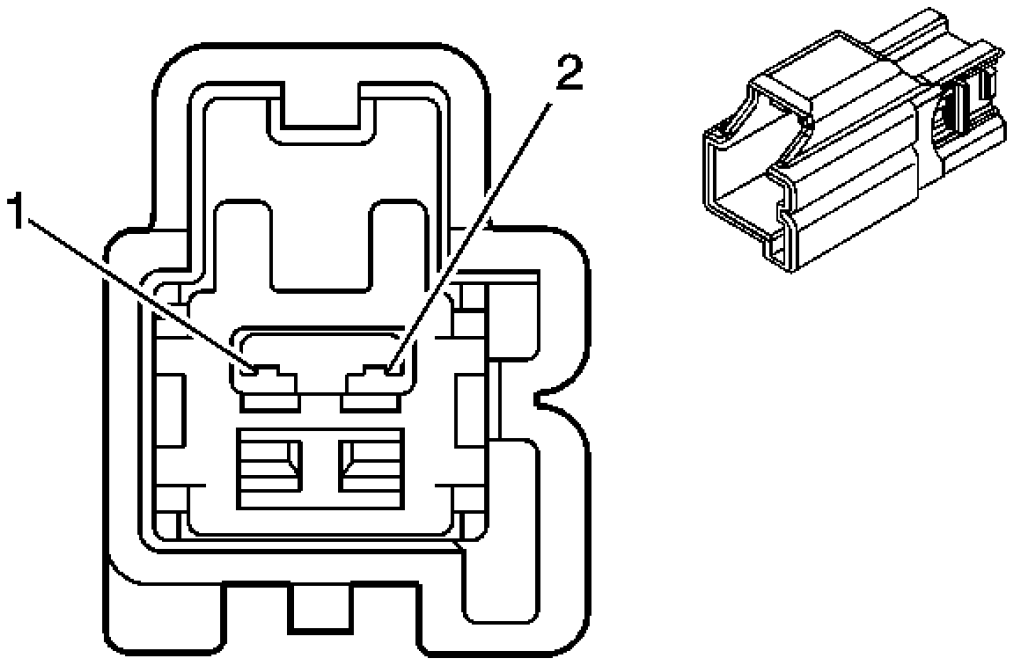
Terminal Part Information

- Terminal/Tray: 7116-4103-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E13R Headlamp - Right (T4A)

Pin	Wire	Circuit	Function
1	0.8 TN/WH	312	Right Headlamp Low Beam Supply Voltage
2	0.8 BK	1050	Ground
3	0.8 L-GN/BK	311	Right Headlamp High Beam Supply Voltage

E14A SEAT HEATING ELEMENT - DRIVER BACK (KA1)



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Fig. 30: E14A Seat Heating Element - Driver Back (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 7282-6443-40
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7114-4101-08/9
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

E14A Seat Heating Element - Driver Back (KA1)

Pin	Wire	Circuit	Function
1	0.8 L-BU	2424	Driver Heated Seat Back Element Control
2	0.8 PK	2078	Heated Seat Cushion Element Control

E14B SEAT HEATING ELEMENT - DRIVER CUSHION (KA1)

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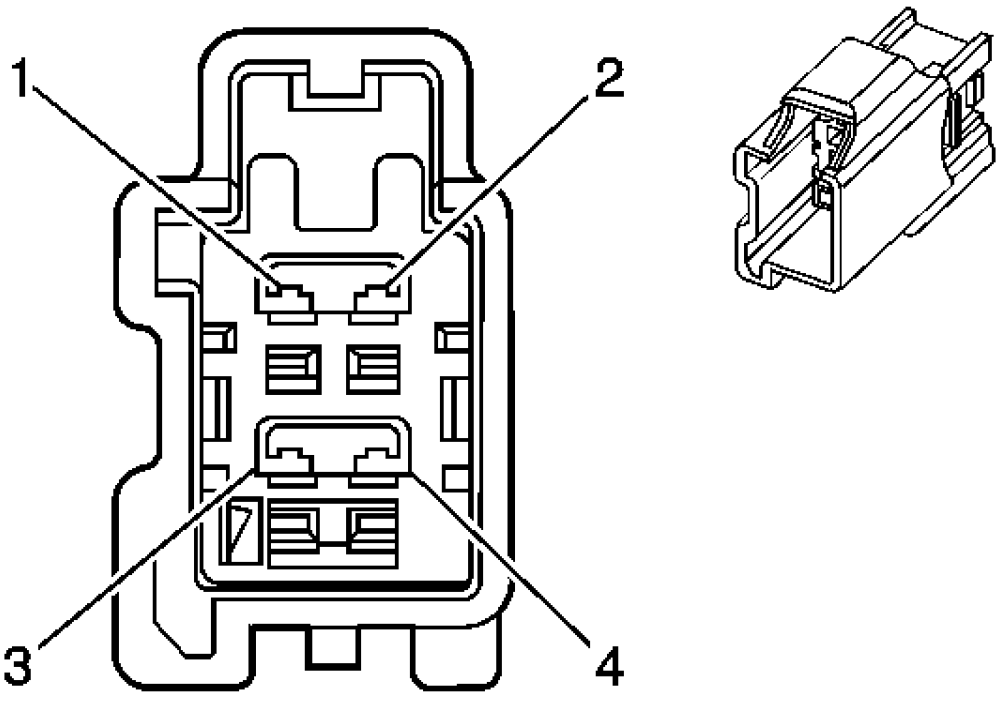


Fig. 31: E14B Seat Heating Element - Driver Cushion (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 7282-6449-40
- Service: Service by Harness - See Part Catalog
- Description: 4-Way M Kaizen YESC Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7114-4100-08/9
- Core/Insulation Crimp: Pins - 1, 2 - E/C
- Core/Insulation Crimp: Pins - 3, 4 - E/A
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

E14B Seat Heating Element - Driver Cushion (KA1)

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Pin	Wire	Circuit	Function
1	0.5 PK	2080	Low Reference
2	0.5 GY	2079	Heated Seat Cushion Temperature Sensor Signal
3	0.8 D-BU	2077	Heated Seat Cushion Element Supply Voltage
4	0.8 PK	2078	Heated Seat Cushion Element Control

E14C SEAT HEATING ELEMENT - PASSENGER BACK (KA1)

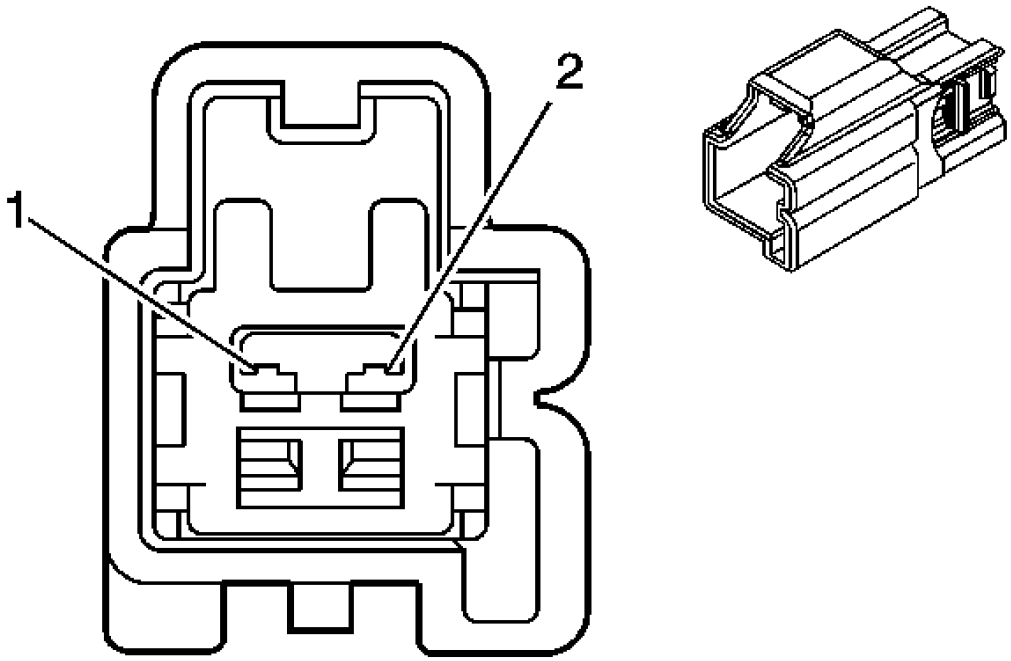


Fig. 32: E14C Seat Heating Element - Passenger Back (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Seat
- OEM: 7282-6443-40
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series (L-GY)

Terminal Part Information

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- Terminal/Tray: 7114-4101-08/9
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

E14C Seat Heating Element - Passenger Back (KA1)

Pin	Wire	Circuit	Function
1	0.8 L-BU	2433	Passenger Heated Seat Back Element Control
2	0.8 PK	2480	Passenger Heated Seat Cushion Element Control

E14D SEAT HEATING ELEMENT - PASSENGER CUSHION (KA1)

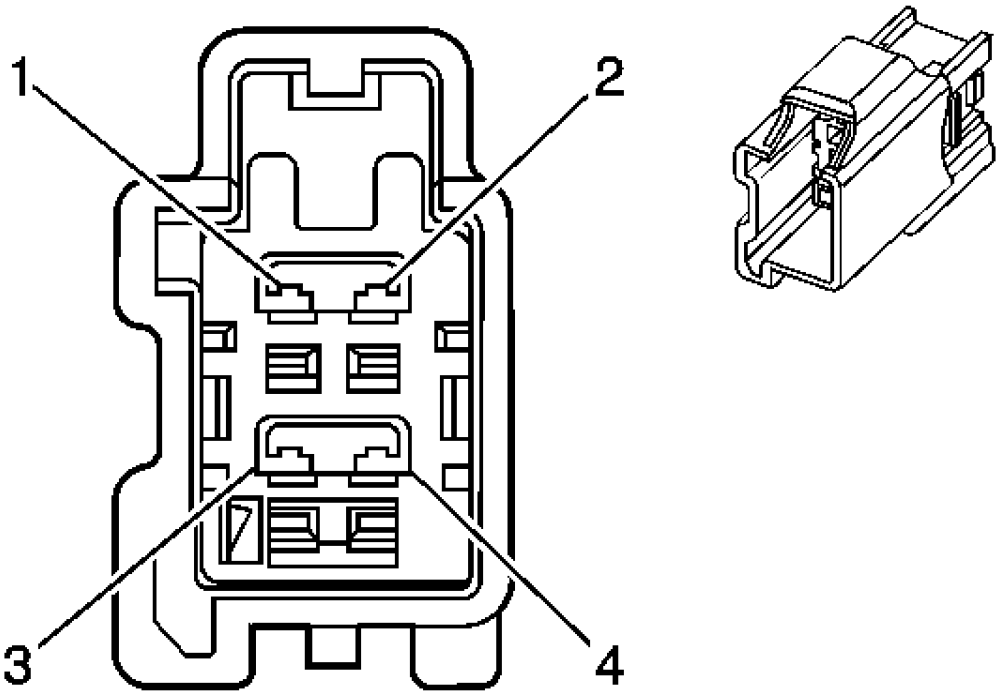


Fig. 33: E14D Seat Heating Element - Passenger Cushion (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Driver Seat
- OEM: 7282-6449-40
- Service: Service by Harness - See Part Catalog
- Description: 4-Way M Kaizen YESC Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7114-4100-08/9
- Core/Insulation Crimp: Pins - 1, 2 - E/C
- Core/Insulation Crimp: Pins - 3, 4 - E/A
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

E14D Seat Heating Element - Passenger Cushion (KA1)

Pin	Wire	Circuit	Function
1	0.5 PK	2435	Low Reference
2	0.5 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal
3	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage
4	0.8 PK	2480	Passenger Heated Seat Cushion Element Control

E18 REAR DEFOGGER GRID X1

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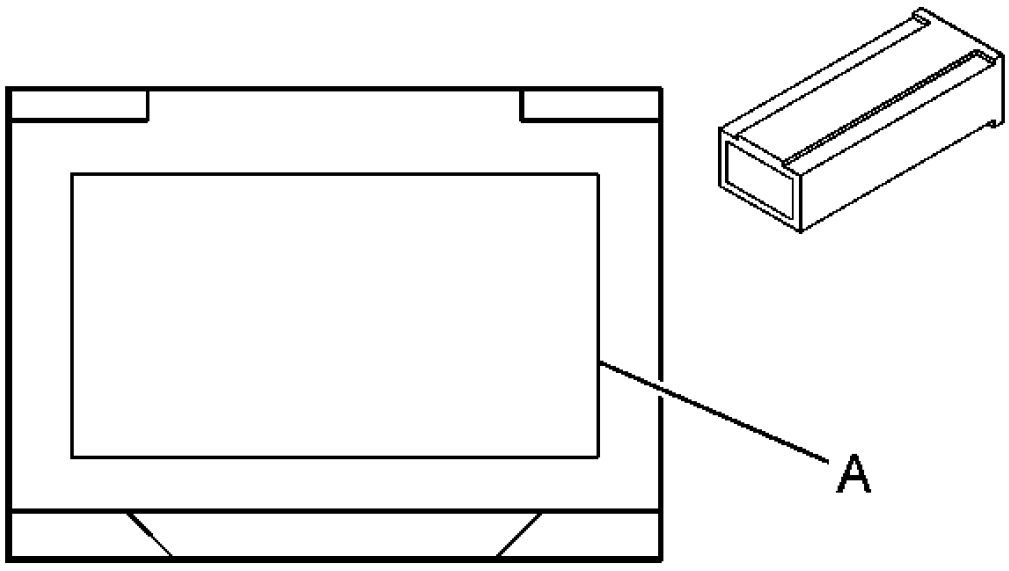


Fig. 34: E18 Rear Defogger Grid X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12052018
- Service: 88988738
- Description: 1-Way F (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 88988738
- Core/Insulation Crimp: Not Available
- Release Tool/Test Probe: Not Available

E18 Rear Defogger Grid X1

Pin	Wire	Circuit	Function
A	5 PU	293	Rear Defog Element Supply Voltage

E18 REAR DEFOGGER GRID X2

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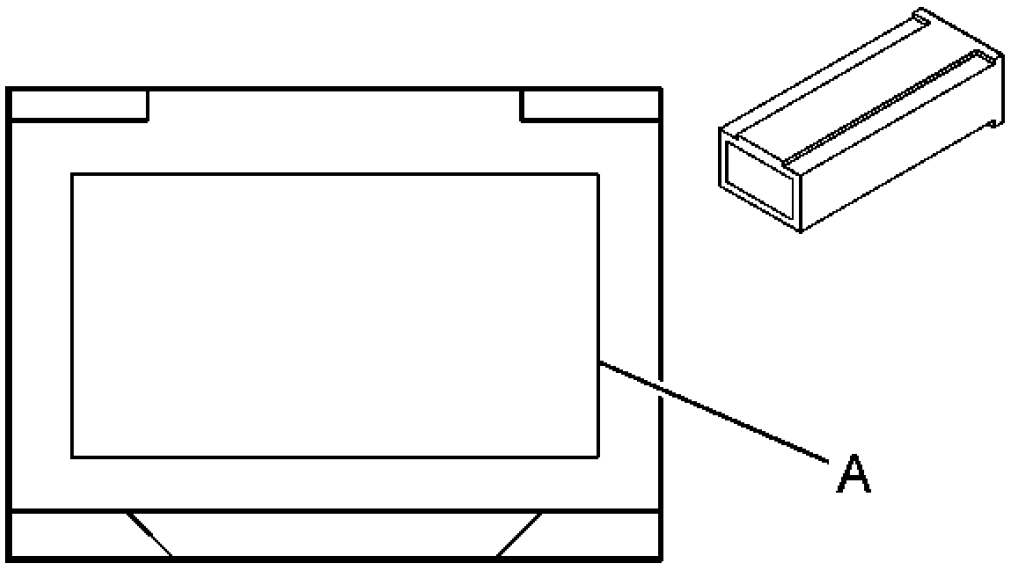


Fig. 35: E18 Rear Defogger Grid X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12052018
- Service: 88988738
- Description: 1-Way F (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 88988738
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

E18 Rear Defogger Grid X2

Pin	Wire	Circuit	Function
A	5 BK	2950	Ground

E1G ACCENT LAMP - LEFT I/P (SRK OR SRM)

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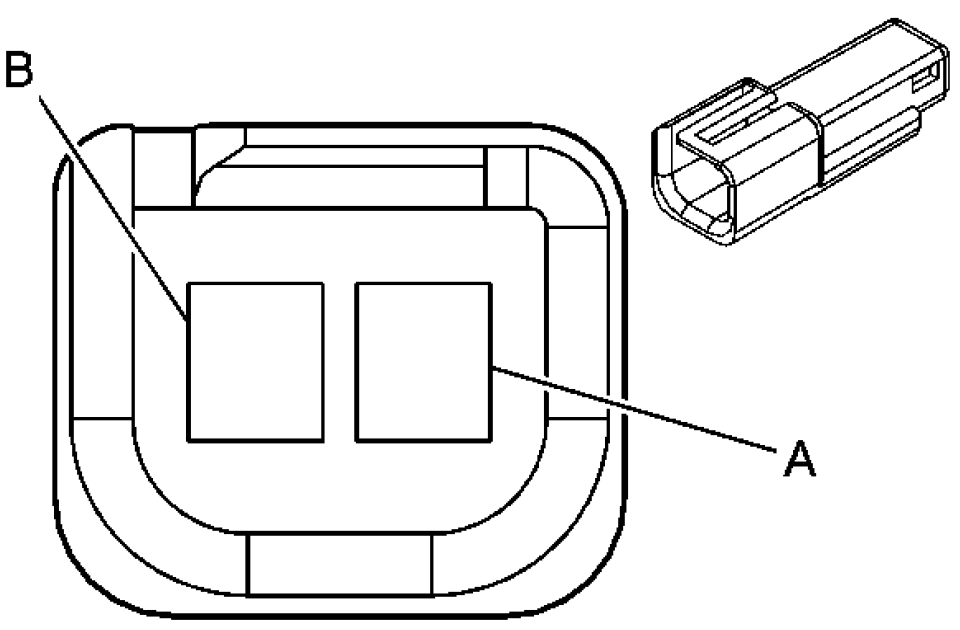


Fig. 36: E1G Accent Lamp - Left I/P (SRK or SRM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 12089868
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pin A - E/A
- Core/Insulation Crimp: Pin B - E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

E1G Accent Lamp - Left I/P (SRK or SRM)

Pin	Wire	Circuit	Function
A	0.8 BK	1450	Ground

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B	0.35 PU	7558	Accent Lamps Control

E1H ACCENT LAMP - RIGHT I/P (SRK OR SRM)

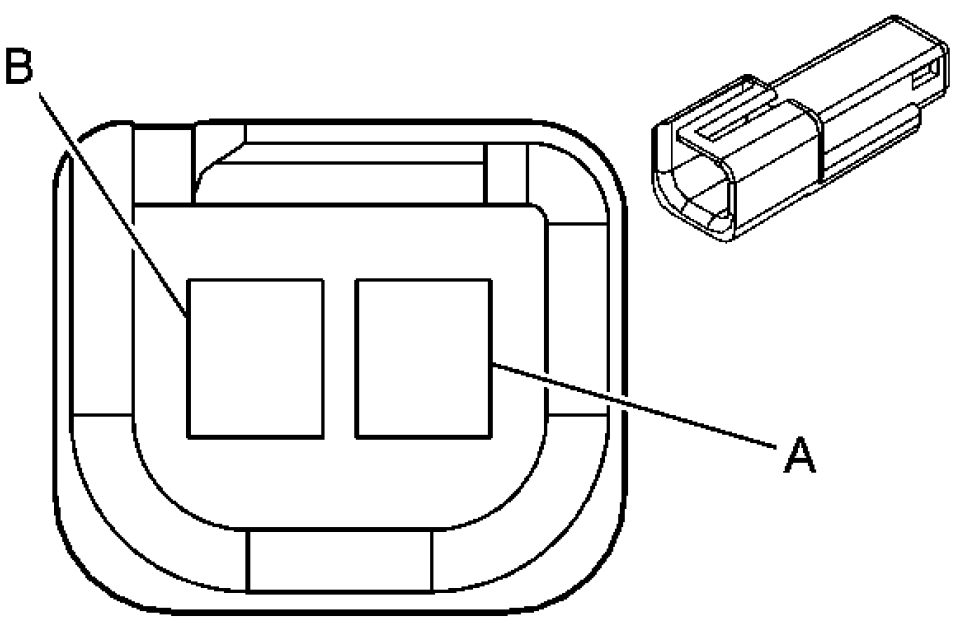


Fig. 37: E1H Accent Lamp - Right I/P (SRK or SRM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 12089868
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pin A - E/A
- Core/Insulation Crimp: Pin B - E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

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E1H Accent Lamp - Right I/P (SRK or SRM)

Pin	Wire	Circuit	Function
A	0.8 BK	1450	Ground
B	0.35 PU	7558	Accent Lamps Control

E1P ACCENT LAMP - PASSENGER DOOR (SRK/SRM)

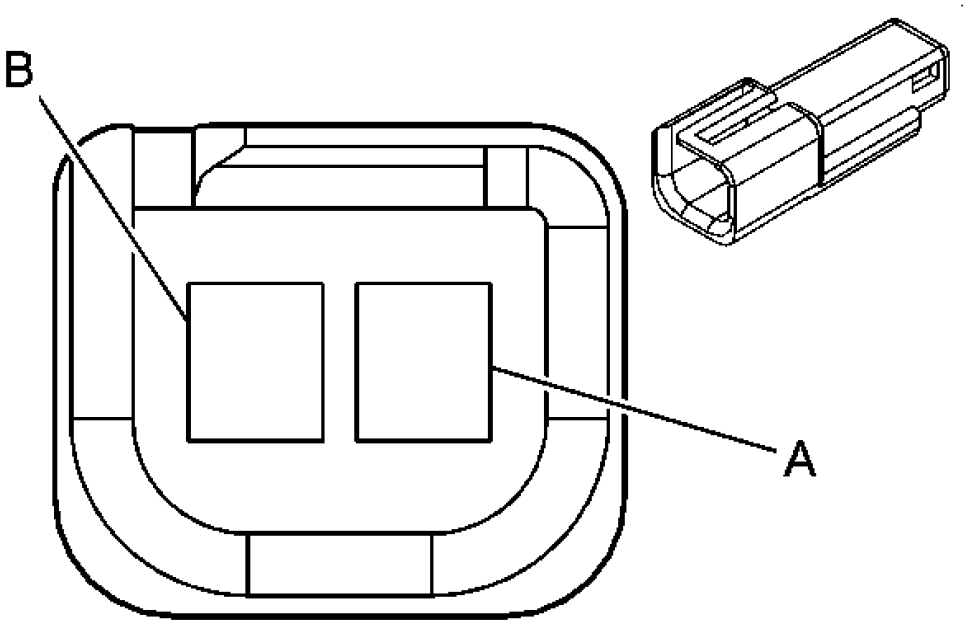


Fig. 38: E1P Accent Lamp - Passenger Door (SRK/SRM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 12047663
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C

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- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

E1P Accent Lamp - Passenger Door (SRK/SRM)

Pin	Wire	Circuit	Function
A	0.35 BK	2350	Ground
B	0.35 PU	7558	Accent Lamps Control

E17D OUTSIDE REARVIEW MIRROR GLASS - DRIVER

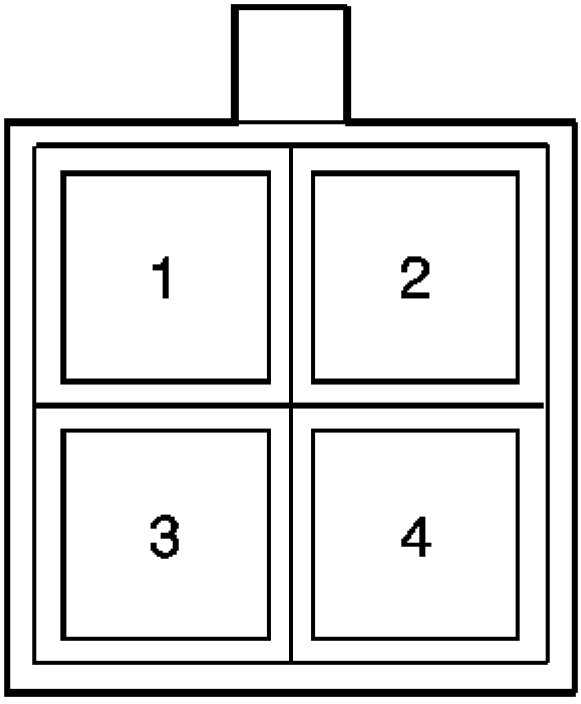


Fig. 39: E17D Outside Rearview Mirror Glass - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Outside Rearview Mirror - Driver
- OEM: MHFS 104W

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- Service: Not Available
- Description: 4-Way F (WH)

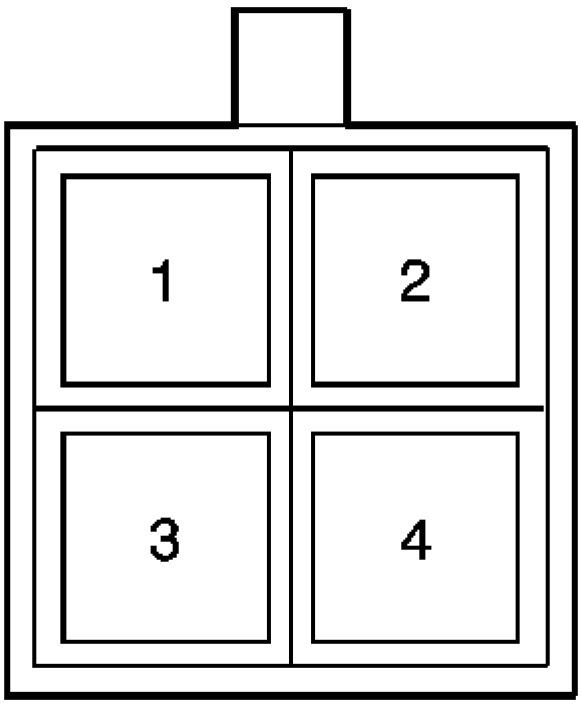
Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool/Test Probe: Pending

E17D Outside Rearview Mirror Glass - Driver

Pin	Wire	Circuit	Function
1	0.35 BN/BK	1690	Automatic Day/Night Mirror Signal
2	0.35 BN	1691	Low Reference
3	0.35 BK	850	Ground
4	0.35 BK	2267	Mirror Heating Element Supply Voltage

E17P OUTSIDE REARVIEW MIRROR GLASS - PASSENGER



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Fig. 40: E17P Outside Rearview Mirror Glass - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Outside Rearview Mirror - Passenger
- OEM: MHFS 104W
- Service: Not Available
- Description: 4-Way F (WH)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool/Test Probe: Pending

E17P Outside Rearview Mirror Glass - Passenger

Pin	Wire	Circuit	Function
1	0.35 BK	2267	Mirror Heating Element Supply Voltage
2	0.35 BK	2350	Ground
3-4	-	-	Not Used

E29LF FOG LAMP - LEFT FRONT (T3U)

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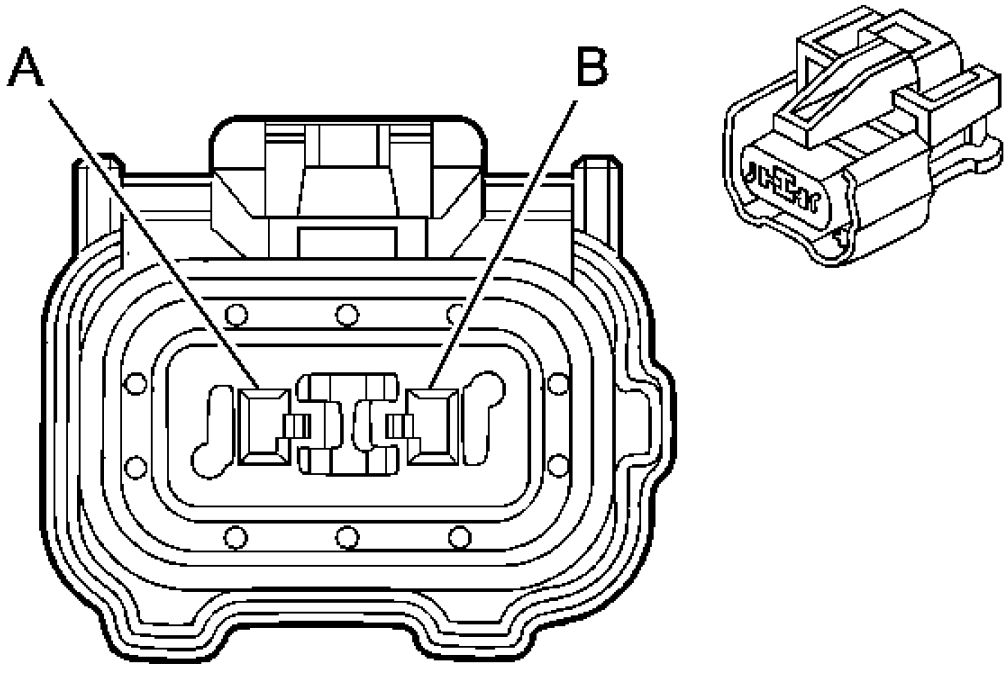


Fig. 41: E29LF Fog Lamp - Left Front (T3U) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp
- OEM: 13513272
- Service: 19153187
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15496531/8
- Core/Insulation Crimp: E/A
- Release Tool: J-38125-29
- Test Probe: J-35616-2A (GY)

E29LF Fog Lamp - Left Front (T3U)

Pin	Wire	Circuit	Function
A	0.5 BK	1150	Ground

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B	0.5 PU	2234	Front Fog Lamp Supply Voltage

E29RF FOG LAMP - RIGHT FRONT (T3U)

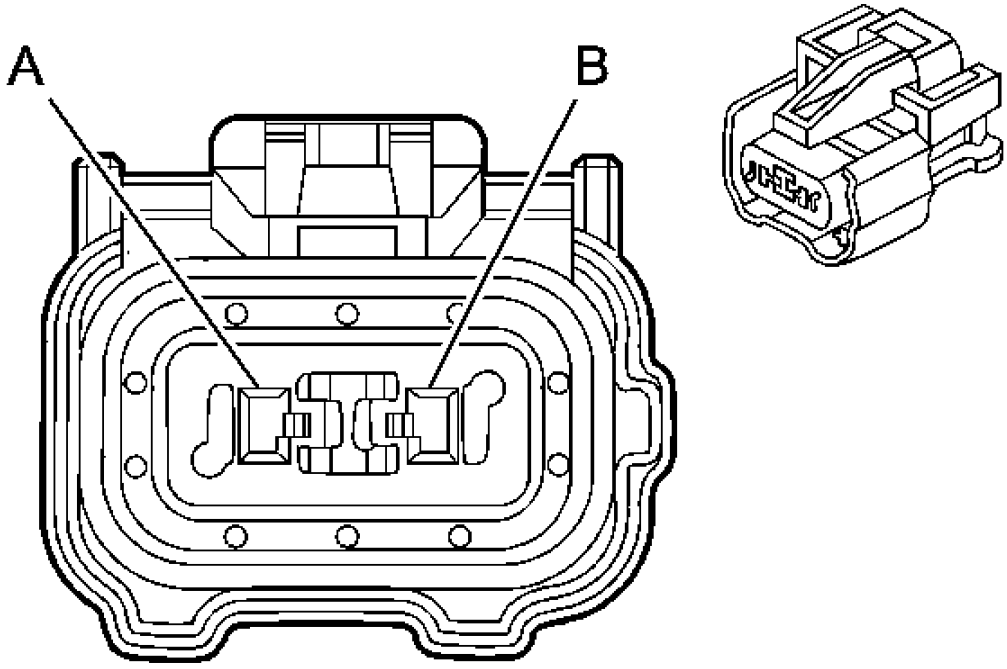


Fig. 42: E29RF Fog Lamp - Right Front (T3U) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp
- OEM: 13513272
- Service: 19153187
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15496531/8
- Core/Insulation Crimp: E/A
- Release Tool: J-38125-29
- Test Probe: J-35616-2A (GY)

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E29RF Fog Lamp - Right Front (T3U)

Pin	Wire	Circuit	Function
A	0.5 BK	1050	Ground
B	0.5 PU	2234	Front Fog Lamp Supply Voltage

E2LF SIDE MARKER LAMP - LEFT FRONT

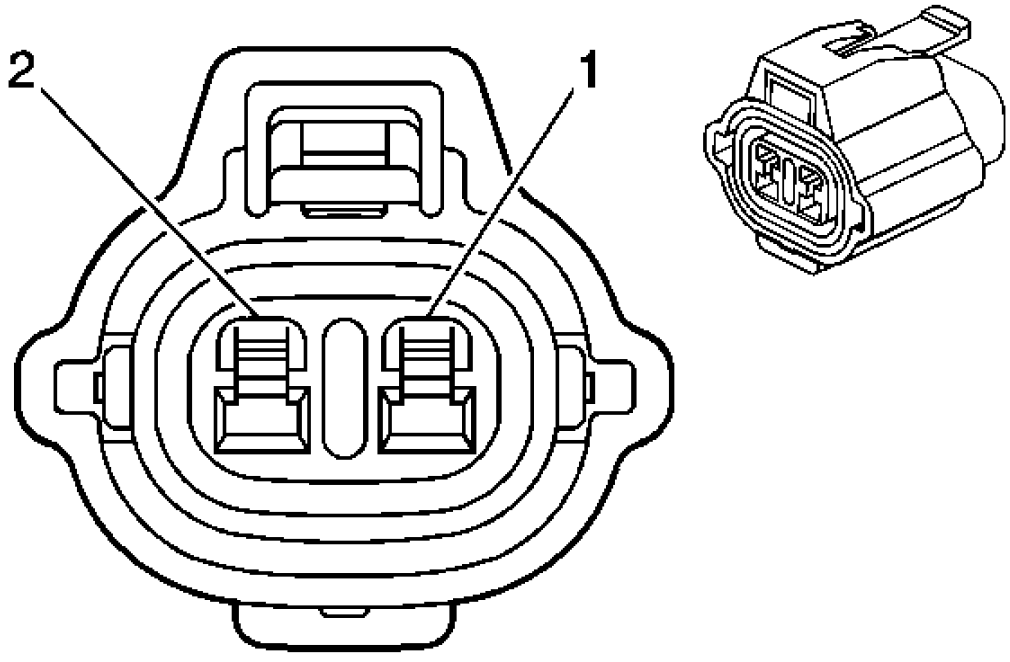


Fig. 43: E2LF Side Marker Lamp - Left Front Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp
- OEM: 15316694
- Service: 88988460
- Description: 2-Way F 090 Series, Sealed (GN)

Terminal Part Information

- Terminal/Tray: 7116-1420/11
- Core/Insulation Crimp: E/1

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- Release Tool: 15315247
- Test Probe: J-35616-18 (BK)

E2LF Side Marker Lamp - Left Front

Pin	Wire	Circuit	Function
1	0.5 PU	709	Left Park Lamp Supply Voltage
2	0.5 BK	1150	Ground

E2LR SIDE MARKER LAMP - LEFT REAR

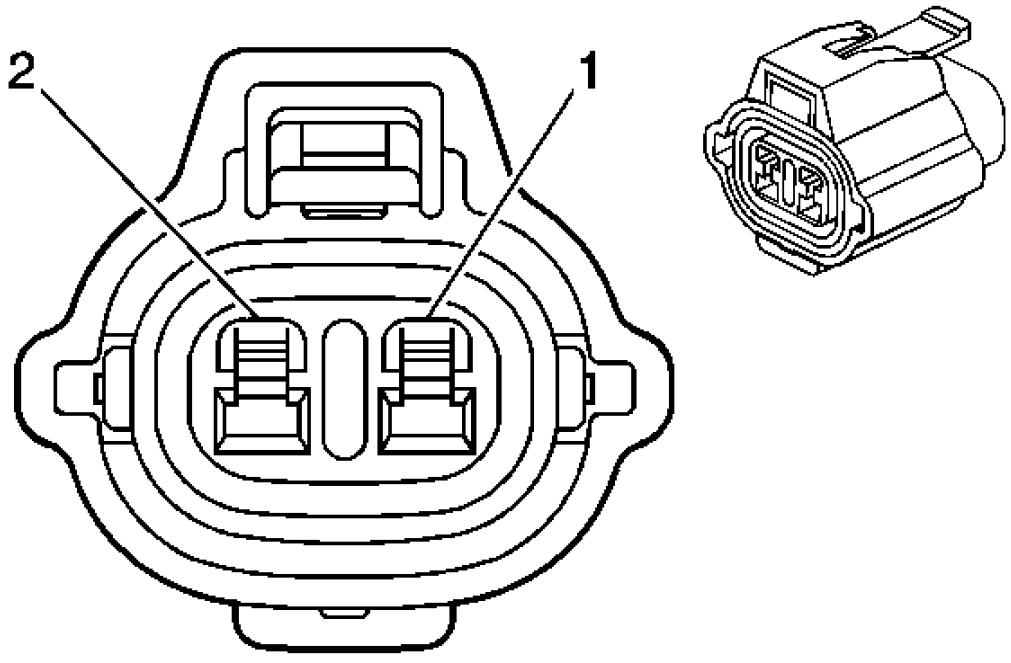


Fig. 44: E2LR Side Marker Lamp - Left Rear Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 15316694
- Service: 88988460
- Description: 2-Way F 090 Series, Sealed (GN)

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Terminal Part Information

- Terminal/Tray: 7116-1420/11
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-18 (BK)

E2LR Side Marker Lamp - Left Rear

Pin	Wire	Circuit	Function
1	0.5 PU	709	Left Park Lamp Supply Voltage
2	0.5 BK	2550	Ground

E2RF SIDE MARKER LAMP - RIGHT FRONT

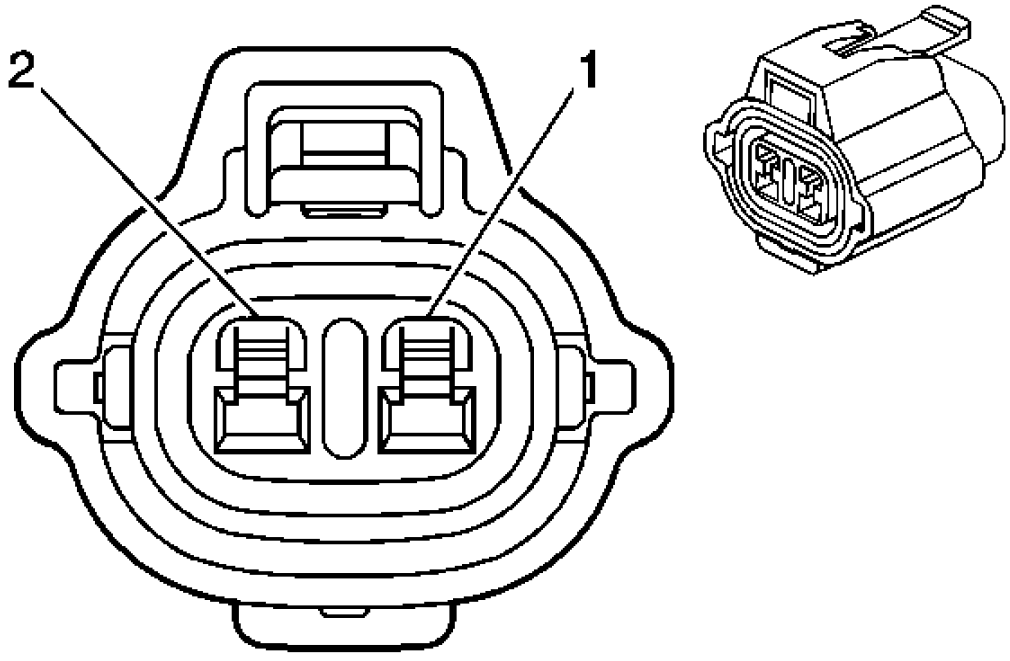


Fig. 45: E2RF Side Marker Lamp - Right Front Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp

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- OEM: 15316694
- Service: 88988460
- Description: 2-Way F 090 Series, Sealed (GN)

Terminal Part Information

- Terminal/Tray: 7116-1420/11
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-18 (BK)

E2RF Side Marker Lamp - Right Front

Pin	Wire	Circuit	Function
1	0.5 BN/WH	309	Right Park Lamp Supply Voltage
2	0.5 BK	1050	Ground

E2RR SIDE MARKER LAMP - RIGHT REAR

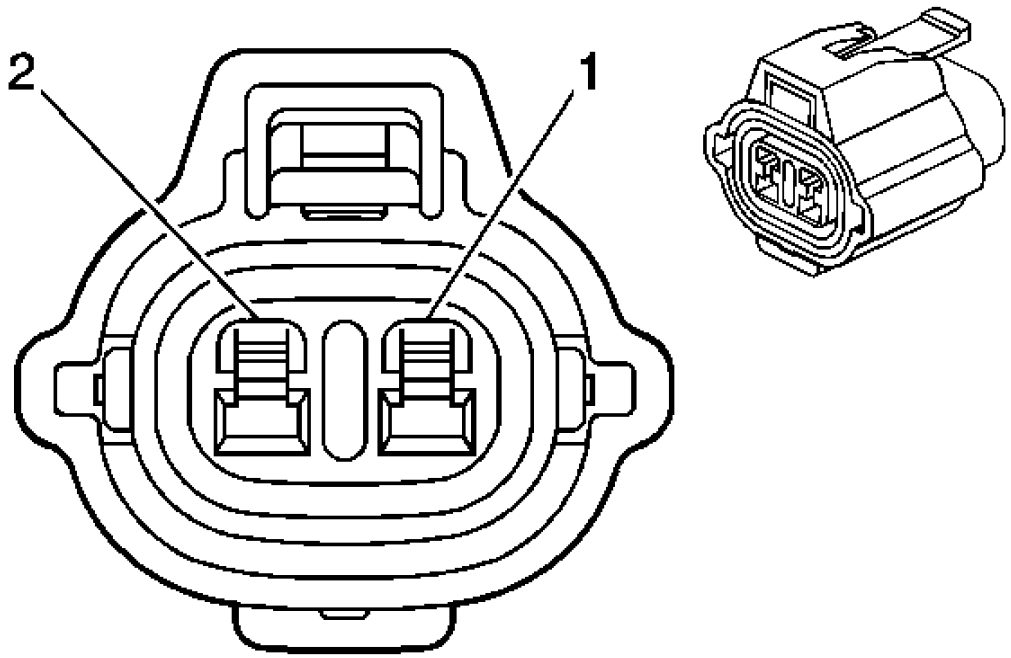


Fig. 46: E2RR Side Marker Lamp - Right Rear Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Rear Fascia
- OEM: 15316694
- Service: 88988460
- Description: 2-Way F 090 Series, Sealed (GN)

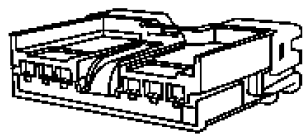
Terminal Part Information

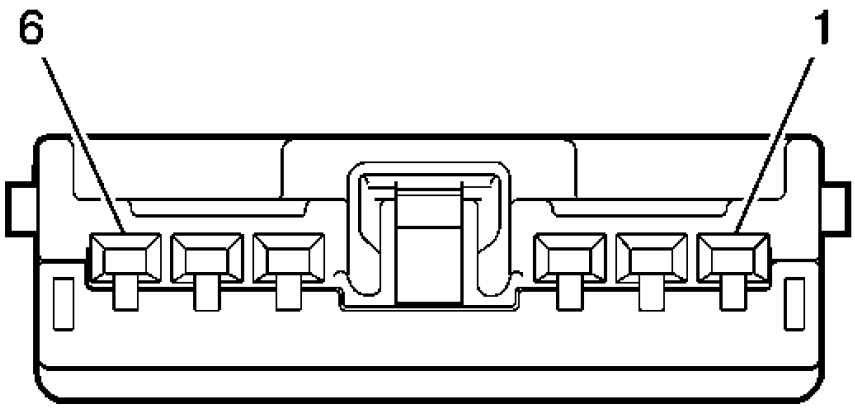
- Terminal/Tray: 7116-1420/11
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-18 (BK)

E2RR Side Marker Lamp - Right Rear

Pin	Wire	Circuit	Function
1	0.5 BN/WH	309	Right Park Lamp Supply Voltage
2	0.5 BK	550	Ground

E37A DOME/READING LAMPS





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Fig. 47: E37A Dome/Reading Lamps Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 13641551
- Service: 19115647
- Description: 6-Way F 1.5 Series (BK)

Terminal Part Information

- Terminal/Tray: 8240-0127/22
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

E37A Dome/Reading Lamps

Pin	Wire	Circuit	Function
1	-	-	Not Used
2	0.5 GY	157	Courtesy Lamp Control
3	-	-	Not Used
4	0.35 PU	328	Interior lamp Defeat Switch Signal
5	0.35 WH	156	Courtesy Lamp Switch Signal
6	0.35 BK	1550	Ground

E4C DAYTIME RUNNING LAMP - LEFT (T4F)

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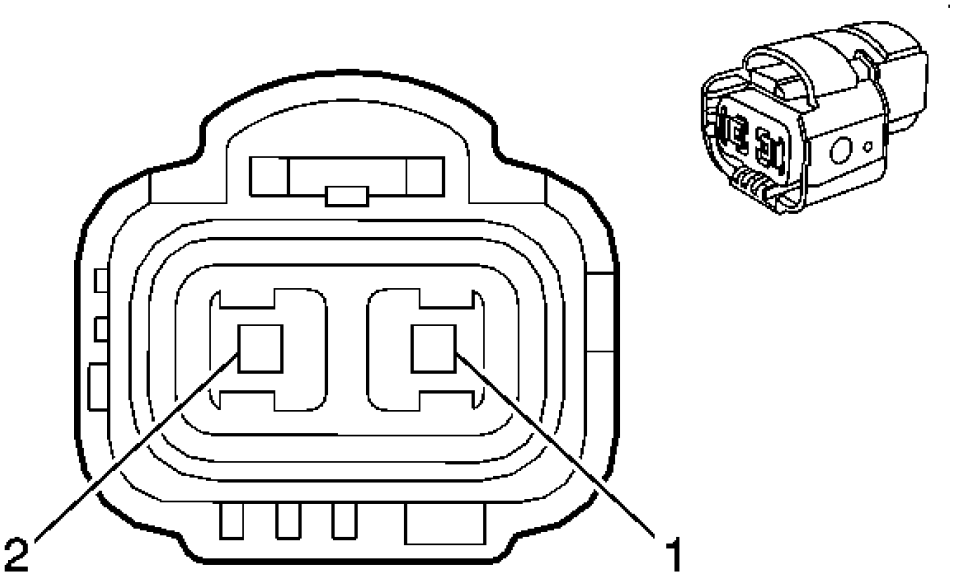


Fig. 48: E4C Daytime Running Lamp - Left (T4F) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp
- OEM: 13693815
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 13648599/See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: See Terminal Repair Kit
- Test Probe: See Terminal Repair Kit

E4C Daytime Running Lamp - Left (T4F)

Pin	Wire	Circuit	Function
1	0.5 L-BU	7538	DRL Control
2	0.5 BK	1150	Ground

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Wiring Systems and Power Management - Component Locator - Component Connector End Views - Camaro

COMPONENT CONNECTOR END VIEWS

E4D DAYTIME RUNNING LAMP - RIGHT (T4F)

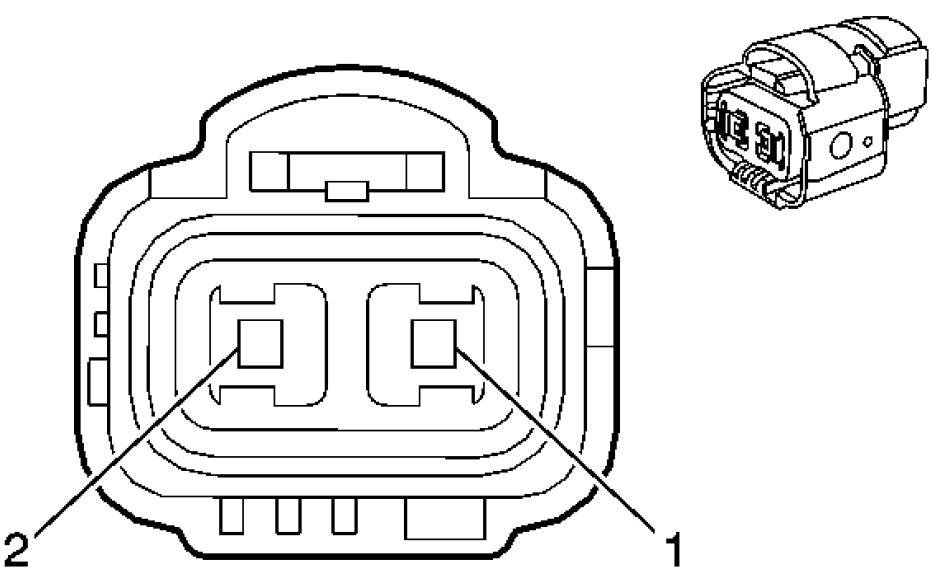


Fig. 1: E4D Daytime Running Lamp - Right (T4F) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fog Lamp
- OEM: 13693815
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 13648599/See Terminal Repair Kit

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- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: See Terminal Repair Kit
- Test Probe: See Terminal Repair Kit

E4D Daytime Running Lamp - Right (T4F)

Pin	Wire	Circuit	Function
1	0.5 D-BU	7539	DRL Control
2	0.5 BK	1050	Ground

E4LF TURN SIGNAL LAMP - LEFT FRONT (T4F)

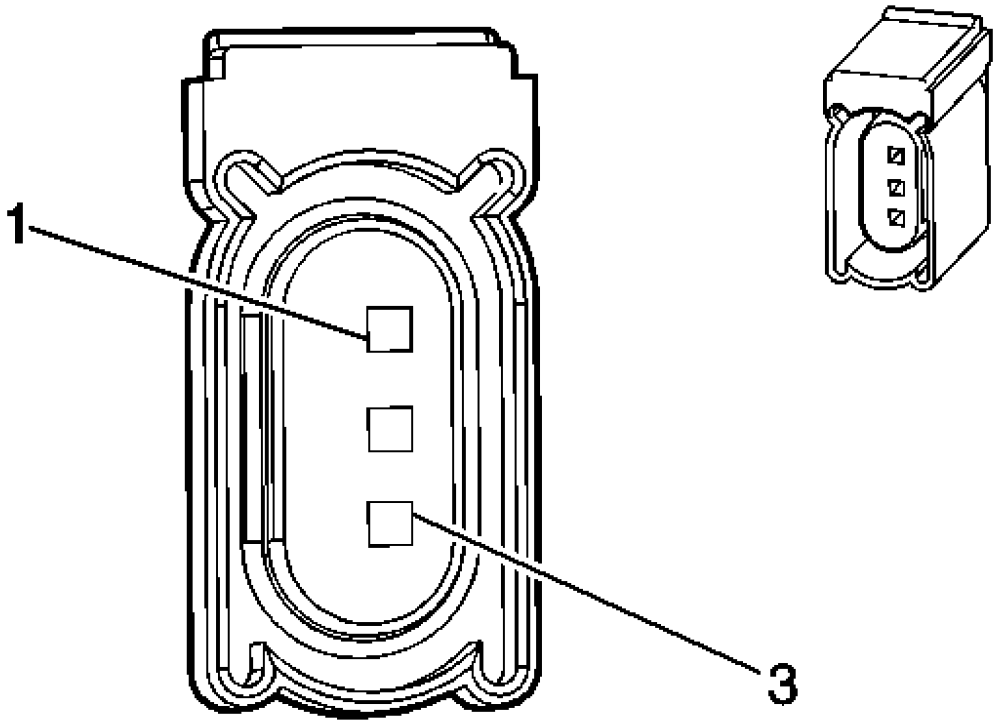


Fig. 2: E4LF Turn Signal Lamp - Left Front (T4F) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp

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- OEM: 13539910
- Service: 88988383
- Description: 3-Way F Base 3, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E4LF Turn Signal Lamp - Left Front (T4F)

Pin	Wire	Circuit	Function
1	0.5 BK	1150	Ground
2	-	-	Not Available
3	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage

E4N PARK/TURN SIGNAL LAMP - LEFT (T4A)

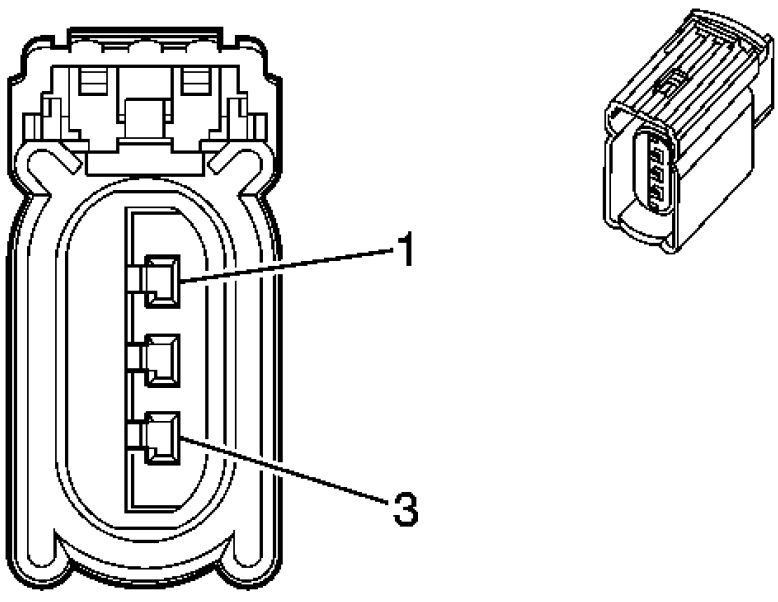


Fig. 3: E4N Park/Turn Signal Lamp - Left (T4A) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Forward Lamp
- OEM: 15466016
- Service: 88988599
- Description: 3-Way F Receptacle 1.5, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E4N Park/Turn Signal Lamp - Left (T4A)

Pin	Wire	Circuit	Function
1	0.5 BK	1150	Ground
2	0.5 PU	709	Left Park Lamp Supply Voltage
3	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage

E4P PARK/TURN SIGNAL LAMP - RIGHT (T4A)

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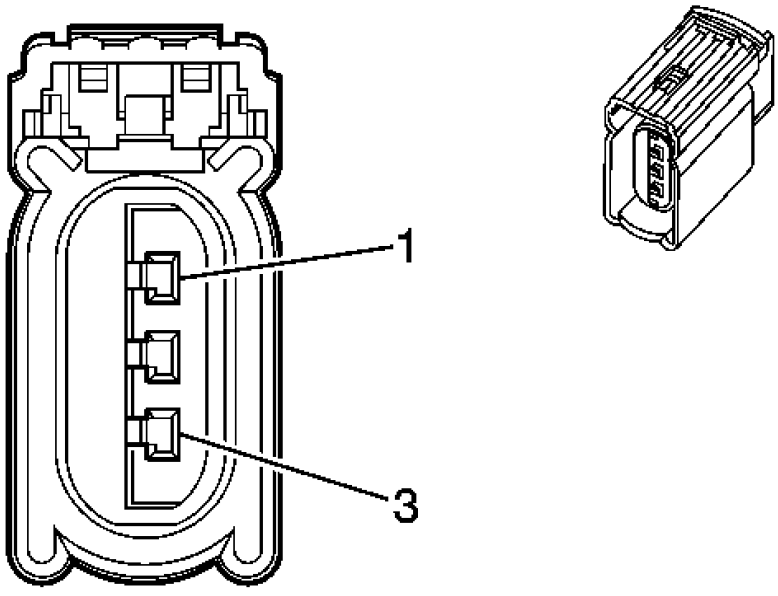


Fig. 4: E4P Park/Turn Signal Lamp - Right (T4A) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 15466016
- Service: 88988599
- Description: 3-Way F Receptacle 1.5, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E4P Park/Turn Signal Lamp - Right (T4A)

Pin	Wire	Circuit	Function
1	0.5 BK	1050	Ground
2	0.5 BN/WH	309	Right Park Lamp Supply Voltage

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3	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage

E4RF TURN SIGNAL LAMP - RIGHT FRONT (T4F)

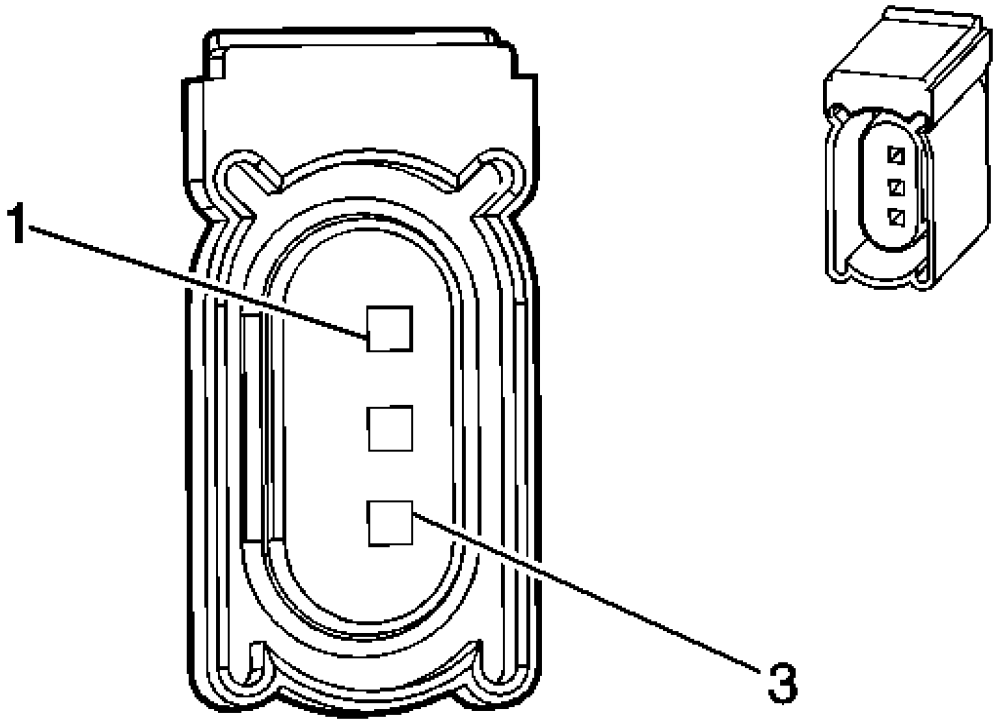


Fig. 5: E4RF Turn Signal Lamp - Right Front (T4F) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13539910
- Service: 88988383
- Description: 3-Way F Base 3, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9

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- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E4RF Turn Signal Lamp - Right Front (T4F)

Pin	Wire	Circuit	Function
1	0.5 BK	1050	Ground
2	-	-	Not Available
3	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage

E5A BACKUP LAMP - LEFT

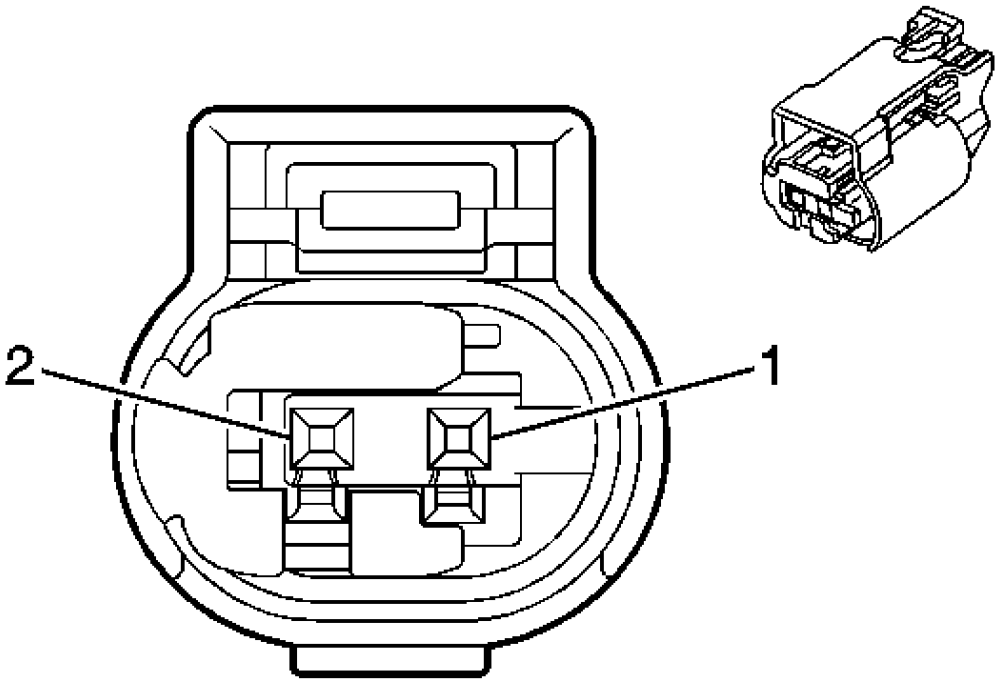


Fig. 6: E5A Backup Lamp - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Rear Fascia
- OEM: 13531640
- Service: 19149296
- Description: 2-Way F Clean Body Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 962885-5/15
- Core/Insulation Crimp: 6/6
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

E5A Backup Lamp - Left

Pin	Wire	Circuit	Function
1	0.5 L-GN	24	Backup Lamp Supply Voltage
2	0.5 BK	2550	Ground

E5AE TAIL/STOP AND TURN SIGNAL LAMP - LEFT INNER

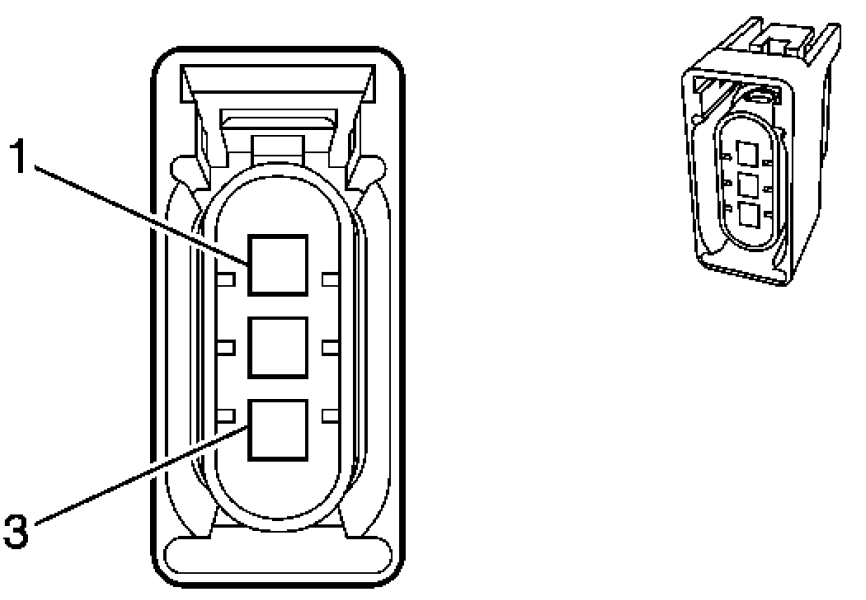


Fig. 7: E5AE Tail/Stop and Turn Signal Lamp - Left Inner Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Rear Fascia
- OEM: 15431041
- Service: 88988139
- Description: 3-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E5AE Tail/Stop and Turn Signal Lamp - Left Inner

Pin	Wire	Circuit	Function
1	0.5 BK	2550	Ground
2	0.5 PU	709	Left Park Lamp Supply Voltage
3	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage

E5AF TAIL/STOP AND TURN SIGNAL LAMP - RIGHT INNER

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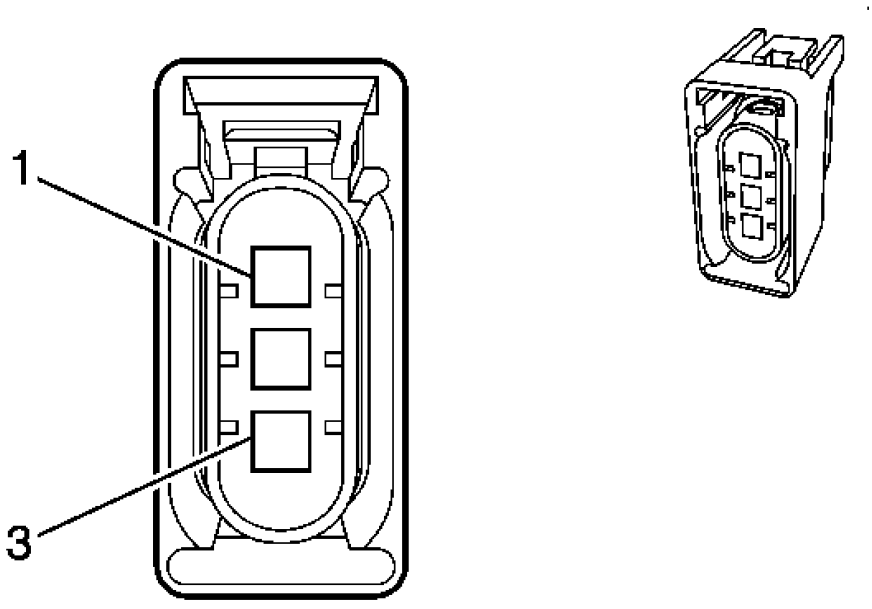


Fig. 8: E5AF Tail/Stop and Turn Signal Lamp - Right Inner Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 15431041
- Service: 88988139
- Description: 3-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E5AF Tail/Stop and Turn Signal Lamp - Right Inner

Pin	Wire	Circuit	Function
1	0.5 BK	550	Ground
2	0.5 BN/WH	309	Right Park Lamp Supply Voltage

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3	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage

E5B BACKUP LAMP - RIGHT

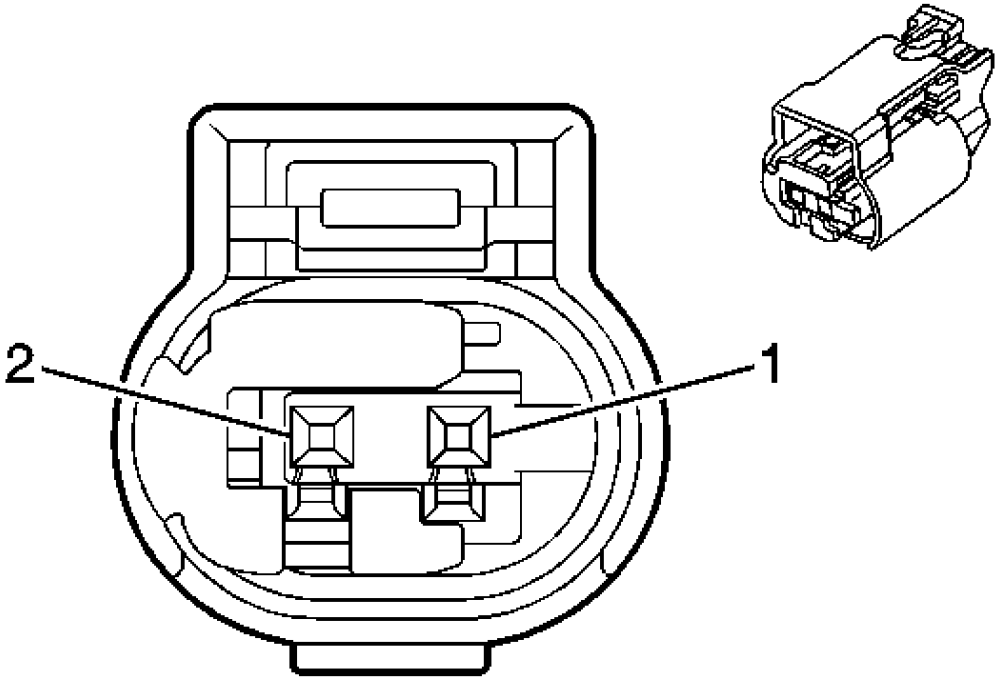


Fig. 9: E5B Backup Lamp - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 13531640
- Service: 19149296
- Description: 2-Way F Clean Body Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 962885-5/15
- Core/Insulation Crimp: 6/6
- Release Tool: 12094429

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- Test Probe: J-35616-64B (L-BU)

E5B Backup Lamp - Right

Pin	Wire	Circuit	Function
1	0.5 L-GN	24	Backup Lamp Supply Voltage
2	0.5 BK	2550	Ground

E5W TAIL/STOP AND TURN SIGNAL LAMP - LEFT OUTER

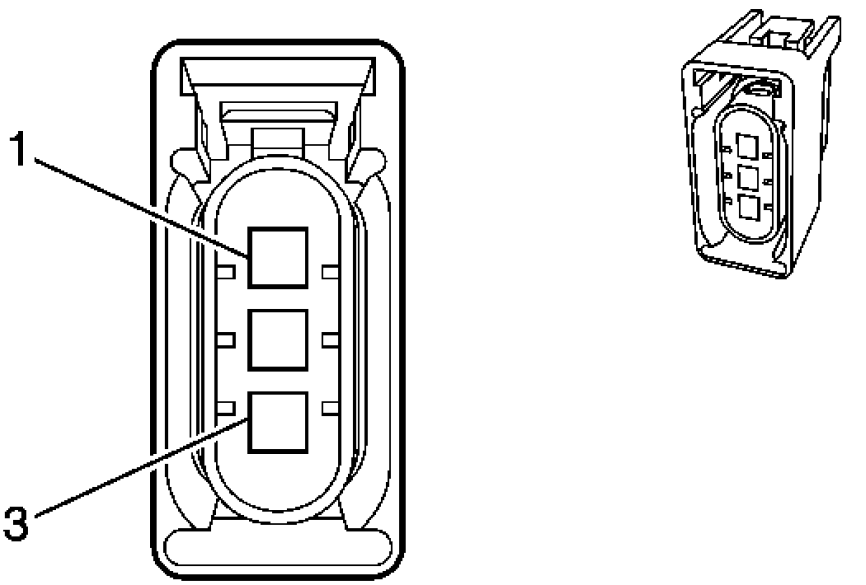


Fig. 10: E5W Tail/Stop and Turn Signal Lamp - Left Outer Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 15431041
- Service: 88988139
- Description: 3-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

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- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E5W Tail/Stop and Turn Signal Lamp - Left Outer

Pin	Wire	Circuit	Function
1	0.5 BK	2550	Ground
2	0.5 PU	709	Left Park Lamp Supply Voltage
3	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage

E5X TAIL/STOP AND TURN SIGNAL LAMP - RIGHT OUTER

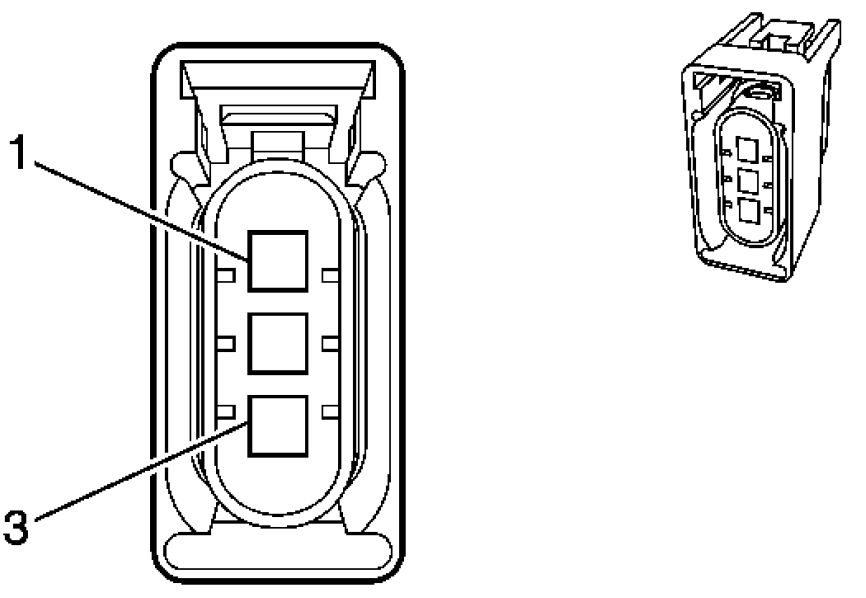


Fig. 11: E5X Tail/Stop and Turn Signal Lamp - Right Outer Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Fascia
- OEM: 15431041

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- Service: 88988139
- Description: 3-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4102-08/9
- Core/Insulation Crimp: E/1
- Release Tool: 12094430
- Test Probe: J-35616-2A (GY)

E5X Tail/Stop and Turn Signal Lamp - Right Outer

Pin	Wire	Circuit	Function
1	0.5 BK	550	Ground
2	0.5 BN/WH	309	Right Park Lamp Supply Voltage
3	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage

E6 CENTER HIGH MOUNTED STOP LAMP

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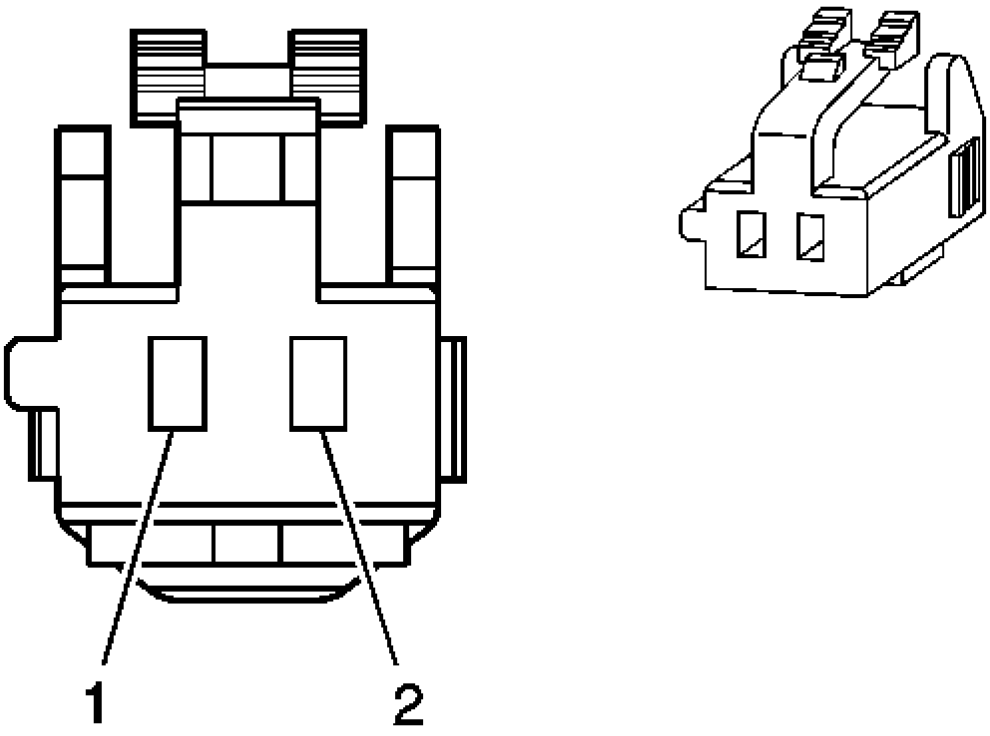


Fig. 12: E6 Center High Mounted Stop Lamp Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Rear Window Trim Harness
- OEM: 10763601
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 090 II Series (WH)

Terminal Part Information

- Terminal/Tray: 7116-4020/11
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-18 (BK)

E6 Center High Mounted Stop Lamp

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Pin	Wire	Circuit	Function
1	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control
2	0.5 BK	2350	Ground

E7L LICENSE PLATE LAMP - LEFT

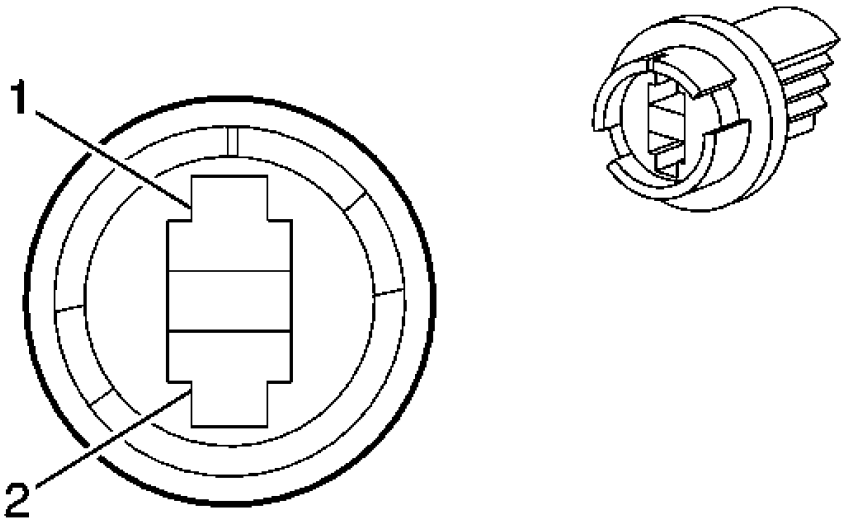


Fig. 13: E7L License Plate Lamp - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: License Lamp
- OEM: N/A
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F Bulb Socket, Sealed (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available

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- Release Tool: Not Available
- Test Probe: Not Available

E7L License Plate Lamp - Left

Pin	Wire	Circuit	Function
1	0.5 BN	6846	Rear License Lamp Control
2	0.5 BK	2550	Ground

E7R LICENSE PLATE LAMP - RIGHT

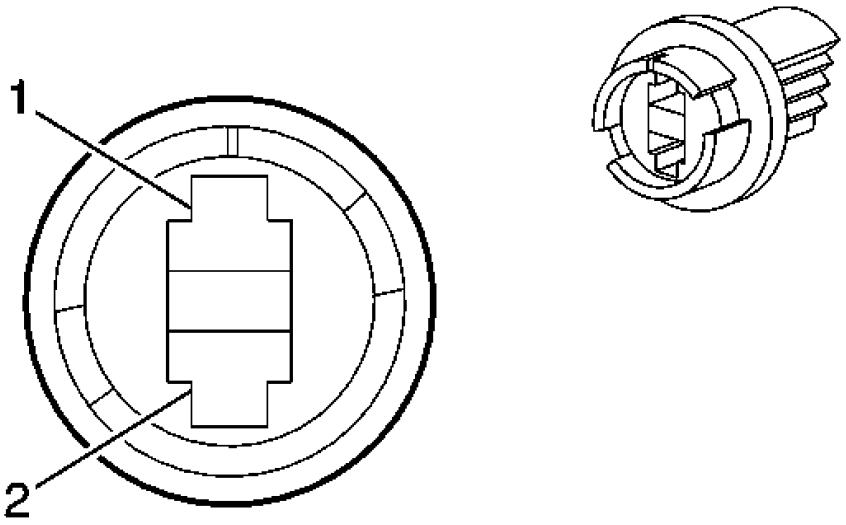


Fig. 14: E7R License Plate Lamp - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: License Lamp
- OEM: N/A
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F Bulb Socket, Sealed (BK)

Terminal Part Information

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- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

E7R License Plate Lamp - Right

Pin	Wire	Circuit	Function
1	0.5 BN	6846	Rear License Lamp Control
2	0.5 BK	2550	Ground

E8S REAR COMPARTMENT COURTESY LAMP

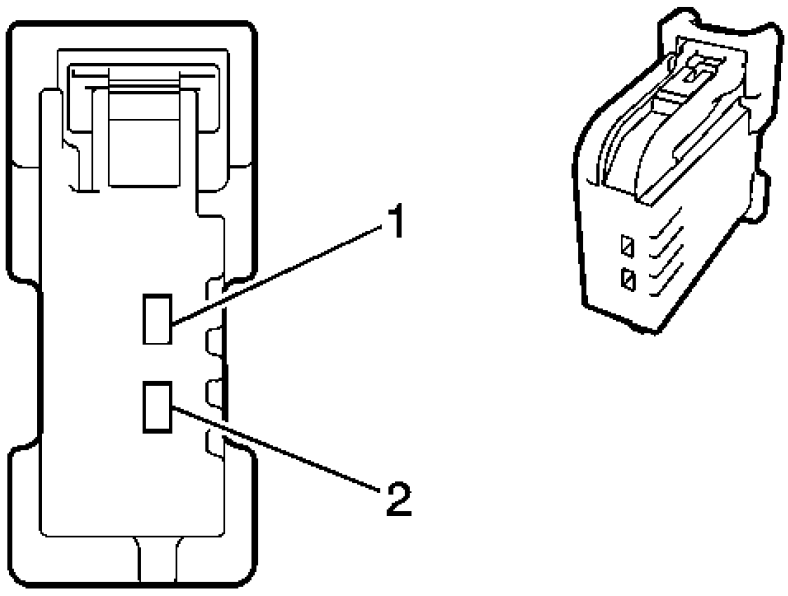


Fig. 15: E8S Rear Compartment Courtesy Lamp Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13595207
- Service: 19179373

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- Description: 2-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: 8240-0127/22
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

E8S Rear Compartment Courtesy Lamp

Pin	Wire	Circuit	Function
1	0.5 OG/BK	737	Rear Compartment Lamp Control
2	0.5 BK	2350	Ground

F105 PASSENGER INSTRUMENT PANEL AIR BAG

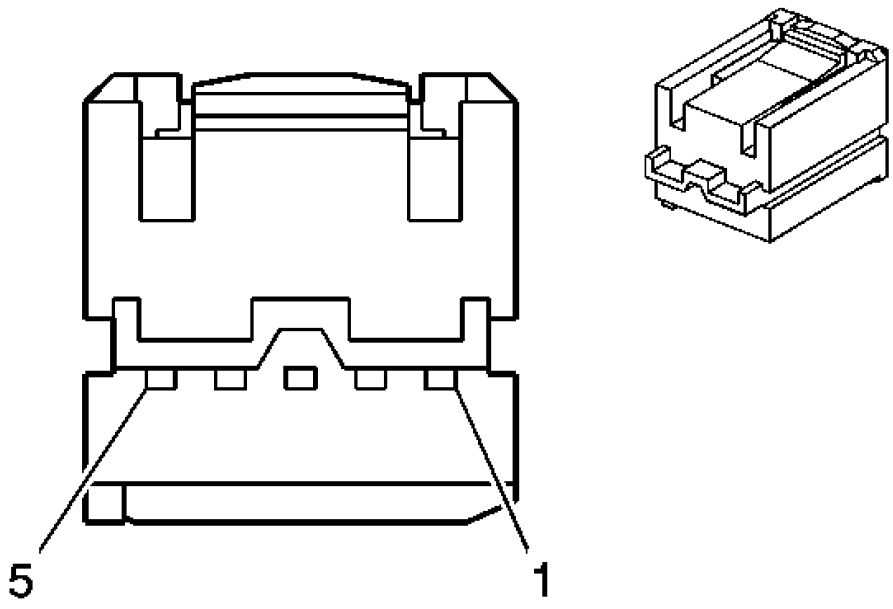


Fig. 16: F105 Passenger Instrument Panel Air Bag Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Instrument Panel
- OEM: 13601511
- Service: 19153434
- Description: 5-Way F 0.64 Series Unsealed (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

F105 Passenger Instrument Panel Air Bag

Pin	Wire	Circuit	Function
1	0.35 YE	3025	I/P Module - Stage 1 - High Control
2	0.35 OG	3024	I/P Module - Stage 1 - Low Control
3	-	-	Not Used
4	0.35 GY	3027	I/P Module - Stage 2 - High Control
5	0.35 PU	3026	I/P Module - Stage 2 - Low Control

F105L ROOF RAIL AIR BAG - LEFT

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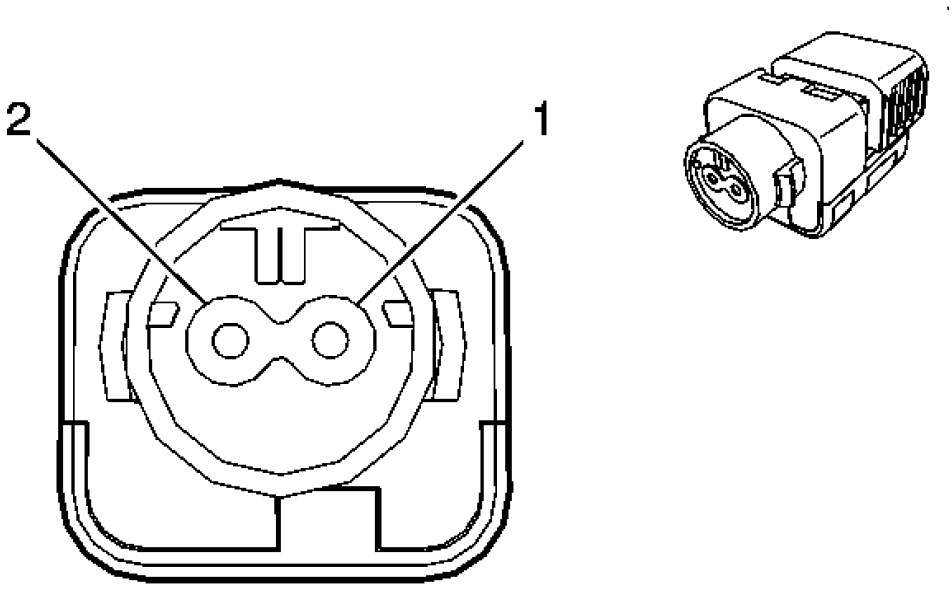


Fig. 17: F105L Roof Rail Air Bag - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13680740
- Service: Pending
- Description: 2-Way F (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

F105L Roof Rail Air Bag - Left

Pin	Wire	Circuit	Function
1	0.35 PU/WH	5019	Roof Rail Module - Left - High Control
2	0.35 PK	5020	Roof Rail Module - Left - Low Control

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F105R ROOF RAIL AIR BAG - RIGHT

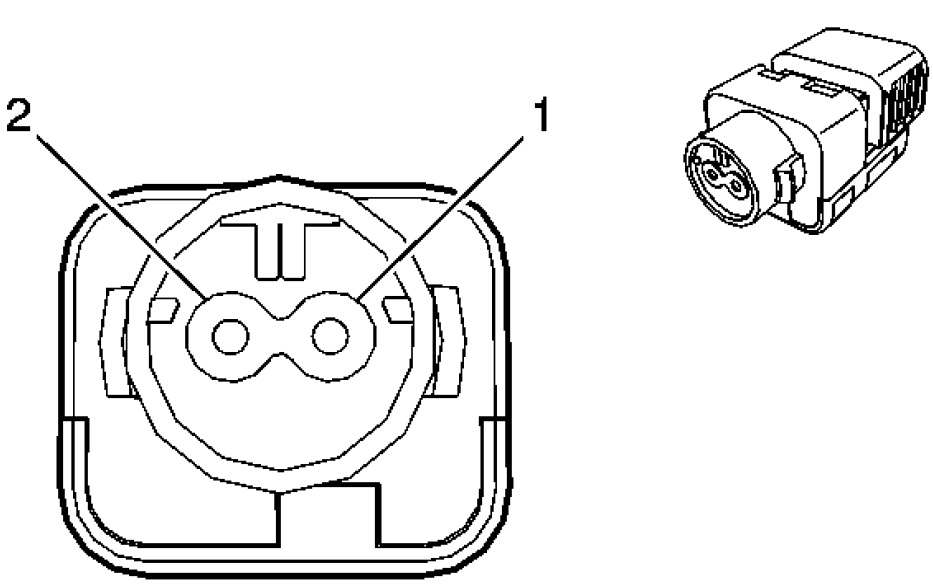


Fig. 18: F105R Roof Rail Air Bag - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13680741
- Service: Pending
- Description: 2-Way F (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

F105R Roof Rail Air Bag - Right

Pin	Wire	Circuit	Function

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1	0.35 YE/BK	5021	Roof Rail Module - Right - High Control
2	0.35 WH/BK	5022	Roof Rail Module - Right - Low Control

F106L SIDE AIR BAG - LEFT

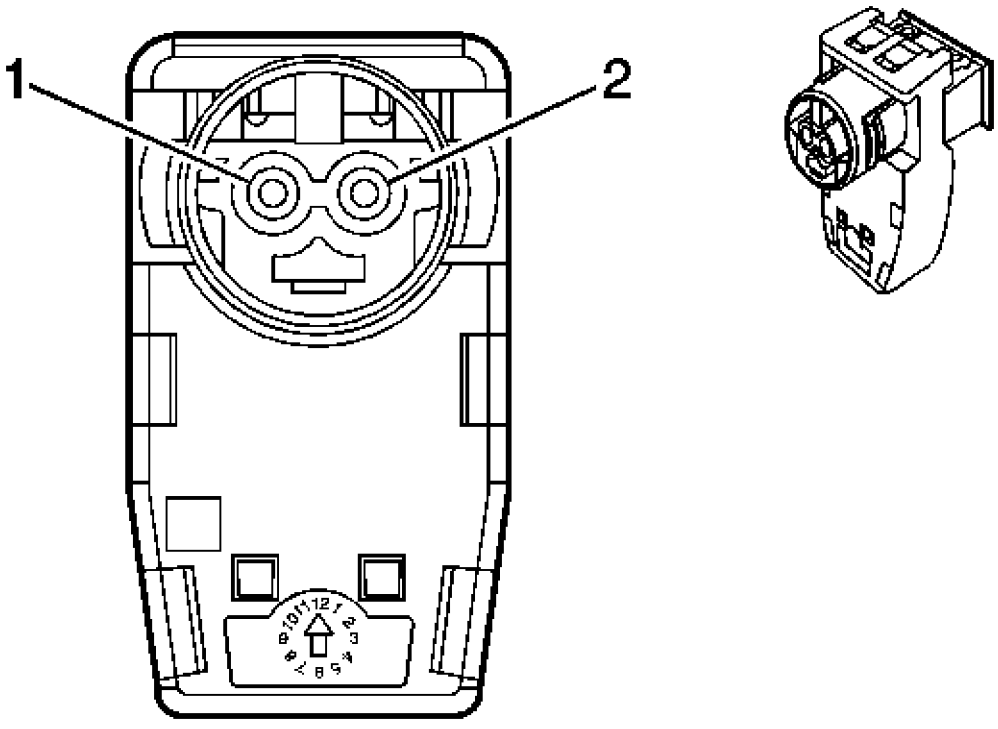


Fig. 19: F106L Side Air Bag - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Inflatable Restraint Side Impact Module - Left Jumper
- OEM: 13234634
- Service: Service by harness - See Part Catalog
- Description: 2-Way F (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog

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- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

F106L Side Air Bag - Left

Pin	Wire	Circuit	Function
1	0.35 BN	2137	Side Impact Module - LF - High Control
2	0.35 YE/BK	2138	Side Impact Module - LF - Low Control

F106R SIDE AIR BAG - RIGHT

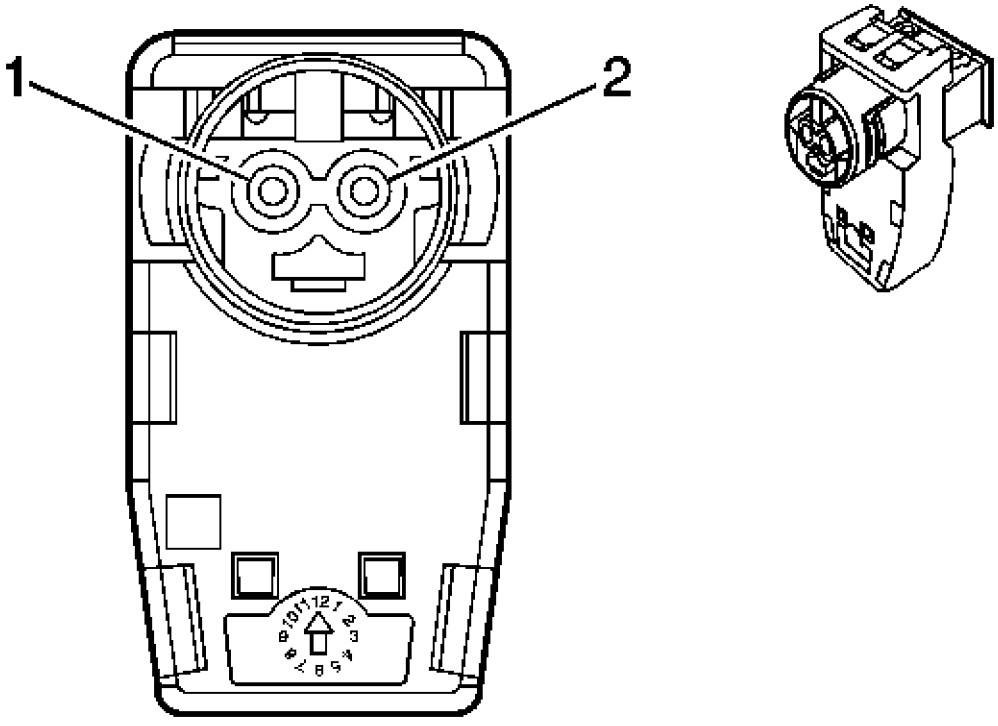


Fig. 20: F106R Side Air Bag - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Inflatable Restraint Side Impact Module - Right Jumper

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- OEM: 13234634
- Service: Service by harness - See Part Catalog
- Description: 2-Way F (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

F106R Side Air Bag - Right

Pin	Wire	Circuit	Function
1	0.35 TN/WH	2135	Side Impact Module - RF - High Control
2	0.35 L-BU	2136	Side Impact Module - RF - Low Control

F107 STEERING WHEEL AIR BAG X1

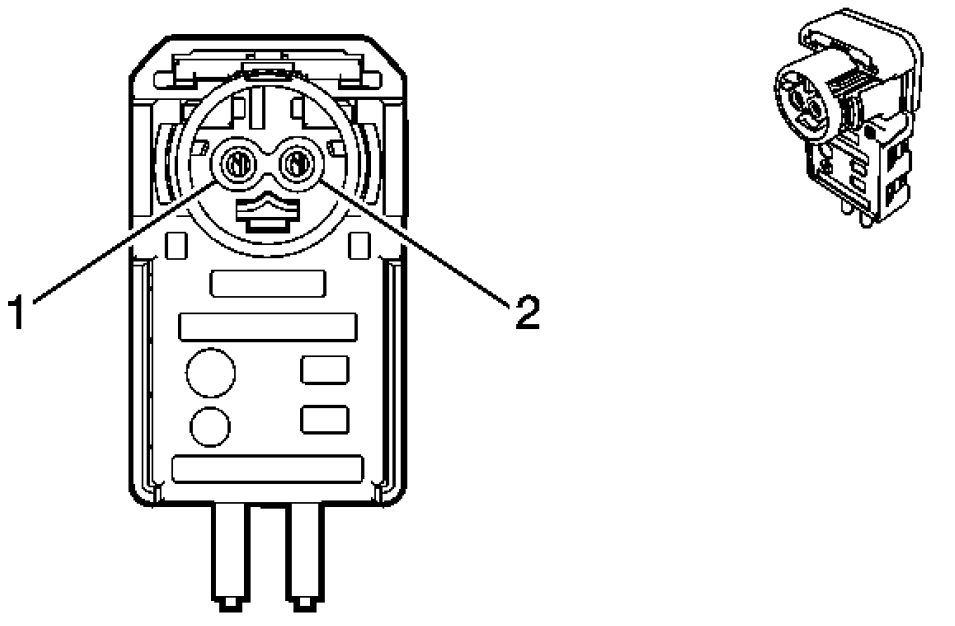


Fig. 21: F107 Steering Wheel Air Bag X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: SIR Coil
- OEM: 0988530002
- Service: Service by Component Assembly - See Part Catalog
- Description: 2-Way F (BU with YE Cover)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

F107 Steering Wheel Air Bag X1

Pin	Wire	Circuit	Function
1	0.35 TN	3021	Steering Wheel Module - Stage 1 - High Control
2	0.35 BN	3020	Steering Wheel Module - Stage 1 - Low Control

F107 STEERING WHEEL AIR BAG X2

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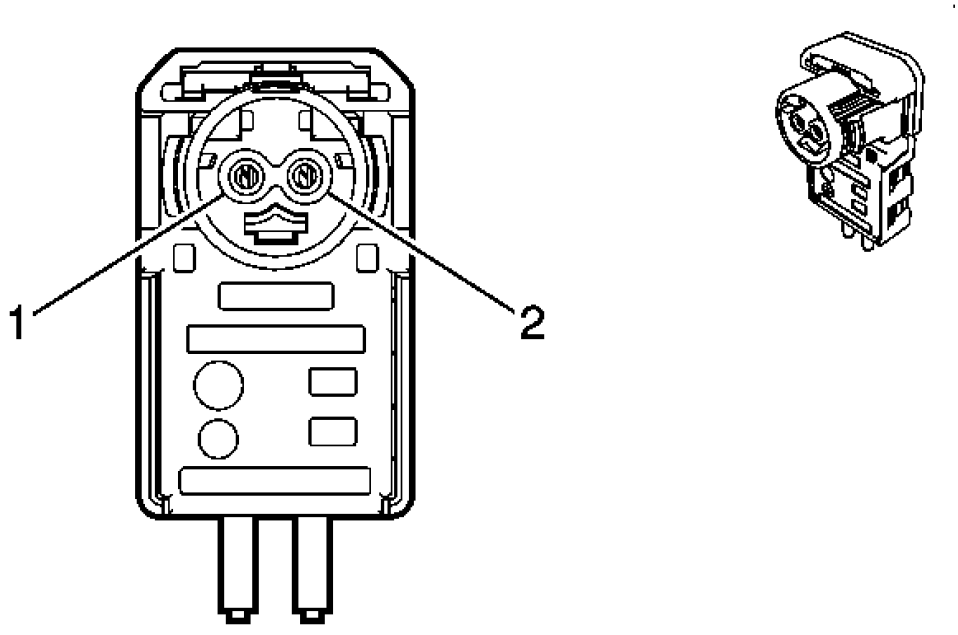


Fig. 22: F107 Steering Wheel Air Bag X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: SIR Coil
- OEM: 0988530003
- Service: Service by Component Assembly - See Part Catalog
- Description: 2-Way F (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

F107 Steering Wheel Air Bag X2

Pin	Wire	Circuit	Function
1	0.35 WH	3023	Steering Wheel Module - Stage 2 - High Control

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2	0.35 PK	3022	Steering Wheel Module - Stage 2 - Low Control

F112D SEAT BELT RETRACTOR PRETENSIONER - DRIVER

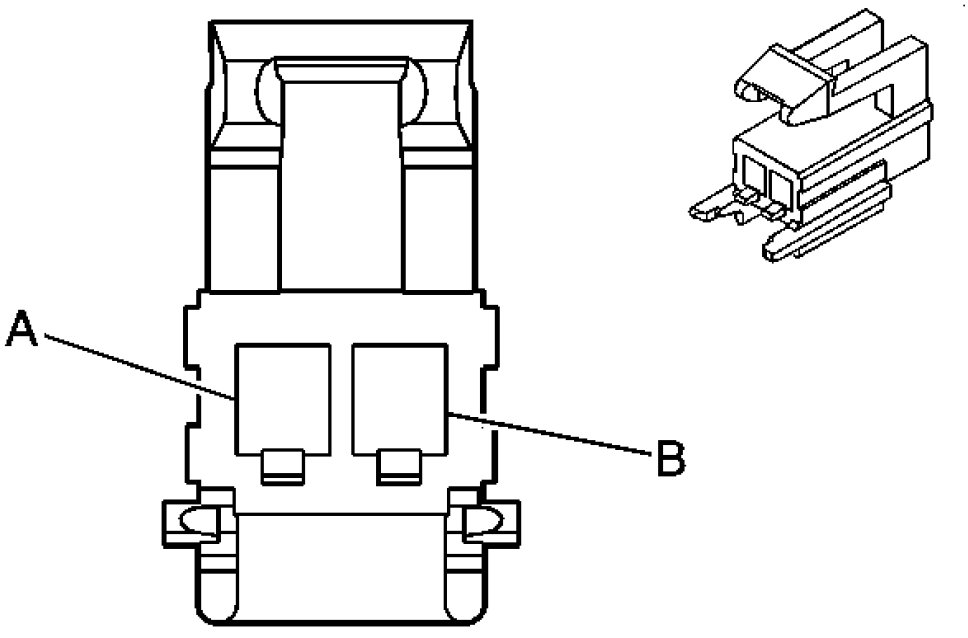


Fig. 23: F112D Seat Belt Retractor Pretensioner - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12110505
- Service: 15306044
- Description: 2-Way F Metri-Pack 150 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: N/A
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

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F112D Seat Belt Retractor Pretensioner - Driver

Pin	Wire	Circuit	Function
A	0.35 TN/WH	2118	Seat Belt Retractor Pretensioner - Left - High Control
B	0.35 OG/BK	2119	Seat Belt Retractor Pretensioner - Left - Low Control

F112P SEAT BELT RETRACTOR PRETENSIONER - PASSENGER

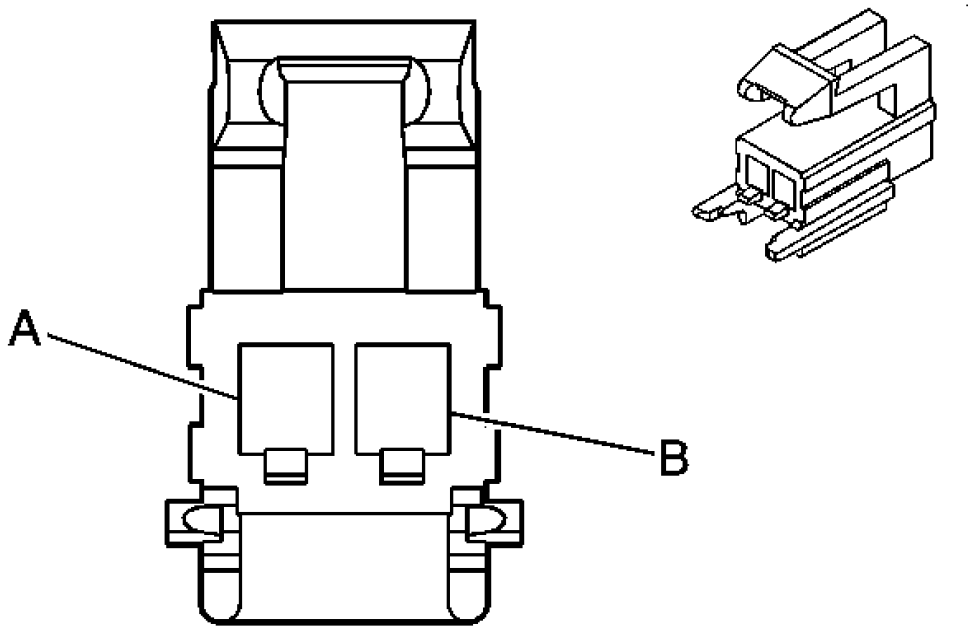


Fig. 24: F112P Seat Belt Retractor Pretensioner - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12110505
- Service: 15306044
- Description: 2-Way F Metri-Pack 150 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog

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- Core/Insulation Crimp: N/A
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

F112P Seat Belt Retractor Pretensioner - Passenger

Pin	Wire	Circuit	Function
A	0.35 L-GN	2116	Seat Belt Retractor Pretensioner - Right - High Control
B	0.35 OG	2117	Seat Belt Retractor Pretensioner - Right - Low Control

G10R COOLING FAN MOTOR - RIGHT

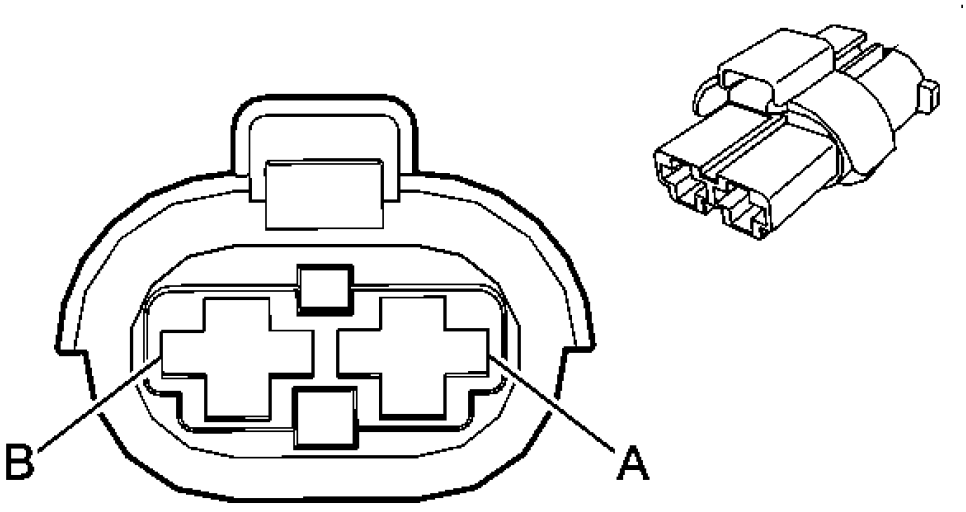


Fig. 25: G10R Cooling Fan Motor - Right Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Cooling Fan Motor - Left
- OEM: 1544361

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- Service: Service by Component - See Part Catalog
- Description: 2-Way F Sealed (BK)

Terminal Part Information

- Terminal/Tray: Not Available
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

G10R Cooling Fan Motor - Right

Pin	Wire	Circuit	Function
A	4 BK	504	Low Reference
B	4 RD	409	Cooling Fan Motor Supply Voltage

G13 GENERATOR X1 (L99 OR LS3)

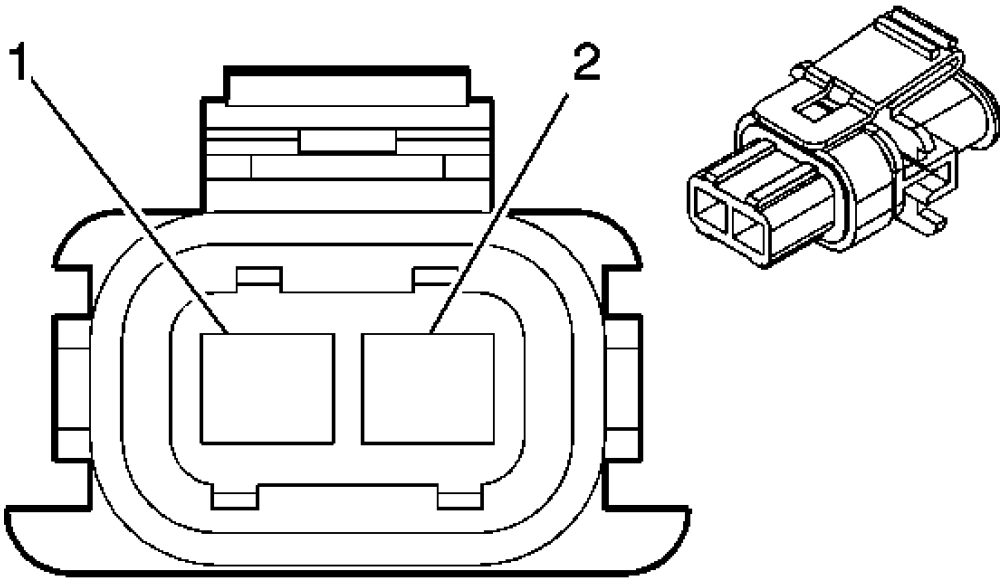


Fig. 26: G13 Generator X1 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Engine
- OEM: 10740370
- Service: 88988586
- Description: 2-Way F 2.8 Series, Sealed (BK)

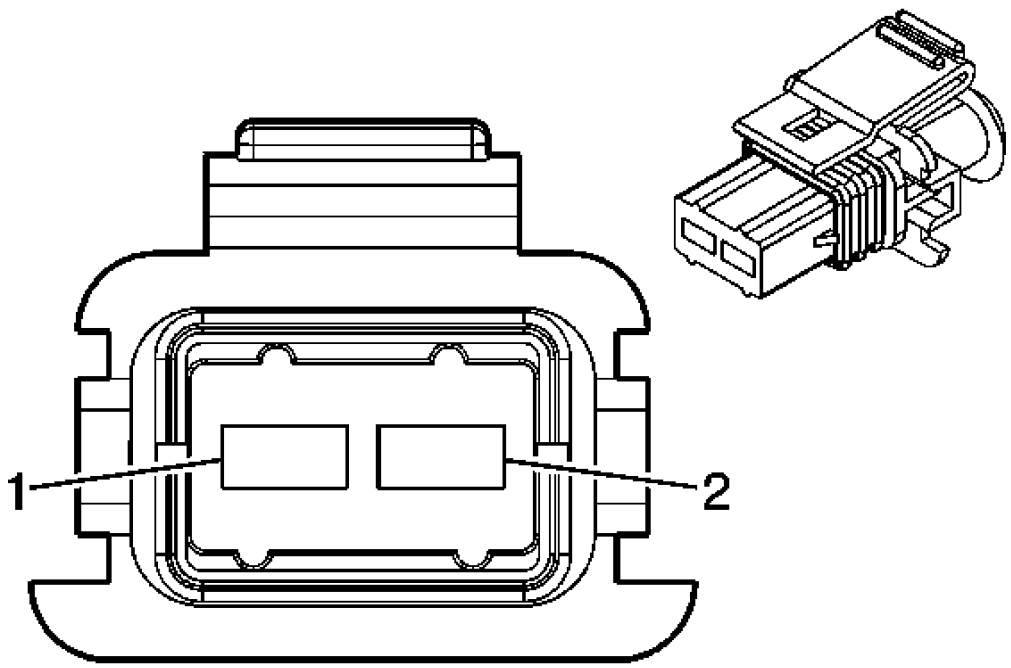
Terminal Part Information

- Terminal/Tray: 1928498056/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

G13 Generator X1 (L99 or LS3)

Pin	Wire	Circuit	Function
1	0.5 BN	25	Charge Indicator Control/Charge Indicator Signal
2	0.5 GY	23	Generator Field Duty Cycle Signal

G13 GENERATOR X1 (LLT)



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Fig. 27: G13 Generator X1 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12186308
- Service: 89046837
- Description: 2-Way F Junior Power Timer Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 4-964286-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

G13 Generator X1 (LLT)

Pin	Wire	Circuit	Function
1	0.5 BN	25	Charge Indicator Control/Charge Indicator Signal
2	0.5 GY	23	Generator Field Duty Cycle Signal

G13 GENERATOR X2

Connector Part Information

- Terminal: 24417869
- Core/Insulation Crimp: N/A
- Description: Ring Terminal

G13 Generator X2

Pin	Wire	Circuit	Function
A	19 RD/BK	2	Battery Positive Voltage
	19 RD	1	Battery Positive Voltage

G18 HIGH PRESSURE FUEL PUMP (LLT)

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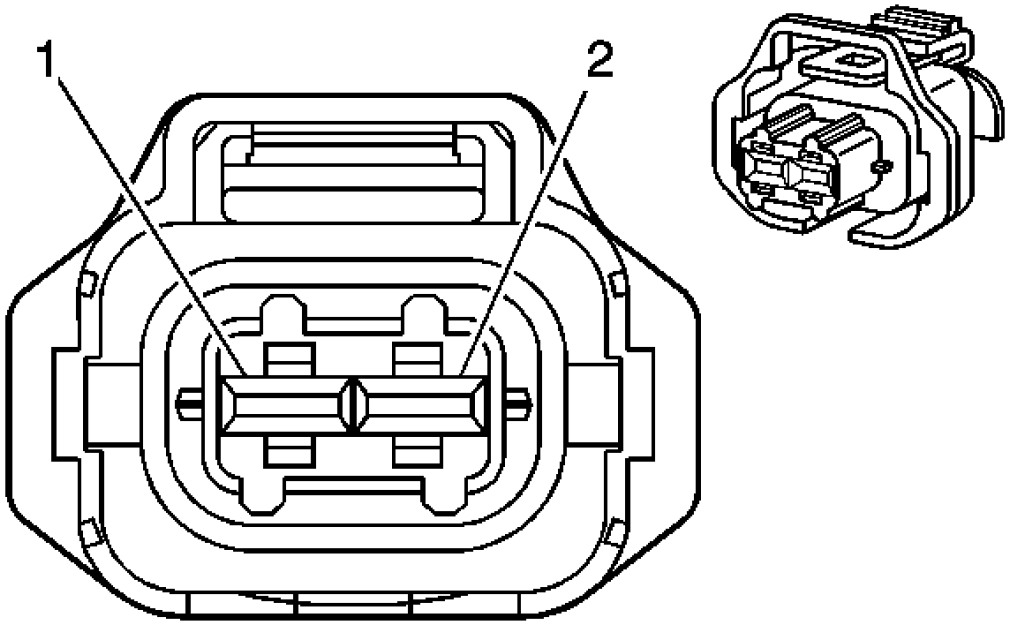


Fig. 28: G18 High Pressure Fuel Pump (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15339756
- Service: 88988963
- Description: 2-Way F Kompakt 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498054/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

G18 High Pressure Fuel Pump (LLT)

Pin	Wire	Circuit	Function
1	1 PU	7300	High Pressure Fuel Pump Actuator Low Control

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2	1 YE	7301	High Pressure Fuel Pump Actuator High Control

G24 WINDSHIELD WASHER PUMP

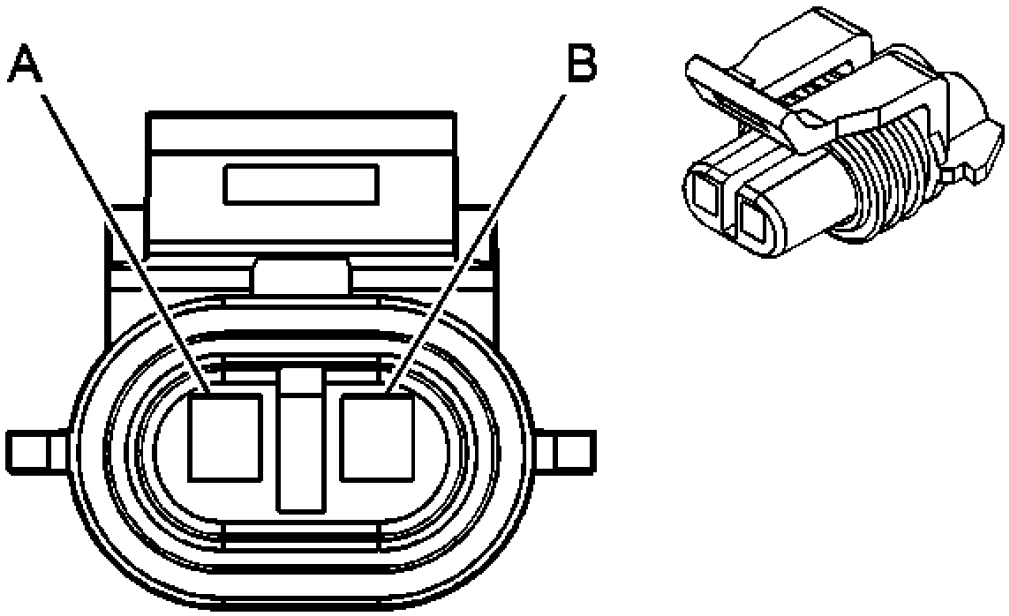


Fig. 29: G24 Windshield Washer Pump Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 12052641
- Service: 12102747
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

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G24 Windshield Washer Pump

Pin	Wire	Circuit	Function
A	0.8 OG	228	Windshield Washer Pump Control
B	0.8 BK	1150	Ground

G6 BRAKE BOOSTER PUMP - AUXILIARY (LLT)

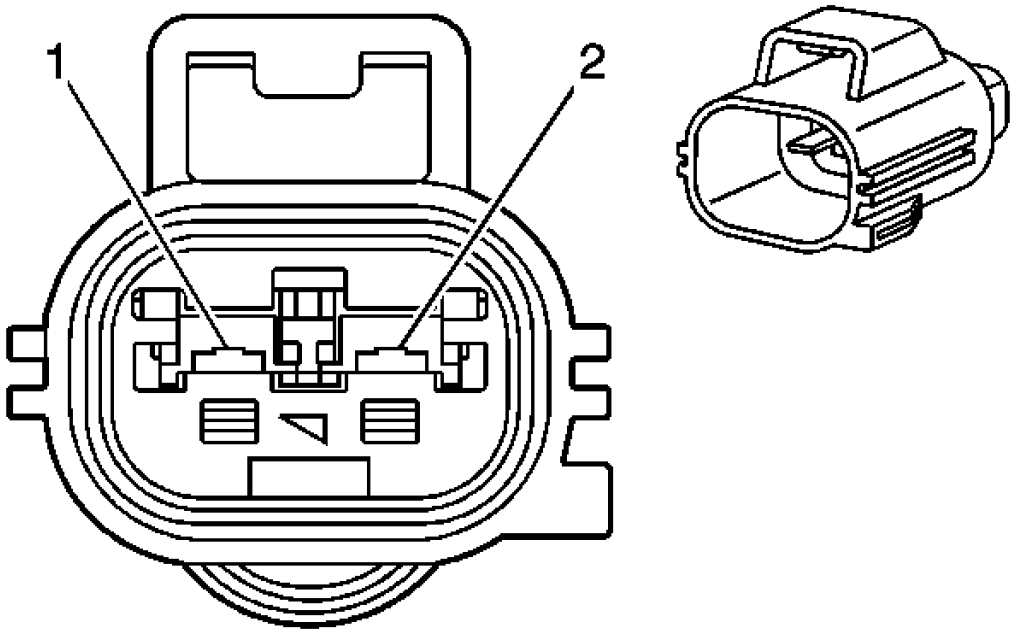


Fig. 30: G6 Brake Booster Pump - Auxiliary (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 10779536
- Service: 19115602
- Description: 2-Way M 2.8 Series, Sealed (D-GY)

Terminal Part Information

- Terminal/Tray: 10779442/See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit

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- Release Tool: See Terminal Repair Kit
- Test Probe: See Terminal Repair Kit

G6 Brake Booster Pump - Auxiliary (LLT)

Pin	Wire	Circuit	Function
1	1 OG	1470	Brake Booster Pump Motor Supply Voltage
2	1 BK	250	Ground

K17 ELECTRONIC BRAKE CONTROL MODULE (EBCM)

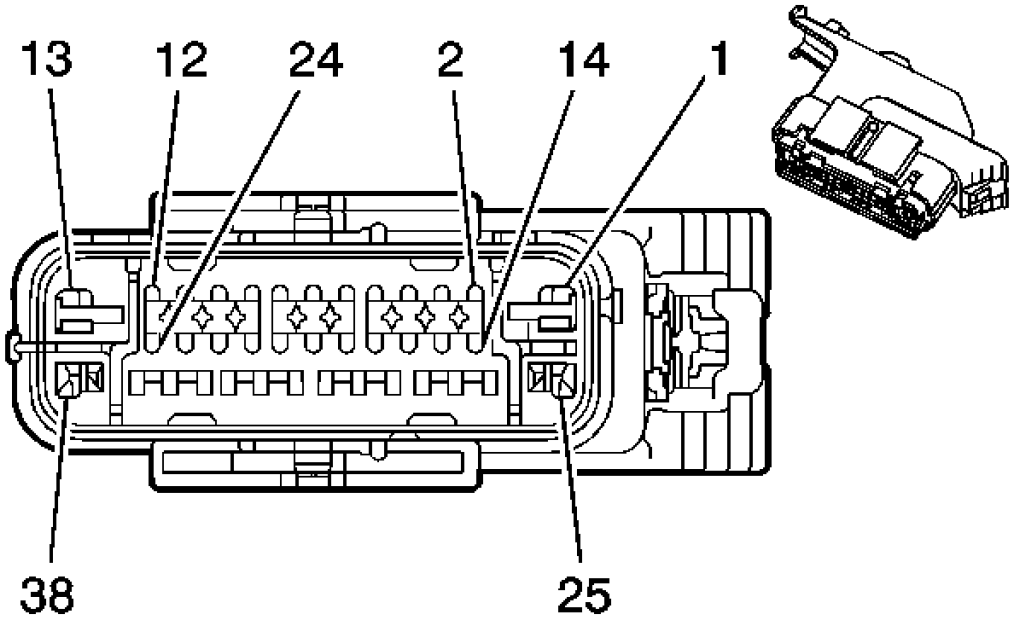


Fig. 31: K17 Electronic Brake Control Module (EBCM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 13518748
- Service: 19178089
- Description: 38-Way F 2.8 Series, Sealed (BK)

Terminal Part Information

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- Pins: 1, 13, 25, 38
- Terminal/Tray: 15392777/23
- Core/Insulation Crimp: Pins 1, 13, 38 - D/5
- Core/Insulation Crimp: Pin 25 - See Terminal Repair Kit
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pins: 4, 6, 14, 15, 18, 19, 20, 21, 24, 26, 27, 31, 32, 33, 34, 35, 37
- Terminal/Tray: SAITS-A03T-M064/14
- Core/Insulation Crimp: 9/9
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K17 Electronic Brake Control Module (EBCM)

Pin	Wire	Circuit	Function
1	3 RD/BK	442	Battery Positive Voltage
2-3	-	-	Not Used
4	0.5 PU	333	Brake Fluid Level Sensor Signal
5	-	-	Not Used
6	0.5 TN	833	Low Reference
7-12	-	-	Not Used
13	3 BK	1050	Ground
14	0.35 TN	2501	High Speed GMLAN Serial Data Bus (-)
15	0.35 TN	2501	High Speed GMLAN Serial Data Bus (-)
16-17	-	-	Not Used
18	0.5 D-GN	872	Right Front Wheel Speed Sensor Signal
19	0.5 BN	882	Right Rear Wheel Speed Sensor Signal
20	0.5 OG	885	Low Reference
21	0.5 L-BU	830	Left Front Wheel Speed Sensor Signal
22-23	-	-	Not Used
24	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
25	2 RD/BK	1042	Battery Positive Voltage
26	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus (+)
27	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus (+)
28-30	-	-	Not Used
31	0.5 WH	883	Low Reference
32	0.5 D-GN	2087	12-Volt Reference
33	0.5 TN	884	Left Rear Wheel Speed Sensor Signal
34	0.5 YE	873	Low Reference
35	0.35 L-BU	5986	Serial Data Communication Enable

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36	-	-	Not Used
37	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
38	3 BK	1050	Ground

K20 ENGINE CONTROL MODULE X1 (L99 OR LS3)

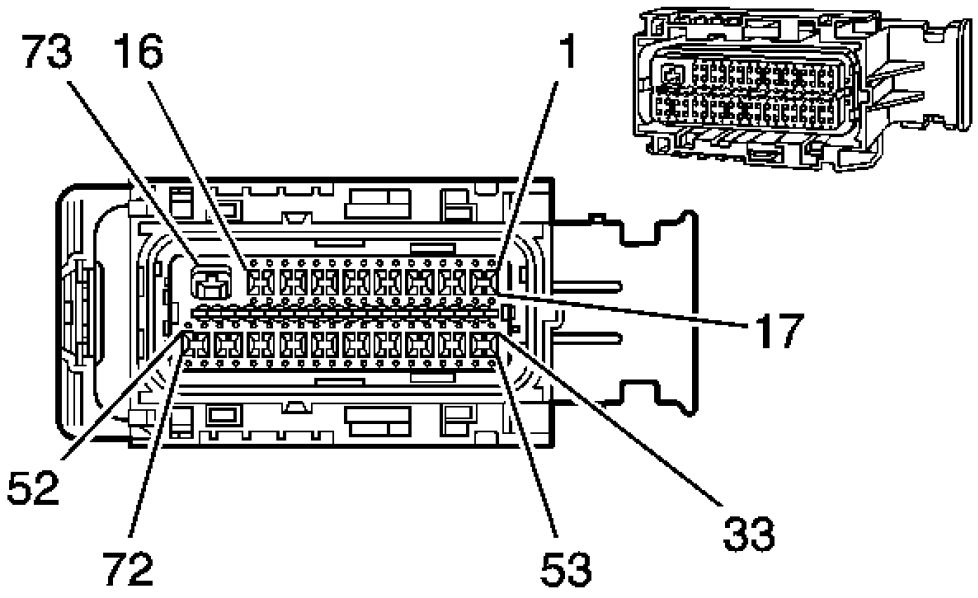


Fig. 32: K20 Engine Control Module X1 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13716072
- Service: 88988931
- Description: 73-Way F 0.64 2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 9, 10, 11, 12, 13, 16, 17, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 41, 42, 49, 50, 52, 53, 54, 56, 58, 59, 61, 63, 64, 65, 66, 68, 69, 70, 71, 72
- Terminal/Tray: 33467-0005/23

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- Core/Insulation Crimp: Pins 1, 9, 10, 11, 12, 13, 16, 17, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 41, 42, 49, 50, 52, 53, 54, 56, 58, 59, 61, 63, 64, 65, 66, 68, 69, 70, 71, 72 - J/J
- Core/Insulation Crimp: Pins 20, 47 - K/K
- Release Tool: J-38125-213
- Test Probe: J-35616-64B (L-BU)

- Pins: 8, 18
- Terminal/Tray: 33467-0003/23
- Core/Insulation Crimp: H/H
- Release Tool: J-38125-213
- Test Probe: J-35616-64B (L-BU)

- Pin: 73
- Terminal/Tray: 1326030-8/17
- Core/Insulation Crimp: A/4
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

K20 Engine Control Module X1 (L99 or LS3)

Pin	Wire	Circuit	Function
1	0.5 OG/BK	1786	Park/Neutral Signal (MYC)
2-7	-	-	Not Available
8	0.35 L-GN	5007	Backup Lamp Switch Signal (M10)
9	0.5 L-BU/WH	6311	Brake Pedal Switch Signal
10	0.5 PU/WH	1668	HO2S High Signal Bank 1 Sensor 2
11	0.5 TN/WH	1669	HO2S Low Signal Bank 1 Sensor 2
12	0.5 OG/BK	380	A/C Refrigerant Pressure Sensor Signal
13	0.5 TN	5514	Low Reference
14-15	-	-	Not Available
16	0.5 D-BU	1936	Fuel Level Sensor Signal
17	0.5 D-BU	473	High Speed Cooling Fan Relay Control
18	0.35 D-BU	5985	Serial Data Wake - Up Signal
19	0.5 PK	439	Ignition Voltage
20	0.8 RD/WH	440	Battery Positive Voltage
21	0.5 OG	6030	Brake Booster Vacuum Sensor Signal (L99)
22	0.5 YE/BK	6032	Low Reference (L99)
23	0.5 PU	1272	Low Reference
24	0.5 D-GN	890	Fuel Tank Pressure Sensor Signal
26	0.5 YE	6111	Clutch Pedal Position Sensor Signal (M10)
27	0.5 TN	2501	High Speed GMLAN Serial Data Bus -

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28	0.5 TN/BK	2500	High Speed GMLAN Serial Data Bus +
29	0.5 D-BU	1161	APP Sensor 1 Signal
30	0.5 BN	1271	Low Reference
31	0.5 BN/WH	6281	Low Reference
32	0.5 L-BU	1162	APP Sensor 2 Signal
33	0.5 GY	2709	5-Volt Reference 1
34	0.5 GY	2700	5-Volt Reference 1
35	-	-	Not Available
36	0.5 TN	1274	5-Volt Reference 1
37	0.5 L-BU	6289	Intake Air Temperature Sensor Signal
38	0.5 TN	2760	Low Reference
39-40	-	-	Not Available
41	0.5 YE	492	MAF Sensor Signal
42	0.5 WH	6110	Low Reference (M10)
43-46	-	-	Not Available
47	0.8 PK/BK	5290	Ignition Voltage
48	-	-	Not Available
49	0.5 TN	1671	HO2S Low Signal Bank 2 Sensor 2
50	0.5 D-GN/WH	465	Fuel Pump Relay Control
51	-	-	Not Available
52	0.5 PU/WH	6386	Starter Relay Control
53	0.5 GY	6031	5-Volt Reference 2 (L99)
54	0.5 TN	6109	5-Volt Reference 2 (M10)
55	-	-	Not Available
56	0.5 WH/BK	1164	5-Volt Reference 2
57	-	-	Not Available
58	0.5 D-GN	335	Low Speed Cooling Fan Relay Control
59	0.5 YE	5991	Powertrain Relay Control
60	-	-	Not Available
61	0.5 WH	1310	EVAP Canister Vent Solenoid Control
62	-	-	Not Available
63	0.5 D-GN/WH	459	A/C Compressor Clutch Relay Control
64	0.5 OG/WH	3223	HO2S Heater Low Control Bank 2 Sensor 2
65	0.5 GY/WH	3122	HO2S Heater Low Control Bank 1 Sensor 2
66	0.5 GY	587	Skip/Shift Solenoid Control (M10)
67	-	-	Not Available
68	0.5 BN/WH	419	MIL Control
69	0.5 PU	1670	HO2S High Signal Bank 2 Sensor 2
70	0.5 L-BU	1937	Fuel Level Sensor Signal - Secondary
71	0.5 GY/BK	6355	VSS Signal High (M10)
72	0.5 PU/WH	6356	VSS Signal Low (M10)
73			

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	2 BK/WH	451	Ground

K20 ENGINE CONTROL MODULE X1 (LLT)

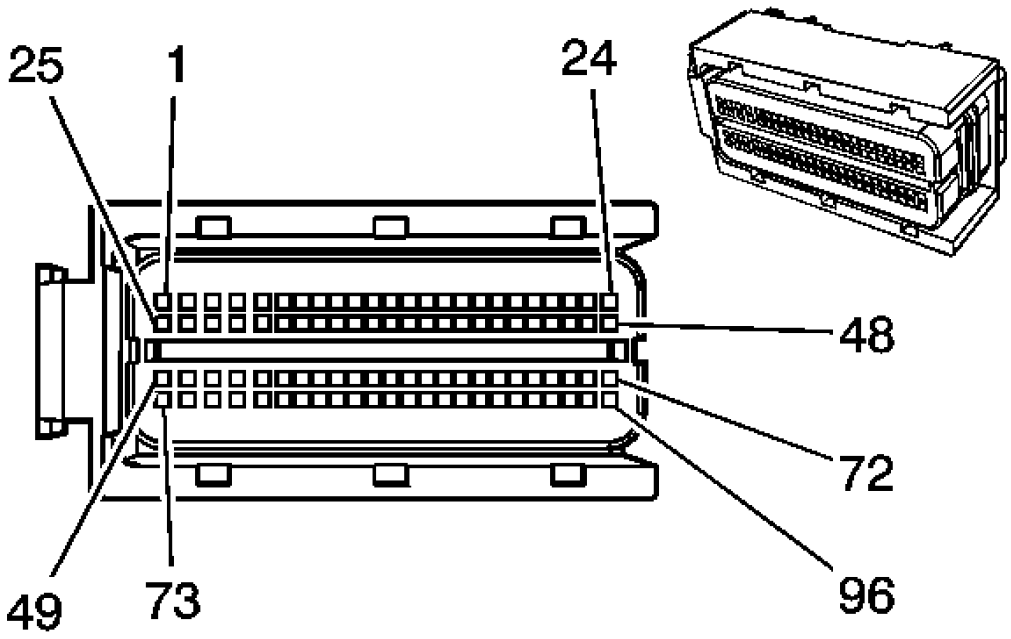


Fig. 33: K20 Engine Control Module X1 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15438366
- Service: 19149311
- Description: 96-Way F Sealed (BK)

Terminal Part Information

- Pins: 1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 15, 18, 24, 25, 26, 27, 28, 29, 30, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56, 57, 59, 60, 61, 67, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 88, 89, 90, 92, 93, 96
- Terminal/Tray: 1928498135/19
- Core/Insulation Crimp: Pins 1, 2, 6, 7, 9, 10, 13, 15, 18, 24, 25, 30, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 55, 56, 57, 59, 60, 61, 67, 70, 72, 78, 79, 80, 81, 82, 83, 84, 88, 89, 90,

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92, 93, 96 - J/J

- Core/Insulation Crimp: Pins 3, 4, 5, 26, 27, 28, 29, 50, 51, 52, 53, 73, 74, 75, 76, 77 - K/K
- Core/Insulation Crimp: Pins 21 - P/P
- Release Tool: J-38125-213
- Test Probe: J-35616-16 (L-GN)

K20 Engine Control Module X1 (LLT)

Pin	Wire	Circuit	Function
1	0.8 L-GN	5282	CMP Actuator Solenoid Control - Exhaust Bank 1
2	0.8 PU	5284	CMP Actuator Solenoid Control - Intake Bank 1
3	1 PU/WH	4906	Fuel Injector 6 Control
4	1 PU	4806	Fuel Injector 6 Control
5	1 YE	7301	High Pressure Fuel Pump Actuator High Control
6	0.8 D-GN/WH	428	EVAP Canister Purge Solenoid Control
7	0.5 OG	5275	Camshaft Position (CMP) Sensor - Intake Bank 1 Signal
8	-	-	Not Used
9	0.5 PU	5274	Camshaft Position (CMP) Sensor - Exhaust Bank 2 Signal
10	0.5 BN	25	Charge Indicator Control/Charge Indicator Signal
11-12	-	-	Not Used
13	0.5 BN/WH	2130	Low Reference
14	-	-	Not Used
15	0.5 GY	705	5-Volt Reference 2
16-17	-	-	Not Used
18	0.5 BN	7448	Vacuum Assist Pump Relay Coil Control
19-20	-	-	Not Used
21	0.35 TN/WH	585	Transmission Fluid Temperature Sensor Signal
22-23	-	-	Not Used
24	0.8 YE	581	TAC Motor Control - 1
25	0.8 WH/BK	5283	CMP Actuator Solenoid Control - Exhaust Bank 2
26	1 D-GN	4803	Fuel Injector 3 Control
27	1 D-GN/WH	4903	Fuel Injector 3 Control
28	1 L-GN	4805	Fuel Injector 5 Control
29	1 L-GN/WH	4905	Fuel Injector 5 Control
30	0.5 GY	23	Generator Field Duty Cycle Signal

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31-32	-	-	Not Used
33	0.5 YE	5276	Camshaft Position (CMP) Sensor - Intake Bank 2 Signal
34	0.5 D-GN	5273	Camshaft Position (CMP) Sensor - Exhaust Bank 1 Signal
35	0.5 YE	573	CKP Sensor Signal
36	0.5 YE	2918	FRP Sensor Signal
37	-	-	Not Used
38	0.5 GY	2700	5-Volt Reference 3
39	0.5 GY	2701	5-Volt Reference 3
40	0.5 GY	2705	5-Volt Reference 1
41	0.5 TN	552	Low Reference
42	0.5 TN	808	Low Reference
43	0.5 BK	2755	Low Reference
44	0.5 TN	476	Low Reference
45	0.5 GY	605	5-Volt Reference 3
46	0.5 TN	452	Low Reference
47	-	-	Not Used
48	0.8 BN	582	TAC Motor Control - 2
49	0.8 OG/BK	5272	CMP Actuator Solenoid Control - Intake Bank 2
50	1 L-BU	4804	Fuel Injector 4 Control
51	1 BN	4801	Fuel Injector 1 Control
52	1 D-BU	4802	Fuel Injector 2 Control
53	1 D-BU/WH	4902	Fuel Injector 2 Control
54	-	-	Not Used
55	0.5 PU	2121	IC 1 Control
56	0.5 L-BU	2123	IC 3 Control
57	0.5 D-GN	2125	IC 5 Control
58	-	-	Not Used
59	0.5 D-BU	496	Knock Sensor (KS) 1 Signal
60	0.5 GY	2303	Knock Sensor (KS) 2 Signal
61	0.5 TN/WH	331	Oil Pressure Sensor Signal
62-66	-	-	Not Used
67	0.5 TN/WH	3111	HO2S Low Signal Bank 1 Sensor 1
68-69	-	-	Not Used
70	0.5 PU/WH	3210	HO2S High Signal Bank 2 Sensor 1
71	-	-	Not Used
72	0.8 L-GN	3212	HO2S Heater Low Control Bank 2 Sensor 1
73	1 PU	7300	High Pressure Fuel Pump Actuator Low Control
74	1 L-BU/WH	4904	Fuel Injector 4 Control

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75	1 BN/WH	4901	Fuel Injector 1 Control
76	1 PK/BK	5291	Ignition Voltage
77	1 PK/BK	5292	Ignition Voltage
78	0.5 BN	2129	Low Reference
79	0.5 OG/WH	2122	IC 2 Control
80	0.5 D-GN/WH	2124	IC 4 Control
81	0.5 L-BU/WH	2126	IC 6 Control
82	0.5 YE	410	ECT Sensor Signal
83	0.5 GY	1716	Knock Sensor (KS) 1 Signal
84	0.5 L-BU	1876	Knock Sensor (KS) 2 Signal
85-87	-	-	Not Used
88	0.5 TN	2752	Low Reference
89	0.5 PU	486	TP Sensor 2 Signal
90	0.5 D-GN	485	TP Sensor 1 Signal
91	-	-	Not Used
92	0.5 PU/WH	3110	HO2S High Signal Bank 1 Sensor 1
93	0.5 TN/WH	3211	HO2S Low Signal Bank 2 Sensor 1
94-95	-	-	Not Used
96	0.8 GY/WH	3113	HO2S Heater Low Control Bank 1 Sensor 1

K20 ENGINE CONTROL MODULE X2 (L99 OR LS3)

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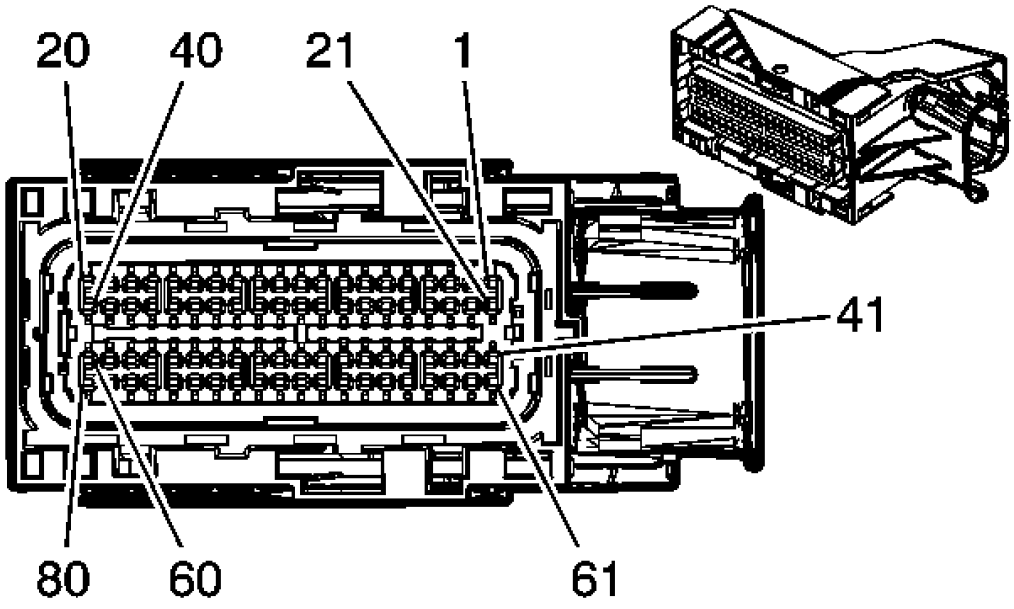


Fig. 34: K20 Engine Control Module X2 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 13716073
- Service: 19115670
- Description: 80-Way F 0.64 Series, Sealed (GY Encased in BK)

Terminal Part Information

- Terminal/Tray: 33467-0005/23
- Core/Insulation Crimp: Pins 2, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30, 32, 33, 34, 35, 37, 38, 39, 40, 41, 43, 44, 50, 52, 53, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79 - J/J
- Core/Insulation Crimp: Pins 5, 6 - K/K
- Release Tool: J-38125-213
- Test Probe: J-35616-64B (L-BU)

K20 Engine Control Module X2 (L99 or LS3)

Pin	Wire	Circuit	Function

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1	-	-	Not Available
2	0.5 PU/WH	6270	5-Volt Reference 2
3	0.5 GY	2701	5-Volt Reference 2
4	-	-	Not Available
5	0.8 BN	582	TAC Motor Control - 2
6	0.8 YE	581	TAC Motor Control - 1
7	-	-	Not Available
8	0.5 D-GN/WH	428	EVAP Canister Purge Solenoid Control
9	0.5 GY	5493	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 6 Shutoff Solenoid (L99)
10	0.5 D-BU	5491	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 1 Shutoff Solenoid (L99)
11	0.5 OG	5494	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 4 Shutoff Solenoid (L99)
			Reverse Lockout Solenoid Control (M10)
12	0.5 GY/WH	3113	HO2S Heater Low Control Bank 1 Sensor 1
13	0.5 L-GN	3212	HO2S Heater Low Control Bank 2 Sensor 1
14	0.5 L-GN	5492	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 7 Shutoff Solenoid (L99)
15	-	-	Not Available
16	0.5 PU	5284	CMP Actuator Solenoid Control - Intake Bank 1 (L99)
17	0.5 D-BU/WH	878	Fuel Injector 8 Control
18	0.5 TN/WH	845	Fuel Injector 5 Control
19	0.5 YE/BK	846	Fuel Injector 6 Control
20	0.5 TN	1744	Fuel Injector 1 Control
21	0.5 YE	410	ECT Sensor Signal
22	0.5 TN	2761	Low Reference
23	0.5 TN/WH	585	Transmission Fluid Temperature Sensor Signal (M10)
	0.5 BN/L-BU	357	Oil Temperature Sensor Signal (MYC)
24	0.5 OG/BK	586	Low Reference (M10)
25	-	-	Not Available
26	0.5 D-BU	496	Knock Sensor (KS) 1 Signal
27	0.5 GY	1716	Knock Sensor (KS) 1 Signal
28	-	-	Not Available
29	0.5 L-BU	1876	Knock Sensor (KS) 2 Signal
30	0.5 GY	2303	Knock Sensor (KS) 2 Signal
31	-	-	Not Available
32	0.5 GY	23	Generator Field Duty Cycle Signal
33	0.5 BN	1174	Oil Level Switch Signal
34	0.5 BK	2755	Low Reference

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35	0.5 TN	2752	Low Reference
36	-	-	Not Available
37	0.5 L-GN/BK	1745	Fuel Injector 2 Control
38	0.5 PK/BK	1746	Fuel Injector 3 Control
39	0.5 L-BU/BK	844	Fuel Injector 4 Control
40	0.5 OG/BK	877	Fuel Injector 7 Control
41	0.5 GY	2705	5-Volt Reference 1
42	-	-	Not Available
43	0.5 GY	2704	5-Volt Reference 1
44	0.5 D-BU	6259	5-Volt Reference 1
45-49	-	-	Not Available
50	0.5 TN/WH	331	Oil Pressure Sensor Signal
51	-	-	Not Available
52	0.5 TN	2199	Low Reference (L99)
53	0.5 OG/BK	469	Low Reference
54-55	-	-	Not Available
56	0.5 TN	1664	HO2S Low Signal - Bank 1 Sensor 1
57	0.5 PU/WH	1665	HO2S High Signal Bank 1 Sensor 1
58	0.5 L-GN	432	MAP Sensor Signal
59	0.5 PU	1666	HO2S High Signal Bank 2 Sensor 1
60	0.5 TN	1667	HO2S Low Signal Bank 2 Sensor 1
61	0.5 BN	25	Charge Indicator Control/Charge Indicator Signal
62	-	-	Not Available
63	0.5 PU	486	TP Sensor 2 Signal
64	0.5 D-BU/WH	6265	Camshaft Position Signal
65	0.5 D-GN	485	TP Sensor 1 Signal
66	0.5 BN	6266	Low Reference
67	-	-	Not Available
68	0.5 WH/BK	6271	Crankshaft Position Sensor Signal
69	0.5 GY/BK	6272	Low Reference
70	0.5 PU	2121	IC 1 Control
71	0.5 PU/WH	2128	IC 8 Control
72	0.5 OG	2127	IC 7 Control
73	0.5 OG/WH	2122	IC 2 Control
74	0.5 L-BU/WH	2126	IC 6 Control
75	0.5 D-GN	2125	IC 5 Control
76	0.5 D-GN/WH	2124	IC 4 Control
77	0.5 L-BU	2123	IC 3 Control
78	0.5 BN	2129	Low Reference
79	0.5 BN/WH	2130	Low Reference

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80	-	-	Not Available

K20 ENGINE CONTROL MODULE X2 (LLT)

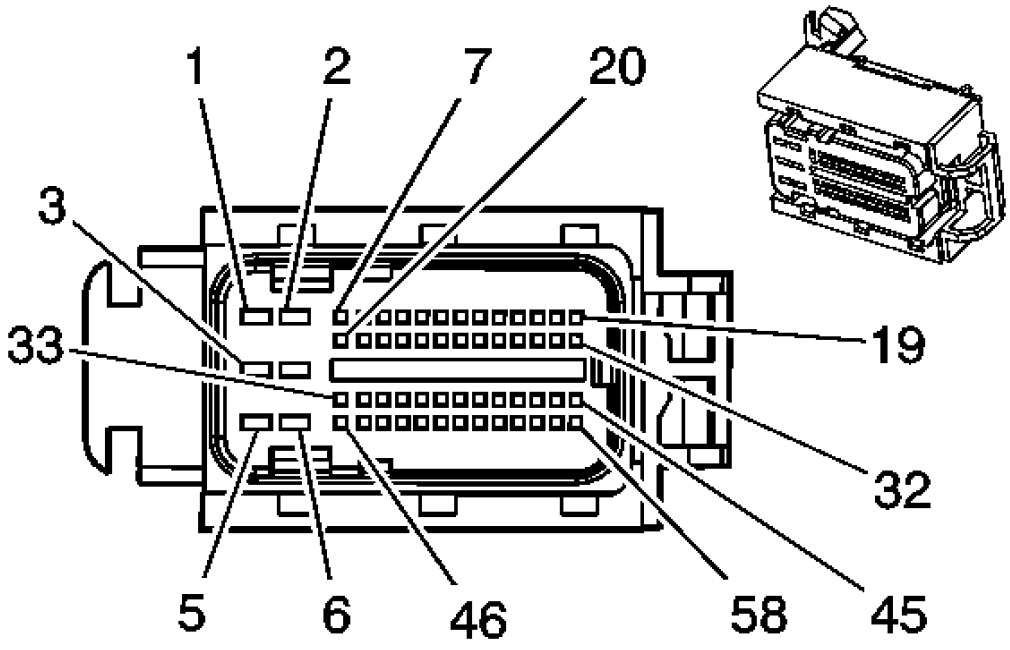


Fig. 35: K20 Engine Control Module X2 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15462694
- Service: 88988935
- Description: 58-Way F Mixed Sealed (BK)

Terminal Part Information

- Pins: 1, 2, 4
- Terminal/Tray: 1928498059/24
- Core/Insulation Crimp: 2/5
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

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- Pins: 3, 5, 6
- Terminal/Tray: 1928498058/8
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

- Pins: 7, 9, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58
- Terminal/Tray: 1928498135/19
- Core/Insulation Crimp: Pins 7, 9, 10, 11, 13, 14, 15, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 34, 35, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58 - J/J
- Core/Insulation Crimp: Pins 18, 41 - P/P
- Release Tool: J-38125-213
- Test Probe: J-35616-16 (L-GN)

K20 Engine Control Module X2 (LLT)

Pin	Wire	Circuit	Function
1	2 BK/WH	451	Ground
2	2 BK/WH	451	Ground
3	1 PK/BK	5290	Ignition Voltage
4	2 BK/WH	451	Ground
5	1 PK/BK	5290	Ignition Voltage
6	1 PK/BK	5290	Ignition Voltage
7	0.8 GY/WH	3122	HO2S Heater Low Control Bank 1 Sensor 2
8	-	-	Not Used
9	0.5 BN/WH	6281	Low Reference
10	0.5 D-GN/WH	465	Fuel Pump Relay Control
11	0.5 TN	5514	Low Reference
12	-	-	Not Used
13	0.5 YE	492	MAF Sensor Signal
14	0.5 GY	2709	5-Volt Reference 1
15	0.5 D-BU	1161	APP Sensor 1 Signal
16	-	-	Not Used
17	0.5 OG/BK	1786	Park/Neutral Signal (MYB)
18	0.35 L-GN	5007	Backup Lamp Switch Signal (MV5)
19	0.5 WH	1310	EVAP Canister Vent Solenoid Control
20	0.8 OG/WH	3223	HO2S Heater Low Control Bank 2 Sensor 2
21	0.5 BN/WH	419	MIL Control
22	0.5 TN	2760	Low Reference
23	0.5 TN/WH	3121	HO2S Low Signal Bank 1 Sensor 2

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24	0.5 TN	3221	HO2S Low Signal Bank 2 Sensor 2
25	0.5 L-BU	1162	APP Sensor 2 Signal
26	0.5 L-BU	1937	Fuel Level Sensor Signal - Secondary
27	0.5 D-GN	890	Fuel Tank Pressure Sensor Signal
28-33	-	-	Not Used
34	0.5 BN	1271	Low Reference
35	0.5 GY	598	5-Volt Reference 1
36	0.5 D-BU	1936	Fuel Level Sensor Signal
37	0.5 YE	6111	Clutch Pedal Position Sensor Signal (MV5)
38	0.5 PU	3120	HO2S High Signal Bank 1 Sensor 2
39	0.5 OG/BK	380	A/C Refrigerant Pressure Sensor Signal
40	-	-	Not Used
41	0.35 D-BU	5985	Serial Data Wake - Up Signal
42	0.5 TN/BK	2500	High Speed GMLAN Serial Data Bus +
43	0.5 GY/BK	6355	VSS Signal High (MV5)
44	0.5 D-GN/WH	459	A/C Compressor Clutch Relay Control
45	0.5 D-BU	473	High Speed Cooling Fan Relay Control
46	0.5 D-GN	335	Low Speed Cooling Fan Relay Control
47	0.5 PU	1272	Low Reference
48	0.5 TN	1274	5-Volt Reference 3
49	0.5 WH/BK	1164	5-Volt Reference 2
50	0.5 L-BU	6289	Intake Air Temperature Sensor Signal
51	0.5 PU	3220	HO2S High Signal Bank 2 Sensor 2
52	0.5 L-BU/WH	6311	Brake Pedal Switch Signal
53	-	-	Not Used
54	0.5 PK	439	Ignition Voltage
55	0.5 TN	2501	High Speed GMLAN Serial Data Bus -
56	0.8 RD/WH	440	Battery Positive Voltage
57	0.5 PU/WH	6386	Starter Relay Control
58	0.5 YE	5991	Powertrain Relay Control

K27 FUEL PUMP CONTROL MODULE

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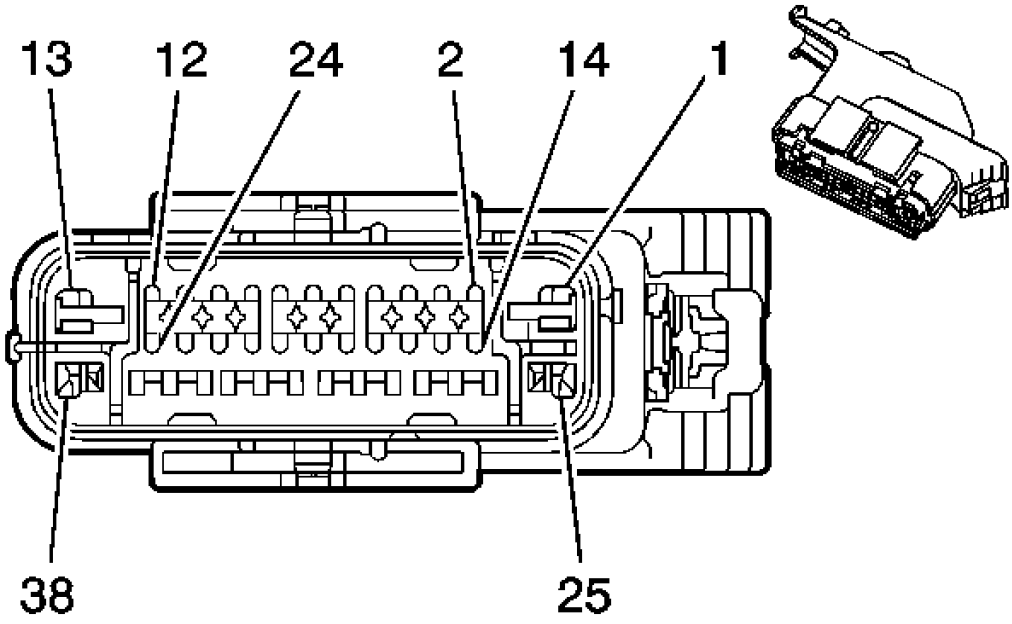


Fig. 36: K27 Fuel Pump Control Module Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13518748
- Service: 19178089
- Description: 38-Way F 2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 13, 25, 38
- Terminal/Tray: 15392777/23
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pins: 5, 6, 8, 10, 17, 18, 20, 21, 22, 23, 24
- Terminal/Tray: SAITS-A03T-M064/14
- Core/Insulation Crimp: 9/9

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- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K27 Fuel Pump Control Module

Pin	Wire	Circuit	Function
1	2 RD/WH	2640	Battery Positive Voltage
2-4	-	-	Not Used
5	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus +
6	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus +
7	-	-	Not Used
8	0.35 L-BU	5986	Serial Data Communication Enable
9	-	-	Not Used
10	0.35 PU	7446	Fuel Pressure Sensor Signal
11-12	-	-	Not Used
13	2 GY	120	Fuel Pump Supply Voltage
14-16	-	-	Not Used
17	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
18	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
19	-	-	Not Used
20	0.35 D-GN/WH	465	Fuel Pump Relay Control
21	0.35 PK	239	Ignition Voltage
22	0.35 BN	7445	5-Volt Reference
23	0.35 GY	7447	Low Reference
24	0.5 BK	7444	Drain Wire
25	2 BK	2550	Ground
26-37	-	-	Not Used
38	2 PK	1580	Low Reference

K29 SEAT HEATING CONTROL MODULE X1 (KA1)

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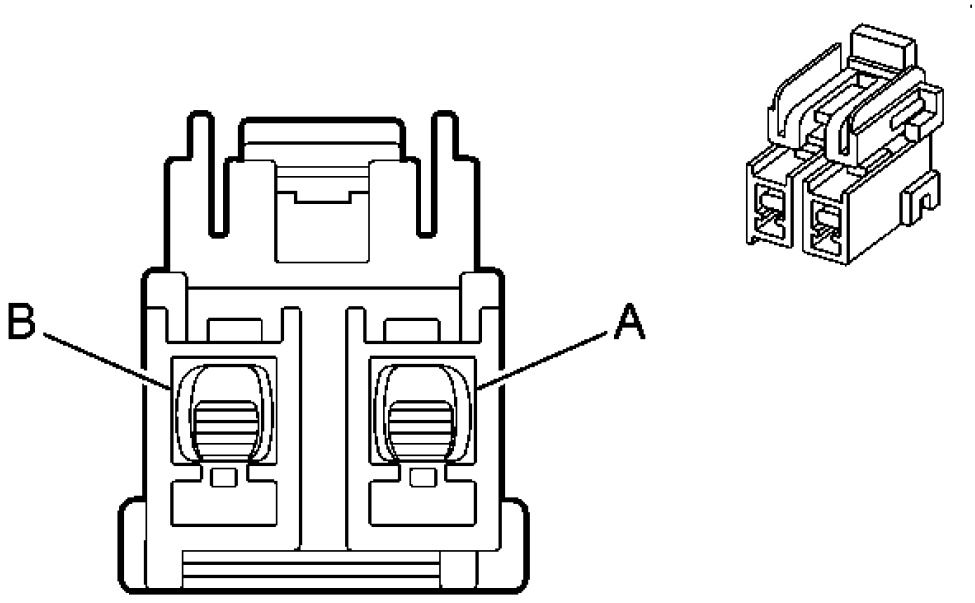


Fig. 37: K29 Seat Heating Control Module X1 (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 13527997
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F Metri-Pack 280 Series (BK)

Terminal Part Information

- Terminal/Tray: Pin A - 12110842/4
- Terminal/Tray: Pin B - 12110844/4
- Core/Insulation Crimp: Pin: A - A/B
- Core/Insulation Crimp: Pin: B - C/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

K29 Seat Heating Control Module X1 (KA1)

Pin	Wire	Circuit	Function

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A	2 BK	850	Ground
B	1 RD/WH	5140	Battery Positive Voltage

K29 SEAT HEATING CONTROL MODULE X2 (KA1)

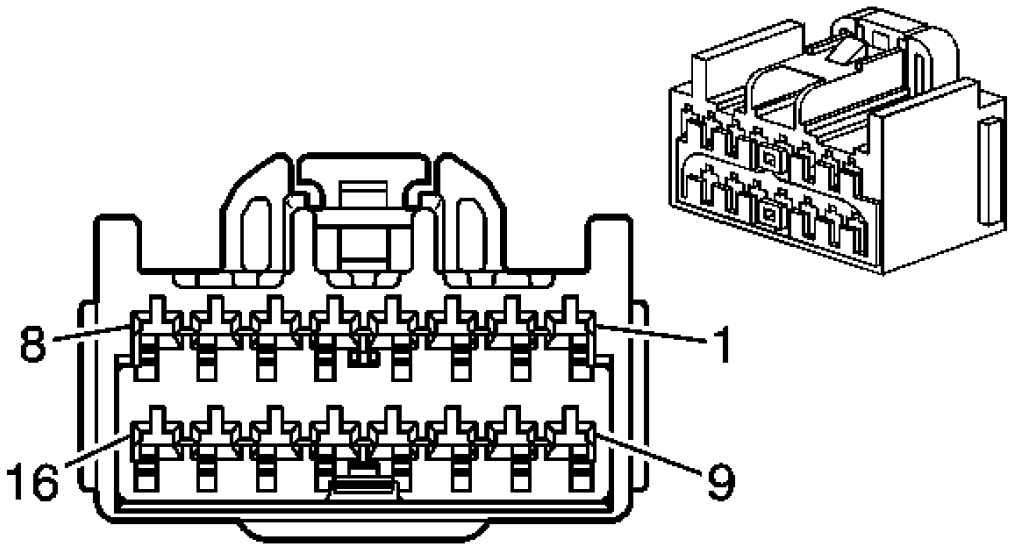


Fig. 38: K29 Seat Heating Control Module X2 (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 6098-4611
- Service: Service by Harness - See Part Catalog
- Description: 16-Way F (BK)

Terminal Part Information

- Terminal/Tray: Pins - 1, 2, 3, 5 - 8240-0128/22
- Terminal/Tray: Pins - 11, 14 - 8240-0127/22
- Core/Insulation Crimp: Pins - 1, 2, 3, 5 - C/A
- Core/Insulation Crimp: Pins - 11, 14 - E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

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K29 Seat Heating Control Module X2 (KA1)

Pin	Wire	Circuit	Function
1	0.8 L-BU	2424	Driver Heated Seat Back Element Control
2	0.8 L-BU	2433	Passenger Heated Seat Back Element Control
3	0.8 D-BU	2077	Heated Seat Cushion Element Supply Voltage
4	-	-	Not Used
5	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage
6-12	-	-	Not Used
13	0.5 PK	2080	Low Reference
14	0.5 PK	2435	Low Reference
15-16	-	-	Not Used

K29 SEAT HEATING CONTROL MODULE X3 (KA1)

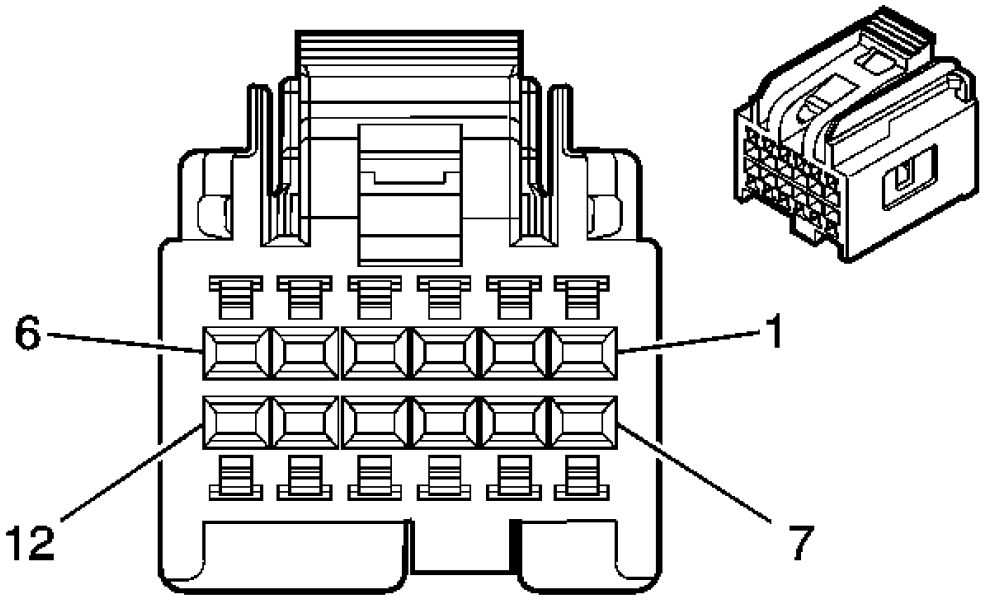


Fig. 39: K29 Seat Heating Control Module X3 (KA1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Driver Seat
- OEM: 31410-1120
- Service: Service by Harness - See Part Catalog
- Description: 12-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K29 Seat Heating Control Module X3 (KA1)

Pin	Wire	Circuit	Function
1-2	-	-	Not Used
3	0.5 GY	2079	Heated Seat Cushion Temperature Sensor Signal
4	0.5 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal
5-10	-	-	Not Used
11	0.35 D-GN	5060	Low Speed GMLAN Serial Data
12	-	-	Not Used

K33 HVAC CONTROL MODULE X1

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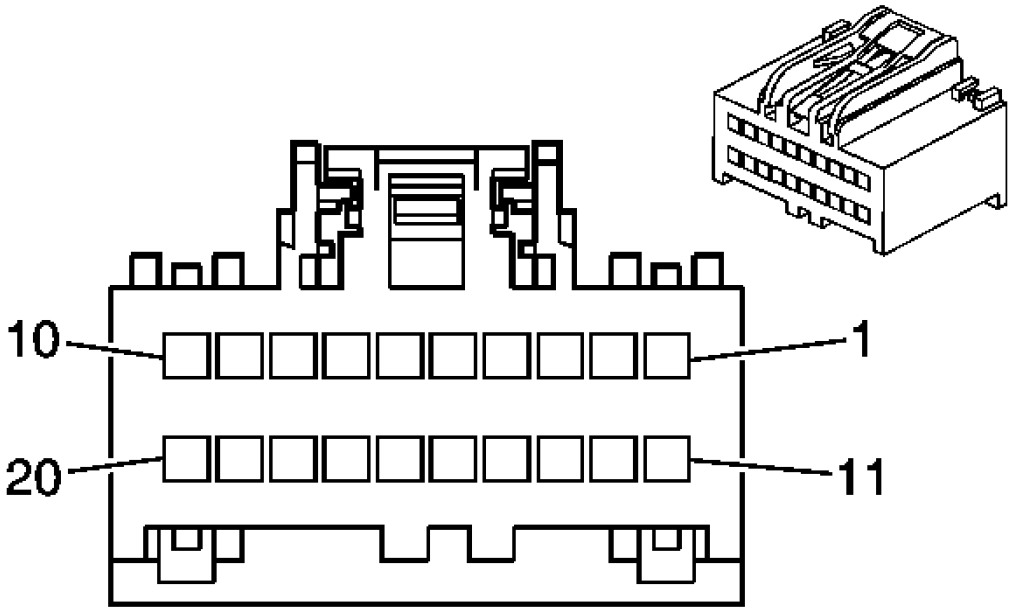


Fig. 40: K33 HVAC Control Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15491305
- Service: 15126709
- Description: 20-Way F USCAR 64 Series (BN)

Terminal Part Information

- Pins: 1, 8
- Terminal/Tray: 13588504/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 2, 4, 9, 15, 19
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P

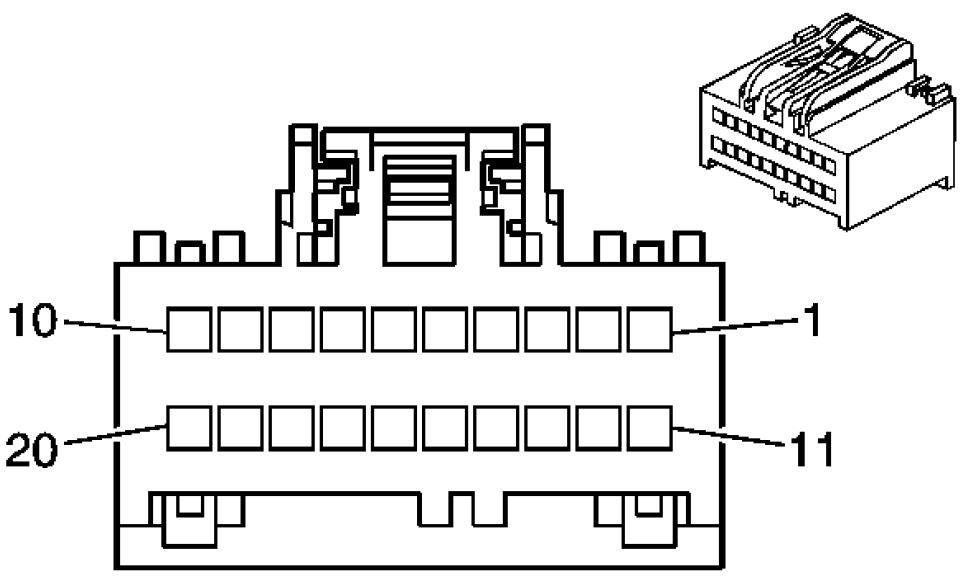
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- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K33 HVAC Control Module X1

Pin	Wire	Circuit	Function
1	0.8 RD/WH	3340	Battery Positive Voltage
2	0.35 D-GN	5060	Low Speed GMLAN Serial Data
3	-	-	Not Used
4	0.35 YE	7531	Linear Interconnect Network 9
5-7	-	-	Not Used
8	0.8 BK	1450	Ground
9	0.35 PK	539	Ignition Voltage
10-14	-	-	Not Used
15	0.35 GY/BK	754	Blower Motor Speed Control
16-18	-	-	Not Used
19	0.35 WH	193	Rear Defog Relay Control
20	-	-	Not Used

K33 HVAC CONTROL MODULE X2



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Fig. 41: K33 HVAC Control Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: HVAC
- OEM: 15489824
- Service: 15126711
- Description: 20-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K33 HVAC Control Module X2

Pin	Wire	Circuit	Function
1	-	-	Not Used
2	0.35 D-BU	3167	Mode Door Stepper Motor Control 3
3	0.35 GY	3165	Mode Door Stepper Motor Control 1
4	0.35 BN	3168	Mode Door Stepper Motor Control 4
5	0.35 D-GN	3166	Mode Door Stepper Motor Control 2
6-8	-	-	Not Used
9	0.35 TN	407	Low Reference
10	-	-	Not Used
11	0.35 TN/BK	3169	Temp Door Stepper Motor Control 1
12	0.35 PU	3170	Temp Door Stepper Motor Control 2
13	0.35 L-GN	3171	Temp Door Stepper Motor Control 3
14	0.35 L-BU	3172	Temp Door Stepper Motor Control 4
15	0.5 OG	7572	HVAC Motor Supply Voltage
16	0.35 D-BU/WH	3173	Air Inlet Door Stepper Motor Control 1
17	0.35 BN/WH	3174	Air Inlet Door Stepper Motor Control 2
18	0.35 YE	3175	Air Inlet Door Stepper Motor Control 3
19	0.35 WH	3176	Air Inlet Door Stepper Motor Control 4
20	0.35 GY	6137	EVAP Core Temperature Sensor Signal

K36 INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE X1

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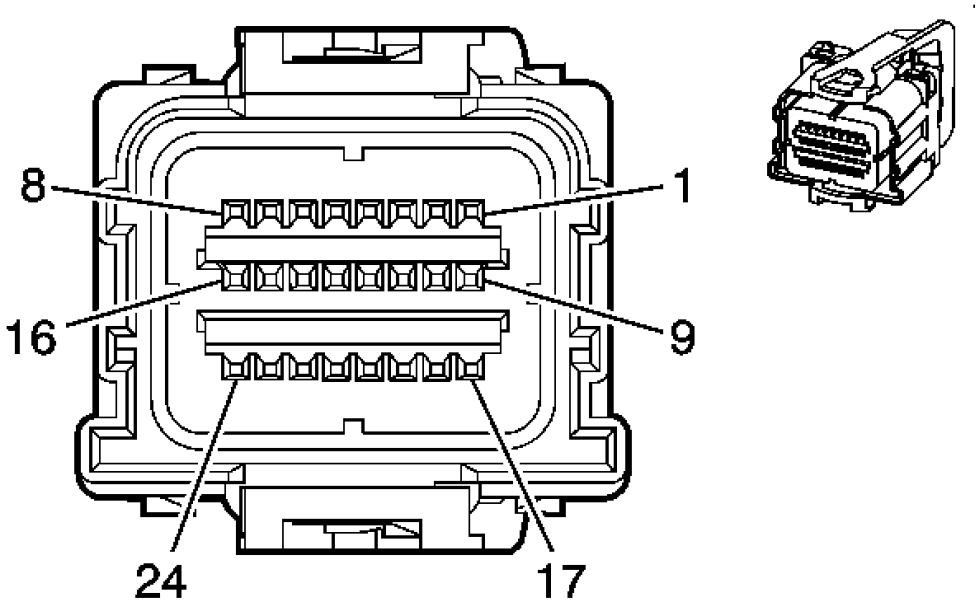


Fig. 42: K36 Inflatable Restraint Sensing and Diagnostic Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13608103
- Service: 13317834
- Description: 24-Way F Kaizen 0.64 Series, Sealed (YE)

Terminal Part Information

- Terminal/Tray: Service with Terminated Lead
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K36 Inflatable Restraint Sensing and Diagnostic Module X1

Pin	Wire	Circuit	Function
1	0.35 WH	3023	Steering Wheel Module - Stage2 - High Control
2	0.35 PK	3022	Steering Wheel Module - Stage2 - Low

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			Control
3	0.35 BN	3020	Steering Wheel Module - Stage1 - Low Control
4	0.35 TN	3021	Steering Wheel Module - Stage1 - High Control
5	0.35 YE	3025	I/P Module - Stage 1 - High Control
6	0.35 OG	3024	I/P Module - Stage 1 - Low Control
7	0.35 PU	3026	I/P Module - Stage 2 - Low Control
8	0.35 GY	3027	I/P Module - Stage 2 - High Control
9	0.5 RD/WH	4440	Battery Positive Voltage
10	0.35 PU	5234	Front Passenger Seat Belt Indicator Control
11	0.35 D-BU	2307	Passenger Air Bag On Indicator Control
12	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control
13-14	-	-	Not Used
15	0.35 D-GN	5060	Low Speed GMLAN Serial Data
16	-	-	Not Used
17	0.35 PK	1139	Ignition Voltage
18	-	-	Not Used
19	0.5 BK	2450	Ground
20-24	-	-	Not Used

K36 INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE X2

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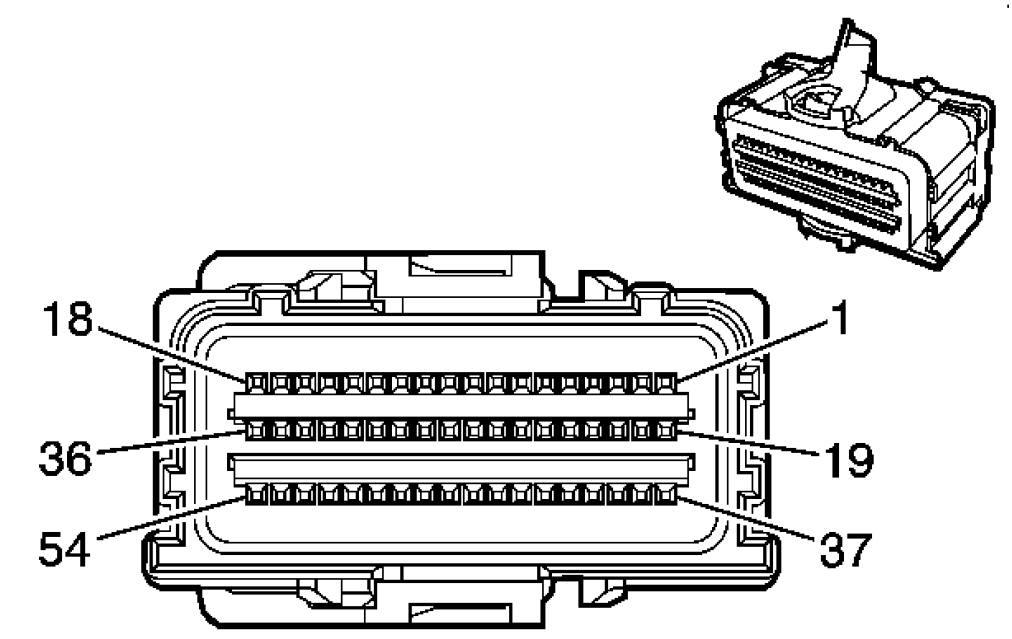


Fig. 43: K36 Inflatable Restraint Sensing and Diagnostic Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13715984
- Service: 13316188
- Description: 54-Way F 0.64 Series, Sealed (YE)

Terminal Part Information

- Terminal/Tray: Service with Terminated Lead
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K36 Inflatable Restraint Sensing and Diagnostic Module X2

Pin	Wire	Circuit	Function
1-12	-	-	Not Used
13	0.35 BN	2137	Side Impact Module - Left Front - High Control

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14	0.35 YE/BK	2138	Side Impact Module - Left Front - Low Control
15	0.35 L-GN	2136	Side Impact Module - Right Front - Low Control
16	0.35 TN/WH	2135	Side Impact Module - Right Front - High Control
17	0.35 PU/WH	5019	Roof Rail Module - Left - High Control
18	0.35 PK	5020	Roof Rail Module - Left - Low Control
19	0.35 WH	2132	Side Impact Sensing Module - Left - Signal
20	0.35 PU/WH	6628	Low Reference
21	0.35 WH/BK	6629	Low Reference
22	0.35 D-GN	2134	Side Impact Sensing Module - Right - Signal
23	0.35 YE	354	Front End Sensor - Left - Signal
24	0.35 TN/OG	5045	Low Reference
25	0.35 GY	5600	Low Reference
26	0.35 D-GN	1409	Front End Sensor - Right - Signal
27-32	-	-	Not Used
33-36	-	-	Not Available
37	0.35 TN/WH	2118	Seat Belt Retractor Pretensioner - Left - High Control
38	0.35 OG/BK	2119	Seat Belt Retractor Pretensioner - Left - Low Control
39	0.35 OG	2117	Seat Belt Retractor Pretensioner - Right - Low Control
40	0.35 L-GN	2116	Seat Belt Retractor Pretensioner - Right - High Control
41	0.35 TN/WH	238	Seat Belt Switch - Left
42	0.35 L-GN	5055	Seat Position Sensor - Left - Signal
43	0.35 D-BU	1363	Seat Belt Switch - Left - Low Reference
44	0.35 L-BU	1361	Seat Belt Switch - Right - Low Reference
45	0.35 OG	1362	Seat Belt Switch - Right - Signal
46	0.35 L-BU	5056	Seat Position Sensor - Right - Signal
47-52	-	-	Not Used
53	0.35 YE/BK	5021	Roof Rail Module - Right - High Control
54	0.35 WH/BK	5022	Roof Rail Module - Right - Low Control

K41 OBJECT ALARM CONTROL MODULE X1 (UD7)

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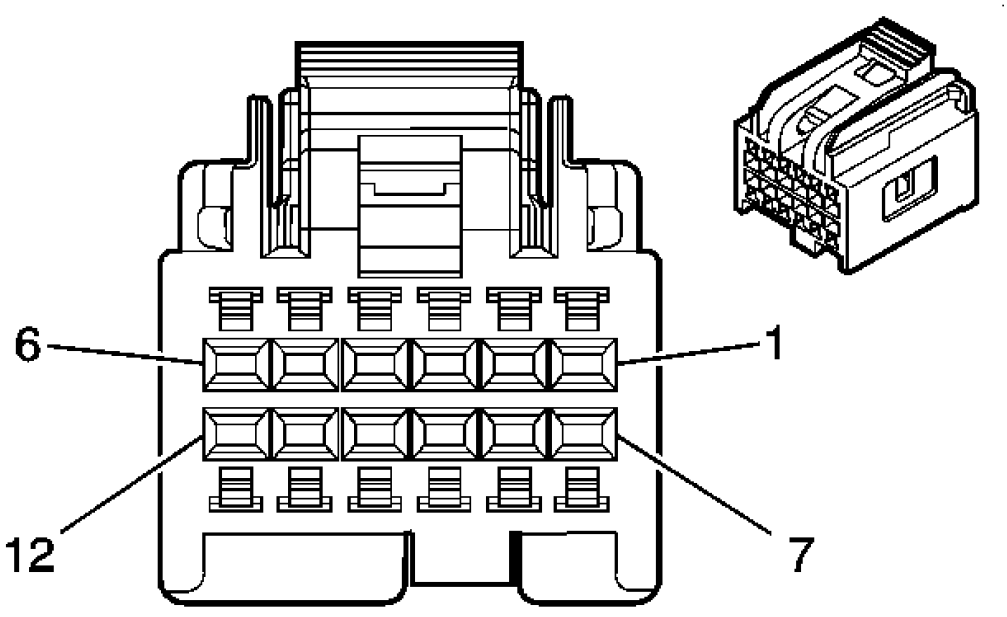


Fig. 44: K41 Object Alarm Control Module X1 (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13551678
- Service: 89047364
- Description: 12-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K41 Object Alarm Control Module X1 (UD7)

Pin	Wire	Circuit	Function
1	0.5 RD/WH	3140	Battery Positive Voltage
2-5	-	-	Not Used

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6	0.35 D-GN	5060	Low Speed GMLAN Serial Data
7	0.5 BK	2550	Ground
8-12	-	-	Not Used

K41 OBJECT ALARM CONTROL MODULE X2 (UD7)

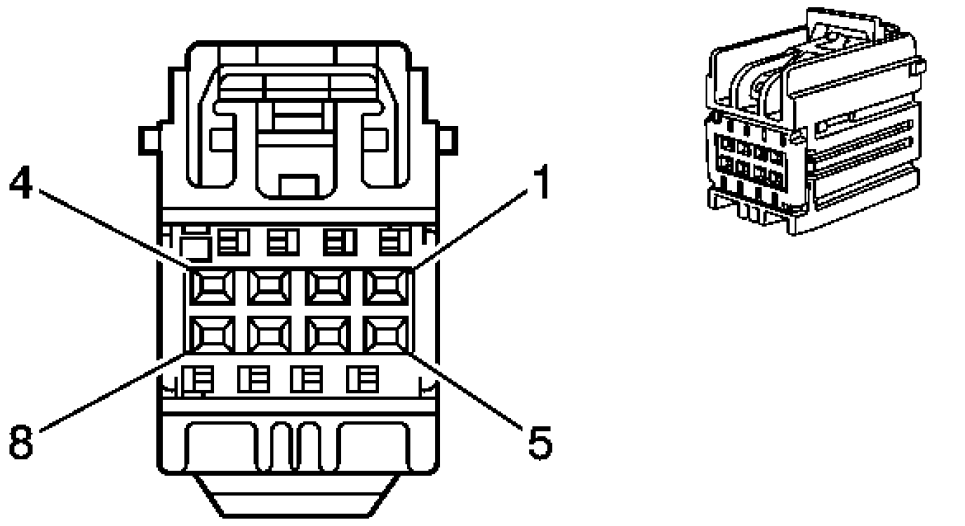


Fig. 45: K41 Object Alarm Control Module X2 (UD7) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13551679
- Service: 19115653
- Description: 8-Way F Kaizen 64 Series (GY)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A

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- Test Probe: J-35616-64B (L-BU)

K41 Object Alarm Control Module X2 (UD7)

Pin	Wire	Circuit	Function
1	0.35 PU	2378	Right Rear Corner Object Sensor Signal
2	0.35 D-GN	2377	Right Rear Middle Object Sensor Signal
3	0.35 OG	2376	Left Rear Middle Object Sensor Signal
4	0.35 D-BU	2374	Object Sensor Supply Voltage
5	0.35 YE	2375	Left Rear Corner Object Sensor Signal
6-7	-	-	Not Used
8	0.35 GY	2379	Low Reference

K61 SUNROOF CONTROL MODULE (CF5)

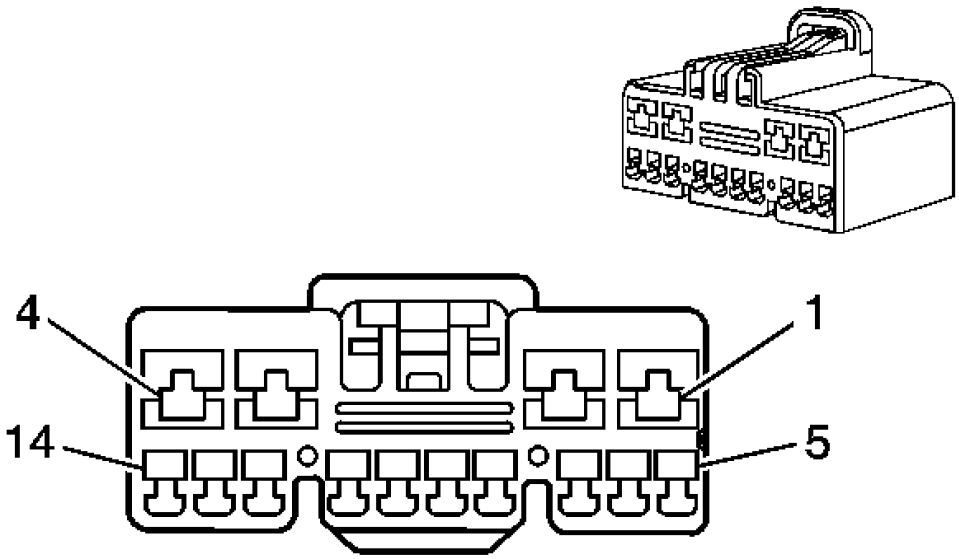


Fig. 46: K61 Sunroof Control Module (CF5) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Sunroof

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- OEM: 15466088
- Service: 19179972
- Description: 14-Way F 64/2.8 YESC Series (L-GY)

Terminal Part Information

- Pins: 1, 4
- Terminal/Tray: 7116-4112-02/9
- Core/Insulation Crimp: C/D
- Release Tool: 12094430
- Test Probe: J-35616-35 (VT)

- Pins: 7, 8, 11
- Terminal/Tray: 7116-4720-02/14
- Core/Insulation Crimp: H/H
- Release Tool: 15315247
- Test Probe: J-35616-64B (L-BU)

K61 Sunroof Control Module (CF5)

Pin	Wire	Circuit	Function
1	3 RD/WH	3540	Battery Positive Voltage
2-3	-	-	Not Used
4	3 BK	1450	Ground
5-6	-	-	Not Used
7	0.35 L-BU	5027	Sunroof Switch Data 1
8	0.35 D-BU	128	Low Reference
9-10	-	-	Not Used
11	0.35 BN	6132	Linear Interconnect Network 1
12-14	-	-	Not Used

K73 TELEMATICS COMMUNICATION INTERFACE CONTROL MODULE X1 (UE1)

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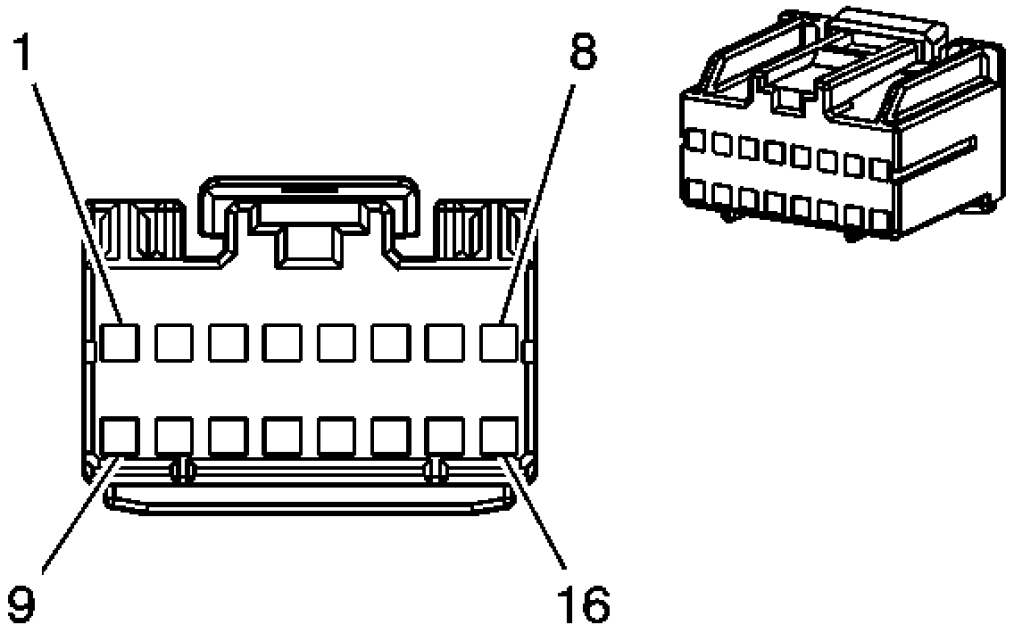


Fig. 47: K73 Telematics Communication Interface Control Module X1 (UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15431362
- Service: 15306351
- Description: 16-Way F Micro-Pack 100A Series (WH)

Terminal Part Information

- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: Pins 1, 2, 3, 6, 10, 11, 12, 13, 14, 16 - J/J
- Core/Insulation Crimp: Pin 8 - K/K
- Release Tool: 12180559
- Test Probe: J-35616-16 (L-GN)

K73 Telematics Communication Interface Control Module X1 (UE1)

Pin	Wire	Circuit	Function
1	0.35 D-GN	5060	Low Speed GMLAN Serial Data

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2	0.35 BN/WH	2517	Keypad Red LED Signal
3	0.35 YE/BK	2516	Keypad Green LED Signal
4-5	-	-	Not Used
6	0.35 L-GN/BK	2515	Keypad Supply Voltage
7	-	-	Not Used
8	0.8 BK	1750	Ground
9	-	-	Not Used
10	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
11	0.35 D-GN/WH	2514	Keypad Signal
12	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
13	0.35 GY/BK	5167	OnStar Backup Battery (-)
14	0.35 RD/WH	5235	OnStar Backup Battery (+)
15	-	-	Not Used
16	0.35 RD/WH	5340	Battery Positive Voltage

K73 TELEMATICS COMMUNICATION INTERFACE CONTROL MODULE X2 (UE1)

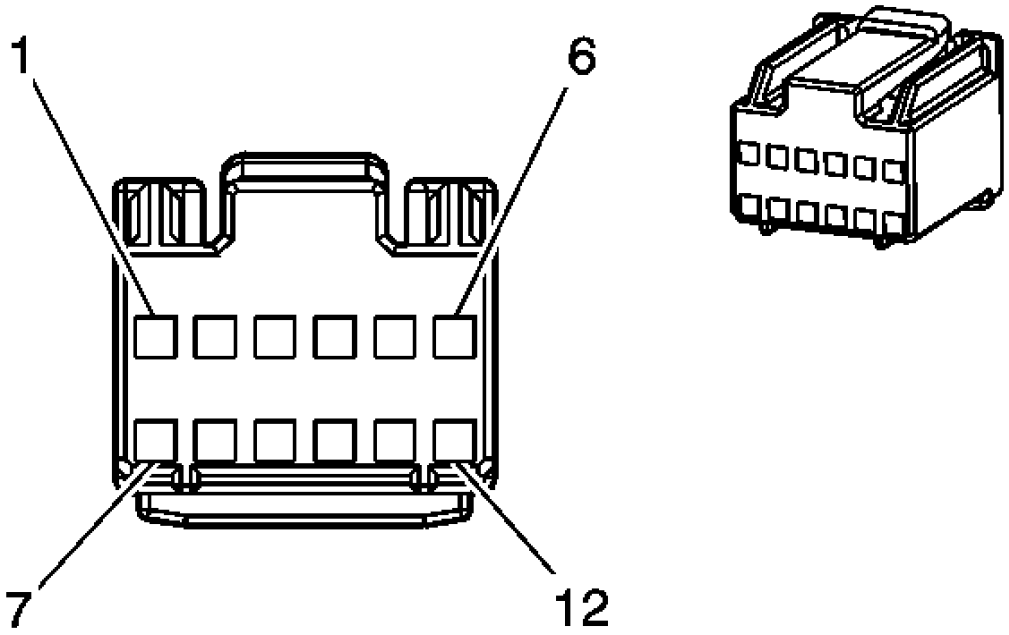


Fig. 48: K73 Telematics Communication Interface Control Module X2 (UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Instrument Panel
- OEM: 15431365
- Service: 88952886
- Description: 12-Way F Micro-Pack 100A Series (WH)

Terminal Part Information

- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: J/J
- Release Tool: 12180559
- Test Probe: J-35616-16 (L-GN)

K73 Telematics Communication Interface Control Module X2 (UE1)

Pin	Wire	Circuit	Function
1	0.35 D-BU	658	Cellular Telephone Voice Signal
2	0.35 L-BU/BK	659	Cellular Telephone Voice Signal
3	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
4	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
5-7	-	-	Not Used
8	0.35 BARE	1782	Drain Wire
9	0.35 GY	655	Cellular Microphone Signal
10	0.35 BARE	654	Cellular Microphone Signal
11-12	-	-	Not Used

K77 REMOTE CONTROL DOOR LOCK RECEIVER

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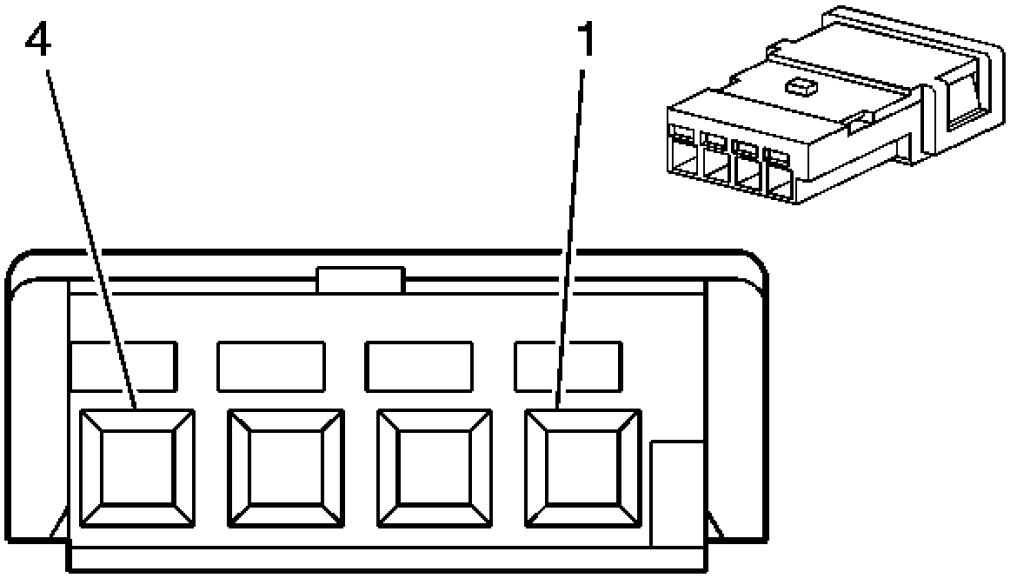


Fig. 49: K77 Remote Control Door Lock Receiver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof (BTV)
- Harness: Instrument Panel (without BTV)
- OEM: 15363838
- Service: 09130527
- Description: 4-Way F 0.64 MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: H/H
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K77 Remote Control Door Lock Receiver

Pin	Wire	Circuit	Function
1	0.35 GY	3273	RCDLR Ground
2	0.35 L-BU/WH	3275	RCDLR Data Transmit

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3	0.35 L-GN	3274	RCDLR Data Receive
4	0.35 PK/WH	3272	RCDLR Power

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Wiring Systems and Power Management - Component Locator - Component Connector End Views - Camaro

COMPONENT CONNECTOR END VIEWS

K8 BLOWER MOTOR CONTROL MODULE X1

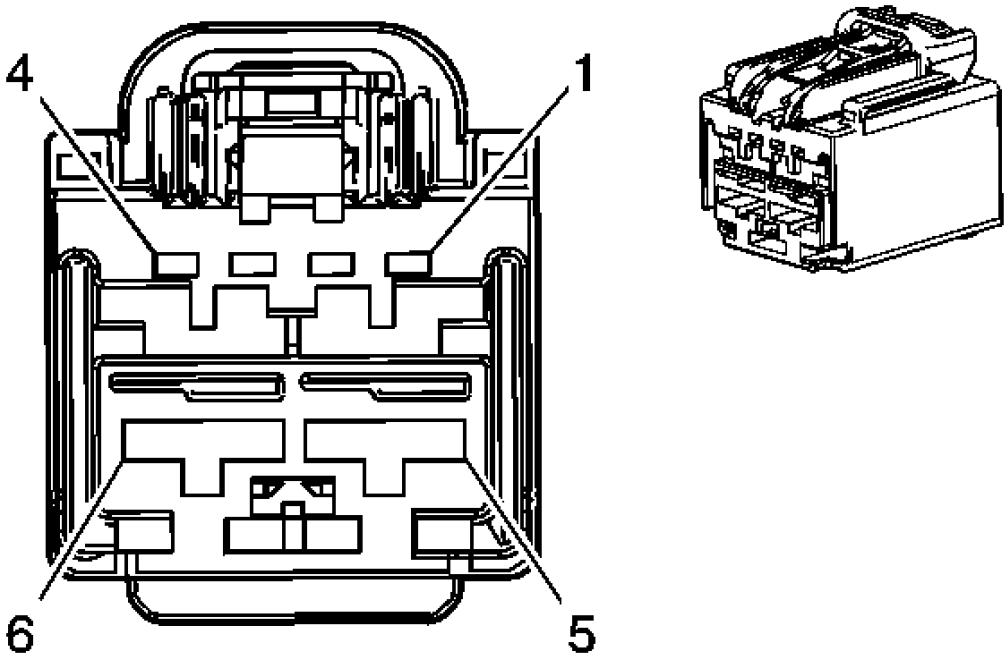


Fig. 1: K8 Blower Motor Control Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13520671
- Service: 88988512
- Description: 6-Way F GT 150 6.3 Series (BK)

Terminal Part Information

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- Pin: 3
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Pins: 5, 6
- Terminal/Tray: 7116-4122-02/10
- Core/Insulation Crimp: D/G
- Release Tool: 12094430
- Test Probe: J-35616-42 (RD)

K8 Blower Motor Control Module X1

Pin	Wire	Circuit	Function
1-2	-	-	Not Used
3	0.35 GY/BK	754	Blower Motor Speed Control
4	-	-	Not Used
5	5 BK	1450	Ground
6	5 RD/BK	542	Battery Positive Voltage

K8 BLOWER MOTOR CONTROL MODULE X2

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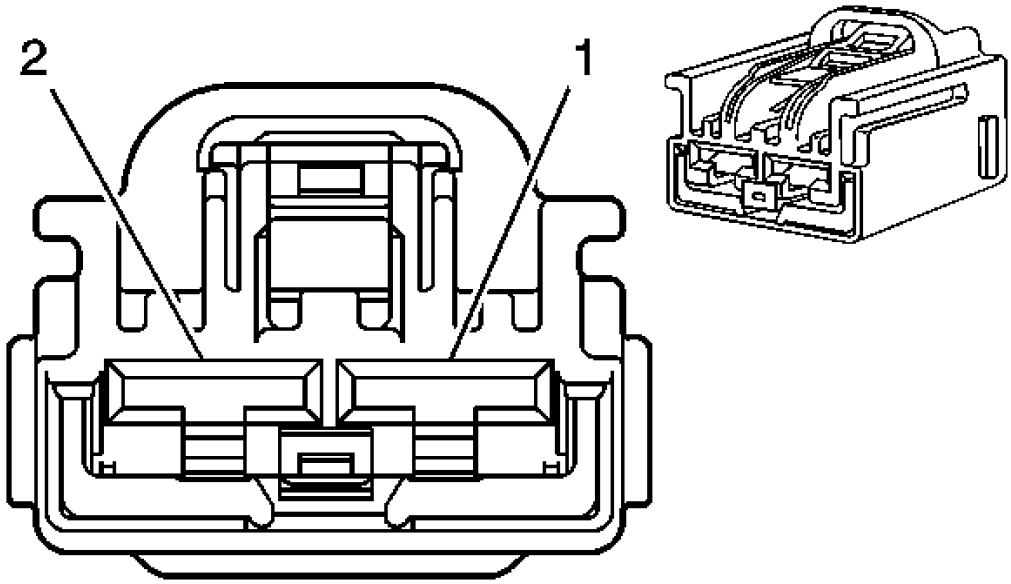


Fig. 2: K8 Blower Motor Control Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Blower Motor
- OEM: 15226103
- Service: 88988507
- Description: 2-Way F Recepticle 6.3 Series (L-GY)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 88988507
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

K8 Blower Motor Control Module X2

Pin	Wire	Circuit	Function
1	4 RD	65	Blower Motor Supply Voltage
2	4 BK	5987	Blower Motor Low Control

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K85 PASSENGER PRESENCE DETECTION MODULE X1

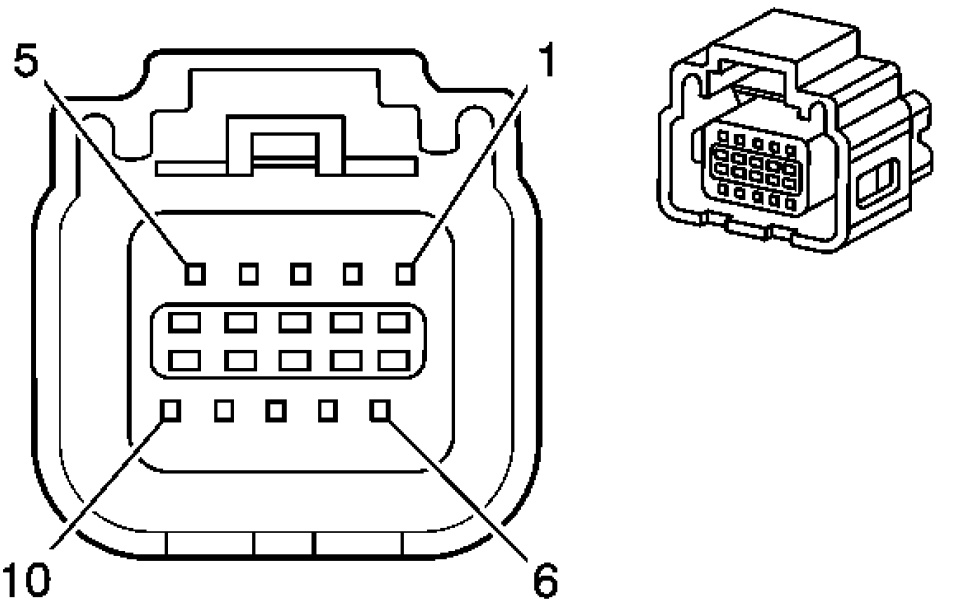


Fig. 3: K85 Passenger Presence Detection Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Seat
- OEM: 13569289
- Service: Servive by Harness - See Part Catalog
- Description: 10-Way F (BK)

Terminal Part Information

- Terminal/Tray: Service with Terminated Lead
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

K85 Passenger Presence Detection Module X1

Pin	Wire	Circuit	Function
1	0.35 RD/WH	2040	Battery Positive Voltage

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2	0.35 BK	2450	Ground
3	-	-	Not Used
4	0.35 D-GN	5060	Low Speed GMLAN Serial Data
5-10	-	-	Not Used

K85 PASSENGER PRESENCE DETECTION MODULE X2

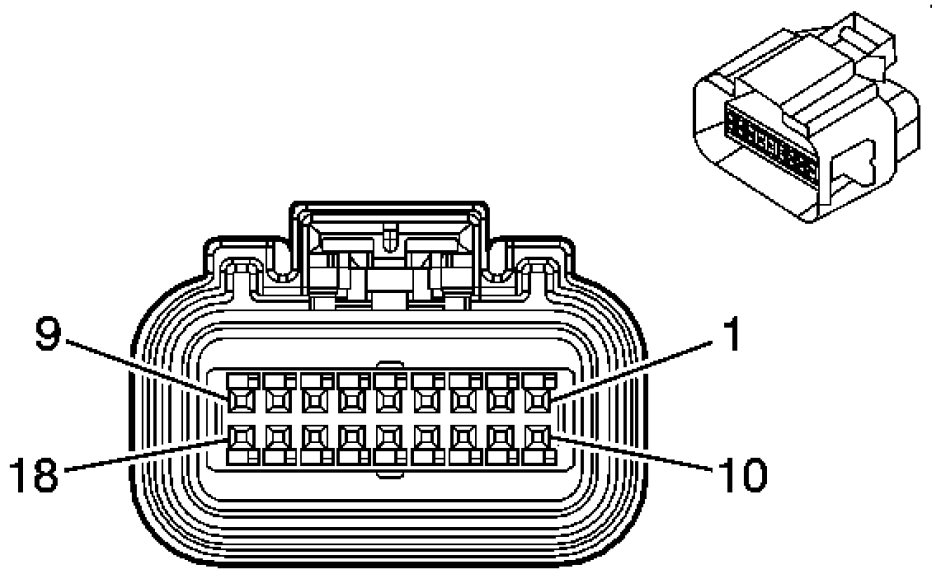


Fig. 4: K85 Passenger Presence Detection Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Presence Detection Sensor
- OEM: 13545457
- Service: Service as Harness - See Part Catalog
- Description: 18-Way F Flexible Printed Circuit Series (BK)

Terminal Part Information

- Terminal/Tray: Service as Harness - See Part Catalog
- Core/Insulation Crimp: Not Available

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- Release Tool: Not Available
- Test Probe: Not Available

K85 Passenger Presence Detection Module X2

Pin	Wire	Circuit	Function
1	FW	-	-
2	FW	-	-
3	FW	-	-
4	FW	-	-
5	FW	-	-
6	FW	-	-
7	FW	-	-
8	FW	-	-
9	FW	-	-
10	FW	-	-
11	FW	-	-
12	FW	-	-
13	FW	-	-
4	FW	-	-
15	FW	-	-
16	FW	-	-
17	FW	-	-
18	FW	-	-

K9 BODY CONTROL MODULE X1

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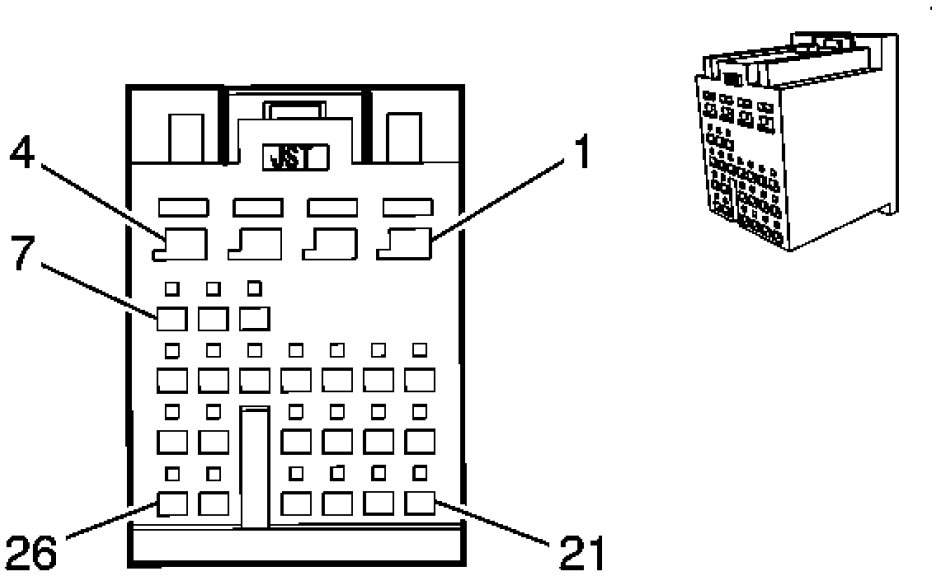


Fig. 5: K9 Body Control Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594128
- Service: 19151262
- Description: 26-Way F 0.64 2.8 Series (WH)

Terminal Part Information

- Pins: 1, 4
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: E/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 2, 3
- Terminal/Tray: SNAC-A081T-M2.8/20
- Core/Insulation Crimp: A/D

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- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 9, 10, 11, 14, 16, 19, 21, 22, 24, 25, 26
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X1

Pin	Wire	Circuit	Function
1	0.8 BK	1650	Ground
2	2 RD/WH	2540	Battery Positive Voltage
3	2 RD/WH	2740	Battery Positive Voltage
4	0.8 RD/WH	2240	Battery Positive Voltage
5-8	-	-	Not Used
9	0.35 D-GN	7555	Headlamp Switch Signal
10	0.35 L-BU	1134	Park Brake Switch Signal
11	0.35 D-GN	306	Headlamp Switch Headlamps Off Signal/Automatic Headlamp Low Control
12-13	-	-	Not Used
14	0.35 PU	328	Interior lamp Defeat Switch Signal
15	-	-	Not Used
16	0.35 WH	103	Headlamp Switch Headlamps On Signal
17-18	-	-	Not Used
19	0.35 L-BU/BK	853	Low Reference
20	-	-	Not Used
21	0.35 GY	728	Security Indicator Control
22	0.35 L-BU	13	Headlamp Switch Park Lamps Signal
23	-	-	Not Used
24	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
25	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
26	0.35 L-GN	3274	RCDLR Data Receive

K9 BODY CONTROL MODULE X2

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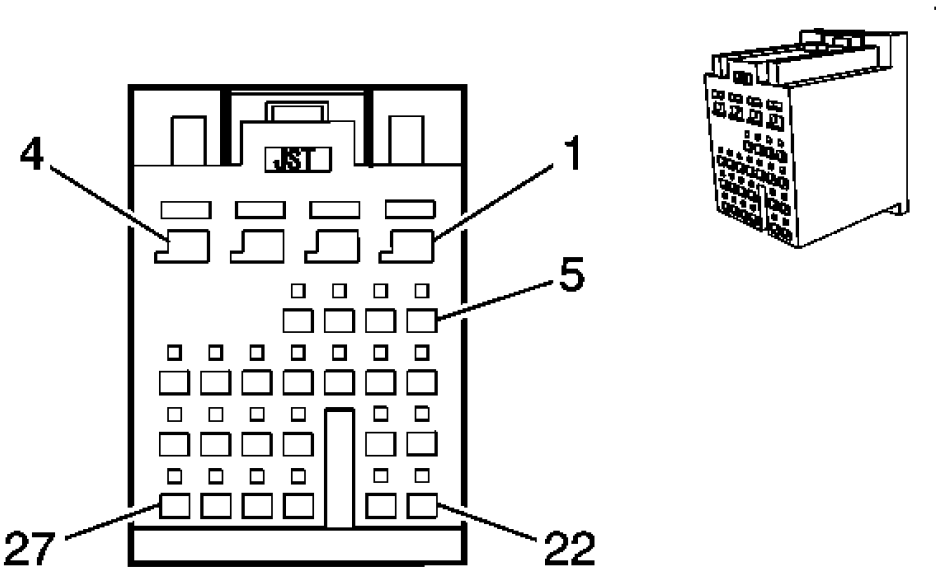


Fig. 6: K9 Body Control Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594133
- Service: 19151266
- Description: 27-Way F 0.64 2.8 Series (L-BU)

Terminal Part Information

- Pins: 1, 2, 3
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: Pins 1, 2 - E/A
- Core/Insulation Crimp: Pins 3 - C/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pin: 4
- Terminal/Tray: SNAC-A081T-M2.8/20

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- Core/Insulation Crimp: A/D
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 7, 8, 10, 13, 14, 15, 16, 19, 21, 22, 23, 24, 25, 26, 27
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X2

Pin	Wire	Circuit	Function
1	0.8 RD/WH	2140	Battery Positive Voltage
2	0.8 BK	1650	Ground
3	1 RD/WH	2940	Battery Positive Voltage
4	3 RD/WH	4040	Battery Positive Voltage
5-6	-	-	Not Used
7	0.35 YE	5361	Brake Pedal Position Sensor Signal
8	0.5 YE	6817	LED Backlight Dimming Control
9	-	-	Not Used
10	0.35 WH	278	Ambient Light Sensor Signal
11-12	-	-	Not Used
13	0.35 GY	5381	5-Volt Reference
14	0.35 L-BU	1788	Traction Control Switch Signal
15	0.35 OG/BK	781	Driver Door Lock Switch Unlock Signal
16	0.35 GY	3273	Low Reference
17-18	-	-	Not Used
19	0.35 PK/BK	780	Driver Door Lock Switch Lock Signal
20	-	-	Not Used
21	0.35 GY	6135	Linear Interconnect Network 4 (without CF5)
22	0.35 D-GN	5060	Low Speed GMLAN Serial Data
23	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
24	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus +
25	0.35 PK/WH	3272	RCDLR Power
26	0.35 WH	111	Hazard Switch Signal
27	0.35 L-BU/WH	3275	RCDLR Data Transmit

K9 BODY CONTROL MODULE X3

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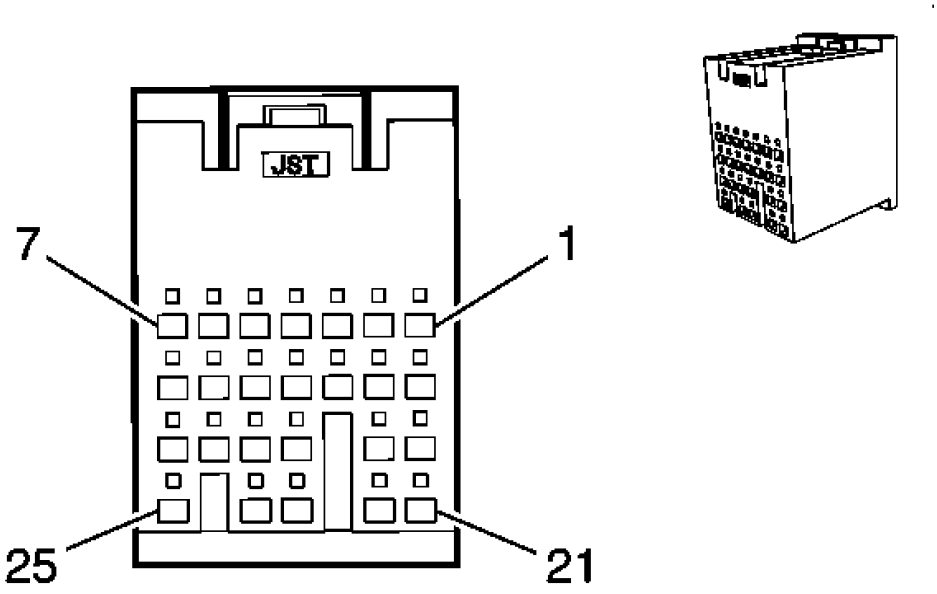


Fig. 7: K9 Body Control Module X3 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594127
- Service: 19151261
- Description: 25-Way F 0.64 Series (L-GN)

Terminal Part Information

- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X3

Pin	Wire	Circuit	Function
1	0.35 D-GN/WH	3277	Immobilizer Ground
2	0.35 L-BU	7533	Linear Interconnect Network 11

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3	0.35 D-GN	3166	Immobilizer Power
4	0.35 YE	7556	Headlamp Switch Reference Voltage
5	0.35 BN	4	Accessory Voltage
6	0.35 PK	3	Ignition Voltage
7	0.35 YE	143	Accessory Voltage (MYB/MYC)
8	0.35 L-GN	6818	Steering Wheel Control Switch Signal (NZL)
9	0.35 GY	1884	Cruise Control Switch Signal
10	0.35 TN/BK	6009	Low Reference
11	0.35 PU	524	Headlamp Dimmer Switch High Beam Signal
12	0.35 D-GN	663	Left Turn Signal
13	0.35 L-BU	1714	Windshield Wiper Switch Low Signal
14	-	-	Not Used
15	0.35 PK	1020	Ignition Voltage
16	-	-	Not Used
17	0.35 YE	307	Headlamp Switch Flash to Pass Signal
18	0.35 L-GN/WH	3287	Horn Switch Signal
19	-	-	Not Used
20	0.35 L-GN	1715	Windshield Wiper Switch High Signal
21	0.35 PU	5526	Tap Up/Tap Down Switch Signal (MYB/MYC)
22	0.35 WH/BK	1073	5-Volt Reference
23	-	-	Not Used
24	0.35 TN	664	Right Turn Signal
25	0.35 PK	94	Windshield Washer Switch Signal

K9 BODY CONTROL MODULE X4

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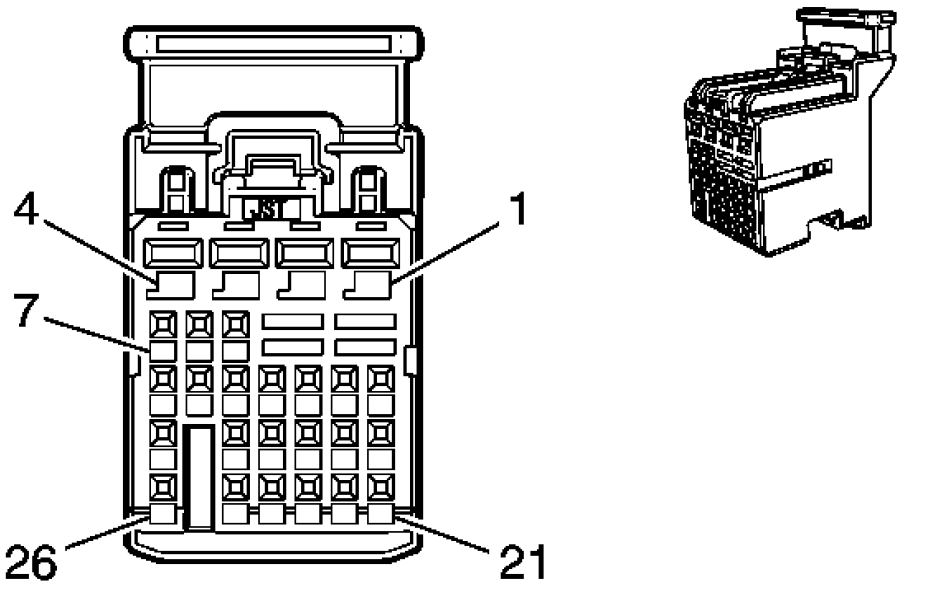


Fig. 8: K9 Body Control Module X4 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594129
- Service: 19151263
- Description: 26-Way F 0.64 2.8 Series (BK)

Terminal Part Information

- Pins: 1, 2, 3, 4
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: E/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 5, 6, 7, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 26
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J

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- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X4

Pin	Wire	Circuit	Function
1	0.8 D-BU	7539	DRL Control
2	0.8 L-BU	7538	DRL Control
3	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage
4	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage
5	0.5 BN/WH	309	Right Park Lamp Supply Voltage
6	0.5 PU	709	Left Park Lamp Supply Voltage
7	0.5 BN/L-BU	6993	Marker Lamps Control
8-10	-	-	Not Used
11	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control
12	0.35 TN	755	RAP Relay Coil Control
13	0.5 D-GN/YE	6846	Rear License Lamp Control
14	0.35 OG	2268	Washer Fluid Pump Relay Control
15	0.35 YE	5199	Ignition Voltage
16	0.35 GY	91	Wiper Relay Control
17	0.35 YE	196	Windshield Wiper Motor Park Switch Signal
18	0.5 WH	5075	Current Sensor Signal
19	-	-	Not Used
20	0.5 RD/WH	2340	Battery Positive Voltage
21	0.5 PK	5076	Current Sensor Voltage
22	0.35 D-BU	5985	Serial Data Wake - Up Signal
23	0.35 L-BU	5986	Serial Data Communication Enable
24	0.35 PK/BK	109	Hood Ajar Switch Signal
25	-	-	Not Used
26	0.5 BK	2550	Ground

K9 BODY CONTROL MODULE X5

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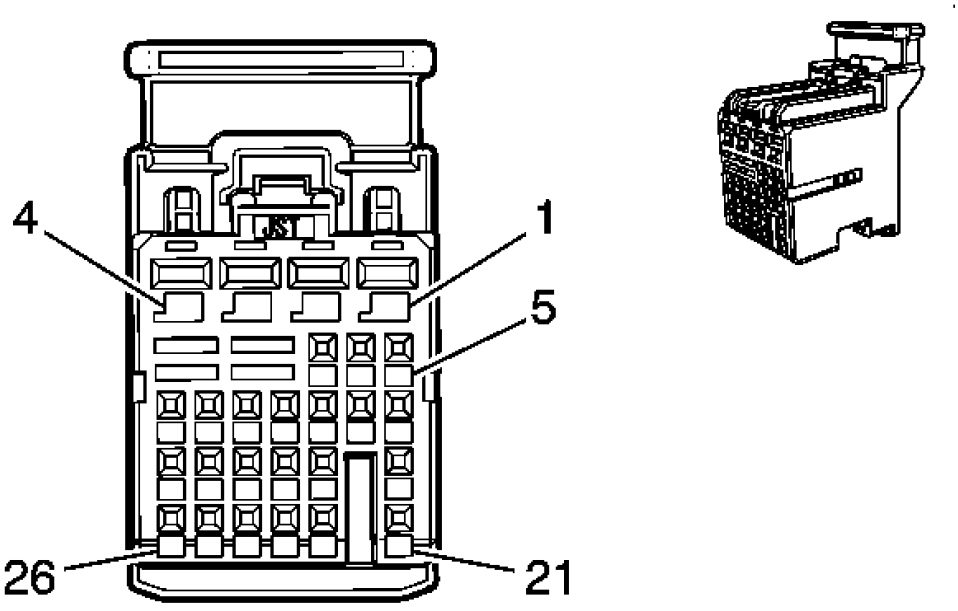


Fig. 9: K9 Body Control Module X5 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594130
- Service: 19151264
- Description: 26-Way F 0.64 2.8 Series (BN)

Terminal Part Information

- Pins: 1, 2, 3
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: E/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pin: 4
- Terminal/Tray: SNAC-A081T-M2.8/20
- Core/Insulation Crimp: A/D

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- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 6, 7, 10, 11, 12, 13, 18, 19, 24
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X5

Pin	Wire	Circuit	Function
1	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage
2	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage
3	0.8 RD/WH	3840	Battery Positive Voltage
4	3 RD/WH	3440	Battery Positive Voltage
5	-	-	Not Used
6	0.5 BN	5077	Low Reference
7	0.5 BN/GY	6995	Marker Lamps Control
8-9	-	-	Not Used
10	0.35 D-GN/WH	1317	Fog Lamp Relay Control
11	0.35 TN	6188	Rear Compartment Lid Release Control
12	0.35 L-BU/WH	6311	Brake Pedal Switch Signal
13	0.35 PK/WH	1970	HID Headlamp Relay Control
14-17	-	-	Not Used
18	0.5 TN/WH	1969	Headlamp High Beam Relay Control
19	0.35 TN	28	Horn Relay Control
20-23	-	-	Not Used
24	0.35 TN	860	Front Windshield Wiper Switch High Signal
25-26	-	-	Not Used

K9 BODY CONTROL MODULE X6

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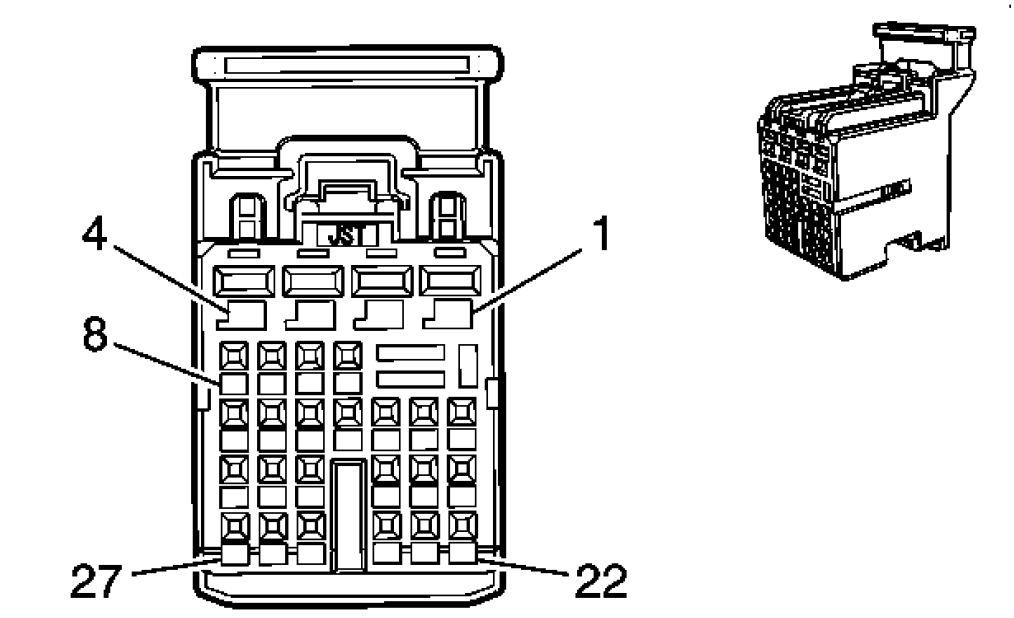


Fig. 10: K9 Body Control Module X6 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594134
- Service: 19151267
- Description: 27-Way F 0.64 2.8 Series (PK)

Terminal Part Information

- Pin: 1
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: C/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 2, 3, 4
- Terminal/Tray: SNAC-A081T-M2.8/20
- Core/Insulation Crimp: A/D

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- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 5, 7, 10, 14, 16, 24, 25
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X6

Pin	Wire	Circuit	Function
1	1 GY	5911	Driver Door Lock Motor Unlock Control
2	2 GY	295	Door Lock Actuator Unlock Control
3	2 BK	1650	Ground
4	2 TN	294	Door Lock Actuator Lock Control
5	0.35 PK/BK	1303	Rear Compartment Lid Ajar Switch Signal
6	-	-	Not Used
7	0.35 PU	7558	Accent Lamps Control (SRK/SRM)
8-9	-	-	Not Used
10	0.35 D-GN	6134	Linear Interconnect Network 3
11-13	-	-	Not Used
14	0.35 D-BU	6189	Rear Compartment Lid Release Switch
15	-	-	Not Used
16	0.35 BN	6132	Linear Interconnect Network 1 (CF5)
17-23	-	-	Not Used
24	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
25	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
26-27	-	-	Not Used

K9 BODY CONTROL MODULE X7

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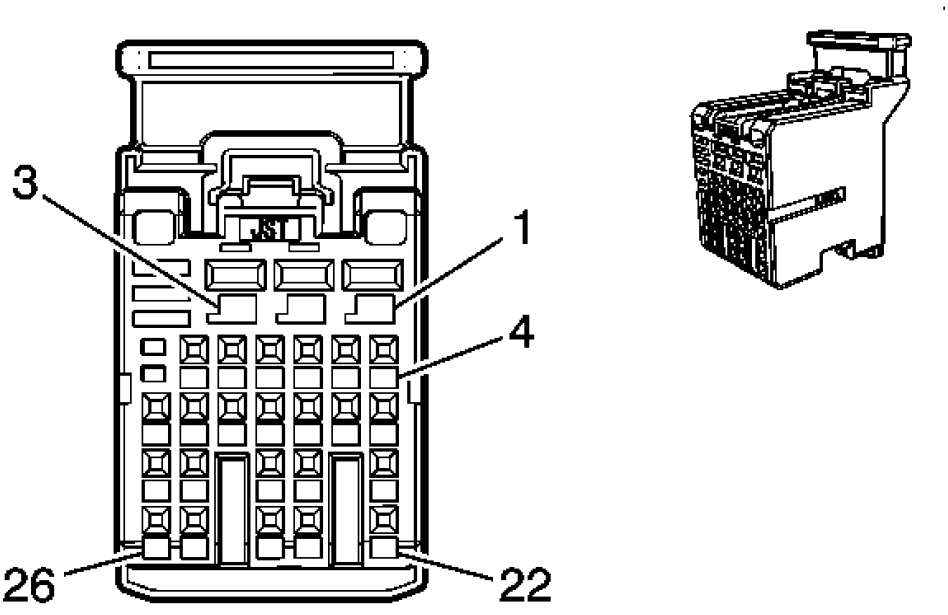


Fig. 11: K9 Body Control Module X7 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13594132
- Service: 19151265
- Description: 26-Way F 0.64 2.8 Series (GY)

Terminal Part Information

- Pins: 1, 3
- Terminal/Tray: SNAC-A061T-M2.8/20
- Core/Insulation Crimp: E/A
- Release Tool: 12094429
- Test Probe: J-35616-35 (VT)

- Pins: 6, 7, 9, 15, 19
- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J

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- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

K9 Body Control Module X7

Pin	Wire	Circuit	Function
1	0.5 GY	157	Courtesy Lamp Control
2	-	-	Not Used
3	0.5 L-GN	24	Backup Lamp Supply Voltage
4-5	-	-	Not Used
6	0.35 TN	7553	Automatic Transmission Shift Lock Control Solenoid Control (MYB/MYC)
7	0.5 OG/BK	737	Rear Compartment Lamp Control
8	-	-	Not Used
9	0.5 YE	6817	LED Backlight Dimming Control
10-14	-	-	Not Used
15	0.35 D-GN	3270	Driver Door Lock Status Signal
16-18	-	-	Not Used
19	0.35 WH	156	Courtesy Lamp Switch Signal
20-26	-	-	Not Used

M37 MODE DOOR ACTUATOR

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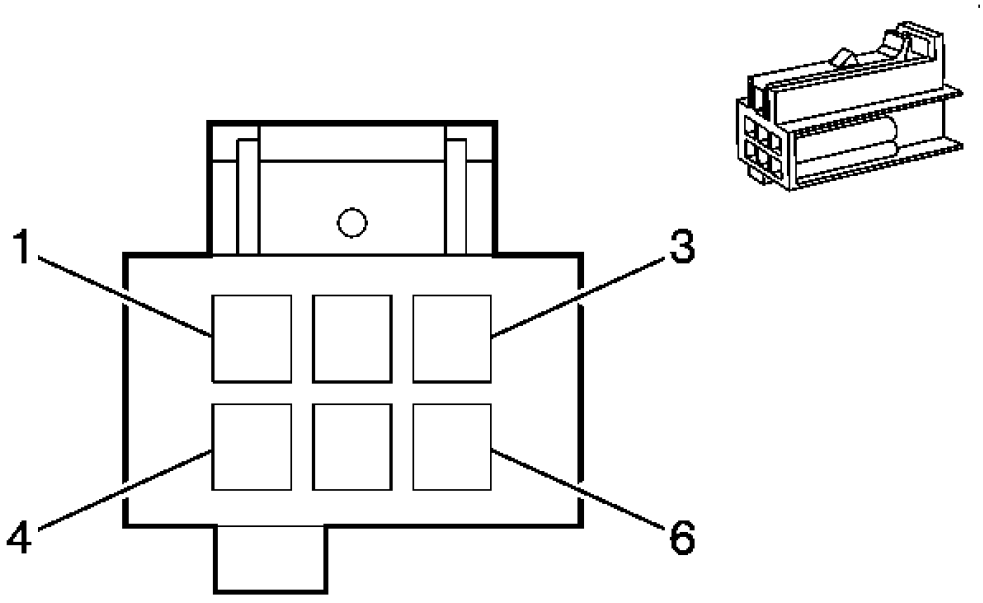


Fig. 12: M37 Mode Door Actuator Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: HVAC
- OEM: 15338980
- Service: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 3, 4, 6 - H/H
- Core/Insulation Crimp: Pins 2 - J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

M37 Mode Door Actuator

Pin	Wire	Circuit	Function
1	0.35 D-BU	3167	Mode Door Stepper Motor Control 3

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2	0.5 OG	7572	HVAC Motor Supply Voltage
3	0.35 GY	3165	Mode Door Stepper Motor Control 1
4	0.35 BN	3168	Mode Door Stepper Motor Control 4
5	-	-	Not Used
6	0.35 D-GN	3166	Mode Door Stepper Motor Control 2

M40 REAR COMPARTMENT LID LATCH

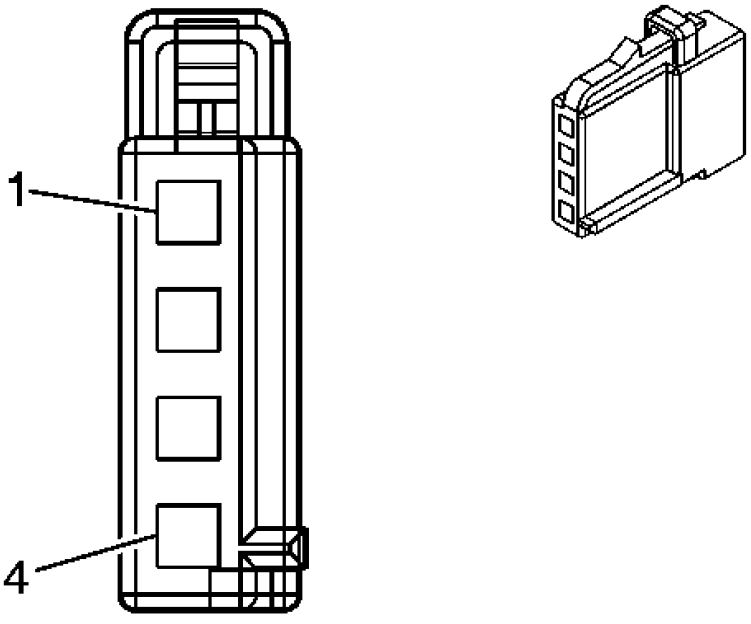


Fig. 13: M40 Rear Compartment Lid Latch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 15324229
- Service: 15306167
- Description: 4-Way F Timer Micro-Pack Series (BK)

Terminal Part Information

- Terminal/Tray: 962943-5/16

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- Core/Insulation Crimp: Pins 1, 2 - E/A
- Core/Insulation Crimp: Pin 4 - See Terminal Repair Kit
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

M40 Rear Compartment Lid Latch

Pin	Wire	Circuit	Function
1	0.5 L-BU	6795	Rear Compartment Lid Release Control 2
2	0.5 BK	2350	Ground
3	-	-	Not Used
4	0.35 PK/BK	1303	Rear Compartment Lid Ajar Switch Signal

M46 AIR RECIRCULATION DOOR MOTOR

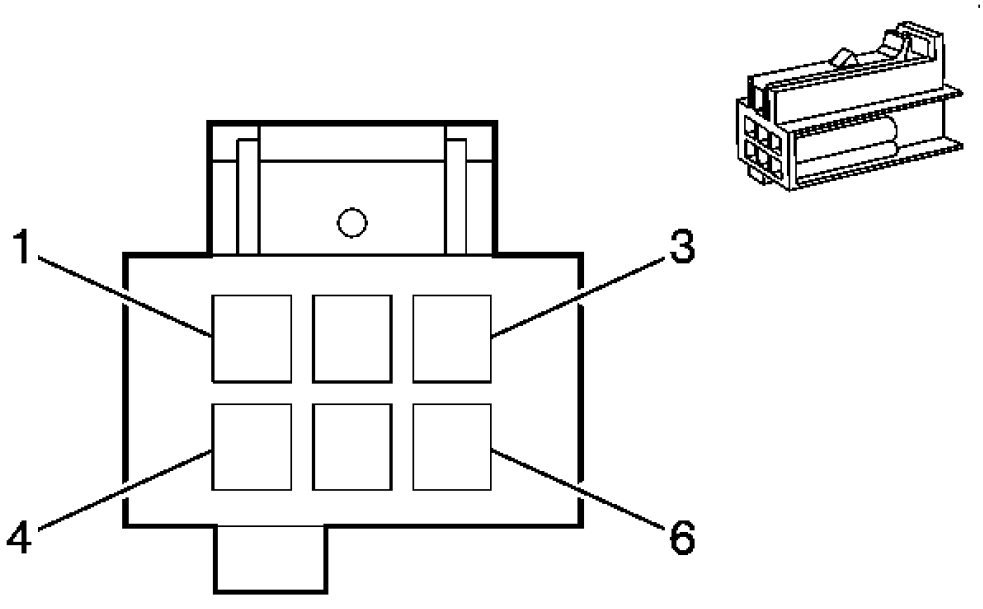


Fig. 14: M46 Air Recirculation Door Motor Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: HVAC

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- OEM: 15338980
- Service: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 3, 4, 6 - H/H
- Core/Insulation Crimp: Pin 2 - J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

M46 Air Recirculation Door Motor

Pin	Wire	Circuit	Function
1	0.35 D-BU/WH	3173	Air Inlet Door Stepper Motor Control 1
2	0.5 OG	7572	HVAC Motor Supply Voltage
3	0.35 BN/WH	3174	Air Inlet Door Stepper Motor Control 2
4	0.35 YE	3175	Air Inlet Door Stepper Motor Control 3
5	-	-	Not Used
6	0.35 WH	3176	Air Inlet Door Stepper Motor Control 4

M47 REVERSE INHIBIT SOLENOID ACTUATOR (M10)

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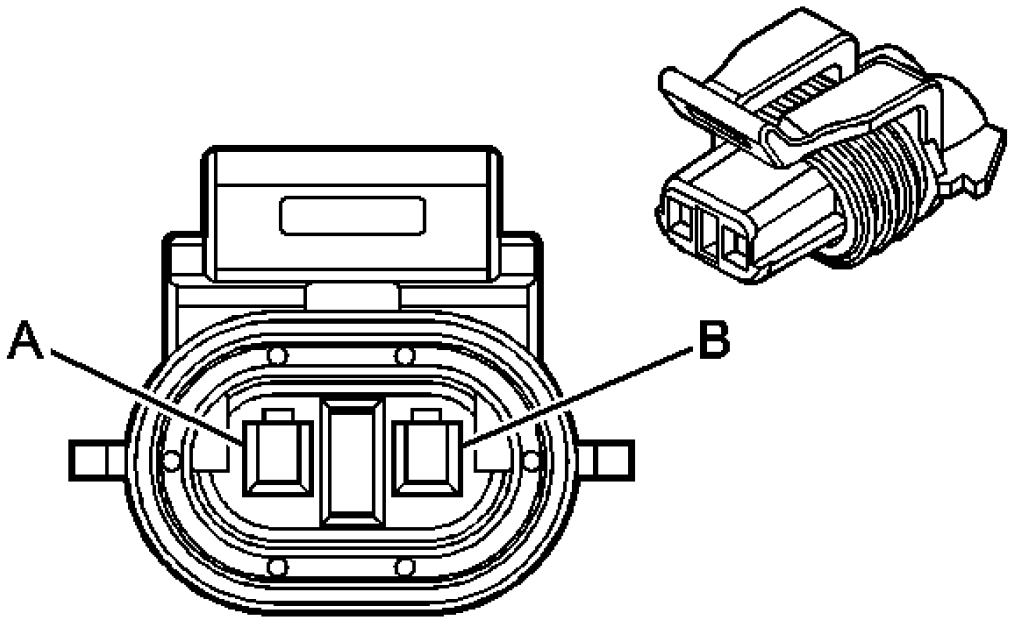


Fig. 15: M47 Reverse Inhibit Solenoid Actuator (M10) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12052646
- Service: 12101857
- Description: 2-Way F Metri-Pack 150 Sealed (WH)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

M47 Reverse Inhibit Solenoid Actuator (M10)

Pin	Wire	Circuit	Function
A	0.5 OG	5494	Reverse Lockout Solenoid Control
B	0.5 PK	239	Ignition Voltage

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M50D SEAT FRONT VERTICAL MOTOR - DRIVER (AMM)

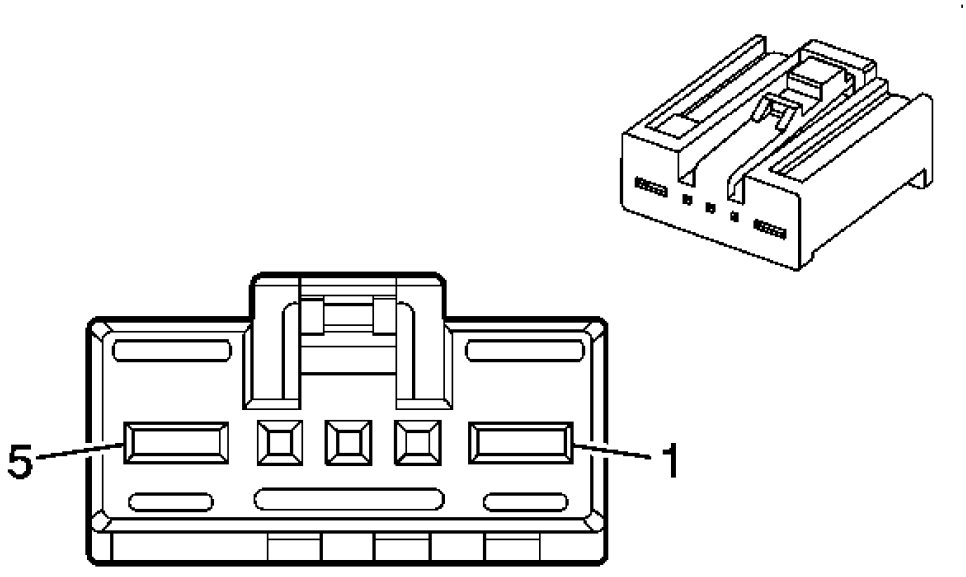


Fig. 16: M50D Seat Front Vertical Motor - Driver (AMM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 1379217-1
- Service: Service by Harness - See Part Catalog
- Description: 5-Way F MQS/MCP Mixed Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

M50D Seat Front Vertical Motor - Driver (AMM)

Pin	Wire	Circuit	Function

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1	3 D-GN	286	Driver Seat Front Vertical Motor Up Control
2-4	-	-	Not Used
5	3 D-BU	287	Driver Seat Front Vertical Motor Down Control

M51D SEAT HORIZONTAL MOTOR - DRIVER (AMM)

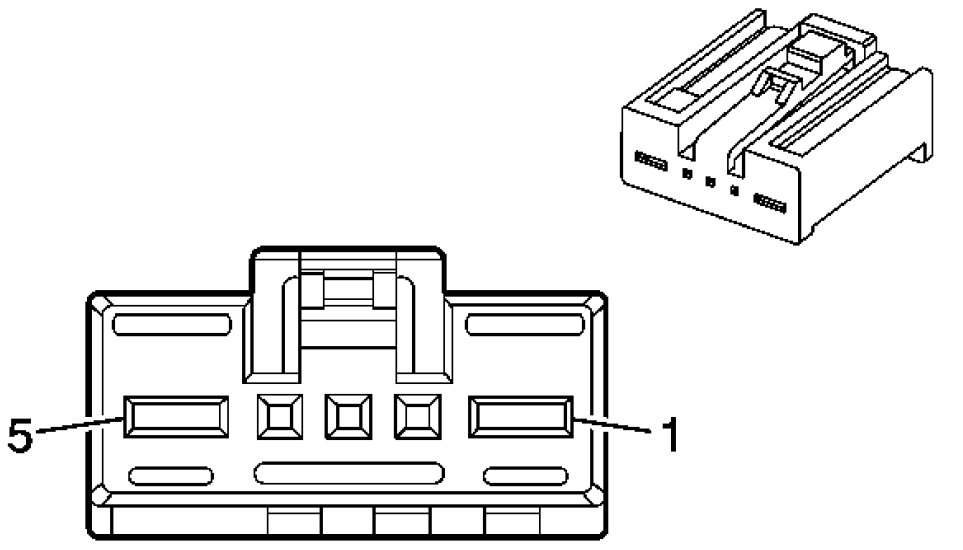


Fig. 17: M51D Seat Horizontal Motor - Driver (AMM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 1379217-1
- Service: Service by Harness - See Part Catalog
- Description: 5-Way F MQS/MCP Mixed Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available

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- Release Tool: Not Available
- Test Probe: Not Available

M51D Seat Horizontal Motor - Driver (AMM)

Pin	Wire	Circuit	Function
1	3 TN	285	Driver Seat Horizontal Motor Forward Control
2-4	-	-	Not Used
5	3 L-GN	284	Driver Seat Horizontal Motor Rearward Control

M55D SEAT REAR VERTICAL MOTOR - DRIVER (AMM)

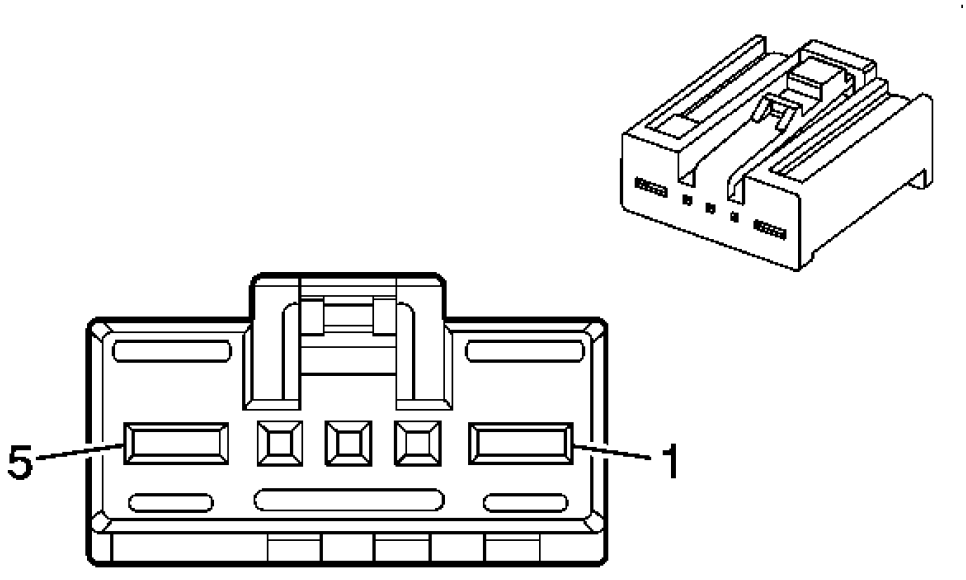


Fig. 18: M55D Seat Rear Vertical Motor - Driver (AMM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 1379217-1

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- Service: Service by Harness - See Part Catalog
- Description: 5-Way F MQS/MCP Mixed Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

M55D Seat Rear Vertical Motor - Driver (AMM)

Pin	Wire	Circuit	Function
1	3 L-BU	283	Driver Seat Rear Vertical Motor Down Control
2-4	-	-	Not Used
5	3 YE	282	Driver Seat Rear Vertical Motor Up Control

M56D SEAT RECLINE MOTOR - DRIVER

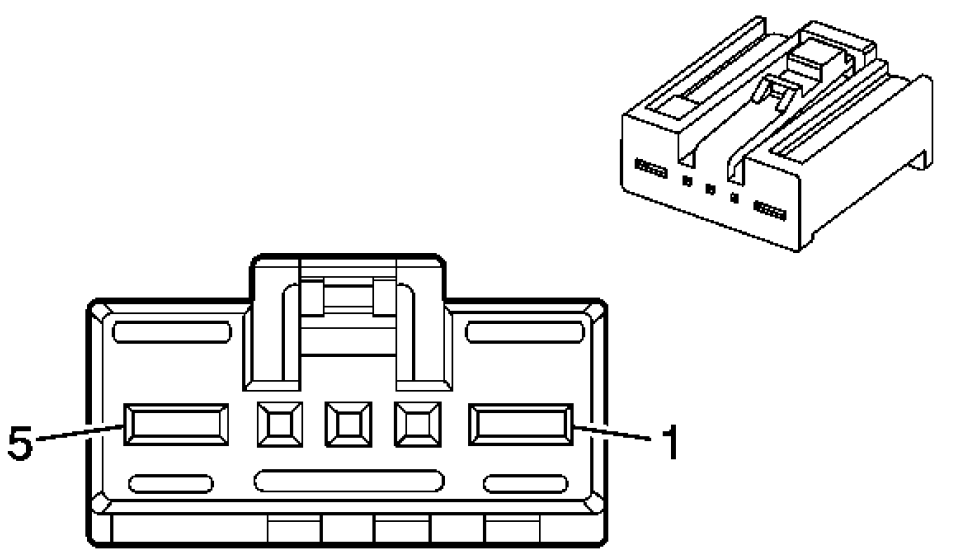


Fig. 19: M56D Seat Recline Motor - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Driver Seat
- OEM: 1379217-1
- Service: Service by Harness - See Part Catalog
- Description: 5-Way F MQS/MCP Mixed Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

M56D Seat Recline Motor - Driver

Pin	Wire	Circuit	Function
1	3 D-BU/YE	277	Driver Seat Recline Motor Rearward Control
2-4	-	-	Not Used
5	3 D-GN/YE	276	Driver Seat Recline Motor Forward Control

M56P SEAT RECLINE MOTOR - PASSENGER

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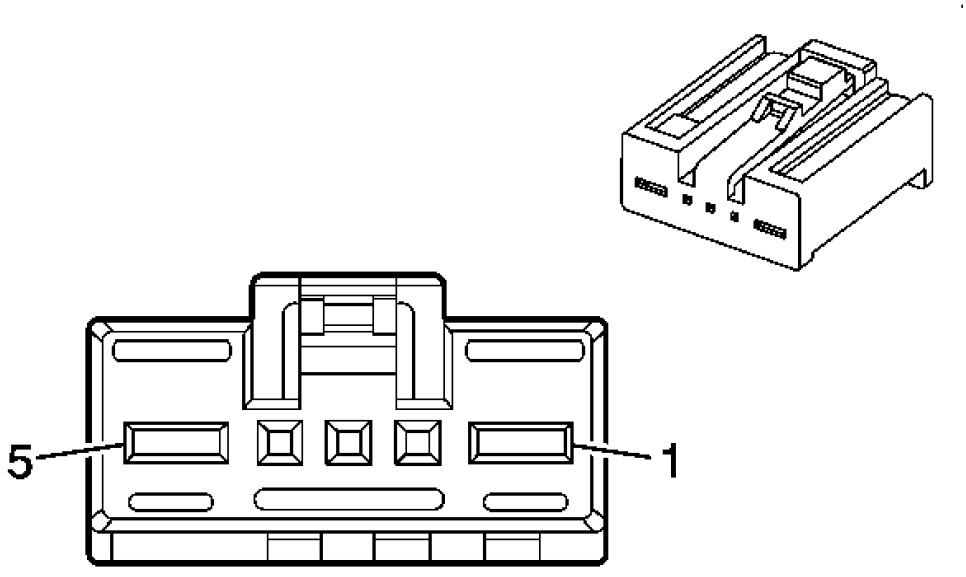


Fig. 20: M56P Seat Recline Motor - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Seat
- OEM: 1379217-1
- Service: Service by Harness - See Part Catalog
- Description: 5-Way F MQS/MCP Mixed Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

M56P Seat Recline Motor - Passenger

Pin	Wire	Circuit	Function
1	3 D-BU/YE	77	Passenger Seat Recline Motor Rearward Control

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2-4	-	-	Not Used
5	3 D-GN/YE	76	Passenger Seat Recline Motor Forward Control

M6 AIR TEMPERATURE DOOR ACTUATOR

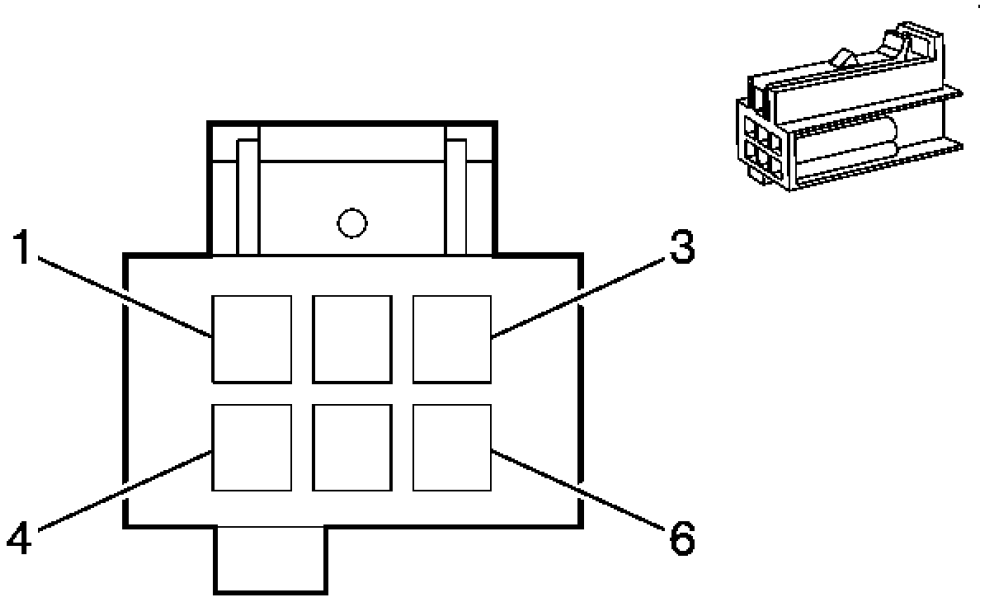


Fig. 21: M6 Air Temperature Door Actuator Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: HVAC
- OEM: 15338980
- Service: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 MQS Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 3, 4, 6 - H/H
- Core/Insulation Crimp: Pin 2 - J/J

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- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

M6 Air Temperature Door Actuator

Pin	Wire	Circuit	Function
1	0.35 TN/BK	3169	Temp Door Stepper Motor Control 1
2	0.5 OG	7572	HVAC Motor Supply Voltage
3	0.35 PU	3170	Temp Door Stepper Motor Control 2
4	0.35 L-GN	3171	Temp Door Stepper Motor Control 3
5	-	-	Not Used
6	0.35 L-BU	3172	Temp Door Stepper Motor Control 4

M64 STARTER MOTOR X1

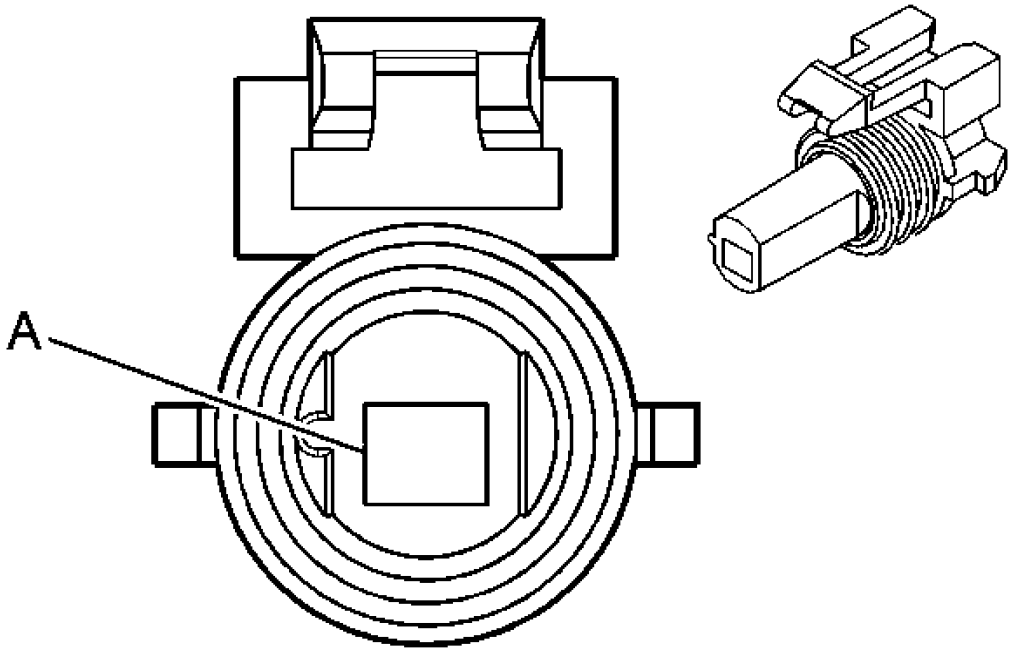


Fig. 22: M64 Starter Motor X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine

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- OEM: 12089916
- Service: 12101763
- Description: 1-Way F Metri-Pack 280 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12129493/2
- Core/Insulation Crimp: 4/5
- Release Tool: 12094430
- Test Probe: J-35616-4A (PU)

M64 Starter Motor X1

Pin	Wire	Circuit	Function
A	3 PU	6	Starter Solenoid Crank Voltage

M64 STARTER MOTOR X2

Connector Part Information

- Terminal: 12176593
- Core/Insulation Crimp: N/A
- Description: Ring Terminal

M64 Starter Motor X2

Pin	Wire	Circuit	Function
A	32 RD	2	Battery Positive Voltage

M7 TRANSMISSION SHIFT LOCK CONTROL SOLENOID ACTUATOR (MYB OR MYC)

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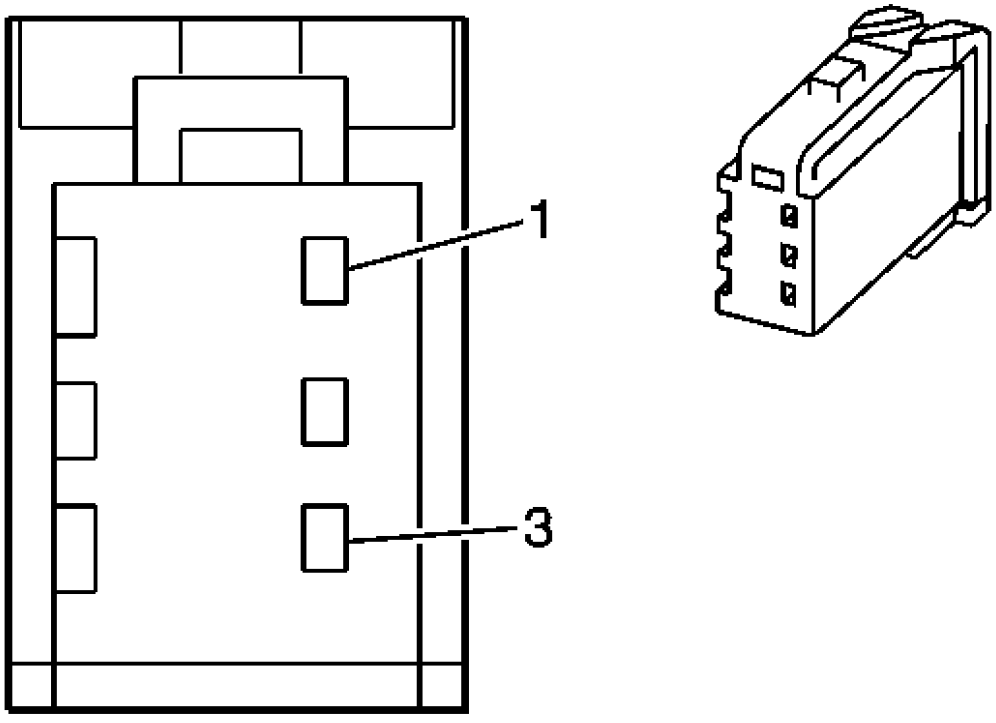


Fig. 23: M7 Transmission Shift Lock Control Solenoid Actuator (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Automatic Transmission Shift Lever Jumper Harness
- OEM: 90000223
- Service: Service by Harness - See Part Catalog
- Description: 3-Way F WH

Terminal Part Information

- Terminal/Tray: Service by Harness See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

M7 Transmission Shift Lock Control Solenoid Actuator (MYB or MYC)

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Pin	Wire	Circuit	Function
1	0.5 BK	1550	Ground
2	-	-	Not Used
3	0.35 TN	7553	Automatic Transmission Shift Lock Control Solenoid Control

M74D WINDOW MOTOR - DRIVER

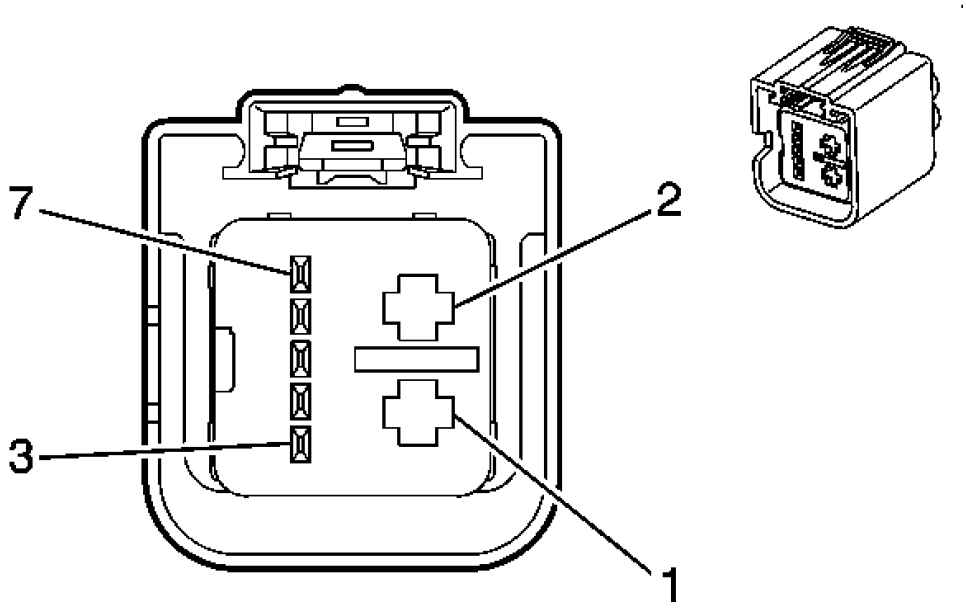


Fig. 24: M74D Window Motor - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 13595813
- Service: Service by Harness - See Part Catalog
- Description: 7-Way F Kaizen 0.64 2.8 Timer Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 2

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- Terminal/Tray: 4-964273-1/15
- Core/Insulation Crimp: C/5
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pins: 3, 4, 5, 6, 7
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

M74D Window Motor - Driver

Pin	Wire	Circuit	Function
1	3 BK	850	Ground
2	3 RD/WH	1240	Battery Positive Voltage
3	0.35 TN	1300	Power Window Master Switch Left Front Up Signal
4	0.35 D-GN	6134	Linear Interconnect Network 3
5	0.35 L-GN/RD	7628	Power Window Switch Express Signal
6	0.35 GY/BK	745	Left Front Door Ajar Switch Signal
7	0.35 GY	1136	Power Window Master Switch Left Front Down Signal

M74P WINDOW MOTOR - PASSENGER

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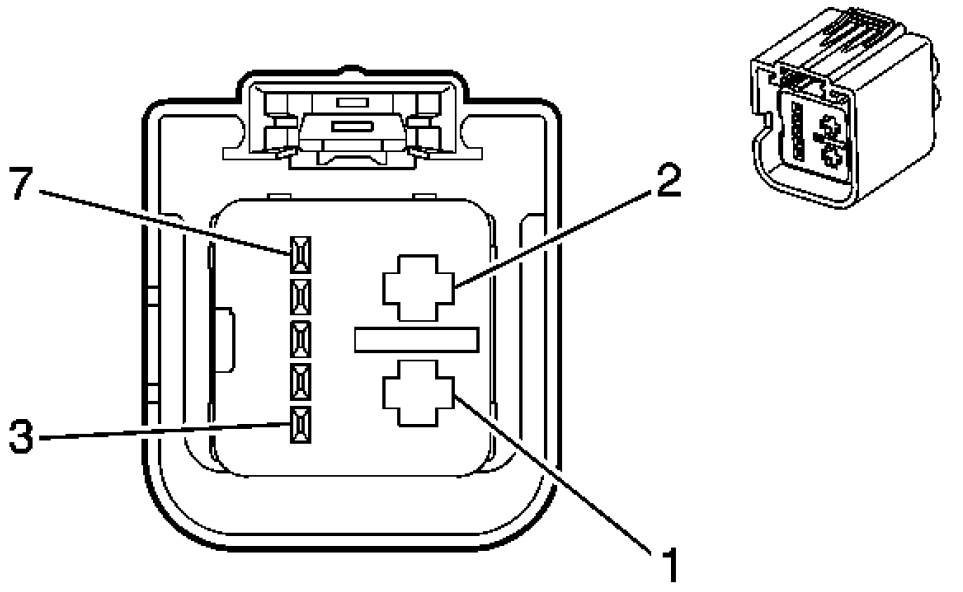


Fig. 25: M74P Window Motor - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 13595813
- Service: Service by Harness - See Part Catalog
- Description: 7-Way F Kaizen 0.64 2.8 Timer Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 2
- Terminal/Tray: 4-964273-1/15
- Core/Insulation Crimp: C/5
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pins: 3, 4, 5, 6, 7
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P

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- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

M74P Window Motor - Passenger

Pin	Wire	Circuit	Function
1	3 BK	2350	Ground
2	3 RD/WH	1240	Battery Positive Voltage
3	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal
4	0.35 D-GN	6134	Linear Interconnect Network 3
5	0.35 PU	2765	Power Window Switch Right Front Express Signal
6	0.35 TN/WH	746	Right Front Door Ajar Switch Signal
7	0.35 TN	167	Power Window Master Switch Right Front Down Signal

M75 WINDSHIELD WIPER MOTOR

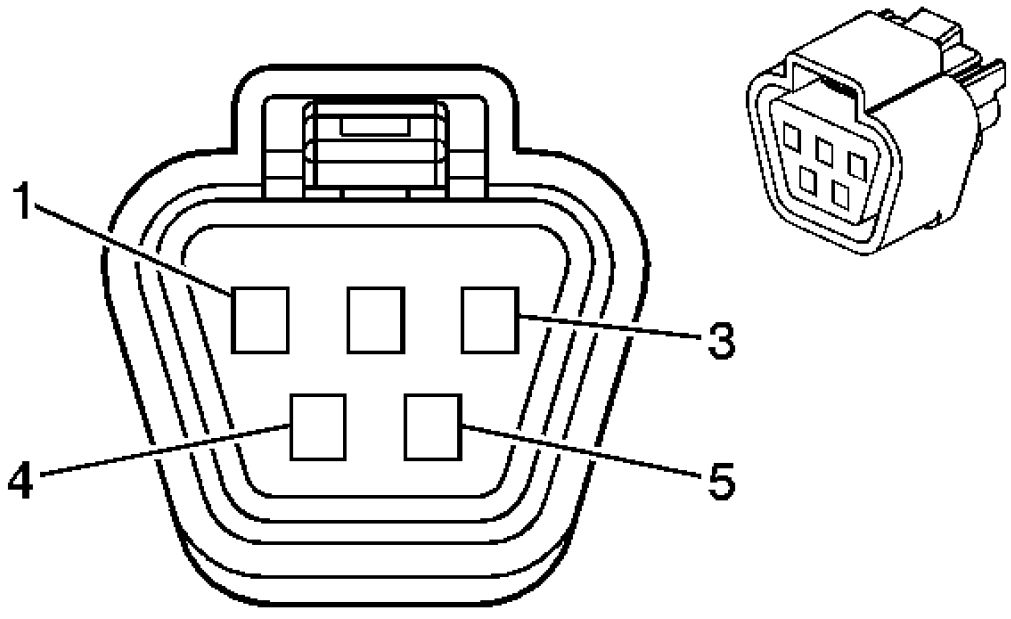


Fig. 26: M75 Windshield Wiper Motor Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Forward Lamp
- OEM: 15316488
- Service: 19149298
- Description: 5-Way F 090 Series, Sealed (BK)

Terminal Part Information

- Pin: 1
- Terminal/Tray: 8100-0594/6
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: 15315247
- Test Probe: J-35616-14 (GN)

- Pins: 3, 4, 5
- Terminal/Tray: 7116-4027/11
- Core/Insulation Crimp: 2/5
- Release Tool: 15313892
- Test Probe: J-35616-18 (BK)

M75 Windshield Wiper Motor

Pin	Wire	Circuit	Function
1	0.35 YE	196	Windshield Wiper Motor Park Switch Signal
2	-	-	Not Used
3	2 PU	92	Windshield Wiper Motor High Speed
4	2 BK	1350	Ground
5	2 D-GN	95	Windshield Wiper Motor Low Speed

M93 IGNITION CYLINDER LOCK CONTROL SOLENOID ACTUATOR (MYB OR MYC)

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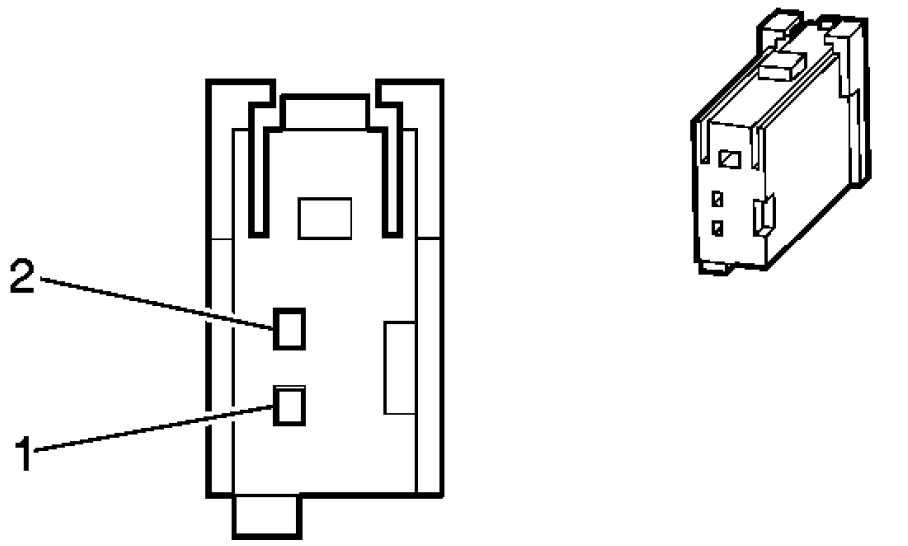


Fig. 27: M93 Ignition Cylinder Lock Control Solenoid Actuator (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13595633
- Service: 19115645
- Description: 2-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

M93 Ignition Cylinder Lock Control Solenoid Actuator (MYB or MYC)

Pin	Wire	Circuit	Function
1	0.35 YE	143	Accessory Voltage
2	0.35 PU/WH	5905	Key Capture Signal

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P12A HORN - HIGH NOTE

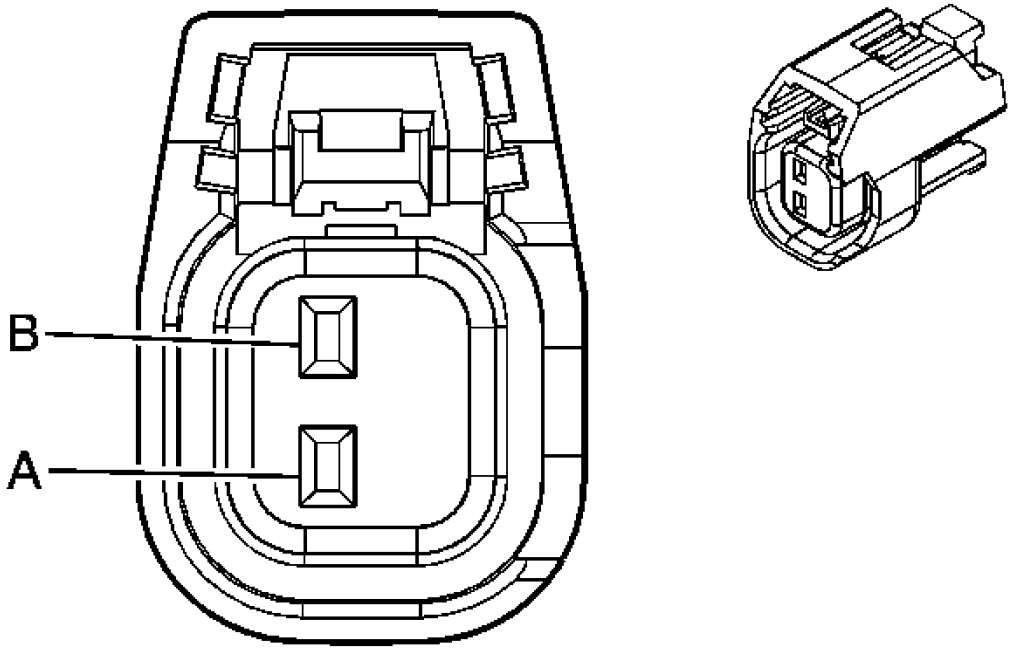


Fig. 28: P12A Horn - High Note Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 15497399
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P12A Horn - High Note

Pin	Wire	Circuit	Function

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A	0.8 D-GN	29	Horn Control
B	0.8 BK	1150	Ground

P12B HORN - LOW NOTE

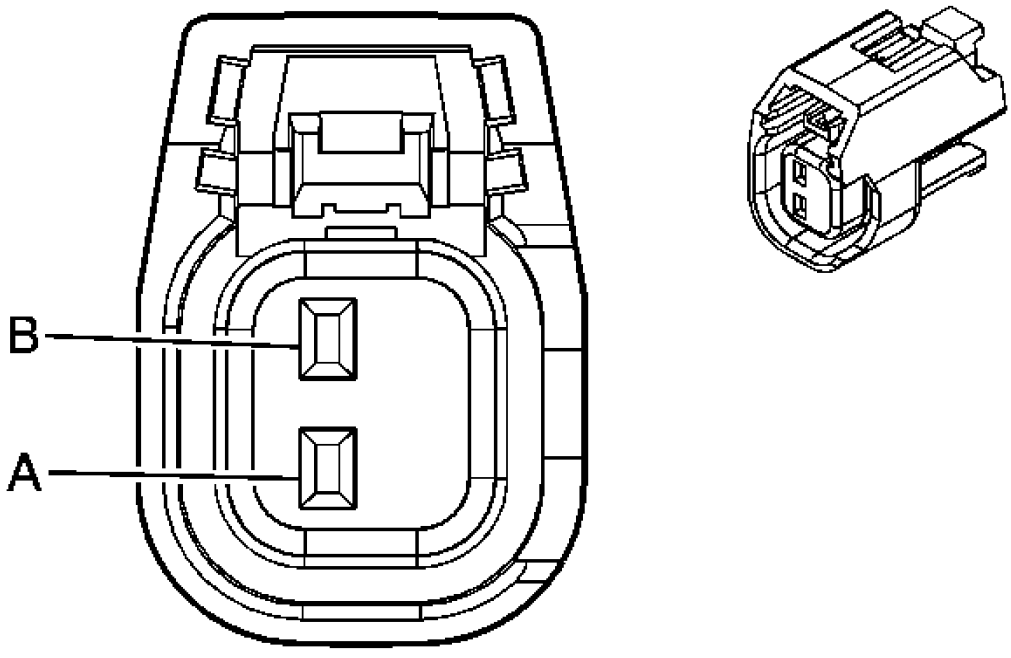


Fig. 29: P12B Horn - Low Note Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Forward Lamp
- OEM: 15497399
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

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P12B Horn - Low Note

Pin	Wire	Circuit	Function
A	0.8 D-GN	29	Horn Control
B	0.8 BK	1150	Ground

P14 PASSENGER AIR BAG DISABLE INDICATOR

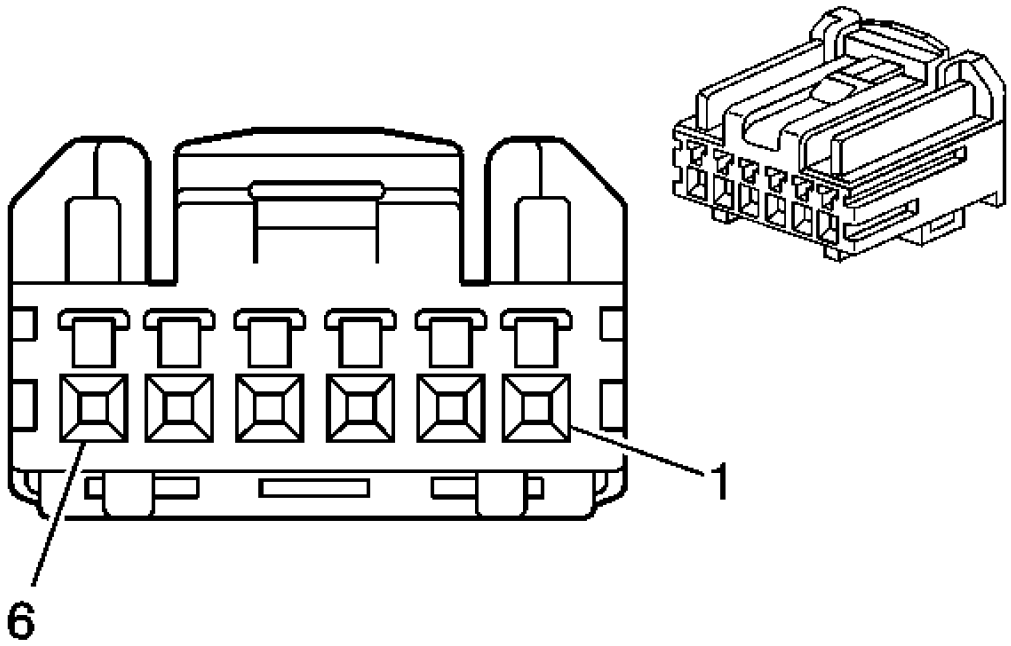


Fig. 30: P14 Passenger Air Bag Disable Indicator Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 13608102
- Service: 19153174
- Description: 6-Way F 1.2 HCM Series (WH)

Terminal Part Information

- Terminal/Tray: SHCM-A03T-P025/20
- Core/Insulation Crimp: J/J

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- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

P14 Passenger Air Bag Disable Indicator

Pin	Wire	Circuit	Function
1	0.35 D-BU	2307	Passenger Air Bag On Indicator Control
2	0.35 BK	1550	Ground
3	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control
4	0.35 PK	339	Ignition Voltage
5	0.35 PU	5234	Front Passenger Seat Belt Indicator Control
6	-	-	Not Used

P16 INSTRUMENT CLUSTER

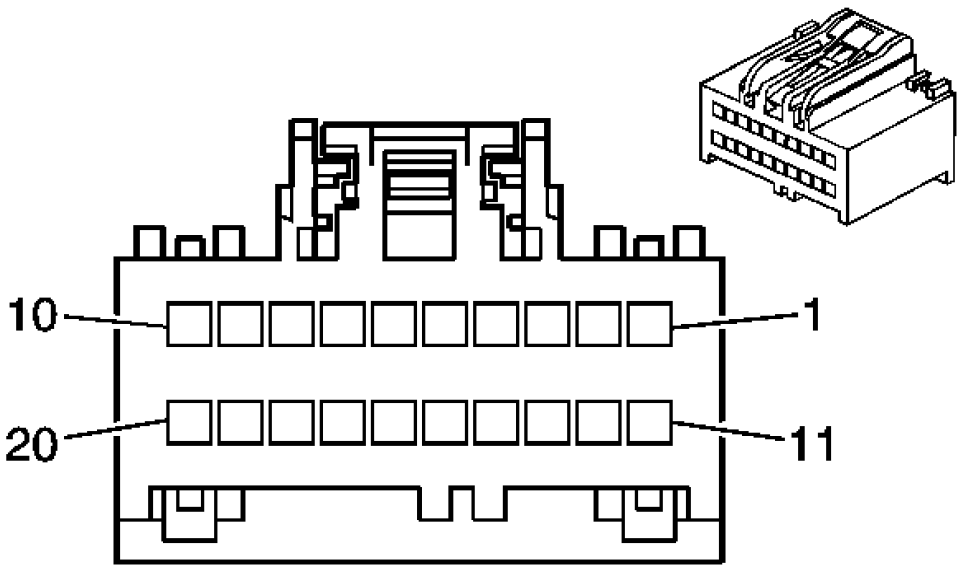


Fig. 31: P16 Instrument Cluster Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel

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- OEM: 15489824
- Service: 15126711
- Description: 20-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

P16 Instrument Cluster

Pin	Wire	Circuit	Function
1	0.35 D-GN	5060	Low Speed GMLAN Serial Data
2-3	-	-	Not Used
4	0.35 D-GN/WH	1358	DIC Switch Signal
5	0.35 BN	897	Low Reference
6	0.35 YE	61	Low Reference
7	0.35 D-GN/WH	636	Ambient Air Temperature Sensor Signal
8-9	-	-	Not Used
10	0.5 BK	1650	Ground
11-15	-	-	Not Used
16	0.35 PK	893	DIC Select Menu Switch Signal
17	0.35 BN/WH	419	MIL Control
18	-	-	Not Used
19	0.35 PK	139	Ignition 1 Voltage
20	0.5 RD/WH	2840	Battery Positive Voltage

P19A SPEAKER - CENTER INSTRUMENT PANEL (UQA)

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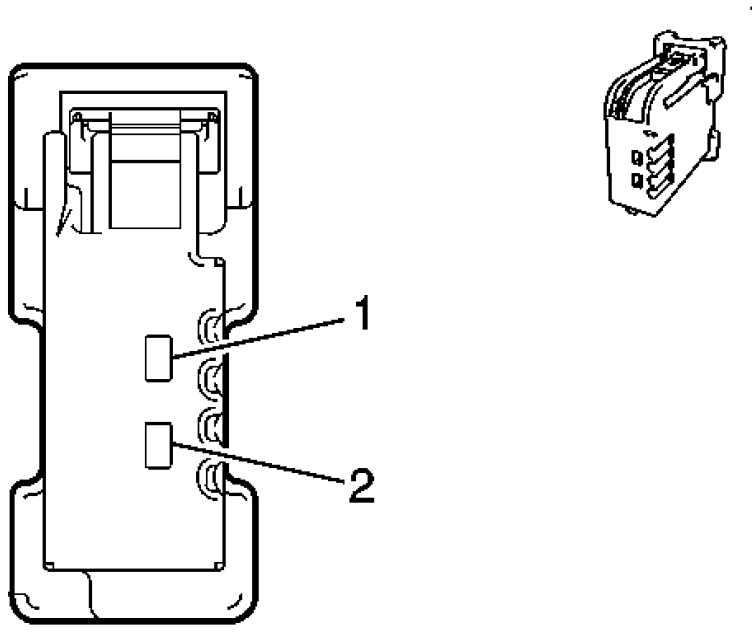


Fig. 32: P19A Speaker - Center Instrument Panel (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13682170
- Service: 13505908
- Description: 2-Way F 1.5 Series (GN)

Terminal Part Information

- Terminal/Tray: 8240-0128/22
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19A Speaker - Center Instrument Panel (UQA)

Pin	Wire	Circuit	Function
1	0.8 L-BU	1960	Front Center Speaker Output (-)
2	0.8 YE	1860	Front Center Speaker Output (+)

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P19G SPEAKER - LEFT FRONT (UQA)

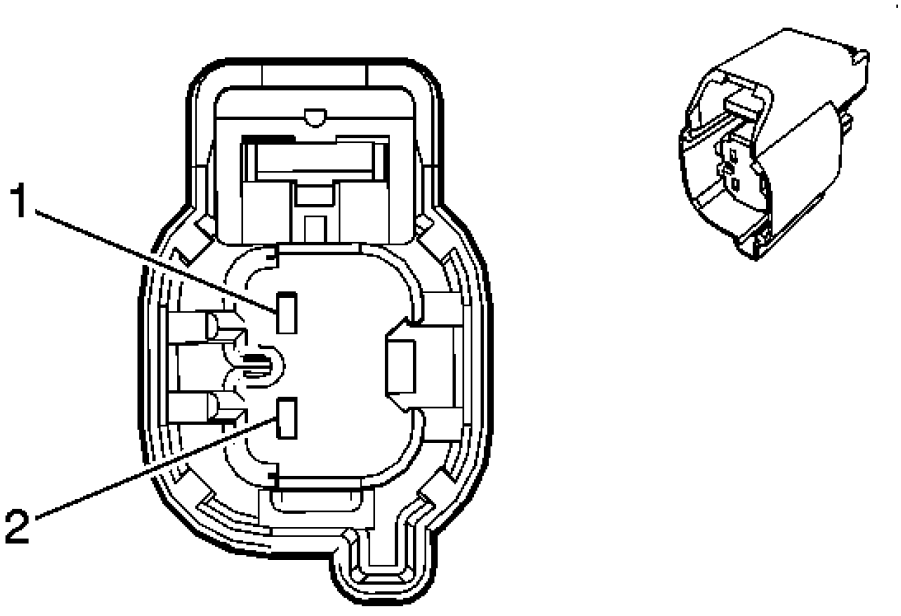


Fig. 33: P19G Speaker - Left Front (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 13667983
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F GT 150 Series (TN)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19G Speaker - Left Front (UQA)

Pin	Wire	Circuit	Function

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1	0.8 GY	118	Left Front Speaker Output (-)
2	0.8 TN	201	Left Front Speaker Output (+)

P19G SPEAKER - LEFT FRONT (UQ3)

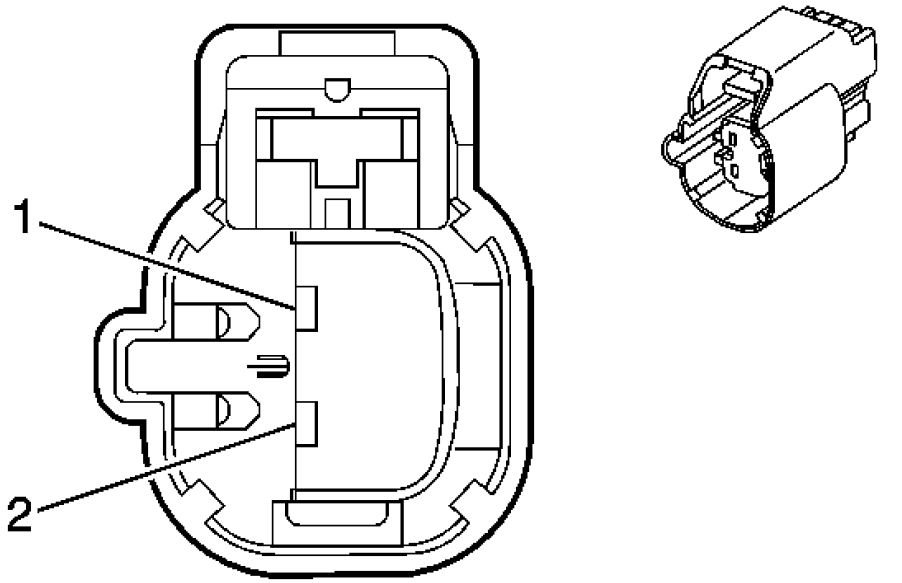


Fig. 34: P19G Speaker - Left Front (UQ3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 13665500
- Service: 19179953
- Description: 2-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

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P19G Speaker - Left Front (UQ3)

Pin	Wire	Circuit	Function
1	0.8 GY	118	Left Front Speaker Output (-)
2	0.8 TN	201	Left Front Speaker Output (+)

P19H SPEAKER - LEFT FRONT TWEETER

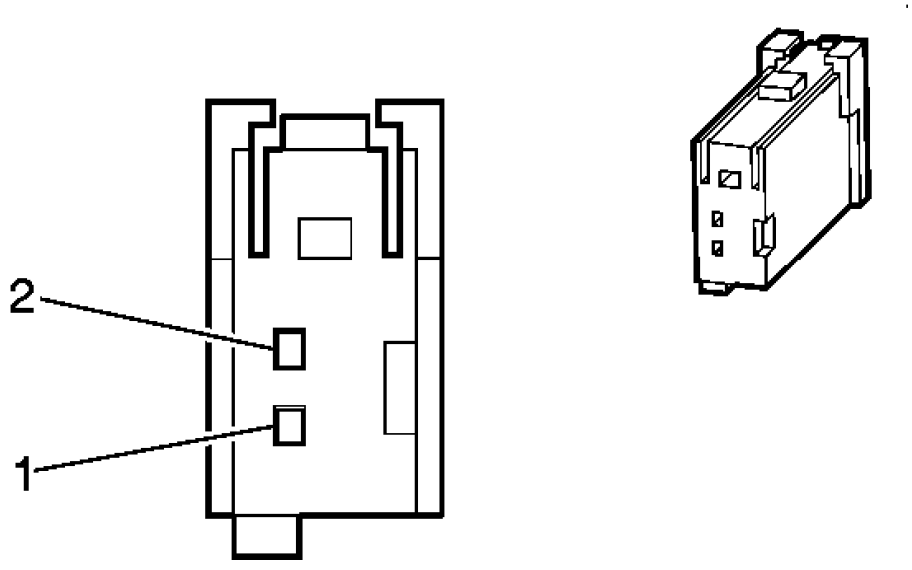


Fig. 35: P19H Speaker - Left Front Tweeter Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 13595633
- Service: 19115645
- Description: 2-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: See Terminal Repair Kit

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- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

P19H Speaker - Left Front Tweeter

Pin	Wire	Circuit	Function
1	0.8 GY	118	Left Front Speaker Output (-)
2	0.8 TN	201	Left Front Speaker Output (+)

P19K SPEAKER - LEFT REAR (UQA)

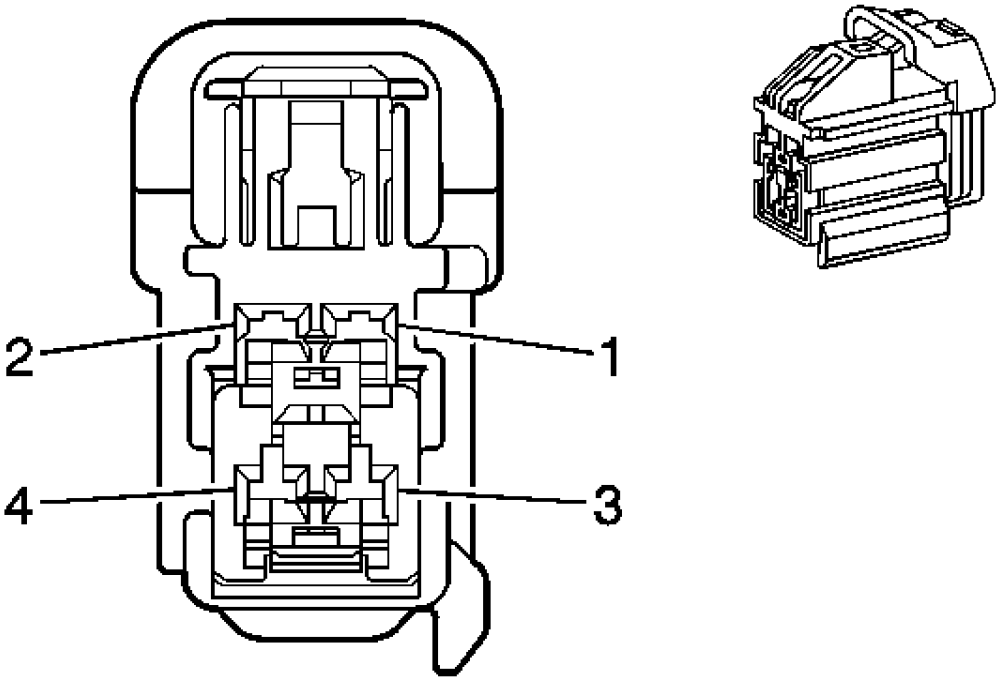


Fig. 36: P19K Speaker - Left Rear (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 10846820
- Service: 88988452

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- Description: 4-Way F Kaizen YESC Series (L-GY)

Terminal Part Information

- Terminal/Tray: 33012-3002/26
- Core/Insulation Crimp: A/E/A/C
- Release Tool: J-38125-217
- Test Probe: J-35616-14 (GN)

P19K Speaker - Left Rear (UQA)

Pin	Wire	Circuit	Function
1	0.8 D-BU/WH	5771	Left Subwoofer Speaker Output (-)
2	0.8 D-BU	5761	Left Subwoofer Speaker Output (+)
3	1 L-GN/BK	1794	Left Subwoofer Speaker Output (-)
4	1 D-BU/WH	346	Left Subwoofer Speaker Output (+)

P19K SPEAKER - LEFT REAR (UQ3)

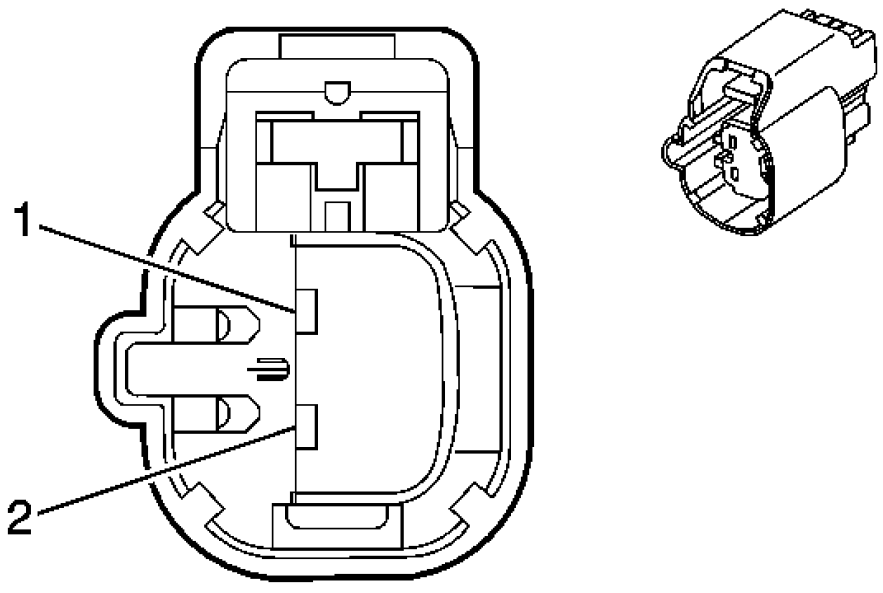


Fig. 37: P19K Speaker - Left Rear (UQ3) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Body
- OEM: 13665500
- Service: 19179953
- Description: 2-Way F GT 150 Series (BK)

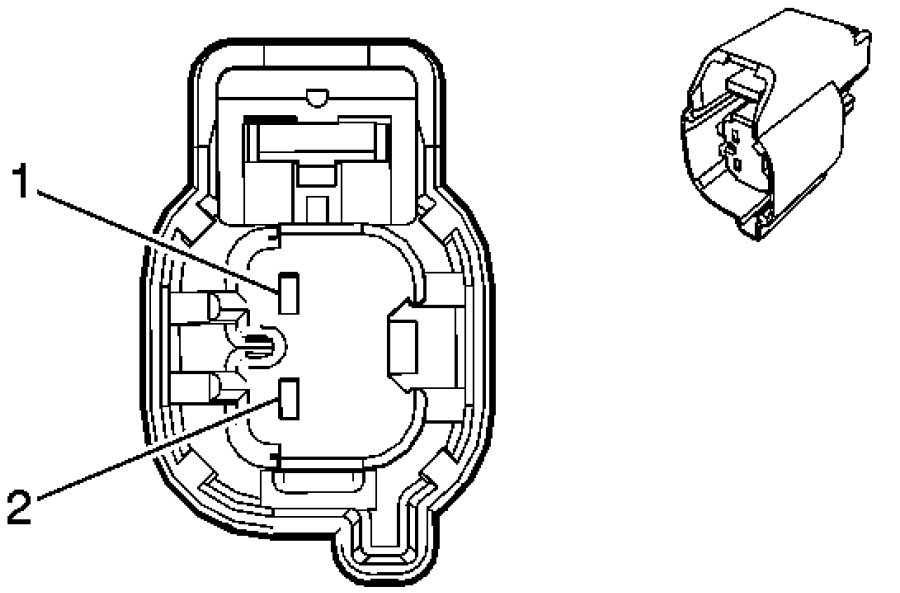
Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19K Speaker - Left Rear (UQ3)

Pin	Wire	Circuit	Function
1	0.8 YE	116	Left Rear Speaker Output (-)
2	0.8 BN	199	Left Rear Speaker Output (+)

P19U SPEAKER - RIGHT FRONT (UQA)



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Fig. 38: P19U Speaker - Right Front (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 13667983
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F GT 150 Series (TN)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19U Speaker - Right Front (UQA)

Pin	Wire	Circuit	Function
1	0.8 D-GN	117	Right Front Speaker Output (-)
2	0.8 L-GN	200	Right Front Speaker Output (+)

P19U SPEAKER - RIGHT FRONT (UQ3)

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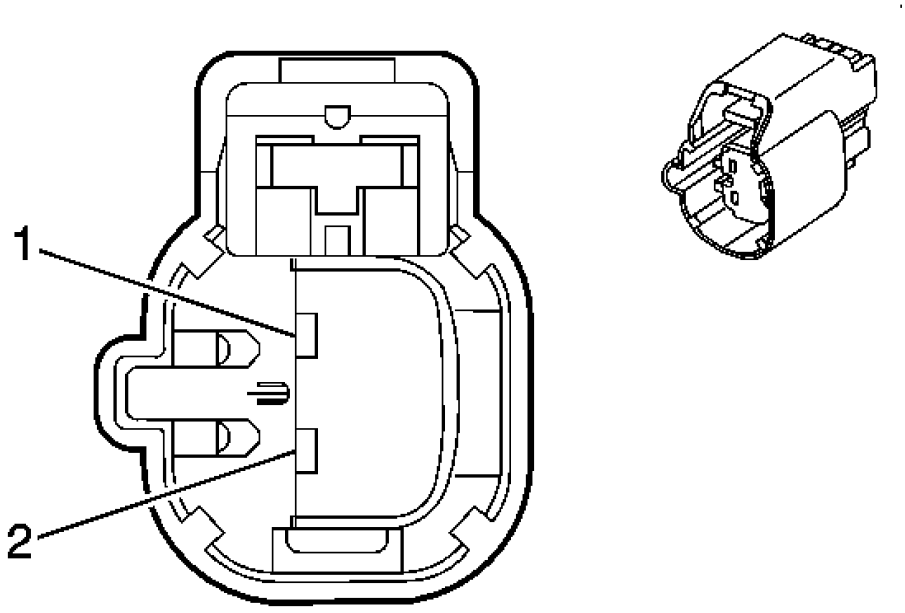


Fig. 39: P19U Speaker - Right Front (UQ3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 13665500
- Service: 19179953
- Description: 2-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19U Speaker - Right Front (UQ3)

Pin	Wire	Circuit	Function
1	0.8 D-GN	117	Right Front Speaker Output (-)
2	0.8 L-GN	200	Right Front Speaker Output (+)

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P19V SPEAKER - RIGHT FRONT TWEETER

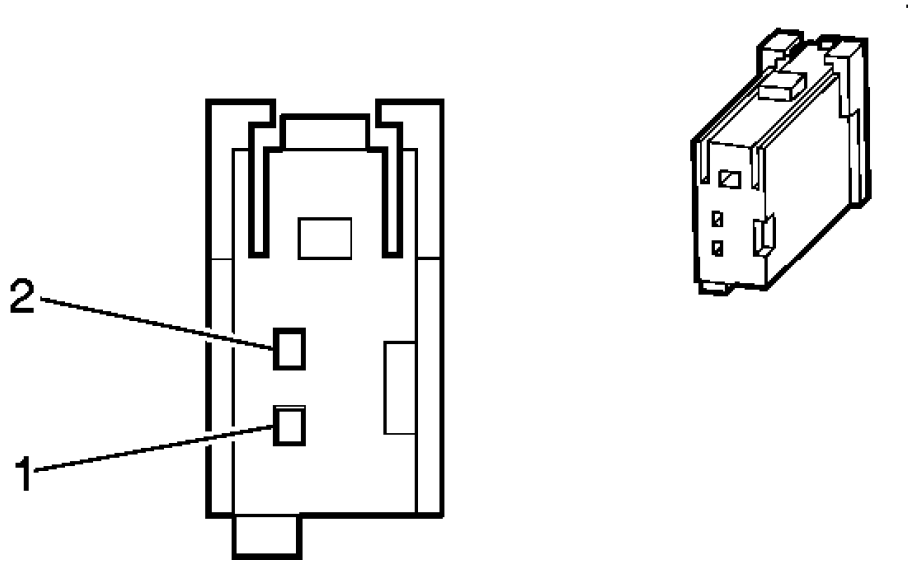


Fig. 40: P19V Speaker - Right Front Tweeter Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 13595633
- Service: 19115645
- Description: 2-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

P19V Speaker - Right Front Tweeter

Pin	Wire	Circuit	Function

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1	0.8 D-GN	117	Right Front Speaker Output (-)
2	0.8 L-GN	200	Right Front Speaker Output (+)

P19X SPEAKER - RIGHT REAR (UQA)

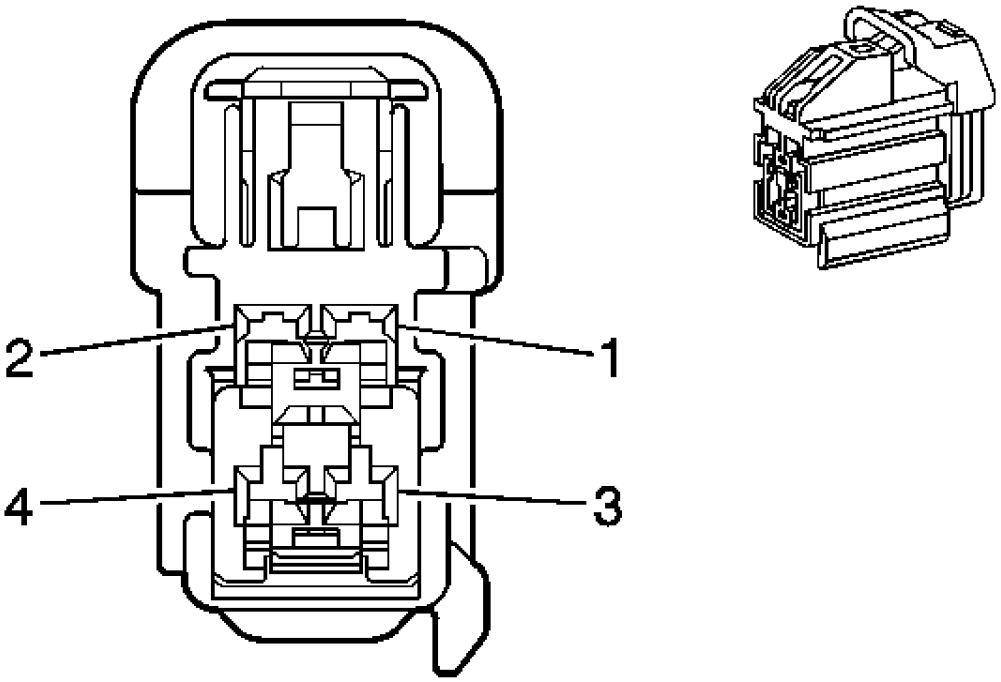


Fig. 41: P19X Speaker - Right Rear (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 10846820
- Service: 88988452
- Description: 4-Way F Kaizen YESC Series (L-GY)

Terminal Part Information

- Terminal/Tray: 33012-3002/26
- Core/Insulation Crimp: A/E/A/C
- Release Tool: J-38125-217

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- Test Probe: J-35616-14 (GN)

P19X Speaker - Right Rear (UQA)

Pin	Wire	Circuit	Function
1	0.8 L-BU/BK	5772	Right Subwoofer Speaker Output (-)
2	0.8 L-BU	5762	Right Subwoofer Speaker Output (+)
3	1 L-BU/BK	315	Right Subwoofer Speaker Output (-)
4	1 D-GN	1795	Right Subwoofer Speaker Output (+)

P19X SPEAKER - RIGHT REAR (UQ3)

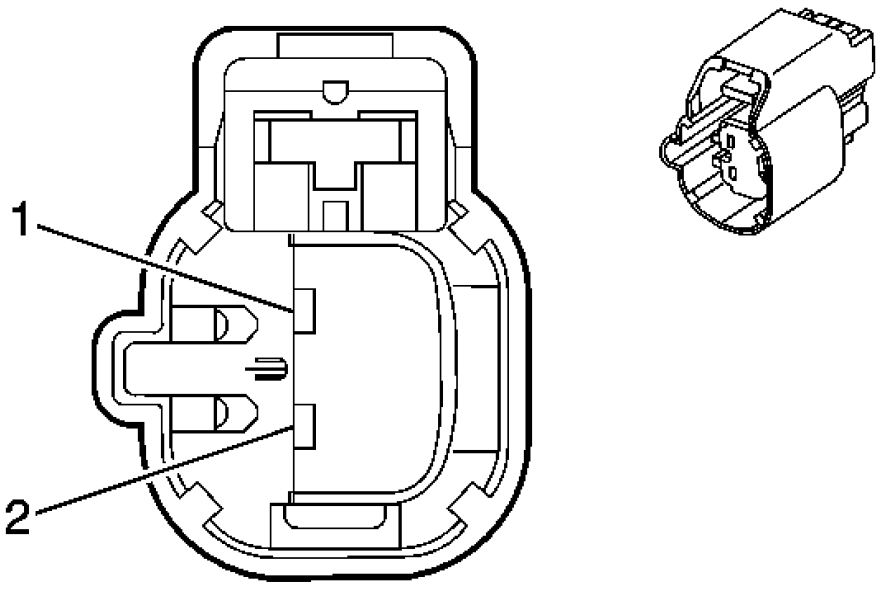


Fig. 42: P19X Speaker - Right Rear (UQ3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 13665500
- Service: 19179953
- Description: 2-Way F GT 150 Series (BK)

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Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

P19X Speaker - Right Rear (UQ3)

Pin	Wire	Circuit	Function
1	0.8 L-BU	115	Right Rear Speaker Output (-)
2	0.8 D-BU	46	Right Rear Speaker Output (+)

P2 TRANSMISSION SHIFT LEVER POSITION INDICATOR (MYB OR MYC)

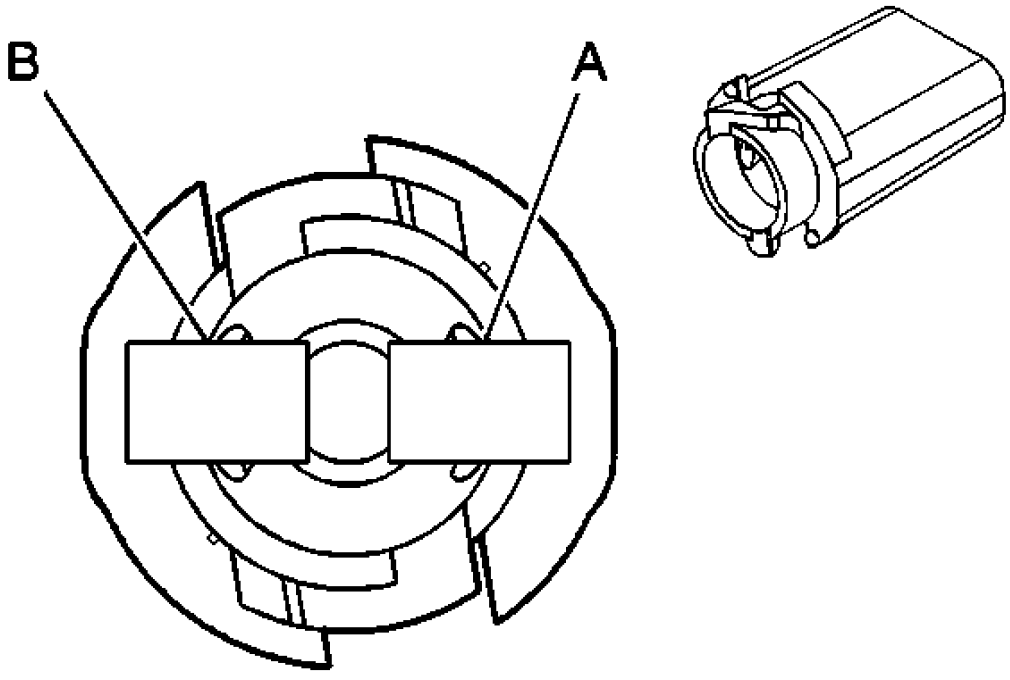


Fig. 43: P2 Transmission Shift Lever Position Indicator (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: A/T Shifter
- OEM: 12162711
- Service: Service by Harness - See Part Catalog
- Description: 2-Way Lamp Socket Wedge Base W2 (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

P2 Transmission Shift Lever Position Indicator (MYB or MYC)

Pin	Wire	Circuit	Function
A	0.5 YE	6817	LED Backlight Dimming Control
B	0.5 BK	1550	Ground

P26 AUXILIARY GAGE MODULE (UMQ)

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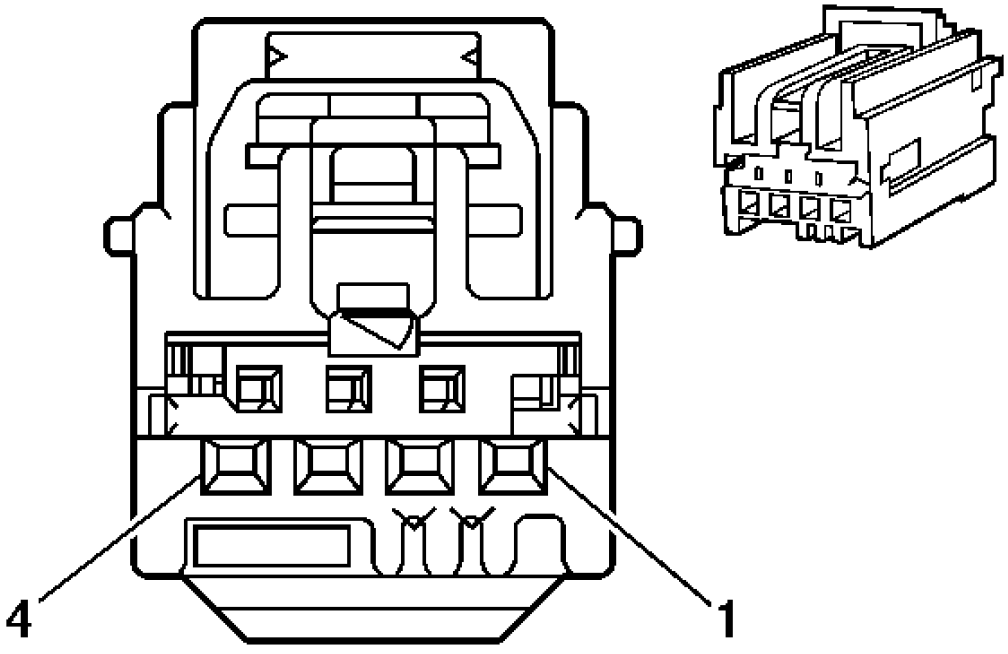


Fig. 44: P26 Auxiliary Gage Module (UMQ) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Console Cap Link
- OEM: 15491295
- Service: 19149305
- Description: 4-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

P26 Auxiliary Gage Module (UMQ)

Pin	Wire	Circuit	Function
1	0.5 RD/WH	2840	Battery Positive Voltage

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2	0.5 BK	1650	Ground
3	0.35 D-GN	5060	Low Speed GMLAN Serial Data
4	-	-	Not Used

Q12 EVAPORATIVE EMISSION (EVAP) PURGE SOLENOID VALVE (L99 OR LS3)

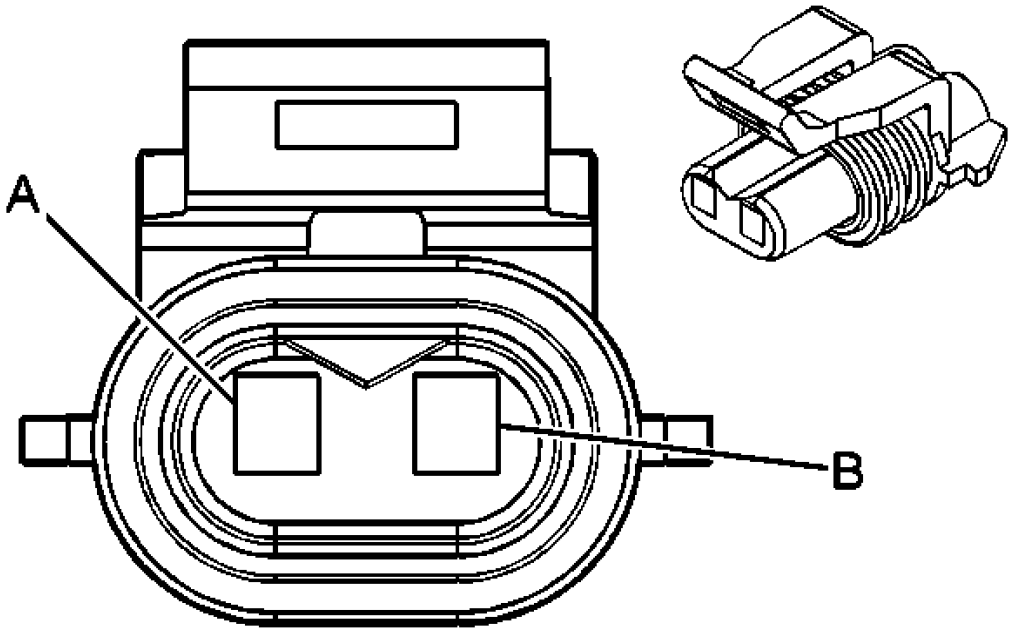


Fig. 45: Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12124037
- Service: 12101858
- Description: 2-Way F Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429

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- Test Probe: J-35616-14 (GN)

Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5293	Ignition Voltage
B	0.5 D-GN/WH	428	EVAP Canister Purge Solenoid Control

Q12 EVAPORATIVE EMISSION (EVAP) PURGE SOLENOID VALVE (LLT)

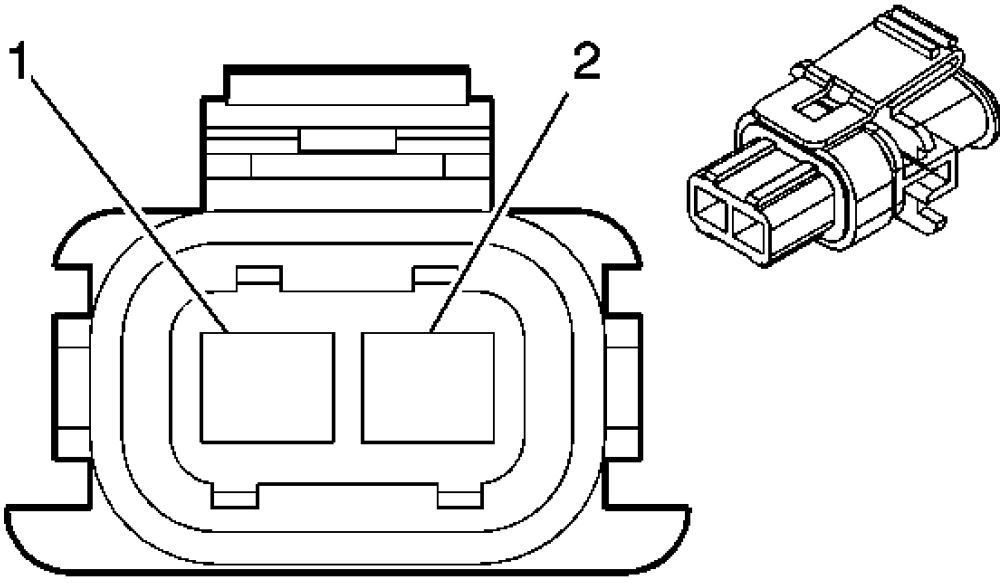


Fig. 46: Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 10740370
- Service: 88988586
- Description: 2-Way F 2.8 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 1928498056/8

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- Core/Insulation Crimp: E/1
- Release Tool: J-38125-561
- Test Probe: J-35616-35 (VT)

Q12 Evaporative Emission (EVAP) Purge Solenoid Valve (LLT)

Pin	Wire	Circuit	Function
1	0.8 PK/BK	5293	Ignition Voltage
2	0.8 D-GN/WH	428	EVAP Canister Purge Solenoid Control

Q13 EVAPORATIVE EMISSION (EVAP) VENT SOLENOID VALVE

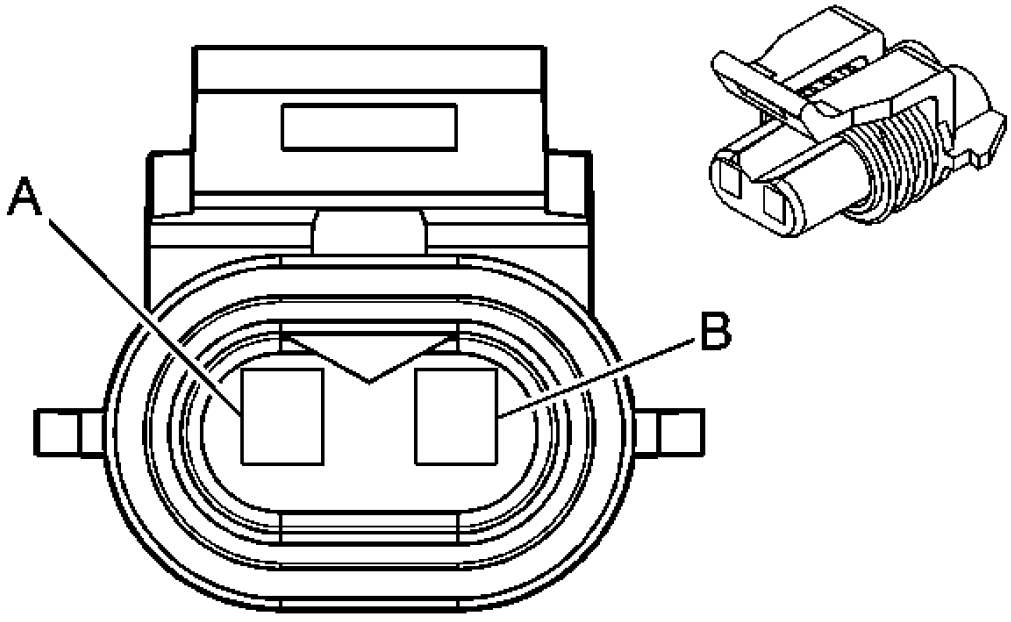


Fig. 47: Q13 Evaporative Emission (EVAP) Vent Solenoid Valve Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Fuel Tank
- OEM: 12052643
- Service: 12101858
- Description: 2-Way F Metri-Pack 150 Series, Sealed (RD)

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Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Q13 Evaporative Emission (EVAP) Vent Solenoid Valve

Pin	Wire	Circuit	Function
A	0.5 RD	2440	Battery Positive Voltage (Early Production)
	0.5 RD/WH	2440	Battery Positive Voltage Late Production)
B	0.5 BN	1310	EVAP Canister Vent Solenoid Control (Early Production)
	0.5 WH	1310	EVAP Canister Vent Solenoid Control (Late Production)

Q17A FUEL INJECTOR 1 (L99 OR LS3)

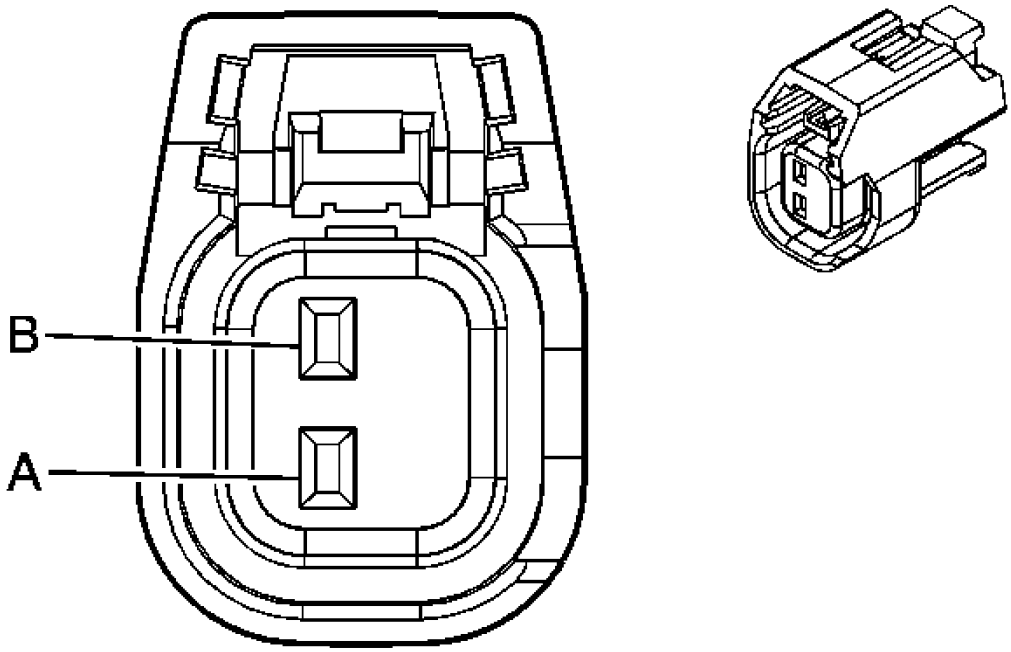


Fig. 48: Q17A Fuel Injector 1 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

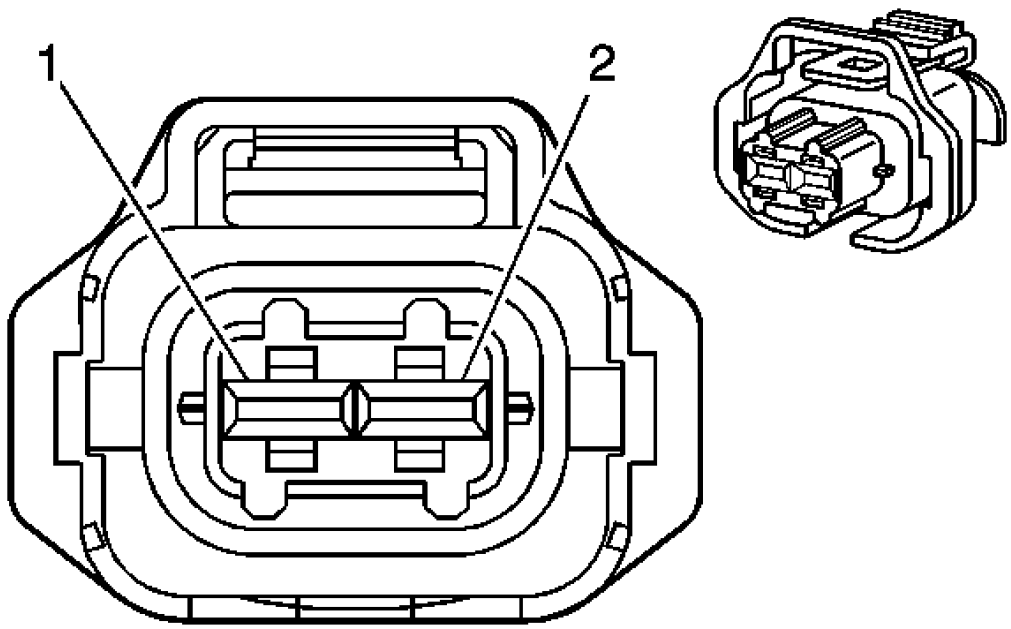
Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17A Fuel Injector 1 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5291	Ignition Voltage
B	0.5 TN	1744	Fuel Injector 1 Control

Q17A FUEL INJECTOR 1 (LLT)



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Fig. 49: Q17A Fuel Injector 1 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Odd)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q17A Fuel Injector 1 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4801	Fuel Injector 1 Low Control
2	1 BK	4901	Fuel Injector 1 High Control

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COMPONENT CONNECTOR END VIEWS

Q17B FUEL INJECTOR 2 (L99 OR LS3)

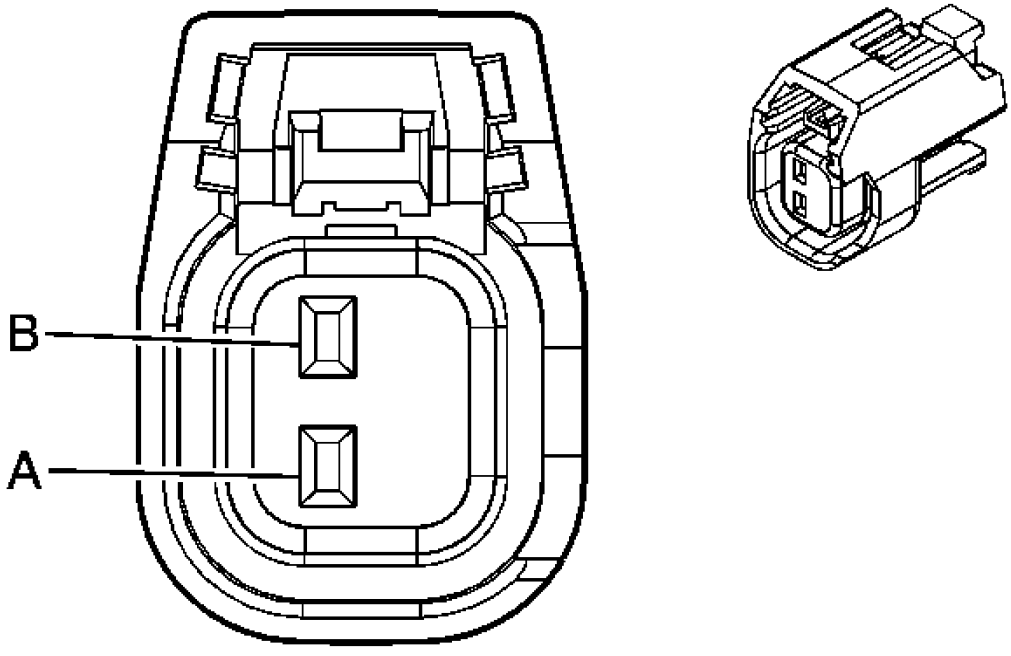


Fig. 1: Q17B Fuel Injector 2 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8

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- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17B Fuel Injector 2 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5292	Ignition Voltage
B	0.5 L-GN/BK	1745	Fuel Injector 2 Control

Q17B FUEL INJECTOR 2 (LLT)

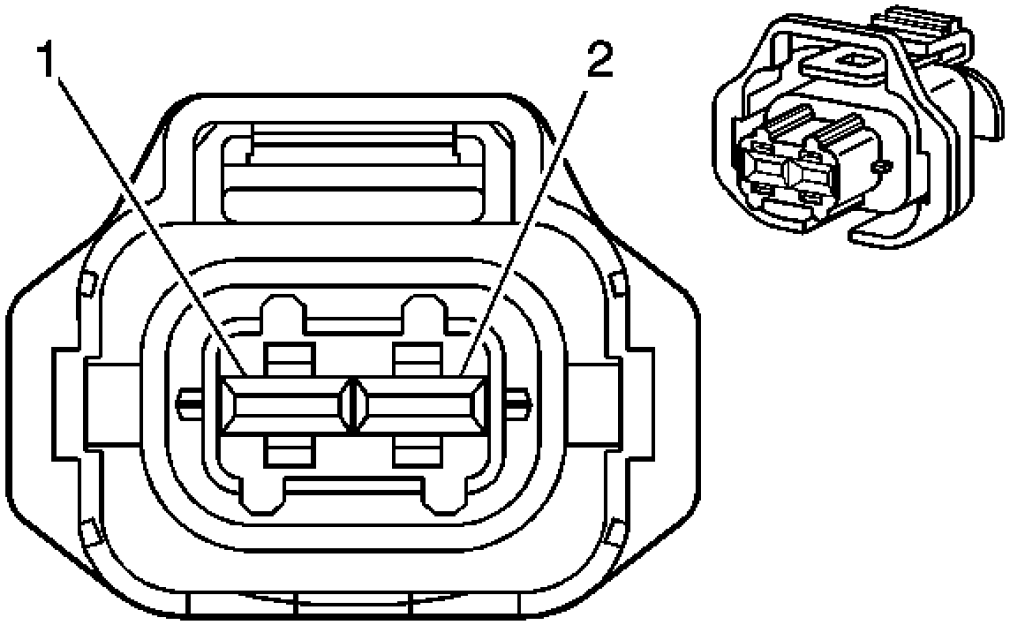


Fig. 2: Q17B Fuel Injector 2 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Even)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

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Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q17B Fuel Injector 2 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4802	Fuel Injector 2 Low Control
2	1 BK	4902	Fuel Injector 2 High Control

Q17C FUEL INJECTOR 3 (L99 OR LS3)

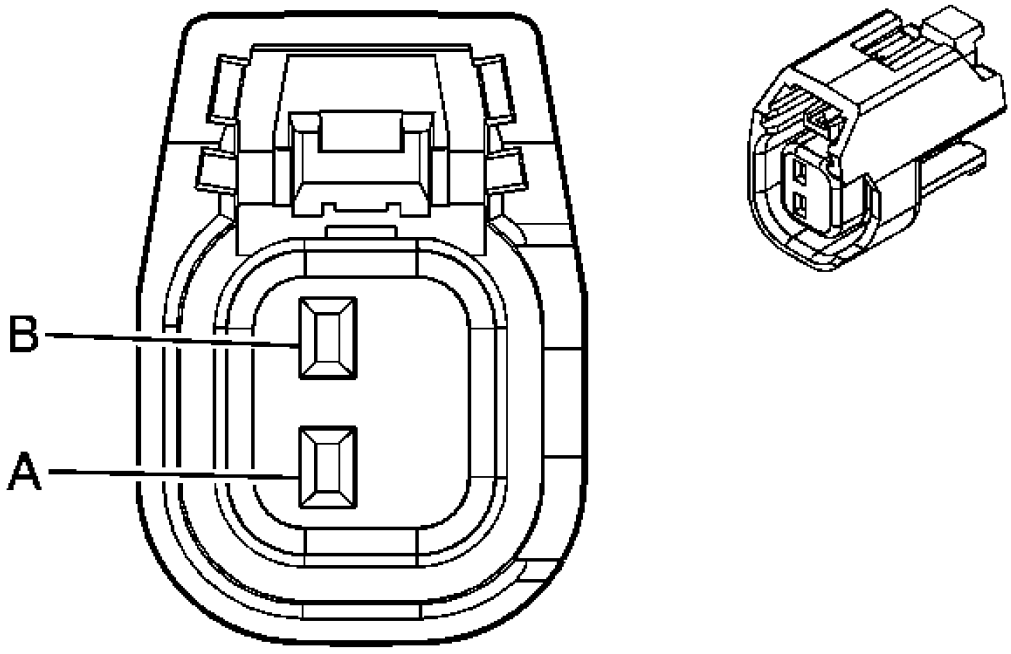


Fig. 3: Q17C Fuel Injector 3 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine

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- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17C Fuel Injector 3 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5291	Ignition Voltage
B	0.5 PK/BK	1746	Fuel Injector 3 Control

Q17C FUEL INJECTOR 3 (LLT)

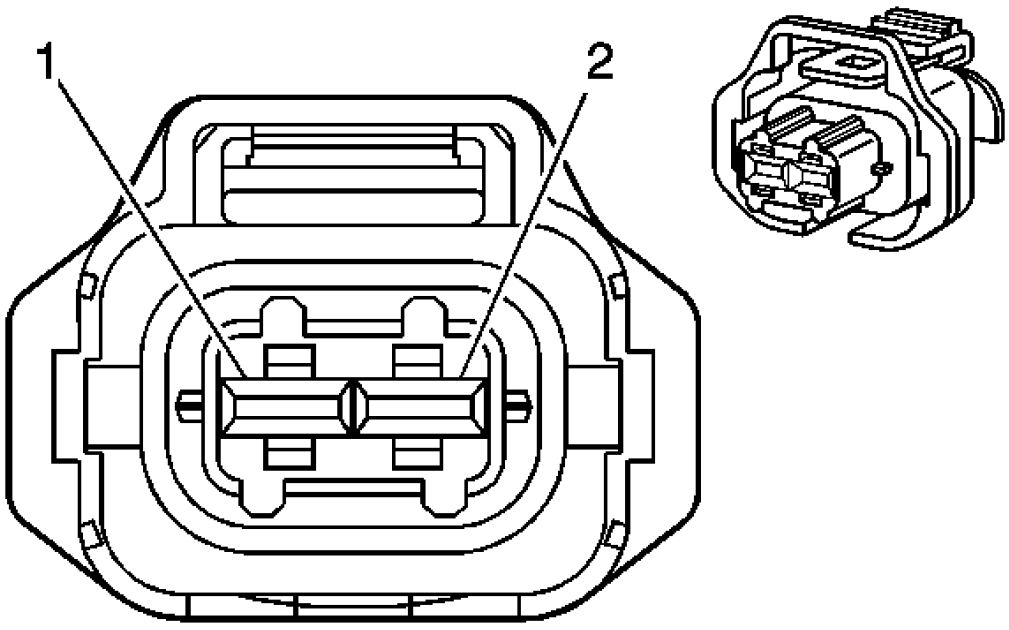


Fig. 4: Q17C Fuel Injector 3 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Injectors (Odd)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

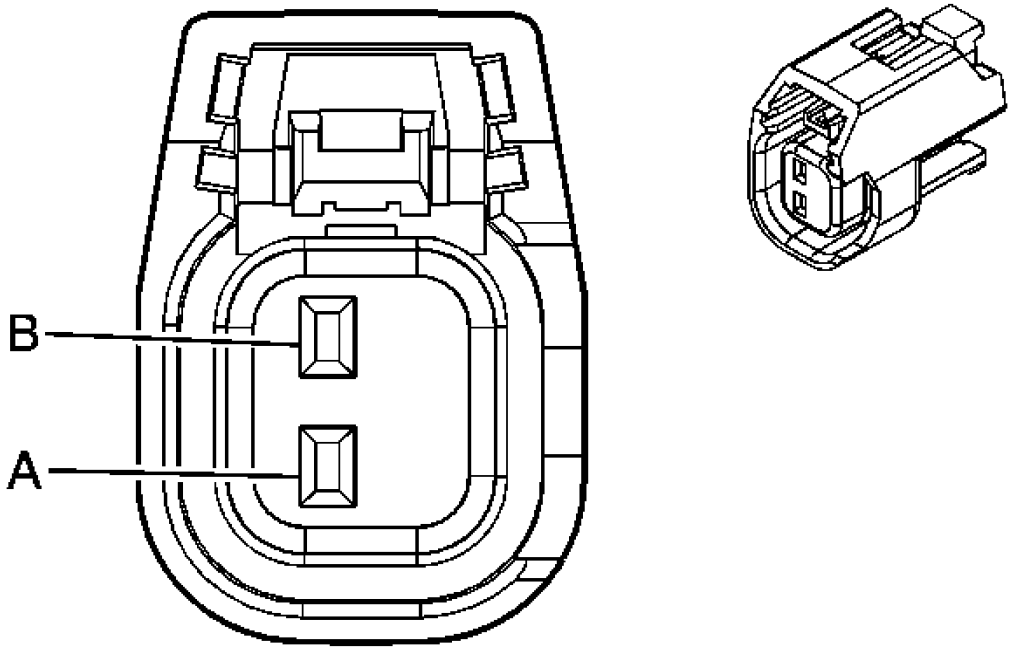
Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q17C Fuel Injector 3 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4803	Fuel Injector 3 Low Control
2	1 BK	4903	Fuel Injector 3 High Control

Q17D FUEL INJECTOR 4 (L99 OR LS3)



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Fig. 5: Q17D Fuel Injector 4 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17D Fuel Injector 4 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5292	Ignition Voltage
B	0.5 L-BU/BK	844	Fuel Injector 4 Control

Q17D FUEL INJECTOR 4 (LLT)

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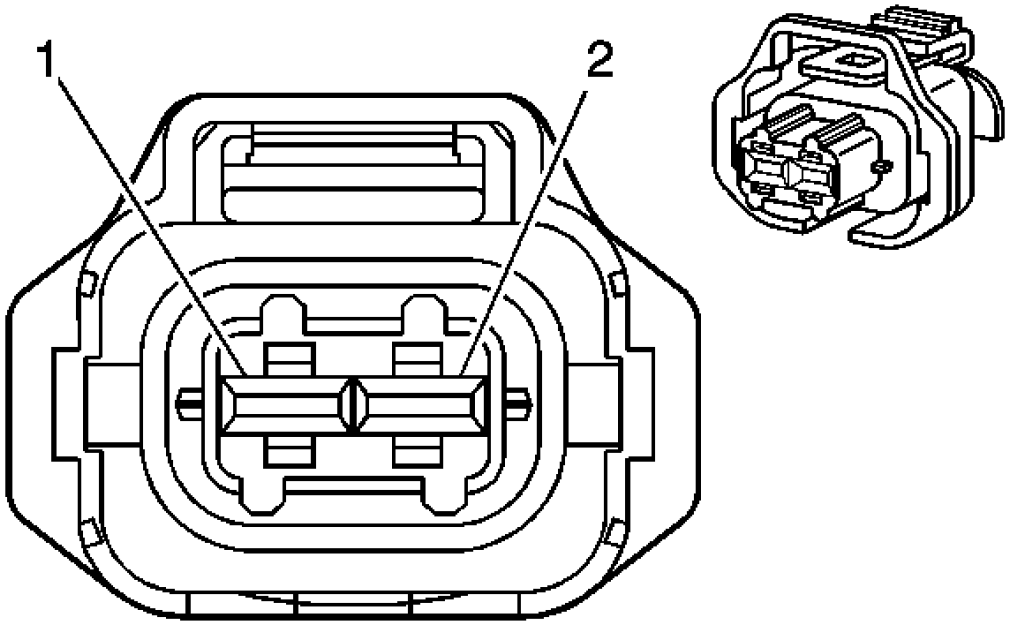


Fig. 6: Q17D Fuel Injector 4 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Even)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q17D Fuel Injector 4 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4804	Fuel Injector 4 Low Control
2	1 BK	4904	Fuel Injector 4 High Control

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Q17E FUEL INJECTOR 5 (L99 OR LS3)

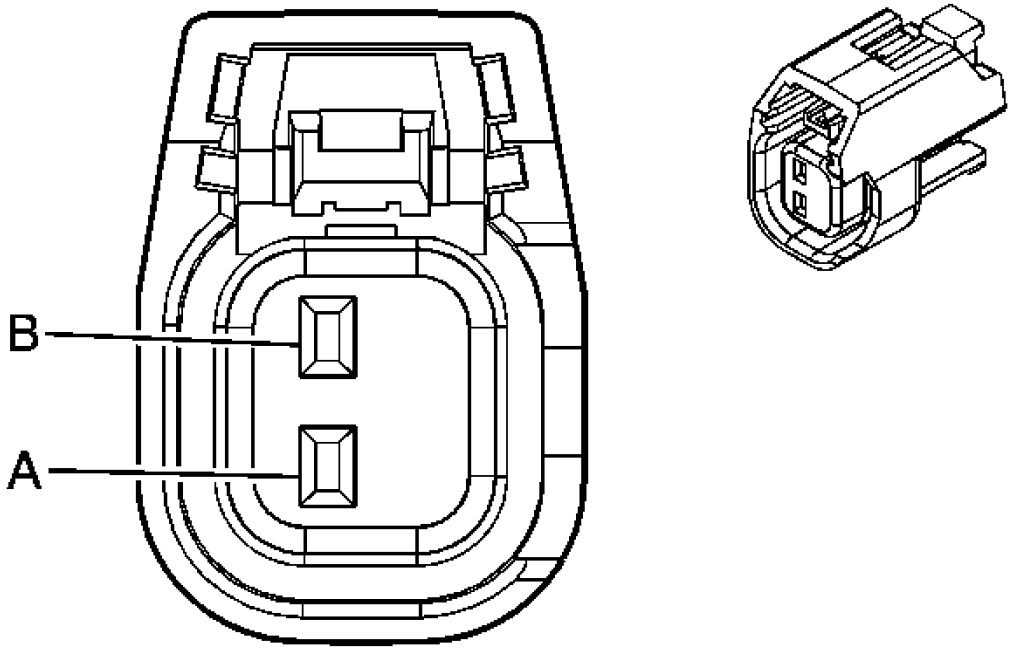


Fig. 7: Q17E Fuel Injector 5 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17E Fuel Injector 5 (L99 or LS3)

Pin	Wire	Circuit	Function

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A	0.5 PK/BK	5291	Ignition Voltage
B	0.5 TN/WH	845	Fuel Injector 5 Control

Q17E FUEL INJECTOR 5 (LLT)

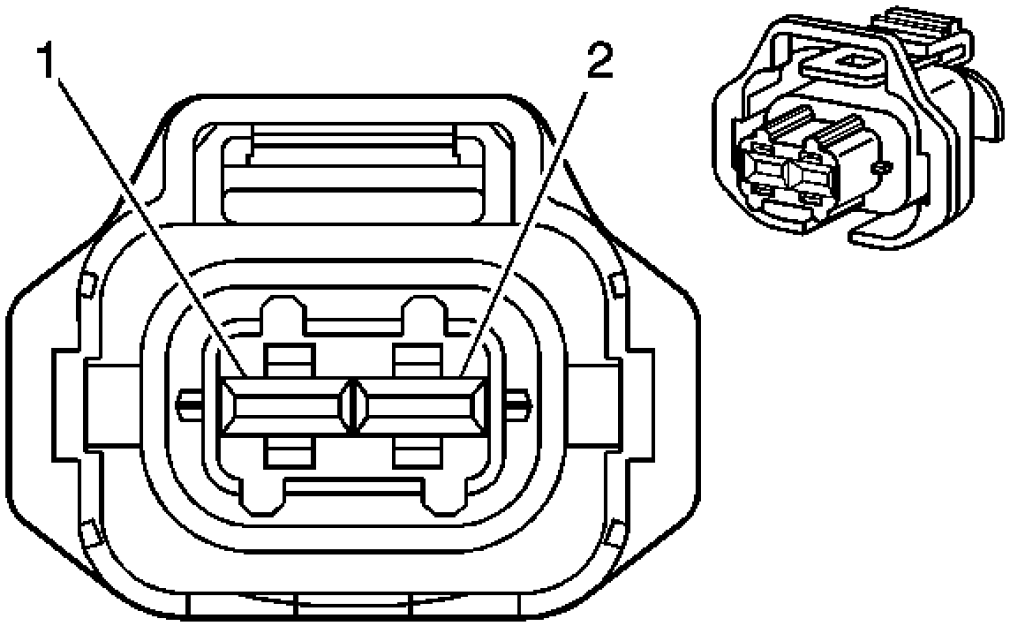


Fig. 8: Q17E Fuel Injector 5 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Odd)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

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Q17E Fuel Injector 5 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4805	Fuel Injector 5 Low Control
2	1 BK	4905	Fuel Injector 5 High Control

Q17F FUEL INJECTOR 6 (L99 OR LS3)

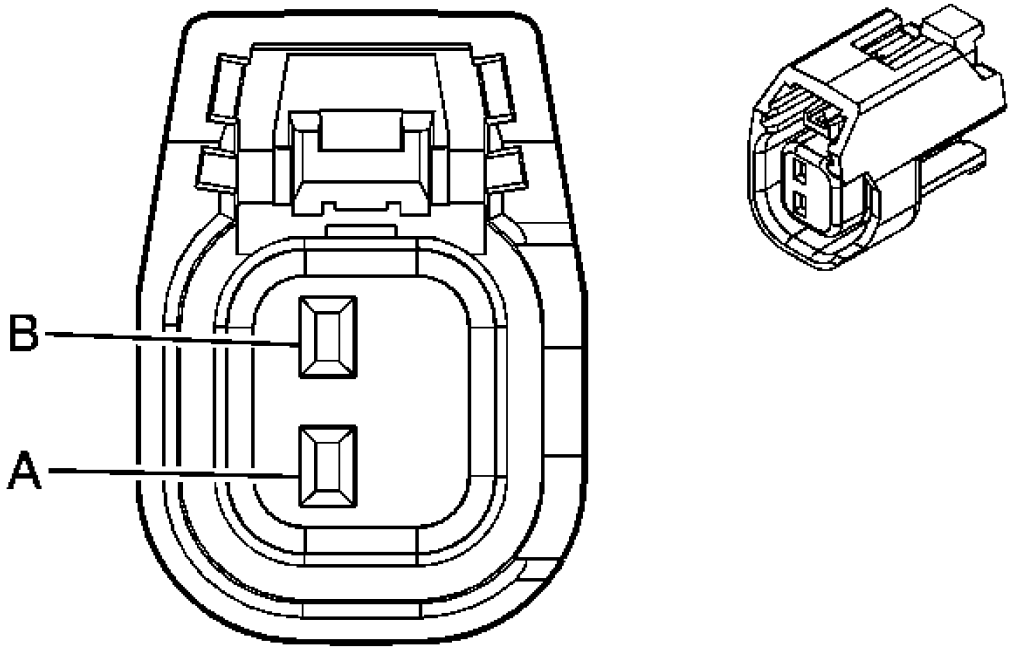


Fig. 9: Q17F Fuel Injector 6 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1

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- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17F Fuel Injector 6 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5292	Ignition Voltage
B	0.5 YE/BK	846	Fuel Injector 6 Control

Q17F FUEL INJECTOR 6 (LLT)

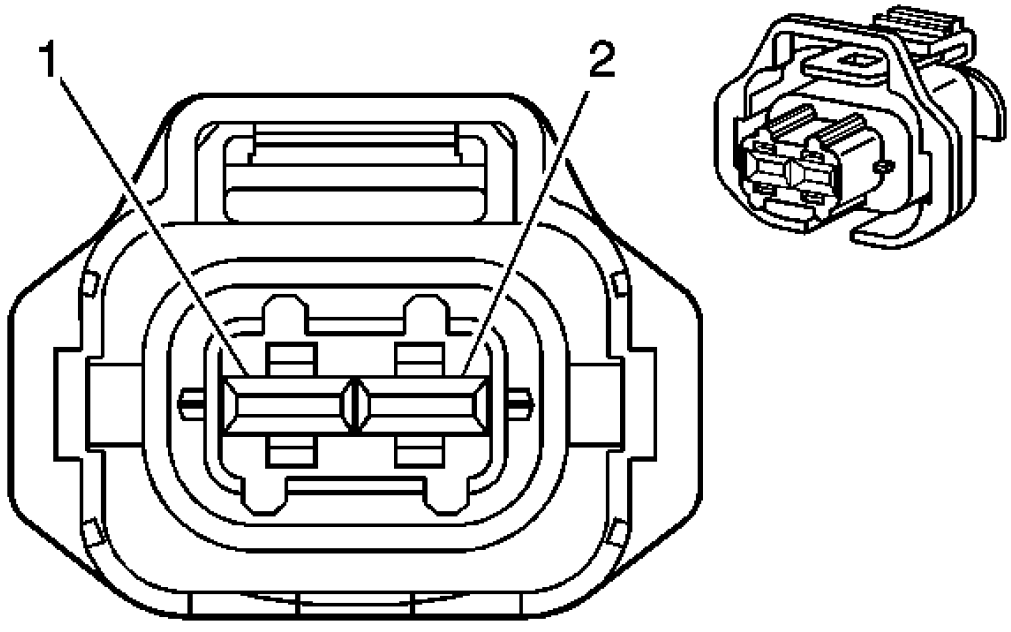


Fig. 10: Q17F Fuel Injector 6 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Injectors (Even)
- OEM: 1928403874
- Service: 88988163
- Description: 2-Way F Kompakt 280 Series, Sealed (BK)

Terminal Part Information

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- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q17F Fuel Injector 6 (LLT)

Pin	Wire	Circuit	Function
1	1 BN	4806	Fuel Injector 6 Low Control
2	1 BK	4906	Fuel Injector 6 High Control

Q17G FUEL INJECTOR 7 (L99 OR LS3)

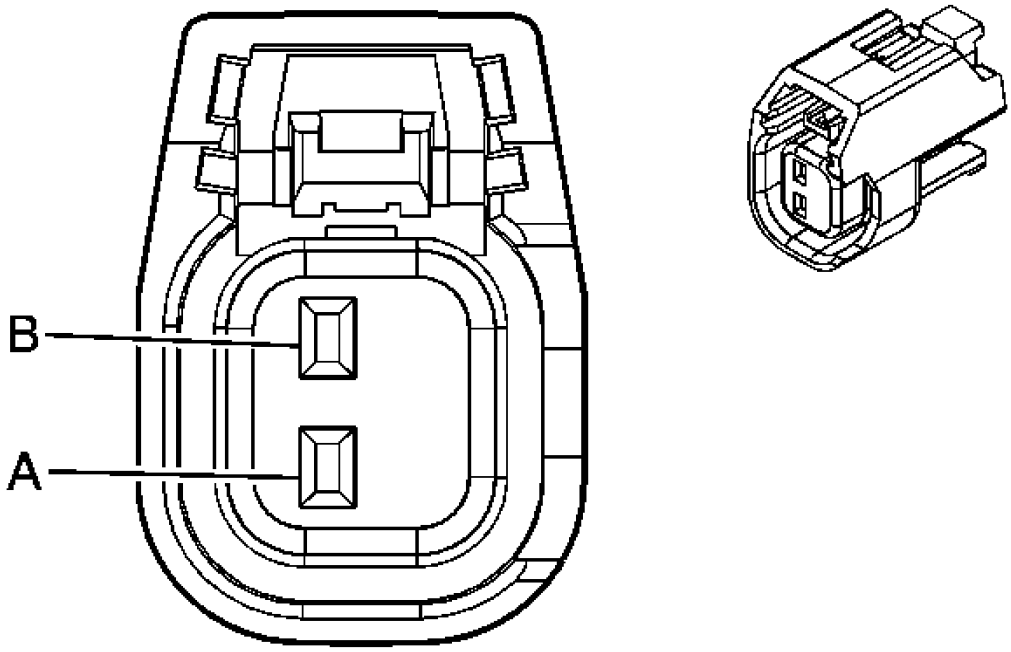


Fig. 11: Q17G Fuel Injector 7 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15419715

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- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17G Fuel Injector 7 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5291	Ignition Voltage
B	0.5 OG/BK	877	Fuel Injector 7 Control

Q17H FUEL INJECTOR 8 (L99 OR LS3)

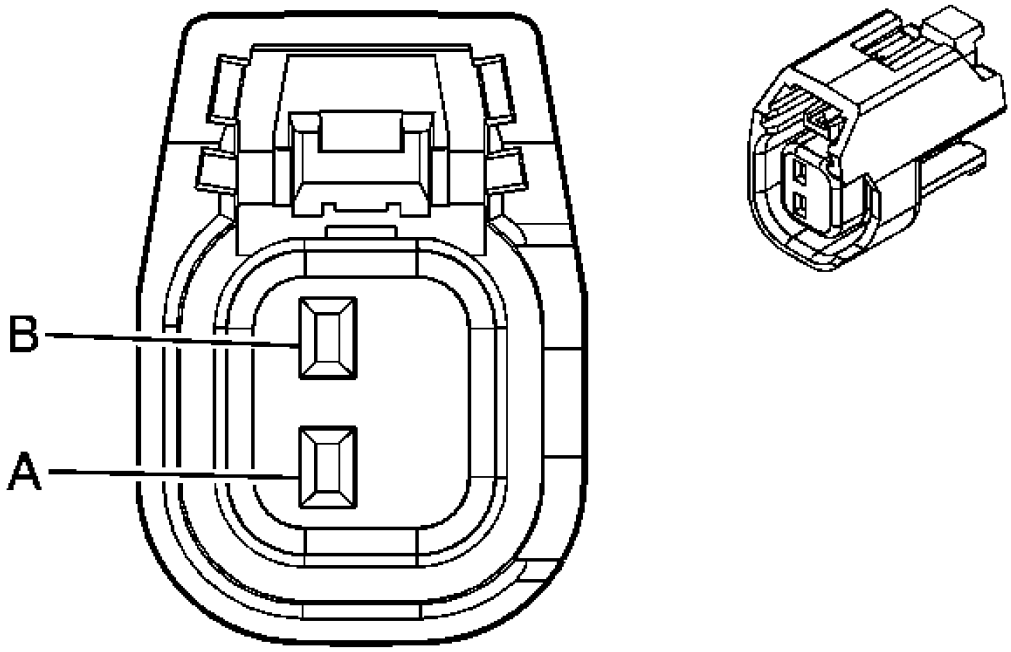


Fig. 12: Q17H Fuel Injector 8 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series, Sealed (GY)

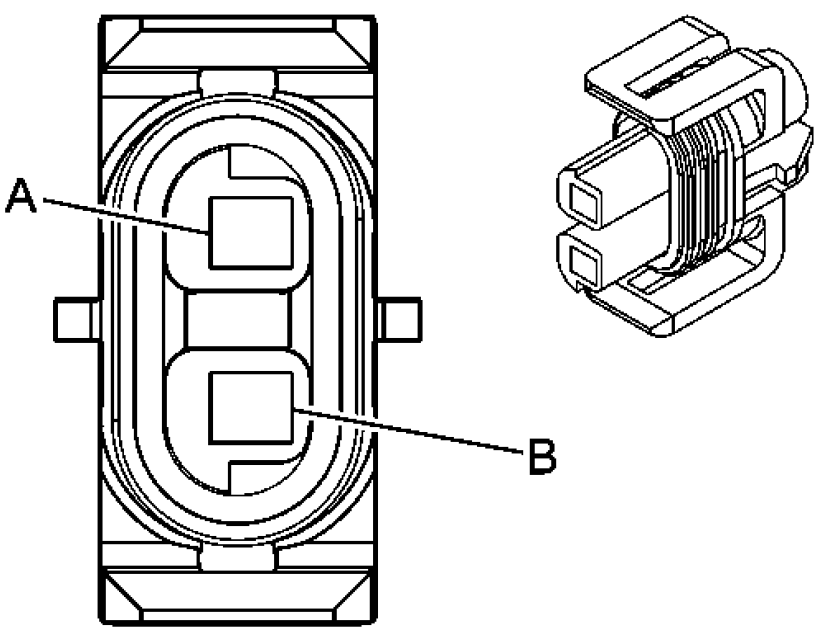
Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q17H Fuel Injector 8 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.5 PK/BK	5292	Ignition Voltage
B	0.5 D-BU/WH	878	Fuel Injector 8 Control

Q2 A/C COMPRESSOR CLUTCH



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Fig. 13: Q2 A/C Compressor Clutch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine Harness
- OEM: 12162017
- Service: 12101937
- Description: 2-Way F Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Q2 A/C Compressor Clutch

Pin	Wire	Circuit	Function
A	0.5 BK	2650	Ground
B	0.5 D-GN	59	A/C Compressor Clutch Supply Voltage

Q34 SKIP SHIFT SOLENOID ACTUATOR (M10)

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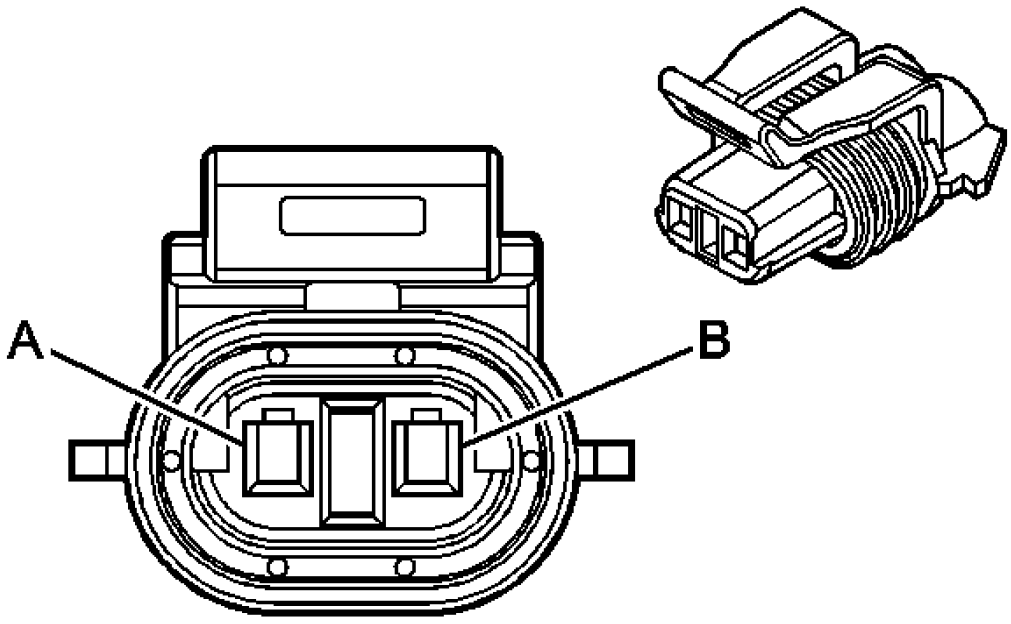


Fig. 14: Q34 Skip Shift Solenoid Actuator (M10) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 12052646
- Service: 12101857
- Description: 2-Way F Metri-Pack 150 Sealed (WH)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Q34 Skip Shift Solenoid Actuator (M10)

Pin	Wire	Circuit	Function
A	0.5 PK	239	Ignition Voltage
B	0.5 GY	587	Skip/Shift Solenoid Control

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Q38 THROTTLE BODY (L99 OR LS3)

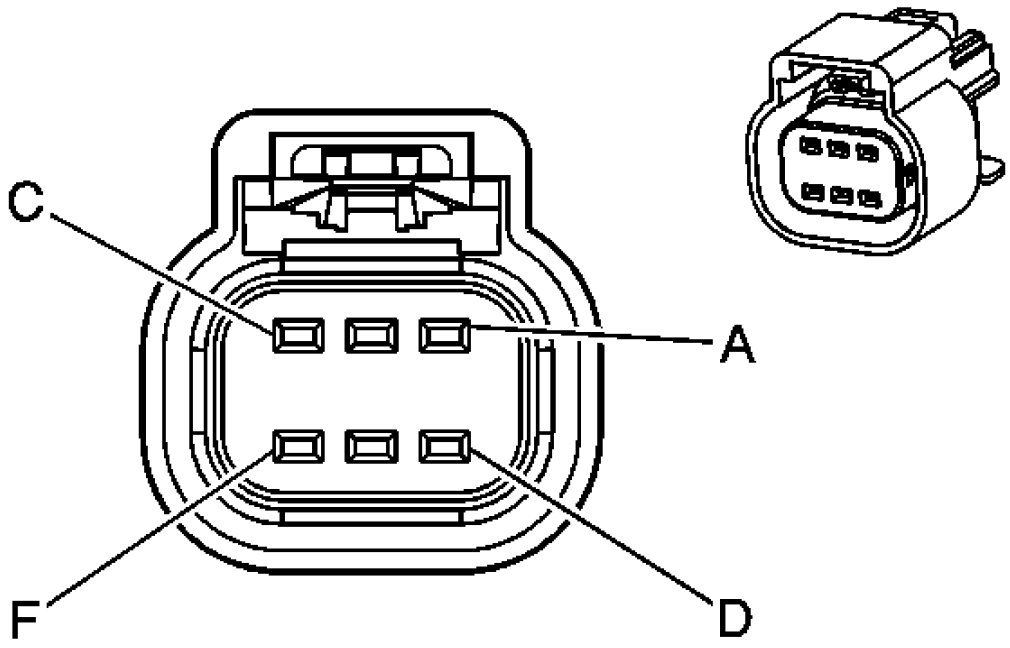


Fig. 15: Q38 Throttle Body (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15418497
- Service: 19207180
- Description: 6-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326427/5
- Core/Insulation Crimp: Pins A, B - 2/1
- Core/Insulation Crimp: Pins C, D, E, F - E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q38 Throttle Body (L99 or LS3)

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Pin	Wire	Circuit	Function
A	0.8 BN	582	TAC Motor Control - 2
B	0.8 YE	581	TAC Motor Control - 1
C	0.5 TN	2752	Low Reference
D	0.5 D-GN	485	TP Sensor 1 Signal
E	0.5 GY	2701	5-Volt Reference 2
F	0.5 PU	486	TP Sensor 2 Signal

Q38 THROTTLE BODY (LLT)

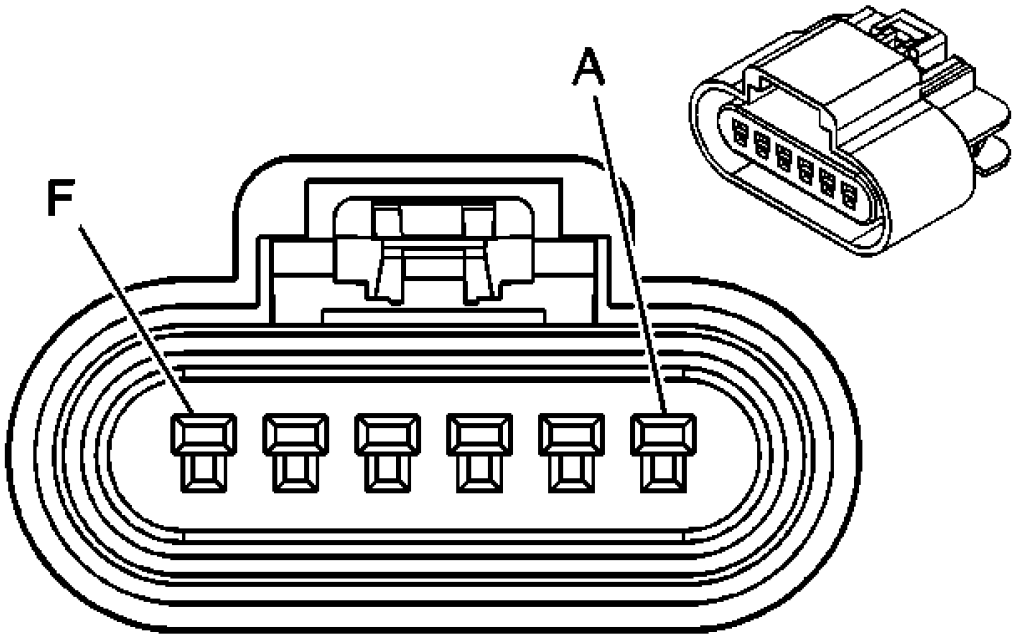


Fig. 16: Q38 Throttle Body (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15397577
- Service: 88988944
- Description: 6-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

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- Terminal/Tray: 15326427/5
- Core/Insulation Crimp: Pins A, B - 2/1
- Core/Insulation Crimp: Pins C, D, E, F - E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Q38 Throttle Body (LLT)

Pin	Wire	Circuit	Function
A	0.8 BN	582	TAC Motor Control - 2
B	0.8 YE	581	TAC Motor Control - 1
C	0.5 TN	2752	Low Reference
D	0.5 D-GN	485	TP Sensor 1 Signal
E	0.5 GY	2701	5-Volt Reference 3
F	0.5 PU	486	TP Sensor 2 Signal

Q43 VALVE LIFTER OIL MANIFOLD ASSEMBLY (L99)

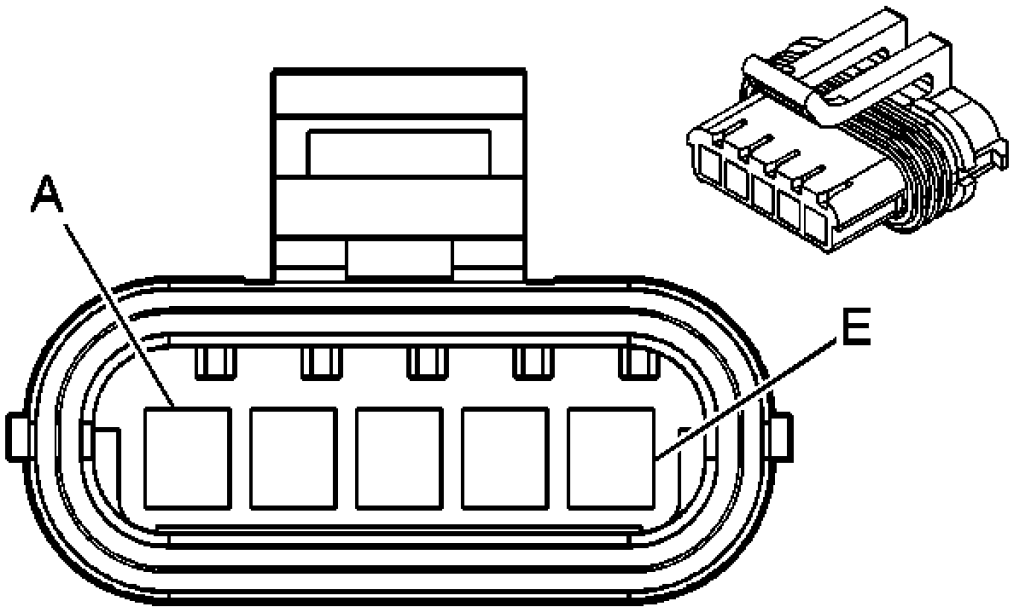


Fig. 17: Q43 Valve Lifter Oil Manifold Assembly (L99) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Engine
- OEM: 12186057
- Service: 15306027
- Description: 5-Way F Metri-Pack 150.2, Pull To Seat Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12124075/5
- Core/Insulation Crimp: E/C
- Release Tool: 12180559-1
- Test Probe: J-35616-14 (GN)

Q43 Valve Lifter Oil Manifold Assembly (L99)

Pin	Wire	Circuit	Function
A	0.5 OG	5494	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 4 Shutoff Solenoid
B	0.5 GY	5493	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 6 Shutoff Solenoid
C	0.5 D-BU	5491	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 1 Shutoff Solenoid
D	0.5 L-GN	5492	Valve Lifter Oil Manifold (VLOM) Assembly Cylinder 7 Shutoff Solenoid
E	0.5 PK	239	Ignition Voltage

Q6 CAMSHAFT POSITION ACTUATOR SOLENOID VALVE (L99)

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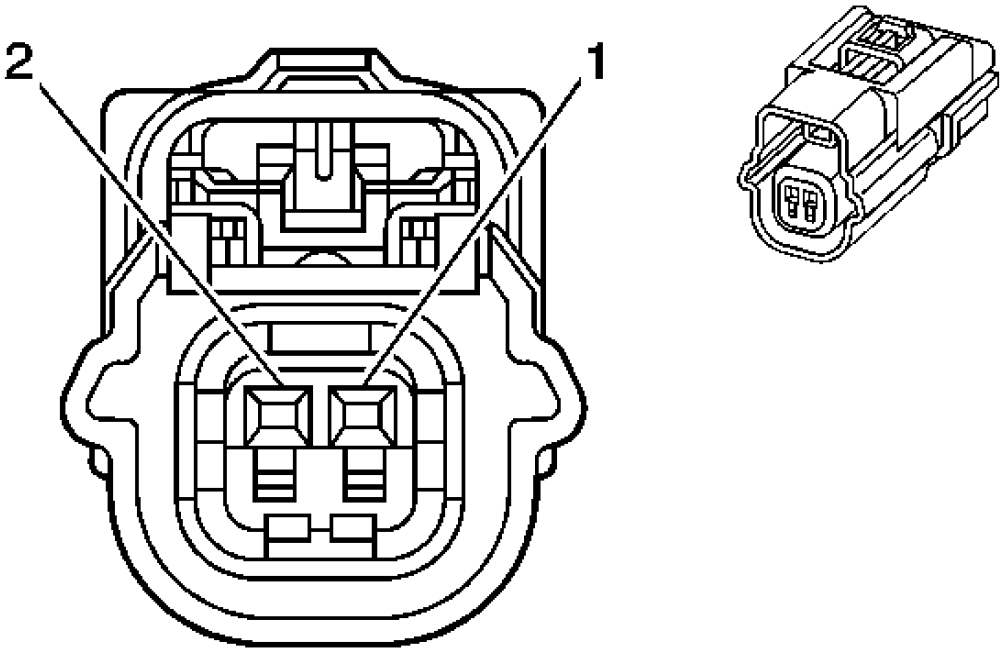


Fig. 18: Q6 Camshaft Position Actuator Solenoid Valve (L99) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Camshaft Position (CMP) Sensor and Camshaft Position (CMP) Actuator Solenoid Valve
- OEM: 13528494
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 0.64 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

Q6 Camshaft Position Actuator Solenoid Valve (L99)

Pin	Wire	Circuit	Function
1	0.5 PU	5284	CMP Actuator Solenoid Control

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2	0.5 TN	2199	Low Reference

Q6A CAMSHAFT POSITION ACTUATOR SOLENOID VALVE - BANK 1 EXHAUST (LLT)

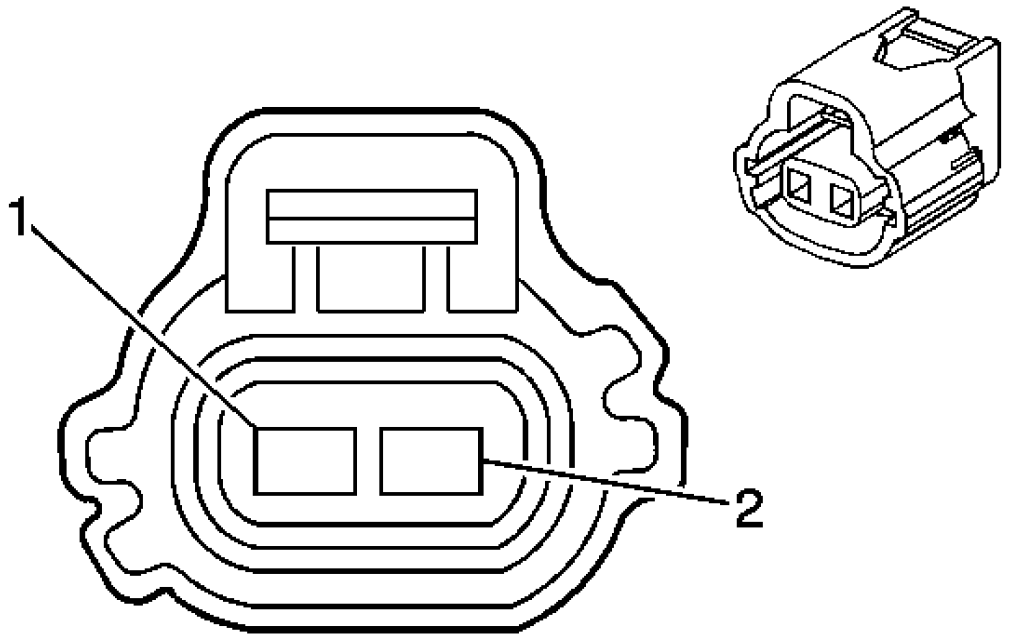


Fig. 19: Q6A Camshaft Position Actuator Solenoid Valve - Bank 1 Exhaust (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15411401
- Service: 88988588
- Description: 2-Way F Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4026/11
- Core/Insulation Crimp: E/1
- Release Tool: 15313892
- Test Probe: J-35616-18 (BK)

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Q6A Camshaft Position Actuator Solenoid Valve - Bank 1 Exhaust (LLT)

Pin	Wire	Circuit	Function
1	0.8 PK/BK	5293	Ignition Voltage
2	0.8 L-GN	5282	CMP Actuator Solenoid Control - Exhaust Bank 1

Q6B CAMSHAFT POSITION ACTUATOR SOLENOID VALVE - BANK 1 INTAKE (LLT)

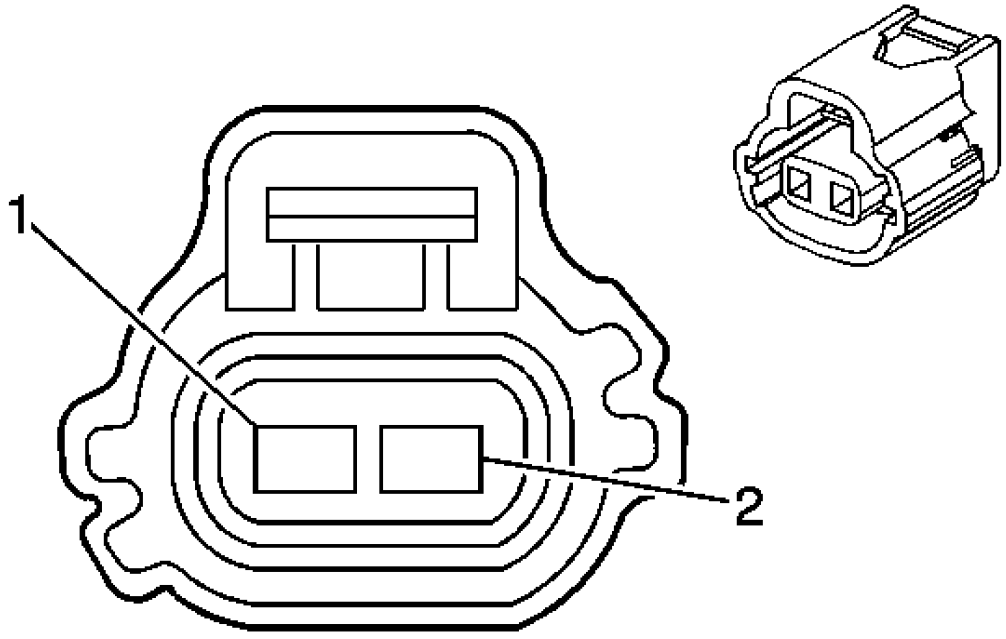


Fig. 20: Q6B Camshaft Position Actuator Solenoid Valve - Bank 1 Intake (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15411401
- Service: 88988588
- Description: 2-Way F Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4026/11

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- Core/Insulation Crimp: E/1
- Release Tool: 15313892
- Test Probe: J-35616-18 (BK)

Q6B Camshaft Position Actuator Solenoid Valve - Bank 1 Intake (LLT)

Pin	Wire	Circuit	Function
1	0.8 PK/BK	5293	Ignition Voltage
2	0.8 PU	5284	CMP Actuator Solenoid Control - Intake Bank 1

Q6C CAMSHAFT POSITION ACTUATOR SOLENOID VALVE - BANK 2 EXHAUST (LLT)

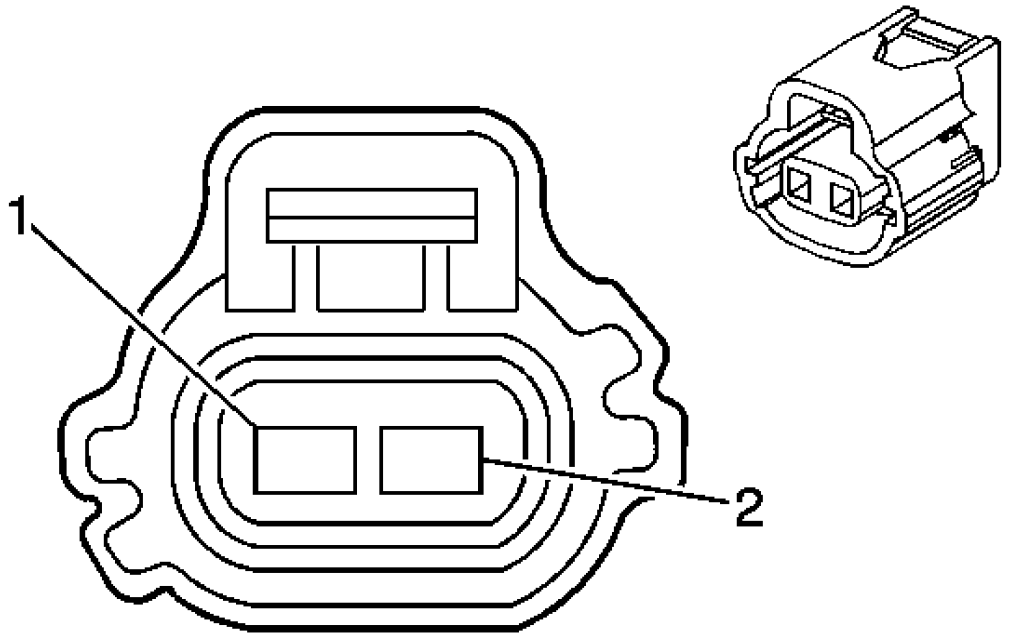


Fig. 21: Q6C Camshaft Position Actuator Solenoid Valve - Bank 2 Exhaust (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15411401
- Service: 88988588

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- Description: 2-Way F Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4026/11
- Core/Insulation Crimp: E/1
- Release Tool: 15313892
- Test Probe: J-35616-18 (BK)

Q6C Camshaft Position Actuator Solenoid Valve - Bank 2 Exhaust (LLT)

Pin	Wire	Circuit	Function
1	0.8 PK/BK	5293	Ignition Voltage
2	0.8 WH/BK	5283	CMP Actuator Solenoid Control - Exhaust Bank 2

Q6D CAMSHAFT POSITION ACTUATOR SOLENOID VALVE - BANK 2 INTAKE (LLT)

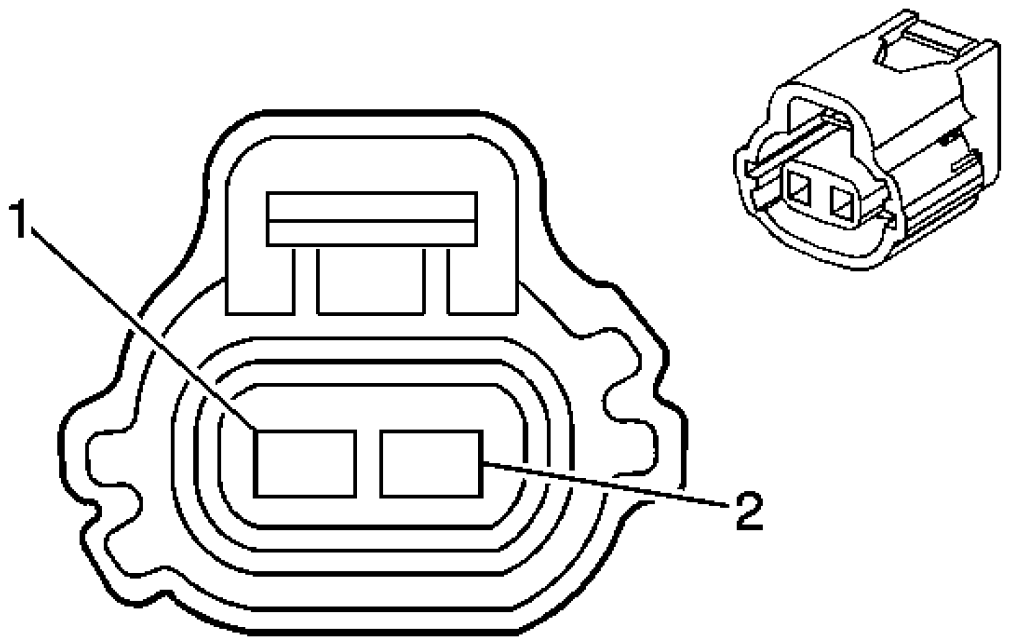


Fig. 22: Q6D Camshaft Position Actuator Solenoid Valve - Bank 2 Intake (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Engine
- OEM: 15411401
- Service: 88988588
- Description: 2-Way F Sealed (BK)

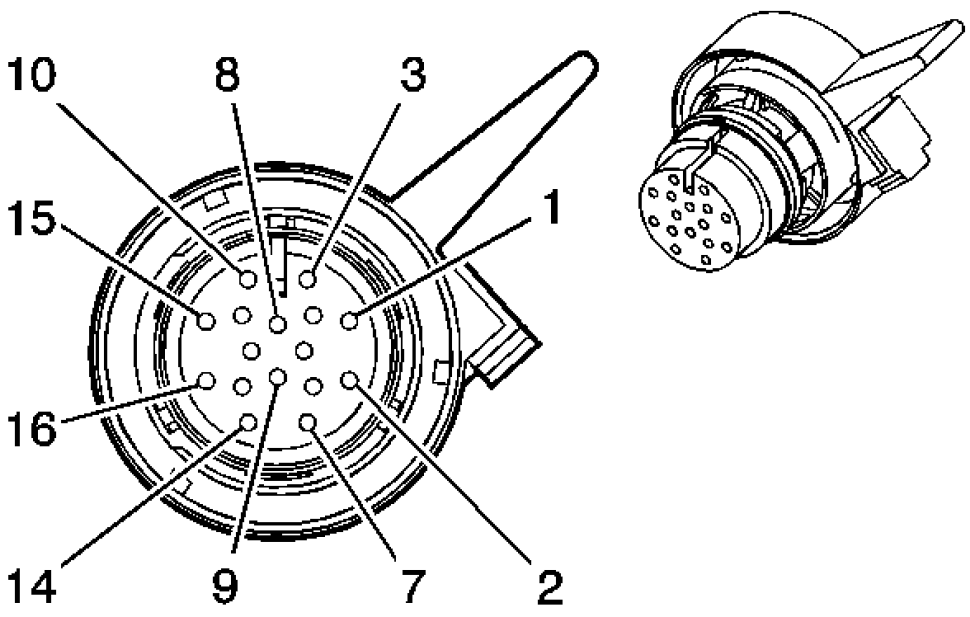
Terminal Part Information

- Terminal/Tray: 7116-4026/11
- Core/Insulation Crimp: E/1
- Release Tool: 15313892
- Test Probe: J-35616-18 (BK)

Q6D Camshaft Position Actuator Solenoid Valve - Bank 2 Intake (LLT)

Pin	Wire	Circuit	Function
1	0.8 PK/BK	5293	Ignition Voltage
2	0.8 OG/BK	5272	CMP Actuator Solenoid Control - Intake Bank 2

Q8 CONTROL SOLENOID VALVE ASSEMBLY X1 (MYB OR MYC)



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Fig. 23: Q8 Control Solenoid Valve Assembly X1 (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15491328
- Service: 15131300
- Description: 16-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 2 21 24 47220 0/12
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-28
- Test Probe: J-35616-66 (YE)

Q8 Control Solenoid Valve Assembly X1 (MYB or MYC)

Pin	Wire	Circuit	Function
1	0.8 RD/WH	1840	Battery Positive Voltage
2	0.5 BK/WH	451	Ground
3	0.5 OG/BK	1786	Park/Neutral Signal
4	0.5 RD/WH	1840	Battery Positive Voltage
5	0.5 BK/WH	451	Ground
6-8	-	-	Not Used
9	0.35 D-BU	5985	Serial Data Wake-Up Signal
10	0.5 TN/BK	2500	High Speed GMLAN Serial Data Bus+
11	0.5 TN	2501	High Speed GMLAN Serial Data Bus -
12	0.5 PK	2139	Ignition Voltage
13	0.5 TN	2501	High Speed GMLAN Serial Data Bus -
14	0.5 TN/BK	2500	High Speed GMLAN Serial Data Bus+
15-16	-	-	Not Used

Q8 CONTROL SOLENOID VALVE ASSEMBLY X2 (MYB OR MYC)

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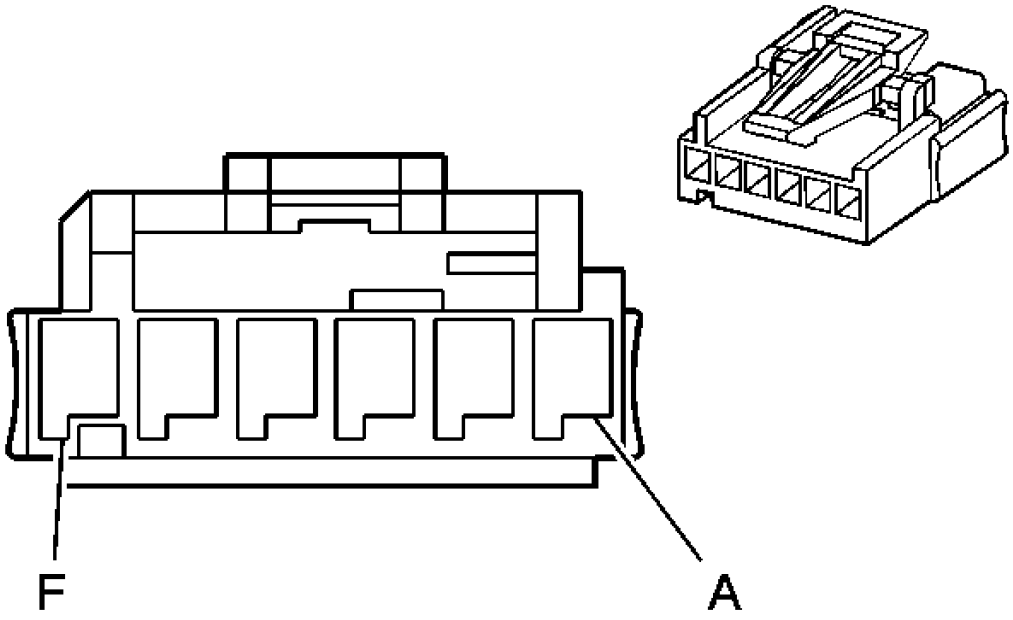


Fig. 24: Q8 Control Solenoid Valve Assembly X2 (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Transmission
- OEM: 15336500
- Service: 89046635
- Description: 6-Way F Metri-Pack 150.2 Series (GN)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

Q8 Control Solenoid Valve Assembly X2 (MYB or MYC)

Pin	Wire	Circuit	Function
A	0.35 GY	-	Ground
B	0.35 BK	-	Transmission Range Switch Signal P
C	0.35 YE	-	Transmission Range Switch Signal C

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D	0.35 RD	-	Transmission Range Switch Signal B
E	0.35 GN	-	Transmission Range Switch Signal A
F	0.35 WH	-	Park/Neutral Switch Signal

Q8 CONTROL SOLENOID VALVE ASSEMBLY X3 (MYB OR MYC)

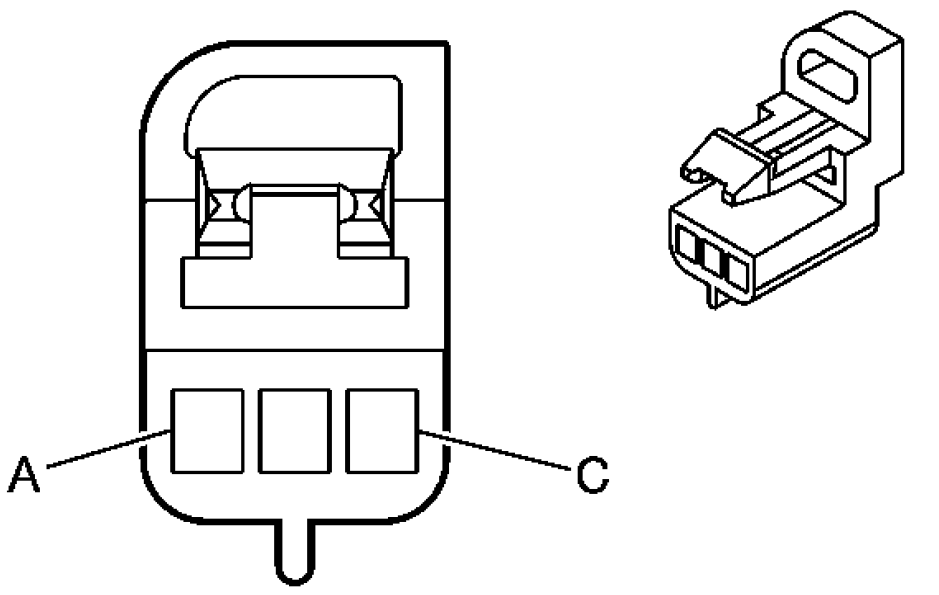


Fig. 25: Q8 Control Solenoid Valve Assembly X3 (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Transmission
- OEM: 13539487
- Service: Service by Harness - See Part Catalog
- Description: 3-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available

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- Test Probe: Not Available

Q8 Control Solenoid Valve Assembly X3 (MYB or MYC)

Pin	Wire	Circuit	Function
A	0.35 GN	-	Input Speed Sensor (ISS) Signal
B	0.35 RD	-	ISS/OSS Supply Voltage
C	0.35 BK	-	Output Speed Sensor (OSS) Signal

R14R REAR WINDOW DEFOGGER NOISE FILTER - RIGHT X1

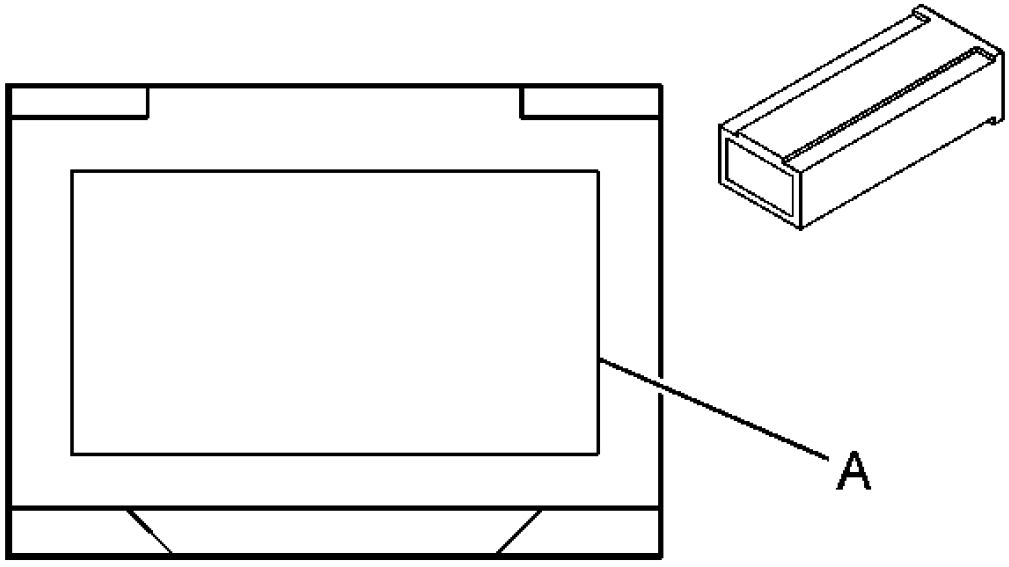


Fig. 26: R14R Rear Window Defogger Noise Filter - Right X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12052018
- Service: 88988738
- Description: 1-Way F (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 88988738

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- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

R14R Rear Window Defogger Noise Filter - Right X1

Pin	Wire	Circuit	Function
A	5 PU	293	Rear Defog Element Supply Voltage

R14R REAR WINDOW DEFOGGER NOISE FILTER - RIGHT X2

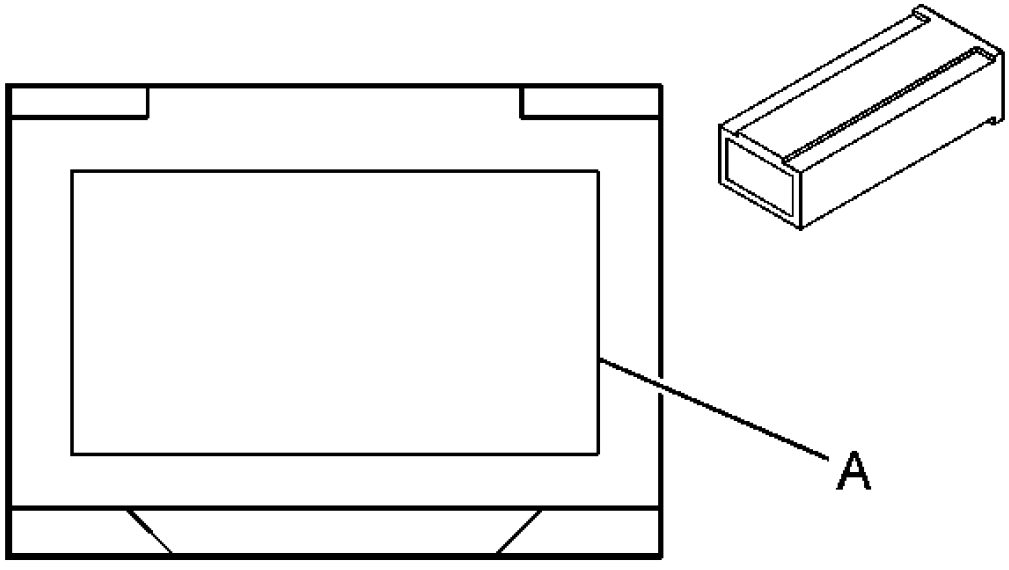


Fig. 27: R14R Rear Window Defogger Noise Filter - Right X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 12052018
- Service: 88988738
- Description: 1-Way F (BK)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - 88988738

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- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

R14R Rear Window Defogger Noise Filter - Right X2

Pin	Wire	Circuit	Function
A	5 PU	293	Rear Defog Element Supply Voltage

R6 DATA LINK RESISTOR

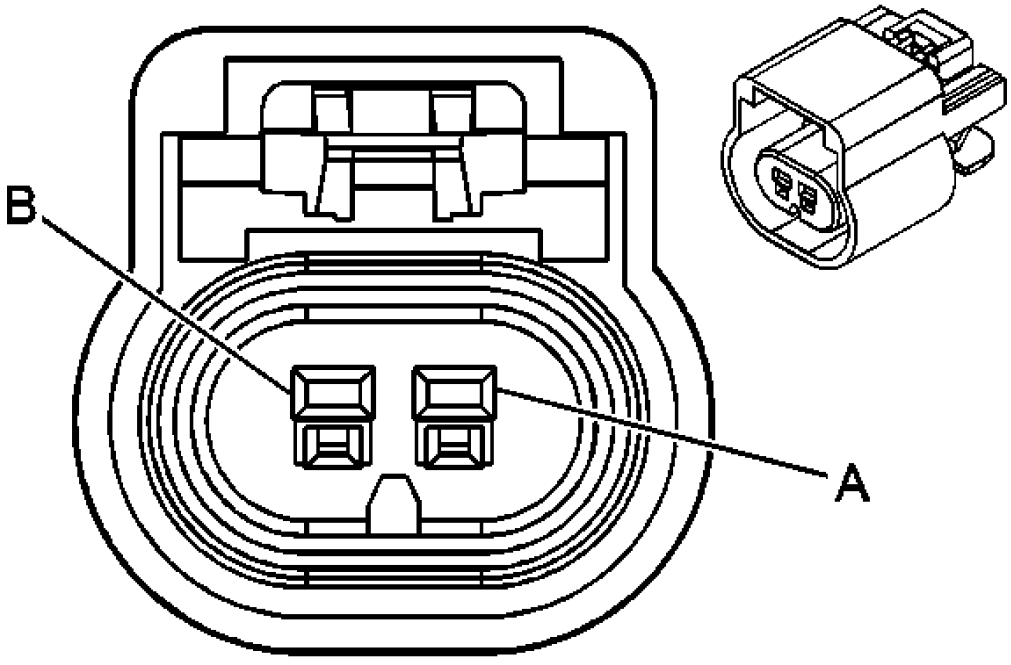


Fig. 28: R6 Data Link Resistor Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 15326801
- Service: 15306156
- Description: 2-Way F GT 150 Series (BK)

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Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

R6 Data Link Resistor

Pin	Wire	Circuit	Function
A	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
B	0.35 TN	2501	High Speed GMLAN Serial Data Bus -

S25 GARAGE DOOR OPENER (UG1)

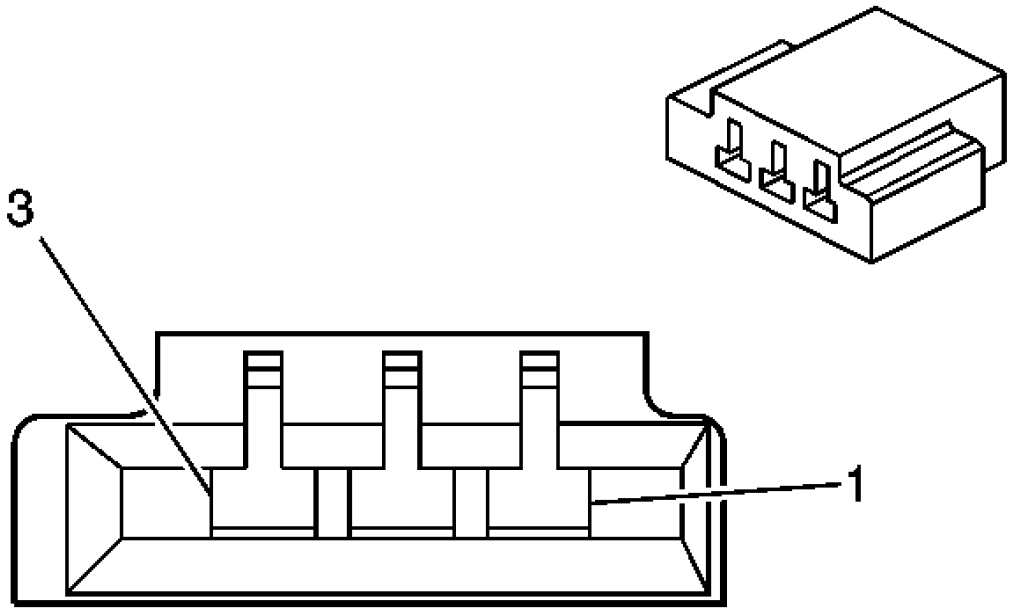


Fig. 29: S25 Garage Door Opener (UG1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 13658917

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- Service: 13505907
- Description: 3-Way F P/C EDGBD-ECM (CR)

Terminal Part Information

- Terminal/Tray: 13673882/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

S25 Garage Door Opener (UG1)

Pin	Wire	Circuit	Function
1	0.35 RD/WH	3140	Battery Positive Voltage
2	-	-	Not Used
3	0.35 BK	1550	Ground

S2L TRANSMISSION MANUAL SHIFT SWITCH - LEFT (MYB OR MYC)

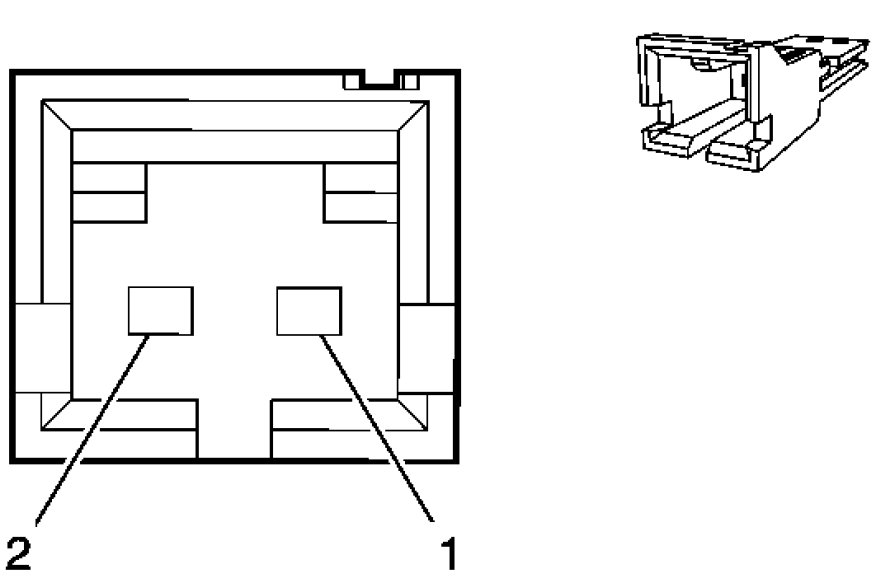


Fig. 30: S2L Transmission Manual Shift Switch - Left (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Steering Wheel
- OEM: 103653-1
- Service: Service by Harness See Part Catalog
- Description: 2-Way M MTE Series (BK)

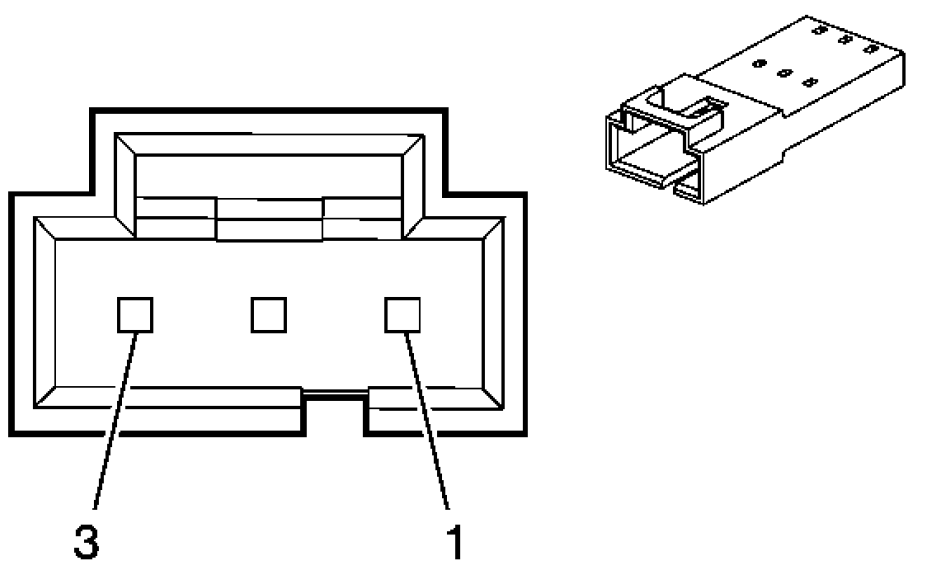
Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

S2L Transmission Manual Shift Switch - Left (MYB or MYC)

Pin	Wire	Circuit	Function
1	0.35 PU	5526	Tap Up/Tap Down Switch Signal
2	0.35 D-BU/RD	5525	Tap Up/Tap Down Enabled Signal

S2R TRANSMISSION MANUAL SHIFT SWITCH - RIGHT (MYB OR MYC)



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Fig. 31: S2R Transmission Manual Shift Switch - Right (MYB or MYC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Steering Wheel
- OEM: 103653-2
- Service: Service by Harness See Part Catalog
- Description: 3-Way M MTE Series (BK)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

S2R Transmission Manual Shift Switch - Right (MYB or MYC)

Pin	Wire	Circuit	Function
1	0.35 BK	1550	Ground
2	0.35 PU	5526	Tap Up/Tap Down Switch Signal
3	0.35 D-BU/RD	5525	Tap Up/Tap Down Enabled Signal

S30 HEADLAMP SWITCH

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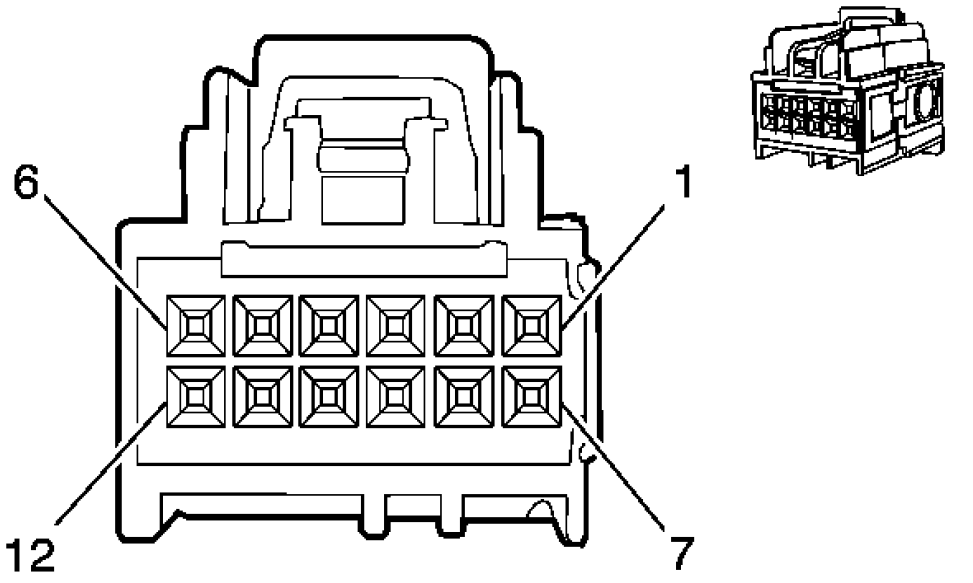


Fig. 32: S30 Headlamp Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 10890121
- Service: 13316200
- Description: 12-Way F 0.64 Micro Quadlok Series (BK)

Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: Pins 1, 3, 4, 5, 7, 12 - H/H
- Core/Insulation Crimp: Pins 6 - K/K
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S30 Headlamp Switch

Pin	Wire	Circuit	Function
1	0.35 YE/BK	7556	Headlamp Switch Reference Voltage

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2	-	-	Not Used
3	0.35 L-BU	13	Headlamp Switch Park Lamps Signal
4	0.35 WH	103	Headlamp Switch Headlamps On Signal
5	0.35 D-GN	306	Headlamp Switch Headlamps Off Signal/Automatic Headlamp Low Control
6	0.8 BK	1550	Ground
7	0.35 YE	6817	LED Backlight Dimming Control
8-11	-	-	Not Used
12	0.35 D-GN	7555	Headlamp Switch Signal

S39 IGNITION SWITCH

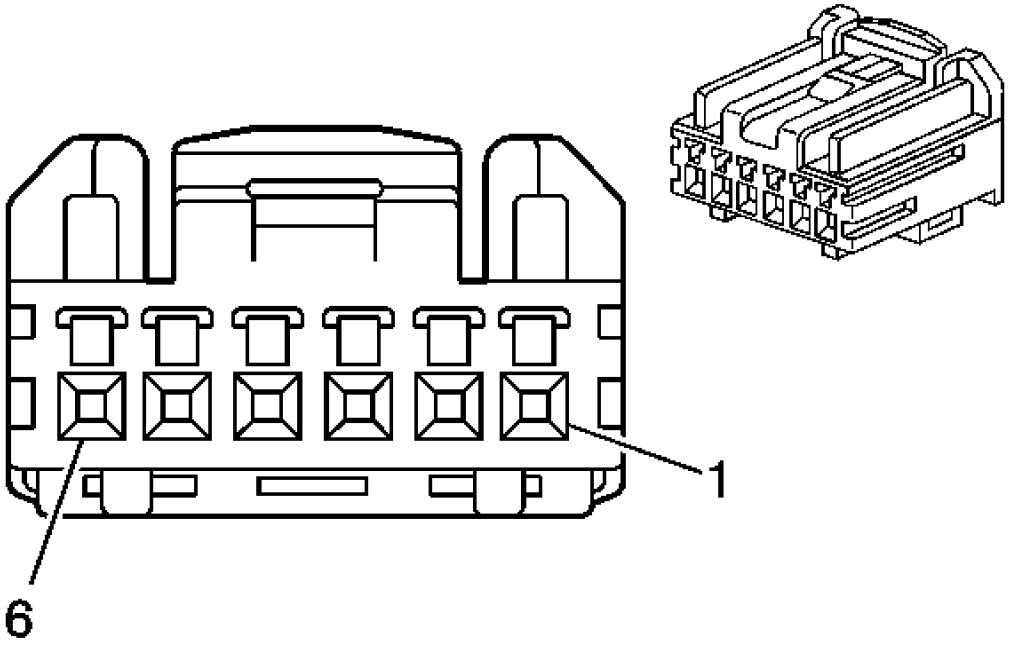


Fig. 33: S39 Ignition Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13608102
- Service: 19153174

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- Description: 6-Way F 1.2 HCM Unsealed (WH)

Terminal Part Information

- Terminal/Tray: SHCM-A03T-P025/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S39 Ignition Switch

Pin	Wire	Circuit	Function
1	0.35 PK	3	Ignition Voltage
2	0.5 RD/WH	540	Battery Positive Voltage
3	0.35 BN	4	Accessory Voltage
4	0.35 PK	1020	Ignition Voltage
5	-	-	Not Used
6	0.35 WH/BK	1073	5-Volt Reference

S52 OUTSIDE REARVIEW MIRROR SWITCH

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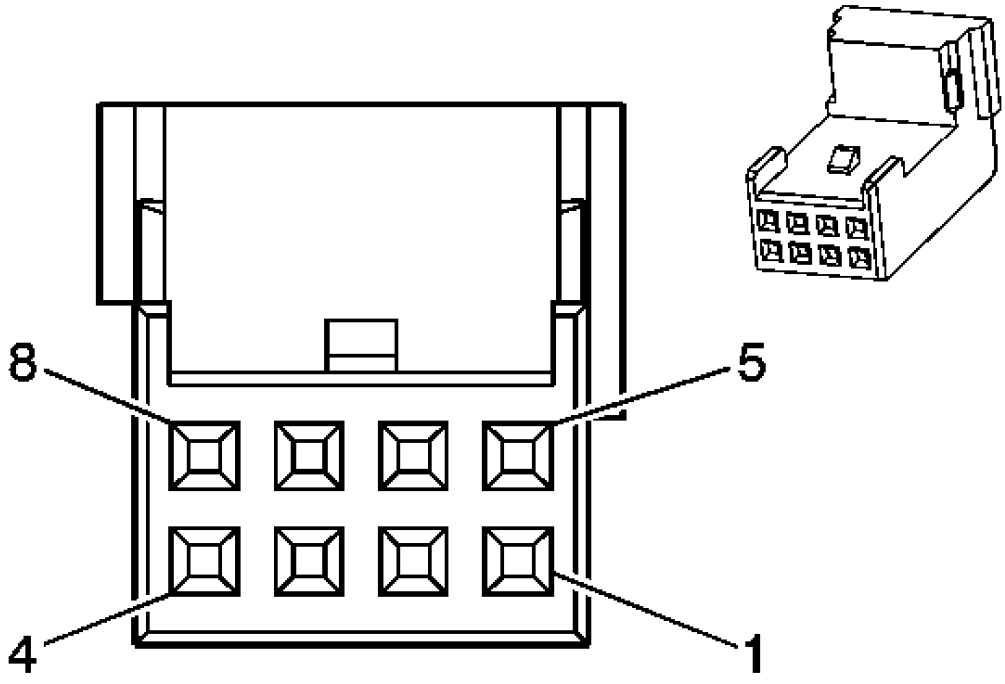


Fig. 34: S52 Outside Rearview Mirror Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 15327190
- Service: 88988407
- Description: 8-Way F DUCON 0.8 Series (GY)

Terminal Part Information

- Terminal/Tray: 15326592/19
- Core/Insulation Crimp: E/2
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S52 Outside Rearview Mirror Switch

Pin	Wire	Circuit	Function
1	0.5 RD/WH	1940	Battery Positive Voltage

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2	0.5 BK	850	Ground
3	0.5 PU/WH	889	Passenger Mirror Motor Down Control
4	0.5 WH	81	Driver Mirror Motor Right Control
5	0.5 TN	329	Mirror Motor Up/Left Control
6	-	-	Not Used
7	0.5 L-GN	89	Driver Mirror Motor Down Control
8	0.5 OG/WH	881	Passenger Mirror Motor Right Control

S58 REAR COMPARTMENT LID UNLATCH SWITCH

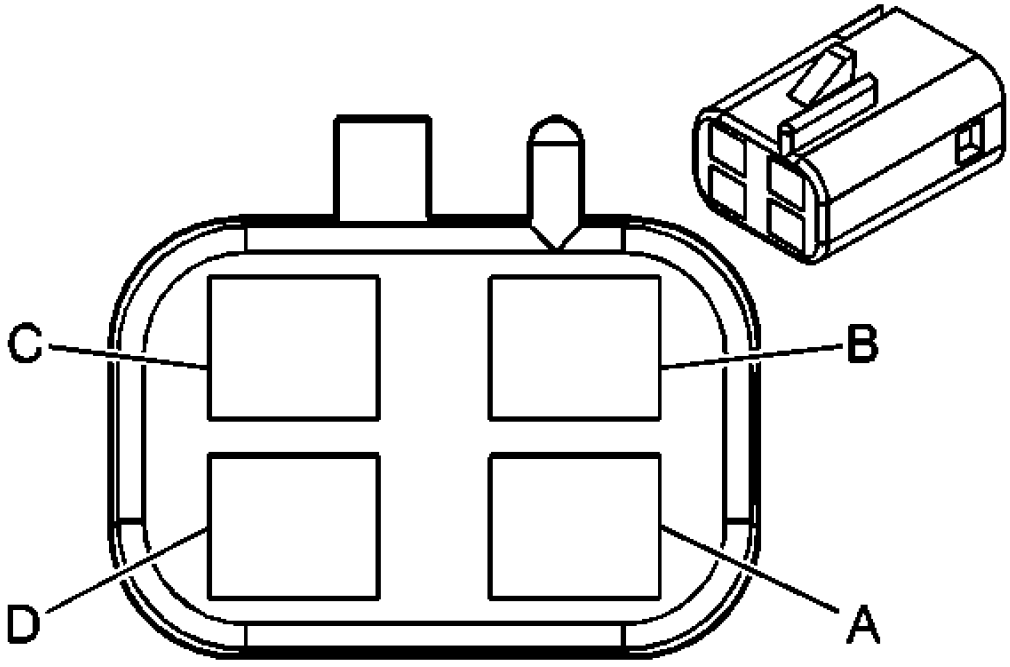


Fig. 35: S58 Rear Compartment Lid Unlatch Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 12047785
- Service: 12102900
- Description: 4-Way F Metri-Pack 150 Series (BK)

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Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

S58 Rear Compartment Lid Unlatch Switch

Pin	Wire	Circuit	Function
A	0.35 BK	850	Ground
B	-	-	Not Used
C	0.35 D-BU	6189	Rear Compartment Lid Release Switch
D	-	-	Not Used

S64D SEAT ADJUSTER SWITCH - DRIVER (AH3)

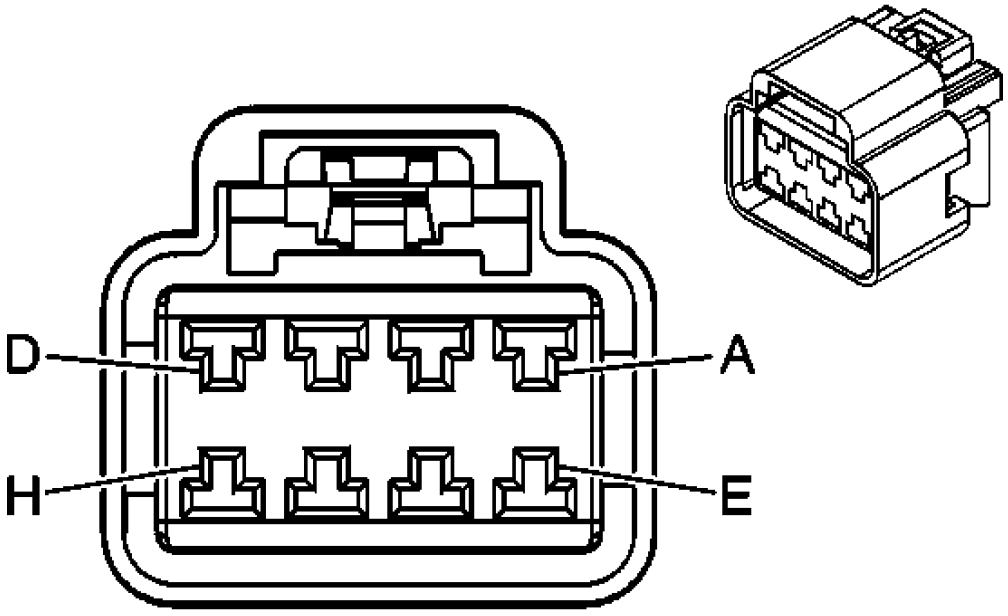


Fig. 36: S64D Seat Adjuster Switch - Driver (AH3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Driver Seat
- OEM: 15326924
- Service: 19181247
- Description: 8-Way F GT 280 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

S64D Seat Adjuster Switch - Driver (AH3)

Pin	Wire	Circuit	Function
A	-	-	Not Used
B	3 BK	850	Ground
C	3 D-GN/YE	276	Driver Seat Recline Motor Forward Control
D	3 RD/WH	5040	Battery Positive Voltage
E	-	-	Not Used
F	3 D-BU/YE	277	Driver Seat Recline Motor Rearward Control
G-H	-	-	Not Used

S64D SEAT ADJUSTER SWITCH - DRIVER (AMM)

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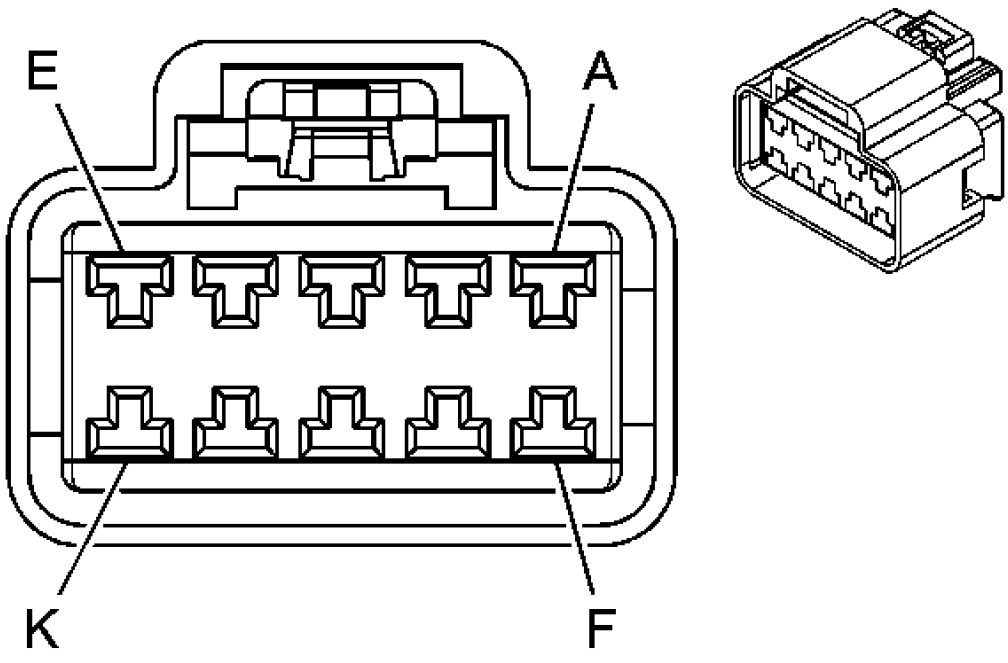


Fig. 37: S64D Seat Adjuster Switch - Driver (AMM) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Seat
- OEM: 15326931
- Service: 15306309
- Description: 10-Way F GT 280 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

S64D Seat Adjuster Switch - Driver (AMM)

Pin	Wire	Circuit	Function
A	3 D-GN	286	Driver Seat Front Vertical Motor Up Control

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B	3 BK	850	Ground
C	3 L-GN	284	Driver Seat Horizontal Motor Rearward Control
D	3 TN	285	Driver Seat Horizontal Motor Forward Control
E	3 RD/WH	5040	Battery Positive Voltage
F	3 YE	282	Driver Seat Rear Vertical Motor Up Control
G	3 D-BU/YE	277	Driver Seat Recline Motor Rearward Control
H	3 D-GN/YE	276	Driver Seat Recline Motor Forward Control
J	3 L-BU	283	Driver Seat Rear Vertical Motor Down Control
K	3 D-BU	287	Driver Seat Front Vertical Motor Down Control

S64P SEAT ADJUSTER SWITCH - PASSENGER

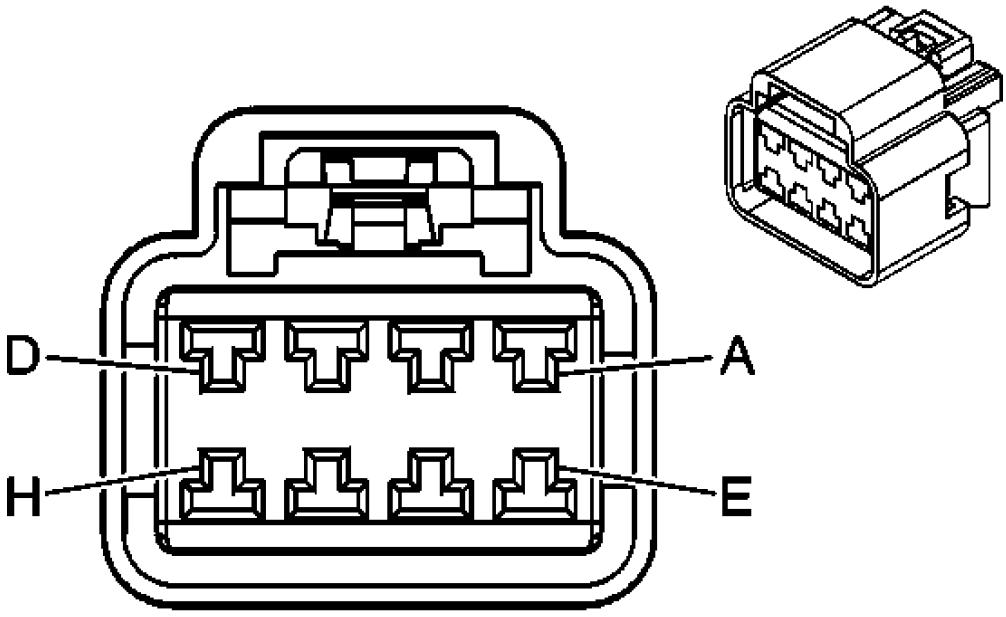


Fig. 38: S64P Seat Adjuster Switch - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Passenger Seat
- OEM: 15326924
- Service: 19181247
- Description: 8-Way F GT 280 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

S64P Seat Adjuster Switch - Passenger

Pin	Wire	Circuit	Function
A	-	-	Not Used
B	3 BK	850	Ground
C	3 D-GN/YE	76	Passenger Seat Recline Motor Forward
D	3 RD/WH	1440	Battery Positive Voltage
E	-	-	Not Used
F	3 D-BU/YE	77	Passenger Seat Recline Motor Rearward
G-H	-	-	Not Used

S70L STEERING WHEEL CONTROLS SWITCH - LEFT

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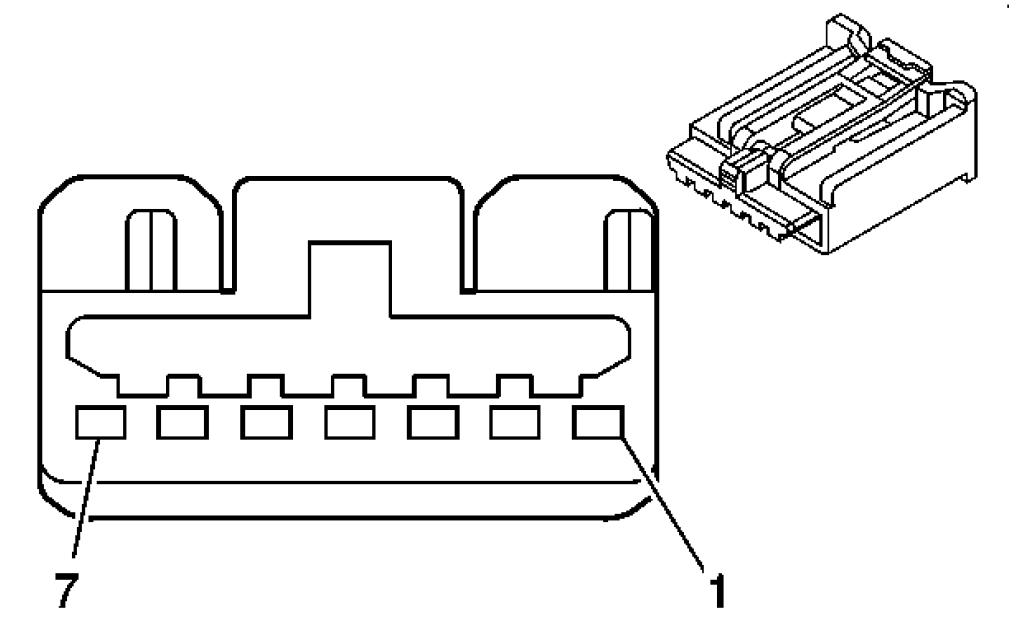


Fig. 39: S70L Steering Wheel Controls Switch - Left Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Steering Wheel
- OEM: AIT2PB-07-1FS
- Service: 88988919
- Description: 7-Way F AIT II Series (WH)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

S70L Steering Wheel Controls Switch - Left

Pin	Wire	Circuit	Function
1	0.35 PK	1444	12-Volt Reference
2	-	-	Not Used

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3	0.35 GY	1884	Cruise Control Switch Signal
4-5	-	-	Not Used
6	0.35 BN	6136	LED Backlight Dimming Control
7	0.35 BK	1550	Ground

S70R STEERING WHEEL CONTROLS SWITCH - RIGHT (NZL)

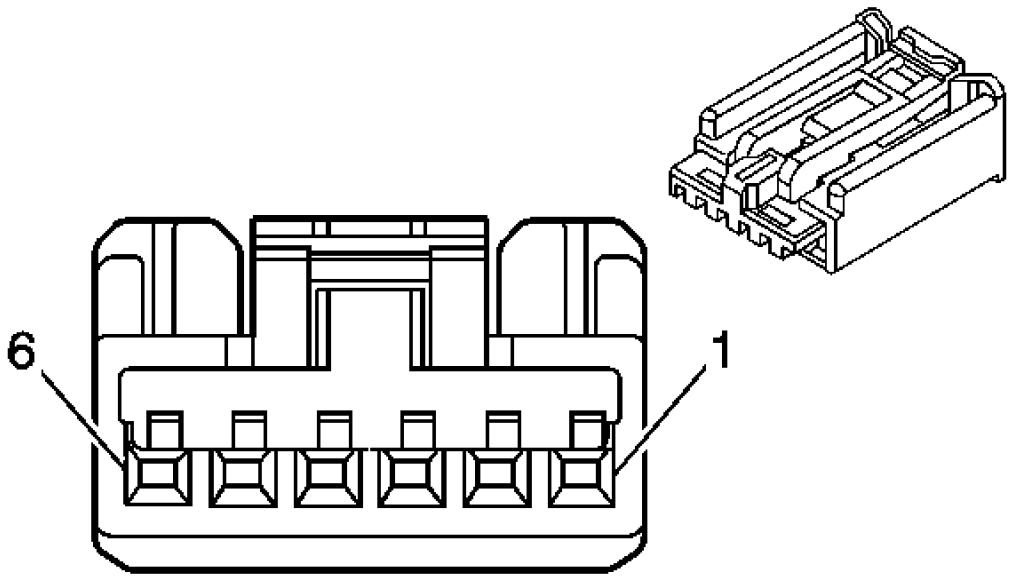


Fig. 40: S70R Steering Wheel Controls Switch - Right (NZL) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Steering Wheel
- OEM: AIT2PB-06-1AK
- Service: 19167753
- Description: 6-Way F AIT II Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A

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- Test Probe: J-35616-64B (L-BU)

S70R Steering Wheel Controls Switch - Right (NZL)

Pin	Wire	Circuit	Function
1	0.35 PK	1444	12-Volt Reference
2	0.35 L-GN	6818	Steering Wheel Control Switch Signal
3	-	-	Not Used
4	0.35 BN	6136	LED Backlight Dimming Control
5	0.35 BK	1550	Ground
6	-	-	Not Used

S72 SUNROOF SWITCH (CF5)

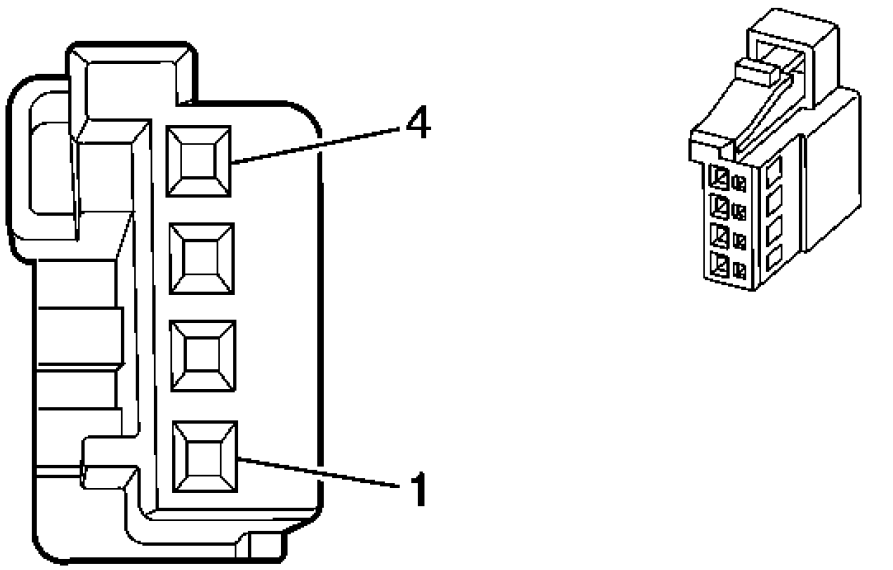


Fig. 41: S72 Sunroof Switch (CF5) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Roof
- OEM: 10768790

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- Service: 13216377
- Description: 4-Way F 0.64 Micro Quadlok Series (BK)

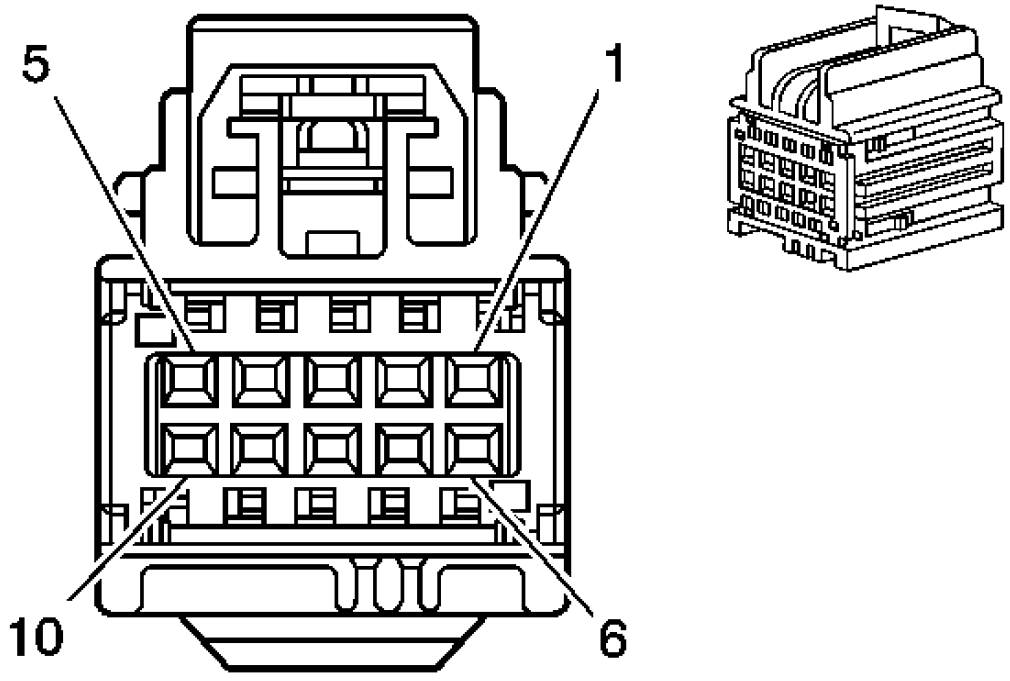
Terminal Part Information

- Terminal/Tray: 928999-5/15
- Core/Insulation Crimp: H/H
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S72 Sunroof Switch (CF5)

Pin	Wire	Circuit	Function
1	0.35 D-BU	128	Low Reference
2	0.35 YE	6817	LED Backlight Dimming Control
3	0.35 BK	1550	Ground
4	0.35 L-BU	5027	Sunroof Switch Data 1

S75 TRACTION CONTROL SWITCH



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Fig. 42: S75 Traction Control Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Console Cap Link
- OEM: 15491259
- Service: 15127042
- Description: 10-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: /J-35616-64B (L-BU)

S75 Traction Control Switch

Pin	Wire	Circuit	Function
1	0.35 YE	6817	LED Backlight Dimming Control
2	0.35 BK	1550	Ground
3-6	-	-	Not Used
7	0.35 L-BU	1788	Traction Control Switch Signal
8-10	-	-	Not Used

S78 TURN SIGNAL/MULTIFUNCTION SWITCH

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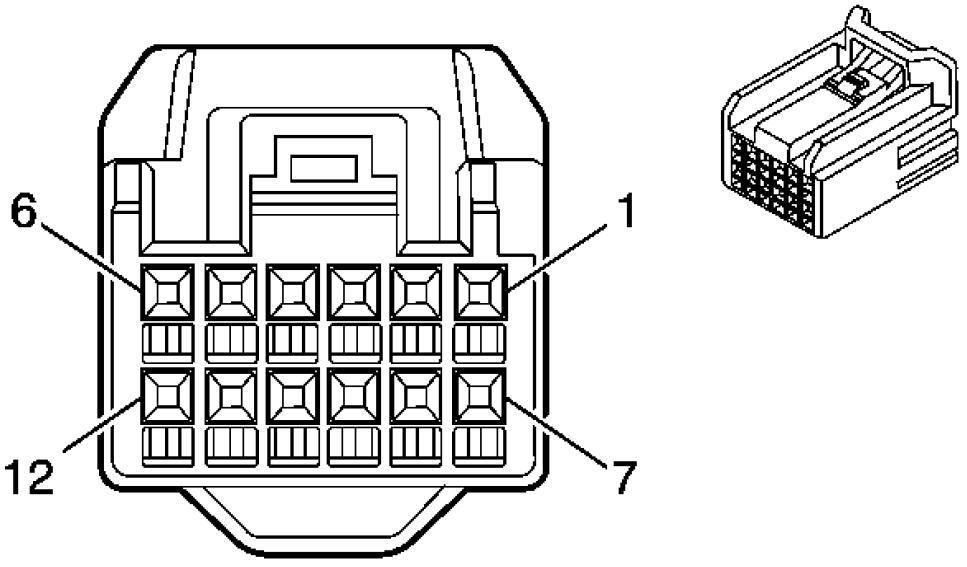


Fig. 43: S78 Turn Signal/Multifunction Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13604008
- Service: 19167197
- Description: 12-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: SNAC3-A021T-M0.64/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S78 Turn Signal/Multifunction Switch

Pin	Wire	Circuit	Function
1	0.35 D-GN	663	Left Turn Signal
2	0.35 PU	524	Headlamp Dimmer Switch High Beam

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			Signal
3	0.5 BK	1550	Ground
4	0.35 YE	307	Headlamp Switch Flash to Pass Signal
5	0.35 PK	893	DIC Select Menu Switch Signal
6	0.35 BN	897	Low Reference
7	0.35 TN	664	Right Turn Signal
8-11	-	-	Not Used
12	0.35 D-GN/WH	1358	DIC Switch Signal

S79D WINDOW SWITCH - DRIVER

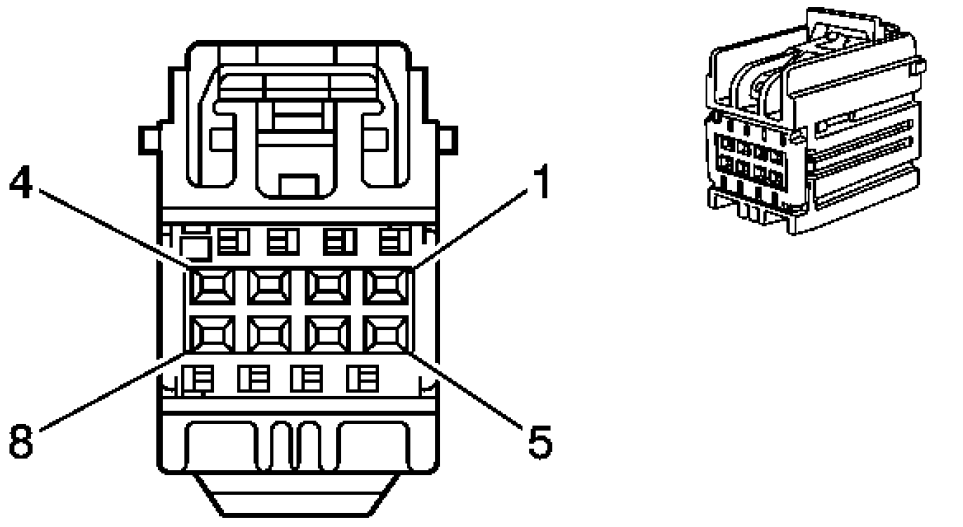


Fig. 44: S79D Window Switch - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Driver Door
- OEM: 13551679
- Service: 88987993
- Description: 8-Way F Kaizen 64 Series (GY)

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Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: Pin 1 - See Terminal Repair Kit
- Core/Insulation Crimp: Pins 2, 3, 4, 5, 6, 7, 8 - P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

S79D Window Switch - Driver

Pin	Wire	Circuit	Function
1	0.8 BK	850	Ground
2	0.35 L-GN/RD	7628	Power Window Switch Express Signal
3	0.35 GY	1136	Power Window Master Switch Left Front Down Signal
4	0.35 YE	6817	LED Backlight Dimming Control
5	0.35 TN	1300	Power Window Master Switch Left Front Up Signal
6	0.35 PU	2765	Power Window Switch Right Front Express Signal
7	0.35 TN	167	Power Window Master Switch Right Front Down Signal
8	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal

S79P WINDOW SWITCH - PASSENGER

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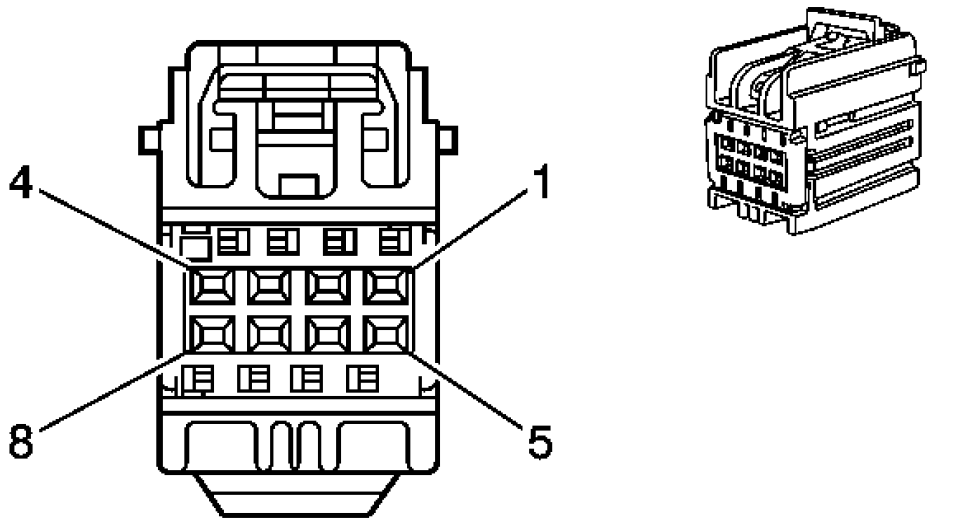


Fig. 45: S79P Window Switch - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Passenger Door
- OEM: 13551679
- Service: 19115653
- Description: 8-Way F Kaizen 64 Series (GY)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

S79P Window Switch - Passenger

Pin	Wire	Circuit	Function
1	0.35 BK	2350	Ground
2	0.35 YE	6817	LED Backlight Dimming Control

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3-5	-	-	Not Used
6	0.35 PU	2765	Power Window Switch Right Front Express Signal
7	0.35 TN	167	Power Window Master Switch Right Front Down Signal
8	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal

S82 WINDSHIELD WIPER/WASHER SWITCH

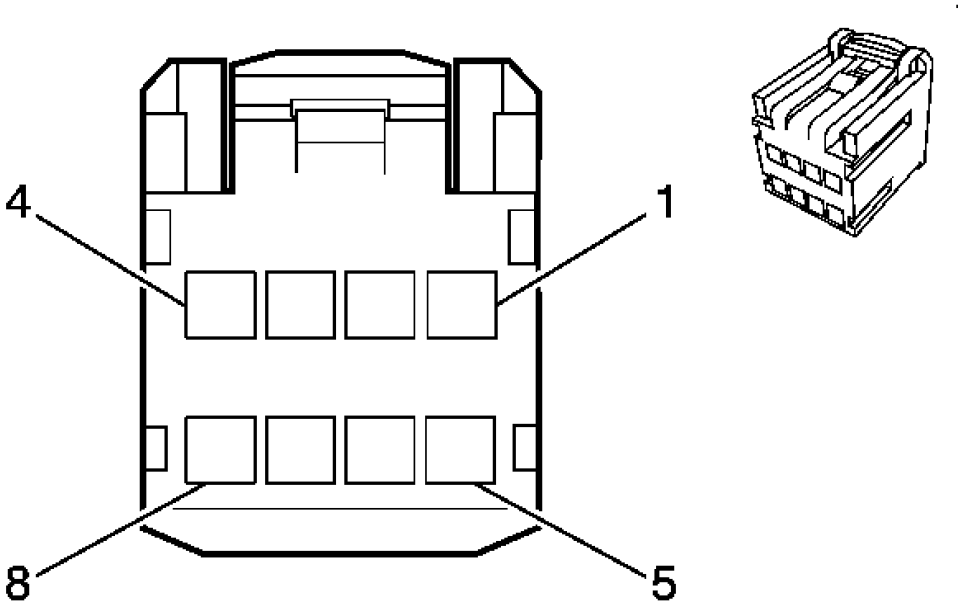


Fig. 46: S82 Windshield Wiper/Washer Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13609516
- Service: 19153437
- Description: 8-Way F 1.2 HCM Series (BK)

Terminal Part Information

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- Terminal/Tray: SHCM-A03T-P025/20
- Core/Insulation Crimp: J/J
- Release Tool: 12094429
- Test Probe: J-35616-64B (L-BU)

S82 Windshield Wiper/Washer Switch

Pin	Wire	Circuit	Function
1	0.35 L-GN	1715	Windshield Wiper Switch High Signal
2	0.35 TN/BK	6009	Low Reference
3	0.35 L-BU	1714	Windshield Wiper Switch Low Signal
4	-	-	Not Used
5	0.35 PK	94	Windshield Washer Switch Signal
6-8	-	-	Not Used

T11 MULTIMEDIA PLAYER INTERFACE MODULE X1 (USR)

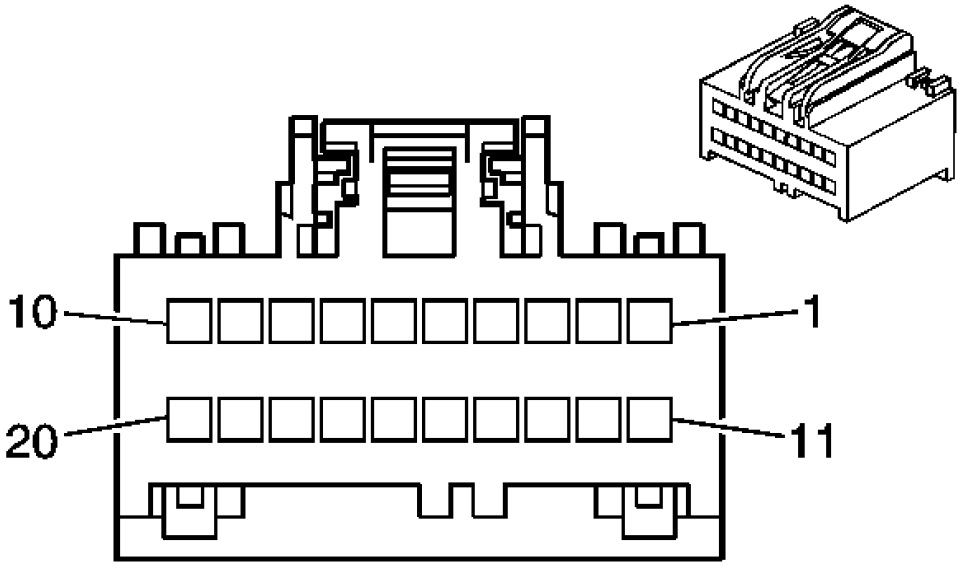


Fig. 47: T11 Multimedia Player Interface Module X1 (USR) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Console
- OEM: 15489824
- Service: 15126711
- Description: 20-Way F 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

T11 Multimedia Player Interface Module X1 (USR)

Pin	Wire	Circuit	Function
1	0.5 RD/WH	3240	Battery Positive Voltage
2	0.35 PK	2060	Auxiliary Detection Signal
3	0.35 D-BU	5843	Auxiliary Audio Common Signal
4	0.35 D-GN/WH	3376	Auxiliary Audio Common Signal
5-7	-	-	Not Used
8	0.5 D-GN	5060	Low Speed GMLAN Serial Data
9-10	-	-	Not Used
11	0.5 BK	1750	Ground
12	0.35 L-GN	5839	Left Auxiliary Audio Signal 2
13	0.35 D-GN/WH	5841	Right Auxiliary Audio Signal 2
14	0.35 YE	3377	Auxiliary Audio Jack Left (+)
15	0.35 TN/WH	3378	Auxiliary Audio Jack Right (+)
16-17	-	-	Not Used
18	0.35 BARE	5842	Drain Wire
19-20	-	-	Not Used

T3 AUDIO AMPLIFIER X1 (UQA)

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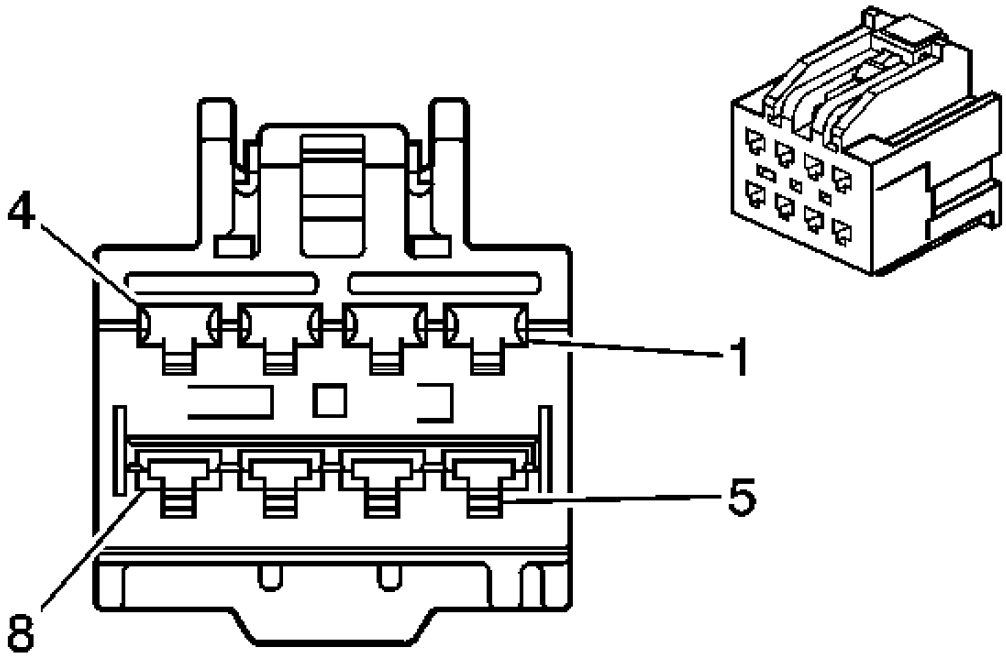


Fig. 48: T3 Audio Amplifier X1 (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 15491289
- Service: 19115652
- Description: 8-Way F 2.8 Series (L-GY)

Terminal Part Information

- Pins: 2, 3, 6, 7
- Terminal/Tray: 8100-4444/22
- Core/Insulation Crimp: 2/A
- Release Tool: 15315247
- Test Probe: J-35616-35 (VT)

- Pins: 4, 8
- Terminal/Tray: 8100-4445/22

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- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-35 (VT)

T3 Audio Amplifier X1 (UQA)

Pin	Wire	Circuit	Function
1	-	-	Not Used
2	1 L-BU/BK	315	Right Subwoofer Speaker Output (-)
3	1 L-GN/BK	1794	Left Subwoofer Speaker Output (-)
4	3 RD/WH	3640	Battery Positive Voltage
5	-	-	Not Used
6	1 D-GN	1795	Right Subwoofer Speaker Output (+)
7	1 D-BU/WH	346	Left Subwoofer Speaker Output (+)
8	3 BK	550	Ground

T3 AUDIO AMPLIFIER X2 (UQA)

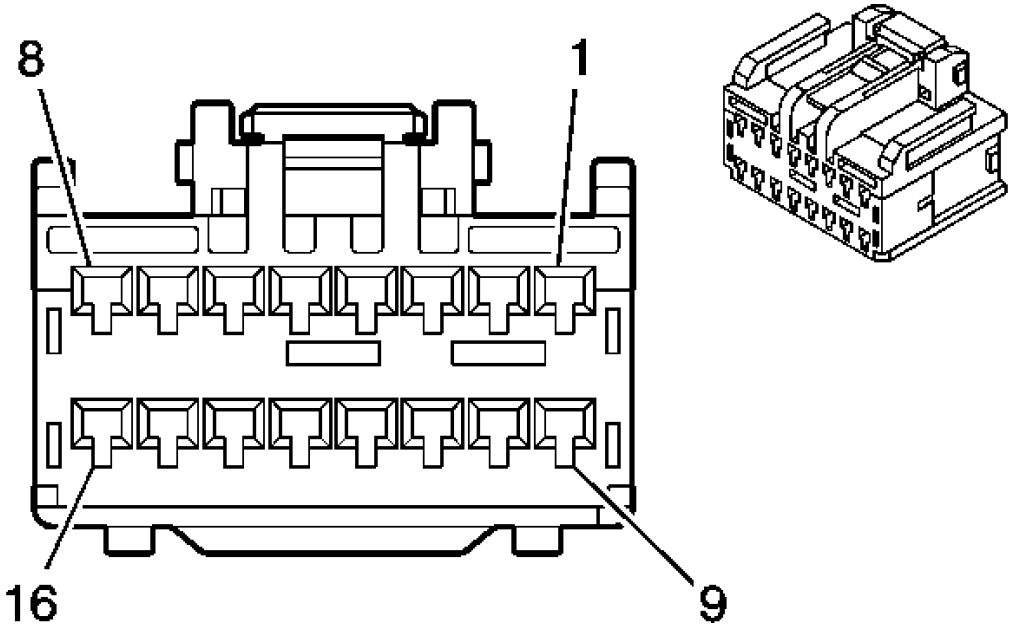


Fig. 49: T3 Audio Amplifier X2 (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Body
- OEM: 15489823
- Service: 15134091
- Description: 16-Way F 1.5 Series (BK)

Terminal Part Information

- Terminal/Tray: 8240-0128/22
- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T3 Audio Amplifier X2 (UQA)

Pin	Wire	Circuit	Function
1	0.8 L-BU/BK	5772	Right Rear Speaker Output (-)
2	0.8 L-BU	5762	Right Rear Speaker Output (+)
3	0.8 L-BU	1960	Front Center Speaker Output (-)
4	0.8 YE	1860	Front Center Speaker Output (+)
5-6	-	-	Not Used
7	0.8 D-GN	117	Right Front Speaker Output (-)
8	0.8 L-GN	200	Right Front Speaker Output (+)
9-12	-	-	Not Used
13	0.8 GY	118	Left Front Speaker Output (-)
14	0.8 TN	201	Left Front Speaker Output (+)
15	0.8 D-BU/WH	5771	Left Rear Speaker Output (-)
16	0.8 D-BU	5761	Left Rear Speaker Output (+)

T3 AUDIO AMPLIFIER X3 (UQA)

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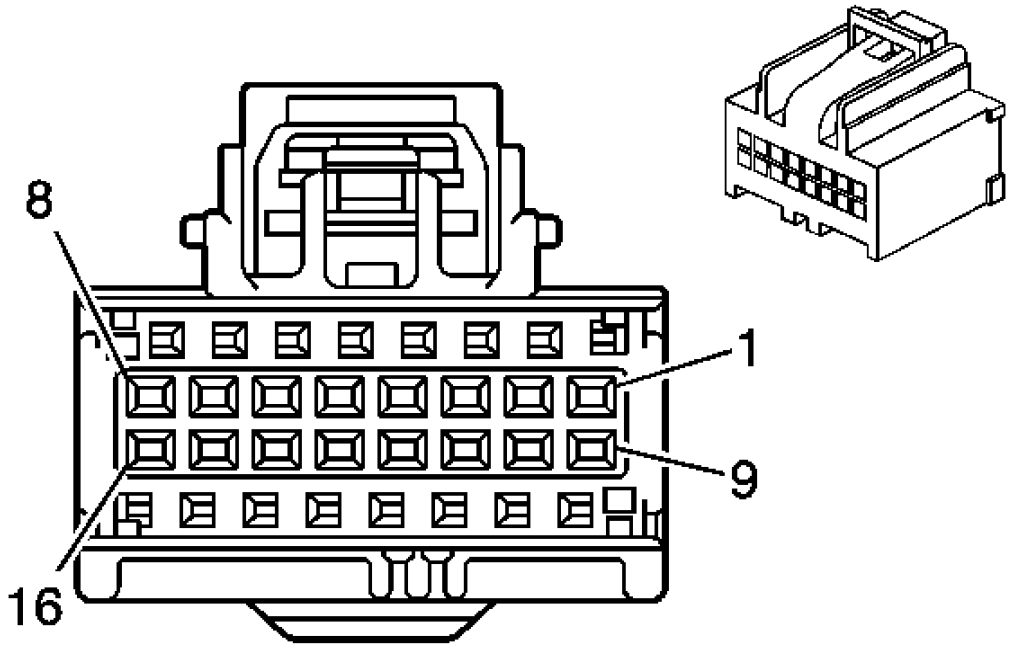


Fig. 50: T3 Audio Amplifier X3 (UQA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Body
- OEM: 15491285
- Service: 15136073
- Description: 16-Way F Kaizen 64 Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

T3 Audio Amplifier X3 (UQA)

Pin	Wire	Circuit	Function
1	0.35 WH	7066	Remote Enable

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2-3	-	-	Not Used
4	0.35 TN	1946	Right Rear Low Level Audio Signal (-)
5	0.35 BN	1999	Left Rear Low Level Audio Signal (-)
6	0.35 OG/BK	1546	Right Front Low Level Audio Signal (-)
7	0.35 D-GN	1947	Left Front Low Level Audio Signal (-)
8-10	-	-	Not Used
11	0.35 OG	6978	Amplifier Control
12	0.35 D-BU	546	Right Rear Low Level Audio Signal (+)
13	0.35 BN/WH	599	Left Rear Low Level Audio Signal (+)
14	0.35 L-GN/WH	512	Right Front Low Level Audio Signal (+)
15	0.35 TN	511	Left Front Low Level Audio Signal (+)
16	-	-	Not Used

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COMPONENT CONNECTOR END VIEWS

T8A IGNITION COIL 1 (L99 OR LS3)

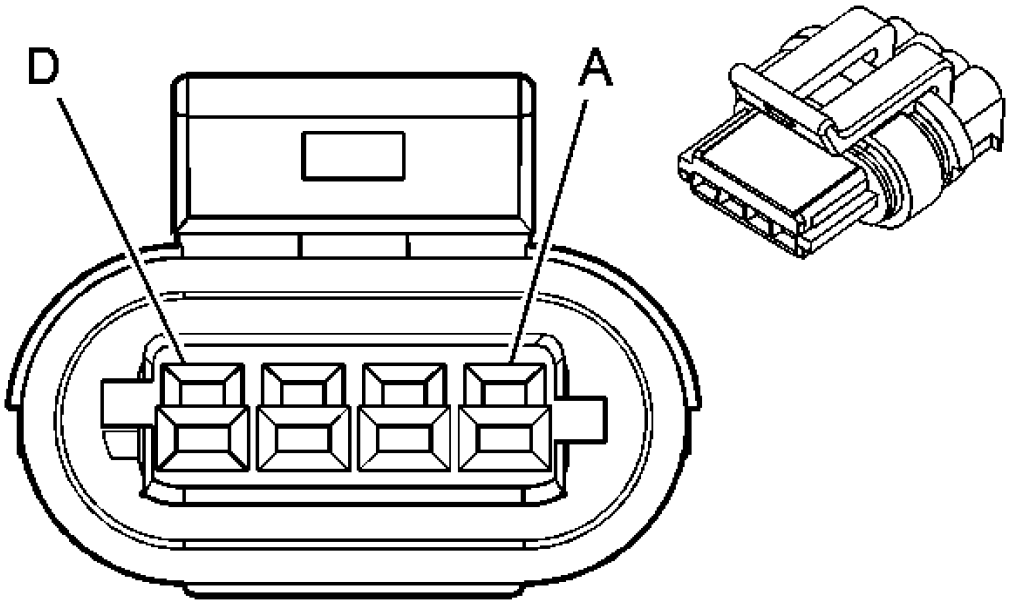


Fig. 1: T8A Ignition Coil 1 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Odd)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D

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- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8A Ignition Coil 1 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 PU	2121	IC 1 Control
D	0.8 PK	39	Ignition 1 Voltage

T8A IGNITION COIL 1 (LLT)

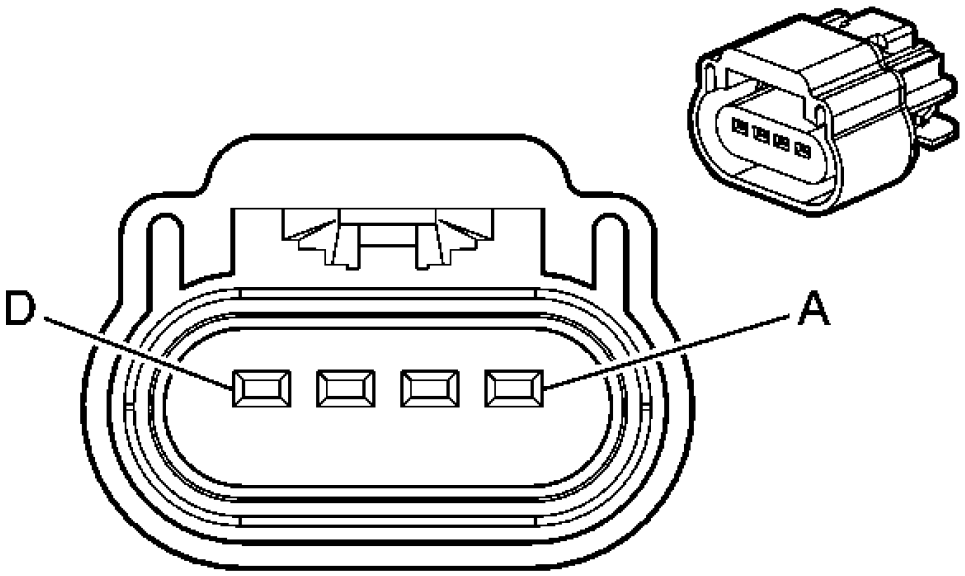


Fig. 2: T8A Ignition Coil 1 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

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- Harness: Engine
- OEM: 15466325
- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8A Ignition Coil 1 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	250	Ground
B	0.5 BN	2129	Low Reference
C	0.5 PU	2121	IC 1 Control
D	1 PK/BK	5291	Ignition Voltage

T8B IGNITION COIL 2 (L99 OR LS3)

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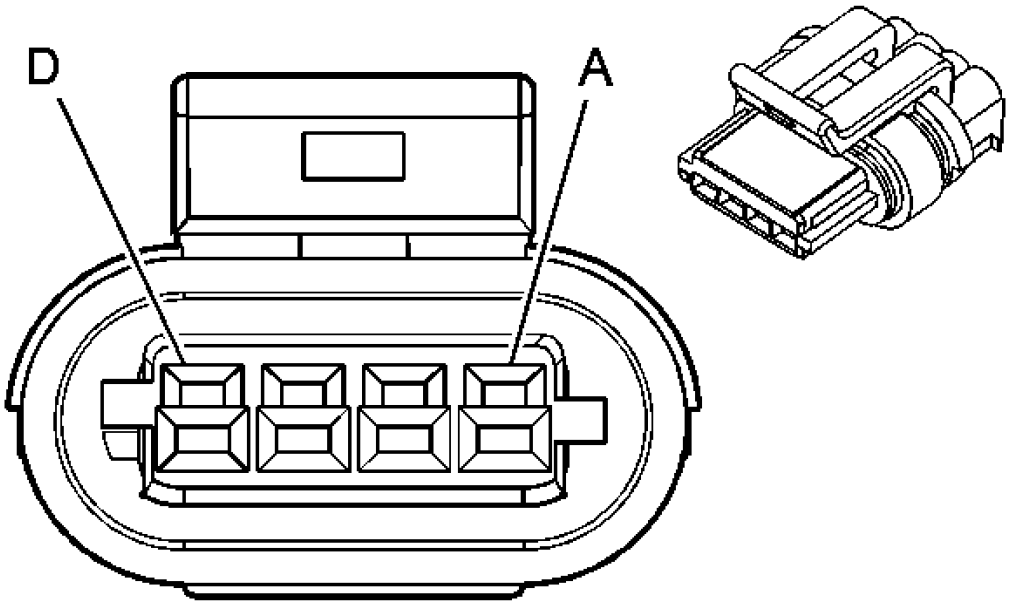


Fig. 3: T8B Ignition Coil 2 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Even)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8B Ignition Coil 2 (L99 or LS3)

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Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 RD	2127	IC 2 Control
D	0.8 PK	39	Ignition 1 Voltage

T8B IGNITION COIL 2 (LLT)

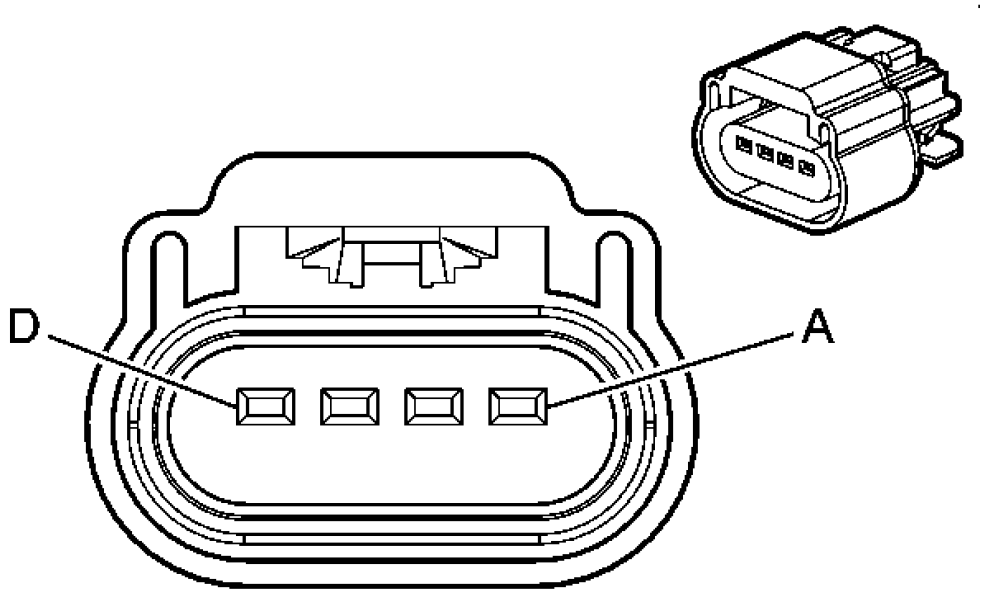


Fig. 4: T8B Ignition Coil 2 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15466325
- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8

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- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8B Ignition Coil 2 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	350	Ground
B	0.5 BN/WH	2130	Low Reference
C	0.5 OG/WH	2122	IC 2 Control
D	1 PK/BK	5292	Ignition Voltage

T8C IGNITION COIL 3 (L99 OR LS3)

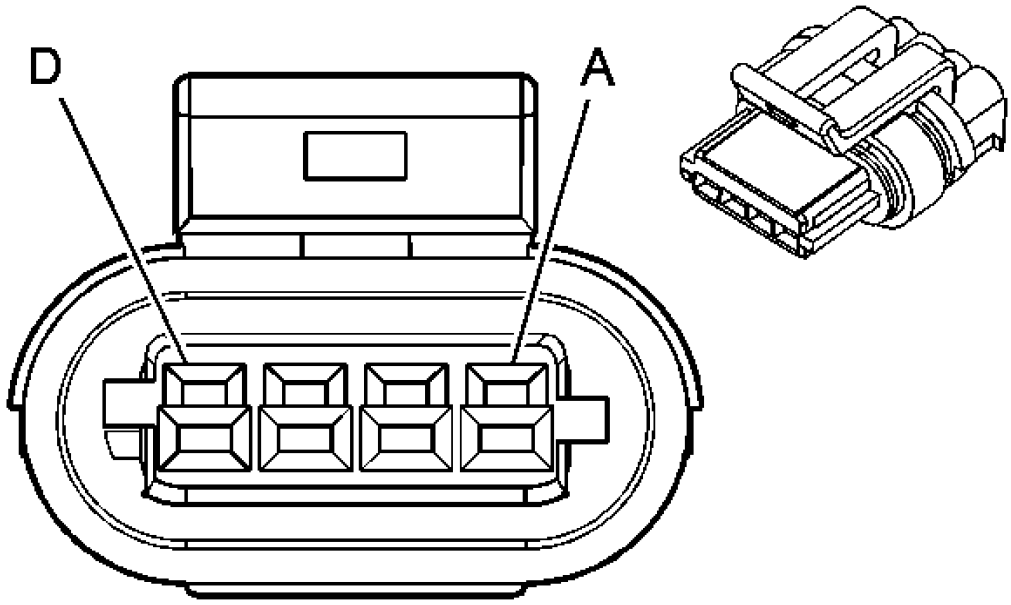


Fig. 5: T8C Ignition Coil 3 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Odd)
- OEM: 15439568

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- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8C Ignition Coil 3 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 L-BU	2123	IC 3 Control
D	0.8 PK	39	Ignition 1 Voltage

T8C IGNITION COIL 3 (LLT)

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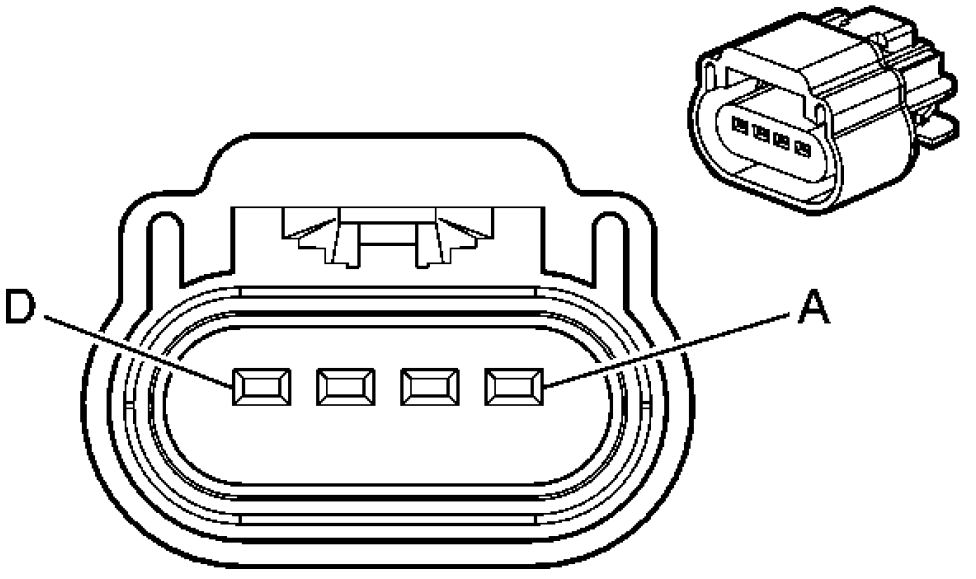


Fig. 6: T8C Ignition Coil 3 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15466325
- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8C Ignition Coil 3 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	250	Ground

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B	0.5 BN	2129	Low Reference
C	0.5 L-BU	2123	IC 3 Control
D	1 PK/BK	5291	Ignition Voltage

T8D IGNITION COIL 4 (L99 OR LS3)

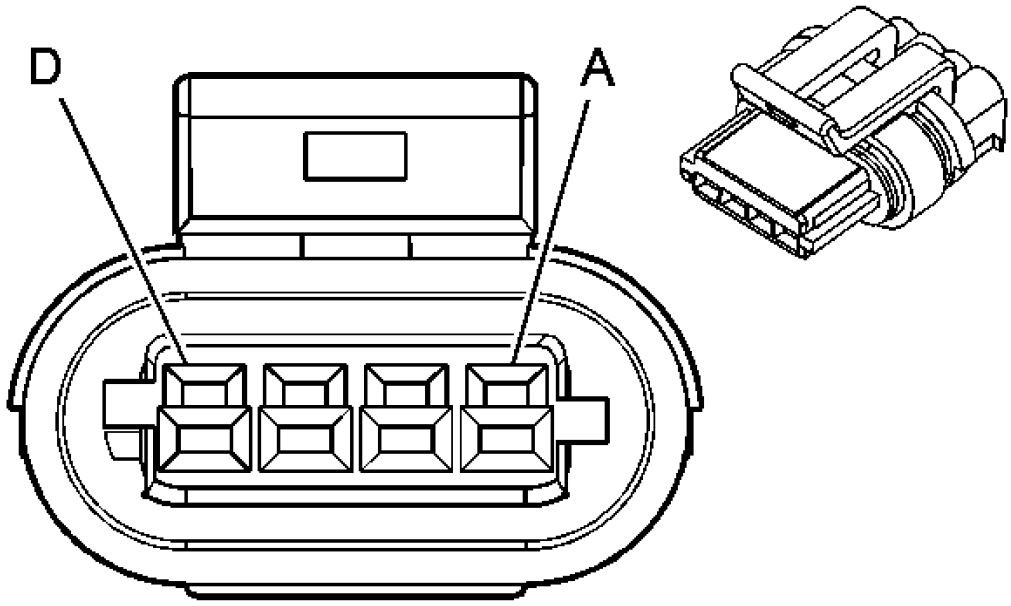


Fig. 7: T8D Ignition Coil 4 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Even)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C

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- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8D Ignition Coil 4 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 D-GN	2125	IC 4 Control
D	0.8 PK	39	Ignition 1 Voltage

T8D IGNITION COIL 4 (LLT)

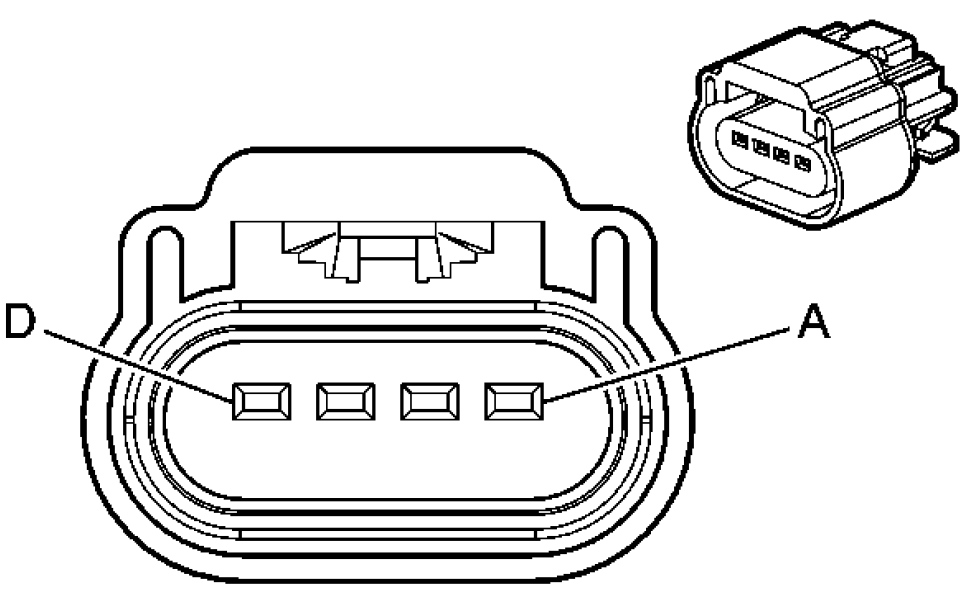


Fig. 8: T8D Ignition Coil 4 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15466325

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- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8D Ignition Coil 4 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	350	Ground
B	0.5 BN/WH	2130	Low Reference
C	0.5 D-GN/WH	2124	IC 4 Control
D	1 PK/BK	5292	Ignition Voltage

T8E IGNITION COIL 5 (L99 OR LS3)

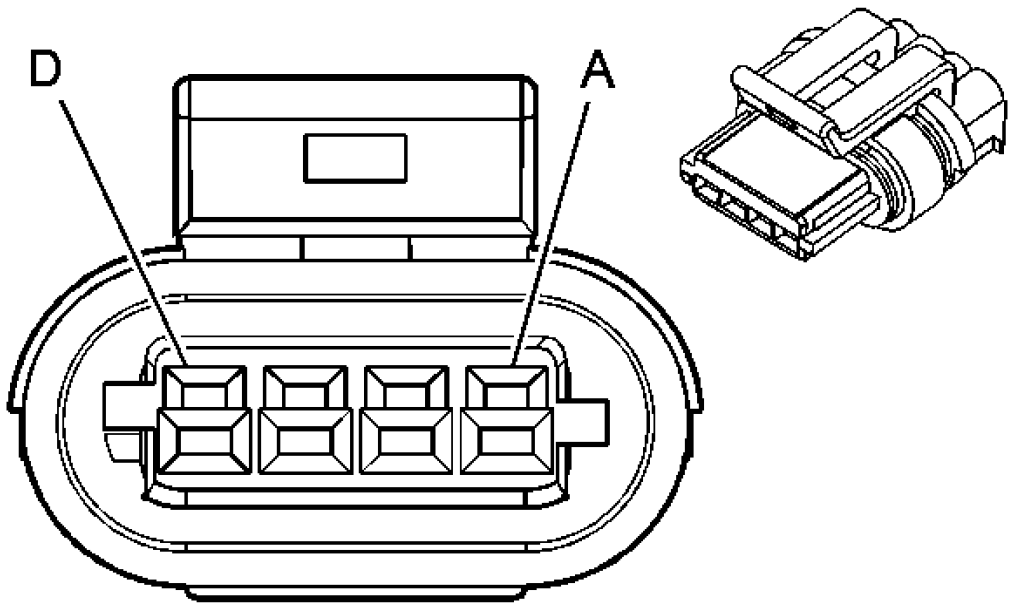


Fig. 9: T8E Ignition Coil 5 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Coils (Odd)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8E Ignition Coil 5 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 D-GN	2125	IC 5 Control
D	0.8 PK	39	Ignition 1 Voltage

T8E IGNITION COIL 5 (LLT)

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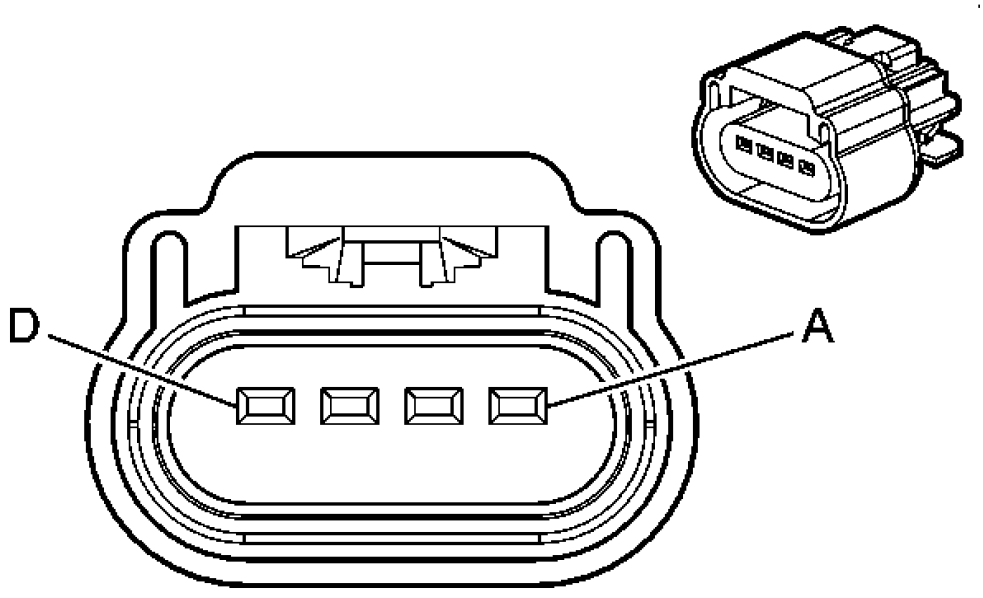


Fig. 10: T8E Ignition Coil 5 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15466325
- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8E Ignition Coil 5 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	250	Ground

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B	0.5 BN	2129	Low Reference
C	0.5 D-GN	2125	IC 5 Control
D	1 PK/BK	5291	Ignition Voltage

T8F IGNITION COIL 6 (L99 OR LS3)

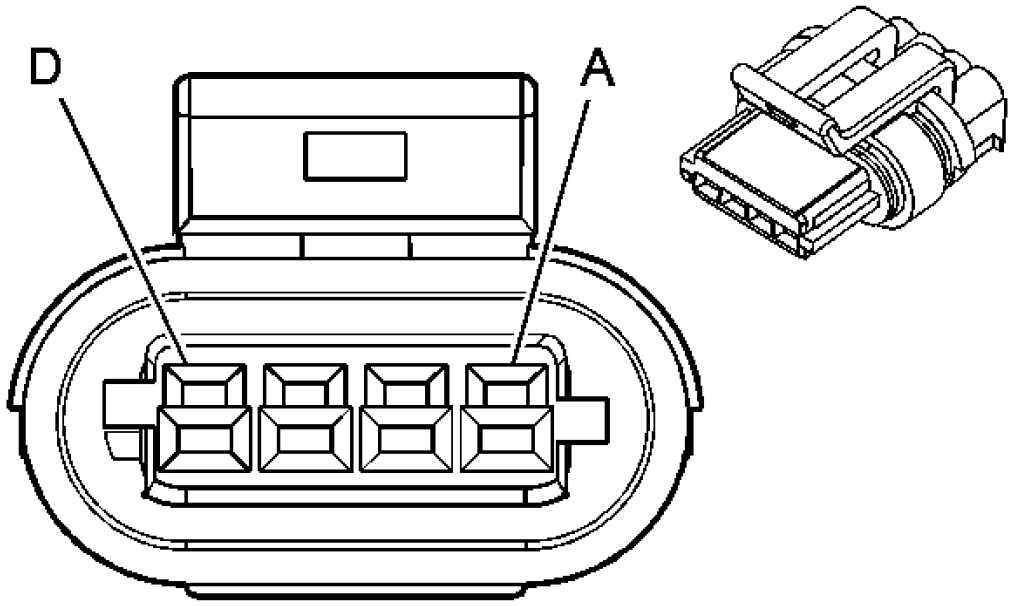


Fig. 11: T8F Ignition Coil 6 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Even)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C

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- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8F Ignition Coil 6 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 L-BU	2123	IC 6 Control
D	0.8 PK	39	Ignition 1 Voltage

T8F IGNITION COIL 6 (LLT)

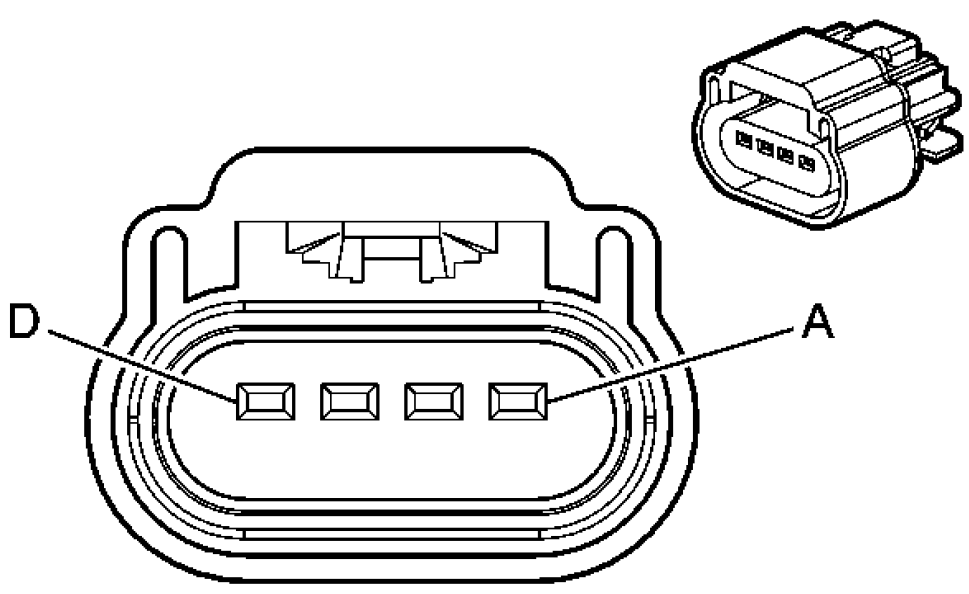


Fig. 12: T8F Ignition Coil 6 (LLT) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Engine
- OEM: 15466325

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- Service: 88988737
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A, D - 2/1
- Core/Insulation Crimp: Pins B, C - E/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8F Ignition Coil 6 (LLT)

Pin	Wire	Circuit	Function
A	1 BK	350	Ground
B	0.5 BN/WH	2130	Low Reference
C	0.5 L-BU/WH	2126	IC 6 Control
D	1 PK/BK	5292	Ignition Voltage

T8G IGNITION COIL 7 (L99 OR LS3)

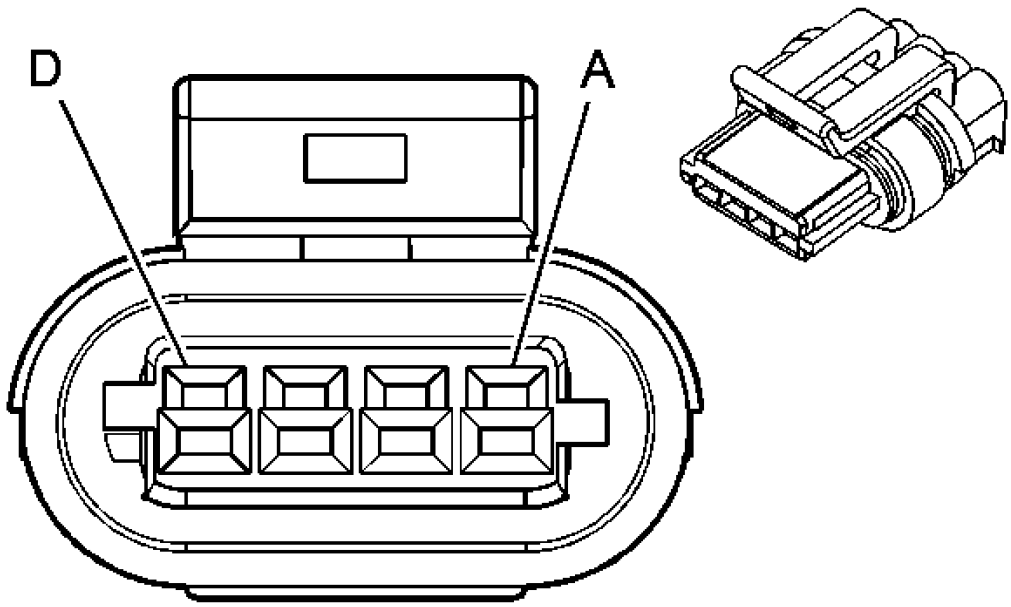


Fig. 13: T8G Ignition Coil 7 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

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Connector Part Information

- Harness: Coils (Odd)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8G Ignition Coil 7 (L99 or LS3)

Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 RD	2127	IC 7 Control
D	0.8 PK	39	Ignition 1 Voltage

T8H IGNITION COIL 8 (L99 OR LS3)

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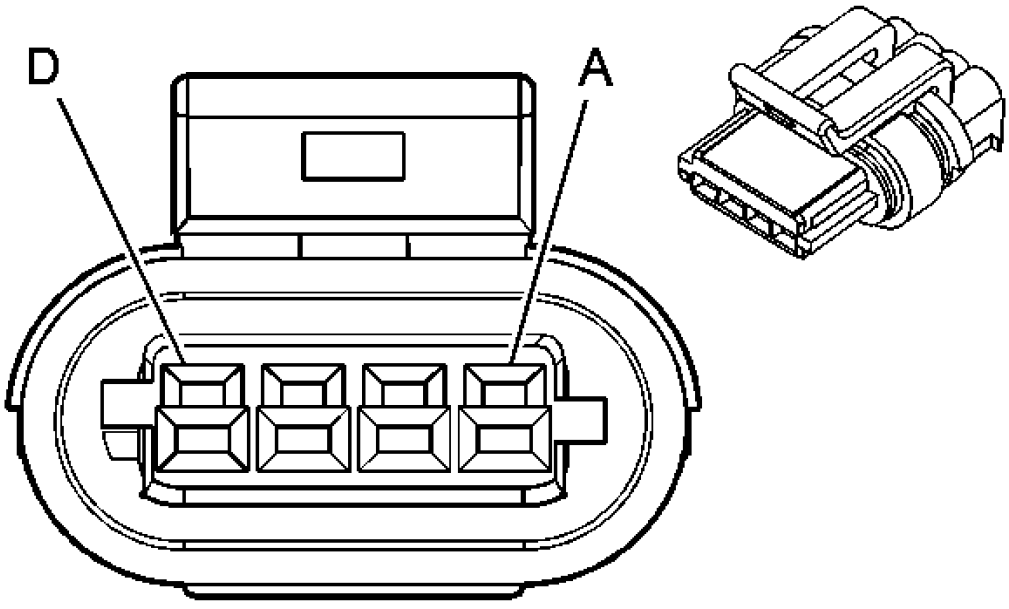


Fig. 14: T8H Ignition Coil 8 (L99 or LS3) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Coils (Even)
- OEM: 15439568
- Service: 88987184
- Description: 4-Way F GT 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Pins: A, D
- Core/Insulation Crimp: E/1
- Pins: B, C
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

T8H Ignition Coil 8 (L99 or LS3)

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Pin	Wire	Circuit	Function
A	0.8 BK	151	Ground
B	0.5 BN	2129	Low Reference
C	0.5 PU	2121	IC 8 Control
D	0.8 PK	39	Ignition 1 Voltage

X80D ACCESSORY POWER RECEPTACLE - CENTER CONSOLE COMPARTMENT

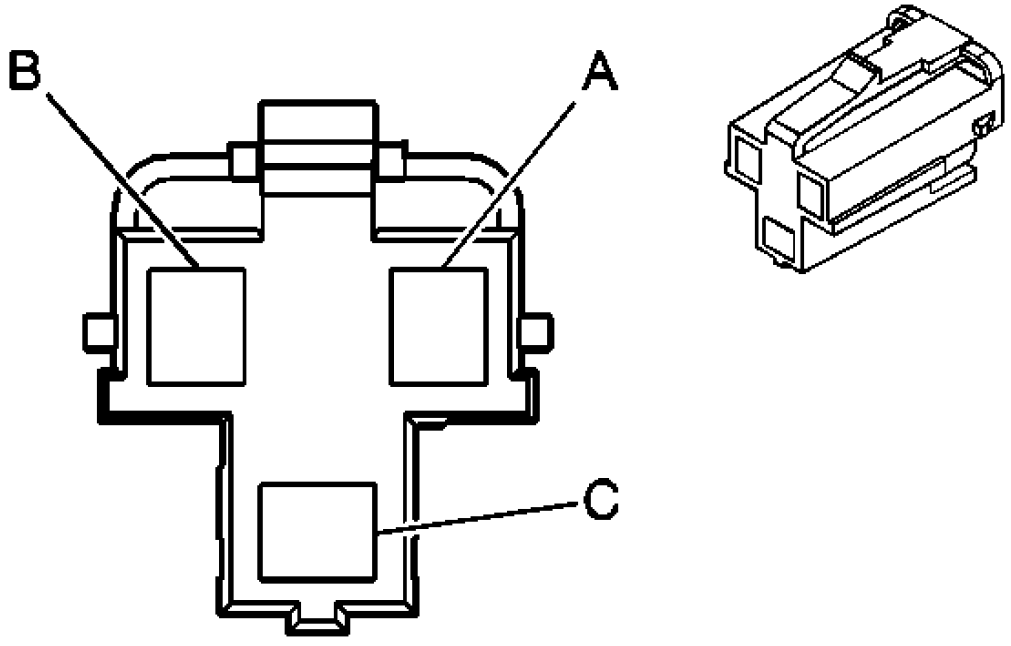


Fig. 15: X80D Accessory Power Receptacle - Center Console Compartment Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Floor Console
- OEM: 12176836
- Service: 15305923
- Description: 3-Way F Metri-Pack 280 Series (GY)

Terminal Part Information

- Terminal/Tray: 12110844/4

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- Core/Insulation Crimp: C/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

X80D Accessory Power Receptacle - Center Console Compartment

Pin	Wire	Circuit	Function
A	1 D-GN/WH	801	RAP 2 Fuse Supply Voltage
B	-	-	Not Used
C	1 BK	1450	Ground

X80H ACCESSORY POWER RECEPTACLE - CENTER CONSOLE

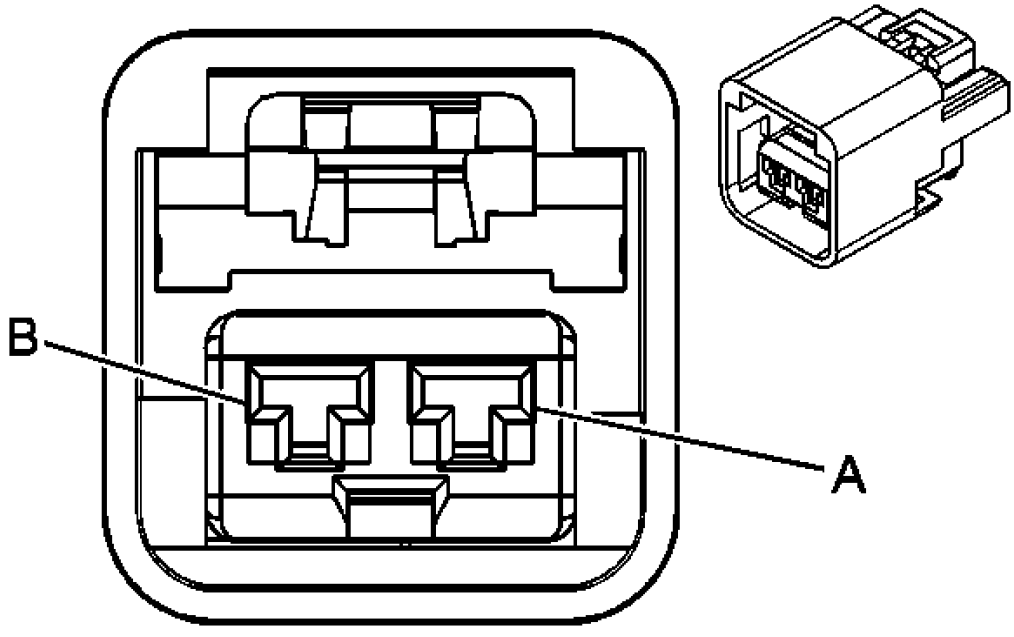


Fig. 16: X80H Accessory Power Receptacle - Center Console Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Console Cap Link
- OEM: 15326870
- Service: 88953160

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- Description: 2-Way F GT 280 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: 2/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

X80H Accessory Power Receptacle - Center Console

Pin	Wire	Circuit	Function
A	1 D-GN	1001	RAP 1 Fuse Supply Voltage
B	1 BK	1450	Ground

X83 AUXILIARY AUDIO INPUT (USR)

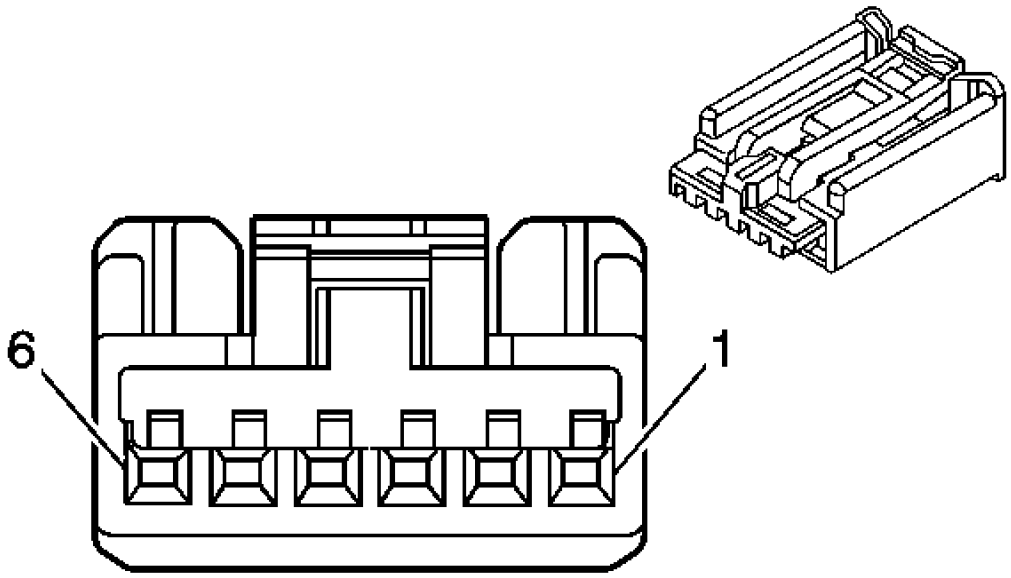


Fig. 17: X83 Auxiliary Audio Input (USR) Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Floor Console

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- OEM: 13595476
- Service: 19167753
- Description: 6-Way F AIT II Series (BK)

Terminal Part Information

- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

X83 Auxiliary Audio Input (USR)

Pin	Wire	Circuit	Function
1	0.35 L-GN	5839	Left Auxiliary Audio Signal 2
2	0.35 D-GN/WH	5841	Right Auxiliary Audio Signal 2
3	0.35 D-BU	5843	Auxiliary Audio Common Signal
4	-	-	Not Used
5	0.35 PK	2060	Auxiliary Detection Signal
6	-	-	Not Used

X84 DATA LINK CONNECTOR

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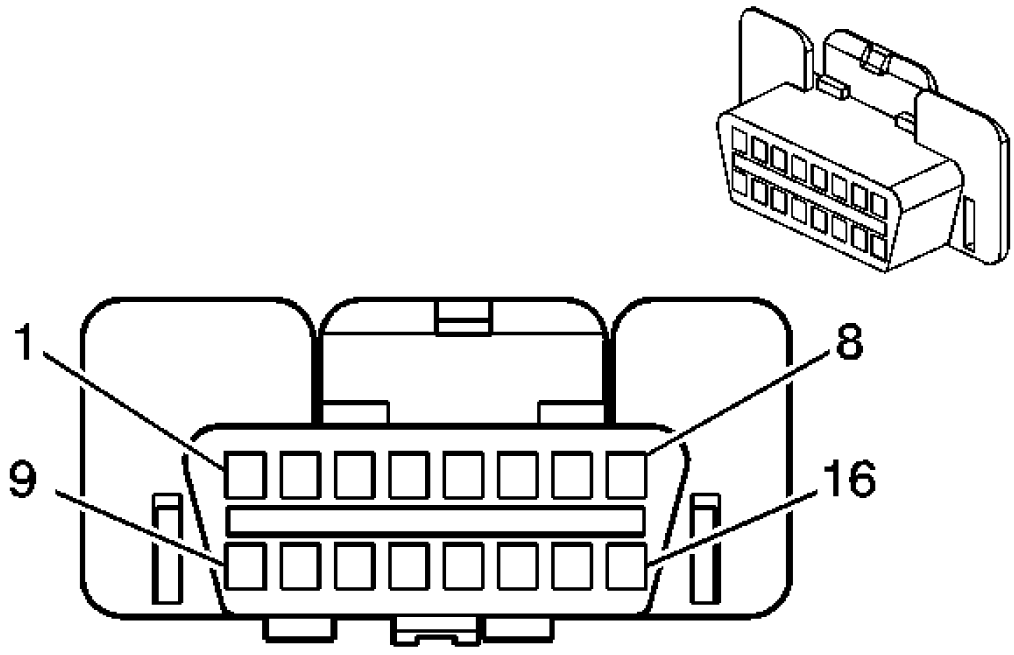


Fig. 18: X84 Data Link Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 15488184
- Service: 19115029
- Description: 16-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12129484/19
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

X84 Data Link Connector

Pin	Wire	Circuit	Function
1	0.35 D-GN	5060	Low Speed GMLAN Serial Data
2-3	-	-	Not Used

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4	0.5 BK	1650	Ground
5	0.5 BK	1650	Ground
6	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus (+)
7-11	-	-	Not Used
12	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
13	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
14	0.35 TN	2501	High Speed GMLAN Serial Data Bus (-)
15	-	-	Not Used
16	0.35 RD/WH	40	Battery Positive Voltage

X85 STEERING WHEEL AIR BAG COIL X1

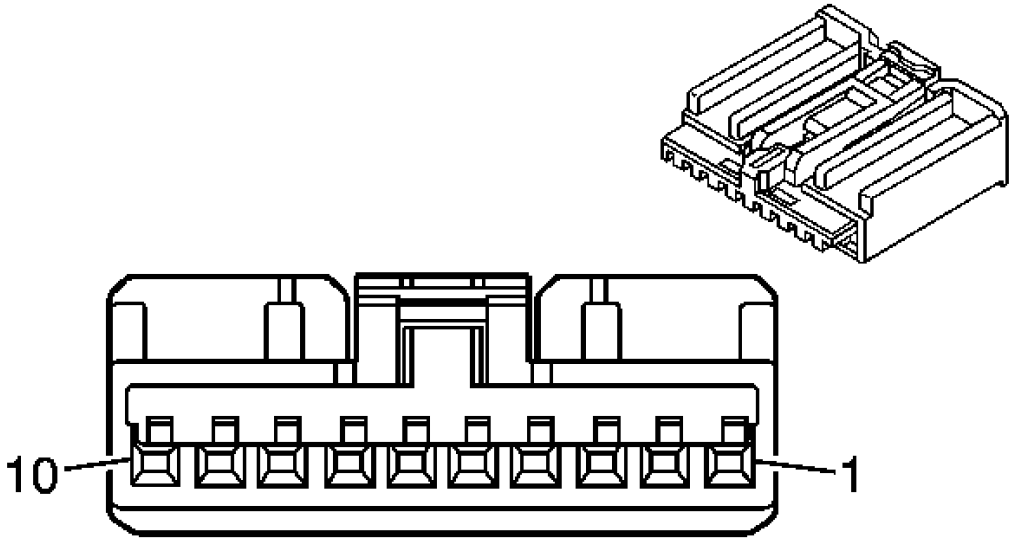


Fig. 19: X85 Steering Wheel Air Bag Coil X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel
- OEM: 13574592
- Service: 13316186
- Description: 10-Way F Kaizen 64 Series (BK)

Terminal Part Information

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- Pin: 2
- Terminal/Tray: Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 1, 3, 4, 5, 6, 8
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

X85 Steering Wheel Air Bag Coil X1

Pin	Wire	Circuit	Function
1	0.35 L-GN/WH	3287	Horn Switch Signal
2	0.8 BK	1550	Ground
3	0.35 GY	1884	Cruise Control Switch Signal
4	0.35 L-GN	6818	Steering Wheel Control Switch Signal
5	0.35 YE	7556	Headlamp Switch Reference Voltage
6	0.35 BN	6136	LED Backlight Dimming Control
7	-	-	Not Used
8	0.35 PU	5526	Tap Up/Tap Down Switch Signal (MYB/MYC)
9-10	-	-	Not Used

X85 STEERING WHEEL AIR BAG COIL X2

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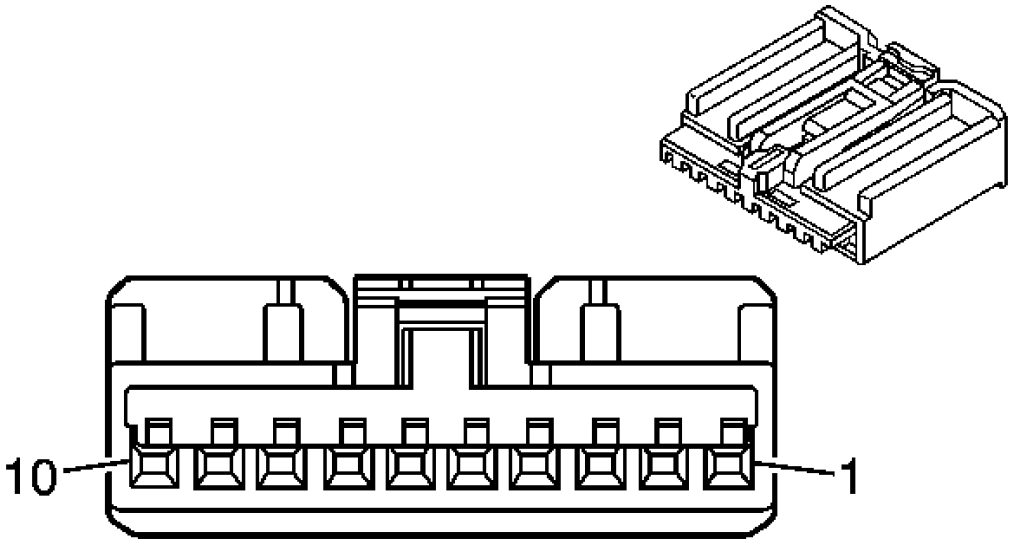


Fig. 20: X85 Steering Wheel Air Bag Coil X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Steering Wheel
- OEM: 15269795
- Service: 13316186
- Description: 10-Way F AIT II Series (BK)

Terminal Part Information

- Pins: 3, 5, 6, 7, 8, 10
- Terminal/Tray: SAIT-A03T-M064/14
- Core/Insulation Crimp: P/P
- Release Tool: J-38125-215A
- Test Probe: J-35616-64B (L-BU)

- Pin: 9
- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

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X85 Steering Wheel Air Bag Coil X2

Pin	Wire	Circuit	Function
1-2	-	-	Not Used
3	0.35 PU	5526	Tap Up/Tap Down Switch Signal (MYB/MYC)
4	-	-	Not Used
5	0.35 BN	6136	LED Backlight Dimming Control
6	0.35 PK	1444	12-Volt Reference
7	0.35 L-GN	6818	Steering Wheel Control Switch Signal
8	0.35 GY	1884	Cruise Control Switch Signal
9	0.8 BK	1550	Ground
10	0.35 L-GN/WH	3287	Horn Switch Signal

X85 STEERING WHEEL AIR BAG COIL X3

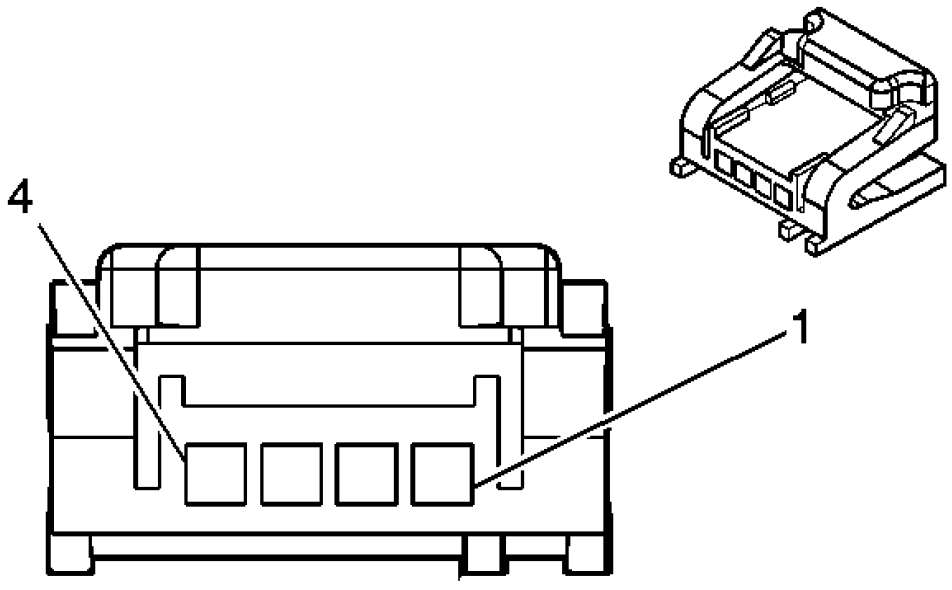


Fig. 21: X85 Steering Wheel Air Bag Coil X3 Connector End View
Courtesy of GENERAL MOTORS CORP.

Connector Part Information

- Harness: Instrument Panel

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- OEM: 15393421
- Service: 88987853
- Description: 4-Way F Micro-Pack 064 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly - See Part Catalog
- Core/Insulation Crimp: E/2
- Release Tool: 12180559-1
- Test Probe: J-35616-64B (L-BU)

X85 Steering Wheel Air Bag Coil X3

Pin	Wire	Circuit	Function
1	0.35 TN	3021	Steering Wheel Module - Stage1 - High Control
2	0.35 BN	3020	Steering Wheel Module - Stage1 - Low Control
3	0.35 WH	3023	Steering Wheel Module - Stage2 - High Control
4	0.35 PK	3022	Steering Wheel Module - Stage2 - Low Control

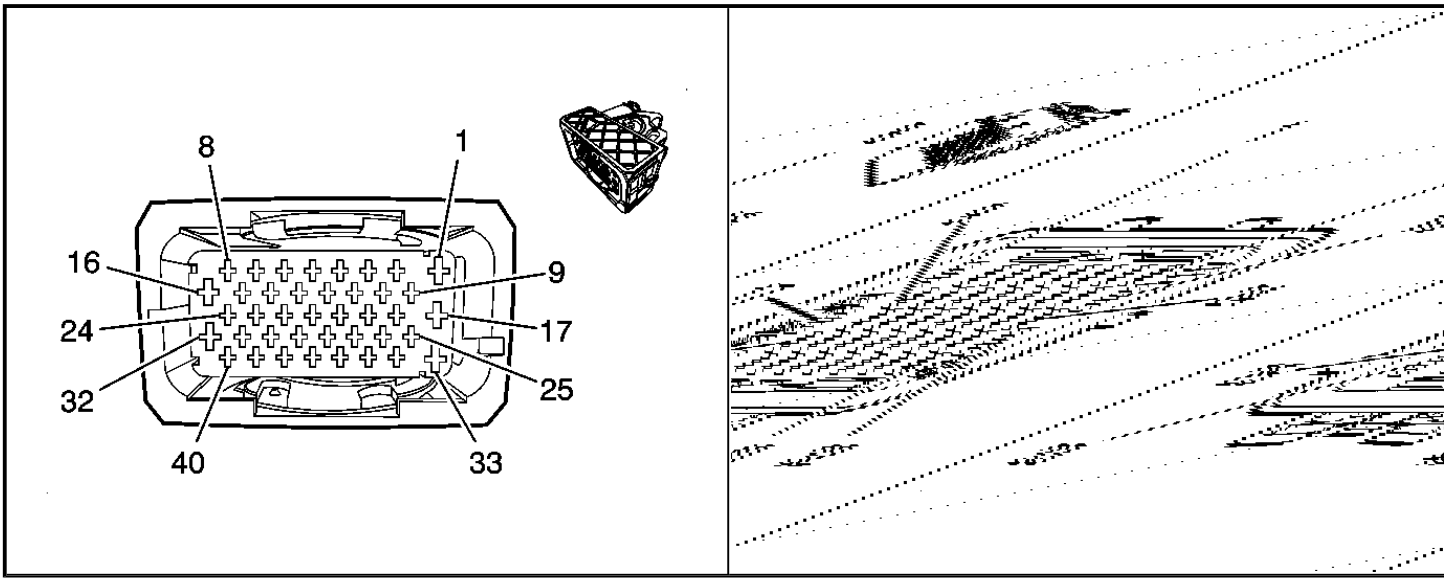
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2010 ELECTRICAL

Wiring Systems and Power Management - Component Locator - Inline Harness Connector End Views - Camaro

INLINE HARNESS CONNECTOR END VIEWS

X102 ENGINE HARNESS TO FORWARD LAMP HARNESS



Connector Part Information

- Harness: Engine
- OEM: 13603185
- Service: 13317815
- Description: 40-Way F 1.5/2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 2, 3, 4, 5, 6, 7, 29, 30, 31
- Terminal/Tray: 15327885/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pin: 1
- Terminal/Tray: 4-964286-1/16
- Core/Insulation Crimp: E/1

Connector Part Information

- Harness: Forward Lamp
- OEM: 13603205
- Service: 13317819
- Description: 40-Way M 1.5/2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 29, 30, 31, 34, 35
- Terminal/Tray: 10725381/Pending

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- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pins: 8, 9, 10, 11, 12, 13, 14, 15, 19, 20, 21, 22, 34
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pins: 18, 23, 24, 25, 35
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pin: 1
- Terminal/Tray: 1-962915-3/15
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-36
- Test Probe: J-35616-5 (PU)

X102 Engine Harness to Forward Lamp Harness

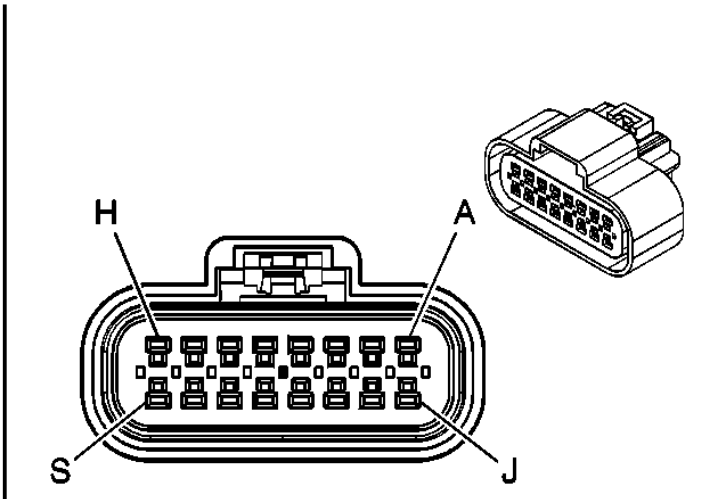
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	0.8 RD/WH	440	Battery Positive Voltage	1	0.8 RD/WH	440	Battery Positive Voltage
2	0.5 D-BU	1161	APP Sensor 1 Signal	2	0.5 D-BU	1161	APP Sensor 1 Signal
3	0.5 WH/BK	1164	5-Volt Reference 2	3	0.5 WH/BK	1164	5-Volt Reference 2
4	0.5 BN	1271	Low Reference	4	0.5 BN	1271	Low Reference
5	0.5 L-BU	1162	APP Sensor 2 Signal	5	0.5 L-BU	1162	APP Sensor 2 Signal
6	0.5 TN	1274	5-Volt Reference 3 (LLT) 5-Volt Reference 1 (L99/LS3)	6	0.5 TN	1274	5-Volt Reference 3 (LLT) 5-Volt Reference 1 (L99/LS3)
7	0.5 PU	1272	Low Reference	7	0.5 PU	1272	Low Reference
8	0.5 L-BU/WH	6311	Brake Pedal Switch Signal	8	0.5 L-BU/WH	6311	Brake Pedal Switch Signal
9	0.5 BN/WH	419	MIL Control	9	0.5 BN/WH	419	MIL Control
10	0.5 D-GN/WH	465	Fuel Pump Relay Control	10	0.35 D-GN/WH	465	Fuel Pump Relay Control
11	0.5 WH	1310	EVAP Canister Vent Solenoid Control	11	0.5 WH	1310	EVAP Canister Vent Solenoid Control
12	0.5 D-GN	890	Fuel Tank Pressure Sensor Signal	12	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal
13	0.5 GY	2709	5-Volt Reference 1	13	0.35 GY	2709	5-Volt Reference 1
14	0.5 D-BU	1936	Fuel Level Sensor	14	0.35 D-BU	1936	Fuel Level Sensor

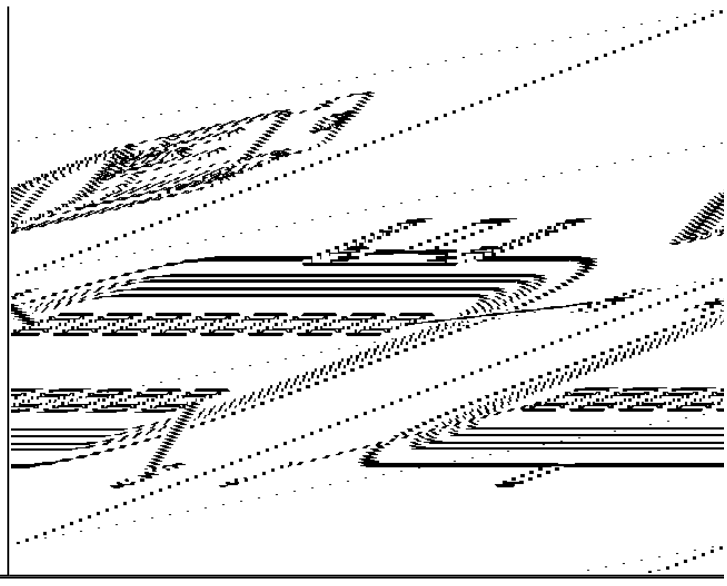
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			Signal				Signal
15	0.5 BN/WH	6281	Low Reference	15	0.35 BN/WH	6281	Low Reference
16-17	-	-	Not Used	16-17	-	-	Not Used
18	0.5 L-BU	1937	Fuel Level Sensor Signal - Secondary	18	0.35 L-BU	1937	Fuel Level Sensor Signal - Secondary
19	0.5 GY	2700	5-Volt Reference 3 (LLT)	19	0.5 GY	2700	5-Volt Reference 3 (LLT)
			5-Volt Reference 1 (L99/LS3)				5-Volt Reference 1 (L99/LS3)
20	0.5 TN	5514	Low Reference	20	0.5 TN	5514	Low Reference
21	0.5 OG/BK	380	A/C Refrigerant Pressure Sensor Signal	21	0.5 OG/BK	380	A/C Refrigerant Pressure Sensor Signal
22	0.35 D-BU	5985	Serial Data Wake-Up Signal	22	0.35 D-BU	5985	Serial Data Wake-Up Signal
23-28	-	-	Not Used	23-28	-	-	Not Used
29	0.5 TN	6109	5-Volt Reference 2 (M10)	29	0.5 TN	6109	5-Volt Reference 2 (M10)
	0.5 GY	2709	5-Volt Reference 1 (MV5)				5-Volt Reference 1 (MV5)
30	0.5 WH	6110	Low Reference (M10)	30	0.5 WH	6110	Low Reference
	0.5 BN/WH	6281	Low Reference (MV5)				
31	0.5 YE	6111	Clutch Pedal Position Sensor Signal (M10 or MV5)	31	0.5 YE	6111	Clutch Pedal Position Sensor Signal (M10 or MV5)
32-33	-	-	Not Used	32-33	-	-	Not Used
34	0.5 TN/BK	2500	High Speed GMLAN Serial Data Bus+	34	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
35	0.5 TN	2501	High Speed GMLAN Serial Data Bus -	35	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
36-40	-	-	Not Used	36-40	-	-	Not Used

X103 FORWARD LAMP HARNESS TO BODY EXTENSION HARNESS

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Connector Part Information

- Harness: Forward Lamp
- OEM: 15326863
- Service: 19180282
- Description: 16-Way F GT 150 Sealed 4.0 (BK)

Terminal Part Information

- Pins: A, B, D, E, F, J, K, L, M, N, P, R
- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins: A, B, E, F, J, K, L, M, N, P, R : E/A
- Core/Insulation Crimp: Pin: D : 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Body Extension
- OEM: 15326868
- Service: 15306364
- Description: 16-Way M 150 Series, Sealed (BK)

Terminal Part Information

- Pins: A, B, D, E, F, J, K, L, M, N, P, R
- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: Pin: D : E/1
- Core/Insulation Crimp: Pin: A, B, E, F, J, K, L, M, N, P, R : E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

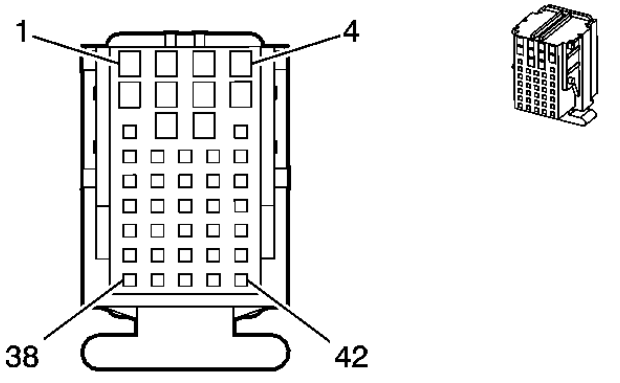
X103 Forward Lamp Harness to Body Extension Harness

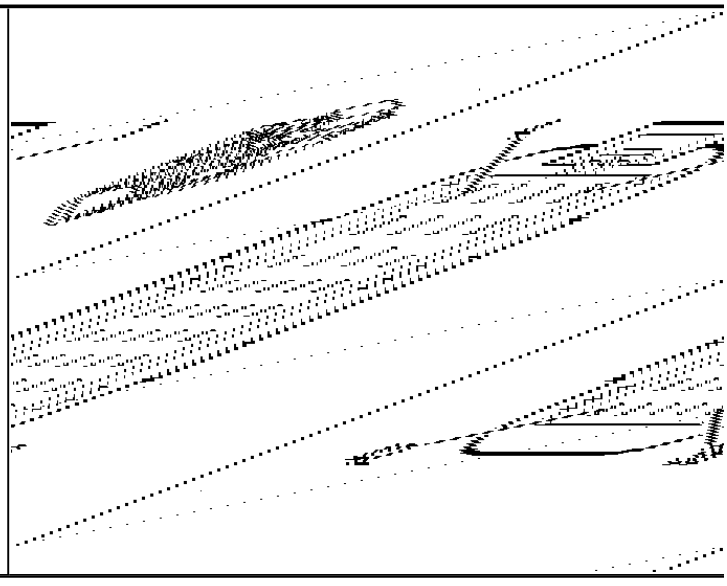
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 BN	882	Right Rear Wheel Speed Sensor Signal	A	0.5 BN	882	Right Rear Wheel Speed Sensor Signal
B	0.5 TN	884	Left Rear Wheel Speed Sensor Signal	B	0.5 TN	884	Left Rear Wheel Speed Sensor Signal
C	-	-	Not Used	C	-	-	Not Used
D	0.8 RD/WH	440	Battery Positive Voltage	D	0.8 RD/WH	440	Battery Positive Voltage
			Fuel Level Sensor				Fuel Level Sensor

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E	0.35 L-BU	1937	Signal - Secondary	E	0.35 L-BU	1937	Signal - Secondary
F	0.35 D-GN/WH	465	Fuel Pump Relay Control	F	0.35 D-GN/WH	465	Fuel Pump Relay Control
G-H	-	-	Not Used	G-H	-	-	Not Used
J	0.5 WH	883	Low Reference	J	0.5 WH	883	Low Reference
K	0.5 OG	885	Low Reference	K	0.5 OG	885	Low Reference
L	0.5 WH	1310	EVAP Canister Vent Solenoid Control	L	0.5 WH	1310	EVAP Canister Vent Solenoid Control
M	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal	M	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal
N	0.35 GY	2709	5-Volt Reference 1	N	0.35 GY	2709	5-Volt Reference 1
P	0.35 D-BU	1936	Fuel Level Sensor Signal	P	0.35 D-BU	1936	Fuel Level Sensor Signal
R	0.35 BN/WH	6281	Low Reference	R	0.35 BN/WH	6281	Low Reference
S	-	-	Not Used	S	-	-	Not Used

X104 FORWARD LAMP HARNESS TO INSTRUMENT PANEL HARNESS





Connector Part Information

- Harness: Forward Lamp
- OEM: 15458508
- Service: Pending
- Description: 42-Way F 1.2 MTII 2.8 Series, Sealed (BK)

Connector Part Information

- Harness: Instrument Panel
- OEM: 13606818
- Service: Pending
- Description: 42-Way M 1.6 MTII 2.8 Series, Sealed (BK)

Terminal Part Information

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- Pins: 12, 13, 14, 15, 16, 17, 27
- Terminal/Tray: 15368843/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 1, 2, 3, 5, 8
- Terminal/Tray: 4-964286-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pins: 18, 19, 20, 21, 22, 23, 29, 30, 31, 34, 26, 28, 32, 33, 36, 37, 38, 39, 40
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pin: 9
- Terminal/Tray: 4-964274-1/25
- Core/Insulation Crimp: E/A
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

Terminal Part Information

- Pins: 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 29, 30, 31, 34, 26, 27, 28, 32, 33, 36, 37, 38, 39, 40
- Terminal/Tray: 10726556/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 2, 3, 5, 8, 1
- Terminal/Tray: 1-962915-3/15
- Core/Insulation Crimp: Pins: 2, 3, 5, 8 : E/1
- Core/Insulation Crimp: Pin: 1 : See Terminal Repair Kit
- Release Tool: J-38125-36
- Test Probe: J-35616-5 (PU)

X104 Forward Lamp Harness to Instrument Panel Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	0.35 L-BU	5986	Serial Data Communication Enable	1	0.35 L-BU	5986	Serial Data Communication Enable
2	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage	2	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage
3	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage	3	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage
4	-	-	Not Used	4	-	-	Not Used
5	0.8 TN/WH	312	Right Headlamp Low Beam Supply Voltage (T4A)	5	0.8 D-BU	7539	Right Headlamp Low Beam Supply Voltage (T4A)
	0.5 D-BU	7539	DRL Control (T4F)				DRL Control (T4F)
6-7	-	-	Not Used	6-7	-	-	Not Used
			Left Headlamp Low				Left Headlamp Low

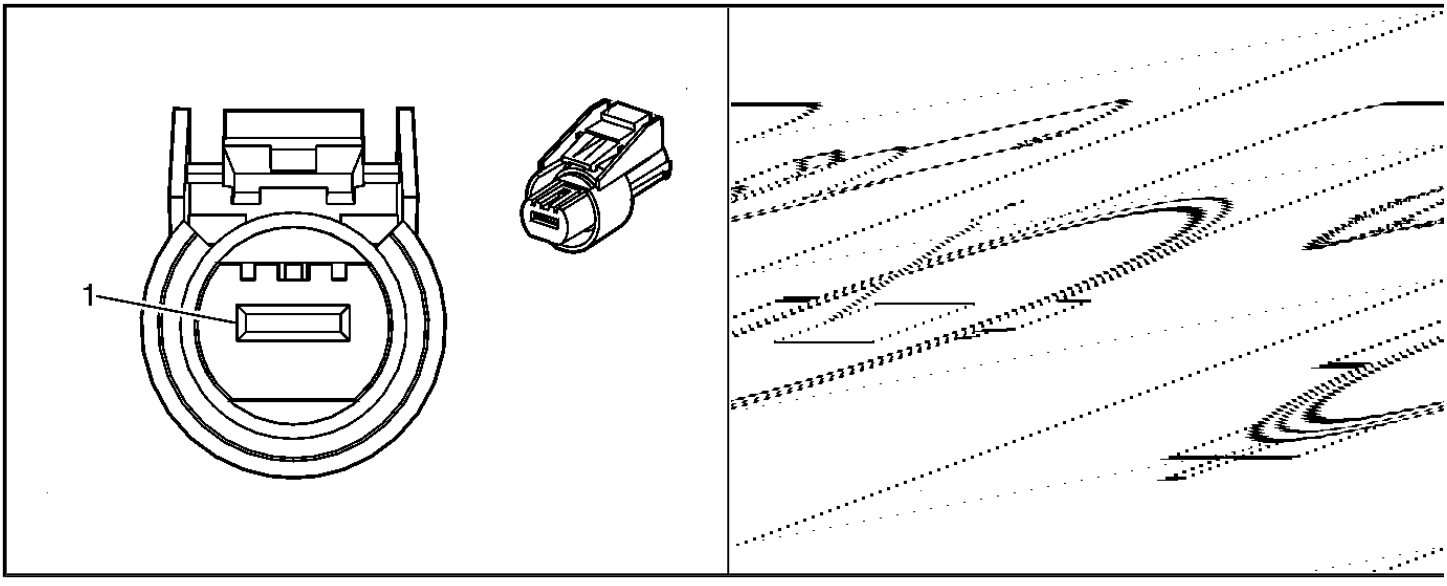
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8	0.5 YE	712	Beam Supply Voltage (T4A)	8	0.8 L-BU	7538	Beam Supply Voltage (T4A)
	0.5 L-BU	7538	DRL Control (T4F)				DRL Control (T4F)
9	0.5 L-BU/WH	6311	Brake Pedal Switch Signal	9	0.35 L-BU/WH	6311	Brake Pedal Switch Signal
10-11	-	-	Not Used	10-11	-	-	Not Used
12	0.5 D-GN	2087	Steering Wheel Position Sensor 5-Volt Reference	12	0.5 D-GN	2087	Steering Wheel Position Sensor 5-Volt Reference
13	0.5 D-GN/WH	636	Ambient Air Temperature Sensor Signal	13	0.35 D-GN/WH	636	Ambient Air Temperature Sensor Signal
14	0.5 YE	61	Low Reference	14	0.35 YE	61	Low Reference
15	0.5 BN/WH	419	MIL Control	15	0.35 BN/WH	419	MIL Control
16	0.5 PU	709	Left Park Lamp Supply Voltage	16	0.5 PU	709	Left Park Lamp Supply Voltage
17	0.5 BN/WH	309	Right Park Lamp Supply Voltage	17	0.5 BN/WH	309	Right Park Lamp Supply Voltage
18	0.5 D-BU	1161	APP Sensor 1 Signal	18	0.35 D-BU	1161	APP Sensor 1 Signal
19	0.5 WH/BK	1164	5-Volt Reference 2	19	0.35 WH/BK	1164	5-Volt Reference 2
20	0.5 BN	1271	Low Reference	20	0.35 BN	1271	Low Reference
21	0.5 L-BU	1162	APP Sensor 2 Signal	21	0.35 L-BU	1162	APP Sensor 2 Signal
22	0.5 TN	1274	5-Volt Reference 3 (LLT)	22	0.35 TN	1274	5-Volt Reference 3 (LLT)
			5-Volt Reference 1 (L99/LS3)				5-Volt Reference 1 (L99/LS3)
23	0.5 PU	1272	Low Reference	23	0.35 PU	1272	Low Reference
24-25	-	-	Not Used	24-25	-	-	Not Used
26	0.35 D-BU	5985	Serial Data Wake-Up Signal	26	0.35 D-BU	5985	Serial Data Wake-Up Signal
27	0.5 PK/BK	109	Hood Ajar Switch Signal	27	0.35 PK/BK	109	Hood Ajar Switch Signal
28	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)	28	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
29	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)	29	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
30	0.5 TN	6109	5-Volt Reference 1 (MV5)	30	0.35 TN	6109	5-Volt Reference 1 (MV5)
			5-Volt Reference 2 (M10)				5-Volt Reference 2 (M10)
31	0.5 WH	6110	Low Reference (MV5 or M10)	31	0.35 WH	6110	Low Reference (MV5 or M10)

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32	0.5 YE	6111	Clutch Pedal Position Sensor Signal (MV5 or M10)	32	0.35 YE	6111	Clutch Pedal Position Sensor Signal (MV5 or M10)
33	0.35 YE	354	Front End Sensor - Left - Signal	33	0.35 YE	354	Front End Sensor - Left - Signal
34	0.35 TN/OG	5045	Low Reference	34	0.35 TN/OG	5045	Low Reference
35	-	-	Not Used	35	-	-	Not Used
36	0.35 D-GN	1409	Front End Sensor - Right - Signal	36	0.35 D-GN	1409	Front End Sensor - Right - Signal
37	0.35 GY	5600	Low Reference	37	0.35 GY	5600	Low Reference
38	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+	38	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
39	0.35 TN	2501	High Speed GMLAN Serial Data Bus -	39	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
40	0.35 YE	196	Windshield Wiper Motor Park Switch Signal	40	0.35 YE	196	Windshield Wiper Motor Park Switch Signal
41-42	-	-	Not Used	41-42	-	-	Not Used

X105 FORWARD LAMP HARNESS TO INSTRUMENT PANEL HARNESS



Connector Part Information

- Harness: Forward Lamp
- OEM: 15326120
- Service: 15326120
- Description: 1-Way F Metri-Pack 800 Series,

Connector Part Information

- Harness: Instrument Panel
- OEM: 15326119
- Service: 89046877
- Description: 1-Way M Metri-Pack 800 Series,

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Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15336748/20
- Core/Insulation Crimp: G/F/3
- Release Tool: 12150860
- Test Probe: J-35616-44 (YE)

Sealed (BK)

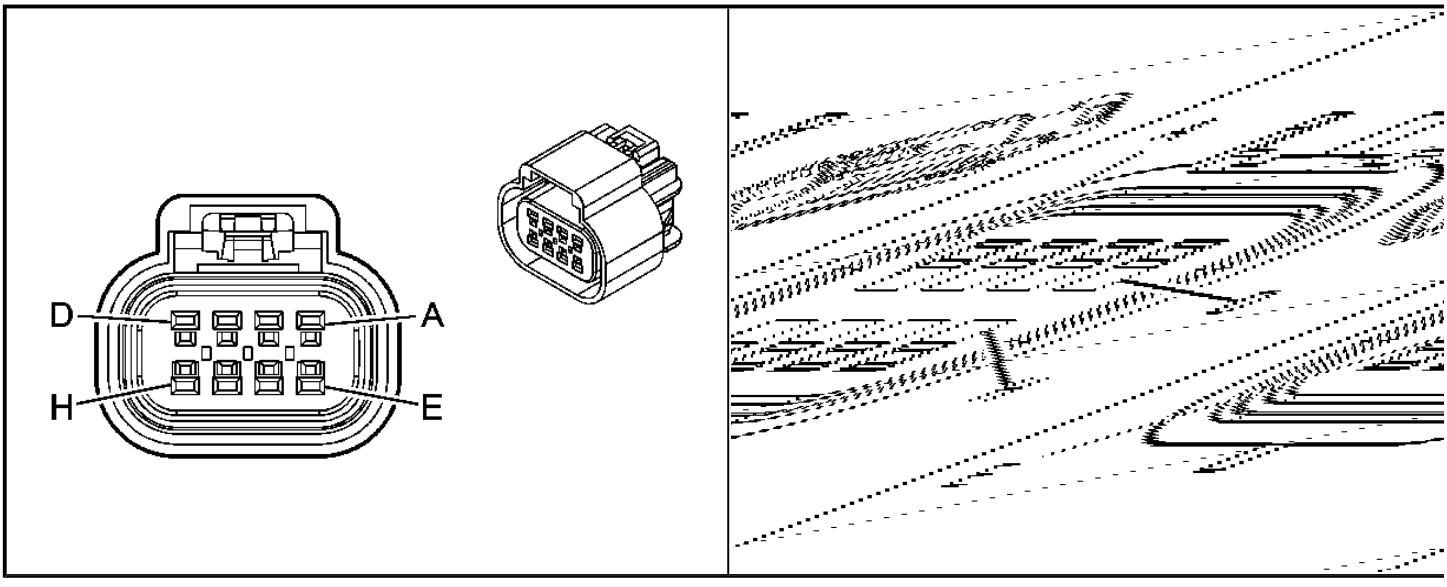
Terminal Part Information

- Terminal/Tray: 12129349/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

X105 Forward Lamp Harness to Instrument Panel Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	5 RD/BK	542	Battery Positive Voltage	1	5 RD/BK	542	Battery Positive Voltage

X108 FORWARD LAMP HARNESS TO FOG LAMP HARNESS



Connector Part Information

- Harness: Forward Lamp
- OEM: 15326835
- Service: 15326835
- Description: 8-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Pins: A, C, E, F, H, D
- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins: A, C, E, F, H :

Connector Part Information

- Harness: Fog Lamp
- OEM: 15326840
- Service: 15326840
- Description: 8-Way M GT 150 Sealed 4.0 (BK)

Terminal Part Information

- Pins: D, H, A, C, E, F, H
- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: Pins: D, H : E/1

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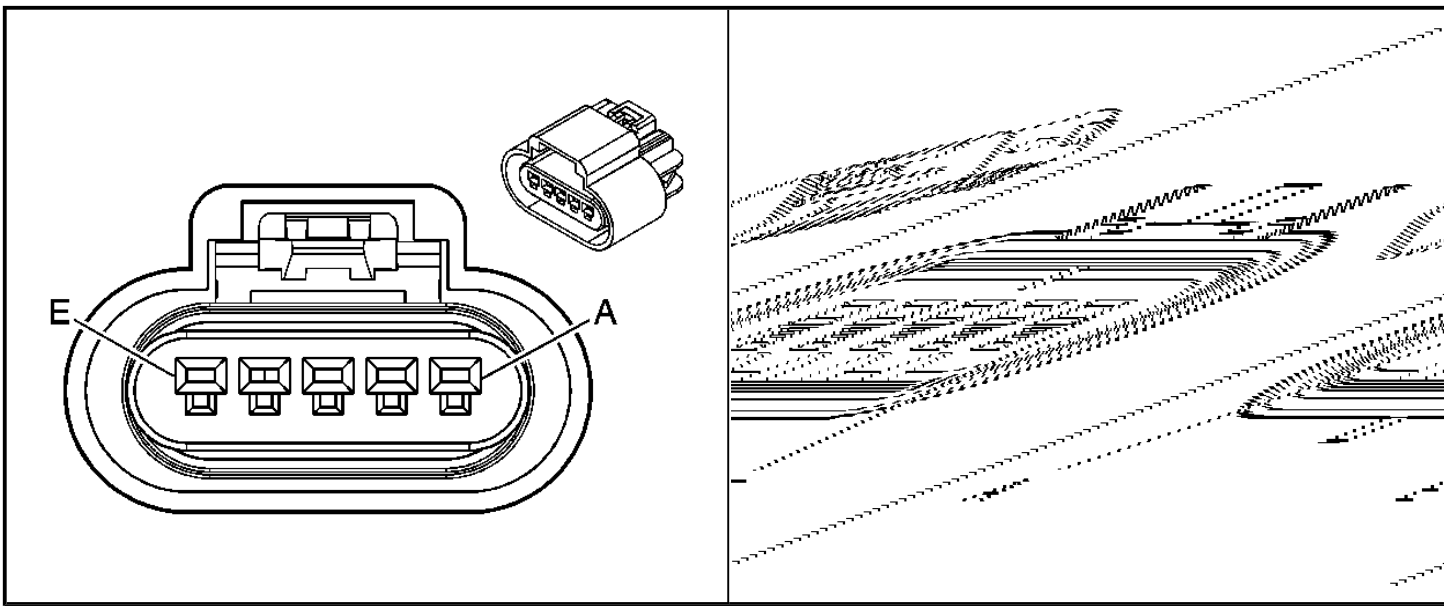
E/A
- Core/Insulation Crimp: Pins: D : 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Core/Insulation Crimp: Pins: A, C, E, F, H : E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

X108 Forward Lamp Harness to Fog Lamp Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 PU	709	Left Park Lamp Supply Voltage	A	0.5 PU	709	Left Park Lamp Supply Voltage
B	-	-	Not Used	B	-	-	Not Used
C	0.5 PU	2234	Front Fog Lamp Supply Voltage (T3U)	C	0.5 PU	2234	Front Fog Lamp Supply Voltage (T3U)
	0.5 L-BU	7538	DRL Control (T4F)		0.5 L-BU	7538	DRL Control (T4F)
D	0.8 BK	1050	Ground	D	0.8 BK	1050	Ground
E	0.5 BN/WH	309	Right Park Lamp Supply Voltage	E	0.5 BN/WH	309	Right Park Lamp Supply Voltage
F	0.5 PU	2234	Front Fog Lamp Supply Voltage (T3U)	F	0.5 PU	2234	Front Fog Lamp Supply Voltage (T3U)
	0.5 D-BU	7539	DRL Control (T4F)		0.5 D-BU	7539	DRL Control (T4F)
G	-	-	Not Used	G	-	-	Not Used
H	0.5 BK	1150	Ground	H	0.8 BK	1150	Ground

X109 ENGINE HARNESS TO CAMSHAFT POSTION SENSOR AND CAMSHAFT POSITION ACTUATOR SOLENOID VALVE HARNESS (L99)



Connector Part Information

Connector Part Information

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- Harness: Engine
- OEM: 13519051
- Service: 19151498
- Description: 5-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Harness: Camshaft Postion (CMP) Sensor and Camshaft Position (CMP) Actuator Solenoid Valve
- OEM: 15326827
- Service: 13504593
- Description: 5-Way M GT 150 Series, Sealed (BK)

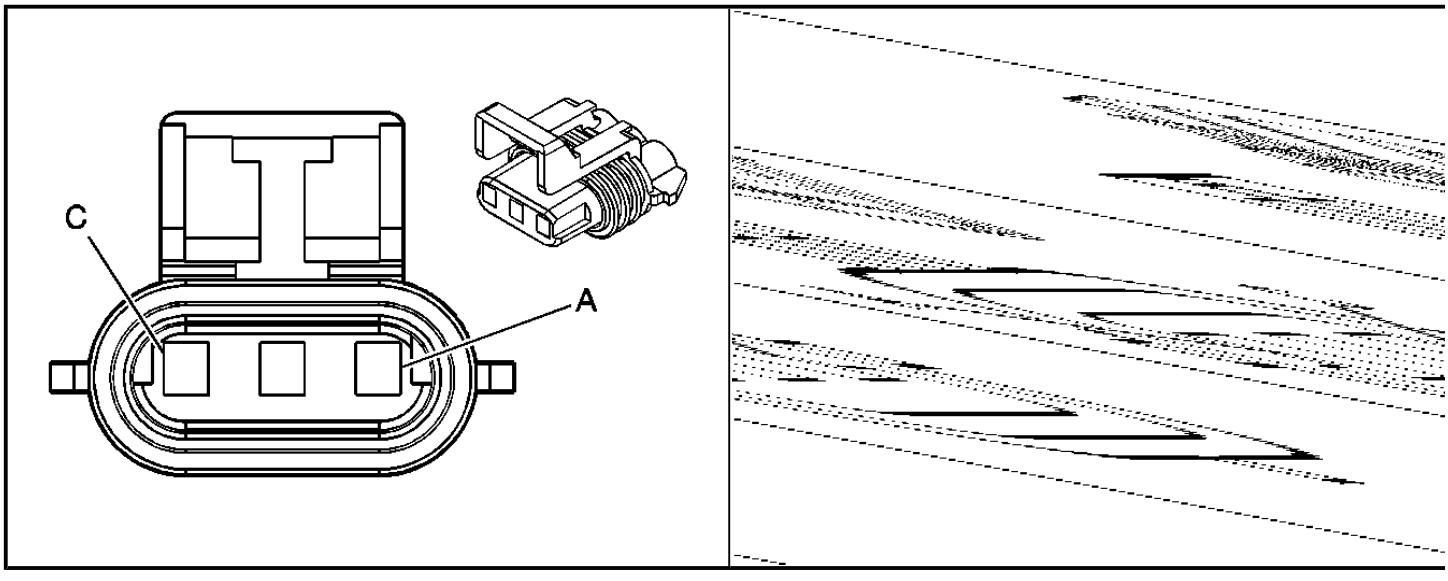
Terminal Part Information

- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

X109 Engine Harness to Camshaft Postion Sensor and Camshaft Position Actuator Solenoid Valve Harness (L99)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 D-BU	6259	5-Volt Reference 1	A	0.5 D-BU	6259	5-Volt Reference 1
B	0.5 BN	6266	Low Reference	B	0.5 BN	6266	Low Reference
C	0.5 D-BU/WH	6265	Camshaft Position Signal	C	0.5 D-BU/WH	6265	Camshaft Position Signal
D	0.5 PU	5284	CMP Actuator Solenoid Control	D	0.5 TN	5284	CMP Actuator Solenoid Control
E	0.5 TN	2199	Low Reference	E	0.5 PU	2199	Low Reference

X109 ENGINE HARNESS TO CAMSHAFT POSTION SENSOR HARNESS (LS3)



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Connector Part Information

- Harness: Engine
- OEM: 12110293
- Service: 12117025
- Description: 3-Way F Metri-Pack 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Connector Part Information

- Harness: Camshaft Postion Sensor
- OEM: 12129615
- Service: 15305889
- Description: 3-Way M Metri-Pack 150 Series, Sealed (BK)

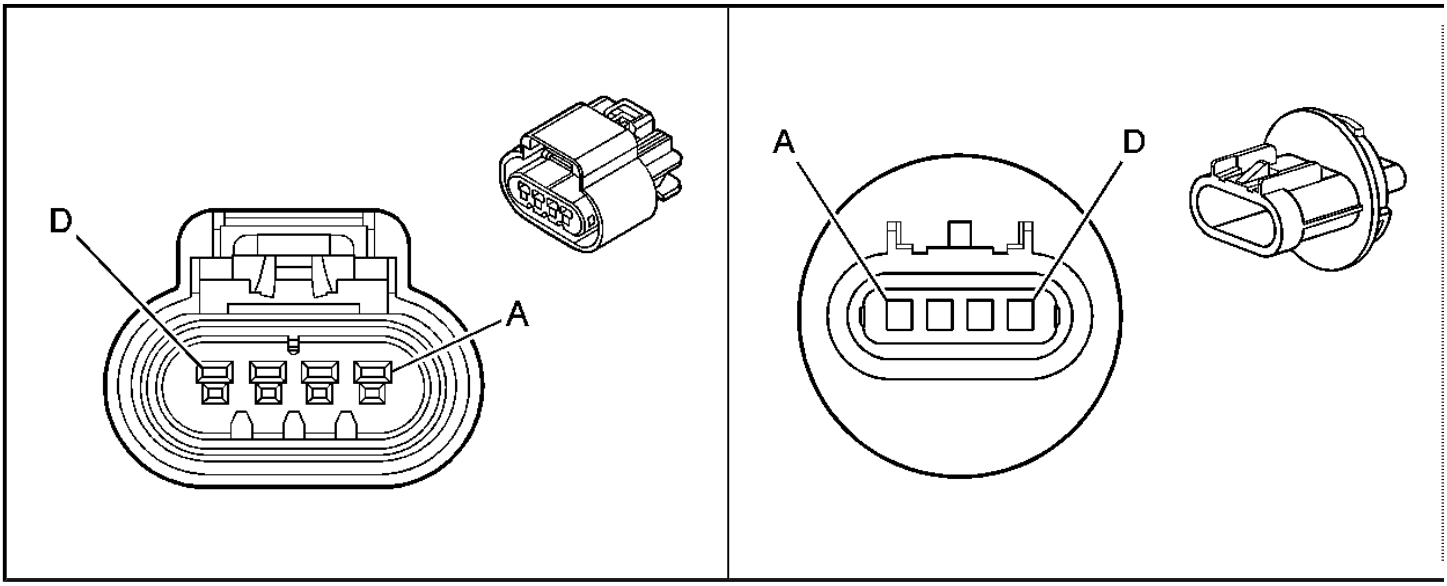
Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

X109 Engine Harness to Camshaft Postion Sensor Harness (LS3)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 D-BU	6259	5-Volt Reference 1	A	0.5 D-BU	6259	5-Volt Reference 1
B	0.5 BN	6266	Low Reference	B	0.5 BN	6266	Low Reference
C	0.5 D-BU/WH	6265	Camshaft Position Signal	C	0.5 D-BU/WH	6265	Camshaft Position Signal

X110 FORWARD LAMP HARNESS TO LEFT HEADLAMP HARNESS (T4F)



Connector Part Information

- Harness: Forward Lamp
- OEM: 15487756

Connector Part Information

- Harness: Left Headlamp
- OEM: 15369319

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- Service: 19180287
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Pins: C, D, A, B
- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins: C, D : E/A
- Core/Insulation Crimp: Pins: A, B : 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Service: Service by Component Assembly - See Part Catalog
- Description: 4-Way M GT 150 Series, Sealed (BK)

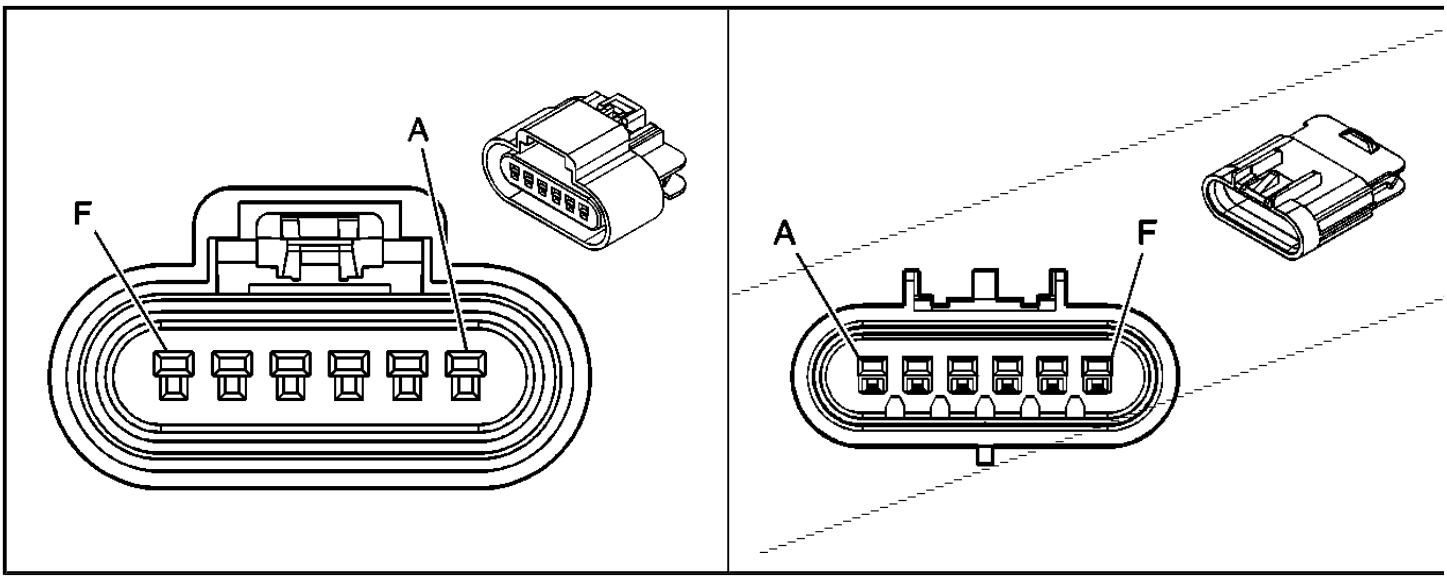
Terminal Part Information

- Terminal/Tray: Service by Component Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

X110 Forward Lamp Harness to Left Headlamp Harness (T4F)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	1 BK	1150	Ground	A	BK	1150	Ground
B	1 YE	712	Left Headlamp Low Beam Supply Voltage	B	RD	712	Left Headlamp Low Beam Supply Voltage
C	0.5 D-GN/WH	711	Left Headlamp High Beam Supply Voltage	C	L-GN	711	Left Headlamp High Beam Supply Voltage
D	0.5 PU	709	Left Park Lamp Supply Voltage	D	D-BU	709	Left Park Lamp Supply Voltage

X111 ENGINE HARNESS TO THROTTLE BODY JUMPER HARNESS (LLT)



Connector Part Information

Connector Part Information

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- Harness: Engine
- OEM: 15397577
- Service: 88988944
- Description: 6-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326427/5
- Core/Insulation Crimp: Pins A, B - 2/1
- Core/Insulation Crimp: Pins C, D, E, F - E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Harness: Throttle Body Jumper
- OEM: 15326833
- Service: 15326833
- Description: 6-Way M GT 150 Series, Sealed (BK)

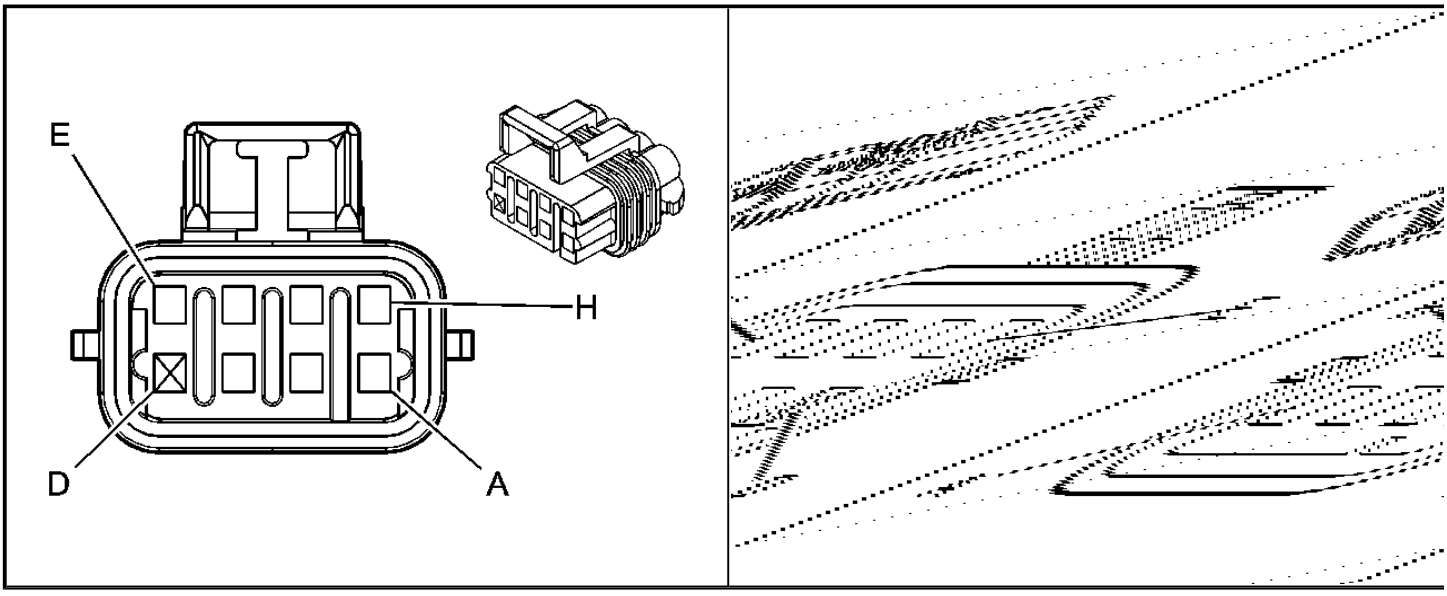
Terminal Part Information

- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: Pins A, B - E/1
- Core/Insulation Crimp: Pins C, D, E, F - E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

X111 Engine Harness to Throttle Body Jumper Harness (LLT)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.8 BN	582	TAC Motor Control - 2	A	0.8 BN	582	TAC Motor Control - 2
B	0.8 YE	581	TAC Motor Control - 1	B	0.8 YE	581	TAC Motor Control - 1
C	0.5 TN	2752	Low Reference	C	0.5 TN	2752	Low Reference
D	0.5 D-GN	485	TP Sensor 1 Signal	D	0.5 D-GN	485	TP Sensor 1 Signal
E	0.5 GY	2701	5-Volt Reference 3	E	0.5 GY	2701	5-Volt Reference 3
F	0.5 PU	486	TP Sensor 2 Signal	F	0.5 PU	486	TP Sensor 2 Signal

X112 ENGINE HARNESS TO COILS (EVEN) HARNESS (L99 OR LS3)



Connector Part Information

Connector Part Information

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- Harness: Engine
- OEM: 12047938
- Service: 12102754
- Description: 8-Way F Metri-Pack 150 Series, Sealed (L-GY)

Terminal Part Information

- Pins: B, C, E, F, G
- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

- Pins: A, H
- Terminal/Tray: 12160223/3
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

- Harness: Coils (Even)
- OEM: 15496016
- Service: Service by Harness - See Part Catalog
- Description: 8-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

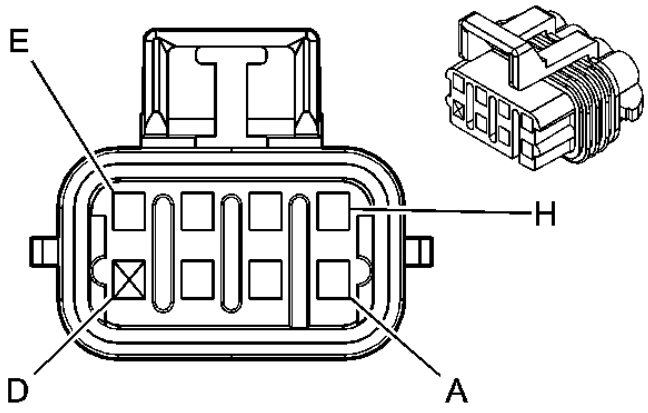
- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

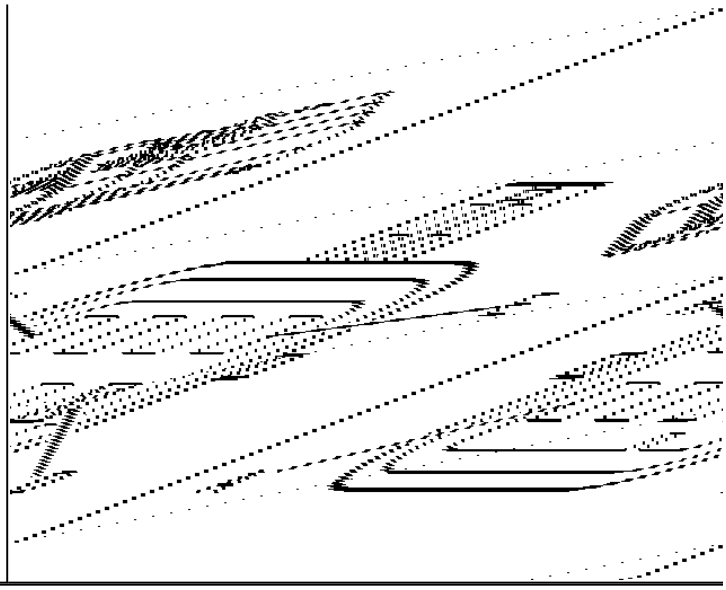
X112 Engine Harness to Coils (Even) Harness (L99 or LS3)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.8 BK	350	Ground	A	0.8 BK	151	Ground
B	0.5 OG/WH	2122	IC 2 Control	B	0.5 RD	2127	IC 2 Control
C	0.5 D-GN/WH	2124	IC 4 Control	C	0.5 D-GN	2125	IC 4 Control
D	-	-	Not Available	D	-	-	Not Available
E	0.5 BN/WH	2130	Low Reference	E	0.5 BN	2129	Low Reference
F	0.5 L-BU/WH	2126	IC 6 Control	F	0.5 L-BU	2123	IC 6 Control
G	0.5 PU/WH	2128	IC 8 Control	G	0.5 PU	2121	IC 8 Control
H	0.8 PK/BK	5292	Ignition Voltage	H	0.8 PK	39	Ignition Voltage

X113 ENGINE HARNESS TO COILS (ODD) HARNESS (L99 OR LS3)

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Connector Part Information

- Harness: Engine
- OEM: 12047938
- Service: 12102754
- Description: 8-Way F Metri-Pack 150 Series, Sealed (L-GY)

Terminal Part Information

- Pins: B, C, E, F, G
- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

- Pins: A, H
- Terminal/Tray: 12160223/3
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Connector Part Information

- Harness: Coils (Odd)
- OEM: 15496016
- Service: Service by Harness - See Part Catalog
- Description: 8-Way M Metri-Pack 150 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12045773/2
- Core/Insulation Crimp: E/1
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

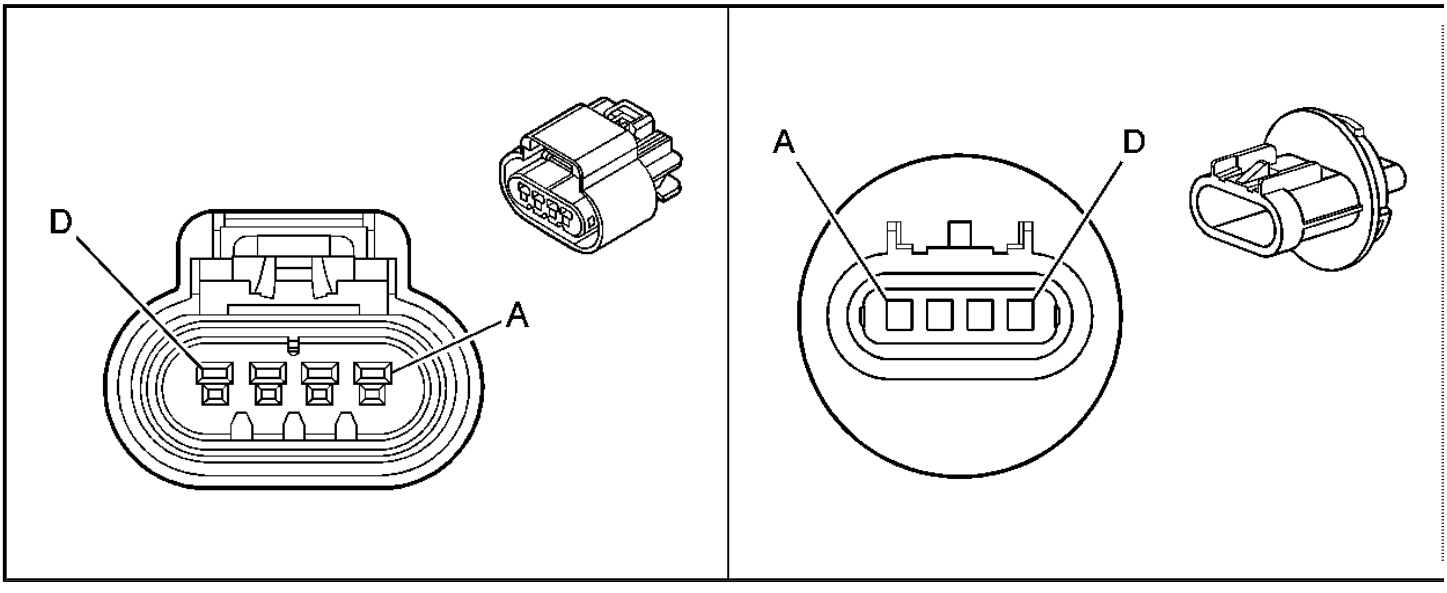
X113 Engine Harness to Coils (Odd) Harness (L99 or LS3)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.8 BK	250	Ground	A	0.8 BK	151	Ground
B	0.5 OG	2127	IC 7 Control	B	0.5 RD	2127	IC 7 Control

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C	0.5 D-GN	2125	IC 5 Control	C	0.5 D-GN	2125	IC 5 Control
D	-	-	Not Available	D	-	-	Not Available
E	0.5 BN	2129	Low Reference	E	0.5 BN	2129	Low Reference
F	0.5 L-BU	2123	IC 3 Control	F	0.5 L-BU	2123	IC 3 Control
G	0.5 PU	2121	IC 1 Control	G	0.5 PU	2121	IC 1 Control
H	0.8 PK/BK	5291	Ignition Voltage	H	0.8 PK	39	Ignition Voltage

X120 FORWARD LAMP HARNESS TO RIGHT HEADLAMP HARNESS (T4F)



Connector Part Information

- Harness: Forward Lamp
- OEM: 15487756
- Service: 19180287
- Description: 4-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Pins: C, D, A, B
- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins: C, D : E/A
- Core/Insulation Crimp: Pins: A, B : 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Right Headlamp
- OEM: 15369319
- Service: Service by Component Assembly - See Part Catalog
- Description: 4-Way M GT 150 Series, Sealed (BK)

Terminal Part Information

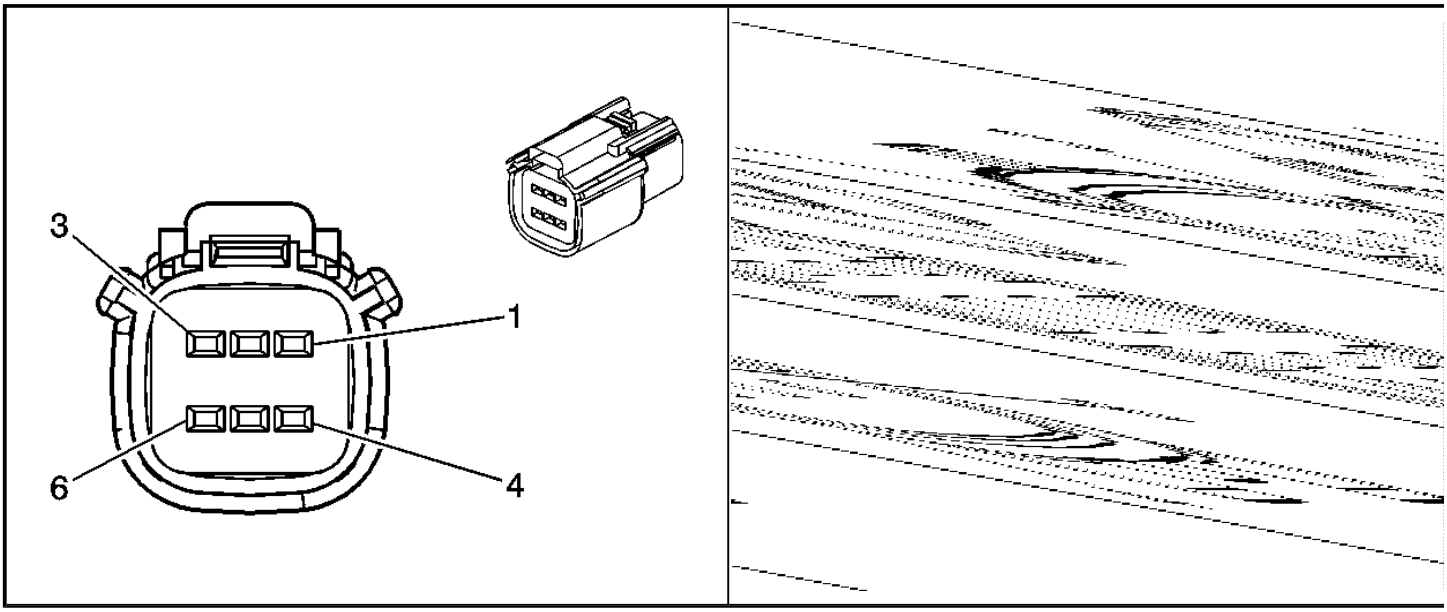
- Terminal/Tray: Service by Component Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

X120 Forward Lamp Harness to Right Headlamp Harness (T4F)

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Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	1 BK	1050	Ground	A	BK	1050	Ground
B	1 TN/WH	312	Right Headlamp Low Beam Supply Voltage	B	RD	312	Right Headlamp Low Beam Supply Voltage
C	0.5 L-GN/BK	311	Right Headlamp High Beam Supply Voltage	C	L-GN	311	Right Headlamp High Beam Supply Voltage
D	0.5 BN/WH	309	Right Park Lamp Supply Voltage	D	D-BU	309	Right Park Lamp Supply Voltage

X160 ENGINE HARNESS TO INJECTORS (EVEN) HARNESS (LLT)



Connector Part Information

- Harness: Engine
- OEM: 13609714
- Service: 19178087
- Description: 6-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 13569881/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

Connector Part Information

- Harness: Injectors (Even)
- OEM: 33482-0601
- Service: Service by Harness - See Part Catalog
- Description: 6-Way M MX150 Series, Sealed (BK)

Terminal Part Information

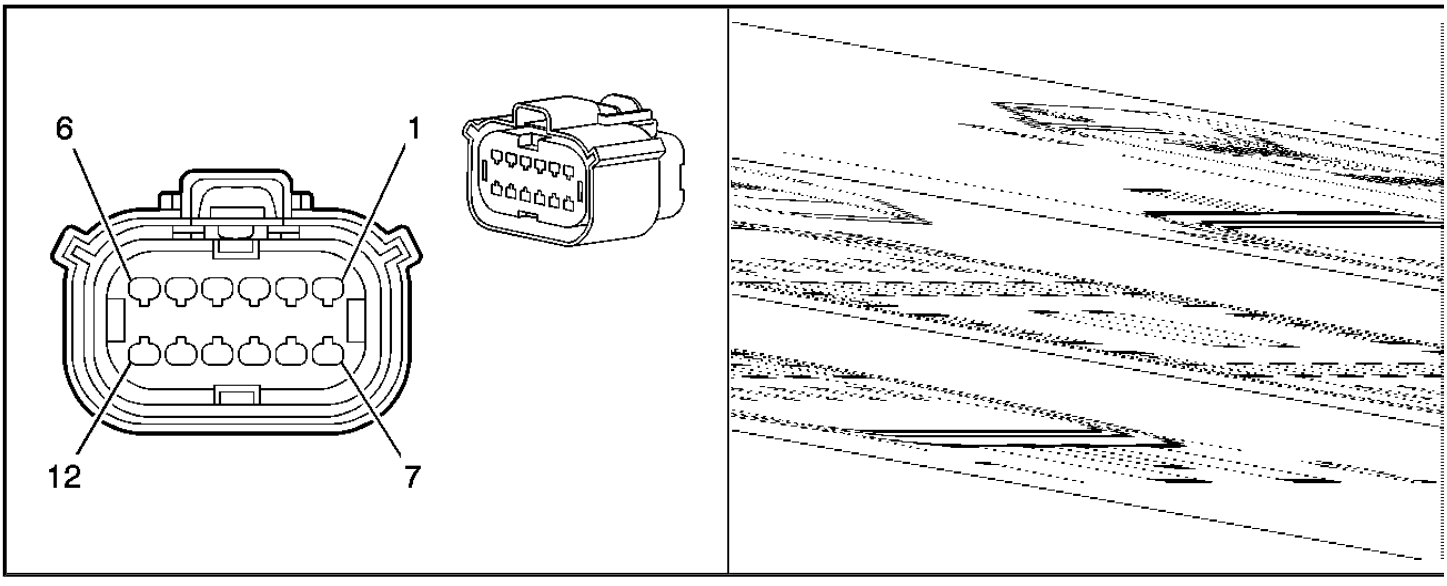
- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

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X160 Engine Harness to Injectors (Even) Harness (LLT)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	1 D-BU	4802	Fuel Injector 2 Low Control	1	BN	4802	Fuel Injector 2 Low Control
2	1 D-BU/WH	4902	Fuel Injector 2 High Control	2	BK	4902	Fuel Injector 2 High Control
3	1 L-BU	4804	Fuel Injector 4 Low Control	3	BN	4804	Fuel Injector 4 Low Control
4	1 L-BU/WH	4904	Fuel Injector 4 High Control	4	BK	4904	Fuel Injector 4 High Control
5	1 PU	4806	Fuel Injector 6 Low Control	5	BN	4806	Fuel Injector 6 Low Control
6	1 PU/WH	4906	Fuel Injector 6 High Control	6	BK	4906	Fuel Injector 6 High Control

X161 ENGINE HARNESS TO INJECTORS (ODD) HARNESS (LLT)



Connector Part Information

- Harness: Engine
- OEM: 13609715
- Service: 19178148
- Description: 12-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

- Pins: 2, 3, 4, 8, 9, 10

Connector Part Information

- Harness: Injectors (Odd)
- OEM: 33482-1216
- Service: Service by Harness - See Part Catalog
- Description: 12-Way M MX150 Series, Sealed (BK)

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- Terminal/Tray: 13569881/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 5, 11, 12
- Terminal/Tray: 33012-3002/26
- Core/Insulation Crimp: E/2
- Release Tool: J-38125-217
- Test Probe: J-35616-14 (GN)

Terminal Part Information

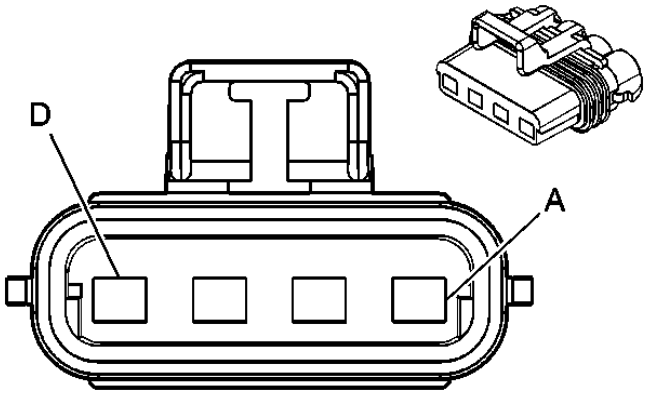
- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

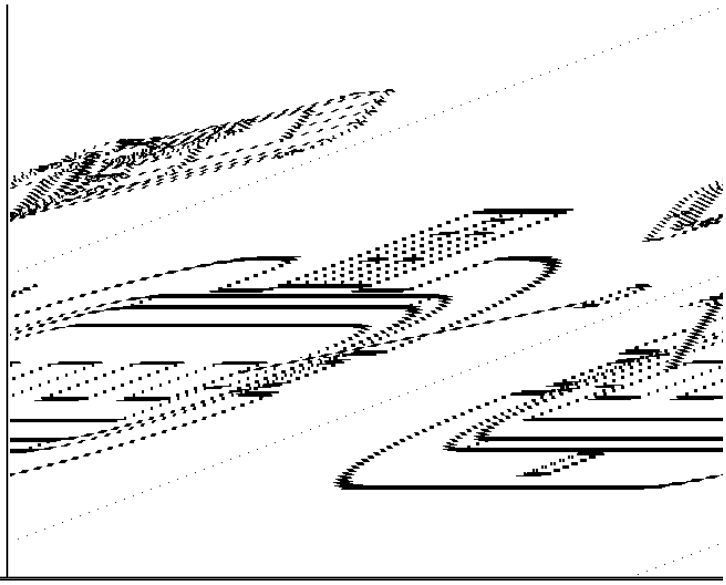
X161 Engine Harness to Injectors (Odd) Harness (LLT)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	-	-	Not Available	1	-	-	Not Available
2	1 BN	4801	Fuel Injector 1 Low Control	2	BN	4801	Fuel Injector 1 Low Control
3	1 D-GN	4803	Fuel Injector 3 Low Control	3	BN	4803	Fuel Injector 3 Low Control
4	1 L-GN	4805	Fuel Injector 5 Low Control	4	BN	4805	Fuel Injector 5 Low Control
5	0.5 TN	808	Low Reference	5	L-BU	808	Low Reference
6-7	-	-	Not Available	6-7	-	-	Not Available
8	1 BN/WH	4901	Fuel Injector 1 High Control	8	BK	4901	Fuel Injector 1 High Control
9	1 D-GN/WH	4903	Fuel Injector 3 High Control	9	BK	4903	Fuel Injector 3 High Control
10	1 L-GN/WH	4905	Fuel Injector 5 High Control	10	BK	4905	Fuel Injector 5 High Control
11	0.5 GY	598	5-Volt Reference 1	11	WH	598	5-Volt Reference 1
12	0.5 YE	2918	FRP Sensor Signal	12	BK	2918	FRP Sensor Signal

X162 FORWARD LAMP HARNESS TO COOLING FAN HARNESS

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Connector Part Information

- Harness: Forward Lamp
- OEM: 12129565
- Service: 15306069
- Description: 4-Way F Metri-Pack 280 Series, Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12077413/4
- Core/Insulation Crimp: F/5
- Release Tool: 12094430
- Test Probe: J-35616-4A (PU)

Connector Part Information

- Harness: Cooling Fan
- OEM: 12129600 (Early Production) 12191399 (Late Production)
- Service: 15306162 (Early Production) 15305995 (Late Production)
- Description: 4-Way M Metri-Pack 280 Series, Sealed (D-GY)

Terminal Part Information

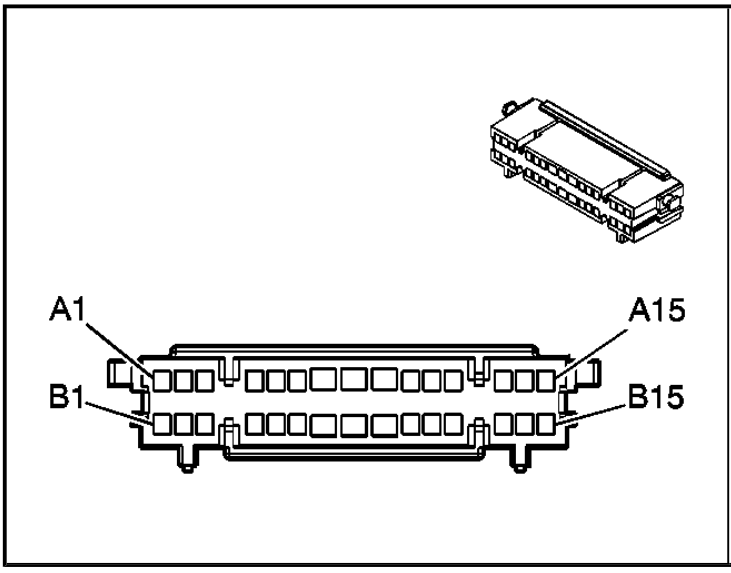
- Terminal/Tray: Service by Component Assembly - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

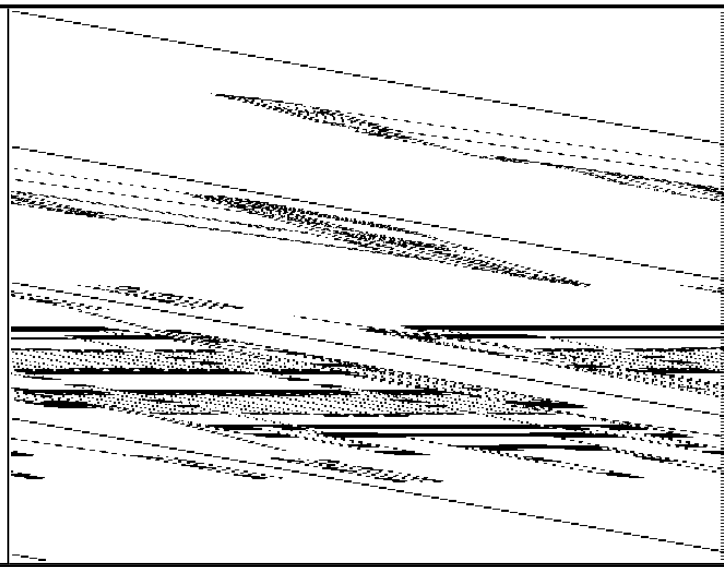
X162 Forward Lamp Harness to Cooling Fan Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	3 L-BU	409	Cooling Fan Motor - Right Supply Voltage	A	4 RD	409	Cooling Fan Motor - Right Supply Voltage
B	3 WH	504	Low Reference	B	4 BK	504	Low Reference
C	3 GY	532	Cooling Fan Motor - Left Supply Voltage	C	4 RD	532	Cooling Fan Motor - Left Supply Voltage
D	3 BK	1150	Ground	D	4 BK	1150	Ground

X204 INSTRUMENT PANEL HARNESS TO ROOF HARNESS

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Connector Part Information

- Harness: Instrument Panel
- OEM: 15304908
- Service: 15304908
- Description: 30-Way F GT 150 280 (BK)

Terminal Part Information

- Pins: A1, A2, A3, A4, A5, A6, A11, A10, A13, A14, A15, B1, B2, B3, B5, B6, B10, B12, B13, B14, B15
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Pins: A7, A8, B7, B8, A9
- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: Pin: A7 : 2/A
- Core/Insulation Crimp: Pins: A8, B7, B8, : E/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

Connector Part Information

- Harness: Roof
- OEM: 15326762
- Service: 15326762
- Description: 30-Way M GT 150 280 Series (BK)

Terminal Part Information

- Pins: A1, A2, A3, A4, A5, A6, A11, A10, A13, A14, A15, B1, B2, B3, B5, B6, B10, B12, B13, B14, B15
- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

- Pins: B7, B8
- Terminal/Tray: 15304722/8
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

- Pins: A7, A8
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: Pin: A7 : 2/A
- Core/Insulation Crimp: Pins: A8 : See

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Terminal Repair Kit

- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

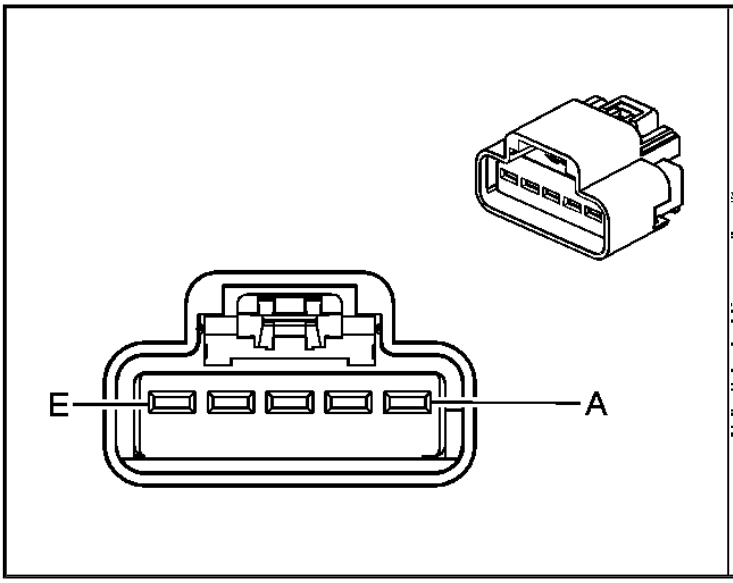
X204 Instrument Panel Harness to Roof Harness

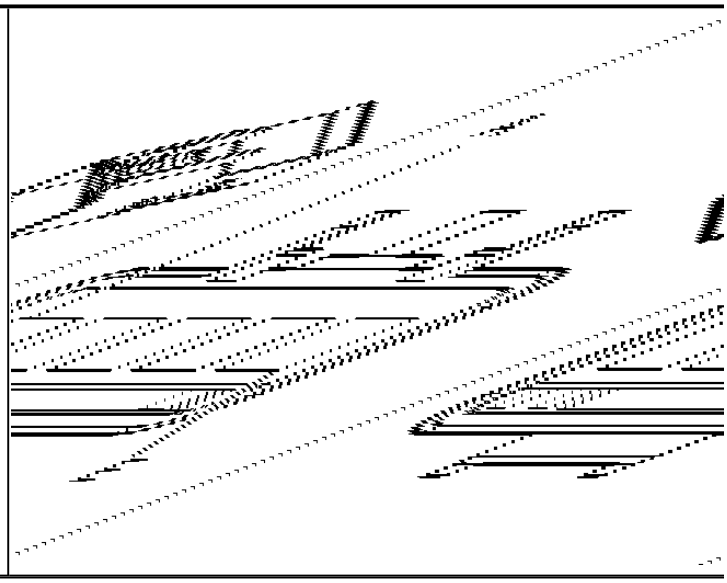
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A1	0.35 L-BU	5027	Sunroof Switch Data 1 (CF5)	A1	0.35 L-BU	5027	Sunroof Switch Data 1 (CF5)
A2	0.35 D-BU	128	Low Reference (CF5)	A2	0.35 D-BU	128	Low Reference (CF5)
A3	0.35 D-GN/WH	2514	Keypad Signal (UE1)	A3	0.35 D-GN/WH	2514	Keypad Signal (UE1)
A4	0.35 L-GN/BK	2515	Keypad Supply Voltage (UE1)	A4	0.35 L-GN/BK	2515	Keypad Supply Voltage (UE1)
A5	0.35 YE/BK	2516	Keypad Green LED Signal (UE1)	A5	0.35 YE/BK	2516	Keypad Green LED Signal (UE1)
A6	0.35 BN/WH	2517	Keypad Red LED Signal (UE1)	A6	0.35 BN/WH	2517	Keypad Red LED Signal (UE1)
A7	1 BK	1550	Ground	A7	1 BK	1550	Ground
A8	0.35 PK	339	Ignition Voltage	A8	0.35 PK	339	Ignition Voltage
					0.35 PK	339	Ignition Voltage
A9	0.5 WH	5937	Convertible Top Header Latch Switch Signal (without CF5)	A9	-	-	Not Used
A10	0.35 PU	328	Interior lamp Defeat Switch Signal	A10	0.35 PU	328	Interior lamp Defeat Switch Signal
A11	0.35 WH	156	Courtesy Lamp Switch Signal	A11	0.35 WH	156	Courtesy Lamp Switch Signal
A12	-	-	Not Used	A12	-	-	Not Used
A13	0.35 RD/WH	3140	Battery Positive Voltage (UG1)	A13	0.35 RD/WH	3140	Battery Positive Voltage (UG1)
A14	0.35 GY	655	Cellular Microphone Signal	A14	0.35 GY	655	Cellular Microphone Signal
A15	0.35 BARE	654	Cellular Microphone Signal	A15	0.35 BARE	654	Cellular Microphone Signal
B1	0.35 YE	6817	LED Backlight Dimming Control	B1	0.35 YE	6817	LED Backlight Dimming Control (CF5)
B2	0.35 GY	1690	Automatic Day/Night Mirror Signal (DBX/DD8)	B2	0.35 GY	1690	Automatic Day/Night Mirror Signal
B3	0.35 PK	1691	Low Reference (DBX/DD8)	B3	0.35 PK	1691	Low Reference
B4	0.35	3248	Convertible Top Close Switch Signal (without	B4	-	-	Not Used

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	BN/BK		CF5)				
B5	0.35 L-GN	24	Backup Lamp Supply Voltage (DBX/DD8)	B5	0.35 L-GN	24	Backup Lamp Supply Voltage
B6	0.35 D-BU	2307	Passenger Air Bag On Indicator Control	B6	0.35 D-BU	2307	Passenger Air Bag On Indicator Control
B7	0.5 GY	157	Courtesy Lamp Control	B7	0.5 GY	157	Courtesy Lamp Control
B8	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control	B8	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control
B9	0.35 PU	5936	Convertible Top Open Switch Signal (without CF5)	B9	-	-	Not Used
B10	0.35 PU	5234	Front Passenger Seat Belt Indicator Control	B10	0.35 PU	5234	Front Passenger Seat Belt Indicator Control
B11	-	-	Not Used	B11	-	-	Not Used
B12	0.35 GY	3273	RCDLR Ground (BTV)	B12	0.35 GY	3273	RCDLR Ground (BTV)
B13	0.35 L-BU/WH	3275	RCDLR Data Transmit (BTV)	B13	0.35 L-BU/WH	3275	RCDLR Data Transmit (BTV)
B14	0.35 L-GN	3274	RCDLR Data Receive (BTV)	B14	0.35 L-GN	3274	RCDLR Data Receive (BTV)
B15	0.35 PK/WH	3272	RCDLR Power (BTV)	B15	0.35 PK/WH	3272	RCDLR Power (BTV)

X206 INSTRUMENT PANEL HARNESS TO SUNROOF HARNESS (CF5)





Connector Part Information	Connector Part Information

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- Harness: Instrument Panel
- OEM: 15326893
- Service: 89046647
- Description: 5-Way F GT 280 Series (BK)

Terminal Part Information

- Pins: B, C, D
- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pins: A, E
- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Harness: Sunroof
- OEM: 15326897
- Service: 88987846
- Description: 5-Way M GT 280 Series (BK)

Terminal Part Information

- Pins: B, C, D
- Terminal/Tray: 15304722/8
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

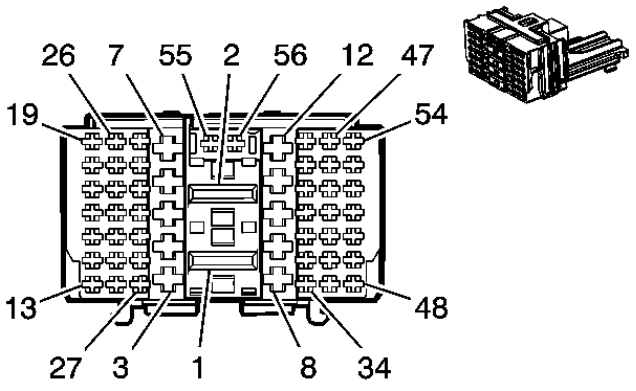
- Pins: A, E
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: A/D
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

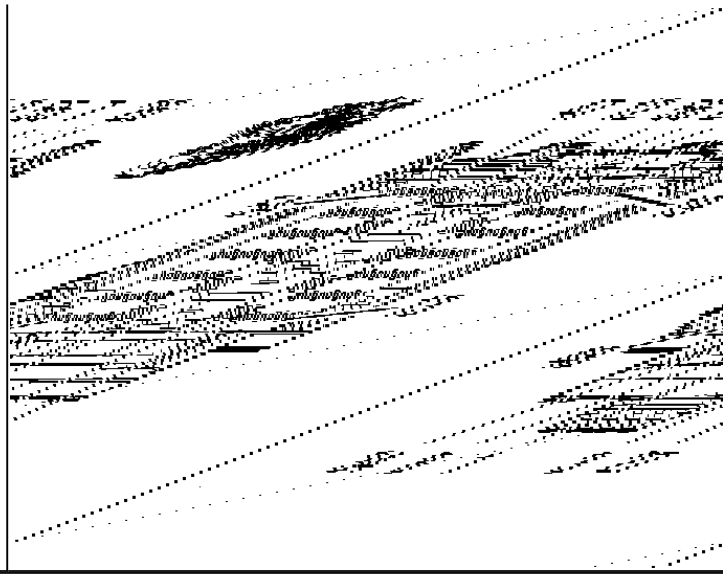
X206 Instrument Panel Harness to Sunroof Harness (CF5)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	3 RD/WH	3540	Battery Positive Voltage	A	3 RD/WH	3540	Battery Positive Voltage
B	0.35 BN	6132	Linear Interconnect Network 1	B	0.35 BN	6132	Linear Interconnect Network 1
C	0.35 D-BU	128	Low Reference	C	0.35 D-BU	128	Low Reference
D	0.35 L-BU	5027	Sunroof Switch Data 1	D	0.35 L-BU	5027	Sunroof Switch Data 1
E	3 BK	1450	Ground	E	3 BK	1450	Ground

X207 INSTRUMENT PANEL HARNESS TO BODY HARNESS

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Connector Part Information

- Harness: Instrument Panel
- OEM: 13697719
- Service: 13505901
- Description: 56-Way F (BK)

Terminal Part Information

- Pins: 1, 2
- Terminal/Tray: 962928-1/25
- Core/Insulation Crimp: B/G
- Release Tool: J-38125-221
- Release Tool/Test Probe: J-38125-221/J-35616-22 (RD)

- Pins: 3, 11, 12
- Terminal/Tray: 2-964284-1/25
- Core/Insulation Crimp: E/A
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pin: 7
- Terminal/Tray: 4-965999-1/25
- Core/Insulation Crimp: 4/A
- Release Tool: J-38125-36

Connector Part Information

- Harness: Body
- OEM: 13697716
- Service: 13505900
- Description: 56-Way M 1.6 2.8 9.5 Series (BK)

Terminal Part Information

- Pins: 1, 2, 3, 7, 11, 12
- Terminal/Tray: 13548691/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 23, 24, 34, 35, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 29, 30, 31, 26, 27, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 56
- Terminal/Tray: 964265-2/28

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- Test Probe: J-35616-35 (VT)
- Pins: 15, 16, 17, 18, 19, 22, 23, 24, 34, 35, 27, 56, 13, 14, 20, 21, 25, 29, 30, 31, 26, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: Pins: 15, 16, 17, 18, 19, 22, 23, 24, 34, 35, 27, 56 : E/1
- Core/Insulation Crimp: Pins: 13, 14, 20, 21, 25, 29, 30, 31, 26, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54 : See Terminal Repair Kit
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)
- Core/Insulation Crimp: Pins: 23, 24, 34, 35 : E/C
- Core/Insulation Crimp: Pins: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 29, 30, 31, 26, 27, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 56 : E/2
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

X207 Instrument Panel Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	3 RD/WH	5040	Battery Positive Voltage	1	3 RD/WH	5040	Battery Positive Voltage
2	3 RD/WH	1440	Battery Positive Voltage	2	3 RD/WH	1440	Battery Positive Voltage
3	1 GY	5911	Driver Door Lock Motor Unlock Control	3	1 GY	5911	Driver Door Lock Motor Unlock Control
4-6	-	-	Not Used	4-6	-	-	Not Used
7	2 GY	295	Door Lock Actuator Unlock Control	7	1 GY	295	Door Lock Actuator Unlock Control
8-10	-	-	Not Used	8-10	-	-	Not Used
11	0.8 YE	116	Left Rear Speaker Output (-) (UQ3)	11	0.8 YE	116	Left Rear Speaker Output (-) (UQ3)
12	0.8 BN	199	Left Rear Speaker Output (+) (UQ3)	12	0.8 BN	199	Left Rear Speaker Output (+) (UQ3)
13	0.35 L-BU	1134	Park Brake Switch Signal	13	0.5 L-BU	1134	Park Brake Switch Signal
14	0.35 D-GN	2087	Steering Wheel Position Sensor 5-Volt Reference	14	0.35 D-GN	2087	Steering Wheel Position Sensor 5-Volt Reference
15	0.5 RD/WH	2340	Battery Positive Voltage	15	0.35 RD/WH	2340	Battery Positive Voltage
16	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control	16	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control
17	0.5 L-GN	24	Backup Lamp Supply Voltage	17	0.5 L-GN	24	Backup Lamp Supply Voltage

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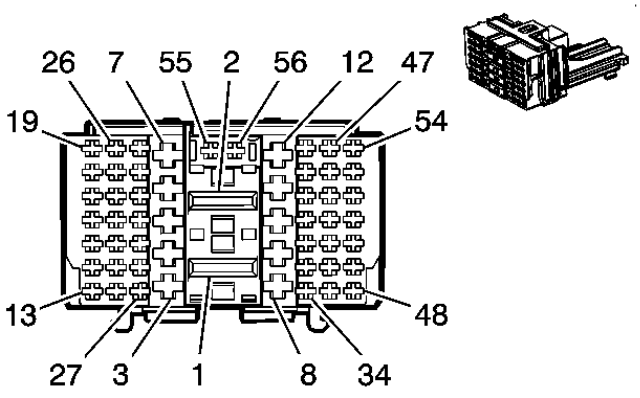
18	0.5 OG/BK	737	Rear Compartment Lamp Control	18	0.5 OG/BK	737	Rear Compartment Lamp Control
19	0.5 YE	6817	LED Backlight Dimming Control	19	0.35 YE	6817	LED Backlight Dimming Control
20	0.35 D-GN	6134	Linear Interconnect Network 3	20	0.35 D-GN	6134	Linear Interconnect Network 3
21	0.35 D-BU	6189	Rear Compartment Lid Release Switch	21	0.35 D-BU	6189	Rear Compartment Lid Release Switch
22	0.5 L-BU	6795	Rear Compartment Lid Release Control 2	22	0.5 L-BU	6795	Rear Compartment Lid Release Control 2
23	0.8 YE	1860	Front Center Speaker Output (+) (UQA)	23	0.8 YE	1860	Front Center Speaker Output (+) (UQA)
24	0.8 L-BU	1960	Front Center Speaker Output (-) (UQA)	24	0.8 L-BU	1960	Front Center Speaker Output (-) (UQA)
25	0.35 D-GN	1409	Front End Sensor - Right - Signal	25	0.35 D-GN	1409	Front End Sensor - Right - Signal
26	0.35 GY	5600	Low Reference	26	0.35 GY	5600	Low Reference
27	0.5 BK	2550	Ground	27	0.5 BK	2550	Ground
28	-	-	Not Used	28	-	-	Not Used
29	0.35 RD/WH	3140	Battery Positive Voltage (UG1)	29	0.35 RD/WH	3140	Battery Positive Voltage (UG1)
30	0.35 D-GN	3270	Driver Door Lock Status Signal	30	0.35 D-GN	3270	Driver Door Lock Status Signal
31	0.35 D-BU	2307	Passenger Air Bag On Indicator Control	31	0.35 D-BU	2307	Passenger Air Bag On Indicator Control
32	0.35 YE	354	Front End Sensor - Left - Signal	32	0.35 YE	354	Front End Sensor - Left - Signal
33	0.35 TN/OG	5045	Low Reference	33	0.35 TN/OG	5045	Low Reference
34	0.8 GY	118	Left Front Speaker Output (-) (UQ3)	34	0.8 GY	118	Left Front Speaker Output (-) (UQ3)
35	0.8 TN	201	Left Front Speaker Output (+) (UQ3)	35	0.8 TN	201	Left Front Speaker Output (+) (UQ3)
36	0.35 PK	1691	Low Reference (DBX/DD8)	36	0.35 PK	1691	Low Reference
37	0.35 PU	5234	Front Passenger Seat Belt Indicator Control	37	0.35 PU	5234	Front Passenger Seat Belt Indicator Control
38	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control	38	0.35 D-GN	2308	Passenger Air Bag Off Indicator Control
39	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)	39	0.35 D-BU	6105	High Speed GMLAN Serial Data (+)
40	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)	40	0.35 L-BU	6106	High Speed GMLAN Serial Data (-)
41	0.35	2099	Drain Wire (UQA)	41	0.35	2099	Drain Wire (UQA)

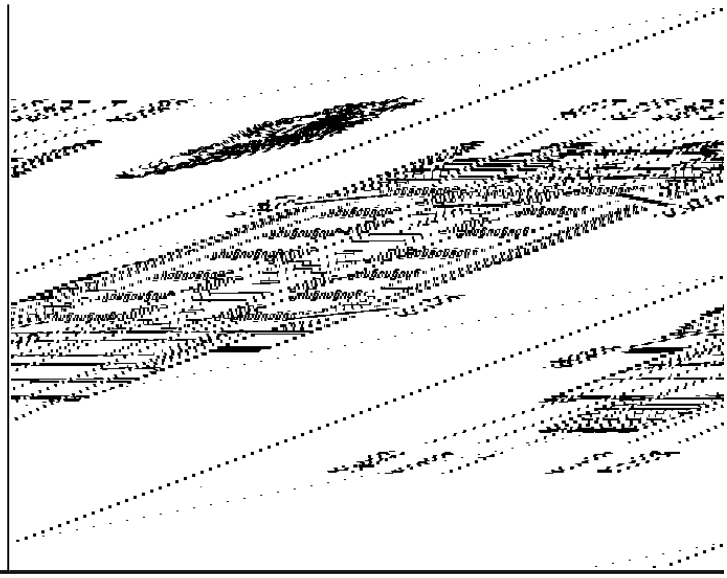
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	BARE				BARE		
42	0.35 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA)	42	0.35 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA)
43	0.35 BN	1999	Left Rear Low Level Audio Signal (-) (UQA)	43	0.35 BN	1999	Left Rear Low Level Audio Signal (-) (UQA)
44	0.35 GY	1690	Automatic Day/Night Mirror Signal (DBX/DD8)	44	0.35 GY	1690	Automatic Day/Night Mirror Signal
45	-	-	Not Used	45	-	-	Not Used
46	0.35 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQA)	46	0.35 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQA)
47	0.35 D-GN	1947	Left Front Low Level Audio Signal (-) (UQA)	47	0.35 D-GN	1947	Left Front Low Level Audio Signal (-) (UQA)
48	0.35 L-BU	5986	Serial Data Communication Enable	48	0.35 L-BU	5986	Serial Data Communication Enable
49	0.35 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA)	49	0.35 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA)
50	0.35 TN	1946	Right Rear Low Level Audio Signal (-) (UQA)	50	0.35 TN	1946	Right Rear Low Level Audio Signal (-) (UQA)
51	0.35 D-GN	5060	Low Speed GMLAN Serial Data	51	0.35 D-GN	5060	Low Speed GMLAN Serial Data
52	0.35 OG/BK	1546	Front Low Level Audio Signal (-) (UQA)	52	0.35 OG/BK	1546	Front Low Level Audio Signal (-) (UQA)
53	0.35 TN	511	Left Front Low Level Audio Signal (+) (UQA)	53	0.35 TN	511	Left Front Low Level Audio Signal (+) (UQA)
54	0.35 BARE	2011	Drain Wire (UQA)	54	0.35 BARE	2011	Drain Wire (UQA)
55	-	-	Not Used	55	-	-	Not Used
56	0.5 RD/WH	4440	Battery Positive Voltage	56	0.5 RD/WH	4440	Battery Positive Voltage

X208 INSTRUMENT PANEL HARNESS TO BODY HARNESS

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Connector Part Information

- Harness: Instrument Panel
- OEM: 13697719
- Service: 13505901
- Description: 56-Way F (BK)

Terminal Part Information

- Pin: 1
- Terminal/Tray: 15327789/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pin: 2
- Terminal/Tray: 962928-1/25
- Core/Insulation Crimp: B/G
- Release Tool: J-38125-221
- Test Probe: J-35616-22 (RD)

- Pins: 3, 4, 9, 11, 12
- Terminal/Tray: 2-964284-1/25
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: J-38125-36/J-35616-35 (VT)

Connector Part Information

- Harness: Body
- OEM: 13697716
- Service: 13505900
- Description: 56-Way M 1.6 2.8 9.5 Series (BK)

Terminal Part Information

- Pin: 1
- Terminal/Tray: 13548690/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 2, 3, 4, 7, 8, 9, 11, 12
- Terminal/Tray: Pending

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- Pin: 7
- Terminal/Tray: 4-965999-1/25
- Core/Insulation Crimp: 4/A
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pin: 8
- Terminal/Tray: 12198192/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 13, 14, 15, 16, 17, 18, 19, 24, 25, 27, 28, 30, 31, 32, 33, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 54, 55, 56
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: Pins: 13, 14, 15, 18, 19, 30, 31, 39, 40, 56, 55 : E/1
- Core/Insulation Crimp: Pins: 16, 17, 24, 25, 27, 28, 32, 33, 37, 38, 41, 42, 43, 44, 45, 46, 47, 54 : See Terminal Repair Kit
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 13, 14, 15, 16, 17, 18, 19, 24, 25, 27, 28, 30, 31, 32, 33, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 54, 56, 45, 55
- Terminal/Tray: 964265-2/28
- Core/Insulation Crimp: Pins: 30, 31 : E/C
- Core/Insulation Crimp: Pins: 13, 14, 15, 16, 17, 18, 19, 24, 25, 27, 28, 32, 33, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 54, 56, 45, 55 : E/2
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

X208 Instrument Panel Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	10 RD/BK	1542	Battery Positive Voltage	1	10 RD/BK	1542	Battery Positive Voltage
2	3 RD/WH	3540	Battery Positive Voltage (CF5)	2	3 RD/WH	3540	Battery Positive Voltage
3	1 RD/WH	340	Battery Positive Voltage	3	1 RD/WH	340	Battery Positive Voltage
4	0.5 BN/GY	6995	Marker Lamps Control	4	0.5 BN/GY	6995	Marker Lamps Control
5-6	-	-	Not Used	5-6	-	-	Not Used
7	2 TN	294	Door Lock Actuator Lock Control	7	2 TN	294	Door Lock Actuator Lock Control
8	3 RD/WH	3440	Battery Positive Voltage	8	0.8 RD/WH	3440	Battery Positive Voltage
9	0.5 BN/L-BU	6993	Marker Lamps Control	9	0.5 BN/L-BU	6993	Marker Lamps Control
10	-	-	Not Used	10	-	-	Not Used
			Right Rear Speaker				Right Rear Speaker

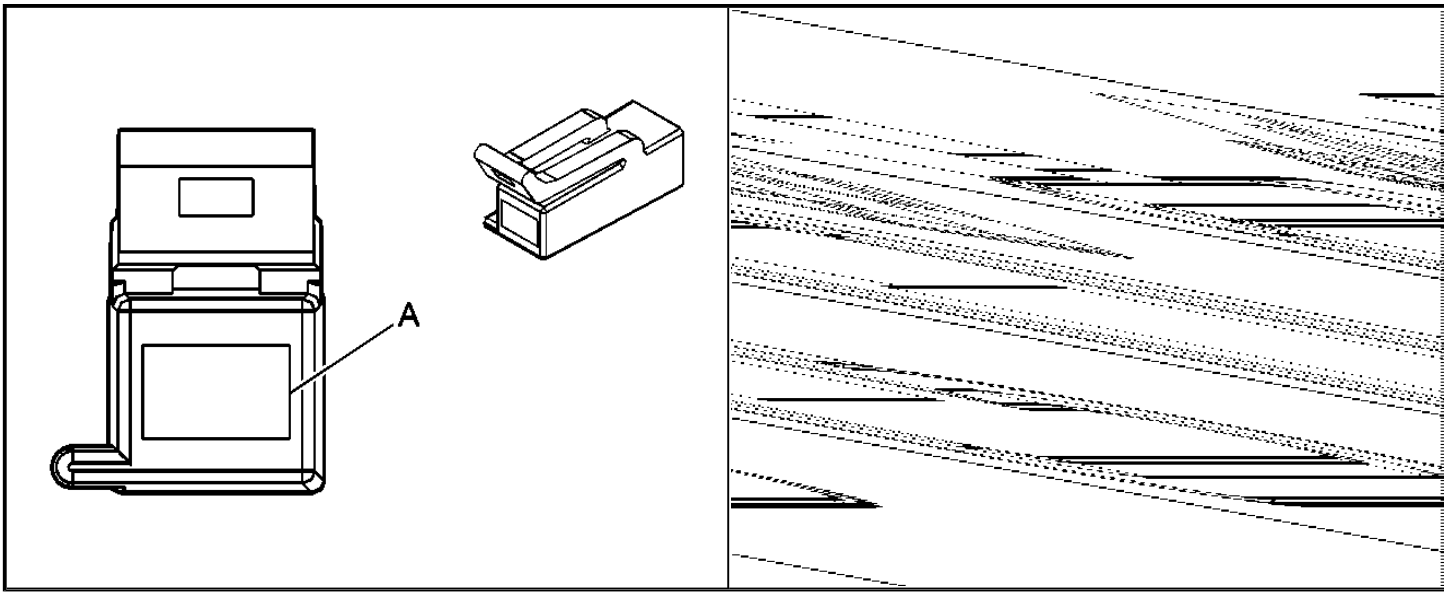
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11	0.8 D-BU	46	Output (+) (UQ3)	11	0.8 D-BU	46	Output (+) (UQ3)
12	0.8 L-BU	115	Right Rear Speaker Output (-) (UQ3)	12	0.8 L-BU	115	Right Rear Speaker Output (-) (UQ3)
13	0.5 WH	5075	Current Sensor Signal	13	0.5 WH	5075	Current Sensor Signal
14	0.5 PK	5076	Current Sensor Voltage	14	0.5 PK	5076	Current Sensor Voltage
15	0.5 BN	5077	Low Reference	15	0.5 BN	5077	Low Reference
16	0.35 TN	28	Horn Relay Control	16	0.35 TN	28	Horn Relay Control
17	0.35 PK/WH	1970	Headlamp Low Beam Relay Control	17	0.35 PK/WH	1970	Headlamp Low Beam Relay Control
18	0.5 TN/WH	1969	Headlamp High Beam Relay Control	18	0.5 TN/WH	1969	Headlamp High Beam Relay Control
19	0.5 D-GN/YE	6846	Rear License Lamp Control	19	0.5 D-GN/YE	6846	Rear License Lamp Control
20-23	-	-	Not Used	20-23	-	-	Not Used
24	0.35 PK	139	Ignition 1 Voltage	24	0.35 PK	139	Ignition 1 Voltage
25	0.35 PK/BK	1303	Rear Compartment Lid Ajar Switch Signal	25	0.35 PK/BK	1303	Rear Compartment Lid Ajar Switch Signal
26	-	-	Not Used	26	-	-	Not Used
27	0.35 TN	860	Front Windshield Wiper Switch High Signal	27	0.35 TN	860	Front Windshield Wiper Switch High Signal
28	0.35 GY	91	Wiper Relay Control	28	0.35 GY	91	Wiper Relay Control
29	-	-	Not Used	29	-	-	Not Used
30	0.8 D-GN	117	Right Front Speaker Output (-) (UQ3)	30	0.8 D-GN	117	Right Front Speaker Output (-) (UQ3)
31	0.8 L-GN	200	Right Front Speaker Output (+) (UQ3)	31	0.8 L-GN	200	Right Front Speaker Output (+) (UQ3)
32	0.35 PU	7558	Accent Lamps Control	32	0.35 PU	7558	Accent Lamps Control (SRK or SRM)
33	0.35 OG	2268	Washer Fluid Pump Relay Control	33	0.35 OG	2268	Washer Fluid Pump Relay Control
34-36	-	-	Not Used	34-36	-	-	Not Used
37	0.35 TN	2501	High Speed GMLAN Serial Data Bus -	37	0.35 TN	2501	High Speed GMLAN Serial Data Bus -
38	0.35 D-GN/WH	1317	Fog Lamp Relay Control	38	0.35 D-GN/WH	1317	Fog Lamp Relay Control
39-40	-	-	Not Used	39-40	-	-	Not Used
41	0.35 PK	339	Ignition Voltage	41	0.5 PK	339	Ignition Voltage
42	0.35 WH	193	Rear Defog Relay Control	42	0.35 WH	193	Rear Defog Relay Control
43	0.35 OG	6978	Amplifier Control (UQA)	43	0.35 OG	6978	Amplifier Control (UQA)

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44	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+	44	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
45	0.35 WH	7066	Remote Enable (UQA)	45	0.35 WH	7066	Remote Enable (UQA)
46	0.35 PK	539	Ignition Voltage	46	0.35 PK	539	Ignition Voltage
47	0.35 YE	5199	Ignition Voltage	47	0.35 YE	5199	Ignition Voltage
48-49	-	-	Not Used	48-53	-	-	Not Used
50	0.5 WH	5937	Convertible Top Header Latch Switch Signal (without CF5)	50	-	-	Not Used
51	0.35 GY	6135	Linear Interconnect Network 4 (without CF5)	51	-	-	Not Used
52	0.5 TN/BK	3248	Convertible Top Close Switch Signal (without CF5)	52	-	-	Not Used
53	0.35 PU	5936	Convertible Top Open Switch Signal (without CF5)	53	-	-	Not Used
54	0.35 RD/WH	2040	Battery Positive Voltage	54	0.35 RD/WH	2040	Battery Positive Voltage
55	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage	55	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage
56	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage	56	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage

X209 BODY EXTENSION HARNESS TO BODY HARNESS



Connector Part Information	Connector Part Information

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- Harness: Body Extension
- OEM: 12059884
- Service: 12102750
- Description: 1-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12084595/2
- Core/Insulation Crimp: B/G
- Release Tool: 12094430
- Test Probe: J-35616-40 (BU)

- Harness: Body
- OEM: 13705942
- Service: 12101893
- Description: 1-Way M Metri-Pack 480 Series (BK)

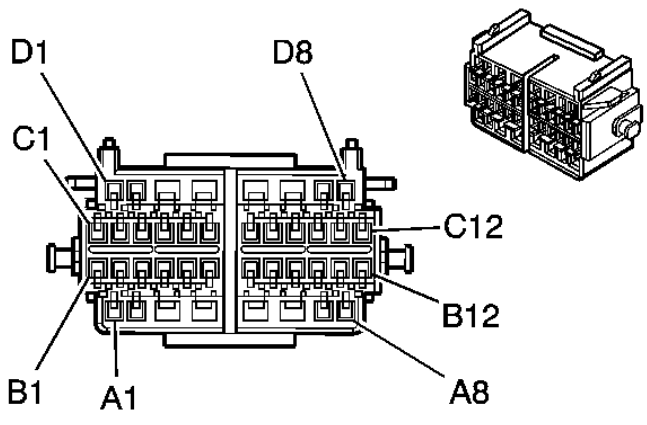
Terminal Part Information

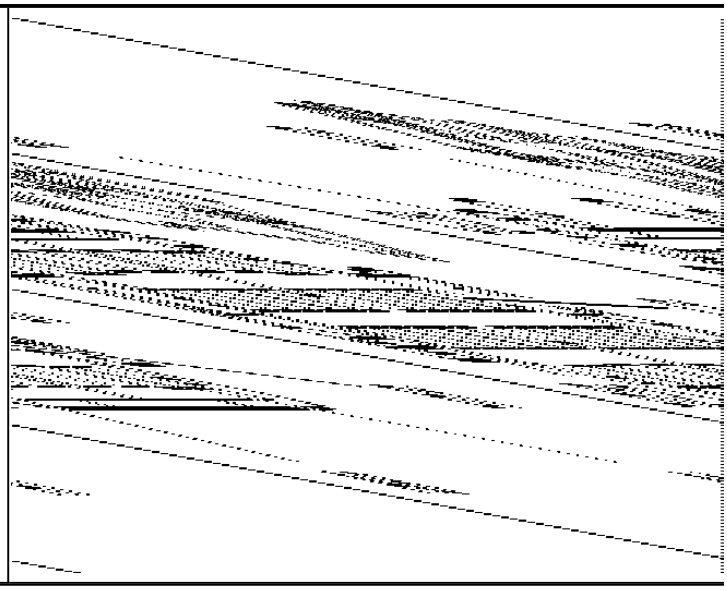
- Terminal/Tray: 12033820/2
- Core/Insulation Crimp: B/G
- Release Tool: 12094430
- Test Probe: J-35616-40 (BU)

X209 Body Extension Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	5 PU	293	Rear Defog Element Supply Voltage	A	5 PU	293	Rear Defog Element Supply Voltage

X210 BODY EXTENSION HARNESS TO BODY HARNESS





Connector Part Information

- Harness: Body Extension
- OEM: 15448129
- Service: 89046969
- Description: 40-Way F GT 150 280 Series (BK)

Connector Part Information

- Harness: Body
- OEM: 15475869
- Service: 88988307
- Description: 40-Way M GT 150 280 Series (BK)

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Terminal Part Information

- Pins: C1, A1, A2, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, C2, C3, C4, C5, C6, C7, C8, C10, C11, C12, C9
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Pins: A4, A5, D5
- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: 2/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pins: A3, A6, D6
- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

Terminal Part Information

- Pins: C1, A1, A2, A7, A8, C2, C3, C8, D1, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, C4, C5, C6, C7, C10, C11, C12, D2, C9
- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: Pins: C1, A1, A2, A7, A8, C2, C3, C8, : E/4
- Core/Insulation Crimp: Pins: B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, C4, C5, C6, C7, C10, C11, C12, D2, C9 : E/C
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

- Pins: A4, A5, D5, A3, D6
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: Pins: A4, A5, D5 : 2/A
- Core/Insulation Crimp: Pins: A3, D6 : A/D
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

X210 Body Extension Harness to Body Harness

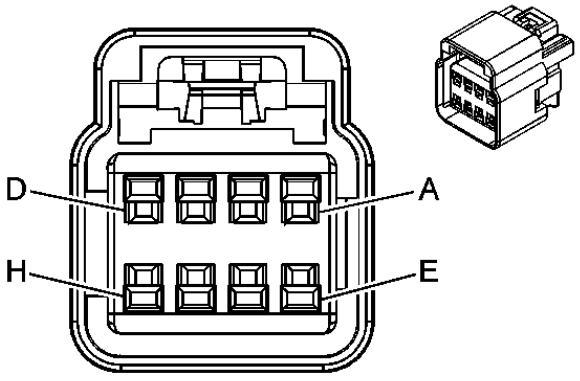
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A1	0.5 TN	884	Left Rear Wheel Speed Sensor Signal	A1	0.5 TN	884	Left Rear Wheel Speed Sensor Signal
A2	0.5 OG	885	Low Reference	A2	0.5 OG	885	Low Reference
A3	3 RD/WH	1240	Battery Positive Voltage	A3	3 RD/WH	1240	Battery Positive Voltage
A4	1 RD/WH	5140	Battery Positive Voltage	A4	1 RD/WH	5140	Battery Positive Voltage
A5	0.8 RD/WH	3440	Battery Positive Voltage	A5	0.8 RD/WH	3440	Battery Positive Voltage
A6	3 RD/WH	1340	Battery Positive Voltage	A6	-	-	Not Used
A7	0.5 BN	882	Right Rear Wheel Speed Sensor Signal	A7	0.5 BN	882	Right Rear Wheel Speed Sensor Signal
A8	0.5 WH	883	Low Reference	A8	0.5 WH	883	Low Reference
B1	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal	B1	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal
B2	0.35 GY	2709	5-Volt Reference 1	B2	0.35 GY	2709	5-Volt Reference 1
			Fuel Level Sensor				Fuel Level Sensor

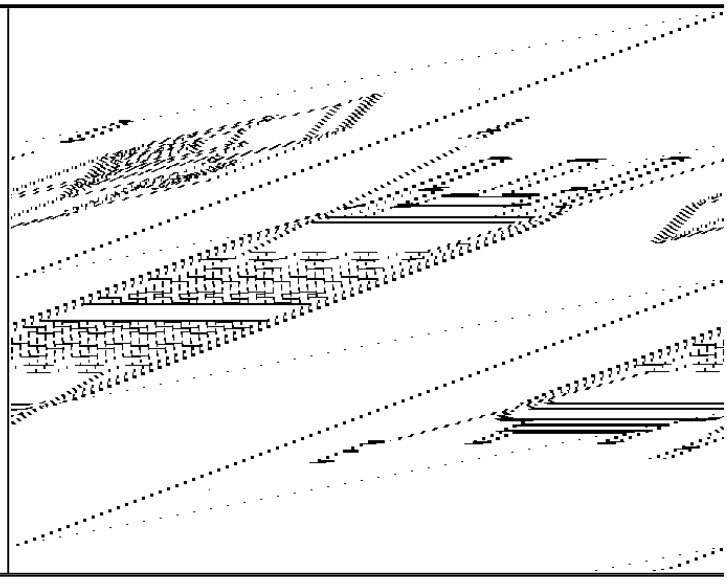
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B3	0.35 D-BU	1936	Signal	B3	0.35 D-BU	1936	Signal
B4	0.35 BN/WH	6281	Low Reference	B4	0.35 BN/WH	6281	Low Reference
B5	0.35 L-BU	1937	Fuel Level Sensor Signal - Secondary	B5	0.35 L-BU	1937	Fuel Level Sensor Signal - Secondary
B6	0.5 WH	1310	EVAP Canister Vent Solenoid Control	B6	0.35 WH	1310	EVAP Canister Vent Solenoid Control
B7	0.35 D-GN/WH	465	Fuel Pump Relay Control	B7	0.35 D-GN/WH	465	Fuel Pump Relay Control
B8	0.35 TN	28	Horn Relay Control	B8	0.35 TN	28	Horn Relay Control
B9	0.35 OG	2267	Mirror Heating Element Supply Voltage	B9	0.35 OG	2267	Mirror Heating Element Supply Voltage
B10	0.35 WH	193	Rear Defog Relay Control	B10	0.35 WH	193	Rear Defog Relay Control
B11	0.35 PK/WH	1970	Headlamp Low Beam Relay Control	B11	0.35 PK/WH	1970	Headlamp Low Beam Relay Control
B12	0.35 D-GN/WH	1317	Fog Lamp Relay Control	B12	0.35 D-GN/WH	1317	Fog Lamp Relay Control
C1	0.5 TN/WH	1969	Headlamp High Beam Relay Control	C1	0.5 TN/WH	1969	Headlamp High Beam Relay Control
C2	0.5 RD/WH	2440	Battery Positive Voltage	C2	0.5 RD/WH	2440	Battery Positive Voltage
C3	0.5 RD/WH	1940	Battery Positive Voltage	C3	0.5 RD/WH	1940	Battery Positive Voltage
C4	0.35 PK	1139	Ignition Voltage	C4	0.35 PK	1139	Ignition Voltage
C5	0.35 PK	139	Ignition Voltage	C5	0.35 PK	139	Ignition Voltage
C6	0.35 YE	5199	Ignition Voltage	C6	0.35 YE	5199	Ignition Voltage
C7	0.35 PK	539	Ignition Voltage	C7	0.35 PK	539	Ignition Voltage
C8	0.5 PK	339	Ignition Voltage	C8	0.5 PK	339	Ignition Voltage
C9	0.35 PK	239	Ignition Voltage	C9	0.35 PK	239	Ignition Voltage
C10	0.35 TN	860	Front Windshield Wiper Switch High Signal	C10	0.35 TN	860	Front Windshield Wiper Switch High Signal
C11	0.35 GY	91	Wiper Relay Control	C11	0.35 GY	91	Wiper Relay Control
C12	0.35 OG	2268	Washer Fluid Pump Relay Control	C12	0.35 OG	2268	Washer Fluid Pump Relay Control
D1-D4	-	-	Not Used	D1-D4	-	-	Not Used
D5	0.8 RD/WH	440	Battery Positive Voltage	D5	0.8 RD/WH	440	Battery Positive Voltage
D6	3 RD/WH	3540	Battery Positive Voltage	D6	3 RD/WH	3540	Battery Positive Voltage
D7-D8	-	-	Not Used	D7-D8	-	-	Not Used

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X211 INSTRUMENT PANEL HARNESS TO CONSOLE CAP HARNESS





Connector Part Information

- Harness: Instrument Panel
- OEM: 15332145
- Service: 15306407
- Description: 8-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: Pins: A, D, H : C/A
- Core/Insulation Crimp: Pins: B, C, E, F, G : E/C
- Release Tool: 15315247
- Release Tool: J-35616-2A (GY)

Connector Part Information

- Harness: Console Cap
- OEM: 15332150
- Service: 88986250
- Description: 8-Way M GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: Pins: A, D : 2/4
- Core/Insulation Crimp: Pins: C, F : E/4
- Core/Insulation Crimp: Pins: B, E, G, H : E/C
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

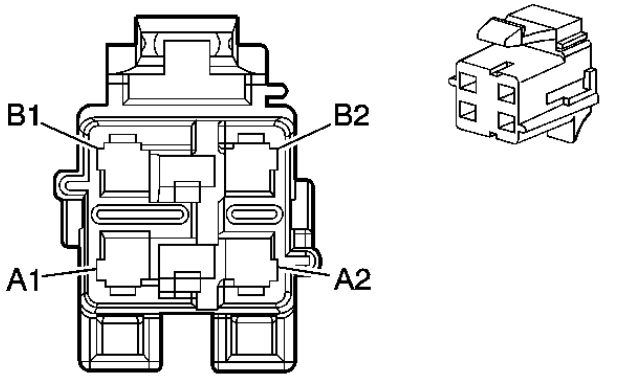
X211 Instrument Panel Harness to Console Cap Harness

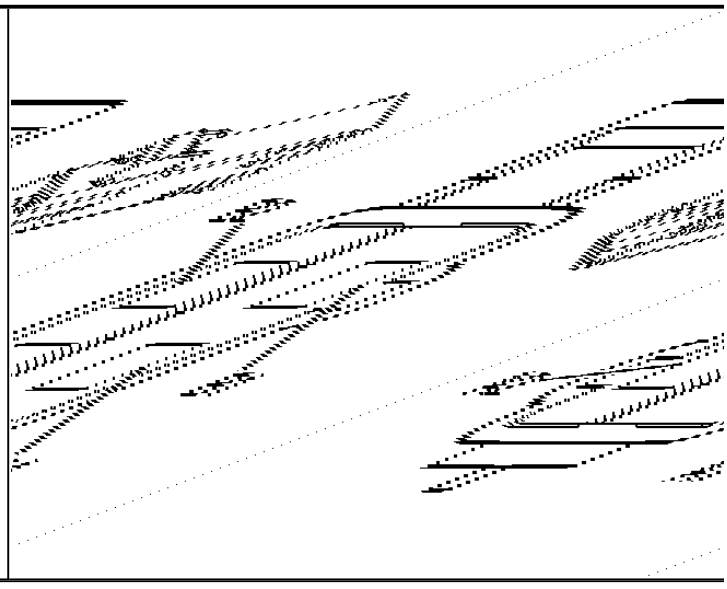
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	1 D-GN	1001	RAP 1 Fuse Supply Voltage	A	1 D-GN	1001	RAP 1 Fuse Supply Voltage
B	0.35 D-GN	5060	Low Speed GMLAN Serial Data SRK/SRM)	B	0.35 D-GN	5060	Low Speed GMLAN Serial Data (UMQ)
C	0.5 RD/WH	2840	Battery Positive Voltage (UMQ)	C	0.5 RD/WH	2840	Battery Positive Voltage (UMQ)
D	1 BK	1450	Ground	D	1 BK	1450	Ground
			Traction Control				Traction Control

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E	0.35 L-BU	1788	Switch Signal	E	0.35 L-BU	1788	Switch Signal
F	0.5 BK	1650	Ground (SRK/SRM)	F	0.5 BK	1650	Ground (UMQ)
G	0.35 YE	6817	LED Backlight Dimming Control	G	0.35 YE	6817	LED Backlight Dimming Control
H	0.8 BK	1550	Ground	H	0.35 BK	1550	Ground

X253 INSTRUMENT PANEL HARNESS TO BODY HARNESS





Connector Part Information

- Harness: Instrument Panel
- OEM: 15479525
- Service: 19149302
- Description: 4-Way F Metri-Pack 280 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: E/C
- Release Tool: 12094430
- Test Probe: J-35616-4A (PU)

Connector Part Information

- Harness: Body
- OEM: 15336476
- Service: 88987998
- Description: 4-Way M Metri-Pack 280 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: E/A
- Release Tool: 12094430
- Test Probe: J-35616-5 (PU)

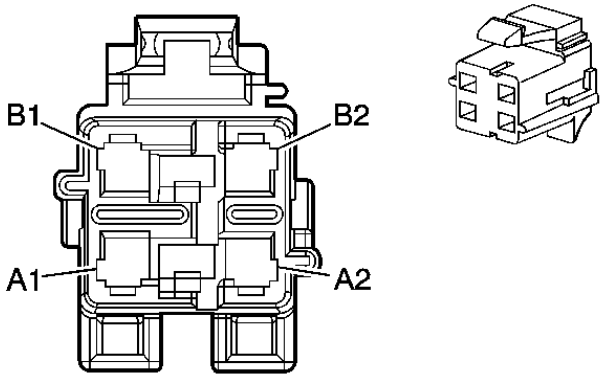
X253 Instrument Panel Harness to Body Harness

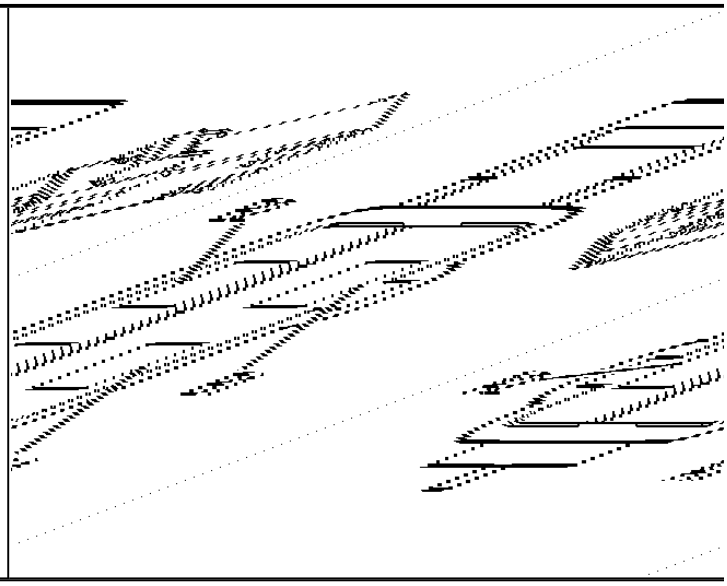
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A1	0.35 PK	3022	Steering Wheel Module - Stage2 - Low	A1	0.35 PK	3022	Steering Wheel Module - Stage2 - Low

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			Control				Control
A2	0.35 WH	3023	Steering Wheel Module - Stage2 - High Control	A2	0.35 WH	3023	Steering Wheel Module - Stage2 - High Control
B1	0.35 BN	3020	Steering Wheel Module - Stage1 - Low Control	B1	0.35 BN	3020	Steering Wheel Module - Stage1 - Low Control
B2	0.35 TN	3021	Steering Wheel Module - Stage1 - High Control	B2	0.35 TN	3021	Steering Wheel Module - Stage1 - High Control

X254 INSTRUMENT PANEL HARNESS TO BODY HARNESS





Connector Part Information

- Harness: Instrument Panel
- OEM: 15479525
- Service: 19149302
- Description: 4-Way F Metri-Pack 280 Series (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: E/C
- Release Tool: 12094430
- Test Probe: J-35616-4A (PU)

Connector Part Information

- Harness: Body
- OEM: 15336476
- Service: 88987998
- Description: 4-Way M Metri-Pack 280 Series (YE)

Terminal Part Information

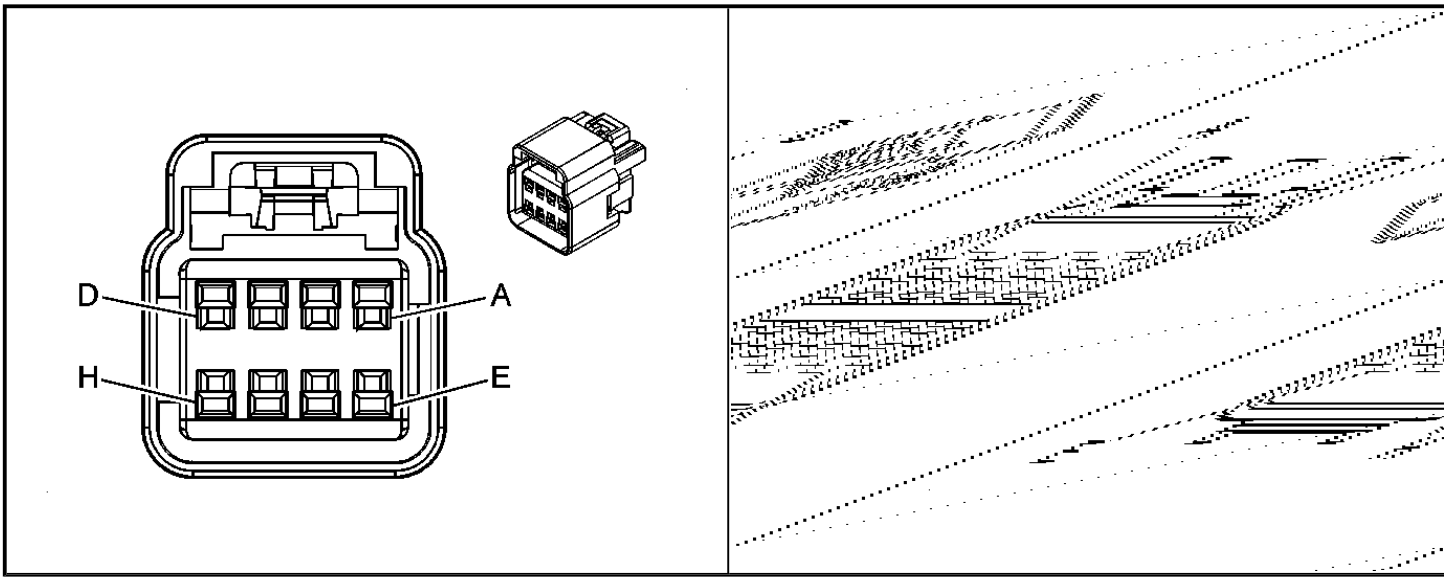
- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: E/A
- Release Tool: 12094430
- Test Probe: J-35616-5 (PU)

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X254 Instrument Panel Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A1	0.35 YE	3025	I/P Module - Stage 1 - High Control	A1	0.35 YE	3025	I/P Module - Stage 1 - High Control
A2	0.35 OG	3024	I/P Module - Stage 1 - Low Control	A2	0.35 OG	3024	I/P Module - Stage 1 - Low Control
B1	0.35 GY	3027	I/P Module - Stage 2 - High Control	B1	0.35 GY	3027	I/P Module - Stage 2 - High Control
B2	0.35 PU	3026	I/P Module - Stage 2 - Low Control	B2	0.35 PU	3026	I/P Module - Stage 2 - Low Control

X301 INSTRUMENT PANEL HARNESS TO AUTOMATIC TRANSMISSION SHIFT LEVER JUMPER HARNESS (MYB OR MYC)



Connector Part Information

- Harness: Instrument Panel
- OEM: 15332145
- Service: 15306407
- Description: 8-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Automatic Transmission Shift Lever Jumper
- OEM: 15332150
- Service: 88986250
- Description: 8-Way M GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: Pins: A, E - E/4
- Core/Insulation Crimp: Pins: C, G - E/C
- Release Tool: 15315247

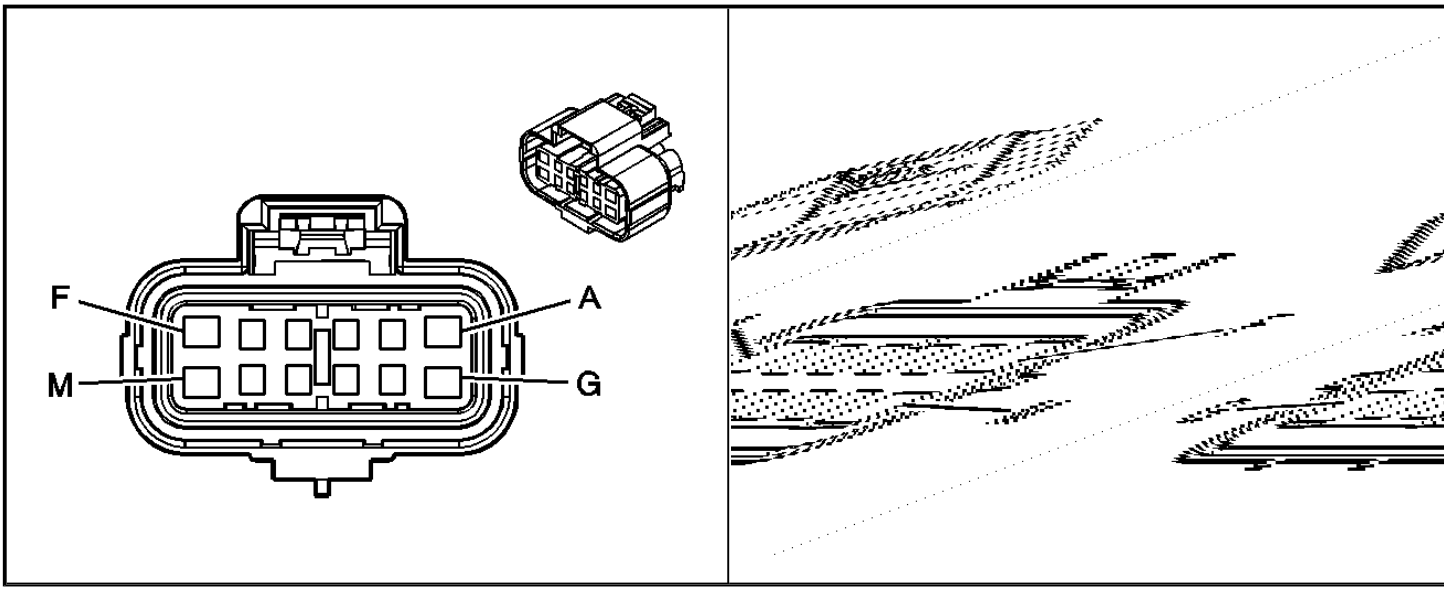
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- Test Probe: J-35616-3 (GY)

X301 Instrument Panel Harness to Automatic Transmission Shift Lever Jumper Harness (MYB or MYC)

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 BK	1550	Ground	A	0.5 BK	1550	Ground
B	-	-	Not Used	B	-	-	Not Used
C	0.35 TN	7553	Automatic Transmission Shift Lock Control Solenoid Control	C	0.35 TN	7553	Automatic Transmission Shift Lock Control Solenoid Control
D	-	-	Not Used	D	-	-	Not Used
E	0.5 YE	6817	LED Backlight Dimming Control	E	0.5 YE	6817	LED Backlight Dimming Control
F	-	-	Not Used	F	-	-	Not Used
G	0.35 PU/WH	5905	Key Capture/Column Lock Shift Position Signal	G	0.35 PU/WH	5905	Key Capture/Column Lock Shift Position Signal
H	-	-	Not Used	H	-	-	Not Used

X302 INSTRUMENT PANEL HARNESS TO CONSOLE HARNESS



Connector Part Information

- Harness: Instrument Panel
- OEM: 15336205
- Service: 88986267

Connector Part Information

- Harness: Console
- OEM: 15336209
- Service: 88986259

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- Description: 12-Way F GT Mixed (BK)

Terminal Part Information

- Pins: C, B, D, H, J, K, L
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: Pins: C : C/A
- Core/Insulation Crimp: Pins: B, D, H, J, K, L : E/C
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Pins: A, F, G
- Terminal/Tray: 15304711/8
- Core/Insulation Crimp: Pins: A, F : 2/A
- Core/Insulation Crimp: Pin: G : E/A
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Description: 12-Way M GT Mixed (BK)

Terminal Part Information

- Pins: B, C, D, H, J, K, L
- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: Pins: B, C : E/4
- Core/Insulation Crimp: Pins: D, H, J, K, L : E/C
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

- Pin: G
- Terminal/Tray: 15304722/8
- Core/Insulation Crimp: E/C
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

- Pins: A, F
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: 2/A
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

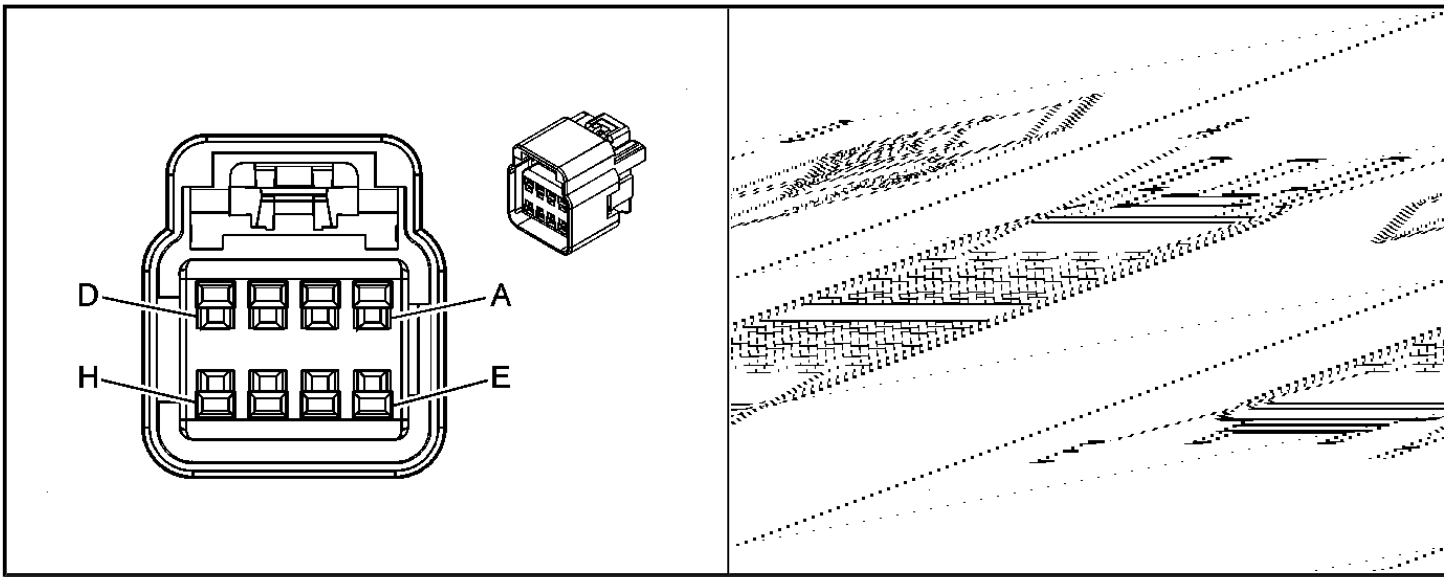
X302 Instrument Panel Harness to Console Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	1 D-GN	801	RAP 2 Fuse Supply Voltage	A	1 D-GN/WH	801	RAP 2 Fuse Supply Voltage
B	0.35 D-GN	5060	Low Speed GMLAN Serial Data (USR)	B	0.5 D-GN	5060	Low Speed GMLAN Serial Data (USR)
C	0.8 BK	1750	Ground (USR)	C	0.5 BK	1750	Ground (USR)
D	0.35 PK	2060	Auxiliary Detection Signal	D	0.35 PK	2060	Auxiliary Detection Signal (without USR)
E	-	-	Not Used	E	-	-	Not Used
F	1 BK	1450	Ground	F	1 BK	1450	Ground
G	0.5 RD/WH	3240	Battery Positive Voltage	G	0.5 RD/WH	3240	Battery Positive Voltage (USR)
H	0.35 D-GN/WH	3376	Auxiliary Audio Common Signal	H	0.35 D-BU	5843	Auxiliary Audio Common Signal (without USR)
					0.35 D-GN/WH	3376	Auxiliary Audio Common Signal (USR)

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J	0.35 YE	3377	Auxiliary Audio Jack Left (+)	J	0.35 L-GN	5839	Left Auxiliary Audio Signal (2) (without USR)
					0.35 YE	3377	Auxiliary Audio Jack Left (+) (USR)
K	0.35 TN/WH	3378	Auxiliary Audio Jack Right (+)	K	0.35 D-GN/WH	5841	Right Auxiliary Audio Signal (2) (without USR)
					0.35 TN/WH	3378	Auxiliary Audio Jack Right (+) (USR)
L	0.35 BARE	3375	Drain Wire	L	0.35 BARE	5842	Drain Wire (without USR)
					0.35 BARE	3375	Drain Wire (USR)
M	-	-	Not Used	M	-	-	Not Used

X304 REAR WINDOW TRIM HARNESS TO BODY HARNESS



Connector Part Information

- Harness: Rear Window Trim
- OEM: 15332145
- Service: 15306407
- Description: 8-Way F GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: E/C

Connector Part Information

- Harness: Body
- OEM: 15332150
- Service: 88986250
- Description: 8-Way M GT 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304702/19
- Core/Insulation Crimp: Pins: A, B : E/4
- Core/Insulation Crimp: Pins: C, D, E, F : E/C

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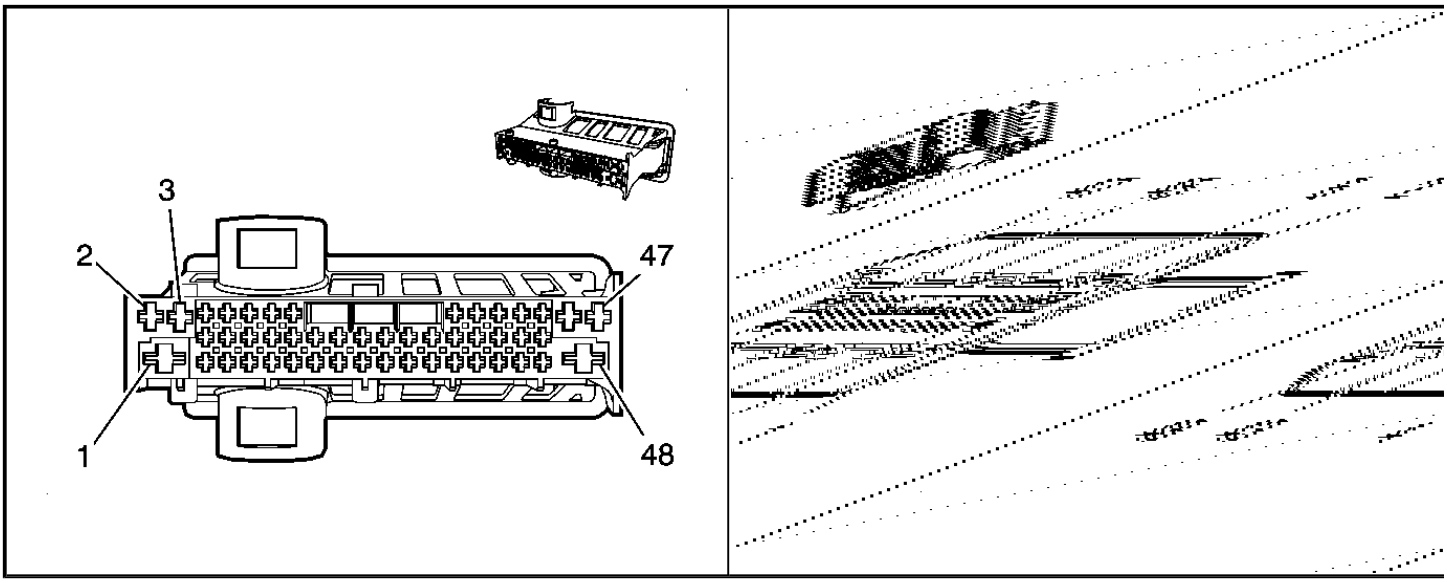
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

X304 Rear Window Trim Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control	A	0.5 WH	5065	Center High Mounted Stop Lamp (CHMSL) Control
B	0.5 BK	2350	Ground	B	0.5 BK	2350	Ground
C-H	-	-	Not Used	C-H	-	-	Not Used

X306 BODY HARNESS TO PASSENGER SEAT HARNESS



Connector Part Information

- Harness: Body
- OEM: 13592486
- Service: 13316172
- Description: 48-Way F 1.6 2.8 6.3 Timer Series, Sealed (BK)

Terminal Part Information

- Pins: 20, 22
- Terminal/Tray: 10725421/Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending

Connector Part Information

- Harness: Passenger Seat
- OEM: 1719636-1
- Service: Service by Harness - See Part Catalog
- Description: 48-Way M 1.6 2.8 6.3 Timer Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 48
- Terminal/Tray: Service by Harness - See Part

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- Test Probe: Pending

- Pins: 10, 11, 7, 8, 19, 21, 25, 41, 42, 44
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: Pins: 10, 11 : E/1
- Core/Insulation Crimp: Pins: 7, 8, 19, 21, 25, 41, 42, 44 : See Terminal Repair Kit
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pins: 1, 48
- Terminal/Tray: 964328-1/25
- Core/Insulation Crimp: 4/B
- Release Tool: J-38125-36
- Test Probe: J-35616-42 (RD)

Catalog

- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

- Pins: 7, 8, 10, 11, 19, 20, 21, 22, 25, 41, 42, 44
- Terminal/Tray: 964265-2/28
- Core/Insulation Crimp: Pins: 7, 8, 19, 20, 21, 22, 25, 41, 42, 44: E/2
- Core/Insulation Crimp: Pins: 10, 11: E/C
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

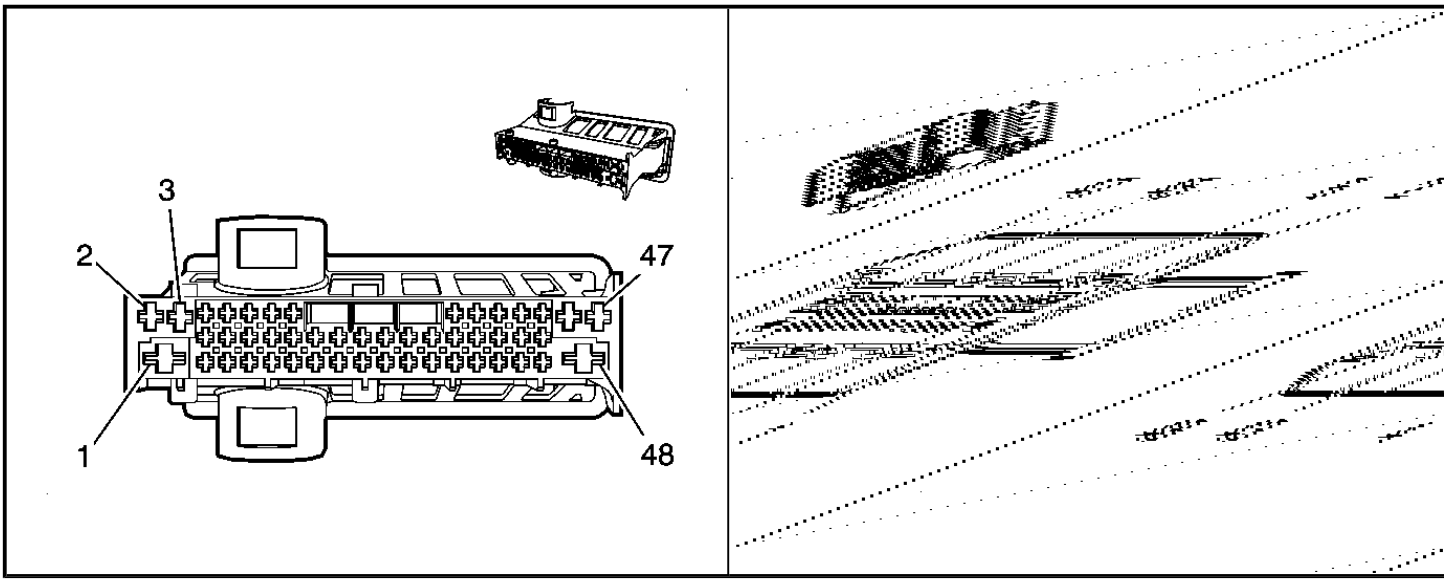
X306 Body Harness to Passenger Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	3 RD/WH	1440	Battery Positive Voltage	1	3 RD/WH	1440	Battery Positive Voltage
2-6	-	-	Not Used	2-6	-	-	Not Used
7	0.35 PK	2435	Low Reference	7	0.35 PK	2435	Low Reference (KA1)
8	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal	8	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal (KA1)
9	-	-	Not Used	9	-	-	Not Used
10	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage	10	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage (KA1)
11	0.8 L-BU	2433	Passenger Heated Seat Back Element Control	11	0.8 L-BU	2433	Passenger Heated Seat Back Element Control (KA1)
12-18	-	-	Not Used	12-18	-	-	Not Used
19	0.35 L-BU	5056	Seat Position Sensor - Right - Signal	19	0.35 L-BU	5056	Seat Position Sensor - Right - Signal
20	0.35 TN/WH	2135	Side Impact Module - Right Front - High Control	20	0.35 TN/WH	2135	Side Impact Module - Right Front - High Control
21	0.35 L-BU	1361	Low Reference	21	0.35 L-BU	1361	Low Reference
22	0.35 L-GN	2136	Side Impact Module - Right Front - Low Control	22	0.35 L-GN	2136	Side Impact Module - Right Front - Low Control

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23-24	-	-	Not Used	23-24	-	-	Not Used
25	0.35 OG	1362	Seat Belt Switch - Right - Signal	25	0.35 OG	1362	Seat Belt Switch - Right - Signal
26-40	-	-	Not Used	26-40	-	-	Not Used
41	0.35 RD/WH	2040	Battery Positive Voltage	41	0.35 RD/WH	2040	Battery Positive Voltage
42	0.35 D-GN	5060	Low Speed GMLAN Serial Data	42	0.35 D-GN	5060	Low Speed GMLAN Serial Data
43	-	-	Not Used	43	-	-	Not Used
44	0.35 BK	2450	Ground	44	0.35 BK	2450	Ground
45-47	-	-	Not Used	45-47	-	-	Not Used
48	3 BK	850	Ground	48	3 BK	850	Ground

X307 BODY HARNESS TO DRIVER SEAT HARNESS



Connector Part Information

- Harness: Body
- OEM: 13592486
- Service: 13316172
- Description: 48-Way F 1.6 2.8 6.3 Timer Series, Sealed (BK)

Terminal Part Information

- Pins: 20, 22
- Terminal/Tray: 10725421/Pending

Connector Part Information

- Harness: Driver Seat
- OEM: 1719636-1
- Service: Service by Harness - See Part Catalog
- Description: 48-Way M 1.6 2.8 6.3 Timer Series, Sealed (BK)

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- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 10, 11, 5, 7, 8, 19, 21, 25
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: Pins: 10, 11 : E/1
- Core/Insulation Crimp: Pins: 5, 7, 8, 19, 21, 25 : See Terminal Repair Kit
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pins: 2, 46
- Terminal/Tray: 4-965999-1/25
- Core/Insulation Crimp: Pins: 2 : C/A
- Core/Insulation Crimp: Pins: 46 : 4/A
- Release Tool: J-38125-36
- Test Probe: J-35616-35 (VT)

- Pins: 1, 48
- Terminal/Tray: 964328-1/25
- Core/Insulation Crimp: 4/B
- Release Tool: J-38125-36
- Test Probe: J-35616-42 (RD)

Terminal Part Information

- Pins: 1, 2, 46, 48
- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

- Pins: 5, 7, 8, 10, 11, 19, 20, 21, 22, 25
- Terminal/Tray: 964265-2/28
- Core/Insulation Crimp: Pins: 5, 7, 8, 19, 20, 21, 22, 25: E/2
- Core/Insulation Crimp: Pins: 10, 11: E/C
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

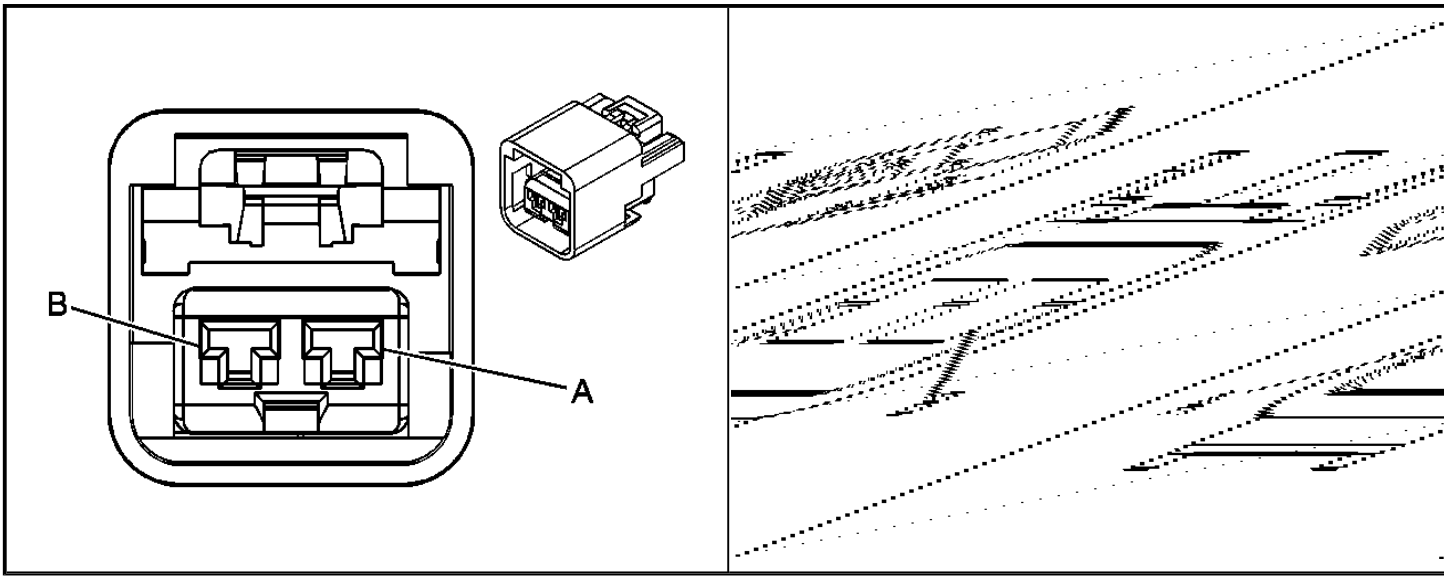
X307 Body Harness to Driver Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	3 RD/WH	5040	Battery Positive Voltage	1	3 RD/WH	5040	Battery Positive Voltage
2	1 RD/WH	5140	Battery Positive Voltage	2	1 RD/WH	5140	Battery Positive Voltage (KA1)
3-4	-	-	Not Used	3-4	-	-	Not Used
5	0.35 D-GN	5060	Low Speed GMLAN Serial Data	5	0.35 D-GN	5060	Low Speed GMLAN Serial Data (KA1)
6	-	-	Not Used	6	-	-	Not Used
7	0.35 PK	2435	Low Reference	7	0.35 PK	2435	Low Reference (KA1)
8	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal	8	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal (KA1)
9	-	-	Not Used	9	-	-	Not Used
			Passenger Heated Seat				Passenger Heated Seat

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10	0.8 D-BU	2479	Element Supply Voltage	10	0.8 D-BU	2479	Element Supply Voltage (KA1)
11	0.8 L-BU	2433	Passenger Heated Seat Back Element Control	11	0.8 L-BU	2433	Passenger Heated Seat Back Element Control (KA1)
12-18	-	-	Not Used	12-18	-	-	Not Used
19	0.35 L-GN	5055	Seat Position Sensor - Left - Signal	19	0.35 L-GN	5055	Seat Position Sensor - Left - Signal
20	0.35 BN	2137	Side Impact Module - Left Front - High Control	20	0.35 BN	2137	Side Impact Module - Left Front - High Control
21	0.35 D-BU	1363	Low Reference	21	0.35 D-BU	1363	Low Reference
22	0.35 YE/BK	2138	Side Impact Module - Left Front - Low Control	22	0.35 YE/BK	2138	Side Impact Module - Left Front - Low Control
23-24	-	-	Not Used	23-24	-	-	Not Used
25	0.35 TN/WH	238	Seat Belt Switch - Left	25	0.35 TN/WH	238	Seat Belt Switch - Left
26-45	-	-	Not Used	26-45	-	-	Not Used
46	2 BK	850	Ground	46	2 BK	850	Ground (KA1)
47	-	-	Not Used	47	-	-	Not Used
48	3 BK	850	Ground	48	3 BK	850	Ground

X308 DRIVER SEAT BACK HARNESS TO THE DRIVER SEAT HARNESS



Connector Part Information

- Harness: Driver Seat Back

Connector Part Information

- Harness: Driver Seat

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- OEM: 15326870
- Service: 88953160
- Description: 2-Way F GT 280 Series (BK)

Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- OEM: 15326874
- Service: 15306379
- Description: 2-Way M GT 280 Series (BK)

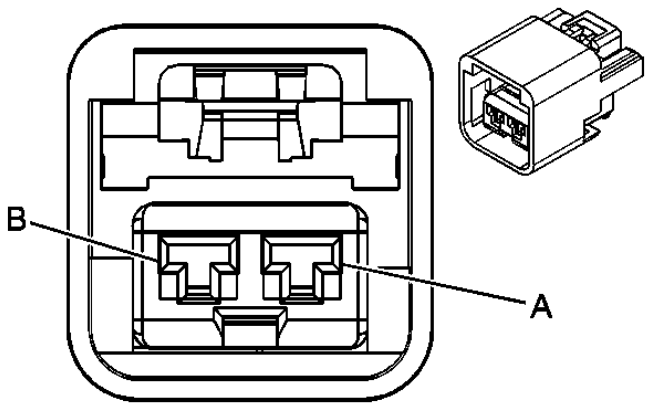
Terminal Part Information

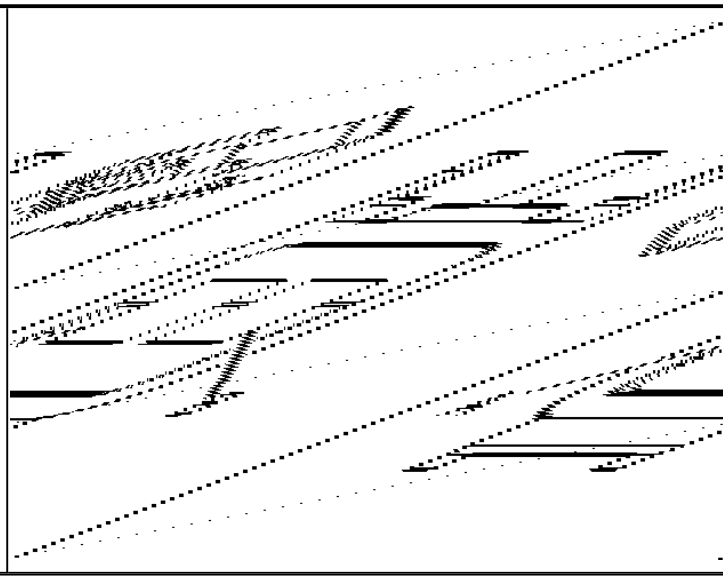
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: A/D
- Release Tool: 15315247
- Test Probe: 15315247

X308 Driver Seat Back Harness to the Driver Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	3 D-BU/YE	277	Driver Seat Recline Motor Rearward Control	A	3 D-BU/YE	277	Driver Seat Recline Motor Rearward Control
B	3 D-GN/YE	276	Driver Seat Recline Motor Forward Control	B	3 D-GN/YE	276	Driver Seat Recline Motor Forward Control

X309 PASSENGER SEAT BACK HARNESS TO THE PASSENGER SEAT HARNESS





Connector Part Information

- Harness: Passenger Seat Back
- OEM: 15326870
- Service: 88953160
- Description: 2-Way F GT 280 Series (BK)

Connector Part Information

- Harness: Passenger Seat
- OEM: 15326874
- Service: 15306379
- Description: 2-Way M GT 280 Series (BK)

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Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

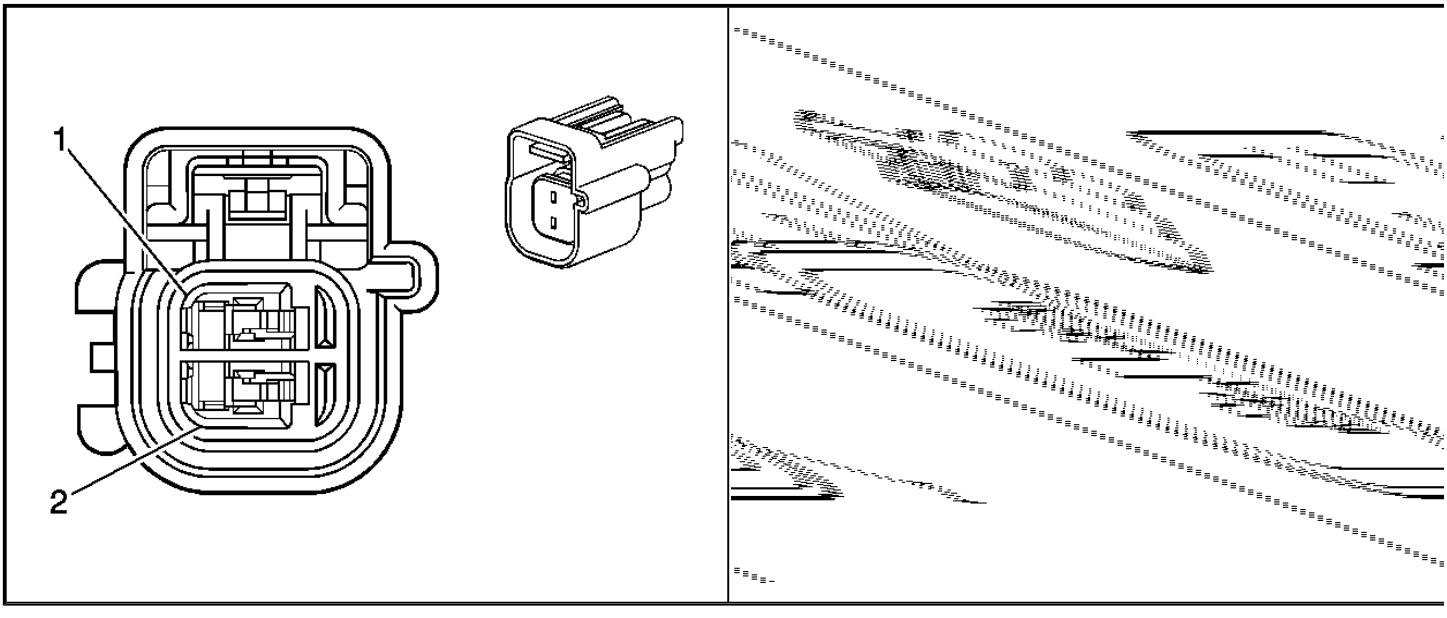
Terminal Part Information

- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: A/D
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

X309 Passenger Seat Back Harness to the Passenger Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	3 D-BU/YE	77	Passenger Seat Recline Motor Rearward Control	A	3 D-BU/YE	77	Passenger Seat Recline Motor Rearward Control
B	3 D-GN/YE	76	Passenger Seat Recline Motor Forward Control	B	3 D-GN/YE	76	Passenger Seat Recline Motor Forward Control

X315 SIDE AIR BAG - LEFT JUMPER HARNESS TO THE DRIVER SEAT HARNESS



Connector Part Information

- Harness: Inflatable Restraint Side Impact Module - Left Jumper
- OEM: E-2239
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed (YE)

Connector Part Information

- Harness: Driver Seat
- OEM: E-2238
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series, Sealed (YE)

Terminal Part Information

Terminal Part Information

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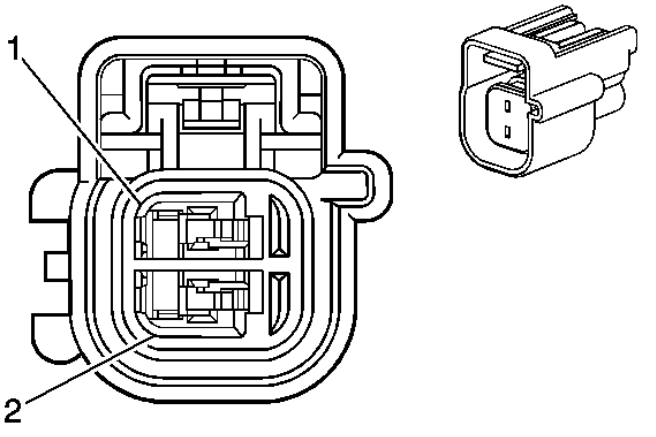
- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

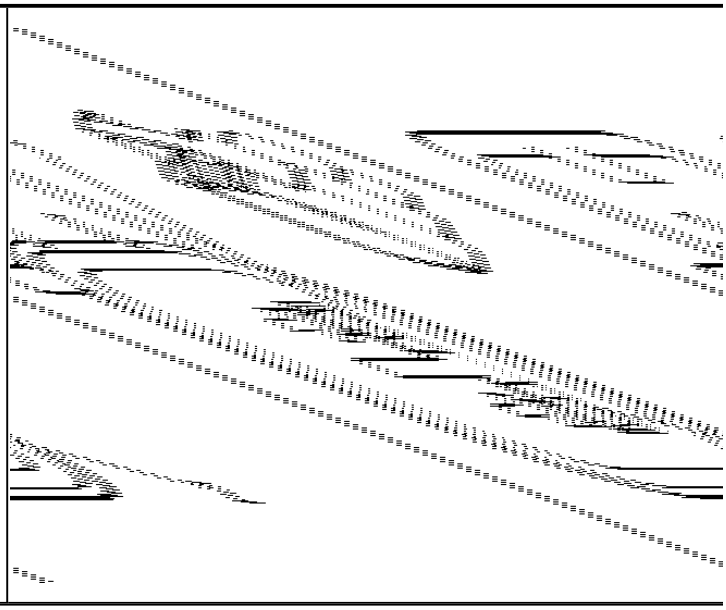
- Terminal/Tray: Service by Connector Assembly- See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

X315 Side Air Bag - Left Jumper Harness to the Driver Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	0.35 BN	2137	Side Impact Module - LF - High Control	1	0.35 BN	2137	Side Impact Module - LF - High Control
2	0.35 YE/BK	2138	Side Impact Module - LF - Low Control	2	0.35 YE/BK	2138	Side Impact Module - LF - Low Control

X316 SIDE AIR BAG - RIGHT JUMPER HARNESS TO THE PASSENGER SEAT HARNESS





Connector Part Information

- Harness: Inflatable Restraint Side Impact Module - Right Jumper
- OEM: E-2239
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed (YE)

Connector Part Information

- Harness: Passenger Seat
- OEM: E-2238
- Service: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series, Sealed (YE)

Terminal Part Information

- Terminal/Tray: Service by Connector

Terminal Part Information

- Terminal/Tray: Service by Connector

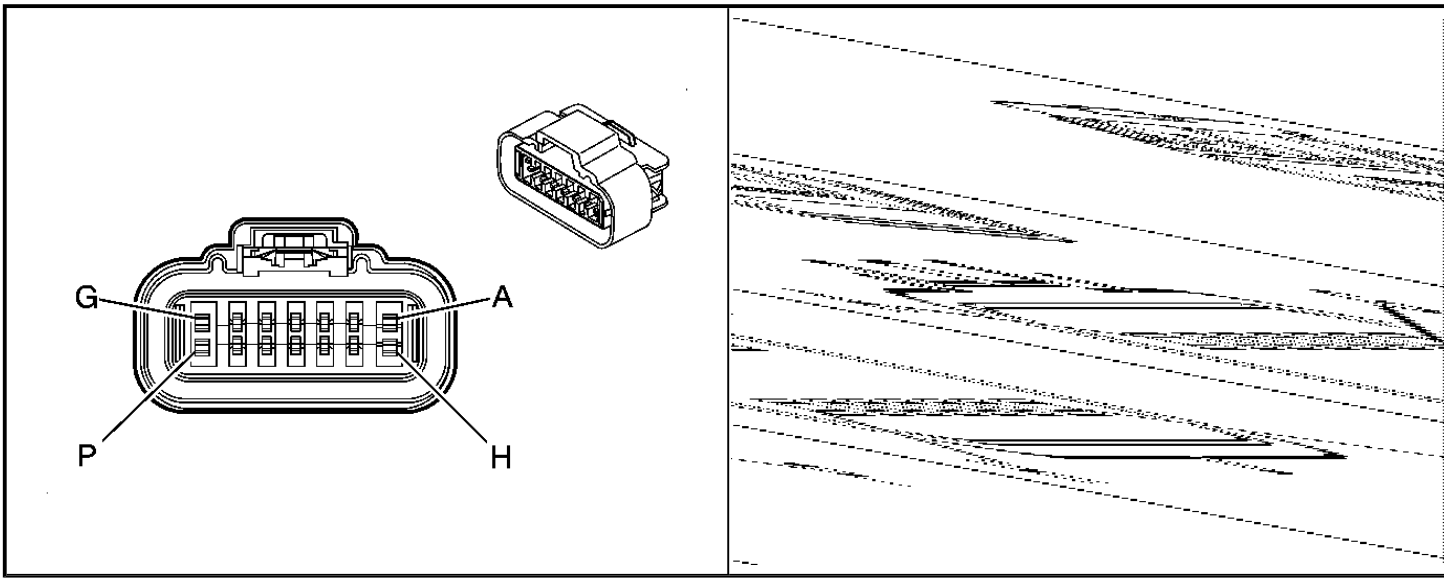
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Assembly - See Part Catalog • Core/Insulation Crimp: Not Available • Release Tool: Not Available • Test Probe: Not Available	Assembly - See Part Catalog • Core/Insulation Crimp: Not Available • Release Tool: Not Available • Test Probe: Not Available

X316 Side Air Bag - Right Jumper Harness to the Passenger Seat Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	0.35 TN/WH	2135	Side Impact Module - RF - High Control	1	0.35 TN/WH	2135	Side Impact Module - RF - High Control
2	0.35 L-BU	2136	Side Impact Module - RF - Low Control	2	0.35 L-GN	2136	Side Impact Module - RF - Low Control

X350 BODY HARNESS TO FUEL TANK HARNESS



Connector Part Information • Harness: Body • OEM: 15336037 • Service: 19179461 • Description: 14-Way F GT 150 Series, Sealed (BK)	**Connector Part Information** • Harness: Fuel Tank • OEM: 15422562 • Service: 88987613 • Description: 14-Way F GT 150, 280 Series, Sealed (BK)
Terminal Part Information • Pins: B, C, D, E, F, J, K, L, M, N • Terminal/Tray: 12191819/8 • Core/Insulation Crimp: E/A • Release Tool: 15315247	**Terminal Part Information** • Pins: B, C, D, E, F, J, K, L, M, N

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- Test Probe: J-35616-2A (GY)

- Pin: P
- Terminal/Tray: 15304719/19
- Core/Insulation Crimp: E/5
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pin: A
- Terminal/Tray: 15304720/19
- Core/Insulation Crimp: 4/5
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Pin: H
- Terminal/Tray: 15392777/23
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool: 15315247
- Test Probe: J-35616-4A (PU)

- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

- Pin: P
- Terminal/Tray: 15304731/19
- Core/Insulation Crimp: E/5
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

- Pins: A,H
- Terminal/Tray: 15304732/8
- Core/Insulation Crimp: A/5
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

X350 Body Harness to Fuel Tank Harness

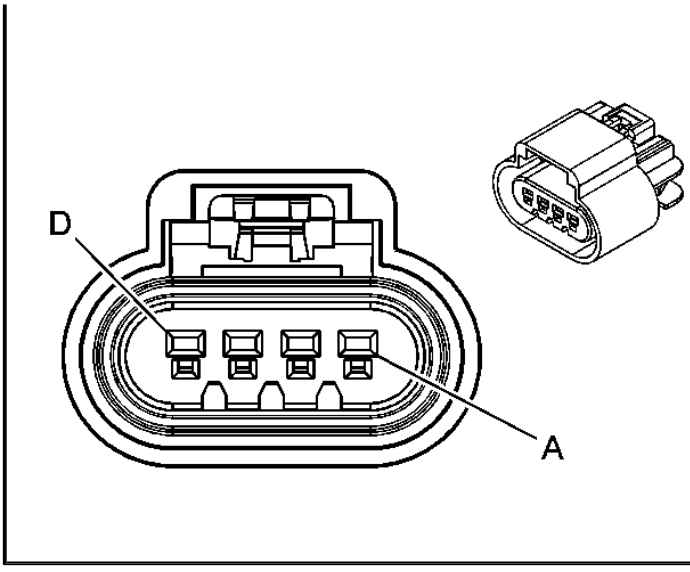
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	2 GY	120	Fuel Pump Supply Voltage	A	2 RD	120	Fuel Pump Supply Voltage (Early Production)
					2 GY	120	Fuel Pump Supply Voltage (Late Production)
B	0.35 GY	2709	5-Volt Reference 1	B	0.5 OG	2709	5-Volt Reference 1 (Early Production)
					0.5 GY	2709	5-Volt Reference 1 (Late Production)
C	0.35 D-GN	890	Fuel Tank Pressure Sensor Signal	C	0.5 D-GN	890	Fuel Tank Pressure Sensor Signal
D	0.35 BN	7445	5-Volt Reference	D	0.5 OG	7445	5-Volt Reference (Early Production)
					0.5 BN	7445	5-Volt Reference (Late Production)
E	0.35 D-BU	1936	Fuel Level Sensor	E	0.5 WH	1936	Fuel Level Sensor Signal (Early Production)

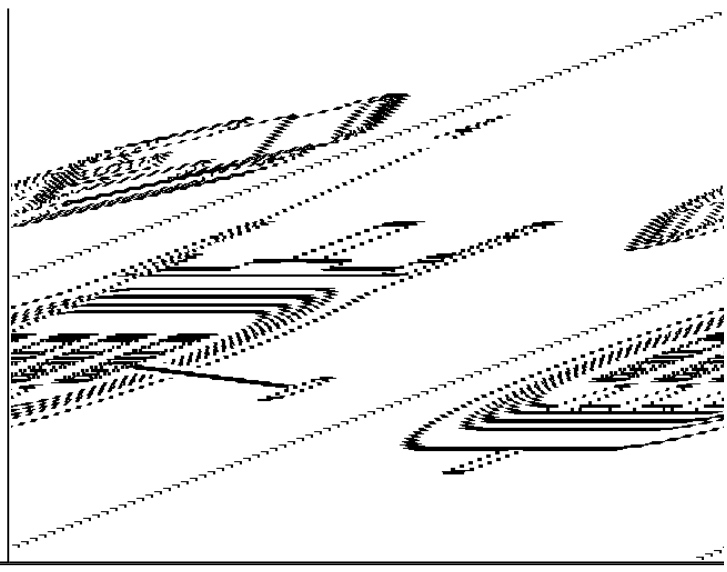
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			Signal		0.5 D-BU	1936	Fuel Level Sensor Signal (Late Production)
F	0.35 L-BU	1937	Fuel Level Sensor Signal - Secondary	F	0.5 YE	1937	Fuel Level Sensor Signal - Secondary (Early Production)
					0.5 L-BU	1937	Fuel Level Sensor Signal - Secondary (Late Production)
G	-	-	Not Used	G	-	-	Not Used
H	2 PK	1580	Low Reference	H	2 BK	1580	Low Reference (Early Production)
					2 PK	1580	Low Reference (Late Production)
J	0.5 BK	7444	Drain Wire	J	0.5 BK	7444	Drain Wire (Late Production)
K	0.35 PU	7446	Fuel Pressure Sensor Signal	K	0.5 GY	7446	Fuel Pressure Sensor Signal (Early Production)
					0.5 PU	7446	Fuel Pressure Sensor Signal (Late Production)
L	0.35 GY	7447	Low Reference	L	0.5 BN	7447	Low Reference (Early Production)
					0.5 GY	7447	Low Reference (Late Production)
M	0.35 WH	1310	EVAP Canister Vent Solenoid Control	M	0.5 BN	1310	EVAP Canister Vent Solenoid Control (Early Production)
					0.5 WH	1310	EVAP Canister Vent Solenoid Control (Late Production)
N	0.5 RD/WH	2440	Battery Positive Voltage	N	0.5 RD	2440	Battery Positive Voltage
					0.5 RD/WH	2440	Battery Positive Voltage
P	0.35 BN/WH	6281	Low Reference	P	0.5 BK	6281	Low Reference (Early Production)
					0.5 BN/WH	6281	Low Reference (Late Production)

X360 REAR AXLE HARNESS TO BODY HARNESS

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Connector Part Information

- Harness: Rear Axle
- OEM: 15326815
- Service: 15306396
- Description: 4-Way F GT 150 Sealed 4.0 (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Body
- OEM: 15326820
- Service: 15326820
- Description: 4-Way M GT 150 Series, Sealed (BK)

Terminal Part Information

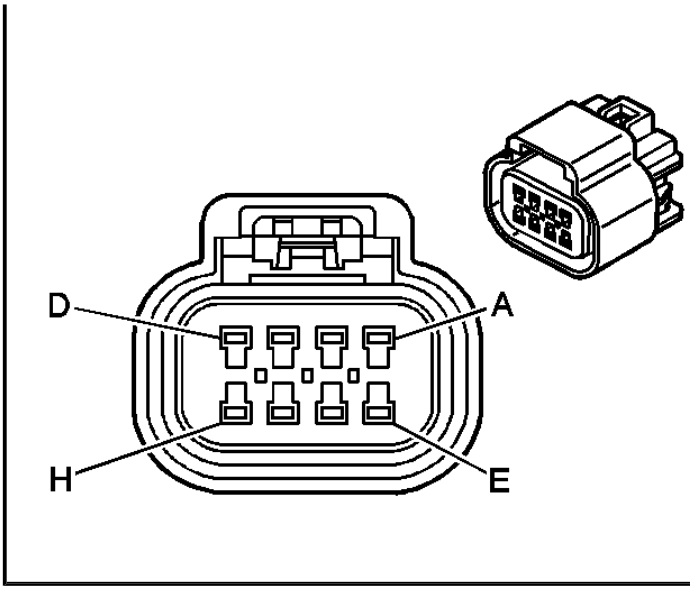
- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

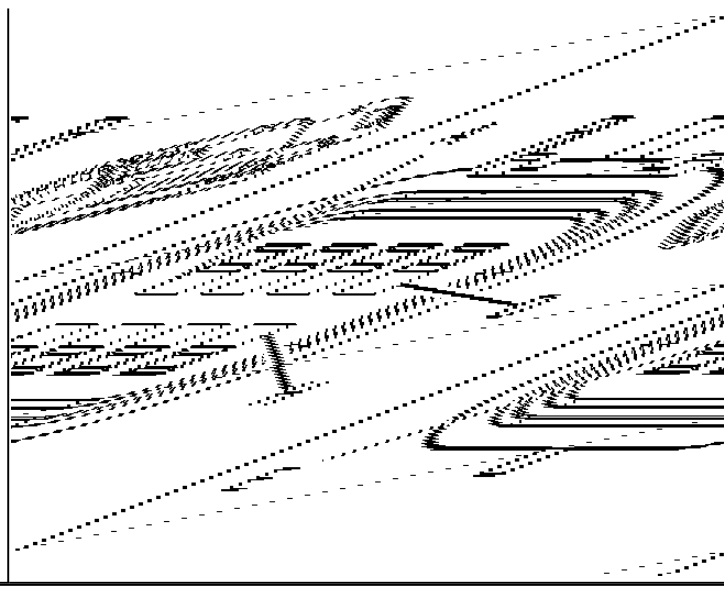
X360 Rear Axle Harness to Body Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.8 WH	883	Low Reference	A	0.5 WH	883	Low Reference
B	0.8 BN	882	Right Rear Wheel Speed Sensor Signal	B	0.5 BN	882	Right Rear Wheel Speed Sensor Signal
C	0.8 OG	885	Low Reference	C	0.5 OG	885	Low Reference
D	0.8 TN	884	Left Rear Wheel Speed Sensor Signal	D	0.5 TN	884	Left Rear Wheel Speed Sensor Signal

X400 BODY HARNESS TO REAR FASCIA LEFT HARNESS

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Connector Part Information

- Harness: Body
- OEM: 15326836
- Service: 88986255
- Description: 8-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Rear Fascia Left
- OEM: 15326840
- Service: Service by Harness - See Part Catalog
- Description: 8-Way M GT 150 Sealed 4.0 (BK)

Terminal Part Information

- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

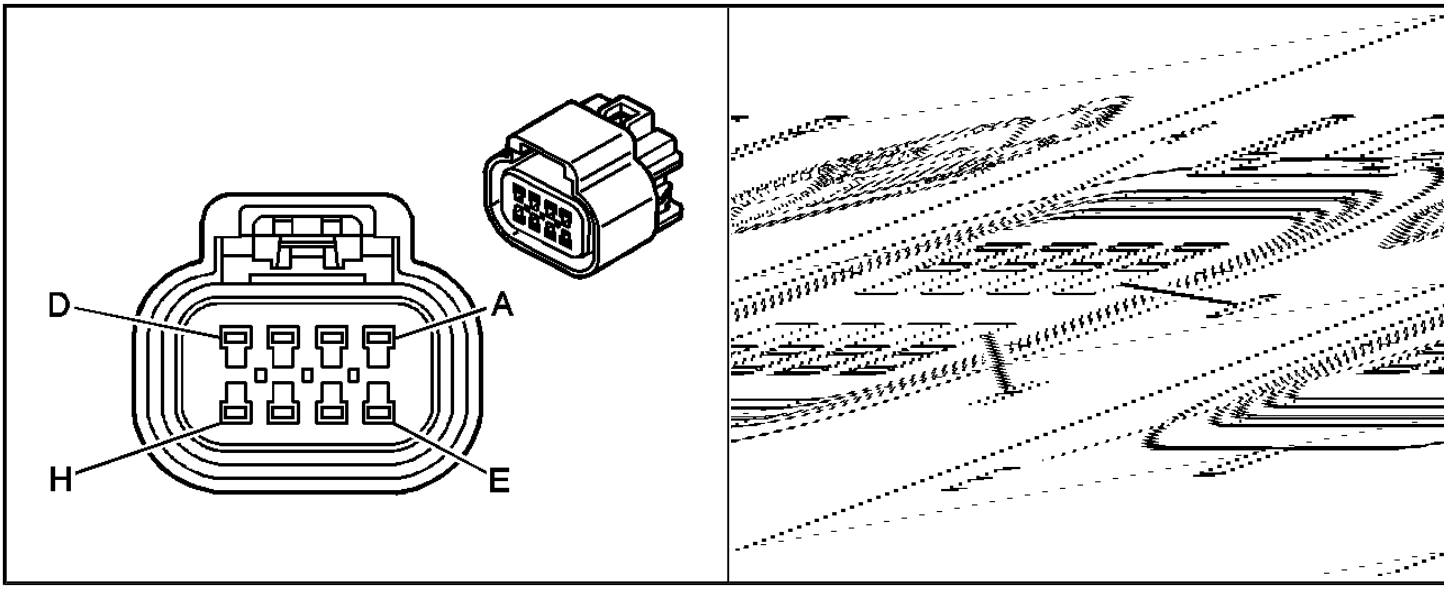
X400 Body Harness to Rear Fascia Left Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 D-GN/YE	6846	Rear License Lamp Control	A	0.5 D-GN/YE	6846	Rear License Lamp Control
B	0.35 GY	2379	Low Reference (UD7)	B	0.35 GY	2379	Low Reference (UD7)
C	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage	C	0.5 YE/BK	1334	Left Rear Turn Signal Lamp Supply Voltage
D	-	-	Not Used	D	-	-	Not Used
E	0.35 D-BU	2374	Object Sensor Supply Voltage (UD7)	E	0.35 D-BU	2374	Object Sensor Supply Voltage (UD7)
F	-	-	Not Used	F	-	-	Not Used
	0.5 BN/L-		Left Park Lamp				Left Park Lamp

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G	BU	6993	Supply Voltage	G	0.5 PU	709	Supply Voltage
H	0.5 L-GN	24	Backup Lamp Supply Voltage	H	0.5 L-GN	24	Backup Lamp Supply Voltage

X401 BODY HARNESS TO REAR FASCIA RIGHT HARNESS



Connector Part Information

- Harness: Body
- OEM: 15326836
- Service: 88986255
- Description: 8-Way F GT 150 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins: A, B, C, F, G, H : E/A
- Core/Insulation Crimp: Pins: D, E : 2/1
- Release Tool: 15315247
- Test Probe: J-35616-2A (GY)

Connector Part Information

- Harness: Rear Fascia Right
- OEM: 15326840
- Service: Service by Harness - See Part Catalog
- Description: 8-Way M GT 150 Sealed 4.0 (BK)

Terminal Part Information

- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: Pins: D, E : E/1
- Core/Insulation Crimp: Pins: A, B, C, F, G, H : E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

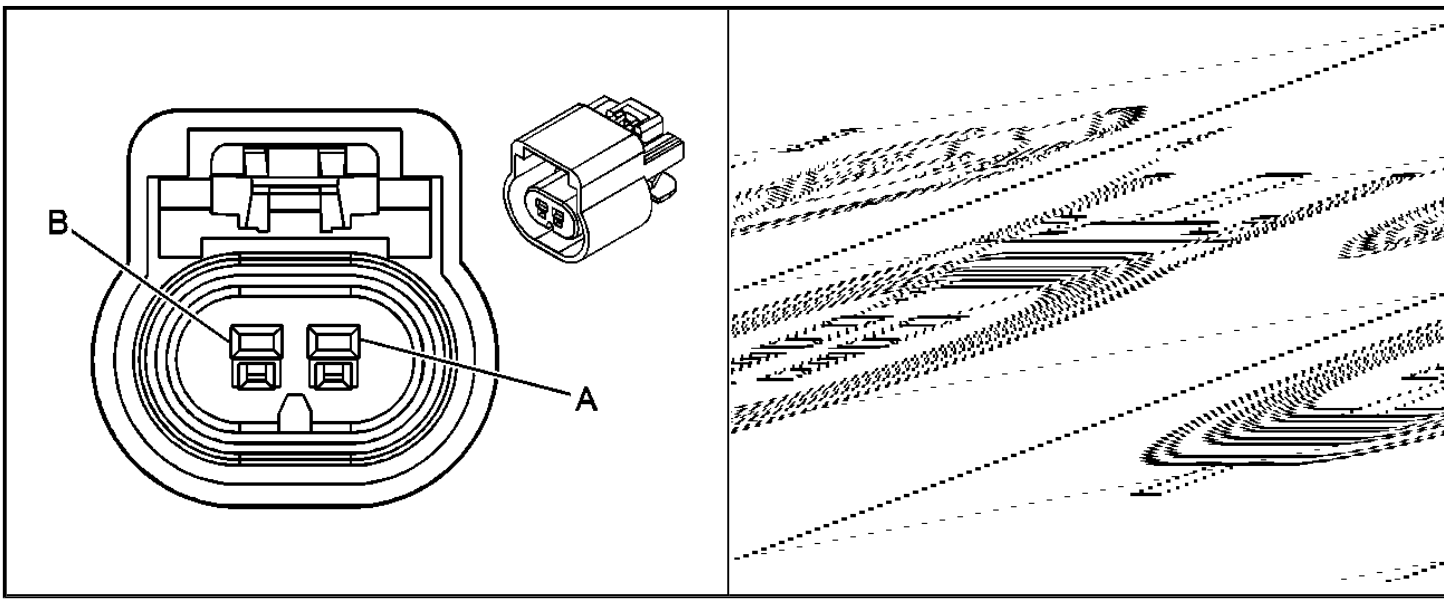
X401 Body Harness to Rear Fascia Right Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.35 YE	2375	Left Rear Corner Object Sensor Signal	A	0.35 YE	2375	Left Rear Corner Object Sensor Signal

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			(UD7)				(UD7)
B	0.5 BN/GY	6995	Right Park Lamp Supply Voltage	B	0.5 BN/WH	309	Right Park Lamp Supply Voltage
C	0.35 OG	2376	Left Rear Middle Object Sensor Signal (UD7)	C	0.35 OG	2376	Left Rear Middle Object Sensor Signal (UD7)
D	1 BK	2550	Ground	D	1 BK	2550	Ground
E	1 BK	550	Ground	E	1 BK	550	Ground
F	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage	F	0.5 D-GN/WH	1335	Right Rear Turn Signal Lamp Supply Voltage
G	0.35 PU	2378	Right Rear Corner Object Sensor Signal (UD7)	G	0.35 PU	2378	Right Rear Corner Object Sensor Signal (UD7)
H	0.35 D-GN	2377	Right Rear Middle Object Sensor Signal (UD7)	H	0.35 D-GN	2377	Right Rear Middle Object Sensor Signal (UD7)

X402 LICENSE LAMP HARNESS TO REAR FASCIA HARNESS



Connector Part Information

- Harness: License Lamp
- OEM: 13510085
- Service: Service by Harness - See Part Catalog
- Description: 2-Way F GT 150 Series, Sealed (BK)

Connector Part Information

- Harness: Rear Fascia
- OEM: 13510099
- Service: 19151499
- Description: 2-Way M GT 150 Series, Sealed (BK)

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Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

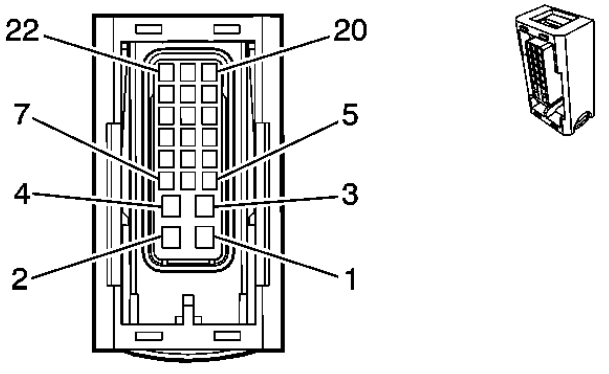
Terminal Part Information

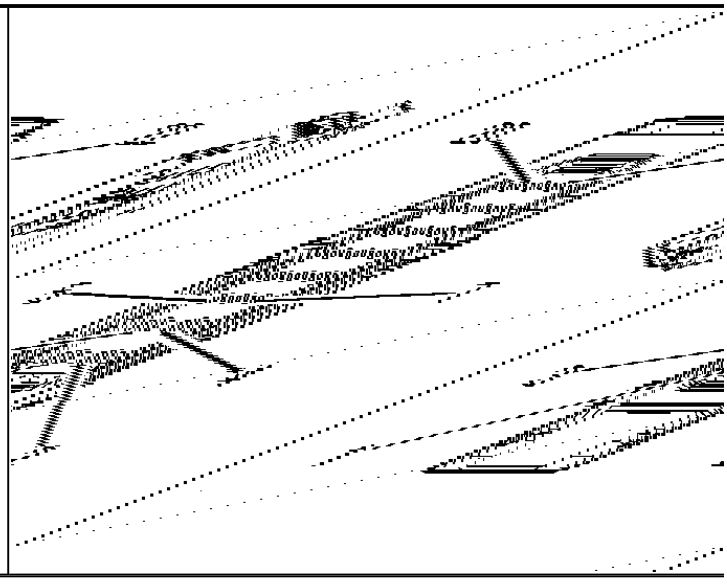
- Terminal/Tray: 15326269/19
- Core/Insulation Crimp: Pin: A : E/1
- Core/Insulation Crimp: Pin: B : E/4
- Release Tool: 15315247
- Test Probe: J-35616-3 (GY)

X402 License Lamp Harness to Rear Fascia Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.8 BK	2550	Ground	A	0.8 BK	2550	Ground
B	0.5 BN	6846	Rear License Lamp Control	B	0.5 D-GN/YE	6846	Rear License Lamp Control

X500 BODY HARNESS TO DRIVER DOOR HARNESS





Connector Part Information

- Harness: Body
- OEM: 10763183
- Service: 13505899
- Description: 22-Way F 1.5 2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 2

Connector Part Information

- Harness: Driver Door
- OEM: 10763193
- Service: Service by Harness - See Part Catalog
- Description: 22-Way M 1.5 2.8 Series, Sealed (BK)

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- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: A/D
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

- Pins: 3, 4, 17, 19
- Terminal/Tray: Pending
- Core/Insulation Crimp: Pending
- Release Tool: Pending
- Test Probe: Pending

- Pins: 5, 6, 12, 14, 15, 16, 18, 20, 21, 22
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pins: 7, 8, 9, 10, 11, 13
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

Terminal Part Information

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

X500 Body Harness to Driver Door Harness

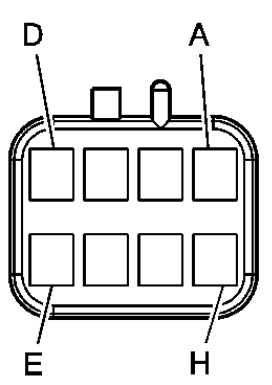
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	-	-	Not Used	1	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage
2	3 RD/WH	1240	Battery Positive Voltage	2	3 RD/WH	1240	Battery Positive Voltage
3	3 BK	850	Ground	3	3 BK	850	Ground
4	0.35 D-GN	3270	Driver Door Lock Status Signal	4	0.35 D-GN	3270	Driver Door Lock Status Signal
5	0.35 OG	2267	Mirror Heating Element Supply Voltage	5	0.35 OG	2267	Mirror Heating Element Supply Voltage
6	0.35 PU	7558	Accent Lamps Control	6	0.35 PU	7558	Accent Lamps Control
7	0.5 OG/WH	881	Passenger Mirror Motor Right Control	7	0.5 OG/WH	881	Passenger Mirror Motor Right Control
8	0.5 PU/WH	889	Passenger Mirror Motor Down Control	8	0.5 PU/WH	889	Passenger Mirror Motor Down Control
9	0.5	330	Passenger Mirror	9	0.5 TN	329	Passenger Mirror

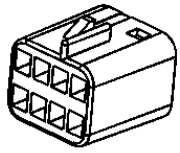
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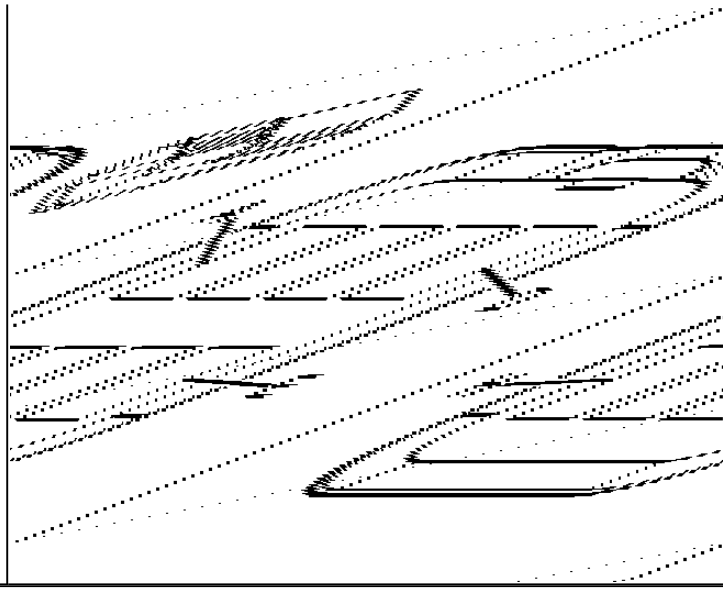
	TN/WH		Motor Left/Up Control				Motor Left/Up Control
10	0.8 GY	118	Left Front Speaker Output (-)	10	0.8 GY	118	Left Front Speaker Output (-)
11	0.5 RD/WH	1940	Battery Positive Voltage	11	0.5 RD/WH	1940	Battery Positive Voltage
12	0.35 PK	1691	Low Reference	12	0.35 PK	1691	Low Reference
13	0.8 TN	201	Left Front Speaker Output (+)	13	0.8 TN	201	Left Front Speaker Output (+)
14	0.35 GY	1690	Automatic Day/Night Mirror Signal	14	0.35 GY	1690	Automatic Day/Night Mirror Signal
15	0.35 D-BU	6189	Rear Compartment Lid Release Switch	15	0.35 D-BU	6189	Rear Compartment Lid Release Switch
16	0.35 D-GN	6134	Linear Interconnect Network 3	16	0.35 D-GN	6134	Linear Interconnect Network 3
17	1 GY	5911	Driver Door Lock Motor Unlock Control	17	0.8 GY	5911	Driver Door Lock Motor Unlock Control
18	0.35 PU	2765	Power Window Switch Right Front Express Signal	18	0.35 PU	2765	Power Window Switch Right Front Express Signal
19	1 TN	294	Door Lock Actuator Lock Control	19	0.8 TN	294	Door Lock Actuator Lock Control
20	0.35 TN	167	Power Window Master Switch Right Front Down Signal	20	0.35 TN	167	Power Window Master Switch Right Front Down Signal
21	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal	21	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal
22	0.35 YE	6817	LED Backlight Dimming Control	22	0.35 YE	6817	LED Backlight Dimming Control

X502 OUTSIDE REARVIEW MIRROR - DRIVER HARNESS TO DRIVER DOOR HARNESS

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Connector Part Information

- Harness Type: Outside Rearview Mirror - Driver
- OEM Connector: 12065398
- Service Connector: 12101822
- Description: 8-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 15326030/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

Connector Part Information

- Harness Type: Driver Door
- OEM Connector: 12045688
- Service Connector: 12101827
- Description: 8-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

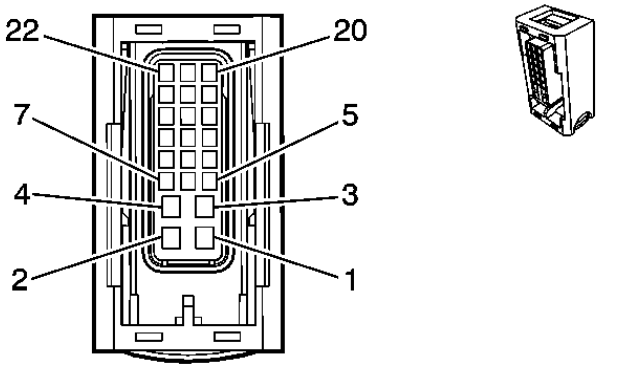
X502 Outside Rearview Mirror - Driver Harness to Driver Door Harness

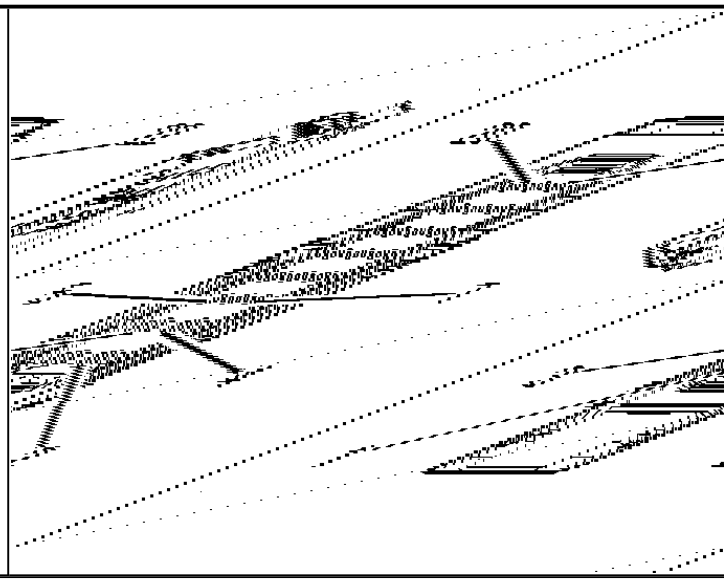
Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 BN	1691	Low Reference	A	0.35 PK	1691	Low Reference
B	0.5 BN/BK	1690	Automatic Day/Night Mirror Signal	B	0.35 GY	1690	Automatic Day/Night Mirror Signal
C	0.5 BK	2267	Mirror Heating Element Supply Voltage	C	0.35 OG	2267	Mirror Heating Element Supply Voltage
D	0.5BK/WH	850	Ground	D	0.35 BK	850	Ground
E	0.35 WH	81	Driver Mirror Motor Right Control	E	0.5 WH	81	Driver Mirror Motor Right Control
F	0.35 YE	89	Driver Mirror Motor	F	0.5 L-GN	89	Driver Mirror Motor

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			Down Control				Down Control
G	0.35 GY	329	Driver Mirror Motor Supply Voltage	G	0.5 TN	329	Driver Mirror Motor Supply Voltage
H	0.35 BU	1314	Left Front Turn Signal Lamp Supply Voltage	H	0.5 L-BU/WH	1314	Left Front Turn Signal Lamp Supply Voltage

X600 BODY HARNESS TO PASSENGER DOOR HARNESS





Connector Part Information

- Harness: Body
- OEM: 10763183
- Service: 13505899
- Description: 22-Way F 1.5 2.8 Series, Sealed (BK)

Terminal Part Information

- Pins: 1, 2
- Terminal/Tray: 15304724/8
- Core/Insulation Crimp: A/D
- Release Tool: 15315247
- Test Probe: J-35616-5 (PU)

- Pins: 3, 4, 17, 19
- Terminal/Tray: Pending
- Core/Insulation Crimp: Pending

Connector Part Information

- Harness: Passenger Door
- OEM: 10763193
- Service: Service by Harness - See Part Catalog
- Description: 22-Way M 1.5 2.8 Series, Sealed (BK)

Terminal Part Information

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- Release Tool: Pending
- Test Probe: Pending

- Pins: 5, 6, 11, 12, 14, 16, 18
- Terminal/Tray: 4-969005-1/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Pins: 7, 8, 9, 10, 13, 17
- Terminal/Tray: 964274-2/16
- Core/Insulation Crimp: E/1
- Release Tool: J-38125-560
- Test Probe: J-35616-14 (GN)

- Terminal/Tray: Service by Harness - See Part Catalog
- Core/Insulation Crimp: Not Available
- Release Tool: Not Available
- Test Probe: Not Available

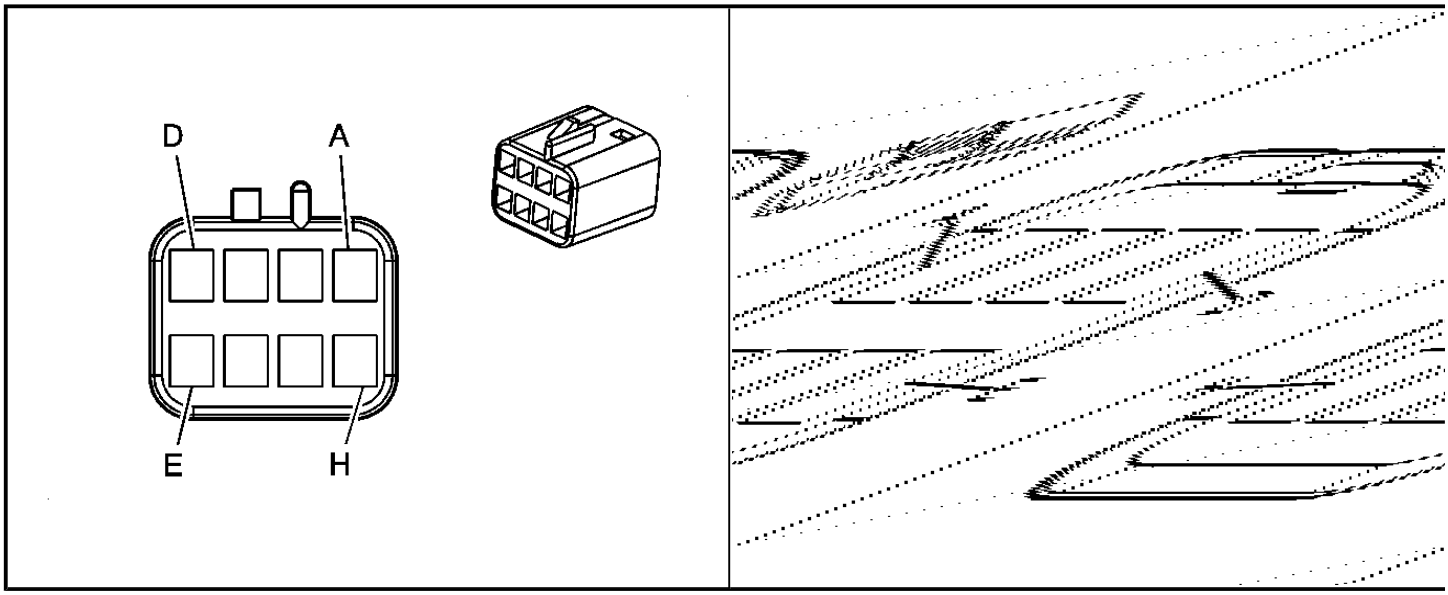
X600 Body Harness to Passenger Door Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
1	3 RD/WH	5040	Battery Positive Voltage	1	-	-	Not Used
2	3 RD/WH	1240	Battery Positive Voltage	2	3 RD/WH	1240	Battery Positive Voltage
3	3 BK	2350	Ground	3	3 BK	2350	Ground
4	-	-	Not Used	4	-	-	Not Used
5	0.35 OG	2267	Mirror Heating Element Supply Voltage	5	0.35 OG	2267	Mirror Heating Element Supply Voltage
6	0.35 PU	7558	Accent Lamps Control	6	0.35 PU	7558	Accent Lamps Control
7	0.5 OG/WH	881	Passenger Mirror Motor Right Control	7	0.5 OG/WH	881	Passenger Mirror Motor Right Control
8	0.5 PU/WH	889	Passenger Mirror Motor Down Control	8	0.5 PU/WH	889	Passenger Mirror Motor Down Control
9	0.5 TN/WH	330	Passenger Mirror Motor Left/Up Control	9	0.5 TN/WH	330	Passenger Mirror Motor Left/Up Control
10	0.8 D-GN	117	Right Front Speaker Output (-)	10	0.8 D-GN	117	Right Front Speaker Output (-)
11	0.35 PU	2765	Power Window Switch Right Front Express Signal	11	0.35 PU	2765	Power Window Switch Right Front Express Signal
12	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal	12	0.35 L-BU	166	Power Window Master Switch Right Front Up Signal
13	0.8 L-GN	200	Right Front Speaker	13	0.8 L-GN	200	Right Front Speaker

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			Output (+)				Output (+)
14	0.35 TN	167	Power Window Master Switch Right Front Down Signal	14	0.35 TN	167	Power Window Master Switch Right Front Down Signal
15	-	-	Not Used	15	-	-	Not Used
16	0.35 D-GN	6134	Linear Interconnect Network 3	16	0.35 D-GN	6134	Linear Interconnect Network 3
17	-	-	Not Used	17	0.5 D-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage
18	0.35 YE	6817	LED Backlight Dimming Control	18	0.35 YE	6817	LED Backlight Dimming Control
19	1 GY	295	Door Lock Actuator Unlock Control	19	0.8 GY	295	Door Lock Actuator Unlock Control
20	1 TN	294	Door Lock Actuator Lock Control	20	0.8 TN	294	Door Lock Actuator Lock Control
21-22	-	-	Not Used	21-22	-	-	Not Used

X602 OUTSIDE REARVIEW MIRROR - PASSENGER HARNESS TO PASSENGER DOOR HARNESS



Connector Part Information

- Harness Type: Outside Rearview Mirror - Driver
- OEM Connector: 12065398
- Service Connector: 12101822
- Description: 8-Way F Metri-Pack 150 Series

Connector Part Information

- Harness Type: Driver Door
- OEM Connector: 12045688
- Service Connector: 12101827
- Description: 8-Way M Metri-Pack 150 Series

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(NA)

Terminal Part Information

- Terminal/Tray: 15326030/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-14 (GN)

(BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool: 12094429
- Test Probe: J-35616-3 (GY)

X602 Outside Rearview Mirror - Passenger Harness to Passenger Door Harness

Pin	Wire	Circuit	Function	Pin	Wire	Circuit	Function
A	0.5 BK	2267	Mirror Heating Element Supply Voltage	A	0.35 OG	2267	Mirror Heating Element Supply Voltage
B	0.5BK/WH	2350	Ground	B	0.35 BK	2350	Ground
C	0.35 OG/WH	881	Passenger Mirror Motor Right Control	C	0.5 OG/WH	881	Passenger Mirror Motor Right Control
D	0.35 BN/WH	889	Passenger Mirror Motor Down Control	D	0.5 PU/WH	889	Passenger Mirror Motor Down Control
E	0.35 TN/WH	330	Passenger Mirror Motor Supply Voltage	E	0.5 TN/WH	330	Passenger Mirror Motor Supply Voltage
F	-	-	Not Used	F	-	-	Not Used
G	-	-	Not Used	G	0.5 TN	329	Driver Mirror Motor Supply Voltage
H	0.5 BU	1315	Right Front Turn Signal Lamp Supply Voltage	H	0.5 L-BU/WH	1315	Right Front Turn Signal Lamp Supply Voltage

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2010 ELECTRICAL

Wiring Systems and Power Management - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

HARNESS ROUTING VIEWS

Fig. 1: Fog Lamp Harness Routing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J102
2	J101

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Fig. 2: Forward Lamp Harness Routing - Left
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J107
2	X110 (T4F)
3	X105
4	X104

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Fig. 3: Forward Lamp Harness Routing - Right
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X162
2	X108
3	J103
4	X120 (T4F)
5	X102
6	X103
7	J104
8	J105
9	J106 (T4A)

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Fig. 4: Engine Harness Routing - Left Rear (LLT)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J122
2	J123
3	J121
4	J120
5	J119

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Fig. 5: Engine Harness Routing - Left Rear (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X113
2	J113
3	X109

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Fig. 6: Engine Harness Routing - Right Side (LLT)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J116
2	J115
3	X161
4	X160
5	J114 (MV5)
6	J113
7	J112
8	X111
9	X102
10	J108 (MV5)
11	J109 (MV5)

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12	J110
13	J111 (MYB)

Fig. 7: Engine Harness Routing - Right Side (L99 or LS3)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X112
2	J123
3	J129
4	X102
5	J111 (MYC)
6	J116
7	J126

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Fig. 8: Transmission Harness Routing - Right Rear (MYB)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J118
2	J117

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Fig. 9: Transmission Harness Routing - Right Rear (MYC)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J117
2	J118

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Fig. 10: Instrument Panel Harness Routing - Top Left Overhead
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J205 (DBX)
2	J206
3	J207
4	J208
5	J209 (SRK or SRM)
6	X208
7	X204
8	X254
9	X211
10	X301 (MYB or MYC)
11	X302
12	J201
13	J202
14	J203
15	J204

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Fig. 11: Instrument Panel Harness Routing - Top Right Overhead
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X253
2	X206 (CF5)
3	X207
4	JX200

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Fig. 12: Doors Harness Routing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	J604
2	J605
3	J602
4	J503
5	X502
6	J502
7	X500
8	J501
9	J500

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10	J600
11	J601
12	J603
13	X600
14	X602

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Fig. 13: Body Harness Routing - Left Passenger and Rear Compartments
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X400
2	X500
3	X253
4	X251
5	X207

6	J301
7	J302
8	J303
9	J304
10	X307

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Fig. 14: Body Harness Routing - Right Passenger Compartment
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X210
2	X209
3	X208
4	X256 (UE1 or U2K)
5	X254

6	X600
7	J305
8	X304
9	J310
10	J309
11	X306
12	J308
13	J307
14	J306

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Fig. 15: Body Harness Routing - Right Rear Compartment and Underbody
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X401

2	J409
3	X360
4	X350

Fig. 16: Fuel Tank Harness Routing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X350

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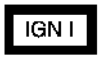
Fig. 17: Rear Fascia Harness Routing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	X401
2	X402
3	X400
4	J400
5	J401
6	J402
7	J403
8	J404 (UD7)
9	J405 (UD7)
10	J406
11	J407
12	J408

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ELECTRICAL SCHEMATIC SYMBOLS

Voltage Indicators

Symbol	Description
	Battery Voltage
	Ignition Switch - Off Position
	Ignition Switch - Accessory Position
	Ignition Switch - Run Position

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	Ignition Switch - Start Position

General Icons

Symbol	Description
	Master Component List Icon This icon is used on the schematic to link to the Master Electrical Component List.
	Description and Operation Icon This icon is used on the schematic to link to the Description and Operation of that particular system.

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	Computer Programming Icon This icon is used on the schematic to link to Control Module References, which identifies which components need programming upon replacement.
	Next Schematic Page Icon This icon is used on the schematic to navigate to the next schematic in the subsystem.
	Previous Schematic Page Icon This icon is used on the schematic to navigate to the previous schematic in the subsystem.

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	Supplemental Inflatable Restraint (SIR) or Supplemental Restraint System (SRS) Icon This icon is used to alert the technician that the system contains SIR/SRS components that require certain precautions before servicing.
	Information Icon This icon is used to alert the technician that there is additional information that will aid in servicing a system.
	Danger - High Voltage Icon This icon is used to alert the technician that a component/system contains 300 volt circuits.

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	High Voltage Icon This icon is used to alert the technician that a component/system contains voltage greater than 42 volts but less than 300 volts.
	Caution Icon This icon is used to advise the technician to use caution when servicing this component.
	Functional Serial Data Communication This icon is used to show the technician that the serial data circuit detail is shown incomplete. It also provides an active link to the Data Communication Schematics were the circuit is shown complete.

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Switch Position Icons

Symbol	Description
	Generic Up Arrows
	Generic Down Arrows
	Generic Left Arrows

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	Generic Right Arrows
	Generic Express Down Arrows

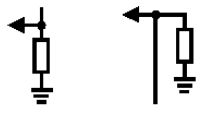
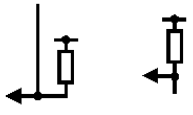
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	On/Off Icon
	Generic Lock Icon
	Generic Unlock Icon
	Generic Window Switch Positions - 4 Door

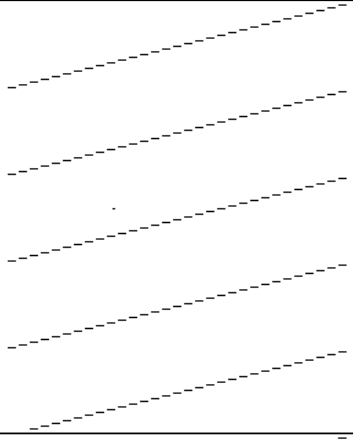
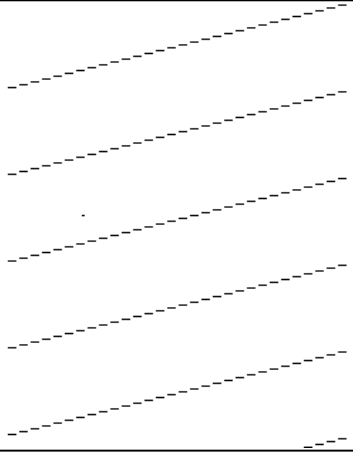
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	Generic Window Switch Positions - 2 Door

Module Circuit Function Icons

Symbol	Description
	I/O Pull-Down Resistors (-)
	I/O Pull-Up Resistors (+)
	I/O High-Side Drive Switch (+)

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	I/O Low-Side Drive Switch (+)
	I/O Bidirectional Switch (+/-)
	Pulse-Width Modulation Symbol
	Battery Voltage

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IGN	Ignition Voltage
5V	Voltage Reference
5V AC	A/C Voltage
	Low Reference

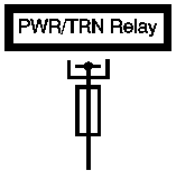
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	Ground
	Serial Data
	Antenna Signal - In
	Antenna Signal - Out

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	Brake Apply

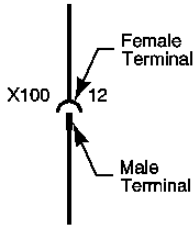
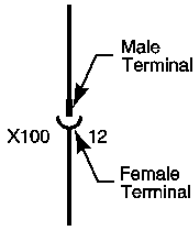
Harness Components

Symbol	Description
	Fuse
	Fuse Supplied by a Relay

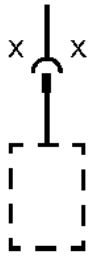
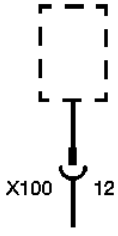
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	Circuit Breaker
	Fusible Link
	Ground

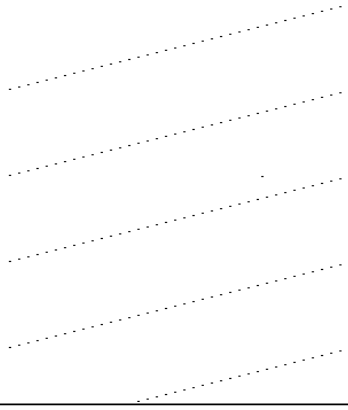
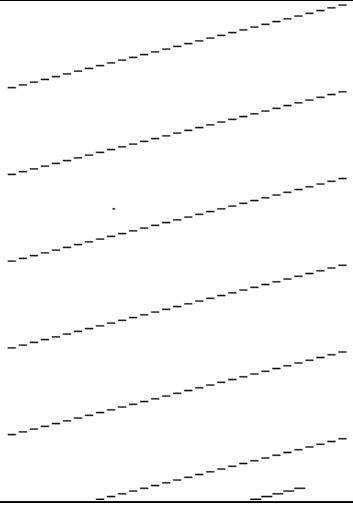
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	Case Ground
	Inline Harness Connector
	Inline Harness Connector
	Pigtail Connection

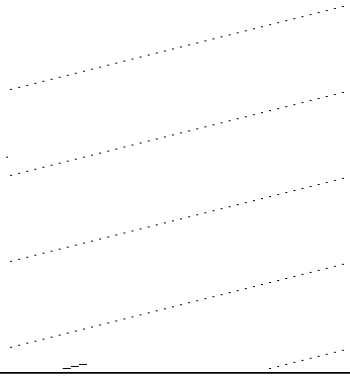
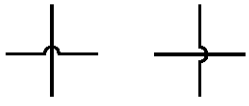
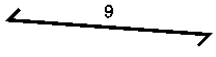
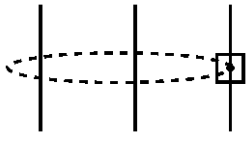
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	Pigtail Connection
	Provisional or Diagnostic Connector
	Blunt Cut Wire

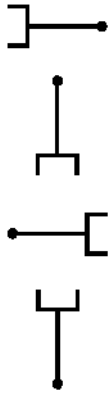
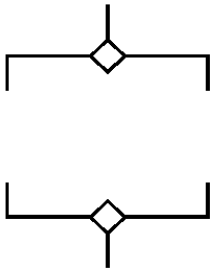
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	Incomplete Physical Splice
	Complete Physical Splice - 2 Wires
	Complete Physical Splice - 3 or more wires

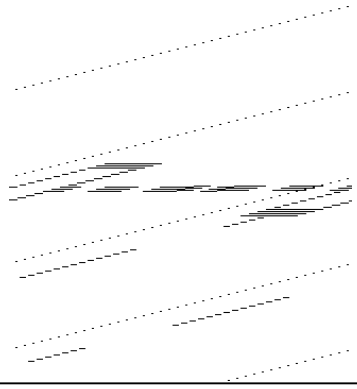
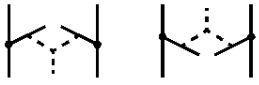
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	Wire Crosses
	Twisted Wires
	Shield

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	Circuit References
	Circuit Continuation Arrowheads
	Option Breakpoint

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	Ground Circuit Connection
	Connector Shorting Clip

Component Parts

Symbol	Description
	Partial Component When a component is represented in a dashed box, the component or its wiring is not shown in its entirety.
	Entire Component When a component is represented in a solid box the component or its wiring is shown in its entirety.

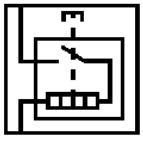
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	Connector Directly Attached to Component
	Pigtail Connector

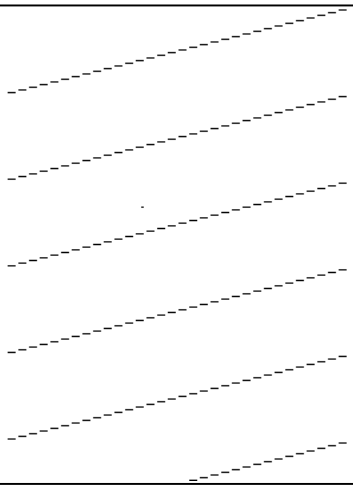
Switches and Relays

Symbol	Description

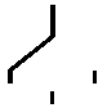
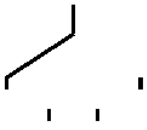
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	Accessory Power Outlet
	Cigar Lighter
	Switch - 2 Position Normally Open
	Switch - 2 Position Normally Closed

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	Switch - Rocker
	Switch - Contact Plate (1 Wire)
	Switch - Contact Plate (2 Wire)

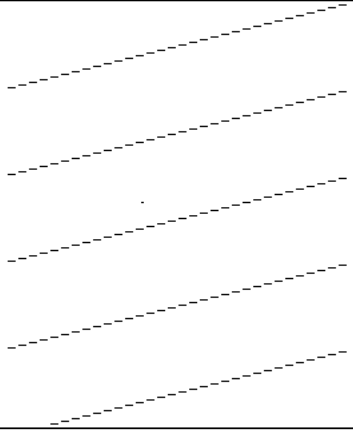
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	Switch - 3 Position
	Switch - 4 Position
	Switch - 5 Position

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	Switch - 6 Position
	Switch Actuator - Push (Momentary)
	Switch Actuator - Push (Latching)

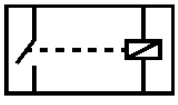
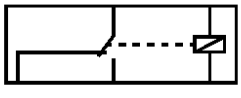
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	Switch Actuator - Pull (Momentary)
	Switch Actuator - Pull (Latching)
	Switch Actuator - Rotate (Momentary)
	Switch Actuator - Rotate (Latching)

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	Switch Actuator - Slide (Momentary)
	Switch Actuator - Slide (Latching)
	Switch Actuator - Pressure (Momentary)

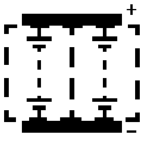
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	Switch Actuator - Temperature (Momentary)
	Switch Actuator - Volume (Latching)
	4-Pin Single Pole/Throw Relay - Normally Open
	5-Pin Relay - Normally Closed

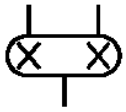
Devices and Sensors

Symbol	Description

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	Battery
	Battery Assembly - Hybrid
	Single Filament Light Bulb
	Double Filament Light Bulb

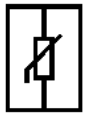
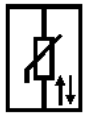
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	Light Emitting Diode (LED)
	Photo Sensor
	Gauge

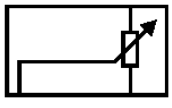
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	Diode
	Capacitor
	Resistor

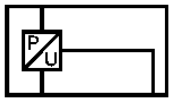
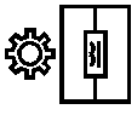
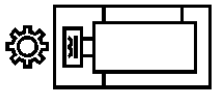
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	Variable Resistor
	Variable Resistor - NTC
	Breakable Wire

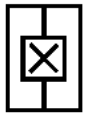
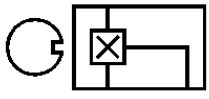
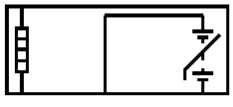
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	Heating Element
	Position Sensor
	Pressure Sensor

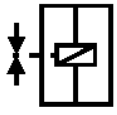
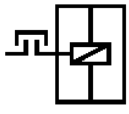
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	Knock Sensor
	Inductive Type Sensor - 2-Wire
	Inductive Type Sensor - 3-Wire

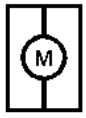
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	Hall Effect Sensor - 2-Wire
	Hall Effect Sensor - 3-Wire
	Oxygen Sensor - 2-Wire
	Heated Oxygen Sensor - 4-Wire

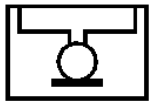
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	Solenoid - Actuator
	Solenoid - Valve
	Clutch
	Motor

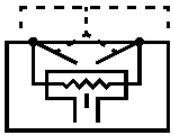
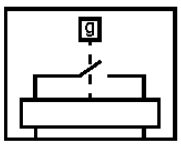
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	Motor with PTC
	Antenna
	Speaker

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	Horn
	Microphone
	Airbag

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	SIR Coil
	SIR Impact Sensor

VEHICLE ZONING STRATEGY

All grounds, in-line connectors, pass-through grommets, and splices have identifying numbers that correspond to where they are located in the vehicle. The following table explains the numbering system.

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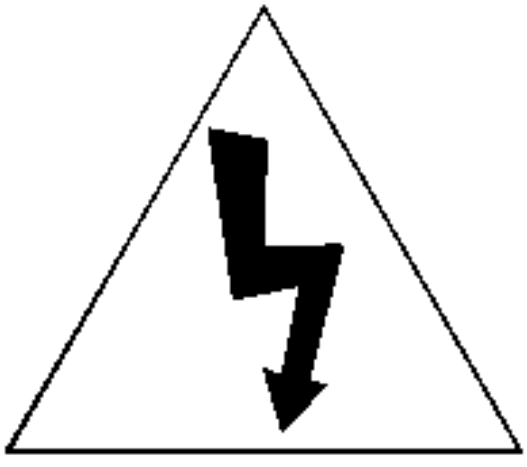
Fig. 18: Passenger Car Zoning View
Courtesy of GENERAL MOTORS CORP.

Callout Numbers	Zone Description
100-199	Engine compartment- All forward of the dash panel Note: 001-099 are additional for the engine compartment - ONLY to be used if all 100-199 items are used
200-299	Within the instrument panel area
300-399	Passenger compartment - From the instrument panel to the rear wheelhouse
400-499	Luggage compartment - From the rear wheelhouse to the rear of the vehicle
500-599	Within the left front door
600-699	Within the right front door
700-799	Within the left rear door
800-899	Within the right rear door
900-999	Within the luggage compartment lid or hatch

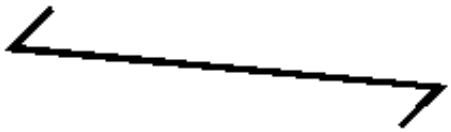
MASTER ELECTRICAL SCHEMATIC ICONS

Icon	Icon Definition
	WARNING: **When performing service on or near the SIR**

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	**components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling. Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.**
	**WARNING:** **The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:** • **Never open the high intensity discharge system ballast or the arc tube assembly starter.** • **Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.**

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NOTE:

Twisted wires provide an effective shield that helps protect sensitive electronic components from electrical interference.
In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted wires shown :

- **The wires must be twisted a minimum of 10 turns per 31 cm (12 in) as measured anywhere along the length of the wires.**
- **The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in).**

POWER DISTRIBUTION SCHEMATICS

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Fig. 19: Fuse Block - Underhood Bussing (1 of 2)
Courtesy of GENERAL MOTORS CORP.

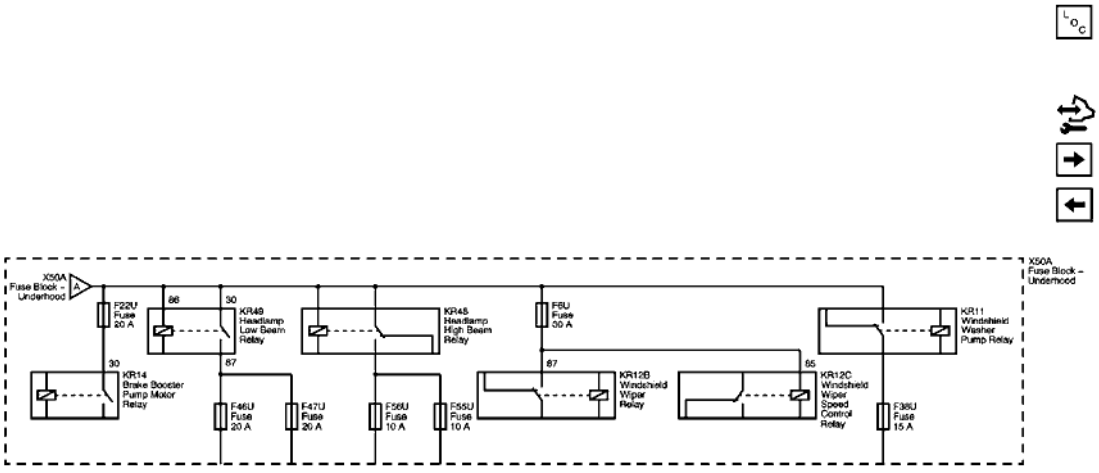


Fig. 20: Fuse Block - Underhood Bussing (2 of 2)
Courtesy of GENERAL MOTORS CORP.

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Fig. 21: Ignition Switch
Courtesy of GENERAL MOTORS CORP.

Fig. 22: Fuse Block - Underhood - TCM BATT Fuse 2, POWER WINDOW REAR Fuse 25, POWER WINDOW FRONT Fuse 26, MIR EWL FR Fuse 31, CANNISTER VENT Fuse 32, BCM 6 Fuse 33, and SUNROOF Fuse 34
Courtesy of GENERAL MOTORS CORP.

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Fig. 23: Fuse Block - Underhood - SEAT HEAT FRT Fuse 35, ABS PUMP Fuse 43, ABS VALVE Fuse 40, HTD WASH Fuse 42, FRONT FOG LAMP Fuse 50, and HORN Fuse 51
Courtesy of GENERAL MOTORS CORP.

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Fig. 24: Fuse Block - Underhood - PWR/TRN Relay K26, ECM Fuse 5, and COOL FAN RLY Fuse 11
Courtesy of GENERAL MOTORS CORP.

Fig. 25: Fuse Block - Underhood - 02 PRE Fuse 7, and 02 POST Fuse 8 (LLT)
Courtesy of GENERAL MOTORS CORP.

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Fig. 26: Fuse Block - Underhood - INJ ODD Fuse 10, and INJ EVEN Fuse 9 (LLT)
Courtesy of GENERAL MOTORS CORP.

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Fig. 27: Fuse Block - Underhood - 02 PRE Fuse 7, and 02 POST Fuse 8 (L99/LS3)
Courtesy of GENERAL MOTORS CORP.

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Fig. 28: Fuse Block - Underhood - INJ ODD Fuse 10, and INJ EVEN Fuse 9 (L99/LS3)
Courtesy of GENERAL MOTORS CORP.

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Fig. 29: Fuse Block - Underhood - RUN/CRNK Relay K50, MAF/CCC Fuse 13, IGN Fuse 15, RUN/CRNK IP Fuse 16, SDM/IGN Fuse 17, RUN/CRNK BODY Fuse 18, and TCM/IGN Fuse 20
Courtesy of GENERAL MOTORS CORP.

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Fig. 30: Fuse Block - Underhood - BCM (RVC) Fuse 61, REAR DEFOG Fuse 27, LO BEAM - LT Fuse 46, LO BEAM - RT Fuse 47, HI BEAM - LT Fuse 56, HI BEAM - RT Fuse 55, and WSW PUMP FRT Fuse 38
Courtesy of GENERAL MOTORS CORP.

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Fig. 31: Fuse Block - I/P - DLC Fuse 2, AIR BAG Fuse 3, CLUSTER Fuse 4, HVAC CNTRL Fuse 5, TRUNK Fuse 23, AOS Fuse 24, APO 1 Fuse 17, and APO 2 Fuse 18
Courtesy of GENERAL MOTORS CORP.

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Fig. 32: Fuse Block - I/P - BCM_1 Fuse 25, BCM_2 Fuse 6, BCM_3 Fuse 15, BCM_4 Fuse 16, BCM_5 Fuse 29, BCM_7 Fuse 30, BCM_8 Fuse 27, and LF_SEAT, RF_SEAT Circuit Breakers
Courtesy of GENERAL MOTORS CORP.

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Fig. 33: Fuse Block - I/P - LOGISTIC MODE Fuse 8, ONSTAR Fuse 14, and SWC BKUP Fuse 19
Courtesy of GENERAL MOTORS CORP.

Fig. 34: Fuse Block - Rear - UGDO/UPA Fuse 1, AMP Fuse 2, RADIO Fuse 3, ECM BATTERY Fuse 13, BATTERY RVC Fuse 14, and CCM/FUEL PMP Fuse 15
Courtesy of GENERAL MOTORS CORP.

POWER MODING SCHEMATICS

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Fig. 35: Power Moding
Courtesy of GENERAL MOTORS CORP.

IGNITION LOCK SCHEMATICS

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Fig. 36: Ignition Lock
Courtesy of GENERAL MOTORS CORP.

GROUND DISTRIBUTION SCHEMATICS

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Fig. 37: G101
Courtesy of GENERAL MOTORS CORP.

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Fig. 38: G102
Courtesy of GENERAL MOTORS CORP.

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Fig. 39: G103, G105 and G401
Courtesy of GENERAL MOTORS CORP.

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Fig. 40: G103 and G106
Courtesy of GENERAL MOTORS CORP.

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Fig. 41: G107 and G108
Courtesy of GENERAL MOTORS CORP.

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Fig. 42: G201
Courtesy of GENERAL MOTORS CORP.

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Fig. 43: G202 and G203
Courtesy of GENERAL MOTORS CORP.

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Fig. 44: G204
Courtesy of GENERAL MOTORS CORP.

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Fig. 45: G205
Courtesy of GENERAL MOTORS CORP.

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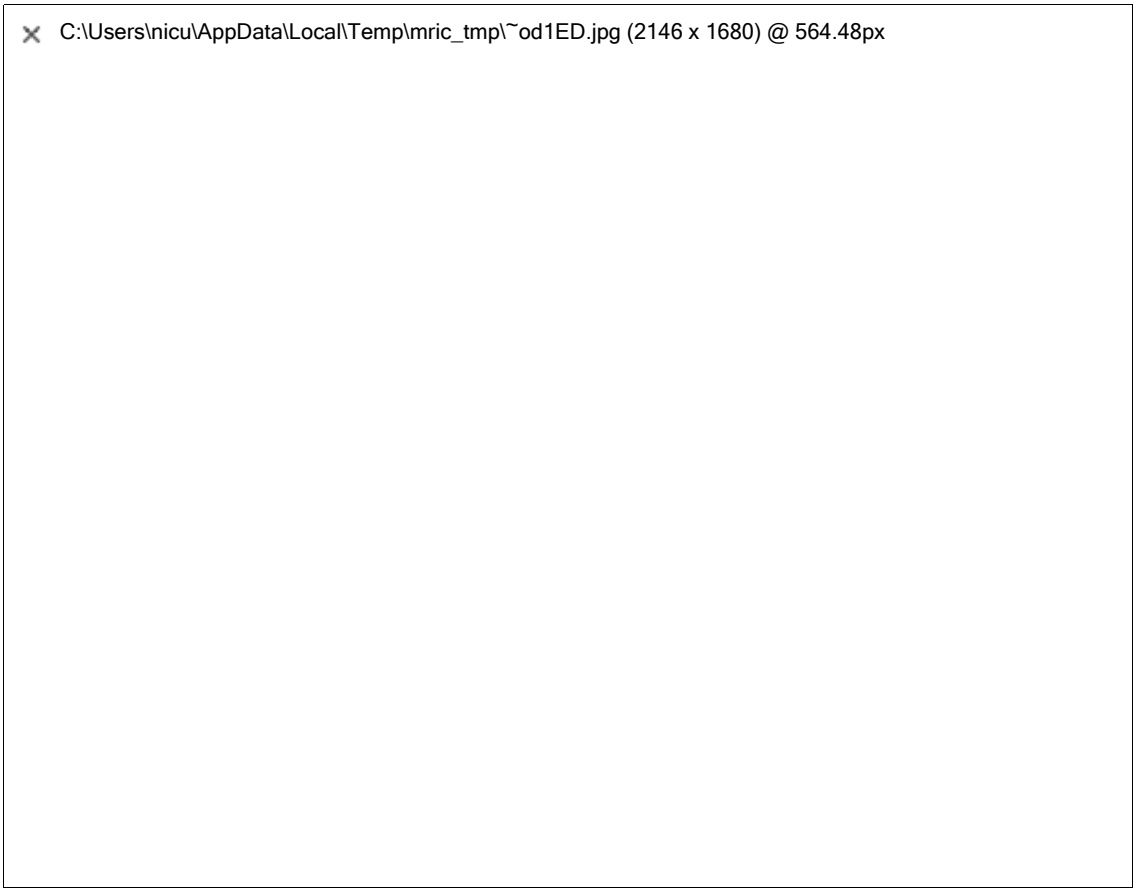


Fig. 46: G206 and G301
Courtesy of GENERAL MOTORS CORP.

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Fig. 47: G402, G403 and G404
Courtesy of GENERAL MOTORS CORP.

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2010 ACCESSORIES & BODY, CAB

Cellular, Entertainment, and Navigation - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Communication Interface Module Bracket Bolt Screw	10 N.m	89 lb in
Front Floor Console Bolts	2.5 N.m	22 lb in
Front Overhead Console Bolt Screw	2 N.m	18 lb in
Radio Antenna Module Bolt	9 N.m	80 lb in
Radio Antenna Module Coil Bolt	10 N.m	89 lb in
Radio Control Assembly Bolt Screw	2.5 N.m	22 lb in
Radio Front Side Door Speaker Bolt/Screw	2.5 N.m	22 lb in
Radio Front Side Door Upper Speaker Grille Bolt	2 N.m	18 lb in
Radio Front Speaker Bolt/Screw	2.5 N.m	22 lb in
Radio Rear Speaker Bolt Screw	2.5 N.m	22 lb in
Radio Screw	2.5 N.m	22 lb in
Radio Speaker Amplifier Nut	9 N.m	80 lb in

SCHEMATIC AND ROUTING DIAGRAMS

RADIO/NAVIGATION SYSTEM SCHEMATICS

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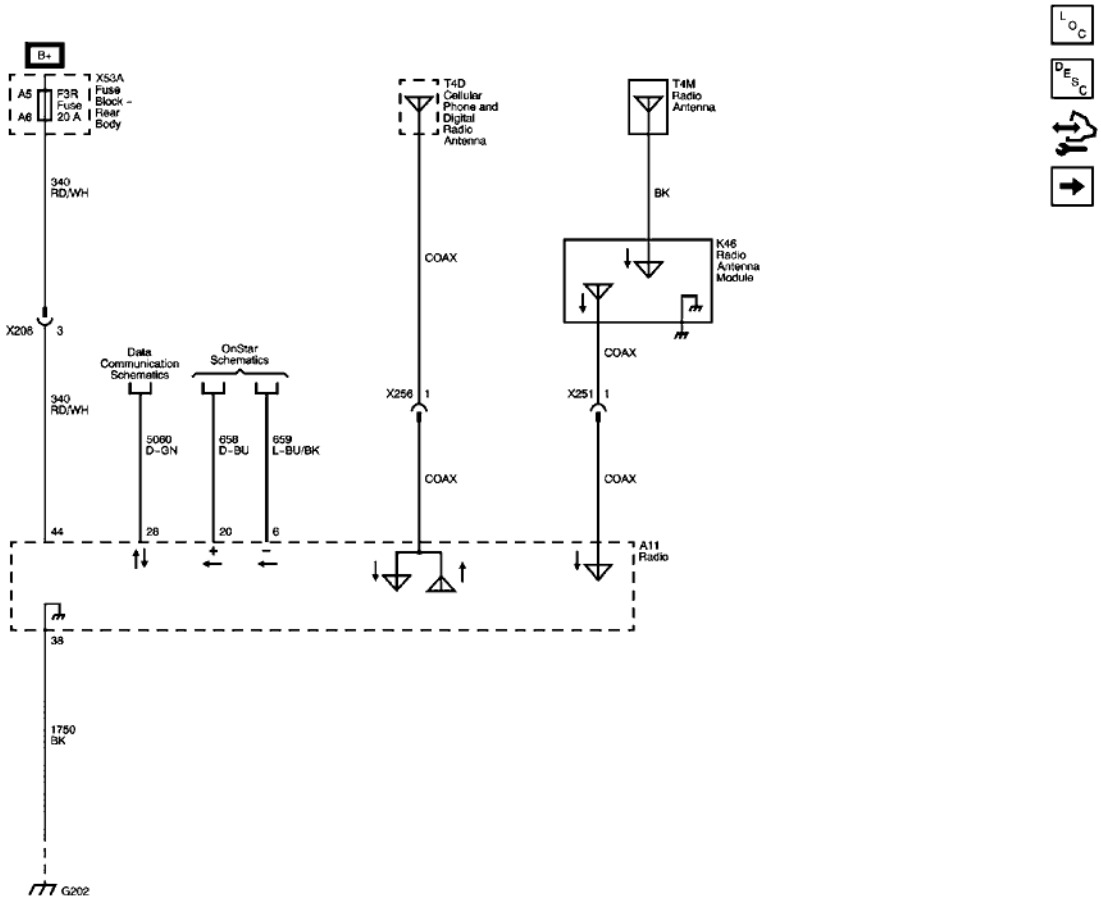


Fig. 1: Power, Ground, References and Antennas
Courtesy of GENERAL MOTORS CORP.

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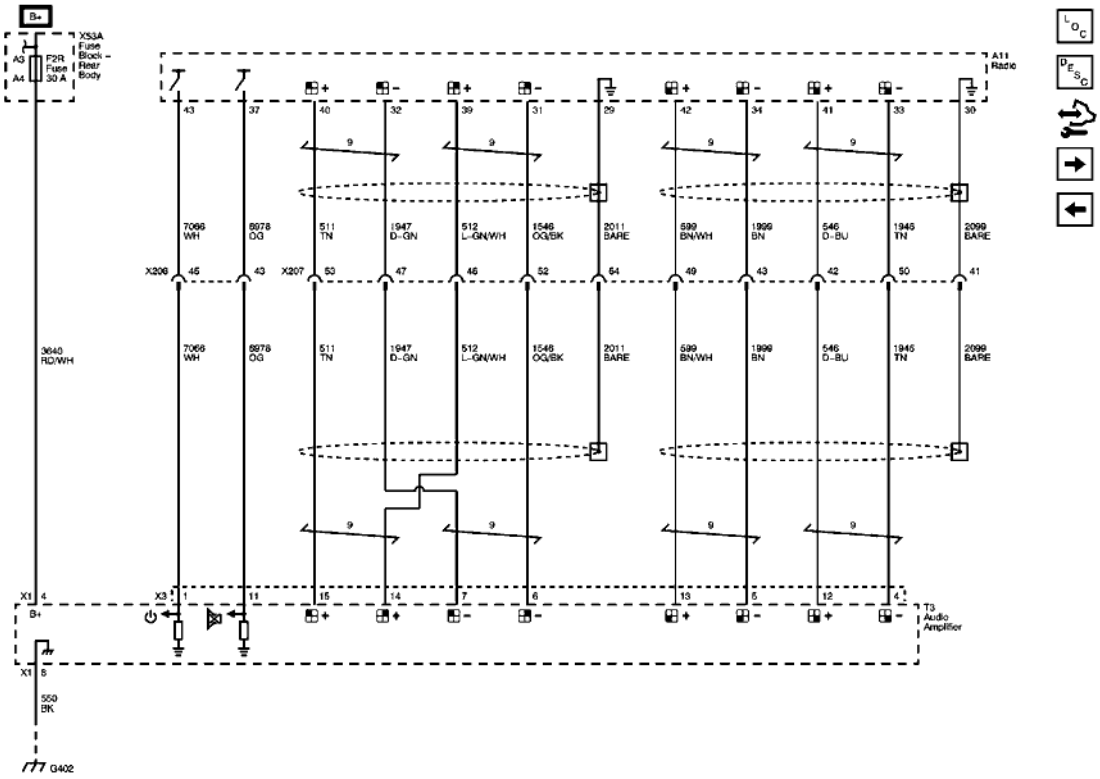


Fig. 2: Amplifier - UQA
Courtesy of GENERAL MOTORS CORP.

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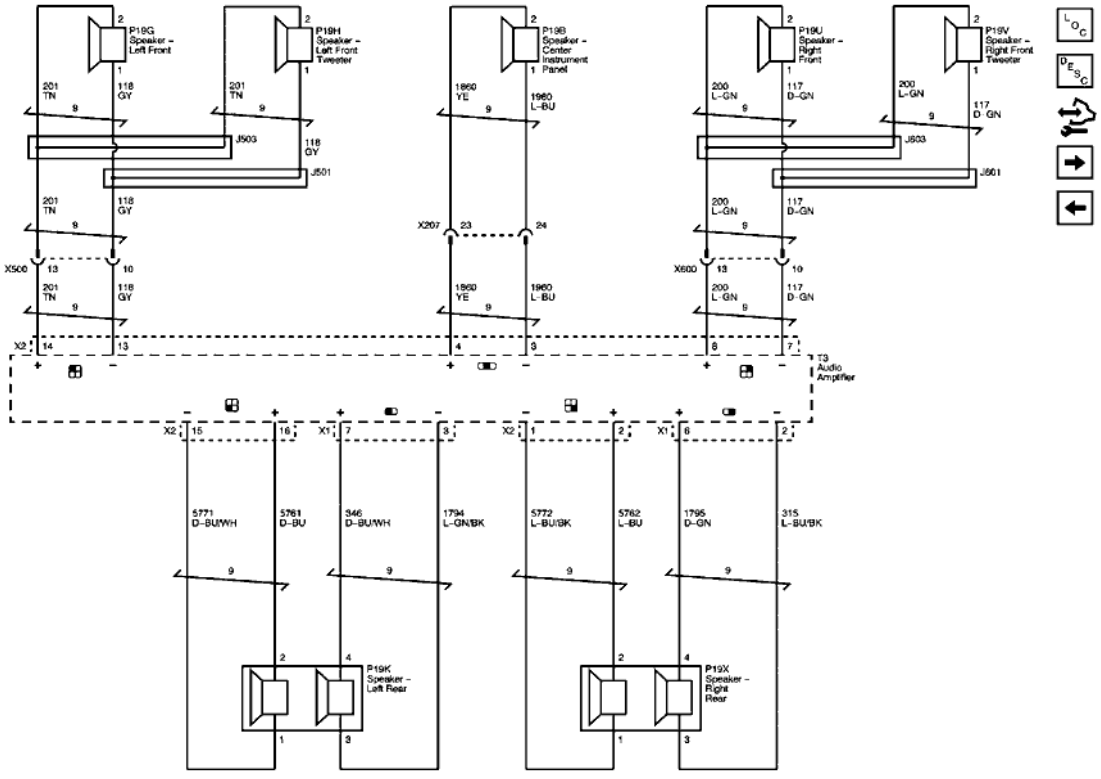


Fig. 3: Speakers - UQA
Courtesy of GENERAL MOTORS CORP.

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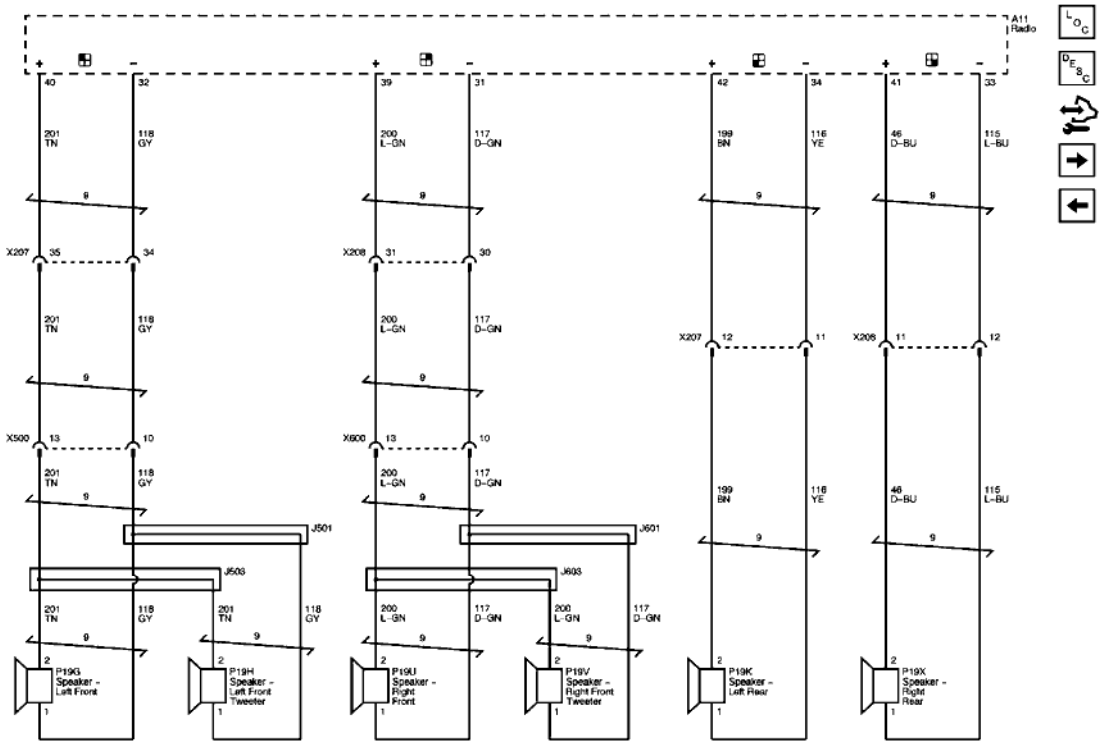


Fig. 4: Speakers - UQ3
Courtesy of GENERAL MOTORS CORP.

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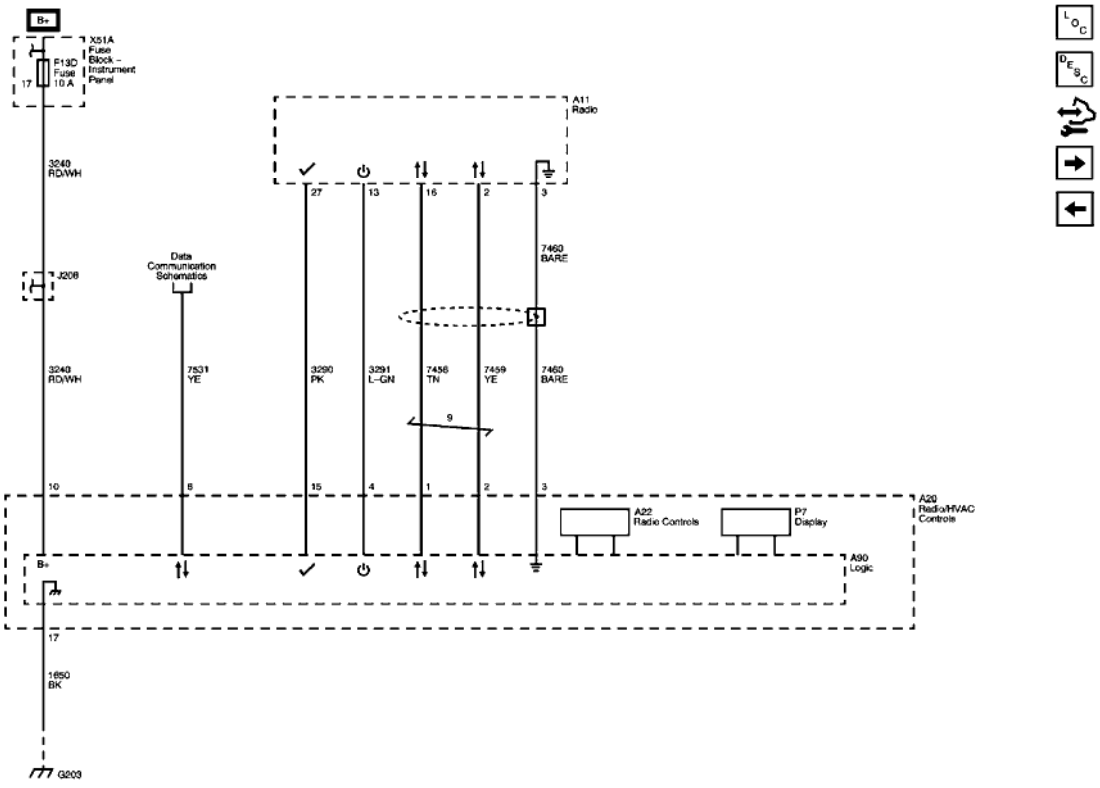


Fig. 5: Infotainment Display
Courtesy of GENERAL MOTORS CORP.

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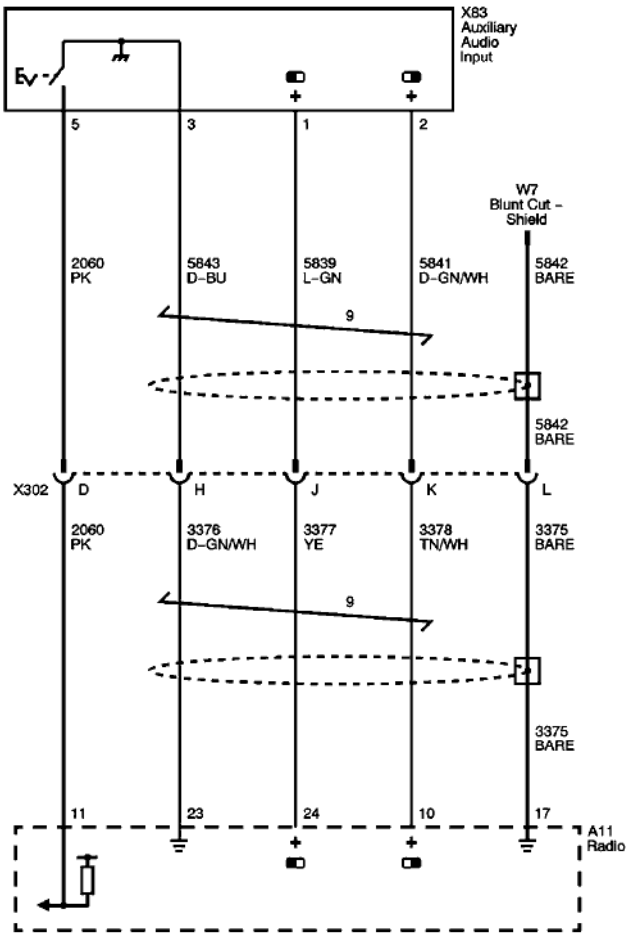


Fig. 6: Auxiliary Audio Input without USR
Courtesy of GENERAL MOTORS CORP.

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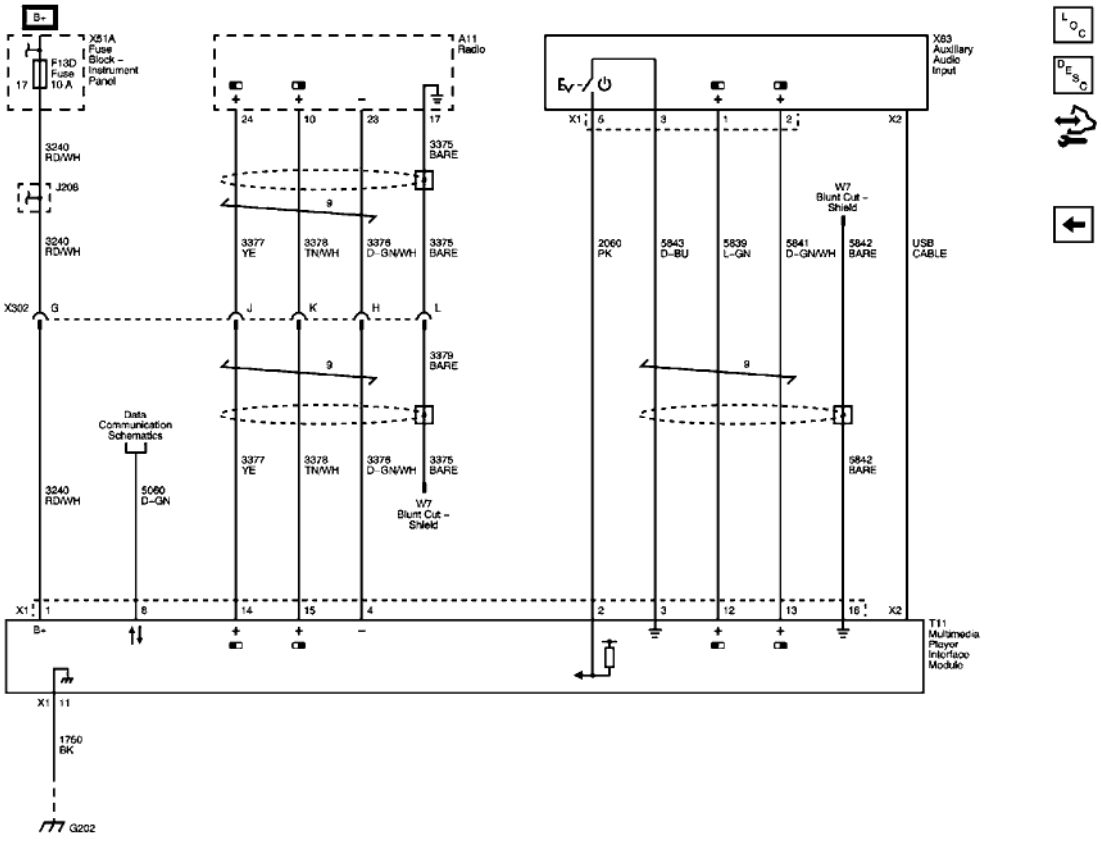


Fig. 7: Auxiliary Audio Input with USR
Courtesy of GENERAL MOTORS CORP.

ONSTAR SCHEMATICS

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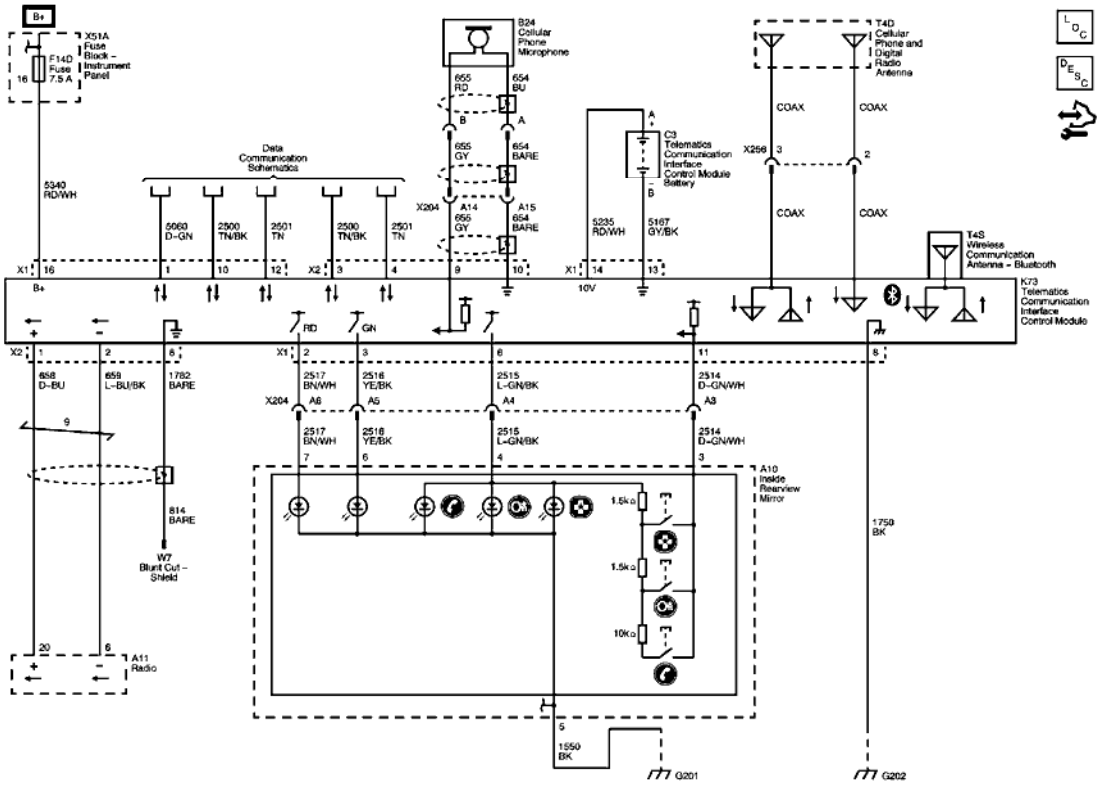


Fig. 8: OnStar
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1020	B1020 00: Auxiliary Electronic Control Unit (ECU) Performance
DTC B1025, B1035, B1045, or B1055	B1025 01: Left Front Audio Output Circuit Short to Battery B1025 02: Left Front Audio Output Circuit Short to Ground B1025 04: Left Front Audio Output Circuit Open B1035 01: Front Audio Output Circuit Short to Battery B1035 02: Right Front Audio Output Circuit Short to Ground B1035 04: Right Front Audio Output Circuit Open B1045 01: Left Rear Audio Output Circuit Short to Battery B1045 02: Left Rear Audio Output Circuit Short to Ground B1045 04: Left Rear Audio Output Circuit Open B1055 01: Right Rear Audio Output Circuit Short to Battery B1055 02: Right Rear Audio Output Circuit Short to Ground B1055 04: Right Rear Audio Output Circuit Open
DTC B125A	B125A 02: Antenna Signal Circuit Short to Ground

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	B125A 04: Antenna Signal Circuit Open Circuit
DTC B125C	B125C 01: Satellite Antenna 1 Circuit Short to Battery B125C 02: Satellite Antenna 1 Circuit Short to Ground B125C 04: Satellite Antenna 1 Circuit Open Circuit
DTC B1271	B1271 00: Theft Protection Active
DTC B1278 or B1279	B1278 01: Left Auxiliary Input Signal Circuit Short to Battery B1278 02: Left Auxiliary Input Signal Circuit Short to Ground B1279 01: Right Auxiliary Input Signal Circuit Short to Battery B1279 02: Right Auxiliary Input Signal Circuit Short to Ground
DTC B1287	B1287 01: Amplifier Control Signal Circuit Short to Battery B1287 02: Amplifier Control Signal Circuit Short to Ground B1287 04: Amplifier Control Signal Circuit Open
DTC B1446 or B1447	B1446 03: Replace Backup Power Source Voltage Below Threshold B1447 04: Backup Power Source Open Circuit
DTC B2455	B2455 00: Cellular Phone Microphone Circuit B2455 04: Cellular Phone Microphone Circuit Open
DTC B2462 (Communication Interface Module)	B2462 02: Global Positioning System (GPS) Signal Short to Ground B2462 04: Global Positioning System (GPS) Signal Open Circuit
DTC B2470	B2470 04: Cellular Phone Antenna Circuit Open Circuit
DTC B2476 or B2482	B2476 04: Cellular Phone Select Service Switch Open Circuit B2476 59: Cellular Phone Select Service Switch Stuck Button B2482 00: Cellular Phone Select Service Switch Range/Performance
DTC B2485	B2485 02: Wireless Communication Antenna Circuit Short to Ground B2485 04: Wireless Communication Antenna Circuit Open Circuit

DTC B1020

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1020 00

Auxiliary Electronic Control Unit (ECU) Performance

Circuit/System Description

The radio communicates with the radio/HVAC control via serial data. This DTC indicates a fault in the radio/HVAC control. No external circuits are involved. The radio may continue to respond normally to faceplate functions when this DTC is set.

Conditions for Running the DTC

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- Ignition is ON or in the ACC position.
- The system voltage is at least 9.5 V and no more than 15.5 V.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

The radio receives an improper status response indicating an internal ECU fault in the radio/HVAC control.

Action Taken when the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC clears when the radio receives a proper status response message back from the radio control assembly.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation ofthe radio/HVAC control.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the radio/HVAC control.
- If this DTC is retrieved as both a current and history DTC, replace the radio/HVAC control.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If this DTC is retrieved as a current DTC, replace the radio/HVAC control.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for radio/HVAC control replacement, setup, and programming

DTC B1025, B1035, B1045, OR B1055

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC B1025 01

Left Front Audio Output Circuit Short to Battery

DTC B1025 02

Left Front Audio Output Circuit Short to Ground

DTC B1025 04

Left Front Audio Output Circuit Open

DTC B1035 01

Front Audio Output Circuit Short to Battery

DTC B1035 02

Right Front Audio Output Circuit Short to Ground

DTC B1035 04

Right Front Audio Output Circuit Open

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DTC B1045 01

Left Rear Audio Output Circuit Short to Battery

DTC B1045 02

Left Rear Audio Output Circuit Short to Ground

DTC B1045 04

Left Rear Audio Output Circuit Open

DTC B1055 01

Right Rear Audio Output Circuit Short to Battery

DTC B1055 02

Right Rear Audio Output Circuit Short to Ground

DTC B1055 04

Right Rear Audio Output Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amplifier B+	-	1	-	-
Powered Subwoofer B+	-	4	-	-
Left Front Low Level Audio Signal	B1025 02*	B1025 04*	B1025 01*	-
Right Front Low Level Audio Signal	B1035 02*	B1035 04*	B1035 01*	-
Left Rear Low Level Audio Signal	B1045 02*	B1045 04*	B1045 01*	-
Right Rear Low Level Audio Signal	B1055 02*	B1055 04*	B1055 01*	-
Subwoofer Left Low Level Audio Signal	2	2	2	-
Subwoofer Right Low Level Audio Signal	2	2	2	-
Center Low Level Audio Signal	3	3	3	-
Powered Subwoofer Ground	-	4	-	-
Amplifier Ground	-	1	-	-

1. Amplifier inoperative/no sound from subwoofers.
2. No or reduced sound from subwoofer.
3. No sound from center speaker.

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4. Powered Subwoofer inoperative.
* Noticeable audio distortion possible.

Circuit/System Description

Each of the audio output channel circuits (+) and (-), at the radio and audio amplifier have a DC bias voltage that is one half of the battery voltage. When using a DMM, each of the audio output channel circuits will measure approximately 6.5 V DC. The audio being played on the system is produced by a varying AC voltage that is centered around the DC bias voltage on the same circuit. The AC voltage is what causes the speaker cone to move and produce sound. This voltage will vary depending on what type of audio is being listened to, talk or music, and type of music, as well as the volume setting of the system. Low volume and talk settings will measure around 1 V AC and less, where constant music may measure 3 V AC and slightly higher. The audio amplifier can not set DTCs. The base audio system has a powered subwoofer that shares the audio outputs for the rear speakers.

Conditions for Running the DTC

- The ignition is in the RUN or ACC position.
- The system voltage is at least 9.5 V and no more than 15.5 V.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

B1025 01, B1035 01, B1045 01, B1055 01

The radio detects a short to voltage on the audio (+) or audio (-) circuit.

B1025 02, B1035 02, B1045 02, B1055 02

The radio detects a short to ground on the audio (+) or audio (-) circuit.

B1025 04, B1035 04, B1045 04, B1055 04

The radio detects an open on the audio (+) or audio (-) circuit.

Action Taken When the DTC Sets

The radio disables the audio output to the speaker signal circuit with the current fault.

Conditions for Clearing the DTC

- A current DTC clears when the conditions for setting the DTC are no longer present and the ignition has been cycled from OFF to ON.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

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Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Radio ON, Mute OFF, adjust the fade and balance controls on the radio to test all channels individually. Each channel should produce clear and even sound.

Circuit/System Testing

Without Amplifier

1. Ignition OFF, disconnect the harness connector at the appropriate speaker.
2. Radio ON, test for 4-8 V between the signal circuit terminal A and ground.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
3. Test for 4-8 V between the signal circuit terminal B and ground.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
4. If all circuits test normal, replace the speaker.

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With Amplifier

1. Ignition OFF, disconnect the X3 harness connector at the amplifier.
2. Radio ON, test for 4-8 V between the appropriate signal circuit terminal listed below and ground.
    - Left front low level audio signal (+) - terminal 15
    - Left front low level audio signal (-) - terminal 7
    - Right front low level audio signal (+) - terminal 14
    - Right front low level audio signal (-) - terminal 6
    - Left rear low level audio signal (+) - terminal 13
    - Left rear low level audio signal (-) - terminal 5
    - Right rear low level audio signal (+) - terminal 12
    - Right rear low level audio signal (-) - terminal 4
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
3. If all circuits test normal, replace the amplifier.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Speaker Replacement Reference**
- **Control Module References** for radio and amplifier replacement, setup, and programming

DTC B125A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B125A 02

Antenna Signal Circuit Short to Ground

DTC B125A 04

Antenna Signal Circuit Open Circuit

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Radio Antenna Coax	B125A 02	B125A 04	1	-
Ground	-	1	-	-
1. May exhibit possible AM/FM interference.				

Circuit/System Description

The antenna module receives both AM and FM signals from the rear glass antenna. The radio antenna module is enabled when the radio is turned on. The radio provides battery voltage to the antenna module using the center conductor of the antenna coaxial cable. When a 12 V signal is seen by the module on the center conductor of the antenna coax, both AM and FM signals are amplified.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

B125A 02

The radio detects a short to ground in the antenna signal circuit center conductor.

B125A 04

The radio detects an open in the antenna signal circuit center conductor.

Action Taken When the DTC Sets

Radio reception may be poor or not available.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clears after 50 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

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Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, A11 radio ON, tune to a strong AM or FM station. Verify that the AM or FM reception is clear.

Circuit/System Testing

1. Ignition OFF, disconnect the radio antenna coax from the A11 radio and from the radio antenna module.
2. Test for infinite resistance between the antenna coax center terminal and ground.
    - If less than the specified value, replace the antenna coax.
3. Test for less than 5 ohms on the antenna coax center circuit from end to end.
    - If greater than the specified range, replace the antenna coax.
4. Ignition ON, test for less than 1 V between the antenna coax center terminal and ground.
    - If greater than the specified range, replace the antenna coax.
5. Test for infinite resistance between the coax center terminal and the outer shield.
    - If less than the specified value, replace the antenna coax.
6. Connect the antenna coax to the A11 radio. Test for 12-15 V between the antenna coax center terminal and ground at the radio antenna module connector.
    - If not within the specified range, replace the A11 radio.
7. If all circuits test normal, replace the radio antenna module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Module Replacement**
- **Control Module References** for radio replacement, setup, and programming

DTC B125C

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Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B125C 01

Satellite Antenna 1 Circuit Short to Battery

DTC B125C 02

Satellite Antenna 1 Circuit Short to Ground

DTC B125C 04

Satellite Antenna 1 Circuit Open Circuit

Circuit/System Description

The digital radio receiver, located inside the radio, receives digital radio information from the digital radio antenna located on the outside of the vehicle. The digital radio receiver is connected to the digital radio antenna via a shielded coax cable.

Conditions for Running the DTC

This DTC is run every 300 milliseconds.

Conditions for Setting the DTC

The radio detects a circuit fault in the digital radio antenna.

Action Taken When the DTC Sets

The radio displays No XM Signal or Check Antenna.

Conditions for Clearing the DTC

- A current DTC clears when the condition for setting the DTC is no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.

Reference Information

Schematic Reference

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Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Special Tools

EL-48028 Digital Radio Test Antenna. See **Special Tools**.

Circuit System Verification

With the vehicle outside in an area with an unobstructed view of the southern sky, tune to XM. Verify XM reception is clear and the No XM Signal message is not displayed on the radio.

Circuit/System Testing

1. Ignition OFF, disconnect the digital radio antenna coax cable from the radio. Connect the **EL-48028** to the radio and place on the roof of the vehicle. See **Special Tools**.
2. Ignition ON, radio tuned to XM channel 1. Verify DTC B125C is not set as current and XM reception is improved.
    - If DTC B125C is set as current or the reception is not improved, replace the radio.
3. Ignition OFF, reconnect the antenna coax cable at the radio. Disconnect the antenna coax cable from the digital radio antenna.
4. Ignition ON, radio ON, test for 4.5-5.5 V between the antenna coax cable center terminal and an outer shield.
    - If less than the specified range, test the antenna coax cable for an open/high resistance.
    - If greater than the specified range, test the antenna coax cable for a short to voltage.
5. If all circuits test normal, replace the digital radio antenna.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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- **Radio Antenna Base Replacement**
- **Control Module References** for radio replacement, setup, and programming

DTC B1271

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1271 00

Theft Protection Active

Circuit/System Description

This DTC is generated by the module when the Theft Protection is activated.

Conditions for Running the DTC

This DTC test runs when the radio changes from OFF to ON.

Conditions for Setting the DTC

This DTC is generated by the module when the vehicle identification number (VIN) as received over the data communication circuit and the VIN as stored in the module memory do not match. This also occurs if no VIN is received over the data communication circuit.

Action Taken When the DTC Sets

The radio does not function. The radio display will indicate that Theft Lock is active.

Conditions for Clearing the DTC

Re-calibration with the correct calibrations for the vehicle and cycling the radio to OFF then to ON will clear the DTC if there is no damage to the radio.

Diagnostic Aids

The VIN in the radio is a single one-time VIN learn.

Reference Information

Schematic Reference

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Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, using the scan tool, verify that the VIN, digits 2-17, of the radio matches the VIN, digits 2-17, of the vehicle.

- If not the specified value, replace the radio.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for radio replacement, setup, and programming

DTC B1278 OR B1279

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1278 01

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Left Auxiliary Input Signal Circuit Short to Battery

DTC B1278 02

Left Auxiliary Input Signal Circuit Short to Ground

DTC B1279 01

Right Auxiliary Input Signal Circuit Short to Battery

DTC B1279 02

Right Auxiliary Input Signal Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal Terminal 1 X1	B1278 02, 3	3	B1278 01, 3	-
Signal Terminal 2 X1	B1279 02, 2	2	B1279 01, 2	-
Control Circuit	4	4	4	-
Low Reference	-	1	-	-
1. No or distorted audio from both sides 2. No or distorted right side audio 3. No or distorted left side audio 4. External audio inputs inoperative				

Circuit/System Description

A remote 3.5 mm auxiliary stereo jack allows playback of audio signals from remote devices (e.g., laptop computer, IPOD, MP3 player, etc.). When a remote device audio mini-plug is inserted in the remote auxiliary jack, an internal mechanical switch closes completing the aux jack detect circuit to the radio. The radio automatically detects the input through the circuit and the device begins playing. The radio receives the devices audio signals on the auxiliary input 1 (left) signal circuit and auxiliary input 2 (right) signal circuit. If equipped with a multimedia player interface module, the auxiliary inputs that would normally connect directly to the radio will have the multimedia player interface module inline of those connections. This means that the auxiliary inputs for the radio connect to the multimedia player interface module, and the multimedia player interface module connects to the radio, passing along the audio signals. Only the multimedia player interface module can set these DTCs.

The auxiliary audio jack has an internal mechanical detection switch that will connect the detection signal on the auxiliary audio jack to ground when an auxiliary mini-plug is inserted.

Conditions for Running the DTC

- Ignition in RUN or ACC position.

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- The system voltage is at least 9.5 V and no more than 15.5 V.

Conditions for Setting the DTC

- The multimedia player interface module detects a short to battery on the signal circuit terminal 1 or signal circuit terminal 2.
- The multimedia player interface module detects a short to ground on the signal circuit terminal 1 or signal circuit terminal 2.
- All the above conditions are present for greater than 250 mS.

Action Taken When the DTC Sets

No audio is heard from the remote audio device.

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present on the auxiliary input signal circuits.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the auxiliary audio jack.
2. Ignition ON, test for less than 1 V between the terminals listed below and ground:
   - signal terminal 1
   - signal terminal 2
   - If greater than the specified value, test the circuit for a short to voltage. If the circuit tests normal, replace the multimedia player interface module.
3. Ignition OFF, test for infinite resistance between the terminals listed below and ground:
   - signal terminal 1
   - signal terminal 2
   - If less than the specified value, test the circuit for a short to ground. If the circuit tests normal, replace the multimedia player interface module.
4. If all of the circuits test normal, replace the auxiliary audio jack.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References multimedia player interface module replacement, setup, and programming

DTC B1287

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1287 01

Amplifier Control Signal Circuit Short to Battery

DTC B1287 02

Amplifier Control Signal Circuit Short to Ground

DTC B1287 04

Amplifier Control Signal Circuit Open

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Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amplifier Control	DTC B1287 02,**	DTC B1287 04,**	DTC B1287 01,*	-
* No audio output. ** 4 Channel unmute, possible noise in speakers when radio muted or turned off				

Circuit/System Description

The radio amplifier control circuit provides varying pulse width modulated (PWM) signals to control overall muting of the amplifier. The PWM signals are varying duty cycle percentages ranging from 0-100 percent. A low duty cycle unmutes all amplifier channels and a high duty cycle mutes all amplifier channels. The radio monitors the amp control circuit for faults.

Conditions for Running the DTC

The following are conditions that must be present in order for the radio to enable the diagnostics.

- The radio is in ACCESSORY, RUN, or RAP power mode.
- The system voltage is at least 9 V and no more than 16 V.

Conditions for Setting the DTC

The radio detects a fault on the amplifier control circuit 400 ms after radio activates the remote enable circuit.

Action Taken When the DTC Sets

Radio sets the DTC and continues to output correct state.

Conditions for Clearing the DTC

- The condition must no longer be present.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, radio ON, verify that the radio mute button functions are working properly.

- If the radio mute button is inoperative, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X3 harness connector at the T3 audio amplifier.
2. Connect a test lamp between the control circuit terminal 11 and ground.
3. Ignition ON, radio ON, turn the mute button on the A11 radio ON and OFF. The test lamp should turn ON and OFF when changing between the commanded states.
   - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the A11 radio.
   - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the A11 radio.
4. If all circuits test normal, replace the T3 audio amplifier.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for A11 radio and T3 amplifier replacement, setup, and programming

DTC B1446 OR B1447

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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DTC Descriptors

DTC B1446 03

Replace Backup Power Source Voltage Below Threshold

DTC B1447 04

Backup Power Source Open Circuit

Circuit/System Description

The backup power source provides voltage to the communication interface module (CIM), to be able to successfully place a call in the event of a main battery disconnect during a collision event.

Conditions for Running the DTC

B1446 03

- Ignition is in the RUN or ACC position.
- System voltage is between 9.5 and 15.5 V.
- DTC B1447 is not set.

B1447 04

- Ignition is in the RUN or ACC position.
- System voltage is between 9.5 and 15.5 V.
- The above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

B1446 03

The CIM detects that the backup power source voltage has dropped below the minimum threshold value.

B1447 04

The CIM detects no voltage from the backup power source.

Action Taken When the DTC Sets

B1446 03

The OnStar® status LED turns red.

B1447 04

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- The OnStar® status LED turns red.
- The CIM will be unable to place a call in the event of a main battery disconnect during a collision event.

Conditions for Clearing the DTC

- A current DTC B1446 will clear when the CIM detects the voltage of the backup power source is above the minimum threshold value.
- A current DTC B1447 will clear when the CIM detects voltage from the backup power source.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

IMPORTANT:

- **Shorting the backup power source positive voltage circuit to the backup power source ground circuit or chassis ground will activate the internal circuit protection of the backup power source, rendering the backup power source inoperable.**
- **DTC B1447 may set if the CIM has been incorrectly disconnected or serviced. When disconnecting the CIM, disconnect the harness connector X1 at the CIM prior to disconnecting any other harness connectors. This will ensure the backup power source is preserved when voltage is removed from the CIM.**

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Testing for Intermittent Conditions and Poor Connections**
- **Circuit Testing**
- **Wiring Repairs**
- **Connector Repairs**

Circuit/System Testing

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1. Ignition OFF, disconnect the harness connector X1 at the CIM.
2. Test for greater than 15.5 V between terminals 13 and 14.
    - If less than specified value, test the B+ circuit and low reference circuit for an open/high resistance, short to ground or short to voltage. If the circuits test normal, replace the backup power source.
3. If all circuits test normal, replace the CIM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Communication Interface Module Battery Replacement**
- **Control Module References** for CIM replacement, setup and programming

DTC B2455

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC B2455 00

Cellular Phone Microphone Circuit

DTC B2455 04

Cellular Phone Microphone Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cellular Microphone Signal	B2455 00, B2455 04	B2455 00, B2455 04	B2455 00, B2455 04	-
Cellular Microphone Drain	-	B2455 00, B2455 04	1	-
1. OnStar Microphone Inoperative - Caller Cannot Be Heard				

Circuit/System Description

The telematics communication interface control module provides the cellular phone microphone with a supplied voltage on the cellular phone microphone signal circuit. When the microphone is in use, voice data from the

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user is sent back to the telematics communication interface control module on the signal circuit. The telematics communication interface control module provides a ground for the cellular phone microphone via the low reference wire.

Conditions for Running the DTC

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 V and no more than 15.5 V.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

- The telematics communication interface control module detects an open, short to ground or short to voltage in the cellular phone microphone signal circuit for 10 seconds or greater.
- The telematics communication interface control module detects an open/high resistance in the low reference circuit for 10 seconds or greater.

Action Taken When the DTC Sets

- The OnStar® status LED turns red.
- The telematics communication interface control module will not receive a signal from the cellular phone microphone.
- Calls can be placed but the caller cannot be heard.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B24 cellular phone microphone.
2. Ignition OFF and scan tool disconnected, wait until all retained accessory power is OFF, test for less than 10 ohms between the low reference circuit terminal 1 or A (depending on vehicle) and ground, allowing up to 5 minutes for the circuit resistance to drop to its lowest reading.
    - If greater than the specified range, test the circuit for an open/high resistance.
3. Ignition ON, test for 9.5-10.5 V between the signal circuit terminal 2 or B (depending on vehicle) and ground.
    - If less than the specified range, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K73 telematics communication interface control module.
    - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the K73 telematics communication interface control module.
4. If all circuit test normal, replace the B24 cellular phone microphone.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Mobile Telephone Microphone Replacement**
- **Control Module References** for telematics communication interface control module replacement, setup, and programming

DTC B2462 (COMMUNICATION INTERFACE MODULE)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2462 02

Global Positioning System (GPS) Signal Short to Ground

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DTC B2462 04

Global Positioning System (GPS) Signal Open Circuit

Circuit/System Description

The telematics communication interface control module receives information from the cellular phone and navigation antenna located on the outside of the vehicle. The cellular phone and navigation antenna is connected to the telematics communication interface control module via a shielded coaxial cable. The antenna cable also provides a path for DC current for powering the cellular phone and navigation antenna.

Conditions for Running the DTC

- Ignition is in the RUN or ACC position.
- System voltage is between 9.5 V and 15.5 V.
- The above conditions are present for greater than 1 second.

Conditions for Setting the DTC

B2462 02

The telematics communication interface control module detects a short to ground on the navigation antenna signal circuit.

B2462 04

The telematics communication interface control module detects an open/high resistance on the navigation antenna signal circuit.

Action Taken When the DTC Sets

- The OnStar® status LED turns red.
- The OnStar® Call Center cannot locate the vehicle.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **OnStar Schematics**
- **Antenna Coaxial/Connector Cable Identification Table**

Connector End View Reference

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Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-49903 GM OnStar Antenna Diagnostic Tool Kit. See **Special Tools**.

Circuit/System Verification

NOTE: The following verification requires the vehicle to be outside with an unobstructed view of the southern sky. Allow 5 minutes after turning key on for the GPS satellites to acquire vehicle signal.

Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, verifying the vehicle OnStar system is functioning and the consultant can locate the vehicle.

Circuit/System Testing

1. Ignition OFF, disconnect both the GPS and cell coax cable connectors at the K73 telematics communication interface control module.
2. Connect the **EL-49903** to the K73 telematics communication interface control module, place the test antenna on the roof of the vehicle. See **Special Tools**.
3. Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, ask the consultant to verify the vehicle location to confirm the GPS system is functioning.
    - If the OnStar GPS does not function, replace the K73 telematics communication interface module.
4. Ignition OFF, perform the coax cable test on the coax cable, refer to Component Testing. The coax cable should pass the test.
    - If the coax cable does not pass the test, replace the coax cable.
5. If all circuits test normal, replace the T4 cellular phone and navigation antenna.

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Component Testing

CAUTION: Refer to Test Probe Caution .

NOTE: Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.
To prevent false reading when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test

1. Ignition OFF, disconnect the GPS and cellular phone coax cable at both components.
2. Test both for less than 5 ohms between both ends of the coax cables center terminals.
   - If greater than the specified range, replace the failed coax cable.
3. Test for greater than 10k ohms between the coax cable center wire and the outer coax shield.
   - If less than the specified range, replace the coax cable.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Base Replacement**
- **Control Module References** for telematics communication interface control module replacement, setup, and programming

DTC B2470

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2470 04

Cellular Phone Antenna Circuit Open Circuit

Circuit/System Description

The cellular phone antenna is connected to the communication interface module (CIM) with a RG-58 coax cable. The CIM polls the data from the cellular phone antenna once every second.

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Conditions for Running the DTC

- Ignition in the RUN or ACC position.
- System voltage is between 9.5 V and 15.5 V.
- The above conditions are present for greater than 1 second.

Conditions for Setting the DTC

The CIM does not detect the presence of a cellular phone antenna.

Action Taken When the DTC Sets

- The vehicle is unable to connect to the OnStar® Call Center.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The CIM detects the presence of a cellular phone antenna.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

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Verify that the T4F cellular phone antenna and T4F cellular phone antenna coupling assembly are not damaged.

- If the antenna assembly is damaged, replace the T4F cellular phone antenna.

Circuit/System Testing

1. Ignition OFF, disconnect the antenna coax from the CIM module and the T4F cellular phone antenna.
2. Ignition ON, test for less than 1 V between the antenna coax center terminal and ground.
   - If greater than the specified range, replace the antenna coax.
3. Ignition ON, test for less than 1 V between the antenna coax outer shield and ground.
   - If greater than the specified range, replace the antenna coax.
4. Test for infinite resistance between the antenna coax center terminal and ground.
   - If less than the specified value, replace the antenna coax.
5. Test for infinite resistance between the antenna coax outer shield and ground.
   - If less than the specified value, replace the antenna coax.
6. Test for less than 5 ohms at the cellular antenna coax center terminal from end to end.
   - If greater than specified value, replace the antenna coax.
7. Test for less than 5 ohms at the cellular antenna coax outer shield from end to end.
   - If greater than specified value, replace the antenna coax.
8. Test for infinite resistance between the antenna coax center terminal and the outer shield.
   - If less than specified value, replace the antenna coax.
9. If coax cable tests normal, replace the T4F cellular phone antenna.
10. Clear the DTCs and operate the vehicle within the conditions for running the DTC. Verify DTC B2470 does not set.
    - If the DTC sets, replace the CIM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Base Replacement**
- **Control Module References** for CIM replacement, setup, and programming

DTC B2476 OR B2482

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

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DTC B2476 04

Cellular Phone Select Service Switch Open Circuit

DTC B2476 59

Cellular Phone Select Service Switch Stuck Button

DTC B2482 00

Cellular Phone Select Service Switch Range/Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
10 V Reference	-	B2476 04	-	-
Control Terminal 6	1	1	2	-
Control Terminal 7	1	1	2	-
Control Terminal 3	3	3	-	B2476 59, B2482 00
Ground	-	1	-	-
1. OnStar® LED Inoperative 2. LED Illuminated At All Times 3. OnStar® Buttons Inoperative				

Circuit/System Description

The OnStar® button assembly consists of 3 buttons, Call/Answer, OnStar® Call Center, and OnStar® Emergency. The communication interface module (CIM) supplies the OnStar® button assembly with 10 V via the keypad supply voltage circuit. Each of the buttons, when pressed, completes the circuit across a resistor allowing a specific voltage to be returned to the CIM over the keypad signal circuit. Depending upon the voltage range returned, the CIM is able to identify which button has been activated.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

B2476 04

The CIM detects an open/high resistance on the keypad supply voltage circuit.

B2482 and B2476 59

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The CIM detects a valid signal on the keypad signal circuit for longer than 15 seconds. If one of the OnStar® buttons is held or stuck for 15 seconds or greater, the CIM will set this DTC.

Action Taken When the DTC Sets

- The OnStar® status LED turns red.
- No calls can be placed.
- The CIM will ignore all inputs from the OnStar® button assembly.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the A10 inside rearview mirror.
2. Test for less than 10 ohms between the mirror ground circuit terminal 5 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for less than 1 V between the keypad signal circuit terminal 3 and ground.

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- If greater than the specified range, test the keypad signal circuit for a short to voltage. If the circuit tests normal, replace the CIM.

4. Ignition OFF, test for 600 k-800 k ohms between the keypad signal circuit terminal 3 and ground.
   - If less than the specified range, test the keypad signal circuit for a short to ground. If the circuit tests normal, replace the CIM.
   - If greater than the specified range, test the keypad signal circuit for an open/high resistance. If the circuit tests normal, replace the CIM.
5. Ignition ON, test for 9.5-10.5 V between the keypad supply voltage circuit terminal 4 and ground.
   - If less than the specified range, test the supply voltage circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the CIM.
   - If greater than the specified range, test the supply voltage circuit for a short to voltage. If the circuit tests normal, replace the CIM.
6. If all circuits test normal, test or replace the button assembly.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Inside Rearview Mirror Replacement**
- **Control Module References** for CIM replacement, setup, and programming

DTC B2485

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC B2485 02

Wireless Communication Antenna Circuit Short to Ground

DTC B2485 04

Wireless Communication Antenna Circuit Open Circuit

Circuit/System Description

The Bluetooth ® antenna is a small fixed antenna connected directly to the communication interface module (CIM) and is used to send and receive signals from a Bluetooth ® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle.

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Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 V.
- The CIM tests the antenna once every second.

Conditions for Setting the DTC

B2485 02

The CIM detects a short to ground in the Bluetooth ® antenna.

B2485 04

The CIM detects an open/high resistance in the Bluetooth ® antenna.

Actions Taken When the DTC Sets

- The OnStar ® status LED turns red.
- Bluetooth ® functionality is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Testing

1. Verify the Bluetooth ® antenna is properly connected to the CIM and is not damaged.
   - If the antenna is disconnected or damaged, repair or replace as necessary.
2. Ignition ON, verify the DTC B2485 is not set.
   - If the DTC is set, replace the Bluetooth ® antenna. Clear the DTC and cycle the ignition OFF then back ON. If the DTC resets as current, replace the CIM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Wireless Communication Interface Antenna Replacement**
- **Control Module References** for CIM replacement, setup, and programming

SYMPTOMS - CELLULAR COMMUNICATION

NOTE: The following steps must be completed before using the symptom table.

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **OnStar Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio/Audio System. Refer to **Checking Aftermarket Accessories** .
- Inspect for easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Bluetooth Malfunction**

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- **OnStar Global Positioning System (GPS) Data Not Current or Inaccurate**
- **OnStar Microphone Malfunction**
- **OnStar Audio Malfunction**
- **OnStar Button LED Malfunction**
- **OnStar Call Center Remote Function Requests Malfunction**
- **OnStar Button Malfunction**
- **Unable to Contact OnStar Call Center**
- **OnStar Voice Recognition Malfunction**
- **OnStar Steering Wheel Control Functions Malfunction**

SYMPTOMS - ENTERTAINMENT

IMPORTANT: The following steps must be completed before using the symptom table.

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Radio/Audio System Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio/Audio System. Refer to **Checking Aftermarket Accessories** .
- Inspect for easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Radio Poor Reception**
- **Radio Displays LOC, LOCKED, or CODE**
- **Digital Radio Poor or No Reception**
- **Speaker Malfunction**
- **Speaker Replacement Reference**

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BLUETOOTH MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

Circuit/System Description

The Bluetooth ® antenna is a small fixed antenna connected directly to the communication interface module (CIM) and is used to send and receive signals from a Bluetooth ® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle.

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth ® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Diagnostic Aids

- The purpose of this diagnostic is to verify the ability of the CIM to pair to a Bluetooth ® device.
- Before performing this test, verify compatibility of the cellular phone(s) the customer is attempting to use with the vehicle. Based on the cellular phone's service provider and the manufacturer's implementation of Bluetooth ®, not all phones support all available Bluetooth ® functionality. A vehicle and feature compatibility list will be provided via the GM Bluetooth ® website: http://www.gm.com/vc/bluetooth/
- If the vehicle passes the following tests and a compatible device is being used, the concern may be due to a device malfunction or an incomplete/improper pairing attempt.
- A Bluetooth ® test tool or equivalent can also be used to verify the ability of the customers cellular phone (s) to pair with another device.

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify DTC B2485 is not set.
   - If DTC B2485 is set, refer to **DTC B2485**
2. Set up a Bluetooth ® test tool or equivalent.
3. Ignition ON, perform the discovery/search operation with the test tool. Verify the vehicle appears in the list of available devices.
   - If the vehicle is not in the list of available devices, repeat the discovery/search operation. If the vehicle is still not in the list of available devices, replace the CIM.
4. Follow the instructions provided in the Vehicle Owners Manual for pairing a device. Verify successful pairing with the test tool.
   - If pairing is not successful, repeat the pairing process. If pairing is still not successful, replace the CIM.
5. Refer to Diagnostic Aids.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for CIM replacement, setup, and programming

DIGITAL RADIO POOR OR NO RECEPTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The digital radio receiver, located inside the radio, receives digital radio information from the digital radio antenna located on the outside of the vehicle. The digital radio receiver is connected to the digital radio antenna via a shielded coax cable.

Reference Information

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Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-48028 Digital Radio Test Antenna. See **Special Tools**.

Circuit/System Verification

1. Tune to a strong AM or FM station and verify each speaker is producing clear and even sound, with no distortion.
    - If any speaker is not producing sound or the sound produced is distorted, refer to **Speaker Malfunction**.
2. With the vehicle outside in an area with an unobstructed view of the southern sky, tune to XM. Verify XM reception is clear and the No XM Signal message is not displayed on the radio.

Circuit/System Testing

1. Ignition OFF, disconnect the digital radio antenna coax from the radio. Connect the **EL-48028** to the radio and place on the roof of the vehicle. See **Special Tools**. Move the vehicle outside in an area with an unobstructed view of the southern sky.
2. Ignition ON, radio tuned to XM channel 1, verify XM reception is clear and uninterrupted.
    - If reception is not clear, replace the radio.
3. Ignition OFF, reconnect the antenna coax cable at the radio. Disconnect the antenna coax cable from the digital radio antenna.

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4. Ignition ON, radio ON, test for 4.5-5.5 V between the antenna coax cable center terminal and outer shield.
    - If less than the specified range, test the antenna coax cable for an open/high resistance.
    - If greater than the specified range, test the antenna coax cable for a short to voltage.
5. If all circuits test normal, replace the digital radio antenna.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Base Replacement**
- **Control Module References** for radio replacement, setup, and programming

ONSTAR GLOBAL POSITIONING SYSTEM (GPS) DATA NOT CURRENT OR INACCURATE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The communication interface module (CIM) receives information from a specific GPS antenna located on the outside of the vehicle. The GPS antenna is connected to the CIM via a shielded coaxial cable. The antenna cable also provides a path for DC current for powering the antenna.

Diagnostic Aids

- The GPS signal title on the scan tool will display a Yes or No dependent upon whether or not the module sees an increment of the seconds transmitted by GPS signals to the vehicle communication interface module. Upon entering this screen, the GPS signal title will automatically display Yes, regardless of the presence of time increment, for at least 2 seconds, while the algorithm in the scan tool determines the status of the clock. If increment is found, Yes is continually displayed. If the clock remains static, No is displayed. The scan tool looks for increment every second, regardless of current display.
- Inaccurate or aged GPS position concerns which are no longer present may have been due to the temporary loss of GPS signal reception by the vehicle. Conditions such as tunnels or parking structures will restrict the GPS antenna from a clear view of the satellites in the sky and may have caused this temporary data loss.

Reference Information

Schematic Reference

OnStar Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: It is important to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from the satellites. It is also necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.

1. Ignition ON, observe the GPS signal status indicator for at least 10 seconds with a scan tool. The indicator should display Yes.
    - If the indicator does not display Yes, refer to Circuit/System Testing.
2. Call and verify the OnStar advisor has received the GPS data.
    - If the advisor did not receive the GPS data and the call was a 'fail to voice', contact the GM Technical Assistance Center.
    - If the advisor did not receive the GPS data and the call was not a 'fail to voice', refer to Circuit/System Testing.
3. Verify with the OnStar Call Center advisor that your actual position is within a reasonable distance from the actual location of the vehicle.
    - If your actual position is not within a reasonable distance from the actual location of the vehicle, replace the CIM.

Circuit/System Testing

1. Disconnect the navigation antenna coax cable from the CIM.
2. Ignition ON, test for 4.5-5.5 V between the CIM coax cable center conductor terminal at the module and ground.

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    - If not within the specified range, replace the CIM.
3. Reconnect the coax cable to the CIM. Disconnect the coax cable from the GPS antenna.
4. Test for 4.5-5.5 V between the coax cable center conductor and the outer shield.
    - If not within the specified range, replace the coax cable.
5. If all circuits test normal, replace the GPS antenna.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Base Replacement**
- **Control Module References** for CIM replacement, setup, and programming

ONSTAR MICROPHONE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B2455 02	B2455 04	B2455 01	-
Low Reference	-	B2455 04	1	-
1. OnStar Microphone Inoperative - Caller Cannot Be Heard				

Circuit/System Description

The communication interface module (CIM) uses the cellular phone microphone to allow driver communication with OnStar.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the cellular microphone.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal A and ground.
   - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the CIM.
3. Ignition ON, test for 9-11 V between the signal circuit terminal B and ground.
   - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the CIM.
   - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the CIM.
4. If all circuits test normal, replace the cellular microphone.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Mobile Telephone Microphone Replacement**
- **Control Module References** for CIM replacement, setup, and programming

ONSTAR AUDIO MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Audio Signal	1	1	1	-
Audio Common Signal	-	1	-	-
1. No (or Noisy) OnStar® Audio				

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Circuit/System Description

When an OnStar® keypress is made, a serial data message is sent to the audio system to mute all radio functions and output OnStar® originated audio. After the audio system is muted, the communication interface module (CIM) transmits audio signals to the audio system.

Reference Information

Schematic Reference

- **OnStar Schematics**
- **Radio/Navigation System Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Tune radio to a known good station and verify the audio is heard clearly through all speaker channels.
    - If audio is not heard clearly, refer to **Speaker Malfunction**.
2. Ignition ON, radio ON, press OnStar® Call Center button. Verify connecting to OnStar® message is heard clearly through the audio system.
    - If OnStar® message is noisy or distorted, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the A11 radio.
2. Ignition ON, test for a varying AC voltage between the following signal circuit terminals listed below and ground when the OnStar® Call Center button is pressed.

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- Terminal 20
- Terminal 6
  - If AC voltage was not present, test the circuit for a short to voltage, short to ground, or an open/high resistance. If the circuit tests normal, replace the CIM.

3. If all circuits test normal, replace the A11 radio.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for radio or CIM replacement, setup, and programming.

ONSTAR BUTTON LED MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
10 V Reference	-	B2476 04	-	-
Control Terminal 6	1	1	2	-
Control Terminal 7	1	1	2	-
Control Terminal 3	3	3	-	B2476 59, B2482 00
Ground	-	1	-	-
1. OnStar® LED Inoperative 2. LED Illuminated At All Times 3. OnStar® Buttons Inoperative				

Circuit Description

The OnStar® status LEDs are located with the OnStar buttons. The green LED is illuminated when the system is ON and operating normally. When the green LED is green and flashing, it is an indication that a call is in progress. When the red LED is illuminated, a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call. The OnStar® LEDs are controlled by the communication interface module (CIM) via the keypad green LED signal circuit and the keypad red LED signal circuit.

Reference Information

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Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, command the Green LED ON and OFF with a scan tool while observing the green LED on the A10 inside rearview mirror. The green LED should turn ON and OFF when commanded.
2. Command the red LED ON and OFF with a scan tool while observing the red LED on the A10 inside rearview mirror. The red LED should turn ON and OFF when commanded.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the A10 inside rearview mirror.
2. Doors closed, courtesy lamps OFF, test for less than 10 ohms between the ground circuit terminal 5 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, command the green LED OFF with a scan tool. Test for less than 1 V between the control circuit terminal 6 and ground.
    - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the CIM.
4. Command the green LED ON with a scan tool. Test for greater than 9 V between the control circuit terminal 6 and ground.
    - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the CIM.
5. Command the red LED OFF with a scan tool. Test for less than 1 V between the control circuit terminal 7

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and ground.

- If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the CIM.

6. Command the red LED ON with a scan tool. Test for greater than 9 V between the control circuit terminal 7 and ground.
   - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the CIM.
7. If all circuits test normal, replace the A10 inside rearview mirror.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Inside Rearview Mirror Replacement**
- **Control Module References** for CIM replacement, setup, and programming

ONSTAR CALL CENTER REMOTE FUNCTION REQUESTS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The communication interface module (CIM) has the capability of commanding the horn, initiating door lock/unlock, or operating the exterior lamps using the serial data circuits. These functions are commanded by the OnStar® Call Center per a customer request.

Diagnostic Aids

The customer concern may have been due to a lack of cellular service in a given area. A failure in the National Cellular Network infrastructure that has since been corrected.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

IMPORTANT:

- **It is necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.**
- **It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.**

1. Verify that the horn, lights, and the doors locks on the vehicle operate properly.
   - If the applicable system does not operate properly, refer to **Diagnostic System Check - Vehicle** .
2. Contact the OnStar® Call Center by pressing the blue OnStar® button. Verify with the OnStar® advisor that all of the remote functions (door locks, lights, or horn) work.
   - If unable to connect with the OnStar® call center, refer to **Unable to Contact OnStar Call Center**.
   - If the remote functions do not operate when requested, replace the CIM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for CIM replacement, setup, and programming

ONSTAR BUTTON MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
10 V Reference	-	B2476 04	-	-
Control Terminal 6	1	1	2	-
Control Terminal 7	1	1	2	-
Control Terminal 3	3	3	-	B2476 59, B2482 00
Ground	-	1	-	-
1. OnStar® LED Inoperative 2. LED Illuminated At All Times 3. OnStar® Buttons Inoperative				

Circuit/System Description

The OnStar® button assembly consists of 3 buttons, Call/Answer, OnStar® Call Center, and OnStar® Emergency. The communication interface module (CIM) supplies the OnStar® button assembly with 10 V via the keypad supply voltage circuit. Each of the buttons, when pressed, completes the circuit across a resistor allowing a specific voltage to be returned to the CIM over the keypad signal circuit. Depending upon the voltage range returned, the CIM is able to identify which button has been activated.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

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NOTE: Contact the OnStar® Call Center first before pressing the emergency button in order to notify them of the test.

Ignition ON, press the OnStar® Call buttons one at the time. Verify that all of the OnStar® buttons operate normally.

- If some OnStar® buttons are inoperative but not all, replace the A10 inside rearview mirror.
- If none of the OnStar® buttons operate, refer to circuit/system testing.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the A10 inside rearview mirror.
2. Test for less than 10 ohms between the mirror ground circuit terminal 5 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for less than 1 V between the keypad signal circuit terminal 3 and ground.
   - If greater than the specified range, test the keypad signal circuit for a short to voltage. If the circuit tests normal, replace the CIM.
4. Ignition OFF, test for 600k-800k ohms between the keypad signal circuit terminal 3 and ground.
   - If less than the specified range, test the keypad signal circuit for a short to ground. If the circuit tests normal, replace the CIM.
   - If greater than the specified range, test the keypad signal circuit for an open/high resistance. If the circuit tests normal, replace the CIM.
5. Ignition ON, test for 9.5-10.5 V between the keypad supply voltage circuit terminal 4 and ground.
   - If less than the specified range, test the supply voltage circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the CIM.
   - If greater than the specified range, test the supply voltage circuit for a short to voltage. If the circuit tests normal, replace the CIM.
6. If all circuits test normal, test or replace the button assembly.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Inside Rearview Mirror Replacement**
- **Control Module References** for CIM replacement, setup, and programming

ONSTAR STEERING WHEEL CONTROL FUNCTIONS MALFUNCTION

Some vehicles equipped with the OnStar® system have the capability of accessing voice mailboxes and other automated phone systems by means of the steering wheel controls, while the OnStar® Personal Calling (OPC) feature is in use. If the "Talk" or "Mute" button (depending upon the vehicle) on the steering wheel controls is depressed during an OPC call, the communication interface module (CIM) receives the message on the serial data bus from either the radio or body control module (BCM). This message is interpreted as a request to turn any spoken numbers into dual tone multi-frequency (DTMF) tones to be delivered over the airwaves to the

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phone system the user is communicating with. Complete instructions for operation of these features can be found in the information provided to the customer with the OnStar® system.

The steering wheel controls are a resistor network that consist of multiple momentary contact switches and a series of resistors. The switches and resistor network are arranged so that each switch has a different resistance value. When a switch is pressed, a voltage drop occurs in the resistor network, which produces a specific voltage value unique to the switch selected, to be interpreted by either the radio or BCM. In the event the OnStar® steering wheel control functions are inoperative, technicians should refer to **Steering Wheel Controls Malfunction** , to begin diagnosis of the steering wheel control concern.

ANTENNA COAXIAL/CONNECTOR CABLE IDENTIFICATION TABLE

ONSTAR, GPS, XM, AM/FM-CONNECTOR IDENTIFICATION AT CIM

SYSTEM	COAX TYPE	PURPLE	BLUE	CURRY (Mustard Yellow)	GREEN
OnStar (Cellular)	RG 58	X	-	-	-
GPS	RG 174	-	X	-	-
XM	RG 316	-	-	X	-
XM w/High Gain Antenna Module (Cables longer than 4400 mm (14.5 ft))	-	-	-	-	X

CONNECTOR IDENTIFICATION AT ONSTAR ANTENNA BASE

CONNECTOR CONFIGURATION	OnStar (Cellular) PURPLE	GPS BLUE	XM CURRY (Mustard Yellow)	XM GREEN	AM/FM
3 Individual Connectors	X	X	X	-	-
2 Individual Connectors	X	X	-	-	-
3 Way Connector w/3 COAX Cables	X	X	X	-	-
3 Way Connector w/2 COAX Cables with a Separate Connector for XM	X	X	X (S)	-	-
3 Blue 2 Way Connectors + Power Feed (Hexband)	X	-	X	-	X
1 Connector with Splitter	X (S)	X (S)	-	-	-
High Gain Antenna XM 3 Individual Connectors (ver 1)	X	X	-	X	-
High Gain Antenna XM Blue 2 Way with Separate Green Connector (ver 2)	2 way	2 way	-	X	-

RADIO DISPLAYS LOC, LOCKED, OR CODE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Aids

The vehicle identification number (VIN) in the radio is a single one-time VIN learn.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

Ignition ON, using the scan tool, verify that the VIN, digits 2-17, of the radio matches the VIN, digits 2-17, of the vehicle.

- If not the specified value, replace the radio.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for radio replacement, setup, and programming

RADIO POOR RECEPTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Radio Antenna Coax	B125A 02	B125A 04	1	-
Ground	-	1	-	-
1. May exhibit possible AM/FM interference				

Circuit/System Description

AM and FM radio reception is dependent on the following components:

- Radio antenna in the rear glass
- Radio antenna module
- Coax cable between the radio antenna and the radio antenna module
- Radio

The antenna module receives both AM and FM signals from the rear glass antenna. The radio antenna module is enabled when the radio is turned on. The radio provides battery voltage to the antenna module using the center conductor of the antenna coaxial cable. When a 12 V signal is seen by the module on the center conductor of the antenna coax, both AM and FM signals are amplified.

Diagnostic Aids

Poor AM and FM radio reception is dependent on multiple influences, some of which may not be vehicle related. Areas which have high RF traffic or block the signal path may cause a degradation in radio reception. Radio reception may also be influenced by items within the vehicle, but not part of the radio system. Such examples are aftermarket electrical accessories or other items which may generated noise in the vehicle electrical system. Aftermarket window tinting, especially when there is a metallic in the film, may reduce radio reception.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the radio antenna coax from the A11 radio and from the radio antenna module.
2. Test for infinite resistance between the antenna coax center terminal and ground.
    - If less than the specified value, replace the antenna coax.
3. Test for less than 5 ohms on the antenna coax center circuit from end to end.
    - If greater than the specified range, replace the antenna coax.
4. Ignition ON, test for less than 1 V between the antenna coax center terminal and ground.
    - If greater than the specified range, replace the antenna coax.
5. Test for infinite resistance between the coax center terminal and the outer shield.
    - If less than the specified value, replace the antenna coax.
6. Connect the antenna coax to the A11 radio. Test for 12-15 V between the antenna coax center terminal and ground at the radio antenna module connector.
    - If not within the specified range, replace the A11 radio.
7. If all circuits test normal, replace the radio antenna module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for radio replacement, setup, and programming

SPEAKER REPLACEMENT REFERENCE

Component	Repair Instruction
Center I/P Speaker	**Radio Front Center Speaker Replacement**
Front Tweeter Speaker	**Radio Front Side Door Upper Speaker Grille Replacement**
Front Door Speakers	**Radio Front Side Door Speaker Replacement**
Rear Speakers/Subwoofers	**Radio Rear Speaker Replacement**

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SPEAKER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

Each of the audio output channel circuits (+) and (-), at the radio and audio amplifier have a DC bias voltage that is approximately one half of battery voltage. When using a DMM, each of the audio output channel circuits will measure approximately 6.5 V DC. The audio being played on the system is produced by a varying AC voltage that is centered around the DC bias voltage on the same circuit. The AC voltage is what causes the speaker cone to move and produce sound. The frequency (Hz) of the AC voltage signal is directly related to the frequency of the input (audio source playing) to the audio system. Both the DC bias voltage and the AC voltage signals are needed for the audio system to properly produce sound.

Diagnostic Aids

- Improper speaker mounting or loose trim may cause an audible buzz or distortion. Inspect the appropriate speaker and the surrounding interior trim for proper and secure mounting. If the speaker or surrounding interior trim is found to be loose or improperly secured, correctly secure the item.
- When equipped with an amplifier, it is possible for some individual circuit faults to affect more than one speakers operation. Perform diagnostic tests in the sequence listed to avoid misdiagnosis.
- The amplifier control circuit will measure less than 1 V when the mute function is OFF, and approximately 8 V DC when at full mute. When mute is active, the radio stops sending the varying AC voltage to the amplifier/speakers.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Without Amplifier (UQ3)

Radio ON, Mute OFF, verify clear audio is heard from each audio speaker.

- If audio is inoperative from all speakers, replace the radio.
- If audio is inoperative from one or more, but not all, speakers or the audio emitted from the speakers is not clear, refer to Speaker Circuit Malfunction - without Amplifier.

With Amplifier (UQA)

Radio ON, Mute OFF, verify clear audio is heard from each audio speaker.

- If audio is not heard from all speakers, or the audio emitted from the speakers is not clear, refer to Speaker Circuit malfunction- with Amplifier.

Circuit/System Testing

Speaker Circuit Malfunction - without Amplifier

1. Ignition OFF, disconnect the harness connector at the appropriate speaker.
2. Radio ON, mute OFF, test for 5.0-7.5 volts between each audio signal circuit terminal 1 and terminal 2 and ground.
   - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
   - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.

NOTE: In the following tests, audio signal frequencies (Hz) will be tested. To prevent misdiagnosis, the door chime must be OFF during testing. Ensure the driver door latch is closed during testing.

3. Insert the audio test CD from the **J 39916-A** CD and Cassette Diagnostic Audio Kit. See **Special Tools**.
4. Play track number three (50 Hz bass test tone) from the test CD. Test for 49-51 Hz AC between each signal circuit terminal 1 and terminal 2 and ground.
   - If not the specified value, replace the A11 radio.
5. If all circuits test normal, replace the speaker.

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Speaker Circuit malfunction- with Amplifier

1. Ignition OFF, disconnect the X1 harness connector at the T3 audio amplifier.
2. Test for less than 10 ohms between the ground circuit terminal 8 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Disconnect the X3 harness connector at the T3 audio amplifier.
5. Ignition ON, radio ON, verify a test lamp illuminates between the remote enable signal circuit terminal 1 and ground.
    - If the test lamp does not illuminate, test the remote enable signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the A11 radio.
6. Radio ON, mute OFF, test for less than 1 V between the amplifier control circuit terminal 11 and ground.
    - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the A11 radio.
7. Test for 4-8 V between the audio signal circuit terminals listed below and ground.
    - Left front low level audio signal (+) terminal 15
    - Left front low level audio signal (-) terminal 7
    - Right front low level audio signal (+) terminal 14
    - Right front low level audio signal (-) terminal 6
    - Left rear low level audio signal (+) terminal 13
    - Left rear low level audio signal (-) terminal 5
    - Right rear low level audio signal (+) terminal 12
    - Right rear low level audio signal (-) terminal 4
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the A11 radio.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the A11 radio.

NOTE: In the following tests, audio signal frequencies (Hz) will be tested. To prevent misdiagnosis, the door chime must be OFF during testing. Ensure the driver door latch is closed during testing.

8. Insert the audio test CD from the **J 39916-A** CD and Cassette Diagnostic Audio Kit. See **Special Tools**.
9. Mute OFF, play track number three (50 Hz bass test tone) from the test CD. Test for 49-51 Hz AC between the audio signal circuit terminals listed below and ground.
    - Left front low level audio signal (+) terminal 15
    - Left front low level audio signal (-) terminal 7
    - Right front low level audio signal (+) terminal 14
    - Right front low level audio signal (-) terminal 6

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- Left rear low level audio signal (+) terminal 13
- Left rear low level audio signal (-) terminal 5
- Right rear low level audio signal (+) terminal 12
- Right rear low level audio signal (-) terminal 4
  - If not the specified value, replace the A11 radio.

10. Ignition OFF, reconnect all harness connectors at the T3 audio amplifier.
11. Disconnect the harness connector at the appropriate T19 speaker.
12. Ignition ON, radio ON, test for 4-8 V between the appropriate speaker signal terminals listed below and ground:
    - Door speakers, front tweeter speakers, rear speakers, or center I/P speaker: speaker control (-) circuit terminal 1
    - Door speakers, front tweeter speakers, rear speakers, or center I/P speaker: speaker control (+) circuit terminal 2
    - Subwoofer speaker control (-) circuit terminal 3
    - Subwoofer speaker control (+) circuit terminal 4
    - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the T3 audio amplifier.
    - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the T3 audio amplifier.

NOTE: **In the following tests, audio signal frequencies (Hz) will be tested. To prevent misdiagnosis, the door chime must be OFF during testing. Ensure the driver door latch is closed during testing.**

13. Play track number three (50 Hz bass test tone) from the test CD. Test for 49-51 Hz AC between the appropriate speaker signal circuit terminals listed below and ground.
    - Door speakers, front tweeter speakers, rear speakers, or center I/P speaker: speaker control (-) circuit terminal 1
    - Door speakers, front tweeter speakers, rear speakers, or center I/P speaker: speaker control (+) circuit terminal 2
    - Subwoofer speaker control (-) circuit terminal 3
    - Subwoofer speaker control (+) circuit terminal 4
    - If not the specified value, replace the T3 audio amplifier.
14. If all circuits test normal, replace the appropriate T19 speaker.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Speaker Replacement Reference**
- **Control Module References** for amplifier or radio replacement, setup, and programming

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UNABLE TO CONTACT ONSTAR CALL CENTER

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The telematics communication interface control module is a cellular device that allows the user to communicate data and voice signals over the national cellular network. When an OnStar keypress is made, the telematics communication interface control module activates and connects the system to the cellular carriers communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular phone and navigation antenna and cellular antenna coax.

Diagnostic Aids

- The customer concern may have been due to a lack of cellular service in a given area. A failure in the National Cellular Network infrastructure at the time of the customers failed connection that has since been repaired may also have been the cause.
- If an OnStar® emergency call is able to successfully connect the vehicle to the OnStar® Call Center when an OnStar® Call Center button press is not, there may be a failure in the ability of the OnStar® system in the vehicle to be recognized by the local cellular carrier.
- If the prompt "OnStar® request ended" is heard, without pressing the white dot button at the end of the OnStar® keypress, the OnStar® system at one time has made a successful cellular connection, but was unable to complete the call.
- It is important to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.

Reference Information

Schematic Reference

- **OnStar Schematics**
- **Antenna Coaxial/Connector Cable Identification Table**

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-49903 GM OnStar Antenna Diagnostic Tool Kit. See **Special Tools**.

Circuit/System Verification

NOTE: The following verification requires the vehicle to be outside with an unobstructed view of the southern sky. Allow 5 minutes after turning key on for the GPS satellites to acquire vehicle signal.

Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, verifying the vehicle OnStar system is functioning and the consultant can locate the vehicle.

- If the unit does not connect to the OnStar Call Center, verify the vehicles OnStar subscription is valid, has not expired and is in good standing.

Circuit/System Testing

1. Ignition OFF, disconnect both the GPS and cell coax cable connectors at the K73 telematics communication interface control module.
2. Connect the **EL-49903** to the K73 telematics communication interface control module, place the test antenna on the roof of the vehicle. See **Special Tools**.
3. Ignition ON, wait 5 minutes, and then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call.
   - If the unit does not connect to the OnStar Call Center and the subscription is valid, use a scan tool to obtain and record the following information: Electronic Serial Number (ESN), Station Identifier (STID), GM 8-digit part number, Mobile Identification Number (MIN), Mobile Dialed Number (MDN), Transceiver ID (Trans ID) and call GM TAC.
4. Request the consultant to verify the vehicle location to confirm the GPS system is functioning.
   - If the OnStar GPS does not function, replace the K73 telematics communication interface module.
5. Ignition OFF, perform the coax cable test on the coax cable, refer to Component Testing. The coax cable should pass the test.
   - If the coax cable does not pass the test, replace the coax cable.
6. If all circuits test normal, replace the T4 cellular phone and navigation antenna.

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Component Testing

CAUTION: Refer to Test Probe Caution .

NOTE: Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.
To prevent false reading when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test

1. Ignition OFF, disconnect the GPS and cellular phone coax cable at both components.
2. Test both for less than 5 ohms between both ends of the coax cables center terminals.
   - If greater than the specified range, replace the failed coax cable.
3. Test for greater than 10k ohms between the coax cable center wire and the outer coax shield.
   - If less than the specified range, replace the coax cable.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Antenna Base Replacement**
- **Control Module References** for telematic communication interface control module replacement, setup, and programming

ONSTAR VOICE RECOGNITION MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The CIM is capable of interpreting voice commands received over the cellular microphone circuits. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over the cellular communication network. The module attempts to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

Reference Information

Schematic Reference

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OnStar Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Verification

NOTE:

- **It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.**
- **The vehicle should be located in a quiet area.**

1. Ignition ON, press OnStar® Call button. Verify that your voice is heard clearly by the OnStar® Call Center.
   - If your voice can not be heard clearly, refer to **OnStar Microphone Malfunction**.
2. Press the OnStar® Call answer button. Attempt to operate the OnStar® system using multiple different voice commands. Verify the system responds appropriately to all voice commands.
   - If the OnStar® system does not respond to any voice commands, replace the CIM.
3. If the system is operational, but does not respond appropriately to certain commands refer to **OnStar Description and Operation** for tips on proper pronunciation.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for CIM replacement, setup, and programming

REPAIR INSTRUCTIONS

MOBILE TELEPHONE MICROPHONE REPLACEMENT

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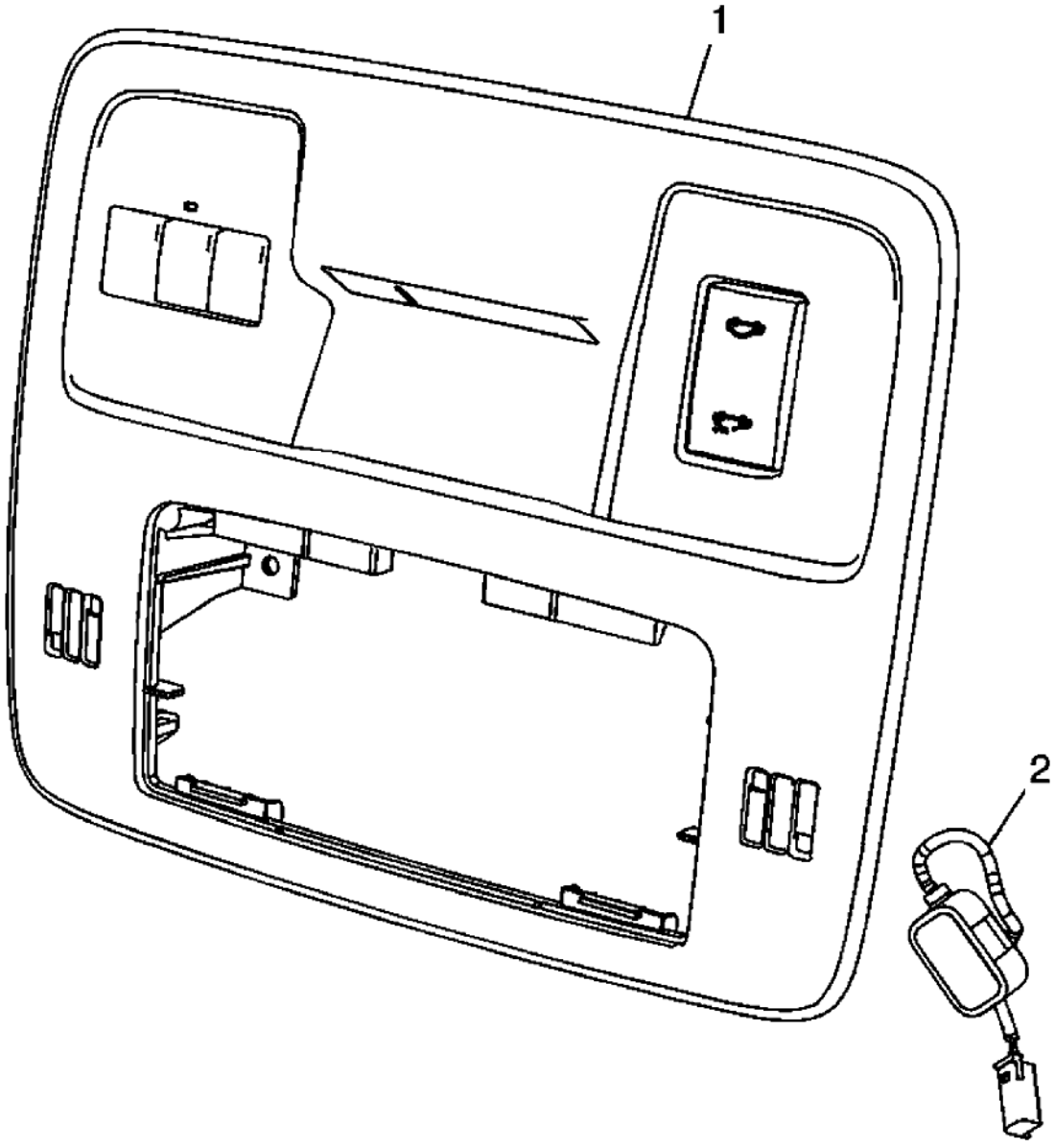


Fig. 9: Mobile Telephone Microphone
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Overhead Console Assembly Refer to the Roof Console Replacement. **Roof Console Replacement**
2	Mobile Telephone Microphone Assembly **Procedure:** Disconnect the electrical connector.

COMMUNICATION INTERFACE MODULE REPLACEMENT

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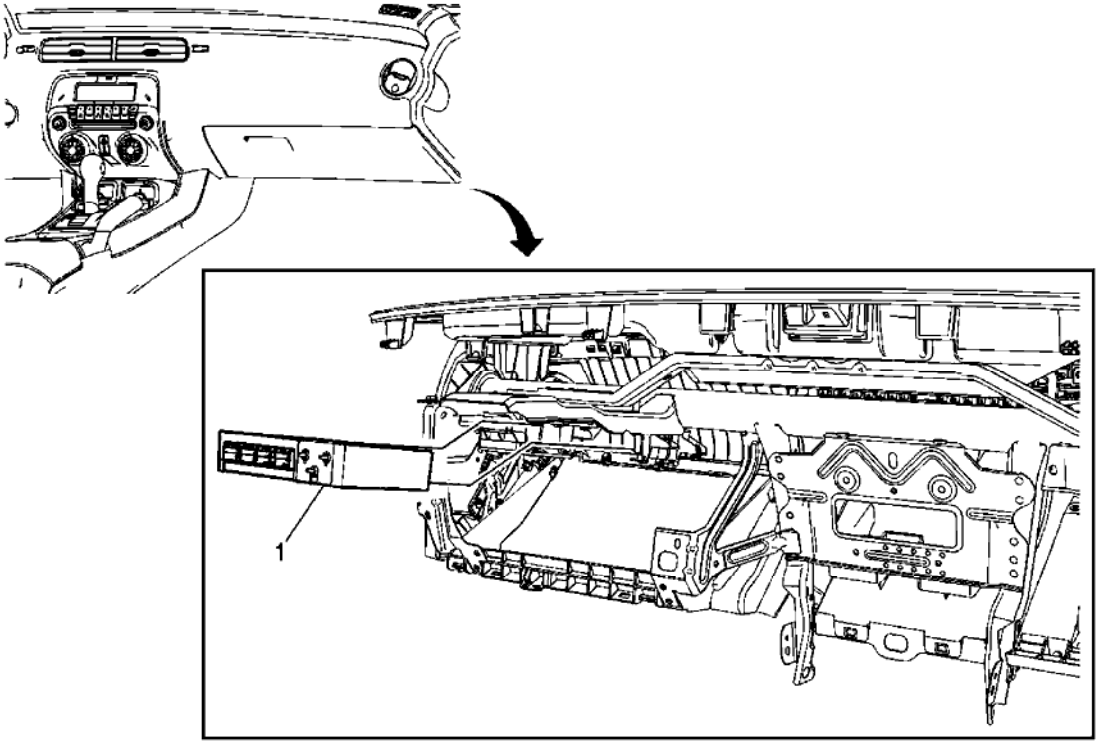


Fig. 10: Communication Interface Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the instrument panel compartment. Refer to **Instrument Panel Compartment Replacement** . 2. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .	
1	Communication Interface Module **Procedure** 1. Disconnect the electrical connections. 2. If replacing the communication interface module be sure to transfer Bluetooth antenna, if equipped. 3. For programming and set up procedures, refer to **Control Module References** .

COMMUNICATION INTERFACE MODULE BATTERY REPLACEMENT

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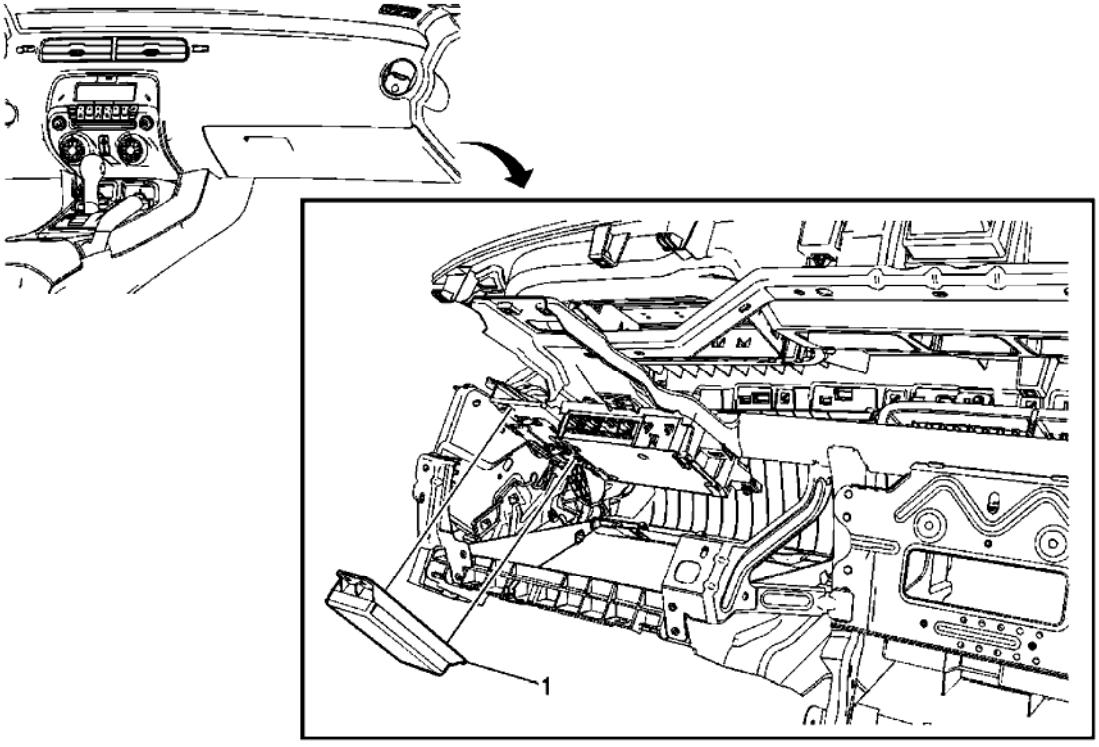


Fig. 11: Communication Interface Module Battery
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the instrument panel compartment. Refer to **Instrument Panel Compartment Replacement** . 2. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .	
1	Communication Interface Module Battery **Procedure** 1. Disconnect the electrical connector. 2. Reprogramming of the Module may be necessary after losing battery power. 3. For programming and set up procedures, refer to **Control Module References** .

WIRELESS COMMUNICATION INTERFACE ANTENNA REPLACEMENT

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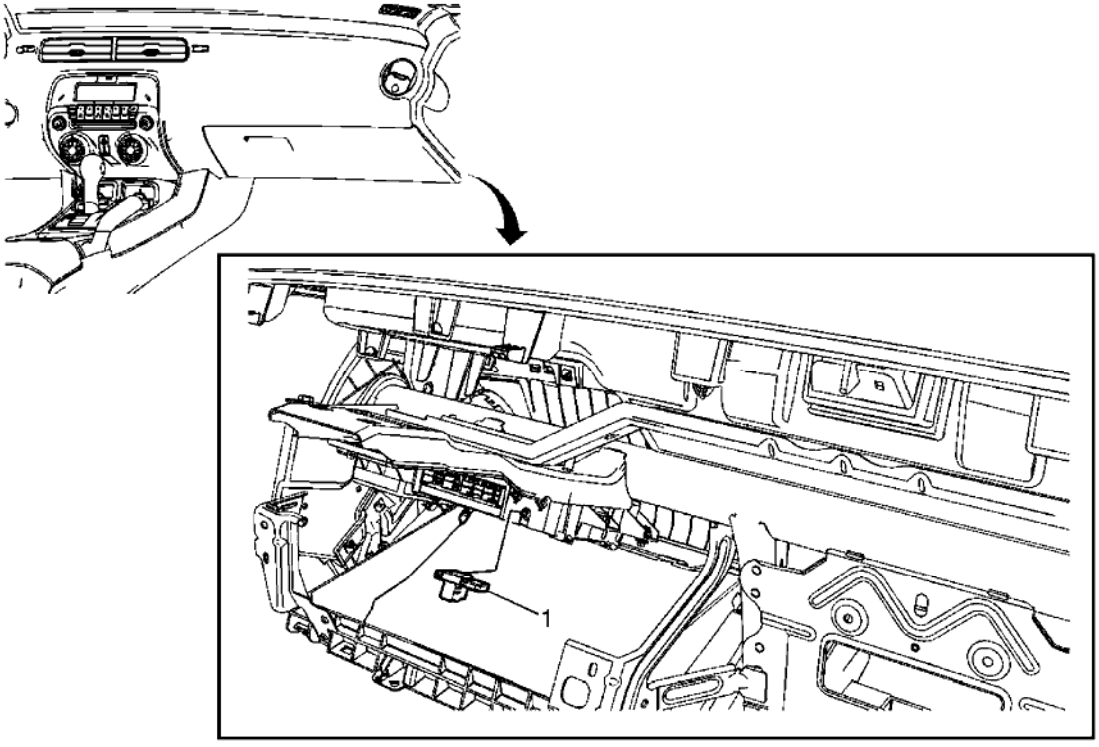


Fig. 12: Wireless Communication Interface Antenna
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement**	
1	Wireless Communication Interface Antenna Bluetooth Module **Procedure:** Unsnap the antenna from communication module.

COMMUNICATION INTERFACE MODULE BRACKET REPLACEMENT

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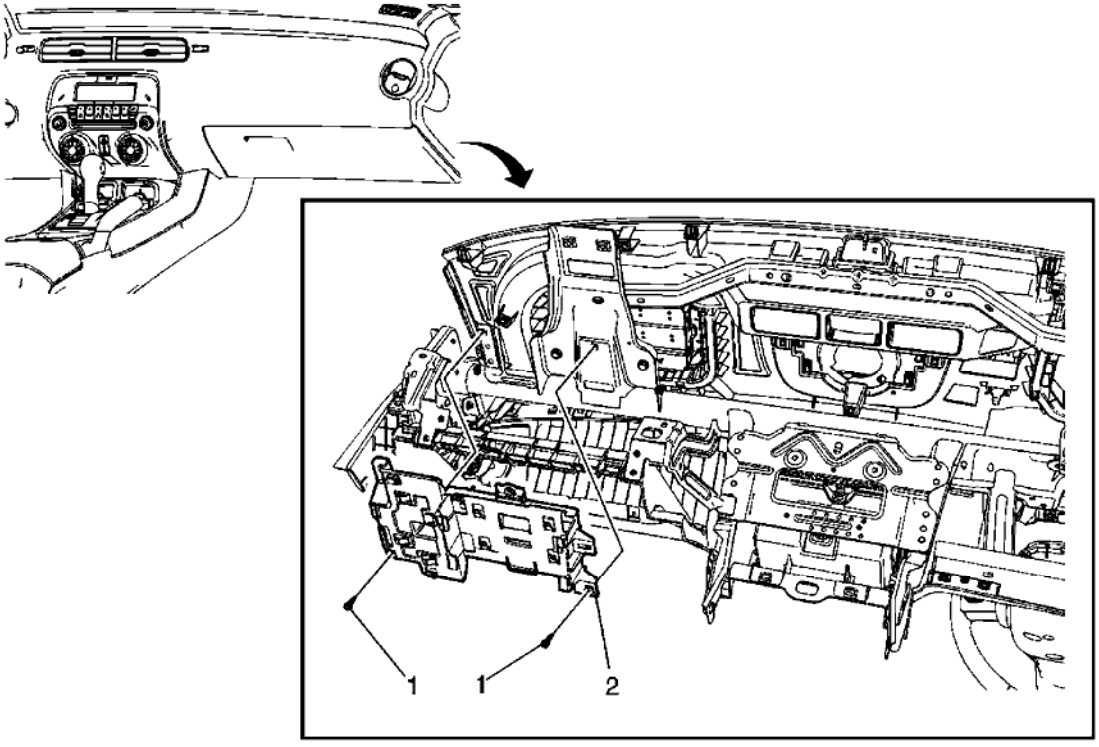


Fig. 13: Communication Interface Module Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the communication interface module. Refer to **Communication Interface Module Replacement** 2. Remove the communication interface battery. Refer to **Communication Interface Module Battery Replacement**	
1	Communication Interface Module Bracket Bolt Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Communication Interface Module Bracket

RADIO REPLACEMENT

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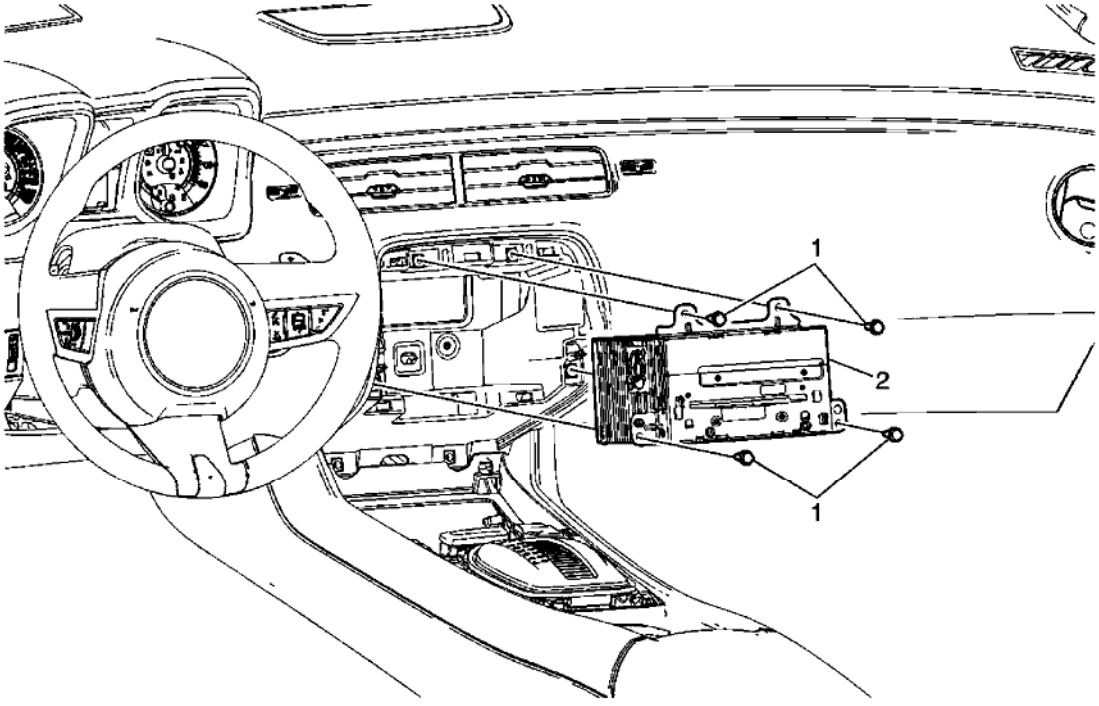


Fig. 14: Radio
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the radio control assembly. Refer to **Radio Control Assembly Replacement**.	
1	Radio Screw (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio **Procedure** 1. Disconnect the electrical connections. 2. Refer to **Control Module References** for programming and setup information.

RADIO CONTROL ASSEMBLY REPLACEMENT

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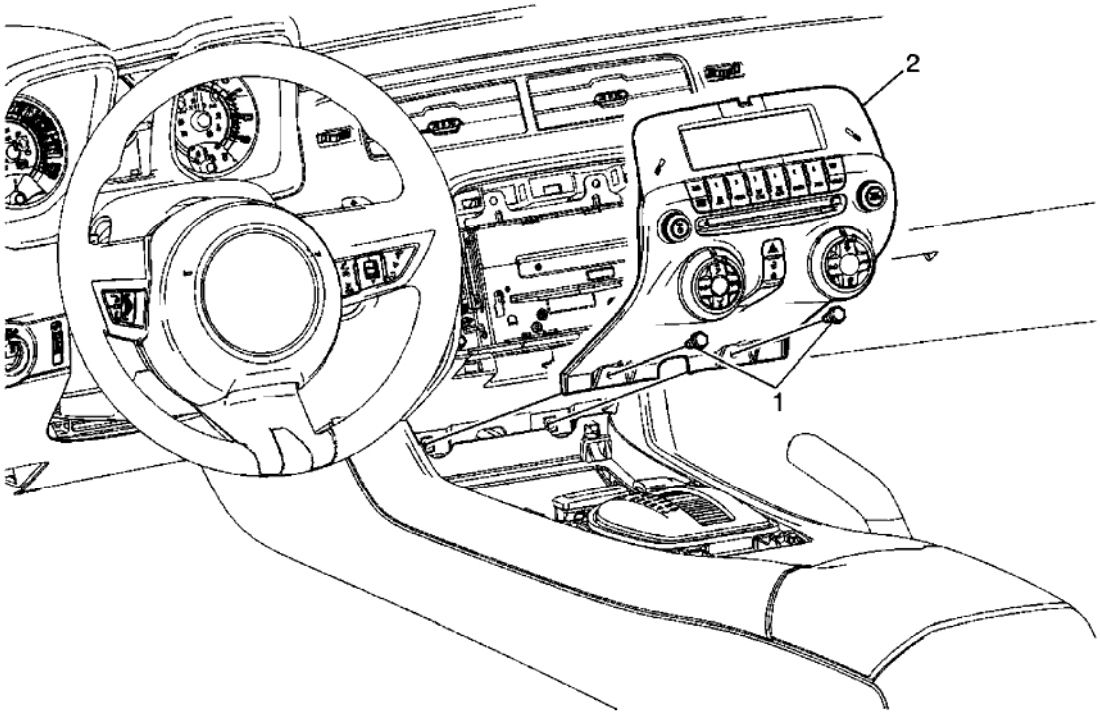


Fig. 15: Radio Control Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front floor console front cover. Refer to **Front Floor Console Front Cover Replacement (Without UMQ)** or **Front Floor Console Front Cover Replacement (With UMQ)**	
1	Radio Control Assembly Bolt/Screw(Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Control Assembly **Procedure** 1. Use a flat-bladed plastic trim tool in order to release the retainer clips securing the radio control assembly to the instrument panel. 2. Disconnect the electrical connections. 3. When replacing the radio control assembly, transfer components as necessary. 4. Refer to **Control Module References** for programming and setup information.

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AUDIO DISC PLAYER AND USB RECEPTACLE REPLACEMENT

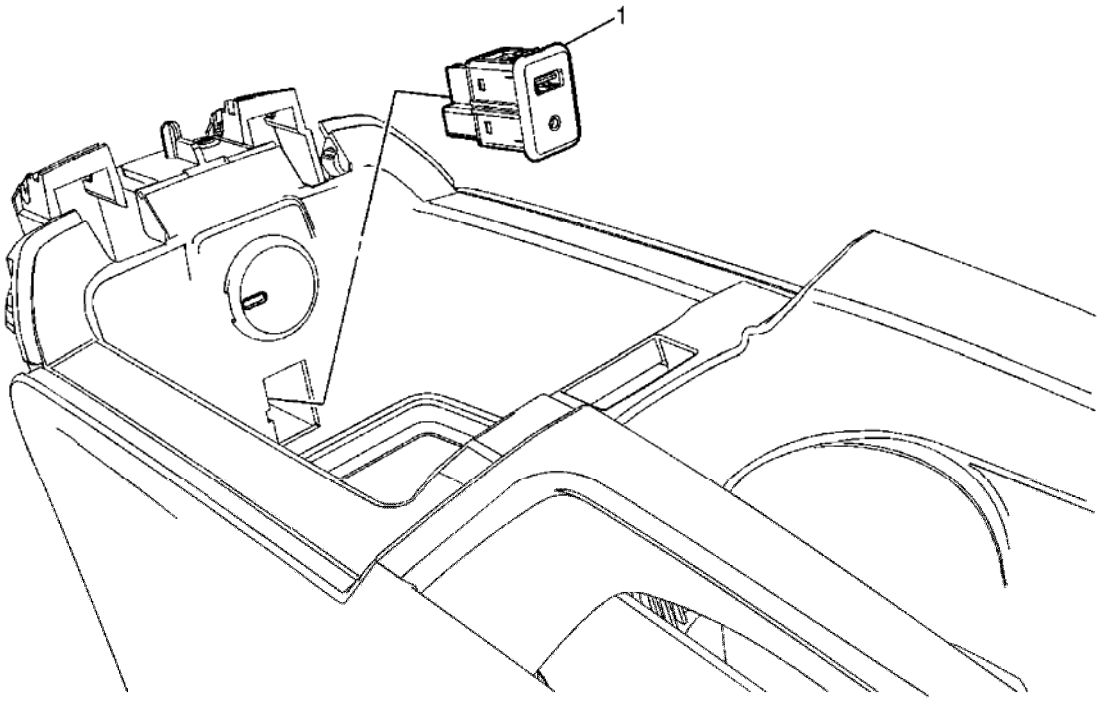


Fig. 16: Audio Disc Player & USB Receptacle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Open the front floor console armrest. 2. Remove the front floor console rear cover. Refer to **Front Floor Console Rear Cover Replacement**	
1	Audio Disc Player and USB Receptacle **Procedure** 1. Depress the tabs to remove the receptacle. 2. Disconnect the electrical connector.

RADIO SPEAKER AMPLIFIER REPLACEMENT

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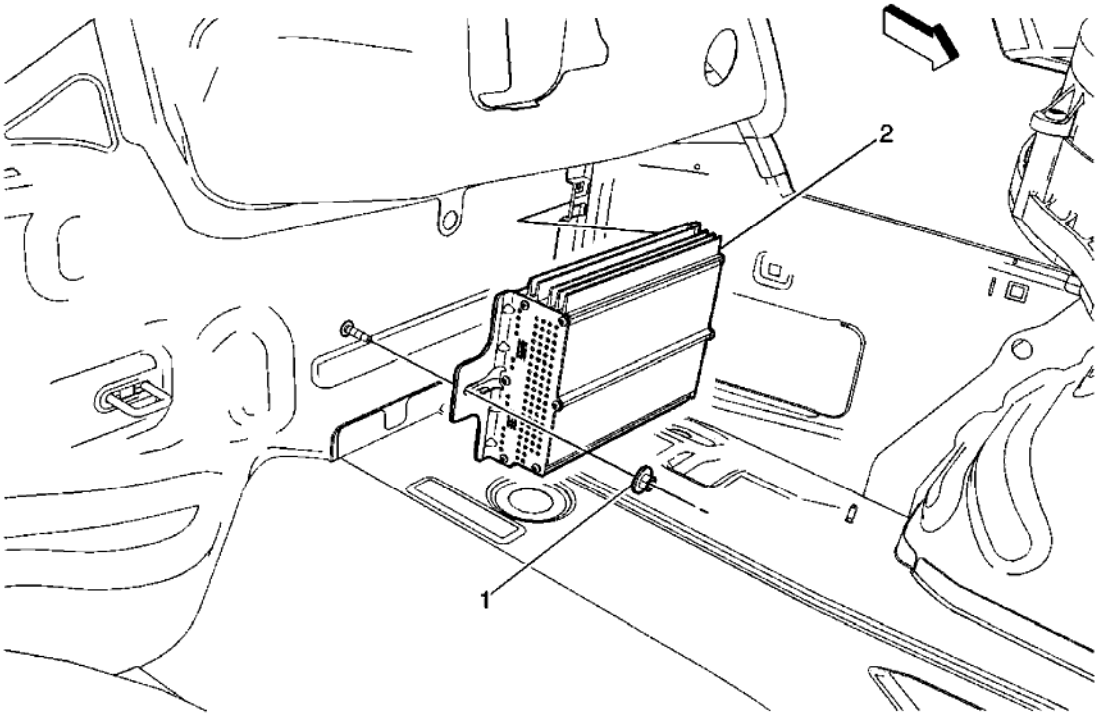


Fig. 17: Radio Speaker Amplifier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear end trim finish panel. Refer to **Rear End Trim Finish Panel Replacement** . 2. Reposition the rear compartment side trim panel on the left side of the vehicle. The panel is cloth and easily moved to gain access to the radio speaker amplifier.	
1	Radio Speaker Amplifier Nut **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
2	Radio Speaker Amplifier Assembly **Procedure** 1. Slide amplifier from integral retaining tabs. 2. Disconnect electrical connection.

MULTIMEDIA PLAYER INTERFACE MODULE REPLACEMENT

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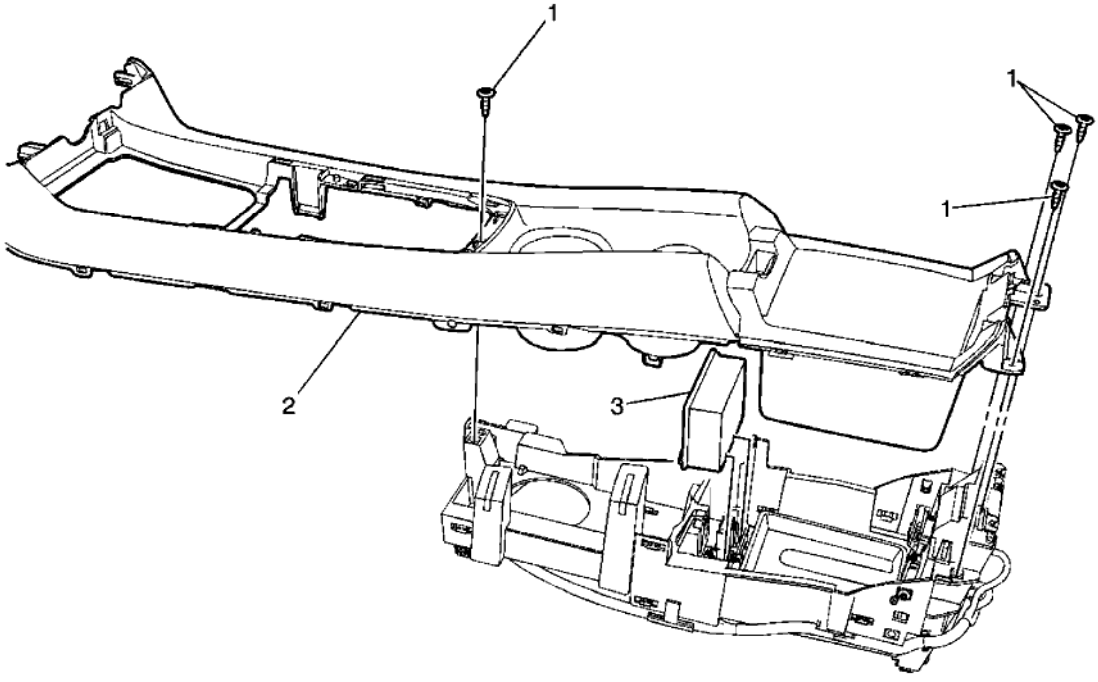


Fig. 18: Multimedia Player Interface Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front floor console. Refer to **Front Floor Console Replacement** . 2. Remove the front floor console armrest. Refer to **Front Floor Console Armrest Replacement** . 3. Remove the console compartment power receptacle. Refer to **Accessory Power Receptacle Replacement** . 4. Remove the USB receptacle. Refer to **Audio Disc Player and USB Receptacle Replacement**.	
1	Front Floor Console Bolts (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Front Floor Console Upper Trim
3	Multimedia Player Interface Module **Procedure** 1. Slide the module upwards after disengaging retaining clips. 2. Disconnect the electrical connectors.

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RADIO ANTENNA COIL REPLACEMENT

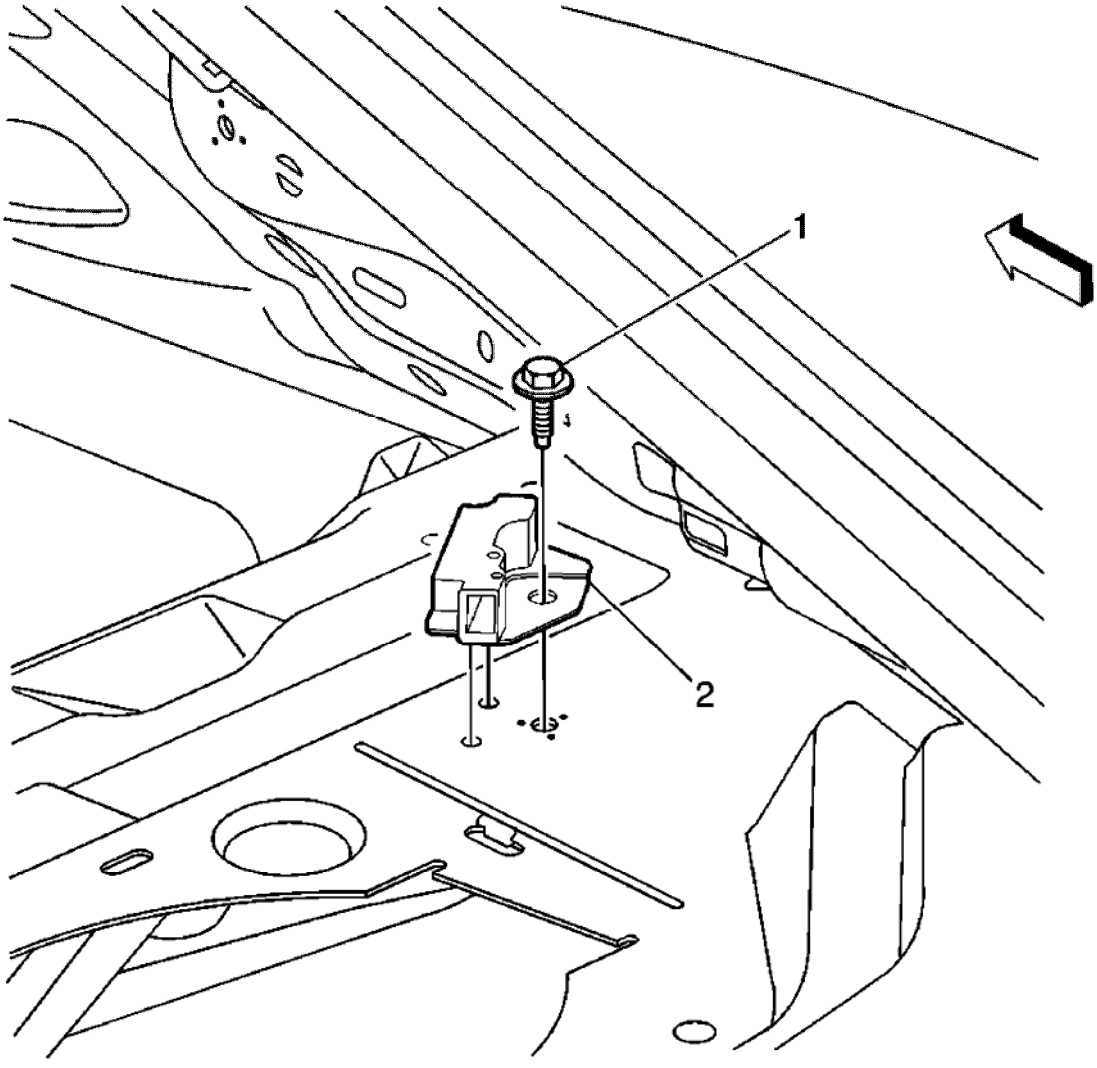


Fig. 19: Radio Antenna Coil
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear window panel trim. Refer to **Rear Window Panel Trim Replacement** .	
1	Radio Antenna Module Coil Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
	Radio Antenna Coil

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2	**Procedure:** Disconnect the electrical connection.

RADIO ANTENNA BASE REPLACEMENT

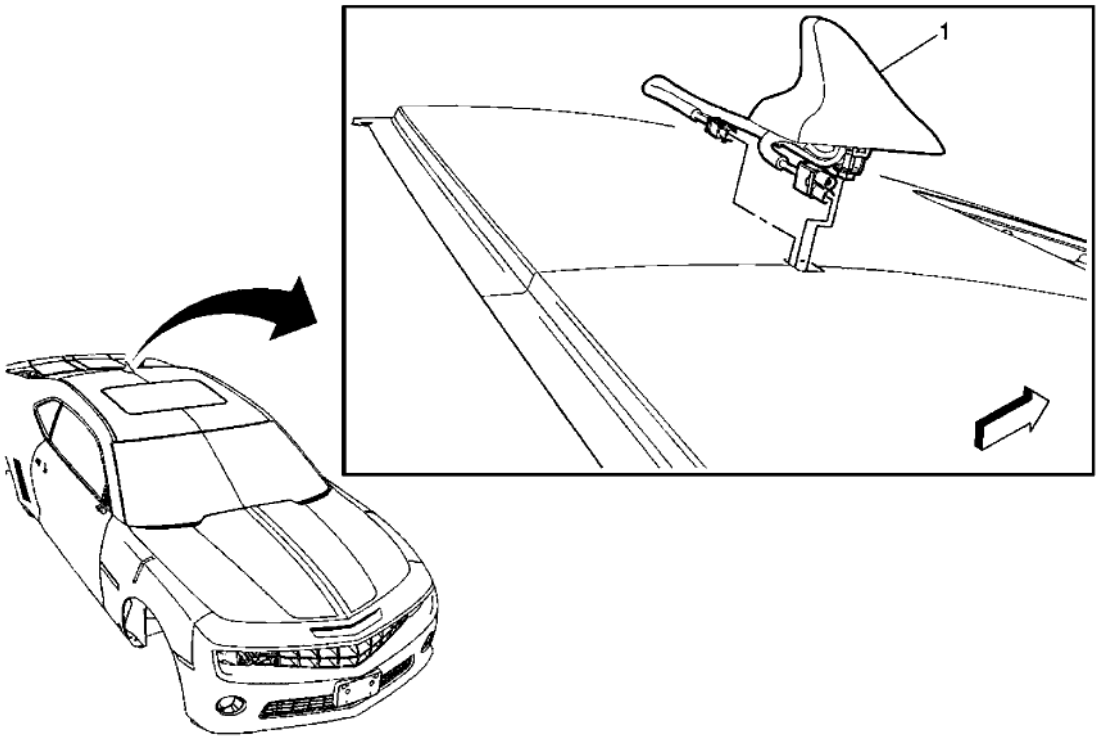


Fig. 20: Radio Antenna Base
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Lower the headliner trim panel to access the antenna base fastener. Refer to **Headlining Trim Panel Replacement** or the sunroof panel trim panel, if equipped. Refer to **Sunroof Panel Trim Panel Replacement** .	
1	Radio Antenna Base **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Loosen the integral nut. 2. Disconnect the electrical connections. 3. Disconnect the antenna cables.

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	4. Feed the wiring and cable up through the hole in the roof panel. **Tighten:** 10 N.m (89 lb in)

RADIO ANTENNA MODULE REPLACEMENT

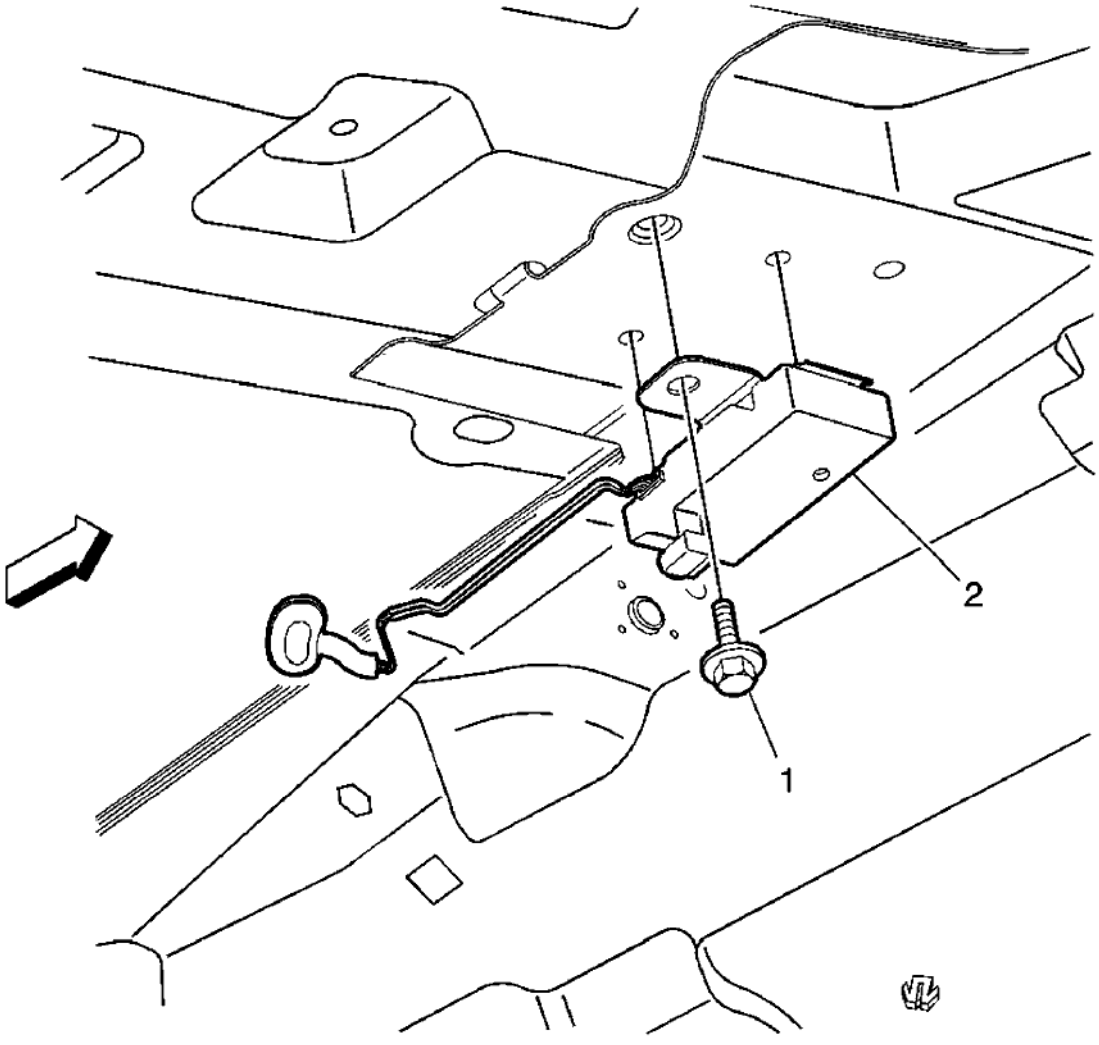


Fig. 21: Radio Antenna Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Lower the rear of the headliner trim panel to access the antenna amplifier. Refer to **Headlining Trim Panel Replacement** or the sunroof panel trim panel, if equipped. Refer to **Sunroof Panel Trim Panel Replacement**	
	Radio Antenna Module Bolt

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1	**CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
2	Radio Antenna Module Assembly **Procedure** 1. Disconnect the electrical connection. 2. Disconnect the antenna cable from the rear glass.

RADIO AND TELEPHONE CONTROL SWITCH REPLACEMENT

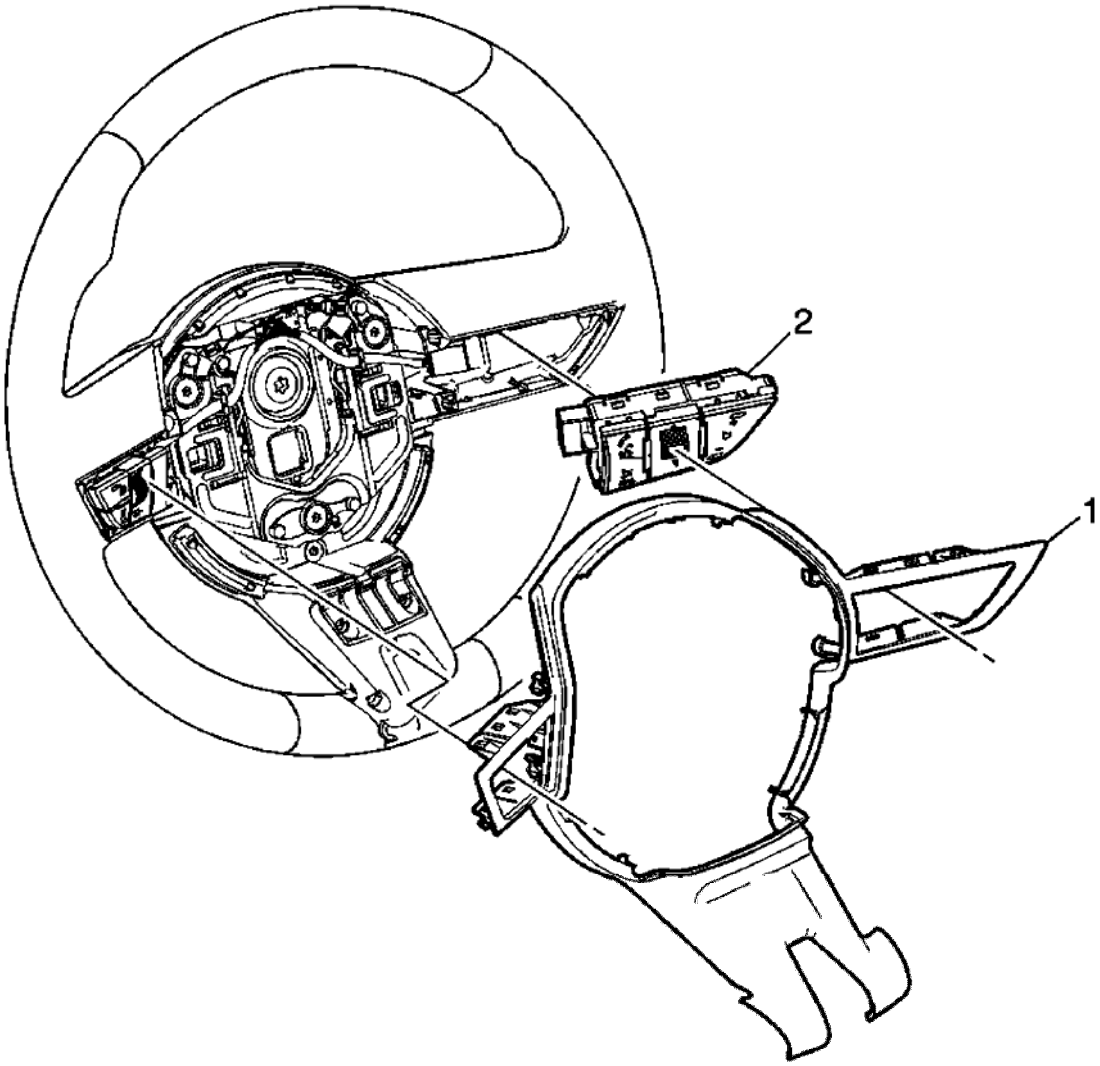


Fig. 22: Radio & Telephone Control Switch

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Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the inflatable restraint steering wheel module. Refer to **Steering Wheel Inflatable Restraint Module Airbag Replacement** .	
1	Steering Wheel Spoke Control Switch Bezel Refer to **Steering Wheel Spoke Control Switch Bezel Replacement**
2	Radio and Telephone Control Switch Assembly **Procedure** 1. Disconnect the electrical connectors. 2. Make sure the steering wheel control switches are properly seated to the steering wheel trim cover during installation.

RADIO FRONT CENTER SPEAKER REPLACEMENT

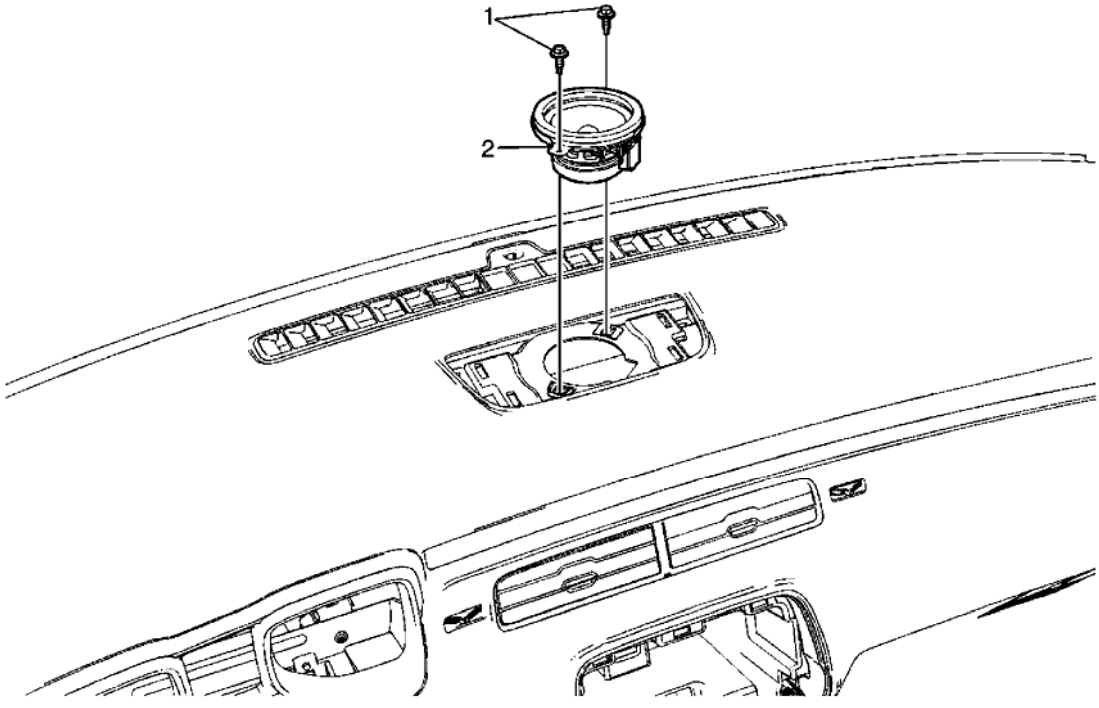


Fig. 23: Radio Front Center Speaker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the radio front speaker grille. Refer to **Radio Front Speaker Grille Replacement**.	

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1	Radio Front Speaker Bolt/Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Front Speaker **Procedure:** Disconnect the electrical connectors.

RADIO FRONT SPEAKER GRILLE REPLACEMENT

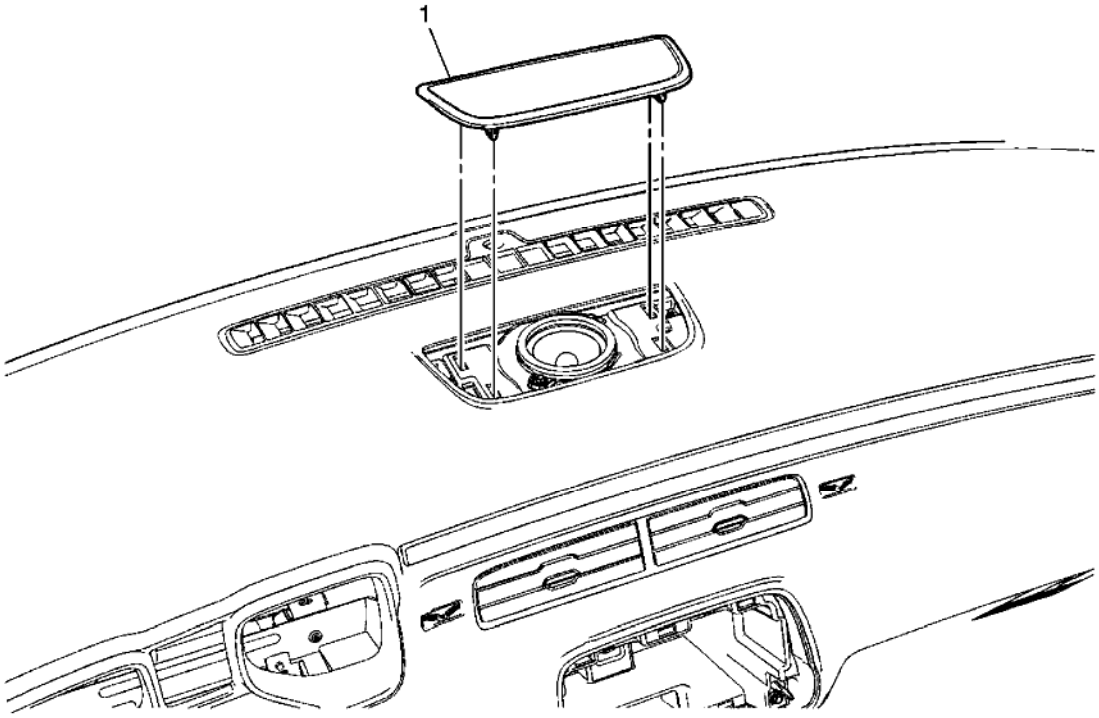


Fig. 24: Radio Front Speaker Grille
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Radio Front Speaker Grille **Procedure:** Using a flat bladed tool, gently unsnap speaker grille from the instrument panel trim pad. The grille is attached with four integral clips.

RADIO FRONT SIDE DOOR UPPER SPEAKER GRILLE REPLACEMENT

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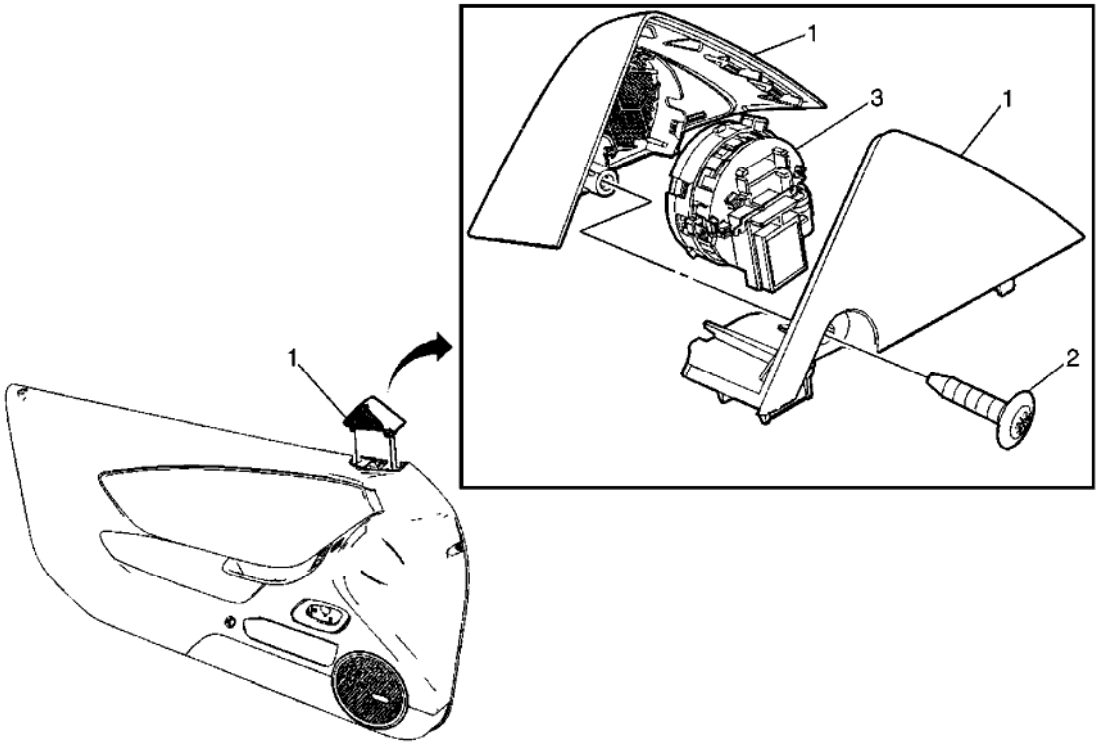


Fig. 25: Radio Front Side Door Upper Speaker Grille
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Radio Front Side Door Upper Speaker Grille **Procedure:** Using plastic trim tool, release 3 retainers, and pull speaker grille assembly straight up
2	Radio Front Side Door Upper Speaker Grille Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)
3	Radio Front Side Door Upper Speaker **Procedure** 1. Disconnect electrical connector. 2. Separate the speaker grille halves. 3. Unclip speaker from grille.

RADIO FRONT SIDE DOOR SPEAKER REPLACEMENT

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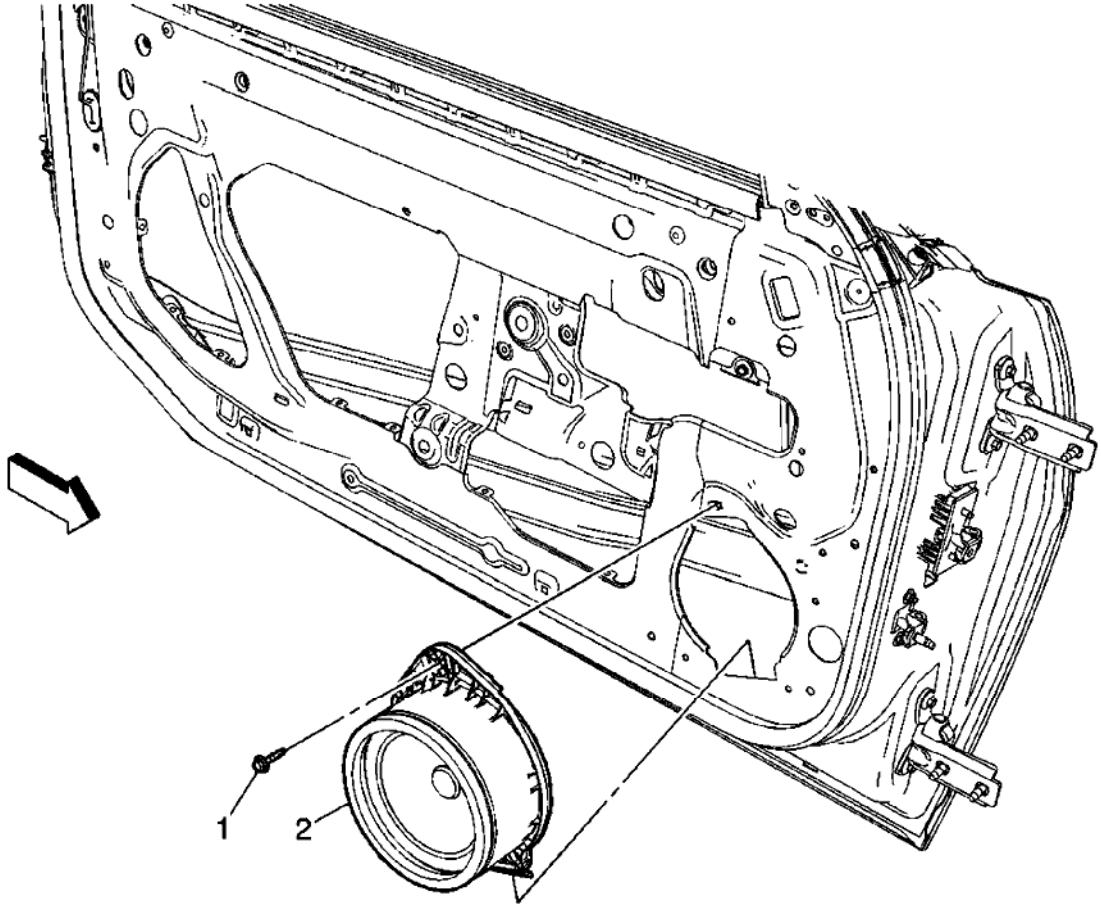


Fig. 26: Radio Front Side Door Speaker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Radio Front Side Door Speaker Bolt/Screw **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Front Side Door Lower Speaker **Procedure:** Disconnect the electrical connector.

RADIO REAR SPEAKER REPLACEMENT

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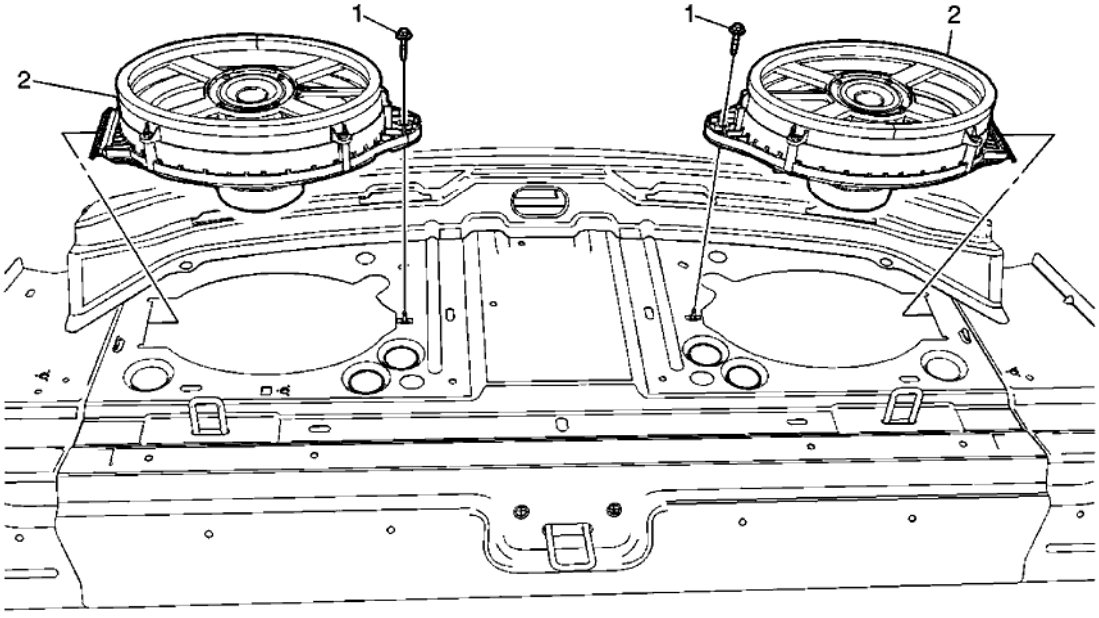


Fig. 27: Radio Rear Speaker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear window shelf trim panel. Refer to **Rear Window Panel Trim Replacement** .	
1	Radio Rear Speaker Bolt/Screw **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Rear Speaker **Procedure:** Disconnect the electrical connectors.

DESCRIPTION AND OPERATION

CELLULAR TELEPHONE DESCRIPTION AND OPERATION

The mobile telephone control module offers the opportunity to hold phone conversations using a cellular telephone via a vehicle microphone and vehicle speaker system and to operate the most important cellular telephone functions via the infotainment system in the vehicle. The mobile telephone control module is available in two configurations, based on different radio types, mobile telephone control module low for base CD radio and a mobile telephone control module high for uplevel CD radios and navigation-systems. Both modules basically provide the same features:

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- Call lists
- Call handling
- Steering wheel control
- Status messages
- Phone book
- Bluetooth
- Speech recognition, including adaptive echo and noise reduction algorithm

An additional base plate and cradle is available for specific cellular telephones, available as an option. It provides charging of the cellular telephone and a connection to the outside antenna. All cellular telephone interaction and data transmission to mobile telephone control module is done via Bluetooth. In order to create a connection between the mobile telephone control module and the infotainment system, the mobile telephone control module must be switched on and the cellular telephone logged in. The mobile telephone control module switches itself on and off via the ignition. If the ignition is switched off the mobile telephone control module can be switched on and off via the infotainment system. When a telephone connection is active, the radio sound is switched off. When the telephone connection has ended, the radio sound is switched on again.

Speech recognition

The speech recognition enables the operation of some cellular telephone functions by voice input. It recognizes commands and sequences of numbers independently of the person speaking. The commands and sequences of numbers can be spoken without a break between the individual words. It is also possible to save telephone numbers using a name randomly chosen by the user. The telephone connection can be created using the proper name.

ONSTAR DESCRIPTION AND OPERATION

This OnStar® system consists of the following components:

- Telematics communication interface control module
- OnStar® three button assembly
- Microphone
- Cellular antenna
- Navigation antenna
- Bluetooth® antenna (If equipped)
- Back up battery (If equipped)

This system also interfaces with the factory installed vehicle audio system.

Telematics Communication Interface Control Module

The telematics communication interface control module is a cellular device that allows the user to communicate data and voice signals over the national cellular network. Power is provided by a dedicated, fused B+ circuit. Ground is provided through the vehicle wiring harness attached to the module. The ignition state is determined

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by the telematics communication interface control module through serial data messaging.

Dedicated circuits are used to connect the telematics communication interface control module to a microphone, the button assembly, and to command the status LED. The telematics communication interface control module communicates with the rest of the vehicle over the serial data bus.

The module houses 2 technology systems, one to process GPS data, and another for cellular information. The cellular system connects the OnStar® system to the cellular carrier's communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular antenna and cellular antenna coax. GPS satellites orbiting earth are constantly transmitting signals of their current location. The OnStar® system uses the GPS signals to provide location on demand.

The module also has the capability of activating the horn, initiating door lock/unlock, or activating the exterior lamps using the serial data circuits. These functions can be commanded by the OnStar® Call Center per a customer request.

OnStar® Three Button Assembly

The OnStar® button assembly may be part of the rearview mirror, or a separate, stand alone unit. The button assembly is comprised of 3 buttons and a status LED. The buttons are defined as follows:

- The answer/end call button, which is black with a white phone icon, allows the user to answer and end calls or initiate speech recognition.
- The blue OnStar® call center button, which displays the OnStar® logo, allows the user to connect to the OnStar® call center.
- The emergency button, which displays a white cross with a red background, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.

The OnStar® status LED is located with the button assembly. The LED is green when the system is ON and operating normally. When the status LED is green and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

If the LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

Each LED is controlled by the telematics communication interface control module over dedicated LED signal circuits. Ground for the LED is provided by the wiring harness attached to the button assembly.

Secondary OnStar® Controls

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Some vehicles may have an additional button that when pushed can engage the OnStar® system. The button may be a symbol of a face with sound waves, or may say MUTE, or be a symbol of a radio speaker with a slash through it.

By engaging the OnStar® system with this feature, the user can interact with the system by use of voice commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available for reference, at any command prompt the user can say "HELP" and the telematics communication interface control module will return an audible list of available commands.

OnStar® Microphone

The OnStar®, or cellular microphone, can be a part of the rearview mirror assembly, or on some vehicle lines, a separate, stand alone unit. In either case, the telematics communication interface control module supplies approximately 10 volts to the microphone on the cellular microphone signal circuit, and voice data from the user is sent back to the telematics communication interface control module over the same circuit. A cellular microphone low reference circuit or a drain wire provides a ground for the microphone.

Cellular and GPS Antennas

This vehicle will be equipped with one of the following types of antennas:

- A combination cellular and navigation antenna, which brings the functions of both into a single part
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the functionality of the digital radio receiver satellite antenna (XM).
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the AM/FM antenna.

The cellular antenna is the component that allows the OnStar® system to send and receive data over airwaves by means of cellular technology. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module.

The GPS antenna is used to collect the signals of the orbiting GPS satellites. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module. The cable also provides a path for DC current for powering the antenna.

The OnStar® Call Center also has the capability of communicating with the vehicle during an OnStar® call to retrieve the latest GPS location and transmit it to the OnStar® Call Center. A history location of the last recorded position of the vehicle is stored in the module and marked as aged, for as long as the module power is not removed. Actual GPS location may take up to 10 minutes to register in the event of a loss of power.

Bluetooth® (If Equipped)

Bluetooth® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. Only vehicles with steering wheel controls will have Bluetooth® functionality. In order to utilize the vehicle's Bluetooth® system, a Bluetooth® equipped cellular phone is required.

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The Bluetooth® antenna is a small fixed antenna connected directly to the telematics communication interface control module and is used to send and receive signals from a Bluetooth® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle. The available features and functions are determined by the software within the device being used and the telematics communication interface control module. The operating range of the signal from the vehicle is approximately 30 feet. Note that the operating range is dependent upon the cellular phone being used and battery level of the phone.

With Bluetooth® technology customers can experience hands-free calling as their Bluetooth® capable cellular phones are wirelessly connected to the vehicle. It will allow customers to place and receive calls using the steering wheel controls and voice recognition. The vehicle audio system will allow you to listen to your call through the vehicle speakers and adjust volume through steering wheel or radio controls.

Not all Bluetooth® cellular phones are guaranteed to work with the vehicle's Bluetooth® system. Based on the cellular phone's service provider and the manufacturer's implementation of Bluetooth®, not all phones support all available Bluetooth® functionality. Bluetooth® enabled cellular phones will be tested for vehicle compatibility and a feature compatibility list will be provided via the GM Bluetooth® website: http://www.gm.com/vc/bluetooth/

Bluetooth® Features Supported

The following is a list of features supported by the Bluetooth® system. Note that not all devices will support all of the listed functions.

- Automatic reconnection - highest priority phone will automatically be connected to vehicle when vehicle ignition is on
- Hands-free dialing- via digits, redial, name tags (phone number saved to a nametag via voice recognition)
- Answering a call
- Ending a call
- Mute a Call
- Rejecting a call - ignore an incoming call
- Call Waiting
- Three-way Calling - initiated from hands-free system
- Send Number During a Call - this is used when calling a menu-driven phone system
- Transfer a Call - transfer call from vehicle to cellular phone and visa versa
- Voice Pass-Thru - allow access to the voice recognition commands on the cellular phone

Pairing a Bluetooth® Cellular Phone to the Vehicle

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Once the Bluetooth® cellular phone has been paired with vehicle, it will automatically connect to the vehicle

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when the ignition is on and the device is on. When more than one paired phone is in the vehicle, the phone with the highest priority will be connected. If the cellular phone is in use while getting into the vehicle, the phone can be switched to hands-free mode with the press of a button. In addition, a call in progress can be transferred from the vehicle hands-free mode to the phone to continue the call as the customer exits the vehicle.

Complete pairing instructions are provided in the Vehicle Owners Manual.

Back-up Battery (If Equipped)

IMPORTANT: Do not disconnect the main vehicle battery or remove the OnStar® fuse with the ignition key in any position other than OFF. Disconnecting power to the OnStar® module in any way while the ignition is ON or with retained accessory power activated may cause activation of the OnStar® Back-Up Battery. This action is per design as the back-up battery is designed to provide power to the telematics communication interface control module so an emergency notification call can be made after a vehicle collision where the main battery is disabled. Once the Back-Up Battery is activated it will stay on until it has completely discharged. The back-up battery is not rechargeable and once activated the back-up battery must be replaced.

Certain OnStar® equipped vehicles may also be equipped with a back-up battery. The back-up battery is a non-rechargeable, lithium battery intended to provide an auxiliary power source for the telematics communication interface control module in the event of a vehicle collision where power from the main vehicle battery is lost.

The back-up battery is intended to have a limited life span of approximately 4 years and is designed to maintain an open circuit voltage between 16 V and 9 V throughout this period. This allows the battery to power the basic functions of the telematics communication interface control module for least one 200 second (5 minute) call at the end of the 4 year span, should a main vehicle battery loss collision occur.

The back-up battery is connected to the telematics communication interface control module through the back-up battery positive voltage circuit and back-up battery ground circuit and is protected from a short circuit by means of an internal fuse. In the event the back-up battery, battery positive voltage circuit is shorted to the back-up battery ground circuit or chassis ground, the fuse will open and render the back-up battery permanently inoperable. The status of the back-up battery and its associated wiring is monitored by the telematics communication interface control module.

Audio System Interface

When the OnStar® requires audio output, a serial data message is sent to the audio system to mute all radio functions and transmit OnStar® originated audio. The OnStar® audio is transmitted to the vehicle audio system by a dedicated signal circuit and a low reference circuit.

The audio system will mute and an audible ring will be heard though the speakers if the vehicle receives a call with the radio ON.

On some vehicles, the HVAC blower speed may be reduced when the OnStar® system is active to aid in reducing interior noise. When the system is no longer active, the blower speed will return to its previous setting.

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OnStar® Sleep Cycle

The OnStar® system uses a unique sleep cycle to allow the system to receive cellular calls while the ignition is in the OFF position and retained accessory power mode has ended. This cycle enables the telematics communication interface control module to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, and to continue to maintain an acceptable level of battery electrical drain.

The OnStar® system uses 4 states of readiness, depending upon the type of cellular market the vehicle is in when the ignition is put into the OFF state:

- High power
- Low power
- Sleep
- Digital standby

The high power state is in effect whenever the ignition is in the ON or RUN position, or retained accessory power is enabled, and the OnStar® system is sending or receiving calls or when the system is performing a remote function.

The low power state is in effect when the OnStar® system is idle with the ignition in the ON or RUN position, or with retained accessory power enabled.

The sleep state is entered after the vehicle has been shut off and the retained accessory power has timed out while in an analog cellular area. At a predetermined time recorded within the telematics communication interface control module, the system re-enters the low power state to listen for a call from the OnStar® Call Center for 1 minute. After this interval, the system will again return to the sleep state for 9 minutes. If a call is sent during the 1 minute interval, the OnStar® system will receive the call and immediately go into the high power mode to perform any requested functions. If no call is received during the 1 minute interval, the system will go back into the sleep mode for another 9 minutes. This process will continue for up to 48 hours, after which the OnStar® system will turn off until the ignition is turned to the ON or RUN position.

The digital standby power state is entered after the vehicle has been shut off and the retained accessory power has timed out while in a digital cellular area. When in digital standby mode, the OnStar® module is able to perform all remote functions as commanded by an OnStar® advisor at any time, for a continuous 120 hours. After 120 hours, the OnStar® module will go into sleep mode until a wake up signal from the vehicle is seen by the telematics communication interface control module. If the OnStar module loses the digital cellular signal it will revert to analog mode and follow the standard sleep state (9 minutes OFF, 1 minute standby) based on the time of the GPS signals, this will continue until a digital cellular signal is again received.

If the OnStar® system loses battery power while the system is in a standby or sleep mode, the system will remain OFF until battery power is restored and the ignition is turned to the ON or RUN position.

Features

OnStar® Personal Calling

The hands free, OnStar® personal calling cellular phone feature is an additional feature of the OnStar® system.

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This feature is embedded within the telematics communication interface control module; however it must be activated by an OnStar® advisor. OnStar® personal calling operates similar to most hand held cellular phones in that the availability for its usage is based on minutes or units. The customer must have a current OnStar® subscription, as this feature cannot be utilized without it. To use OnStar® personal calling, the customer must also purchase units (minutes) as outlined in the owners guide provided with the OnStar® system. Units begin to deplete, 1 unit is equal to 1 minute, as the customer makes outbound phone calls, answers inbound phone calls, or while connected to the OnStar® virtual advisor. In addition, units may also have an expiration date, depending upon the type of units purchased.

Customers have the ability to store telephone numbers within the module, referenced by a nametag for the convenience of frequently dialed numbers. After storing a nametag, the user can dial this number by initiating the OnStar® personal calling feature, speaking the word "call," and repeating the nametag assigned.

Turn by Turn Navigation

Turn by Turn Navigation allows the driver to contact OnStar® to obtain directions for driving from a current location to a desired location. The Turn by Turn Navigation system stores your planned route and continually checks your position along that route, when you deviate from the planned route, the system will recognize this and prompt the driver with verbal prompts for how to proceed. The driver then responds verbally to direct the system to continue the current routing or to recalculate the route because of a missed turn.

Advisor Record Feature

The Advisor Record Feature allows the user to store any information given during a call with an OnStar® Advisor. Recording is activated by pressing the blue OnStar button during a call; pressing the button a second time stops the recording. The stored information can be played back by pressing the phone button on the three button assembly and using the voice command "Advisor Playback".

Deactivated OnStar® Accounts

In the event a customer has not renewed their OnStar® account after expiration or the account was never activated, OnStar® will make a discrete cellular call to the vehicle to deactivate the OnStar® system. Before taking this action, customers are notified that the OnStar® system in their vehicle will be deactivated unless they elect to renew the account. After the OnStar® account has been deactivated, customers will experience the following:

- The OnStar® status LED will not illuminate.
- The OnStar® system will NOT attempt to connect to the OnStar® Call Center in the event of a collision or if the vehicle's front air bags deploy for any other reason.
- An emergency button press will play a demo message indicating the service has been deactivated.
- An OnStar® Call Center button press will connect the customer with a dedicated sales team who can sell an OnStar® subscription and reactivate the vehicle. Depending on the type of OnStar® hardware in the vehicle, the customer may first hear a demonstration message stating there is no current OnStar® subscription for the vehicle, and directing the customer what to do to activate services.
- OnStar® personal calling will not be available, as this feature requires the customer to have a current OnStar® account. Attempts to use this feature may result in cellular connection failure messages and the inability to connect to the number dialed.

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Certain vehicles that have never had an active OnStar® account, or that have been deactivated, may be unable to establish a connection with the OnStar® Call Center. When normal published diagnostic procedures do not indicate a possible cause for the no connect concern, the vehicle may have been deactivated. For deactivated vehicles, a no connect response should be considered normal operation. Further diagnosis and subsequent repair is only necessary should the customer elect to become an active OnStar® subscriber or renew the account subscription.

OnStar® Cellular, GPS, and Diagnostic Limitations

The proper operation of the OnStar® System is dependent on several elements outside the components integrated into the vehicle. These include the National Cellular Network Infrastructure, the cellular telephone carriers within the network, and the GPS.

The cellular operation of the OnStar® system may be inhibited by factors such as the users range from an analog or digital cellular tower, the state of the cellular carrier's equipment, and the location where the call is placed. Making an OnStar® key press in areas that lack sufficient cellular coverage or have a temporary equipment failure will result in either the inability of a call to complete with a data transfer or the complete inability to connect to the OnStar® Call Center. The OnStar® system may also experience connection issues if the identification numbers for the module, station identification number, electronic serial number or manufacturers electronic ID, are not recognized by the cellular carriers local signal receiving towers.

The satellites that orbit earth providing the OnStar system with GPS data have almost no failures associated with them. In the event of a no GPS concern, the failure will likely lie with the inability of the system to gain GPS signals because of its location, i.e. in a parking structure, hardware failure, or being mistaken with an OnStar® call which has reached the Call Center without vehicle data.

During diagnostic testing of the OnStar® system, the technician should ensure the vehicle is located in an area that has a clear unobstructed view of the open sky, and preferably, an area where analog or digital cellular calls have been successfully placed. These areas can be found by successfully making an OnStar® keypress in a known good OnStar® equipped vehicle and confirming success with the OnStar® Call Center advisor. Such places can be used as a permanent reference for future OnStar® testing.

Mobile Identification Number and Mobile Directory Number

The telematics communication interface control module utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number and a mobile directory number. The mobile identification number represents the number used by the cellular carrier for call routing purposes while the mobile directory number represents the number dialed to reach the cellular device.

Operation of the OnStar® Speech Recognition Systems

OnStar® users communicate with 2 speech recognition systems. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over a phone line. The computer tries to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

- Personal Calling uses a speech recognition system that resides in the vehicle. When the user presses the phone button, the system states, Ready, and listens for the user's command. The user can speak commands to control the hands-free phone.

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- Virtual advisor is a remote speech recognition system that the caller can access by making a phone call. The user connects to virtual advisor by requesting it during personal calling use. The user is then transferred to the virtual advisor server and talks to it via a cellular connection.

The OnStar® speech recognition systems use speech technology that is designed to understand a wide range of American English speakers. Although there is no one right way to speak English, the system will work best when users try to modify their pronunciation should they encounter difficulty. Users who do not obtain good results are advised to try the tips and workarounds found in this section.

General Tips for Better Speech Recognition

Concern	Tip for Better Result
Noise	Noise may confuse the speech recognition system. You usually get better performance from the system in quieter conditions: • The HVAC fan creates noise. Turn it down or OFF for better speech system performance. • Driving at high speeds creates louder engine noise and wind noise. You may get better results at lower speeds. • An open window or an open sunroof allows more noise to enter the vehicle. Close all windows for better results. • Noisy rainstorms can also reduce performance. • If passengers are talking while you use the speech system, it may be confused by their speech. You will get better results if all occupants of the vehicle are quiet while the system is listening for commands.
When to Speak	In Personal Calling, the system is only listening after it prompts you to speak with a beep. • When the system prompts you to speak, you have about 5 seconds to respond. If the system does not hear a response, it will prompt you again, or cancel the transaction. • If you begin to speak too soon, try pausing for a half second before speaking after the beep. • In the Virtual Advisor, the system is always listening for commands, even while it is speaking.
How to Speak	Speak forcefully, and clearly. • The noisier the environment, the louder you need to speak. If you are in the driver seat, speak facing the front of the car. If you are a passenger, speak facing the rearview mirror. • Speak calmly, and naturally. The system may sometimes fail your repeated attempts to give a command. If your speech is distorted by shouting or frustration, this may cause more errors. • People with high-pitched voices may have better results by speaking in a deeper, lower-pitched voice. However, do not lower the volume of the voice.

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	• Avoid speaking with a rising intonation, like asking a question. Use a flat or falling intonation, like giving an answer.
What to Say	Personal Calling: One-word commands • The Personal Calling system listens for only one word at a time. There are some exceptions, 2-word phrases that are spoken and understood as a single word, e.g. "virtual advisor", "voice feedback", and "my number". You can enter phone numbers only one digit at a time, and the system repeats each digit as it hears it. • Say "Help" at the Ready prompt to hear the list of Personal Calling commands. • Virtual Advisor can understand sentences with more than one word. It also expects to hear a 4-digit number all at once when it asks for your PIN. • Say, "What are my choices?" to hear a list of commands that the Virtual Advisor understands.
Entering a phone number	• If you have trouble getting numbers correctly into the system, store your frequently-called number in the directory, so the system will remember them. After you have stored a number with a nametag, then you simply say "call" and the nametag in order to call the number. • If the system cannot understand your numbers, ask another person to help you enter your frequently-called numbers. This person can speak the numbers, then you can speak the nametag.
Storing or dialing a number	When you have finished speaking your phone number, you do not need to say "store" or "dial" to indicate that you are done. If you pause and say nothing, the system will ask you if you want to store or dial. Say "yes".
Creating nametags	• Short nametags that are similar may be easily confused by the system. You may get better recognition of your nametags if you make them longer, for example "George Washington" without pause, instead of "George" only. • If you want to use nametags while driving, it is best to store the nametag with some vehicle noise in the background. If you are in park while you are storing nametags, you can turn the fan on low or open windows in order to create some background noise.
Virtual Advisor 4-digit PIN	Say the 4 digits in a natural way, without pausing between digits.
Interrupting	• When the Virtual Advisor is speaking, you can interrupt it with another command. The first word in your command helps to get its attention. • If the Virtual Advisor has trouble understanding your commands when you interrupt, try speaking the first word loudly and clearly, then pause for an instant, then continue with the rest of the command. For example: "Get .. my weather" or "Lookup... a quote for General Motors".

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RADIO/AUDIO SYSTEM DESCRIPTION AND OPERATION

The entertainment system on this vehicle may have several different configurations available to it. To determine the specific configuration of the vehicle, please see the Service Parts ID Label, and refer to **RPO Code List** .

The entertainment system on this vehicle is configured with either a base or an uplevel system. The base and uplevel systems each contain a radio, antenna, speakers, and on some systems an audio amplifier. The uplevel system differs from the base system by providing the customer with enhanced audio system features. Some of those features may include more speakers, an audio amplifier, programmable equalizer, and Digital Audio Broadcast.

Each item in the list below represents topics covered in detail below.

- Radio Circuit Operation
- Radio/HVAC Communications
- Radio/HVAC Controls
- Antenna System
- AM/FM Reception
- Digital Audio Broadcast (if equipped)
- Speaker Operation
- Audio Amplifier (if equipped)
- Radio Data System (RDS) (if equipped)
- Radio Data System (RDS) Messages (if equipped)
- MP3/CD Formatting Information for MP3/CD Radios (if equipped)
- Integral Multi Disc CD Changer (if equipped)
- Rear Seat Audio (RSA) (if equipped)
- Theft Deterrent
- Radio Error Messages
- OnStar (If equipped)
- Universal Handsfree Phone (if equipped)
- Steering Wheel Controls (if equipped)
- Auxiliary Input Jack (if equipped)
- USB Port (if equipped)
- Multimedia Player Interface Module (if equipped)
- Speed Controlled Volume (SCV) (if equipped)

Radio Circuit Operation

Radio Power

The radio is supplied power by a fused B+ circuit. The radio does not use a discrete ignition feed circuit for power moding. The power mode master provides the system power mode to the radio via serial data messages.

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The power mode master determines the system power mode by processing power mode information from ignition switch inputs. Power modes supported by the radio are OFF, ACCESSORY, RUN, RAP and CRANK REQUEST.

Radio Grounds

The vehicle harness provides a ground for the radio circuits. The radio may also be case grounded.

Radio Data Link Communication

The radio communicates with other modules via serial data.

Radio Outputs

At minimum volume, the plus (+) and minus (-) speaker outputs are approximately half battery voltage, measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other either driving the voice coil of the speaker, or being fed to an amplifier.

Radio Head Dimming

Dimming and backlighting levels are determined by the serial data messages the radio receives.

Radio/HVAC Controls

The radio/HVAC controls is a separate component from the radio. The radio/HVAC controls contain the radio control knobs and buttons for all audio functions. Additionally the radio/HVAC controls contain the radio information display.

The radio/HVAC controls operate radio functions through serial data messages. The radio/HVAC controls communicate to the radio through CGI serial data.

When equipped with the optional navigation radio, the radio/HVAC controls communicate directly to the navigation radio, and the display communicates information through the signal circuits to the navigation radio.

When the operator rotates a radio control knob to change radio stations or increase the volume a message is sent to the radio over serial data. After receiving the message the radio will make the adjustment. Messages communicated between the radio and the radio/HVAC controls and info display include the following:

- Button presses/knob rotations
- Info display module dimming
- Radio/HVAC controls back-lighting
- Graphics and text information

HVAC data for controls and status indicators is communicated between the radio/HVAC controls and the HVAC control module with a separate LIN serial data circuit. HVAC status screen information from the HVAC control module is transmitted to the radio on the GMLAN serial data circuit. The radio then displays the desired screen information on the info display using the CGI circuits.

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Antenna System

NOTE: Radio systems with the antenna(s) in the glass are subject to possible interference when an aftermarket window tint is applied.

Multi-Band Antenna (If equipped)

The multi-band antenna is located on the roof of the vehicle. This type of antenna may be used with the AM/FM radio, but is primarily for OnStar® and the XM™ Satellite Radio Service System, if the vehicle has these features. Keep this antenna clear of snow and ice build up for clear reception. If the vehicle has a sunroof, the performance of the system may be affected if the sunroof is open. Loading items onto the roof of the vehicle can interfere with the performance of the system, ensure the multi-band antenna is not obstructed.

Diversity Antenna (If equipped)

The diversity antenna system may use both the back window with an applique on the rear glass and an antenna internal to the antenna module. Any damage to the rear antenna requires replacing the glass. This system is designed to deliver the best radio signal reception possible. Two antennas are used to form a diversity system. The primary antenna is part of the rear window and looks similar to the defogger grid. This antenna receives both AM and FM signals. The secondary antenna is part of the antenna module.

The antenna reception signals are sorted out by the radio antenna module. The radio antenna module is enabled when the radio is turned on. Superimposed on the powered antenna coax is the strength of the signal being received by the antenna module. The antenna module switches between the antennas, monitoring the radio signal strength and combines the signals and phase aligns them to create one strong signal.

Fixed Mast Antenna (If equipped)

The fixed mast antenna can withstand most car washes without being damaged. If the mast should ever become slightly bent, straighten it out by hand. If the mast is badly bent, replace it.

AM/FM Reception

Radio Signal

The radio signal is sent from a broadcast station and is then received by an antenna. The strength of the signal received depends on the following:

- The power output (wattage) of the broadcasting station
- The location of the vehicle (or receiver) relative to the broadcast tower.
- Obstacles between the tower and the receiver
- Atmospheric conditions
- What band (AM or FM) the station is broadcasting
- Type of antenna and the ground plane

AM Reception

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The AM band has a lower frequency range than the FM band. These longer wavelengths:

- Bend around Obstacles
- Follow the curvature of the earth
- May reflect off the ionosphere (skip)

The AM frequencies have longer range due to the ground wave. The ground wave follows the curvature of the earth and is effected by its conductivity. Greater conductivity equates to less signal loss thus transmission over water is better than over land. The AM band has a range of 80-320 km (50-200 miles).

FM Reception

The shorter wavelengths of the higher frequency FM band:

- Reflect off obstacles
- Are absorbed by the ground
- Penetrate the ionosphere

Broadcasts in the FM band are limited to line of sight reception which is typically 40 km (25 miles). Even when out of a direct line of sight, the signal may be reflected into areas that would be in a shadow otherwise. Factors which affect the line of sight include:

- Height of the broadcast antenna
- Height of the receiving antenna
- Terrain and buildings in the broadcast path

Digital Audio Broadcast (If Equipped)

The Digital Radio Broadcast is emitted terrestrial repeaters. A service fee may be required in order to receive the Digital Audio Broadcast service.

The Digital Audio Broadcast receiver is external to the Radio.

Speaker Operation

Speakers turn electrical energy into mechanical energy to move air, using a permanent magnet and an electromagnet. The electromagnet is energized when the radio or amplifier (if equipped) delivers current to the voice coil on the speaker. The voice coil will form a north and south pole that will cause the voice coil and the speaker cone to move in relation to the permanent magnet. The current delivered to the speaker is rapidly changing alternating current (A/C). This causes the speaker cone to move in two directions producing sound. When the speaker is at rest, such as when the volume at a minimum value, the voltage applied to each side of the speaker is 1/2 ignition system voltage. This way, the speaker cone can be moved in either direction.

Audio Amplifier (If Equipped)

Amplifier Interface

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A fused battery voltage circuit provides the main amplifier power. A switched 12-volt output from the radio is used to control the power - state of the amplifier. To respond quickly to audio input and control signals, the amplifier is ON in all vehicle power modes except OFF and CRANK Request. The internal amplifier bridges are fully powered and unmuted when the amplifier receives the switched 12-volt input. This type of amplifier does not have serial data communication capability, and can not set DTCs.

Amplifier Operation

The purpose of the amplifier is to increase the power of a voltage or current signal. The output signal of an amplifier may consist of the same frequencies as the input signal or it may consist of only a portion of the frequencies as in the case of a subwoofer or midrange speaker. The radio creates a low level stereo audio output signal, which is sent at the user-defined volume level to the audio amplifier. The audio amplifier amplifies the signal and sends it to the appropriate speakers.

Radio Data System (RDS) (If Equipped)

The radio may be equipped with the Radio Data System (RDS). The RDS feature is available only on FM stations that broadcast RDS information. This system relies upon receiving specific information from these stations and only works when the information is available. While the radio is tuned to an FM-RDS station, the station name or call letters display.

RDS data is carried in what is known as a "subcarrier". A subcarrier is a frequency that the FM broadcaster is authorized to use to send data that is not audible in the main audio program.

- RDS functions will only work with FM broadcast stations that are broadcasting RDS data.
- Not all FM Broadcast stations broadcast RDS data or offer all of the RDS services.
- The information displayed is dependent upon the information broadcast by the particular station. The information may vary greatly between stations.
- RDS functions may not work properly when reception is weak, reception is of poor quality, or RDS is not implemented properly by the FM Broadcaster.
- In some cases, a radio station broadcasting incorrect information may cause the RDS features of the radio to appear to work improperly.

With RDS, the radio can do the following:

- Seek to stations broadcasting the selected type of programming
- Receive announcements concerning local and national emergencies
- Display messages from radio stations

RDS may display text information such as:

- The name of the station.
- The type of program.
- General information such as artist and song title, call in phone numbers, etc.

RDS Messages

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- ALERT!: Alert warns of local or national emergencies. When an alert announcement comes on the current radio station, ALERT! displays. You will hear the announcement, even if the volume is low or a CD is playing. If a CD is playing, play stops during the announcement. Alert announcements cannot be turned off. ALERT! is not affected by tests of the emergency broadcast system. This feature is not supported by all RDS stations.
- INFO (Information): If the current station has a message, the information symbol or INFO displays. Press this button to see the message. The message can display the artist, song title, call in phone numbers, etc. If the entire message can not be displayed, parts of the message appear every three seconds. To scroll through the message, press and release the INFO button. A new group of words displays after every press of this button. Once the complete message has displayed, the information symbol or INFO disappears from the display until another new message is received. The last message is displayed by pressing the INFO button. View the last message until a new message is received or you tune to a different station.

MP3/CD Formatting Information for MP3/CD Radios

The MP3/CD equipped radios will play standard audio CDs, and MP3/WMA files that were recorded on a CD-R or CD-RW disc. Customers who record their own music CDs should be aware of the following:

- The radio will only play audio from a CD-R/RW, it cannot record audio.
- Standard audio and MP3/WMA files should not be mixed on a disc.
- Song title, artist name, and album can display when files are recorded using ID3 tags version 1 and 2.
- Long file, folder, or playlist names, or a combination of a large number of files and folders, or playlists can cause the player to be unable to play up to the maximum number of files, folders, playlists, or sessions.
- The radio supports multi-session discs, but only the files from the last session will be played.

Integral Multi Disc CD Changer (If Equipped)

The integral multi disc CD changer has the capability of storing and playing up to six (6) compact discs. The integral multi disc CD changer has a shock-absorbing system. Only under extreme operating temperatures or severe shock or vibration should the compact disc player skip or mute. If the customer travels an abnormally rough road, a skip condition may be normal. Test drive the vehicle on a normal road with a known good CD. If the condition is still present, replace the radio. The use of CD lens cleaner discs is not advised, due to the risk of contaminating the lens of the CD optics with lubricants internal to the CD mechanism.

The CD mechanism within the radio will begin an initialization routine after a battery connect (e.g., connecting radio connector X1). The initialization process takes approximately 25 seconds to complete. It is very critical that the initialization is completed before removing battery power from the radio, in order for the complex moving parts of the CD mechanism to be positioned properly before shipping and/or handling purposes. Damage may result to the moving parts of the CD mechanism if battery power is removed during the initialization routine. The damage occurs to the CD mechanism during subsequent shipping or handling operations. The extent of the damage causes the CD mechanism not to recover and the mechanism becomes inoperative.

Rear Seat Audio (RSA) (If Equipped)

The rear seat audio (RSA) feature allows rear seat passengers to listen to a different audio program than the

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front seat passengers. When RSA is ON, the rear vehicle speakers are muted, and the rear passengers can select their own audio program to listen to using the headphones.

The rear seat passengers can only control the sources that are not being listened by the front seat passengers. For example, rear seat passengers can listen to and control CDs or DVDs through the headphones while the driver listens to the radio through the front speakers. The front seat audio controls always have priority over the RSA controls. If the front seat passengers switch the source for the main radio to a remote source, the RSA is not able to control the source. The rear seat audio can be operated while the main radio is OFF, and the key is ON/RUN, ACC/ACCESSORY, or when retained accessory power (RAP) is active. The rear seat passengers have control of the volume for each set of individual headphones.

Depending on the audio system, the rear speakers may continue to play when the RSA is active through the headphones.

Theft Deterrent

The radio theft deterrent system is intended to disable radio functionality if incorrect vehicle information is received by the radio. The radio disables functionality if the vehicle identification number (VIN) sequence received by the radio (A VIN sequence is usually the last six digits of the VIN.) does not match the VIN information learned by the radio. The radio receives this information in a serial data frame form.

The radio provides the following theft operating modes as part of the radio theft deterrent system:

- No VIN Mode - A radio that has not received or learned a VIN. In this mode the radio has limited functionality.
- Normal Mode - A radio has received a VIN sequence. The radio only learns the VIN sequence if the VIN sequence contained all six digits. In this mode the radio has full functionality.
- Theft Detected Mode - A radio that had previously learned a VIN sequence and subsequently received a VIN sequence not matching the learned sequence. In this mode the radio has limited functionality.

Radio Error Messages

The Radio may display the following Error Messages (Not all messages may be applicable):

- ERR: This message is displayed when the radio is unable to play the inserted cassette or CD
- LOC: This message is displayed when the radio has entered Theft mode.
- CAL/CAL ERR: This message is displayed when the radio has detected an invalid calibration.
- CDX ERR: Displays if communication is lost with the remote CD changer.
- CHECK CD: Displays when the player encounters a focus or tracking error.
- CHK CDXX: Displays when the CD changer encounters a focus or tracking error.
- DOOR OPEN: Displays when the CD changer door has been left open.
- NO DISC: Displays when the radio expected a disc to be inserted.
- NONE: Displays when the radio is unable to detect the vehicle speed data information via the serial data circuit.

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If an error message is displayed, perform the appropriate diagnostics.

OnStar ® (If equipped)

When OnStar is activated, a serial data message is sent to the radio that activates a software program. When the software begins its process, the fade goes to the front, Bass and Treble are set to the mid range, the outputs are mono, and the audio source is OnStar. OnStar takes priority over any other audio source. All of these actions are preset values stored in the radio.

Universal Handsfree Phone (If Equipped)

When the universal handsfree phone is activated, a serial data message is sent to the radio that activates a software program. When the software begins its process, the fade goes to the front, Bass and Treble are set to the mid range, the outputs are mono, and the audio source is the universal handsfree phone. The phone takes priority over any other audio source. All of these actions are preset values stored in the radio.

Steering Wheel Controls (If Equipped)

Some audio functions are available using the steering wheel controls. The steering wheel controls duplicate the function of the primary controls available on the radio.

For additional information on steering wheel controls, refer to **Steering Wheel Controls Description and Operation** .

Auxiliary Input Jack (If Equipped)

A remote 3.5 mm auxiliary stereo jack and USB connector allows playback of audio signals from remote devices (e.g., laptop computer, iPod®, MP3 player, etc.). The radio detects the presence or absence of an audio mini-plug through the AuxJackDetect input. The Aux Detect Switch is normally closed and when the audio mini-plug is inserted, the circuit is open.

This is not an audio output; do not plug a headphone set into the front auxiliary input jack.

USB Port (If Equipped)

The USB connector uses the USB standards, 1.1 and 2.0. This type of connector supports rates for low speed (1.5 Mb/s), full speed (12 Mb/s), and high speed (480 Mb/s).

USB Supported Devices:

- USB Flash Sticks (Thumb Drives)
- Portable USB Hard Drives
- CompactFlash (or other portable media) adapters

Depending on the USB mass storage device, some devices may not be recognized. The HUB device is not supported. An iPod® can be controlled using the radio buttons and knobs and display the iPod® song information on the radio display. A special iPod® connection cable is needed. This feature supports the following iPod® models:

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- Fifth generation or later iPod®
- First or Second generation or later iPod® Nano

For proper operation, make sure the iPod® has the latest firmware from Apple®. The iPod® firmware can be updated using the latest iTunes application. See apple.com/itunes. To connect and control the iPod®, connect the iPod® to the USB port. If the vehicle is on and the USB connection is present, a GM logo appears on the iPod®. The iPod® music displays on the radio display and begins playing through the vehicle radio system.

Multimedia Player Interface Module (If Equipped)

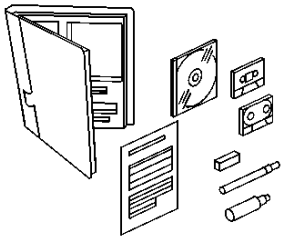
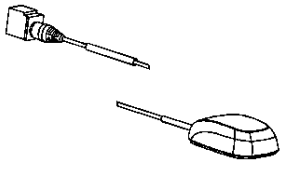
The vehicle may be equipped with a Multimedia Player Interface Module. This module receives multiple incoming digital media signals (USB, Bluetooth, iPOD®, ZUNE®, etc), then transforms the signals into audio inputs to the radio.

Speed Controlled Volume (If Equipped)

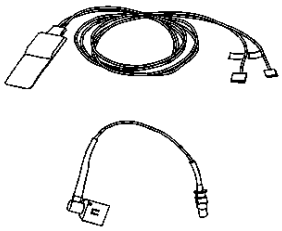
With Speed Controlled Volume, the audio system will adjust automatically to make up for road and wind noise as you drive, by increasing the volume as vehicle speed increases.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	J 39916-A CD and Cassette Diagnostic Audio Kit
	EL-48028 Digital Radio Test Antenna

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	EL-49903 OnStar Antenna Diagnostic Tool Kit

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2010 ENGINE

Cruise Control - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

CRUISE CONTROL SCHEMATICS

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Fig. 1: Cruise Control
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3794	B3794 08: Cruise Control Function Request Circuit Signal Invalid B3794 61: Cruise Control Function Request Circuit Actuator Stuck
DTC P0564, P0567, or P0568	P0564: Cruise Control Multifunction Switch Circuit P0567: Cruise Control Resume Switch Circuit

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	P0568: Cruise Control Set Switch Circuit
DTC P0571	P0571: Cruise Control Brake Switch Circuit
DTC P0572 or P0573	P0572: Brake Switch Circuit 1 Low Voltage P0573: Brake Switch Circuit 1 High Voltage
DTC P0575	P0575: Cruise Control Switch Signal Circuit
DTC P0703	P0703: Brake Switch Circuit 2

DTC B3794

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3794 08

Cruise Control Function Request Circuit Signal Invalid

DTC B3794 61

Cruise Control Function Request Circuit Actuator Stuck

Diagnostic Fault Information

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
B+	1	1	1	-
Signal	1	P0564	B3794 08, P0567, P0568	B3794 61, P0564
1. Cruise Control Malfunction				

Circuit/System Description

The cruise control switch is an input to the body control module (BCM). The BCM monitors the cruise control on/off, set/coast, resume/accelerate and cancel switches via the cruise control switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control switch signal circuit when a switch is applied. The BCM sends a serial data message to the engine control module (ECM) indicating the status of the cruise control switches.

Conditions for Running the DTC

- The cruise switch is ON.

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- The ignition is ON.

Conditions for Setting the DTC

B3794 08

The BCM detects an invalid voltage signal on the cruise control switch signal circuit for 1 second.

B3794 61

Stuck switch for either Resume/Accel or Set/Coast button for 60 seconds.

Actions Taken When the DTC Sets

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

Engine ON, while rotating the steering wheel to both steering stops, observe the scan tool Cruise Control Switch parameter while pressing each of the cruise control switches. The parameter should toggle between On, Off, Resume, Set, and Cancel as the applicable switch is pressed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S70L steering wheel control switch-left.
2. Ignition ON, test for B+ between the B+ circuit terminal 1 and ground.
    - If less than the specified value, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 3.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition OFF, disconnect the X3 harness connector at the K9 BCM.
5. Test for infinite resistance between the signal circuit terminal 9 and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70L steering wheel control switch-left.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Cruise Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DTC P0564, P0567, OR P0568

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC P0564

Cruise Control Multifunction Switch Circuit

DTC P0567

Cruise Control Resume Switch Circuit

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DTC P0568

Cruise Control Set Switch Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
B+	1	1	1	-
Signal	1	P0564	B3794 08, P0567, P0568	B3794 61, P0564
1. Cruise Control Malfunction				

Circuit/System Description

The cruise control switch is an input to the body control module (BCM). The BCM monitors the cruise control on/off, set/coast, resume/accelerate and cancel switches via the cruise control switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control switch signal circuit when a switch is applied. The BCM sends a serial data message to the engine control module (ECM) indicating the status of the cruise control switches.

Conditions for Running the DTC

- The cruise switch is ON.
- The ignition is ON.

Conditions for Setting the DTC

- The BCM detects an invalid voltage signal on the cruise control switch signal circuit for greater than 2 seconds and sends a serial data message to the ECM. The ECM sets these DTCs when the message is received.
- The ECM runs this diagnostic every 0.05 second.

Actions Taken When the DTC Sets

DTCs P0564, P0567, or P0568 are type C DTCs.

Conditions for Clearing the DTC

DTCs P0564, P0567, or P0568 are type C DTCs.

Reference Information

Schematic Reference

Cruise Control Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Engine ON, while rotating the steering wheel to both steering stops, observe the scan tool Cruise Control Switch parameter while pressing each of the cruise control switches. The parameter should toggle between On, Off, Resume, Set, and Cancel as the applicable switch is pressed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S70L steering wheel control switch - left.
2. Ignition ON, test for B+ between the B+ circuit terminal 1 and ground.
    - If less than the specified value, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 3.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition OFF, disconnect the X3 harness connector at the K9 BCM.
5. Test for infinite resistance between the signal circuit terminal 9 and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70L steering wheel control switch - left.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Cruise Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DTC P0571

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category

DTC Descriptor

DTC P0571

Cruise Control Brake Switch Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Stop Lamp Switch Signal	-	-	-	P0571

Circuit/System Description

The stop lamp switch signal circuit is a voltage input from the body control module (BCM) to the engine control module (ECM). The ECM monitors the stop lamp switch circuit to detect when the brake pedal has been applied. The BCM monitors the brake pedal position sensor to determine when the brake pedal is applied. When the brake pedal is applied, the BCM supplies a voltage signal on the brake applied signal circuit and also sends a serial data message to the ECM indicating that the brake pedal has been applied.

Conditions for Running the DTC

- The vehicle has cycled from 0-60 km/h (0-37 mph) 3 times in 1 ignition cycle.
- Continuous once the previous criteria have been met.

Conditions for Setting the DTC

This DTC will set if the serial data message and the voltage signal on the discrete brake signal circuit do not match for 10 consecutive times when this diagnostic is run. This condition must be present for greater than 2 seconds.

Actions Taken When the DTC Sets

DTC P0571 is a type C DTC.

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Conditions for Clearing the DTC

DTC P0571 is a type C DTC.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the Stoplamp Pedal Switch parameter while applying and releasing the brake pedal. The reading should change between Applied/Released, and all brake lights should turn ON and OFF accordingly.

Circuit/System Testing

1. Ignition OFF, disconnect the appropriate harness connector listed below at the ECM:
   - X1 (L99/LS3)
   - X2 (LLT)
2. Connect a test lamp between the appropriate signal circuit terminal listed below and ground:
   - Terminal 9 (L99/LS3)
   - Terminal 52 (LLT)

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3. Ignition ON, press and release the brake pedal. Verify the test lamp turns ON and OFF when pressing and releasing the brake pedal.
    - If the test lamp is always ON, test the signal circuit for a short to voltage. If the circuit tests normal, replace the BCM.
    - If the test lamp is always OFF, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
4. If all circuits test normal, replace the ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM or ECM replacement, setup, and programming

DTC P0572 OR P0573

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC P0572

Brake Switch Circuit 1 Low Voltage

DTC P0573

Brake Switch Circuit 1 High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
Stop Lamp Switch Signal	P0572	P0572	P0573	P0572, P0573

Circuit/System Description

The stop lamp switch signal circuit is a B+ input from the body control module (BCM) to the engine control module (ECM). The ECM monitors the stop lamp switch circuit to detect when the brake pedal has been applied. The BCM monitors the brake pedal position sensor to determine when the brake pedal is applied. When the brake pedal is applied, the BCM supplies B+ on the stop lamp switch signal circuit and also sends a serial data message to the ECM indicating that the brake pedal has been applied.

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Conditions for Running the DTC

- The engine is running.
- Battery voltage is greater than 11.5 V.

Conditions for Setting the DTC

P0572

This DTC will set when the ECM detects a short to ground or an open on the discrete brake signal circuit when the serial data message from the BCM indicates the brakes are applied. This diagnostic will run when the serial data message and the voltage signal on the brake switch signal circuit do not match for 8 out 10 times, and the condition is present for greater than 2 seconds.

P0573

This DTC will set when the ECM detects a short to voltage on the discrete brake signal circuit when the serial data message from the BCM indicates the brakes are NOT applied. This diagnostic will run when the serial data message and the voltage signal on the brake switch signal circuit do not match for 8 out 10 times, and the condition is present for greater than 2 seconds.

Actions Taken When the DTC Sets

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 (L99/LS3) or X2 (LLT) harness connector at the K20 ECM.
2. Connect a test lamp between the appropriate signal circuit terminal listed below and ground.
   - Terminal 9 (L99/LS3)
   - Terminal 52 (LLT)
3. Ignition ON, verify the test lamp turns ON and OFF when pressing and releasing the brake pedal.
   - If the test lamp is always ON, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
   - If the test lamp is always OFF, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, replace the K20 ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM or ECM, replacement, setup, and programming

DTC P0575

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0575

Cruise Control Switch Signal Circuit

Circuit/System Description

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When a cruise control function switch is activated, the body control module (BCM) detects a predetermined voltage. The BCM sends a serial data message to the engine control module (ECM) indicating the function that has been requested.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The ECM receives an invalid cruise control switch status serial data message from the BCM.
- This diagnostic runs continuously.

Actions Taken When the DTC Sets

DTC P0575 is a type C DTC.

Conditions for Clearing the DTC

DTC P0575 is a type C DTC.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B3794 is not set.
   - If DTC is set, refer to **DTC B3794**.
2. Road test the vehicle and attempt to engage cruise. Verify that cruise control engages properly and the DTC P0575 is not set.
   - If DTC is set, replace the K9 BCM. Clear the DTC, road test the vehicle and attempt to engage cruise. If the DTC resets, replace the K20 ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM or ECM replacement, setup, and programming

DTC P0703

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0703

Brake Switch Circuit 2

Circuit/System Description

The body control module (BCM) monitors the brake pedal position sensor. When the brake pedal is applied, the BCM detects a predetermined voltage signal. The BCM sends a serial data message to the engine control module (ECM) indicating the status of the stop lamps.

Conditions for Running the DTC

The engine is ON.

Conditions for Setting the DTC

- The ECM receives an invalid brake pedal status serial data message from the BCM.
- This diagnostic runs continuously.

Actions Taken When the DTC Sets

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- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC P0572 or P0573 is not set.
   - If DTC is set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Verify that DTC P0703 is not set.
   - If DTC is set, replace the K9 BCM. Clear the DTC and road test the vehicle. If DTC resets, replace the K20 ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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Control Module References for BCM or ECM replacement, setup, and programming

SYMPTOMS - CRUISE CONTROL

NOTE: The following steps must be completed before using the symptom tables.

1. Before using the symptom diagnostic table, perform the **Diagnostic System Check - Vehicle** in order to verify the following conditions:
   - There are no DTCs set.
   - The module can communicate via the serial data.
2. Review the system operation in order to understand the system functions. Refer to **Cruise Control Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which can affect the operation of the Cruise Control System. Refer to **Checking Aftermarket Accessories** .
- Inspect the accessible system components or the visible system components for obvious damage or for obvious conditions which can cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Cruise Control Malfunction**
- **Cruise Control Indicator Malfunction**

CRUISE CONTROL INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The instrument panel cluster (IPC) illuminates the cruise control engaged indicator based on serial data messages received from the engine control module (ECM). The indicator is commanded ON when the cruise control system is controlling vehicle speed, and turned OFF with the system disengaged.

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Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

- **Cruise Control Description and Operation**
- **Indicator/Warning Message Description and Operation**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, with a scan tool command the IPC display test ON and OFF. The cruise control light should turn ON and OFF.
    - If the cruise control light does not turn ON and OFF, replace the IPC.
2. Replace the ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM or IPC replacement, setup, and programming

CRUISE CONTROL MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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Diagnostic Fault Information

Circuit	Short to Ground	Open or High Resistance	Short to Voltage	Signal Performance
B+	1	1	1	-
Cruise Control Switch Signal	1	P0564	B3794 08, P0567, P0568	B3794 61, P0564
1. Cruise Control Malfunction				

Circuit/System Description

The cruise control switch is an input to the body control module (BCM). The BCM monitors the cruise control on/off, set/coast, resume/accelerate and cancel switches via the cruise control switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control switch signal circuit when a switch is applied. The BCM sends a serial data message to the engine control module (ECM) indicating the status of the cruise control switches.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Engine ON, while rotating the steering wheel to both steering stops, observe the scan tool Cruise Control Switch parameter while pressing each of the cruise control switches. The parameter should toggle between On,

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Off, Resume, Set, and Cancel as the applicable switch is pressed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S70L steering wheel control switch-left.
2. Ignition ON, test for B+ between the B+ circuit terminal 1 and ground.
    - If less than the specified value, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 3.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition OFF, disconnect the X3 harness connector at the K9 BCM.
5. Test for infinite resistance between the signal circuit terminal 9 and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70L steering wheel control switch-left.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Cruise Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

REPAIR INSTRUCTIONS

CRUISE CONTROL SWITCH REPLACEMENT

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Fig. 2: Cruise Control Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the inflatable restraint steering wheel module. Refer to **Steering Wheel Inflatable Restraint Module Airbag Replacement** .	
1	Steering Wheel Spoke Control Switch Bezel Refer to **Steering Wheel Spoke Control Switch Bezel Replacement**
2	Cruise Control Switch Assembly **Procedure** 1. Disconnect the electrical connectors.

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	2. Make sure the steering wheel control switches are properly seated to the steering wheel trim cover during installation.

DESCRIPTION AND OPERATION

CRUISE CONTROL DESCRIPTION AND OPERATION

Cruise control is a speed control system that maintains a desired vehicle speed under normal driving conditions at speeds above 40 km/h (25 mph). Steep grades may cause variations in the selected vehicle speeds.

The following are the main components of the Cruise Control System:

- The accelerator pedal
- The brake pedal position (BPP) sensor
- The body control module (BCM)
- The cruise on/off switch
- The cruise control cancel switch
- The + RES switch (equivalent to resume/accel switch)
- The - SET switch (equivalent to set/coast switch)
- The engine control module (ECM)
- The throttle actuator control (TAC) motor
- The vehicle speed sensor

The body control module (BCM) monitors the signal circuit of the cruise control switches, which are located on the steering wheel. The BCM relays the cruise control switch status to the engine control module (ECM) via the serial data circuit. The ECM uses the status of the cruise control switch to determine when to capture and maintain the vehicle speed. The ECM monitors the vehicle speed signal circuit in order to determine the desired vehicle speed. The ECM uses the TAC motor in order to maintain the vehicle speed.

Voltage is supplied to the cruise control switch via the steering wheel control switch reference voltage circuit supplied by the BCM. The cruise control function switches are arranged in a resistive ladder design, with each cruise control function switch having a different resistance value. The BCM detects a specific voltage value that is associated with the cruise control function switch being activated. The BCM sends a serial data message to the ECM indicating that the on/off switch is active. Similarly, when the normally open + RES switch or the normally open - SET switch are pressed, the switch closes and the BCM detects the predetermined voltage signal on the cruise control resume/accel and set/coast switch signal circuit. The BCM sends a serial data message to the ECM indicating that the + RES switch or the - SET switch is active. The + RES switch or the - SET switch will remain inactive when the BCM has not received the predetermined voltage signal from the on/off switch.

Cruise Control Engaged

The Cruise Control System will engage and adjust vehicle speeds, based on the activation of the following cruise control switches, which are located on the steering wheel:

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- On/Off
- + RES
- - SET

To engage the Cruise Control System, ensure that the vehicle speed is above 40.2 km/h (25 mph), turn the cruise On/Off switch ON and momentarily press the - SET switch. The ECM will engage the Cruise Control System and record the vehicle speed. The ECM sends a serial data message to the instrument panel cluster (IPC) in order to illuminate the Cruise Engaged indicator in the IPC.

Pressing the accelerator pedal while the Cruise Control System is engaged, allows the driver to override the Cruise Control System in order to accelerate the vehicle beyond the current set vehicle speed. When the accelerator pedal is released, the vehicle will decelerate and resume the current set vehicle speed. The driver can also override the current set vehicle speed via the - SET switch and the + RES switch. When the Cruise Control System is engaged, pressing and holding the - SET switch will allow the vehicle to decelerate from the current set vehicle speed without deactivating the Cruise Control System. When the - SET switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the - SET switch will allow the vehicle to decelerate at 1.6 km/h (1 mph) increments for each time that the - SET is momentarily pressed, with a minimum vehicle speed of 37 km/h (23 mph).

Pressing and holding the + RES switch, when the Cruise Control System is engaged, will allow the vehicle to accelerate to a greater vehicle speed than the current set vehicle speed. When the + RES switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the + RES switch will allow the vehicle to accelerate at 1.6 km/h (1 mph) increments for each time that the + RES switch is momentarily pressed, with the maximum acceleration total of 16 km/h (10 mph) over the current set vehicle speed. Momentarily activating the + RES switch will recall the previous vehicle speed, after the cruise control system is disengaged by pressing the brake pedal, or CANCEL switch.

Cruise Control Disengaged

The engine control module (ECM) disengages the cruise control operation based on the signals from the following switches:

- The brake pedal position (BPP) sensor
- The On/Off switch
- The cruise control cancel switch

The Cruise Control System will disengage when the brake pedal is applied. The body control module (BCM) monitors the BPP sensor via the BPP sensor signal circuit as the voltage signal increases while the pedal reaches the fully applied position. The ECM monitors the BPP signal through a discrete input and a serial data message signal from the BCM indicating the brake status. When both signals indicate the brake pedal is applied, the ECM will disengage the cruise control system.

The Cruise Control System will also disengage when the cruise control on/off switch is switched OFF, or the cruise control cancel switch is activated. The body control module (BCM) determines when the cruise control cancel switch is activated. When the normally open cancel switch is closed, the BCM detects the predetermined

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voltage signal on the cruise control function switch circuit. The vehicle speed stored in the memory of the engine control module will be erased when the cruise control On/Off switch is turned OFF, or the ignition switch is turned OFF. The BCM sends a serial data message to the ECM in order to disengage the cruise control system. The Cruise Control System will disengage when the ECM detects that a driver override function has been active for approximately 60 seconds. When the Cruise Control System has been disengaged, the ECM sends a serial message to the instrument panel cluster (IPC) in order to turn OFF the Cruise Engaged indicator.

Every time the Cruise Control System is disengaged, the ECM will keep track of the reason for system disengagement. The last 8 disengagement reasons will be recorded within the ECM memory. The scan tool will display the last 8 Cruise Disengage History parameters, in which one out of approximately 50 possible reasons will be displayed in each of these 8 parameters. For the disengagement reason to be displayed within the scan tool parameter either the Cruise Control System is active and disengagement is requested, or engagement of the system is requested but a fault is present.

Cruise Control Inhibited

The engine control module (ECM) inhibits the cruise control operation when any of the following conditions exist:

- The ECM has not detected a brake pedal activation from the body control module (BCM).
- A Cruise Control System DTC has been set.
- The vehicle speed is less than 40.2 km/h (25 mph).
- The vehicle speed is too high.
- The vehicle is in PARK, REVERSE, NEUTRAL, or 1st gear.
- The engine RPM is low.
- The engine RPM is high.
- The system voltage is not between 9 volts and 16 volts.
- The Antilock Brake System (ABS)/Traction Control System (TCS) is active for more than 2 seconds.

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Data Communications - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

DATA COMMUNICATION SCHEMATICS

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Fig. 1: High Speed GMLAN
Courtesy of GENERAL MOTORS CORP.

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Fig. 2: High Speed GMLAN - BUS 2
Courtesy of GENERAL MOTORS CORP.

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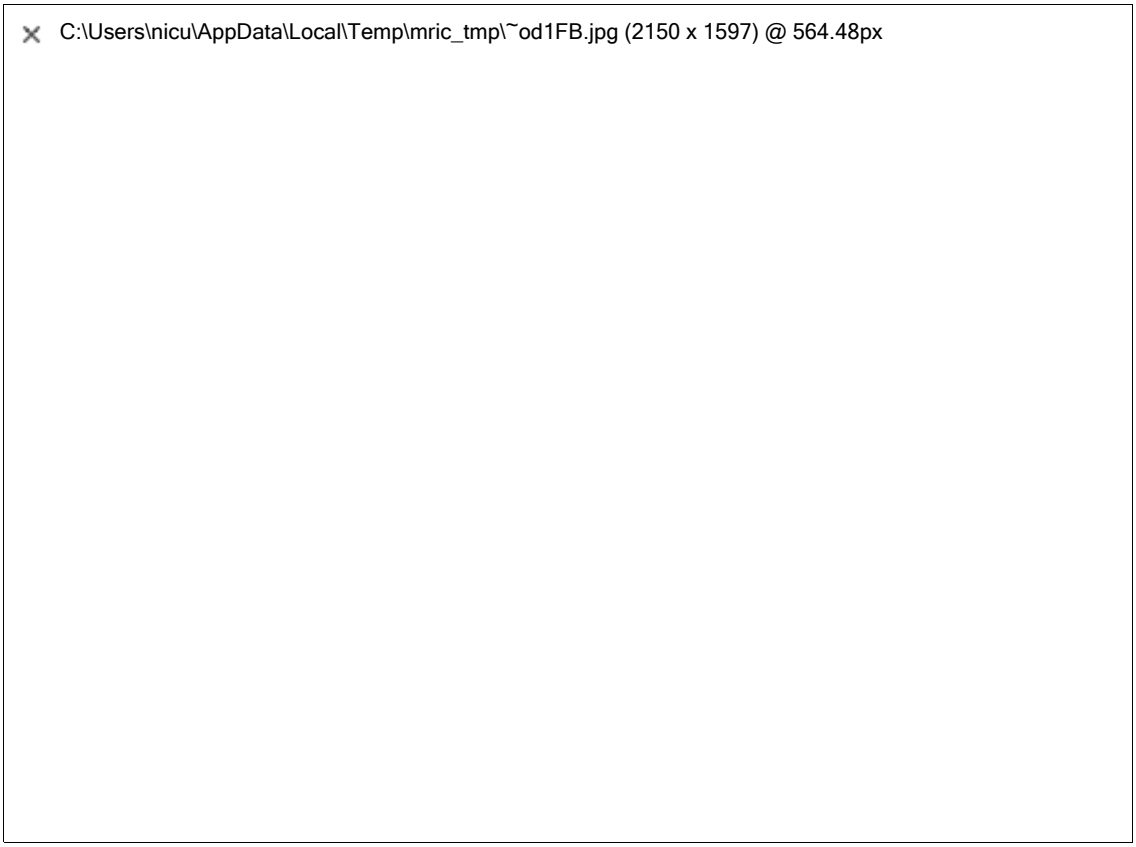


Fig. 3: Low Speed GMLAN
Courtesy of GENERAL MOTORS CORP.

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Fig. 4: Communications Enable
Courtesy of GENERAL MOTORS CORP.

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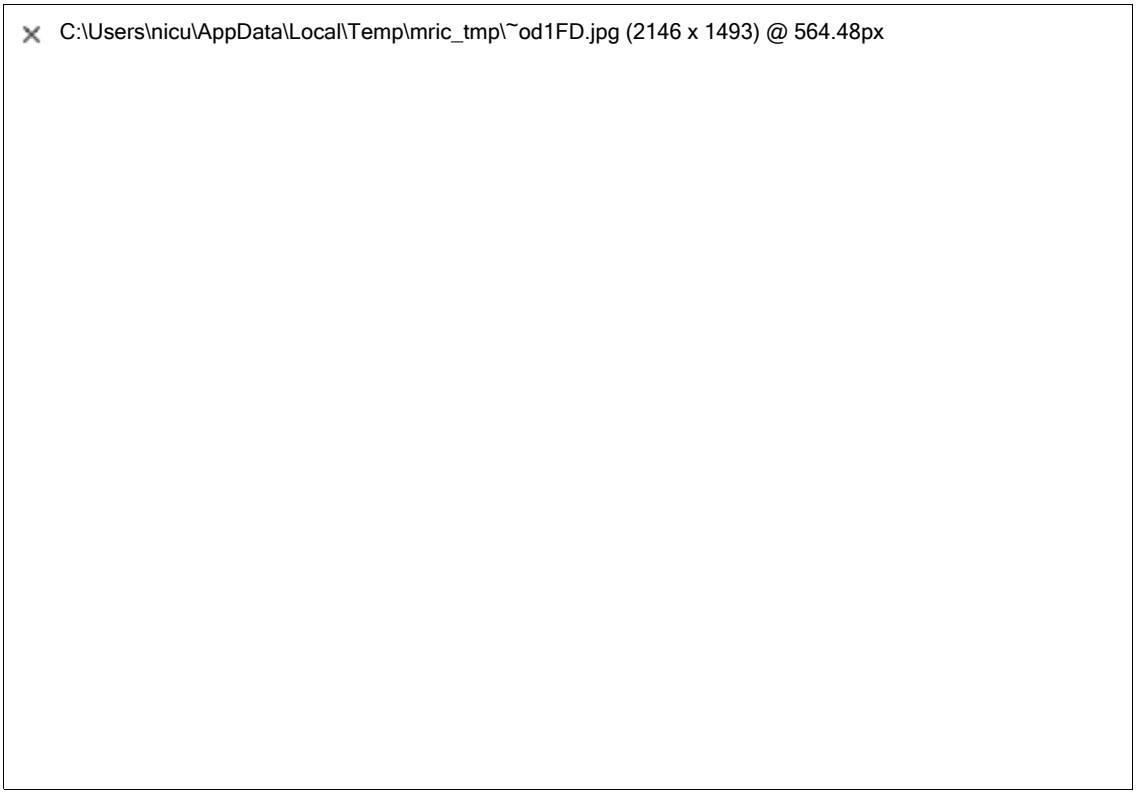


Fig. 5: Local Interconnect Network Bus 1, 3, 4, 9, 11
Courtesy of GENERAL MOTORS CORP.

BODY CONTROL SYSTEM SCHEMATICS

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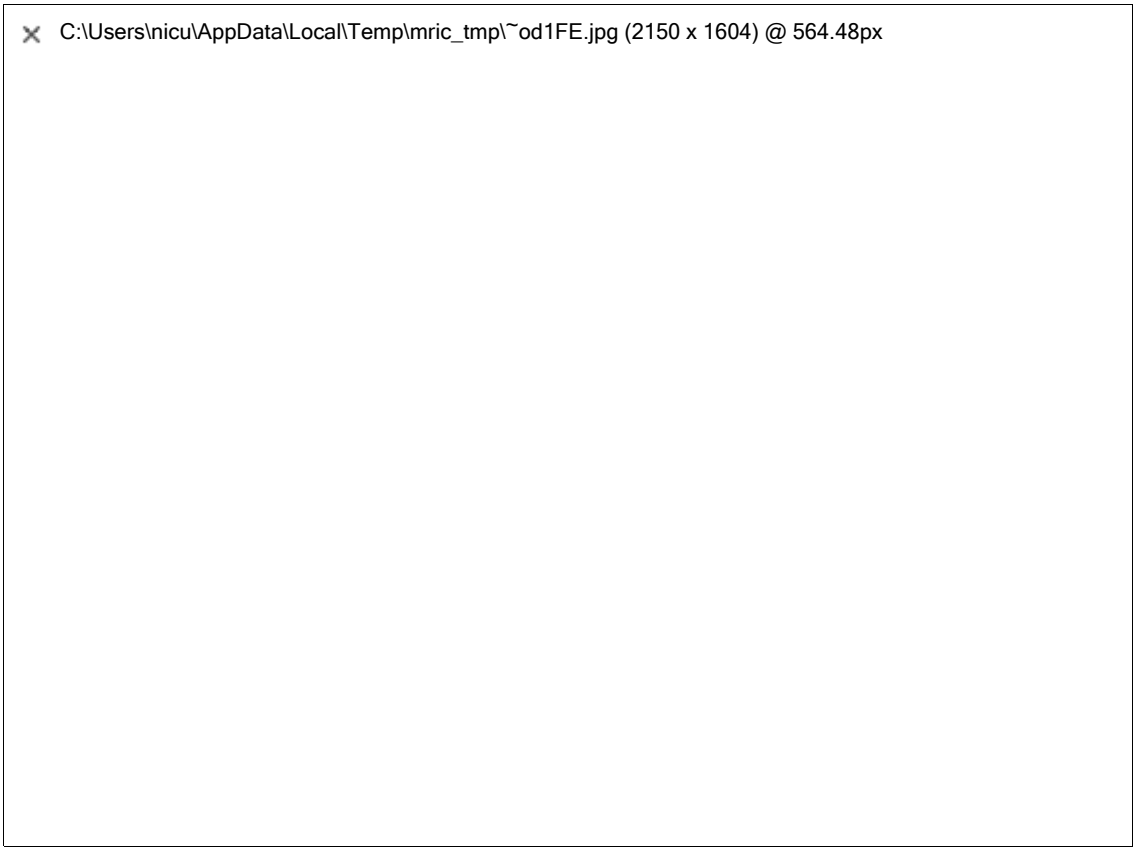


Fig. 6: Module Power, Ground, Data Communications
Courtesy of GENERAL MOTORS CORP.

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Fig. 7: References 1 of 2
Courtesy of GENERAL MOTORS CORP.

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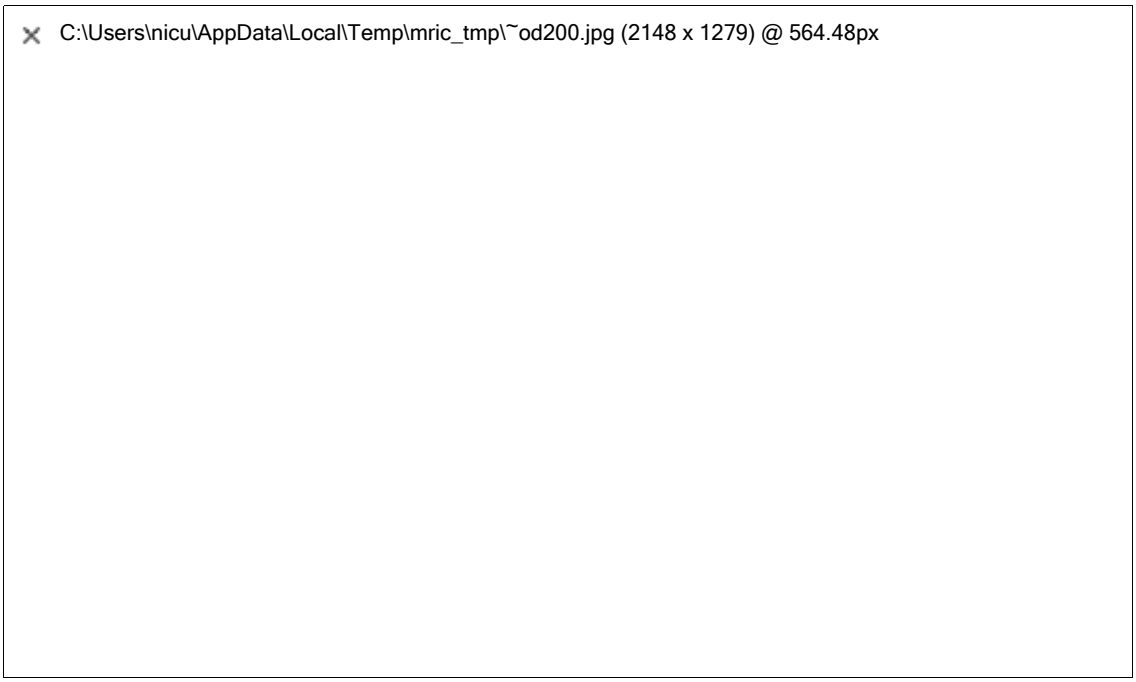


Fig. 8: References 2 of 2
Courtesy of GENERAL MOTORS CORP.

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DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1000	B1000 XX: Electronic Control Unit
DTC B1001	B1001 XX: Option Configuration
DTC B101D	B101D XX: ECU Hardware
DTC B101E	B101E XX: ECU Software
DTC C0550	C0550 XX: Electronic Control Unit
DTC C056D	C056D XX: Electronic Control Unit Hardware
DTC C056E	C056E XX: Electronic Control Unit Software
DTC C078A	C078A 39: Tire Pressure Indicator Module Internal Malfunction
DTC U0001	U0001 00: High Speed CAN Communication Bus
DTC U0002	U0002: High Speed CAN Bus
DTC U0020	U0020 00: Low Speed CAN Communication Bus Performance
DTC U0073 or U2100	U0073 00: Control Module Communication Bus Off U0073 71: ECU HS Bus Off U0073 72: ECU LS Bus Off U2100 00: Controller Area Network (CAN) Bus Communication U2100 47: Controller Area Network (CAN) Bus Communication
DTC U0074	U0074 00: Control Module Communication Bus B Off
DTC U0100-U02FF	The serial data circuit is the means by which the control modules in the vehicle communicate with each other. Once the scan tool is connected to the serial data circuit through the data link connector (DLC), the scan tool can be used to monitor each control module for diagnostic purposes and to check for diagnostic trouble codes (DTCs). When the ignition switch is in RUN, each control module communicating on the serial data circuit sends a state of health (SOH) message to ensure that the control module is operating properly. When a control module stops communicating on the serial data circuit, for example if the control module loses power or ground, the SOH message it normally sends on the serial data circuit disappears. Other control modules on the serial data circuit, which expect to receive that SOH message, detect its absence; those control modules in turn set a DTC associated with the loss of SOH of the non-communicating control module. The DTC is unique to the control module which is not communicating and one or more control modules may set the same exact code. A loss of serial data communications DTC does not represent a failure of the control modules that contain the stored code.
DTC U0300-U0336	U0301 00: Software Incompatibility with Engine Control Module U0302 00: Software Incompatibility with Transmission Control Module U0315 00: Software Incompatibility with Electronic Brake Control Module

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DTC U0400-U05FF	Some control modules are constantly receiving information from other control modules through serial data communication network. The invalid data code will be set when a receiving control module detects a discrepancy in information it receives from another control module causing its integrity to be questioned. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.
DTC U1500-U15BF	The serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a master control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set. A master control module is the one that reports the non communication code. Note: a loss of serial data communications DTC does not represent a failure of the master control module that set it.
DTC U1814	U1814 00: Powertrain Wake Up Communication Circuit
DTC U18B9-U18BF	U18B9: Primary High Speed CAN Bus Subnet Configuration List U18BF: Secondary High Speed CAN Bus Subnet Configuration List
DTC U2099	U2099 00: High Speed Communication Enable Circuit
DTC U2101	U2101: CAN Bus Maximum Configuration List
DTC U2103	U2103 00: Fewer Controllers On Than Programmed
DTC U2105-U2199	** DESCRIPTION NOT COLLECTED **

CONTROL MODULE U CODE LIST

This list includes all Data Communications related U-code DTCs in alphanumeric order with descriptors for all modules. Not all DTCs listed will be applicable to all vehicles.

DTC	DTC Descriptor
U0001 00	High Speed CAN Bus Malfunction
U0002 00	High Speed CAN Bus
U0020 00	Low Speed CAN Bus
U0073 00	Control Module Communication Bus A Off
U0073 01	Control Module Communication Bus A Off Short to Battery
U0073 02	Control Module Communication Bus A Off Short to Ground
U0073 04	Control Module Communication Bus A Off Open
U0073 71	Control Module Communication Bus A Off Invalid Data
U0074 00	Control Module Communication Bus B Off
U0100 00	Lost Communication With Engine Control Module
U0100 71	Lost Communication With Engine Control Module Invalid Data
U0100 72	Lost Communication With Engine Control Module Message Counter Incorrect
U0100 74	Lost Communication With Engine Control Module Bus Signal Checksum Error
U0101 00	Lost Communication With Transmission Control Module

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U0101 71	Lost Communication With Transmission Control Module Invalid Data
U0102 00	Lost Communication with Transfer Case Control Module
U0102 71	Lost Communication with Transfer Case Control Module Invalid Data
U0104 00	Lost Communication With Cruise Control Module
U0104 02	Lost Communication With Cruise Control Module Short to Ground
U0104 71	Lost Communication With Cruise Control Module Invalid Data
U0104 72	Lost Communication With Cruise Control Module Message Counter Incorrect
U0104 74	Lost Communication With Cruise Control Module Bus Signal Checksum Error
U0109 00	Lost Communication with Fuel Pump Control Module
U0115 00	Lost Communication with ECM 2
U0117 00	Lost Communication With Power Take-Off Control Module
U0121 00	Lost Communication With Electronic Brake Control Module
U0121 03	Lost Communication With Electronic Brake Control Module Low Voltage
U0121 71	Lost Communication With Electronic Brake Control Module Invalid Data
U0121 72	Lost Communication With Electronic Brake Control Module Message Counter Incorrect
U0121 74	Lost Communication With Electronic Brake Control Module Bus Signal Checksum Error
U0122 00	Lost Communication With Vehicle Stability Control Module
U0125 00	Lost Communication With Multi-axis Acceleration Sensor Module
U0125 71	Lost Communication With Multi-axis Acceleration Sensor Module Invalid Data
U0125 72	Lost Communication With Multi-axis Acceleration Sensor Module Message Counter Incorrect
U0125 74	Lost Communication With Multi-axis Acceleration Sensor Module Bus Signal Checksum Error
U0126 00	Lost Communication With Steering Wheel Angle Sensor Module
U0126 71	Lost Communication With Steering Wheel Angle Sensor Module Invalid Data
U0126 72	Lost Communication With Steering Wheel Angle Sensor Module Message Counter Incorrect
U0126 74	Lost Communication With Steering Wheel Angle Sensor Module Bus Signal Checksum Error
U0126 5A	Lost Communication With Steering Wheel Angle Sensor Module Not Plausible
U0128 00	Lost Communication With Park Brake Control Module
U0128 71	Lost Communication With Park Brake Control Module Invalid Data
U0128 72	Lost Communication With Park Brake Control Module Message Counter Incorrect
U0128 74	Lost Communication With Park Brake Control Module Bus Signal Checksum Error
U0129 00	Lost Communication with Brake System Control Module
U0130 00	Lost Communication With Electric Power Steering Control Module
U0130 71	Lost Communication With Electric Power Steering Control Module Invalid Data
U0130 72	Lost Communication With Electric Power Steering Control Module Message Counter Incorrect

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U0130 74	Lost Communication With Electric Power Steering Control Module Bus Signal Checksum Error
U0131 00	Lost Communication With Power Steering Control Module
U0131 71	Lost Communication With Power Steering Control Module Invalid Data
U0132 00	Lost Communication With Suspension Control Module
U0133 00	Lost Communication With Air Suspension Control Module
U0133 71	Lost Communication With Air Suspension Control Module Invalid Data
U0136 00	Lost Communication With Differential Control Module - Rear
U0136 71	Lost Communication With Differential Control Module - Rear Invalid Data
U0139 00	Lost Communication With Suspension Control Module
U0139 71	Lost Communication With Suspension Control Module Invalid Data
U0140 00	Lost Communication With Body Control Module
U0140 71	Lost Communication With Body Control Module Invalid Data
U0140 72	Lost Communication With Body Control Module Message Counter Incorrect
U0140 74	Lost Communication With Body Control Module Bus Signal Checksum Error
U0146 00	Lost Communication with Gateway
U0151 00	Lost Communication With Inflatable Restraint Sensing and Diagnostic Module
U0155 00	Lost Communication With Instrument Cluster
U0158 00	Lost Communication With Head-Up Display
U0159 00	Lost Communication With Parking Assist Control Module
U0160 00	Lost Communication With Chime Alarm Control Module
U0164 00	Lost Communication with HVAC Control Module
U0166 00	Lost Communication with Auxiliary Heater Control Module
U0167 00	Lost Communication with Immobilizer Control Module
U0168 00	Lost Communication With Keyless Entry Control Module
U0170 00	Lost Communication With Passenger Presence Detection Sensor Module
U0181 00	Lost Communication With Headlamp Leveling Control Module
U0182 00	Lost Communication With Lighting Control Module - Front
U0184 00	Lost Communication With Radio
U0186 00	Lost Communication With Speaker Amplifier Module
U0196 00	Lost Communication With Rear Audio Control Module
U0191 00	Lost Communication With Television
U0193 00	Lost Communication With Digital Radio Receiver Control Module
U0197 00	Lost Communication With Telephone Control Module
U0198 00	Lost Communication With Telematic Control Module
U0201 00	Lost Communication With Transfer Case Control Module
U0203 00	Lost Communication With Left Rear Door Switch Panel Control Module
U0204 00	Lost Communication With Right Rear Door Switch Panel Control Module
U0207 00	Lost Communication With Moveable Roof Control Module
U0208 00	Lost Communication With Memory Seat Control Module
U0209 00	Lost Communication With Front Seat Heating Control Module

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U0210 00	Lost Communication With Rear Seat Heating Control Module
U0230 00	Lost Communication With Liftgate Control Module
U0232 00	Lost Communication With Side-Object Detection Control Module - Left
U0233 00	Lost Communication With Side-Object Detection Control Module - Right
U0236 00	Lost Communication With Steering Column Lock Module
U0237 00	Lost Communication With Multimedia Player Interface Module
U023A 00	Lost Communication With Vehicle Direction Camera Control Module
U0249 00	Lost Communication With Rear Radio Audio Control Module
U0252 00	Lost Communication With Trailer Interface Control Module
U0254 00	Lost Communication With Remote Start Module
U0255 00	Lost Communication With Info Display Module
U0256 00	Lost Communication With Infotainment Faceplate Control Module
U0257 00	Lost Communication With Info Display Module/Infotainment Faceplate Control Module
U0264 00	Lost Communication With Camera Module - Rear
U0293 00	Lost Communication with Hybrid Powertrain Control Module
U0301 00	Software Incompatibility with Engine Control Module
U0302 00	Software Incompatibility with Transmission Control Module
U0315 00	Software Incompatibility with Electronic Brake Control Module
U0401 00	Invalid Data Received from ECM
U0401 72	Invalid Data Received from ECM Message Counter Incorrect
U0401 74	Invalid Data Received from ECM Bus Signal Checksum Error
U0402 72	Invalid Data Received From Transmission Control Module Message Counter Incorrect
U0402 73	Invalid Data Received From Transmission Control Module Parity Error
U0402 74	Invalid Data Received From Transmission Control Module Bus Signal Checksum Error
U0405 00	Invalid Data Received From Cruise Control Module
U0405 71	Invalid Data Received From Cruise Control Module Invalid Data
U0405 72	Invalid Data Received From Cruise Control Module Message Counter Incorrect
U0405 74	Invalid Data Received From Cruise Control Module Bus Signal Checksum Error
U0415 00	Invalid Data Received From Electronic Brake Control Module
U0415 72	Invalid Data Received From Electronic Brake Control Module Message Counter Incorrect
U0415 74	Invalid Data Received From Electronic Brake Control Module Bus Signal Checksum Error
U0416 00	Invalid Data Received From Vehicle Dynamics Control Module
U0416 72	Invalid Data Received From Vehicle Dynamics Control Module Message Counter Incorrect
U0416 74	Invalid Data Received From Vehicle Dynamics Control Module Bus Signal Checksum Error
U0418 00	Invalid Data Received From Brake System Control Module

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U0418 71	Invalid Data Received From Brake System Control Module Invalid Data
U0418 72	Invalid Data Received From Brake System Control Module Message Counter Incorrect
U0418 74	Invalid Data Received From Brake System Control Module Bus Signal Checksum Error
U0422 00	Invalid Data Received From Body Control Module
U0422 70	Invalid Data Received From Body Control Module
U0422 72	Invalid Data Received From Body Control Module Message Counter Incorrect
U0422 74	Invalid Data Received From Body Control Module Bus Signal Checksum Error
U0424 00	Invalid Data Received From HVAC Control Module
U0432 00	Invalid Data Received From Multi-axis Acceleration Sensor Module
U0432 72	Invalid Data Received From Multi-axis Acceleration Sensor Module Message Counter Incorrect
U0432 74	Invalid Data Received From Multi-axis Acceleration Sensor Module Bus Signal Checksum Error
U0438 71	Invalid Data Received From Trailer Brake Control Module
U0465 00	Invalid Data Received From Power Take-Off Control Module
U1501 00	LIN Bus 1
U1502 00	LIN Bus 2
U1510 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 0 (K38 Intrusion Sensor Module)
U1510 00	(K33 HVAC Control Module) LIN Bus 1 Lost Communication With Device 0 (A26 HVAC Control)
U1510 00	(A11 Radio) LIN Bus 1 Lost Communication with Device 0 (A20 Radio/HVAC Control)
U1511 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 1 (E13L Headlamp Assembly-Left)
U1512 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 2 (E13R Headlamp Assembly-Right)
U1513 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 3 (E13L Headlamp Assembly-Left)
U1514 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 4 (E13R Headlamp Assembly-Right)
U1515 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 5 (B117 Windshield Outside Moisture Sensor)
U1517 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 7 (Sunroof Sunshade Module)
U1519 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 9 (S52 Outside Rearview Mirror Switch)
U1519 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 9 (K96 Mirror Control Module)
U151A 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 10 (B117 Windshield Outside Moisture Sensor)

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U151B 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 11 (K61 Sunroof Control Module)
U151B 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 11 (S79P Window Switch - Passenger)
U1520 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 0 (P25 Power Sounder Content Theft Deterrent Alarm Module)
U1521 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 1 (E13L Headlamp Assembly-Left)
U1522 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 2 (K65 Tire Pressure Indicator Module)
U1522 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 2 (E13R Headlamp Assembly-Right)
U1523 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 3 (E13L Headlamp Assembly-Left)
U1524 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 4 (E13R Headlamp Assembly-Right)
U152C 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 12 (K18 Electronic Compass Module)
U152D 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 13 (S3 Automatic Gearbox Change Lever)
U1530 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 0 (M74P Window Motor - Passenger)
U1534 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 4 (M74D Window Motor - Driver)
U1538 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 8 (S79D Window Switch - Driver)
U153A 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 10 (S79P Window Switch - Passenger)
U1540 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 0 (M74RR Window Motor - Right Rear)
U1544 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 4 (M74LR Window Motor - Left Rear)
U1548 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 8 (S79LR Window Switch - Left Rear)
U154A 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 10 (S79RR Window Switch - Right Rear)
U154B 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 11 (K49 Rear Seat Control Module)
U1814 01	Powertrain Wake Up Communication Circuit Short to Battery
U1814 02	Powertrain Wake Up Communication Circuit Short to Ground
U1814 04	Powertrain Wake Up Communication Circuit Open
U1826 00	Lost Communication With Multi-Axis Acceleration Sensor Module on Bus B (Chassis Expansion Bus)
U1827 00	Lost Communication With Steering Angle Sensor Module on Bus B (Chassis

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	Expansion Bus)
U18B9 00	Primary High Speed CAN Bus Subnet Configuration List
U18BF 00	Secondary High Speed CAN Bus Subnet Configuration List
U1900 00	Lost Communication With Speech to Text Interface Module
U1901 00	Lost Communication With Front Controls Multifunction Interface Module
U2099 00	High Speed Communication Enable Circuit
U2099 01	High Speed Communication Enable Circuit Short to Battery
U2099 02	High Speed Communication Enable Circuit Short to Ground
U2099 04	High Speed Communication Enable Circuit Open
U2099 5A	High Speed Communication Enable Circuit Not Plausible
U2100 00	CAN Bus Communication
U2101 00	CAN Bus Maximum Configuration List
U2103 00	Fewer Controllers On Bus Than Programmed
U2105 00	Lost Communication with Engine Control Module
U2106 00	Lost Communication with Transmission Control Module
U2107 00	Lost Communication with Body Control Module
U2108 00	Lost Communication with Electronic Brake Control Module
U2127 00	Lost Communication with Front HVAC Control Module
U2139 00	Lost Communication with Column Integrated Module
U2144 00	Lost Communication with Distance Sensing Cruise Control Module
U2176 00	Lost Communication with Power Take-Off Control Module
U2178 00	Lost Communication With Trailer Interface Control Module

DTC B1000

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1000 XX

Electronic Control Unit

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

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The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the module that set the DTC.

Circuit/System Verification

If this DTC is retrieved as a current DTC, replace the module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC B1001

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1001 XX

Option Configuration

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Circuit/System Description

Some control modules must be configured with serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC B1001. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9-16 V and data link communications operate normally.

Conditions for Setting the DTC

The control module is not configured properly.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

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Verify DTC B1001 is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC B101D

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B101D XX

ECU Hardware

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

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Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the control module.
- Do not replace a control module based only on DTC B101D being set in history with the exception of the following control modules:
  - Sensing and Diagnostic Module (SDM)
  - Passenger Presence System Module
- If DTC B101D is set as current, replace the appropriate control module.

Circuit/System Verification

Verify that DTC B101D is not set.

- If the DTC is set, replace the module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC B101E

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B101E XX

ECU Software

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC B101E. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9-16 V and data link communications operate normally.

Conditions for Setting the DTC

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The control module is not configured properly.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify DTC B101E is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC C0550

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Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0550 XX

Electronic Control Unit

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the module that set the DTC.

Circuit/System Verification

Verify that DTC C0550 is not set.

- If the DTC is set, replace the module that set the DTC.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC C056D

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C056D XX

Electronic Control Unit Hardware

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.

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- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the module that set the DTC.

Circuit/System Verification

Verify that DTC C056D is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC C056E

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C056E XX

Electronic Control Unit Software

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC C056E. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9-16 V and data link communications operate normally.

Conditions for Setting the DTC

The control module is not configured properly.

Conditions for Clearing the DTC

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- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify DTC C056E is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC C078A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C078A 39

Tire Pressure Indicator Module Internal Malfunction

Circuit/System Description

The internal fault detection is handled inside the tire pressure sensor locator module. No external circuit diagnosis is involved.

Conditions for Running the DTC

The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the tire pressure sensor locator module.

Circuit/System Verification

Verify that DTC C078A is not set.

- If the DTC is set, replace the tire pressure sensor locator module.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC U0001

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0001 00

High Speed CAN Communication Bus

Circuit Description

Modules connected to the GMLAN serial data circuits monitor for serial data communications on the GMLAN network during normal vehicle operation. Operating information and commands are exchanged among the modules. Each module on GMLAN network maintains a transmit error counter (TEC) and a receive error counter (REC). The counter values increase with detected errors and will decrease with error-free messages. If the TEC value exceeds 255 the controller removes itself from the network and a DTC U0001 will be set.

Conditions for Running the DTC

- Voltage supplied to the module is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTC

A certain number of no valid transmitted messages on the GMLAN serial data circuits are detected by the module.

Action Taken When the DTC Sets

- The module suspends all message transmission.
- The module uses default values for all parameters received on the GMLAN serial data circuits.
- The module inhibits the setting of all other GMLAN communication DTCs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

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Diagnostic Aids

- This DTC cannot be retrieved with a current status. Diagnosis of current DTC is accomplished via the symptom, Scan Tool Does Not Communicate with GMLAN Device. Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device**.
- An intermittent condition is likely to be caused by a short on the GMLAN serial data circuits. Use the Scan Tool Does Not Communicate with GMLAN Device procedure in order to isolate an intermittent condition. Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device**.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

DTC U0002

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0002

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High Speed CAN Bus

Circuit/System Description

Modules connected to the high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have prerecorded information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are supervised and also, some periodic messages are used by the receiver module as an availability indication of the transmitter module. The supervision time-out period is 250 ms. Each message contains the identification number of the transmitter module.

Conditions for Running the DTC

- Voltage supplied to the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- The DTC U0001 does not have a current status.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

The module uses a default value for the missing parameter.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

With a scan tool, attempt to communicate with all modules.

Circuit/System Testing

1. With a scan tool, verify DTC U0100-U0299 or U2105-U2199 is not set as current.
    - If DTC is set, refer to **DTC U0100-U02FF** or **DTC U2105-U2199**.
2. Ignition OFF, test for less than 5 ohms between the applicable module ground circuit and ground.
    - If greater than the specified range, test the circuit for an open/high resistance.
3. Ignition OFF, disconnect the applicable module harness connector.
4. Ignition ON, verify a test lamp illuminates between the following circuits of the applicable module and ground:
    - The battery positive voltage input circuits
    - The battery positive voltage output circuits
    - The ignition voltage input circuits
    - The ignition voltage output circuits
    - The switched battery positive voltage supply circuits
    - If the test lamp does not illuminate, test the circuit for an open/high resistance. If the circuit fuse is open, test the circuit for a short to ground. If the circuit tests normal, replace the applicable control module.
5. Ignition OFF, test for less than 5 ohms between the non-communicating modules GMLAN serial data circuits and the module reporting DTC U0002.
    - If greater than the specified range, test the circuit for an open/high resistance.
6. If all circuits test normal, replace the applicable control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for module replacement, setup, and programming
- **GMLAN Wiring Repairs**

DTC U0020

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Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0020 00

Low Speed CAN Communication Bus Performance

Circuit/System Description

Modules connected to the GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have programmed information about what messages are needed to be exchanged on the serial data circuits. The messages are also supervised and some periodic messages are used by the receiver module as an availability indication of the transmitter module.

DTC U0020 will set when fewer modules are detected on the bus before the modules can learn the other modules IDs. If the communication bus is opened, or if the modules power supply is lost when the vehicle is in the OFF power mode, and then placed in the RUN power mode, U0020 will set in specific modules.

Conditions for Running the DTCs

- Voltage at the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- The DTC U2100 does not have a current status.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTCs Sets

The module uses a default value for the missing parameter.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Circuit/System Verification

Diagnosis of this DTC is accomplished via the symptom or an additional DTC, Refer to **Symptoms - Data**

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Communications DTC U0100-U02FF.

DTC U0073 OR U2100

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC U0073 00

Control Module Communication Bus Off

DTC U0073 71

ECU HS Bus Off

DTC U0073 72

ECU LS Bus Off

DTC U2100 00

Controller Area Network (CAN) Bus Communication

DTC U2100 47

Controller Area Network (CAN) Bus Communication

Circuit/System Description

The serial data circuits are serial data buses are used to communicate information between the control modules. The serial data circuits also connect directly to the data link connector (DLC).

Conditions for Running the DTCs

- Supply voltage at the control modules is in the normal operating range.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

The control module setting the DTC has attempted to establish communications on the serial data circuits more than 3 times in 5 seconds.

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Action Taken When the DTCs Sets

- The control module suspends all message transmission.
- The control module uses default values for all parameters received on the serial data circuits.
- In the TCM, DTC U0073 will cause the transmission to go into default gears.
- In the ECM and TCM, DTC U0073 will cause the malfunction indicator lamp (MIL) to illuminate.
- The control module inhibits the setting of all other communication DTCs.

Conditions for Clearing the DTC

- The ECM/TCM modules turn OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Circuit/System Verification

1. Refer to **Data Link References** to determine which serial data system is used for a specific control module.
2. This DTC cannot be retrieved with a current status. Diagnosis is accomplished using the symptom. Refer to **Symptoms - Data Communications**.

DTC U0074

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0074 00

Control Module Communication Bus B Off

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Battery Positive Voltage (B+)	1	1	-	-
Ground (DLC, terminal 5)	-	1	-	-
Mid Speed GMLAN Serial Data (+)	1	U0074 00, 3*	1	-

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Mid Speed GMLAN Serial Data (-)	1	U0074 00, 3*	1	-
Chassis High Speed GMLAN Serial Data (+)	2	U0074 00, 3*	U0074 00, 2	-
Chassis High Speed GMLAN Serial Data (-)	2	U0074 00, 3*	U0074 00, 2	-
* An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle control modules will still communicate. 1. No communication on any mid speed GMLAN module. 2. No communication on any chassis high speed GMLAN module. 3. An open in only one mid speed or chassis high speed GMLAN serial data circuit may allow degraded communication between the controls modules.				

Circuit/System Description

Control modules connected to the mid speed or chassis high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the control modules when the ignition switch is in any position other than OFF. The mid speed or chassis high speed GMLAN serial data bus uses a terminating resistor that is in parallel with the mid speed or chassis high speed GMLAN (+) and (-) circuits.

Conditions for Running the DTC

The system voltage is between 9-16 V.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

Specific subsystems will not function.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the **Data Link References** to identify the mid speed or chassis high speed GMLAN serial data modules.
- Some control modules may not have internal protection for specific voltage outputs and may open a battery positive voltage or ignition voltage source fuse. If a voltage input fuse is open and no short is found in that circuit, ensure that no control module output voltage circuit is shorted to ground before replacing the control module.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate to set up the vehicle on

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the tool and then not communicate with the vehicle. When the scan tool is to the point of communicating with the vehicle, a message on the scan tool will indicate "no CANdi module detected" and will not communicate.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify there are no other U code DTCs set.
   - If other U code DTCs are set, diagnose them first. Refer to **Control Module U Code List**.
2. Refer to **Data Link References** to determine if the control module setting DTC U0074 is on the mid speed or chassis high speed serial data circuits.

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Mid speed or chassis high speed serial data circuit terminating resistors**
- **Control module locations on the serial data circuits**
- **Each control modules mid speed or chassis high speed serial data circuit**

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terminals

1. Attempt to communicate with all control modules on the mid speed or chassis high speed serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the mid speed or chassis high speed serial data circuit.
    - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 3 V between the serial data circuits listed below and ground:
    - Mid speed GMLAN serial data terminal 3
    - Mid speed GMLAN serial data terminal 11
    - Chassis high speed GMLAN serial data terminal 12
    - Chassis high speed GMLAN serial data terminal 13
    - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
    - Mid speed GMLAN serial data terminal 3
    - Mid speed GMLAN serial data terminal 11
    - Chassis high speed GMLAN serial data terminal 12
    - Chassis high speed GMLAN serial data terminal 13
    - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Test for 50-70 ohms between the serial data circuits listed below:
    - Mid speed GMLAN serial data circuits terminal 3 and terminal 11
    - Chassis high speed GMLAN serial data circuits terminal 12 and terminal 13
    - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
    - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
    - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
    - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

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1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 3 V between the serial data circuits and ground. Verify that one or more serial data circuits are greater than 3 V.
    - If less than the specified range for all serial data circuits, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 3 V between the serial data circuits and ground. Verify that one or more serial data circuits are greater than 3 V.
    - If less than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to voltage on the serial data circuit between 2 control modules
    - A short to voltage on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 100 ohms between the serial data circuits and ground. Verify that one or more serial data circuits are less than 100 ohms.
    - If greater than the specified range for all serial data circuits, replace the control module that was disconnected.
3. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 100 ohms between the serial data circuits and ground. Verify that one or more serial data circuits are less than 100 ohms.
    - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to ground on the serial data circuit between 2 control modules
    - A short to ground on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module, that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 110 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are less than 110 ohms.
    - If greater than the specified range for each pair of serial data circuits, replace the control module that was disconnected.

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3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 110 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are less than 110 ohms.
    - If between the specified range for each pair of serial data circuits, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
    - Serial data circuits shorted together between 2 control modules
    - Serial data circuits shorted together between a control module and a terminating resistor
    - A shorted terminating resistor

Testing the Serial Data Circuits for a Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module, that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 130 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are greater than 130 ohms.
    - If less than the specified range for each pair of serial data circuits, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 130 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are greater than 130 ohms.
6. Repeat step 3 until one of the following conditions are isolated:
    - An open/high resistance on the serial data circuit between 2 control modules
    - An open/high resistance on the serial data circuit between a control module and a terminating resistor
    - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U0100-U02FF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Module B+	U0100-U02FF	U0100-U02FF	-	-
Module Ignition	U0100-U02FF	U0100-U02FF	-	-
Module Ground	U0100-U02FF	U0100-U02FF	-	-
Accessory Wake Up Serial Data	U1814	U0100-U02FF	-	-
High Speed GMLAN Serial Data Wake Up	U2099	U0100-U02FF	-	-
High Speed GMLAN Serial Data (+)	2	U0100-U02FF	2	-
High Speed GMLAN Serial Data (-)	2	U0100-U02FF	2	-
Low Speed GMLAN Serial Data	1	U0100-U02FF	1	-
1. Scan tool does not communicate with low speed GMLAN device 2. Scan tool does not communicate with high speed GMLAN device				

Circuit/System Description

The serial data circuit is the means by which the control modules in the vehicle communicate with each other. Once the scan tool is connected to the serial data circuit through the data link connector (DLC), the scan tool can be used to monitor each control module for diagnostic purposes and to check for diagnostic trouble codes (DTCs). When the ignition switch is in RUN, each control module communicating on the serial data circuit sends a state of health (SOH) message to ensure that the control module is operating properly. When a control module stops communicating on the serial data circuit, for example if the control module loses power or ground, the SOH message it normally sends on the serial data circuit disappears. Other control modules on the serial data circuit, which expect to receive that SOH message, detect its absence; those control modules in turn set a DTC associated with the loss of SOH of the non-communicating control module. The DTC is unique to the control module which is not communicating and one or more control modules may set the same exact code. A loss of serial data communications DTC does not represent a failure of the control modules that contain the stored code.

Conditions for Running the DTC

The system voltage is between 9-16 V.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

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Action Taken When the DTC Sets

- Specific subsystems will not function.
- DTC U0100 in the TCM will cause the transmission to go into default gears.
- Both DTC U0100 in the TCM and DTC U0101 in the ECM will cause the malfunction indicator lamp (MIL) to illuminate.

Conditions for Clearing the DTC

- The ECM/TCM module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
    - A control module on the data communication circuit was disconnected while the communication circuit is awake.
    - Power to one or more control modules was interrupted during diagnosis.
    - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
    - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
    - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- A control module may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between control modules can be temporary with no apparent symptom or complaint; this does not mean the control module is faulty. Do not replace a control module based only on a history U-code.
- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with either the low or high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the low and high speed GMLAN systems.
- Use **Data Link References** to determine if the control module uses high or low speed GMLAN serial data communications.

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- Some control modules may not have internal protection for specific control circuits and may open a B+ or ignition fuse. If a fuse is open and the B+ or ignition circuit is not shorted to ground, ensure none of the control circuits are shorted to ground before replacing the control module.
- This diagnostic can be used for any control module that is not communicating, regardless of the type of serial data circuit it is connected to, providing the vehicle is equipped with the control module.

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Determine the control module that is not communicating. Refer to **Control Module U Code List**.
2. Verify that DTC U1814, U2099, B1428, B1370, B1380, B1440, or B1441 is not set.
    - If any of the DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
3. Engine running for 10 seconds.
4. Ignition ON, engine OFF, verify that DTC U0100-U0299 is not set with symptom byte 00.
    - If the DTC U0100-U0299 is set with symptom byte 00, refer to Circuit/System Testing.
5. Verify that DTC U0100-U0299 is not set with symptom byte 71 or 72.
    - If the DTC U0100-U0299 is set with symptom byte 71 or 72 along with other DTCs set, diagnose all other codes first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
    - If the DTC U0100-U0299 is set with symptom byte 71 or 72 and without other DTCs set,

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reprogram the control module. If the DTC resets, replace the control module.

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Control module locations on the low and high speed GMLAN serial data circuits**
- **The control modules B+, ignition, ground, communication enable and serial data circuit terminals**

1. Ignition OFF, disconnect the harness connector at of the control module that is not communicating.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
   - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the control module for a short to ground. If the circuits test normal, replace the control module.
4. If equipped, ignition ON, verify that a test lamp illuminates between each ignition circuit terminal and ground.
   - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the control module for a short to ground. If the circuits test normal, replace the control module.

NOTE: Only the high speed GMLAN modules have a serial data communication enable circuit OR an accessory wakeup serial data circuit, and the BCM is the output for these circuits. Refer to the control module schematics to identify which modules have these circuits.

5. If equipped, ignition ON, verify that a test lamp illuminates between the communication enable circuit terminal OR the accessory wakeup circuit terminal and ground.
   - If the test lamp does not illuminate, test the entire circuit, including the B+ circuit to the BCM, for an open/high resistance or short to ground. If the circuits test normal, replace the BCM.
6. Ignition OFF for 60 seconds, test for less than 5 ohms between the serial data circuit terminals and the appropriate DLC terminal listed below:
   - Class 2 serial data circuit terminal 2
   - Low speed GMLAN serial data terminal 1
   - High speed GMLAN serial data terminal 6 or 14
   - If greater than the specified range, test the serial data circuit for an open/high resistance between the non communicating control module and a module setting the DTC or a serial data splice pack.
7. If all circuits test normal, replace the control module that is not communicating.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U0300-U0336

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC U0301 00

Software Incompatibility with Engine Control Module

DTC U0302 00

Software Incompatibility with Transmission Control Module

DTC U0315 00

Software Incompatibility with Electronic Brake Control Module

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set the appropriate U Code. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9-16 V and data link communications operate normally.

Conditions for Setting the DTC

The control module is not configured properly.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat

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of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify the appropriate DTC is not set.

- If the DTC is set, program the control module specified by the DTC descriptor. If the DTC resets, replace the control module specified by the DTC descriptor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U0400-U05FF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

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- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Circuit/System Description

Some control modules are constantly receiving information from other control modules through serial data communication network. The invalid data code will be set when a receiving control module detects a discrepancy in information it receives from another control module causing its integrity to be questioned. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9-16 V and data link communications operate normally.

Conditions for Setting the DTC

The control module is not configured properly.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

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- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Engine running for 10 seconds.
2. Ignition ON, engine OFF, verify the DTC U0400-U05FF is not set.
   - If the DTC U0400-U05FF is set along with other DTCs set, diagnose all other codes first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
   - If the DTC U0400-U05FF is set without other DTCs set, program the control module specified by the DTC descriptor. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U1500-U15BF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Circuit/System Description

The serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a master control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set. A master control module is the one that reports the non communication code. Note: a loss of serial data communications DTC does not represent a failure of the master control module that set it.

Diagnostic Aids

- A control module may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between control modules can be temporary with no apparent symptom or

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complaint; this does not mean the control module is faulty. Do not replace a control module based only on a history U-code.

- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication will be available between the master control module and the scan tool if there is a loss of communications with any of the other control modules on the LIN bus network.
- An open in the LIN bus serial data circuit between the splice pack and a module will only affect that specific module. This type of failure will set a loss of communication DTC for each control module affected and the other control modules will still communicate.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

NOTE:

- **Use the schematic to identify the following:**
  - **Control modules and LIN devices the vehicle is equipped with**
  - **Control module and LIN device locations on the serial data circuit**
  - **The control module serial data circuit terminals and LIN device B+, ignition, ground, and serial data circuit terminals**
- **Use the Control Module U-Code list to determine which control module is not communicating with the master control module. Refer to Control Module U Code List.**
- **A loss of serial data communications DTC does not represent a failure of the master control module that set it.**

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1. Ignition OFF, disconnect the harness connector at a LIN device that is not communicating.
2. Test for less than 5 ohms between each ground circuit terminal and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
   - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the LIN device for a short to ground. If the circuits test normal, replace the LIN device.
4. If equipped, ignition ON, verify that a test lamp illuminates between each ignition circuit terminal and ground.
   - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the LIN device for a short to ground. If the circuits test normal, replace the LIN device.
5. Ignition ON, test for 2-11.5 V between the LIN serial data circuit and ground.
   - If greater than the specified range, test the LIN serial data circuit for a short to voltage. If the circuit tests normal, replace the master control module.
   - If less than the specified range, test the LIN serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the master control module.
6. If all circuits test normal, replace the LIN device.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U1814

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U1814 00

Powertrain Wake Up Communication Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

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Powertrain Serial Data Communication Enable	U1814, 1	U0100-U0299	-	-
1. Vehicle will not start.				

Circuit/System Description

The body control module (BCM) activates the serial data communication enable circuit when the ignition key is in ACC, ON or START. The serial data communication enable circuit wakes up the engine control module (ECM) for serial data bus communication.

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

The BCM senses a short to ground on the serial data communication enable circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The modules use a default value for the missing parameters until the next ignition cycle.
- The module(s) is never signaled, therefore the specific subsystem(s) will not function.
- The vehicle will not start while the circuit is shorted to ground.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DMM MIN/MAX function to capture/locate intermittent conditions.
- Short to ground will also set multiple history no communication codes for GMLAN high speed modules.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

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Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

NOTE: Use the schematic to determine which control modules are on the BCM communications enable circuit 22, X4.

1. Ignition OFF, disconnect the harness connector at the most easily accessible control module on the BCM communications enable circuit.
2. Ignition ON, retest for current DTCs. DTC U1814 should remain current.
   - If the DTC becomes history, replace the control module.
3. With the prior control modules disconnected, repeat steps 1 and 2 for each control module on the circuit except the BCM.
4. Ignition OFF, disconnect the X 4 harness connector at the K9 BCM.
5. Test for infinite resistance between the serial data communication enable circuit terminal 22 and ground.
   - If less than infinite resistance, repair the enable circuit for a short to ground.
6. If all circuits tests normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC U18B9-U18BF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U18B9

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Primary High Speed CAN Bus Subnet Configuration List

DTC U18BF

Secondary High Speed CAN Bus Subnet Configuration List

Circuit/System Description

Control modules on the high speed GMLAN serial data bus and the chassis high speed GMLAN serial data bus must be programmed with software that specifically identifies the correct type and quantity of modules on the bus based on RPO configuration. If a control module was not properly configured after installation, the appropriate U Code may be set for that module. No external circuit diagnosis is involved.

Conditions for Running the DTC

- Voltage supplied to the module is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTC

- The control module is not configured properly.
- Control unit recognises a programming error.
- CAN-Bus configuration is invalid

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Verify the appropriate DTC is not set.
   - If the DTC is set along with other codes, diagnose all other codes first. If no other codes are set, program the control module that set the DTC.
2. With a scan tool, clear the DTCs.
3. Ignition OFF, remove the scan tool, open and close the drivers door.
4. Wait 60 seconds, then verify the DTC is not set.
   - If the DTC is set, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U2099

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2099 00

High Speed Communication Enable Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Serial Data Communication Enable	U2099, U0100-U0299[1]	U0100-U0299	U0100-U0299[2]	-

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[1] Vehicle will not start.
[2] History only. If cleared the DTC will return after several ignition cycles.

Circuit/System Description

The body control module (BCM) activates the serial data communication enable circuit, when the ignition key is in ACC, ON or START. The serial data communication enable circuit wakes up the modules for serial data buss communication.

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

The BCM senses a short to ground on the serial data communication enable circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The modules use a default value for the missing parameters until the next ignition cycle.
- The module(s) is never signaled, therefore the specific subsystem(s) will not function.
- The vehicle will not start while the circuit is shorted to ground.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DMM MIN/MAX function to capture/locate intermittent conditions.
- Short to ground will also set multiple history no communication codes for GMLAN high speed modules.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

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Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

NOTE: Use the schematic to determine which control modules are on the BCM communications enable circuit 23, X4.

1. Ignition OFF, disconnect the harness connector at the most easily accessible control module on the BCM communications enable circuit.
2. Ignition ON, retest for current DTCs. DTC U2099 should remain current.
   - If the DTC becomes history, replace the control module.
3. With the prior control modules disconnected, repeat steps 1 and 2 for each control module on the circuit except the BCM.
4. Ignition OFF, disconnect the X 4 harness connector at the K9 BCM.
5. Test for infinite resistance between the serial data communication enable circuit terminal 23 and ground.
   - If less than infinite resistance, repair the enable circuit for a short to ground.
6. If all circuits tests normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC U2101

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2101

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CAN Bus Maximum Configuration List

Circuit/System Description

Some control modules must be programmed with software that specifically identifies the correct type and quantity of modules on the serial data bus based on RPO configuration. If a control module was not properly configured after installation, the appropriate U Code may be set for that module. No external circuit diagnosis is involved.

Conditions for Running the DTC

- Voltage supplied to the module is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTC

- The control module is not configured properly.
- Control unit recognises a programming error.
- CAN-Bus configuration is invalid

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

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Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Verify the appropriate DTC is not set.
    - If the DTC is set along with other codes, diagnose all other codes first. If no other codes are set, program the control module specified by the DTC descriptor.
2. With a scan tool, clear the DTCs.
3. Ignition OFF, remove the scan tool, open and close the drivers door.
4. Wait 60 seconds, then verify the DTC is not set.
    - If the DTC is set, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U2103

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2103 00

Fewer Controllers On Than Programmed

Circuit Description

Modules connected to the GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have programmed information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are also supervised and some periodic messages are used by the receiver module as an availability indication of the transmitter module.

DTC U2103 will set when fewer modules are detected on the buss before the modules can learn the other module IDs. If the communication buss is opened, or if the module power supply is lost when the vehicle is in the OFF power mode, and then placed in the RUN power mode, U2103 will set in specific modules.

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Conditions for Running the DTCs

- Voltage supplied to the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- The DTC U2100 does not have a current status.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

The module uses a default value for the missing parameter.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- Diagnosis of this DTC is accomplished via the symptom or an additional DTC. Refer to **Symptoms - Data Communications** or **DTC U0100-U02FF**.
- An intermittent condition is likely to be caused by a short on the GMLAN serial data circuits. Use the **DTC U0100-U02FF** procedure in order to isolate an intermittent condition.

DTC U2105-U2199

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using the diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Speed GMLAN Serial Data	1	U2105-U2199	1	-
Battery Positive Voltage Circuits	U2105-U2199	U2105-U2199	-	-
Ignition Voltage Circuits	U2105-U2199	U2105-U2199	-	-
Module Ground Circuits	U2105-U2199	U2105-U2199	-	-
Accessory Wake Up Serial Data	U1814	U2105-U2199	-	-
High Speed GMLAN Serial Data	U2099	U2105-U2199	-	-

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Wake Up				
1. Scan tool does not communicate with low speed GMLAN device				

Circuit/System Description

Modules connected to the high and low speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have prerecorded information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are supervised and also, some periodic messages are used by the receiver module as an availability indication of the transmitter module. Each message contains the identification number of the transmitter module.

The body control module (BCM) activates the high speed GMLAN serial data wake up and the accessory wake up serial data circuits by applying voltage when the ignition key is in ACC, ON or START. The high speed GMLAN serial data wake up circuit wakes up the electronic brake control module (EBCM) for bus communication and the accessory wake up serial data circuit wakes up the engine control module (ECM) and transmission control module (TCM).

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

The module uses a default value for the missing parameters.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DTC Descriptor list above to determine the module which is not communicating.
- If there are multiple non-communicating modules choose the one closest to the data link connector (DLC).
- Use **Data Link References** to determine if the module uses high or low speed GMLAN serial data communications
- Some modules may not have internal protection for specific voltage outputs and may open a battery positive voltage or ignition voltage source fuse. If a voltage input fuse is open and no short is found in

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that circuit, ensure that no module output voltage circuit is shorted to ground before replacing the module.

- This diagnostic can be used for any module that should communicate with high or low speed GMLAN serial data providing the vehicle is equipped with the option that uses that module.

Reference Information

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Testing

NOTE: **If more than one module is not communicating use Data Communication Schematics to determine which module is closest to the DLC. Start diagnostics with that module.**
Terminal and connector identifiers will be different depending on the individual module being tested. Use Schematic Reference and Connector End View Reference to determine which connector and terminal to access.

1. Using the DTC Descriptor and Diagnostic Aids, determine the module that is not communicating that should be tested.
2. Ignition OFF, disconnect the harness connector of the module that is not communicating.
3. Test for less than 2 ohms between the module ground circuits and ground.
    - If greater than specified range, test the ground circuit for an open/high resistance.

NOTE: **Only the high speed GMLAN modules have a wired serial data wake up circuit. Refer to the module schematics to identify which modules have a**

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wake up circuit. If the module that is not communicating does not have a serial data wake up circuit, proceed to step 5.

4. Ignition ON, verify that a test lamp illuminates between the high speed GMLAN serial data wake up circuit OR the accessory wake up serial data circuit and ground.
    - If the test lamp does not illuminate, test the circuit for an open/high resistance. If the circuits test normal, replace the BCM.
5. Ignition ON, verify that a test lamp illuminates between all B+ circuits and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, also test the positive voltage outputs of the module for a short to ground. If the circuits test normal, replace the appropriate module.
6. Verify that a test lamp illuminates between all ignition voltage circuits and ground.
    - If the test lamp does not illuminate, test the ignition voltage circuits for a short to ground or an open/high resistance. If the circuit fuse is open, also test the positive voltage outputs of the module for a short to ground. If the circuits test normal, replace the appropriate module.
7. Test for less than 1 ohms in the GMLAN serial data circuits between the non-communicating module and the module that displays the DTC.
    - If greater than specified range, test the GMLAN serial data circuits for open/high resistance.
8. If all circuits test normal, replace the module that is not communicating.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **GMLAN Wiring Repairs**
- **Control Module References** for module replacement, setup, and programming

SYMPTOMS - DATA COMMUNICATIONS

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
    - There are no DTCs set.
    - The control modules can communicate via the serial data links.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Data Link Communications Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the systems. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

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Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Scan Tool Does Not Power Up**
- **Scan Tool Does Not Communicate with High Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Mid Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**

SCAN TOOL DOES NOT POWER UP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
DLC B+	1	1	-	-
DLC Ground	-	1	-	-
1. Scan Tool Does Not Power Up				

Circuit/System Description

The data link connector (DLC) is a standardized 16 cavity connector. Connector design and location is dictated by an industry wide standard, and is required to provide the following:

- Scan tool B+ voltage at terminal 16
- Scan tool ground at terminal 4
- Common ground at terminal 5

Diagnostic Aids

- The scan tool will power up with the ignition OFF. Some modules however, will not communicate unless the ignition is ON and the power mode master module sends the appropriate power mode message.
- If the B+ circuit, ground circuits, and connections of the DLC are functioning properly, the malfunction

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must be due to the scan tool.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Testing

1. Test for less than 2.0 ohms between the ground circuits terminal 4 of the DLC and ground, and terminal 5 of the DLC and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
2. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 16 at the DLC and ground.
    - If the test lamp does not illuminate, test the voltage supply circuit for a short to ground or an open/high resistance.
3. If all circuits test normal, refer to the scan tool user guide.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

SCAN TOOL DOES NOT COMMUNICATE WITH CHASSIS HIGH SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Chassis High Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
Chassis High Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1	-	-
* No communications with one or more chassis high speed GMLAN modules. An open in only one chassis high speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate. 1. No communication with any chassis high speed GMLAN module				

Circuit/System Description

The GMLAN high speed chassis expansion bus functions the same as the GMLAN high speed bus, and the two buses operate in parallel. The expansion chassis bus was added to reduce message congestion on the primary high speed bus. Since the GMLAN high speed chassis bus and primary GMLAN high speed bus operate in the same manner, the diagnostics for each are the same.

The serial data is transmitted on two twisted wires that allow speeds up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the engine control module (ECM) and the other can be a separate resistor in a connector assembly or in another control module. The resistors are used as the load for the High Speed GMLAN buss during normal vehicle operation. The high speed GMLAN is a differential bus. The high speed GMLAN serial data bus (+) and high speed GMLAN serial data (-) are driven to opposite extremes from a rest or idle level of approximately 2.5 V. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) circuit and subtracts one volt from the high speed GMLAN serial data bus (-) circuit. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note that a loss of serial data DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of-communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
  - A control module on the data communication circuit was disconnected while the communication circuit is awake.

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  - Power to one or more modules was interrupted during diagnosis
  - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
  - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
  - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with the high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.

  These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

  - Vehicle will not crank
  - Vehicle cranks but will not start
  - Vehicle stability enhancement system warning lights and messages
  - PRNDL gear indicator position errors

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Chassis high speed GMLAN serial data circuit terminating resistors**
- **Control module locations on the chassis high speed GMLAN serial data circuits**
- **Each control module chassis high speed GMLAN serial data circuit terminals**

1. Attempt to communicate with all control modules on the high speed GMLAN serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the chassis high speed GMLAN serial data circuit.
   - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
   - Terminal 12
   - Terminal 13
   - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
   - Terminal 12
   - Terminal 13
   - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Test for 50-70 ohms between the serial data circuits terminal 12 and terminal 13.

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- If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
- If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
- If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
- If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
   - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
   - A short to voltage on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
   - If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.

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    - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
    - A short to ground on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
    - Serial data circuits shorted together between 2 control modules or splice packs, if equipped
    - Serial data circuits shorted together between a control module and a terminating resistor
    - A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
    - If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.

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- If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.

6. Repeat step 3 until one of the following conditions are isolated:
   - An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
   - An open/high resistance on the serial data circuit between a control module and a terminating resistor
   - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH HIGH SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
High Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
High Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1	-	-
* No communications with one or more high speed GMLAN modules. An open in only one high speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate. 1. No communication with any high speed GMLAN module				

Circuit/System Description

The serial data is transmitted on two twisted wires that allow speeds up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the engine control module (ECM) and the other can be a separate resistor in a connector assembly or in another control module. The resistors are used as the load for the High Speed GMLAN buss during normal vehicle operation. The high speed GMLAN is a differential

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bus. The high speed GMLAN serial data bus (+) and high speed GMLAN serial data (-) are driven to opposite extremes from a rest or idle level of approximately 2.5 V. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) circuit and subtracts one volt from the high speed GMLAN serial data bus (-) circuit. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note that a loss of serial data DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of-communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
    - A control module on the data communication circuit was disconnected while the communication circuit is awake.
    - Power to one or more modules was interrupted during diagnosis.
    - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
    - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
    - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with the high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.

  These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

    - Vehicle will not crank
    - Vehicle cranks but will not start
    - Vehicle stability enhancement system warning lights and messages
    - PRNDL gear indicator position errors

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Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

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Data Link Communications Description and Operation

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **High speed GMLAN serial data circuit terminating resistors**
- **Control module locations on the high speed GMLAN serial data circuits**
- **Each control module's high speed GMLAN serial data circuit terminals**

1. Attempt to communicate with all control modules on the high speed GMLAN serial data circuit Refer to **Data Link References**. Communications should not be available with two or more control modules on the high speed GMLAN serial data circuit.
   - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.

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- If greater than the specified range, test the ground circuit for an open/high resistance.

4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
   - Terminal 6
   - Terminal 14
   - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
   - Terminal 6
   - Terminal 14
   - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Test for 50-70 ohms between the serial data circuits terminal 6 and terminal 14.
   - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
   - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
   - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
   - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
   - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
   - A short to voltage on the serial data circuit between a control module and a terminating resistor.

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Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
    - If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
    - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
    - A short to ground on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
    - Serial data circuits shorted together between 2 control modules or splice packs, if equipped
    - Serial data circuits shorted together between a control module and a terminating resistor
    - A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

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1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
    - If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
    - If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
    - An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
    - An open/high resistance on the serial data circuit between a control module and a terminating resistor
    - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH MID SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Mid Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
Mid Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-

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Ground (DLC, terminal 5)	-	1	-	-

* No communications with one or more mid speed GMLAN modules. An open in only one mid speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate.
1. No communication on any mid speed GMLAN module.

Circuit/System Description

Modules connected to the mid speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules when the ignition switch is in any position other than OFF. The mid speed GMLAN serial data bus uses a terminating resistor that is in parallel with the mid speed GMLAN (+) and (-) circuits.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they're transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
  - A control module on the data communication circuit was disconnected while the communication circuit is awake.
  - Power to one or more modules was interrupted during diagnosis.
  - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
  - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
  - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with the mid speed GMLAN serial data system inoperative. This condition is due to the BCM using the high, mid, and low speed GMLAN systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine will not start when there is a total malfunction of the mid speed GMLAN serial data bus.
- Technicians may find various Local Area Network communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.

  These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

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- Vehicle will not crank
- Vehicle cranks but will not start
- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Mid speed GMLAN serial data circuit terminating resistors**
- **Control module locations on the mid speed GMLAN serial data circuits**
- **Each control module's mid speed GMLAN serial data circuit terminals**

1. Attempt to communicate with all control modules on the mid speed GMLAN serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the mid speed GMLAN serial data circuit.

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- If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.

2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
   - Terminal 3
   - Terminal 11
   - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
   - Terminal 3
   - Terminal 11
   - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Test for 50-70 ohms between the serial data circuits terminal 3 and terminal 11.
   - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
   - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
   - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
   - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
   - If all serial data circuits are less than the specified range, replace the control module that was just

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disconnected.

5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
    - A short to voltage on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
    - If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
    - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
    - A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
    - A short to ground on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
    - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:

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- Serial data circuits shorted together between 2 control modules or splice packs, if equipped
- Serial data circuits shorted together between a control module and a terminating resistor
- A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
    - If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits is greater than 100k ohms.
    - If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
    - An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
    - An open/high resistance on the serial data circuit between a control module and a terminating resistor
    - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH LOW SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Speed GMLAN Serial Data	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1*	-	-
* An open between the data link connector serial data circuit terminal 1 or ground circuit terminal 5 and the BCM circuit will only effect the communication with the scan tool. 1. No communication on any low speed GMLAN module				

Circuit/System Description

The serial data is transmitted over a single wire to the appropriate control modules. The transmission speed for GMLAN low speed is up to 83.33 Kb/s. Under normal vehicle operating conditions, the speed of the buss is 33.33 Kb/s. The control modules toggle the serial data circuit between 0-5 V during normal communications. To wake the control modules connected to the GMLAN low speed serial data circuit, a voltage wake up pulse of 10 V is sent out. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note: a loss of serial data communications DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
  - A control module on the data communication circuit was disconnected while the communication circuit is awake.
  - Power to one or more modules was interrupted during diagnosis
  - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
  - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
  - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the body control module (BCM) and the scan tool with the low speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.
- An open in the low speed GMLAN serial data circuit between the splice pack and a module will only affect that specific module. This type of failure will set a loss of communication DTC for each module effected, and the other modules will still communicate.
- An open in the data link connector (DLC) ground circuit terminal 5 will allow the scan tool to operate but

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not communicate with the vehicle.

- The engine may not start when there is a total malfunction of the low speed GMLAN serial data circuit.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed LAN communications with the scan tool.

These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

- Vehicle will not crank
- Vehicle cranks but will not start
- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Control module and splice pack locations on the low speed GMLAN serial data circuit**
- **The low speed GMLAN serial data circuit terminals for each control module, component, or splice pack**

1. Attempt to communicate with all control modules on the low speed GMLAN serial data circuit. Refer to

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Data Link References. Communications should not be available with two or more control modules on the low speed GMLAN serial data circuit.

- If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
- If one or more control modules are communicating but not all, refer to Testing the Serial Data Circuit for an Open/High Resistance.

2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 4.5 V between the serial data circuit terminal 1 and ground.
   - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuit for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuit terminal 1 and ground.
   - If less than the specified range, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Disconnect the harness connector at the first splice pack closest in the circuit to the DLC.
7. Test for less than 2 ohms between the DLC serial data circuit terminal 1 and the splice pack connector serial data input terminal.
   - If greater than the specified range, test the serial data circuit for an open/high resistance. If the circuit tests normal, replace the splice pack.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the appropriate harness connectors at the following components:
   - All low speed serial data splice packs
   - Any module or component between that may be between the splice packs
2. Ignition ON, test for less than 4.5 V between the DLC serial data circuit terminal 1 and ground.
   - If greater than the specified range, repair the short to voltage.
3. Test for less than 4.5 V between each serial data circuit at each component connector and ground.
   - If greater than the specified range, perform the appropriate test listed below:

- Serial data circuits with one control module, test the serial data circuit for a short to voltage. If the circuit tests normal, replace the control module.
- Serial data circuits with 2 or more control modules, test each section of the serial data circuit for a short to voltage. If the circuits test normal, replace the control module that causes the short to voltage when connected.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the appropriate harness connectors at the following components:

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- All low speed serial data splice packs
- Any module or component between that may be between the splice packs

2. Test for infinite resistance between the DLC serial data circuit terminal 1 and ground.
    - If not the specified value, repair the short to ground.
3. Ignition OFF for 60 seconds, test for greater than 100 ohms between each serial data circuit at the splice pack and ground.
    - If less than the specified range, perform the appropriate test listed below:

- Serial data circuits with one control module, test the serial data circuit for a short to ground. If the circuit tests normal, replace the control module.
- Serial data circuits with 2 or more control modules, test each section of the serial data circuit for a short to ground. If the circuits test normal, replace the control module that causes the short to ground when connected.

Testing the Serial Data Circuit for an Open/High Resistance

1. If equipped with a second splice pack, ignition ON, verify the scan tool communicates with one or more control modules connected to the second splice pack.
    - If all control modules on the second splice pack do not communicate, test the serial data circuit between the first and second splice packs for an open/high resistance. If the circuit tests normal, test the second splice pack for an open/high resistance. If the splice pack tests normal, replace any module or component that may be between those two splice packs.
2. If equipped with a third splice pack, ignition ON, verify the scan tool communicates with one or more control modules connected to the third splice pack.
    - If all control modules on the third splice pack do not communicate, test the serial data circuit between the second and third splice packs for an open/high resistance. If the circuit tests normal, test the third splice pack for an open/high resistance. If the splice pack tests normal, replace any module or component that may be between the those two splice packs.
3. Ignition OFF, disconnect the splice pack containing the serial data circuits to the modules that are not communicating.
4. Install a 3 A fused jumper wire between the splice pack connector serial data input terminal and a low speed GMLAN serial data circuit that is not communicating:
5. Ignition ON, verify the scan tool communicates with the control modules connected to the low speed GMLAN serial data circuit.
    - If any control module does not communicate, test each section of the serial data circuit for an open/high resistance. If the circuits test normal, replace the control module that does not communicate when connected.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for module replacement, setup, and programming

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DATA LINK REFERENCES

This table identifies which serial data link that a particular module uses for in-vehicle data transmission. Some modules may use more than one data link to communicate. Some modules may have multiple communication circuits passing through them without actively communicating on that data link. This table is used to assist in correcting a communication malfunction. Not all modules listed will be applicable to all vehicles. Refer to the schematics to determine which modules apply. For the description and operation of these serial data communication circuits refer to **Data Link Communications Description and Operation**.

Control Module	Data Link Type	Diagnostic Procedure
Schematic Reference: Data Communication Schematics		
Advanced Parking Assist Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Body Control Module	• High Speed GMLAN • Mid Speed GMLAN • Low Speed GMLAN • Local Interconnect Network (LIN)	• **Scan Tool Does Not Communicate with High Speed GMLAN Device** • **Scan Tool Does Not Communicate with Mid Speed GMLAN Device** • **Scan Tool Does Not Communicate with Low Speed GMLAN Device** • **DTC U1500-U15BF**
Chime Alarm Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Compass Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Content Theft Deterrent Sensor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Digital Radio Receiver Control Module	Mid Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device**
Driver Door Switch Panel Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Driver Mirror Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Electronic Brake Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device** or **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Engine Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed**

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		GMLAN Device
Front Seat Heating Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Fuel Pump Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device**
Headlamp Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device**
Headlamp High Beam Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Inflatable Restraint Sensing and Diagnostic Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Info Display Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Infotainment Faceplate Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Inside Rear View Mirror	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Instrument Cluster	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Keyless Entry Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Left Front Window Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Left Headlamp Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Left Rear Door Switch Panel Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Left Rear Window Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Liftgate Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Memory Seat Control Module	Low Speed GMLAN Local Interconnect Network (LIN)	**Scan Tool Does Not Communicate with Low Speed GMLAN Device** or **DTC U1500-U15BF**
Mobile Telephone Control Module	• Mid Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device** or **Scan Tool Does Not**

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		Communicate with Low Speed GMLAN Device
Multi-axis Acceleration Sensor Module	Chassis High Speed GMLAN	**Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Parking Assist Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Parking Brake Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device**
Parking Heater Control Module (GME Only)	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Passenger Door Switch Panel Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Passenger Mirror Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Passenger Presence Detection Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Power Sounder Content Theft Deterrent Alarm Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Power Steering Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device** or **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Radio (Base)	• Mid Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device** or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Radio (High Content Navigation)	• Mid Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device** or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
		Scan Tool Does Not Communicate with Mid Speed GMLAN Device

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Radio (In-Dash CD Changer)	• Mid Speed GMLAN • Low Speed GMLAN	or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Radio (Medium Content Navigation)	• Mid Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device** or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Radio (Rear Seat Entertainment Lite)	• Mid Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with Mid Speed GMLAN Device** or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Rain/Ambient Light Sensor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Rear Differential Clutch Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device** or **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Remote Heater and Air Conditioning Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Right Front Window Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Right Headlamp Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Right Rear Door Switch Panel Control Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Right Rear Window Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Steering Angle Sensor Module	Chassis High Speed GMLAN	**Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Steering Column Lock Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Sunroof Sunshade Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Sunroof Window Motor Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
		Scan Tool Does Not

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Suspension Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	**Communicate with High Speed GMLAN Device** or **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**
Tire Pressure Sensor Locator Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Trailer Interface Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Transmission Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device**
Transmission Range Indicator Module	Local Interconnect Network (LIN)	**DTC U1500-U15BF**
Variable Power Steering Control Module	High Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device**
Vehicle Communication Interface Module (VCIM)	• High Speed GMLAN • Low Speed GMLAN	**Scan Tool Does Not Communicate with High Speed GMLAN Device** or **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
Vehicle Direction Camera Control Module	Low Speed GMLAN	**Scan Tool Does Not Communicate with Low Speed GMLAN Device**

REPAIR INSTRUCTIONS

BODY CONTROL MODULE REPLACEMENT

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Fig. 9: Body Control Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Body Control Module **Procedure** 1. Disconnect the electrical connectors. 2. Release the body control module bracket tab and slide module out of the bracket. 3. Refer to **Control Module References** for programming and set-up information.

DESCRIPTION AND OPERATION

BODY CONTROL SYSTEM DESCRIPTION AND OPERATION

The body control system consists of the body control module (BCM), communications, and various input and outputs. Some inputs, outputs and messages require other modules to interact with the BCM. The BCM also has discrete input and output terminals to control the vehicle's body functions. The BCM is wired to the high speed GMLAN serial data bus, low speed GMLAN serial data bus and Multiple LIN buses and acts as a gateway between them.

Power Mode Master

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This vehicle body control module (BCM) functions as the power mode master (PMM). The ignition switch is a low current switch with multiple discrete ignition switch signals to the PMM for determining the power mode that will be sent over the serial data circuits to the other modules that need this information; the PMM will activate relays and other direct outputs of the PMM as needed. Refer to **Power Mode Description and Operation** for a complete description of power mode functions.

Gateway

The body control module (BCM) in this vehicle functions as a gateway or translator. The purpose of the gateway is to translate serial data messages between the GMLAN high speed bus and the GMLAN low speed bus for communication between the various modules. The gateway will interact with each network according to that network's transmission protocol.

All communication between the BCM and a scan tool is on the high speed GMLAN serial data circuits. A lost communication DTC typically is set in modules other than the module with a communication failure.

Body Control

The various body control module (BCM) input and output circuits are illustrated in the corresponding functional areas on the BCM electrical schematics. Refer to the **Body Control System Schematics** for more detailed information.

DATA LINK COMMUNICATIONS DESCRIPTION AND OPERATION

Circuit Description

The communication among control modules is performed through the high speed GMLAN serial data circuit, the chassis high speed GMLAN serial data circuit, the mid speed GMLAN serial data circuit, and the low speed GMLAN serial data circuit. The modules that need real time communication are attached to the high speed GMLAN network and the chassis high speed GMLAN network. The body control module (BCM) is the gateway between the networks. The purpose of the gateway is to translate serial data messages between the high speed GMLAN bus and the low speed GMLAN bus. The gateway will interact with each network according to that network's transmission protocol. Refer to **Body Control System Description and Operation** for more information about the gateway.

High Speed GMLAN Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the high speed GMLAN serial data circuit. The serial data is transmitted on two twisted wires that allow speed up to 500 Kb/s. The twisted pair is terminated with 120 ohms resistors. The resistors are used to reduce noise on the high speed GMLAN bus during normal vehicle operation. The high speed GMLAN is a differential bus. The high speed GMLAN serial data bus (+) and high speed GMLAN serial data (-) are driven to opposite extremes from a rest or idle level. The idle level, which is approximately 2.5 volts, is considered recessive transmitted data and is interpreted as a logic 1. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) and subtracts one volt from the high speed GMLAN serial data bus (-) wire. This dominant state is interpreted as a logic 0. GMLAN network management supports selective start up and is based on virtual networks. A virtual network is a collection of signals started in response to a vehicle event. The starting of a virtual network signifies that a particular aspect of the vehicles functionality has been requested. A virtual network is supported by virtual

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devices, which represents a collection of signals owned by a single physical device. So, any physical device can have one or more virtual devices. The signal supervision is the process of determining whether an expected signal is being received or not. Failsofting is the ability to substitute a signal with a default value or a default algorithm, in the absence of a valid signal. Some messages are also interpreted as a heartbeat of a virtual device. If such a signal is lost, the application will set a no communication code against the respective virtual device. Note: a loss of serial data DTC does not represent a failure of the module that the code is set in.

Chassis High Speed GMLAN Circuit Description

The high speed GMLAN chassis expansion bus functions the same as the high speed GMLAN bus, and the two buses operate in parallel. The expansion chassis bus was added to reduce message congestion on the primary high speed bus. Since the high speed GMLAN chassis bus and primary high speed GMLAN bus operate in the same manner, the diagnostics for each are the same.

Mid Speed GMLAN Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the mid speed GMLAN serial data circuit. Modules connected to the mid speed GMLAN serial data circuit monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules when the ignition switch is in any position other than OFF. The mid speed GMLAN serial data bus uses a terminating resistor that is in parallel with the mid speed GMLAN (+) and (-) circuits.

Low Speed GMLAN Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the low speed GMLAN serial data circuit. The serial data is transmitted over a single wire to the appropriate control modules. The transmission speed for low speed GMLAN is up to 83.33 Kb/s. Under normal vehicle operating conditions, the speed of the bus is 33.33 Kb/s. This protocol produces a simple pulse train sent out over the low speed GMLAN serial data bus. When a module pulls the bus high, 5 volts, this creates a dominant logic state or 0 on the bus. When the bus is pulled low, 0 volts, it is translated as a recessive logic state or 1. To wake the control modules connected to the low speed GMLAN serial data bus, a high voltage wake up pulse is sent out over the bus, the voltage level of the pulse is +10 volts. Modules connected to the low speed GMLAN bus can be part of a virtual network as described in the previous paragraph. The modules on the low speed GMLAN serial data bus are connected to the bus in a parallel configuration.

Local Interconnect Network (LIN) Circuit Description

Serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a primary control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set.

CAN Graphical Interface (CGI) Circuit Description

The CAN graphical interface (CGI) is a high speed UART-based serial data interface utilizing a CAN physical layer. It is used by the Entertainment sub-system to transfer high-rate display graphics between the Radio and the Info Display Module and/or Radio/HVAC Control. In the case where the Info Display Module and Radio/HVAC Control are separate control modules, the Radio interfaces only with the Info Display Module and

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the Info Display Module communicates with the Radio/HVAC Control through a LIN interface. The Info Display Module therefore is responsible for passing information between the Radio and the Radio/HVAC Control. A bus wake up signal will be generated by the Radio or by the Info Display Module when the systems functionality is required. Once the CGI network is awake, all message transfers on the CGI are initiated by the Radio. Slave devices such as the Info Display Module and Radio/HVAC Control may not transmit unless they are responding to a request from the Radio.

Dual wire CGI networks have a termination resistance between the CGI+ (CAN- High) and CGI- (CAN- Low) conductors at each end of the bus. Each termination resistance is 120 ohms.

The communication function of the CGI shall be enabled or disabled based on the voltage level of a dedicated input (typically called "Center Stack Wake"). The network will stay awake as long as this discrete signal is driven low to less than 1.5 V. When the Radio determines that the communication bus needs to be operational or active, it shall generate the wake-up signal by pulling this signal circuit low.

The Radio can execute a warm reset of the Info Display Module if the Info Display Module fails to respond to Radio's request via the CGI interface. Center Stack Reset is a low-asserted pull down output (less than 1.5 V) from the Radio to the Info Display Module and has the same electrical characteristics as those for the Center Stack Wake signal defined above.

Data Link Connector (DLC)

The data link connector (DLC) is a standardized 16-cavity connector. Connector design and location is dictated by an industry wide standard, and is required to provide the following:

- Pin 1 Low speed GMLAN communications terminal
- Pin 3 Mid speed GMLAN serial bus (+) terminal
- Pin 4 Scan tool power ground terminal
- Pin 5 Common signal ground terminal
- Pin 6 High speed GMLAN serial data bus (+) terminal
- Pin 11 Mid speed GMLAN serial bus (-) terminal
- Pin 12 Chassis high speed GMLAN serial bus terminal
- Pin 13 Chassis high speed GMLAN serial bus terminal
- Pin 14 High speed GMLAN serial data bus (-) terminal
- Pin 16 Scan tool power, battery positive voltage terminal

Serial Data Reference

The scan tool communicates over the various buses on the vehicle. When a scan tool is installed on a vehicle, the scan tool will try to communicate with every module that could be optioned into the vehicle. If an option is not installed on the vehicle, the scan tool will display No Comm for that options control module. In order to avert misdiagnoses of No Communication with a specific module, refer to **Data Link References** for a list of modules, the buses they communicate with, and the RPO codes for a specific module.

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2010 ACCESSORIES & BODY, CAB

Displays and Gauges - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Instrument Panel Cluster Fasteners	2.5 N.m	22 lb in
Multifunction Auxiliary Gauge Fasteners	2.5 N.m	22 lb in

AMBIENT AIR TEMPERATURE SENSOR RESISTANCE

Temperature		Ambient Air Temp Sensor	Ambient Air Temp Sensor (Min)	Ambient Air Temp Sensor (Max)
°C	°F	(kohms)	(kohms)	(kohms)
-40	-40	169.4	158.46	181.19
-30	-22	88.74	83.39	94.47
-20	-4	48.58	47.19	50.02
-10	14	27.67	26.93	28.44
0	32	16.33	15.92	16.75
10	50	9.95	9.71	10.19
20	68	6.24	6.1	6.38
30	86	4.02	3.94	4.11
40	104	2.66	2.61	2.71
50	122	1.8	1.73	1.87
60	140	1.24	1.2	1.28

SCHEMATIC AND ROUTING DIAGRAMS

INSTRUMENT CLUSTER SCHEMATICS

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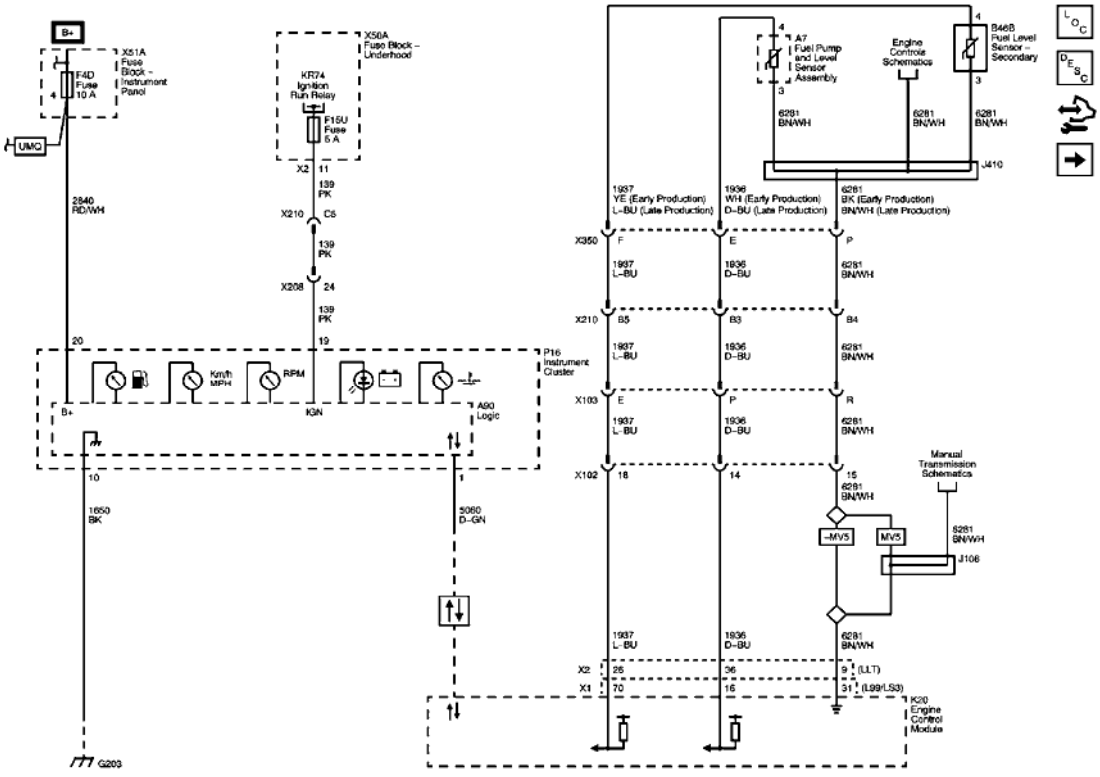


Fig. 1: Gauges
Courtesy of GENERAL MOTORS CORP.

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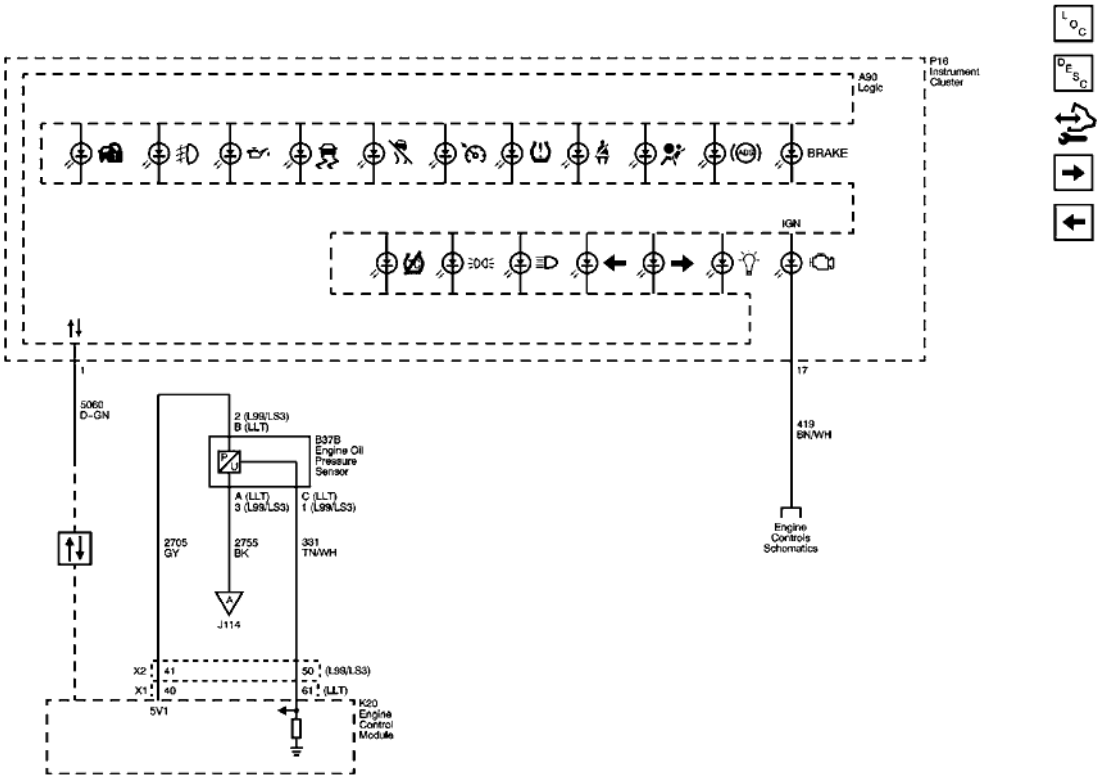


Fig. 2: Indicators
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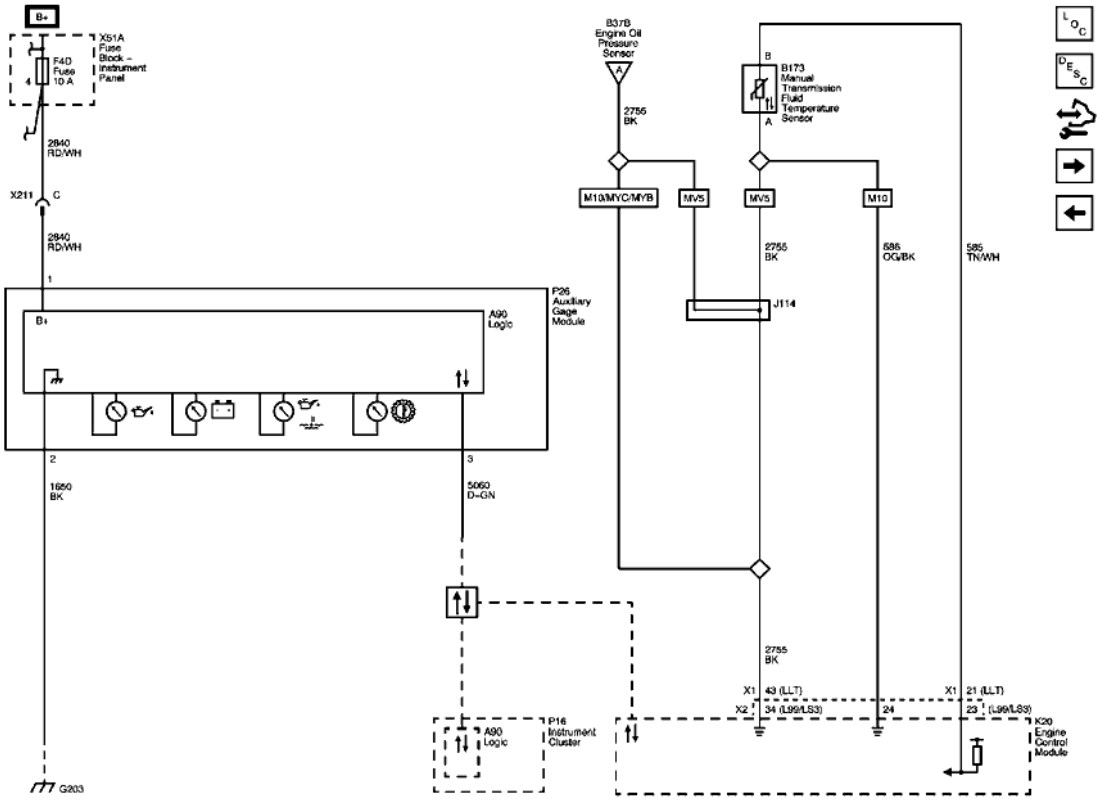
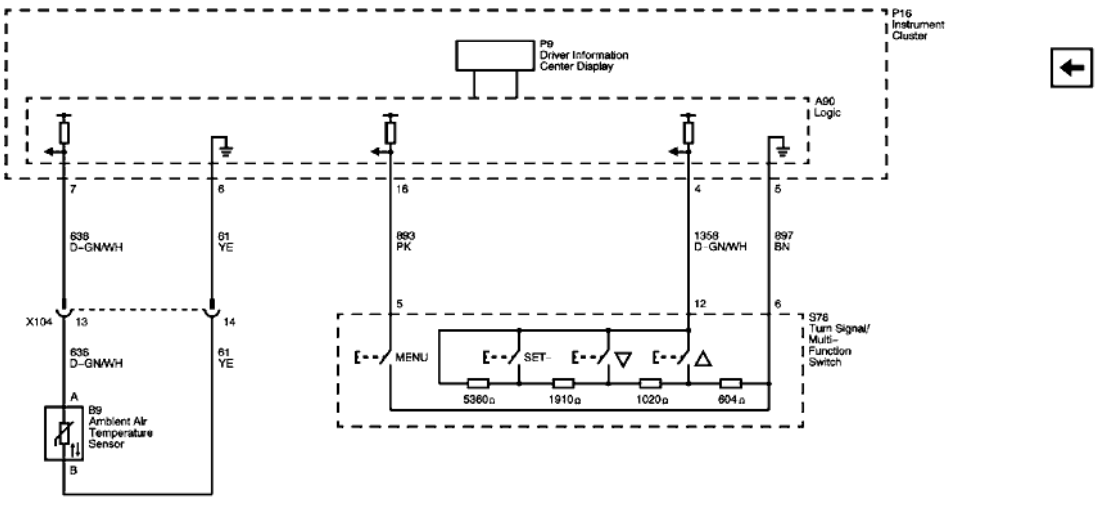


Fig. 3: Auxiliary Gage Module
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Fig. 4: Driver Information Center
Courtesy of GENERAL MOTORS CORP.

AUDIBLE WARNINGS SCHEMATICS

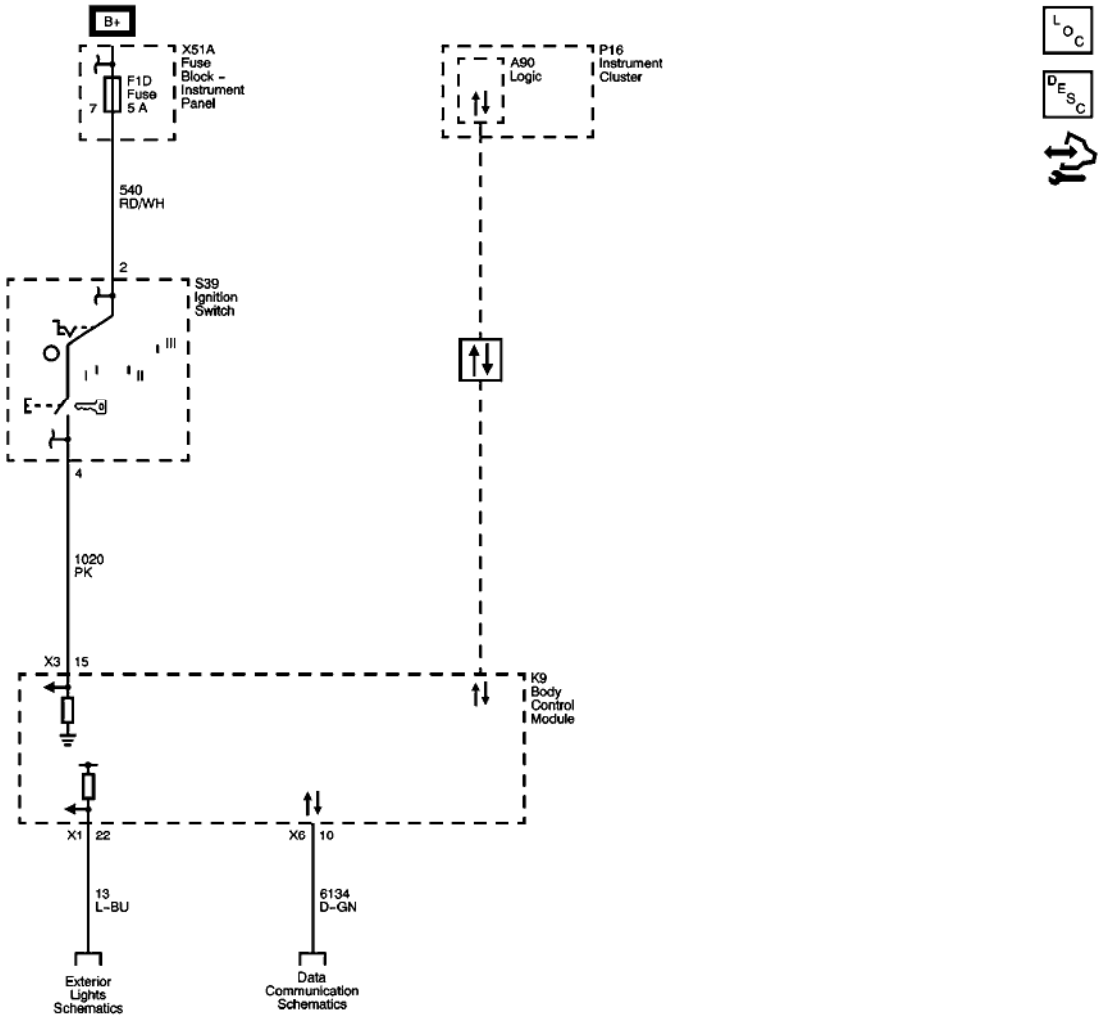


Fig. 5: Audible Warnings
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0158	B0158 02: Ambient Air Temperature Sensor Circuit Short to Ground B0158 05: Ambient Air Temperature Sensor Circuit High Voltage/Open

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DTC B0550	B0550 32: Odometer Circuit General Memory Malfunction
DTC B3567	B3567 01: Info Display Select Switch Circuit Short to Battery B3567 02: Info Display Select Switch Circuit Short to Ground B3567 04: Info Display Select Switch Circuit Open B3567 59: Info Display Select Switch Circuit Protection Time-Out
DTC P0461-P0463, P2066, P2067, or P2068	P0461: Fuel Level Sensor Performance P0462: Fuel Level Sensor Circuit Low Voltage P0463: Fuel Level Sensor Circuit High Voltage P2066: Fuel Level Sensor 2 Performance P2067: Fuel Level Sensor 2 Circuit Low Voltage P2068: Fuel Level Sensor 2 Circuit High Voltage
DTC P0464	P0464: Fuel Level Sensor 1 Circuit Intermittent
DTC P0521, P0522, or P0523	P0521: Engine Oil Pressure Sensor Performance P0522: Engine Oil Pressure Sensor Circuit Low Voltage P0523: Engine Oil Pressure Sensor Circuit High Voltage

DTC B0158

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0158 02

Ambient Air Temperature Sensor Circuit Short to Ground

DTC B0158 05

Ambient Air Temperature Sensor Circuit High Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Air Temperature Sensor Signal	B0158 02	B0158 05	B0158 05	-
Low Reference	-	B0158 05	B0158 05	-

Circuit/System Description

The instrument cluster monitors the ambient air temperature sensor with a low reference circuit and 5 V signal circuit. The instrument cluster monitors the voltage drop across the sensor, which is proportional to temperature.

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When the ambient air temperatures are cold, the resistance of the sensor is high and the voltage signals are high. When the ambient air temperatures are hot, the resistance of the sensors is low and the voltage signals are low. The instrument cluster converts the voltage value to a temperature value of Celsius or Fahrenheit that will be displayed by the display.

Conditions for Running the DTC

The system voltage is between 9-16 V

Conditions for Setting the DTC

B0158 02

The instrument cluster detects the sensor signal circuit is more than 88°C (190°F).

B0158 05

The instrument cluster detects the sensor signal circuit is less than -40°C (-40°F).

Action Taken When the DTC Sets

The instrument cluster uses a default air temperature value for further calculations. The driver information center displays ---°C (---°F).

Conditions for Clearing the DTC

The DTC will become history if the instrument cluster no longer detects a malfunction.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Driver Information Center (DIC) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Ambient Air Temperature parameter. The reading should be between -40°C (-40°F) to +88°C (+190°F) and change with air temperature changes.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B9 Air Temperature Sensor - Ambient.
2. Test for less than 10 ohms between the low reference circuit terminal B and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
3. Ignition ON, test for 4.8-5.2 V between the signal circuit terminal A and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the P16 Instrument Cluster.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
4. If all circuits test normal, test or replace the B9 Air Temperature Sensor - Ambient.

Component Testing

Static Test

1. Test the B9 Air Temperature Sensor - Ambient by varying the sensor temperature while monitoring the sensor resistance.
2. Compare the readings with the **Ambient Air Temperature Sensor Resistance**
    - If not within the specified range, replace the B9 Air Temperature Sensor - Ambient.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ambient Air Temperature Sensor Replacement**
- **Control Module References** for instrument cluster replacement, setup, and programming

DTC B0550

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0550 32

Odometer Circuit General Memory Malfunction

Circuit/System Description

The instrument cluster is equipped with odometers that indicate the distance travelled by the vehicle. One type of odometer is the season odometer where the traveled distance can not be reset by the driver. This information is also stored in the body control module (BCM). In addition to storing the season odometer value for the vehicle, the instrument cluster and the BCM store the VIN. Software checks are performed to ensure these modules, and their stored season odometer information, can not be removed or transferred between different vehicles.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The BCM has detected an internal memory malfunction.

Action Taken When the DTC Sets

DTC B0550 32 is stored in the BCM memory.

Conditions for Clearing the DTC

The BCM no longer detects a malfunction.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Driver Information Center (DIC) Description and Operation

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Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B0550 32 is not set.
    - If the DTC is set, program the K9 Body Control Module.
2. Verify that DTC B0550 32 does not reset, If the DTC resets, replace the K9 Body Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming.

DTC B3567

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3567 01

Info Display Select Switch Circuit Short to Battery

DTC B3567 02

Info Display Select Switch Circuit Short to Ground

DTC B3567 04

Info Display Select Switch Circuit Open

DTC B3567 59

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Info Display Select Switch Circuit Protection Time-Out

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Information Center Switch Signal	B3567 02	B3567 04	B3567 01	-
Driver Information Center Reset Switch Signal	1	1	1	-
Low Reference	-	B3567 04	-	-
1 Driver Information Center Switch Malfunction				

Circuit/System Description

The driver information center switch is a multiplexed switch. Battery power is provided to the driver information center switch via the instrument cluster. The driver information center switch signal circuit is pulled up to battery voltage in the instrument cluster. The instrument cluster also provides the driver information center switch with a low reference. The switch input to the instrument cluster is pulled low when a switch is activated. The driver information center switch is a momentary contact switch that connects a series of resistors in a resistor ladder format. The instrument cluster monitors the driver information center switch signal circuit to determine the driver information center switch inputs. Each switch state Menu, INFO+, INFO- corresponds to a certain resistance value. The instrument cluster determines the switch pressed by the voltage drop across the resistors.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

B3567 01

The instrument cluster detects that the driver information center switch signal circuit is shorted to battery.

B3567 02

The instrument cluster detects that the driver information center switch signal circuit is shorted to ground.

B3567 04

The instrument cluster detects that the driver information center switch signal circuit is open.

B3567 59

The instrument cluster detects that the driver information center switch is stuck.

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Action Taken When the DTC Sets

The instrument cluster ignores the driver information center switch inputs.

Conditions for Clearing the DTC

The DTC will become history if the instrument cluster no longer detects a malfunction.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Driver Information Center (DIC) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Driver Information Center Switch parameter, that when the S78 Turn Signal/Multi-Function Switches Menu, INFO+, INFO-, SET are pressed and released the scan tool parameter toggles between Menu, Up, Down, Clear and Inactive.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S78 Turn Signal/Multi-Function Switch.
2. Ignition OFF for more than 60 s, test for less than 10 ohms between the low reference circuit terminal 6 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.

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3. Ignition ON, verify the scan tool Driver Information Center Switch parameter is Undefined.
    - If not Undefined, test the signal circuits terminal 5 and terminal 12 for a short to ground. If the circuit tests normal, replace the P16 Instrument Cluster
4. Ignition ON, install a 680 ohms resistance between the signal circuit terminal 12 and the low reference circuit terminal 6. Verify the scan tool Driver Information Center Switch parameter is Up.
    - If not Up, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
5. Ignition ON, install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6. Verify the scan tool Driver Information Center Switch is Menu.
    - If not Menu, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
6. If all circuits test normal, test or replace the S78 Turn Signal/Multi-Function Switch.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the S78 Turn Signal/Multi-Function Switch.
2. Test for 496-498 kohms between the signal terminal 12 and the low reference circuit terminal 6.
    - If not within the specified range, replace the S78 Turn Signal/Multi-Function Switch.
3. Test for 550-650 ohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Info+ switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
4. Test for 1.5-1.7 kohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Info- switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
5. Test for 3.3-3.7 kohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Set switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
6. Test for less than 5 ohms between the signal terminal 5 and the low reference circuit terminal 6 while pressing the Menu switch.
    - If greater than the specified value, replace the S78 Turn Signal/Multi-Function Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for instrument cluster replacement, setup, and programming

DTC P0461-P0463, P2066, P2067, OR P2068

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0461

Fuel Level Sensor Performance

DTC P0462

Fuel Level Sensor Circuit Low Voltage

DTC P0463

Fuel Level Sensor Circuit High Voltage

DTC P2066

Fuel Level Sensor 2 Performance

DTC P2067

Fuel Level Sensor 2 Circuit Low Voltage

DTC P2068

Fuel Level Sensor 2 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Level Sensor 1 Signal	P0462	P0463	P0463	P0461
Fuel Level Sensor 2 Signal	P2067	P2068	P2068	P2066
Low Reference	-	1	P0463, P2068	P0461, P2066
1. Fuel Gauge Inoperative				

Circuit/System Description

The primary fuel level sensor and the secondary fuel level sensor change resistance based on fuel level. The engine control module (ECM) monitors the signal circuits of the primary fuel level sensor and the secondary fuel level sensor in order to determine the fuel level. When the fuel tank is full, the resistances of both fuel level sensors are low and the ECM senses a low signal voltage on both the signal circuits of the primary fuel level sensor and the secondary fuel level sensor. When the fuel tank is empty, the resistances of the fuel level sensors

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are high and the ECM senses a high signal voltage. The ECM uses the signal circuits of the primary fuel level sensor and the secondary fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM sends the fuel level percentage via High Speed CAN-Bus to the body control module (BCM). The BCM then sends the fuel level percentage via Low Speed CAN-Bus to the instrument cluster in order to control the fuel gauge.

Conditions for Running the DTC

- The engine is running
- The system voltage is between 11-16 V

Conditions for Setting the DTC

P0461 or P2066

- The ECM detects a difference between the fuel consumed by the engine and change of the fuel level signal of less than 1 L (0.26 gal) over a range of 30 L (7.92 gal) or 45.6% of the primary fuel tank.
- The above condition is present for about 300 s.

P0462 or P2067

- The signal voltage is less than 0.25 V.
- The above conditions must be met for 5 s.

P0463 or P2068

- The signal voltage is greater than 4.7 V.
- The above conditions must be met for 5 s.

Action Taken When the DTC Sets

- P0461, P0462, P0463, P2066, P2067 and P2068 are Type B DTCs
- The fuel gauge defaults to empty
- The low fuel indicator illuminates

Conditions for Clearing the DTC

- P0461, P0462, P0463, P2066, P2067 and P2068 are Type B DTCs
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.

Reference Information

Schematic Reference

Instrument Cluster Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool ECM - Fuel Level Sensor parameter. The reading should be between 0.1-4 V.

Circuit/System Testing

6 Cylinder Engine RPO LLT

1. Ignition OFF, disconnect the harness connector X2 at the K20 Engine Control Module.
2. Ignition ON, test for less than 0.3 V between the low reference circuit terminal 9 and ground.
    - If greater than the specified range, test both the low reference circuit and the signal circuits terminal 26 and 36 for a short to voltage. If the circuit tests normal, replace the appropriate fuel level sensor.
3. Ignition OFF, test for infinite resistance between the low reference circuit terminal 9 and ground.
    - If less than the specified range, test both the low reference circuit and the signal circuits terminal 26 and 36 for a short to ground. If the circuit tests normal, replace the appropriate fuel level sensor.
4. Test for 20-300 ohms between the signal circuit terminal 36 and the low reference circuit terminal 9.
    - If not within the specified range, test both the signal circuit and then low reference circuit or an open/high resistance. If the circuit tests normal, replace the G12 Fuel Pump.
5. Test for 20-300 ohms between the signal circuit terminal 26 and the low reference circuit terminal 9.
    - If not within the specified range, test both the signal circuit and then low reference circuit or an open/high resistance. If the circuit tests normal, replace the B46B Fuel Level Sensor - Secondary.

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6. If all circuits test normal, test or replace the K20 Engine Control Module.

8 Cylinder Engine RPO L99 or LS3

1. Ignition OFF, disconnect the harness connector X2 at the K20 Engine Control Module.
2. Ignition ON, test for less than 0.3 V between the low reference circuit terminal 31 and ground.
    - If greater than the specified range, test both the low reference circuit and the signal circuits terminal 70 and 16 for a short to voltage. If the circuit tests normal, replace the appropriate fuel level sensor.
3. Ignition OFF, test for infinite resistance between the low reference circuit terminal 31 and ground.
    - If less than the specified range, test both the low reference circuit and the signal circuits terminal 70 and 16 for a short to ground. If the circuit tests normal, replace the appropriate fuel level sensor.
4. Test for 20-300 ohms between the signal circuit terminal 16 and the low reference circuit terminal 31.
    - If not within the specified range, test both the signal circuit and then low reference circuit or an open/high resistance. If the circuit tests normal, replace the G12 Fuel Pump.
5. Test for 20-300 ohms between the signal circuit terminal 70 and the low reference circuit terminal 31.
    - If not within the specified range, test both the signal circuit and then low reference circuit or an open/high resistance. If the circuit tests normal, replace the B46B Fuel Level Sensor - Secondary.
6. If all circuits test normal, test or replace the K20 Engine Control Module.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the appropriate fuel level sensor.
2. Test for 40-250 ohms between the signal terminal 4 and the low reference terminal 3.
    - If not within the specified range, replace the appropriate fuel level sensor.

Dynamic Test

1. Ignition OFF, disconnect the harness connector at the appropriate fuel level sensor.
2. Remove the appropriate fuel level sensor from the fuel tank.
3. Sweep the sensor through the entire range while monitoring the resistance between the signal terminal 4 and the low reference terminal 3. The resistance should vary between less than 45 ohms and greater than 250 ohms without any spikes or dropouts.
    - If not within the specified range or is erratic, replace the appropriate fuel level sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuel Level Sensor Replacement - Left Side** for LLT
- **Fuel Level Sensor Replacement - Right Side** for LLT
- **Fuel Level Sensor Replacement - Left Side** for L99 or LS3

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- **Fuel Level Sensor Replacement - Right Side** for L99 or LS3
- **Control Module References** for the ECM replacement, setup, and programming.

DTC P0464

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0464

Fuel Level Sensor 1 Circuit Intermittent

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Level Sensor 1 Signal	P0462	P0463	P0463, P0464	P0461
Fuel Level Sensor 2 Signal	P2067	P2068	P2068	P2066
Low Reference	-	1	P0463, P0464, P2068	P0461, P2066
1. Fuel Gauge Inoperative				

Circuit/System Description

The primary fuel level sensor and the secondary fuel level sensor change resistance based on fuel level. The engine control module (ECM) monitors the signal circuits of the primary fuel level sensor and the secondary fuel level sensor in order to determine the fuel level. When the fuel tank is full, the resistances of both fuel level sensors are low and the ECM senses a low signal voltage on both the signal circuits of the primary fuel level sensor and the secondary fuel level sensor. When the fuel tank is empty, the resistances of the fuel level sensors are high and the ECM senses a high signal voltage. The ECM uses the signal circuits of the primary fuel level sensor and the secondary fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM sends the fuel level percentage via High Speed CAN-Bus to the body control module (BCM). The BCM then sends the fuel level percentage via Low Speed CAN-Bus to the instrument cluster in order to control the fuel gauge.

Conditions for Running the DTC

- The ignition is off
- The system voltage is between 11-16 V

Conditions for Setting the DTC

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- The fuel level change is greater than 10%.
- The above conditions must be met for 30 s.
- DTC P0464 runs and fails 2 out of 3 test cycles.

Action Taken When the DTC Sets

- P0464 is a Type B DTC
- The fuel gauge defaults to empty
- The low fuel indicator illuminates

Conditions for Clearing the DTC

- P0464 is a Type B DTC
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

Ignition ON, observe the scan tool ECM - Fuel Level Sensor parameter. The reading should be between 0.1-4 V.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X2 at the K20 Engine Control Module.
2. Ignition ON, test for less than 0.3 V between the low reference circuit terminal 9 and ground.
    - If greater than the specified range, test both the low reference circuit and the signal circuits terminal 26 and 36 for a short to voltage. If the circuit tests normal, replace the appropriate fuel level sensor.
3. Ignition OFF, test for infinite resistance between the low reference circuit terminal 9 and ground.
    - If less than the specified range, test both the low reference circuit and the signal circuits terminal 26 and 36 for a short to voltage. If the circuit tests normal, replace the appropriate fuel level sensor.
4. Test for 20-300 ohms between the signal circuit terminal 36 and the low reference circuit terminal 9.
    - If not within the specified range, test both the signal circuit and then low reference circuit or an open/high resistance. If the circuit tests normal, replace the G12 Fuel Pump.
5. If all circuits test normal, test or replace the K20 Engine Control Module.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the G12 Fuel Pump.
2. Test for 40-250 ohms between the signal terminal 4 and the low reference terminal 3.
    - If not within the specified range, replace the G12 Fuel Pump.

Dynamic Test

1. Ignition OFF, disconnect the harness connector at the G12 Fuel Pump.
2. Remove the fuel level sensor from the fuel tank.
3. Sweep the sensor through the entire range while monitoring the resistance between the signal terminal 4 and the low reference terminal 3. The resistance should vary between less than 45 ohms and greater than 250 ohms without any spikes or dropouts.
    - If not within the specified range or is erratic, replace the G12 Fuel Pump.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuel Level Sensor Replacement - Left Side** for LLT
- **Fuel Level Sensor Replacement - Right Side** for LLT
- **Fuel Level Sensor Replacement - Left Side** for L99 or LS3
- **Fuel Level Sensor Replacement - Right Side** for L99 or LS3

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- **Control Module References** for the ECM replacement, setup, and programming.

DTC P0521, P0522, OR P0523

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0521

Engine Oil Pressure Sensor Performance

DTC P0522

Engine Oil Pressure Sensor Circuit Low Voltage

DTC P0523

Engine Oil Pressure Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5V Reference	P0522	P0522	P0523	P0521
Signal	P0522	P0522	P0523	P0521
Low Reference	-	P0523	-	P0521

Circuit/System Description

The engine oil pressure sensor changes voltage based on the engine oil pressure. The engine oil pressure sensor is a 3-wire sensor comprised of the signal circuit, the low reference circuit and the 5V reference circuit. The engine control module (ECM) supplies 5 V to the engine oil pressure sensor via the 5V reference circuit and provides ground via the engine oil pressure sensor low reference circuit. The ECM monitors the signal circuit of the engine oil pressure sensor to determine the engine oil pressure sensor voltage is within the normal operating range of approximately 1-4 V. When the engine oil pressure is high, the engine oil pressure sensor voltage is high and the sensor senses a high signal voltage. When the engine oil pressure is low, the engine oil pressure sensor voltage is low and the ECM senses a low signal voltage. The ECM sends the engine oil pressure sensor information via High Speed CAN-Bus to the body control module (BCM). The BCM then sends the engine oil pressure sensor information via Low Speed CAN-Bus to the instrument cluster.

Conditions for Running the DTC

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The engine is running.

Conditions for Setting the DTC

P0521

- The engine oil pressure is out of its working range.
- The ECM does not detect a change in the engine oil pressure.
- The above condition is present over a predetermined variance of engine speed.

P0522

- The ECM detects a short to ground in the engine oil pressure signal circuit.
- The above condition is present for greater than 10 s.

P0523

- The ECM detects a short to voltage or an open circuit in the engine oil pressure signal circuit.
- The above condition is present for greater than 10 s.

Action Taken When the DTC Sets

The instrument cluster illuminates the service vehicle soon indicator.

Conditions for Clearing the DTC

The DTC becomes history when the conditions for setting the DTC are no longer present.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

- **Instrument Cluster Description and Operation**
- **Indicator/Warning Message Description and Operation**
- **Driver Information Center (DIC) Description and Operation**

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Engine running, observe the scan tool Engine Oil Pressure Sensor parameter. The reading should be between 103-241 kPa (15-35 PSI).

Circuit/System Testing

6 Cylinder Engine RPO LLT

1. Ignition OFF, disconnect the harness connector at the B37B Engine Oil Pressure Sensor.
2. Test for less than 10 ohms between the low reference circuit terminal 3 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K20 Engine Control Module.
3. Ignition ON, test for 4.8-5.2 V between the 5V reference circuit terminal 2 and ground.
    - If less than the specified range, test the 5V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K20 Engine Control Module.
    - If greater than the specified range, test the 5V reference circuit for a short to voltage. If the circuit tests normal, replace the K20 Engine Control Module.
4. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
5. Test for greater than 500 kohms between the signal circuit terminal 1 and ground.
    - If less than the specified range, test the signal circuit terminal 1 for a short to ground. If the circuit tests normal, replace the B37B Engine Oil Pressure Sensor.
6. Ignition ON, test for less than 0.3 V between the signal circuit terminal 1 and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the B37B Engine Oil Pressure Sensor.
7. If all circuits test normal, replace the K20 Engine Control Module.

8 Cylinder Engine RPO L99 or LS3

1. Ignition OFF, disconnect the harness connector at the B37B Engine Oil Pressure Sensor.

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2. Test for less than 10 ohms between the low reference circuit terminal A and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K20 Engine Control Module.
3. Ignition ON, test for 4.8-5.2 V between the 5V reference circuit terminal B and ground.
    - If less than the specified range, test the 5V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K20 Engine Control Module.
    - If greater than the specified range, test the 5V reference circuit for a short to voltage. If the circuit tests normal, replace the K20 Engine Control Module.
4. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
5. Test for greater than 500 kohms between the signal circuit terminal C and ground.
    - If less than the specified range, test the signal circuit terminal C for a short to ground. If the circuit tests normal, replace the B37B Engine Oil Pressure Sensor.
6. Ignition ON, test for less than 0.3 V between the signal circuit terminal C and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the B37B Engine Oil Pressure Sensor.
7. If all circuits test normal, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Engine Oil Pressure Sensor and/or Switch Replacement** for LLT
- **Engine Oil Pressure Sensor and/or Switch Replacement (L99/LS3)** for L99 or LS3
- **Control Module References** for ECM replacement, setup and programming

SYMPTOMS - DISPLAYS AND GAUGES

NOTE: The following steps must be completed before using the symptom diagnostic tables.

1. Before using the symptom diagnostic tables, perform the **Diagnostic System Check - Vehicle**
2. Review the system operation in order to understand the system functions. Refer to the following description and operations:
    - **Instrument Cluster Description and Operation**
    - **Indicator/Warning Message Description and Operation**
    - **Driver Information Center (DIC) Description and Operation**
    - **Audible Warnings Description and Operation**
    - **Auxiliary Gauges Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which can affect the operation of the instrument panel cluster or the

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audible warning systems. Refer to **Checking Aftermarket Accessories**

- Inspect the accessible system components or the visible system components for obvious damage or for obvious conditions which can cause the symptom.
- Inspect for the proper fluid levels.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Gauges and Odometer

- **Instrument Cluster Gauges Inoperative**
- **Fuel Gauge Inaccurate or Inoperative**
- **Odometer Trip/Reset Switch Inoperative**
- **Engine Oil Pressure Gauge Inaccurate or Inoperative**
- **Engine Oil Temperature Gauge Inoperative**
- **Transmission Fluid Temperature Gauge Inaccurate or Inoperative**
- **Volt Gauge Inaccurate or Inoperative**
- **Speedometer and/or Odometer Inaccurate or Inoperative**

Indicators

- **ABS Indicator Malfunction**
- **Air Bag Indicator Circuit Malfunction (Driver)** or **Air Bag Indicator Circuit Malfunction (Passenger)**
- **Brake Warning Indicator Malfunction**
- **Charge Indicator Malfunction**
- **Cruise Control Indicator Malfunction**
- **Door Ajar Indicator Malfunction**
- **Park Brake System Diagnosis**
- **Engine Oil Pressure Indicator Malfunction**
- **Front Fog Lamps Malfunction**
- **Headlamps Malfunction (T4A)** or **Headlamps Malfunction (T4F)**
- **Low Tire Pressure Indicator Malfunction**
- **Malfunction Indicator Lamp (MIL) Diagnosis**
- **Seat Belt Indicator Circuit Malfunction - Driver**
- **Security Indicator Malfunction**

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- **StabiliTrak Indicator Malfunction**
- **Turn Signal Lamps and/or Indicators Malfunction**

Driver Information Center

- **Driver Information Center (DIC) Switch Malfunction**
- **Outside Air Temperature Display Inaccurate or Inoperative**

Audible Warnings

Chime Malfunction

Compass

Compass Calibration and Magnetic Variance

CHARGE INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The engine control module (ECM) uses the generator turn ON signal circuit to control the load of the generator on the engine. A high side driver in the ECM applies voltage to the voltage regulator. This signals the voltage regulator to turn the field circuit ON and OFF. The ECM monitors the state of the generator turn ON signal circuit. The ECM should detect low voltage on the generator turn ON signal circuit when the ignition is ON and the engine is OFF, or when the charging system malfunctions. With the engine running, the ECM should detect high voltage on the generator turn ON signal circuit. The ECM performs key ON and RUN tests to determine the status of the generator turn ON signal circuit. If a malfunction is detected the ECM will illuminate the charge indicator in the instrument cluster.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Indicator/Warning Message Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, engine running, verify the scan tool Battery Voltage parameter is between 12.5-15.5 V.
   - If not within the specified range, refer to **Charging System Test** .
2. Command the All Indicators test ON and OFF with the scan tool, verify that the charge indicator turns ON and OFF.
   - If the charge indicator always stays ON or always OFF, replace the P16 Instrument Cluster.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Instrument Cluster replacement, setup, and programming

CHIME MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The radio generates the audible warnings. The instrument cluster, the body control module (BCM), the inflatable restraint sensing and diagnostic module (SDM) or the object alarm module request audible warnings via Low Speed CAN-Bus signals.

Reference Information

Schematic Reference

Audible Warnings Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Audible Warnings Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Before performing this diagnostics, make sure no indicators are illuminated after the instrument cluster performs a lamp test. If any indicators are illuminated after the bulb test, perform the indicator diagnostics before this diagnostics.

1. Ignition ON, radio ON, adjust the radio balance and fade to each speaker.
   - If any speaker does not operate properly, refer to **Speaker Malfunction** .
2. Ignition ON, buckle up driver seat belt, verify the scan tool Driver Seat Belt Status parameter is Buckled.
   - If not Buckled refer to **Seat Belt Indicator Circuit Malfunction - Driver**
3. Ignition ON, headlamp switch OFF, verify the scan tool Headlamp On Switch parameter is Inactive.
   - If not Inactive, refer to **Headlamps Malfunction (T4A)** or **Headlamps Malfunction (T4F)** .
4. Ignition ON, parking lamp switch OFF, verify the scan tool Parklamp Switch parameter is Inactive.
   - If not Inactive, refer to **Park, License, and/or Tail Lamps Malfunction** .
5. Ignition ON, turn signal switch OFF, verify the scan tool Left Turn Signal Switch parameter and the scan tool Right Turn Signal Switch parameter is Inactive.
   - If not Inactive, refer to **Turn Signal Lamps and/or Indicators Malfunction** .
6. Ignition ON, parking brake released, verify the scan tool Park Brake Switch parameter is Inactive.
   - If not Inactive, refer to **Park Brake System Diagnosis**
7. Ignition ON, doors closed, verify that all scan tool parameters listed below are Inactive.
   - Driver Door Ajar Switch
   - Passenger Door Ajar Switch

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- Left Rear Door Ajar Switch
- Right Rear Door Ajar Switch
  - If any are not Inactive, refer to **Door Ajar Indicator Malfunction** .

8. Verify the scan tool Key in Ignition Status parameter is Inactive when the key is in the ignition and Active when the key is out of the ignition.
   - If the scan tool parameter does not operate properly, replace the K9 Body Control Module.
9. Ignition ON, verify that the scan tool Park Assist Switch parameter is Active when the parking assist is active and Inactive when the parking assist is Inactive.
   - If the scan tool parameter does not operate properly, refer to **Parking Assist System Malfunction** .
10. If all tests operate properly, replace the A11 Radio.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM or Radio replacement, setup, and programming

DRIVER INFORMATION CENTER (DIC) SWITCH MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Information Center Switch Signal	B3567 02	B3567 04	B3567 01	-
Driver Information Center Reset Switch Signal	1	1	1	-
Low Reference	-	B3567 04	-	-
1. Driver Information Center Switch Malfunction				

Circuit/System Description

The driver information center switch is a multiplexed switch. Battery power is provided to the driver information center switch via the instrument cluster. The driver information center switch signal circuit is pulled up to battery voltage in the instrument cluster. The instrument cluster also provides the driver information center switch with a low reference. The switch input to the instrument cluster is pulled low when a switch is activated. The driver information center switch is a momentary contact switch that connects a series of resistors in a resistor ladder format. The instrument cluster monitors the driver information center switch signal circuit to

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determine the driver information center switch inputs. Each switch state - Menu, INFO+, INFO-, corresponds to a certain resistance value. The instrument cluster determines the switch pressed by the voltage drop across the resistors.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Driver Information Center (DIC) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Driver Information Center Switch parameter, that when the S78 Turn Signal/Multi-Function Switches Menu, INFO+, INFO-, SET are pressed and released the scan tool parameter toggles between Menu, Up, Down, Clear and Inactive.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S78 Turn Signal/Multi-Function Switch.
2. Ignition OFF for more than 60 s, test for less than 10 ohms between the low reference circuit terminal 6 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
3. Ignition ON, verify the scan tool Driver Information Center Switch parameter is Undefined.
    - If not Undefined, test the signal circuits terminal 5 and terminal 12 for a short to ground. If the circuit tests normal, replace the P16 Instrument Cluster
4. Ignition ON, install a 680 ohms resistance between the signal circuit terminal 12 and the low reference

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circuit terminal 6. Verify the scan tool Driver Information Center Switch parameter is Up.
    - If not Up, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
5. Ignition ON, install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6. Verify the scan tool Driver Information Center Switch is Menu.
    - If not Menu, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
6. If all circuits test normal, test or replace the S78 Turn Signal/Multi-Function Switch.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the S78 Turn Signal/Multi-Function Switch.
2. Test for 496-498 kohms between the signal terminal 12 and the low reference circuit terminal 6.
    - If not within the specified range, replace the S78 Turn Signal/Multi-Function Switch.
3. Test for 550-650 ohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Up switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
4. Test for 1.5-1.7 kohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Down switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
5. Test for 3.3-3.7 kohms between the signal terminal 12 and the low reference circuit terminal 6 while pressing the Reset switch.
    - If not within the specified value, replace the S78 Turn Signal/Multi-Function Switch.
6. Test for less than 5 ohms between the signal terminal 5 and the low reference circuit terminal 6 while pressing the Menu switch.
    - If greater than the specified value, replace the S78 Turn Signal/Multi-Function Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for the instrument cluster replacement, setup, and programming

ENGINE OIL PRESSURE GAUGE INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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Circuit/System Description

The auxiliary gauge module displays the engine oil pressure based on the information from the engine control module (ECM). The ECM converts the data from the engine oil pressure sensor to a engine oil pressure signal. The ECM sends the engine oil pressure signal via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil pressure.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Auxiliary Gauges Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify that the engine oil pressure gauge sweeps from its low to high position.
    - If the engine oil pressure gauge does not sweep, replace the P26 Auxiliary Gauge Module.
2. If the engine oil pressure gauge does sweep, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Auxiliary Gauge Module or ECM replacement, setup, and programming

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ENGINE OIL PRESSURE INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The engine oil pressure sensor changes voltage based on the engine oil pressure. The engine oil pressure sensor is a 3-wire sensor comprised of the signal circuit, the low reference circuit and the 5-V reference circuit. The engine control module (ECM) supplies 5 V to the engine oil pressure sensor via the 5-V reference circuit and provides ground via the engine oil pressure sensor low reference circuit. The ECM monitors the signal circuit of the engine oil pressure sensor to determine the engine oil pressure sensor voltage is within the normal operating range of approximately 1-4 V. When the engine oil pressure is high, the engine oil pressure sensor voltage is high and the sensor senses a high signal voltage. When the engine oil pressure is low, the engine oil pressure sensor voltage is low and the ECM senses a low signal voltage. The ECM sends the engine oil pressure sensor information via High Speed CAN-Bus to the body control module (BCM). The BCM then sends the engine oil pressure sensor information via Low Speed CAN-Bus to the instrument cluster.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Indicator/Warning Message Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

1. Ignition ON, command the All Indicators test ON and OFF with the scan tool, verify that the engine oil pressure indicator changes between turn ON and OFF.
    - If the engine oil pressure indicator always stays ON or always OFF, replace the P16 Instrument Cluster.
2. If the engine oil pressure indicator changes between ON and OFF, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for instrument cluster or ECM replacement, setup, and programming.

ENGINE OIL TEMPERATURE GAUGE INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The auxiliary gauge module displays the engine oil temperature based on the information from the engine control module (ECM). The ECM converts the data from the engine oil temperature sensor to a engine oil temperature signal. The ECM sends the engine oil temperature signal via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil temperature.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Auxiliary Gauges Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify that the engine oil temperature gauge sweeps from its low to high position.
    - If the fuel engine oil pressure gauge does not sweep, replace the P26 Auxiliary Gauge Module.
2. If the engine oil temperature gauge does sweep, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Auxiliary Gauge Module or ECM replacement, setup, and programming

FUEL GAUGE INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The instrument cluster displays the fuel level based on the information from the engine control module (ECM). The ECM converts the data from the fuel level sensors to a fuel level signal. The ECM sends the fuel level signal via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the fuel level. If the fuel level falls below 11% the instrument cluster switches the low fuel level indicator ON.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

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Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, perform the Instrument Cluster Gauge Sweep test with the scan tool, verify that the fuel level gauge sweeps from its low to high position.
    - If the fuel level gauge does not sweep, replace the P16 Instrument Cluster.
2. Command the All Indicators test ON and OFF with the scan tool, verify that the low fuel level indicator turns ON and OFF.
    - If the low fuel level indicator always stays on or always off, replace the P16 Instrument Cluster.
3. If the fuel level gauge does sweep and the low fuel level indicator changes between ON and OFF, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Instrument Cluster or ECM replacement, setup, and programming

INSTRUMENT CLUSTER GAUGES INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The instrument cluster displays the engine coolant temperature, fuel level, vehicle speed and the engine speed

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based on the information from the engine control module (ECM). The ECM sends information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the engine coolant temperature, fuel level, the engine speed, the vehicle speed and the distance travelled, either in kilometers or miles, based on the vehicle requirements.

Diagnostic Aids

Verify the fuel level sensor is able to move through the entire range and does not stuck at any pipe or wire.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify no DTC is set.
    - If any DTC is set, diagnose this first.
2. Ignition ON, perform the Instrument Cluster Gauge Sweep test with the scan tool, verify that all gauges sweep from their low to high position.
    - If any gauge does not sweep, replace the P16 Instrument Cluster.
3. Drive the vehicle, verify the gauge values matches the values on the scan tool.
    - If the values do not match, replace the P16 Instrument Cluster.
4. Verify the fuel level sensor arm is able to move through the entire range and does not stuck at any pipe or

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wire.

5. If all gauges do sweep and display the correct value, and the odometer display counts up, replace the K20 Engine Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for instrument cluster or ECM replacement, setup and programming

ODOMETER TRIP/RESET SWITCH INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The instrument cluster displays the travelled distance based on the information from the engine control module (ECM). The ECM converts the data from the vehicle speed sensor to a distance signal. The ECM sends the distance information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the vehicle odometer and trip odometer. The instrument cluster detects the activation of the trip reset switch and a press and hold of the trip reset switch resets the trip odometer information to zero.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, verify the odometer trip reset switch resets the trip odometer display when the switch is pressed.

- If the odometer trip reset switch does not reset the trip odometer, replace the P16 Instrument Cluster.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for instrument cluster replacement, setup, and programming

OUTSIDE AIR TEMPERATURE DISPLAY INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Air Temperature Sensor Signal	B0158 02	B0158 05	B0158 05	-
Low Reference	-	B0158 05	B0158 05	-

Circuit/System Description

The instrument cluster monitors the ambient air temperature sensor with a low reference circuit and 5-V signal circuit. The instrument cluster monitors the voltage drop across the sensor, which is proportional to temperature. When the ambient air temperatures are cold, the resistance of the sensor is high and the voltage signals are high. When the ambient air temperatures are hot, the resistance of the sensors is low and the voltage signals are low. The instrument cluster converts the voltage value to a temperature value of Celsius or Fahrenheit which will be displayed by the driver information center display.

Reference Information

Schematic Reference

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Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Driver Information Center (DIC) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Ambient Air Temperature parameter. The reading should be between -40°C (-40°F) to +88°C (+190°F) and change with air temperature changes.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B9 Air Temperature Sensor - Ambient.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal B and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
3. Ignition ON, test for 4.8-5.2 V between the signal circuit terminal A and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the P16 Instrument Cluster.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the P16 Instrument Cluster.
4. If all circuits test normal, test or replace the B9 Air Temperature Sensor - Ambient and verify that the customer concern is not still present.
    - If the customer concern is still present, replace the P9 Driver Information Center Display.

Component Testing

Static Test

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1. Test the B9 Air Temperature Sensor - Ambient by varying the sensor temperature while monitoring the sensor resistance.
2. Compare the readings with the **Ambient Air Temperature Sensor Resistance** and verify that the resistance is within the range of the specification.
    - If not within the specified range, replace the B9 Air Temperature Sensor - Ambient.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ambient Air Temperature Sensor Replacement**
- **Control Module References** for instrument cluster or display replacement, setup, and programming

SPEEDOMETER AND/OR ODOMETER INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The instrument cluster displays the engine coolant temperature, fuel level, vehicle speed and the engine speed based on the information from the engine control module (ECM). The ECM sends information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the engine coolant temperature, fuel level, the engine speed, the vehicle speed and the distance travelled, either in kilometers or miles, based on the vehicle requirements. The instrument cluster will display dashes when its VIN does not match the VIN received from the BCM.

Diagnostic Aids

If the VIN mismatch is corrected the odometer will once again be displayed in the instrument cluster. If the vehicle is driven for a calibrated distance with a VIN mismatch, it will cause the instrument cluster odometer to enter into an error mode and lock itself. When this occurs the dashes will remain on the display even after correcting the VIN mismatch. The vehicle odometer status data display on the scan tool can be used to identify a locked odometer. The only way to unlock the instrument cluster (clear the dashes from the display) is to perform an SPS programming event. Failure to follow the diagnostic and programming procedures may result in either an improper odometer value or a module replacement.

Reference Information

Schematic Reference

Instrument Cluster Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Instrument Cluster Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify no DTC is set.
   - If any DTC is set, diagnose this first.
2. Ignition ON, perform the Instrument Cluster Gauge Sweep test with the scan tool, verify that all gauges sweep from their low to high position.
   - If any gauge does not sweep, replace the P16 Instrument Cluster.
3. Drive the vehicle, verify the speedometer gauge value matches the Vehicle Speed parameter on the scan tool.
   - If the value do not match, replace the P16 Instrument Cluster.
4. Drive the vehicle, verify the odometer display, the displayed distance counts up while driving.
   - If the odometer displays only "----" (dashes), go to circuit/system testing.
   - If the odometer display does not count up, verify the K9 Body Control Module and K20 Engine Control Module are functioning correctly. If the K9 Body Control Module and K20 Engine Control Module are working correctly, replace the P16 Instrument Cluster.
5. If all gauges do sweep and display the correct value, and the odometer display counts up, replace the K20 Engine Control Module.

Circuit/System Testing

NOTE: If there are multiple modules not original to the vehicle and are not new correctly configured service parts, SPS may not be able to proper read or recover the vehicle odometer value. Follow government rules and documentation (including vehicle identification) regarding inaccurate/unknown odometer values.

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Perform circuit/system verification first.

Instrument Cluster is Showing "----" (Dashes)

Correcting VIN mismatch - odometer is still unlocked.

1. Verify the vehicle odometer status with a scan tool. The reading should be Unlocked.
    - If the reading is Locked, go to correcting VIN mismatch - odometer locked.
2. Using the scan tool, verify the BCM VIN matches the vehicle VIN placard.
    - If the VIN does not match, reprogram the BCM. Then proceed with step 3.
3. Using the scan tool, verify the instrument cluster VIN matches the vehicle VIN placard.
    - If the VIN does not match, reprogram the instrument cluster. Then proceed with step 4.
4. Ignition ON, verify the instrument cluster is displaying the correct value.
    - If the instrument cluster is still displaying "----" (dashes), replace the P16 Instrument Cluster.

Instrument Cluster is Showing "----" (Dashes)

Correcting VIN mismatch - odometer is locked.

1. Verify the vehicle odometer status with a scan tool. The reading should be Unlocked.
    - If the reading is Locked, go to step 2.
2. Using the scan tool, verify the instrument cluster VIN matches the vehicle's VIN placard.
    - If the VIN does not match, reprogram the instrument cluster. Then proceed with step 3.
3. Perform the BCM setup procedure in SPS.
4. Ignition ON, verify the instrument cluster is displaying the correct value.
    - If the instrument cluster is still displaying "----" (dashes), replace the P16 Instrument Cluster.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for instrument cluster, BCM or ECM replacement, setup and programming

TRANSMISSION FLUID TEMPERATURE GAUGE INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The auxiliary gauge module displays the transmission fluid temperature based on the information either from

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the engine control module (ECM) or the transmission control module (TCM). The ECM or the TCM converts the data from the transmission oil temperature sensor to a transmission fluid temperature signal. The ECM or the TCM sends the transmission oil temperature signal via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the transmission fluid temperature.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Auxiliary Gauges Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

without TCM

1. Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify that the transmission fluid temperature gauge sweeps from its low to high position.
    - If the transmission fluid temperature gauge does not sweep, replace the P26 Auxiliary Gauge Module.
2. If the engine oil pressure gauge does sweep, replace the K20 Engine Control Module.

with TCM

1. Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify that the transmission fluid temperature gauge sweeps from its low to high position.
    - If the transmission fluid temperature gauge does not sweep, replace the P26 Auxiliary Gauge

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Module.

2. If the engine oil pressure gauge does sweep, replace the K71 Transmission Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Auxiliary Gauge Module, TCM or ECM replacement, setup, and programming

VOLT GAUGE INACCURATE OR INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The auxiliary gauge module displays the battery voltage measured at the B+ input circuit.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Auxiliary Gauges Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

1. Verify that DTC B1420 is not set.
    - If the DTC B1420 is set, refer to **DTC B1420** .
2. Replace the P26 Auxiliary Gauge Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for Auxiliary Gauge Module replacement, setup, and programming

REPAIR INSTRUCTIONS

INSTRUMENT CLUSTER REPLACEMENT

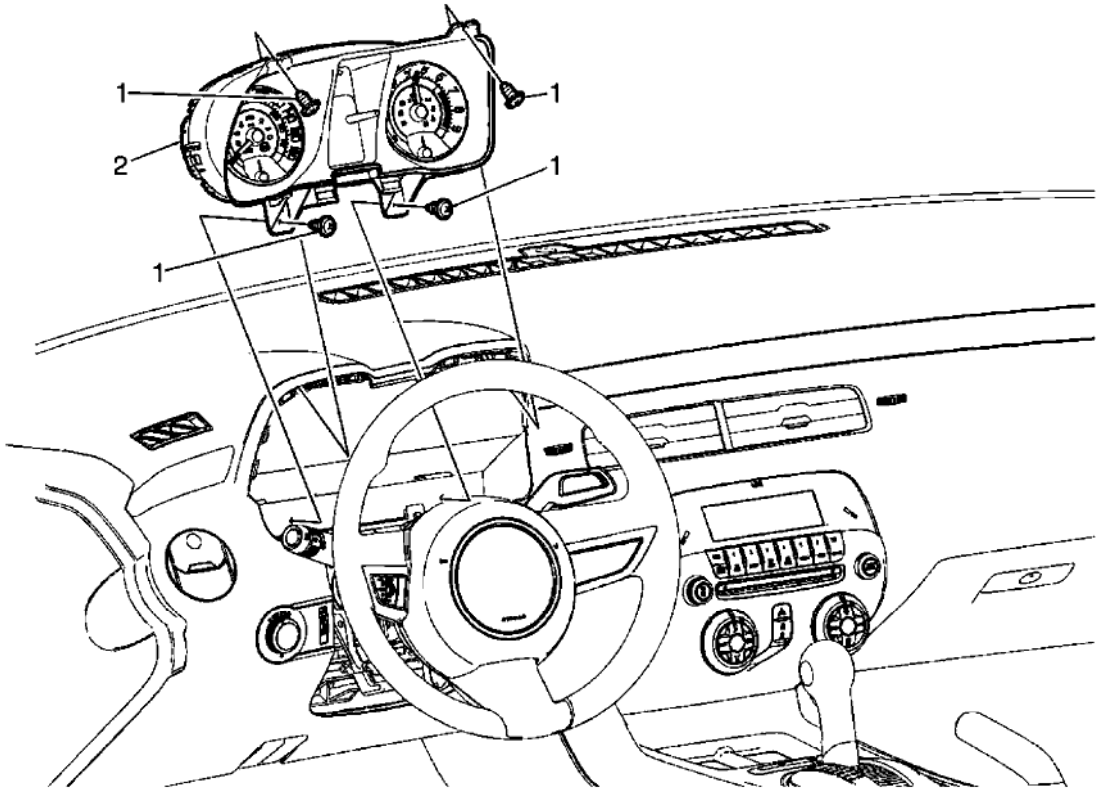


Fig. 6: Instrument Cluster
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel cluster trim plate. Refer to **Instrument Panel Cluster Trim Plate**	

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Replacement .	
1	Instrument Panel Cluster Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Cluster Assembly **Procedure** 1. Disconnect the electrical connections. 2. Refer to **Control Module References** for programming and set up information.

MULTIFUNCTION AUXILIARY GAUGE REPLACEMENT (WITH UMG)

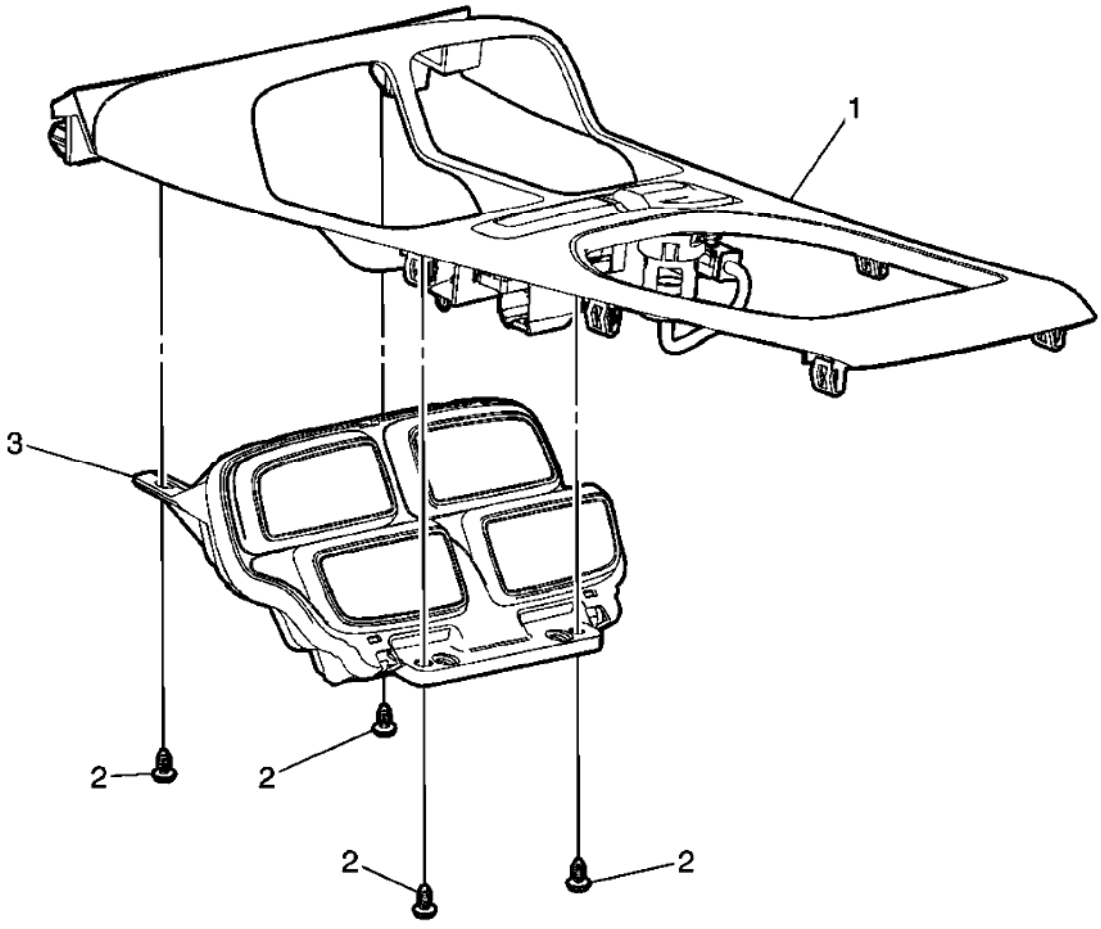


Fig. 7: Multifunction Auxiliary Gauge (With UMG)
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
1	Front Floor Console Front Cover Refer to **Front Floor Console Front Cover Replacement (Without UMQ)** or **Front Floor Console Front Cover Replacement (With UMQ)** .
2	Multifunction Auxiliary Gauge Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Multifunction Auxiliary Gauge Assembly **Procedure:** Refer to **Control Module References** for programming and set up information.

DESCRIPTION AND OPERATION

AUDIBLE WARNINGS DESCRIPTION AND OPERATION

The audible warnings alert the driver of a system concern or a critical vehicle condition. The radio generates the audible warnings through the speakers. The radio receives audible warning requests via the serial data circuit. If the radio receives multiple audible warning requests, the warning with the highest priority sounds first. The following lists the audible warning sounds:

1. Single pulse gong
2. Multiple pulse gong
3. Single pulse beep
4. Multiple pulse beep
5. Click
6. Clack

Fasten Safety Belt Warning

The chime producer activates the fasten safety belt audible warning as requested by the body control module (BCM). The BCM sends a serial data message to the chime producer indicating the chime as a multiple gong. The fasten safety belt warning sounds and the fasten safety belt indicator illuminates when the following occurs:

- The ignition switch transitions to ON.
- The inflatable restraint sensing and diagnostic module (SDM) detects that the drivers seat belt is not buckled and the signal is low. The SDM sends a serial data message to the BCM indicating the seat belt status. The instrument cluster receives a serial data message from the BCM indicating the driver seat belt status.

If the seat belt is buckled when the ignition is turned ON, the chime does not sound. If the seat belt is buckled while the chime is sounding, the chime stops. If the seat belt is unbuckled after the initial transition to ON, the chime does not sound.

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Lights On Warning

The chime producer activates the lights on warning as requested by the BCM. The BCM sends a serial data message to the chime producer indicating the chime as a multiple gong. The lights on warning sounds when the following occurs:

- The ignition is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.
- The BCM determines that the headlamp switch is in the park or head position.

Brake Warning

The chime producer activates the brake audible warning as requested by multiple control modules. The BCM, electronic brake control module or the parking brake control module sends a serial data message to the chime producer indicating the chime as a multiple gong. The brake warning sounds and the BRAKE indicator illuminates when the following occurs:

- The ignition is ON.
- The vehicle speed is greater than 8 km/h (4.9 MPH). The instrument cluster receives a serial data message from the engine control module (ECM) indicating the vehicle speed.
- The BCM determines that the parking brake is engaged and the signal circuit is low.
- The brake fluid is low.

Key-In-Ignition Warning

The chime producer activates the key-in-ignition audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer indicating the chime as a multiple gong. The key-in-ignition warning sounds when the following occurs:

- The ignition switch is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.

Door Ajar Warning

The chime producer activates the door ajar audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer indicating the chime frequency of a medium rate and continuous duration. The door ajar warning sounds and the appropriate door ajar indicator illuminates in the driver information center when the following occurs:

- The BCM determines that a door (driver door, passenger door) is open and the signal circuit is low. The instrument cluster also receives a serial data message from the BCM indicating the door ajar status.
- The vehicle is not in PARK. The BCM receives a serial data message from the ECM/BCM indicating the gear position.

Object Detection

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The chime producer activates the object detection audible warning as requested by the object alarm module. When an object is within the measuring range of the sensor, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the object alarm module. The object alarm module evaluates the received sensor signals. As soon as an object is within the measuring range, the object alarm module sends a message via CAN-Bus to the chime producer in order to give out the acoustic distance signal. The measuring range is between 30-120 cm (11.81-47.24 in). From a distance of 120 cm (47.24 in), the acoustic signal is active. The frequency of the beep sound increases with decreasing distance. From a distance less than 30 cm (11.81 in), the sound becomes continuous.

Additional Warnings

The following warnings have an associated instrument cluster indicator or driver information center message:

- Turn Signal Indicators - The chime producer activates the audible warning as requested by the BCM. The chime produces two different chimes, one when the turn signal turns OFF and another when the turn signal turns ON.
- Vehicle Overspeed Message - The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Fuel Level Low Message - The chime producer activates the audible warning as requested by the ECM. The ECM sends a serial data message to the chime producer.
- Oil Pressure Indicator - The chime producer activates the audible warning as requested by the ECM. The ECM sends a serial data message to the chime producer.
- Park Assist Fault Clean Rear Bumper Message - The chime producer activates the audible warning as requested by the object alarm module. The object alarm module sends a serial data message to the chime producer.
- Tire Pressure Low Indicator - The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Hood Open Message - The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Tire Pressure Low Indicator - The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Engine Overheated - Stop Engine Message - The chime producer activates the audible warning as requested by the ECM. The ECM sends a serial data message to the chime producer.

Refer to **Indicator/Warning Message Description and Operation**.

AUXILIARY GAUGES DESCRIPTION AND OPERATION

Engine Oil Pressure Gauge

The auxiliary gauge module displays the engine oil pressure as determined by the engine control module (ECM). The ECM sends the engine oil pressure information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil pressure. The engine oil pressure gauge defaults to 0 kPa (0 PSI) if:

- The ECM detects a malfunction in the engine oil pressure sensor circuit.

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- The BCM detects a loss of serial data communications with the ECM.
- The auxiliary gauge module detects a loss of serial data communications with the BCM.

Engine Oil Temperature Gauge

The auxiliary gauge module displays the engine oil temperature based on the information from the ECM. The ECM converts the data from the engine oil temperature sensor to a engine oil temperature signal. The ECM sends the engine oil temperature signal via a High Speed CAN-Bus signal to the BCM. The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil temperature. The engine oil temperature gauge defaults to 40°C (100°F) if:

- The ECM detects a malfunction in the engine oil temperature sensor circuit.
- The BCM detects a loss of serial data communications with the ECM.
- The auxiliary gauge module detects a loss of serial data communications with the BCM.

Transmission Fluid Temperature Gauge

The auxiliary gauge module displays the transmission fluid temperature based on the information from the ECM on an automatic transmission vehicle or from the transmission control module (TCM) on an manual transmission vehicle. The ECM or the TCM sends the transmission fluid temperature information via a High Speed CAN-Bus signal to the BCM. The BCM then sends the transmission fluid temperature information via a Low Speed CAN-Bus signal to the auxiliary gauge module in order to display the transmission fluid temperature. The transmission fluid temperature gauge defaults to 0°C (30°F) if:

- The ECM or the TCM detects a malfunction in the transmission fluid temperature sensor circuit.
- The BCM detects a loss of serial data communications with the ECM or the TCM.
- The auxiliary gauge module detects a loss of serial data communications with the BCM.

Volt Gauge

The auxiliary gauge module displays the battery voltage. This gauge shows the condition of the charging system. The vehicle charging system regulates voltage based on the state of charge of the battery. It is normal for the volt gauge to fluctuate. Readings between the low and high warning zones indicate the normal operating range. Readings in the low warning zone can occur when a large number of electrical accessories are operating in the vehicle and the engine is left idling for an extended period. If there is a problem with the battery charging system, a message appears in the driver information center display and/or the charging system telltale comes on.

COMPASS CALIBRATION AND MAGNETIC VARIANCE

Driver Information Center

The vehicle may have a compass display on the Driver Information Center. The compass receives its heading and other information from Global Positioning System (GPS) antenna, StabiliTrak, and vehicle speed information.

Avoid covering the GPS antenna for long periods of time with objects that may interfere with the antenna's

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ability to receive a satellite signal. The compass system is designed to operate for a certain number of miles or degrees of turn before needing a signal from the GPS satellites. When the compass display shows CAL, drive the vehicle for a short distance in an open area where it can receive a GPS signal. The compass system will automatically determine when GPS signal is restored and provide a heading again. Refer to **OnStar Description and Operation** and **Symptoms - Cellular Communication** .

DRIVER INFORMATION CENTER (DIC) DESCRIPTION AND OPERATION

Driver Information Center

In the lower middle of the instrument cluster, an additional display is installed. Its task is to give additional information, such as an odometer, select gear or error codes/warning messages. Refer to **Indicator/Warning Message Description and Operation**

There are 4 switch functions for the driver information center:

- Menu
- Set
- Up
- Down

Menu

The Menu switch is used to navigate between the Vehicle Information Menu and the Trip/Fuel Information Menu. Cycle through the following vehicle parameters by successive pressing of the Menu switch.

Up and Down

The Up and the Down switches are used to navigate within the menus. Cycle through the following menu parameters by successive pressing of the Down switch.

Vehicle Information Menu

- Units Menu
- Tire Pressure Menu
- Remaining Oil Life
- Coolant Temperature
- Speed Warning
- Compass

Trip/Fuel Information Menu

- Trip 1
- Trip 2
- Fuel Range

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- Average Fuel Economy
- Instantaneous Fuel Economy
- Average Vehicle Speed
- Timer

Trip 1/2

The trip odometer 1 or 2 can be accessed through the driver information center switch Up/Down function.

Trip Display

Driver Information Center Trip Display	Range	
	Metric	US
TRIP 1	####.#km	####.#miles
TRIP 2	####.#km	####.#miles

Information Menu

Fuel Range

This message indicates the estimated distance that the vehicle can travel under the current fuel economy and fuel level conditions since the last battery connection to the instrument cluster. Fuel Range is calculated using the equation: Fuel Range = Range Distance/Range Fuel Used.

- Range Distance = The accumulated distance travelled since the last reset of this value
- Fuel Used = The accumulated fuel delivered since the last reset of this value

The engine control module (ECM) sends the fuel range value to the instrument cluster. The instrument cluster receives a GMLAN message with fuel information. The fuel range value is retained during ignition OFF and can be changed between Metric and US units by accessing the driver information center Units menu. The Fuel Range display cannot be reset. LOW is displayed when fuel range is below a predetermined value.

Average Fuel Economy

Average fuel economy is calculated using the equation: Average Fuel Economy = Distance/Fuel.

- Distance = The accumulated distance travelled since the last reset of this value
- Fuel = The accumulated fuel consumption since the last reset of this value

The ECM sends the average fuel economy GMLAN message to the instrument cluster. The value of this mode is retained during ignition OFF and can be changed between Metric and US units by selecting from the driver information center options menu.

Instantaneous Fuel Economy

The ECM sends the instantaneous fuel economy GMLAN message to the instrument cluster. The value of this mode can be changed between Metric and US units by selecting from the driver information center options

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menu.

Average Vehicle Speed

Average speed is calculated using the equation: Average Speed = Average Speed Distance/Average Speed Time.

- Distance = The accumulated distance travelled since the last reset of this value
- Ignition ON = The accumulated ignition on time since the last reset of this value

Timer

The timer records elapsed time starting from activation. When the driver information center displays the timer, pressing the Set/Reset switch for longer than 1 s the driver information center resets the timer. Pressing the Set/Reset button on the driver information center switch for approximately 1 s starts and stops the timer. The driver information center displays the timer in one of the following formats:

The driver information center displays the timer in the following format: XX: XX:XX:

The first XX represents hours elapsed, the second XX represents minutes elapsed, and the third XX represents seconds elapsed. The maximum range of the timer is 99 h, 59 min, and 59 s. After the maximum range is reached, the timer displays zeros in all positions. (00:00:00).

Units Menu

The unit mode is used to toggle between Metric and US units and can be accessed through the driver information center Menu switch and the driver information center Set switch.

Tire Pressure Monitor

The instrument cluster receives a GMLAN message from the tire pressure monitoring system for front and rear tire pressure data. The driver information center will display the pressure for each of the front and rear tires. When a tire with low air pressure is present, the driver information center displays a warning, CHECK XX TIRE PRESSURE.

Oil Life Remaining

The ECM sends the oil life remaining percentage to the instrument cluster via a GMLAN message. The instrument panel cluster receives a GMLAN message indicating the engine oil life remaining. The driver information center displays the current percentage of the GM Oil Life System as determined by the ECM. When the oil life remaining percentage drops below 5%, the driver information center displays CHANGE ENGINE OIL SOON. When the engine oil is changed, reset the GM Oil Life System. Refer to **GM Oil Life System Resetting** .

Odometer

The instrument cluster displays the vehicle odometer in the driver information center. The ECM send a distance rolling count message on GMLAN to the body control module (BCM). The BCM uses this information to

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calculate the vehicle odometer. This odometer value is then sent to the instrument cluster on GMLAN. The instrument cluster does not calculate the odometer. The odometer displays miles or kilometers as selected in the Units menu.

The odometer value is stored in multiple modules. The instrument cluster is a secondary storage module for the odometer, while the BCM is the primary storage and accumulator.

In addition to storing the odometer value for the vehicle, the instrument cluster and the BCM store the VIN. Software checks are performed to ensure these modules, and their stored odometer information, can not be move or transferred between different vehicles.

If the VINs do not match, the instrument cluster will go into an error mode and display "----" (dashes). If the VIN mismatch exists over a calibrated distance, the instrument cluster will "lock" the odometer display and only show dashes, even if the VIN mismatch is subsequently correct. The only way to clear or "unlock" the instrument cluster is to perform a BCM programming event using SPS.

Gear Indication

If the vehicle is equipped with an automatic transmission the driver information center displays the actual gear. The instrument cluster receives a GMLAN message with actual gear information from the automatic transmission module.

Park Assist Menu

If the parallel parking assistant is activate, the parallel parking assist menu is displayed in the driver information center. The driver information center displays the current state of the parallel parking assist until the instrument cluster receives a message indicating otherwise.

Language

The driver information center is capable of displaying in different languages, corresponding to the radio language settings. The instrument cluster receives a GMLAN message with language information from the radio.

Compass

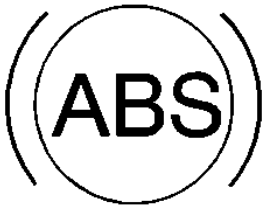
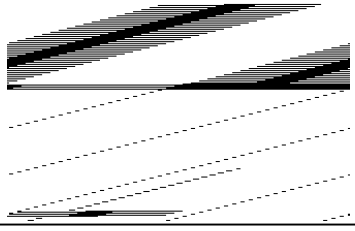
The vehicle may have a compass in the driver information center. The communication interface module receives information from a specific GPS antenna located on the outside of the vehicle. The GPS antenna is connected to the communication interface module via a shielded coaxial cable. The antenna cable also provides a path for DC current for powering the antenna. The instrument cluster communicates with the communication interface module via serial data.

INDICATOR/WARNING MESSAGE DESCRIPTION AND OPERATION

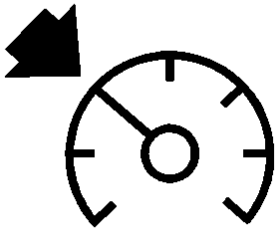
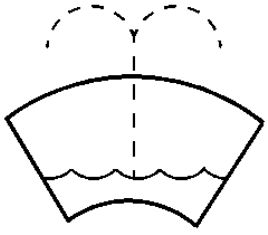
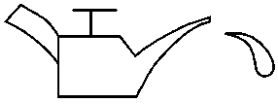
Instrument Cluster Indicators

Symbol	Reference

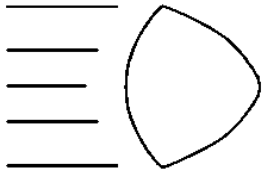
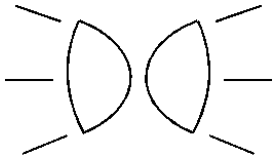
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	ABS: **ABS Description and Operation**
	Air Bag: **SIR System Description and Operation**
	Brake: **Brake Warning System Description and Operation**
	Charge: **Charging System Description and Operation**

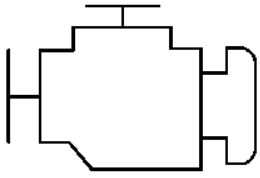
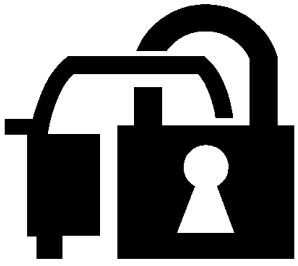
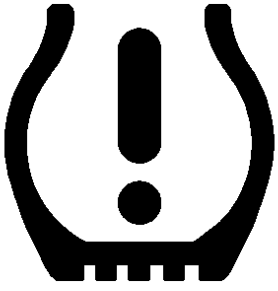
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	Cruise Control: **Cruise Control Description and Operation**
	Washer Fluid Low: **Wiper/Washer System Description and Operation**
	The instrument cluster displays the engine oil pressure low indicator as determined by the engine control module (ECM). The ECM monitors the engine oil pressure switch/sensor signal circuit to determine the engine oil pressure. The ECM sends the engine oil pressure information to the body control module (BCM) via the serial data circuit. The instrument cluster receives a serial data message from the BCM requesting display of the engine oil pressure from the ECM. When the instrument cluster detects a low engine oil pressure it turns ON the engine oil pressure low indicator.
	Fasten Safety Belt: **Seat Belt System Description and Operation**

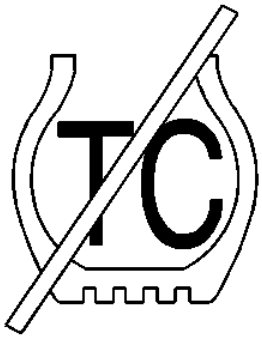
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	Front Fog Lamps: **Exterior Lighting Systems Description and Operation**
	High Beam: **Exterior Lighting Systems Description and Operation**
	Lights ON Warning: **Exterior Lighting Systems Description and Operation**

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	Malfunction Indication Lamp: • LLT: **Engine Control Module Description** • L99 or LS3: **Engine Control Module Description**
	Security: **Immobilizer Description and Operation**
	Tire Pressure Low: **Tire Pressure Monitor Description and Operation**
	Turn Signals: **Exterior Lighting Systems Description and Operation**

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	Electronic Stability Control: **ABS Description and Operation**
	Electronic Stability Control OFF: **ABS Description and Operation**
	Traction Control OFF: **ABS Description and Operation**

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	Door Ajar: **Power Door Locks Description and Operation**
	Service Vehicle Soon: Refer to Indicator/Warning Message Description and Operation

Driver Information Center Warning Code

Code	Explanation	Reference
3	Coolant Level Low Add Coolant	**Cooling System Description and Operation**
4	Air Conditioning OFF Due to High Engine Temp	**Manual HVAC Description and Operation**
10	Brakes Overheated	**Brake Warning System Description and Operation**
11	Brakes Worn	**Brake Warning System Description and Operation**
25	Left Front Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
26	Left Rear Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
27	Right Front Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
28	Right Rear Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
35	Replace Battery In Remote Key	**Keyless Entry System Description and Operation**
51	Compass, See Owners Manual	**Compass Calibration and Magnetic Variance**
53	Tighten Gas Cap	**Fuel System Description** for LLT **Fuel System Description** for L99 or LS3
56	Pressure Imbalance - Front	**Tire Pressure Monitor Description and Operation**
57	Tire Imbalance - Rear	**Tire Pressure Monitor Description and Operation**
58	Winter Tire Recognition	**Tire Pressure Monitor Description and Operation**

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59	Open, Then Close Driver Window	**Power Windows Description and Operation**
60	Open, Then Close Front Passenger Window	**Power Windows Description and Operation**
65	Theft Attempted	**Content Theft Deterrent (CTD) Description and Operation**
66	Service Theft Alarm	**Content Theft Deterrent (CTD) Description and Operation**
68	Service Power Steering	**Power Steering System Description and Operation**
75	Service A/C System	**Manual HVAC Description and Operation**
79	Engine Oil Low - Add Oil	Refer to Indicator/Warning Message Description and Operation
80	Change Transmission Fluid	**Transmission General Description**
81	Service Transmission	**Transmission General Description**
82	Change Engine Oil Soon	Refer to Indicator/Warning Message Description and Operation
84	Engine power is reduced	**Fuel System Description** for LLT **Fuel System Description** for L99 or LS3
95	Service Airbag	**SIR System Description and Operation**

Driver Information Center Warning Messages

Message	Reference
1-4 Shift	**Transmission General Description**
A/C OFF Due to High Engine Temp.	**Manual HVAC Description and Operation**
Apply Brake Before Cruise	**Cruise Control Description and Operation**
Automatic Light Control OFF	**Exterior Lighting Systems Description and Operation**
Automatic Light Control ON	**Exterior Lighting Systems Description and Operation**
Battery Saver Active	**Electrical Power Management Description and Operation**
Brake Fluid Low	**Brake Warning System Description and Operation**
Brakes Overheated	**Brake Warning System Description and Operation**
Brakes Worn	**Brake Warning System Description and Operation**
Buckle Seatbelt	**Seat Belt System Description and Operation**
Change A/C Filter	**Manual HVAC Description and Operation**
Change Engine Oil Soon	Refer to Indicator/Warning Message Description and Operation
Change Fuel Filter	**Fuel System Description** for LLT **Fuel System Description** for L99 or LS3

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Check XXX Tire Pressure	**Tire Pressure Monitor Description and Operation**
Compass, See Owners Manual	**Compass Calibration and Magnetic Variance**
Coolant Level Low - Add Coolant	**Cooling System Description and Operation**
Cruise Set To XXX	**Cruise Control Description and Operation**
Driver Door Open	**Door Ajar Indicator Description and Operation**
Driver Selected Speed Limit Exceeded	Refer to Indicator/Warning Message Description and Operation
Engine Oil Hot, Idle Engine	**Cooling System Description and Operation**
Engine Oil Low - Add Oil	Refer to Indicator/Warning Message Description and Operation
Engine Overheated - Idle Engine	**Cooling System Description and Operation**
Engine Overheated - Stop Engine	**Cooling System Description and Operation**
Engine Overspeed	**Engine Control Module Description** for LLT **Engine Control Module Description** for L99 or LS3
Engine Power is Reduced	**Engine Control Module Description** for LLT **Engine Control Module Description** for L99 or LS3
Fuel Level Low	**Instrument Cluster Description and Operation**
High Coolant Temperature	**Cooling System Description and Operation**
Hood Open	**Immobilizer Description and Operation**
Ice Possible Drive With Care	This message is displayed when ice conditions are possible.
Left Front Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
Left Rear Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
Low Battery	**Battery Description and Operation**
Number Of Keys Programmed	**Keyless Entry System Description and Operation**
Oil Pressure Low - Stop Engine	Refer to Indicator/Warning Message Description and Operation
Open, then Close Driver Window	**Power Windows Description and Operation**
Open, then Close Passenger Window	**Power Windows Description and Operation**
Park Assist OFF	**Object Detection Description and Operation**
Passenger Door Open	**Door Ajar Indicator Description and Operation**
Press Clutch to Start Engine	**Starting System Description and Operation**
Program Cluster	Refer to Indicator/Warning Message Description and Operation
Release Parking Brake	**Park Brake System Description and Operation**
Replace Battery in Remote Key	**Keyless Entry System Description and Operation**
Right Front Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**

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Right Rear Turn Indicator inoperative	**Exterior Lighting Systems Description and Operation**
Right Rear Door Open	**Door Ajar Indicator Description and Operation**
Right Rear Tire Pressure High	**Tire Pressure Monitor Description and Operation**
Service A/C System	**Manual HVAC Description and Operation**
Service Airbag	**SIR System Description and Operation**
Service Battery Charging System	**Charging System Description and Operation**
Service Brake Assist	**ABS Description and Operation**
Service Compass	**Compass Calibration and Magnetic Variance**
Service Park Assist	**Object Detection Description and Operation**
Service Parking Brake	**Park Brake System Description and Operation**
Service Power Steering	**Power Steering System Description and Operation**
Service StabiliTrak	**ABS Description and Operation**
Service Tire Monitor System	**Tire Pressure Monitor Description and Operation**
Service Traction Control	**ABS Description and Operation**
Service Transmission	**Transmission General Description**
Service Tire Monitor System	**Tire Pressure Monitor Description and Operation**
Service Traction Control	**ABS Description and Operation**
Service Transmission	**Transmission General Description**
Service Vehicle Soon	Refer to Indicator/Warning Message Description and Operation
Set Compass Zone	**Compass Calibration and Magnetic Variance**
Shift Denied	**Automatic Transmission Shift Lock Control Description and Operation**
Shift to Park	**Automatic Transmission Shift Lock Control Description and Operation**
Speed Limited Set To	**Driver Information Center (DIC) Description and Operation**
Speed Limited To	**Driver Information Center (DIC) Description and Operation**
Stabilitrak Competitive Mode	**ABS Description and Operation**
Theft Attempted	**Content Theft Deterrent (CTD) Description and Operation**
Tighten Gas Cap	**Fuel System Description** for LLT **Fuel System Description** for L99 or LS3
Tire Learning Active	**Tire Pressure Monitor Description and Operation**
Tire Pressure System Reset	**Tire Pressure Monitor Description and Operation**

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Transmission Hot - Idle Engine	**Transmission General Description**
Trunk Open	**Door Ajar Indicator Description and Operation**
Turn Signal ON	**Exterior Lighting Systems Description and Operation**
Turn Wiper Control to Intermittent First	**Wiper/Washer System Description and Operation**

Change Engine Oil Soon

The driver information center displays the Change Engine Oil Soon message when the engine control module (ECM) determines that the engine oil life is below 5%. The ECM sends a serial data message to the instrument cluster requesting the Change Engine Oil Soon message. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System Resetting** . Refer to the following before adding or changing engine oil:

- When the Low Engine Oil Level/Change Engine Oil Soon message displays in the driver information center due to a low engine oil level condition, make sure that the ignition is turned OFF before adding or changing the oil in the vehicle. If ignored it may result in the Low Engine Oil Level/Change Engine Oil Soon message staying ON after the engine attains proper oil level.
- Before replacing the instrument cluster because of the Low Engine Oil Level/Change Engine Oil Soon message staying ON after an oil change or engine oil addition, it is necessary for the engine to undergo a thermodynamic cycle process. The instrument cluster may not be malfunctioning but only needs the Low Engine Oil Level/Change Engine Oil Soon to turn OFF. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System Resetting**

Engine Oil Low - Add Oil

The driver information center displays Engine Oil Low - Add Oil message when the ECM detects a low engine oil level condition from the engine oil level sensor/switch. The ECM sends a High Speed CAN-Bus message to the body control module (BCM). The BCM then sends a Low Speed CAN-Bus message to the instrument cluster requesting to display the Engine Oil Low - Add Oil message in the driver information center.

Oil Pressure Low - Stop Engine

The driver information center displays the Oil Pressure Low - Stop Engine message when the ECM detects a low engine oil pressure condition from the engine oil pressure sensor/switch. The ECM sends a High Speed CAN-Bus message to BCM. The BCM then sends a Low Speed CAN-Bus message to the instrument cluster requesting to display the Oil Pressure Low - Stop Engine message in the driver information center.

Program Cluster

The driver information center displays a Program Cluster message when the instrument cluster needs to be programmed. The instrument cluster requires programming after a replacement or whenever the message is displayed in the driver information center. The instrument cluster must be programmed and setup using the service programming system (SPS). Refer to **Control Module References** for the instrument cluster replacement, programming and setup.

Service Vehicle Soon

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The driver information center displays the Service Vehicle Soon indicator when the ECM detects certain malfunctions that are not related to the emissions system or other modules detect malfunctions that require service to the vehicle. The instrument cluster receives serial data messages from various modules requesting the display of Service Vehicle Soon indicator.

Vehicle Overspeed

The driver information center displays a Vehicle Overspeed message when the instrument cluster determines that the vehicle speed is more than 120 km/h (75 MPH) in case the vehicle overspeed function is activated.

INSTRUMENT CLUSTER DESCRIPTION AND OPERATION

Displays Test

Certain instrument cluster features are tested when the ignition is turned ON in order to verify the features are working properly. The following occurs when the ignition is turned ON:

- The ABS indicator illuminates briefly.
- The battery indicator illuminates briefly.
- The brake indicator illuminates briefly.
- The door ajar indicator illuminates briefly.
- The oil pressure low indicator illuminates briefly.
- The security indicator illuminates briefly.
- The service vehicle soon indicator illuminates briefly.
- The tire pressure low indicator illuminates briefly.
- The electronic stability control service indicator illuminates briefly.
- The electronic stability control off indicator illuminates briefly.

Indicators and Warning Messages

Refer to **Indicator/Warning Message Description and Operation**.

Engine Coolant Temperature Gauge

The instrument cluster displays the engine coolant temperature as determined by the engine control module (ECM). The ECM sends the engine coolant temperature information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the engine coolant temperature. The engine coolant temperature gauge defaults to cold or below if:

- The ECM detects a malfunction in the engine coolant temperature sensor circuit.
- The BCM detects a loss of serial data communications with the ECM.
- The instrument cluster detects a loss of serial data communications with the BCM.

Fuel Level Gauge

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The instrument cluster displays the fuel level based on the information from the ECM. The ECM converts the data from the fuel level sensors to a fuel level signal. The ECM sends the fuel level signal via a High Speed CAN-Bus signal to the BCM. The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the fuel level. If the fuel level falls under 11% the driver information center display displays the low fuel level message. The fuel gauge defaults to empty if:

- The ECM detects a malfunction in the fuel level sensor circuit.
- The BCM detects a loss of serial data communications with the ECM.
- The instrument cluster detects a loss of serial data communications with the BCM.

Speedometer

The instrument cluster displays the vehicle speed based on the information from the ECM. The ECM sends the vehicle speed information via a High Speed CAN-Bus signal to the BCM. The BCM then sends the vehicle speed information via a Low Speed CAN-Bus signal to the instrument cluster in order to display the vehicle speed, either in kilometers or miles, based on the vehicle requirements. The speedometer defaults to 0 km/h (0 MPH) if:

- The BCM detects a loss of serial data communications with the ECM.
- The instrument cluster detects a loss of serial data communications with the BCM.

Tachometer

The instrument cluster displays the engine speed based on the information from the ECM. The ECM converts the data from the engine speed sensor to an engine revolution signal. The ECM sends the engine speed information via a High Speed CAN-Bus signal to the BCM. The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the engine speed. The tachometer defaults to 0 RPM if:

- The ECM detects a malfunction in the engine speed sensor circuit.
- The BCM detects a loss of serial data communications with the ECM.
- The instrument cluster detects a loss of serial data communications with the BCM.

Driver Information Center Display

In the lower middle of the instrument cluster, an additional display is installed. Its task is to give additional information, such as an odometer or error codes. This part of the instrument cluster is available in 4 different variants, mostly depending on the assembled engine. For further information refer to **Driver Information Center (DIC) Description and Operation**.

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2010 ACCESSORIES & BODY, CAB

Fixed and Moveable Windows - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Side Door Window Belt Outer Sealing Strip Screws	1 N.m	9 lb in
Front Side Door Window Regulator Upper and Lower Nuts	10 N.m	89 lb in
Front Side Door Window Regulator Motor Bolts	10 N.m	89 lb in
Front Side Door Window Regulator to Window Bolts	10 N.m	89 lb in

SCHEMATIC AND ROUTING DIAGRAMS

MOVEABLE WINDOW SCHEMATICS

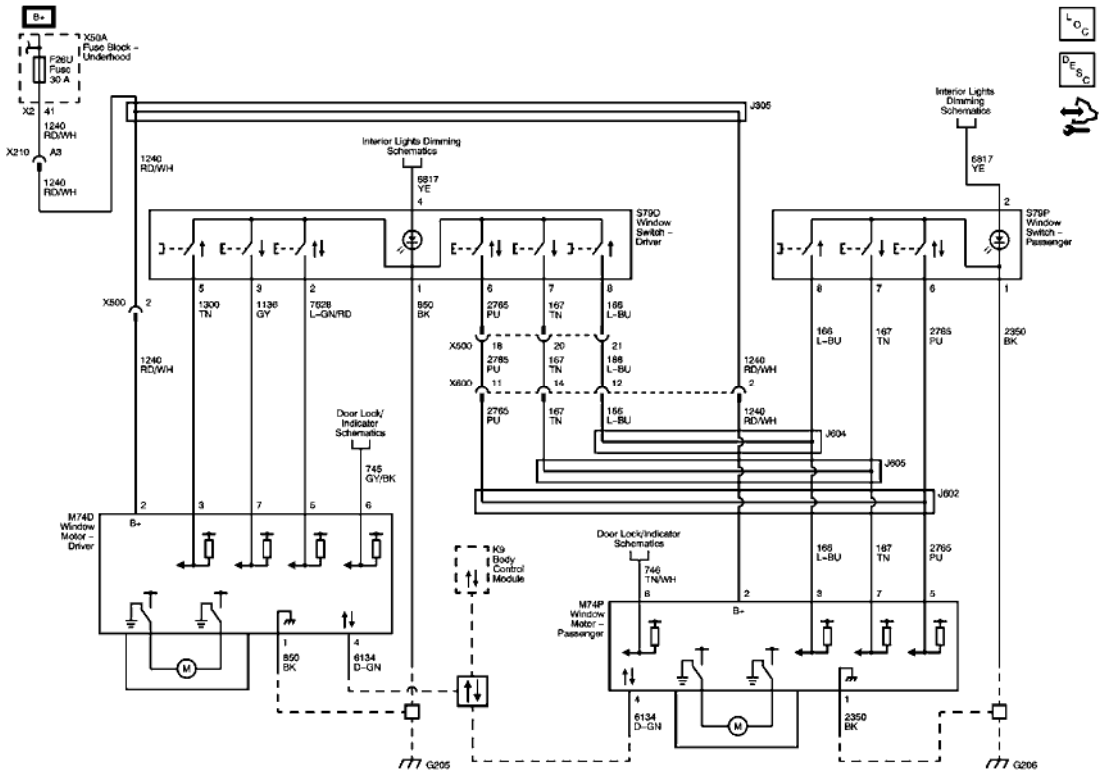


Fig. 1: Moveable Window
Courtesy of GENERAL MOTORS CORP.

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DEFOGGER SCHEMATICS

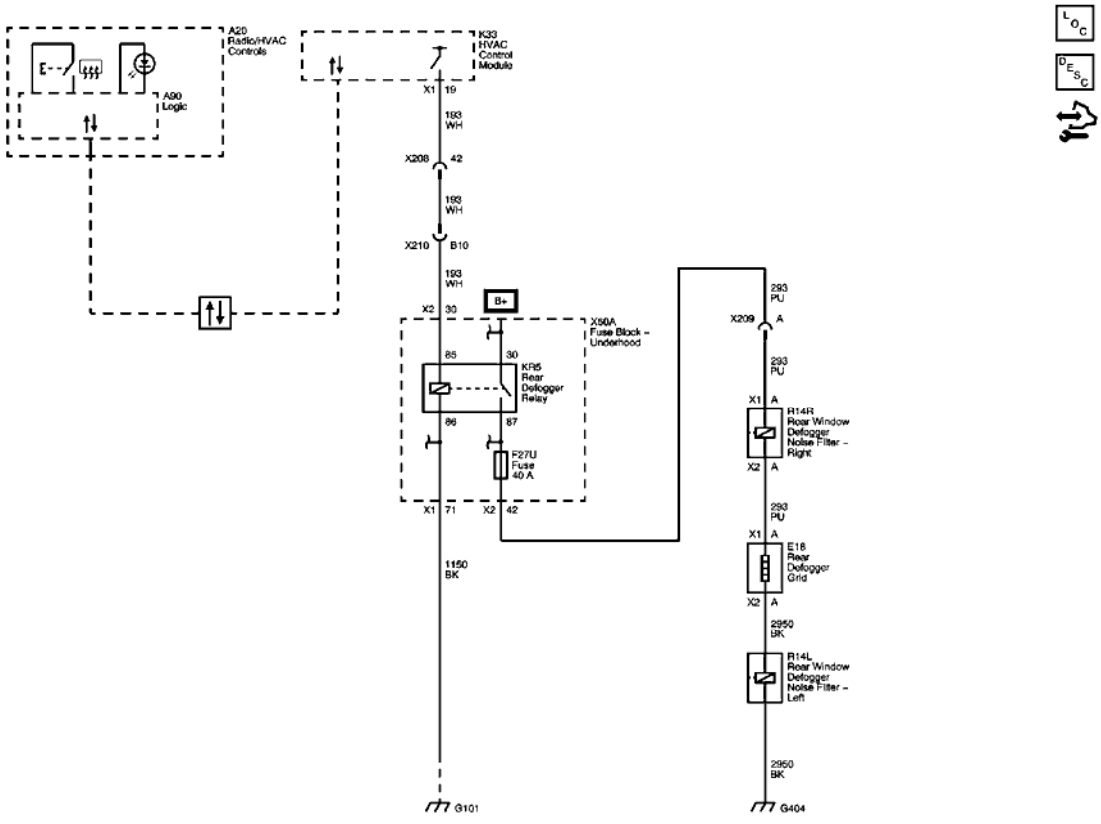


Fig. 2: Defogger
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0283	B0283 02: Electric Rear Defrost Circuit Short To Ground B0283 05: Electric Rear Defrost Circuit Short To Battery or Open
DTC B316B or B317A	B316B 02: Driver Window Switch Short to Ground B317A 02: Passenger Window Switch Short to Ground
DTC B3205 or B3210	B3205 00: Driver Window Motor Circuit B3205 39: Driver Window Motor Circuit internal electronic failure B3205 42: Driver Window Motor Circuit calibration data set not programmed B3205 4B: Driver Window Motor Circuit calibration not learned B3210 00: Right Front/Passenger Window Motor Circuit B3210 39: Right Front/Passenger Window Motor Circuit internal

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	electronic failure B3210 42: Right Front/Passenger Window Motor Circuit calibration data set not programmed B3210 4B: Right Front/Passenger Window Motor Circuit calibration not learned

DTC B0283

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B0283 02

Electric Rear Defrost Circuit Short To Ground

DTC B0283 05

Electric Rear Defrost Circuit Short To Battery or Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Window Defogger Relay Switch B+	1	1	-	-
Rear Window Defogger Relay Control	B0283 02	B0283 05	B0283 05	-
Rear Window Defogger Relay Coil Ground	-	B0283 05	1	-
1. Rear Defogger Inoperative				

Circuit/System Description

When the HVAC control module receives a rear window defog request from the radio/HVAC control, the HVAC control module will supply voltage to the relay coil. Battery positive voltage is supplied at all times to the relay switched input and the relay coil is always grounded. This allows current from the relay switched input to flow through the switch contacts and out the relay switched output to the rear window defogger grid.

Conditions for Running the DTC

Battery voltage must be between 9-16 volts.

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Conditions for Setting the DTC

B0283 02

The HVAC control module detects a short to ground in the relay control circuit.

B0283 05

The HVAC control module detects a short to voltage or an open/high resistance in the rear window defogger relay control circuit or an open/high resistance in the rear window defogger relay ground circuit.

Action Taken When the DTC Sets

- If B0283 02 is current, the rear window defogger grid will operate continuously.
- If B0283 05 is current, the rear window defogger grid will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Defogger Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Rear Window Defogger Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

Engine running, command the Rear Defog ON and OFF with a scan tool, the rear window defogger grid should turn ON or OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the K55 DEFOG RR relay.
2. Test for less than 5 ohm between the ground circuit terminal 86 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance
3. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
4. Engine running, command the Rear Defog ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K33 HVAC control module.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K33 HVAC control module.
5. If all circuits test normal, test or replace the K55 DEFOG RR relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the K55 DEFOG RR relay.
2. Test for 60-180 ohms between terminals 85 and 86.
    - If not within the specified range, replace the K55 DEFOG RR relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the K55 DEFOG RR relay.
4. Install a 25A fused jumper wire between relay terminal 86 and 12V. Install a jumper wire between relay terminal 85 and ground. Test for less than 2 ohms between terminals 30 and 87.
    - If greater than the specified range, replace the K55 DEFOG RR relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for the HVAC control module replacement, setup and programming

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DTC B316B OR B317A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B316B 02

Driver Window Switch Short to Ground

DTC B317A 02

Passenger Window Switch Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Window Motor Up Control	B316B 02	1	1	-
Driver Window Motor Down Control	B316B 02	1	1	-
Driver Window Motor Express Control	B316B 02	1	1	-
Passenger Window Motor Up Control	B317A 02	2	2	-
Passenger Window Motor Down Control	B317A 02	2	2	-
Passenger Window Motor Express Control	B317A 02	2	2	-
1. Driver Window Malfunction 2. Passenger Window Malfunction				

Circuit/System Description

The window motors are supplied with B+ voltage which is used to power the motor and also used as a reference voltage within the logic circuit. When the driver or passenger window switch is pressed, a switch is closed causing the reference voltage in the appropriate circuit in the window motor to drop, the window motor responds by moving the window in the direction commanded.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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B316B 02

The BCM has detected the driver left front window switch is active for greater than 60 seconds.

B317A 02

The BCM has detected the passenger window switch or the driver right front window switch is active for greater than 60 seconds.

Action Taken When the DTC Sets

The affected power window will malfunction.

Conditions for Clearing the DTC

- The DTC will be current as long as the fault is present.
- The DTC will change from current to history when the fault is no longer present.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

Reference Information

Schematic Reference

Moveable Window Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Windows Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

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1. Ignition ON, command the driver window UP, DOWN, express UP and express DOWN by using the S79D window switch-driver. The driver window should perform the UP, DOWN and express functions.
    - If the driver window does not perform as specified, refer to Driver Window Malfunction.
2. Command the passenger window UP, DOWN, express UP and express DOWN by using the S79P window switch-passenger and the right front window switch on the S79D window switch-driver. The passenger window should perform the UP, DOWN and express functions from each switch.
    - If the passenger window does not perform as specified, refer to Passenger Window Malfunction.

Circuit/System Testing

Driver Window Malfunction

1. Ignition OFF, disconnect the harness connector at the S79D window switch-driver.
2. Ignition ON, verify the scan tool Driver Window Main Control Down Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver.
3. Verify the scan tool Driver Window Main Control Up Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 5 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver.
4. Verify the scan tool Driver Window Main Control Express Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 2 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver
5. If all circuits test normal, test or replace the S79D window switch-driver.

Passenger Window Malfunction

1. Ignition OFF, disconnect the harness connector at the S79P window switch-passenger.
2. Disconnect the harness connector at the S79D window switch-driver.
3. Ignition ON, verify that the scan tool Passenger Window Switch at Door parameter is Inactive.
    - If the value is Up, test the signal circuit terminal 8 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
    - If the value is Down, test the signal circuit terminal 7 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
    - If the value is Express, test the signal circuit terminal 6 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
4. Ignition OFF, connect the harness connector at the S79D window switch-driver.
5. Ignition ON, observe the scan tool Passenger Window Switch at Door parameter while using the right front window switch on the S79D window switch-driver. The parameters should change from Inactive to Up, Down and Express.
    - If the values do not change, test or replace the S79D window switch-driver.
6. If all circuits test normal, replace the S79P window switch-passenger.

Component Testing

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Driver Window Switch

1. Ignition OFF, disconnect the harness connector at the S79D window switch-driver.
2. With the switch in the INACTIVE position, test for infinite resistance between the appropriate signal terminals listed below and the ground terminal 1:
    - Terminal 2
    - Terminal 3
    - Terminal 5
    - Terminal 6
    - Terminal 7
    - Terminal 8
    - If less than the specified value, replace the S79D window switch-driver.
3. With the switch in the UP position, test for less than 2 ohms between the signal terminal listed below and the ground terminal 1:
    - Terminal 5
    - Terminal 8
    - If greater than the specified range, replace the S79D window switch-driver.
4. With the switch in the DOWN position, test for less than 2 ohms between the signal terminal listed below and the ground terminal 1:
    - Terminal 3
    - Terminal 7
    - If greater than the specified range, replace the S79D window switch-driver.

Passenger Window Switch

1. Ignition OFF, disconnect the harness connector at the S79P window switch-passenger.
2. Test for infinite resistance between the signal terminals 6, 7 and 8 and the ground terminal 1 with the switch in the INACTIVE position.
    - If less than the specified value, replace the S79P window switch-passenger
3. Test for less than 2 ohms between the signal terminal 8 and the ground terminal 1 with the switch in the UP position.
    - If greater than the specified range, replace the S79P window switch-passenger.
4. Test for less than 2 ohms between the signal terminal 7 and the ground terminal 1 with the switch in the DOWN position.
    - If greater than the specified range, replace the S79P window switch-passenger.
5. Test for less than 2 ohms between the signal terminal 6 and the ground terminal 1 with the switch in the EXPRESS DOWN position
    - If greater than the specified range, replace the S79P window switch-passenger.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Window Switch Replacement**
- **Front Side Door Window Regulator Motor Replacement**

DTC B3205 OR B3210

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3205 00

Driver Window Motor Circuit

DTC B3205 39

Driver Window Motor Circuit internal electronic failure

DTC B3205 42

Driver Window Motor Circuit calibration data set not programmed

DTC B3205 4B

Driver Window Motor Circuit calibration not learned

DTC B3210 00

Right Front/Passenger Window Motor Circuit

DTC B3210 39

Right Front/Passenger Window Motor Circuit internal electronic failure

DTC B3210 42

Right Front/Passenger Window Motor Circuit calibration data set not programmed

DTC B3210 4B

Right Front/Passenger Window Motor Circuit calibration not learned

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Circuit/System Description

When a window switch is pressed on the driver window switch, a serial data message is sent to the body control module (BCM). The BCM examines the request and checks for messages from other power window motors prohibiting the window movement. If no prohibitive messages have been received, the BCM will send a serial data message to the passenger window motor which will perform the command as requested.

Conditions for Running the DTC

- The ignition switch is in the ON position
- Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

B3205 00, B3210 00

The BCM has detected that the compatibility code stored in the affected window motor does not match the compatibility code stored in the BCM.

B3205 39, B3210 39

An internal malfunction has been detected by the BCM in the power window motor while commanding the window UP or DOWN.

B3205 42, B3210 42

The BCM will automatically attempt to download the calibration program into the appropriate window motor (As will occur when the window motor has been replaced), if the first calibration program fails to load, the BCM will attempt to download the calibration program a second time. If this download fails, the BCM will set appropriate DTC.

B3205 4B, B3210 4B

The BCM has detected that a window is not "normalized" and can set for the folowing reasons:

- When the battery has been disconnected
- When the battery has been replaced
- When the door wiring harness has been disconnected
- When the window motor has been disconnected.

Action Taken When the DTC Sets

B3205 00, B3210 00, B3205 39, B3210 39, B3205 42, B3210 42

The affected motor will be inoperative.

B3205 4B, B3210 4B

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The affected motor will not perform the express up or express down functions and the driver information center will display Open, then Close Driver Window or will display Open, then Close Passenger Window.

Conditions for Clearing the DTC

B3205 00, B3210 00

Installing a compatible window motor for that specific make and model vehicle.

B3205 39, B3210 39

If the DTC is current, the appropriate window motor must be replaced before the DTC can be cleared.

B3205 42, B3210 42

The appropriate window motor must be replaced before the DTC can be cleared.

B3205 4B, B3210 4B

The appropriate window motor must be normalized before the DTC can be cleared.

Reference Information

Schematic Reference

Moveable Window Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Windows Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

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B3205 00, B3205 39, B3205 42, B3210 00, B3210 39, B3210 42

1. Ignition ON, command the M74 window motor UP and DOWN with a scan tool. The M74 window motor should perform the UP and DOWN functions.

NOTE: If the window performs the UP and DOWN functions, clear the DTC

2. Replace the M74 window motor with a M74 window motor compatible for that specific make and model vehicle.

Circuit/System Testing

B3205 4B, B3210 4B

NOTE: The doors must be completely closed prior to normalizing the windows, a door that is open or ajar may cause the power window to function abnormally or it may become inoperative while performing the normalizition procedure. If this occures, verify that the door is completely closed then repeat the normalization procedure.

1. Ignition ON, starting with the window completely UP, press and hold the appropriate power window switch until the window is fully open and continue holding the switch down for approximately 5 seconds after the window is completely open.
2. Pull the power window switch up until the window is fully closed and continue holding the switch up for approximately 5 seconds after the window is completely closed.
3. Command the window to express UP and express DOWN by pressing the window switch past the first detent and releasing and then pulling the window switch past the first detent and releasing. The window should perform the express UP and express DOWN functions
    - If the M74 window motor does not perform as specified and the DTC resets, replace the M74 window motor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Front Side Door Window Regulator Motor Replacement

SYMPTOMS - FIXED AND MOVEABLE WINDOWS

Important Preliminary Checks Before Starting:

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
    - There are no DTCs set.
    - The control modules can communicate via the serial data link.
2. Review the power window system operation or rear window defogger system operation in order to

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familiarize yourself with the system functions. Refer to the following:

- **Rear Window Defogger Description and Operation**
- **Power Windows Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the rear window defogger. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

NOTE:

- **Inspect for proper installation of electrical components if an intermittent condition exists. Inspect for aftermarket theft deterrent devices, lights, and cellular phones. Ensure that no aftermarket equipment is connected to the class 2 circuit. If you can not locate an intermittent condition, a cellular phone signal may cause the condition. Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections .**
- **The problem may or may not turn ON the SERVICE VEHICLE SOON indicator or store a DTC. Do not use the symptom tables to diagnose intermittent conditions. The malfunction must be present in order to locate the problem.**

Poor electrical connections or wiring cause most intermittent conditions. Perform a careful visual/physical check for the following conditions:

- Poor mating of the connector halves or a terminal not fully seated in the connector body
- An improperly formed or damaged terminal
- Reform or replace connector terminals in the problem circuit in order to ensure proper contact tension.
- Poor terminal to wire connection requires removing the terminal from the connector body in order to perform the check.

Use a scan tool in order to help detect intermittent conditions. The scan tool has several features that can be used to locate an intermittent condition. The snapshot feature can capture and store data parameters within the scan tool when the malfunction occurs. This information can then be reviewed in order to see what caused the malfunction.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Rear Window Defogger Malfunction**
- **Power Windows Malfunction**

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REAR WINDOW DEFOGGER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Defog Rear Relay Switch B+	1	1	-	-
HVAC Control Serial Data	U1510 00	U1510 00	U1510 00	-
Defog Rear Relay Control	B0283 02	B0283 05	B0283 05	-
Rear Window Defogger Grid Control	1	1	2	-
Defog Rear Relay Coil Ground	-	1	1	-
Rear Window Defogger Grid Ground	-	1	1	-
1. Rear Defogger Inoperative 2. Rear Defogger Always ON				

Circuit/System Description

When the HVAC control module receives a rear window defog request from the rear window defogger switch, the HVAC control module will supply voltage to the relay coil. Battery positive voltage is supplied at all times to the relay switched input and the relay coil is always grounded. This allows current from the relay switched input to flow through the switch contacts and out the relay switched output to the rear defogger grid.

Reference Information

Schematic Reference

Defogger Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Rear Window Defogger Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine running, observe the scan tool Rear Defogger Switch parameter while pressing the S59 rear window defogger switch. The parameter should change from Inactive to Active.
    - If the value does not change, replace the P17 radio/HVAC display.
2. Observe the operation of the rear defogger indicator while pressing the S59 rear window defogger switch. The indicator should turn ON or OFF each time the S59 rear window defogger switch is pressed.
    - If the indicator does not turn ON or OFF with each switch press, replace the P17 radio/HVAC display.
3. Command the Rear Defog ON and OFF with a scan tool, the E18 rear defogger grid should turn ON or OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the K55 rear window defogger relay.
2. Test for less than 1 ohms between the ground circuit terminal 86 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify a test lamp does not illuminate between the control circuit terminal 87 and ground.
    - If the test lamp illuminates, test the control circuit for a short to voltage.
4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
5. Ignition OFF, disconnect the X2 harness connector at the E18 rear defogger grid.
6. Test for less than 5 ohms between the ground circuit terminal A and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
7. Connect the X2 harness connector at the E18 rear defogger grid.
8. Ignition ON, connect a 40 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87. Verify the E18 rear defogger grid is activated.
    - If the E18 rear defogger grid does not activate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the E18 rear defogger grid.
9. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
10. Engine running, command the Rear Defog ON and OFF with a scan tool, the test lamp should turn ON and OFF when changing between the commanded states.

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- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K33 HVAC control module.
- If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K33 HVAC control module.

11. If all circuits test normal, test or replace the K55 rear window defogger relay.

Component Testing

Rear Window Defogger Grid Test

1. Engine running, turn on the E18 rear defogger grid.
2. Verify that a test lamp illuminates between each E18 rear defogger grid line and ground. The test lamp should be off when testing at the ground side of the grid and get brighter as the test lamp moves closer to the voltage supply side of the grid. The test lamp should be dim when testing each grid line in the middle.
   - If the test lamp remains bright at the middle of the grid line, test for an open between the test point and the ground side of the grid.
   - If the test lamp remains off at the middle of the grid line, test for an open between the test point and the voltage supply side of the grid

Relay Test

1. Ignition OFF, disconnect the K55 rear window defogger relay.
2. Test for 60-180 ohms between terminals 85 and 86.
   - If the not within the specified range, replace the K55 rear window defogger relay.
3. Test for infinite resistance between the following terminals:
   - 30 and 86
   - 30 and 87
   - 30 and 85
   - 85 and 87
   - If not the specified value, replace the K55 rear window defogger relay.
4. Install a 25 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground. Test for less than 2 ohms between terminals 30 and 87.
   - If greater than the specified range, replace the K55 rear window defogger rela.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Window Replacement**
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for the HVAC control module and radio/HVAC control replacement, setup, and programming

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POWER WINDOWS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Window Motor B+	U1530 00, U1534 00	U1534 00	-	-
Passenger Window Motor B+	U1530 00, U1534 00	U1530 00	-	-
Driver Window Motor Serial Data	U1530 00, U1534 00	U1534 00	U1534 00	-
Passenger Window Motor Serial Data	U1530 00, U1534 00	U1534 00	U1534 00	-
Driver Window Motor Down Signal	B316B 02	1	1	-
Driver Window Motor Express Signal	B316B 02	1	1	-
Driver Window Motor Up Signal	B316B 02	1	1	-
Passenger Window Motor Down Signal	B317A 02	2	1	-
Passenger Window Motor Express Signal	B317A 02	2	1	-
Passenger Window Motor Up Signal	B317A 02	2	1	-
Driver Window Motor Ground	-	U1534 00	-	-
Passenger Window Motor Ground	-	U1530 00	-	-
Driver Window Switch Ground	-	1, 2	-	-
Passenger Window Switch Ground	-	2	-	-
1. Driver Window Malfunction 2. Passenger Window Malfunction				

Circuit/System Description

The window motors are supplied with B+ voltage which is used to power the motor and also used as a reference voltage within the logic circuit. When the driver or passenger window switch is pressed, a switch is closed causing the reference voltage in the appropriate circuit in the window motor to drop, the window motor responds by moving the window in the direction commanded.

Diagnostic Aids

Failure of a window not completely closing or a window auto reversing when completely closed may have been

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caused by the following conditions:

- When the window glass has been replaced
- When the door has been replaced
- When the window regulator has been replaced

A relearn procedure may be necessary to correct for the above malfunctions, refer to **Window Regulator Motor Programming and Setup** .

Reference Information

Schematic Reference

Moveable Window Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Windows Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, command the driver window UP and DOWN with a scan tool. The driver window should perform the UP, DOWN functions.
    - If the driver window does not perform as specified, refer to Window Motor Malfunction.
2. Command the passenger window UP and DOWN with a scan tool. The passenger window should perform the UP, DOWN functions.
    - If the passenger window does not perform as specified, refer to Window Motor Malfunction.
3. Command the driver window UP, DOWN, express UP and express DOWN by using the S79D window switch-driver. The driver window should perform the UP, DOWN and express functions.
    - If the driver window does not perform as specified, refer to Driver Window Switch Malfunction.

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4. Command the passenger window UP, DOWN, express UP and express DOWN by using the passenger window switch and the right front switch on the S79D window switch-driver, the passenger window should perform the UP, DOWN and express functions from each switch.
    - If the passenger window does not perform as specified, refer to Passenger Window Switch Malfunction.

Circuit/System Testing

Window Motor Malfunction

1. Ignition OFF for, disconnect the harness connector at the appropriate M74 window motor.
2. After 10 minutes, test for less than 10 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 2 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Test for 5 - 10 V between the serial data circuit terminal 4 and ground.
    - If greater than the specified range, test the serial data circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If less than the specified range, test the serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the M74 window motor.

Driver Window Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S79D window switch-driver.
2. After 10 minutes, test for less than 10 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that the scan tool Driver Window Main Control Down Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver.
4. Connect a 3 A fused jumper wire between the signal circuit terminal 3 and ground. Verify that the scan tool Driver Window Main Control Down Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74D window motor-driver.
5. Verify that the scan tool Driver Window Main Control Up Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 5 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver.
6. Connect a 3 A fused jumper wire between the signal circuit terminal 5 and ground. Verify that the scan tool Driver Window Main Control Up Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74D window motor-driver.

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7. Verify the scan tool Driver Window Main Control Express Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 2 for a short to ground. If the circuit tests normal, replace the M74 driver window motor.
8. Connect a 3 A fused jumper wire between the signal circuit terminal 2 and ground, verify the scan tool Driver Window Main Control Express Switch parameter is Active.
    - If not the specified value, test the signal circuit terminal for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74 driver window motor.
9. If all circuits test normal, replace the S79D window switch-driver.

Passenger Window Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S79P window switch-passenger.
2. After 10 minutes, test for less than 10 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the harness connector at the S79D window switch-driver.
4. Ignition ON, verify that the scan tool Passenger Window Switch at Door parameter is Inactive.
    - If the value is Up, test the signal circuit terminal 8 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
    - If the value is Down, test the signal circuit terminal 7 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
    - If the value is Express, test the signal circuit terminal 6 for a short to ground. If the circuit tests normal, test or replace the M74P window motor-passenger.
5. Connect a 3 A fused jumper wire between the signal circuit terminal 8 and ground, verify that the scan tool Passenger Window Switch at Door parameter is Up.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74P window motor-passenger.
6. Connect a 3 A fused jumper wire between the signal circuit terminal 7 and ground, verify that the scan tool Passenger Window Switch at Door parameter is Down.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74P window motor-passenger.
7. Connect a 3 A fused jumper wire between the signal circuit terminal 6 and ground, verify that the scan tool Passenger Window Switch at Door parameter is Express.
    - If not the specified value, test the signal circuit terminal for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74 passenger window motor.
8. Ignition OFF, connect the harness connector at the S79D window switch-driver.
9. Ignition ON, observe the scan tool Passenger Window Switch at Door parameter while using the right front switch on the S79D window switch-driver. The parameters should change from Inactive to Up, Down and Express.
    - If the values do not change, test or replace the S79D window switch-driver.
10. If all circuits test normal, test or replace the S79P window switch-passenger.

Component Testing

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Driver Window Switch

1. Ignition OFF, disconnect the harness connector at the S79D window switch-driver.
2. With the switch in the INACTIVE position, test for infinite resistance between the signal terminals listed below and the ground terminal 1:
    - Terminal 2
    - Terminal 3
    - Terminal 5
    - Terminal 6
    - Terminal 7
    - Terminal 8
    - If less than the specified value, replace the S79D window switch-driver.
3. With the switch in the UP position, test for less than 2 ohms between the signal terminal listed below and the ground terminal 1:
    - Terminal 5
    - Terminal 8
    - If greater than the specified range, replace the S79D window switch-driver.
4. With the switch in the DOWN position, test for less than 2 ohms between the signal terminal listed below and the ground terminal 1:
    - Terminal 3
    - Terminal 7
    - If greater than the specified range, replace the S79D window switch-driver.

Passenger Window Switch

1. Ignition OFF, disconnect the harness connector at the S79P window switch-passenger.
2. Test for infinite resistance between the signal terminals 6, 7 and 8 and the ground terminal 1 with the switch in the INACTIVE position.
    - If less than the specified value, replace the S79P window switch-passenger
3. Test for less than 2 ohms between the signal terminal 8 and the ground terminal 1 with the switch in the UP position.
    - If greater than the specified range, replace the S79P window switch-passenger.
4. Test for less than 2 ohms between the signal terminal 7 and the ground terminal 1 with the switch in the DOWN position.
    - If greater than the specified range, replace the S79P window switch-passenger.
5. Test for less than 2 ohms between the signal terminal 6 and the ground terminal 1 with the switch in the EXPRESS DOWN position
    - If greater than the specified range, replace the S79P window switch-passenger.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Window Switch Replacement**
- **Front Side Door Window Regulator Motor Replacement**
- **Control Module References** for BCM replacement, setup and programming

SIDE DOOR WINDOW MECHANICAL DIAGNOSIS

Cause	Correction
DEFINITION: A mechanical condition that requires a correction for proper operation of the side door window. Refer to **Symptoms - Fixed and Moveable Windows** prior to beginning this table.	
Intermittent Operation	Check proper glass alignment/attachment and door seal installation.
	Check switch and switch bezel to see if sticking.
	Check wire harness for pinched/shorted wire.
	THIS STEP APPLIES TO ALL TWO PIN MOTOR CONNECTORS ONLY. Perform electrical diagnostics, by first applying 12 volt power supply to the regulator motor to verify motor function.
Glass Binds	Check proper glass alignment/attachment.
	Check for defective seal and/or proper seal installation.
	Check for debris in glass run channel.
	Check for glass run channel position.
Regulator/Glass Rattles	Check for loose fasteners and retorque if required.
	Check that the glass is in the channel and reinstall if not positioned correctly.
Noisy Operation	Check for other components in the glass path such as wire harness, impact foam, lock rods, or cables.
	Check for proper glass alignment/attachment and door seal installation.
Windnoise	Check seals, mirror patch, and glass alignment.
False glass reversal, the glass goes down unexpectedly.	Check seals, reinitialize the glass and/or realign the glass.
	Check for debris in the glass run channel.

REPAIR INSTRUCTIONS

WINDSHIELD REPLACEMENT

Special Tools

- **S-0201964:** Bonded, Glass Removing Device
- Glass Handling Suction Cups
- Use an adhesive that is approved by GM

For equivalent regional tools, refer to **Special Tools**

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Removal Procedure

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and the interior trim.

1. Open the hood.
2. Remove the windshield wiper arms. Refer to **Windshield Wiper Arm Replacement** .
3. Remove the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** .
4. Remove the inside rearview mirror. Refer to **Inside Rearview Mirror Replacement** .
5. Remove the remote control door receiver antenna. Refer to **Remote Control Door Lock Receiver Replacement (With BTV)** or **Remote Control Door Lock Receiver Replacement (Without BTV)** .

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

6. Cover to protect the following parts from broken glass:
   - The upper dash pad
   - The defroster outlets and A/C outlets
   - The seats and carpeting
7. Remove the lower windshield supports from the cowl panel, if equipped.

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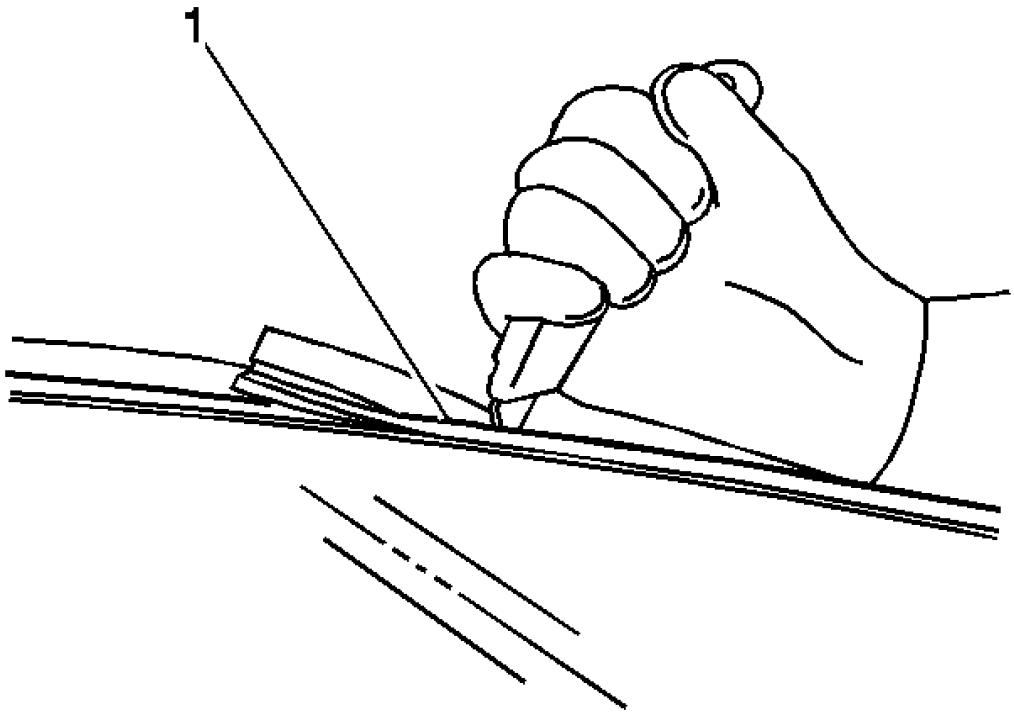


Fig. 3: Cutting Window Lace Molding
Courtesy of GENERAL MOTORS CORP.

WARNING: When working with any type of glass or sheet metal with exposed or rough edges, wear approved safety glasses and gloves in order to reduce the chance of personal injury.

8. Using a utility knife, carefully cut around the window (1) to expose the lace and to access the urethane adhesive bead.

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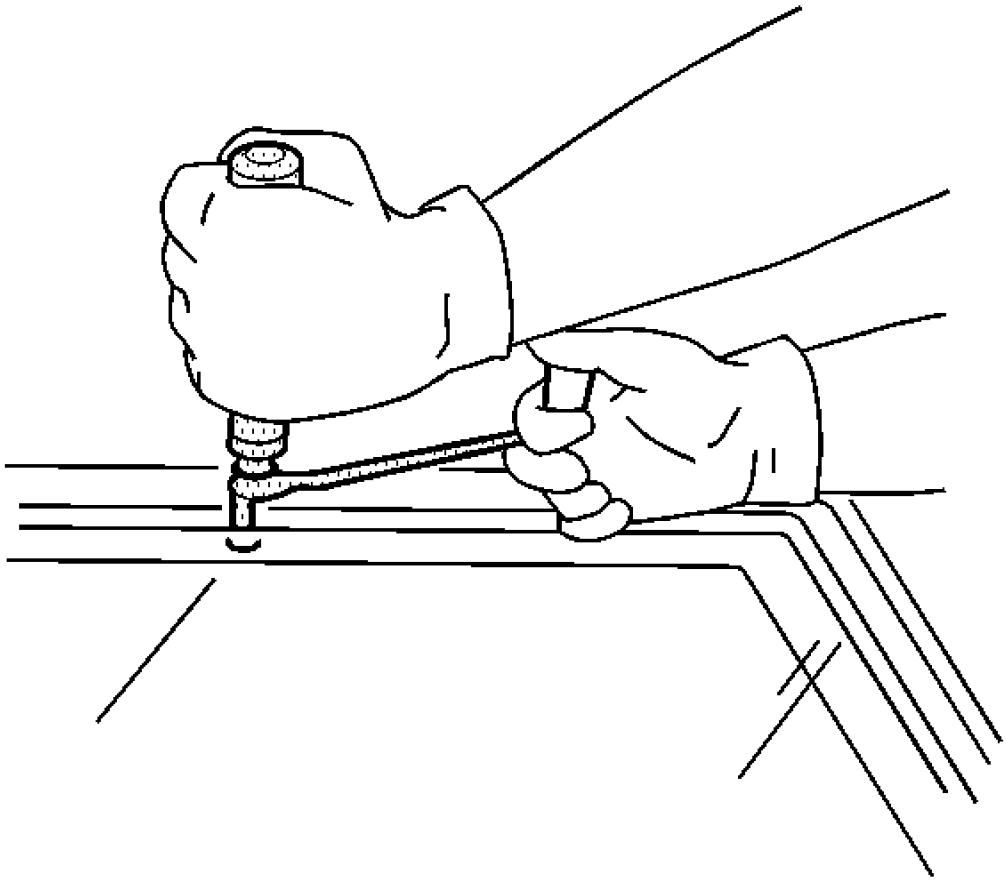


Fig. 4: Separating Urethane Adhesive From Window
Courtesy of GENERAL MOTORS CORP.

NOTE: Keep the cutting edge of the tool against the windshield.

9. This will allow the urethane adhesive to be separated from the windshield.
    - Leave a base of urethane on the pinchweld flange.
    - The only suitable lubrication is clear water.
    - **BO-24402-A:** Glass Sealant Remover (Cold Knife).
    - **BO-39032:** Stationary Glass Removal Tool, or equivalent in order to remove the window.

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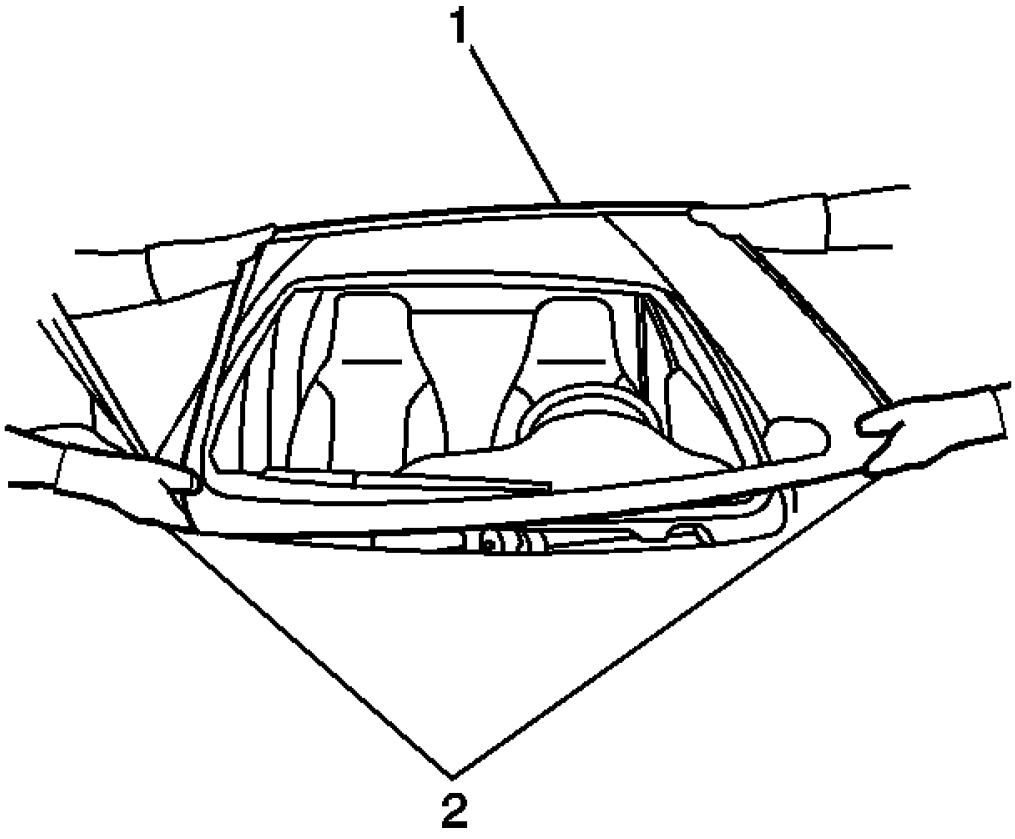


Fig. 5: Removing/Installing Windshield
Courtesy of GENERAL MOTORS CORP.

10. Remove the windshield (1) from the vehicle with the aid of an assistant (2).

Installation Procedure

1. Install a stationary window into the opening. Refer to **Adhesive Installation of Windshields**.
2. Install the remote control door receiver antenna. Refer to **Remote Control Door Lock Receiver Replacement (With BTV)** or **Remote Control Door Lock Receiver Replacement (Without BTV)** .
3. Install the inside rearview mirror. Refer to **Inside Rearview Mirror Replacement** .
4. Install the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** .
5. Install the windshield wiper arms. Refer to **Windshield Wiper Arm Replacement** .
6. Close the hood.
7. Remove the double layer of masking tape from around the perimeter of the painted surfaces and the interior trim.

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FRONT SIDE DOOR WINDOW ADJUSTMENT

Removal Procedure

1. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .
2. Remove the water deflector.
3. Remove the door window switch from the door trim panel.

   Reinstall the door window switch to the door harness to be able to operate the door window.

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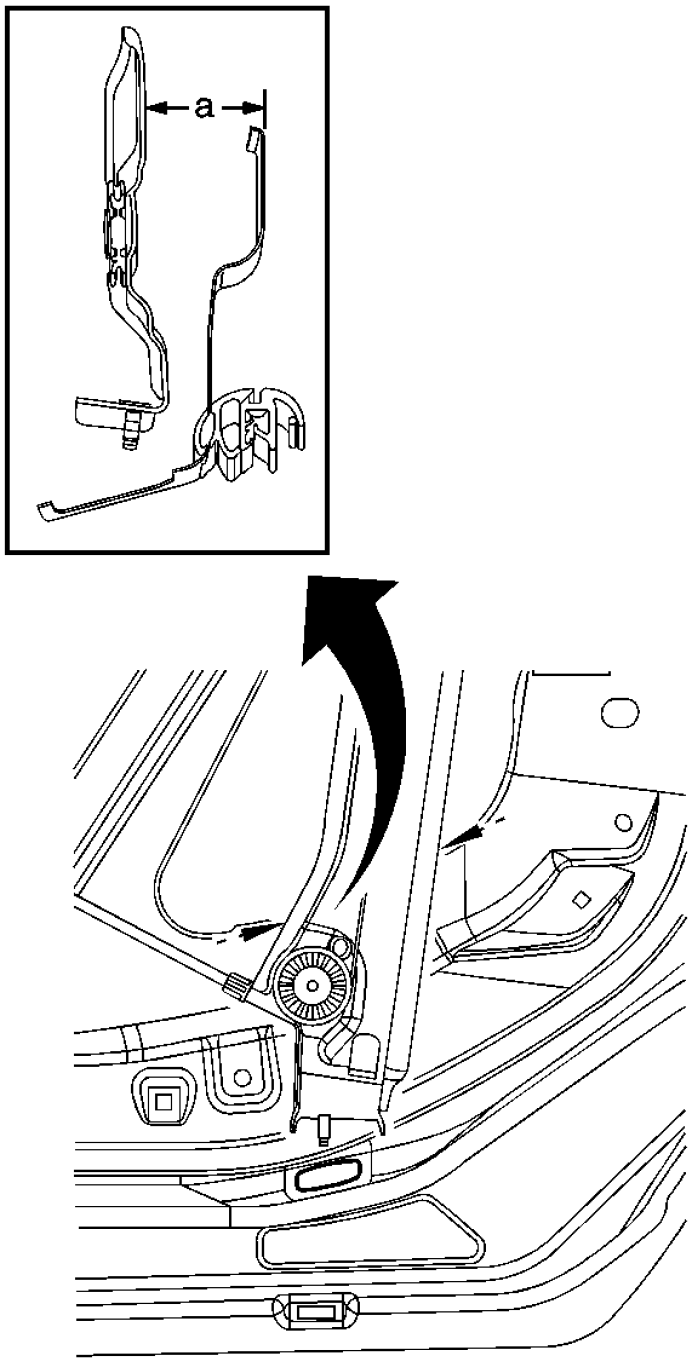


Fig. 6: Inner Panel To Rear Regulator Rail
Courtesy of GENERAL MOTORS CORP.

4. Verify that the measurement from the inboard surface of the inner panel to the rear regulator rail (a) is 57.5 mm (2.3 in), if correct go to next step. If not do the following:

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1. Remove the access plug in the lower inside edge of the door.
2. Loosen the nut that secures the bottom of the regulator rail to the door.
3. Adjust the regulator rail to achieve 57.5 mm (2.3 in).

NOTE: **Refer to Fastener Caution .**

4. Re torque the nut.

Tighten: Tighten the nut to 11 N.m (97 lb in).

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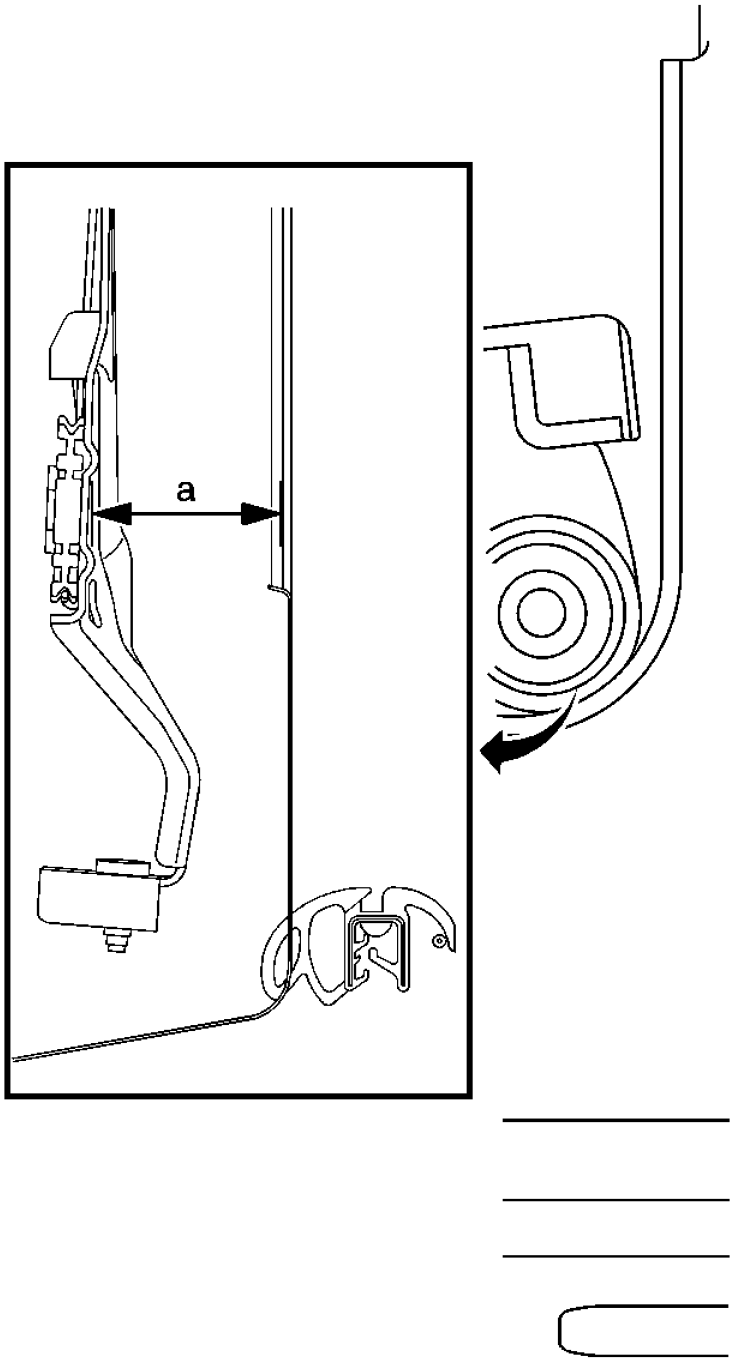


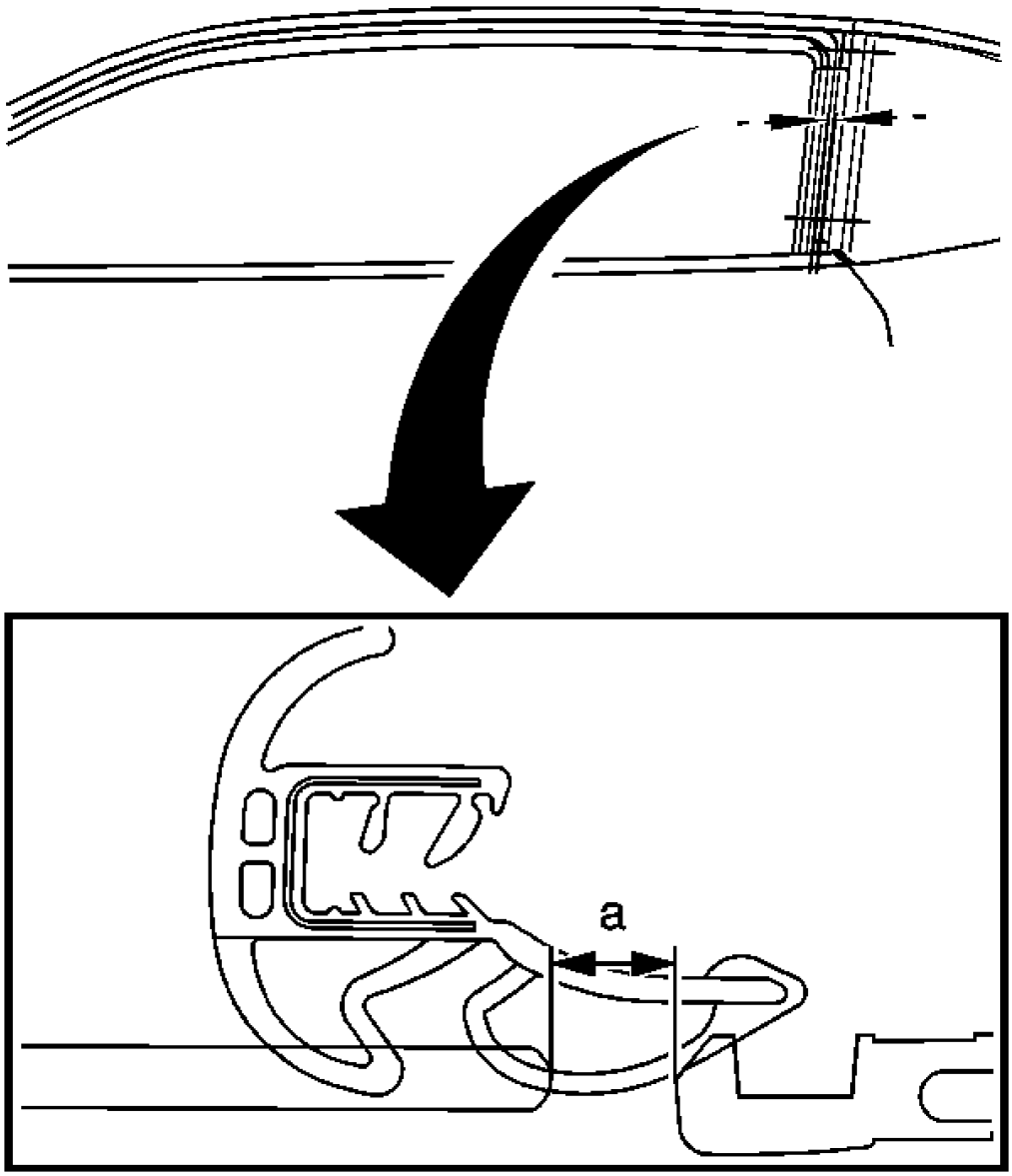
Fig. 7: Inner Panel To Front Regulator Rail
Courtesy of GENERAL MOTORS CORP.

5. Verify that the measurement (a) from the inboard surface of the inner panel to the front regulator rail is 51 mm (2 in), if correct go to the next step. If not do the following:

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1. Remove the access plug.
2. Loosen the nut that secures the bottom of the regulator rail to the door.
3. Adjust the regulator rail to achieve 51 mm (2 in).
4. Re torque the nut.

Tighten: Tighten the nut to 11 N.m (97 lb in).



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Fig. 8: Gap Between Door Window & 1/4 Window
Courtesy of GENERAL MOTORS CORP.

6. Measure the gap (a) between door window and the 1/4 window, at 2 locations. 10 mm (0.39 in) +/-1.5 mm (0.06 in) and parallel within 1.5 mm (0.060 in), go to the next step.
7. Record the measurements on the repair order for future reference.

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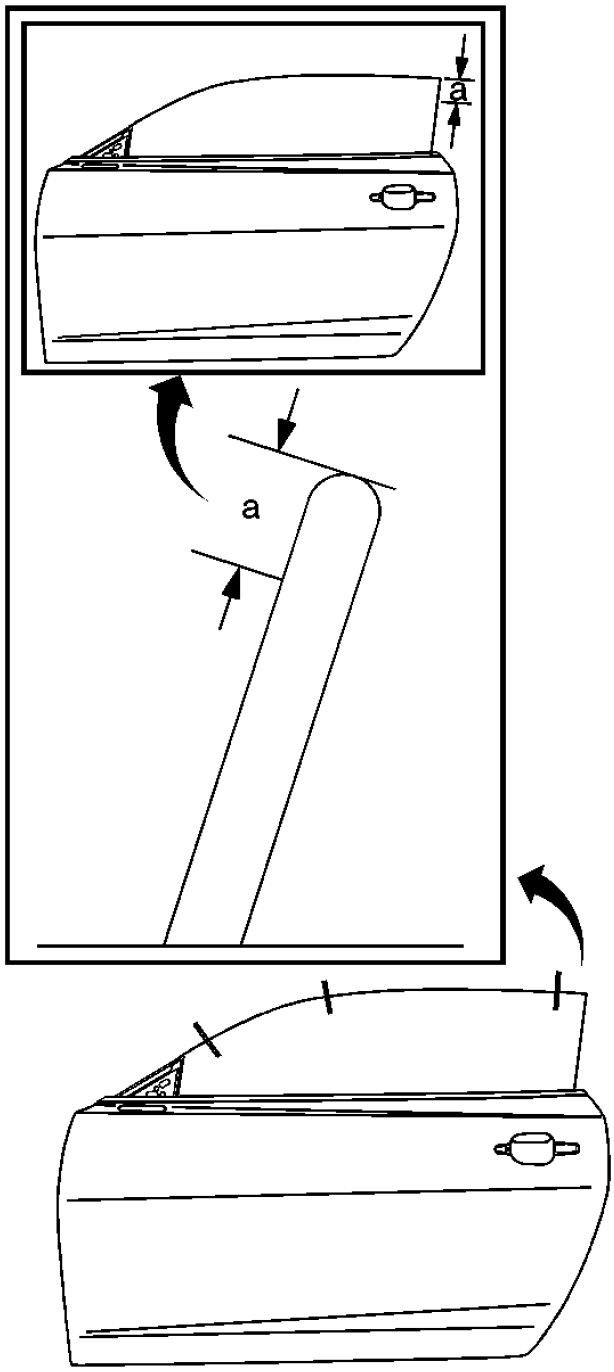


Fig. 9: Window Seal Penetration
Courtesy of GENERAL MOTORS CORP.

NOTE: Record and save the measurement on the repair order for warranty /

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engineering request.

8. Measure the door window for proper seal penetration (a), at three locations. Record the measurements future reference. Adjust the door window seal for penetration.

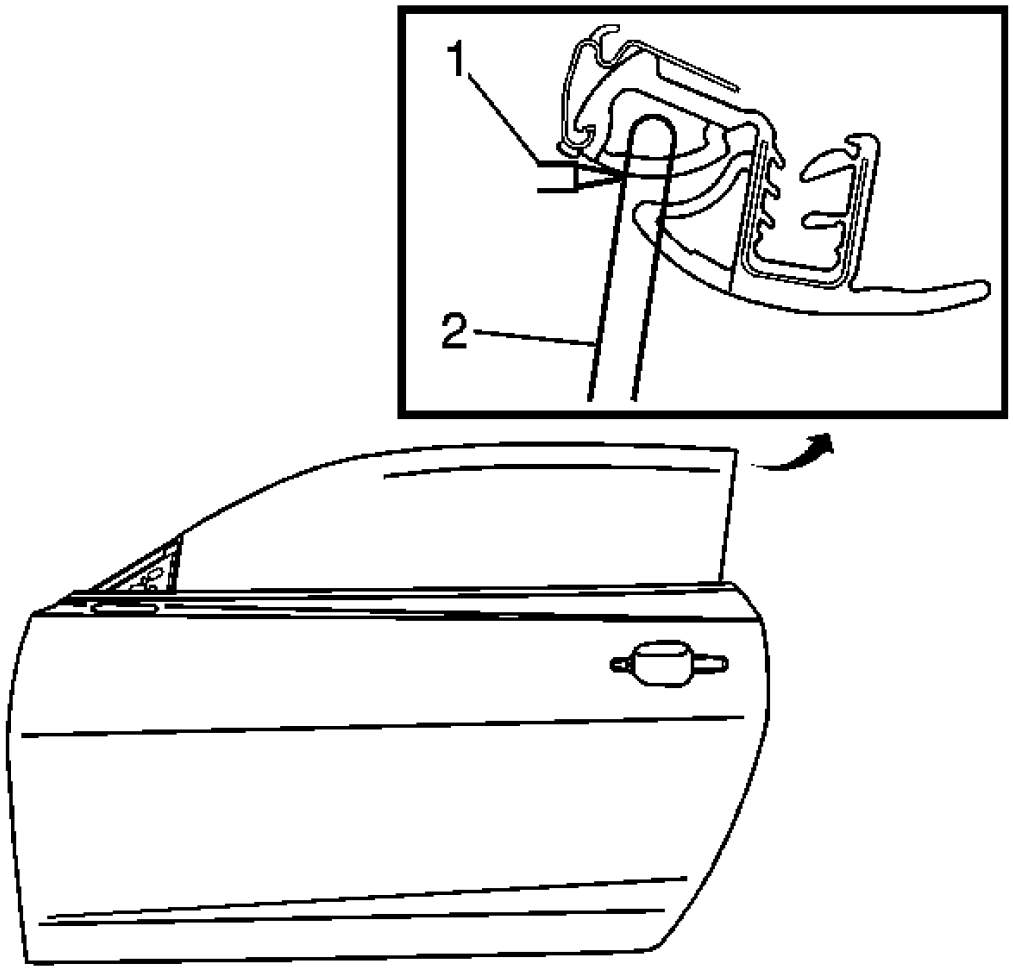


Fig. 10: Marking Window
Courtesy of GENERAL MOTORS CORP.

9. Adjust the door window seal for penetration, Do the following:
    1. Using a felt tip pen (1) to mark the window is preferred, this washes off easily and does not scratch the window.

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NOTE: Ensure that the parking brake is set and the right door is unlocked do the following.

2. With the window in the full up position and engine running close the door and mark the window as follows:
3. Mark the window along the top edge and the seal (1), were the window contact.
4. Mark the window (2) in three locations.

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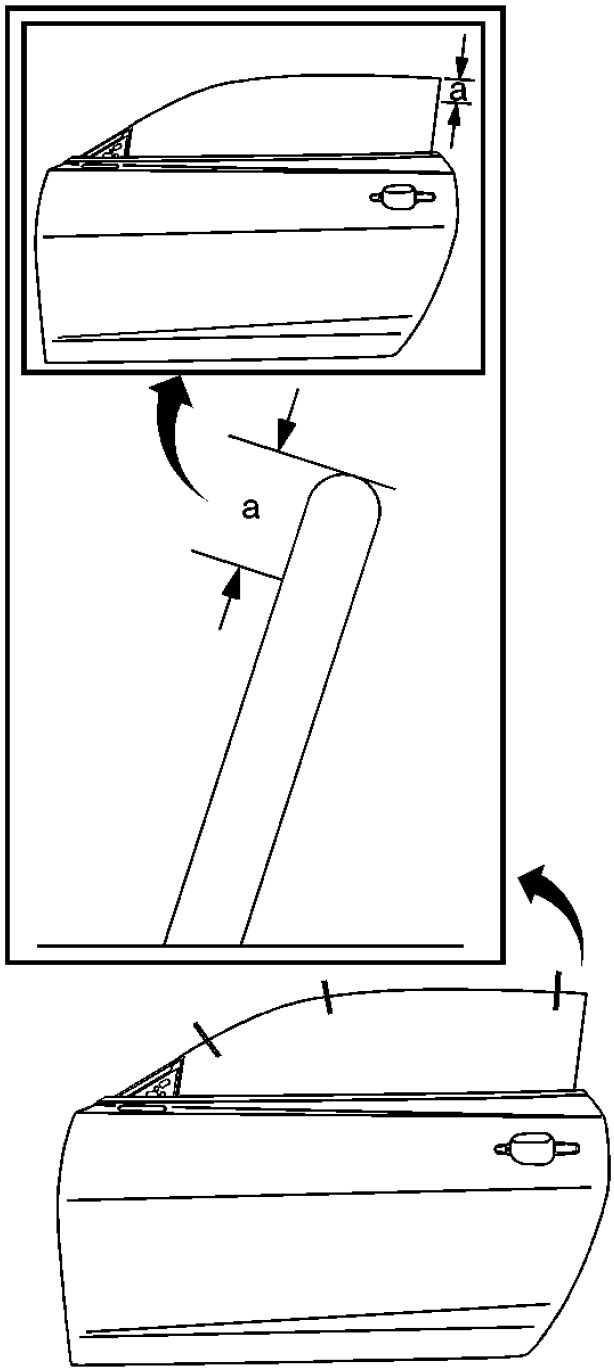


Fig. 11: Window Seal Penetration
Courtesy of GENERAL MOTORS CORP.

10. Open the door, measure window for seal penetration in three locations above to 4.5 mm (0.18 in) +/-1.5 mm (0.06 in).

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All three 3 locations must be within 1.5 mm (0.06 in) of each other.

NOTE: If all measurements meet the requirements, no additional repair is required.

11. The door window will need to be adjusted if any of the previous measurements were out of the specification: Do the following:
    1. If the door window to 1/4 window gap measured in step 6 is not 10 mm (0.39 in) +/-1.5 mm (0.06 in) and parallel within 1.5 mm (0.06 in) (this step may not be needed).
    2. If the window penetration measured in step 7 is less than 3mm (0.19 in).
12. This will require loosening the regulator clamps bolts to adjust the window. Do the following:
    1. Before the regulator clamp bolts are loosened to adjust the window, the following should be performed.
    2. With the door open, run the window to the full up position.
    3. Place the door window in the service position.

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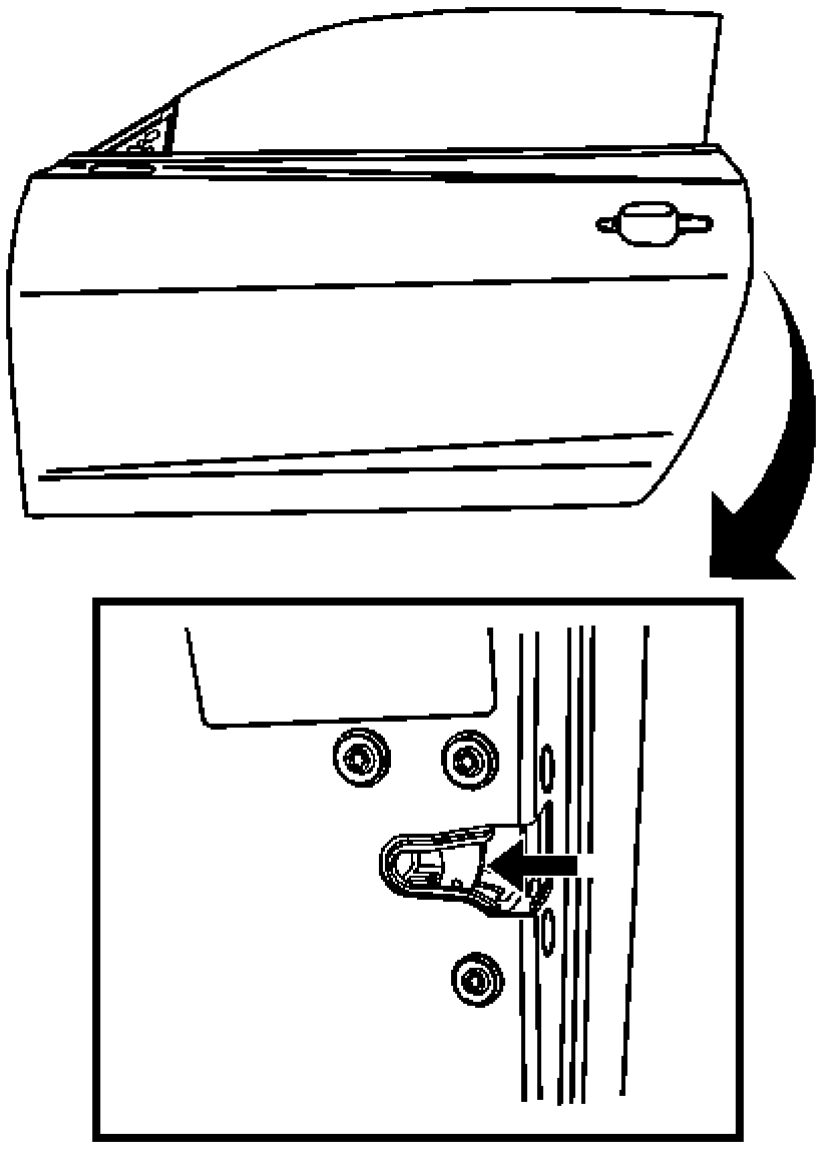


Fig. 12: Door Latch Bolt
Courtesy of GENERAL MOTORS CORP.

4. Locate the door latch bolt.
5. Push the latch bolt until it reaches the second detent or full lock position.
6. The window will automatically more up to the full close position.
7. Leave the window in this position during all adjustments while the regulator clamps are loose.

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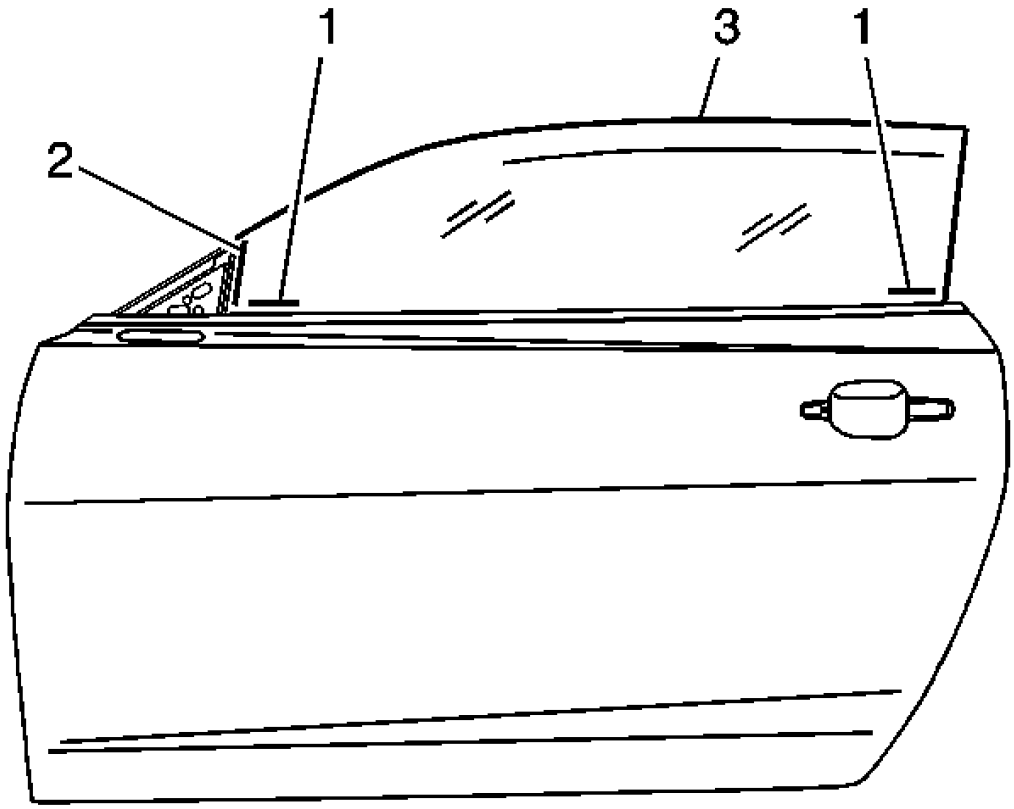


Fig. 13: Outer Reveal Belt Seal & Mirror Patch
Courtesy of GENERAL MOTORS CORP.

13. Locate the outer reveal belt seal (1) and mirror patch (2), mark the window (3) in 3 places for the initial window position before adjustments are performed. These marks will aid in positioning the window to the desired location during adjustment.
14. Loosen the regulator clamp bolts and adjust the window as required to achieve the dimensions in step 6.

CAUTION: Refer to Fastener Caution

15. Tighten the regulator clamps bolts to the window.

    Tighten: Tighten the regulator clamp bolts to the window to 11 N.m(97 lb in).

16. After all adjustments are complete, and the regulator clamps are torqued, pull the outside door handle to release the latch bolt before closing the door.

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17. After all adjustments are complete and verified, do the following:
    1. This step is only required if the regulator clamp bolts were loosened and the window was adjusted).
    2. Access under hood fuse box. Remove fuse #26 and reinstall. Close hood.
    3. Get inside vehicle with both doors closed. Start the engine and follow the instructions on the DIC (Driver Information Center).
    4. The DIC should instruct to run the window down and up on both sides.
18. Verify both windows have express up function and no DIC message exists. If the DIC does not instruct you to operate the windows to re-normalize, the following Must be done:
    1. This will require 2 people while the window is in motion.
    2. Pull the fuse as described above in #2.
    3. The windows will stop, release the window switch.
    4. Reinstall the fuse and redo steps #13.3, #13.4 and #13.5 above.

Installation Procedure

1. Inspect the window for proper operation with the door opened and closed.
2. Install the window switch to the door trim panel.
3. Install the water deflector.
4. Install the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .
5. Clear all current and historical DTCs.
6. Clean the door window.

FRONT SIDE DOOR WINDOW REPLACEMENT

Removal Procedure

1. If the window is being replaced it will be necessary to do a full window alignment. Refer to **Front Side Door Window Adjustment**.
2. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .
3. Remove the door window switch from the door trim panel. Refer to **Front Side Door Window Switch Replacement**.
4. Reinstall the window switch to the door harness this will allow you to operate the door window.
5. Remove the water deflector.

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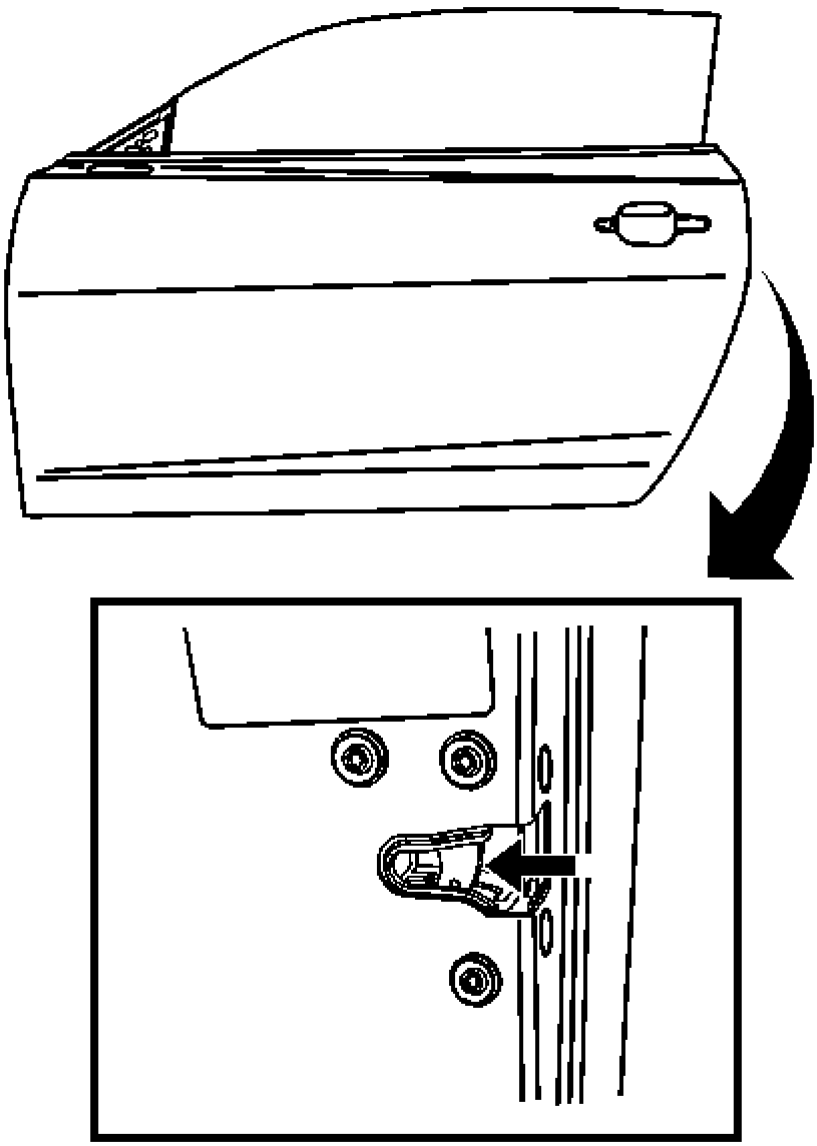


Fig. 14: Door Latch Bolt
Courtesy of GENERAL MOTORS CORP.

6. Place the front side door latch bolt in the closed position

WARNING: Refer to Glass and Sheet Metal Handling Warning .

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7. If reusing the same window put the window in the full up position, Do the following:
    1. Locate the door latch mechanism.
    2. Push the latch bolt until it reaches the second detent or full lock position.
    3. The window will automatically move up to the hard stop position.
    4. Leave the window in this position during all adjustment while the regulator clamp are loose.

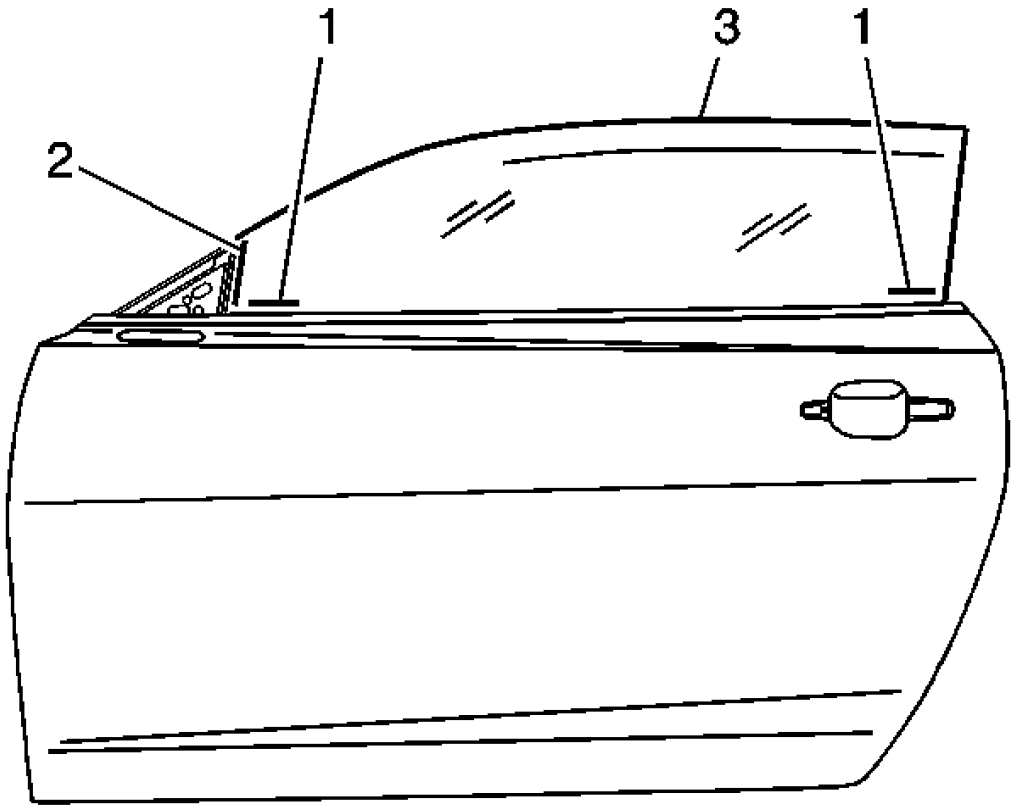


Fig. 15: Outer Reveal Belt Seal & Mirror Patch
Courtesy of GENERAL MOTORS CORP.

8. Locate the outer reveal belt seal (1) and mirror patch (2), mark the window (3) in 3 places for the initial window position before adjustments are performed. These marks will aid in positioning the window to the desired location during adjustment.
9. Place the door window in the service position to expose the window guide bolts.

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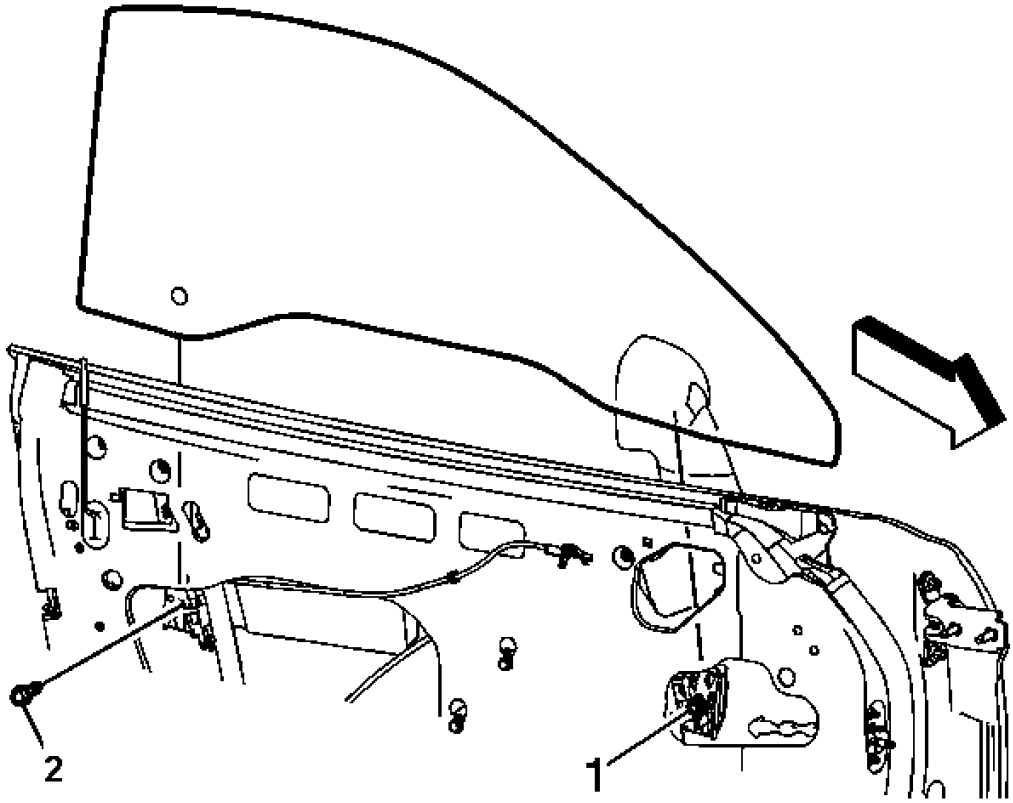


Fig. 16: Window Clamp Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: The rear rail window guide bolt goes through the window and Must be removed before the window can be removed from the regulator.

10. Loosen the front window clamp bolt (1). Do Not remove it completely.
11. Remove the rear rail window clamp bolt (2) completely.

NOTE: It will be necessary to open the rear window guide to remove the window.

12. Remove the window from the window clamps.

Installation Procedure

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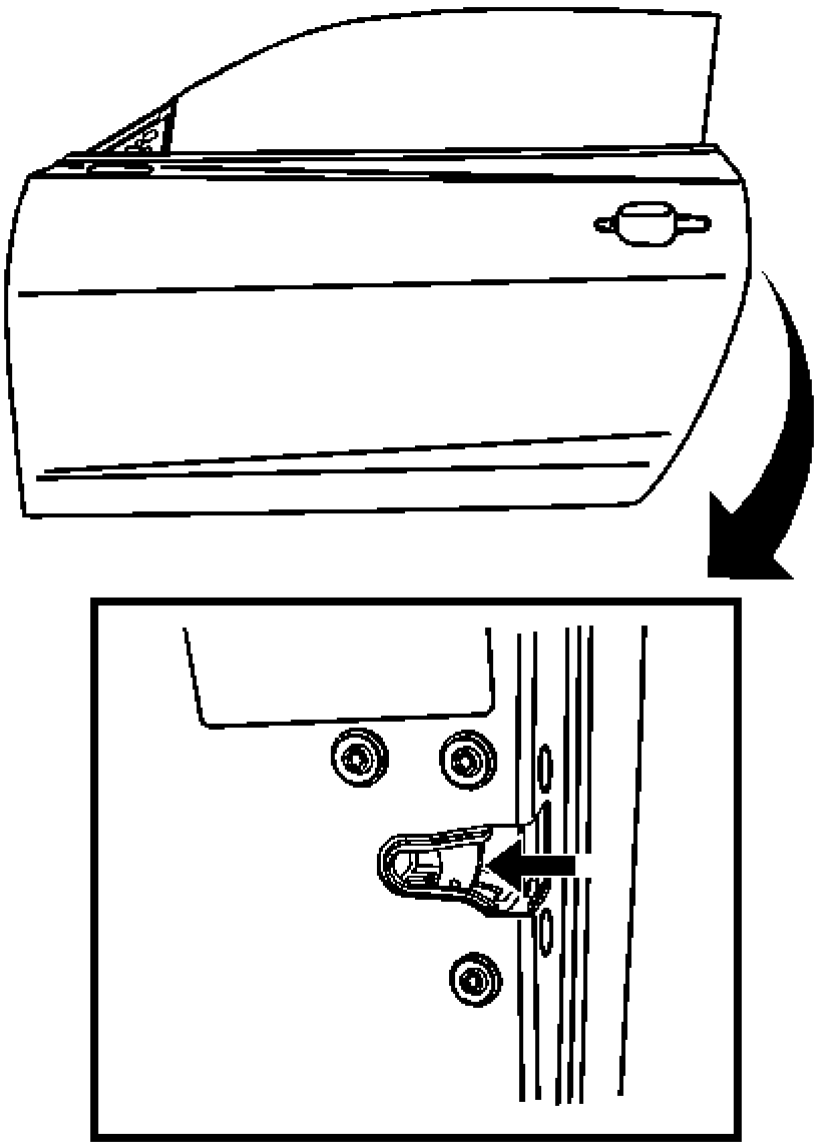


Fig. 17: Door Latch Bolt
Courtesy of GENERAL MOTORS CORP.

1. Open the front side door latch bolt, by pulling the outside door handle releasing the latch bolt.
2. Lower the window regulator clamps to the halfway down position by using the switch.

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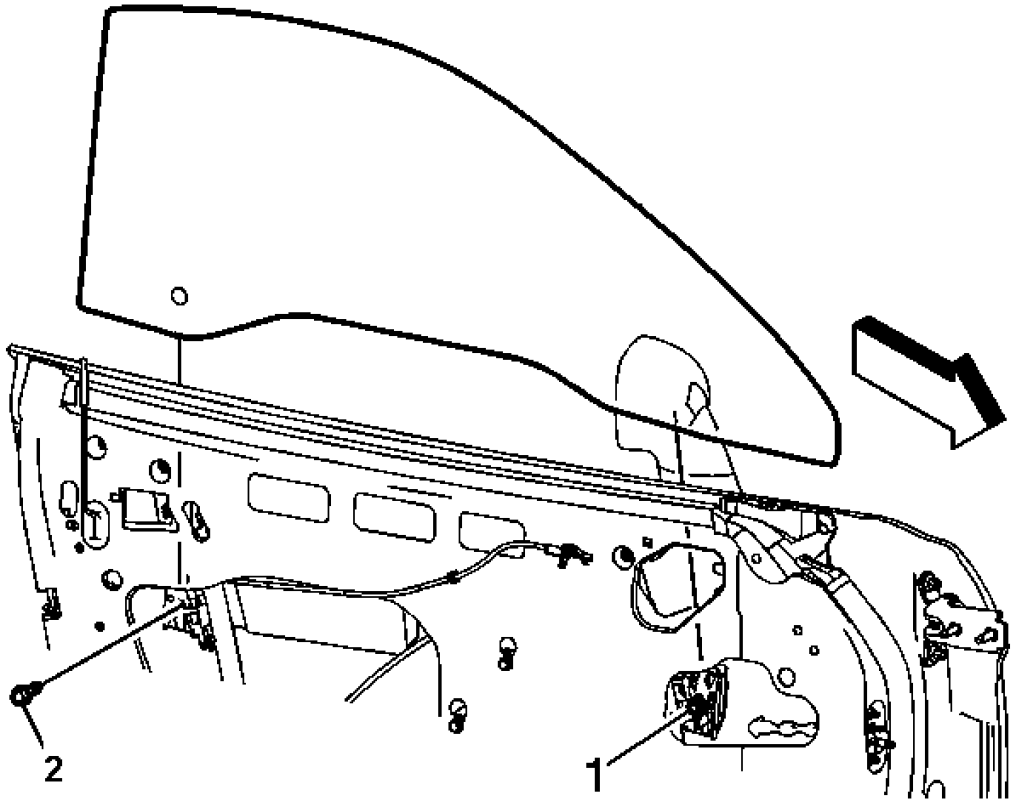


Fig. 18: Window Clamp Bolts
Courtesy of GENERAL MOTORS CORP.

WARNING: Refer to Glass and Sheet Metal Handling Warning .

3. Install the window to the window clamps.
4. Install the front window clamp bolt (1), Do Not tighten completely.
5. Install the rear window clamp bolt (2), Do not tighten completely.
6. With the door open, run the window up to a hard stop.
7. Place the door window in the full up position. Do the following:
    1. Locate the door latch mechanism.
    2. Push the latch bolt until it reaches the second detent or full lock position.
    3. The window will automatically more up to the full close position.
    4. Leave the window in this position during all adjustments while the regulator clamps are loose.

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8. Align the marks from step 7.

NOTE: Refer to Fastener Caution Fastener Caution.

9. Tighten both window clamp bolts.

Tighten: Tighten the window clamp bolts to 10 N.m (89 lb in).

10. After all adjustments are complete, and the regulator clamps are torqued, pull the outside door handle to release the latch bolt before closing the door.
11. After all adjustments are complete and verified, do the following:
12. After replacing the window it is necessary to reprogram the window. Refer to **Window Regulator Motor Programming and Setup** .
13. Inspect the window for proper operation in the open and closed position before installing the door trim panel.
14. Install the water deflector.
15. Install the window switch to the door trim panel. Refer to **Front Side Door Window Switch Replacement**.
16. Install the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .

QUARTER WINDOW REPLACEMENT

Special Tools

- **J 24402-A:** Glass Sealant Remover (Cold Knife)
- **J 39032:** Stationary Glass Removal Tool
- Use a urethane adhesive systems which meet GM Specification GM 3651G

Removal Procedure

WARNING: If a window is cracked but still intact, crisscross the window with masking tape in order to reduce the risk of damage or personal injury.

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and inner trim of the window.

1. Remove the rear quarter upper trim. Refer to **Quarter Upper Trim Panel Replacement** .

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

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2. Cover to protect the following parts from broken glass:
   - Upper dash pad
   - Defroster outlets and A/C outlets
   - Seats and carpeting

WARNING: **Refer to Glass and Sheet Metal Handling Warning .**

NOTE: **Keep the cutting edge of the tool against the window. Do this from inside the vehicle to protect the outer painted surface.**

3. Using a utility knife, carefully cut around the quarter modular window to expose the urethane adhesive bead.

   Use care not to damage the retainers. If the retainer get damaged it will be necessary to use mask tape to tape it in place while curing.

4. This will allow the urethane adhesive to be separated from the window.
   - Leave a base of urethane on the pinch-weld flange.
   - The only suitable lubrication is clear water.
   - Use **J 39032:** stationary glass removal tool or equivalent in order to remove the window.

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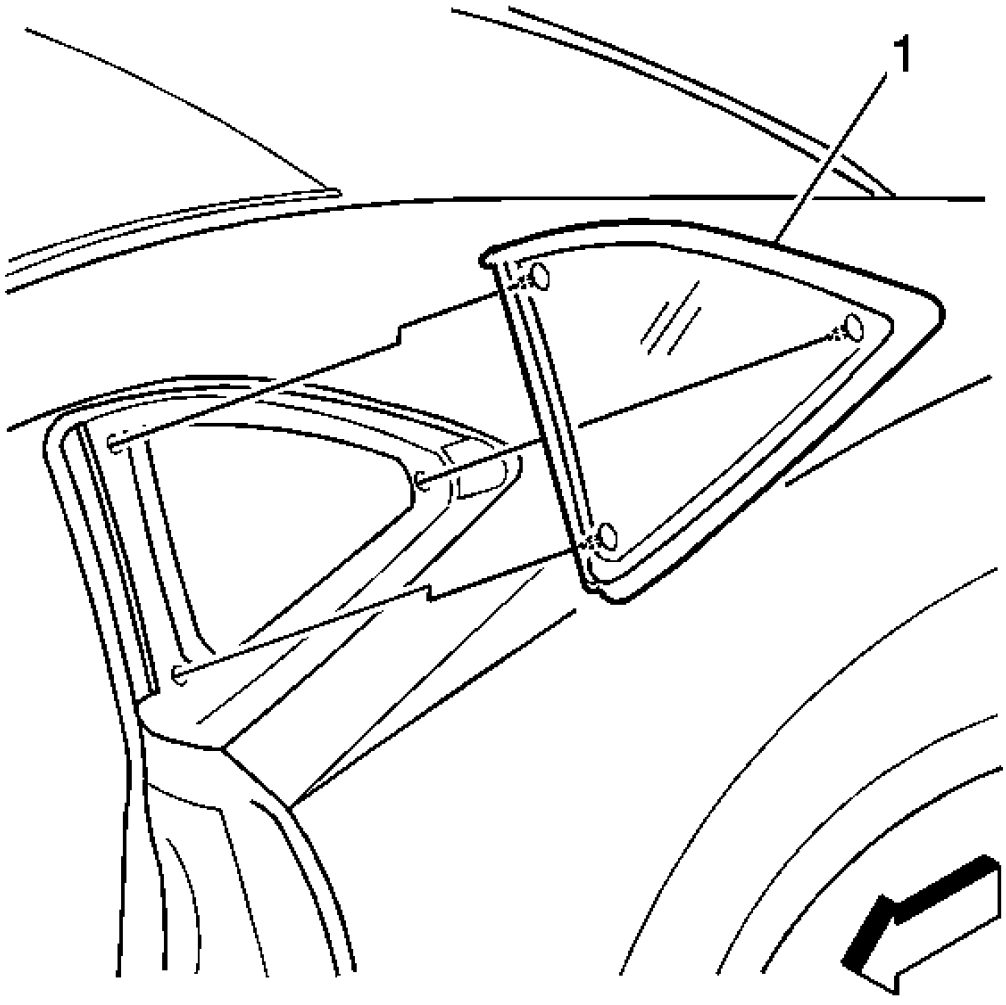


Fig. 19: Quarter Modular Window
Courtesy of GENERAL MOTORS CORP.

- Remove the quarter modular window (1) from the pinch-weld flange.

Installation Procedure

1. Install the quarter modular window into the opening. Refer to **Adhesive Installation of Bodyside Stationary Windows**.
2. Install the rear quarter upper trim panel. Refer to **Quarter Upper Trim Panel Replacement** .
3. Remove the double layer of masking tape around the perimeter of the painted surfaces and the interior trim.

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REAR WINDOW REPLACEMENT

Special Tools

- **S-0201964:** Bonded, Glass Removing Device
- Glass Handling Suction Cups
- Use an adhesive that is approved by GM

For equivalent regional tools, refer to **Special Tools**

Removal Procedure

WARNING: If a window is cracked but still intact, crisscross the window with masking tape in order to reduce the risk of damage or personal injury.

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and inner trim.

1. Open the rear compartment lid.
2. Remove the rear window lower seal.
3. Disconnect the rear window defogger electrical connectors.

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

4. Cover to protect the following parts from broken glass:
    - Upper dash pad
    - Defroster outlets and A/C outlets
    - Seats and carpeting

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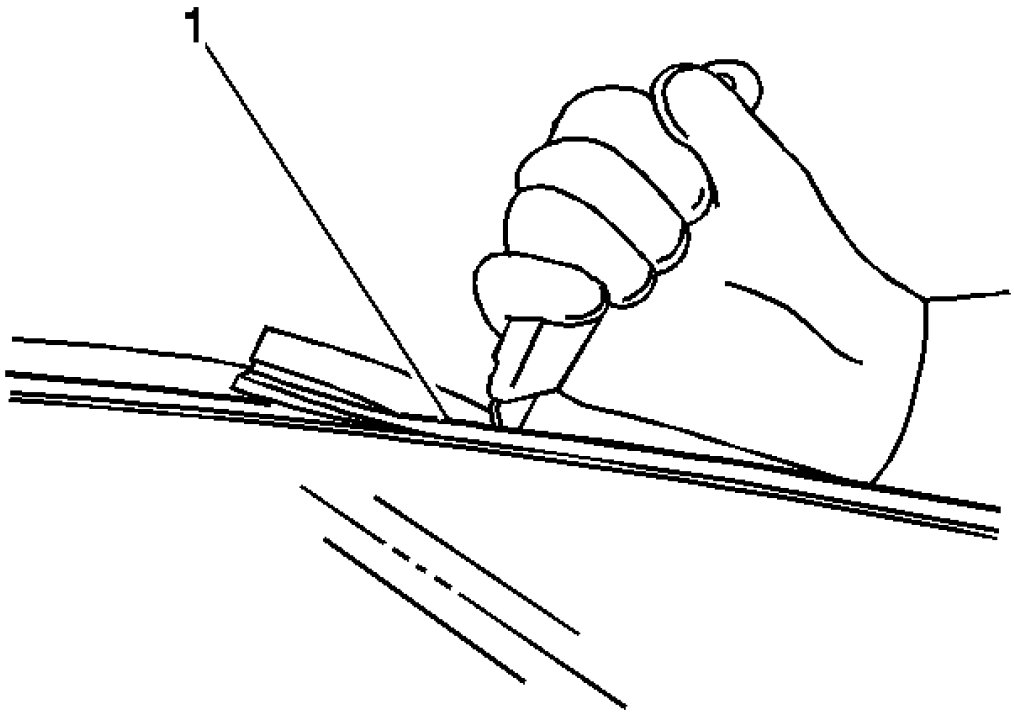


Fig. 20: Cutting Window Lace Molding
Courtesy of GENERAL MOTORS CORP.

WARNING: Refer to Glass and Sheet Metal Handling Warning .

5. Using a utility knife, carefully cut around the window (1) to expose the lace and to access the urethane adhesive bead.
6. This will allow the urethane adhesive to be separated from the window.
7. Remove the window lace.
    - Leave a base of urethane on the pinchweld flange.
    - The only suitable lubrication is clear water.
    - **BO-24402-A:** Glass Sealant Remover (Cold Knife).
    - **BO-39032:** Stationary Glass Removal Tool, or equivalent in order to remove the window.

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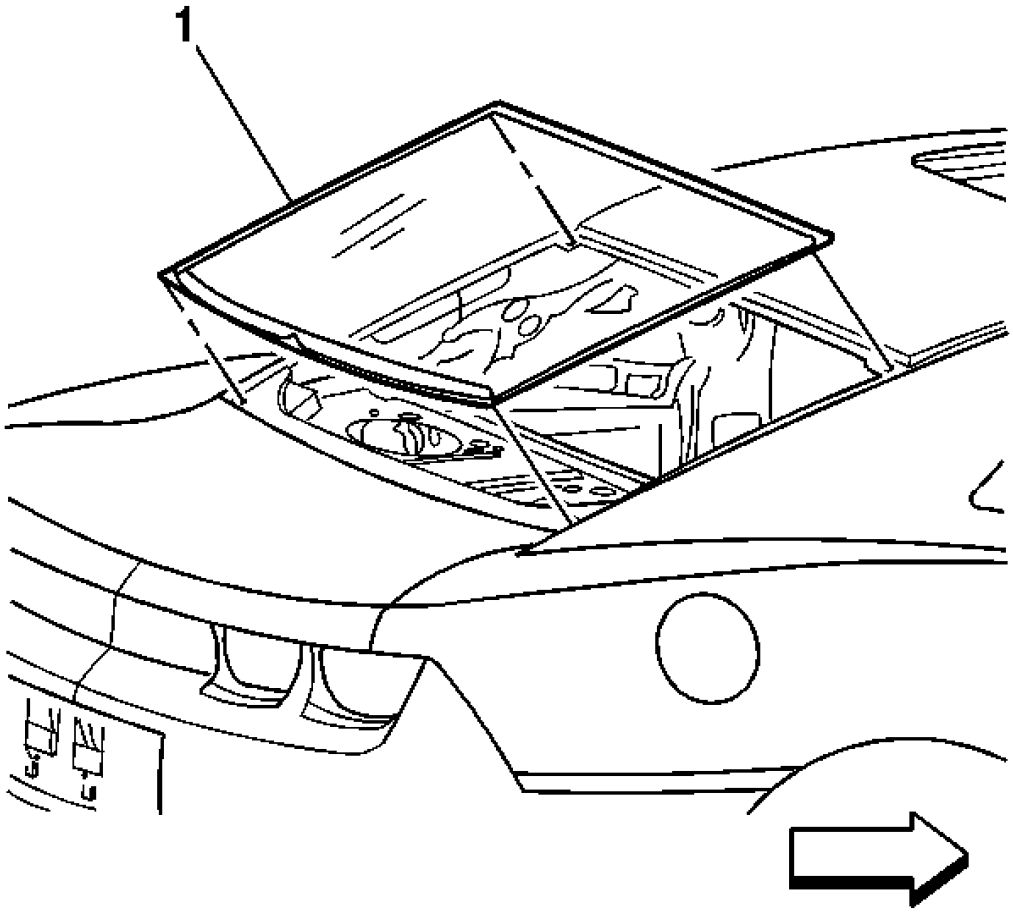


Fig. 21: Rear Window
Courtesy of GENERAL MOTORS CORP.

8. With the aid of an assistant lift the rear window (1) from the opening.

Installation Procedure

1. Install the rear window into the opening. Refer to **Adhesive Installation of Rear Windows**.
2. Install the rear window lower seal.
3. Connect the rear window defogger electrical connectors.
4. Close the rear compartment lid.
5. Remove the double layer of masking tape around the perimeter of the painted surfaces and the interior trim.

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FRONT SIDE DOOR WINDOW SWITCH REPLACEMENT

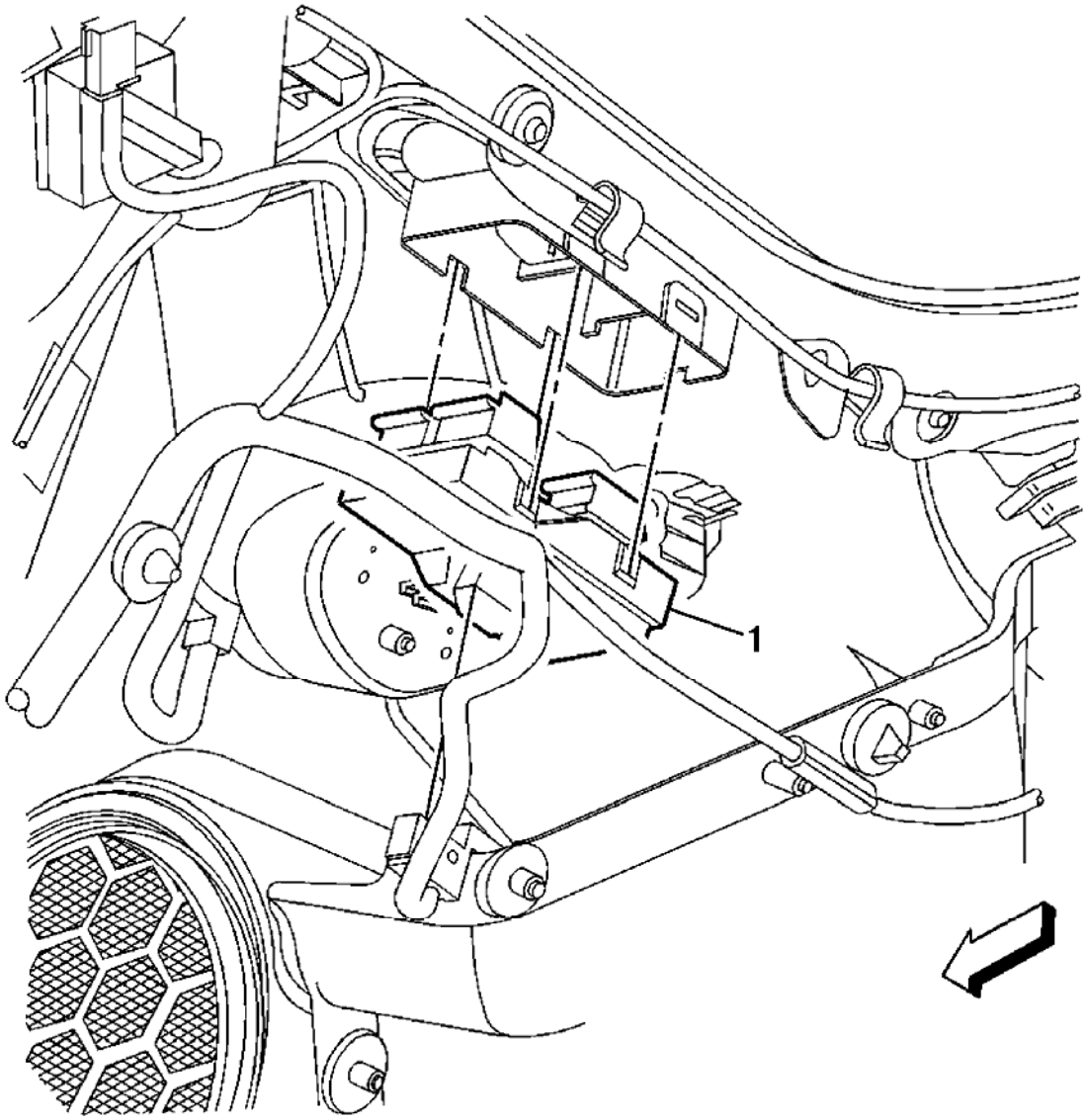


Fig. 22: Front Side Door Window Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Window Switch Assembly **Tip:** Use a flat bladed tool to release the switch from the trim panel.

FRONT SIDE DOOR WINDOW REGULATOR REPLACEMENT

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Removal Procedure

1. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .
2. Remove the water deflector.
3. Remove the door window switch from the door trim panel. Refer to **Front Side Door Window Switch Replacement**.

   Reinstall the window switch to the door harness this will allow you to operate the door window.

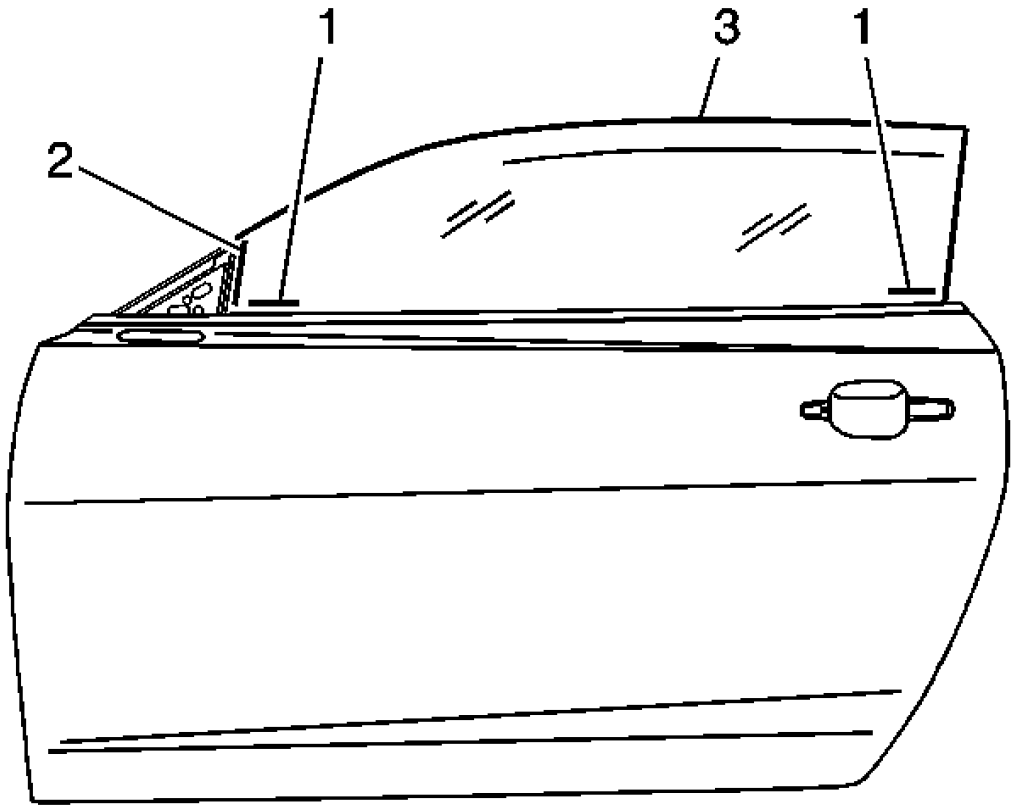


Fig. 23: Outer Reveal Belt Seal & Mirror Patch
Courtesy of GENERAL MOTORS CORP.

4. Locate the outer reveal belt seal (1) and mirror patch (2), mark the window (3) in 3 places for the initial window position before adjustments are performed. These marks will aid in positioning the window to the desired location during adjustment.

WARNING: Refer to Glass and Sheet Metal Handling Warning .

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5. Remove the front side door window. Refer to **Front Side Door Window Replacement**.
6. Mark all locations of the bolts/nuts and the window when removing the regulator. To ensure proper alignment when installing the window regulator later.
    1. Rear rail lower nut.
    2. Front rail lower nut.

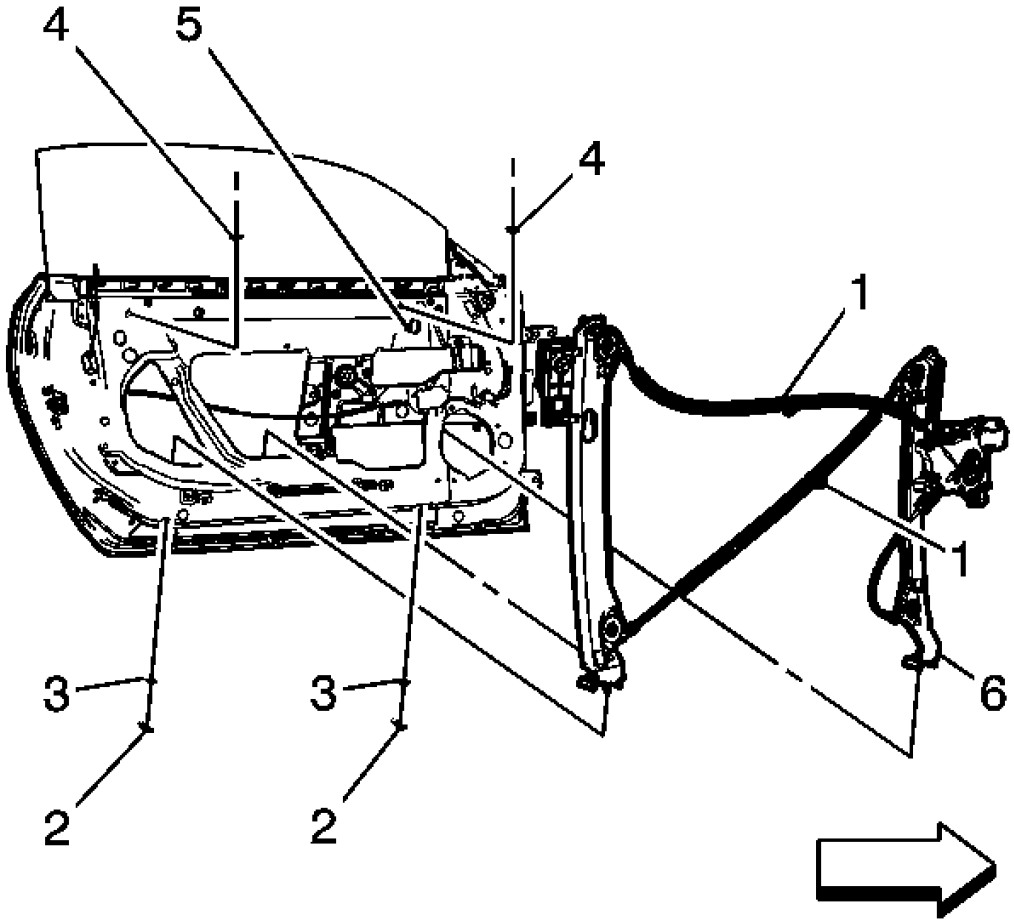


Fig. 24: Front Side Door Window Regulator Components
Courtesy of GENERAL MOTORS CORP.

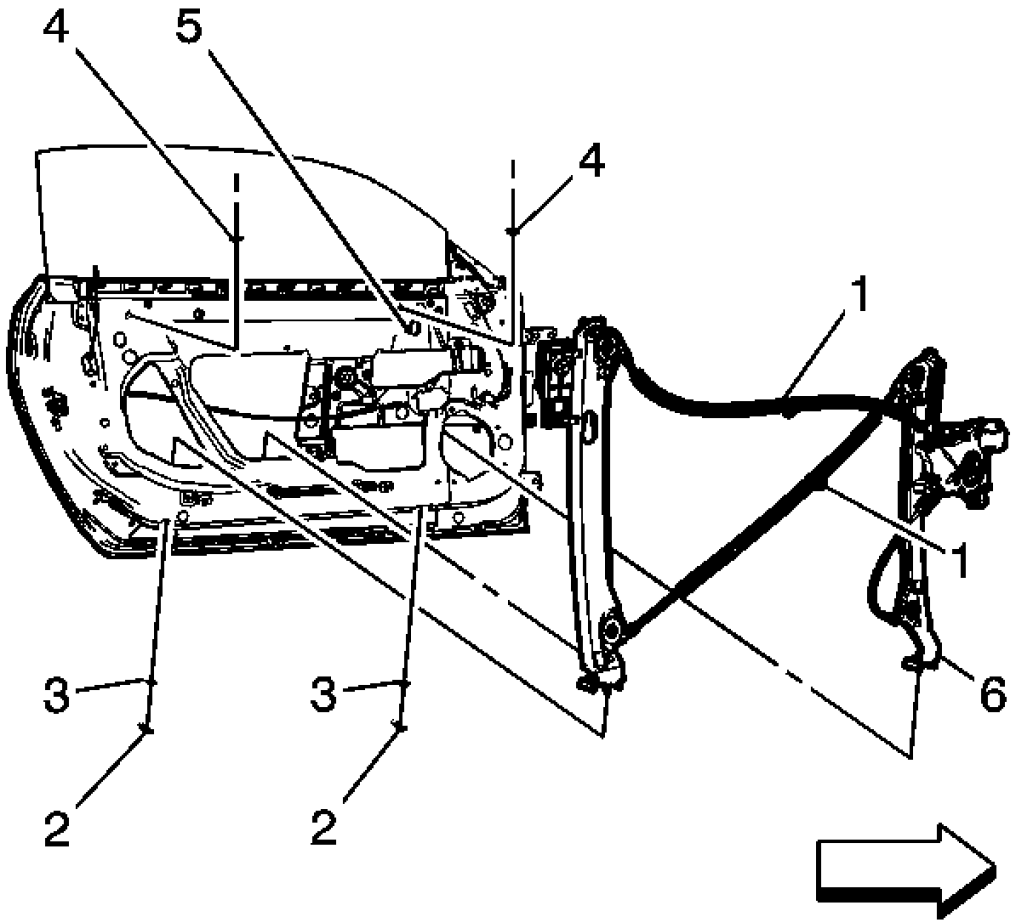
7. Remove the front side door window regulator cable retainers (1).
8. Remove the front side door window regulator nut covers (2) located at the bottom of the door.
9. Remove the front side door window regulator lower nuts (3) located at the bottom of the door.

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10. Remove The front side door window regulator upper nuts (4).
11. Remove the front side door window regulator motor bolt (5).
12. Disconnect the electrical from the motor.
13. Remove the window regulator from the door.

Installation Procedure

1. Transfer the window regulator motor to the new regulator. Refer to **Front Side Door Window Regulator Motor Replacement**.
2. Install the window regulator to the door as follows:
    1. Rear rail lower nut.
    2. Front rail lower nut.



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Fig. 25: Front Side Door Window Regulator Components
Courtesy of GENERAL MOTORS CORP.

3. Place the window regulator bolts/nuts with the align up marks in step 4 of the removal, to ensure proper alignment

CAUTION: Refer to Fastener Caution

4. Install the front side door window regulator upper nuts (4).

   Tighten: Tighten the to window regulator upper nuts 10 N.m (89 lb in).

5. Install the front side door window regulator lower nuts (3) to the marks 4 located at the bottom of the door.

   Tighten: Tighten the to window regulator upper nuts 10 N.m (89 lb in).

6. Install the front side door window regulator motor bolt (5).

   Tighten: Tighten the to window regulator bolt 10 N.m (89 lb in).

7. Install the front side door window regulator cable retainers (1).
8. Install the front side door window regulator nut covers (2) located at the bottom of the door.
9. Connect the electrical to the motor.

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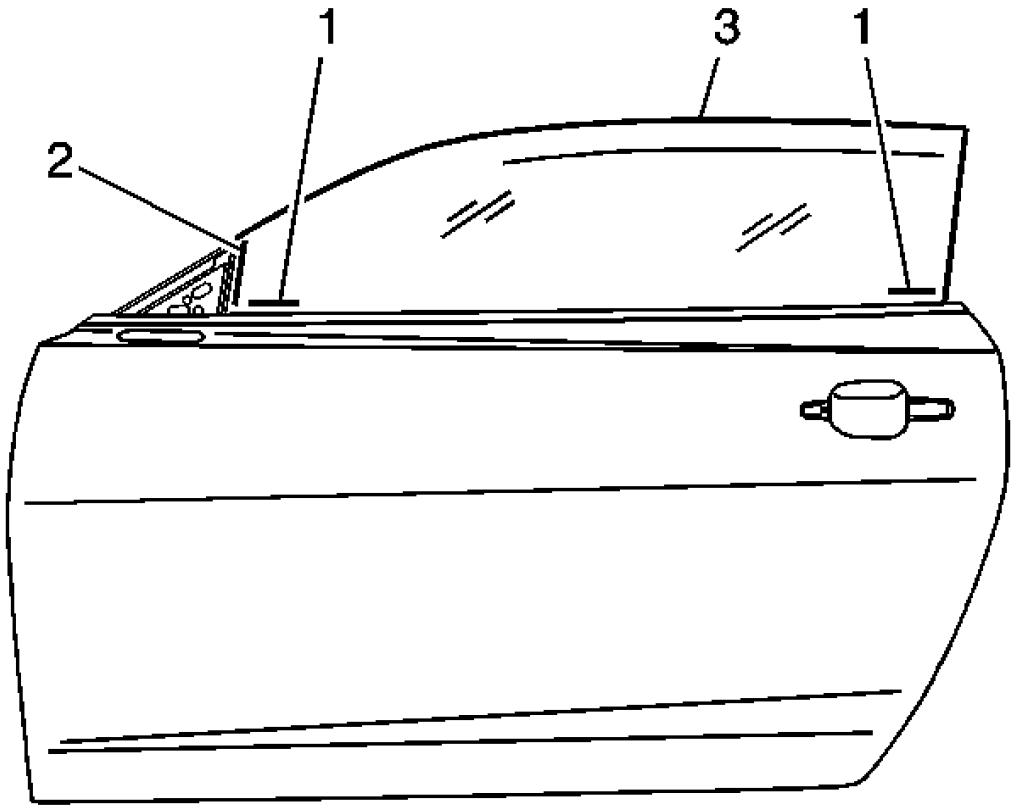


Fig. 26: Outer Reveal Belt Seal & Mirror Patch
Courtesy of GENERAL MOTORS CORP.

WARNING: Refer to Glass and Sheet Metal Handling Warning .

10. Align the front side door window (3) using the marks taken in step 6 of the removal. Refer to **Front Side Door Window Replacement**.
11. Tighten the regulator clamps to the window when the marks align.
12. After all adjustment are completed, the regulator clamps bolts are tightened, pull the outside handle to release the door latch bolt before closing the door.
13. Inspect the window for proper operation in the open and closed position before installing the door trim panel.
14. Install the water deflector.
15. Install the window switch to the door trim panel. Refer to **Front Side Door Window Switch Replacement**.

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16. Install the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .
17. Clean the door window.

FRONT SIDE DOOR WINDOW REGULATOR MOTOR REPLACEMENT

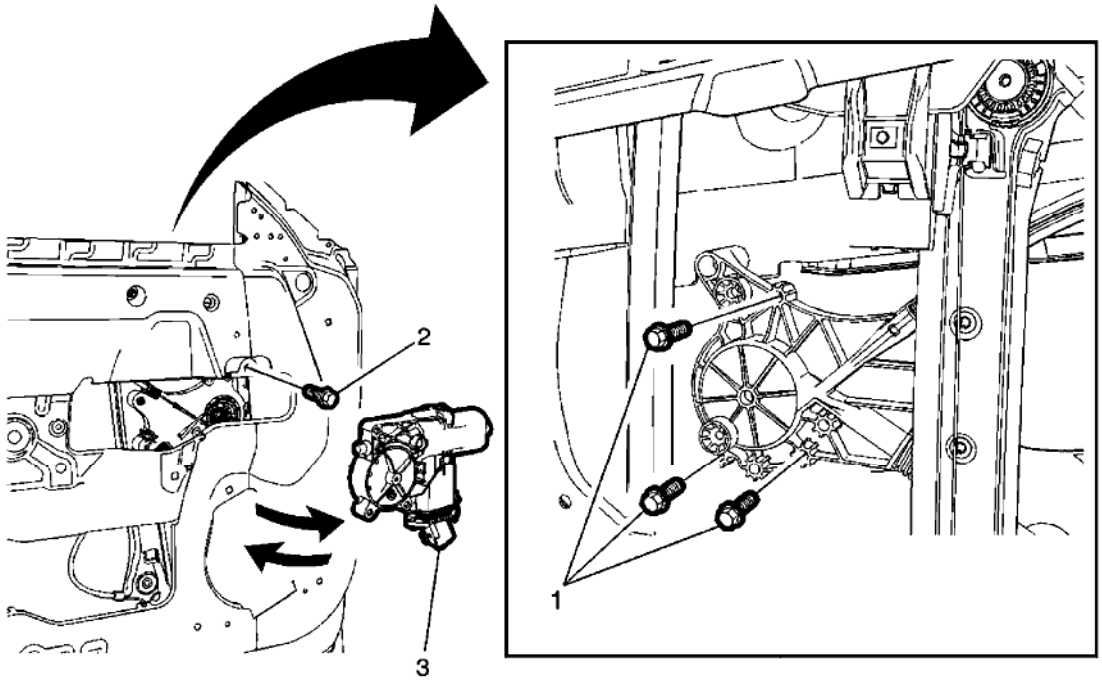


Fig. 27: Front Side Door Window Regulator Motor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Disconnect the power window switch when working inside the driver door. When operated, the Express Up/Down Feature allows the door window to move very quickly, without stopping, which could cause personal injury.** **Preliminary Procedures:** Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** Do Not remove the window from door or regulator.	
1	Front Side Door Window Regulator Motor Bolt (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Place the window in the full up position.

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	2. Remove the water deflector. 3. Disconnect the window regulator motor electrical connector. 4. Remove the front lower door speaker to access the window regulator motor bolts. Refer to **Radio Front Side Door Speaker Replacement** . 5. On the outboard side of the regulator motor locate and remove the three internal torques head bolts that hold the motor to regulator. **Tighten:** 10 N.m (89 lb in)
2	Front Side Door Window Regulator Top Bolt **Procedure:** Remove the window regulator top right attachment bolt, push the regulator slightly outboard and remove the regulator motor through the speaker opening. **Tighten:** 10 N.m (89 lb in)
3	Front Side Door Window Regulator Motor **Procedure** 1. When installing the regulator motor ensure that the gear washer is in place. 2. Inspect the door window for proper operation before installing the door trim panel. 3. After replacing the window regulator motor, it is necessary to reprogram. Refer to **Window Regulator Motor Programming and Setup** .

FRONT SIDE DOOR WINDOW INNER SEALING STRIP REPLACEMENT

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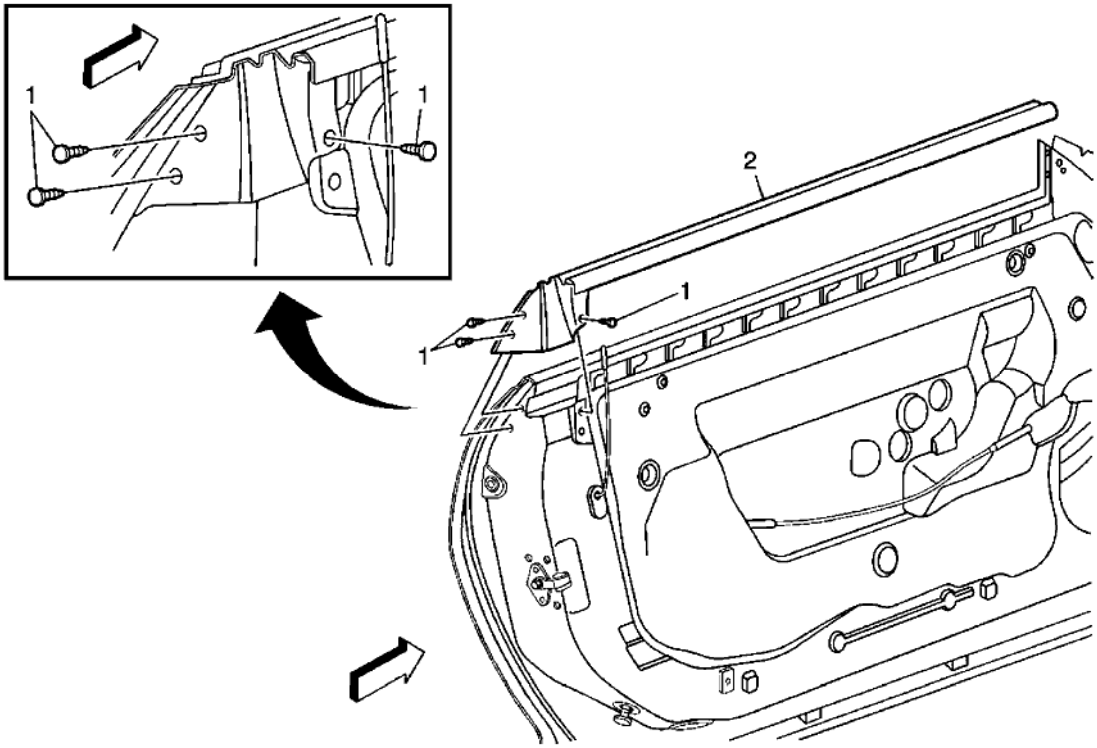


Fig. 28: Front Side Door Window Inner Sealing Strip
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the interior trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Window Inner Sealing Strip Retainers (Qty: 3)
2	Front Side Door Window Inner Sealing Strip **Procedure:** Inspect the door for proper operation before installing the door trim panel. **Tip:** Pull up and away from inner panel to remove from the door.

FRONT SIDE DOOR WINDOW BELT REVEAL MOLDING REPLACEMENT

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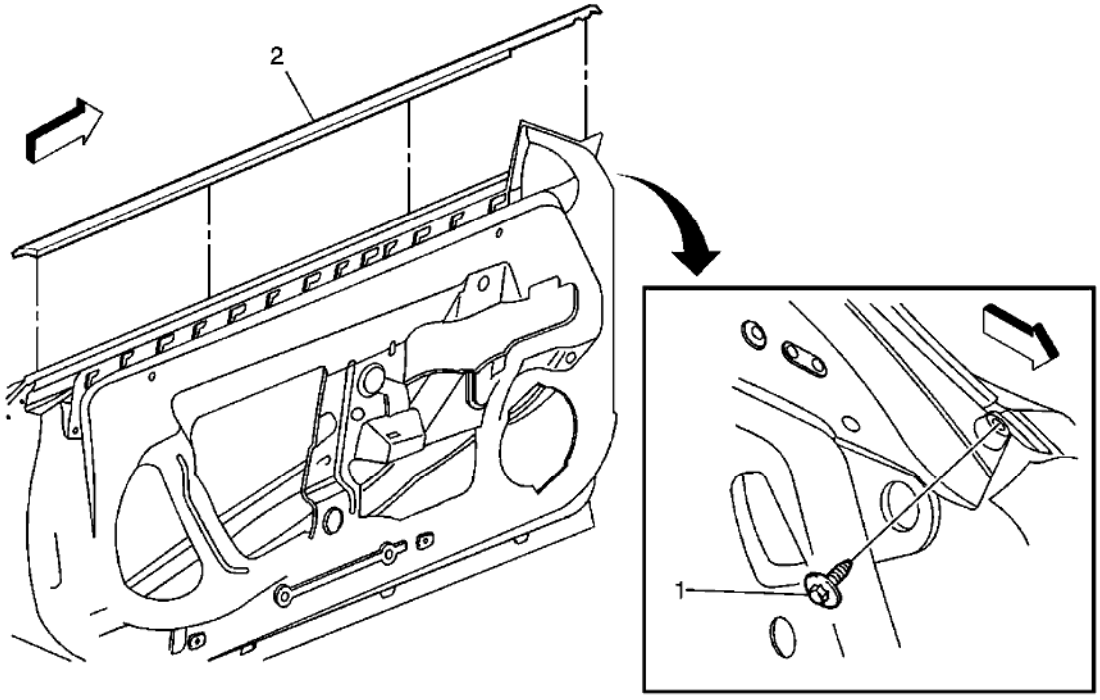


Fig. 29: Front Side Door Window Belt Reveal Molding
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the outside rearview mirror. Refer to **Outside Rearview Mirror Replacement**	
1	Front Side Door Window Belt Reveal Molding Fastener **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Remove the three retaining screws and the fin trim to remove the sealing strip. **Tighten:** 1 N.m (9 lb in)
2	Front Side Door Belt Reveal Molding **Procedure:** Inspect the door for proper operation before installing the door trim panel. **Tip:** Pull the outer sealing strip up and away from the upper door flange.

ADHESIVE INSTALLATION OF WINDSHIELDS

1. Use a urethane adhesive systems which meet GM Specification GM 3651G

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WARNING: Refer to Glass and Sheet Metal Handling Warning .

2. Remove all mounds or loose pieces of urethane adhesive from the pinch-weld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinch-weld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
   - High weld
   - Solder spots on the pinchweld
   - Hardened sealer
   - Any other obstruction or irregularity in the pinch-weld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15®, DuPont 2610®, Sherwin-Williams PSE 4600 and NP70® and Martin-Semour 5120 and 5130® PPG DP90LF SPIES/ HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
   1. Remove all traces of broken glass from the outer cowl panel, seats, floor and defroster ducts.
   2. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.

WARNING: Refer to Window Retention Warning .

6. Verify all primers and urethane adhesive are within expiration dates.

WARNING: Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

NOTE: Do not apply the black #3 primer to the existing bead of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.

7. Shake the pinch-weld primer black #3 for at least 1 minute.
8. Use a new dauber in order to apply the primer to the surface of the pinch-weld flange.

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9. Allow the pinch-weld primer to dry for approximately 10 minutes.

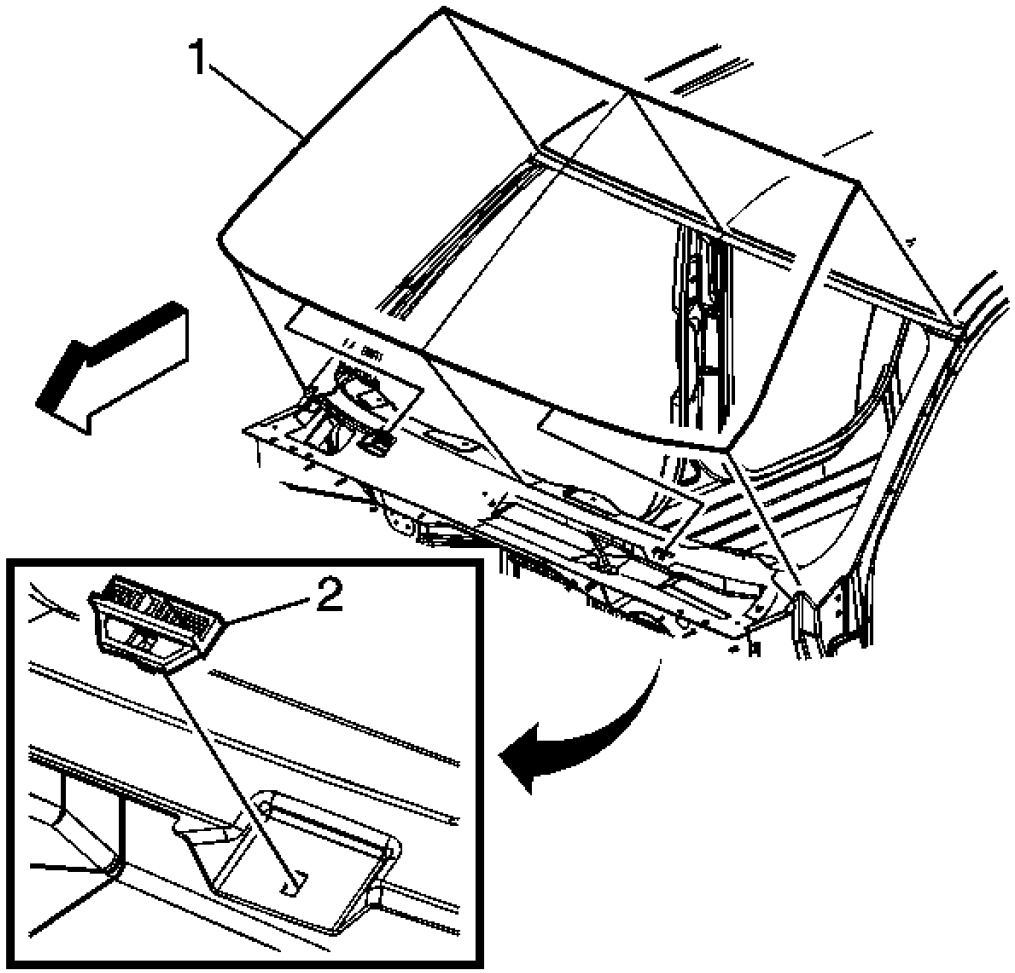


Fig. 30: Dry Fitting Window
Courtesy of GENERAL MOTORS CORP.

10. With the aid of an assistant, dry fit the window (1) to the opening in order to determine the correct position.

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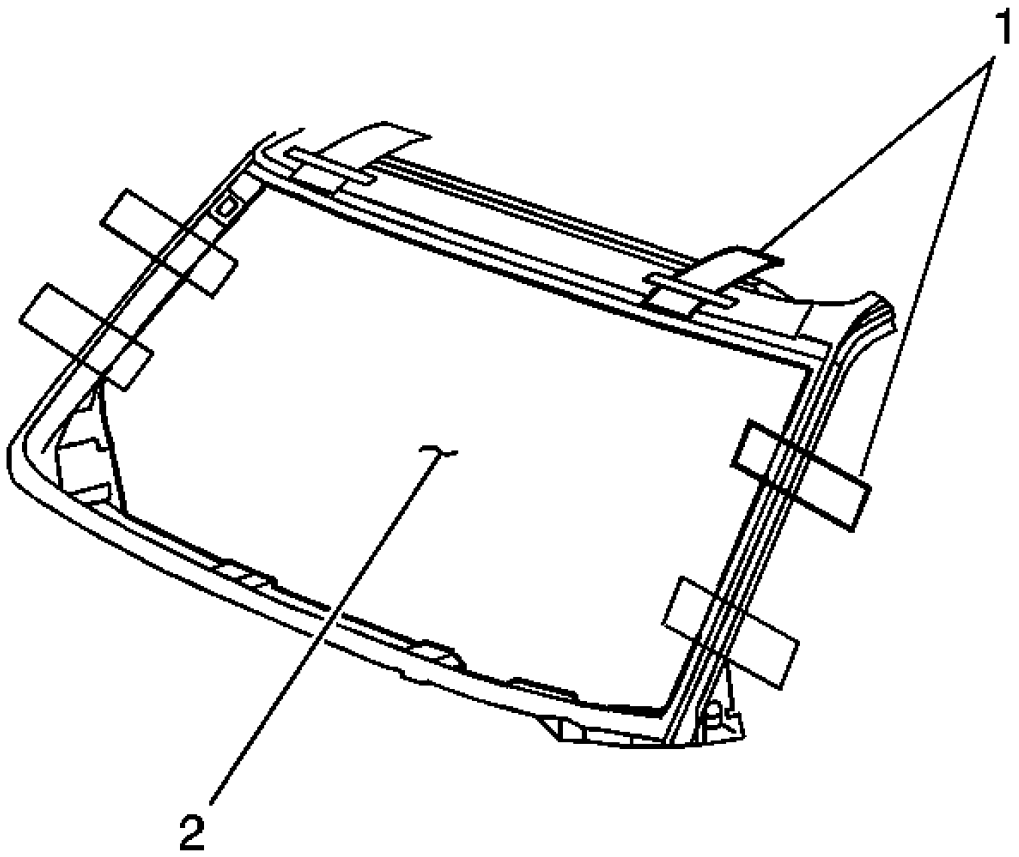


Fig. 31: Marking Locations Of Window
Courtesy of GENERAL MOTORS CORP.

11. Use masking tape in order to mark the locations (1) of the window (2) in the opening.
12. Cut the masking tape in the center and remove the window from the opening.

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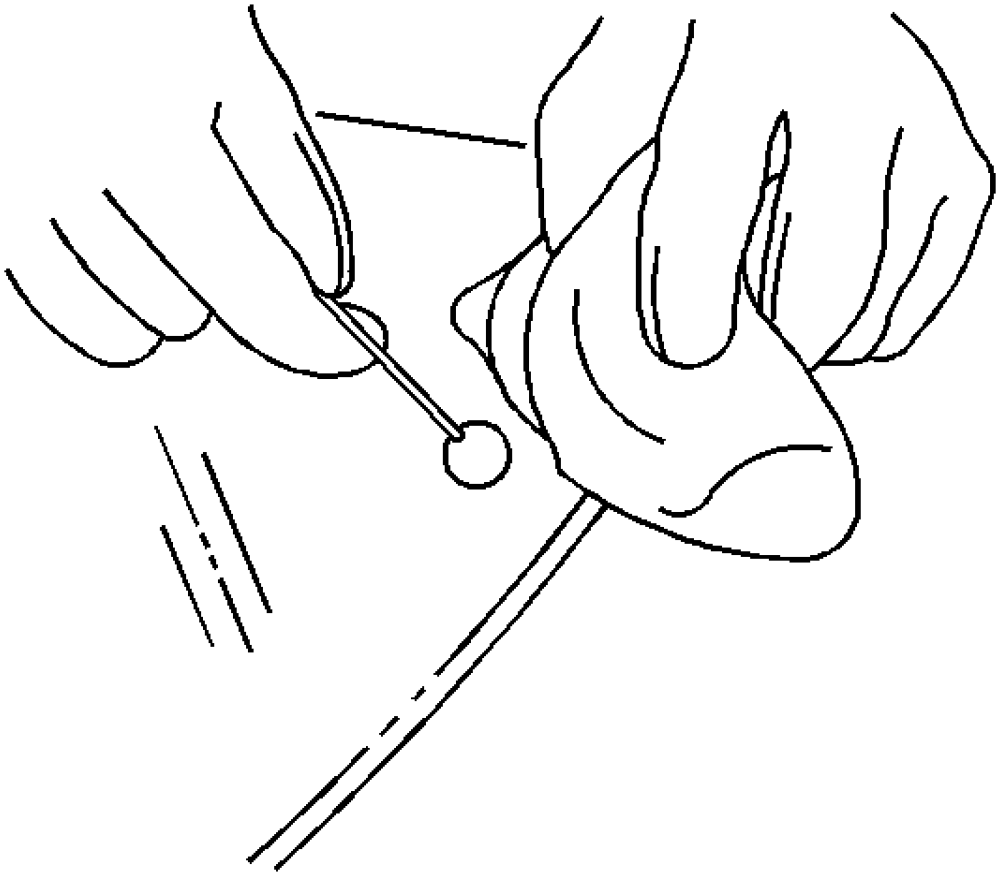


Fig. 32: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

NOTE: Use care when applying glass prep clear #1 on the window. This primer dries almost instantly, and may stain the viewing area of the window if not applied evenly.

13. Use a new dauber in order to apply glass prep clear #1 to the area approximately 10-16 mm (3/8-5/8 in) around the entire perimeter of the window inner surface.

    Immediately wipe the glass primed area using a clean, lint-free cloth.

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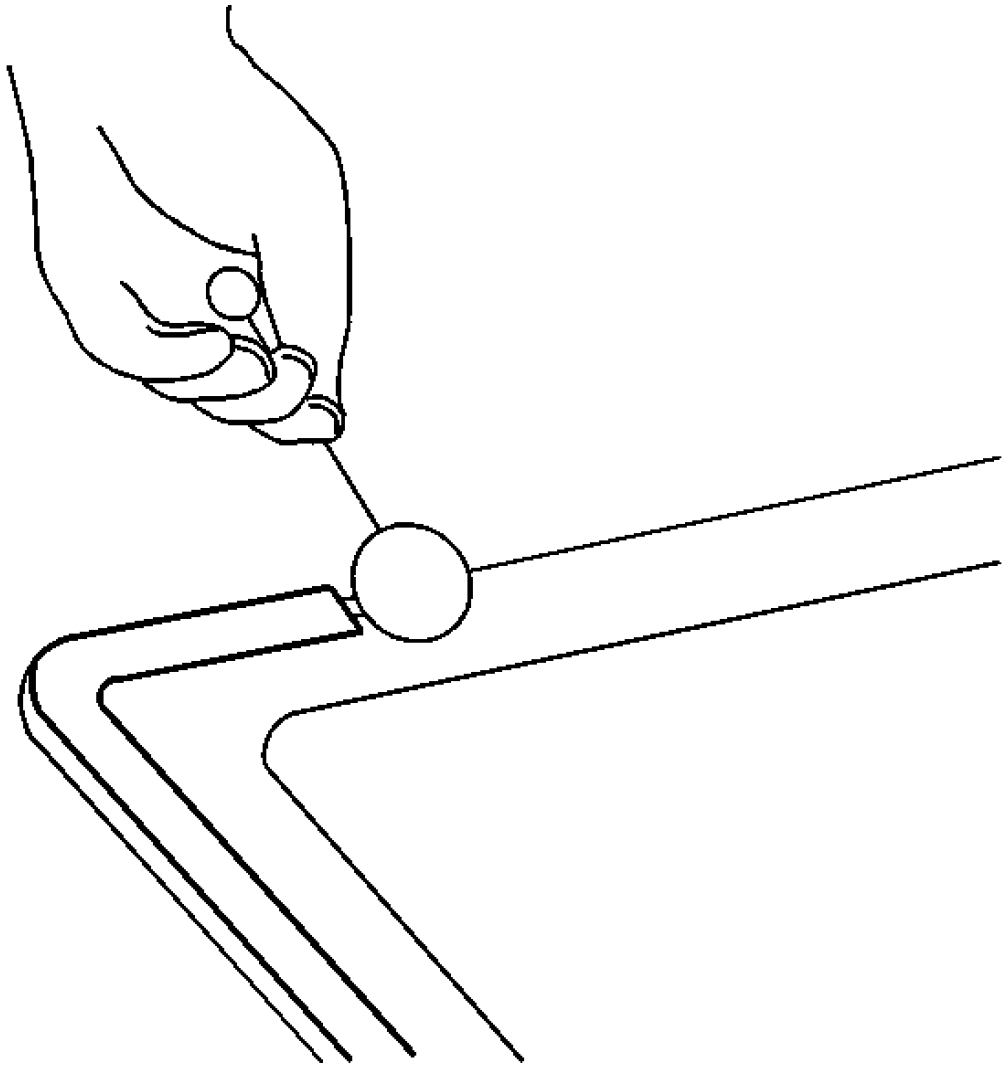


Fig. 33: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

14. Apply a second coat of the glass prep clear #1 to the same area of the glass.

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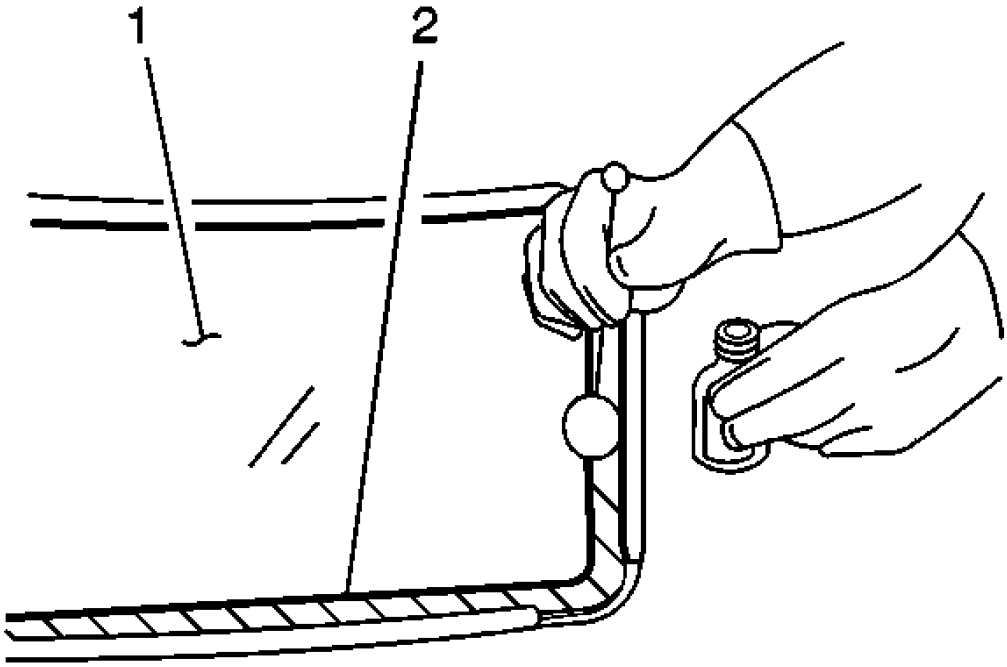


Fig. 34: Applying Glass Primer
Courtesy of GENERAL MOTORS CORP.

NOTE: The glass primer black #2 is effective up to 8 hours after applying it to the glass. The primed surface of the glass must be kept clean.

15. Shake the glass primer black #2 for at least 1 minute.
16. Use a new dauber in order to apply the glass primer black #2 to the same areas (2) that glass prep clear #1 was applied.
17. Allow the glass primer to dry for approximately 10 minutes.

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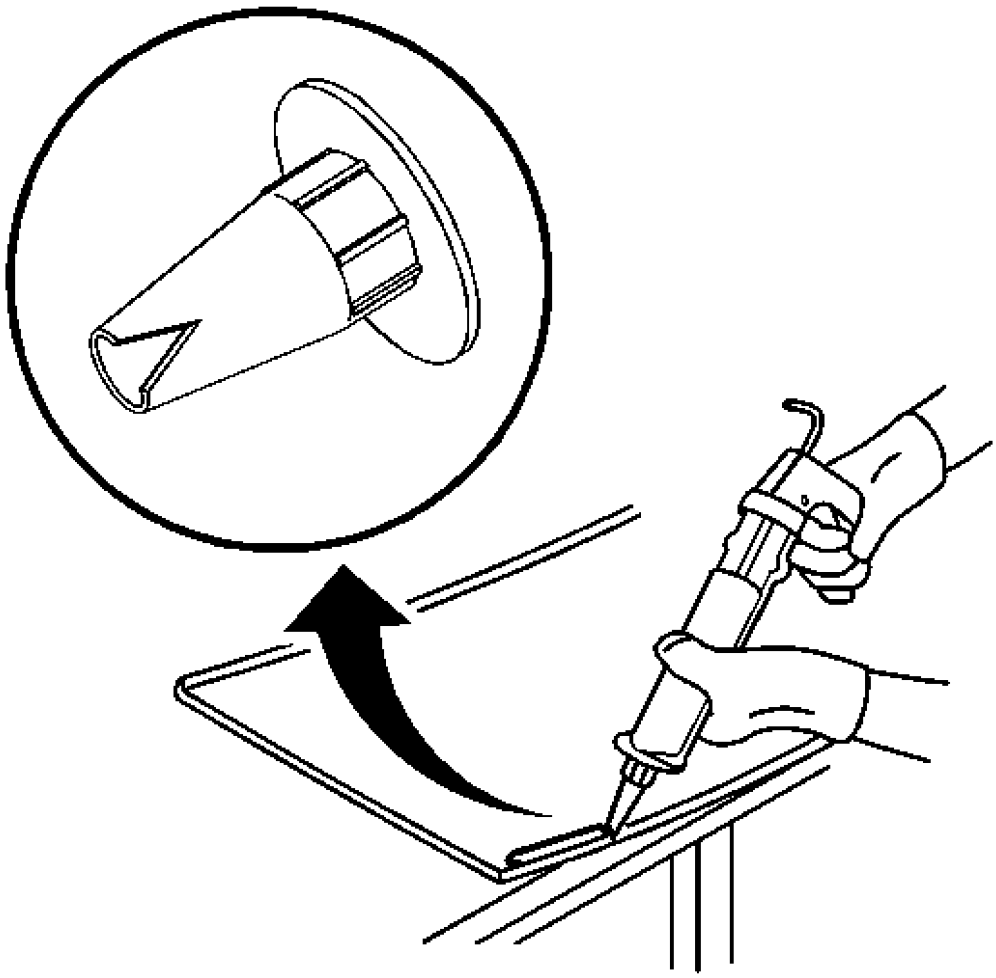


Fig. 35: View Of Modified Applicator Nozzle
Courtesy of GENERAL MOTORS CORP.

18. Cut the applicator nozzle in order to provide a bead of 8 mm (0.316 in) wide and 12.7 mm (1/2 in) high.

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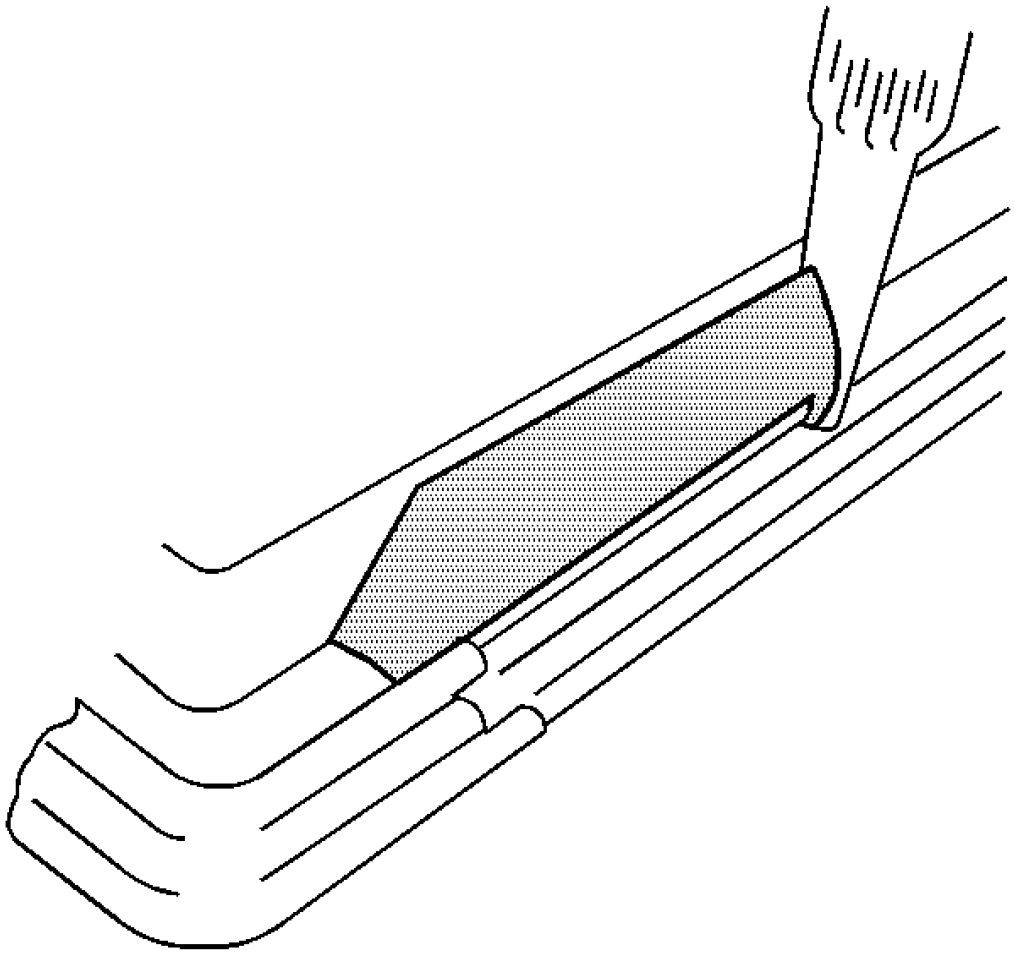


Fig. 36: Applying Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS CORP.

19. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.

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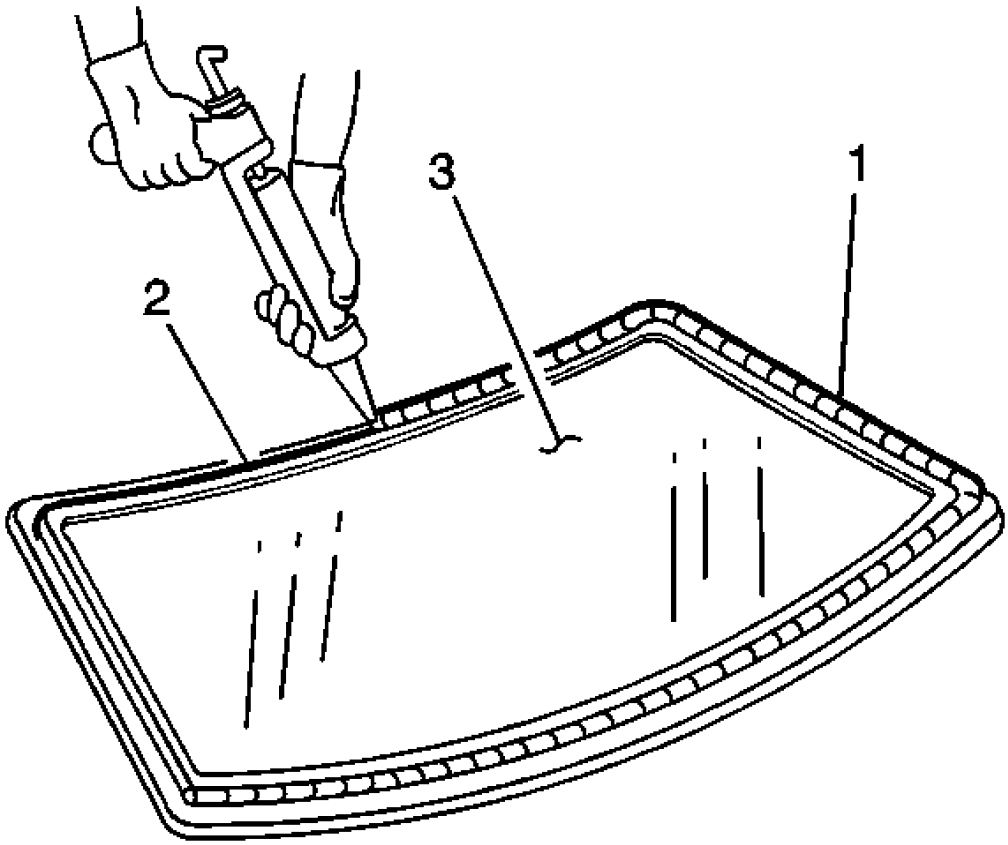


Fig. 37: Applying Urethane Adhesive To Inner Surface Of Window
Courtesy of GENERAL MOTORS CORP.

20. Use the edge of the window as a guide for the nozzle in order to apply the urethane adhesive (1) to the inner surface of the window (3).

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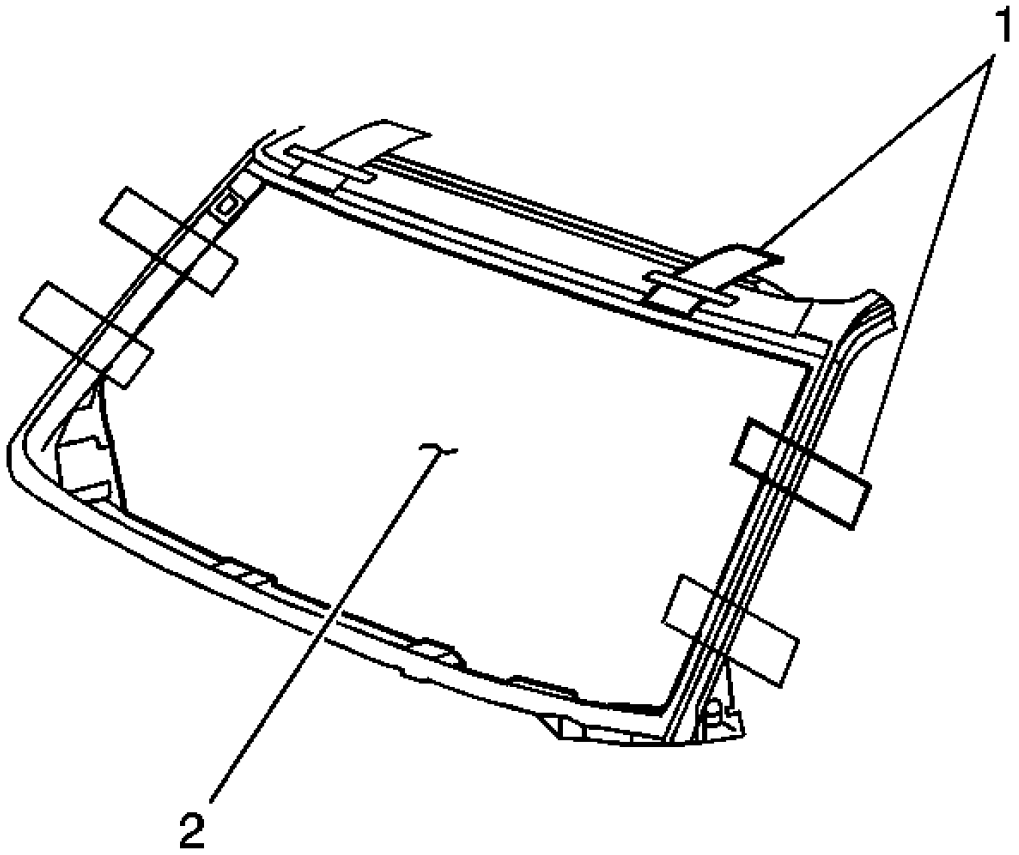


Fig. 38: Marking Locations Of Window
Courtesy of GENERAL MOTORS CORP.

21. Align the masking tape (1) lines on the window (2) and the body.

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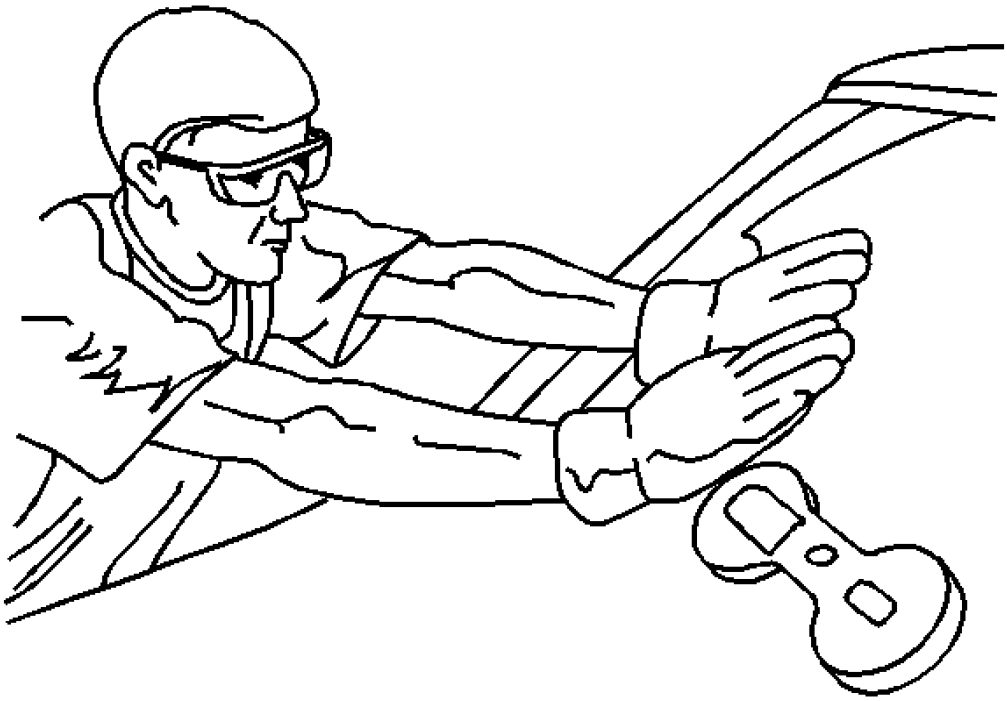


Fig. 39: Pressing Window Into Place
Courtesy of GENERAL MOTORS CORP.

22. Press the window firmly into place.
23. Tape the window to the body in order to minimize movement until the urethane adhesive cures.

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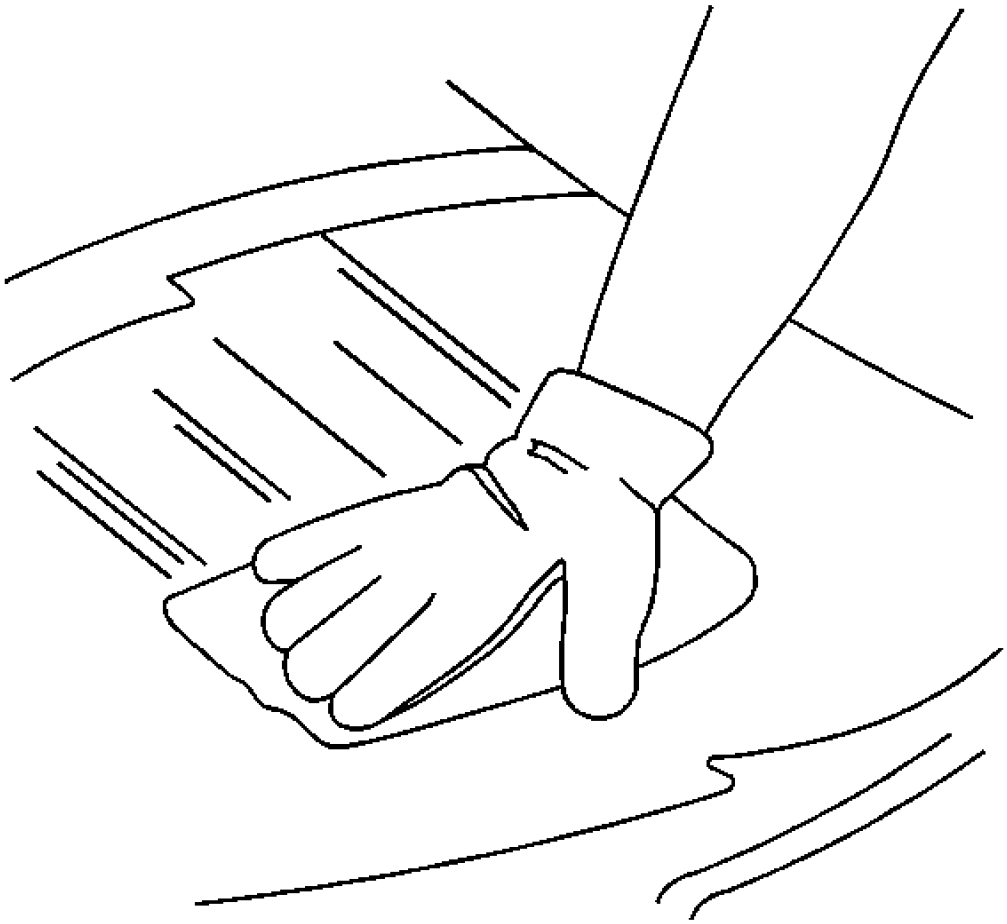


Fig. 40: Cleaning Excess Urethane Adhesive From Body
Courtesy of GENERAL MOTORS CORP.

24. Clean any excess urethane adhesive from the body.

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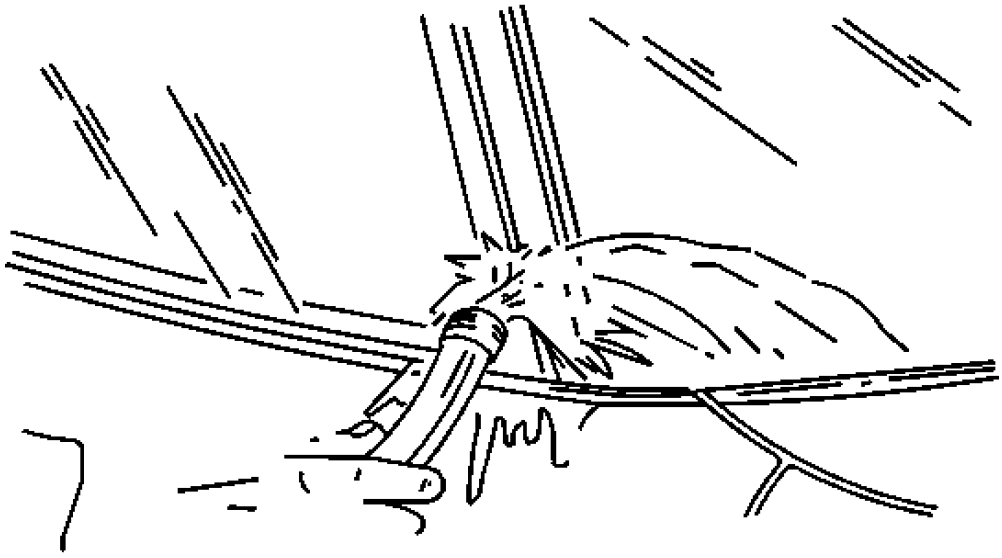


Fig. 41: Performing Water Hose Test
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

25. Use a soft spray of warm water in order to immediately water test the window.
26. Inspect the window for leaks.
27. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
28. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- **For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.**
- **For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.**

Do NOT physically disturb the repair area until after these minimum

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times have elapsed.

29. Maintain the following conditions in order to properly cure the urethane adhesive:
    - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
    - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.
    - Do not use compressed air in order to dry the urethane adhesive.
30. Complete the window installation.

ADHESIVE INSTALLATION OF BODYSIDE STATIONARY WINDOWS

1. Use a urethane adhesive systems which meet GM Specification GM 3651G

WARNING: Refer to Glass and Sheet Metal Handling Warning .

2. Remove all mounds or loose pieces of urethane adhesive from the pinch-weld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinch-weld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
    - High weld
    - Solder spots on the pinchweld
    - Hardened sealer
    - Any other obstruction or irregularity in the pinch-weld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15®, DuPont 2610®, Sherwin-Williams PSE 4600 and NP70® and Martin-Semour 5120 and 5130® PPG DP90LF SPIES/ HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
    1. Remove all traces of broken glass from the outer cowl panel, seats, floor and defroster ducts.
    2. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.

WARNING: Refer to Window Retention Warning .

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6. Verify all primers and urethane adhesive are within expiration dates.

WARNING: Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

NOTE: Do not apply the black #3 primer to the existing bead of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.

7. Shake the pinch-weld primer black #3 for at least 1 minute.
8. Use a new dauber in order to apply the primer to the surface of the pinch-weld flange.
9. Allow the pinch-weld primer to dry for approximately 10 minutes.
10. With the aid of an assistant, dry fit the window to the opening in order to determine the correct position.
11. Use masking tape in order to mark the locations of the window in the opening.
12. Cut the masking tape in the center and remove the window from the opening.

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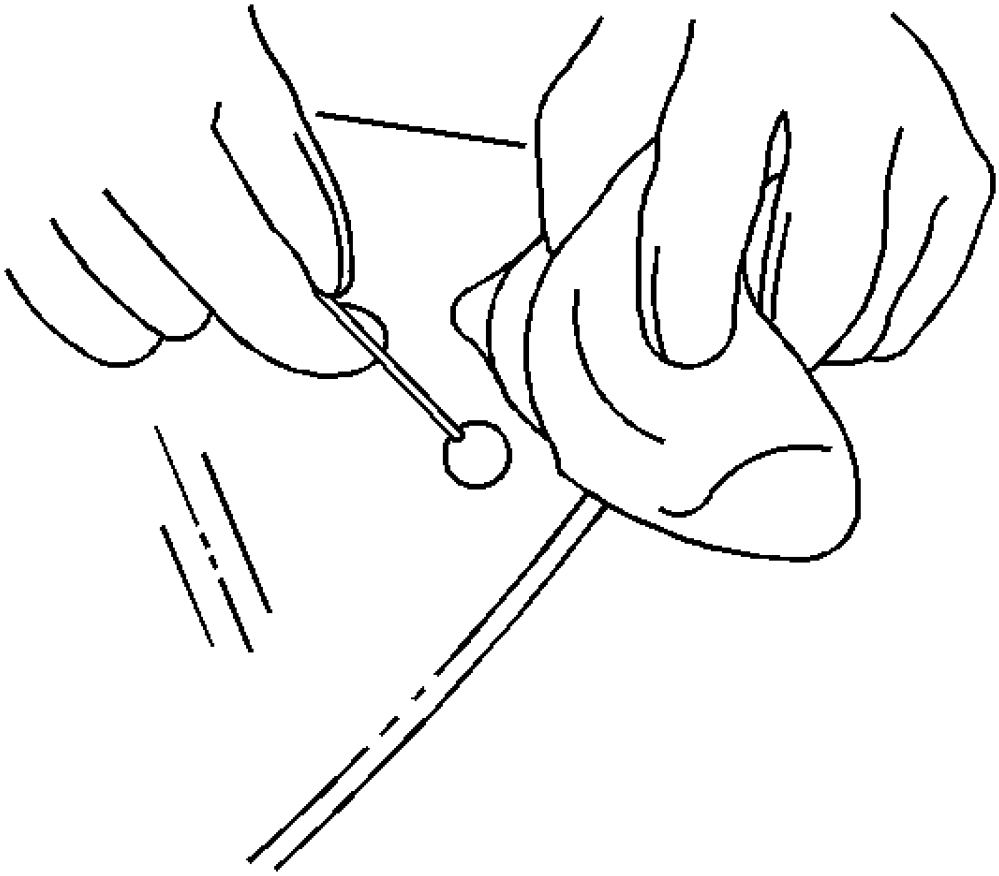


Fig. 42: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

NOTE: Use care when applying glass prep clear #1 on the window. This primer dries almost instantly, and may stain the viewing area of the window if not applied evenly.

13. Use a new dauber in order to apply glass prep clear #1 to the area approximately 10-16 mm (3/8-5/8 in) around the entire perimeter of the window inner surface.

    Immediately wipe the glass primed area using a clean, lint-free cloth.

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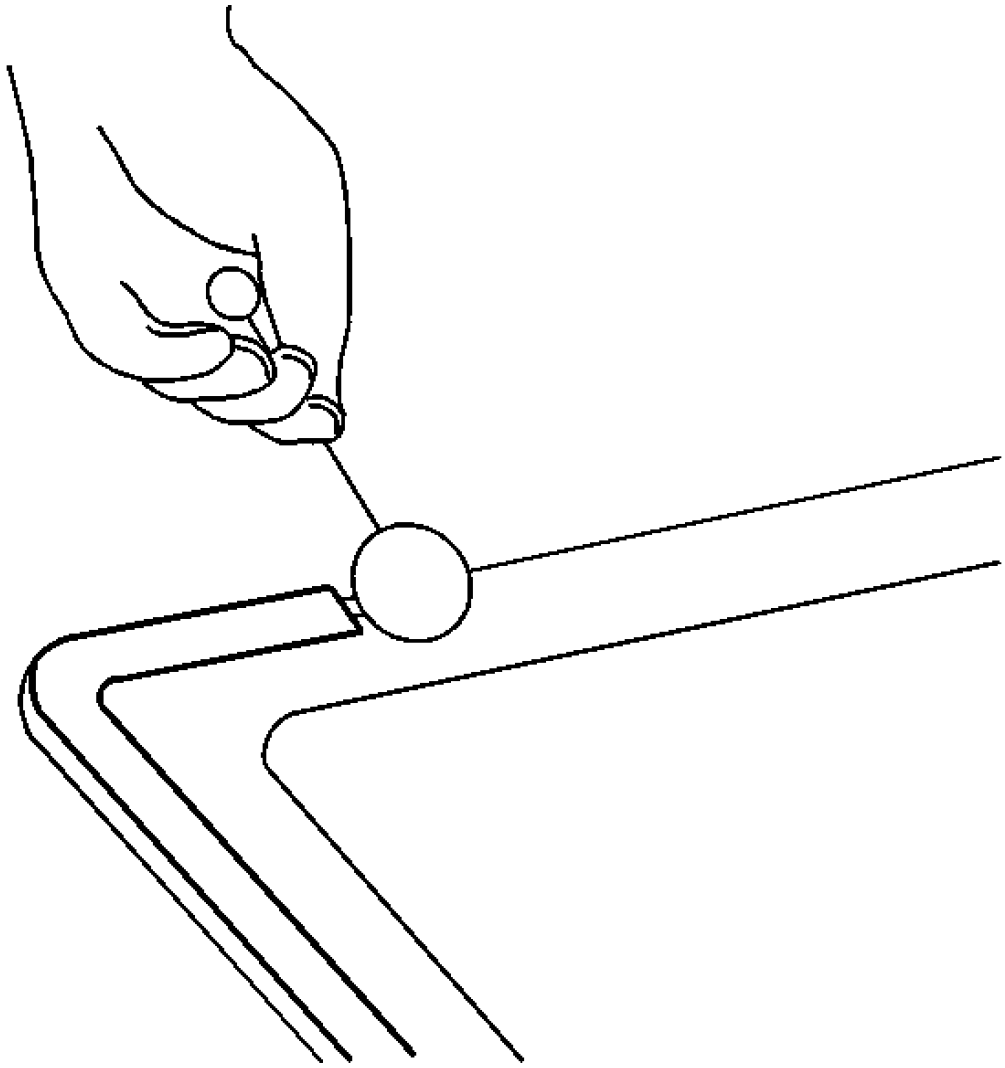


Fig. 43: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

14. Apply a second coat of the glass prep clear #1 to the same area of the glass.

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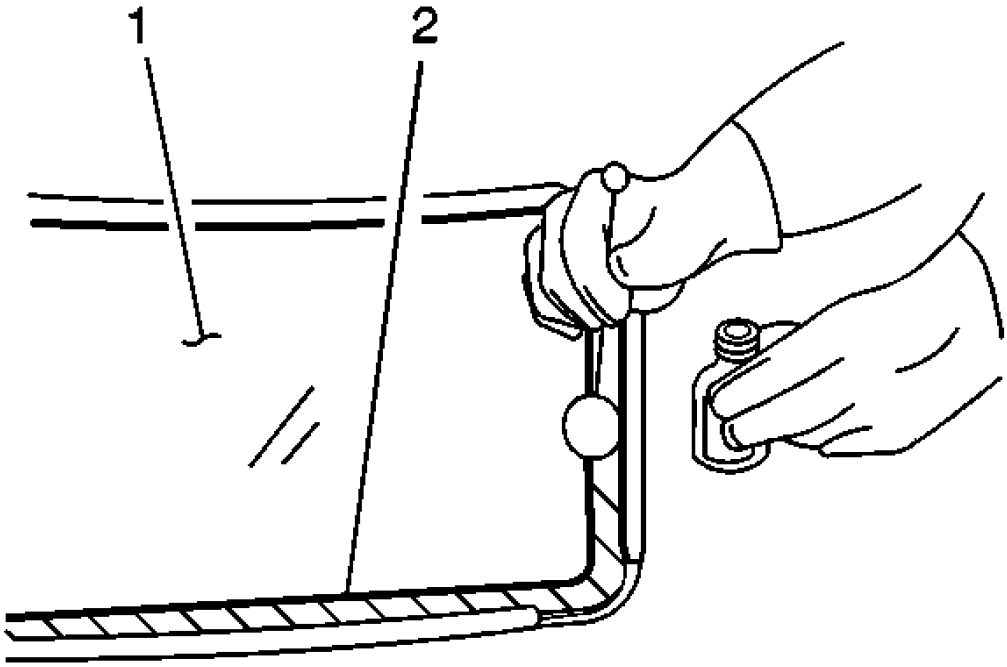


Fig. 44: Applying Glass Primer
Courtesy of GENERAL MOTORS CORP.

NOTE: The glass primer black #2 is effective up to 8 hours after applying it to the glass. The primed surface of the glass must be kept clean.

15. Shake the glass primer black #2 for at least 1 minute.
16. Use a new dauber in order to apply the glass primer black #2 to the same areas (2) that glass prep clear #1 was applied.
17. Allow the glass primer to dry for approximately 10 minutes.

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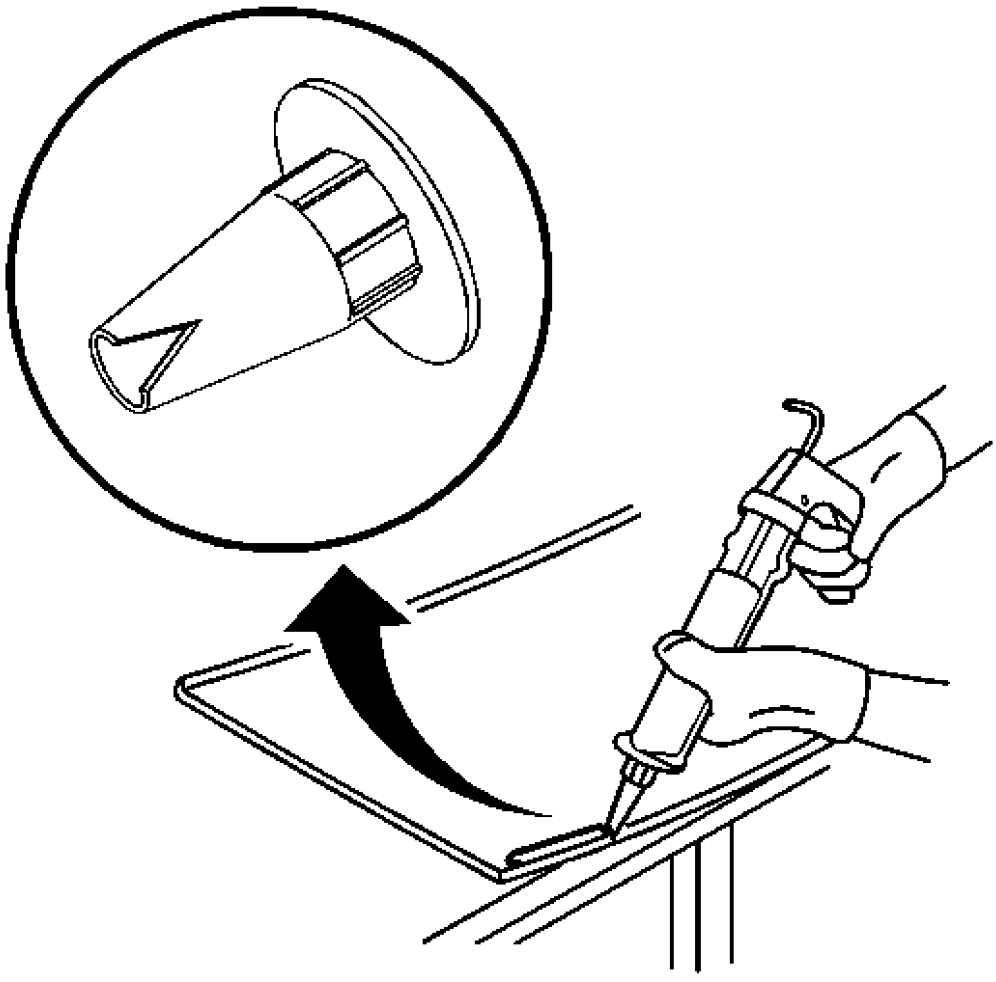


Fig. 45: View Of Modified Applicator Nozzle
Courtesy of GENERAL MOTORS CORP.

18. Cut the applicator nozzle in order to provide a bead of 8 mm (0.316 in) wide and 12.7 mm (1/2 in) high.

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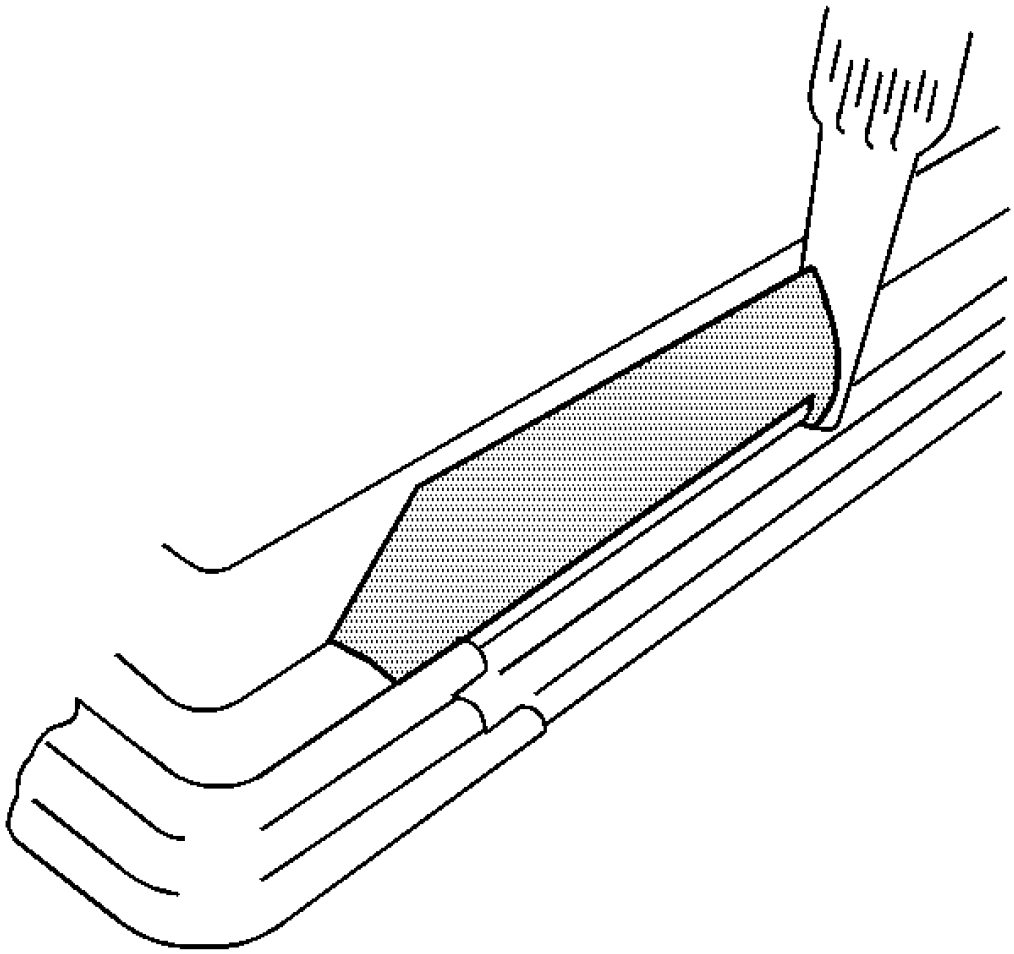


Fig. 46: Applying Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS CORP.

19. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.

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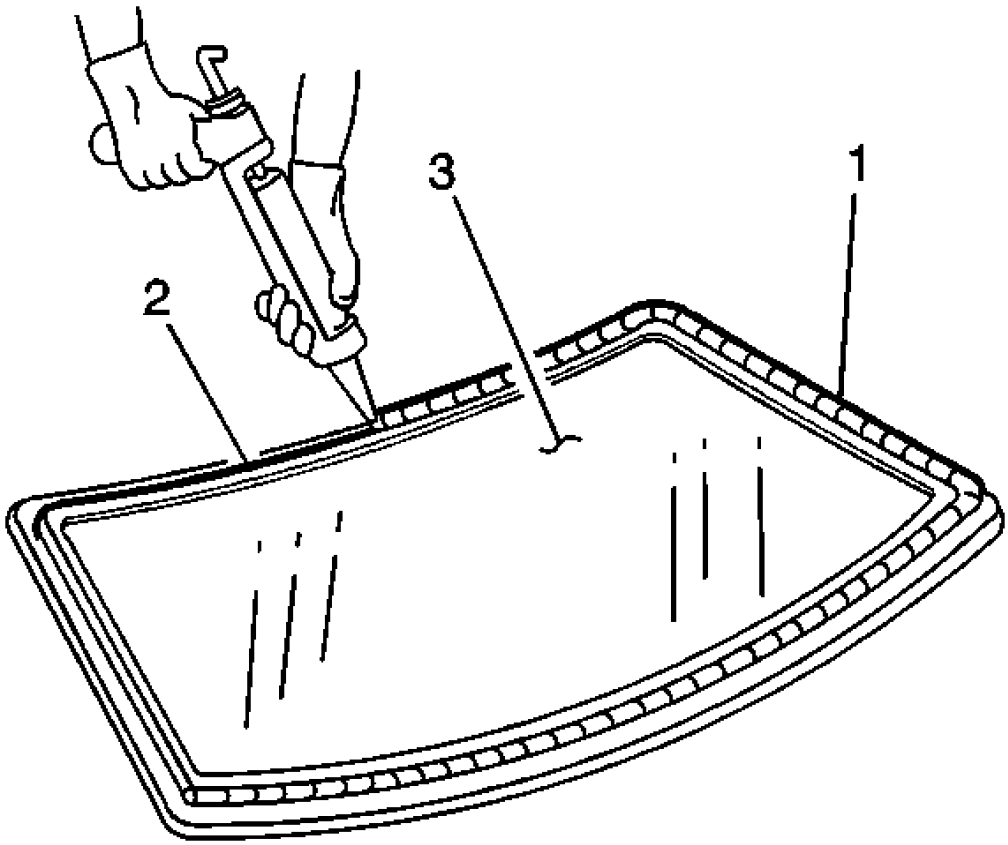


Fig. 47: Applying Urethane Adhesive To Inner Surface Of Window
Courtesy of GENERAL MOTORS CORP.

20. Use the edge of the window as a guide for the nozzle in order to apply the urethane adhesive (1) to the inner surface of the window (3).
21. Align the masking tape lines on the window and the body.

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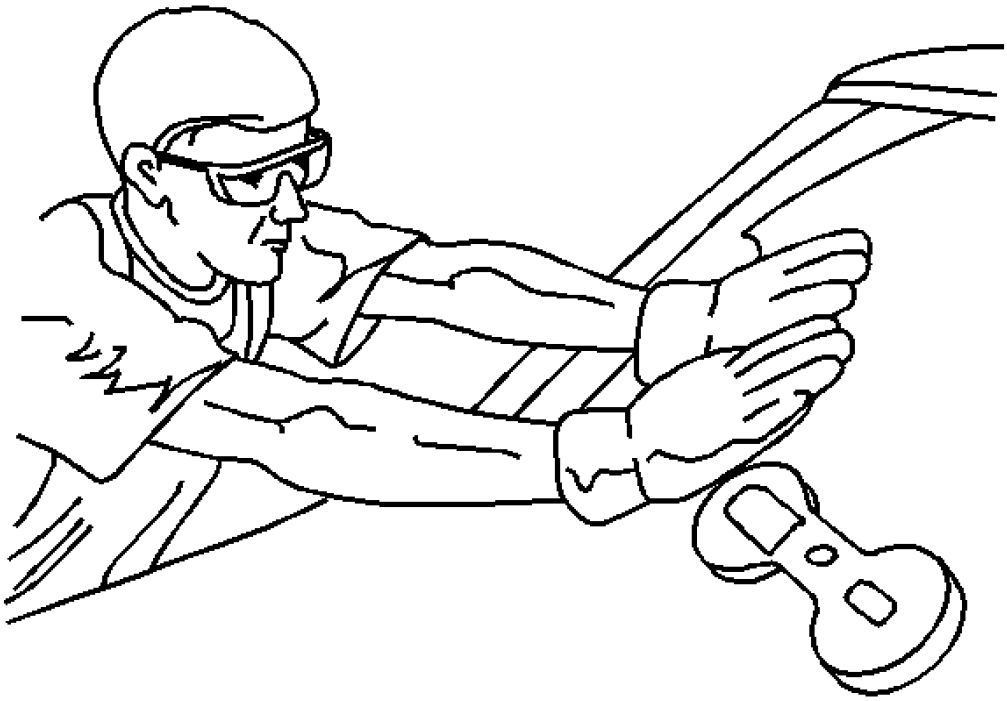


Fig. 48: Pressing Window Into Place
Courtesy of GENERAL MOTORS CORP.

22. Press the window firmly into place.
23. Tape the window to the body in order to minimize movement until the urethane adhesive cures.

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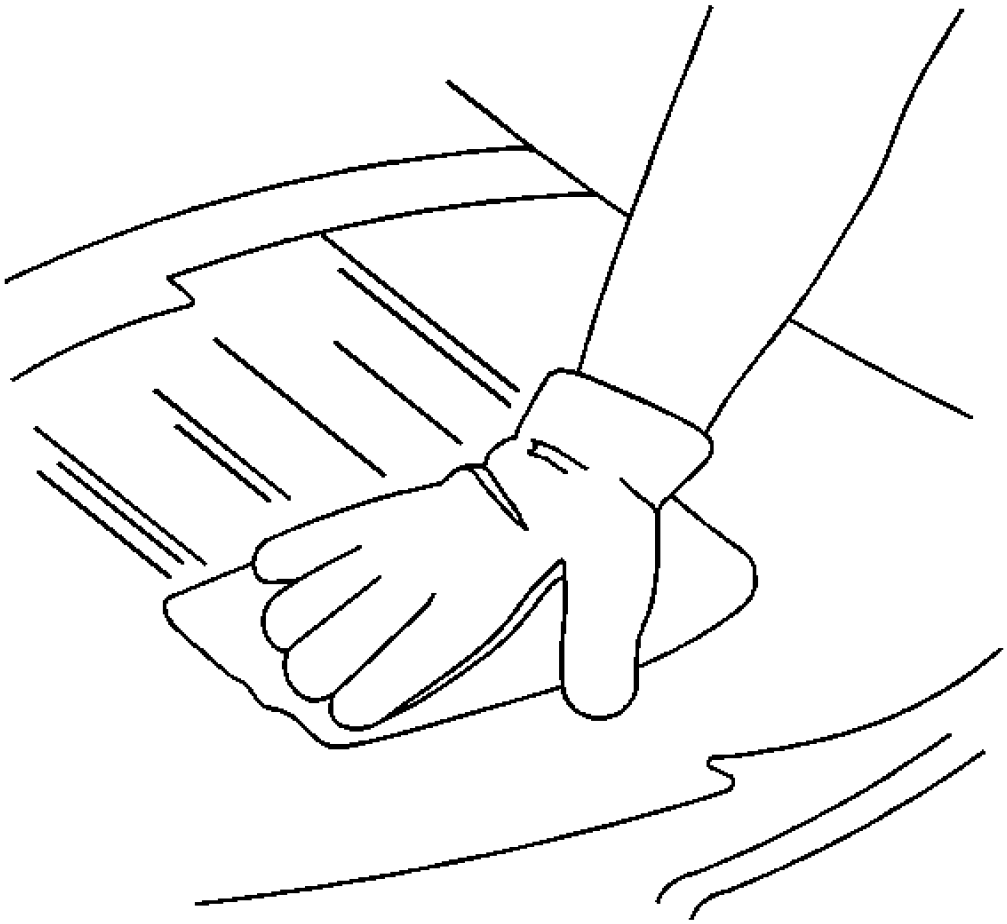


Fig. 49: Cleaning Excess Urethane Adhesive From Body
Courtesy of GENERAL MOTORS CORP.

24. Clean any excess urethane adhesive from the body.

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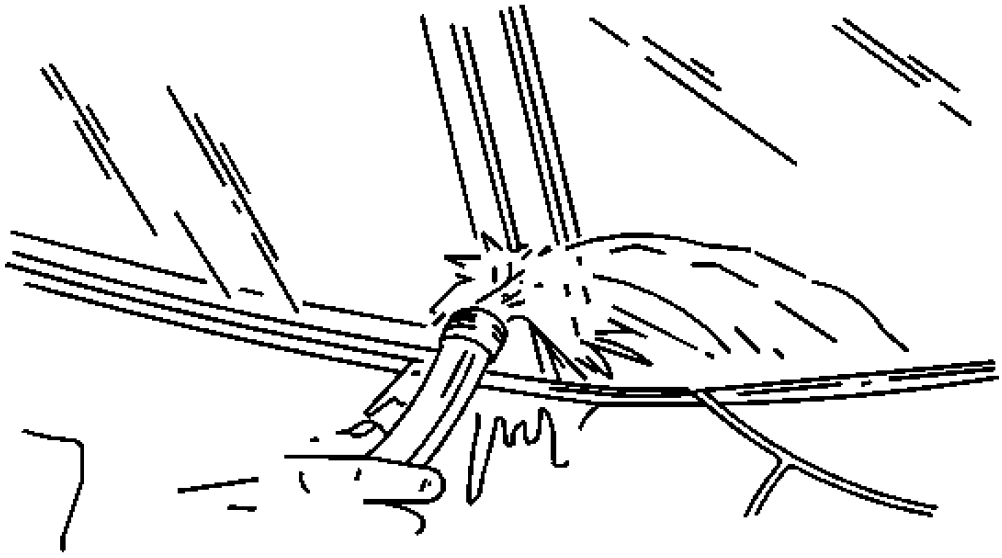


Fig. 50: Performing Water Hose Test
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

25. Use a soft spray of warm water in order to immediately water test the window.
26. Inspect the window for leaks.
27. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
28. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- **For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.**
- **For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.**

Do NOT physically disturb the repair area until after these minimum

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times have elapsed.

29. Maintain the following conditions in order to properly cure the urethane adhesive:
    - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
    - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.
    - Do not use compressed air in order to dry the urethane adhesive.
30. Complete the window installation.

ADHESIVE INSTALLATION OF REAR WINDOWS

1. Use a urethane adhesive systems which meet GM Specification GM 3651G

WARNING: Refer to Glass and Sheet Metal Handling Warning .

2. Remove all mounds or loose pieces of urethane adhesive from the pinch-weld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinch-weld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
    - High weld
    - Solder spots on the pinchweld
    - Hardened sealer
    - Any other obstruction or irregularity in the pinch-weld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15®, DuPont 2610®, Sherwin-Williams PSE 4600 and NP70® and Martin-Semour 5120 and 5130® PPG DP90LF SPIES/ HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
    1. Remove all traces of broken glass from the outer cowl panel, seats, floor and defroster ducts.
    2. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.

WARNING: Refer to Window Retention Warning .

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6. Verify all primers and urethane adhesive are within expiration dates.

WARNING: **Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.**

NOTE: **Do not apply the black #3 primer to the existing bead of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.**

7. Shake the pinch-weld primer black #3 for at least 1 minute.
8. Use a new dauber in order to apply the primer to the surface of the pinch-weld flange.
9. Allow the pinch-weld primer to dry for approximately 10 minutes.
10. With the aid of an assistant, dry fit the window to the opening in order to determine the correct position.

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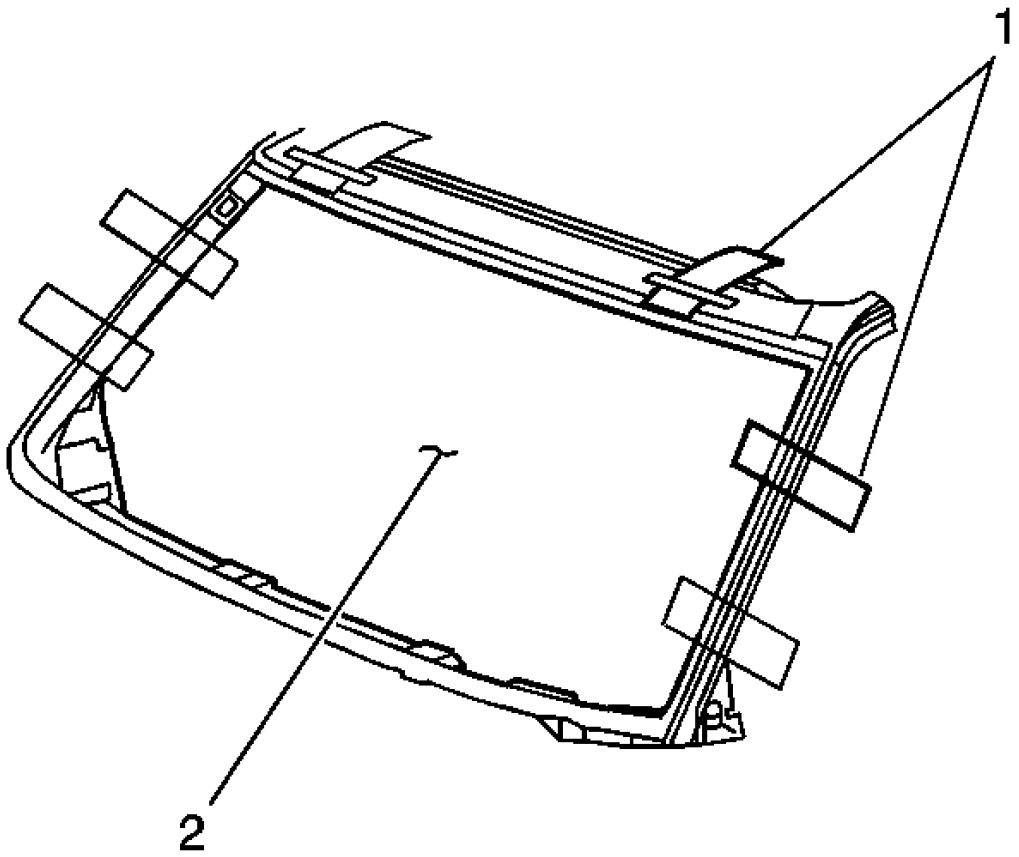


Fig. 51: Marking Locations Of Window
Courtesy of GENERAL MOTORS CORP.

11. Use masking tape in order to mark the locations (1) of the window (2) in the opening.
12. Cut the masking tape in the center and remove the window from the opening.

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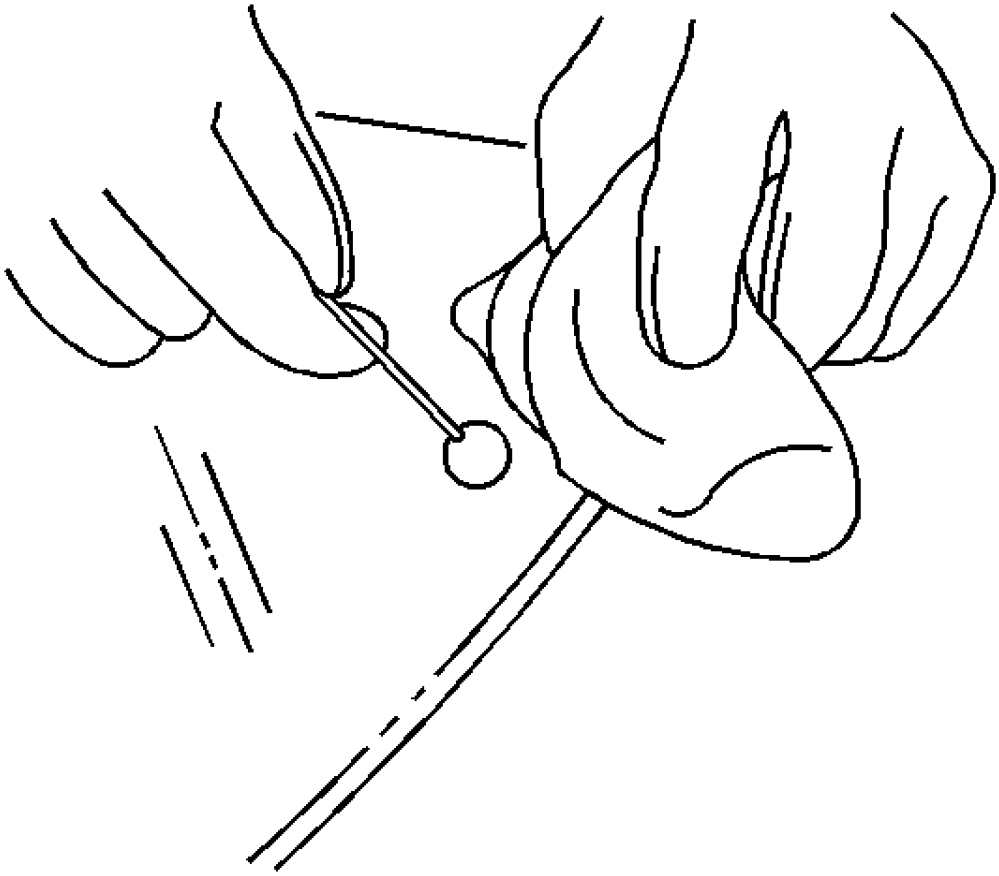


Fig. 52: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

NOTE: Use care when applying glass prep clear #1 on the window. This primer dries almost instantly, and may stain the viewing area of the window if not applied evenly.

13. Use a new dauber in order to apply glass prep clear #1 to the area approximately 10-16 mm (3/8-5/8 in) around the entire perimeter of the window inner surface.

    Immediately wipe the glass primed area using a clean, lint-free cloth.

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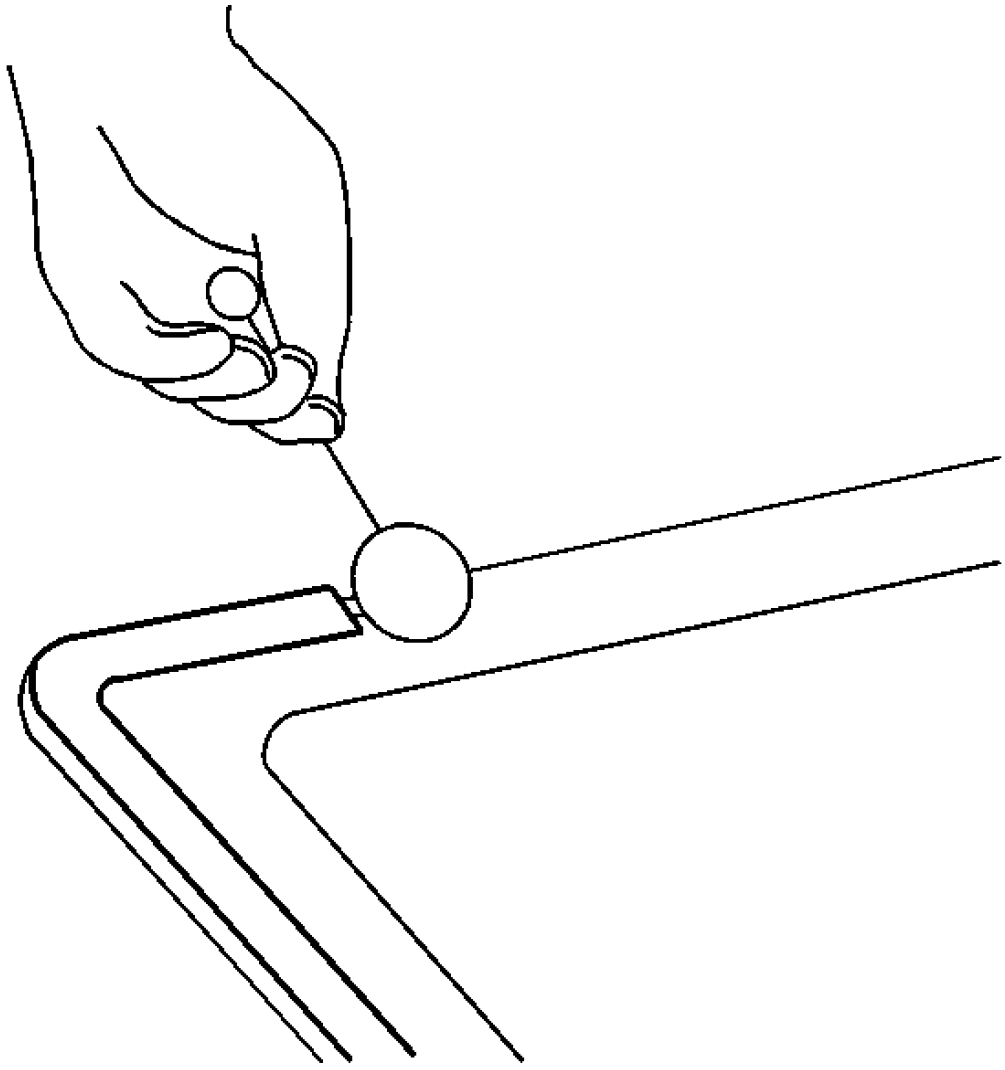


Fig. 53: Applying Glass Prep
Courtesy of GENERAL MOTORS CORP.

14. Apply a second coat of the glass prep clear #1 to the same area of the glass.

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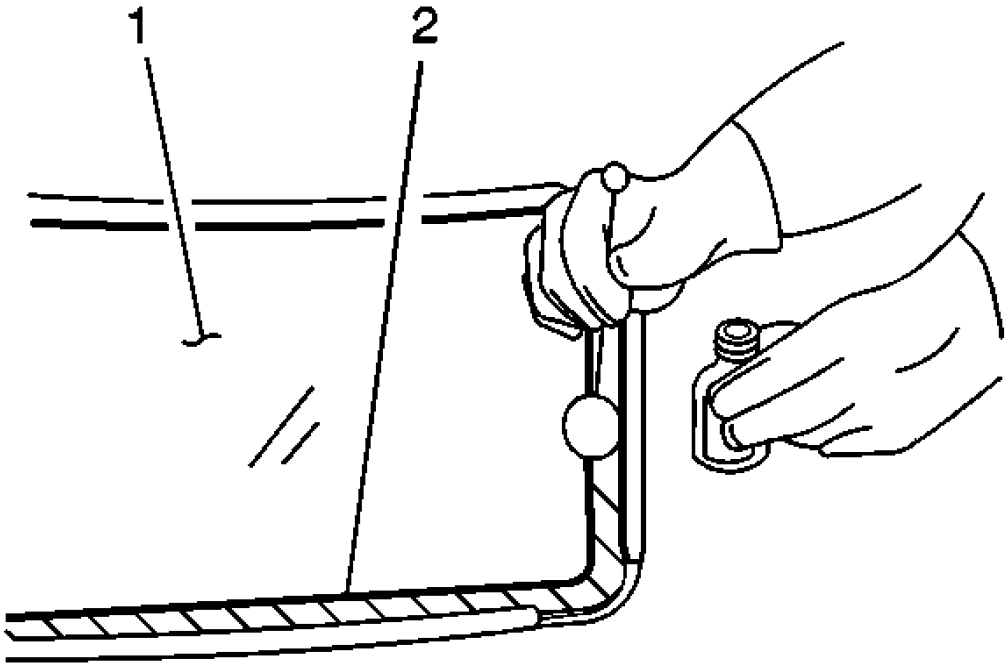


Fig. 54: Applying Glass Primer
Courtesy of GENERAL MOTORS CORP.

NOTE: The glass primer black #2 is effective up to 8 hours after applying it to the glass. The primed surface of the glass must be kept clean.

15. Shake the glass primer black #2 for at least 1 minute.
16. Use a new dauber in order to apply the glass primer black #2 to the same areas (2) that glass prep clear #1 was applied.
17. Allow the glass primer to dry for approximately 10 minutes.

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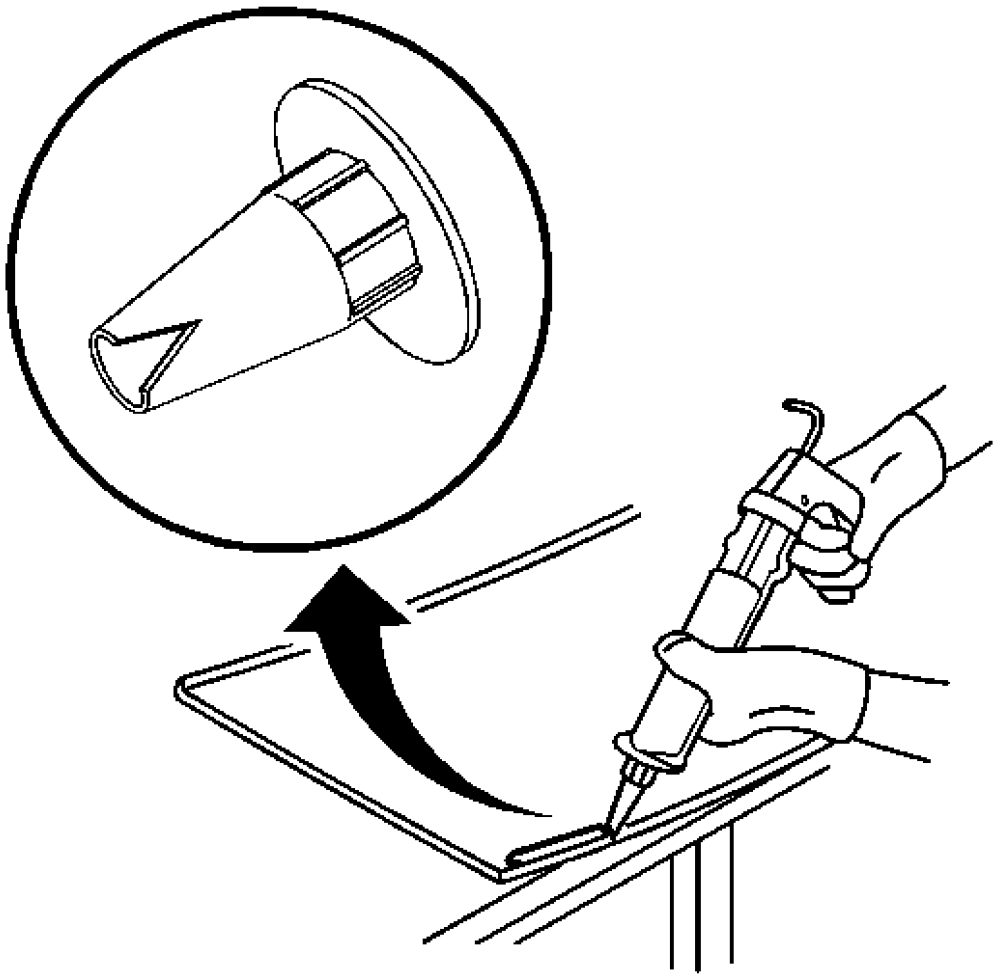


Fig. 55: View Of Modified Applicator Nozzle
Courtesy of GENERAL MOTORS CORP.

18. Cut the applicator nozzle in order to provide a bead of 8 mm (0.316 in) wide and 12.7 mm (1/2 in) high.

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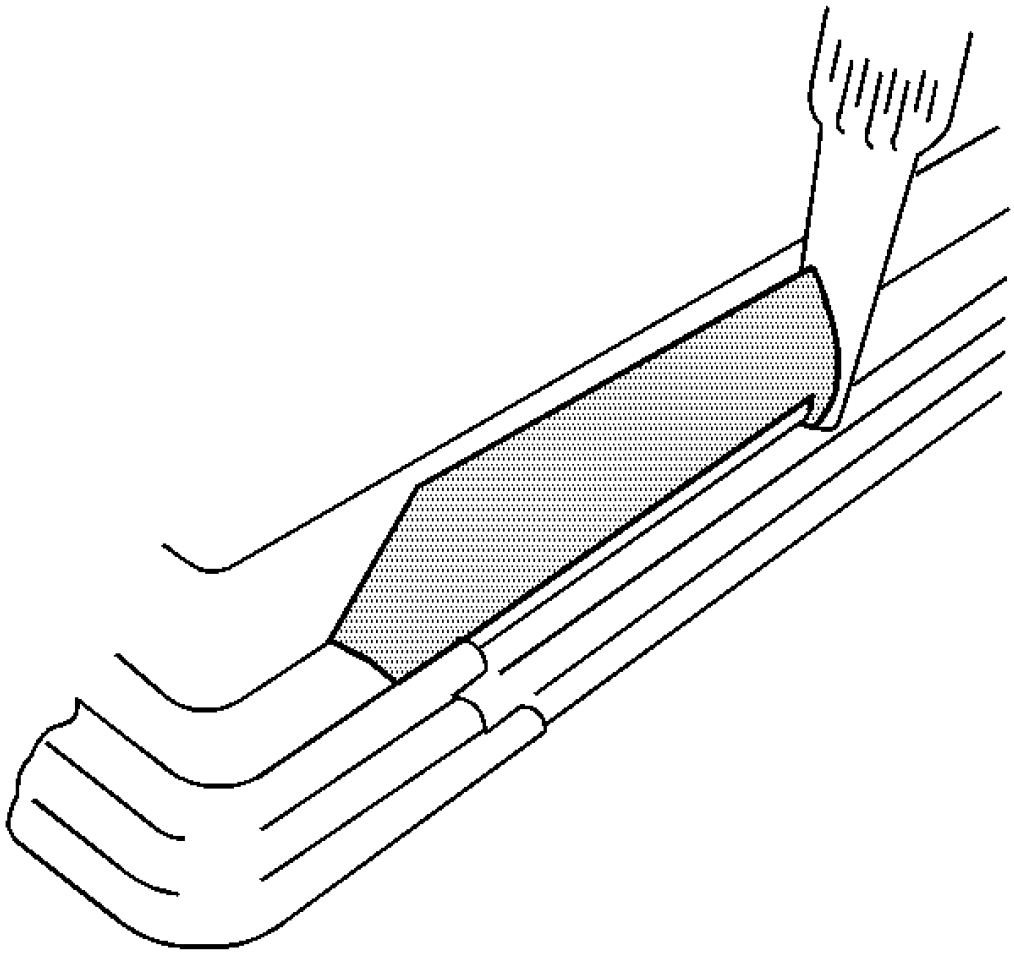


Fig. 56: Applying Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS CORP.

19. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.

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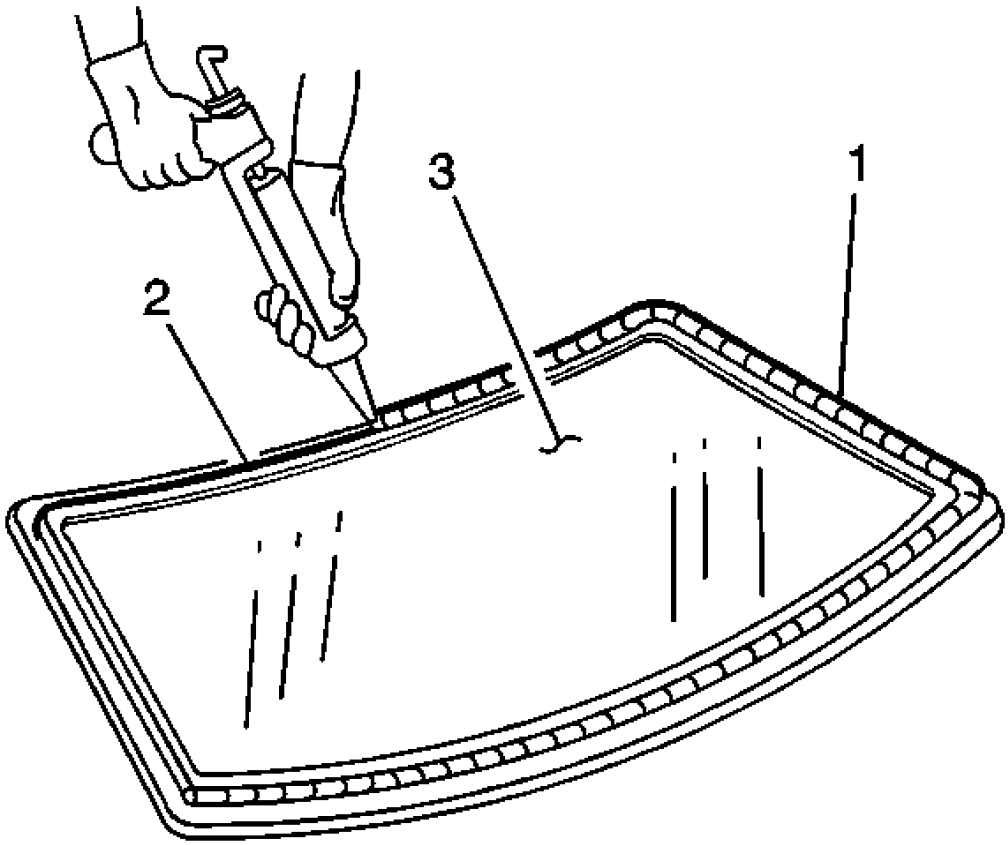


Fig. 57: Applying Urethane Adhesive To Inner Surface Of Window
Courtesy of GENERAL MOTORS CORP.

20. Use the edge of the window as a guide for the nozzle in order to apply the urethane adhesive (1) to the inner surface of the window (3).

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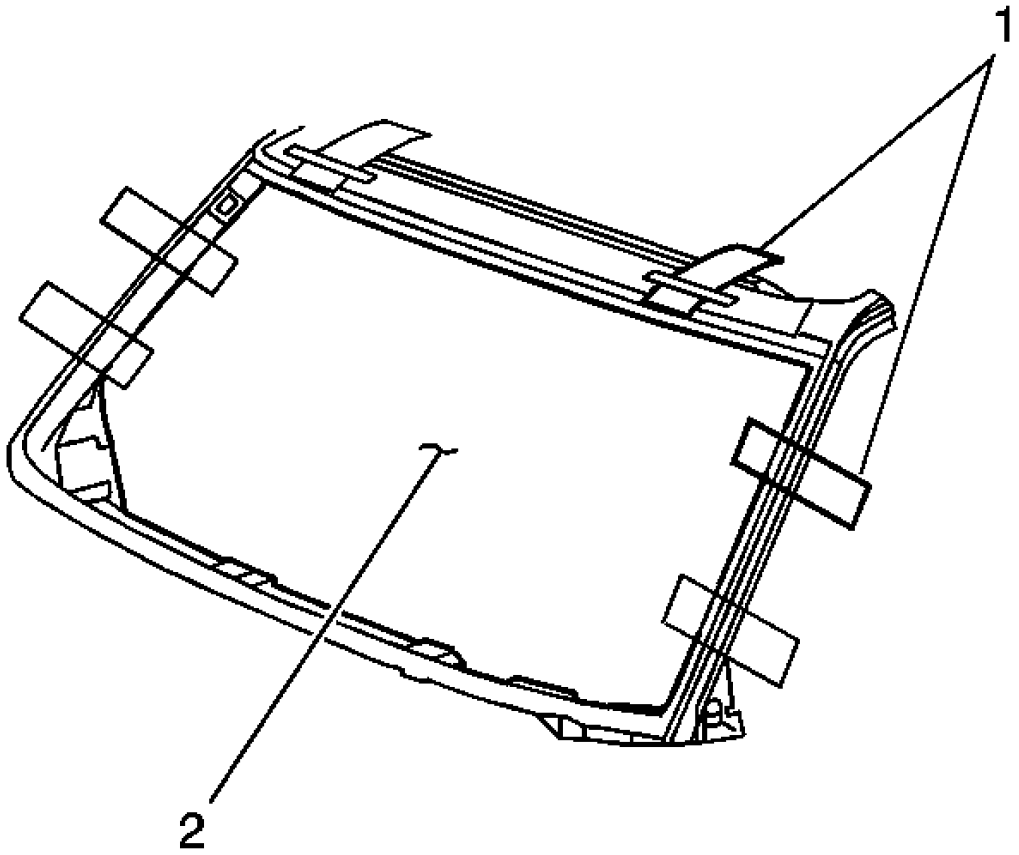


Fig. 58: Marking Locations Of Window
Courtesy of GENERAL MOTORS CORP.

21. Align the masking tape (1) lines on the window (2) and the body.

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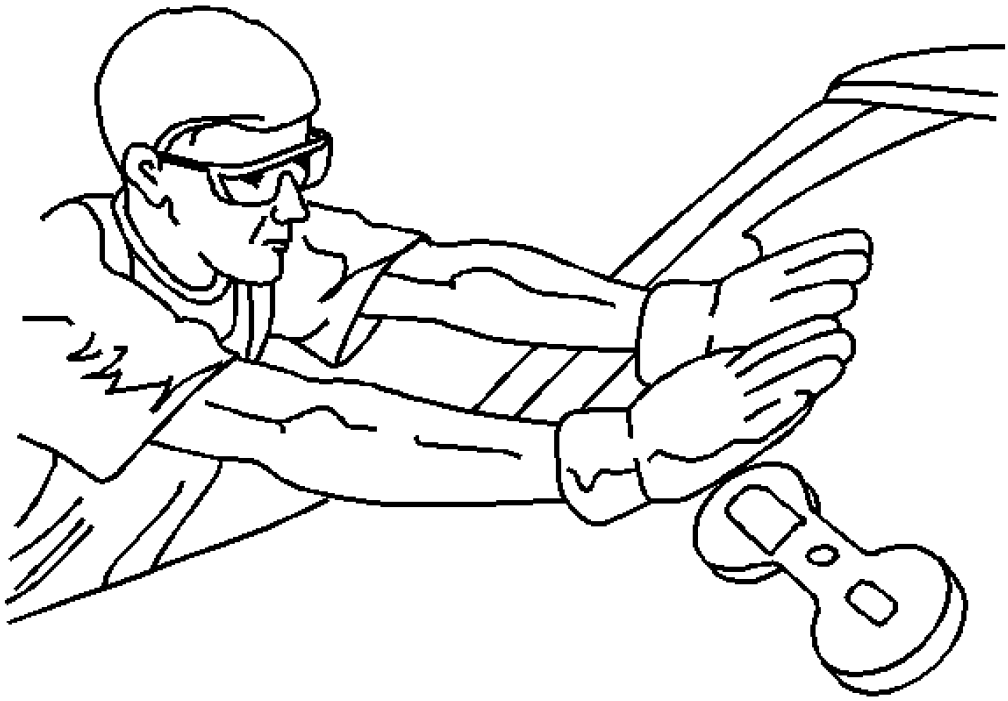


Fig. 59: Pressing Window Into Place
Courtesy of GENERAL MOTORS CORP.

22. Press the window firmly into place.
23. Tape the window to the body in order to minimize movement until the urethane adhesive cures.

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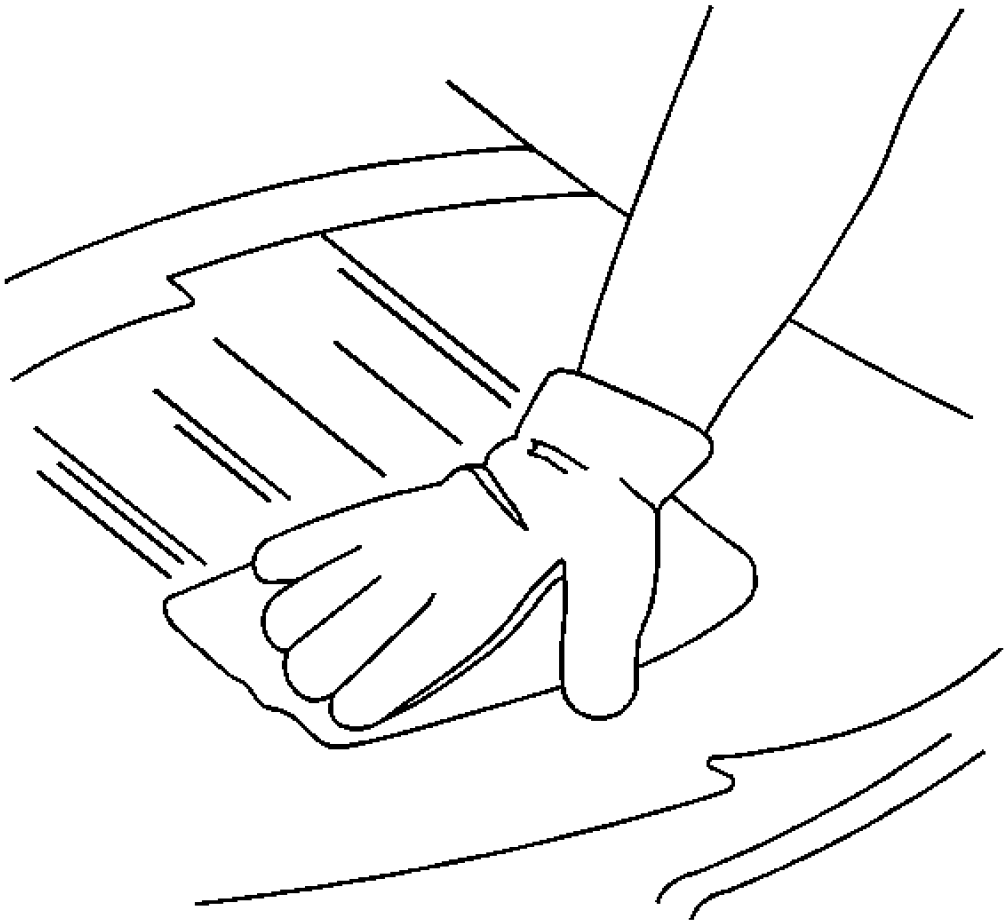


Fig. 60: Cleaning Excess Urethane Adhesive From Body
Courtesy of GENERAL MOTORS CORP.

24. Clean any excess urethane adhesive from the body.

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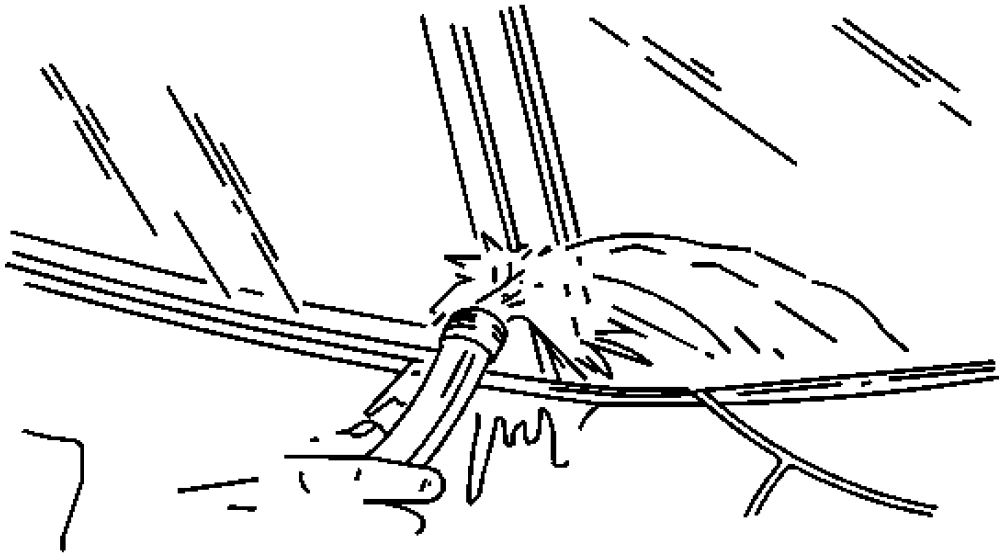


Fig. 61: Performing Water Hose Test
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

25. Use a soft spray of warm water in order to immediately water test the window.
26. Inspect the window for leaks.
27. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
28. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- **For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.**
- **For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.**

Do NOT physically disturb the repair area until after these minimum

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times have elapsed.

29. Maintain the following conditions in order to properly cure the urethane adhesive:
    - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
    - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.
    - Do not use compressed air in order to dry the urethane adhesive.
30. Complete the window installation.

DESCRIPTION AND OPERATION

FULL-CUT METHOD DESCRIPTION

IMPORTANT:

- **If corrosion of the pinch-weld flange is present, or if sheet metal repairs or replacements are required, refinish the pinch-weld flange in order to present a clean, primer-only surface.**
- **If paint repairs are required, mask the flange bonding area, prior to applying the color coat, in order to provide a clean, primer-only surface.**
- **Appropriate materials for these primer applications are typically 2 component catalyzed products. Use materials such as BASF DE15®, DuPont 2610®, Sherwin-Williams PSE 4600 and NP70® and Martin-Semour 5120,5130®, PPG DP90LF SPIES/HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application. Follow the manufacturer's directions for the mix, the application, and the drying times.**
- **After repairing the opening as indicated, shake the pinch-weld primer black #3 well. Using a new dauber, apply the primer to the primed surface of the flange in the bonding area. Allow the primer to dry for 10 minutes.**

Use only the full cut method, also known in the field as full strip method, when installing windows.

This method includes the following:

- The replacement of a majority of the urethane adhesive bead. Remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinch-weld flange.
- Apply pinch-weld primer to any exposed painted areas on the pinch-weld flange.

No mounds or loose pieces of urethane adhesive should remain on the pinch-weld flange. Do not remove all traces of urethane adhesive.

POWER WINDOWS DESCRIPTION AND OPERATION

Power Windows System Components

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The power window system consists of the following components:

- Driver window switch
- Passenger window switch
- Window motors in each of the doors
- F26U 30A Fuse

Power Windows System Controls

The power windows system can be controlled by pressing or pulling the appropriate power window switch and may be commanded to raise or lower by the BCM through a serial data message to each of the window motors.

Driver Window Operation

The driver window switch receives a constant ground source and the driver window motor is supplied battery voltage through the accessory voltage supply circuit. The logic circuit within the window motor monitors the up, down and express signal circuits which are normally equal to B+ voltage. When the driver window switch is used, the contacts close causing a voltage drop within the appropriate signal circuit. The window motor will detect the voltage drop and will command the window to move in the direction requested.

Passenger Window Operation

The driver and passenger window switches each receives a constant ground source and the passenger window motor is supplied battery voltage through the accessory voltage supply circuit. The up, down and express signal circuits are shared between the right front switch on the driver window switch and the passenger window switch. The logic circuit within the window motor monitors the up, down and express signal circuits which are normally equal to B+ voltage. When the right front switch is used on the driver window switch or the passenger window switch is used, the contacts close causing a voltage drop within the appropriate signal circuit. The window motor will detect the voltage drop and will command the window to move in the direction requested.

Express Up/Express Down Feature

The logic circuit within the window motor monitors the express signal circuits which are normally equal to B+ voltage and when the appropriate switch is pressed or pulled past the first detent and released, the logic circuit within the window motor will command the window to automatically fully open or fully close depending upon which command was initially requested. The driver and passenger doors contain smart motors that will detect excessive resistance while performing the express up function and automatically reverse direction to prevent injury to any occupants that may become trapped between the closing window and the roof. The automatic reverse safety feature can be overridden by pulling and holding the window switch.

REAR WINDOW DEFOGGER DESCRIPTION AND OPERATION

Rear Window Defogger System Components

The rear window defogger system consists of the following components:

- HVAC Control Module

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- HVAC Control Head
- Rear Defog Relay
- Rear Defogger Grid
- Rear Defog 40A Fuse

Rear Window Defogger Operation

The rear defog control system utilizes a single zone backlight design, driven with a single relay configuration. Additionally, up to two outside rear view mirrors can be heated if required. A switch for the customer to control the system is provided within the HVAC control head. Also included in the HVAC control head is an indicator to inform the customer with the current state of the system. The system is only operational when engine is running or during remote start.

Pressing the heated rear window switch on the HVAC control face plate causes the HVAC control head to send a serial data message to the HVAC control module requesting rear window defog operation. The HVAC control module upon receipt of the serial data message will provide voltage to the coil side of the rear window defogger relay, this will energize the relay causing the relay switch contacts to close allowing B+ voltage to flow through the rear defogger grid control circuit to the rear defogger grid.

When the rear heated window switch is pressed and the engine is running, the rear defog control system will remain active for 10 minutes. After the initial cycle has lapsed, pressing the switch again will continue rear window defogger operation, but the cycle will only last 5 minutes. The rear defog control system will function continuously if the vehicle speed is greater than 70 kilometers per hour (45 mph).

STATIONARY WINDOW DESCRIPTION

Most stationary windows, specifically windshields, are retained to the body with urethane adhesive which adheres the window to the body, increasing structural integrity. The reinstallation of the windows with urethane adhesive requires complete replacement of the urethane adhesive bead, and is known as the full cut method. All stationary windows must use a urethane adhesive systems which meet GM Specification GM 3651G

URETHANE ADHESIVE DESCRIPTION

For replacement of any adhesive-installed window use the full cut method only.

In the United States or Canada, you may use adhesive systems which meet GM Specification GM 3651G.

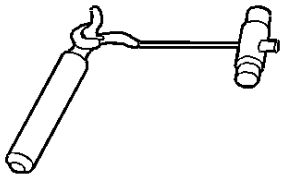
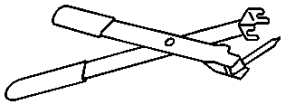
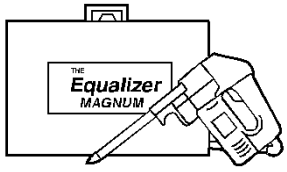
Use these materials based on specific manufacturer. Do NOT intermix primers or adhesives from one manufacturer to another.

Always follow the system manufacturer's instructions for application, handling, and curing.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

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Illustration	Tool Number/ Description
	J-24402-A Glass Sealant Cold Knife Remover
	J-34946 Window Pin Remover
	J-39032 Stationary Glass Removal Tool
	J-39040 Quarter Window Remover

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2010 ACCESSORIES & BODY, CAB

Horns - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Horn Bolt	17 N.m	12 lb ft
Steering Wheel Horn Contact Bolt Screws	8 N.m	71 lb in

SCHEMATIC AND ROUTING DIAGRAMS

HORN SCHEMATICS

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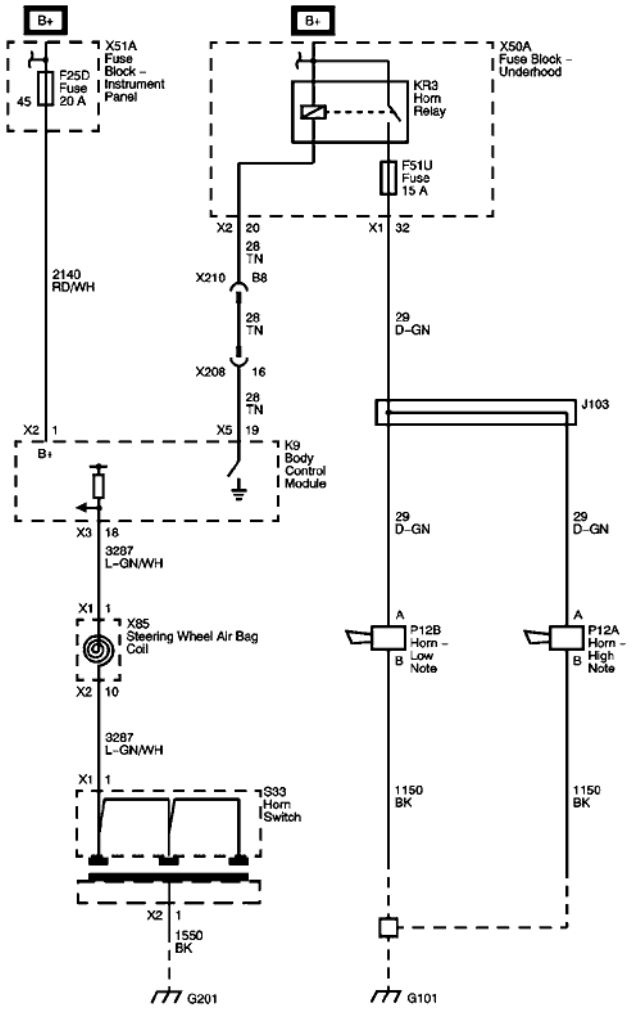


Fig. 1: Horn
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2750	B2750 01: Horn Relay Secondary Circuit Short to Battery B2750 02: Horn Relay Secondary Circuit Short to Ground B2750 04: Horn Relay Secondary Circuit Open

DTC B2750

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2750 01

Horn Relay Secondary Circuit Short to Battery

DTC B2750 02

Horn Relay Secondary Circuit Short to Ground

DTC B2750 04

Horn Relay Secondary Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Horn Relay Control	B2750 02	B2750 04	B2750 01	-

Circuit/System Description

The body control module (BCM) provides a ground for the Horn PCB relay within the underhood fuse block. The underhood fuse block will then provide B+ voltage to the horn control circuit, sounding the horns.

Conditions for Running the DTC

When the horn output is actively being requested by the BCM.

Conditions for Setting the DTC

B2750 01

The BCM detects a short to voltage in the horn relay control circuit.

B2750 02

The BCM detects a short to ground in the horn relay control circuit.

B2750 04

The BCM detects an open/high resistance in the horn relay control circuit.

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Action Taken When the DTC Sets

B2750 01, B2750 04

The horns will be inoperative.

B2750 02

The horns will sound continuously until the horns are disconnected or when the horns overheat and becomes inoperative.

Conditions for Clearing the DTC

- The DTC clears when the fault is no longer detected.
- The current DTC will become history when the request for the output is removed.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Horn Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Horns System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, command the Horn Relay ON and OFF with a scan tool. The horns should turn ON and OFF when changing between the commanded states.

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Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the X50A underhood fuse block.
2. Connect a test lamp between the control circuit terminal 20 and B+.
3. Ignition ON, command the Horn Relay ON and OFF with the scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, replace the X50A underhood fuse block.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Accessory Wiring Junction Block Retainer Replacement**
- **Control Module References** for BCM replacement, setup and programming

SYMPTOMS - HORNS

IMPORTANT: The following steps must be completed before using the symptom tables:

1. **Perform Diagnostic System Check - Vehicle , before using the symptom tables in order to verify that all of the following are true:**
    - **There are no DTCs set**
    - **The control modules can communicate via the serial data link**
2. **Review the system operation in order to familiarize yourself with the system functions. Refer to Horns System Description and Operation.**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the horn system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Perform the following if a horn buzzes or has a harsh tone.
    - Inspect for debris in the joint where the horn fastens to the vehicle.
    - Test the torque of the horn mounting hardware. The horn mounting hardware should be tightened to a torque of 10 N.m (7 lb ft).

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for**

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Intermittent Conditions and Poor Connections .

Symptom List

Refer to a symptom diagnostic procedure **Horns Malfunction** in order to diagnose the symptom.

HORNS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Horn Switch Signal	1	2	2	-
Horn Relay Control	B2750 02	B2750 04	B2750 01	-
Horn Control	2	2	1	-
Horn Ground	-	2	-	-
Horn Switch Ground	-	2	-	-
1. Horn Always On 2. Horn Inoperative				

Circuit/System Description

The body control module (BCM) monitors the horn switch signal circuit, when the horn pad is pressed, the BCM detects the drop in the horn switch signal circuit and provides a ground for the Horn PCB relay within the underhood fuse block. The underhood fuse block will then provide B+ voltage to the horn control circuit, sounding the horns.

Diagnostic Aids

A short to ground in the horn relay control circuit or a short to voltage in the horn control circuit will cause the horns to sound continuously until the horns overheat and become inoperative.

Rotate the steering wheel while pressing the horn pad to identify intermittent and poor connections within the steering column.

If diagnosing a Horn- Poor Tone condition, inspect the following:

- Debris or water in the horn assembly
- Proper horn mounting hardware torque-Refer to **Fastener Tightening Specifications**.
- Debris in the joint where the horns attach to the vehicle

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- Debris in direct contact with the horn
- Vehicle components vibrating while the horn is sounding

Reference Information

Schematic Reference

Horn Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Horns System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Command the Horn Relay ON and OFF with the scan tool, the P12 horns should turn ON and OFF when changing between the commanded states.
    - If the P12 horns are always ON or always OFF, refer to Horns or Horn Command Malfunction.
    - If the sound emitted from the P12 horns are not clear and even, refer to Horn - Poor Tone.
2. Command the P12 horns ON and OFF by pressing and releasing the horn pad. The P12 horns should turn ON with each press of the horn pad.
    - If horns are always OFF, refer to Horn Switch Malfunction.

Circuit/System Testing

Horns or Horn Command Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the X50A underhood fuse block.
2. Connect a test lamp between the control circuit terminal 20 and B+.
3. Ignition ON, command the Horn Relay ON and OFF with a scan tool. The test lamp should turn ON and

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OFF when changing between the commanded states.

- If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
- If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

4. Ignition OFF, connect the X2 harness connector at the X50A underhood fuse block. Disconnect the harness connector at the appropriate P12 horn.
5. Test for less than 1 ohms between the ground circuit terminal B and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
6. Connect a test lamp between the control circuit terminal A and ground.
7. Ignition ON, command the Horn Relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
   - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the X50A underhood fuse block.
   - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the X50A underhood fuse block.
8. If all circuits test normal, test or replace the P12 horn.

Horn - Poor Tone

1. Ignition OFF, disconnect the harness connector at the appropriate P12 horn.
2. Test for less than 1 ohms between the ground circuit terminal B and ground.
   - If greater than the specified range, test the ground circuit for high resistance.
3. Disconnect the X1 harness connector at the X50A underhood fuse block.
4. Test for less than 1 ohms between the control circuit terminal 32 at the X50A underhood fuse block and the control circuit terminal A at the P12 horn.
   - If greater than the specified range, test the control circuit for high resistance.
5. If all circuits test normal, test or replace the P12 horn.

Horn Switch Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the S33 horn switch.
2. Test for less than 30 ohms between the ground circuit terminal 1 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the X1 harness connector at the S33 horn switch.
4. Ignition ON, test for greater than 10V between the signal circuit terminal 1 and ground.
   - If less than the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the S33 horn switch.

Component Testing

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Horn Test

1. Ignition OFF, disconnect the harness connector at the appropriate P12 horn.
2. Install a 15 A fused jumper wire between the control terminal A and 12 V. Install a jumper wire between the ground terminal B and ground. Verify the P12 horn emits a clear and even tone.
    - If the sound emitted is not clear and even, replace the P12 horn.

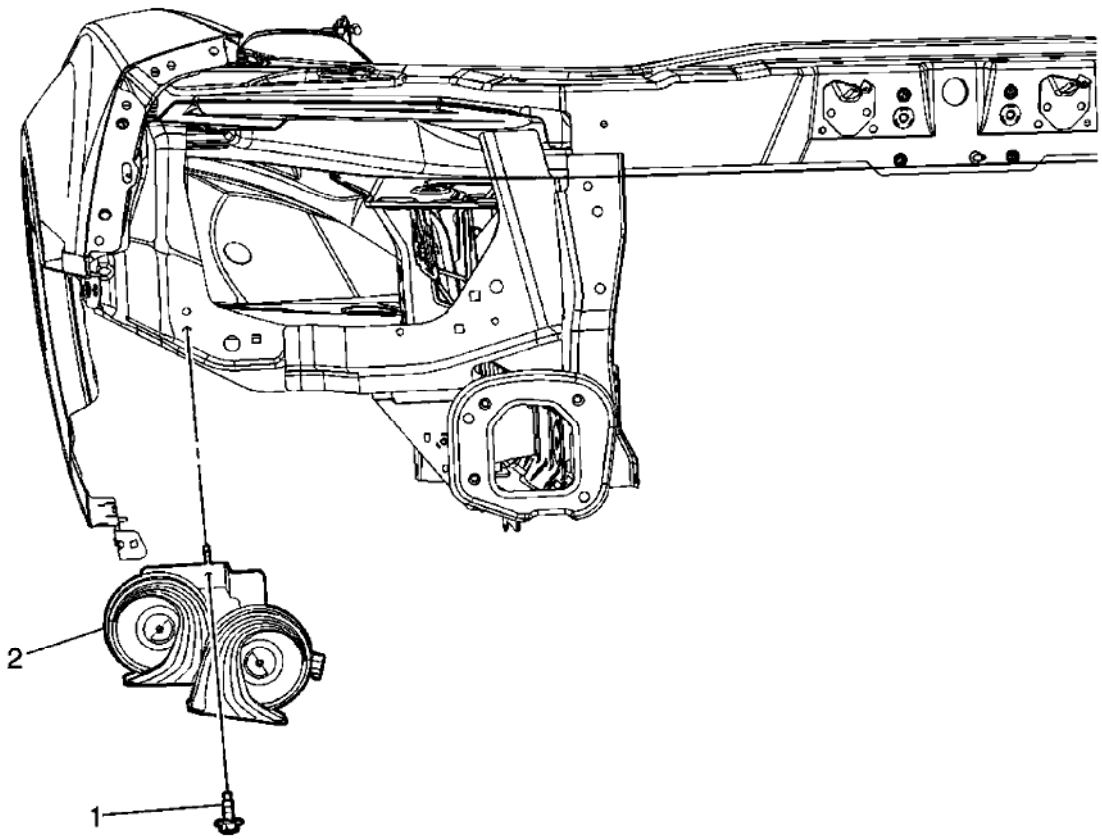
Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Steering Wheel Horn Contact Replacement**
- **Horn Replacement**
- **Accessory Wiring Junction Block Retainer Replacement**
- **Control Module References** for BCM replacement, setup and programming

REPAIR INSTRUCTIONS

HORN REPLACEMENT



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Fig. 2: Horn
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front left or right wheelhouse liner (front). Refer to **Front Wheelhouse Liner Replacement** .	
1	Horn Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
2	Horn **Procedure:** Disconnect the electrical connector.

STEERING WHEEL HORN CONTACT REPLACEMENT

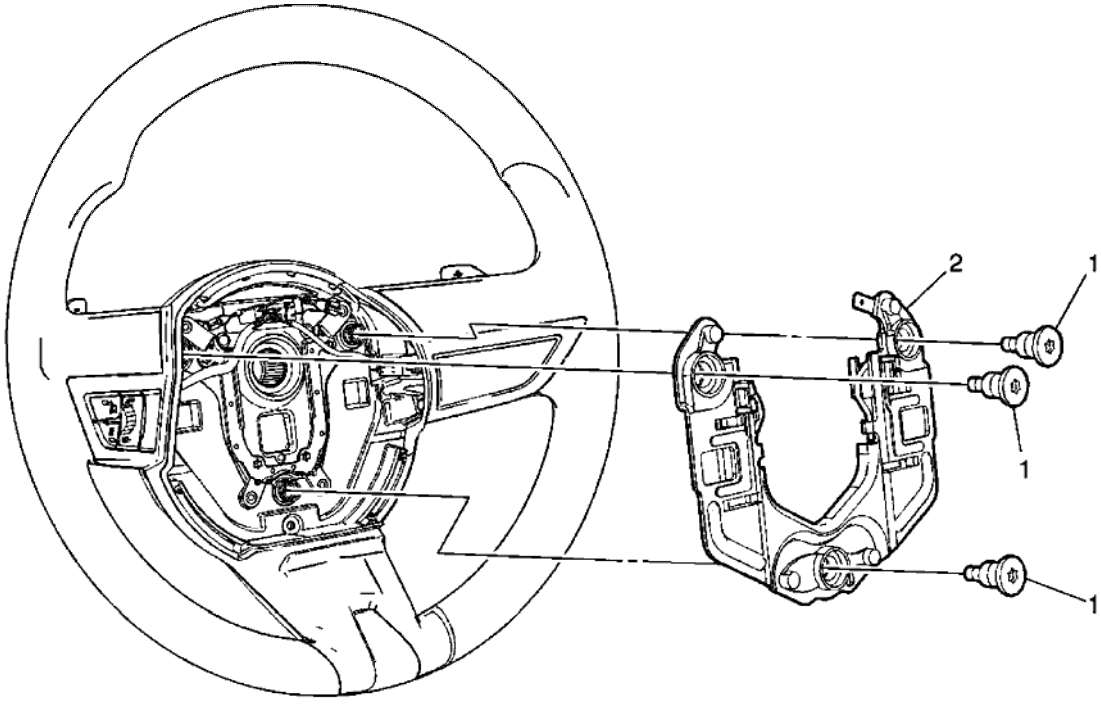


Fig. 3: Steering Wheel Horn Contact
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure:	

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Remove the inflatable restraint steering wheel module. Refer to **Steering Wheel Inflatable Restraint Module Airbag Replacement** .	
1	Steering Wheel Horn Contact Bolt/Screw (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 8 N.m (71 lb in)
2	Steering Wheel Horn Contact **Procedure:** Disconnect electrical connectors as needed.

DESCRIPTION AND OPERATION

HORNS SYSTEM DESCRIPTION AND OPERATION

System Description

The horn system consists of the following components:

- Horn 15A fuse
- Underhood fuse block (contains a non-serviceable PCB Horn relay)
- Horn switch
- Horn
- Body control module (BCM)

System Operation

- The vehicle horn is activated whenever the horn switch is depressed.
- The BCM commands the horns ON under any of the following conditions:
  - When the content theft deterrent system detects a vehicle intrusion-For further information refer to **Content Theft Deterrent (CTD) Description and Operation** .
  - When the keyless entry system is used to lock the vehicle, a horn chirp may sound to notify the driver that the vehicle has been locked. The notification feature may be enabled or disabled through personalization.

Circuit Operation

The body control module (BCM) controls the horn operation, when the horn switch is pressed, it closes a switch pulling the horn signal circuit low. When the BCM detects the drop in voltage in the horn switch signal circuit, it energizes the PCB Horn relay which provides B+ voltage to the horn control circuit, sounding the horn.

When the vehicle is in the Off Power Mode the BCM will attempt to detect a stuck or continuously activated horn switch. When enabled, activation of the horn will be limited to 10 seconds to protect the horn from excessive use.

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Immobilizer - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Theft Deterrent Module Bolt/Screw	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

IMMOBILIZER SCHEMATICS

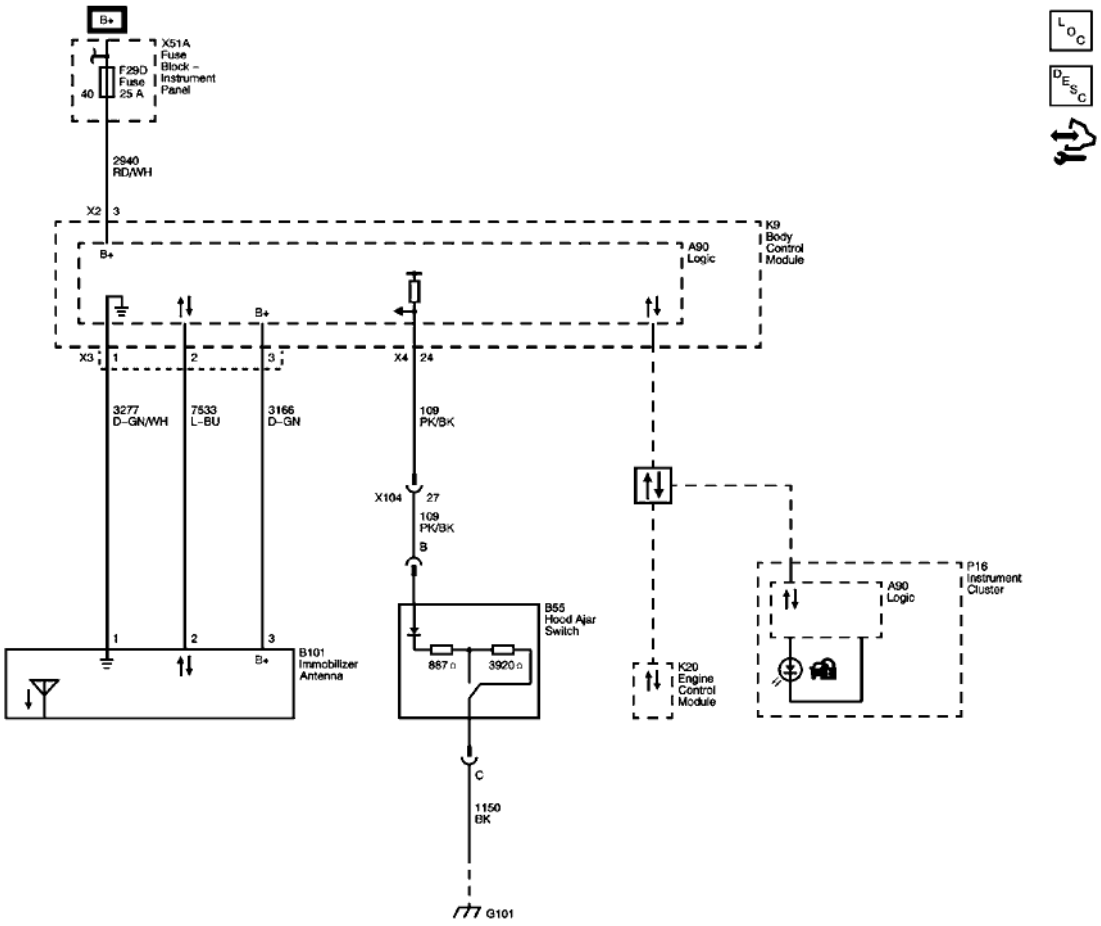


Fig. 1: Immobilizer
Courtesy of GENERAL MOTORS CORP.

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DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2955	B2955: Security Sensor Data Circuit Malfunction
DTC B3006	B3006 01: Hood Ajar Circuit Short to Battery B3006 02: Hood Ajar Circuit Short to Ground B3006 04: Hood Ajar Circuit Open Circuit
DTC B302A	B302A 00: Telematic Requested Immobilization
DTC B3031	B3031 00: Security System Controller In Learn Mode
DTC B3055	B3055 00: No Transponder Modulation or No Transponder
DTC B3060	B3060 00: Unprogrammed Transponder Identification Code Received
DTC B3902	B3902 00: Incorrect Immobilizer Identifier Received
DTC B3935	B3935 00: Transponder Authentication Error
DTC B3976	B3976 00: Unconfigured Transponder
DTC B3984	B3984 00: Device 1 Environment Identifier Not Programmable
DTC P0513	P0513: Immobilizer Key Incorrect
DTC P0633	P0633: Immobilizer Key Not Programmed
DTC P162B	P162B: Remote Vehicle Speed Limiting Signal Message Counter Incorrect
DTC P1631	P1631: Immobilizer Fuel Enable Signal Not Correct
DTC P1648	P1648: Immobilizer Security Code Incorrect
DTC P1649	P1649: Immobilizer Security Code Not Programmed

DTC B2955

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2955

Security Sensor Data Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

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B+	B2955	B2955	-	-
Serial Data	B2955	B2955	B2955	B2955
Low Reference	-	B2955	-	-

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils surrounding the ignition lock cylinder. The transponder transmits a signal to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

- The BCM is unable to measure the ignition key transponder value.
- On B+ circuit 3166, there is a 65 second delay before communications with the immobilizer antenna. After the time delay, a no response must occur for two of these cycles. 2.5 minutes must lapse before this DTC sets.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator in the instrument cluster will be illuminated. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Inspect all available vehicle keys that they are correct vehicle keys.
    - If not a correct vehicle key, replace the key.
2. While viewing the scan tool BCM Data Display, Immobilizer Data, Key Part Number, turn ON the ignition with each of the available vehicle keys. The parameter should read a Key Part Number with all available keys.
    - If only one key results in the parameter reading no Part Number, replace the appropriate key.
3. Ignition OFF, disconnect the harness connector at the B101 Immobilizer Antenna.
4. Test for less than 10 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Ignition ON, test for more than 10 V between the serial data circuit terminal 2 and ground.
    - If less than the specified range, test the serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. Ignition ON. Test for B+ between the B+ circuit terminal 3 and ground.
    - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, replace the B101 Immobilizer Antenna.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for control module replacement, setup, and programming

DTC B3006

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3006 01

Hood Ajar Circuit Short to Battery

DTC B3006 02

Hood Ajar Circuit Short to Ground

DTC B3006 04

Hood Ajar Circuit Open Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B3006 02	B3006 04	B3006 01	-
Ground	-	B3006 04	-	-

Circuit/System Description

The body control module (BCM) monitors the voltage input of the hood ajar switch signal circuit.

Conditions for Running the DTC

The BCM continuously monitors for this DTC

Conditions for Setting the DTC

B3006 01

The BCM detects that the hood ajar switch signal circuit is shorted to battery.

B3006 02

The BCM detects that the hood ajar switch signal circuit is shorted to ground.

B3006 04

The BCM detects that the hood ajar switch signal circuit is open.

Action Taken When the DTC Sets

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- Remove vehicle start functions are disabled
- Content theft deterrent ignores the hood ajar switch

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

- **Immobilizer Schematics**
- **Remote Function Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool BCM Hood Position parameter. With the hood open, the Hood Position parameter should read open. With the hood closed, the Hood Position parameter should read closed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B55 Hood Ajar Switch.
2. Ignition OFF, test for less than 8 ohms between the ground circuit terminal C and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for greater than 11 V between the signal circuit terminal B and ground.

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    - If less than the specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 Body Control Module (BCM).
4. Disconnect the X4 harness connector at the BCM.
5. Test for less than 1 V between the signal circuit terminal 24 and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. If all circuits test normal, test or replace the B55 Hood Ajar Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Hood Primary and Secondary Latch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B302A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B302A 00

Telematic Requested Immobilization

Circuit/System Description

As part of the vehicle telematics enhanced services, a request may be sent to the theft deterrent module (TDM) to disable vehicle starting. If a valid message is received by the TDM requesting that starting be disabled, the start enable message will not be sent to the engine control module (ECM).

Conditions for Setting the DTC

A valid start disable from telematics will set DTC B302A only as a history DTC.

Action Taken When the DTC Sets

Vehicle starting will be suspended and the security indicator will be illuminated.

Conditions for Clearing the DTC

- A current DTC will clear when the telematic start disable request is no longer seen.
- A history DTC will clear after 100 ignition cycles in which the telematic start disable request is not seen.

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Diagnostic Aids

DTC B302A is only an indicator that a start disable request has been received from the vehicle telematics system and does not indicate a fault in the immobilizer system. DTC B302A will only set as a history DTC.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. With a master vehicle key, turn the ignition ON.
2. Observe the security indicator. After approximately 10 minutes, the indicator will turn off.
3. Turn the ignition OFF and wait 5 seconds.
4. Repeat steps 2-4 two more times for a total of 3 cycles or 30 minutes.
5. With a master vehicle key, turn the ignition ON. The start disable will now be cleared.
6. Using the Red Emergency Button, notify the advisor that the Ignition Block on the vehicle has been cleared and to update the account status.

DTC B3031

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3031 00

Security System Controller In Learn Mode

Circuit/System Description

When learning a coded key, the body control module (BCM) is placed in learn mode. DTC B3031 will set automatically as an indicator that the system is in learn mode and not as a fault indicator. Once the coded key is learned, learn mode will be exited and the DTC cleared. If the BCM does not exit learn mode, B3031 will remain current and indicate a fault. The instrument cluster security indicator will turn ON and the driver information center will display a message.

Conditions for Running the DTC

The immobilizer system is the learn coded keys state.

Conditions for Setting the DTC

The BCM is in the learn coded keys state.

Action Taken When the DTC Sets

The security indicator will illuminate. The driver information center will display a message.

Conditions for Clearing the DTC

- A current DTC will be cleared upon the successful exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Perform the Vehicle Key Relearn procedure. Refer to **Replacing Keys**. The BCM should learn the key and exit the learn coded key state.

- If the BCM does not exit the learn coded key state after the programming attempt, replace the K9 Body Control Module (BCM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming.

DTC B3055

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3055 00

No Transponder Modulation or No Transponder

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B3055 00	B3055 00	-	-

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Serial Data	B3055 00	B3055 00	B3055 00	B3055 00
Low Reference	-	B3055 00	-	-

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

The BCM is unable to measure the ignition key transponder value.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Inspect all available vehicle keys that they are correct vehicle keys.
    - If not a correct vehicle key, replace the key.
2. While viewing the scan tool BCM Key Part Number, turn ON the ignition with each of the available vehicle keys. The parameter should read a Key Part Number for all available keys.
    - If only one key result in the parameter not reading a Key Part Number, replace the appropriate key.
    - If all keys result in the parameter not reading a Key Part Number, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the K64 Theft Deterrent Module.
2. Ignition OFF, test for less than 10ohms between the low reference circuit terminal 1 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K64 Theft Deterrent Module.
3. Ignition ON, test for B+ between the ignition circuit terminal 3 and ground.
    - If not the specified value, test the ignition circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K64 Theft Deterrent Module.
4. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
5. Ignition ON, test for less than 1 V between the signal circuit terminal 2 at the K9 Body Control Module harness connector and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. Ignition OFF, test for infinite resistance between the signal circuit terminal 2 at the K9 Body Control Module harness connector and ground.
    - If less than the specified range, test the signal circuit for a short to ground.
7. Test for less than 1ohms between the signal circuit terminal 2 at the K9 Body Control Module harness connector and the signal circuit terminal 2 at the K64 Theft Deterrent Module harness connector.
    - If greater than the specified range, test the signal circuit for an open/high resistance.
8. If all circuits test normal, replace the K64 Theft Deterrent Module.
9. Ignition ON, verify DTC B3055 is not set as current.
    - If the DTC is set, replace the K9 Body Control Module.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM and theft deterrent module replacement, setup, and programming.

DTC B3060

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3060 00

Unprogrammed Transponder Identification Code Received

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

The transponder value measured by the BCM is incorrect or not learned to the vehicle.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. The driver information center will display a service message.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

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Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Perform the Vehicle Key Relearn procedure. Refer to **Replacing Keys**.
2. While viewing the scan tool BCM Transponder Authentication parameter, turn ON the ignition with each of the available vehicle keys. The parameter should read Active with all available keys.
    - If not the specified value, replace the appropriate key.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM replacement, setup, and programming

DTC B3902

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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DTC Descriptor

DTC B3902 00

Incorrect Immobilizer Identifier Received

Circuit/System Description

When certain modules are programmed and configured during installation, the module learns a specific immobilizer identifier which is unique to the vehicle. The immobilizer identifier is used to prevent swapping modules between vehicles. The body control module (BCM) is the keeper of the immobilizer identifier. Various control modules each learn the immobilizer identifier during their configuration process. During vehicle operation, each of these modules compare their immobilizer identifier to that of the BCM. If the identifiers match, vehicle starting is allowed. If an immobilizer identifier does not match, vehicle starting is disabled.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The immobilizer identifier between the control module and the BCM does not match.

Action Taken When the DTC Sets

- The security indicator will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

A current DTC will be cleared when the immobilizer identifiers match between the module and the BCM.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Programming and Setup procedure for the appropriate control module. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC B3935

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3935 00

Transponder Authentication Error

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

- Ignition is in the Accessory or Run position.

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- A valid transponder value has been read.

Conditions for Setting the DTC

- The transponder value is valid and matches the value stored in the BCM memory.
- The transponder calculation of the challenge from the BCM does not match the BCM calculation.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. The driver information center will display a service message.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid transponder value has been read and authenticated.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, replace the suspected inoperative or malfunctioning key. If the DTC resets, replace the K9

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Body Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM replacement, setup, and programming

DTC B3976

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3976 00

Unconfigured Transponder

Circuit/System Description

When the body control module (BCM) is in the learn coded key state, the BCM checks the current key to ensure it has been configured as a proper vehicle key.

Conditions for Running the DTC

- Ignition is in the Accessory or Run position.
- The BCM is in the learn coded key state.

Conditions for Setting the DTC

The BCM has determined the current key is not configured as a proper vehicle key.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a properly configured vehicle key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to

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clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, replace the suspected inoperative or malfunctioning key. If the DTC resets, replace the K9 Body Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Replacing Keys

DTC B3984

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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DTC Descriptor

DTC B3984 00

Device 1 Environment Identifier Not Programmable

Circuit/System Description

When certain modules are programmed and configured during installation, the module learns a specific environment identifier which is unique to the vehicle. The environment identifier is used to prevent swapping modules between vehicles. The body control module (BCM) is the keeper of the environment identifier. Various control modules each learn the environment identifier during their configuration process. During vehicle operation, each of these modules compare their environment identifier to that of the BCM. If the identifiers match, vehicle starting is allowed. If an environment identifier does not match, vehicle starting is disabled.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The environment identifier is incorrect or not programmed

Action Taken When the DTC Sets

- The security indicator will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

A current DTC will be cleared when the module learns a correct environment identifier.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Programming and Setup procedure for the appropriate control module. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC P0513

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0513

Immobilizer Key Incorrect

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via serial data. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

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The calculated response from the BCM does not equal the calculation performed by the ECM.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid calculation is received.
- A history DTC will be cleared after 40 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Diagnostic Aids

The key referenced in the DTC descriptor does not refer to the vehicle key. In this case, key is referring to the challenge response.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any

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immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

DTC P0633

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0633

Immobilizer Key Not Programmed

Circuit/System Description

When learning the security code, as well as the challenge and response sequence, the engine control module (ECM) is placed in learn mode. DTC P0633 will set automatically as an indicator that the system is in learn mode and not as a fault indicator. Once the security code and challenge/response are learned, learn mode will be exited when the engine is successfully started. If the ECM does not exit learn mode, P0633 will remain current and indicate a fault.

Conditions for Running the DTC

The ECM is in learn mode.

Conditions for Setting the DTC

The DTC will set any time ECM enters learn mode.

Action Taken When the DTC Sets

The security indicator in the instrument cluster will illuminate.

Conditions for Clearing the DTC

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- A current DTC will be cleared upon a successful engine start after exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Diagnostic Aids

The key referenced in the DTC descriptor does not refer to the vehicle key. In this case, key is referring to the challenge response.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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Control Module References for ECM replacement, setup, and programming

DTC P162B

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P162B

Remote Vehicle Speed Limiting Signal Message Counter Incorrect

Circuit/System Description

When a Slow-Down request is sent from OnStar® the vehicle communication interface module (VCIM) sends a serial data message to the engine control module (ECM) indicating that reduced vehicle speed has been requested. Once the request is active the ECM begins reducing engine torque to match requested vehicle speed and a REDUCED ENGINE POWER indications is displayed. No DTCs will be set during this process.

The ECM monitoring the serial data message for specific validity traits. If the ECM determines that the validity of the message is in error DTC P162B will be set.

Conditions for Running the DTC

- The engine run time is greater than 5 seconds.
- No other serial data errors are present.

Conditions for Setting the DTC

- The VIN embedded in the Slow-Down serial data request does not match the VIN stored in the ECM.
- The rolling code counter embedded in the Slow-Down serial data request does not increment for 10 consecutive messages.

Action Taken When the DTC Sets

- ECM disregards all reduced vehicle speed request messages from the VCIM.
- The ECM stores DTC P162B in ECM history.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

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- A scan tool clear DTC request is performed.

Reference Information

Description and Operation

Remote Vehicle Speed Limiting Description and Operation (Stolen Vehicle Slow-Down)

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Stolen Vehicle Slow-Down Clear with a scan tool. If the DTC resets, replace the VCIM. If the DTC resets again, replace the ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for VCIM and ECM replacement, setup, and programming

DTC P1631

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1631

Immobilizer Fuel Enable Signal Not Correct

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via serial data. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

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Conditions for Setting the DTC

The ECM receives an incorrect security code from the BCM.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a correct security code is received.
- A history DTC will be cleared after 40 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

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If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup and programming

DTC P1648

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1648

Immobilizer Security Code Incorrect

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via the serial data circuit. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The security code received by the ECM is incorrect.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid security code is received.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to

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clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

DTC P1649

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1649

Immobilizer Security Code Not Programmed

Circuit/System Description

When learning the security code, as well as the challenge and response sequence, the engine control module (ECM) is placed in learn mode. Once the security code and challenge/response are learned, learn mode will be exited when the engine is successfully started.

Conditions for Running the DTC

The ECM is in learn mode.

Conditions for Setting the DTC

The ECM is not programmed.

Action Taken When the DTC Sets

The security indicator in the instrument cluster will illuminate.

Conditions for Clearing the DTC

- A current DTC will be cleared upon a successful engine start after exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

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Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

SYMPTOMS - IMMOBILIZER

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data links.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Immobilizer Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the systems. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

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Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to **Hood Ajar Indicator/Message Malfunction** in order to diagnose the symptom.

SYMPTOMS - REDUCED ENGINE POWER MESSAGE

Verification

Verify the vehicle is not in an OnStar initiated Stolen Vehicle Slow-Down mode. Look for a Reduced Engine Power message.

- If in the Stolen Vehicle Slow-Down mode, perform the OnStar vehicle interface communication module (VCIM) Stolen Vehicle Slow-Down Clear with a scan tool. After performing the clear event procedure, press the Blue OnStar® button to inform the advisor that you need to be transferred to the Stolen Vehicle team to have the vehicle account updated.

HOOD AJAR INDICATOR/MESSAGE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3006 01

Hood Ajar Circuit Short to Battery

DTC B3006 02

Hood Ajar Circuit Short to Ground

DTC B3006 04

Hood Ajar Circuit Open Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B3006 02	B3006 04	B3006 01	-
Ground	-	B3006 04	-	-

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Circuit/System Description

The body control module (BCM) monitors the voltage input of the hood ajar switch signal circuit.

Conditions for Running the DTC

The BCM continuously monitors for this DTC

Conditions for Setting the DTC

B3006 01

The BCM detects that the hood ajar switch signal circuit is shorted to battery.

B3006 02

The BCM detects that the hood ajar switch signal circuit is shorted to ground.

B3006 04

The BCM detects that the hood ajar switch signal circuit is open.

Action Taken When the DTC Sets

- Remove vehicle start functions are disabled
- Content theft deterrent ignores the hood ajar switch

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

- **Immobilizer Schematics**
- **Remote Function Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool BCM Hood Position parameter. With the hood open, the Hood Position parameter should read open. With the hood closed, the Hood Position parameter should read closed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B55 Hood Ajar Switch.
2. Ignition OFF, test for less than 8 ohms between the ground circuit terminal C and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for greater than 11 V between the signal circuit terminal B and ground.
    - If less than the specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 Body Control Module (BCM).
4. Disconnect the X4 harness connector at the BCM.
5. Test for less than 1 V between the signal circuit terminal 24 and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. If all circuits test normal, test or replace the B55 Hood Ajar Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Hood Primary and Secondary Latch Replacement**
- **Control Module References** for BCM replacement, programming and setup

REPAIR INSTRUCTIONS

THEFT DETERRENT MODULE REPLACEMENT

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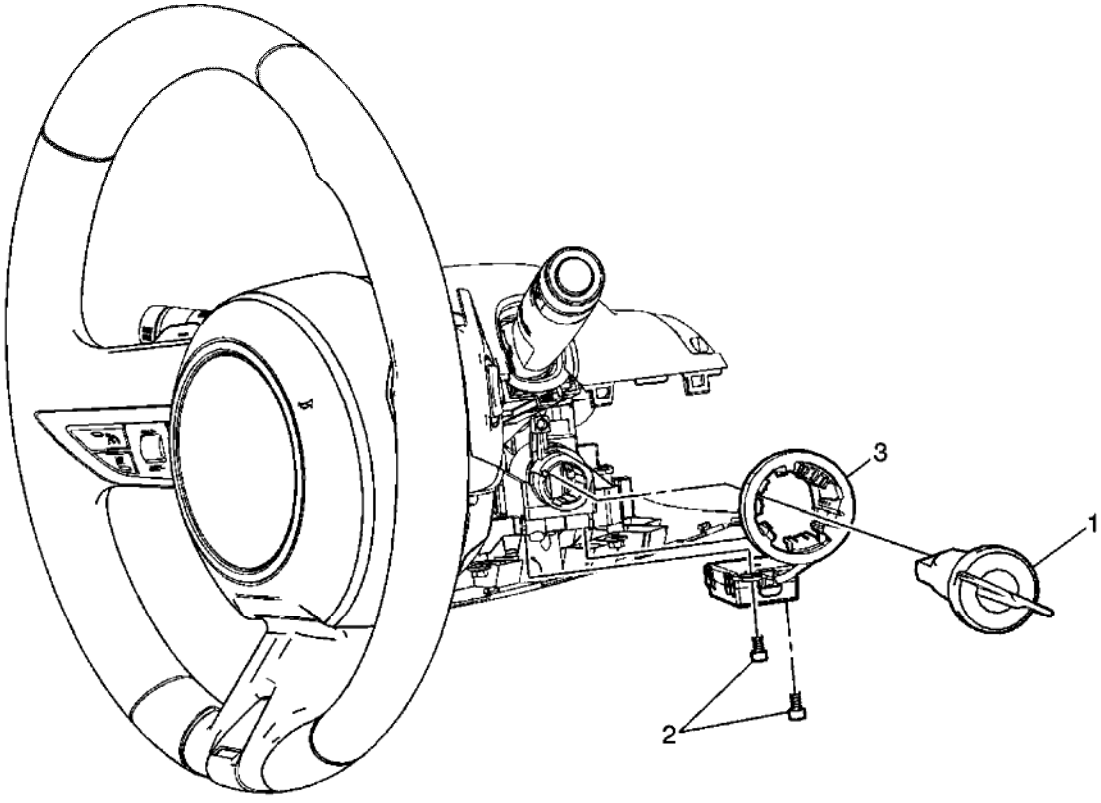


Fig. 2: Theft Deterrent Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the steering column shrouds. Refer to **Steering Column Shroud Replacement** .	
1	Ignition Lock Cylinder Refer to **Ignition Lock Cylinder Replacement**
2	Theft Deterrent Module Bolt/Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)
3	Theft Deterrent Module **Procedure** 1. Disconnect the electrical connector. 2. Refer to **Control Module References** for programming and set up procedures.

IMMOBILIZER SYSTEM COMPONENT PROGRAMMING

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Immobilizer Relearn

This relearn procedure will relearn the required communication data between the body control module (BCM) and the engine control module (ECM).

NOTE: On some vehicles the security indicator may be illuminated for the duration of the relearn procedure.

Without RPO ATH- Passive Entry

1. Connect the scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)** .
2. Perform the SPS function Immobilizer Learn-Setup.
3. Perform the appropriate SPS function from the menu and follow the on-screen instructions.

With RPO ATH- Passive Entry

1. Connect the scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)** .
2. Perform the SPS function Body Control Module-Setup in SPS.
3. Select and perform the SPS function Brake Pedal Position Sensor Learn and follow the on-screen instructions.
4. Perform the SPS function Immobilizer Learn-Setup.
5. Perform the appropriate SPS function from the menu and follow the on-screen instructions

ADDING KEYS (NORTH AMERICA, EXCEPT CANADA)

NOTE:

- **To initiate, this procedures requires that a learned master key be available.**
- **A total of 10 keys may be programmed to a single vehicle.**
- **This procedure adds keys only. The procedure does not erase previously learned keys.**
- **The keys to be learned must duplicate the mechanical cut of the current key.**
- **If more than one valet key is to be learned, immediately precede each valet key with a learned master key.**

1. With a previously learned master key, turn ON the ignition, with the engine OFF.
2. Turn OFF the ignition and remove the key.
3. Within 10 seconds of turning OFF the ignition, insert the key to be learned and turn ON the ignition. The vehicle has now learned the new key.

ADDING KEYS (CANADA)

NOTE:

- **To initiate, this procedures requires that 2 learned master keys be available.**

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- **A total of 10 master keys or valet keys may be programmed to a single vehicle.**
- **This procedure adds keys only. The procedure does not erase previously learned keys.**
- **The keys to be learned must duplicate the mechanical cut of the current key.**
- **If more than one valet key is to be learned, immediately precede each valet key with a learned master key.**

1. With the first previously learned vehicle key, turn ON the ignition, with the engine OFF.
2. Turn OFF the ignition and remove the key.
3. With the second previously learned vehicle key, turn ON the ignition, with the engine OFF.
4. Turn OFF the ignition and remove the key.
5. Within 10 seconds insert the key to be learned. Turn ON the ignition with the engine OFF. The vehicle has now learned the new key.

REPLACING KEYS

Vehicle Key Relearn

NOTE: This procedure will only relearn the vehicle keys. This procedure will not learn the immobilizer pre-release password or the challenge/response data. Do not use this procedure as a substitute for a relearn when replacing or reprogramming a body control module (BCM) or engine control module (ECM). Doing so will result in a module that will not learn the pre-release password and/or the challenge/response data.

This procedure should be used when all vehicle keys are to be replaced or reprogrammed. The procedure will erase all previously learned vehicle keys from the BCM. Once the relearn procedure has been completed, any remaining vehicle keys may be programmed using the Adding Keys procedure to ensure their continued functionality.

1. With a scan tool, access Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)** .
2. On the SPS Supported Controllers screen, select IMMO Immobilizer Learn - Setup.
3. On the Validate/Select Vehicle Data screen, select Program Transponder or Remote Key (Add) and follow the on-screen instructions.
4. With a scan tool, clear any DTCs.
5. If additional keys are required to be learned, refer to **Adding Keys (North America, except Canada)** or **Adding Keys (Canada)**.

DESCRIPTION AND OPERATION

IMMOBILIZER DESCRIPTION AND OPERATION

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The immobilizer system functions are provided by the body control module (BCM) and the engine control module (ECM), as well as any modules which store and report the security code.

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the encrypted code in the key is energized by the immobilizer coil surrounding the ignition lock cylinder. This immobilizer coil is part of the immobilizer antenna. The encrypted code transmits a signal that contains its unique value, which is received by the BCM. The BCM then compares this value to a value stored in memory. The BCM also monitors various modules to determine that the stored environment ID matches.

If both the environment ID and the value received from the transponder match, the BCM will send the prerelease password via serial data to the ECM. If the encrypted codes unique value is incorrect or the environment ID does not match, the BCM will send the fuel disable message to the ECM.

When the ECM receives the BCM prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the BCM via serial data. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The components of the theft system are as follows:

- BCM
- ECM
- Immobilizer antenna
- Ignition key/fob
- Security indicator
- Various modules which store and report the environment ID are BCM, IPC, HVAC, EBCM, ECM and SDM

BCM is programmed with the environment ID at the manufacturer.

Body Control Module (BCM)

The immobilizer system is an integral part of the BCM and is controlled internally within the BCM. The BCM can learn up to 8 keys/fob (transponder values).

The BCM uses the following inputs:

- Environment ID exchange with various modules
- Encrypted code from key/fob from immobilizer coil

The BCM uses the following outputs:

- Prerelease password communication with ECM
- Challenge/response with ECM

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the encrypted

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code in the key is energized by the immobilizer coil surrounding the ignition lock cylinder. The energized transponder transmits a signal that contains its unique value, which is received by the BCM. The BCM then compares this value to the learned key code stored in memory. The BCM then performs one of the following functions:

- If the encrypted code value matches the values stored in the BCM memory, the BCM will send the prerelease password to the ECM via serial data.
- If the encrypted code unique value does not match the value stored in the BCM, the BCM will send the start disable message to the ECM via serial data.
- If the BCM is unable to measure the ignition key encrypted code value, the BCM will not send any messages to the ECM.

Engine Control Module (ECM)

When the ECM receives the BCM prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the BCM via the serial data circuit. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The ECM will disable vehicle starting if any of the following conditions occur:

- The prerelease password is invalid.
- The start disable password is sent by the BCM.
- No passwords are received. There is no communication with the BCM.
- The BCM calculated response to the challenge does not equal the calculation performed by the ECM.

Immobilizer Antenna

The immobilizer antenna contains an immobilizer coil which surrounds the ignition cylinder. The coil passively powers the key/fob located in the ignition key when the key is in the ignition. When powered, the key/fob transmits its unique value to the immobilizer antenna, which is then relayed to the BCM via a LIN serial data circuit. The immobilizer antenna also receives B+ and ground from the BCM.

Immobilizer antenna is used to:

1. Learn key/keys
2. To start vehicle with or without RF interference
3. To start vehicle when key/fob battery is dead

The Ignition Key/Fob

The ignition key/fob encrypted value is fixed and unable to be changed. The immobilizer system uses the ignition key transponder value to determine if a valid ignition key is being used to start the vehicle. There are approximately 3 trillion possible encrypted code values. There are no visible electrical contacts. The keys are identified by + symbol in a circle stamped into the steel shank of the key.

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Environment ID

Various modules throughout the vehicle learn a specific environment ID during the module programming process. The environment ID learned by each individual module matches the security code stored in the BCM, which is the environment ID master. Prior to starting, each of the modules which store a environment ID will compare their ID to that of the ID stored in the BCM. If all the IDs match, the engine starting process will continue. If the environment ID do not match, engine starting will be disabled.

Security Indicator

The BCM will command the instrument panel cluster to illuminate the security indicator when the ignition key is in the ON position to indicate a fault is noted in the immobilizer system and when the engine starting is disabled.

REMOTE VEHICLE SPEED LIMITING DESCRIPTION AND OPERATION (STOLEN VEHICLE SLOW-DOWN)

Certain vehicles equipped with OnStar® now have an additional feature that allows for remote limiting of the vehicle's speed. This OnStar® feature is called Stolen Vehicle Slow-Down and is now part of the OnStar® Stolen Vehicle Assistance service. This feature, when used in conjunction with local law enforcement and strict guidelines at the OnStar® Call Center, will slow the vehicle by interacting with the engine control system.

When the engine control system receives a valid request from the OnStar® telematics communications interface module, it will enter into a reduced engine power/vehicle speed limiting mode, which will decelerate the vehicle. Once the request is active the engine control module begins reducing engine torque to match requested vehicle speed and a REDUCED ENGINE POWER indication is displayed. No DTCs will be set during this process.

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Immobilizer - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Theft Deterrent Module Bolt/Screw	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

IMMOBILIZER SCHEMATICS

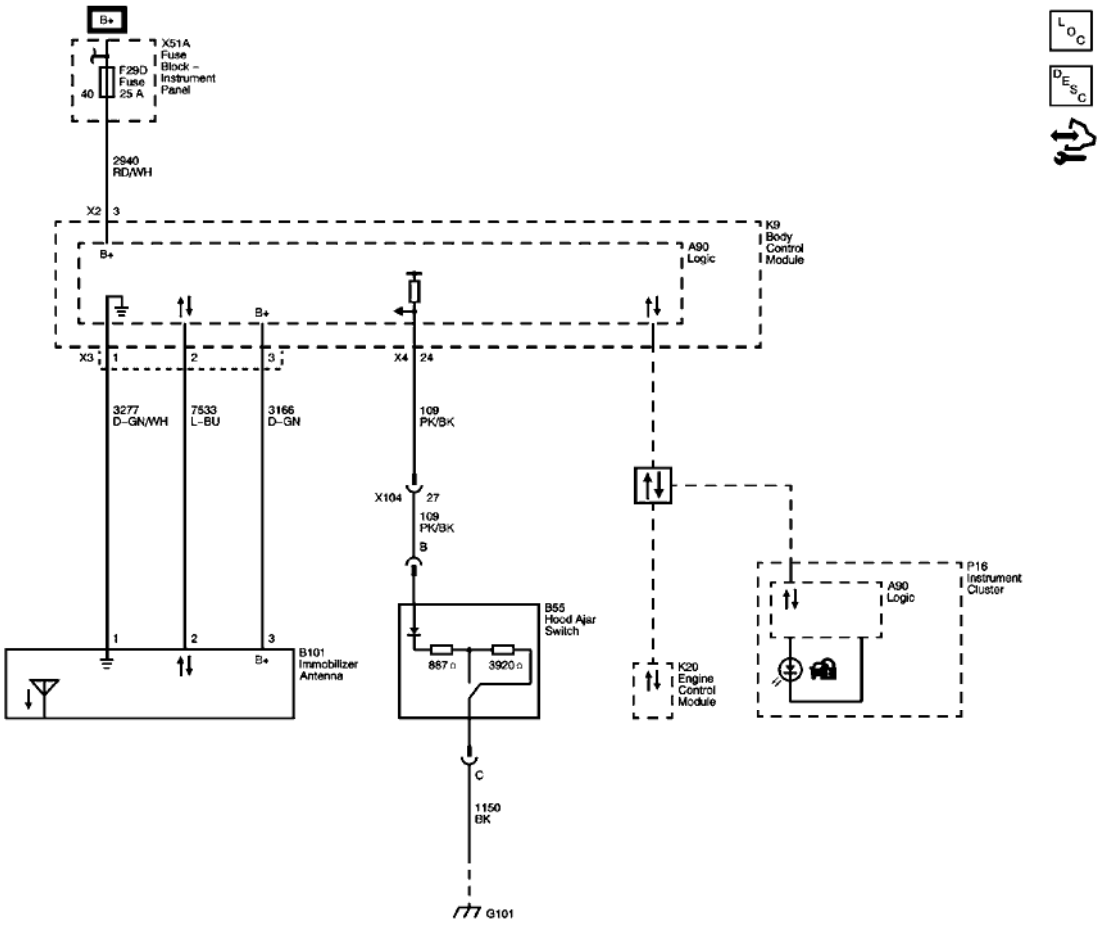


Fig. 1: Immobilizer
Courtesy of GENERAL MOTORS CORP.

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DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2955	B2955: Security Sensor Data Circuit Malfunction
DTC B3006	B3006 01: Hood Ajar Circuit Short to Battery B3006 02: Hood Ajar Circuit Short to Ground B3006 04: Hood Ajar Circuit Open Circuit
DTC B302A	B302A 00: Telematic Requested Immobilization
DTC B3031	B3031 00: Security System Controller In Learn Mode
DTC B3055	B3055 00: No Transponder Modulation or No Transponder
DTC B3060	B3060 00: Unprogrammed Transponder Identification Code Received
DTC B3902	B3902 00: Incorrect Immobilizer Identifier Received
DTC B3935	B3935 00: Transponder Authentication Error
DTC B3976	B3976 00: Unconfigured Transponder
DTC B3984	B3984 00: Device 1 Environment Identifier Not Programmable
DTC P0513	P0513: Immobilizer Key Incorrect
DTC P0633	P0633: Immobilizer Key Not Programmed
DTC P162B	P162B: Remote Vehicle Speed Limiting Signal Message Counter Incorrect
DTC P1631	P1631: Immobilizer Fuel Enable Signal Not Correct
DTC P1648	P1648: Immobilizer Security Code Incorrect
DTC P1649	P1649: Immobilizer Security Code Not Programmed

DTC B2955

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2955

Security Sensor Data Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

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B+	B2955	B2955	-	-
Serial Data	B2955	B2955	B2955	B2955
Low Reference	-	B2955	-	-

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils surrounding the ignition lock cylinder. The transponder transmits a signal to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

- The BCM is unable to measure the ignition key transponder value.
- On B+ circuit 3166, there is a 65 second delay before communications with the immobilizer antenna. After the time delay, a no response must occur for two of these cycles. 2.5 minutes must lapse before this DTC sets.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator in the instrument cluster will be illuminated. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Inspect all available vehicle keys that they are correct vehicle keys.
    - If not a correct vehicle key, replace the key.
2. While viewing the scan tool BCM Data Display, Immobilizer Data, Key Part Number, turn ON the ignition with each of the available vehicle keys. The parameter should read a Key Part Number with all available keys.
    - If only one key results in the parameter reading no Part Number, replace the appropriate key.
3. Ignition OFF, disconnect the harness connector at the B101 Immobilizer Antenna.
4. Test for less than 10 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Ignition ON, test for more than 10 V between the serial data circuit terminal 2 and ground.
    - If less than the specified range, test the serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. Ignition ON. Test for B+ between the B+ circuit terminal 3 and ground.
    - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, replace the B101 Immobilizer Antenna.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for control module replacement, setup, and programming

DTC B3006

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3006 01

Hood Ajar Circuit Short to Battery

DTC B3006 02

Hood Ajar Circuit Short to Ground

DTC B3006 04

Hood Ajar Circuit Open Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B3006 02	B3006 04	B3006 01	-
Ground	-	B3006 04	-	-

Circuit/System Description

The body control module (BCM) monitors the voltage input of the hood ajar switch signal circuit.

Conditions for Running the DTC

The BCM continuously monitors for this DTC

Conditions for Setting the DTC

B3006 01

The BCM detects that the hood ajar switch signal circuit is shorted to battery.

B3006 02

The BCM detects that the hood ajar switch signal circuit is shorted to ground.

B3006 04

The BCM detects that the hood ajar switch signal circuit is open.

Action Taken When the DTC Sets

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- Remove vehicle start functions are disabled
- Content theft deterrent ignores the hood ajar switch

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

- **Immobilizer Schematics**
- **Remote Function Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool BCM Hood Position parameter. With the hood open, the Hood Position parameter should read open. With the hood closed, the Hood Position parameter should read closed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B55 Hood Ajar Switch.
2. Ignition OFF, test for less than 8 ohms between the ground circuit terminal C and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for greater than 11 V between the signal circuit terminal B and ground.

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    - If less than the specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 Body Control Module (BCM).
4. Disconnect the X4 harness connector at the BCM.
5. Test for less than 1 V between the signal circuit terminal 24 and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. If all circuits test normal, test or replace the B55 Hood Ajar Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Hood Primary and Secondary Latch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B302A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B302A 00

Telematic Requested Immobilization

Circuit/System Description

As part of the vehicle telematics enhanced services, a request may be sent to the theft deterrent module (TDM) to disable vehicle starting. If a valid message is received by the TDM requesting that starting be disabled, the start enable message will not be sent to the engine control module (ECM).

Conditions for Setting the DTC

A valid start disable from telematics will set DTC B302A only as a history DTC.

Action Taken When the DTC Sets

Vehicle starting will be suspended and the security indicator will be illuminated.

Conditions for Clearing the DTC

- A current DTC will clear when the telematic start disable request is no longer seen.
- A history DTC will clear after 100 ignition cycles in which the telematic start disable request is not seen.

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Diagnostic Aids

DTC B302A is only an indicator that a start disable request has been received from the vehicle telematics system and does not indicate a fault in the immobilizer system. DTC B302A will only set as a history DTC.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. With a master vehicle key, turn the ignition ON.
2. Observe the security indicator. After approximately 10 minutes, the indicator will turn off.
3. Turn the ignition OFF and wait 5 seconds.
4. Repeat steps 2-4 two more times for a total of 3 cycles or 30 minutes.
5. With a master vehicle key, turn the ignition ON. The start disable will now be cleared.
6. Using the Red Emergency Button, notify the advisor that the Ignition Block on the vehicle has been cleared and to update the account status.

DTC B3031

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3031 00

Security System Controller In Learn Mode

Circuit/System Description

When learning a coded key, the body control module (BCM) is placed in learn mode. DTC B3031 will set automatically as an indicator that the system is in learn mode and not as a fault indicator. Once the coded key is learned, learn mode will be exited and the DTC cleared. If the BCM does not exit learn mode, B3031 will remain current and indicate a fault. The instrument cluster security indicator will turn ON and the driver information center will display a message.

Conditions for Running the DTC

The immobilizer system is the learn coded keys state.

Conditions for Setting the DTC

The BCM is in the learn coded keys state.

Action Taken When the DTC Sets

The security indicator will illuminate. The driver information center will display a message.

Conditions for Clearing the DTC

- A current DTC will be cleared upon the successful exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Perform the Vehicle Key Relearn procedure. Refer to **Replacing Keys**. The BCM should learn the key and exit the learn coded key state.

- If the BCM does not exit the learn coded key state after the programming attempt, replace the K9 Body Control Module (BCM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming.

DTC B3055

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3055 00

No Transponder Modulation or No Transponder

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B3055 00	B3055 00	-	-

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Serial Data	B3055 00	B3055 00	B3055 00	B3055 00
Low Reference	-	B3055 00	-	-

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

The BCM is unable to measure the ignition key transponder value.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Inspect all available vehicle keys that they are correct vehicle keys.
    - If not a correct vehicle key, replace the key.
2. While viewing the scan tool BCM Key Part Number, turn ON the ignition with each of the available vehicle keys. The parameter should read a Key Part Number for all available keys.
    - If only one key result in the parameter not reading a Key Part Number, replace the appropriate key.
    - If all keys result in the parameter not reading a Key Part Number, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the K64 Theft Deterrent Module.
2. Ignition OFF, test for less than 10ohms between the low reference circuit terminal 1 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K64 Theft Deterrent Module.
3. Ignition ON, test for B+ between the ignition circuit terminal 3 and ground.
    - If not the specified value, test the ignition circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K64 Theft Deterrent Module.
4. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
5. Ignition ON, test for less than 1 V between the signal circuit terminal 2 at the K9 Body Control Module harness connector and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. Ignition OFF, test for infinite resistance between the signal circuit terminal 2 at the K9 Body Control Module harness connector and ground.
    - If less than the specified range, test the signal circuit for a short to ground.
7. Test for less than 1ohms between the signal circuit terminal 2 at the K9 Body Control Module harness connector and the signal circuit terminal 2 at the K64 Theft Deterrent Module harness connector.
    - If greater than the specified range, test the signal circuit for an open/high resistance.
8. If all circuits test normal, replace the K64 Theft Deterrent Module.
9. Ignition ON, verify DTC B3055 is not set as current.
    - If the DTC is set, replace the K9 Body Control Module.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM and theft deterrent module replacement, setup, and programming.

DTC B3060

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3060 00

Unprogrammed Transponder Identification Code Received

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

Ignition is in the Accessory or Run position.

Conditions for Setting the DTC

The transponder value measured by the BCM is incorrect or not learned to the vehicle.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. The driver information center will display a service message.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a valid transponder value from the ignition key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

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Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Perform the Vehicle Key Relearn procedure. Refer to **Replacing Keys**.
2. While viewing the scan tool BCM Transponder Authentication parameter, turn ON the ignition with each of the available vehicle keys. The parameter should read Active with all available keys.
    - If not the specified value, replace the appropriate key.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM replacement, setup, and programming

DTC B3902

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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DTC Descriptor

DTC B3902 00

Incorrect Immobilizer Identifier Received

Circuit/System Description

When certain modules are programmed and configured during installation, the module learns a specific immobilizer identifier which is unique to the vehicle. The immobilizer identifier is used to prevent swapping modules between vehicles. The body control module (BCM) is the keeper of the immobilizer identifier. Various control modules each learn the immobilizer identifier during their configuration process. During vehicle operation, each of these modules compare their immobilizer identifier to that of the BCM. If the identifiers match, vehicle starting is allowed. If an immobilizer identifier does not match, vehicle starting is disabled.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The immobilizer identifier between the control module and the BCM does not match.

Action Taken When the DTC Sets

- The security indicator will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

A current DTC will be cleared when the immobilizer identifiers match between the module and the BCM.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Programming and Setup procedure for the appropriate control module. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC B3935

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3935 00

Transponder Authentication Error

Circuit/System Description

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the key is energized by the exciter coils located in the theft deterrent module. The transponder transmits a signal that is received by the theft deterrent module and is sent to the body control module (BCM). The BCM then compares this value to a value stored in memory. If the value is correct, the BCM will send the prerelease password via the serial data circuit to the engine control module (ECM). If the learned key code does not match or a transponder value is not received, the BCM will send the start disable password to the ECM.

Conditions for Running the DTC

- Ignition is in the Accessory or Run position.

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- A valid transponder value has been read.

Conditions for Setting the DTC

- The transponder value is valid and matches the value stored in the BCM memory.
- The transponder calculation of the challenge from the BCM does not match the BCM calculation.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. The driver information center will display a service message.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid transponder value has been read and authenticated.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, replace the suspected inoperative or malfunctioning key. If the DTC resets, replace the K9

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Body Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for BCM replacement, setup, and programming

DTC B3976

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3976 00

Unconfigured Transponder

Circuit/System Description

When the body control module (BCM) is in the learn coded key state, the BCM checks the current key to ensure it has been configured as a proper vehicle key.

Conditions for Running the DTC

- Ignition is in the Accessory or Run position.
- The BCM is in the learn coded key state.

Conditions for Setting the DTC

The BCM has determined the current key is not configured as a proper vehicle key.

Action Taken When the DTC Sets

- Vehicle starting will be disabled.
- The security indicator will illuminate. A service message will be displayed in the driver information center.

Conditions for Clearing the DTC

- A current DTC will be cleared when the BCM detects a properly configured vehicle key.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to

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clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, replace the suspected inoperative or malfunctioning key. If the DTC resets, replace the K9 Body Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Replacing Keys

DTC B3984

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

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DTC Descriptor

DTC B3984 00

Device 1 Environment Identifier Not Programmable

Circuit/System Description

When certain modules are programmed and configured during installation, the module learns a specific environment identifier which is unique to the vehicle. The environment identifier is used to prevent swapping modules between vehicles. The body control module (BCM) is the keeper of the environment identifier. Various control modules each learn the environment identifier during their configuration process. During vehicle operation, each of these modules compare their environment identifier to that of the BCM. If the identifiers match, vehicle starting is allowed. If an environment identifier does not match, vehicle starting is disabled.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The environment identifier is incorrect or not programmed

Action Taken When the DTC Sets

- The security indicator will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

A current DTC will be cleared when the module learns a correct environment identifier.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Programming and Setup procedure for the appropriate control module. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC P0513

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0513

Immobilizer Key Incorrect

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via serial data. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

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The calculated response from the BCM does not equal the calculation performed by the ECM.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid calculation is received.
- A history DTC will be cleared after 40 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Diagnostic Aids

The key referenced in the DTC descriptor does not refer to the vehicle key. In this case, key is referring to the challenge response.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any

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immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

DTC P0633

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P0633

Immobilizer Key Not Programmed

Circuit/System Description

When learning the security code, as well as the challenge and response sequence, the engine control module (ECM) is placed in learn mode. DTC P0633 will set automatically as an indicator that the system is in learn mode and not as a fault indicator. Once the security code and challenge/response are learned, learn mode will be exited when the engine is successfully started. If the ECM does not exit learn mode, P0633 will remain current and indicate a fault.

Conditions for Running the DTC

The ECM is in learn mode.

Conditions for Setting the DTC

The DTC will set any time ECM enters learn mode.

Action Taken When the DTC Sets

The security indicator in the instrument cluster will illuminate.

Conditions for Clearing the DTC

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- A current DTC will be cleared upon a successful engine start after exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Diagnostic Aids

The key referenced in the DTC descriptor does not refer to the vehicle key. In this case, key is referring to the challenge response.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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Control Module References for ECM replacement, setup, and programming

DTC P162B

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P162B

Remote Vehicle Speed Limiting Signal Message Counter Incorrect

Circuit/System Description

When a Slow-Down request is sent from OnStar® the vehicle communication interface module (VCIM) sends a serial data message to the engine control module (ECM) indicating that reduced vehicle speed has been requested. Once the request is active the ECM begins reducing engine torque to match requested vehicle speed and a REDUCED ENGINE POWER indications is displayed. No DTCs will be set during this process.

The ECM monitoring the serial data message for specific validity traits. If the ECM determines that the validity of the message is in error DTC P162B will be set.

Conditions for Running the DTC

- The engine run time is greater than 5 seconds.
- No other serial data errors are present.

Conditions for Setting the DTC

- The VIN embedded in the Slow-Down serial data request does not match the VIN stored in the ECM.
- The rolling code counter embedded in the Slow-Down serial data request does not increment for 10 consecutive messages.

Action Taken When the DTC Sets

- ECM disregards all reduced vehicle speed request messages from the VCIM.
- The ECM stores DTC P162B in ECM history.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

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- A scan tool clear DTC request is performed.

Reference Information

Description and Operation

Remote Vehicle Speed Limiting Description and Operation (Stolen Vehicle Slow-Down)

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

If the DTC is set, perform the Stolen Vehicle Slow-Down Clear with a scan tool. If the DTC resets, replace the VCIM. If the DTC resets again, replace the ECM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for VCIM and ECM replacement, setup, and programming

DTC P1631

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1631

Immobilizer Fuel Enable Signal Not Correct

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via serial data. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

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Conditions for Setting the DTC

The ECM receives an incorrect security code from the BCM.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a correct security code is received.
- A history DTC will be cleared after 40 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

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If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup and programming

DTC P1648

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1648

Immobilizer Security Code Incorrect

Circuit/System Description

The body control module (BCM) sends the security code to the engine control module (ECM) via the serial data circuit. The ECM then sends a challenge to the BCM. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Conditions for Running the DTC

Ignition is in the ACCESSORY or RUN position.

Conditions for Setting the DTC

The security code received by the ECM is incorrect.

Action Taken When the DTC Sets

- The security indicator in the instrument cluster will illuminate.
- Vehicle starting will be disabled.

Conditions for Clearing the DTC

- A current DTC will be cleared when a valid security code is received.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to

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clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

DTC P1649

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC P1649

Immobilizer Security Code Not Programmed

Circuit/System Description

When learning the security code, as well as the challenge and response sequence, the engine control module (ECM) is placed in learn mode. Once the security code and challenge/response are learned, learn mode will be exited when the engine is successfully started.

Conditions for Running the DTC

The ECM is in learn mode.

Conditions for Setting the DTC

The ECM is not programmed.

Action Taken When the DTC Sets

The security indicator in the instrument cluster will illuminate.

Conditions for Clearing the DTC

- A current DTC will be cleared upon a successful engine start after exit of learn mode.
- A history DTC will be cleared after 100 malfunction-free ignition cycles or when a scan tool is used to clear DTCs.

Reference Information

Schematic Reference

Immobilizer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Immobilizer Description and Operation

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Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Because of normal system communications between the BCM and ECM, any immobilizer B-codes must be diagnosed prior to the diagnosis of P-codes. Refer to the appropriate DTC.

If the DTC is set, perform the Immobilizer Relearn procedure. Refer to **Immobilizer System Component Programming**. If the DTC resets, replace the K20 Engine Control Module (ECM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for ECM replacement, setup, and programming

SYMPTOMS - IMMOBILIZER

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data links.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Immobilizer Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the systems. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

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Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to **Hood Ajar Indicator/Message Malfunction** in order to diagnose the symptom.

SYMPTOMS - REDUCED ENGINE POWER MESSAGE

Verification

Verify the vehicle is not in an OnStar initiated Stolen Vehicle Slow-Down mode. Look for a Reduced Engine Power message.

- If in the Stolen Vehicle Slow-Down mode, perform the OnStar vehicle interface communication module (VCIM) Stolen Vehicle Slow-Down Clear with a scan tool. After performing the clear event procedure, press the Blue OnStar® button to inform the advisor that you need to be transferred to the Stolen Vehicle team to have the vehicle account updated.

HOOD AJAR INDICATOR/MESSAGE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3006 01

Hood Ajar Circuit Short to Battery

DTC B3006 02

Hood Ajar Circuit Short to Ground

DTC B3006 04

Hood Ajar Circuit Open Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B3006 02	B3006 04	B3006 01	-
Ground	-	B3006 04	-	-

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Circuit/System Description

The body control module (BCM) monitors the voltage input of the hood ajar switch signal circuit.

Conditions for Running the DTC

The BCM continuously monitors for this DTC

Conditions for Setting the DTC

B3006 01

The BCM detects that the hood ajar switch signal circuit is shorted to battery.

B3006 02

The BCM detects that the hood ajar switch signal circuit is shorted to ground.

B3006 04

The BCM detects that the hood ajar switch signal circuit is open.

Action Taken When the DTC Sets

- Remove vehicle start functions are disabled
- Content theft deterrent ignores the hood ajar switch

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

- **Immobilizer Schematics**
- **Remote Function Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool BCM Hood Position parameter. With the hood open, the Hood Position parameter should read open. With the hood closed, the Hood Position parameter should read closed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B55 Hood Ajar Switch.
2. Ignition OFF, test for less than 8 ohms between the ground circuit terminal C and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for greater than 11 V between the signal circuit terminal B and ground.
    - If less than the specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 Body Control Module (BCM).
4. Disconnect the X4 harness connector at the BCM.
5. Test for less than 1 V between the signal circuit terminal 24 and ground.
    - If greater than the specified range, test the signal circuit for a short to voltage.
6. If all circuits test normal, test or replace the B55 Hood Ajar Switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Hood Primary and Secondary Latch Replacement**
- **Control Module References** for BCM replacement, programming and setup

REPAIR INSTRUCTIONS

THEFT DETERRENT MODULE REPLACEMENT

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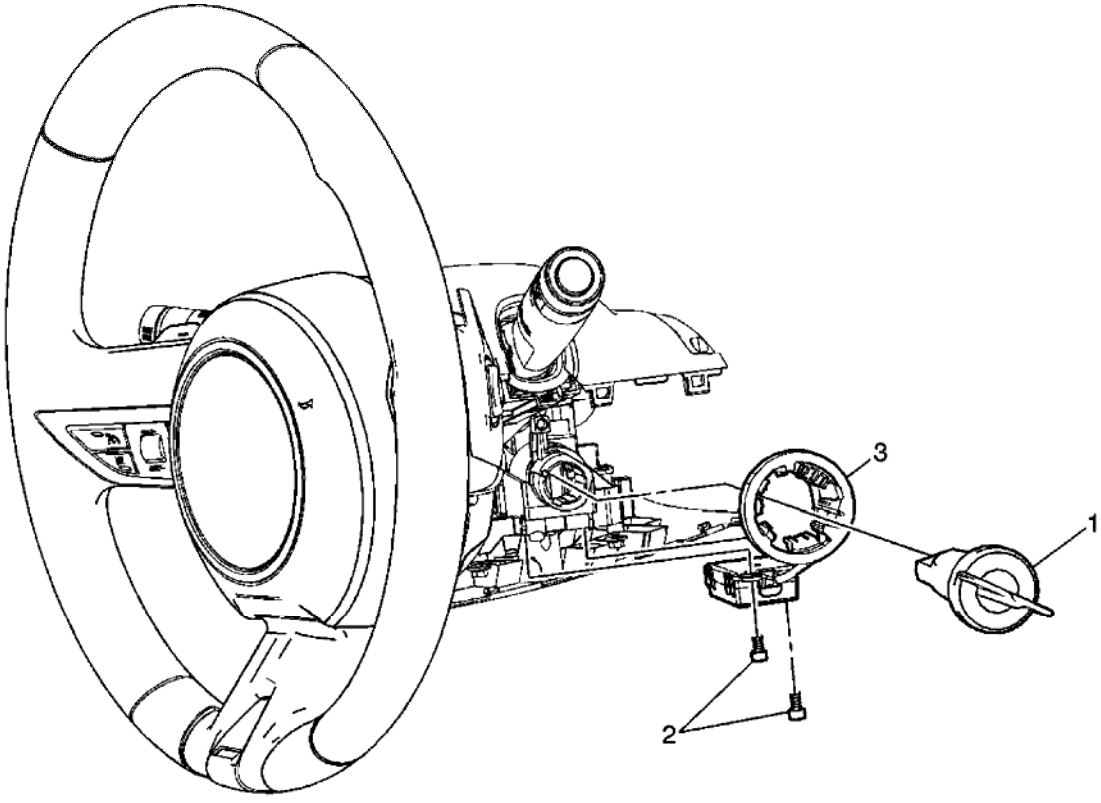


Fig. 2: Theft Deterrent Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the steering column shrouds. Refer to **Steering Column Shroud Replacement** .	
1	Ignition Lock Cylinder Refer to **Ignition Lock Cylinder Replacement**
2	Theft Deterrent Module Bolt/Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)
3	Theft Deterrent Module **Procedure** 1. Disconnect the electrical connector. 2. Refer to **Control Module References** for programming and set up procedures.

IMMOBILIZER SYSTEM COMPONENT PROGRAMMING

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Immobilizer Relearn

This relearn procedure will relearn the required communication data between the body control module (BCM) and the engine control module (ECM).

NOTE: On some vehicles the security indicator may be illuminated for the duration of the relearn procedure.

Without RPO ATH- Passive Entry

1. Connect the scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)** .
2. Perform the SPS function Immobilizer Learn-Setup.
3. Perform the appropriate SPS function from the menu and follow the on-screen instructions.

With RPO ATH- Passive Entry

1. Connect the scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)** .
2. Perform the SPS function Body Control Module-Setup in SPS.
3. Select and perform the SPS function Brake Pedal Position Sensor Learn and follow the on-screen instructions.
4. Perform the SPS function Immobilizer Learn-Setup.
5. Perform the appropriate SPS function from the menu and follow the on-screen instructions

ADDING KEYS (NORTH AMERICA, EXCEPT CANADA)

NOTE:

- **To initiate, this procedures requires that a learned master key be available.**
- **A total of 10 keys may be programmed to a single vehicle.**
- **This procedure adds keys only. The procedure does not erase previously learned keys.**
- **The keys to be learned must duplicate the mechanical cut of the current key.**
- **If more than one valet key is to be learned, immediately precede each valet key with a learned master key.**

1. With a previously learned master key, turn ON the ignition, with the engine OFF.
2. Turn OFF the ignition and remove the key.
3. Within 10 seconds of turning OFF the ignition, insert the key to be learned and turn ON the ignition. The vehicle has now learned the new key.

ADDING KEYS (CANADA)

NOTE:

- **To initiate, this procedures requires that 2 learned master keys be available.**

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- **A total of 10 master keys or valet keys may be programmed to a single vehicle.**
- **This procedure adds keys only. The procedure does not erase previously learned keys.**
- **The keys to be learned must duplicate the mechanical cut of the current key.**
- **If more than one valet key is to be learned, immediately precede each valet key with a learned master key.**

1. With the first previously learned vehicle key, turn ON the ignition, with the engine OFF.
2. Turn OFF the ignition and remove the key.
3. With the second previously learned vehicle key, turn ON the ignition, with the engine OFF.
4. Turn OFF the ignition and remove the key.
5. Within 10 seconds insert the key to be learned. Turn ON the ignition with the engine OFF. The vehicle has now learned the new key.

REPLACING KEYS

Vehicle Key Relearn

NOTE: This procedure will only relearn the vehicle keys. This procedure will not learn the immobilizer pre-release password or the challenge/response data. Do not use this procedure as a substitute for a relearn when replacing or reprogramming a body control module (BCM) or engine control module (ECM). Doing so will result in a module that will not learn the pre-release password and/or the challenge/response data.

This procedure should be used when all vehicle keys are to be replaced or reprogrammed. The procedure will erase all previously learned vehicle keys from the BCM. Once the relearn procedure has been completed, any remaining vehicle keys may be programmed using the Adding Keys procedure to ensure their continued functionality.

1. With a scan tool, access Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)** .
2. On the SPS Supported Controllers screen, select IMMO Immobilizer Learn - Setup.
3. On the Validate/Select Vehicle Data screen, select Program Transponder or Remote Key (Add) and follow the on-screen instructions.
4. With a scan tool, clear any DTCs.
5. If additional keys are required to be learned, refer to **Adding Keys (North America, except Canada)** or **Adding Keys (Canada)**.

DESCRIPTION AND OPERATION

IMMOBILIZER DESCRIPTION AND OPERATION

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The immobilizer system functions are provided by the body control module (BCM) and the engine control module (ECM), as well as any modules which store and report the security code.

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the encrypted code in the key is energized by the immobilizer coil surrounding the ignition lock cylinder. This immobilizer coil is part of the immobilizer antenna. The encrypted code transmits a signal that contains its unique value, which is received by the BCM. The BCM then compares this value to a value stored in memory. The BCM also monitors various modules to determine that the stored environment ID matches.

If both the environment ID and the value received from the transponder match, the BCM will send the prerelease password via serial data to the ECM. If the encrypted codes unique value is incorrect or the environment ID does not match, the BCM will send the fuel disable message to the ECM.

When the ECM receives the BCM prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the BCM via serial data. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The components of the theft system are as follows:

- BCM
- ECM
- Immobilizer antenna
- Ignition key/fob
- Security indicator
- Various modules which store and report the environment ID are BCM, IPC, HVAC, EBCM, ECM and SDM

BCM is programmed with the environment ID at the manufacturer.

Body Control Module (BCM)

The immobilizer system is an integral part of the BCM and is controlled internally within the BCM. The BCM can learn up to 8 keys/fob (transponder values).

The BCM uses the following inputs:

- Environment ID exchange with various modules
- Encrypted code from key/fob from immobilizer coil

The BCM uses the following outputs:

- Prerelease password communication with ECM
- Challenge/response with ECM

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the encrypted

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code in the key is energized by the immobilizer coil surrounding the ignition lock cylinder. The energized transponder transmits a signal that contains its unique value, which is received by the BCM. The BCM then compares this value to the learned key code stored in memory. The BCM then performs one of the following functions:

- If the encrypted code value matches the values stored in the BCM memory, the BCM will send the prerelease password to the ECM via serial data.
- If the encrypted code unique value does not match the value stored in the BCM, the BCM will send the start disable message to the ECM via serial data.
- If the BCM is unable to measure the ignition key encrypted code value, the BCM will not send any messages to the ECM.

Engine Control Module (ECM)

When the ECM receives the BCM prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the BCM via the serial data circuit. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The ECM will disable vehicle starting if any of the following conditions occur:

- The prerelease password is invalid.
- The start disable password is sent by the BCM.
- No passwords are received. There is no communication with the BCM.
- The BCM calculated response to the challenge does not equal the calculation performed by the ECM.

Immobilizer Antenna

The immobilizer antenna contains an immobilizer coil which surrounds the ignition cylinder. The coil passively powers the key/fob located in the ignition key when the key is in the ignition. When powered, the key/fob transmits its unique value to the immobilizer antenna, which is then relayed to the BCM via a LIN serial data circuit. The immobilizer antenna also receives B+ and ground from the BCM.

Immobilizer antenna is used to:

1. Learn key/keys
2. To start vehicle with or without RF interference
3. To start vehicle when key/fob battery is dead

The Ignition Key/Fob

The ignition key/fob encrypted value is fixed and unable to be changed. The immobilizer system uses the ignition key transponder value to determine if a valid ignition key is being used to start the vehicle. There are approximately 3 trillion possible encrypted code values. There are no visible electrical contacts. The keys are identified by + symbol in a circle stamped into the steel shank of the key.

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Environment ID

Various modules throughout the vehicle learn a specific environment ID during the module programming process. The environment ID learned by each individual module matches the security code stored in the BCM, which is the environment ID master. Prior to starting, each of the modules which store a environment ID will compare their ID to that of the ID stored in the BCM. If all the IDs match, the engine starting process will continue. If the environment ID do not match, engine starting will be disabled.

Security Indicator

The BCM will command the instrument panel cluster to illuminate the security indicator when the ignition key is in the ON position to indicate a fault is noted in the immobilizer system and when the engine starting is disabled.

REMOTE VEHICLE SPEED LIMITING DESCRIPTION AND OPERATION (STOLEN VEHICLE SLOW-DOWN)

Certain vehicles equipped with OnStar® now have an additional feature that allows for remote limiting of the vehicle's speed. This OnStar® feature is called Stolen Vehicle Slow-Down and is now part of the OnStar® Stolen Vehicle Assistance service. This feature, when used in conjunction with local law enforcement and strict guidelines at the OnStar® Call Center, will slow the vehicle by interacting with the engine control system.

When the engine control system receives a valid request from the OnStar® telematics communications interface module, it will enter into a reduced engine power/vehicle speed limiting mode, which will decelerate the vehicle. Once the request is active the engine control module begins reducing engine torque to match requested vehicle speed and a REDUCED ENGINE POWER indication is displayed. No DTCs will be set during this process.

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2010 ACCESSORIES & BODY, CAB

Instrument Panel and Console Trim - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Floor Console Fastener	2.5 N.m	22 lb in
Front Floor Console Rear Cover Fasteners	2.5 N.m	22 lb in
Instrument Panel Assembly Fasteners	2.5 N.m	22 lb in
Instrument Panel Carrier Support Bracket Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Dampener Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Latch Fasteners	2.5 N.m	22 lb in
Instrument Panel Driver Knee Bolster Energy Absorber Fastener	2.5 N.m	22 lb in
Instrument Panel Inflatable Restraint Fasteners	22 N.m	16 lb ft
Instrument Panel Tie Bar Assembly to the Vehicle Body	25 N.m	18 lb ft
Instrument Panel Tie Bar Assembly to the Vehicle Cowl	9 N.m	80 lb in
Instrument Panel Tie Bar Assembly to the Windshield Frame and Plenum Panel	22 N.m	16 lb ft
Instrument Panel Trim Pad Fasteners	2.5 N.m	22 lb in
Instrument Panel Trim Plate Retainer Fastener	2.5 N.m	22 lb in
Instrument Tie Bar Assembly to the HVAC Module Assembly	9 N.m	80 lb in
Roof Console Fasteners	2.5 N.m	22 lb in

REPAIR INSTRUCTIONS

INSTRUMENT PANEL INSULATOR SEAL REPLACEMENT

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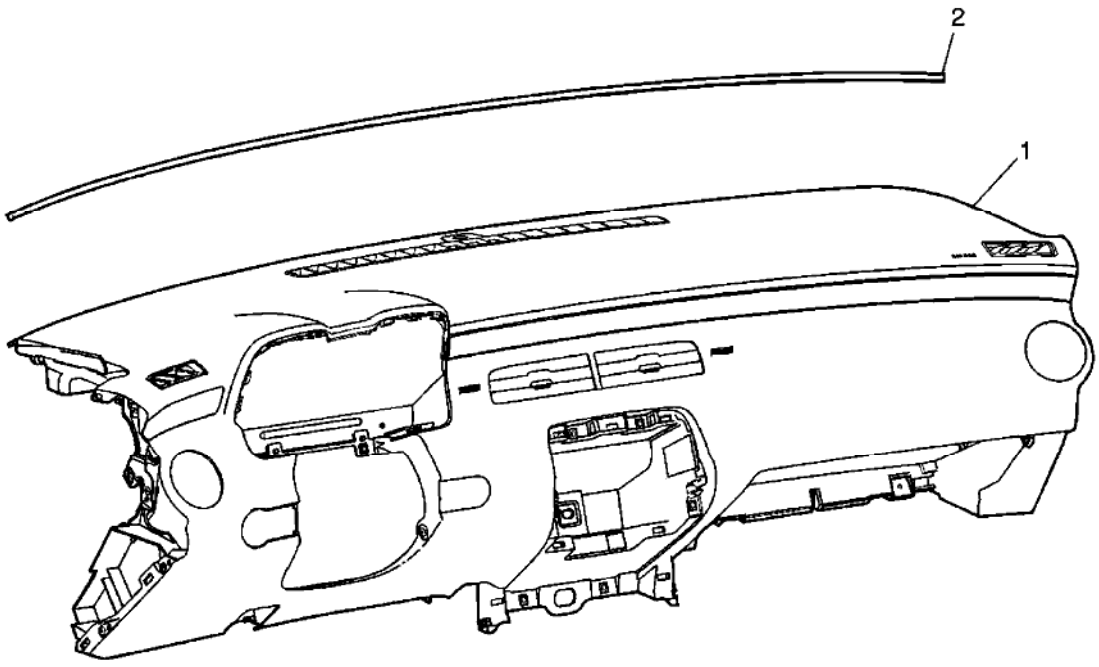


Fig. 1: Instrument Panel Insulator Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Pad Refer to **Instrument Panel Trim Pad Replacement**
2	Instrument Panel Insulator Seal **Procedure** 1. The seal and Instrument Panel surface should be 21°C (70°F) prior to installation. The vehicle should remain 21°C (70°F) for one hour after assembly to allow adhesive to develop sufficient bond strength. 2. Clean all adhesive from the Instrument Panel and wipe the surface dry with a clean lint-free towel prior to installing the new seal. 3. When removing protective film from the adhesive backed seal, be careful not to touch the adhesive with your hands and do not allow the adhesive to come in contact with dirt or any foreign matter prior to adhesion. 4. Peel the adhesive backing from the seal. 5. Locate and position the seal to the instrument panel. 6. Using the palm of the hand, press the seal to the instrument panel and ensure full adhesion of the seal to the instrument panel is made

INSTRUMENT PANEL DRIVER KNEE BOLSTER ENERGY ABSORBER REPLACEMENT

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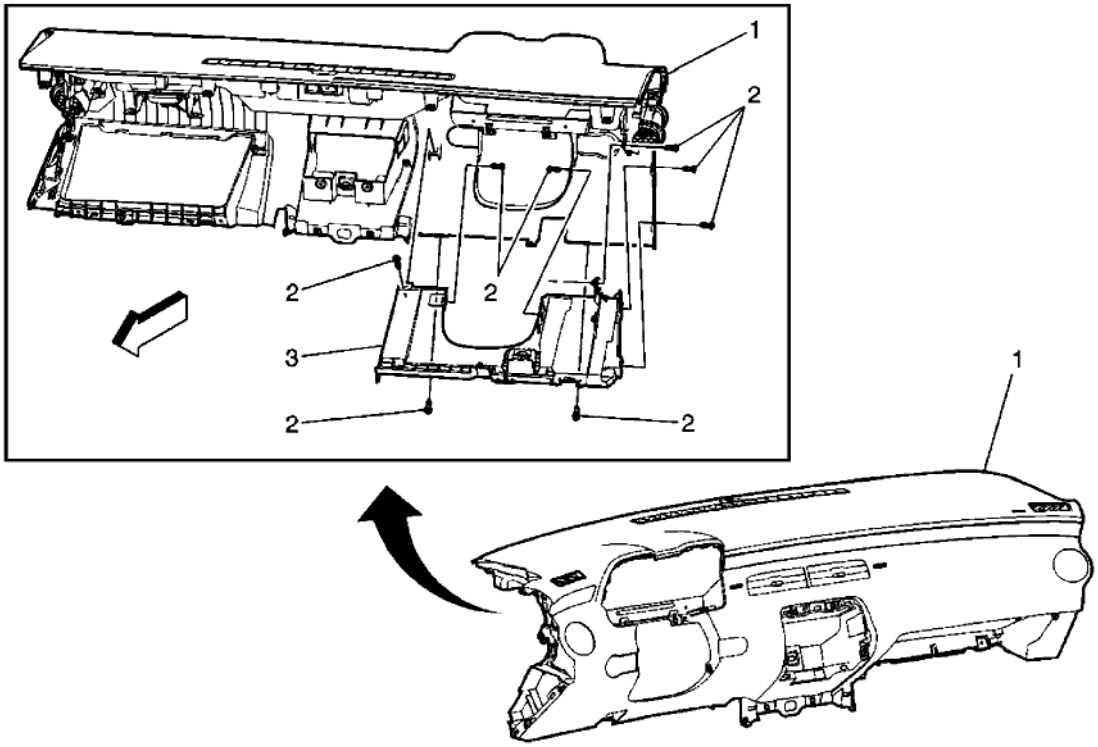


Fig. 2: Instrument Panel Driver Knee Bolster Energy Absorber
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Pad Refer to **Instrument Panel Trim Pad Replacement**
2	Instrument Panel Driver Knee Bolster Energy Absorber Fasteners (Qty: 8) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Instrument Panel Driver Knee Bolster Energy Absorber

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - RIGHT SIDE (WITHOUT GRE)

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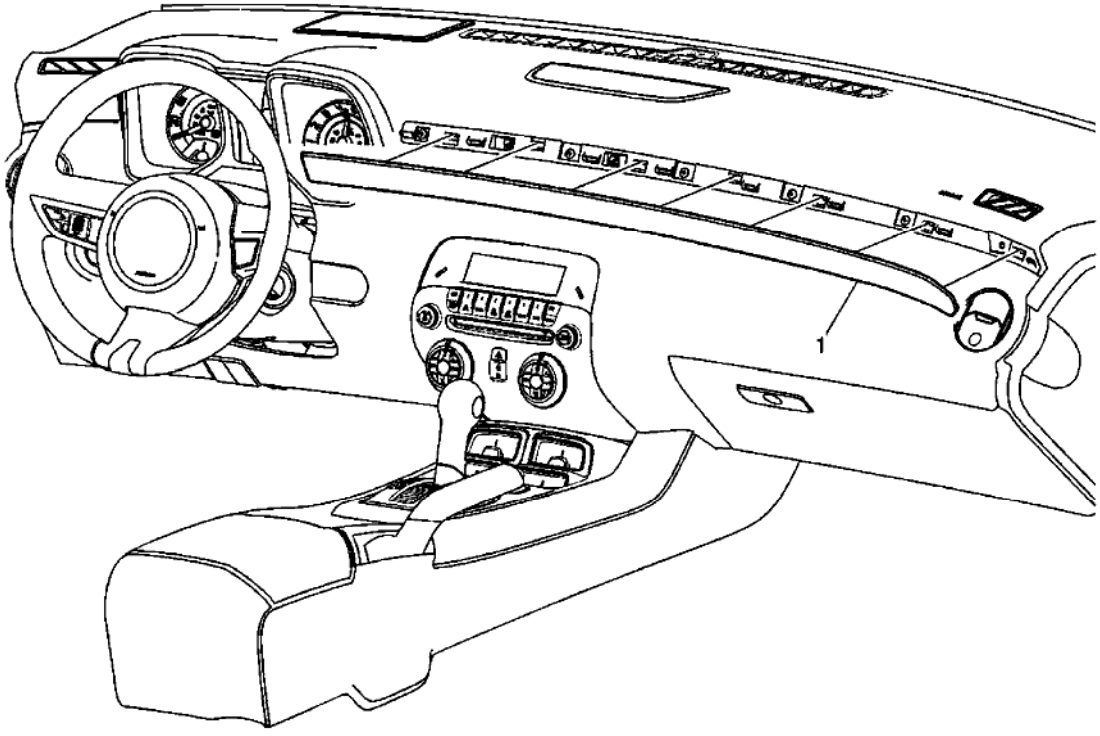


Fig. 3: Instrument Panel Trim Plate Applique - Right Side (Without GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the applique to the instrument panel assembly.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - RIGHT SIDE (WITH GRE)

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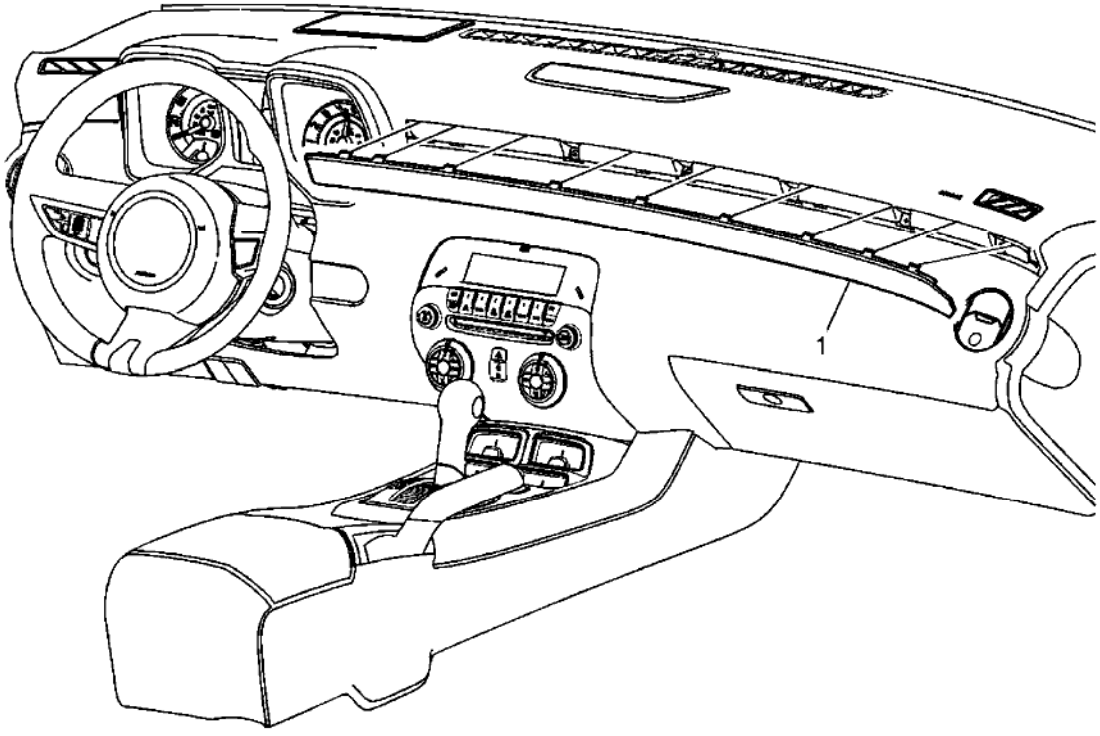


Fig. 4: Instrument Panel Trim Plate Applique - Right Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the lower edge of the applique from the instrument panel trim plate retainer. 2. Unsnap the top edge of the applique from the instrument panel trim plate retainer.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - LEFT SIDE (WITHOUT GRE)

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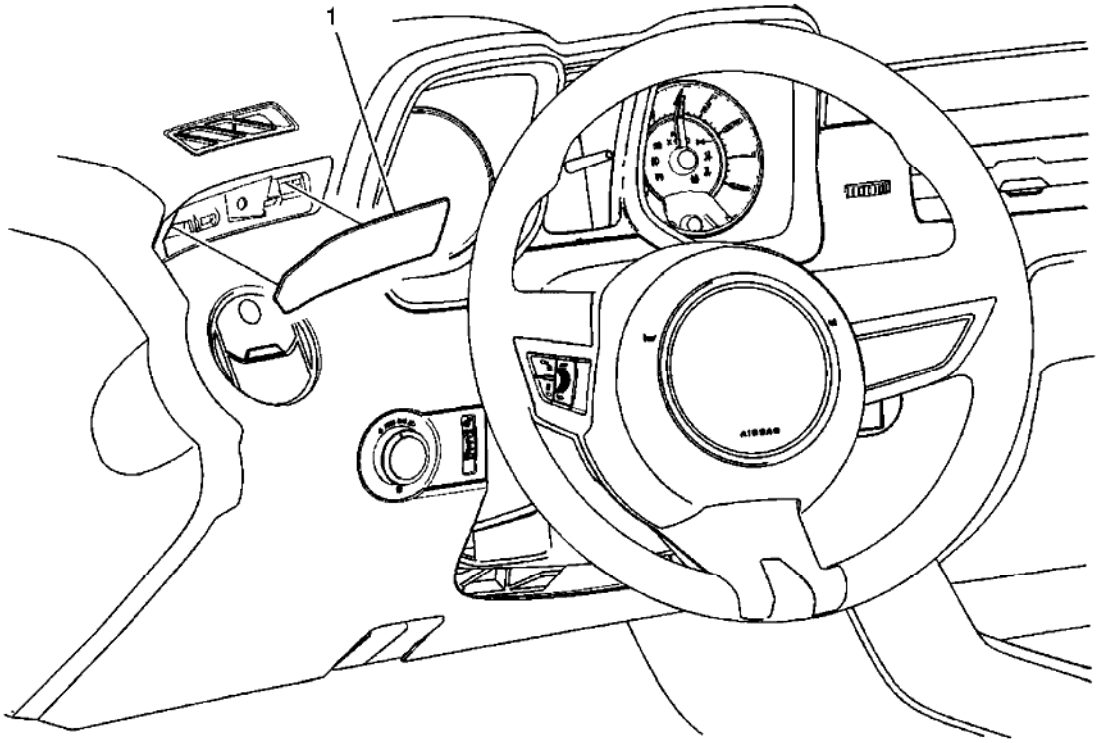


Fig. 5: Instrument Panel Trim Plate Applique - Left Side (Without GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the applique to the instrument panel assembly.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - LEFT SIDE (WITH GRE)

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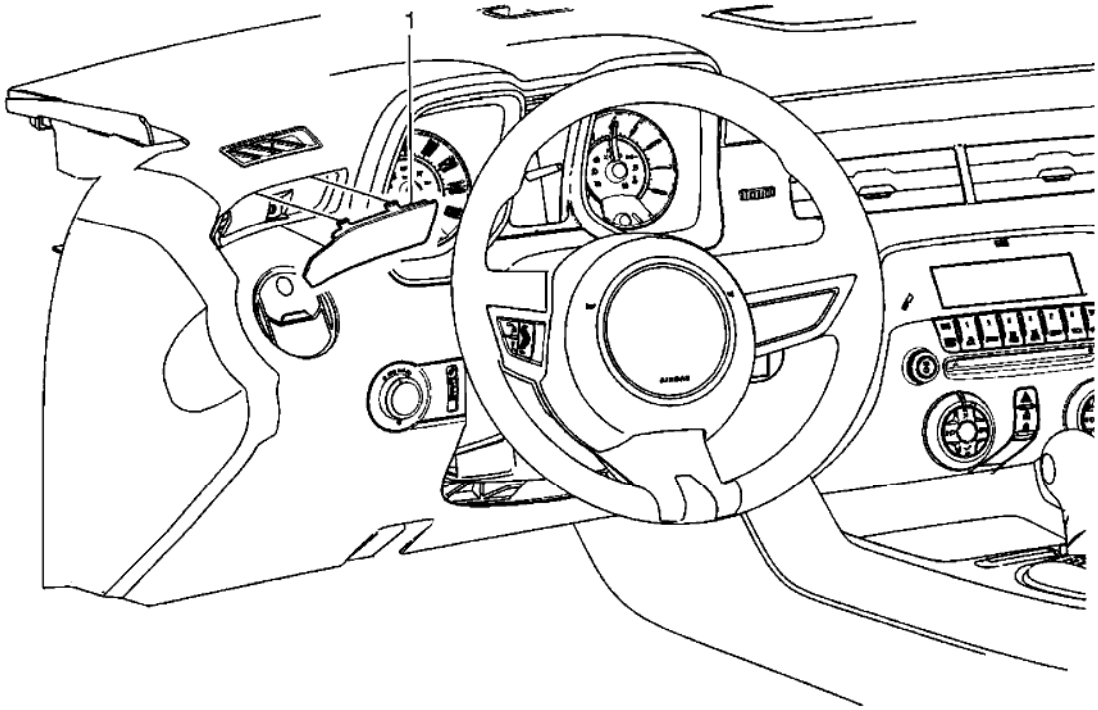


Fig. 6: Instrument Panel Trim Plate Applique - Left Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the lower edge of the applique from the instrument panel trim plate retainer. 2. Unsnap the top edge of the applique from the instrument panel trim plate retainer.

INSTRUMENT PANEL TRIM PLATE RETAINER REPLACEMENT - RIGHT SIDE (WITH GRE)

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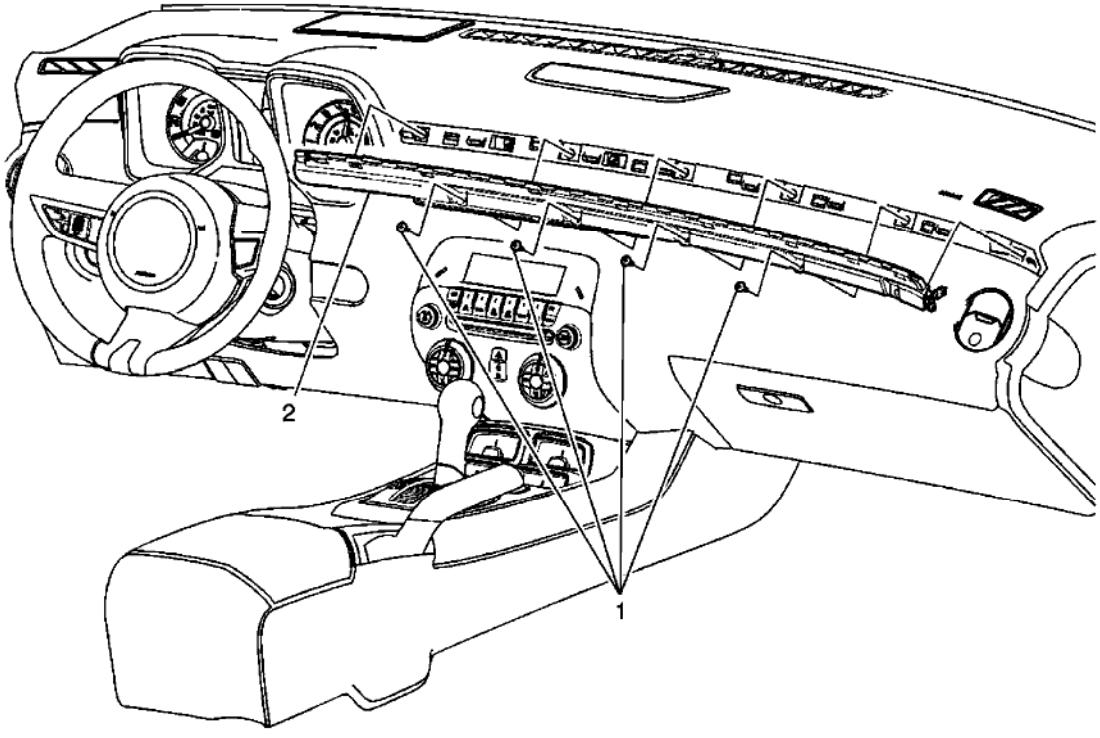


Fig. 7: Instrument Panel Trim Plate Retainer - Right Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the right instrument panel trim plate applique. Refer to **Instrument Panel Trim Plate Applique Replacement - Right Side (Without GRE)** or **Instrument Panel Trim Plate Applique Replacement - Right Side (With GRE)**.	
1	Instrument Panel Trim Plate Retainer Fastener (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Trim Plate Retainer Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the retainer clips securing the instrument panel trim plate retainer to the instrument panel assembly. 2. Disconnect the electrical connections.

INSTRUMENT PANEL TRIM PLATE RETAINER REPLACEMENT - LEFT SIDE (WITH GRE)

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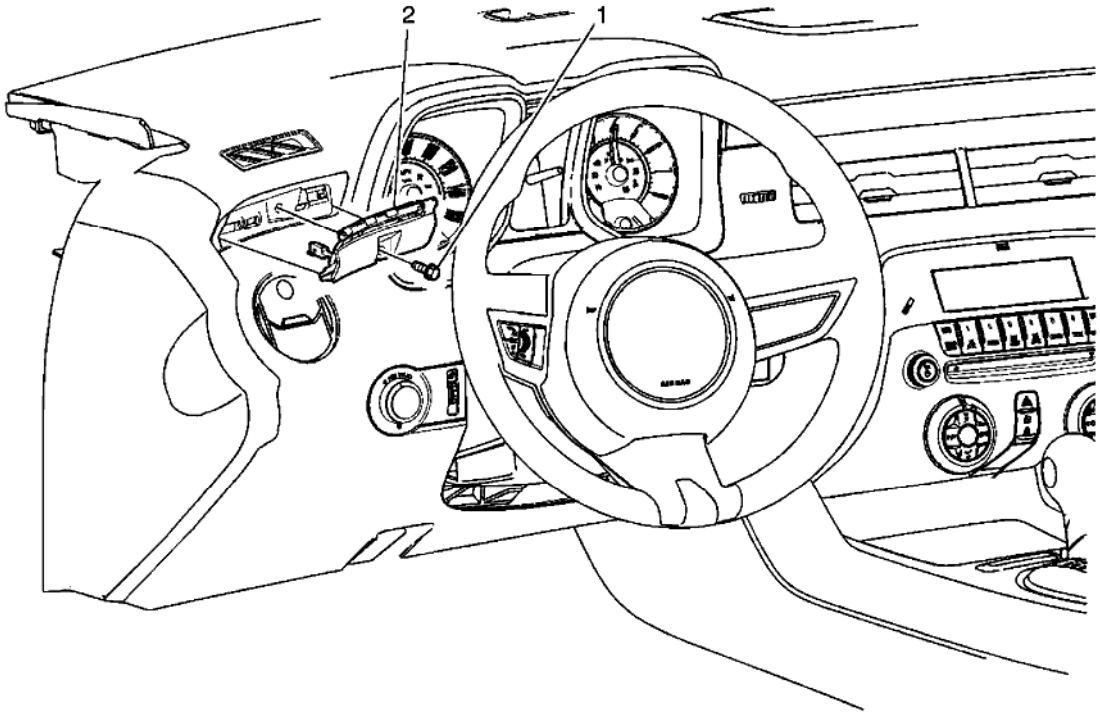


Fig. 8: Instrument Panel Trim Plate Retainer - Left Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the left instrument panel trim plate applique. Refer to **Instrument Panel Trim Plate Applique Replacement - Left Side (Without GRE)** or **Instrument Panel Trim Plate Applique Replacement - Left Side (With GRE)**.	
1	Instrument Panel Trim Plate Retainer Fastener **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Trim Plate Retainer Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the retainer clips securing the instrument panel trim plate retainer to the instrument panel assembly. 2. Disconnect the electrical connections.

INSTRUMENT PANEL CLUSTER TRIM PLATE REPLACEMENT

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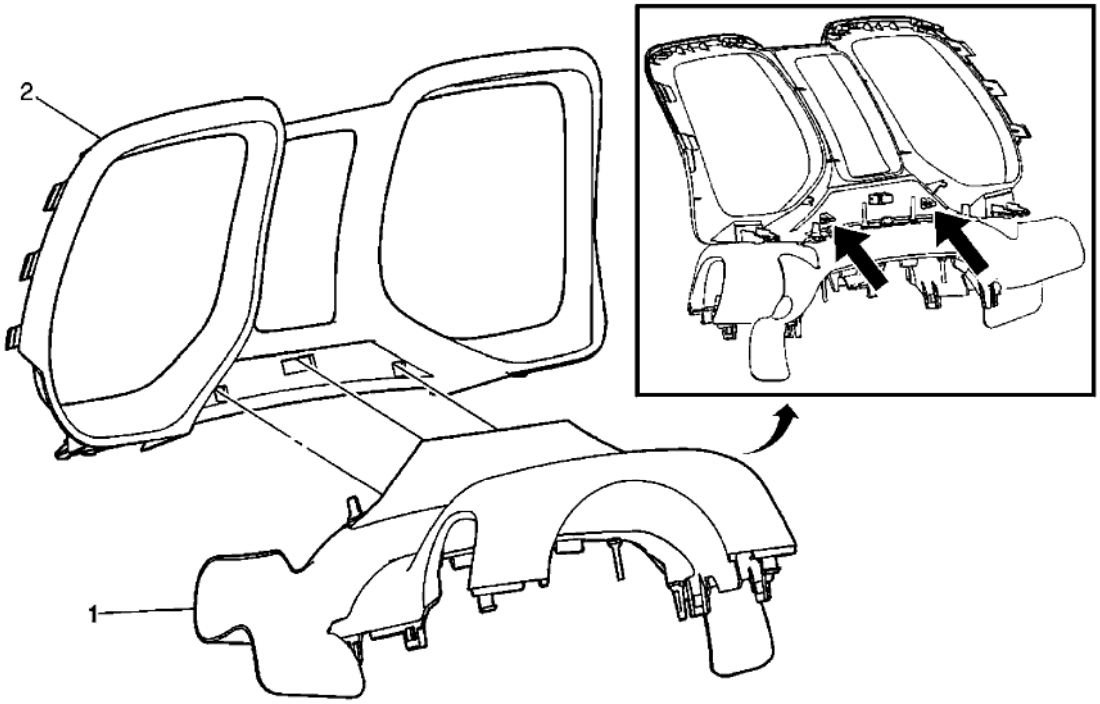
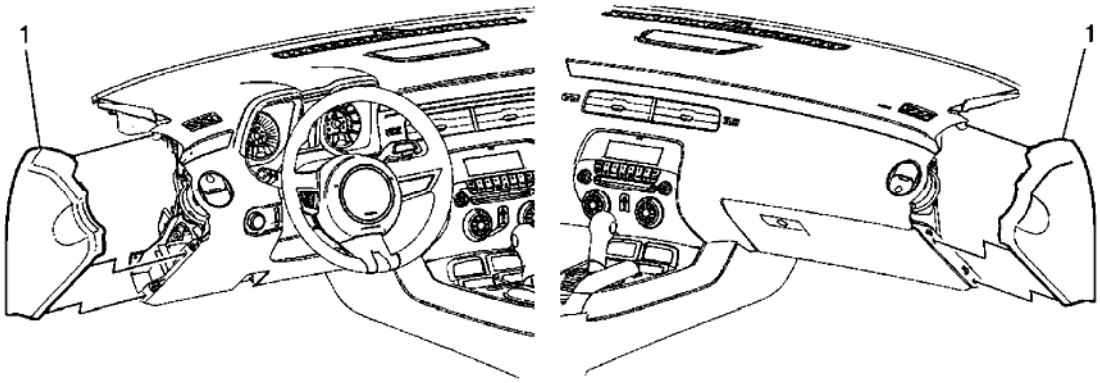


Fig. 9: Instrument Panel Cluster Trim Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Upper Steering Column Shroud Refer to **Steering Column Shroud Replacement** .
2	Instrument Panel Cluster Trim Plate Assembly **Procedure:** Squeeze the tabs on the back of the upper steering column shroud in order to release the instrument panel cluster plate from the shroud.

INSTRUMENT PANEL OUTER TRIM COVER REPLACEMENT



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Fig. 10: Instrument Panel Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Outer Trim Cover Assemblies (Right or Left) **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the outer trim covers to the instrument panel assembly.

INSTRUMENT PANEL COMPARTMENT REPLACEMENT

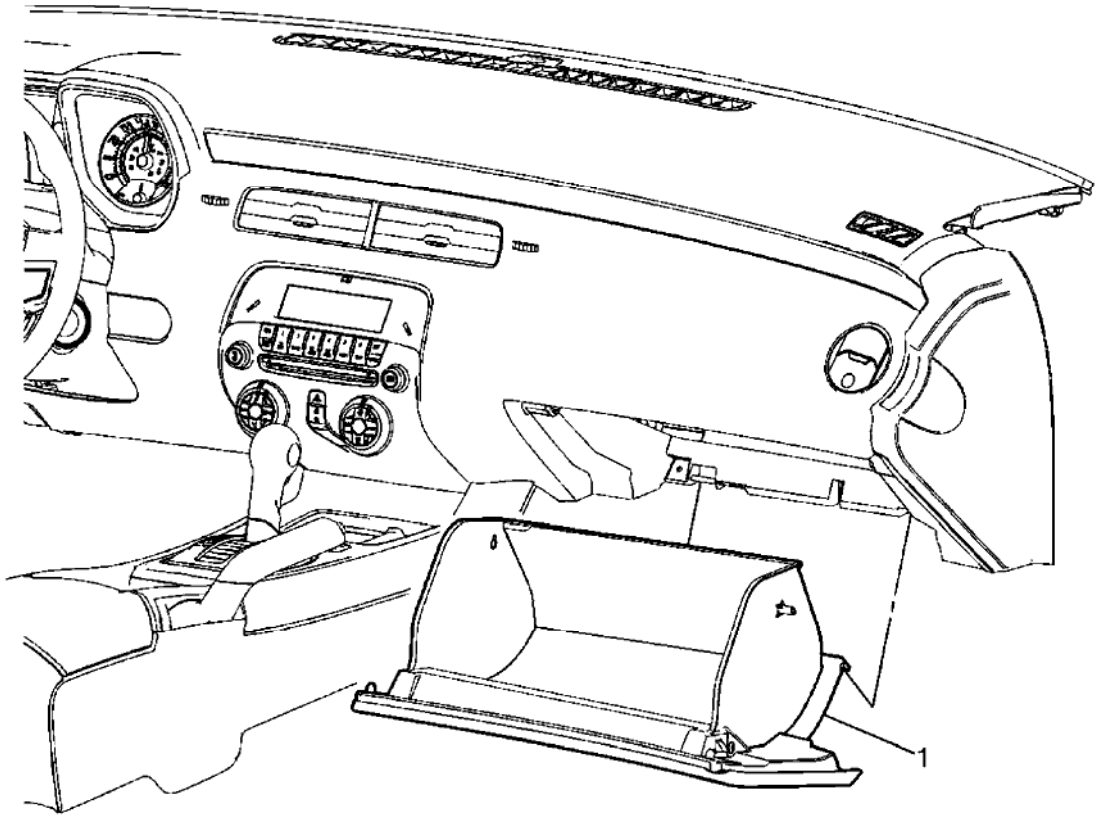


Fig. 11: Instrument Panel Compartment
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Disconnect the instrument panel compartment door dampener from the compartment assembly. 2. Squeeze the sides of the instrument panel compartment assembly allowing the compartment to open past the stops.	
	Instrument Panel Compartment Assembly

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1	**Procedure:** Unsnap the instrument panel compartment assembly from the instrument panel.

INSTRUMENT PANEL COMPARTMENT DOOR LATCH RELEASE ROD REPLACEMENT

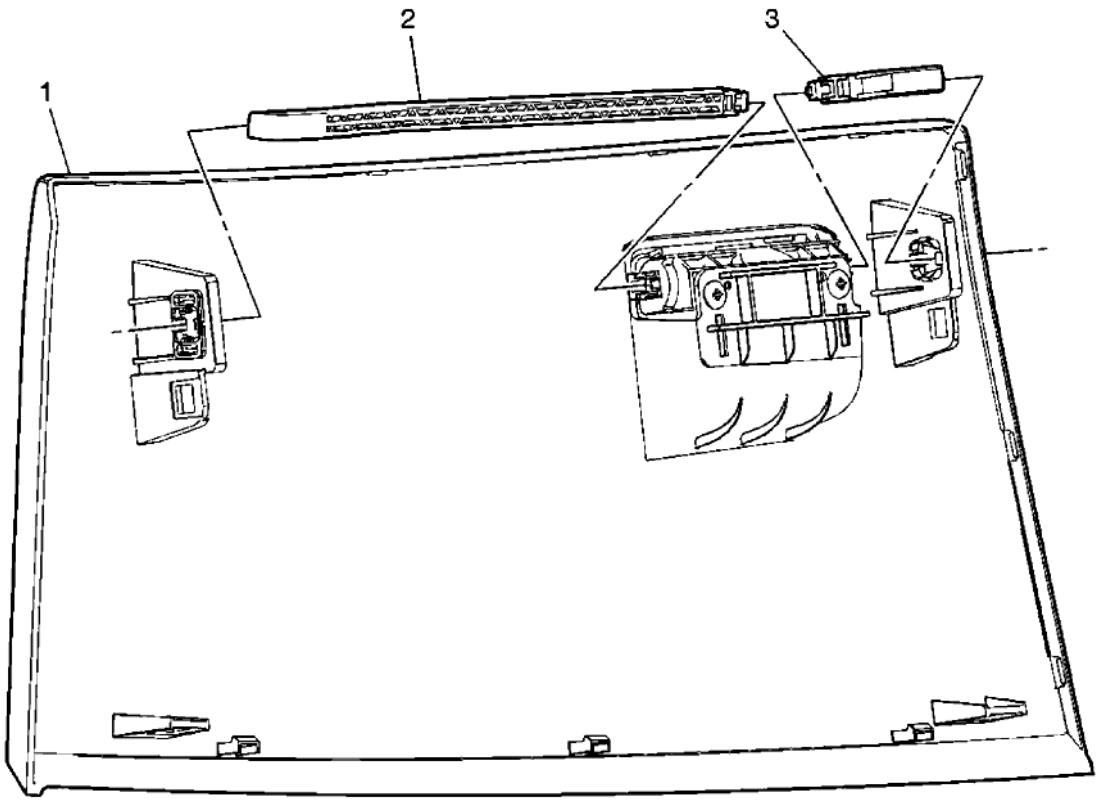


Fig. 12: Instrument Panel Compartment Door Latch Release Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Compartment Door Refer to **Instrument Panel Compartment Door Assembly Replacement**.
2	Instrument Panel Compartment Door Latch Release Rod - Right **Procedure:** Unsnap the release rod from the latch assembly and the guide.
3	Instrument Panel Compartment Door Latch Release Rod - Left **Procedure:** Unsnap the release rod from the latch assembly and the guide.

INSTRUMENT PANEL COMPARTMENT DOOR FOUNDATION REPLACEMENT

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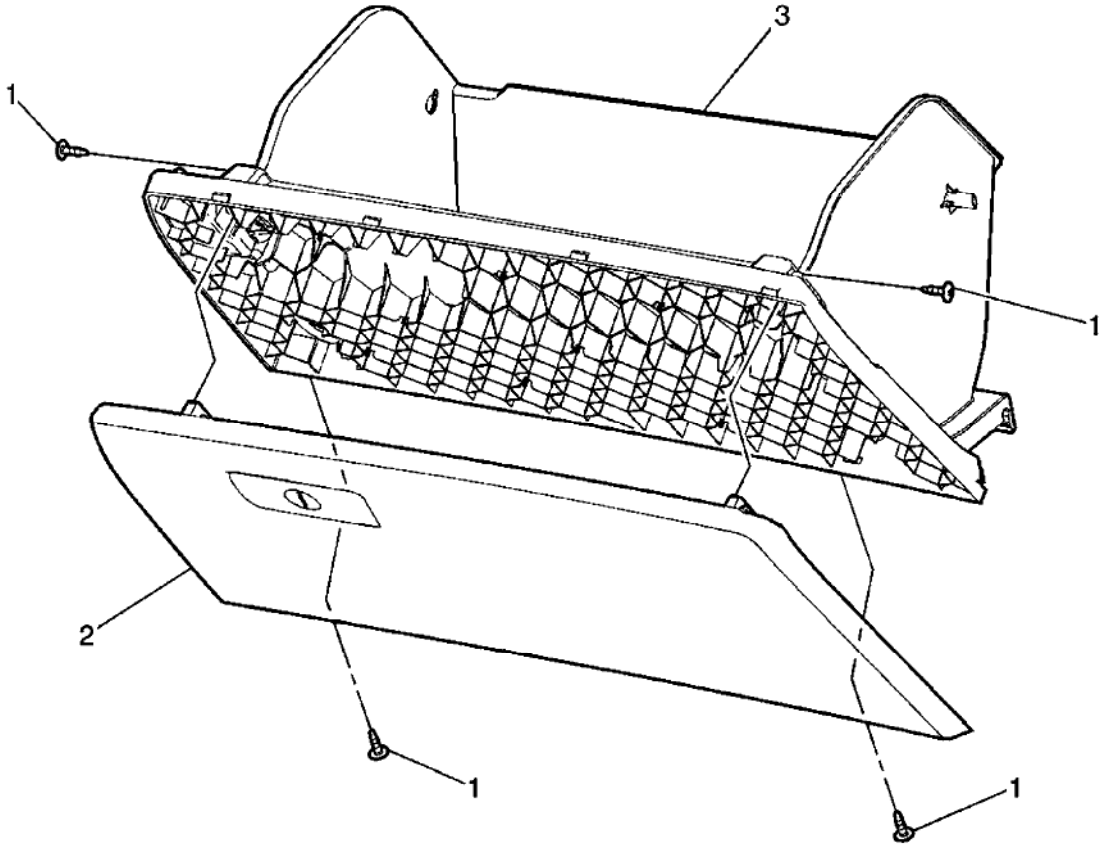


Fig. 13: Instrument Panel Compartment Door Foundation
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Compartment Door Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Compartment Door
3	Instrument Panel Compartment Door Foundation

INSTRUMENT PANEL COMPARTMENT DOOR ASSEMBLY REPLACEMENT

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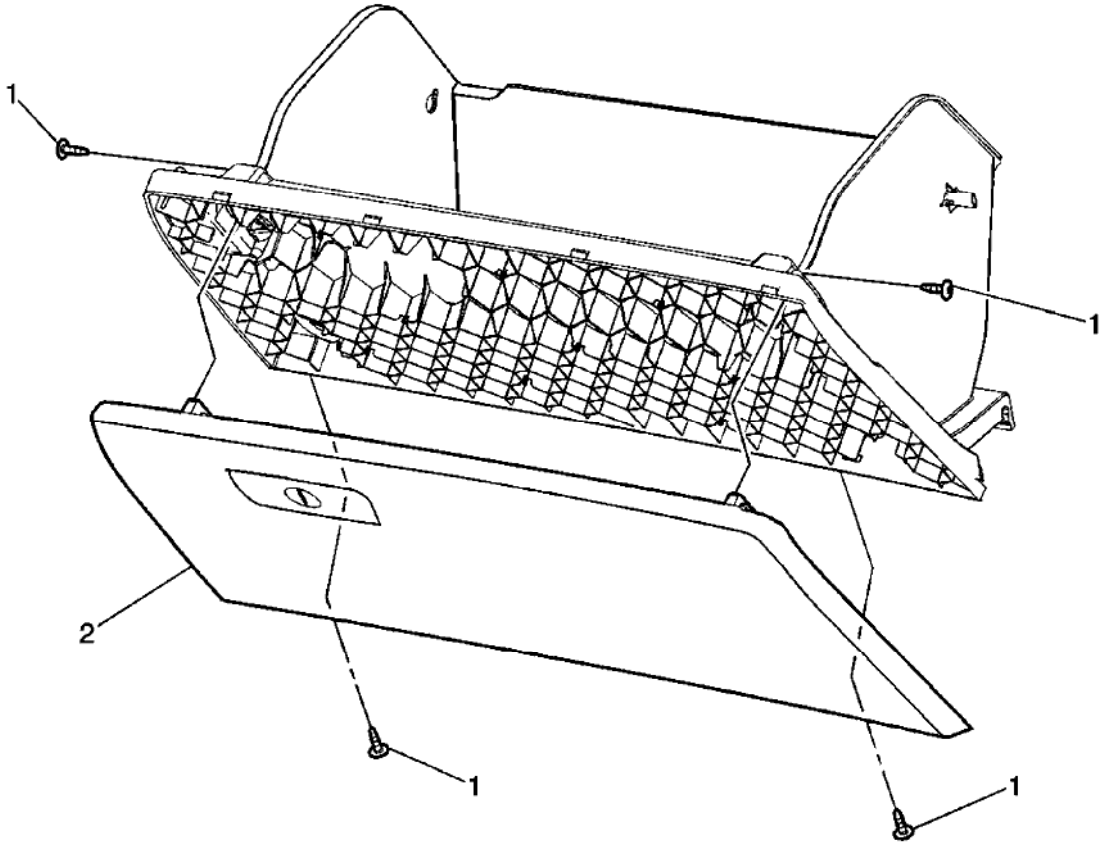


Fig. 14: Instrument Panel Compartment Door Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Compartment Door Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Compartment Door **Procedure:** When replacing the instrument panel compartment door assembly, transfer all necessary components.

INSTRUMENT PANEL COMPARTMENT DOOR LATCH REPLACEMENT

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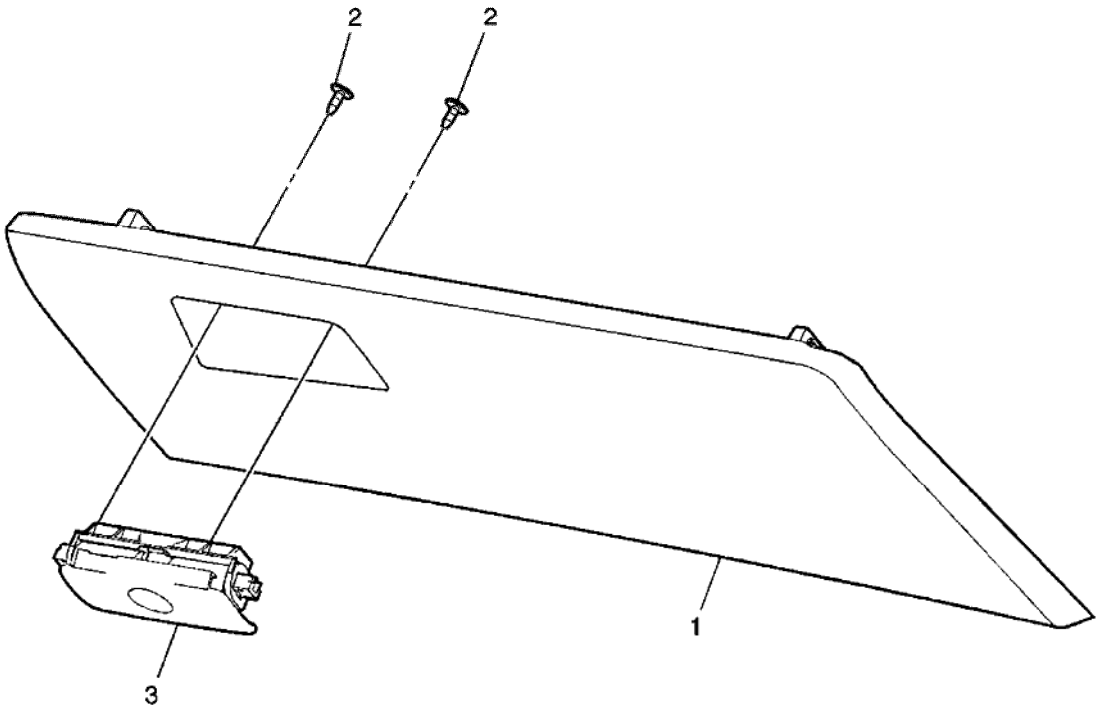


Fig. 15: Instrument Panel Compartment Door Latch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Compartment Door Refer to **Instrument Panel Compartment Door Assembly Replacement**.
2	Instrument Panel Compartment Door Latch Fasteners (Qty; 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Instrument Panel Compartment Door Latch Assembly **Procedure:** Unsnap the instrument panel compartment door latch release rods from the latch assembly.

INSTRUMENT PANEL COMPARTMENT DOOR DAMPENER REPLACEMENT

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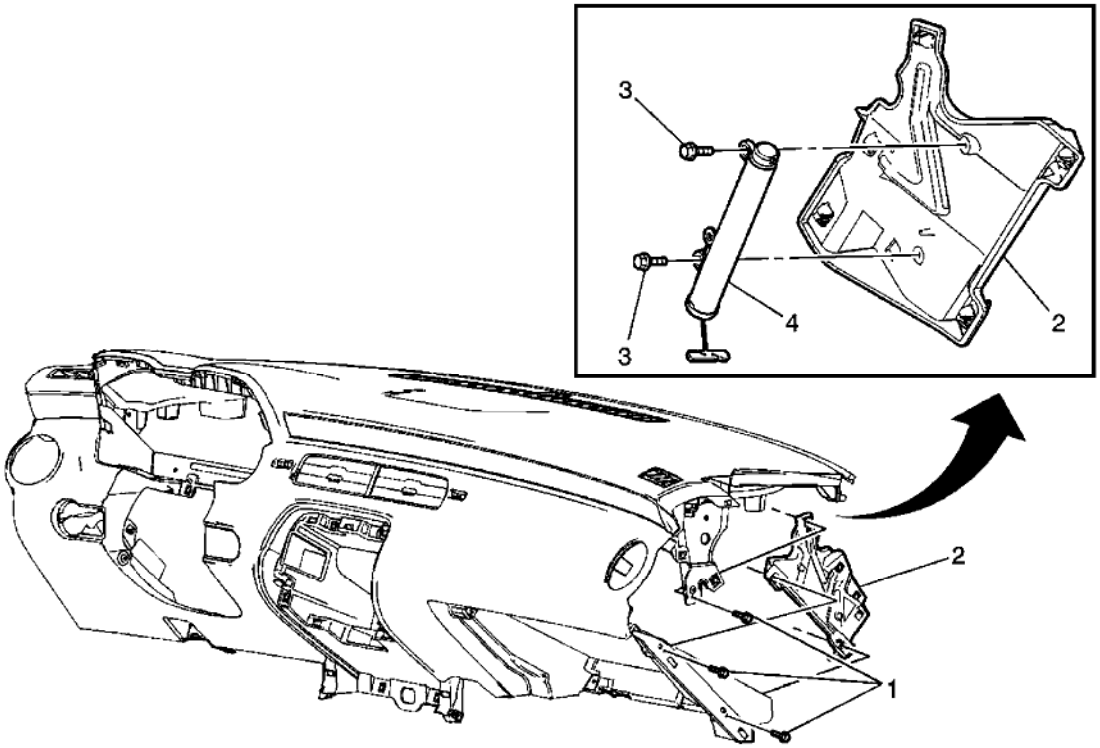


Fig. 16: Instrument Panel Compartment Door Dampener
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right instrument panel outer trim cover. Refer to **Instrument Panel Outer Trim Cover Replacement**. 2. Remove the right instrument panel outer air outlet duct. Refer to **Instrument Panel Outer Air Outlet Duct Replacement - Right Side** . 3. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement**.	
1	Instrument Panel Carrier Support Bracket Fasteners (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Carrier Support Bracket
3	Instrument Panel Compartment Door Dampener Fasteners (Qty: 2) **Tighten:** 2.5 N.m (22 lb in)
4	Instrument Panel Compartment Door Dampener Assembly

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INSTRUMENT PANEL TRIM PAD REPLACEMENT

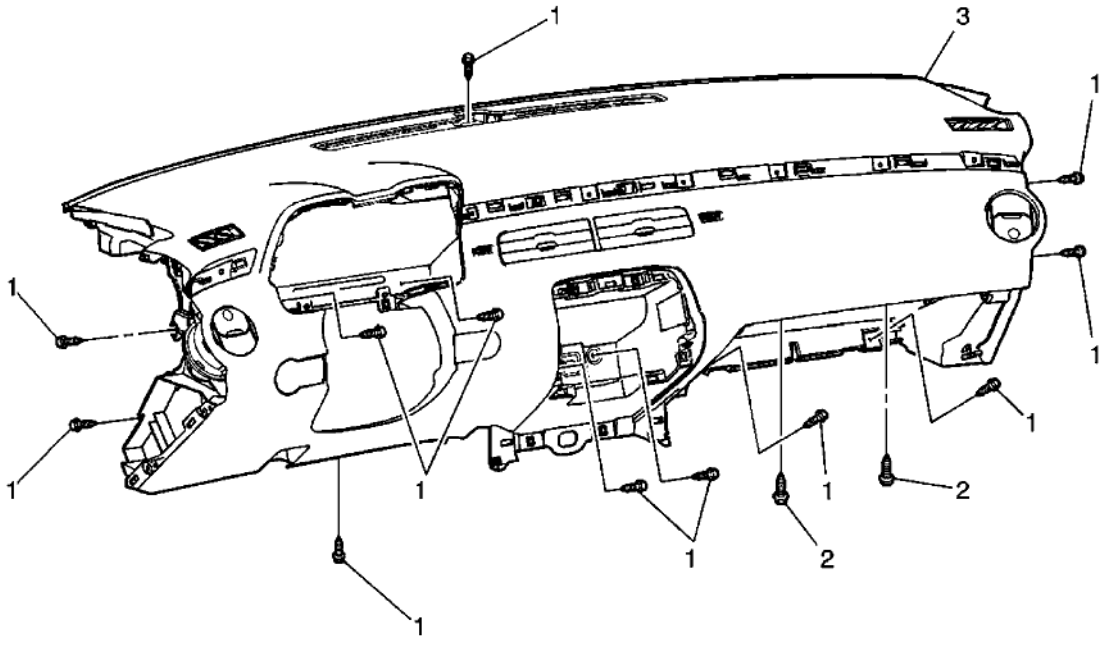


Fig. 17: Instrument Panel Trim Pad
Courtesy of GENERAL MOTORS CORP.

Callous	Component Name

Preliminary Procedure

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Remove the right and left windshield garnish moldings. Refer to **Windshield Side Garnish Molding Replacement** .
3. Remove the front floor console assembly. Refer to **Front Floor Console Replacement**.
4. Remove the right and left instrument panel outer trim covers. Refer to **Instrument Panel Outer Trim Cover Replacement**.
5. Remove the left and right instrument panel outer air outlet ducts. Refer to **Instrument Panel Outer Air Outlet Duct Replacement - Left Side** and **Instrument Panel Outer Air Outlet Duct Replacement - Right Side** .
6. Remove the instrument panel cluster assembly. Refer to **Instrument Cluster Replacement** .
7. Remove the steering wheel. Refer to **Steering Wheel Replacement** .
8. Remove the turn signal multifunction switch assembly and the wiper washer switch. Refer to **Turn Signal Multifunction Switch Replacement** and **Windshield Wiper and Washer Switch Replacement** .
9. Remove the radio control assembly. Refer to **Radio Control Assembly Replacement** .
10. Remove the radio. Refer to **Radio Replacement** .

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11. Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.
12. Remove the instrument panel center air outlet grille assembly. Refer to **Instrument Panel Center Air Outlet Grille Replacement** .
13. Remove the communication interface module and battery. Refer to **Communication Interface Module Replacement** and **Communication Interface Module Battery Replacement** .
14. Disconnect the DLC Connector and hood release handle.
15. Remove the head lamp switch. Refer to **Headlamp, Instrument Panel Lamp Dimmer, and Fog Lamp Switch Replacement** .

1	Instrument Panel Trim Pad Fasteners (Qty: 12) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Inflatable Restraint Fasteners (Qty: 2) **Tighten:** 22 N.m (16 lb ft)
3	Instrument Panel Trim Pad Assembly **Procedure** 1. Note location and routing of the electrical harnesses in order to ensure proper reinstallation. 2. Disconnect the electrical harnesses and connectors. 3. When replacing the instrument panel trim pad, transfer all necessary components.

INSTRUMENT PANEL ASSEMBLY REPLACEMENT

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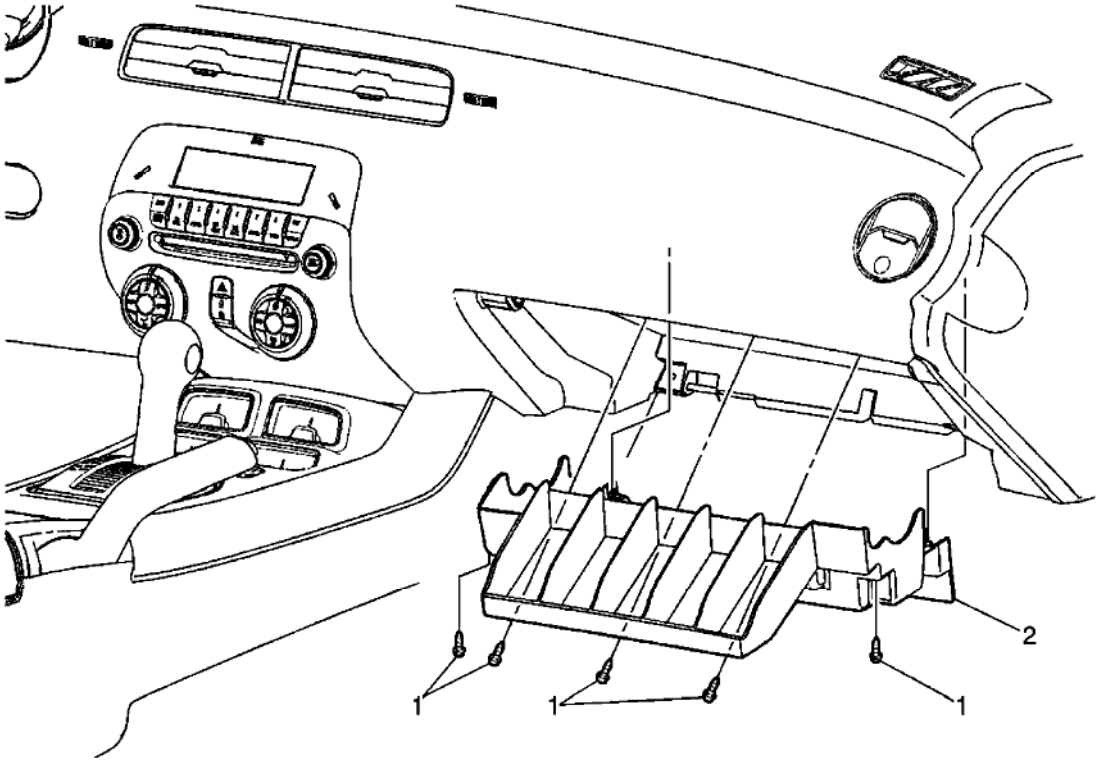


Fig. 18: Instrument Panel Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Assembly Fasteners (Qty: 5) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Assembly

INSTRUMENT PANEL TIE BAR REPLACEMENT

Removal Procedure

1. Remove the instrument panel trim pad assembly. Refer to **Instrument Panel Trim Pad Replacement**.
2. Remove the steering column assembly. Refer to **Steering Column Replacement** .
3. Remove the windshield. Refer to **Windshield Replacement** .

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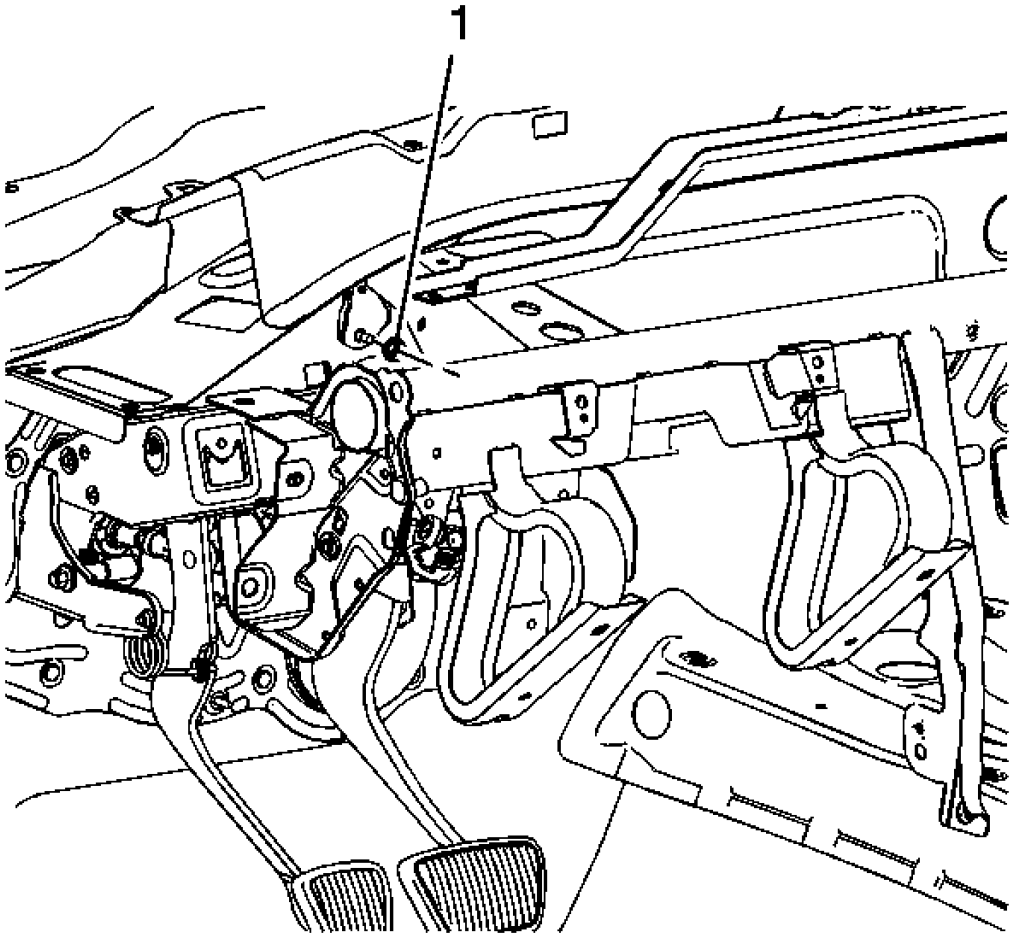


Fig. 19: Instrument Panel Tie Bar Assembly Nut To Vehicle Cowl Panel
Courtesy of GENERAL MOTORS CORP.

4. Remove the nut (1) securing the instrument panel tie bar assembly to the vehicle cowl panel.
5. Remove the fasteners securing the brake pedal assembly to the instrument panel tie bar. Refer to **Brake Pedal Assembly Replacement** .
6. If equipped with a manual transmission, remove the fasteners securing the clutch pedal assembly to the instrument panel tie bar. Refer to **Clutch Pedal Replacement** .
7. Note the location and routing of the instrument panel electrical harness assembly, to ensure proper reinstallation.
8. Disconnect the fasteners securing the instrument panel electrical harness assembly to the instrument panel tie bar and position out of the way.

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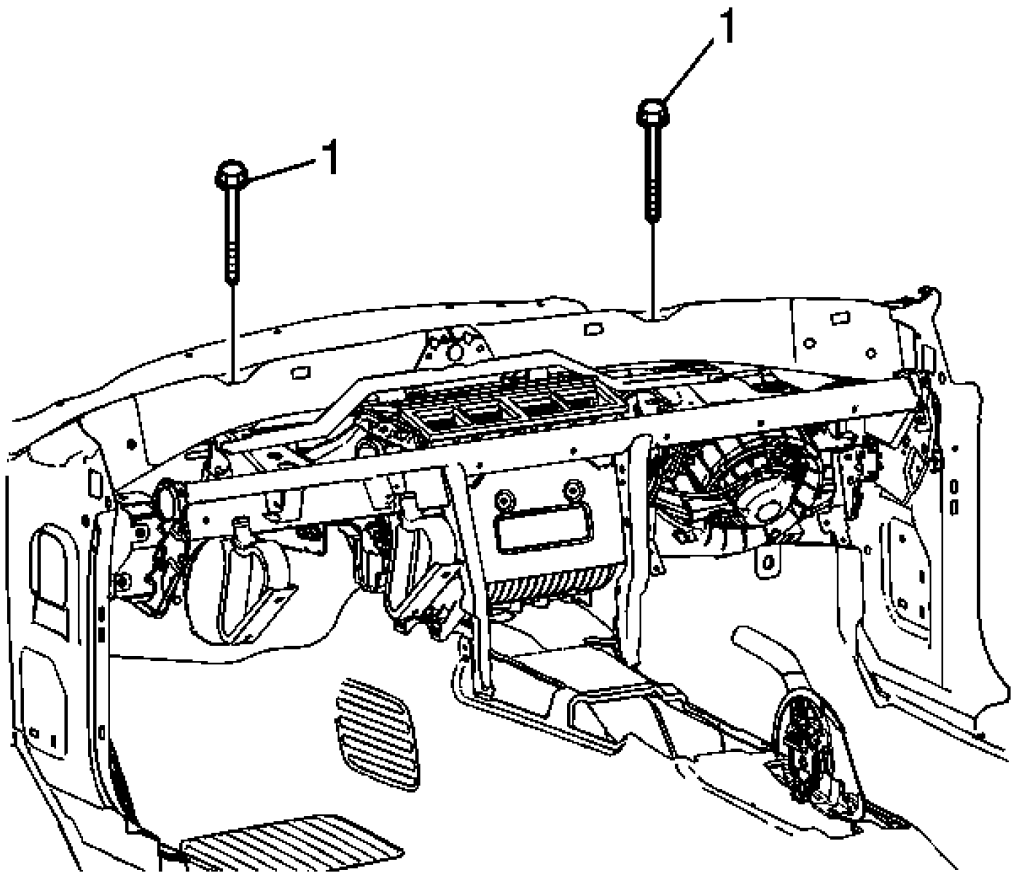


Fig. 20: Instrument Panel Tie Bar Assembly To Windshield Frame & Plenum Panel Fasteners
Courtesy of GENERAL MOTORS CORP.

9. Remove the 2 fasteners (1) securing the instrument panel tie bar assembly to the windshield frame and plenum panel.

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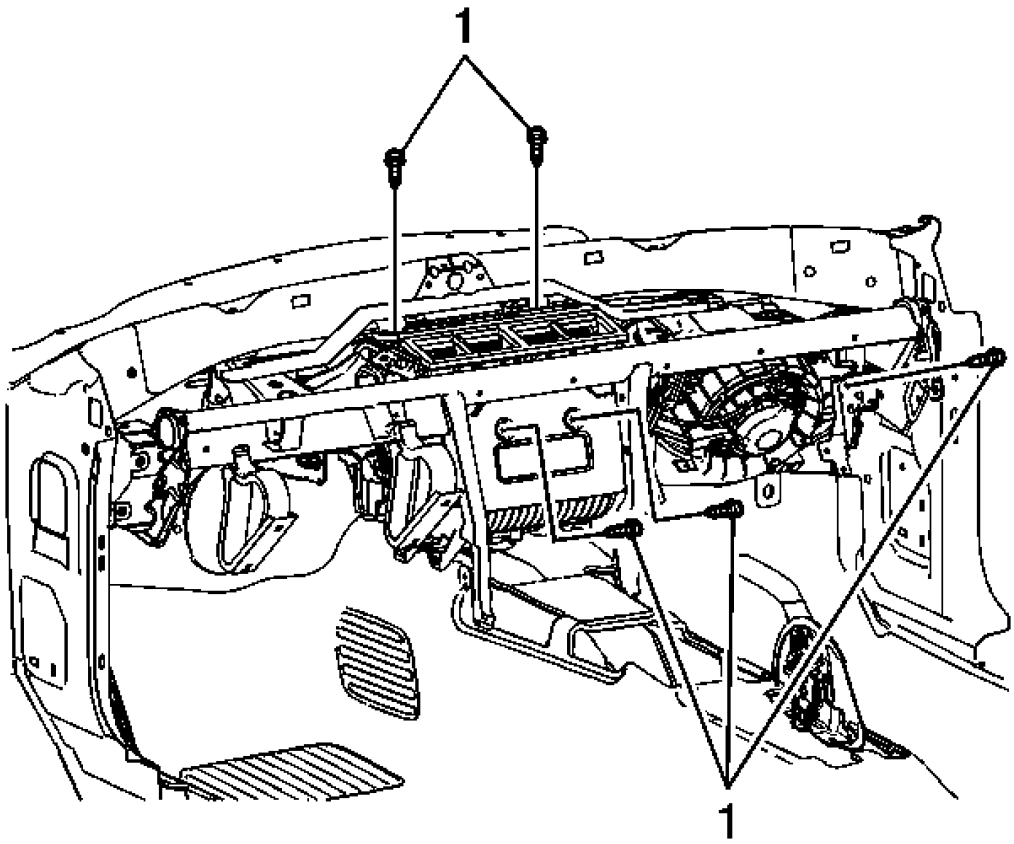


Fig. 21: Instrument Panel Tie Bar Assembly To Hvac Module Assembly Fasteners
Courtesy of GENERAL MOTORS CORP.

10. Remove the 5 fasteners (1) securing the instrument panel tie bar assembly to the HVAC module assembly.

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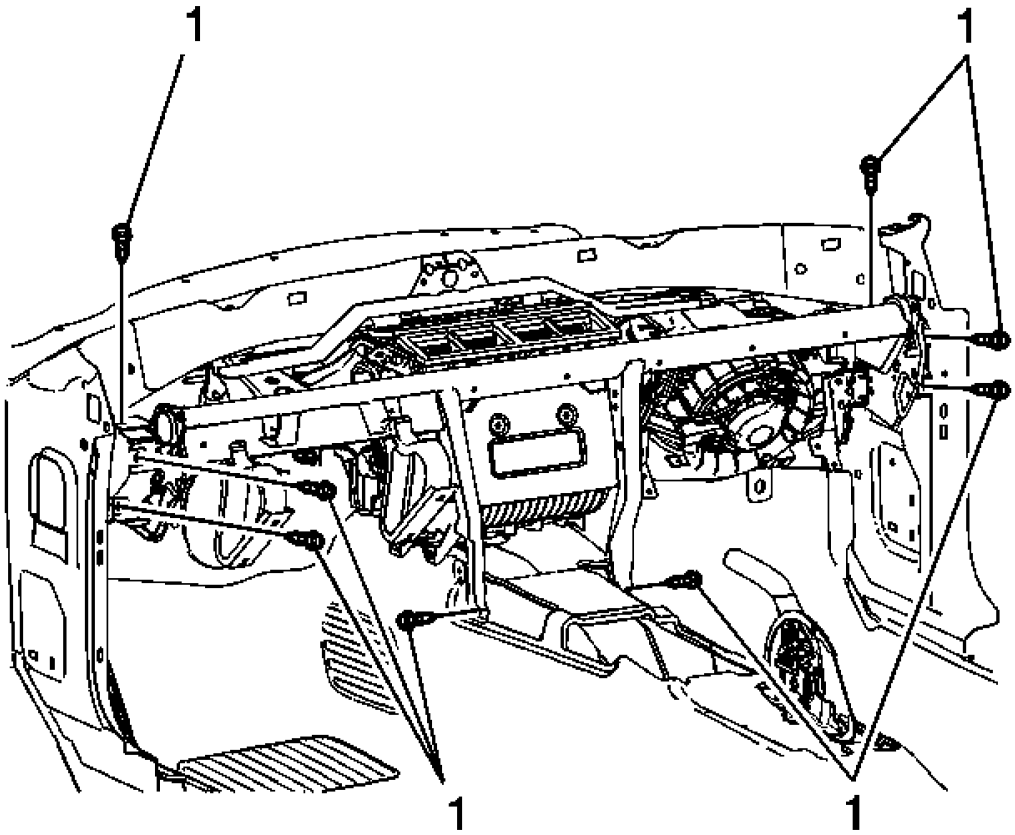


Fig. 22: Instrument Panel Tie Bar Assembly To Vehicle Body Fasteners
Courtesy of GENERAL MOTORS CORP.

11. Remove the 8 fasteners (1) securing the instrument panel tie bar assembly to the vehicle body.
12. Support the HVAC module assembly, as needed.

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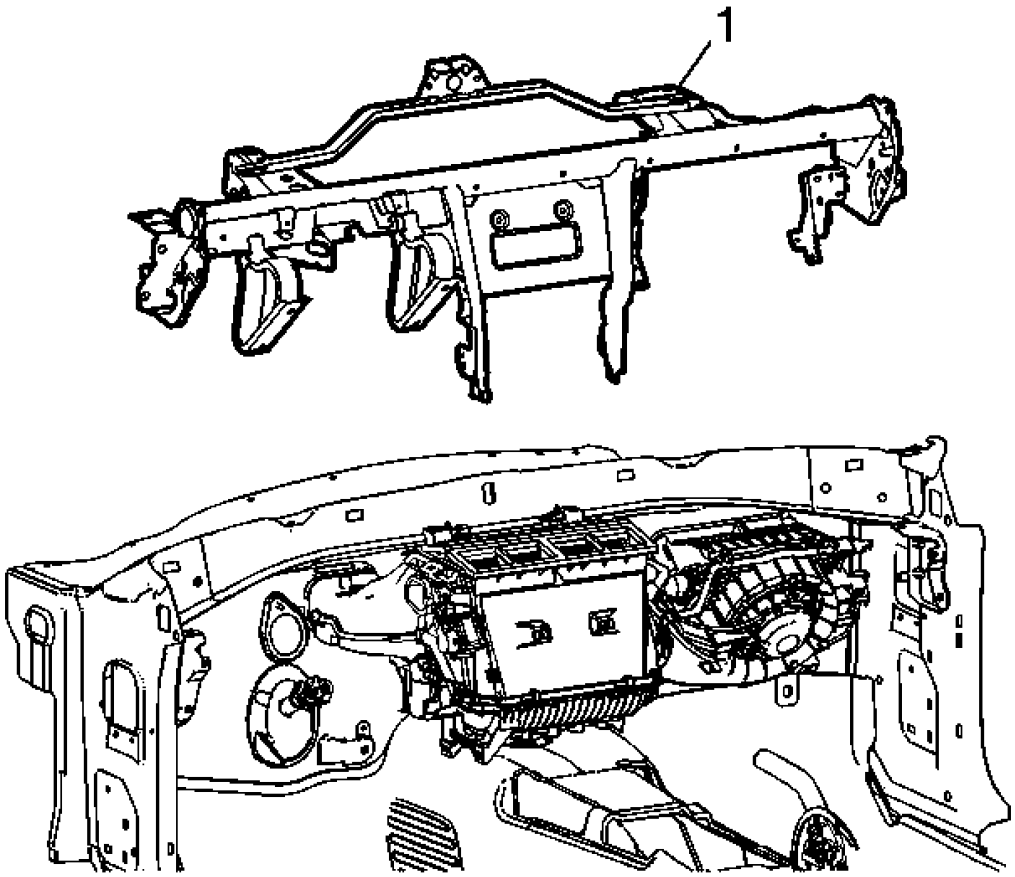


Fig. 23: Instrument Panel Tie Bar Assembly
Courtesy of GENERAL MOTORS CORP.

13. Remove the instrument panel tie bar assembly (1) from the vehicle.

Installation Procedure

1. Position the instrument panel tie bar assembly into the vehicle.

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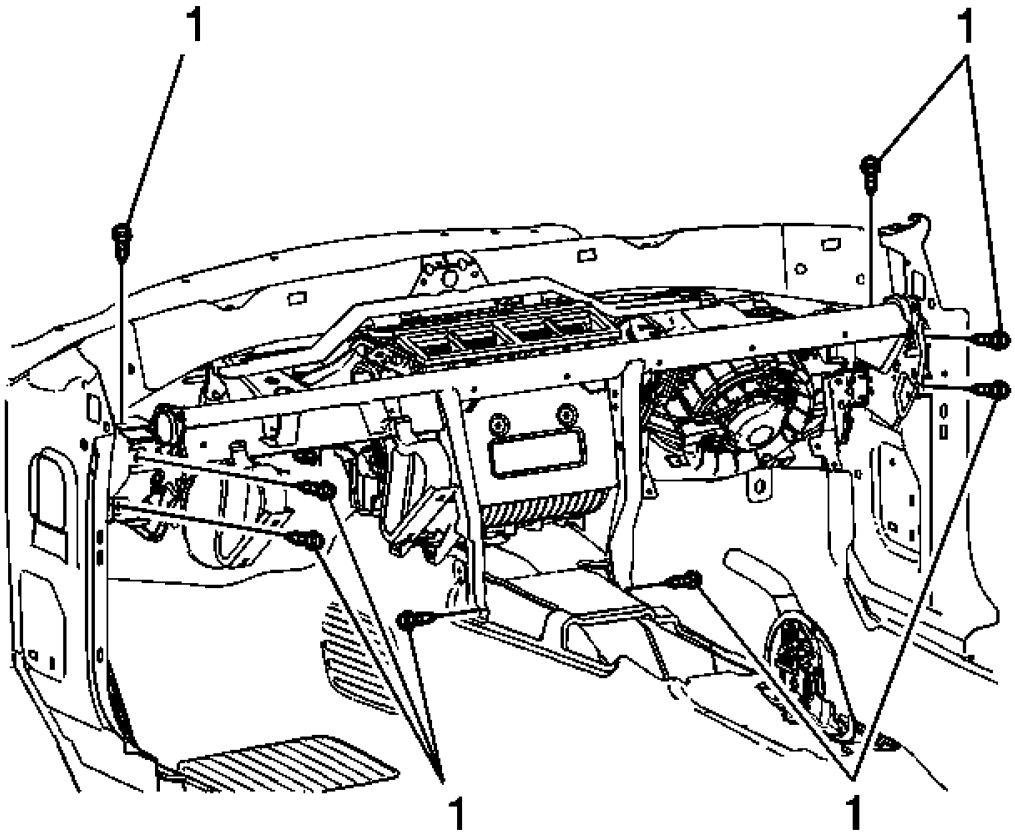


Fig. 24: Instrument Panel Tie Bar Assembly To Vehicle Body Fasteners
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

2. Install the 8 fasteners (1) securing the instrument panel tie bar assembly to the vehicle body and tighten to 25 N.m (18 lb ft).

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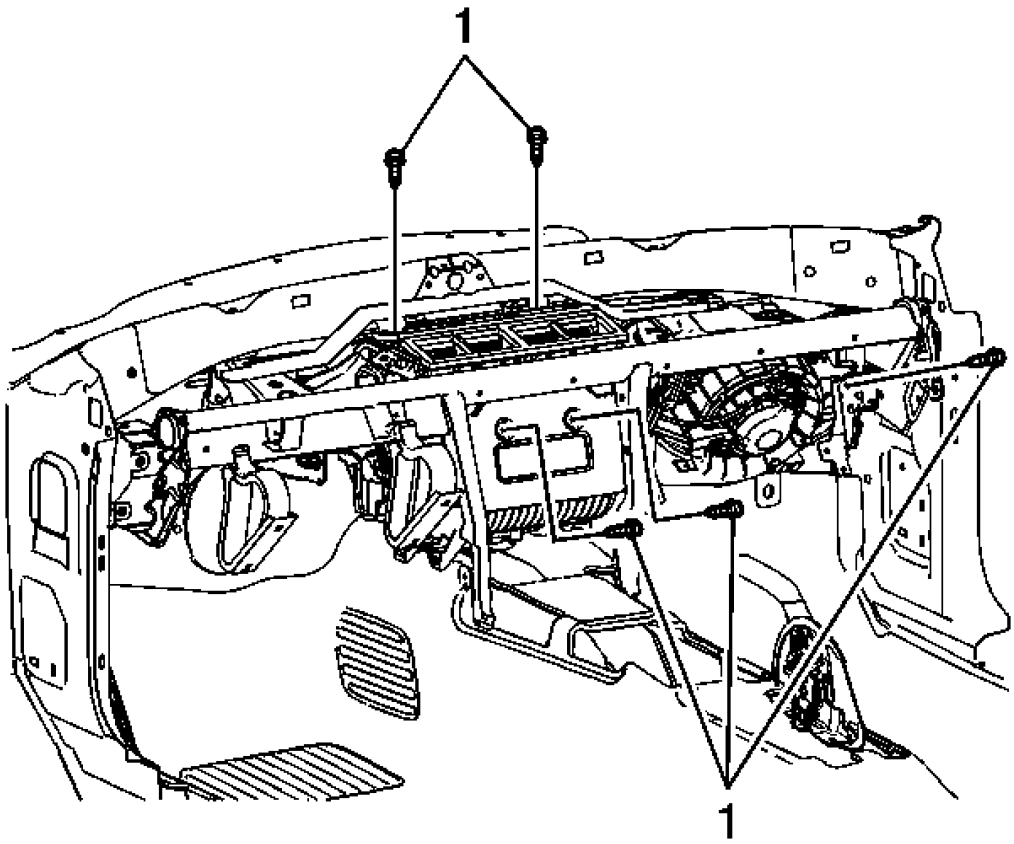


Fig. 25: Instrument Panel Tie Bar Assembly To Hvac Module Assembly Fasteners
Courtesy of GENERAL MOTORS CORP.

3. Install the 5 fasteners (1) securing the instrument panel tie bar assembly to the HVAC module assembly and tighten to 9 N.m (80 lb in).

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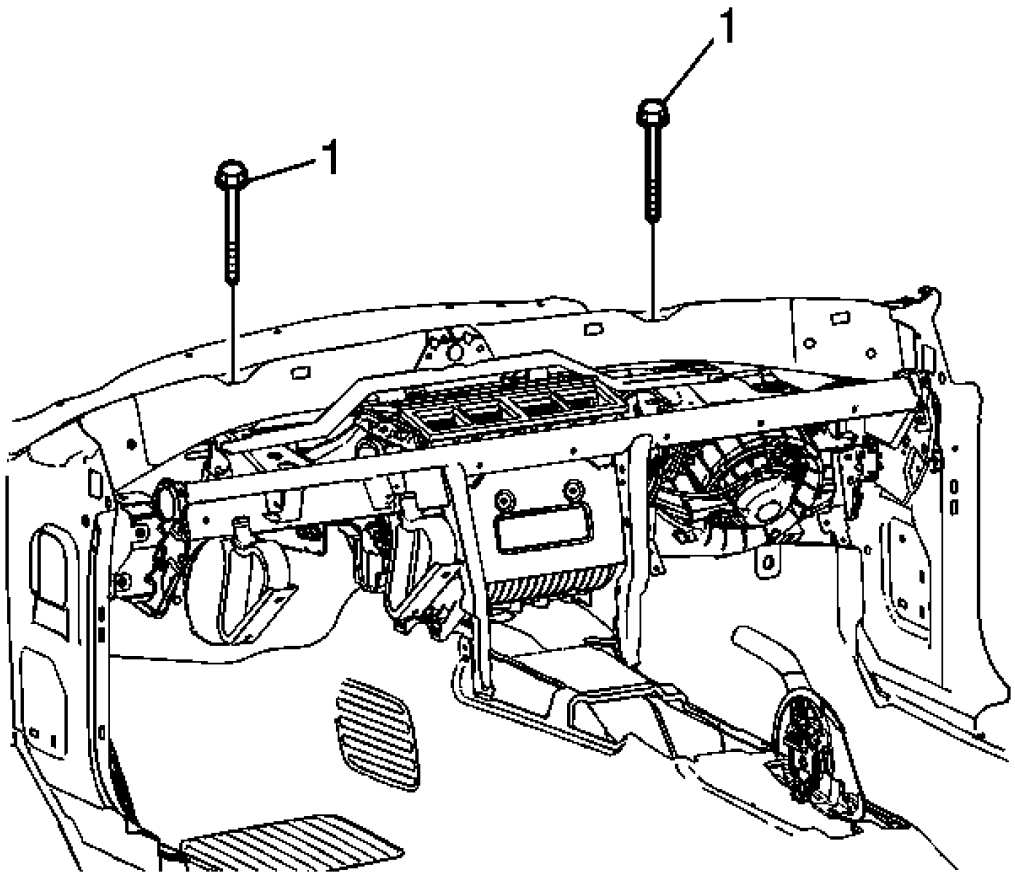


Fig. 26: Instrument Panel Tie Bar Assembly To Windshield Frame & Plenum Panel Fasteners
Courtesy of GENERAL MOTORS CORP.

4. Install the 2 fasteners (1) securing the instrument panel tie bar assembly to the windshield frame and plenum panel and tighten to 22 N.m (16 lb ft).
5. Reposition the instrument panel wiring harness into vehicle position as was noted in the removal process and connect the fasteners securing the instrument panel electrical harness assembly to the instrument panel tie bar.
6. If equipped with a manual transmission, Install the fasteners securing the clutch pedal assembly to the instrument panel tie bar. Refer to **Clutch Pedal Replacement** .
7. Install the fasteners securing the brake pedal assembly to the instrument panel tie bar. Refer to **Brake Pedal Assembly Replacement** .

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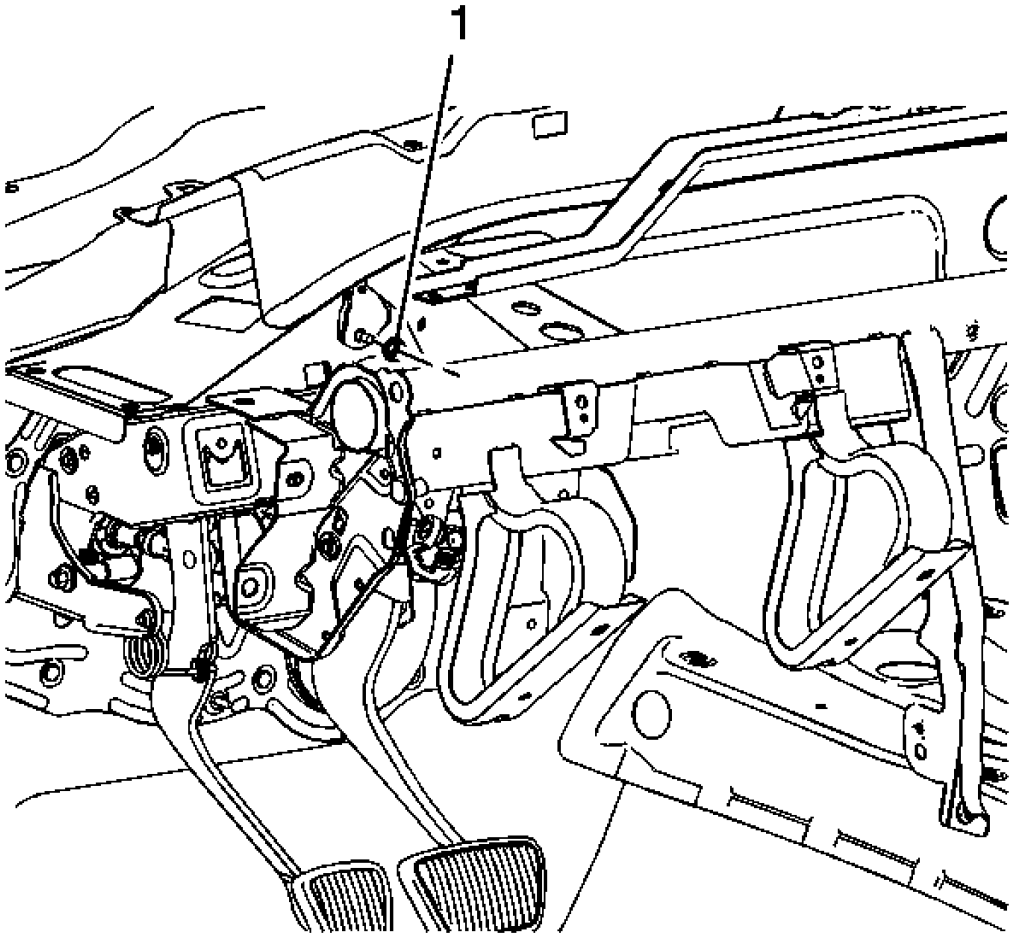


Fig. 27: Instrument Panel Tie Bar Assembly Nut To Vehicle Cowl Panel
Courtesy of GENERAL MOTORS CORP.

8. Install the nut (1) securing the instrument panel tie bar assembly to the vehicle cowl panel and tighten to 9 N.m (80 lb in).
9. Install the windshield. Refer to **Windshield Replacement** .
10. Install the steering column assembly. Refer to **Steering Column Replacement** .
11. Install the instrument panel trim pad assembly. Refer to **Instrument Panel Trim Pad Replacement**.

FRONT FLOOR CONSOLE SIDE COVER REPLACEMENT - RIGHT SIDE

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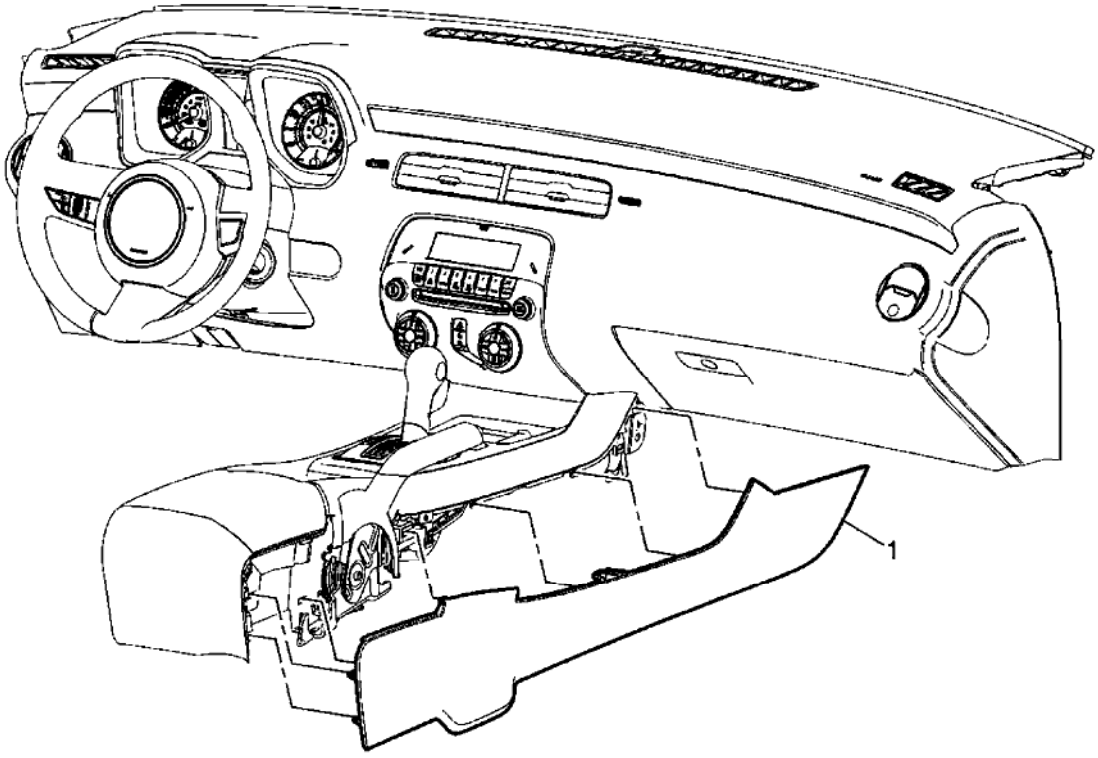


Fig. 28: Front Floor Console Side Cover - Right Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover Assembly - Right **Procedure:** Use a flat bladed plastic trim tool and release the retainer clips securing the console side cover to the front floor console assembly.

FRONT FLOOR CONSOLE SIDE COVER REPLACEMENT - LEFT SIDE

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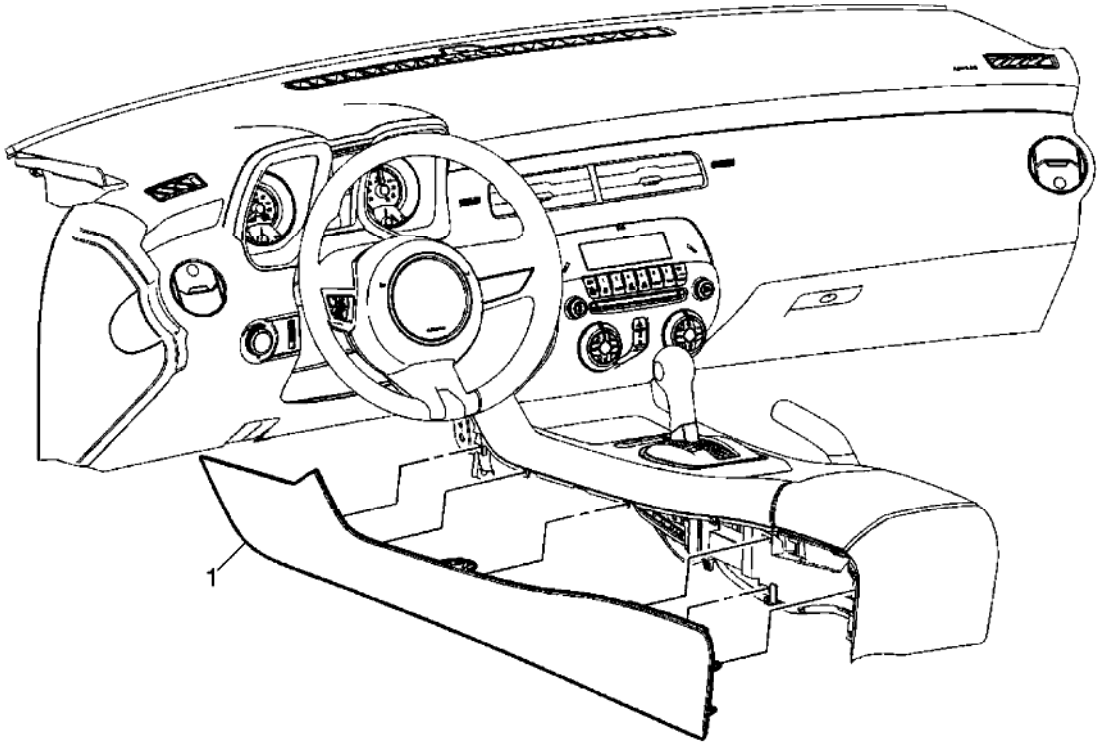


Fig. 29: Front Floor Console Side Cover - Left Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover Assembly - Left **Procedure:** Use a flat bladed plastic trim tool and release the retainer clips securing the console side cover to the front floor console assembly.

FRONT FLOOR CONSOLE REPLACEMENT

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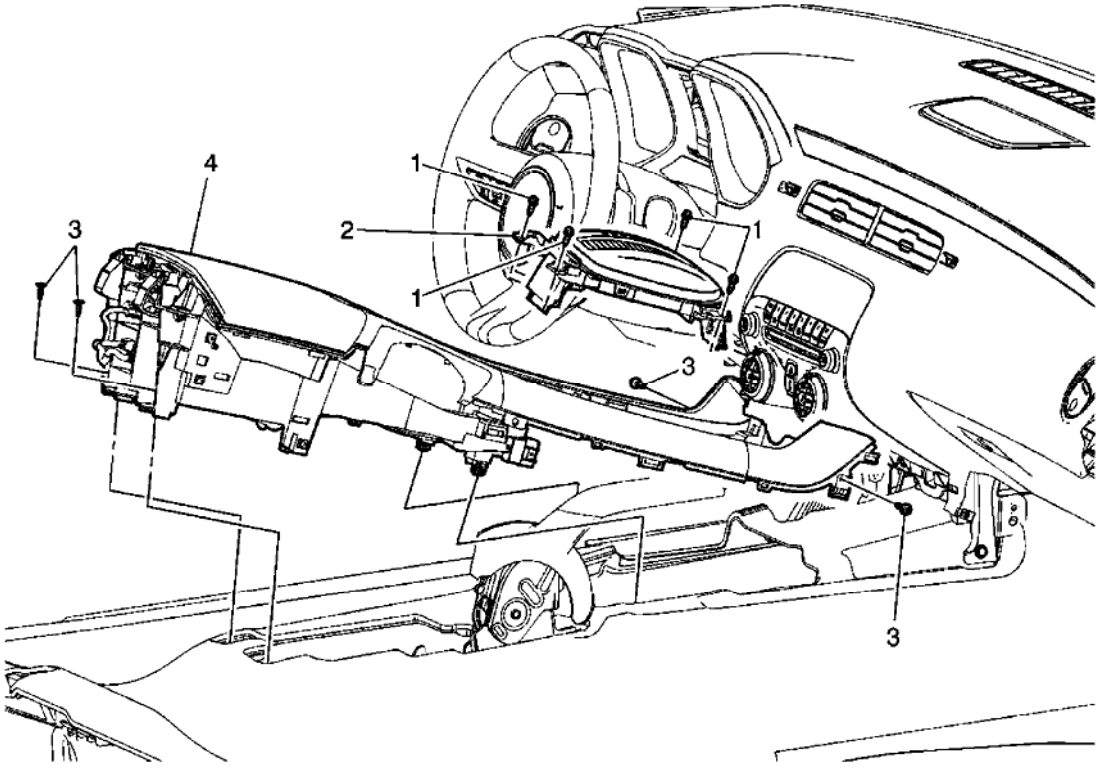


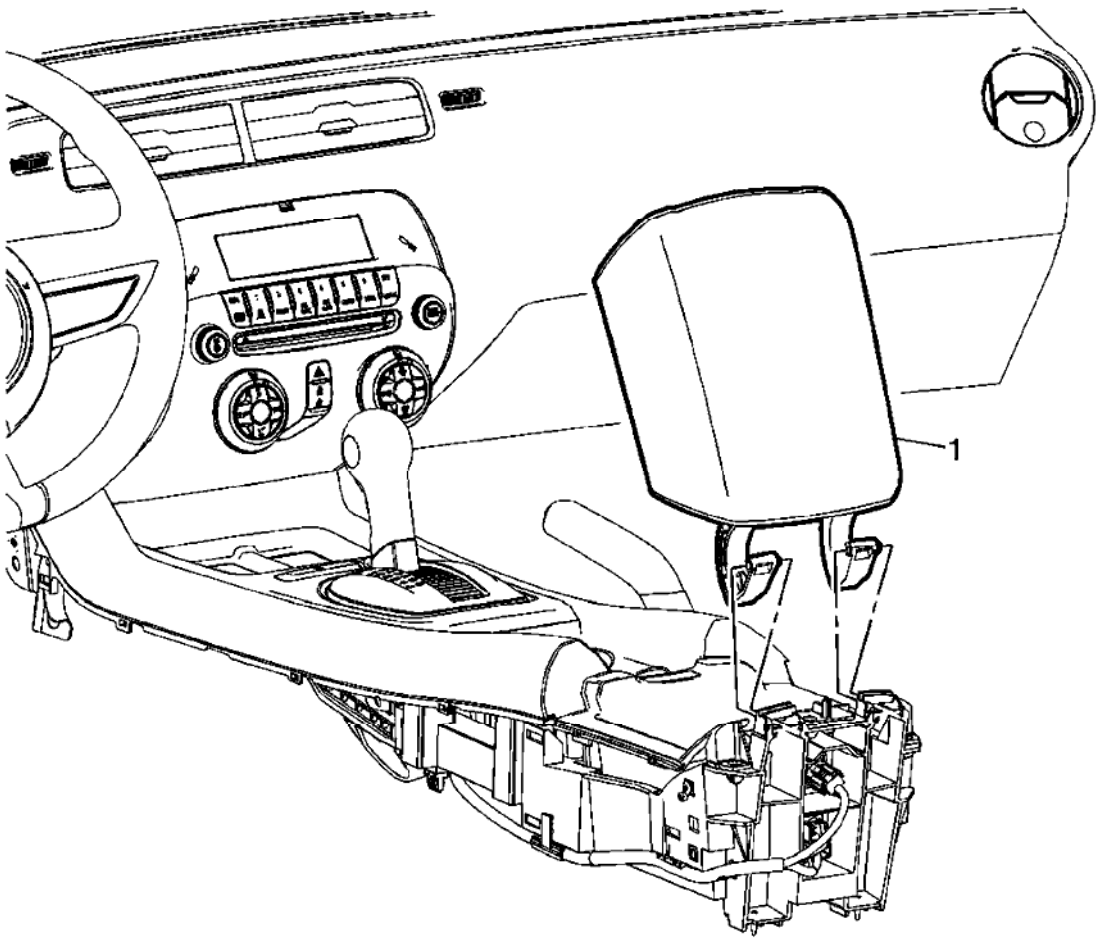
Fig. 30: Front Floor Console
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right and left front floor console side cover assemblies. Refer to **Front Floor Console Side Cover Replacement - Right Side** and **Front Floor Console Side Cover Replacement - Left Side**. 2. Remove the front floor console rear cover. Refer to **Front Floor Console Rear Cover Replacement**. 3. Remove the front floor console front cover assembly. Refer to **Front Floor Console Front Cover Replacement (Without UMQ)** or **Front Floor Console Front Cover Replacement (With UMQ)**. 4. Remove the transmission control lever knob, if equipped with a automatic transmission. Refer to **Transmission Control Lever Knob Replacement** . 5. Remove the transmission control lever knob, if equipped with a manual transmission. Refer to **Transmission Control Lever Knob Replacement** or **Transmission Control Lever Knob Replacement** .	
1	Automatic Control Transmission Control Lever Housing Bezel Fastener (Qty: 4) **CAUTION:**

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	Refer to Fastener Caution . **Tighten:** 2.5 N.m (22 lb in)
2	Automatic Control Transmission Control Lever Housing Bezel **Procedure:** Disconnect the electrical connections.
3	Front Floor Console Fastener (Qty: 4) **Tighten:** 2.5 N.m (22 lb in)
4	Front Floor Console Assembly **Procedure** 1. Disconnect the electrical connections. 2. When replacing the front floor console assembly, transfer all necessary components.

FRONT FLOOR CONSOLE ARMREST REPLACEMENT



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Fig. 31: Front Floor Console Armrest
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right and left front floor console side cover assemblies. Refer to **Front Floor Console Side Cover Replacement - Right Side** and **Front Floor Console Side Cover Replacement - Left Side**. 2. Remove the front floor console rear cover. Refer to **Front Floor Console Rear Cover Replacement**.	
1	Front Floor Console Armrest Assembly **Procedure** 1. Lift the front floor console armrest assembly to the full open position. 2. Unsnap the armrest from the front floor console assembly.

FRONT FLOOR CONSOLE FRONT COVER REPLACEMENT (WITHOUT UMQ)

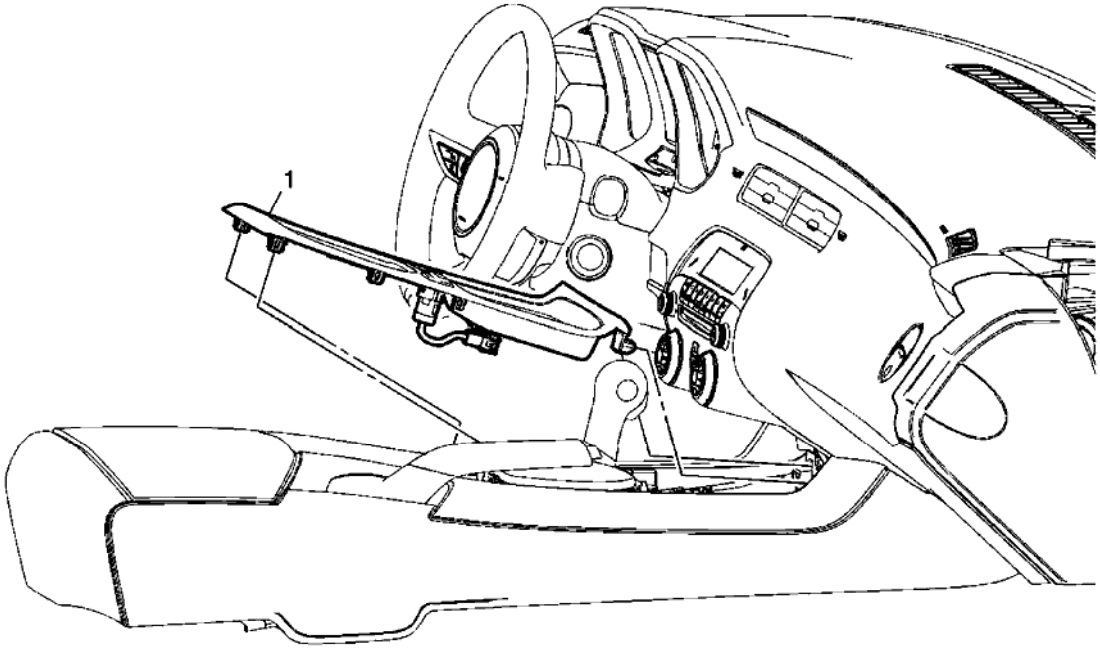


Fig. 32: Front Floor Console Front Cover (Without UMQ)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Front Floor Console Front Cover Assembly

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1	**Procedure** 1. Use a flat bladed plastic trim tool and release the retainer tabs securing the front floor console front cover to the console assembly. 2. Disconnect the electrical connections. 3. When replacing the front floor console front trim cover, transfer all necessary components.

FRONT FLOOR CONSOLE FRONT COVER REPLACEMENT (WITH UMQ)

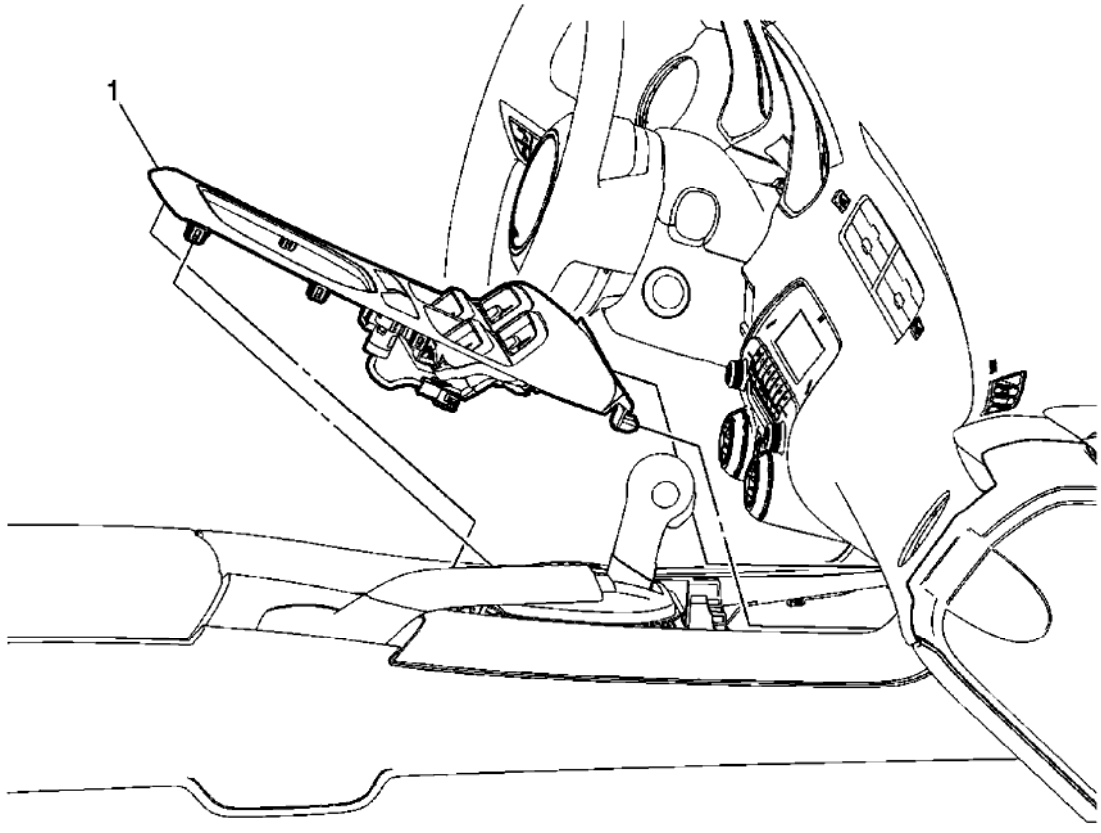


Fig. 33: Front Floor Console Front Cover (With UMQ)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Front Cover Assembly **Procedure** 1. Apply the parking brake. 2. Move the transmission shift assembly to the most rearward position possible.

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	3. Use a flat bladed plastic trim tool and release the retainer tabs securing the front floor console front cover to the console assembly. 4. Disconnect the electrical connections. 5. When replacing the front floor console front trim cover, transfer all necessary components.

FRONT FLOOR CONSOLE REAR COVER REPLACEMENT

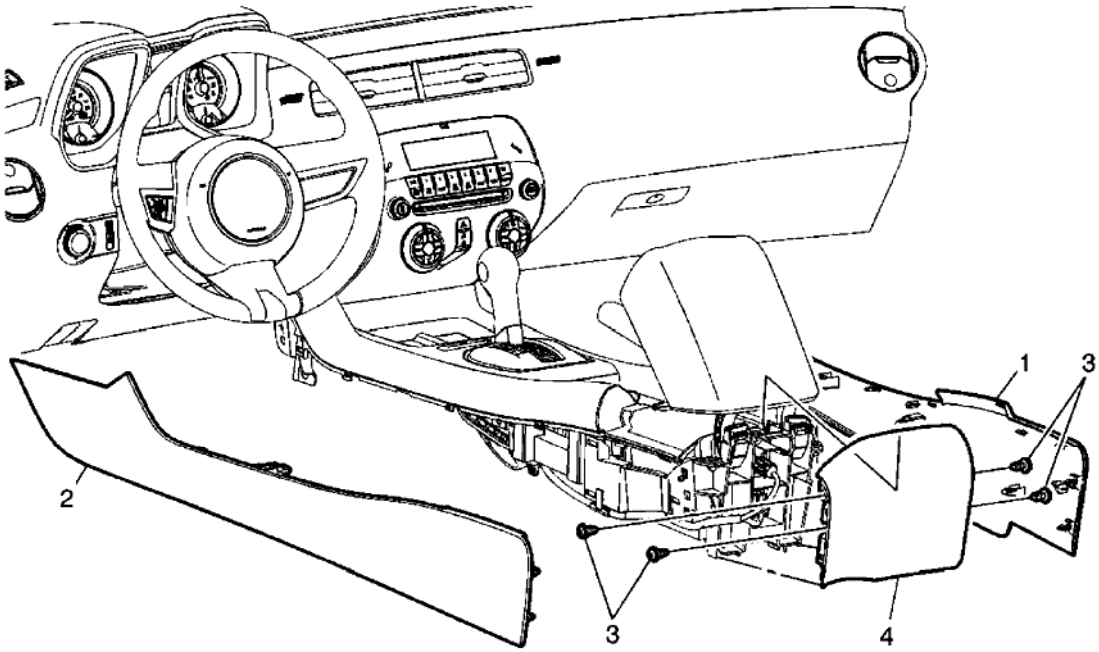


Fig. 34: Front Floor Console Rear Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover - Right Refer to **Front Floor Console Side Cover Replacement - Right Side**
2	Front Floor Console Side Cover - Left Refer to **Front Floor Console Side Cover Replacement - Left Side**
3	Front Floor Console Rear Cover Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
4	Front Floor Console Rear Cover

ROOF CONSOLE REPLACEMENT

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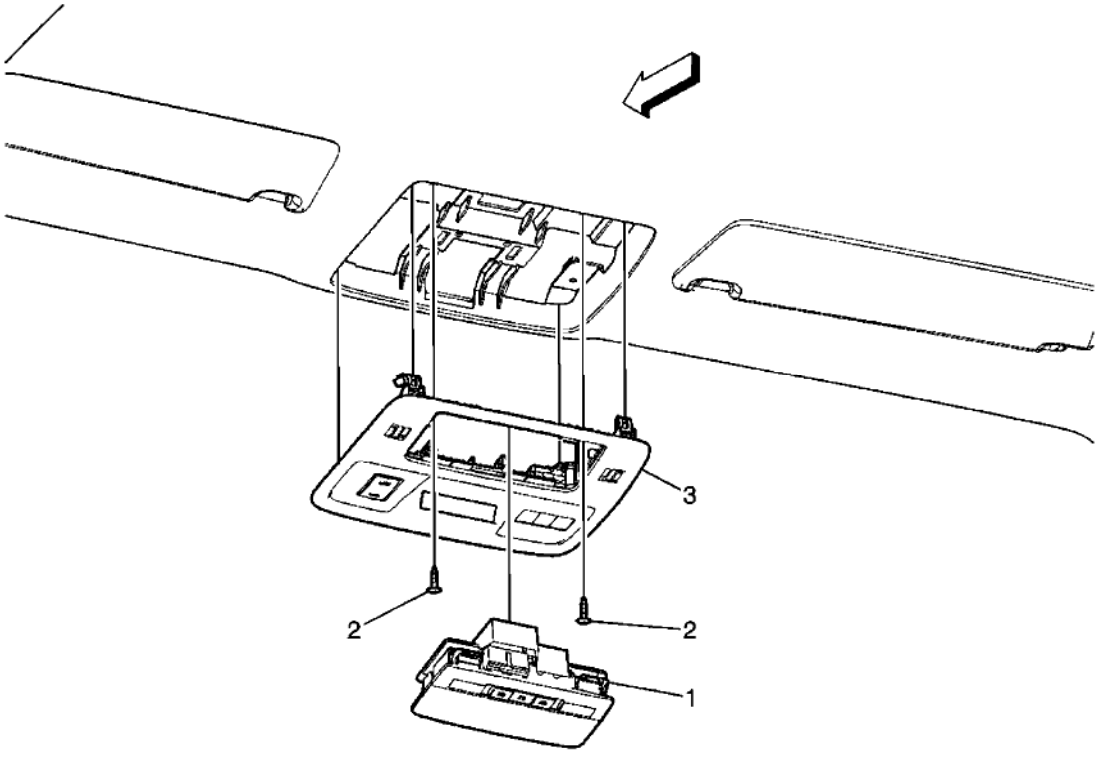


Fig. 35: Roof Console
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Courtesy Lamp Assembly Refer to **Courtesy Lamp Replacement** .
2	Roof Console Fasteners (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Roof Console Assembly **Procedure** 1. Grasp the right and left sides of the roof console assembly and pull downward using equal force on each side in order to release the four retainer clips securing the roof console assembly to the headlining assembly. 2. Disconnect the electrical connections. 3. When replacing the roof console assembly, transfer all necessary components.

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2010 ACCESSORIES & BODY, CAB

Mirrors - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Inside Rearview Mirror Set Screw	2 N.m	18 lb in
Outside Rearview Mirror Nuts	10 N.m	89 lb in
Outside Rearview Mirror Inner Actuator/Motor Screws	10 N.m	89 lb in

SCHEMATIC AND ROUTING DIAGRAMS

INSIDE REARVIEW MIRROR SCHEMATICS

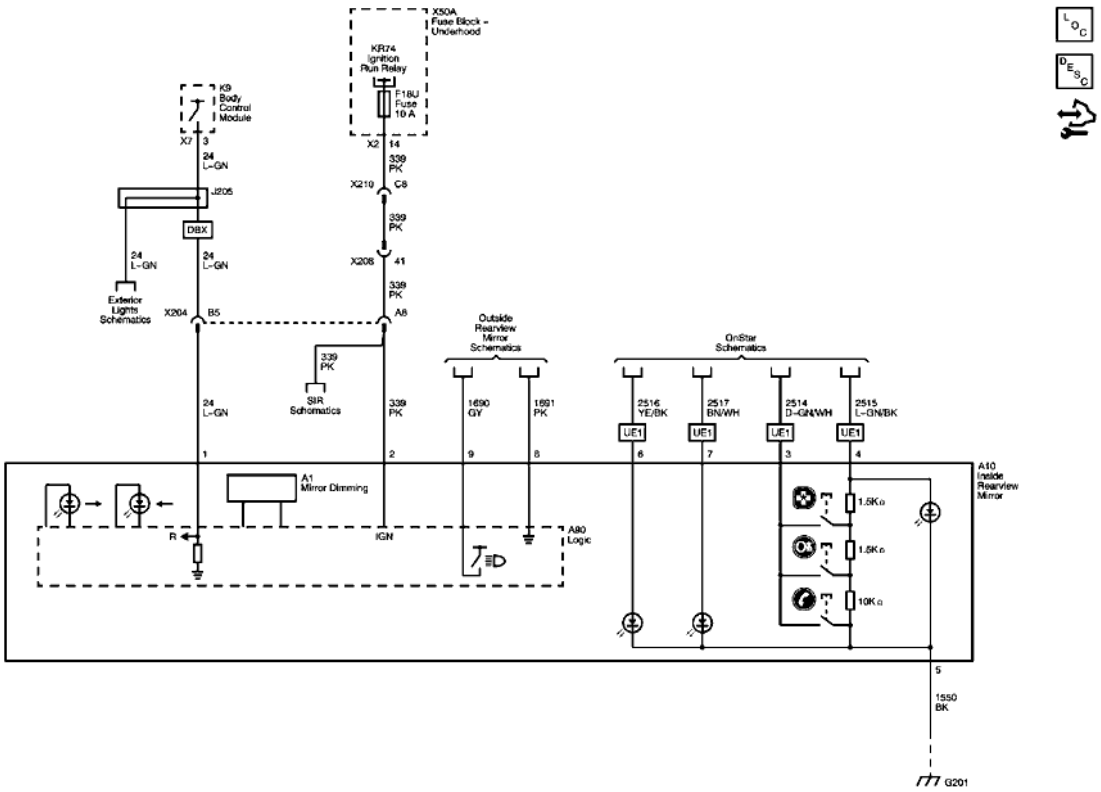


Fig. 1: Inside Rearview Mirror
Courtesy of GENERAL MOTORS CORP.

OUTSIDE REARVIEW MIRROR SCHEMATICS

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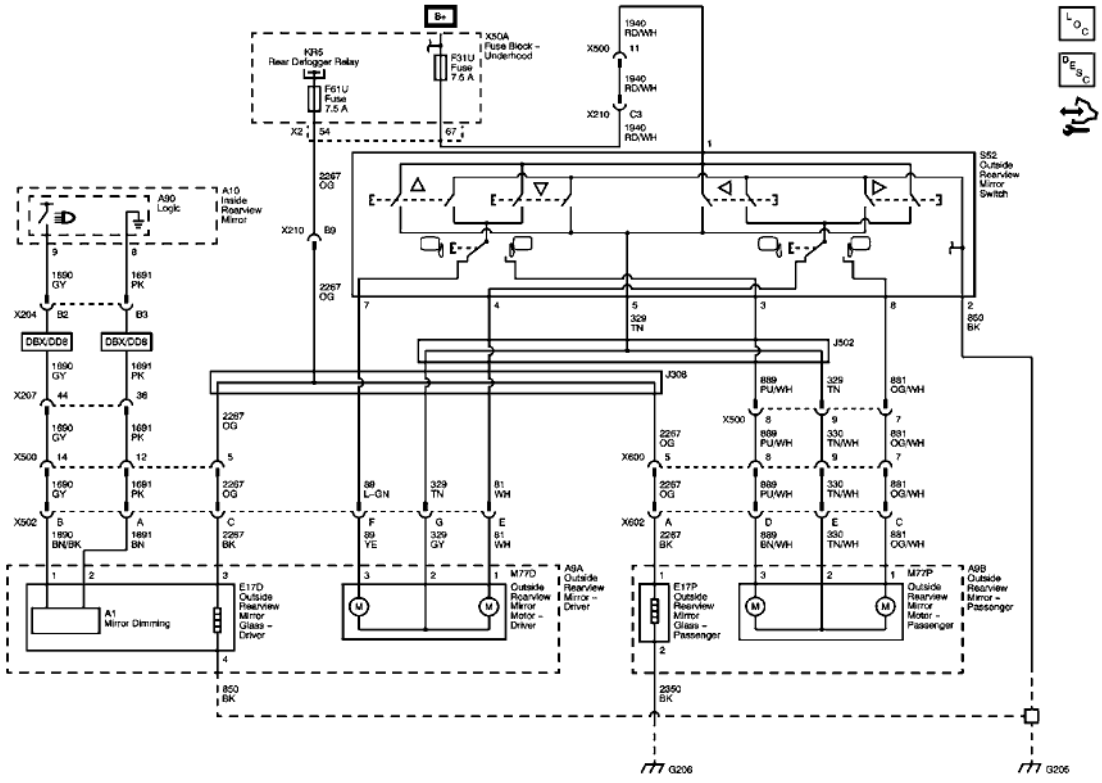


Fig. 2: Outside Rearview Mirror
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - MIRRORS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to the following system descriptions:
   - **Outside Mirror Description and Operation**
   - **Automatic Day-Night Mirror Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the system. Refer to **Checking Aftermarket Accessories** .

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- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Heated Mirrors Malfunction**
- **Automatic Day-Night Mirrors Malfunction**
- **Power Mirror Malfunction**

HEATED MIRRORS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Heated Mirror Element Control	1	1	2	-
Ground	-	1	-	-
1. Heated Mirror Inoperative 2. Heated Mirror Always On				

Circuit/System Description

The RR DEFOG relay supplies voltage to the outside rearview mirror heater elements based on the current state of the rear window defogger. The relay supplies B+ through the driver/passenger mirror heating element control circuits when a request is seen.

Reference Information

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

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Component Connector End Views

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Vehicle running, press the rear window defogger switch. Verify the rear window defogger turns ON and the rear window becomes warm.
    - If the rear window defogger does not turn on, refer to **Rear Window Defogger Malfunction** .
2. Verify both the left and right outside mirror glass become warm.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate E17 outside rearview mirror glass.
2. Test for less than 10 ohms between the ground circuit terminal 4 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the heater element control circuit terminal 3 and ground.
4. Vehicle running, operate the rear window defogger ON and OFF with the S59 rear defogger switch. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to voltage.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance.
5. If all circuits test normal, test or replace the E17 outside rearview mirror glass.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Outside Rearview Mirror Glass Replacement

AUTOMATIC DAY-NIGHT MIRRORS MALFUNCTION

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Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	1	1	-	-
Automatic Day/Night Mirror Signal	2	2	2	-
Backup Lamp Control	1, 2	1, 2	1, 2	-
Automatic Day/Night Mirror Low Reference	-	2	2	-
Ground	-	1	-	-
1. Inside Electrochromic Mirror Malfunction 2. Outside Rearview Mirror Automatic Dimming Malfunction				

Circuit/System Description

The inside rearview mirror uses 2 photocell sensors. One sensor is the rear light sensor, located on the face side of the mirror, facing the rear of the vehicle. The rear light sensor is used to determine light conditions present at the mirror face. The other sensor is the front light sensor, located on the backside of the mirror, facing the front of the vehicle. The front light sensor is used to determine the exterior light conditions at the front of the vehicle. With a low exterior light condition detected by the front light sensor and a high light condition from the rear light sensor, the inside rearview mirror will automatically darken the face of the inside rearview mirror and the driver outside rearview mirror. The inside rearview mirror provides a signal circuit and a low reference circuit to the driver mirror face to darken the mirror when needed.

With the gear selector lever in the REVERSE position and the engine running, backup lamp control voltage is supplied as an input to the inside rearview mirror. The mirror monitors this input to disable the automatic day-night feature. This allows the driver to see objects in the mirror clearly when backing up, regardless of the rear light sensor status.

Reference Information

Schematic Reference

- **Inside Rearview Mirror Schematics**
- **Outside Rearview Mirror Schematics**

Connector End View Reference

Component Connector End Views

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Description and Operation

Automatic Day-Night Mirror Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, headlamps ON, vehicle in PARK, cover the front light sensor with a towel or other suitable item. Shine a flashlight at the rear light sensor while observing the inside rearview mirror face. The inside rearview mirror face should dim.
2. Engine running, place the transmission in REVERSE. The inside rearview mirror face should transition from dim to bright.
    - If the mirror does not transition between the bright and dim states, refer to Inside Rearview Mirror Dimming Malfunction.
3. Vehicle in PARK, shine a flashlight at the rear light sensor while observing the driver outside rearview mirror face. The outside rearview mirror face should dim.
4. Engine running, place the transmission in REVERSE. The driver outside rearview mirror face should transition from dim to bright.
    - If the mirror does not transition between the bright and dim states, refer to Outside Rearview Mirror Dimming Malfunction.

Circuit/System Testing

Inside Rearview Mirror Dimming Malfunction

1. Ignition OFF, disconnect the harness connector at the A10 inside rearview mirror.
2. Wait 1 minute, test for less than 10 ohms between the ground circuit terminal 5 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 2 and ground.
    - If the test lamp does not illuminate test the ignition circuit for an open/high resistance or short to ground.
4. Engine running, park brake applied, vehicle in REVERSE, verify that a test lamp illuminates between the backup lamp control circuit terminal 1 and ground.
    - If the test lamp does not illuminate test the control circuit for an open/high resistance or short to

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ground. If the circuit tests normal, refer to **Backup Lamps Malfunction (Automatic Transmission)** or **Backup Lamps Malfunction (Manual Transmission)** .

5. If all circuits test normal, test or replace the A10 inside rearview mirror.

Outside Rearview Mirror Dimming Malfunction

1. Ignition OFF, disconnect the harness connector at the E17D driver outside rearview mirror glass.
2. Wait 1 minute, test for less than 10 ohms between the low reference circuit terminal 2 and ground.
   - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, test or replace the A10 inside rearview mirror.
3. Ignition ON, test for less than 1 V between the signal circuit terminal 1 and ground.
   - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, test or replace the A10 inside rearview mirror.
4. Headlamps ON, vehicle in PARK, cover the front light sensor with a towel or other suitable item. Shine a flashlight at the rear light sensor. Test for greater than 1 V between the signal circuit terminal 1 and ground.
   - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the A10 inside rearview mirror.
5. If all circuits test normal, test or replace the driver E17D outside rearview mirror glass.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Inside Rearview Mirror Replacement**
- **Outside Rearview Mirror Glass Replacement**

POWER MIRROR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Left/Right Mirror Horizontal Motor Control	1	1	-	-
Left/Right Mirror Vertical Motor Control	1	1	-	-

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Left/Right Mirror Motor Common Control	1	1	-	-
Ground	-	1	-	-
1. Power Mirror Malfunction				

Circuit/System Description

The outside rearview mirror switch controls the outside rearview mirrors based on the position of the mirror selector switch and which movement position is selected. The outside rearview mirror switch has four positions: up, down, left, and right. B+ is applied to the switch and when a movement position switch is selected, B+ is sent to the mirror via a motor control circuit. The opposite motor control circuit acts as a ground circuit for the bi-directional mirror motor.

Reference Information

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, with the mirror selector switch in the DRIVER position, command the mirrors UP, DOWN, LEFT, and RIGHT using the mirror directional switch. The driver mirror should move in the commanded direction.
2. Ignition ON, with the mirror selector switch in the PASSENGER position, command the mirrors UP, DOWN, LEFT, and RIGHT using the mirror directional switch. The passenger mirror should move in the commanded direction.

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Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S52 outside rearview mirror switch.
2. Ignition OFF for 1 minute, test for less than 10 ohms between the ground circuit terminal 2 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Connect the harness connector at the S52 outside rearview mirror switch.
5. Ignition OFF, disconnect the harness connector at the appropriate A9 outside rearview mirror.
6. Connect a test lamp between the control circuit terminal 3 and the control circuit terminal 2.
7. Operate the vertical switch UP and DOWN. The test lamp should turn ON when commanding the UP and DOWN states.
    - If the test lamp remains OFF during either of the commands, test for a short to voltage, short to ground, or an open/high resistance on the control circuits. If the circuits test normal, replace the S52 outside rearview mirror switch.
8. Connect a test lamp between the control circuit terminal 1 and the control circuit terminal 2.
9. Operate the horizontal switch LEFT and RIGHT. The test lamp should turn ON when commanding the LEFT and RIGHT states.
    - If the test lamp remains OFF during either of the commands, test for a short to voltage, short to ground, or an open/high resistance on the control circuits. If the circuits test normal, replace the S52 outside rearview mirror switch.
10. If all circuits test normal, test or replace the outside rearview mirror actuator.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Outside Remote Control Rearview Mirror Switch Replacement**
- **Outside Rearview Mirror Inner Actuator Replacement**

REPAIR INSTRUCTIONS

OUTSIDE REARVIEW MIRROR OPENING APPLIQUE REPLACEMENT

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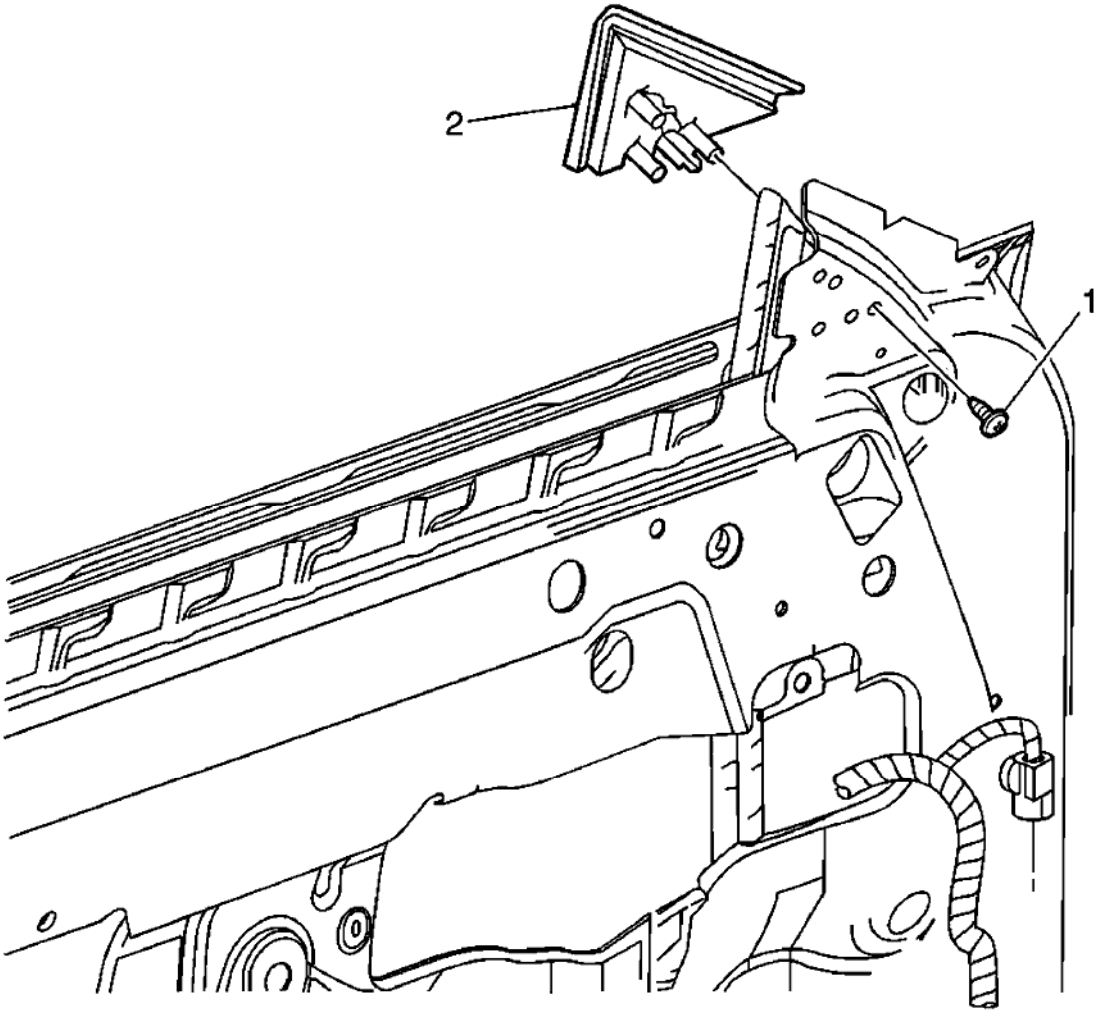


Fig. 3: Outside Rearview Mirror Opening Applique
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Outside Rearview Mirror Opening Applique Fastener (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tip:** Remove pad to assess the outside rearview mirror opening applique fasteners. **Tighten:** 2 N.m (18 lb in)
2	Outside Rearview Mirror Opening Applique

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OUTSIDE REARVIEW MIRROR SEAL REPLACEMENT

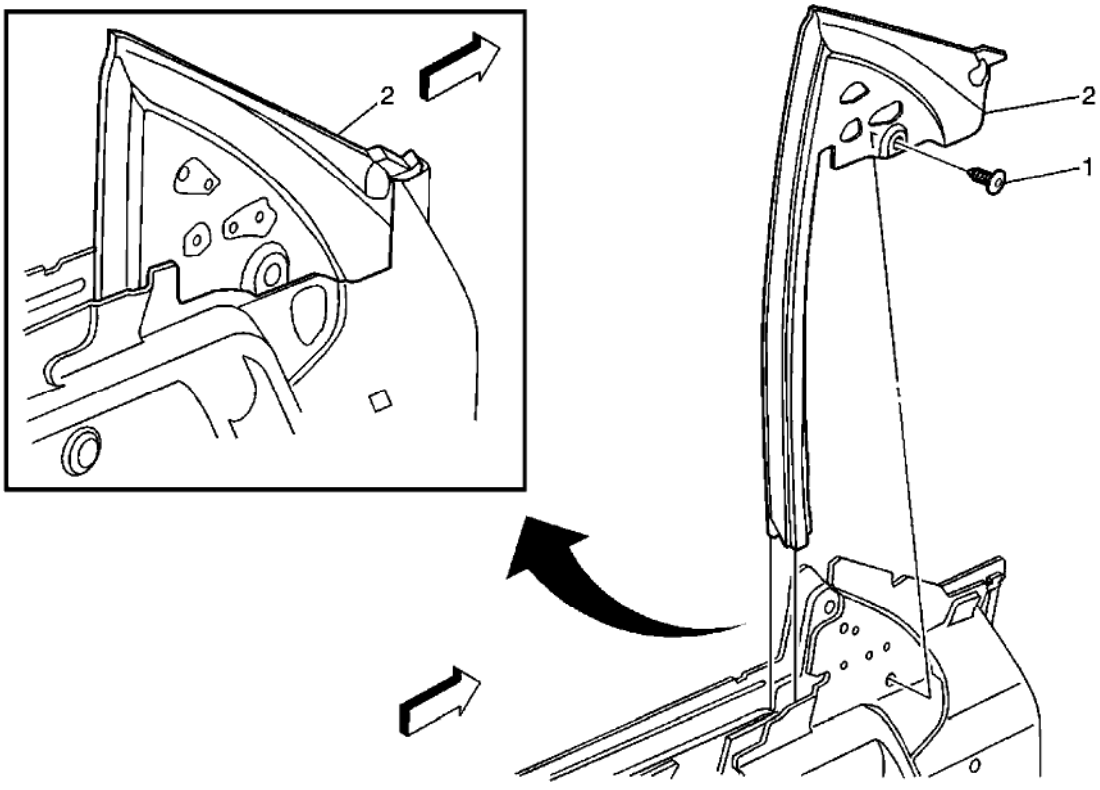


Fig. 4: Outside Rearview Mirror Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Place the front door window in the full down position. 2. Remove the outside rearview mirror. Refer to **Outside Rearview Mirror Replacement**. 3. Remove the front side door window belt reveal molding. Refer to **Front Side Door Window Belt Reveal Molding Replacement** .	
1	Outside Rearview Mirror Seal Retainer
2	Outside Rearview Mirror Seal **Procedures** 1. Insert mirror seal into the channel working it downward. 2. The seal must be fully seated into the door lower frame. 3. Inspect the mirror and window for proper operation before install the trim panel.

OUTSIDE REARVIEW MIRROR REPLACEMENT

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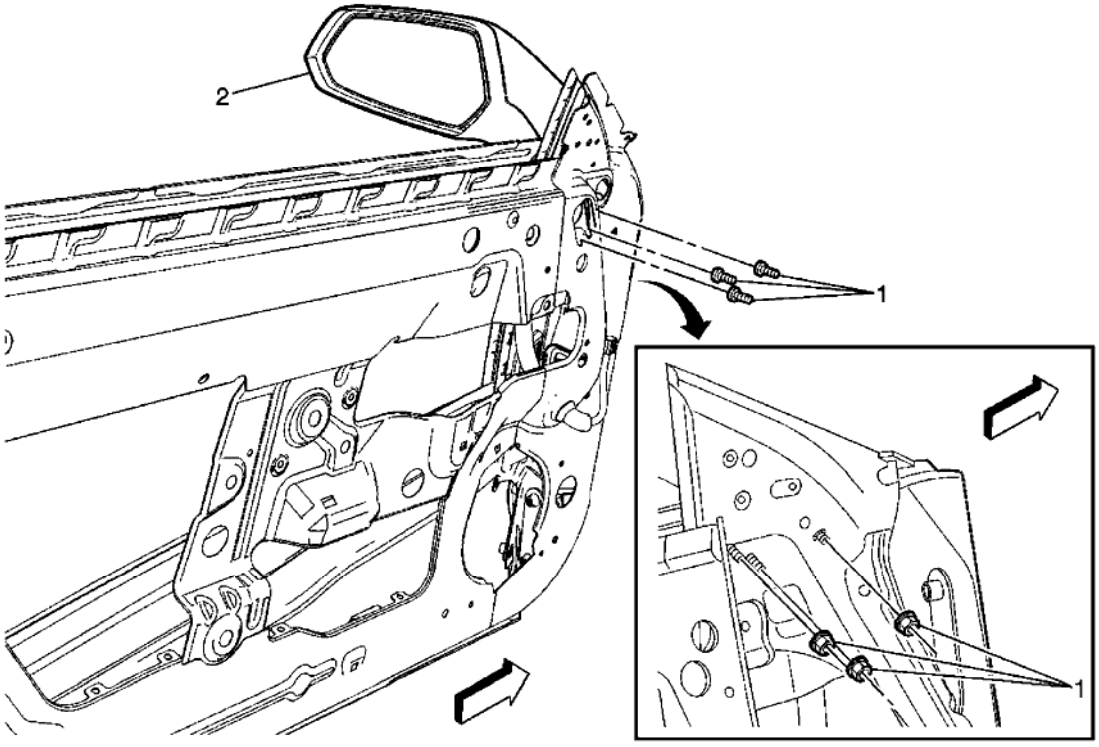


Fig. 5: Outside Rearview Mirror
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to Glass and Sheet Metal Handling Warning .** **Preliminary Procedure:** Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Outside Rearview Mirror Nuts (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Remove the outside rearview mirror nuts access cover. 2. Disconnect the electrical connector. **Tighten:** 10 N.m (89 lb in)
2	Outside Rearview Mirror

OUTSIDE REMOTE CONTROL REARVIEW MIRROR SWITCH REPLACEMENT

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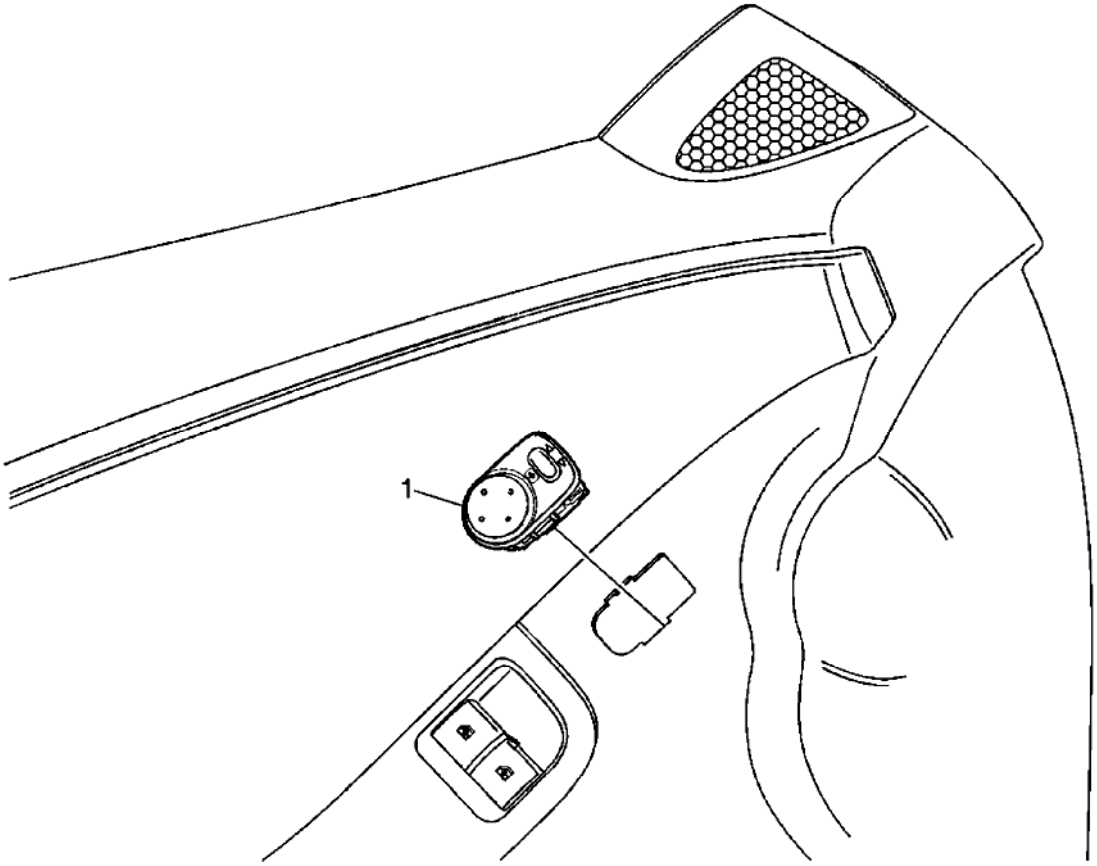


Fig. 6: Outside Remote Control Rearview Mirror Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Outside Remote Control Rearview Mirror Switch Assembly **Procedure** 1. Using a plastic pry tool, gently pry on the sides to release the switch. 2. Disconnect the electrical connector.

OUTSIDE REARVIEW MIRROR INNER ACTUATOR REPLACEMENT

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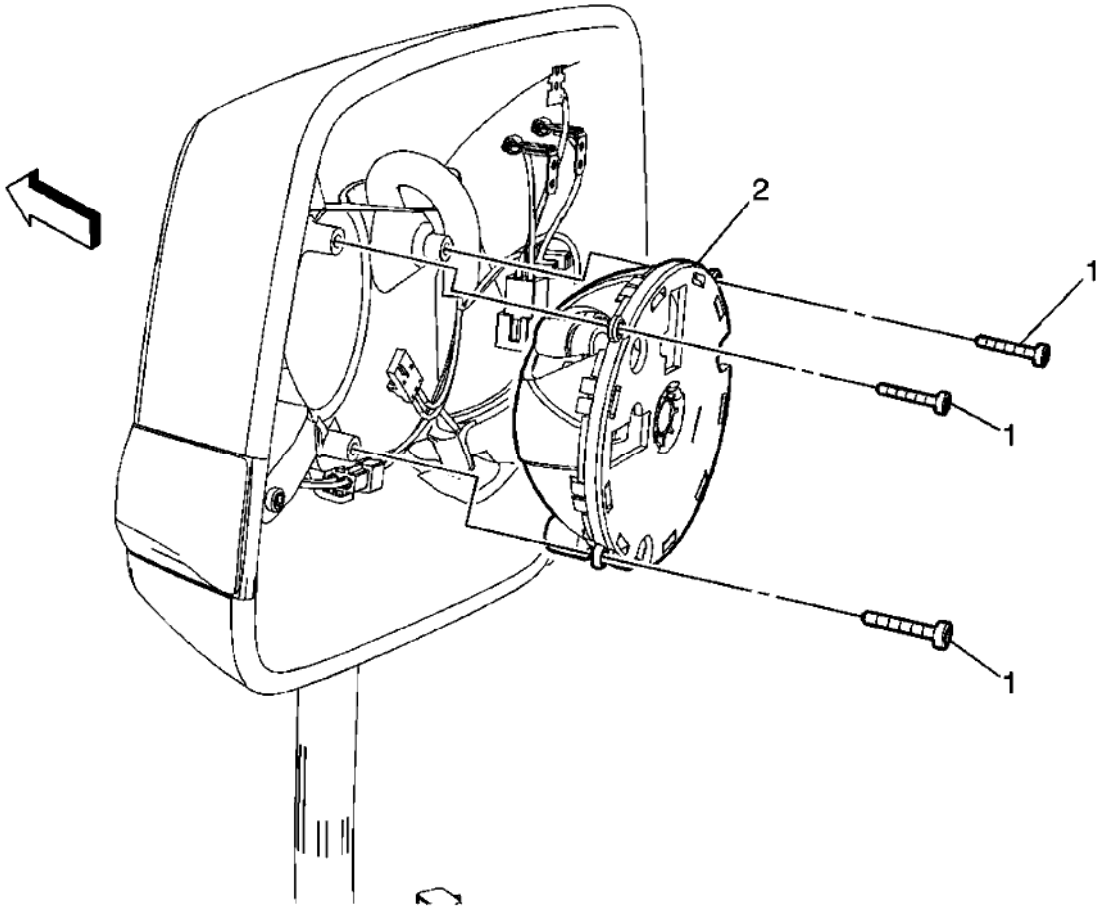


Fig. 7: Outside Rearview Mirror Inner Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the outside rearview mirror lens. Refer to **Outside Rearview Mirror Glass Replacement**.	
	Outside Rearview Mirror Inner Actuator/Motor Screws (Qty: 3) **WARNING:** **Refer to Glass and Sheet Metal Handling Warning .**
1	**Procedure:** Disconnect the electrical connector. **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)

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2	Outside Rearview Mirror Inner Actuator/Motor

OUTSIDE REARVIEW MIRROR GLASS REPLACEMENT

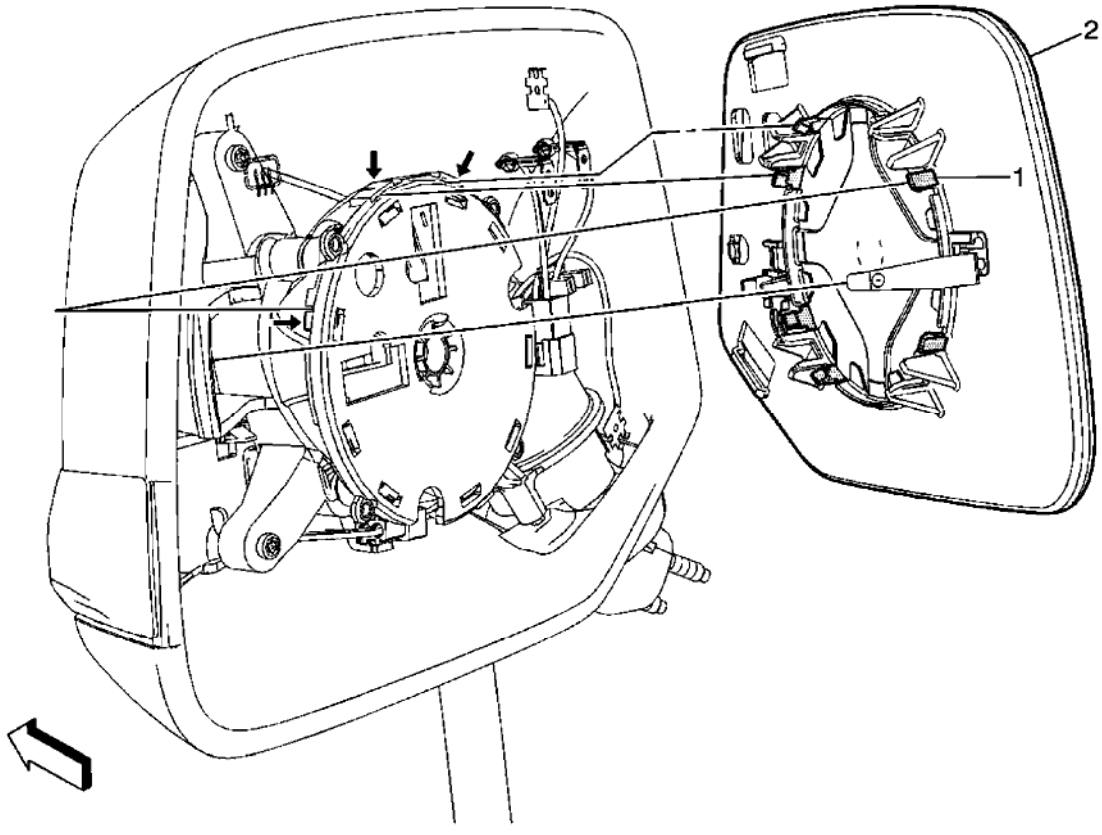


Fig. 8: Outside Rearview Mirror Glass
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Outside Rearview Mirror Glass Retainers (Qty :6) **WARNING:** **Refer to Glass and Sheet Metal Handling Warning .** **Procedure** 1. Apply several layers of masking tape to the top of the outside rearview mirror housing in order to protect the painted finish. Push the mirror glass (2) inward at the bottom of the mirror glass until full travel is reached.

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	2. Insert a suitable tool behind the mirror glass and housing, pry outward until the mirror glass is releases from the retainers. 3. Disconnect electrical connectors from mirror, if equipped.
2	Outside Rearview Mirror Glass **Procedure** 1. Align the mirror glass retainers with the retaining tabs (1) on the actuator. 2. Using a 9 cm (3 in) rubber sanding block placed in the center of the mirror glass, apply pressure until an audible click is heard. 3. Inspect the power mirror for proper operation.

INSIDE REARVIEW MIRROR REPLACEMENT

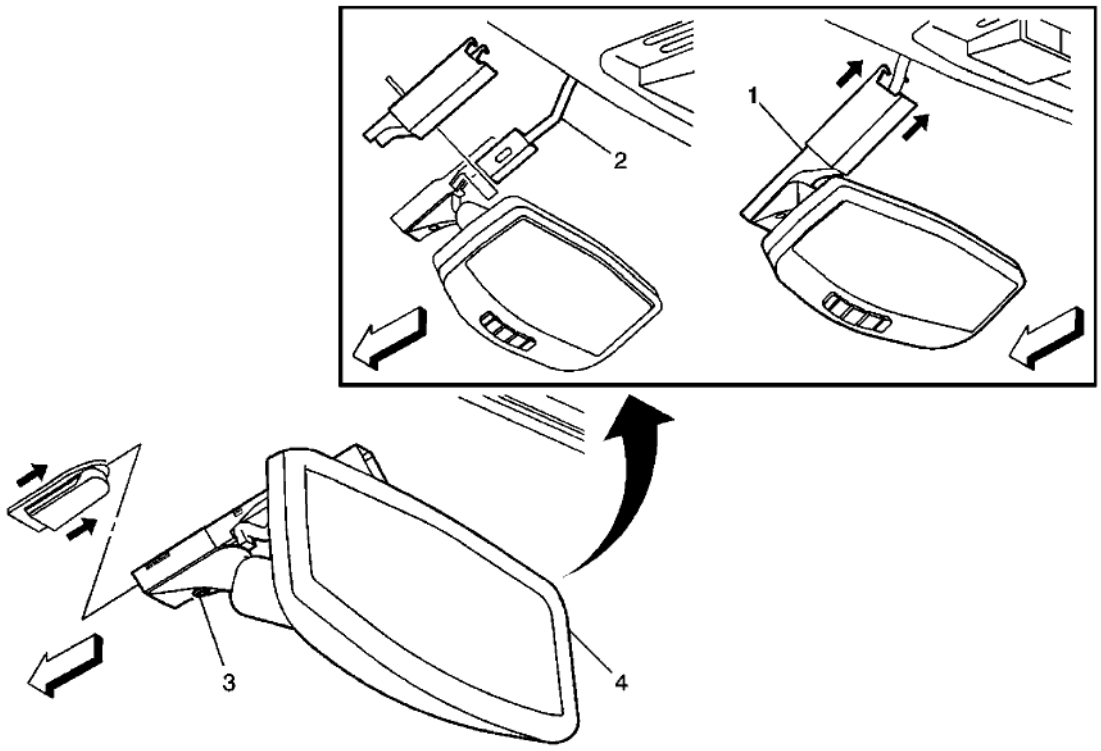


Fig. 9: Inside Rearview Mirror
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Inside Rearview Mirror Electrical Connector Cover
2	Inside Rearview Mirror Electrical Connector
	Inside Rearview Mirror Set Screw

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3	**CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Adjust the mirror to the full upward position. 2. Loosen the set screw located at the base of the mirror. 3. Slide the mirror upward off of the rearview mirror button. **Tighten:** 2 N.m (18 lb in)
4	Inside Rearview Mirror **Procedure:** Refer to **Control Module References** for programming and setup information.

INSIDE REARVIEW MIRROR BRACKET INSTALLATION

Special Tools

Safety Razor or Utility Knife

1. Determine the location of the mirror mounting base by marking the outside of the windshield with a marking pencil where the base was previously located. If it is not clear where the base was mounted, use the following steps to determine where the base should be installed:

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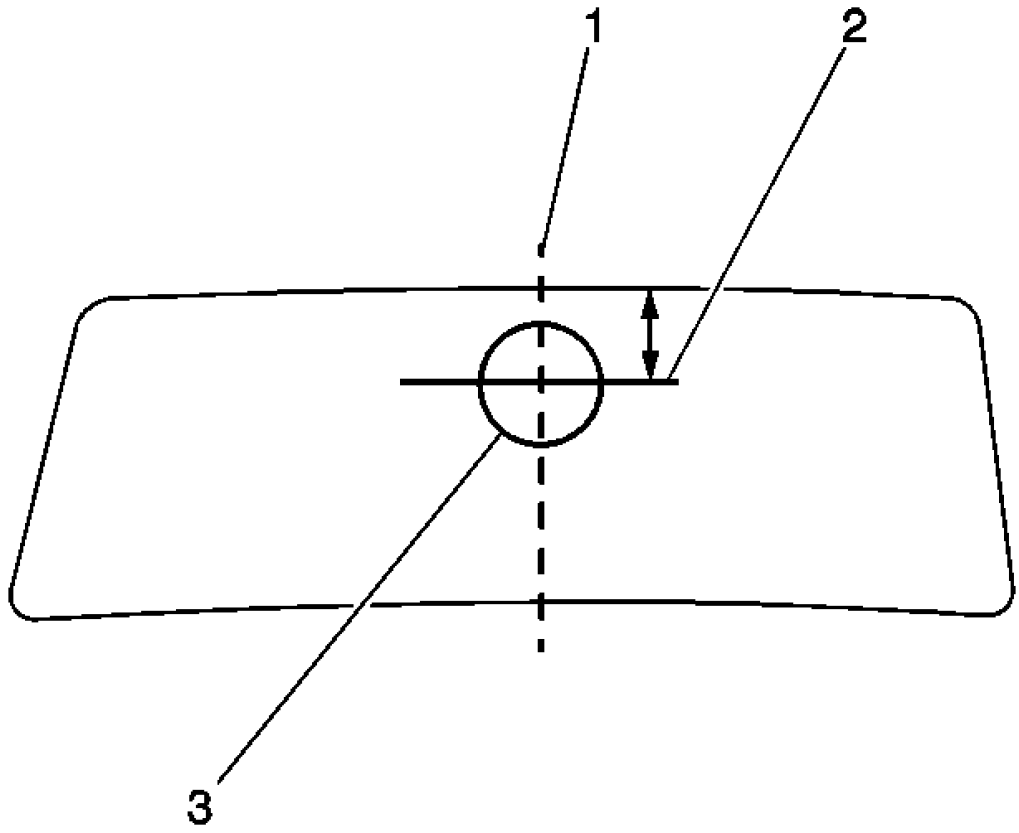


Fig. 10: Locating Mirror Mounting Base
Courtesy of GENERAL MOTORS CORP.

1. Using a measuring tape, measure the distance between the windshield pillars from the base of the shade line .
2. Using a marking pencil, halfway between the windshield pillars, draw a centerline (1) on the windshield from the roof panel to the windshield base.
3. Draw a perpendicular line intersecting the centerline (2) at that location.

   The top center of the mirror mounting base will be at the intersection of these lines.

2. Scrape the inside windshield thoroughly with a safety razor or utility knife in order to remove all old adhesive.
3. If reinstalling the original mounting base, place the mirror mounting base in a suitable holding device, such as a vise.
4. Clean the mirror mounting base thoroughly with a safety razor or utility knife in order to remove all old adhesive.

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5. Clean the inside windshield and the mounting surface of the mirror mounting base thoroughly with a clean cloth saturated with naphtha or a 50/50 mixture (by volume) of clean water and isopropyl alcohol.

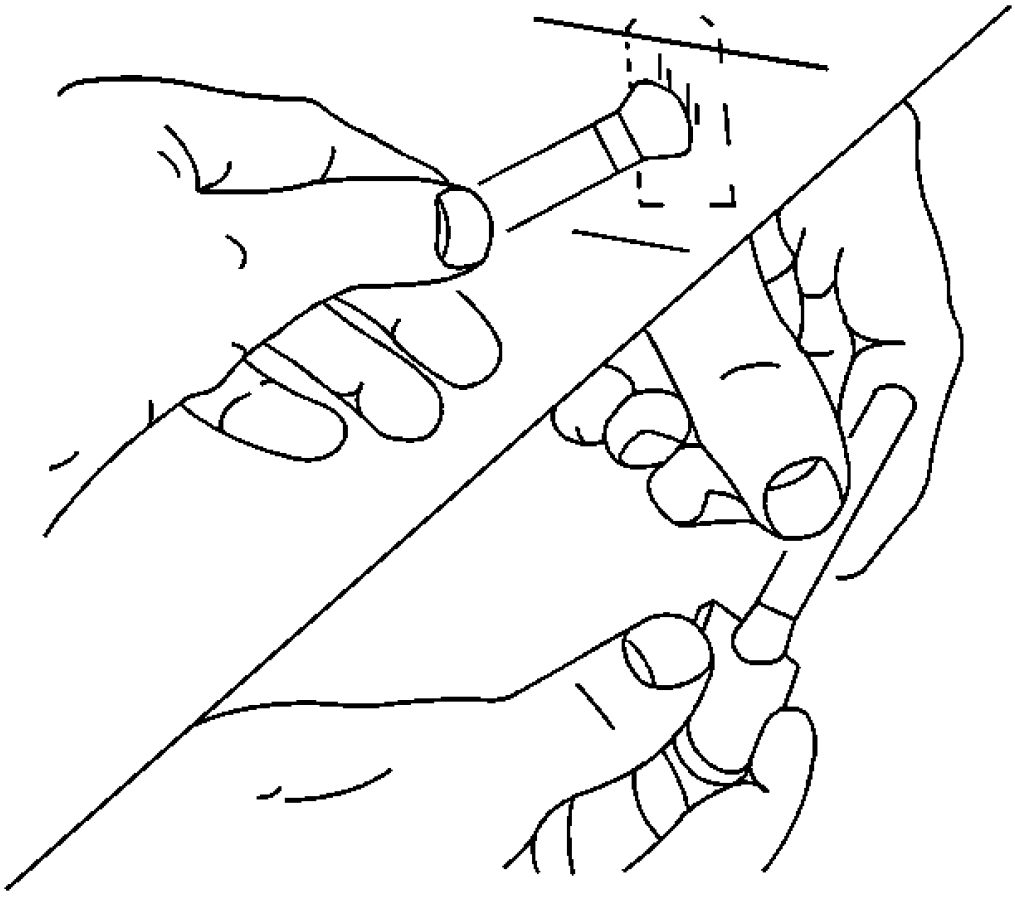


Fig. 11: Applying Adhesive To Mirror Base & Window
Courtesy of GENERAL MOTORS CORP.

6. Use Inside Mirror Adhesive Kit GM P/N 89021329 (Canadian P/N 993362), or equivalent, to apply a small amount of activator to the mounting surface of the mirror mounting base.
7. Apply a small amount of activator to the windshield where the mounting base is to be installed.
8. Allow the activator to dry 5 minutes.

NOTE: Do not touch the mounting surface of the mirror mounting base or the window.

9. Apply 1 drop of adhesive to the center of the mirror mounting base.

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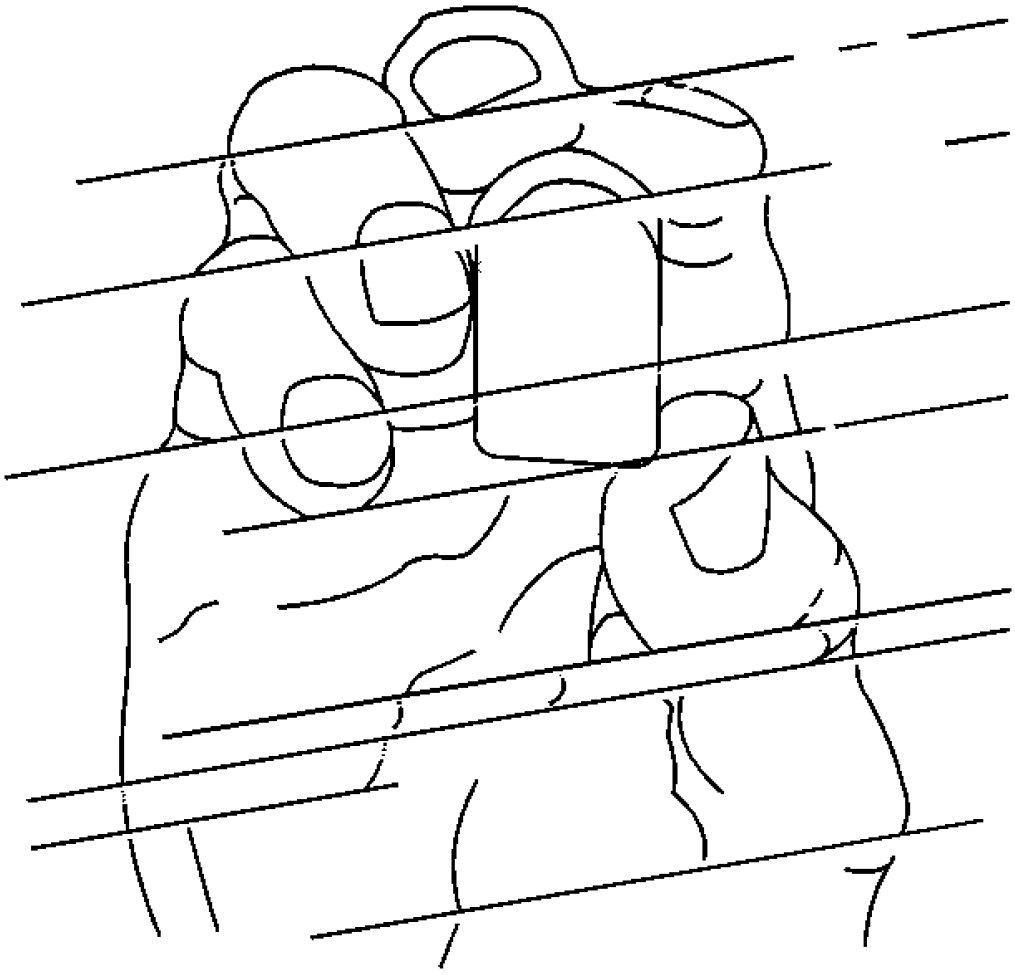


Fig. 12: Installing Mirror Mounting Base
Courtesy of GENERAL MOTORS CORP.

10. Immediately apply the mounting base to the windshield, ensuring that the mounting base aligns correctly to the marks made on the outside of the windshield.
11. Hold the mounting base firmly in place for 1 minute.
12. Allow the adhesive to set for 15 minutes.
13. Install the mirror to the mirror mounting base and fasten, if necessary.
14. Connect the electrical connector and install the wire cover, if equipped.

DESCRIPTION AND OPERATION

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AUTOMATIC DAY-NIGHT MIRROR DESCRIPTION AND OPERATION

Inside Rearview Mirror with the Automatic Day-Night Feature System Operation

The inside rearview mirror uses 2 photocell sensors. One sensor is the headlight sensor, located on the face side of the mirror. The headlight sensor is used to determine light conditions present at the mirror face. The other sensor is the ambient light sensor, located on the rear of the mirror or windshield side. The ambient light sensor is used to determine the exterior light conditions. With a low exterior light condition detected, and a high light condition from behind the car, at the headlight sensor, the inside rearview mirror will automatically darken the face of the mirror.

In the daytime, the mirror is in a normal state because of the high exterior light condition that is indicated by the ambient light sensor. With the gear selector lever in the REVERSE position and the engine running, backup lamp supply voltage is supplied as an input to the inside rearview mirror. The mirror monitors this input to disable the automatic day-night feature. This allows the driver to see objects in the mirror clearly when backing up, even during the night.

Driver Outside Rearview Mirror with Automatic Day-Night System Operation (If Equipped)

The automatic day-night feature of the driver outside rearview mirror is controlled by the inside rearview mirror. The inside rearview mirror supplies a signal and low reference to the driver outside rearview mirror. At night, with the automatic day-night feature enabled, the driver outside rearview mirror will automatically darken with the inside rearview mirror to reduce glare from headlamps behind the vehicle.

OUTSIDE MIRROR DESCRIPTION AND OPERATION

Power Mirror System Components

The power mirror system consists of the following components:

- Outside rearview mirror switch
- Mirror selector switch
- Left outside rearview mirror
- Right outside rearview mirror
- Power mirror fuse

Each of the outside rearview mirrors contains two motors. The vertical motor operates the mirror in the up and down directions, and the horizontal motor operates the mirror in the left and right directions. Each of the outside rearview mirror motors are circuit breaker protected.

Power Mirror System Controls

The outside rearview mirror switch is a four position directional switch: Up, Down, Left and Right.

The mirror select switch is a two position switch: left and right.

Power Mirror System Operation

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The outside rearview mirror switch receives power through the battery positive voltage circuit from the power mirror fuse. The power mirror switch also receives a constant ground.

The four positions of the direction switch have dual switch contacts. Each of the contacts are connected to opposing sides of the appropriate power mirror motors through the selector switch. The selector switch completes these circuits depending on the position of the selector switch, left or right.

If the selector switch is placed in the left position and the up switch is depressed, battery positive voltage will be supplied to the left outside rearview mirror vertical motor through the left mirror motor down control circuit and ground through the left mirror motor left control circuit. If the down switch is depressed, battery positive voltage will be supplied to the left outside rearview mirror vertical motor through the left mirror motor left control circuit and ground through the left mirror motor down control circuit.

The remainder of the mirror functions operate in the same manner as described above. Placing the power mirror switch in opposing positions, left/right or up/down, will reverse the polarity to the mirror motor, reversing the direction of movement.

Heated Mirrors (If Equipped)

The heated outside mirrors will operate when the rear window defogger is energized. Vehicle needs to be running for rear window defogger to operate.

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2010 ACCESSORIES & BODY, CAB

Object Detection - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Rear Object Alarm Indicator Screws	7 N.m	62 lb in
Rear Object Alarm Module Nuts	6 N.m	53 lb in

SCHEMATIC AND ROUTING DIAGRAMS

OBJECT DETECTION SCHEMATICS

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Fig. 1: Object Detection
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

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DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0958, B0959, B0960, or B0961	B0958 01: Parking Aid Rear Sensor Left Corner Circuit Short to Battery B0958 06: Parking Aid Rear Sensor Left Corner Circuit Low Voltage/Open B0958 08: Parking Aid Rear Sensor Left Corner Circuit Performance - Signal Invalid B0958 21: Parking Aid Rear Sensor Left Corner Circuit Incorrect Period B0958 3A: Parking Aid Rear Sensor Left Corner Circuit Incorrect Component Installed B0959 01: Parking Aid Rear Sensor Left Middle Circuit Short to Battery B0959 06: Parking Aid Rear Sensor Left Middle Circuit Low Voltage/Open B0959 08: Parking Aid Rear Sensor Left Middle Circuit Performance - Signal Invalid B0959 21: Parking Aid Rear Sensor Left Middle Circuit Incorrect Period B0959 3A: Parking Aid Rear Sensor Left Middle Circuit Incorrect Component Installed B0960 01: Parking Aid Rear Sensor Right Middle Circuit Short to Battery B0960 06: Parking Aid Rear Sensor Right Middle Circuit Low Voltage/Open B0960 08: Parking Aid Rear Sensor Right Middle Circuit Performance - Signal Invalid B0960 21: Parking Aid Rear Sensor Right Middle Circuit Incorrect Period B0960 3A: Parking Aid Rear Sensor Right Middle Circuit Incorrect Component Installed B0961 01: Parking Aid Rear Sensor Right Corner Circuit Short to Battery B0961 06: Parking Aid Rear Sensor Right Corner Circuit Low Voltage/Open B0961 08: Parking Aid Rear Sensor Right Corner Circuit Performance - Signal Invalid B0961 21: Parking Aid Rear Sensor Right Corner Circuit Incorrect Period B0961 3A: Parking Aid Rear Sensor Right Corner Circuit Incorrect Component Installed
DTC B1015	B1015 00: Vehicle Identification Number Information Malfunction
DTC B138A	B138A 03: Control Module Voltage Reference Output Circuit Low Voltage B138A 07: Control Module Voltage Reference Output Circuit High Voltage
DTC B1405	B1405 02: Control Module Voltage Reference Output 2 Circuit Short to Ground

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	B1405 03: Control Module Voltage Reference Output 2 Circuit Low Voltage B1405 07: Control Module Voltage Reference Output 2 Circuit High Voltage

DTC B0958, B0959, B0960, OR B0961

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B0958 01

Parking Aid Rear Sensor Left Corner Circuit Short to Battery

DTC B0958 06

Parking Aid Rear Sensor Left Corner Circuit Low Voltage/Open

DTC B0958 08

Parking Aid Rear Sensor Left Corner Circuit Performance - Signal Invalid

DTC B0958 21

Parking Aid Rear Sensor Left Corner Circuit Incorrect Period

DTC B0958 3A

Parking Aid Rear Sensor Left Corner Circuit Incorrect Component Installed

DTC B0959 01

Parking Aid Rear Sensor Left Middle Circuit Short to Battery

DTC B0959 06

Parking Aid Rear Sensor Left Middle Circuit Low Voltage/Open

DTC B0959 08

Parking Aid Rear Sensor Left Middle Circuit Performance - Signal Invalid

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DTC B0959 21

Parking Aid Rear Sensor Left Middle Circuit Incorrect Period

DTC B0959 3A

Parking Aid Rear Sensor Left Middle Circuit Incorrect Component Installed

DTC B0960 01

Parking Aid Rear Sensor Right Middle Circuit Short to Battery

DTC B0960 06

Parking Aid Rear Sensor Right Middle Circuit Low Voltage/Open

DTC B0960 08

Parking Aid Rear Sensor Right Middle Circuit Performance - Signal Invalid

DTC B0960 21

Parking Aid Rear Sensor Right Middle Circuit Incorrect Period

DTC B0960 3A

Parking Aid Rear Sensor Right Middle Circuit Incorrect Component Installed

DTC B0961 01

Parking Aid Rear Sensor Right Corner Circuit Short to Battery

DTC B0961 06

Parking Aid Rear Sensor Right Corner Circuit Low Voltage/Open

DTC B0961 08

Parking Aid Rear Sensor Right Corner Circuit Performance - Signal Invalid

DTC B0961 21

Parking Aid Rear Sensor Right Corner Circuit Incorrect Period

DTC B0961 3A

Parking Aid Rear Sensor Right Corner Circuit Incorrect Component Installed

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Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
8V Reference	B1405 02	B0958 06, B0959 06, B0960 06, B0961 06, B1405 03	B0958 06, B0959 06, B0960 06, B0961 06, B1405 07	-
Rear Object Sensor - Left Outer Signal	B0958 06	B0958 06	B0958 01	B0958 08, B0958 21
Rear Object Sensor - Left Middle Signal	B0959 06	B0959 06	B0959 01	B0959 08, B0959 21
Rear Object Sensor - Right Middle Signal	B0960 06	B0960 06	B0960 01	B0960 08, B0960 21
Rear Object Sensor - Right Outer Signal	B0961 06	B0961 06	B0961 01	B0961 08, B0961 21
Low Reference	-	B0958 06, B0959 06, B0960 06, B0961 06	-	-

Circuit/System Description

The object sensors are 3-wire sensors that are used to determine the distance between the vehicle and an object of interest. The parking assist control module supplies 8 V to the object sensors via the 8 V reference circuit and provides ground via the low reference circuit. The parking assist control module triggers the sensors in a sequential loop. After each sensor transmits, the parking assist control module uses the sensor echo received through the signal circuit to calculate the distance and position of an object.

Conditions for Running the DTC

- Ignition ON
- Transmission in REVERSE

Conditions for Setting the DTC

B0958 01, B0959 01, B0960 01, or B0961 01

The parking assist control module has detected the voltage at the sensor circuit is greater than 11.5 V or the object sensor is not grounded.

B0958 06, B0959 06, B0960 06, or B0961 06

The parking assist control module has detected the voltage at the sensor circuit less than 0.5 V.

B0958 08, B0959 08, B0960 08, or B0961 08

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The parking assist control module has received an invalid signal.

B0958 21, B0959 21, B0960 21, or B0961 21

The object sensor determines no change in the position of an object while the vehicle is in motion.

B0958 3A, B0959 3A, B0960 3A, or B0961 3A

The parking assist control module determines the wrong sensor type is installed.

Action Taken When the DTC Sets

- The parking assist is disabled.
- The driver information center displays SERVICE PARK ASSIST.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B1405 is not present.

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- If DTC is present, refer to **DTC B1405**.

2. Verify that DTC B0958 01, B0959 01, B0960 01 or B0961 01 is not present.
   - If DTC is present, check the appropriate sensor for contamination with mud, ice or snow. If no contamination is diagnosed, refer to Circuit/System Testing.
3. Verify that DTC B0958 21, B0959 21, B0960 21 or B0961 21 is not present.
   - If DTC is present, check the appropriate sensor for contamination with mud, ice or snow. If no contamination is diagnosed, replace the sensor.
4. Verify that DTC B0958 3A, B0959 3A, B0960 3A or B0961 3A is not present.
   - If DTC is present, replace the appropriate sensor with a sensor of correct sensor type.
5. Ignition ON, transmission in REVERSE, verify the scan tool Parking Assist System Status parameter displays Enabled.

Circuit/System Testing

1. Ignition OFF for 30 s, disconnect the harness connector at the appropriate rear object sensor.
2. Test for less than 5 ohms between the low reference circuit terminal 2 and ground.
   - If greater than the specified value, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K41 Parking Assist Control Module.
3. Ignition ON, transmission in REVERSE, test for 7.5-9.0 V between the 8 V reference circuit terminal 1 and ground.
   - If less than the specified range, test the 8 V reference circuit for an open/high resistance. If the circuit tests normal, replace the K41 Parking Assist Control Module.
4. Ignition OFF, remove the malfunctioning object sensor and swap locations with another properly functioning rear object sensor. Connect the harness connector at both sensors.
5. Ignition ON, verify the DTC is set for the new location in which the malfunctioning sensor is installed.
   - If the DTC does not set for the new location, test the signal circuit terminal 3 for a short to voltage, short to ground, or an open/high resistance. If the circuit tests normal, replace the K41 Parking Assist Control Module.
6. If the DTC sets for the new location in which the malfunctioning sensor is installed, replace the appropriate rear object sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Object Sensor Replacement**
- **Control Module References** for parking assist control module replacement, setup and programming

DTC B1015

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1015 00

Vehicle Identification Number Information Malfunction

Circuit/System Description

When the ignition is turned ON, the parking assist control module receives the vehicle identification number (VIN) from the body control module (BCM). The parking assist control module will compare the VIN received to the VIN stored in memory.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

The VIN stored in the parking assist control module does not match the received VIN.

Action Taken When the DTC Sets

- The parking assist is disabled.
- The driver information center displays SERVICE PARK ASSIST.

Conditions for Clearing the DTC

The VIN stored in the parking assist control module matches the VIN stored in the BCM.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, program the K41 Parking Assist Control Module and verify the DTC does not reset.

- If the DTC is reset, replace the K41 Parking Assist Control Module

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for parking assist control module replacement, setup and programming

DTC B138A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B138A 03

Control Module Voltage Reference Output Circuit Low Voltage

DTC B138A 07

Control Module Voltage Reference Output Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
8V Reference	B0958 06, B0959 06, B0960 06,	B0958 06, B0959 06,	B0958 06, B0959 06, B0960 06,	-

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	B0961 06, B138A 03	B0960 06, B0961 06	B0961 06, B138A 07	
Rear Object Sensor - Left Outer Signal	B0958 06	B0958 06	B0958 01	B0958 08, B0958 21
Rear Object Sensor - Left Middle Signal	B0959 06	B0959 06	B0959 01	B0959 08, B0959 21
Rear Object Sensor - Right Middle Signal	B0960 06	B0960 06	B0960 01	B0960 08, B0960 21
Rear Object Sensor - Right Outer Signal	B0961 06	B0961 06	B0961 01	B0961 08, B0961 21
Low Reference	-	B0958 06, B0959 06, B0960 06, B0961 06	-	-

Circuit/System Description

The object sensors are 3-wire sensors that are used to determine the distance between the vehicle and an object of interest. The parking assist control module supplies 8 V to the object sensors via the 8 V reference circuit and provides ground via the low reference circuit. The parking assist control module triggers the sensors in a sequential loop. After each sensor transmits, the parking assist control module uses the sensor echo received through the signal circuit to calculate the distance and position of an object.

Conditions for Running the DTC

- Ignition ON
- The parking assist is activated. The activation takes place through putting in the reverse gear.

Conditions for Setting the DTC

B138A 03

The parking assist control module has detected the 8 V reference circuit is less than 7.2 V.

B138A 07

The parking assist control module has detected the 8 V reference circuit is greater than 9.2 V.

Action Taken When the DTC Sets

- The parking assist is disabled.
- The driver information center displays SERVICE PARK ASSIST.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

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Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References

Circuit/System Verification

Ignition ON, activate the parking assist, observe the scan tool Park Assist Sensor Reference Voltage parameter. The reading should be between 7.2-9.2 V.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at each of the object sensors.
2. Ignition ON, activate the park assist, test for 7.5-9.0 V between the 8 V reference circuit terminal 1 at the B78G Rear Object Sensor - Left Outer harness connector and ground.
    - If less than the specified range, test the 8 V reference circuit for a short to ground. If the circuit tests normal, replace the K41 Parking Assist Control Module.
    - If greater than the specified range, test the 8 V reference circuit for a short to voltage. If the circuit tests normal, replace the K41 Parking Assist Control Module.
3. Install each object alarm sensor harness connector one at a time, checking DTCs after each sensor is connected. Verify DTC B138A is not set as current.
    - If the DTC is set, replace the object alarm sensor that was connected immediately before the DTC set.
4. If all circuits test normal, replace the K41 Parking Assist Control Module.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Object Sensor Replacement**
- **Control Module References**

DTC B1405

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1405 02

Control Module Voltage Reference Output 2 Circuit Short to Ground

DTC B1405 03

Control Module Voltage Reference Output 2 Circuit Low Voltage

DTC B1405 07

Control Module Voltage Reference Output 2 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
8V Reference	B1405 02	B0958 06, B0959 06, B0960 06, B0961 06, B1405 03	B0958 06, B0959 06, B0960 06, B0961 06, B1405 07	-
Left Rear Object Sensor Signal	B0958 06	B0958 06	B0958 01	B0958 08, B0958 21
Left Middle Rear Object Sensor Signal	B0959 06	B0959 06	B0959 01	B0959 08, B0959 21
Right Middle Rear Object Sensor Signal	B0960 06	B0960 06	B0960 01	B0960 08, B0960 21
Right Rear Object Sensor Signal	B0961 06	B0961 06	B0961 01	B0961 08, B0961 21

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Low Reference	-	B0958 06, B0959 06, B0960 06, B0961 06	-	-

Circuit/System Description

The object sensors are 3-wire sensors that are used to determine the distance between the vehicle and an object of interest. The parking assist control module supplies 8 V to the object sensors via the 8 V reference circuit and provides ground via the low reference circuit. The parking assist control module triggers the sensors in a sequential loop. After each sensor transmits, the parking assist control module uses the sensor echo received through the signal circuit to calculate the distance and position of an object.

Conditions for Running the DTC

- Ignition ON
- Transmission in REVERSE

Conditions for Setting the DTC

B1405 02

The parking assist control module has detected the 8 V reference circuit is shorted to ground.

B1405 03

The parking assist control module has detected the 8 V reference circuit is less than 6.3 V.

B1405 07

The parking assist control module has detected the 8 V reference circuit is greater than 10.4 V.

Action Taken When the DTC Sets

- The parking assist is disabled.
- The driver information center displays SERVICE PARK ASSIST.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

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Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, transmission in REVERSE, observe the scan tool Park Assist Sensors Reference Voltage parameter. The reading should be between 6.3-10.4 V.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at each of the object sensors.
2. Ignition ON, transmission in REVERSE, test for 6.3-10.4 V between the 8 V reference circuit terminal 1 at the B78G Rear Object Sensor - Left Outer harness connector and ground.
    - If less than the specified range, test the 8 V reference circuit for a short to ground. If the circuit tests normal, replace the K41 Parking Assist Control Module.
    - If greater than the specified range, test the 8 V reference circuit for a short to voltage. If the circuit tests normal, replace the K41 Parking Assist Control Module.
3. Install each object alarm sensor harness connector one at a time, checking DTCs after each sensor is connected. Verify DTC B1405 is not set as current.
    - If the DTC is set, replace the object alarm sensor that was connected immediately before the DTC set.
4. If all circuits test normal, replace the K41 Parking Assist Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Object Sensor Replacement**
- **Control Module References** for parking assist control module replacement, setup and programming

SYMPTOMS - OBJECT DETECTION

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NOTE: The following steps must be completed before using the symptom tables:

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Object Detection Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which may cause the symptom.
- Make sure the rear parking assist sensors located on the vehicle rear bumper are clear. Remove any snow, mud or ice that is blocking the sensors.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Parking Assist System Malfunction

PARKING ASSIST SYSTEM MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicle's path when reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by four object sensors located in the rear bumper. The parking assist system will notify the driver using an audible signal through the radio.

Diagnostic Aids

The scan tool Park Assist Disable History parameters are a list of the seven previous reasons the parking assist system was disabled. These parameters may help in the diagnosis of an intermittent concern or a customer

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concern which is the result of normal system operation. The following is a brief description of potential causes which may aid in diagnosis:

- Manual Disable - The parking assist system has been disabled by the vehicle operator through the audio system personalization menu.
- Hitch/Object Attached - The parking assist control module is detecting an object that is attached to the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Reverse Overspeed - The vehicle is travelling too fast in reverse at speeds of greater than 8 km/h (5 MPH).
- Inhibit - The parking assist control module has lost or received invalid GMLAN signal(s).
- Sensor Disturbance - An outside interference is causing sensor movement. Such interference may be caused by a heavy pounding, like that of a nearby jackhammer, or large changes in pressure, such as a large truck's air brakes.
- Sensor Ring Time - If the sensor fails its own diagnostic initialization the parking assist control module will set this error. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH). The following is a list of reasons this cause may have set:
    - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
    - Silicone insulator surrounding sensor may be missing, cut, or twisted.
    - Improperly installed sensor, sensor may be crooked due to a tight wire harness.
    - One or more of the sensors may be scratched or the paint may be chipped.
    - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

Manual Transmission

1. Ignition ON, transmission in REVERSE, verify the engine control module (ECM) scan tool Reverse Position Switch parameter is Active.
   - If not the specified value, refer to **Backup Lamps Malfunction (Automatic Transmission)** or **Backup Lamps Malfunction (Manual Transmission)** .
2. Verify the scan tool Park Assist System Status parameter displays Enable.

   NOTE: After completing the next step the vehicle might need to be driven in the forward direction at speed greater than 40 km/h (25 MPH).

   -
   - If not the specified values, refer to Diagnostic Aids and the scan tool Park Assist Disable History parameters to determine the cause of the inhibit.
3. If all tests normal, replace the K41 Parking Assist Control Module.

Automatic Transmission

1. Ignition ON, transmission in REVERSE, verify the scan tool Park Assist System Status parameter displays Enable.

   NOTE: After completing the next step the vehicle might need to be driven in the forward direction at speed greater than 40 km/h (25 MPH).

   -
   - If not the specified values, refer to Diagnostic Aids and the scan tool Park Assist Disable History parameters to determine the cause of the inhibit.
2. If all tests normal, replace the K41 Parking Assist Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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Control Module References for parking assist control module replacement, setup and programming

REPAIR INSTRUCTIONS

REAR OBJECT ALARM MODULE REPLACEMENT



Fig. 2: Rear Object Alarm Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear end trim panel. Refer to **Rear End Trim Finish Panel Replacement** .	
1	Rear Object Alarm Module Nut (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 6 N.m (53 lb in)
2	Rear Object Alarm Module **Procedure** 1. Disconnect electrical connector.

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	2. Reprogram the rear object alarm module after replacement. Refer to **Control Module References** .

REAR OBJECT SENSOR REPLACEMENT

Removal Procedure

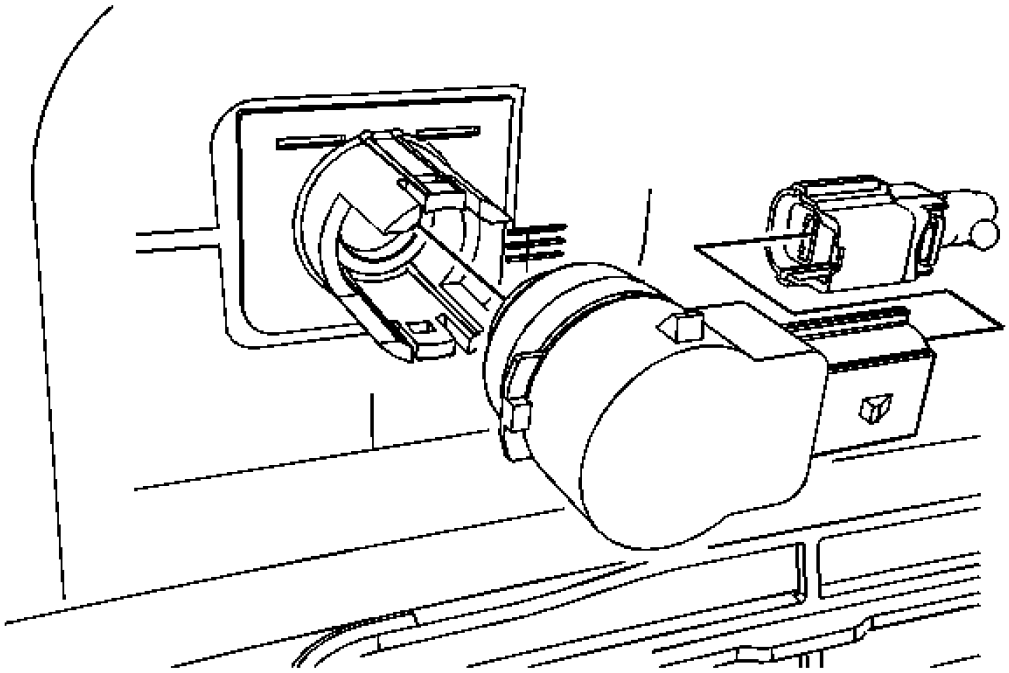


Fig. 3: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS CORP.

1. Remove rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
2. Disconnect electrical from the rear object sensor.
3. Lift the locking tabs on the housing and remove the rear object sensor.

Installation Procedure

NOTE: Do not refinish previously painted sensors. Excess paint build up will cause the sensor to be inoperative.

1. Paint the rear object sensor. Refer to **Basecoat/Clearcoat Paint Systems** .

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2. Ensure the paint does not exceed 6 mils. Use a paint thickness gauge suitable for non-ferrous metals. Refer to **Paint Gauges** .

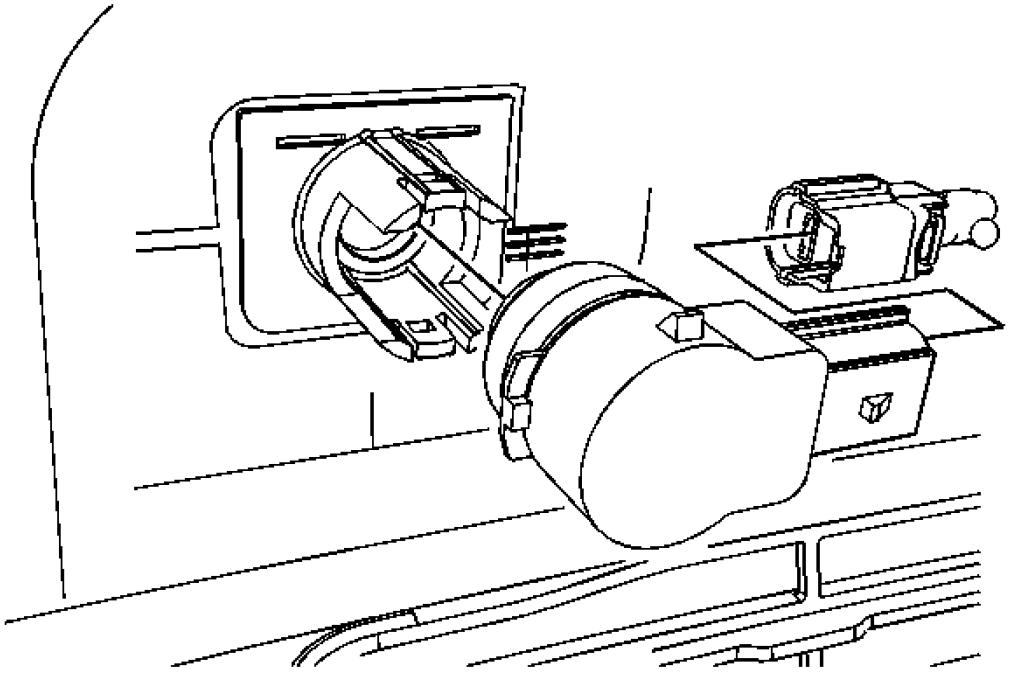


Fig. 4: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS CORP.

3. Insert the sensor into the housing.
4. Connect the electrical connector to the rear object sensor.
5. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .

DESCRIPTION AND OPERATION

OBJECT DETECTION DESCRIPTION AND OPERATION

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicle's path when reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by 4 object sensors located in the rear bumper. The parking assist system will notify the driver using an audible beep signal through the radio.

The parking assist system is made up of the following components:

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- Parking assist control module
- Rear object alarm sensors

Parking Assist Control Module

The parking assist control module provides an 8V reference and a low reference to the four object alarm sensors. The parking assist control module receives individual signals from each of the four sensors and determines the location and distance of an object based on these inputs. When an object is detected, the parking assist control module will send a data message via CAN-Bus to the radio requesting an audible alert.

Rear Object Alarm Sensors

The object alarm sensors are located in the rear bumper of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time, it is used to determine the distance to the object. The sensors report this information to the parking assist control module.

Rear Parking Assist Operation

When the vehicle is first placed into reverse there will be one audible beep, to indicate that the system is working.

When backing up at speed of less than 8 km/h (5 MPH), the system is constantly monitoring for object of interest located behind the vehicle. The rear parking assist system can detect objects greater than 7.6 cm (3 in) wide and 25.4 cm (10 in) tall. The system cannot detect objects below the bumper, underneath the vehicle. If an object is detected within 2.5 m (8 ft) there will be a audible beep notification out of both rear speakers based upon the distance to the object. As the vehicle gets closer to an object, the time between the beeps become shorter.

If the vehicle stops in a range zone the beeping will stop after 5 seconds. When the distance between the object and the vehicle changes, beeping will start again.

If the rear parking assist system detects a malfunction the single audible beep will not chime when put into reverse along with a DTC being stored. The object alarm module will send a serial data message to the instrument panel cluster to display the SERVICE PARK ASSIST message on the driver information center.

Parking Assist System Driver Information Center Messages

SERVICE PARK ASSIST

The driver information center displays SERVICE PARK ASSIST when the parking assist control module detects a malfunction in the rear parking assist system and the system is disabled. The driver information center also displays SERVICE PARK ASSIST when a loss of communication occurs with the parking assist control module.

PARK ASSIST OFF

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The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The parking assist control module requests the driver information center display PARK ASSIST OFF when it detects that one of the following conditions:

- The rear parking assist system is manually disabled by the vehicle operator through the audio system personalization menu.
- The park brake is applied or not fully released.
- An object is attached to the rear of the vehicle, such as a trailer, bicycle rack, trailer hitch receiver, or tow bar. Also, an object extending beyond a lowered tailgate will disable the system.
- The parking assist sensors are covered by snow, mud, dirt or ice.
- The vehicle bumper is damaged.
- Excessive paint thickness on a replacement parking assist sensor.
- The parking assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.

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2010 ACCESSORIES & BODY, CAB

Power Seats - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

DRIVER SEAT SCHEMATICS

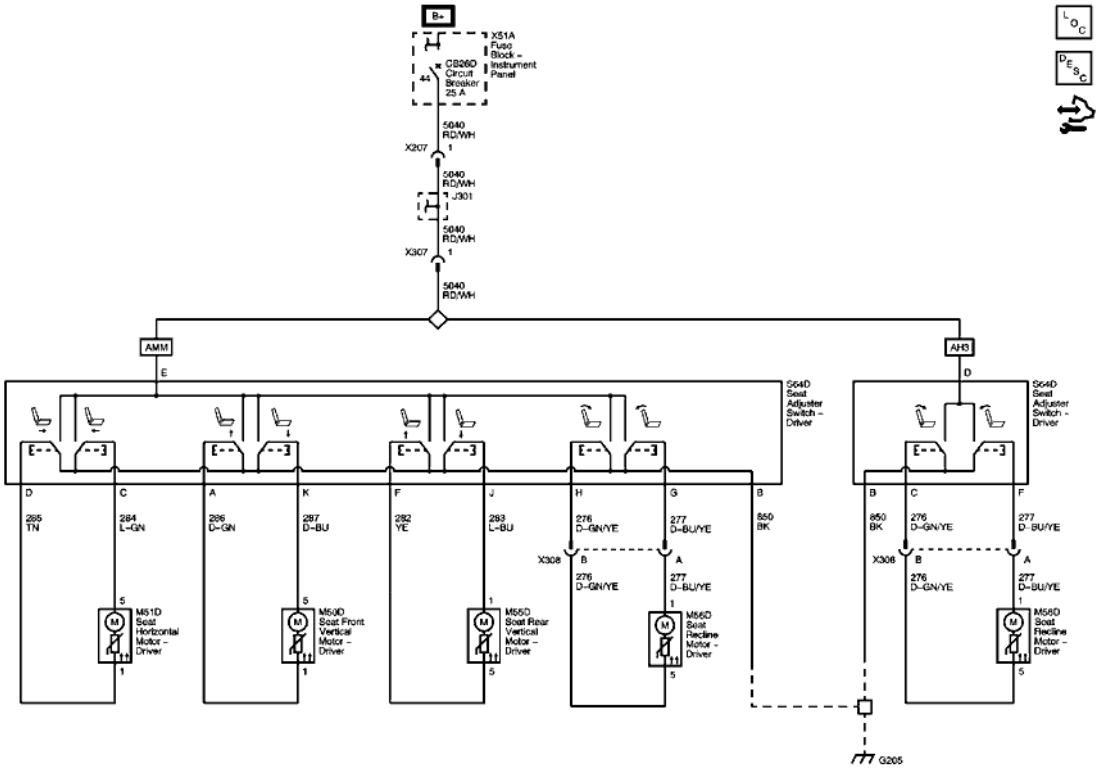


Fig. 1: Driver Seat
Courtesy of GENERAL MOTORS CORP.

PASSENGER SEAT SCHEMATICS

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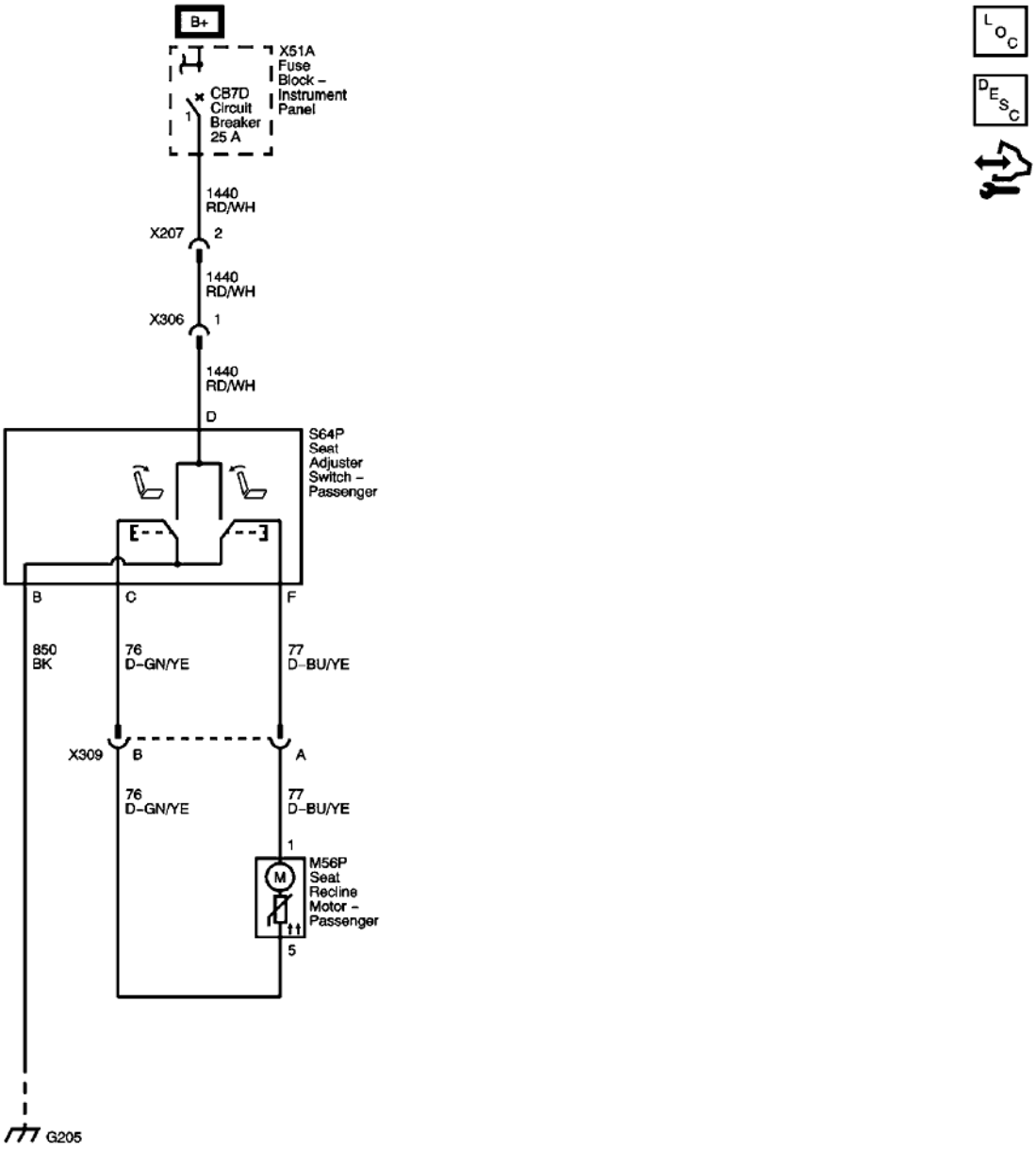


Fig. 2: Passenger Seat
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - POWER SEATS

NOTE: **Review the system description in order to familiarize yourself with the system functions. Refer to Power Seats System Description and Operation.**

Visual/Physical Inspection

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- Inspect for aftermarket devices which could affect the operation of the seat systems. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to **Power Seat Malfunction** diagnostic procedure in order to diagnose the symptom.

POWER SEAT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Seat Adjuster Switch B+	1	1	-	-
Front Vertical Motor Down Control	1	1	-	-
Front Vertical Motor Up Control	1	1	-	-
Horizontal Motor Forward Control	1	1	-	-
Horizontal Motor Rearward Control	1	1	-	-
Rear Vertical Motor Down Control	1	1	-	-
Rear Vertical Motor Up Control	1	1	-	-
Recline Motor Forward Control	1	1	-	-
Recline Motor Rearward Control	1	1	-	-
Seat Adjuster Switch Ground	-	1	-	-
1. Power seat inoperative				

Circuit/System Description

Power seat without memory is controlled through the seat adjuster switch. Battery voltage is supplied at all times to the seat adjuster switch through a circuit breaker located in the I/P fuse block. When the seat adjuster switches are in an inactive state, the switch contacts are closed to the switch ground circuit.

All seat motors are reversible. For example, when the seat horizontal forward switch is pressed to move the

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entire seat forward, battery voltage is applied through the switch contacts and the seat horizontal motor forward control circuit to the motor. The motor is grounded through the horizontal motor rearward switch contacts and the horizontal motor rearward control circuit to the motor. The motor runs in order to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction. All seat motors are powered this way.

Reference Information

Schematic Reference

- **Driver Seat Schematics**
- **Passenger Seat Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Power Seats System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Verification

Operate the seat switches for the seat directional motors listed below in both directions. The seat should move in the commanded directions.

- M51 seat horizontal motor
- M50 seat front vertical motor
- M55 seat rear vertical motor
- M56 seat recline motor

  - If a 2-way power seat is inoperative, refer to 2-Way Power Seat Malfunction
  - If the 8-way power seat is inoperative in all directions, refer to the Seat Adjuster Switch Circuit Test.
  - If 1 or more of the 8-way power seat adjuster motors operate, refer to the Seat Adjuster Motor Circuit Test.

Circuit/System Testing

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2-Way Power Seat Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate S64 seat adjuster switch.
2. Test for less than 5 ohms between the ground circuit terminal B and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal D and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Connect the harness connector at the S64 seat adjuster switch and disconnect the harness connector at the M56 seat recline motor.
5. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5.
6. Ignition ON, command the M56 seat recline motor Forward and Rearward using the seat adjuster switch. The test lamp should turn ON when commanding the forward and rearward states.
    - If the test lamp remains OFF for either of the commands, test the control circuits for a short to ground or an open/high resistance. If the circuits test normal, test or replace the S64 seat adjuster switch.
7. If all circuits test normal, test or replace the M56 seat recline motor.

Seat Adjuster Switch Circuit Test

1. Disconnect the harness connector at the appropriate S64 seat adjuster switch.
2. Test for less than 5 ohms between the ground circuit terminal B and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal E and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. If all circuits test normal, test or replace the S64 seat adjuster switch.

Seat Adjuster Motor Circuit Test

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:
    - M51 seat horizontal motor
    - M50 seat front vertical motor
    - M55 seat rear vertical motor
    - M56 seat recline motor
2. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5.
3. Ignition ON, command the appropriate seat motor Up and Down or Forward and Rearward using the S64 seat adjuster switch. The test lamp should turn ON when commanding the up and down or forward and rearward states.
    - If the test lamp remains OFF for either of the commands, test the control circuits for a short to ground or an open/high resistance. If the circuits test normal, test or replace the S64 seat adjuster switch.

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4. If all circuits test normal, test or replace the seat motor.

Component Testing

Seat Adjuster Switch

1. Ignition OFF, disconnect the harness connector at the S64 seat adjuster switch.
2. Test for infinite resistance between the B+ terminal and each control terminal with the switch in the open position.
    - If not the specified value, replace the S64 seat adjuster switch.
3. Test for less than 1 ohms between the B+ terminal and each control terminal with the appropriate switch in the closed position.
    - If greater than the specified range, replace the S64 seat adjuster switch.
4. Test for less than 1 ohms between the ground terminal B and each control terminal with the switch in the open position.
    - If greater than the specified range, replace the S64 seat adjuster switch.

Seat Motor

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:
    - M51 seat horizontal motor
    - M50 seat front vertical motor
    - M55 seat rear vertical motor
    - M56 seat recline motor

NOTE: When performing the following tests, make sure that the seat is not already in the position the test is attempting to produce.

2. Install a 30 A fused jumper wire between either one of the control terminals and 12 V. Momentarily install a jumper wire between other control terminal and ground. The seat motor should momentarily perform the appropriate FORWARD/REARWARD/UP/DOWN function.
    - If the function does not perform as specified, replace the seat motor.
3. Reverse the polarity of jumper wires. The a seat motor should perform in the opposite direction.
    - If the function does not perform as specified, replace the seat motor.

Repair Procedures

- **Driver or Passenger Seat Adjuster Switch Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Adjuster Switch Replacement (with Manual Height Adjuster)**
- Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

REPAIR INSTRUCTIONS

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DRIVER OR PASSENGER SEAT ADJUSTER SWITCH REPLACEMENT (WITH POWER HEIGHT ADJUSTER)

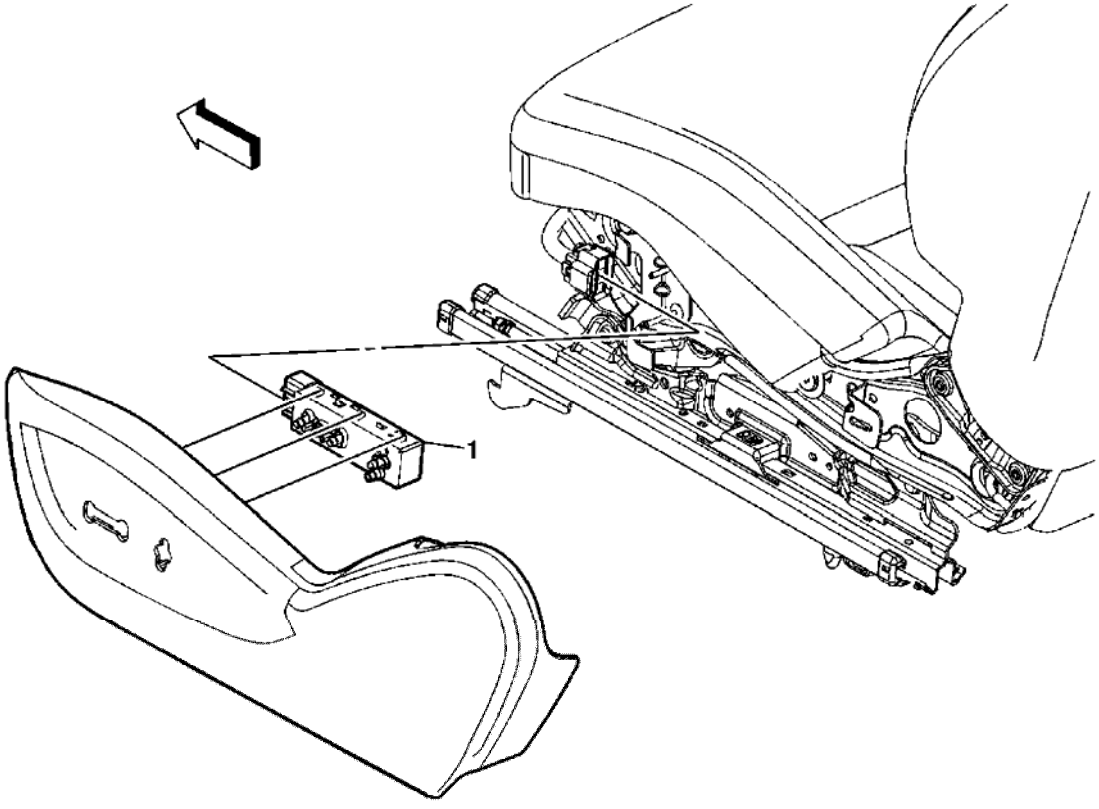


Fig. 3: Driver Or Passenger Seat Adjuster Switch (With Power Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the outer adjuster finish cover. Refer to Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster) or Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster) .**	
1	Front Seat Adjuster Switch **Tip:** Use a flat-bladed tool to release the switch from the finish cover.

DRIVER OR PASSENGER SEAT ADJUSTER SWITCH REPLACEMENT (WITH POWER HEIGHT ADJUSTER)

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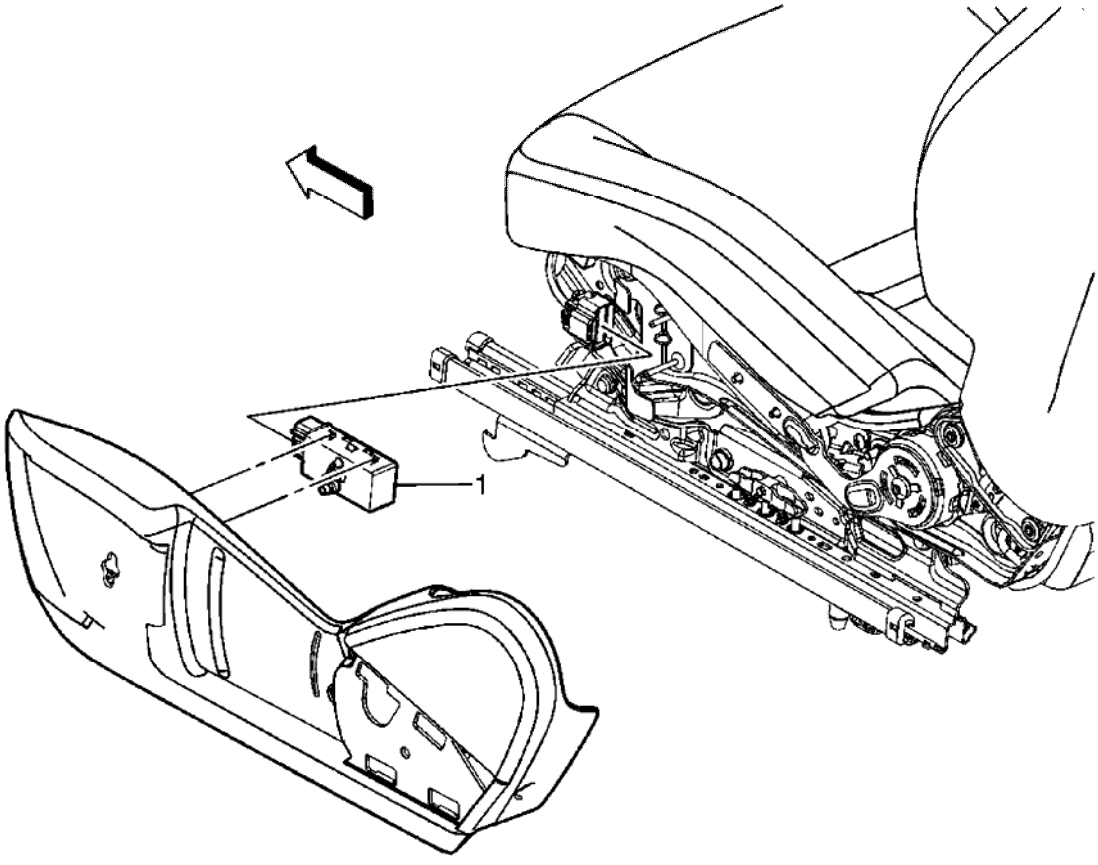


Fig. 4: Driver Or Passenger Seat Adjuster Switch (With Power Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the outer adjuster finish cover. Refer to Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster) or Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster) .**	
1	Front Seat Adjuster Switch **Tip:** Use a flat-bladed tool to release the switch from the finish cover.

DESCRIPTION AND OPERATION

POWER SEATS SYSTEM DESCRIPTION AND OPERATION

The driver and passenger power seat systems each consist of the following components:

- Seat adjuster switch
- Seat horizontal motor
- Seat front vertical motor

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- Seat rear vertical motor
- Seat recline motor
- Circuit breaker 25 A

Seat Adjuster Switch

The seat adjuster switches provide both power and ground to the selected seat motors. Battery positive voltage is supplied at all times to the driver and passenger seat adjuster switches from the circuit breaker located in the I/P fuse block. The driver and passenger seat adjuster switches receives ground through the switch ground circuit and G307.

Seat Motors

All of the seat motors operate independently of each other. Each motor contains an electronic circuit breaker (PTC) that opens in the event of a circuit overload and will reset only after voltage has been removed from the circuit. There are four seat position motors. These are the horizontal motor, front vertical motor, rear vertical motor, and the seat back recline motor. The horizontal motor moves the entire seat forward and rearward. The seat vertical motors may operate independently to tilt the front or rear of the seat cushion up or down. Both motors can also run simultaneously to move the entire seat up or down. The recline motor moves the angle of the seat back forward or rearward.

Horizontal

When the seat switch is operated to move the entire seat forward, battery positive voltage is applied through the switch contacts and the horizontal motor forward control circuit to the motor. The motor is grounded through the horizontal motor rearward switch contacts and the horizontal motor rearward control circuit to the motor. The motor runs in order to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction.

Rear Vertical

When the seat switch is operated to tilt the rear of the seat cushion up, battery positive voltage is applied through the switch contacts and the rear vertical motor up control circuit to the rear vertical motor. The motor is grounded through the down switch contacts and the rear vertical motor down control circuit to the motor. The motor runs in order to drive the rear of the seat cushion up until the switch is released. Tilting the rear of the seat cushion down works similarly to tilting the rear of the seat cushion up, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction.

Front Vertical

When the seat switch is operated to tilt the front of the seat cushion up, battery positive voltage is applied through the switch contacts and the front vertical motor up control circuit to the motor. The motor is grounded through the down switch contacts and the front vertical motor down control circuit to the motor. The motor runs in order to drive the front of the seat cushion up until the switch is released. Tilting the front of the seat cushion down works similarly to tilting the front of the seat cushion up, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction.

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Entire Seat Up or Down

When the seat switch is operated in order to move the entire seat to the up position, battery positive voltage is simultaneously applied through the front and rear vertical motor up switch contacts and the front and rear vertical motor up control circuits to both vertical motors. The motors are grounded through the down switch contacts and the front and rear vertical motor down control circuits to both vertical motors. Both motors run simultaneously in order to drive the entire seat up until the switch is released. Moving the entire seat down works similarly to moving the entire seat up, except that battery positive voltage and ground are applied on the opposite circuits causing the motors to run in the opposite direction.

Recline

When the seat recline switch is operated to move the seat back forward, battery positive voltage is applied through the switch contacts and the recline motor forward control circuit to the motor. The motor is grounded through the rearward switch contacts and the recline motor rearward control circuit to the motor. The motor runs in order to move the seat back forward until the switch is released. Moving the seat back rearward works similarly to moving the seat back forward, except that battery positive voltage and ground are applied on the opposite circuits causing the motor to run in the opposite direction.

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2010 GENERAL INFORMATION

Programming and Setup - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

CONTROL MODULE REFERENCES

Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
• **Data Link References** • **Diagnostic System Check - Vehicle** • **Diagnostic Trouble Code (DTC) List - Vehicle** • **Symptoms - Vehicle**			
Blower Motor Control Module	**HVAC Schematics**	**Blower Motor Control Module Replacement**	**Blower Motor Control Module Programming and Setup**
Body Control Module Scan Tool Information	**Body Control System Schematics**	**Body Control Module Replacement**	**Body Control Module Programming and Setup**
Communication Interface Module Scan Tool Information (Vehicle Communication Interface Module)	**OnStar Schematics**	**Communication Interface Module Replacement**	**Communication Interface Module Programming and Setup**
Control Solenoid Valve and Transmission Control Module Assembly **Transmission Control Module Scan Tool Information (6L45/6L50/6L80/6L90)**	**Automatic Transmission Controls Schematics**	**Control Solenoid Valve and Transmission Control Module Assembly Replacement**	**Control Solenoid Valve and Transmission Control Module Assembly Programming and Setup (6L45/6L50/6L80/6L90)**
Digital Radio Receiver Scan Tool Information	**Radio/Navigation System Schematics**	**Radio Replacement**	**Digital Radio Receiver Programming and Setup**
Driver Seat and Passenger Seat Heater Control Module Scan Tool Information	**Heated/Cooled Seat Schematics**	**Front Seat Heater Control Module Replacement**	**Heated Seat Control Module Programming and Setup**
Electronic Brake Control Module Scan Tool Information	**Antilock Brake System Schematics**	**Electronic Brake Control Module Replacement**	**Electronic Brake Control Module Programming and Setup**
Engine Control Module Scan Tool Information (LS3, L99) or **Engine**	**Engine Controls Schematics** for the 2.8L, 3.0L, 3.2L or 3.6L engines or	**Engine Control Module Replacement** for the 2.8L, 3.0L, 3.2L or 3.6L engines or	**Engine Control Module Programming and Setup (LS3, L99)** or **Engine**

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Control Module Scan Tool Information (w/LLT)	**Engine Controls Schematics** for the 4.8L, 5.3L, 6.0L, 6.2L or 7.0L engines	**Engine Control Module Replacement** for the 4.8L, 5.3L, 6.0L, 6.2L or 7.0L engines	**Control Module Programming and Setup (LLT)**
Fuel Pump Flow Control Module Scan Tool Information	**Engine Controls Schematics** for the 2.8L, 3.0L, 3.2L or 3.6L engines or **Engine Controls Schematics** for the 4.8L, 5.3L, 6.0L, 6.2L or 7.0L engines	**Fuel Pump Flow Control Module Replacement** for the 2.8L, 3.0L, 3.2L or 3.6L engines or **Fuel Pump Flow Control Module Replacement** for the 4.8L, 5.3L, 6.0L, 6.2L or 7.0L engines	**Fuel Pump Flow Control Module Programming and Setup**
Heating, Ventilation and Air Conditioning Control Module Scan Tool Information (HVAC Control Module)	**HVAC Schematics**	**Heater and Air Conditioning Control Replacement**	**HVAC System Control Module Programming and Setup**
Inflatable Restraint Front Passenger Mass Sensor **Inflatable Restraint Passenger Presence System Scan Tool Information** (Passenger Presence System)	**SIR Schematics**	**Inflatable Restraint Front Passenger Mass Sensor Replacement**	**Passenger Presence System Programming and Setup**
Inflatable Restraint Passenger Presence System Scan Tool Information	**SIR Schematics**	**Inflatable Restraint Front Passenger Presence Module Replacement**	**Passenger Presence System Programming and Setup**
Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information (Supplemental Inflatable Restraint)	**SIR Schematics**	**Inflatable Restraint Sensing and Diagnostic Module Replacement**	**Inflatable Restraint Sensing and Diagnostic Module Programming and Setup**
Instrument Cluster Scan Tool Information (Instrument Panel Cluster)	**Instrument Cluster Schematics**	**Instrument Cluster Replacement**	**Instrument Cluster Programming and Setup**
Mobile Telephone Control Module Scan Tool Information	**OnStar Schematics**	**Communication Interface Module Replacement**	**Mobile Telephone Control Module Programming and Setup**
Multifunction Auxiliary Gauge Scan Tool Information	**Instrument Cluster Schematics**	**Multifunction Auxiliary Gauge Replacement (With UMG)**	**Multifunction Auxiliary Gauge Programming and Setup**

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Multimedia Player Interface Module Scan Tool Information	**Radio/Navigation System Schematics**	**Multimedia Player Interface Module Replacement**	**Multimedia Player Interface Module Programming and Setup**
Object Alarm Module Scan Tool Information	**Object Detection Schematics**	**Rear Object Alarm Module Replacement**	**Object Alarm Module Programming and Setup**
Radio Scan Tool Information	**Radio/Navigation System Schematics**	**Radio Replacement**	**Radio Programming and Setup**
Radio Control Assembly	**Radio/Navigation System Schematics**	**Radio Control Assembly Replacement**	**Radio Control Programming and Setup**
Radio Speaker Amplifier	**Radio/Navigation System Schematics**	**Radio Speaker Amplifier Replacement**	**Audio Amplifier Programming and Setup**
Remote Control Door Lock Receiver	**Remote Function Schematics**	**Remote Control Door Lock Receiver Replacement (With BTV)** or **Remote Control Door Lock Receiver Replacement (Without BTV)**	**Remote Control Door Lock Receiver Programming and Setup**
Sunroof Actuator Motor	**Sunroof Schematics**	**Sunroof Actuator Motor Replacement**	**Sunroof Control Module Programming and Setup**
Theft Deterrent Module	**Immobilizer Schematics**	**Theft Deterrent Module Replacement**	**Theft Deterrent Module Programming and Setup (Immobilizer Antenna)**
Window Regulator Motor	**Moveable Window Schematics**	**Front Side Door Window Regulator Motor Replacement**	**Window Regulator Motor Programming and Setup**

REPAIR INSTRUCTIONS

AUDIO AMPLIFIER PROGRAMMING AND SETUP

This device requires no programming or setup.

BLOWER MOTOR CONTROL MODULE PROGRAMMING AND SETUP

Blower Motor Control Module Replacement

There is no setup procedure that needs to be performed for the blower motor control module on this vehicle.

BODY CONTROL MODULE PROGRAMMING AND SETUP

The body control module (BCM) must be programmed with the proper calibration software. The BCM stores and utilizes this information however if it is not properly configured with the correct calibration software, the BCM will not control all of the vehicle features properly.

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Ensure that the following conditions exist in order to prepare for BCM programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected control modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the body control module unless directed by a service procedure or a service bulletin.

Replace and Program BCM

To program and setup a replacement BCM, perform the following procedure:

1. With a scan tool, access the Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)**.
2. On the SPS Supported Controllers screen, select BCM Body Control Module - Configuration and follow the on-screen instructions (if applicable).
3. On the SPS Supported Controllers screen, select BCM Body Control Module - Programming and follow the on-screen instructions.
4. Perform the following for the appropriate ignition type prior to proceeding with the next step:
   - Key Ignition System: Key in the ignition and any additional keys must be away from the vehicle at least 3 meters.
   - Push Button Start System: Key Fob must be in the console programming pocket. Refer to the Help selection button on the SPS Immobilizer Setup screen for the exact pocket location. All additional Key Fobs must be away from the vehicle at least 3 meters.

   NOTE: The following programming step may take between 10-12 minutes and progress will appear to have stopped during this process. This is a normal security timer response and a restart should not be performed.

5. On the SPS Supported Controllers screen, select IMMO Immobilizer Learn - Setup. On the next screen, select Body Control Module IMMO Learn with Existing Transponder or Remote Key and follow the on-screen instructions. When Immobilizer Learn is complete, press the Unlock button on the Key Fob to allow the Key Fob to exit the Immobilizer Learn mode.

   NOTE: When performing the Tire Pressure Monitor Sensor Learn during BCM setup, the J-46079 Tire Pressure Monitor Diagnostic Tool must be used to activate each tire pressure sensor.

6. On the SPS Supported Controllers screen, select BCM Body Control Module - Setup and follow the on-screen instructions.
7. Check the driver information center display for additional messages regarding further calibration instructions. If there are no addition driver information center instructions present, programming is

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complete.

Reprogram Existing BCM

To program and setup an existing BCM, perform the following procedure:

1. With a scan tool, access the Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)**.
2. On the SPS Supported Controllers screen, select BCM Body Control Module - Programming and follow the on-screen instructions.

NOTE: When performing the Tire Pressure Monitor Sensor Learn during BCM setup, the J-46079 Tire Pressure Monitor Diagnostic Tool must be used to activate each tire pressure sensor.

3. On the SPS Supported Controllers screen, select BCM Body Control Module - Setup and follow the on-screen instructions.
4. Check the driver information center display for additional messages regarding further calibration instructions. If there are no addition driver information center instructions present, programming is complete.

If the BCM fails to accept the program, verify all scan tool and BCM connections are secure.

NOTE: After programming is completed, perform the following to avoid future misdiagnosis:

1. **Turn the ignition OFF for 10 seconds.**
2. **Open and close the door.**
3. **Connect the scan tool to the data link connector.**
4. **Ignition ON, engine OFF.**
5. **With a scan tool, clear all DTCs from all control modules.**

COMMUNICATION INTERFACE MODULE PROGRAMMING AND SETUP

Each of the following service procedures require programming or setup procedures to be performed on the communication interface module.

Communication Interface Module Replacement

NOTE:

- **It is critical to use the service replacement Communication Interface Module (CIM) only in the vehicle for which it was ordered.**
- **Failure to perform the following procedures will result in a red LED, DTC(s) being set, and limited or incomplete OnStar® services**
- **An OnStar® button-press to the OnStar® call center is not required to**

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complete the procedure.

- **It may take up to 24 hours for OnStar® service to become fully activated after performing the procedures.**
- **Perform the following procedure only once. Repeat attempts of the procedure may result in a delay of the activation process.**
- **To fully activate an OnStar® module, both the setup and activation request procedures must be completed on all vehicles with AND without an active OnStar® subscription to insure the unit has been setup properly for the vehicle it has been installed into and also to update the OnStar® with the correct unit information.**
- **To initialize the Turn-by-Turn feature, the vehicle must first be driven 8-16 km (5-10 miles) in order to allow the system to self-calibrate the dead reckoning feature.**
- **Use of a J 2534-compatible diagnostic tool interface is required when performing the SPS supported OnStar® Setup and Activation (ONSU) procedure.**
- **On vehicles up-fitted with TTY capabilities, it is necessary to perform a power cycle of the OnStar® Interface Module (OTIM), and toggle the TTY mode after completing the CIM installation and setup procedures.**

1. Connect the scan tool to the vehicle.
2. Connect the Techline Information System (TIS) terminal to the scan tool.
3. Select the OnStar® Setup and Activation (ONSU) option using the service programming system (SPS).
4. The default language for the new CIM is English. To change the language to French or Spanish, access the scan tool.
5. Inform the customer that it may take up to 24 hours for the OnStar® service to become fully activated.

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY PROGRAMMING AND SETUP (6L45/6L50/6L80/6L90)

The following service procedures require either a programming or a setup event be performed for a complete repair. The transmission control module (TCM) is part of the control solenoid (w/body and TCM) valve assembly, and is not serviced separately.

Transmission Control Module (TCM) Replacement

If the TCM is replaced, the following procedures must be performed:

1. TCM Reprogramming
2. The Service Fast Learn Adapts - Refer to **Service Fast Learn Adapts**

TCM Reprogramming

1. If the TCM needs to be reprogrammed, refer to **Service Programming System (SPS)**.

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2. Perform the Service Fast Learn Adapts - Refer to **Service Fast Learn Adapts** .

NOTE: After programming, perform the following to avoid future misdiagnosis:

1. Turn the ignition OFF for 30 seconds.
2. Turn the ignition ON with the engine OFF.
3. Use the scan tool in order to retrieve history DTCs from all modules.
4. Clear all history DTCs.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the **Service Fast Learn Adapts** procedure must be performed:

- Transmission replacement
- Any internal transmission repair
- Any speed sensor

Refer to **Service Fast Learn Adapts** .

DIGITAL RADIO RECEIVER PROGRAMMING AND SETUP

Each of the following service procedures requires programming or setup procedures to be performed on the digital radio receiver.

XM™ Activation

IMPORTANT: After replacement of an XM™ receiver, call XM™ radio to deactivate the receiver that has been removed from the vehicle. The vehicle must be parked in view of a satellite within 24 hours after an activation call.

1. Radio ON, tune to the XM™ channel 0 and record the radio ID. The radio ID will be required for activation of the new receiver.
2. Call XM™ radio to deactivate the faulty receiver and activate the new receiver.
   - US: 1-800-556-3600
   - Canada: 1-877-438-9677
3. Park the vehicle outside in an area with an unobstructed view of the southern sky.
4. Leave the vehicle outside with the ignition switch in the ACC position and the radio ON, tune to the XM™ channel 1 for 30 minutes to activate XM™ service.
5. Once activated, the radio will receive the remaining XM™ channels.

ELECTRONIC BRAKE CONTROL MODULE PROGRAMMING AND SETUP

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The following service procedures require either a programming or a setup event performed for a complete repair.

Electronic Brake Control Module Replacement and/or Reprogramming

If the electronic brake control module (EBCM) needs to be replaced and/or reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Electronic Brake Control Module - Programming and follow the on-screen instructions.
3. Place the front wheels and steering wheel in the straight ahead position.
4. Perform the SPS function Electronic Brake Control Module - Configuration & Setup and follow the on-screen instructions. Perform the following functions in this order:
    1. Programming
    2. Setup
5. Clear DTCs after completing the programming procedure.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the corresponding procedure must be performed.

Steering Angle Sensor

Calibrate the steering angle sensor. Refer to **Steering Angle Sensor Centering** .

Multi-Axis Acceleration Sensor

Calibrate the multi-axis acceleration sensor. Refer to **Vehicle Yaw Sensor Learn** .

ENGINE CONTROL MODULE PROGRAMMING AND SETUP (LS3, L99)

The following service procedures require either a programming or a setup event performed for a complete repair.

ECM Replacement

WARNING: Replacement or reprogramming of the ECM, or replacement of the clutch pedal position sensor (CPPS) or clutch pedal requires that a CPPS learn procedure be performed. Failure to perform the CPPS learn procedure may result in personal injury or damage to the vehicle or its components if the vehicle is in gear and the starter motor is accidentally engaged.

If the engine control module (ECM) is replaced, the following procedures must be performed:

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1. The ECM Reprogramming-Refer to **Service Programming System (SPS)**.
2. The Theft Deterrent Programming-Refer to **Immobilizer System Component Programming** .
3. The CKP Variation Learn-Refer to **Crankshaft Position System Variation Learn** .
4. The Clutch Pedal Position Sensor Learn-Refer to **Clutch Pedal Position Sensor Learn** .
5. The Throttle Learn procedure-Refer to **Throttle/Idle Learn** .
6. Engine Oil Life Remaining-When available, use a scan tool to rest the Engine Oil Life Remaining back to the original percentage recorded.
7. Transmission Fluid Life Remaining-When available, use a scan tool to reset the Transmission Fluid Life Remaining back tot he original percentage recorded.

ECM Reprogramming

WARNING: Replacement or reprogramming of the ECM, or replacement of the clutch pedal position sensor (CPPS) or clutch pedal requires that a CPPS learn procedure be performed. Failure to perform the CPPS learn procedure may result in personal injury or damage to the vehicle or its components if the vehicle is in gear and the starter motor is accidentally engaged.

- If the ECM needs to be reprogrammed, refer to **Service Programming System (SPS)**.
- The Clutch Pedal Position Sensor Learn-Refer to **Clutch Pedal Position Sensor Learn** .
- Engine Oil Life Remaining-When available, use a scan tool to reset the Engine Oil Life Remaining back to the original percentage recorded before the module was reprogrammed.
- Transmission Fluid Life Remaining-When available, use a scan tool to reset the Transmission Fluid Life Remaining back to the original percentage recorded before the module was reprogrammed.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, a CKP Variation Learn Procedure must be performed. Refer to **Crankshaft Position System Variation Learn** .

- Engine replacement
- Any engine repair that disturbs the crankshaft position (CKP) sensor or its relationship with the crankshaft reluctor wheel
- CKP sensor

If the throttle body is replaced, a Throttle Learn procedure must be performed. Refer to **Throttle/Idle Learn** .

ENGINE CONTROL MODULE PROGRAMMING AND SETUP (LLT)

The following service procedures require either a programming or a setup event performed for a complete repair.

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WARNING: Replacement or reprogramming of the ECM, or replacement of the clutch pedal position sensor (CPPS) or clutch pedal requires that a CPPS learn procedure be performed. Failure to perform the CPPS learn procedure may result in personal injury or damage to the vehicle or its components if the vehicle is in gear and the starter motor is accidentally engaged.

ECM Replacement and Reprogramming

If the engine control module (ECM) is replaced or reprogrammed, the following procedures must be performed:

1. ECM Reprogramming-Refer to **Service Programming System (SPS)**.
2. Theft Deterrent-Refer to **Immobilizer System Component Programming** . The ECM will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. An ECM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password, and will require a learn procedure after programming to learn the current vehicle's password.
3. Clutch pedal position sensor learn-Refer to **Clutch Pedal Position Sensor Learn** .
4. Idle Learn Procedure-Refer to **Throttle/Idle Learn (Without LF1)** .
5. Engine Oil Life Remaining-When available, use a scan tool to reset the Engine Oil Life Remaining back to the original percentage recorded before the module was replaced.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

- If any of the following components are replaced, an Idle Learn Procedure must be performed. Refer to **Throttle/Idle Learn (Without LF1)** .
  - Throttle body assembly
  - ECM
- If any of the following components are replaced, a Clutch Pedal Position Sensor Learn Procedure must be performed. Refer to **Clutch Pedal Position Sensor Learn** .
  - Clutch pedal
  - Clutch pedal position sensor

FUEL PUMP FLOW CONTROL MODULE PROGRAMMING AND SETUP

The fuel pump control module must be programmed with the proper calibration software. The module stores and utilizes this information however if it is not properly configured with the correct calibration software, the fuel pump control module will not control all of the vehicle features properly.

Ensure that the following conditions exist in order to prepare for fuel pump control module programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.

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3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the fuel pump control module unless directed by a service procedure or a service bulletin.

Fuel Pump Control Module Programming

To program and setup an existing or new replacement fuel pump control module, perform the following procedure:

1. With a scan tool, access the Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)**.
2. On the SPS Supported Controllers screen, select CCM Fuel Pump Flow Control Module - Programming and follow the on-screen instructions.

If the fuel pump control module fails to accept the program, verify all scan tool and fuel pump control module connections are secure.

NOTE: After programming is completed, perform the following to avoid future misdiagnosis:

1. **Turn the ignition OFF for 10 seconds.**
2. **Open and close the door.**
3. **Connect the scan tool to the data link connector.**
4. **Ignition ON, engine OFF.**
5. **With a scan tool, clear all DTC's from all modules.**

HEATED SEAT CONTROL MODULE PROGRAMMING AND SETUP

The seat heating control module must be programmed with the proper calibration software. The module stores and utilizes this information however if it is not properly configured with the correct calibration software, the seat heating control module will not control all of the vehicle features properly.

Ensure that the following conditions exist in order to prepare for seat heating control module programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the seat heating control module unless directed by a service procedure or a service bulletin.

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Seat Heating Control Module Programming

To program and setup an existing or new replacement seat heating control module, perform the following procedure:

1. With a scan tool, access the Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)**.
2. On the SPS Supported Controllers screen, select HVSMF Front Seat Heating Control Module - Programming and follow the on-screen instructions.

If the HVSMF Front Seat Heating Control Module fails to accept the program, verify all scan tool and seat heating control module connections are secure.

NOTE: After programming is completed, perform the following to avoid future misdiagnosis:

1. **Turn the ignition OFF for 10 seconds.**
2. **Open and close the door.**
3. **Connect the scan tool to the data link connector.**
4. **Ignition ON, engine OFF.**
5. **With a scan tool, clear all DTC's from all modules.**

HVAC SYSTEM CONTROL MODULE PROGRAMMING AND SETUP

The following service procedures require either a programming or a setup event performed for a complete repair.

HVAC Control Module Replacement

If the HVAC control module needs to be replaced, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Remote Heater and Air Conditioning Control Module - Programming and follow the on-screen instructions.
3. Perform the SPS function Remote Heater and Air Conditioning Control Module - Setup and follow the on-screen instructions.
4. Clear DTCs after completing the programming procedure.

HVAC Control Module Reprogramming

Do not reprogram the HVAC control module unless directed by a service procedure or a service bulletin.

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Remote Heater and Air Conditioning Control Module - Programming and follow the on-screen instructions.

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3. Clear DTCs after completing the programming procedure.

Setup for Component Replacement

If an actuator is replaced, the following procedure must be performed:

Re-calibrating actuators for the HVAC system. Refer to **Actuator Recalibration** .

INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE PROGRAMMING AND SETUP

NOTE: The air bag indicator light may remain ON after the body control module (BCM), or inflatable restraint sensing and diagnostic module (SDM) is replaced, and during the programming procedure for the BCM until after the procedure is completed. When installing a new SDM, there may be several DTCs set prior to programming. Once programmed, these DTCs should be in history and can be cleared.

The following service procedures require either a programming or a setup event performed for a complete repair:

Sensing and Diagnostic Module Replacement or Reprogramming

If the sensing and diagnostic control module (SDM) is replaced or needs to be reprogrammed, programming must be performed. Refer to **Service Programming System (SPS)**. Ensure the following conditions exist in order to prepare for module programming:

1. The battery is fully charged.
2. The ignition switch is in the RUN position.
3. The Techline equipment cable connection at the data link connector (DLC) is secure.
4. Program the control module using the latest software matching the vehicle. Refer to up-to-date Techline equipment user instructions.

If the control module fails to program, proceed as follows:

1. Ensure the DLC and APM connections are good.
2. Inspect the Techline equipment for the latest software version.
3. Attempt to program the control module. If the control module still cannot be programmed properly, replace the control module.

Sensing and Diagnostic Module Setup

The replacement of some components will require a setup procedure for complete repair. The SDM Setup Procedure must be performed if any of the following components are replaced:

1. SDM

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2. BCM

Refer to **Service Programming System (SPS)** for SDM Setup.

INSTRUMENT CLUSTER PROGRAMMING AND SETUP

The instrument panel cluster must be programmed with the proper calibration software. The module stores and utilizes this information however if it is not properly configured with the correct calibration software, the instrument panel cluster will not control all of the vehicle features properly.

Ensure that the following conditions exist in order to prepare for instrument panel cluster programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the instrument panel cluster unless directed by a service procedure or a service bulletin.

Instrument Panel Cluster Programming

To program and setup an existing or new replacement instrument panel cluster, perform the following procedure:

1. With a scan tool, access the Service Programming System (SPS) and follow the on-screen instructions. Refer to **Service Programming System (SPS)**
2. On the SPS Supported Controllers screen, select IPC Instrument Cluster - Programming and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select IPC Instrument Cluster - Configuration and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select IPC Instrument Cluster - Setup and follow the on-screen instructions.

If the instrument panel cluster fails to accept the program, verify all scan tool and instrument panel cluster connections are secure.

NOTE: After programming is completed, perform the following to avoid future misdiagnosis:

1. **Turn the ignition OFF for 10 seconds.**
2. **Open and close the door.**
3. **Connect the scan tool to the data link connector.**
4. **Ignition ON, engine OFF.**

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5. **With a scan tool, clear all DTC's from all modules.**

MOBILE TELEPHONE CONTROL MODULE PROGRAMMING AND SETUP

The following service procedures require either a programming or a setup event performed for a complete repair. Do not reprogram the mobile telephone control module, unless directed by a service procedure, or a service bulletin.

Mobile Telephone Control Module Replacement and/or Programming

If the mobile telephone control module needs to be replaced and/or reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Mobile Telephone Control Module - Programming and follow the on-screen instructions.
3. Perform the SPS function Onstar Activation and follow the on-screen instructions.
4. Clear DTCs after completing the programming procedure.

MULTIFUNCTION AUXILIARY GAUGE PROGRAMMING AND SETUP

This device requires no programming or setup.

OBJECT ALARM MODULE PROGRAMMING AND SETUP

The following service procedures require either a programming or a setup event performed for a complete repair.

Parking Assist Control Module Replacement

If the parking assist control module needs to be replaced, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Parking Assist Control Module - Programming and follow the on-screen instructions.
3. Perform the SPS function Parking Assist Control Module - Setup and follow the on-screen instructions.
4. Clear DTCs after completing the programming procedure.

Parking Assist Control Module Reprogramming

Do not reprogram the parking assist control module, unless directed by a service procedure, or a service bulletin.

1. Connect a scan tool to the vehicle and access SPS. Refer to **Service Programming System (SPS)**.
2. Perform the SPS function Parking Assist Control Module - Programming and follow the on-screen

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instructions.

3. Clear DTCs after completing the programming procedure.

PASSENGER PRESENCE SYSTEM PROGRAMMING AND SETUP

NOTE: Before rezeroing the passenger presence detection system, the front passenger seat must be completely empty of all items. The presence of any items on the front passenger seat will affect the calibration and operation of the passenger presence detection system. When rezeroing the passenger presence detection system, the instrument cluster and dash lights will begin dimming ON and OFF. This is normal operation during the rezeroing procedure and does not indicate additional system faults.

If the passenger presence detection system is replaced or serviced, perform the rezeroing procedure for the passenger presence detection system. Refer to **Passenger Presence System Rezeroing** for the rezeroing procedure.

MULTIMEDIA PLAYER INTERFACE MODULE PROGRAMMING AND SETUP

Each of the following service procedures require programming or setup procedures to be performed on the multimedia player interface module.

Multimedia Player Interface Module Programming and Setup

For all Multimedia Player Interface Modules, setup is completed using the Service Programming System (SPS). Refer to **Service Programming System (SPS)**.

RADIO CONTROL PROGRAMMING AND SETUP

This device requires no programming or setup.

RADIO PROGRAMMING AND SETUP

Any time the radio is replaced or a diagnostic procedure requires radio programming, the radio must be programmed using SPS. Refer to **Service Programming System (SPS)**.

XM Satellite Radio (If Equipped)

The XM satellite radio is integrated into the radio. If XM was activated in the previous radio, the replacement radio will require no additional activation steps. Customer subscription information is transfered to the replacement radio when a replacement radio is ordered.

REMOTE CONTROL DOOR LOCK RECEIVER PROGRAMMING AND SETUP

The remote control door lock receiver only acts as an antenna, receiving the signals sent by the keyless entry transmitter and sending them to the body control module (BCM). Because the keyless entry software is contained in the BCM, the remote control door lock receiver requires no programming or setup after

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replacement.

SERVICE PROGRAMMING SYSTEM (SPS)

Special Tools

EL-49642: SPS Programming Support Tool

For equivalent regional tools, refer to **Special Tools**.

For step-by-step control module programming instructions, please refer to the techline information system (TIS) terminal.

Review the information below to ensure proper programming protocol.

NOTE:

- **DO NOT program a control module unless you are directed by a service procedure or you are directed by a General Motors service bulletin. Programming a control module at any other time will not permanently correct a customers concern.**
- **It is essential that the TIS terminal, MDI, and/or Scan Tool, is equipped with the latest software before performing service programming.**
- **Due to the time requirements of programming a controller, install EL-49642 SPS Programming Support Tool to maintain system voltage. See Special Tools. Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. If the above tool is not available, DO NOT connect a battery charger, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.**
- **Some modules will require additional programming/setup events to be performed before or after programming.**
- **Some vehicles may require the use of a CANDi or MDI module for programming.**
- **Review the appropriate service information for these procedures.**
- **DTCs may set during programming. Clear DTCs after programming is complete.**
- **Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.**

Ensure the following conditions are met before programming a control module:

- Vehicle system voltage:
  - There is not a charging system concern. All charging system concerns must be repaired before programming a control module.
  - Battery voltage is greater than 12 volts but less than 16 volts. The battery must be fully charged

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before programming the control module.
    - Turn OFF or disable any system that may put a load on the vehicles battery, such as the following components:
        - Interior lights
        - Exterior lights including daytime running lights (DRL)-Applying the parking brake, on most vehicles, disables the DRL system
        - Heating, ventilation, and air conditioning (HVAC) systems
        - Engine cooling fans
        - Radio, etc.
- The ignition switch must be in the proper position. SPS prompts you to turn ON the ignition, with the engine OFF. DO NOT change the position of the ignition switch during the programming procedure, unless instructed to do so.
- Make certain all tool connections are secure, including the following components and circuits:
    - Scan Tool
        - The RS-232 communication cable port
        - The connection at the data link connector (DLC)
        - The voltage supply circuits
    - MDI
        - The USB, Ethernet or Wireless communication port
        - The connection at the data link connector (DLC)
- DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all control module and DLC connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the control module.
3. If the control module can still not be programmed, turn the ignition OFF for at least one minute.
4. Turn the ignition ON and attempt to reprogram the control module. The control module should program.
    - If the control module still cannot be programmed, replace the control module.

After successfully programming the control module, ensure that all post programming procedures are performed; refer to **Control Module References** for the appropriate control module Programming and Setup document for any required procedures.

SUNROOF CONTROL MODULE PROGRAMMING AND SETUP

When replacing the sunroof motor/control module, the sunroof motor/actuator initialization/teach procedure must be followed.

Initialization and Learn Procedures

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In order for the sunroof system to perform correctly it needs to establish its position and the force profile it will encounter under normal closing conditions. These two procedures need to be run when a new controller is placed on a vehicle, when a service procedure is performed on any mechanical component, or if the system seems to lose track of its known position.

Initialization and Reinitialization

When the sunroof controller is not initialized it will perform all OPEN requests, but no LIN-Bus communicated close commands. It will only perform a CLOSE operation requested by the switch with obstacle detection disabled. If an initialization procedure is interrupted the controllers will return to the not initialized state. Which procedure is run depends on the state of the controller.

For a module which is not initialized begin the process by holding the sunroof switch in the CLOSE position. The sunroof will move to the end of physical travel in the closed direction and store that position. During this time it is necessary to keep the switch active until the process completes. At the completion of the procedure the sunroof should back off slightly to its soft stops. The rest of the defined positions are determined by offsets from this home position.

For a module which has been previously initialized release the switch after the sunroof is considered fully closed by the software. Then hold the sunroof switch in the closed position for 10 s. The sunroof shall resume motion in the CLOSE direction until the end of travel is detected. During this time it is necessary to keep the switch active until the process completes. At the completion of the procedure the sunroof should back off slightly to its soft stops.

THEFT DETERRENT MODULE PROGRAMMING AND SETUP (IMMOBILIZER ANTENNA)

The theft deterrent module only acts as an exciter and antenna, energizing the key transpoder and receiving the key code information. Because the immobilizer software is contained in the BCM, the theft deterrent module requires no programming or setup after replacement.

WINDOW REGULATOR MOTOR PROGRAMMING AND SETUP

Window Motor Normalized Procedure

A window motor that has not been normalized will no longer perform the express up and express down functions, this may occure during the following conditions:

- When a window motor has been disconnected
- When a door harness has been disconnected
- When the battery has been disconnected or replaced

NOTE: **When DTC B3205 4B & 3210 4B are set, the following warnings will be displayed on the driver information center:**
Open, then Close Driver Window
Open, then Close Passenger Window
These warnings will clear once the windows have been "Normalized" and the respective DTC will clear.

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To normalize the window motor, follow these steps:

NOTE: The doors must be completely closed prior to normalizing the windows, a door that is open or ajar may cause the power window to function abnormally or to become inoperative while performing the normalizition procedure. If this occures, verify that the door is completely closed then repeat the normalization procedure.

1. Ignition ON.
2. Starting with the window completely UP, press and hold the power window switch until the window is fully open and continue holding the switch down for approximately 5 seconds after the window is completely open.
3. Pull the power window switch up until the window is fully closed and continue holding the switch up for approximately 5 seconds after the window is completely closed.

The window should now be normalized and the window should perform the express up and express down functions.

Window Motor Relearn Procedure

A relearn procedure may need to be performed for any LIN window motor for the following conditions:

- When the window glass is out of alignment
- When the window glass has been replaced
- When the door has been replaced
- When the window regulator has been replaced

NOTE: Prior to performing the relearn procedure the vehicle must have all 4 wheels properly inflated and mounted, the vehicle must be sitting on a level surface and all doors must be completely closed.

To relearn the window motor, follow these steps:

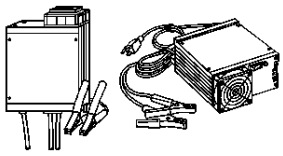
1. Ignition ON.
2. With a scan tool, select Module Diagnosis, Body Control Module, Configuration/Reset Functions and then select the appropriate Clear Window Learn Values for the window motor requiring the relearn procedure.
3. After the learn procedure, exit the scan tool learn procedure completely, the power window cannot be normalized and will not function until you exit the program.
4. Starting with the window completely UP, press and hold the power window switch until the window is fully open and continue holding the switch down for approximately 5 seconds after the window is completely open.
5. Pull the power window switch up until the window is fully closed and continue holding the switch up for approximately 5 seconds after the window is completely closed.

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The window is now reprogrammed.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	EL 49642 EL 50113 SPS Programming Support Tool

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Remote Functions - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Garage Door Opener Bolt Screws	2.5 N.m	22 lb in
Overhead Console Screws	2.5 N.m	22 lb in

SCHEMATIC AND ROUTING DIAGRAMS

REMOTE FUNCTION SCHEMATICS

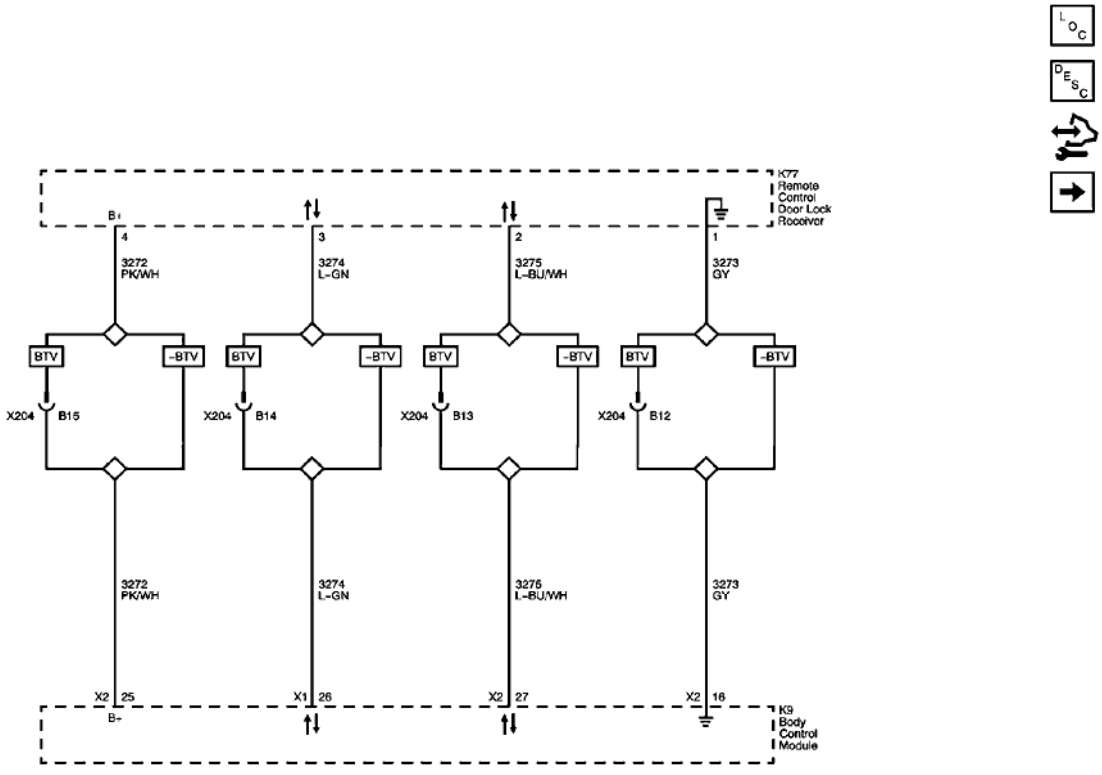


Fig. 1: Keyless Entry
Courtesy of GENERAL MOTORS CORP.

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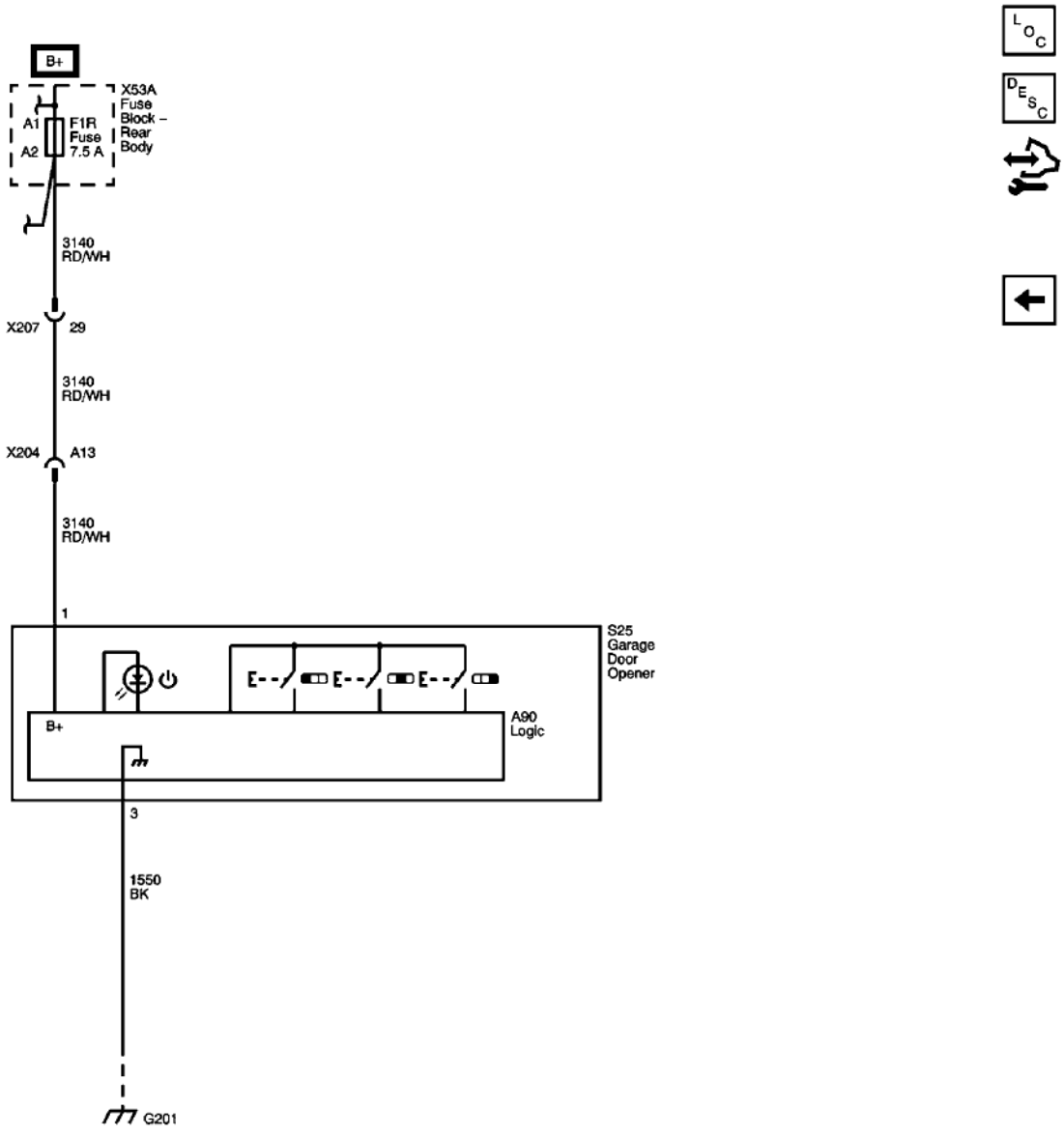


Fig. 2: Garage Door Opener
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3101	B3101 00: Keyless Entry Data Link Circuit
DTC B3105	B3105 00: Keyless Entry System Key Fobs
DTC B3106	B3106 00: Keyless Entry Data Link

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DTC B3109-B3113	B3109 00: Keyless Entry Transmitter 1 Battery B3110 00: Keyless Entry Transmitter 2 Battery B3111 00: Keyless Entry Transmitter 3 Battery B3112 00: Keyless Entry Transmitter 4 Battery B3113 00:: Keyless Entry Transmitter 5 Battery
DTC B310D-B310F	B310D 00: Keyless Entry Transmitter 6 Battery B310E 00: Keyless Entry Transmitter 7 Battery B310F 00: Keyless Entry Transmitter 8 Battery

DTC B3101

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3101 00

Keyless Entry Data Link Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B3101 00	B3101 00	-	-
Serial Data - Transmit/Enable Line	B3101 00	B3101 00	B3101 00	B3101 00
Serial Data - Receive	B3101 00	B3101 00	B3101 00	B3101 00
Low Reference	-	B3101 00	-	-

Circuit/System Description

The body control module (BCM) communicates with the remote control door lock receiver through the keyless entry serial data circuits. When any button on the keyless entry transmitter is pressed, the transmitter sends a signal to the remote control door lock receiver. The remote control door lock receiver sends a function request to the BCM, depending on which button is pressed on the transmitter. The BCM receives the message and performs the appropriate function.

Conditions for Running the DTC

A button is pressed on the keyless entry transmitter.

Conditions for Setting the DTC

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No response is received from the remote control door lock receiver after the BCM requests information from or sends configuration commands to the remote control door lock receiver.

Action Taken When the DTC Sets

In case of power failure the remote control door lock receiver is disabled for 65 seconds, otherwise no action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the fault is no longer present.
- A history DTC will clear after 40 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Remote Function Schematics

Component Connector End Views

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the K77 remote control door lock receiver.
2. Ignition OFF, doors closed, wait 30 seconds. Test for less than 50 ohms between the low reference circuit terminal 1 and ground.
    - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.

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- If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.

4. Ignition ON, test for 4-6 V between the serial data circuit terminal 3 and ground after inserting key in ignition cylinder.
   - If greater than the specified range, test the serial data circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
   - If less than the specified range, test the serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. Disconnect the X1 and X2 harness connectors at the K9 BCM.
6. Test for less than 1 V between the serial data circuit terminal 27 and ground.
   - If greater than the specified range, test the serial data circuit for a short to voltage.
7. Ignition OFF, test for infinite resistance between the serial data circuit terminal 27 and ground.
   - If not the specified value, test the serial data circuit for a short to ground.
8. Test for less than 2 ohms between the K9 BCM terminal 27 X2 and K77 remote control door lock receiver terminal 2.
   - If greater than the specified range, test the serial data circuit for an open/high resistance.
9. If all circuits test normal, replace the K77 remote control door lock receiver. Check if the B3101 is no longer set as current.
10. After K77 remote control door lock receiver replacement, if B3101 is still current, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM or remote control door lock receiver replacement, setup and programming

DTC B3105

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3105 00

Keyless Entry System Key Fobs

Circuit/System Description

The body control module (BCM) monitors the number of keyless entry transmitters programmed. Until at least

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one transmitter is programmed, the BCM determines a malfunction condition exists.

Conditions for Running the DTC

The BCM has been set up without transmitters being programmed.

Conditions for Setting the DTC

No keyless entry transmitter programmed to the BCM.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Conditions for Clearing the DTC

A current DTC is cleared when at least one transmitter has been programmed to the BCM.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Attempt to program the keyless entry transmitter. Refer to **Replacing Keys** . The transmitter should program.

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Circuit/System Testing

1. Verify that the transmitter is the correct transmitter for the vehicle.
    - If not correct, replace the transmitter.
2. Attempt to program the transmitter. Refer to **Replacing Keys** . The transmitter should program.
    - If the transmitter does not program, replace the transmitter.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming

DTC B3106

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3106 00

Keyless Entry Data Link

Circuit/System Description

The remote control door lock receiver receives a signal from the keyless entry transmitters when a button is pressed; it then sends the request to the BCM.

Conditions for Setting the DTC

The transmitter that is sending a signal to the remote control door lock receiver is different from those transmitters stored in the body control module (BCM).

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the fault is no longer present and the ignition switch is cycled.
- The history DTC will clear after 100 consecutive ignition cycles without a fault present.

Reference Information

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Schematic Reference

Remote Function Schematics

Component Connector End Views

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. With a valid transmitter, press a button on the transmitter.
2. Verify that DTC B3106 is not set.
    - If the DTC is set, replace the K84 remote control door lock receiver.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for remote control door lock receiver replacement, setup, and programming

DTC B3109-B3113

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3109 00

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Keyless Entry Transmitter 1 Battery

DTC B3110 00

Keyless Entry Transmitter 2 Battery

DTC B3111 00

Keyless Entry Transmitter 3 Battery

DTC B3112 00

Keyless Entry Transmitter 4 Battery

DTC B3113 00:

Keyless Entry Transmitter 5 Battery

Circuit/System Description

With each press of a keyless entry transmitter button, a message containing the current battery state of the transmitter is sent to the remote control door lock receiver, along with the commanded keyless entry function. The remote control door lock receiver sends this to the body control module (BCM) to determine what action to perform.

Conditions for Running the DTC

A keyless transmitter button is pressed.

Conditions for Setting the DTC

The DTC sets after 3 consecutive low battery signals from the same programmed transmitter.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Conditions for Clearing the DTC

The DTC is cleared when a normal transmitter voltage signal is received from the programmed transmitter that set the DTC.

Reference Information

Schematic Reference

Remote Function Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Verify none of the following DTCs are set:

- DTC B3109
- DTC B3110
- DTC B3111
- DTC B3112
- DTC B3113

  - If any of the DTCs are set, replace the battery in the appropriate keyless entry transmitter. Operate the transmitter 3 consecutive times. If the DTC resets, replace the keyless entry transmitter.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for remote control door lock receiver replacement, setup, and programming

DTC B310D-B310F

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

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- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B310D 00

Keyless Entry Transmitter 6 Battery

DTC B310E 00

Keyless Entry Transmitter 7 Battery

DTC B310F 00

Keyless Entry Transmitter 8 Battery

Circuit/System Description

With each press of a keyless entry transmitter button, a message containing the current battery state of the transmitter is sent to the body control module (BCM) along with the commanded keyless entry function.

Conditions for Running the DTC

A keyless transmitter button is pressed.

Conditions for Setting the DTC

The DTC sets after 3 consecutive low battery signals from the same programmed transmitter.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Conditions for Clearing the DTC

The DTC is cleared when a normal transmitter voltage signal is received from the programmed transmitter that set the DTC.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Component Connector End Views

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Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Verify none of the following DTCs are set:

- DTC B310D
- DTC B310E
- DTC B310F

  - If any of the DTCs are set, replace the battery in the appropriate keyless entry transmitter. Operate the transmitter 3 consecutive times. If the DTC resets, replace the keyless entry transmitter.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Replacing Keys

SYMPTOMS - REMOTE FUNCTIONS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Keyless Entry System Description and Operation**.

Visual/Physical Inspection

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- Inspect for aftermarket devices which could affect the operation of the Keyless Entry System. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Garage Door Opener Malfunction**
- **Keyless Entry System Malfunction**
- **Remote Vehicle Start Malfunction**

GARAGE DOOR OPENER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Ground	-	1	-	-
1. Garage Door Opener Malfunction				

Circuit/System Description

The garage door opener is a transmitter operating between 288 and 434 MHz. The garage door opener has three buttons that may be programmed for individual transmitter/receiver combinations to control up to three garage door openers, security gates, lighting systems, etc. Each button represents a unique transmitter code section, which operates independently of the other buttons, and may be considered a separate transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Garage Door Opener Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Special Tools

J 41540 Universal Home Remote Tester

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the garage door opener.

   NOTE: For the following tests use test probe J-35616-4A (PU). Insert this into the connector from the harness side to take measurements. Probing the terminals from the front may damage them.

2. Ignition OFF, test for less than 5 ohms between the ground circuit terminal 3 and ground.
   - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
   - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.

   NOTE: This step will clear any learned transmitters from the garage door opener. This will require reprogramming by the customer to reestablish garage door opener functionality.

4. Ignition ON, hold the two outer buttons on the garage door opener for 10 seconds. The LEDs will flash quickly indicating it has entered the diagnostic mode. Place the **J 41540** adjacent to the garage door opener and press each button of the garage door opener one at a time. The tester should indicate when each button is pressed.
5. Using the Hand Held Transmitter from **J 41540** kit, program a single button on the in-car garage door opener. Verify the Programmed LED on the test tool lights with the newly programmed vehicle garage door opener. This verifies the transmitter can learn a new function.
   - If the tester indicates that one or more of the buttons does not respond, replace the garage door

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opener.

6. Instruct the customer to program the garage door opener. Refer to the vehicle owners manual. If further malfunction occurs, a possible rolling code or incompatibility with the garage door opener receiver will prevent programming.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for garage door opener replacement, setup, and programming

KEYLESS ENTRY SYSTEM MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The keyless entry system is a vehicle entry device. The keyless entry will unlock the vehicle doors or open the rear compartment when a corresponding button on the keyless entry fob/key is pressed. This is accomplished by the keyless entry fob/key sending a radio frequency to the remote control door lock receiver, which then sends the signal to the body control module (BCM). The BCM interprets the signal and activates the requested function. A low fob/key battery or radio frequency (RF) interference from aftermarket devices such as 2-way radios, power inverters, cellular phone chargers, computers, etc. may cause a system malfunction. High RF traffic areas, such as gas stations which use pay-at-the-pump RF transponders, may also cause interference that could lead to a malfunction.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Attempt to learn the keyless entry fob/key, refer to **Replacing Keys** . The fob/key should learn.

Circuit/System Testing

1. Verify that the fob/key is the correct fob/key for the vehicle.
    - If not the correct fob/key, replace the fob/key.
2. Place the fob/key on the test pad of the J 43241 and press each fob/key button one at a time. The tester should sound a tone and illuminate a green light with each button press.
    - If one or more buttons does not sound the tone and illuminate the green light, replace the fob/key battery and retest with the J 43241. If the condition continues after battery replacement, replace the fob/key.
3. Operate the fob/key while observing the scan tool Fob Function parameter for the appropriate fob/key. The parameter should correspond with the function selected on the fob/key.
    - If the parameter does not match the function selected on the fob/key, replace the fob/key.
4. Attempt to learn the fob/key, refer to Replacing/Adding Keys. The fob/key should learn.
    - If the fob/key does not learn, test the keyless entry antenna for an open/high resistance. If the circuit tests normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Replacing Keys**
- **Control Module References** for remote control door lock receiver replacement, setup, and programming

REMOTE VEHICLE START MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of each diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

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Remote vehicle start begins as an radio frequency message received by the BCM (BCM) from a keyless entry transmitter. The BCM monitors system conditions such as content theft deterrent, hood ajar status, and body DTCs to determine if a remote vehicle start event will occur. If conditions are determined to be acceptable, the remote vehicle start message is sent to the engine control module (ECM). The ECM monitors system conditions such as engine control parameters and vehicle theft deterrent to determine if engine starting will be allowed. If conditions are acceptable, the ECM will initiate engine starting. During the engine run time in a remote vehicle start attempt, before the operator enters the vehicle, the ECM may discontinue engine operation if system conditions require it or a message is received from the BCM requesting the engine be turned OFF.

Diagnostic Aids

NOTE: If the vehicle has a current vehicle DTC that illuminates the malfunction indicator lamp (MIL), the cause of the DTC must be diagnosed before proceeding with the Remote Vehicle Start Inoperative diagnostic.

The remote vehicle start system will not operate if any of the following conditions are present:

- A current vehicle DTC that illuminates the malfunction indicator lamp (MIL)
- The vehicle is in valet mode.
- More than 2 remote starts have been attempted.
- The hazard switch is in the ON position.
- A current hazard switch DTC is set.
- The vehicle hood is ajar.
- A current hood ajar DTC is set.
- The content theft deterrent system detects an alarm trigger.
- Excessive engine RPM
- Excessive coolant temperature
- Accelerator pedal position greater than 0 percent
- Vehicle not in park
- Vehicle theft deterrent malfunction
- A current automatic transmission shift lock control system DTC is set.
- A vehicle speed sensor signal is detected by the ECM.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

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Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that remote vehicle start is enabled through vehicle personalization.
    - If remote vehicle start is not enabled, use vehicle personalization to turn on remote vehicle start functionality. Refer to the vehicle owners manual.
2. Verify that the keyless entry functions operate with all available keyless entry transmitters.
    - If the keyless entry system does not function properly, refer to **Keyless Entry System Malfunction**.
3. Observe the scan tool BCM Remote Start Diagnostic Status History and the ECM Remote Vehicle Start Disable History parameters. Verify that no Diagnostic Status History or Start Disable items are present.
    - If remote vehicle start disable history items are present, refer to the appropriate subsection in which the failure occurred.
4. Verify the scan tool BCM Content Theft Trigger History parameters displays None.
    - If not specified value, refer to **Content Theft Deterrent Malfunction** .

REPAIR INSTRUCTIONS

REMOTE CONTROL DOOR LOCK RECEIVER REPLACEMENT (WITH BTV)

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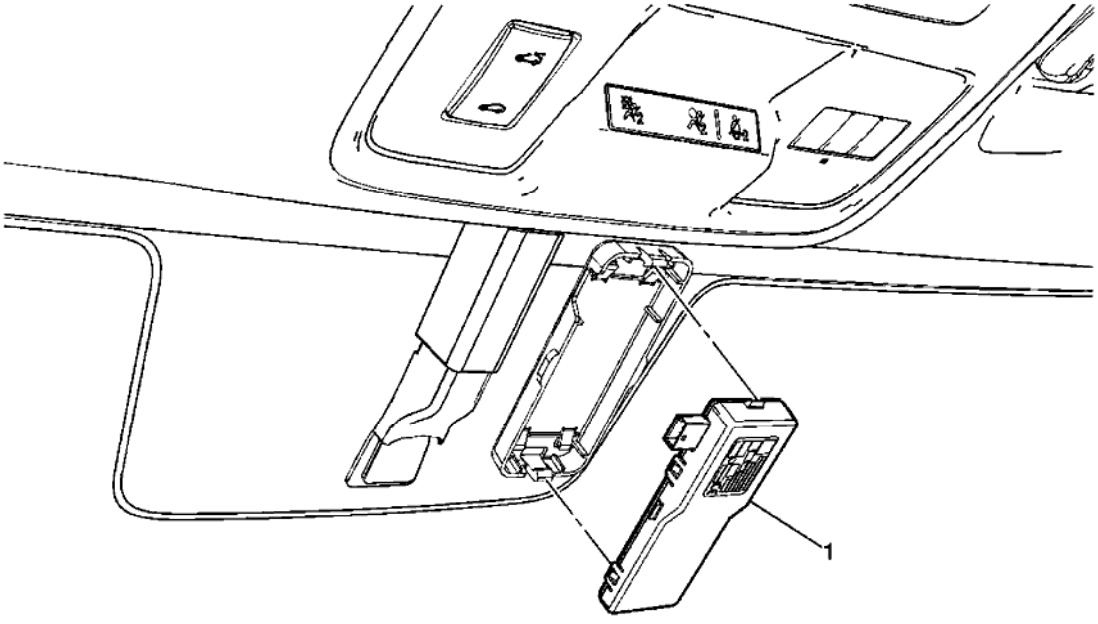


Fig. 3: Remote Control Door Lock Receiver (With BTV)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Remote Control Door Lock Receiver **Procedure** 1. Remove the module trim cover. 2. Disconnect the electrical connector. 3. Remove cover and unsnap the receiver from the windshield bracket. 4. For programming and set up, refer to **Control Module References**

REMOTE CONTROL DOOR LOCK RECEIVER REPLACEMENT (WITHOUT BTV)

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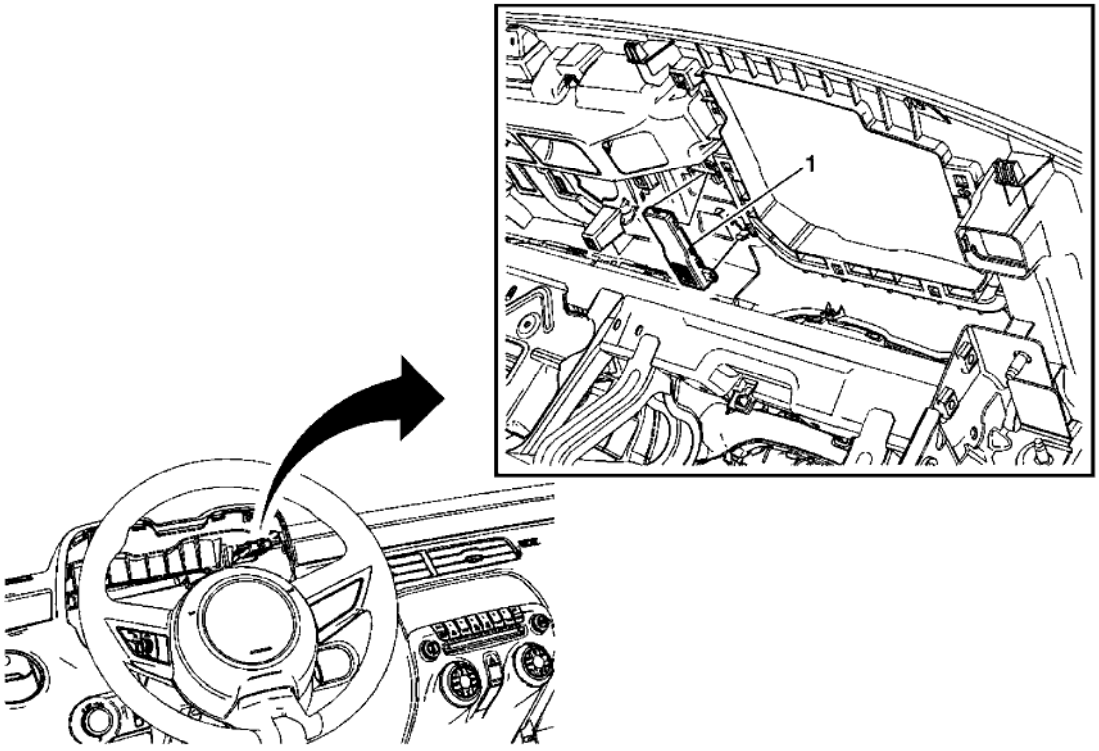


Fig. 4: Remote Control Door Lock Receiver (Without BTV)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument cluster. Refer to **Instrument Cluster Replacement** .	
1	Remote Control Door Lock Receiver **Procedure** 1. Reach through opening and unsnap the receiver from the instrument panel trim pad. 2. Disconnect the electrical connector. 3. For programming and set up, refer to **Control Module References** .

GARAGE DOOR OPENER TRANSMITTER PUSHBUTTON REPLACEMENT

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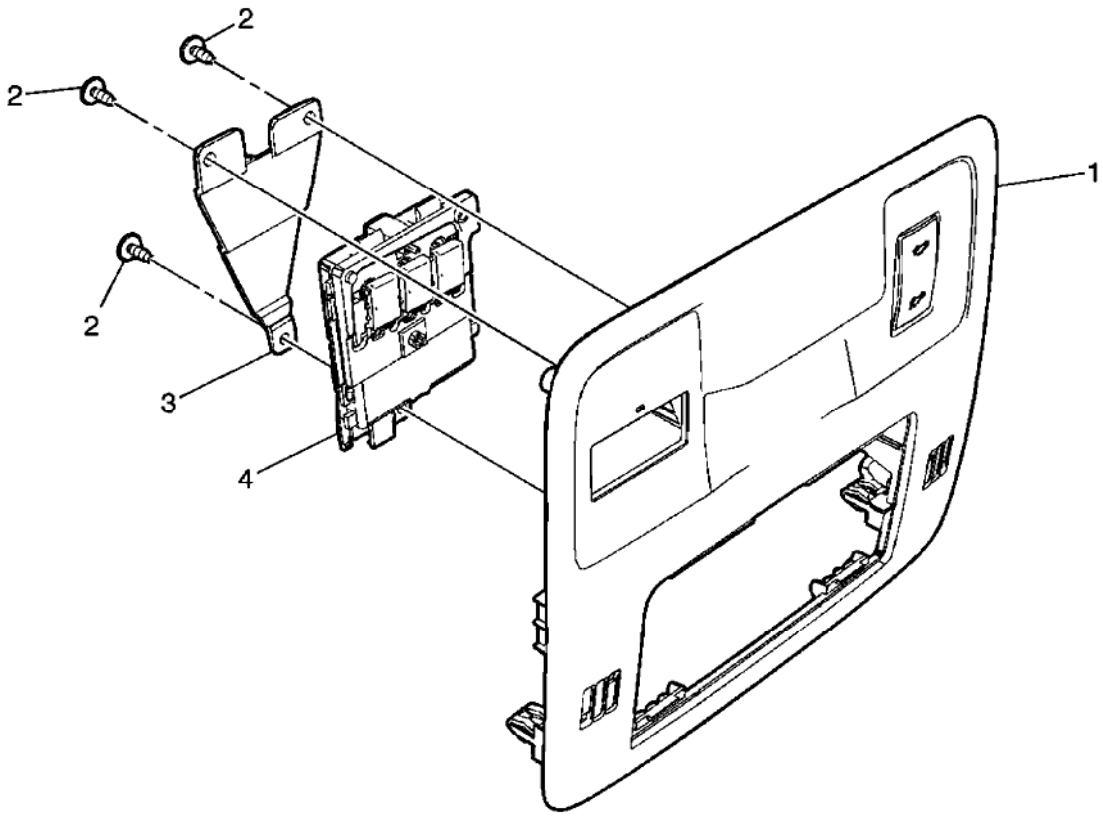


Fig. 5: Garage Door Opener Transmitter Pushbutton
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Roof Console Refer to **Roof Console Replacement**
2	Garage Door Opener Bolt/Screws (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Universal Garage Door Opener Support Bracket
4	Garage Door Opener **Procedure** 1. Disconnect the electrical connectors. 2. Refer to **Control Module References** for programming and set-up procedures.

REMOTE CONTROL DOOR LOCK TRANSMITTER PROGRAMMING

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Because the keyless entry transmitter and the vehicle key are integrated as one unit, the transmitter is learned during the normal key learn procedure. Except for the vehicle key learn, there is no specific learn procedure for the keyless entry transmitter.

DESCRIPTION AND OPERATION

GARAGE DOOR OPENER DESCRIPTION AND OPERATION

The garage door opener is fixed and rolling code capable. Rolling code is a system that allows the code that the customers receiver receives from the garage door opener to change every time the garage door opener is used within operating range of the receiver. Rolling code programming requires the customer to push a learn/program button on the garage door opener receiver at their home. This button is usually located on the receiver unit under a cover (light cover) on one end of the unit. The customer must follow the garage door opener manufacturers instructions to program/learn the receiver to accept the Universal Home Remote System as an authorized opener for their unit. When the receiver and the garage door opener are initially programmed together, a code is established and a new code is created for every new transmission. The software in the receiver recognizes the garage door opener and accepts the new code.

The garage door opener is compatible with most, but not all types and brands of transmitters.

The garage door opener is a transmitter operating between 288-434 MHz. The power and range of the transmitter is limited to comply with laws governing the generation of radio frequency interference. The transmitter is programmed by the user to accept the signal generated by the user's transmitters.

The garage door opener has 3 buttons that may be programmed for individual transmitter/receiver combinations to control up to 3 garage door openers, security gates, lighting systems, etc. Each button represents a transmitter code section of the transmitter, which operates separately from any other button, and may be considered a separate transmitter. Operation consists of simply pressing a button to activate the corresponding transmitter.

KEYLESS ENTRY SYSTEM DESCRIPTION AND OPERATION

The keyless entry system is a vehicle entry device. The keyless entry system is used in conjunction with the body control module (BCM) to remotely activate certain vehicle features. Keyless entry will lock/unlock the doors or open the trunk when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the transmitter sending a radio frequency to the BCM. The BCM interprets the signal and performs the requested function. A low transmitter or vehicle battery or radio frequency interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High radio frequency traffic areas may also cause interference that could lead to a malfunction. Keyless entry allows you to operate the following components:

- Door locks
- Remote trunk release
- Vehicle locator/Panic alarm
- Remote vehicle starting, if equipped

The keyless entry system has the following components:

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- Keyless entry transmitters
- BCM
- Remote Function Receiver Module

Keyless Entry Transmitters

The keyless entry transmitters are used to lock and unlock the vehicle door while away from the immediate are of the vehicle. Vehicles without remote vehicle start will operate at a distance of up to 20 m (65 ft) away, except for Japanese and South Korean vehicles, which are limited to 4 m (16 feet). Vehicles with remote vehicle start will operate at a distance of up to 60 m (195 ft) away. Up to 8 transmitters may be programmed to a single vehicle. The keyless entry transmitter is an integral part of the vehicle key.

Body Control Module (BCM)

The BCM is a multifunction module that operates the keyless entry system. When an radio frequency message is received from a keyless entry transmitter, the BCM interprets this signal and performs the specific function, i.e. door lock, door unlock, or vehicle locate.

Remote Function Receiver Module

The remote function receiver module is connected to the BCM with a dedicated link. When a button is pressed on a keyless entry transmitter, the remote function receiver module receives this signal and sends the request to the BCM. The BCM interprets the signal and performs the specific function, i.e. door lock, door unlock, or vehicle locate.

Unlock Doors

Momentarily press the transmitter UNLOCK button in order to perform the following functions:

- Unlock only the driver door or all doors; this is customized through the DIC.
- Illuminate the interior lamps for a determined length of time or until the ignition is turned ON.
- Flash the exterior lights; this is customized through the DIC.
- Disarm the content theft deterrent (CTD) system, if equipped.
- Deactivate the CTD system when in the alarm mode.

Lock All Doors

Press the transmitter LOCK button to perform the following functions:

- Lock all vehicle doors.
- Immediately turn OFF the interior lamps.
- Flash the exterior lights and/or sound the horn; this is customized through the DIC.
- Arm the CTD system.

Remote Trunk Release

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Press the remote trunk release button on the transmitter to open the trunk.

Vehicle Locator/Panic Alarm

A single press of the panic button performs the following functions. Some functions may be dependent on personalization settings:

- Pulse the horn 3 times.
- Flash the exterior lamps 3 times.

A press and hold of the panic button performs the following functions:

- Illuminate the interior lamps.
- Pulse the horn and flash the exterior lamps for 30 seconds or until the following conditions occur:
  - The panic button is pressed.
  - The ignition switch is turned to the RUN position with a valid key.

Remote Vehicle Start, if equipped

The remote vehicle start function allows engine starting while not in the vehicle. It also allows the vehicle HVAC system and other vehicle systems to enable, providing a comfortable vehicle upon entry. Remote Vehicle Start functions have an operating range of up to 195 feet, depending on conditions. The remote vehicle start sequence begins by pressing and releasing the lock button and then pressing and holding the remote vehicle start buttons on the keyless entry transmitter. The turn signal lamps will illuminate to indicate the vehicle has received the remote start request. Each time an remote vehicle start is performed, the vehicle doors are locked, however they may then be unlocked/locked with the transmitter or vehicle key at any time. Once activated, the engine is allowed to run for 10 minutes. The remote vehicle start time may be extended by an additional 10 minutes by again pressing and releasing the lock button and then pressing and holding the remote vehicle start buttons on the transmitter. This feature is called a remote vehicle start continue and allows a maximum of 20 minutes of engine running. If the remote vehicle start continue is performed at 7 minutes into the initial 10 minute time-out, a total of 17 minutes of engine running would occur. The remote vehicle start event may be suspended at any time by pressing only the remote vehicle start button on the transmitter or by entering the vehicle and turning ON the hazard lamps.

In between ignition cycles, only 2 remote vehicle start events may occur or be attempted. Once 2 events or attempts have been made, future remote vehicle start events will be suspended until the vehicle is started using the ignition.

Enable/Disable Remote Vehicle Start

Using the driver information center, remote vehicle start may be enabled or disabled as a part of vehicle personalization. Refer to the vehicle owners manual for more information.

Hood Ajar Switch

The hood switch provides status of the hood to the BCM for remote vehicle start purposes. The switch is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. These

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separate inputs allow the BCM to actively monitor for a hood ajar switch fault.

Remote Vehicle Start Circuit Description

The BCM receives a signal from the keyless entry transmitter indicating a remote vehicle start request. A message is then sent to the BCM which determines if a crank request message will be sent to the ECM to allow engine starting. To determine if conditions are correct for an remote vehicle start event, the BCM will ensure the following conditions are met:

- A valid hood ajar switch closed signal is present.
- The doors are locked.
- The hazard switch is OFF.
- The vehicle power mode is correct.
- No content theft deterrent (CTD) alarm triggers are present.

When the BCM determines all conditions meet those required for an remote vehicle start event, a message is sent via serial data to the ECM. The ECM relies on the remote vehicle start message from BCM to enable remote vehicle start when the crank request signal is received. If the ECM does not receive a valid remote vehicle start message, it will not attempt to start the engine. While the ECM is in remote vehicle start mode it will suspend engine operation if any of the following additional conditions occur:

- Vehicle speed is greater than 0.
- Transmission is not in PARK.
- Excessive engine coolant temperature
- Low oil pressure
- The malfunction indicator lamp (MIL) is commanded ON.
- Engine crank time is greater than 30 seconds.
- Excessive engine speed
- Accelerator pedal position too high
- Remote start timer equals 0.
- Immobilizer system indicates tamper

Keyless Entry Personalization

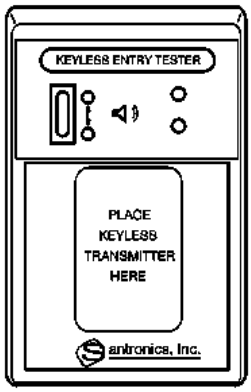
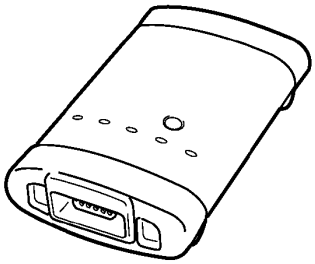
Vehicle lock/unlock functions and remote vehicle start remote vehicle start settings may be personalized. For functional descriptions and personalization instructions, refer to the vehicle owners manual.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description

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	J 43241 Keyless Entry Tester
	EL 47955 J 2534 Multi Diagnostic Interface MDI

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Seat Hardware, Trim, and Upholstery - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Adjuster Vertical Actuator Handle Screw	19 N.m	14 lb ft
Front Seat Belt Buckle Bolt	40 N.m	30 lb ft
Front Seat Mounting Bolt	45 N.m	33 lb ft
Rear Seat Back Cushion Lower Cross Bar Bolts	49 N.m	36 lb ft
Rear Seat Back Cushion Lower Cross Bar Nut	74 N.m	55 lb ft
Rear Seat Back Cushion Stowage Latch Actuator	7.5 N.m	66 lb in
Seat Adjuster Handle Screw	2 N.m	18 lb in
Seat Back Cushion Frame Bolts	35 N.m	26 lb ft
Seat Back Cushion Latch Cable Screws	3 N.m	26 lb in
Seat Back Cushion Latch Cable Strap Screws	10 N.m	88 lb in
Seat Back Cushion Latch Release Handle Screws	3 N.m	26 lb in
Seat Cushion Frame Bolts	35 N.m	26 lb ft
Seat Cushion Frame Rear Bracket Screw	4 N.m	35 lb in
Seat Inner Recliner Finish Cover Rear Screw	4 N.m	35 lb in
Seat Inner Recliner Finish Cover Side Screw	5 N.m	44 lb in
Seat Outer Adjuster Finish Cover Front Screw	4 N.m	35 lb in
Seat Outer Adjuster Finish Cover Rear Screw	4N.m	35 lb in

REPAIR INSTRUCTIONS

DRIVER OR PASSENGER SEAT REPLACEMENT

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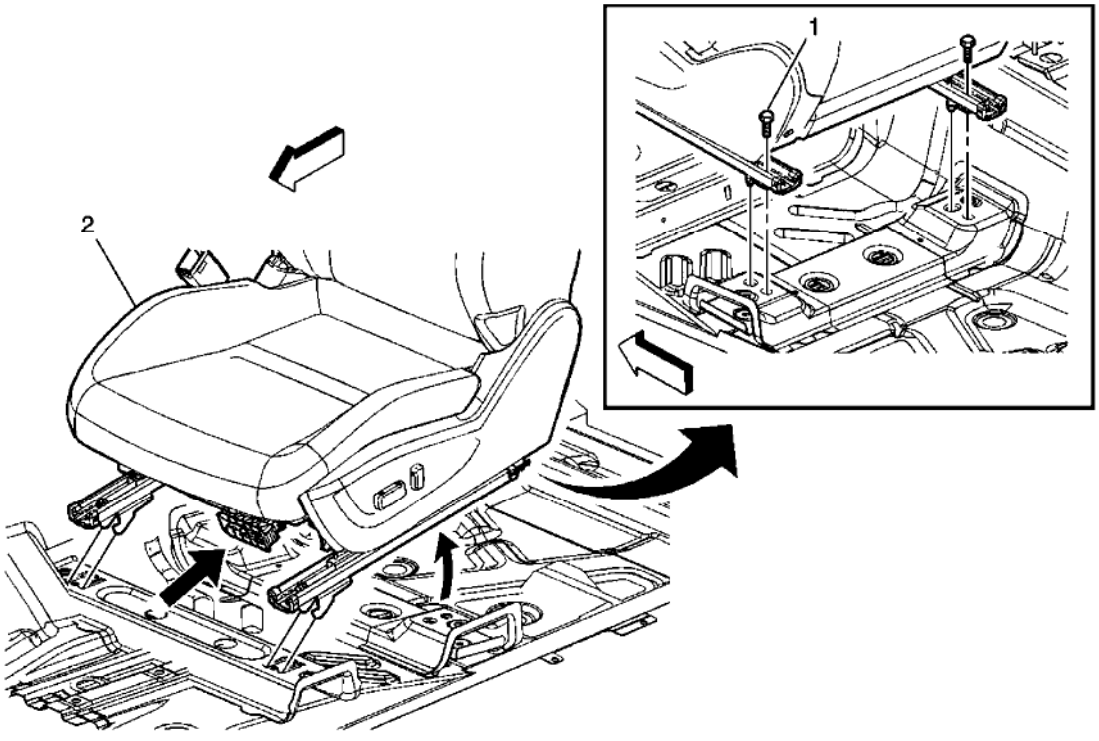


Fig. 1: Driver Or Passenger Seat
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	WARNING: **Refer to SIR Warning .** **WARNING:** **To avoid personal injuries, re-zero the passenger presence system whenever you remove or replace the seat cushion or trim. Failure to do so may cause the system to malfunction.** **Preliminary Procedures** 1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** for replacement and setup information.
1	Front Seat Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 45 N.m (33 lb ft)

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	Procedure: Adjust the seat to the full forward position to gain access to the rear bolts.
2	Front Seat Assembly **Procedure** 1. Disconnect the front seat and pretensioner electrical connector, and passenger presence system connector, if equipped. 2. With the aid of an assistant remove the front seat, by tilting the seat forward, and then lifting and pulling the seat rearwards to disengage the front hooks.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FRONT FINISH COVER REPLACEMENT

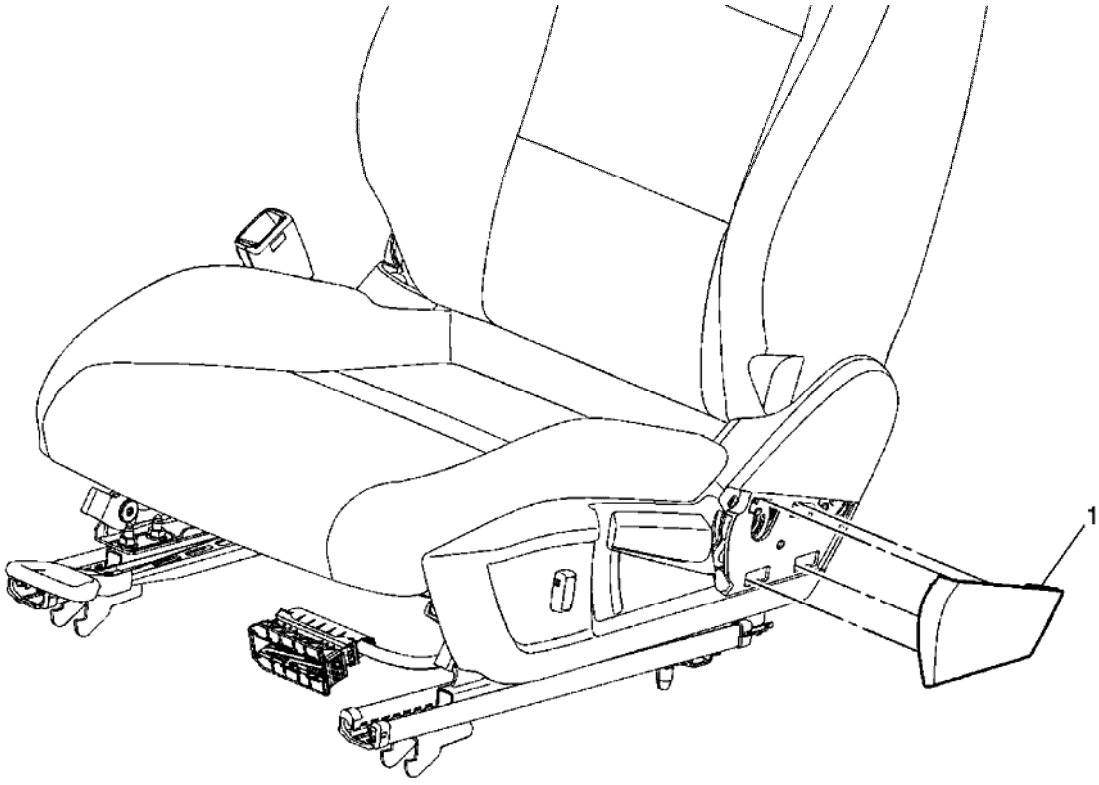


Fig. 2: Driver Or Passenger Seat Outer Adjuster Front Finish Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Outer Adjuster Finish Cover **Tip:** Use a flat-bladed tool to release the adjuster finish cover from the seat verticle actuator handle.

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DRIVER OR PASSENGER SEAT ADJUSTER VERTICAL ACTUATOR HANDLE REPLACEMENT

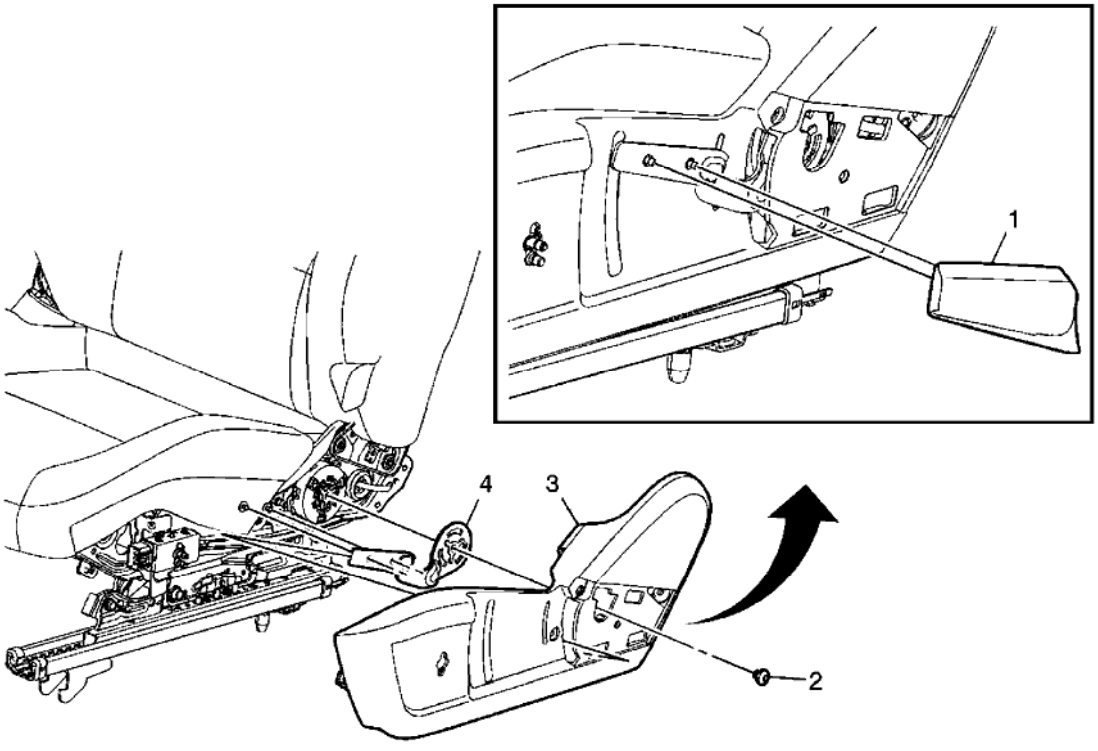


Fig. 3: Driver Or Passenger Seat Adjuster Vertical Actuator Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the driver or passenger seat outer adjuster front finish cover. Refer to Driver or Passenger Seat Outer Adjuster Front Finish Cover Replacement.**	
1	Driver Seat Adjuster Verticle Actuator Handle Cover **Procedure:** Use a flat-bladed tool to release the handle cover from the verticle actuator handle.
2	Driver Seat Adjuster Verticle Actuator Handle Screw **CAUTION:** **Refer to Component Fastener Tightening Caution** **Tighten:** 19 N.m (14 lb ft)
3	Driver or Passenger Seat Outer Adjuster Finish Cover **Procedure:** Remove the driver or passenger seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement**
4	Driver Seat Adjuster Vertical Actuator Handle

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	(with Manual Height Adjuster)
4	Driver Seat Adjuster Verticle Actuator Handle **Procedure:** Note the location and routing of the handle prior to removal in order to ensure proper reinstallation.

DRIVER OR PASSENGER SEAT ADJUSTER HANDLE REPLACEMENT

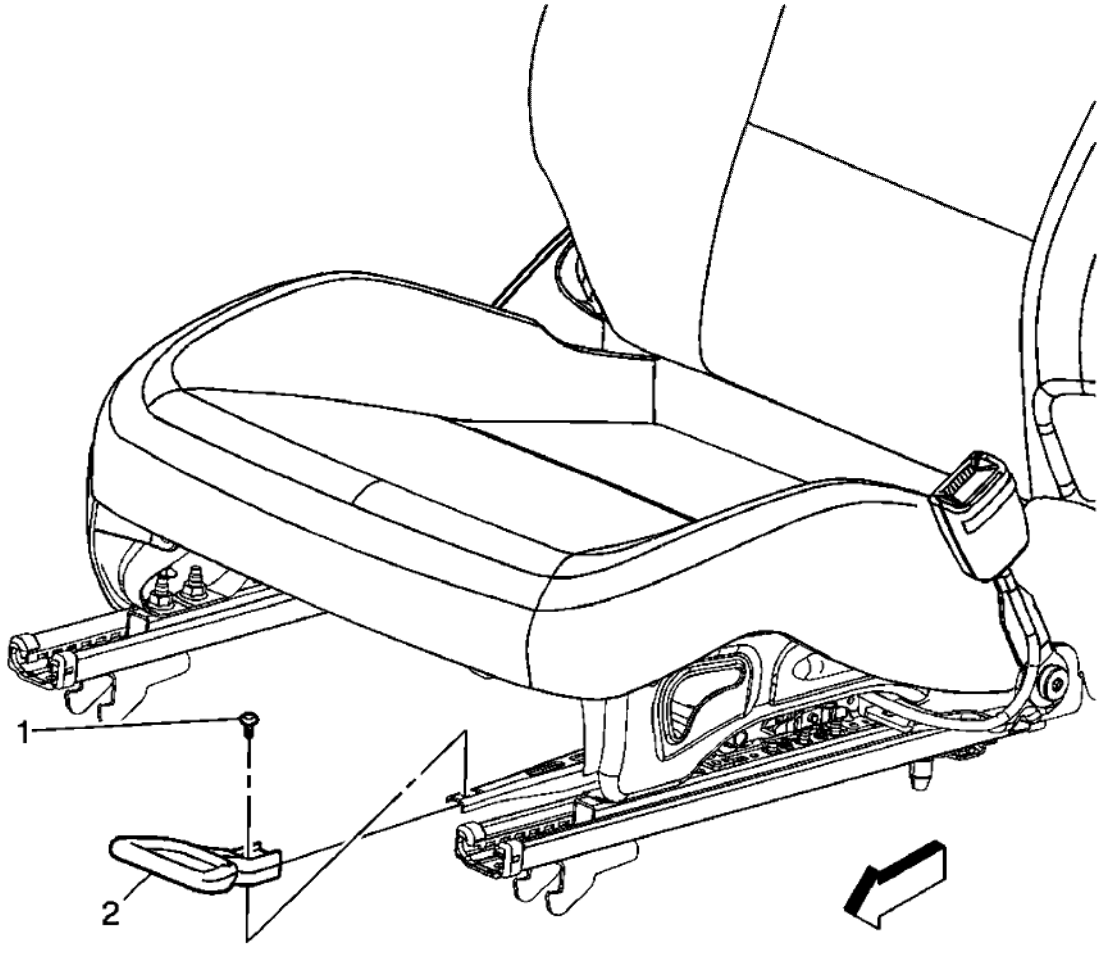


Fig. 4: Driver Or Passenger Seat Adjuster Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Seat Adjuster Handle Retainer **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)

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2	Seat Adjuster Handle

DRIVER OR PASSENGER SEAT ADJUSTER HANDLE KNOB REPLACEMENT

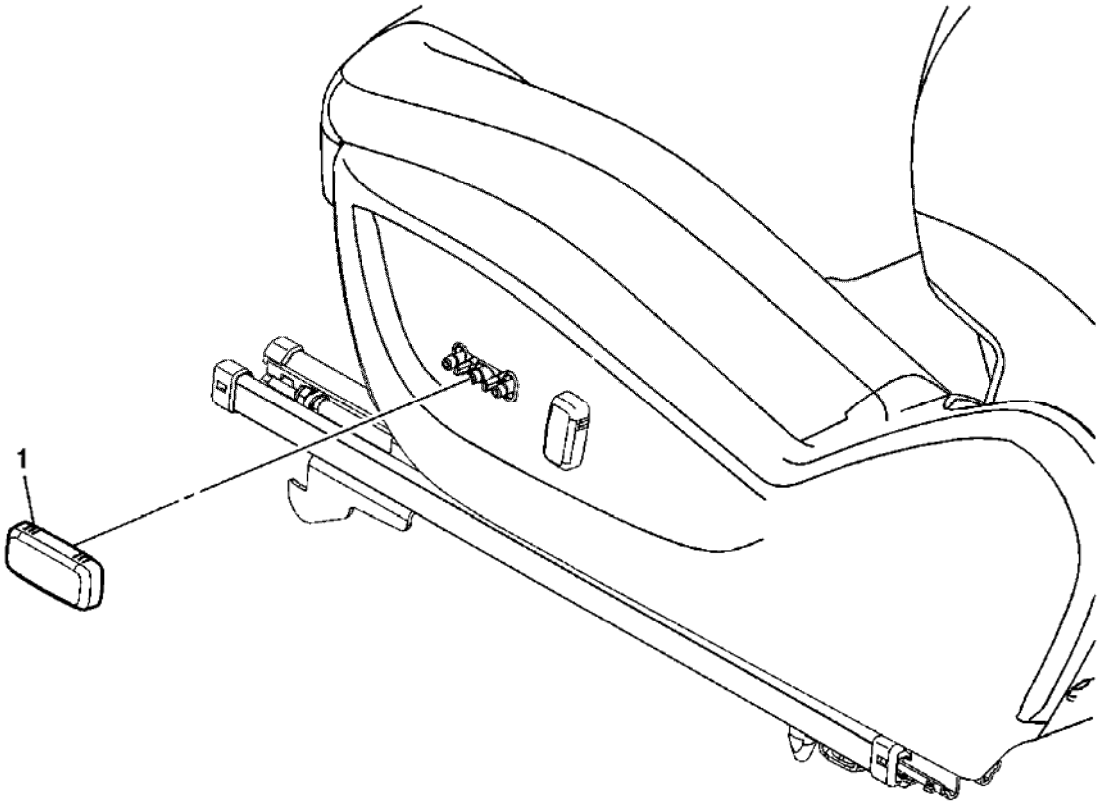


Fig. 5: Driver Or Passenger Seat Adjuster Handle Knob
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Adjuster Handle Knob **Tip:** Use a flat-bladed tool to release adjuster handle knob from the finish cover.

DRIVER SEAT RECLINER LEVER KNOB REPLACEMENT

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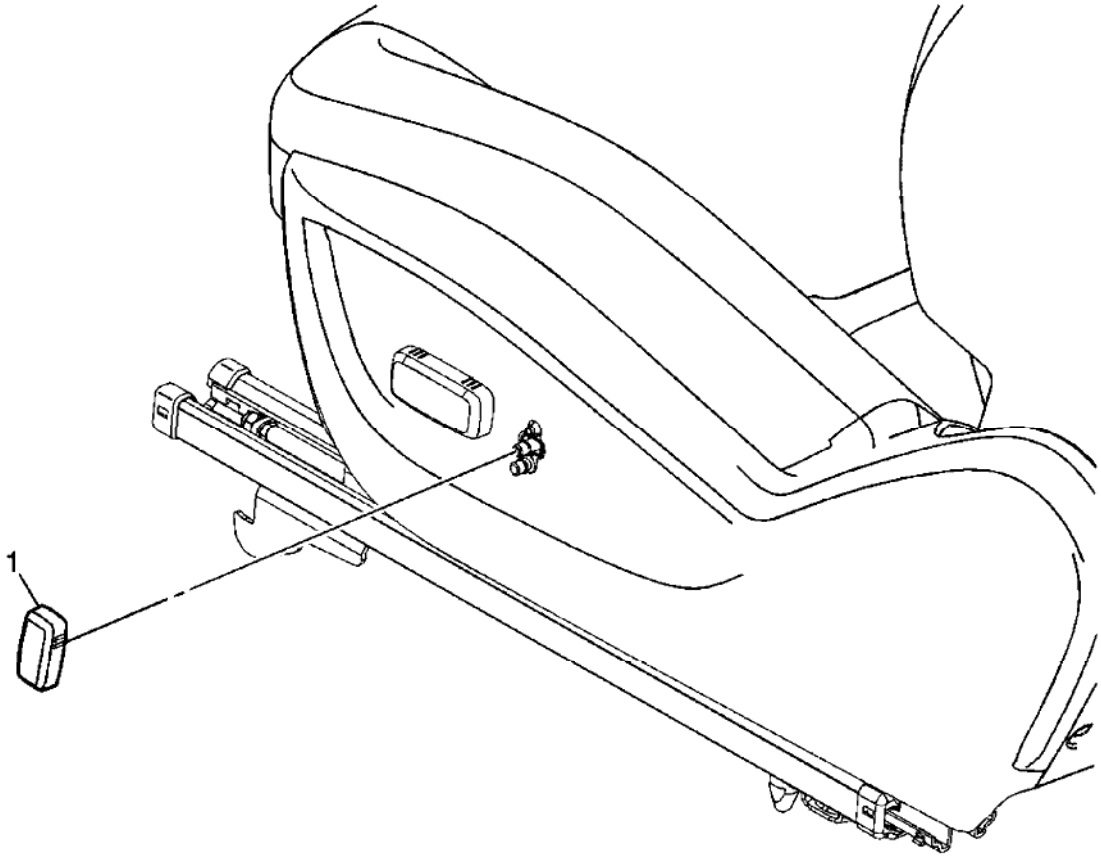


Fig. 6: Driver Seat Recliner Lever Knob
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver Seat Recliner Lever Knob **Tip:** Use a flat-bladed tool to release the recliner lever knob from the finish cover.

DRIVER OR PASSENGER SEAT HEAD RESTRAINT REPLACEMENT

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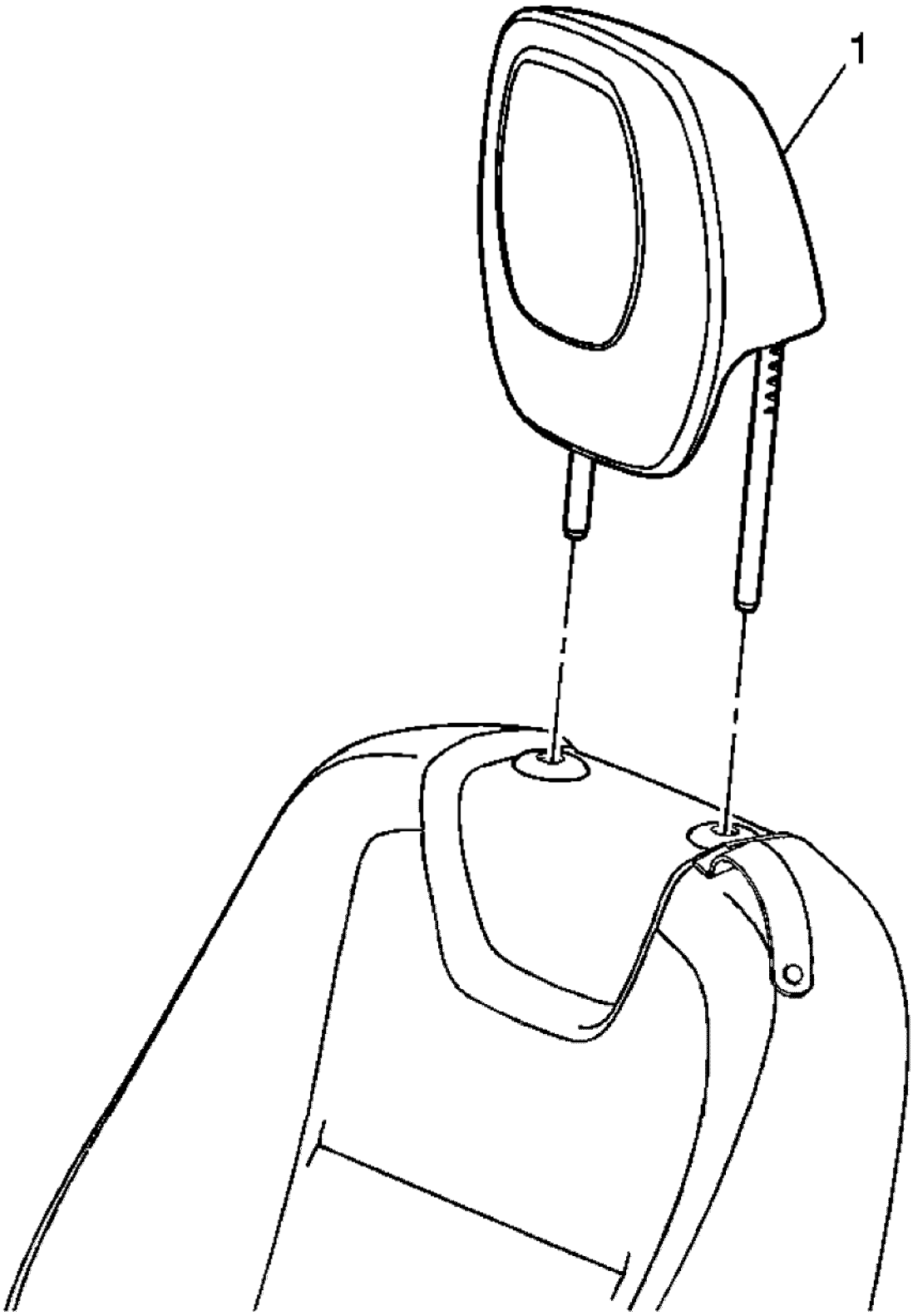


Fig. 7: Driver Or Passenger Seat Head Restraint

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Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Head Restraint **Procedure** 1. Lower the seat back rearward to gain space between the head restraint and the roof. 2. Raise the headrest to the full upward position. 3. Depress the large button on the head restraint guide and raise the head restraint to the full up position. 4. Depress the smaller button on the opposite head restraint guide and pull upward to remove from the seat.

FRONT SEAT HEAD RESTRAINT GUIDE REPLACEMENT

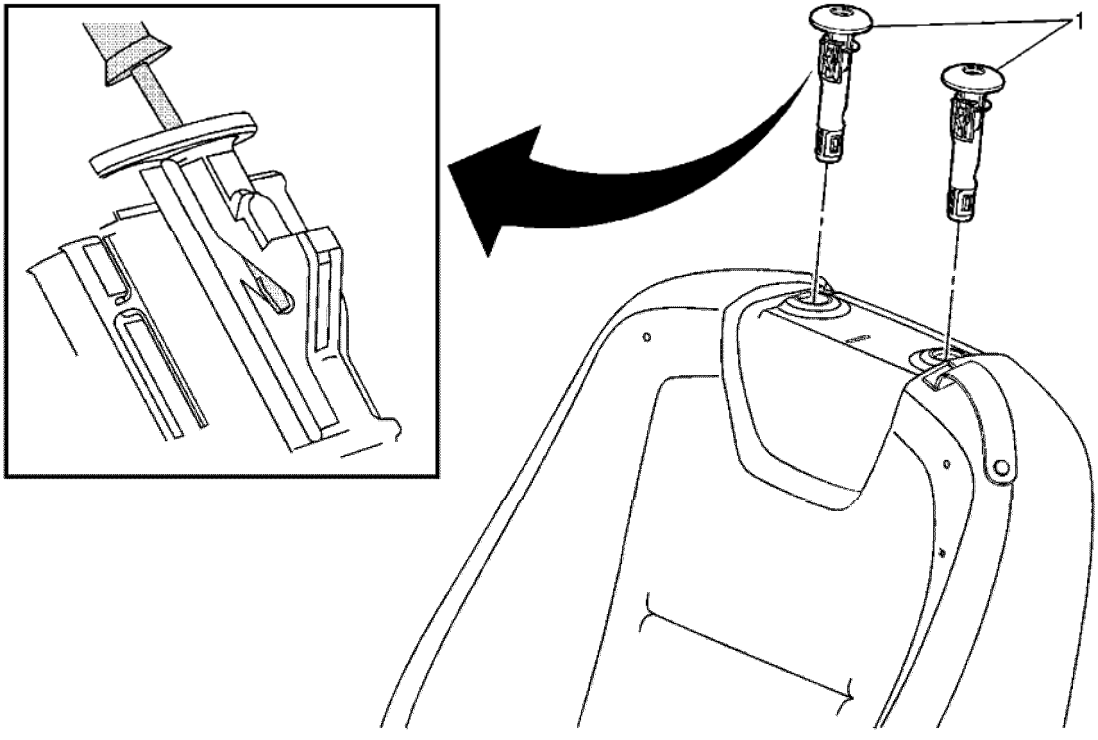


Fig. 8: Front Seat Head Restraint Guide
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the seat head restraint. Refer to Driver or Passenger Seat Head Restraint Replacement.**	
1	Front Seat Head Restraint Guide (Qty: 2)

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1	**Procedure:** Using a suitable flat-bladed tool, slide the tool on the inside of the guide until it finds the slot. Then push the tool forward pulling the guide tab inward, while pulling upward to remove the guide from the seat back frame.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FINISH COVER REPLACEMENT (WITH POWER HEIGHT ADJUSTER)

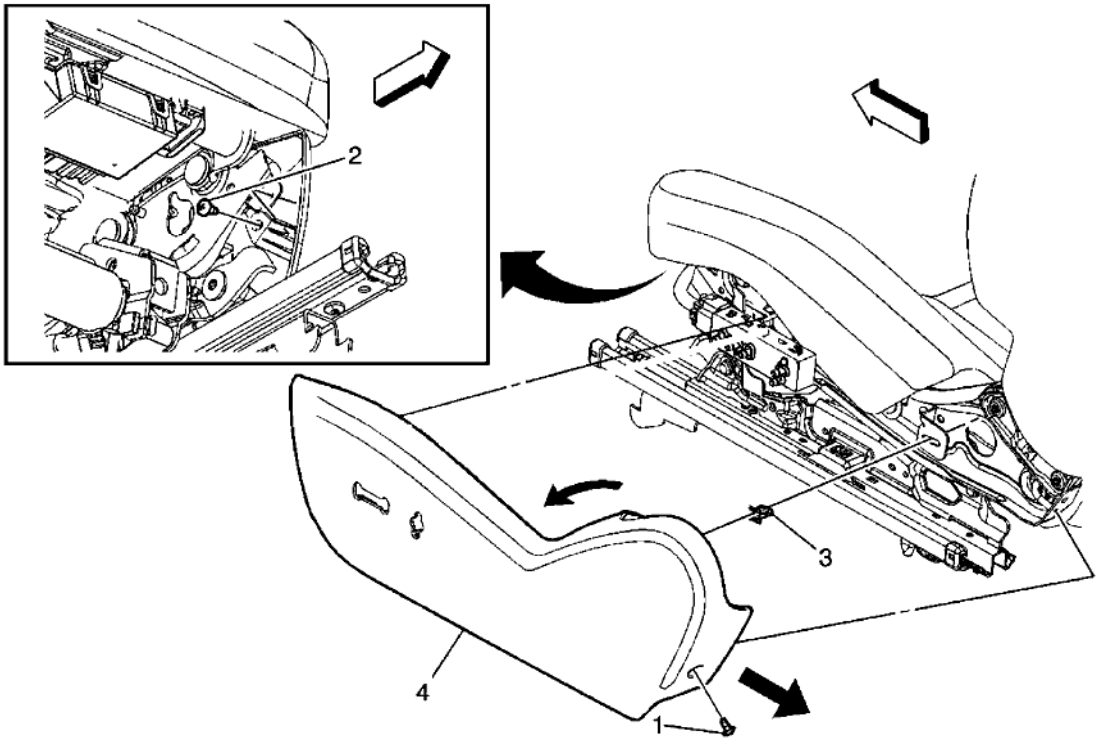


Fig. 9: Driver Or Passenger Seat Outer Adjuster Finish Cover (With Power Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front seat adjuster handle knob. Refer to **Driver or Passenger Seat Adjuster Handle Knob Replacement**. 2. Remove the front seat recliner lever knob. Refer to **Driver Seat Recliner Lever Knob Replacement**.	
1	Driver or Passenger Seat Outer Adjuster Finish Cover Rear Screw
2	Driver or Passenger Seat Outer Adjuster Finish Cover Front Screw
3	Driver or Passenger Seat Outer Adjuster Finish Cover Retainer
	Driver or Passenger Seat Outer Adjuster Finish Cover

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4	**Procedure** 1. Disconnect the electrical connectors. 2. Firmly grasp the upper area of the finish cover that folds over the seat cushion frame, this area needs to be flexed outward while sliding the finish cover rearward. 3. If replacing the cover, transfer components as necessary.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FINISH COVER REPLACEMENT (WITH MANUAL HEIGHT ADJUSTER)

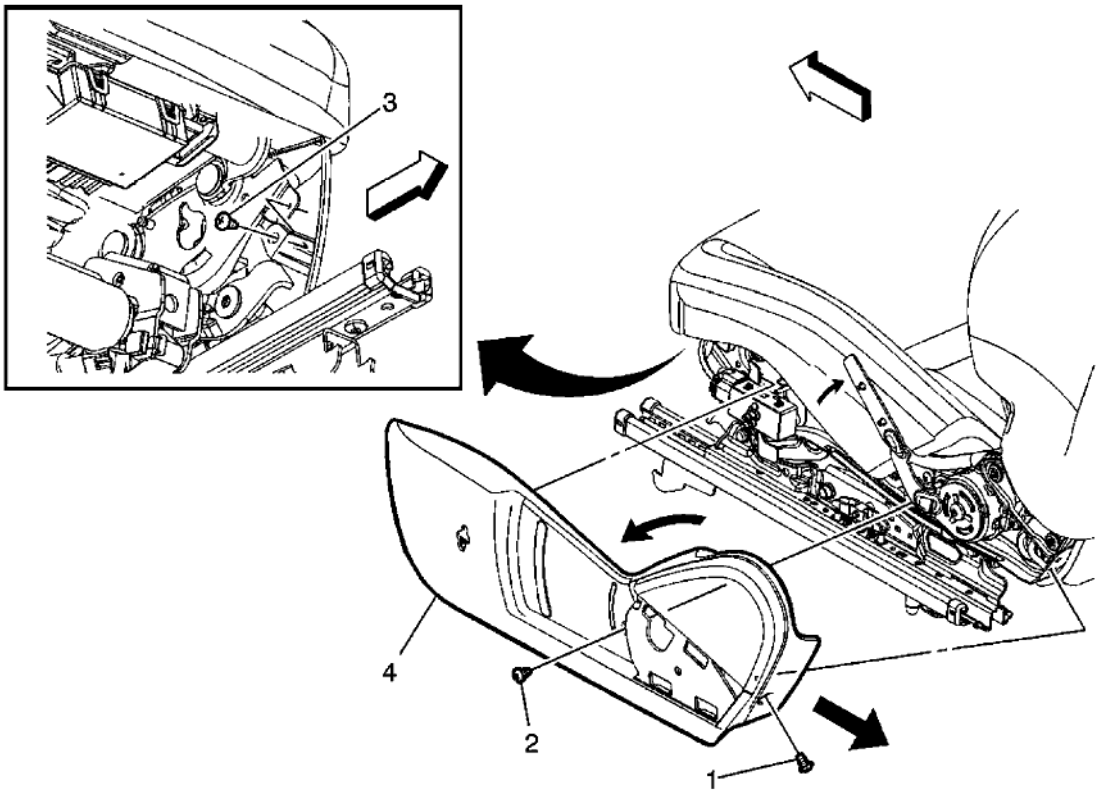


Fig. 10: Driver Or Passenger Seat Outer Adjuster Finish Cover (With Manual Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front seat recliner lever knob, if necessary. Refer to **Driver Seat Recliner Lever Knob Replacement** 2. Remove the front seat adjuster vertical actuator handle cover. Refer to **Driver or Passenger Seat Adjuster Vertical Actuator Handle Replacement**	
1	Driver or Passenger Seat Outer Adjuster Finish Cover Rear Screw

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2	Driver or Passenger Seat Outer Adjuster Finish Cover Side Screw **Tip:** Lift up on the seat back recliner adjuster handle to gain access to finish cover side screw.
3	Driver or Passenger Seat Outer Adjuster Finish Cover Front Screw
4	Driver or Passenger Seat Outer Adjuster Finish Cover **Procedure** 1. Disconnect the electrical connectors. 2. Firmly grasp the upper area of the finish cover that folds over the seat cushion frame, this area needs to be flexed outward while sliding the finish cover rearward. 3. If replacing the cover, transfer components as necessary.

DRIVER OR PASSENGER SEAT INNER RECLINER FINISH COVER REPLACEMENT

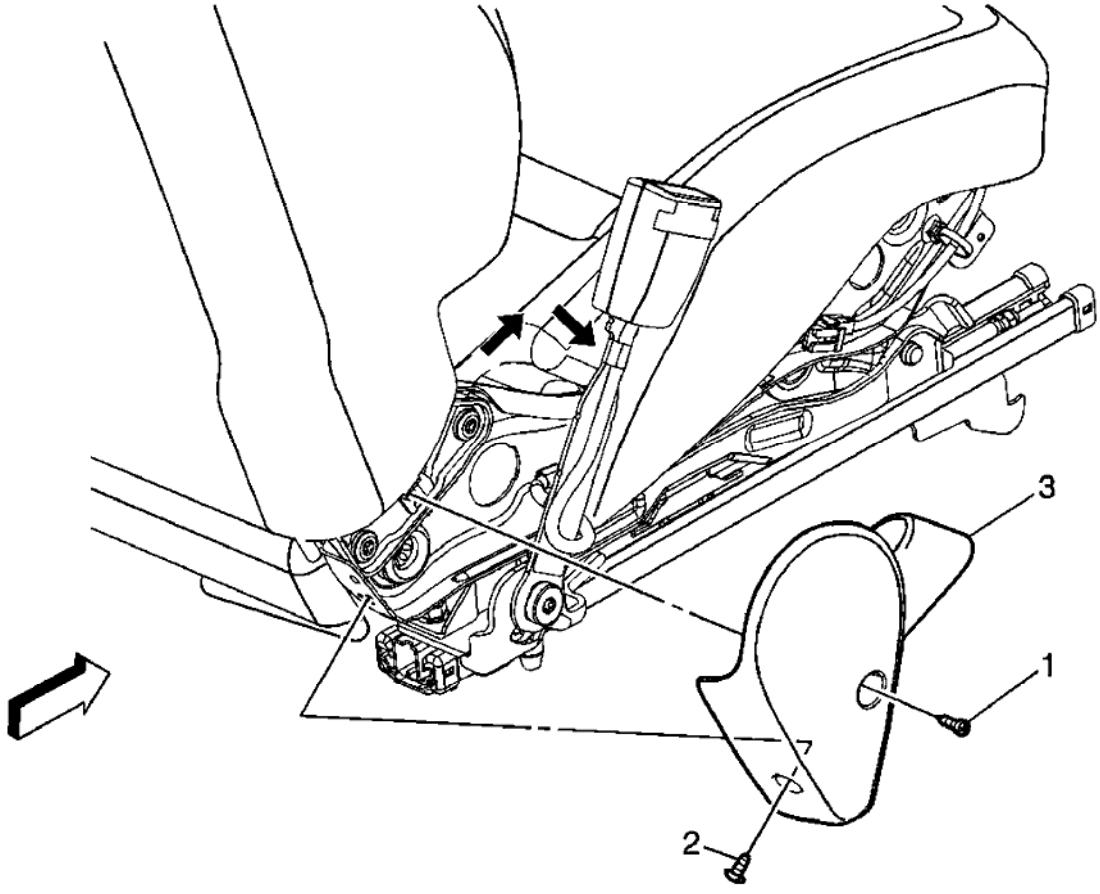


Fig. 11: Driver Or Passenger Seat Inner Recliner Finish Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

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1	Driver or Passenger Seat Inner Recliner Finish Cover Side Screw
2	Driver or Passenger Seat Inner Recliner Finish Cover Rear Screw
3	Driver or Passenger Seat Inner Recliner Finish Cover **Procedure:** Firmly grasp the top of the finish cover, pull upward and then outboard to disengage the finish cover from the seat cushion frame.

DRIVER OR PASSENGER SEAT CUSHION FRAME REPLACEMENT

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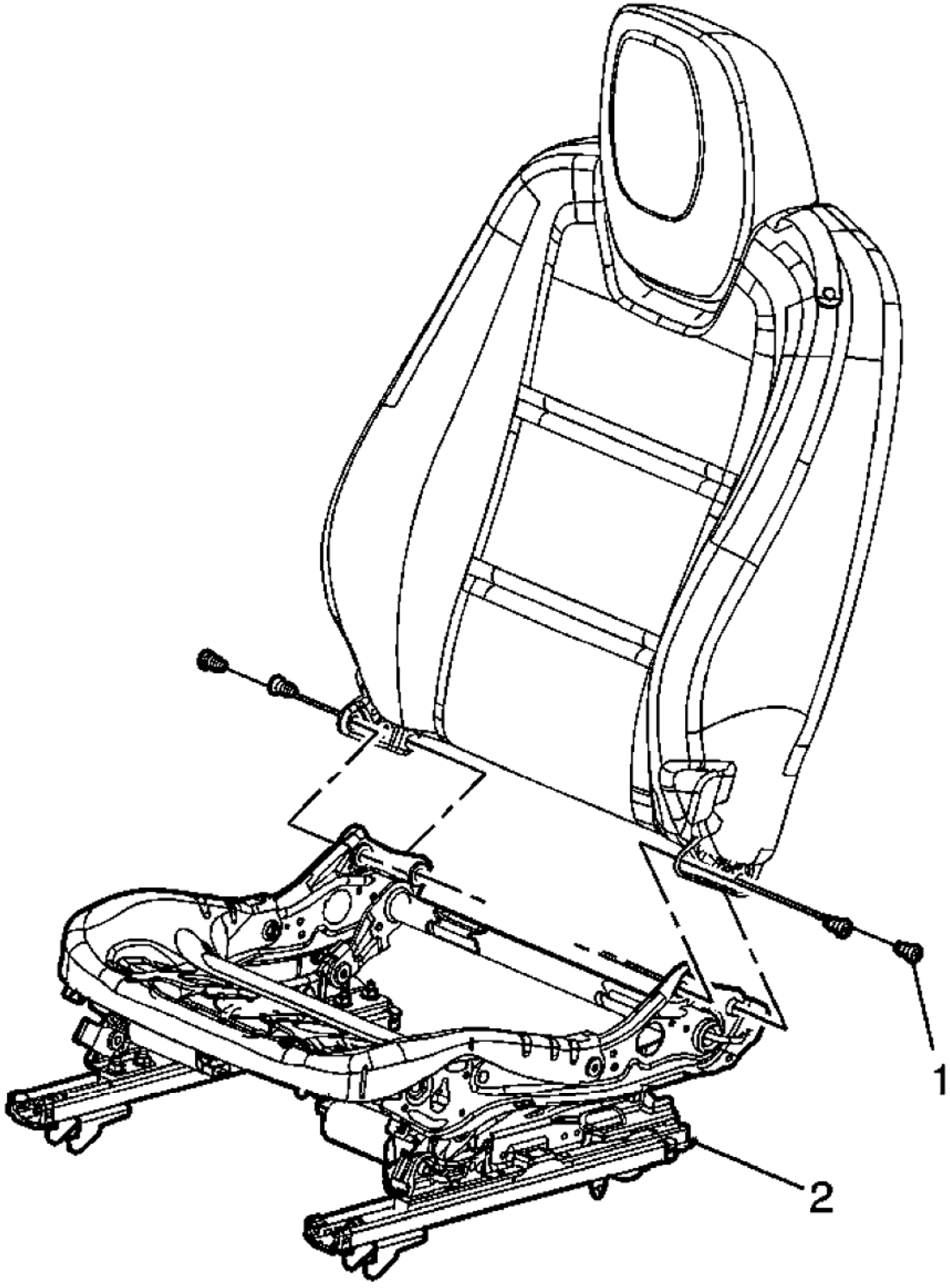


Fig. 12: Driver Or Passenger Seat Cushion Frame
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
	WARNING: **Refer to SIR Warning .** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**. 3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**. 4. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**. 5. When working with the passenger seat re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** .
1	Front Seat Back Cushion Frame Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 35 N.m (26 lb ft)
2	Front Seat Cushion Frame **Procedure** 1. Disconnect electrical connectors as needed. 2. When replacing the front passenger seat cushion, you must also replace the inflatable restraint front passenger mass sensor. Refer to **Inflatable Restraint Front Passenger Mass Sensor Replacement** . 3. If replacing with a new front seat cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION PAD SUPPORT SPRING REPLACEMENT

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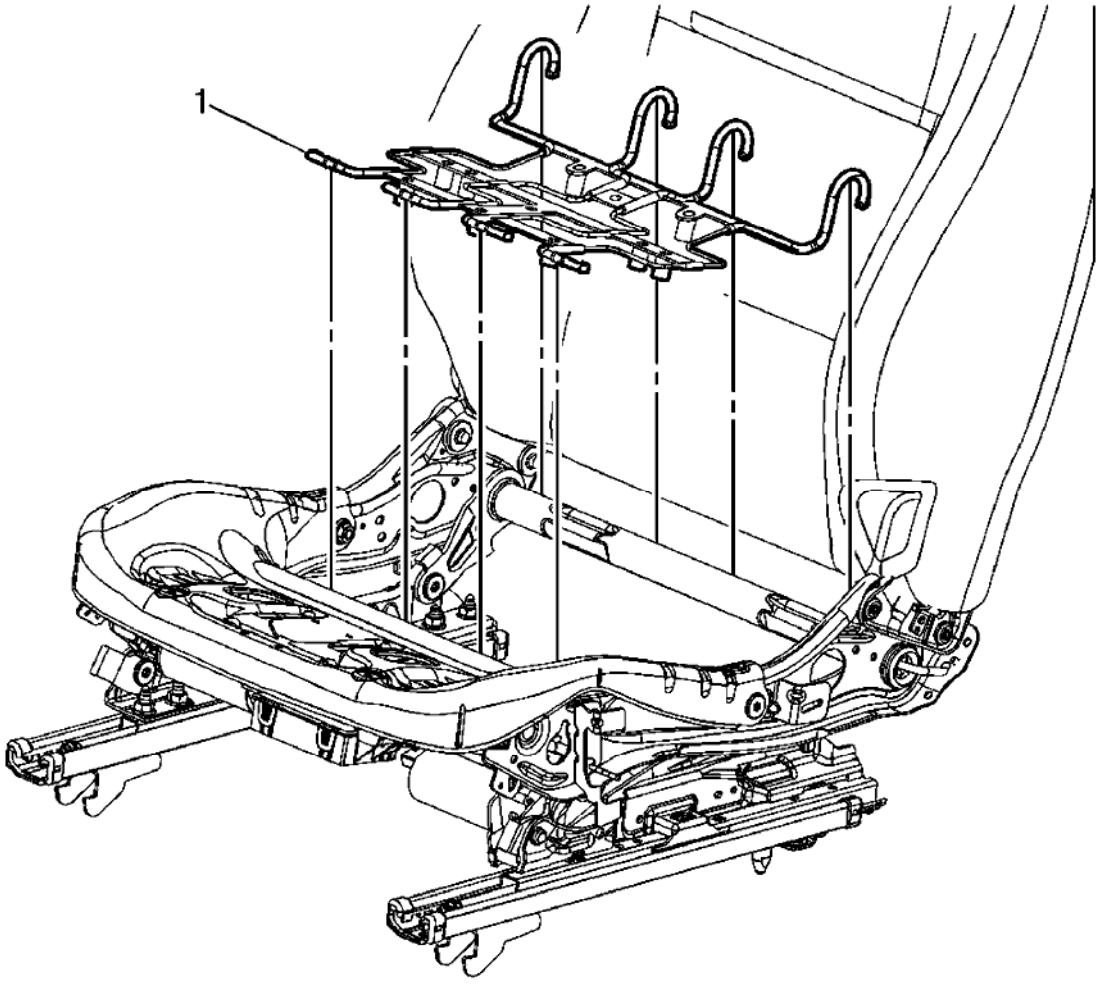


Fig. 13: Driver Or Passenger Seat Cushion Pad Support Spring
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**.	
1	Front Seat Cushion Pad Support Spring

DRIVER OR PASSENGER SEAT CUSHION FRAME FRONT BRACKET REPLACEMENT

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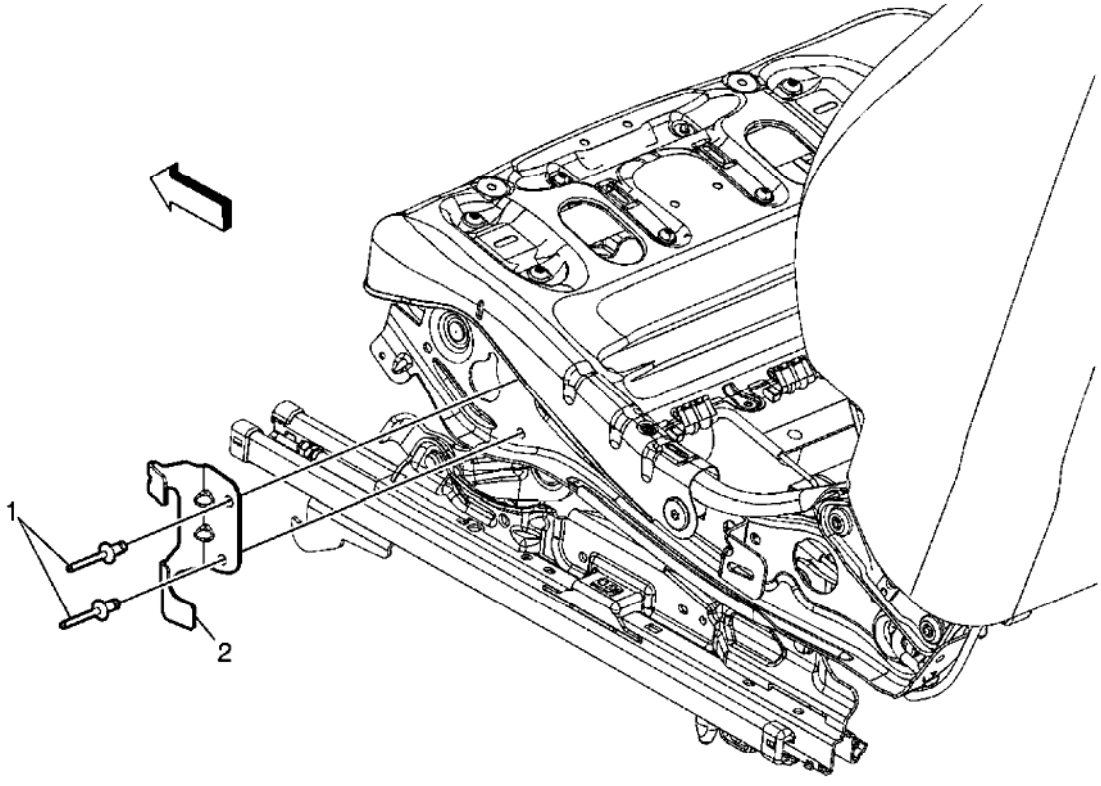


Fig. 14: Driver Or Passenger Seat Cushion Frame Front Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Front Bracket Rivet (Qty: 2) **WARNING:** **Use the proper eye protection when drilling to prevent metal chips from causing physical injury.** **Procedure:** Drill out both guide rivets before removing.
2	Driver or Passenger Seat Cushion Frame Front Bracket **Procedure** 1. When re-installing the bracket re-riveted at the bottom of the lower cushion frame with new rivets.

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	2. If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION FRAME REAR BRACKET REPLACEMENT (6 WAY)

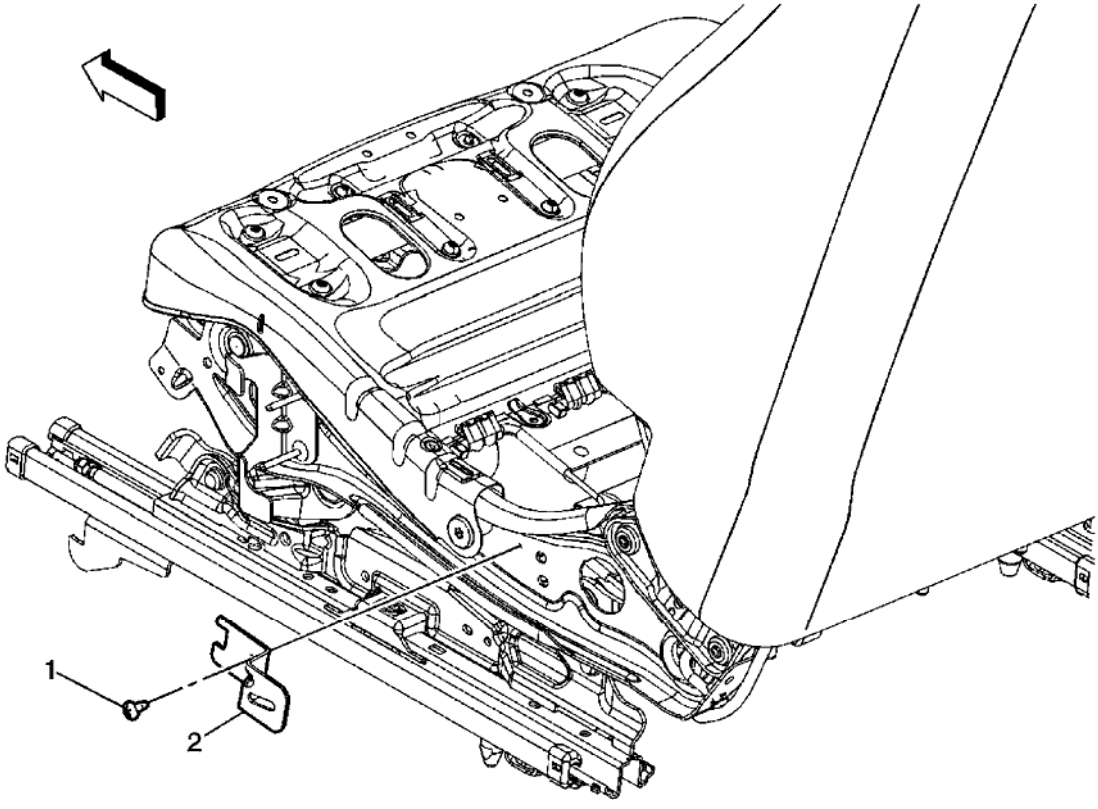


Fig. 15: Driver Or Passenger Seat Cushion Frame Rear Bracket (6 Way)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Rear Bracket Screw **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 4 N.m (35 lb in)
2	Driver or Passenger Seat Cushion Frame Rear Bracket **Procedure:**

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	If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION FRAME REAR BRACKET REPLACEMENT (4 WAY)

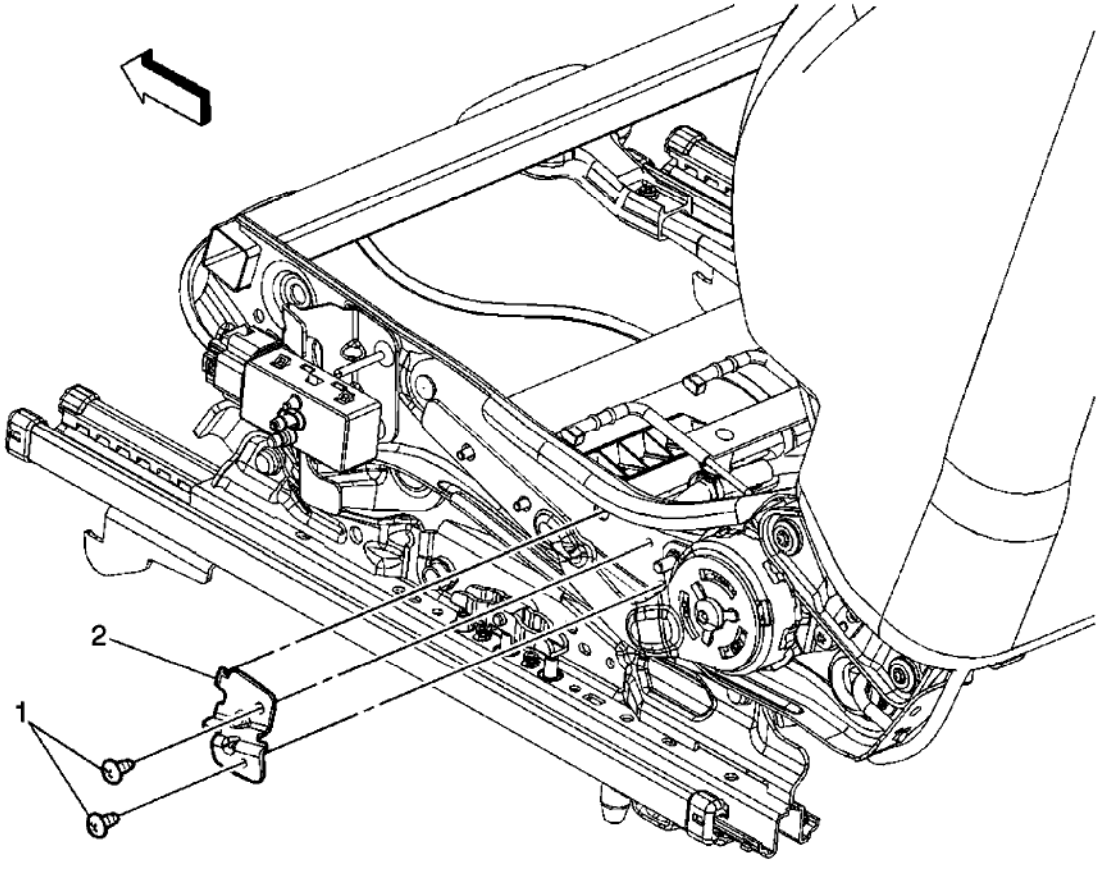


Fig. 16: Driver Or Passenger Seat Cushion Frame Rear Bracket (4 Way)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Rear Bracket Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 4 N.m (35 lb in)
2	Driver or Passenger Seat Cushion Frame Rear Bracket **Procedure:**

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	If replacing with a new front seat back cushion frame, transfer components as necessary.

FRONT SEAT CUSHION COVER AND PAD REPLACEMENT

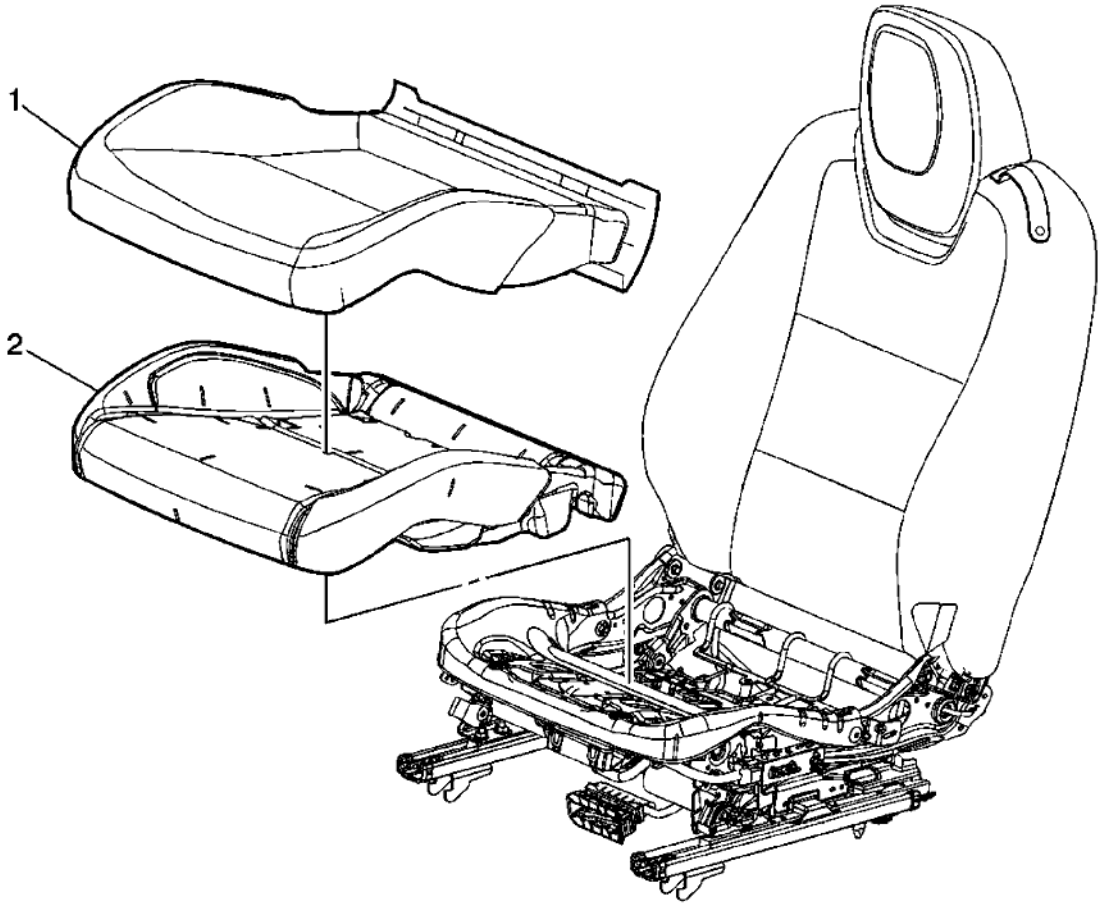


Fig. 17: Front Seat Cushion Cover & Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:
Refer to SIR Warning .

WARNING:
To avoid personal injuries, re-zero the passenger presence system whenever you remove or replace the seat cushion or trim. Failure to do so may cause the system to malfunction.

Preliminary Procedure

1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**.

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2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.
3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**.
4. When working with the passenger seat re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** .

1	Front Seat Cushion Cover **Procedure** 1. Remove the rear hog rings on the seat cushion cover from the seat frame. 2. Disengage the J-channel retainer from the seat frame. 3. Disconnect the electrical connector, if equipped with heated seats. 4. Remove the seat cushion cover and pad from the seat cushion frame as an assembly.
2	Front Seat Cushion Pad **Procedure** 1. Remove the hog rings from the under side of the seat cushion. 2. Pull the cushion cover off of the pad. 3. When replacing the front passenger seat cushion, you must also replace the inflatable restraint front passenger mass sensor. Refer to **Inflatable Restraint Front Passenger Mass Sensor Replacement** .

DRIVER OR PASSENGER SEAT BACK CUSHION COVER AND PAD REPLACEMENT

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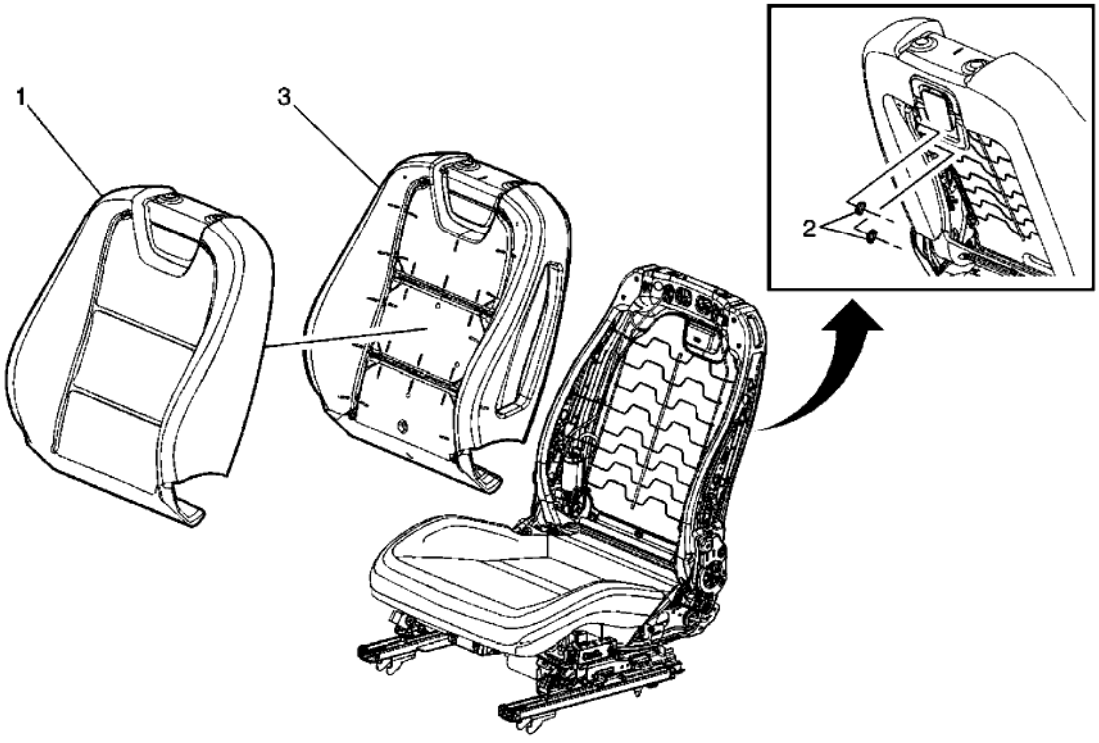


Fig. 18: Driver Or Passenger Seat Back Cushion Cover & Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:
Refer to SIR Warning .

WARNING:
Do not repair or replace the seat stitching or seams in the seat back trim cover with an internal mounted seat side airbag module. Replace the complete seat back trim cover from the OEM. Non-OEM seat stitching may cause improper airbag deployment which could result in personal injury.

Preliminary Procedure

1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**.
2. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**.
3. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.
4. Remove the front seat head restraint guides. Refer to **Front Seat Head Restraint Guide Replacement**.
5. Remove the driver or passenger seat recliner handle bezel, if equipped. Refer to **Driver or**

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	Passenger Seat Recliner Handle Bezel Bracket Replacement.
1	Driver or Passenger Seat Back Cushion Cover **Procedure** 1. Disengage the j-channel retainers from the seat back cushion frame. 2. Disengage both seat cover side j-channel straps from under the seat bottom frame and note the location and routing for installation. 3. Disengage both cushion cover zippers, then flip the cover up to expose the seat back pad and frame. 4. Remove the connector position assurance (CPA) from the SIR module electrical connector. 5. Remove the Inflatable restraint front seat side module nuts (2) from the seat back frame. 6. Disconnect the SIR electrical connector. 7. Note the routing of the inflatable restraint electrical cable for installation. 8. Disconnect the electrical connectors that attach to the seat back cushion, if equipped with seat back cushion heater. 9. Remove the seat back cushion cover, airbag module and pad from the seat cushion frame as an assembly.
2	Inflatable Restraint Front Seat Side Module Nut (Qty: 2) **CAUTION:** **Refer to Fastener Caution** **Tighten:** 3.5 N.m (31 lb in)
3	Driver or Passenger Seat Back Cushion Pad **Procedure** 1. Remove the SIR module from the seat back cushion cover chute. Refer to **Driver or Passenger Seat Side Inflatable Restraint Module Replacement** 2. Remove the hog rings from the seat back pad. 3. Pull the cushion cover off of the pad.

DRIVER OR PASSENGER SEAT BACK CUSHION FRAME REPLACEMENT

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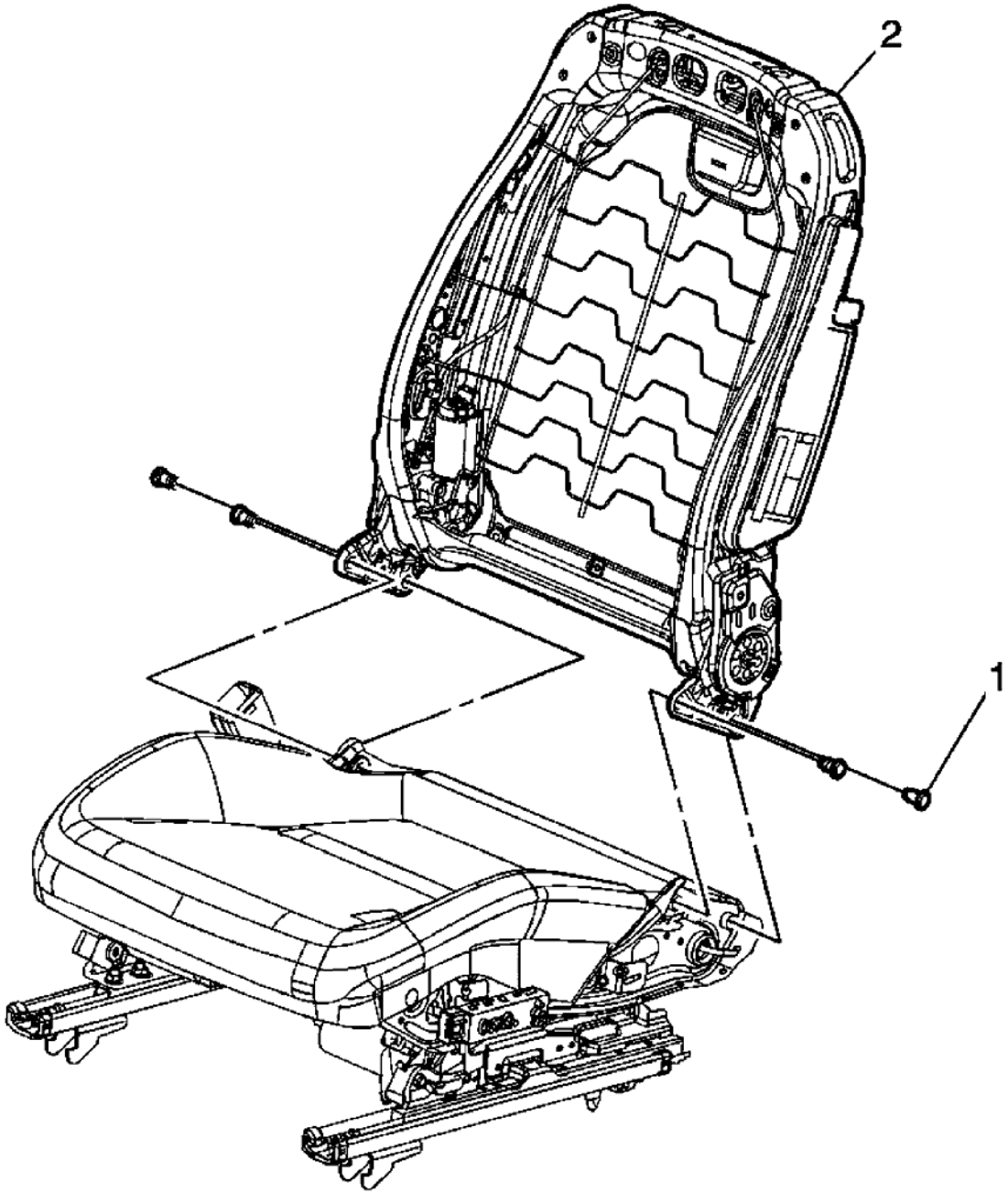


Fig. 19: Driver Or Passenger Seat Back Cushion Frame
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer**	

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	Adjuster Finish Cover Replacement (with Power Height Adjuster) or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**. 3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**. 4. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**. 5. Remove the inflatable restraint side impact module. Refer to **Driver or Passenger Seat Side Inflatable Restraint Module Replacement** .
1	Driver or Passenger Seat Back Cushion Frame Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 35 N.m (26 lb ft)
2	Driver or Passenger Seat Back Cushion Frame **Procedure** 1. Disconnect electrical connectors as needed. 2. If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT RECLINER HANDLE BEZEL BRACKET REPLACEMENT

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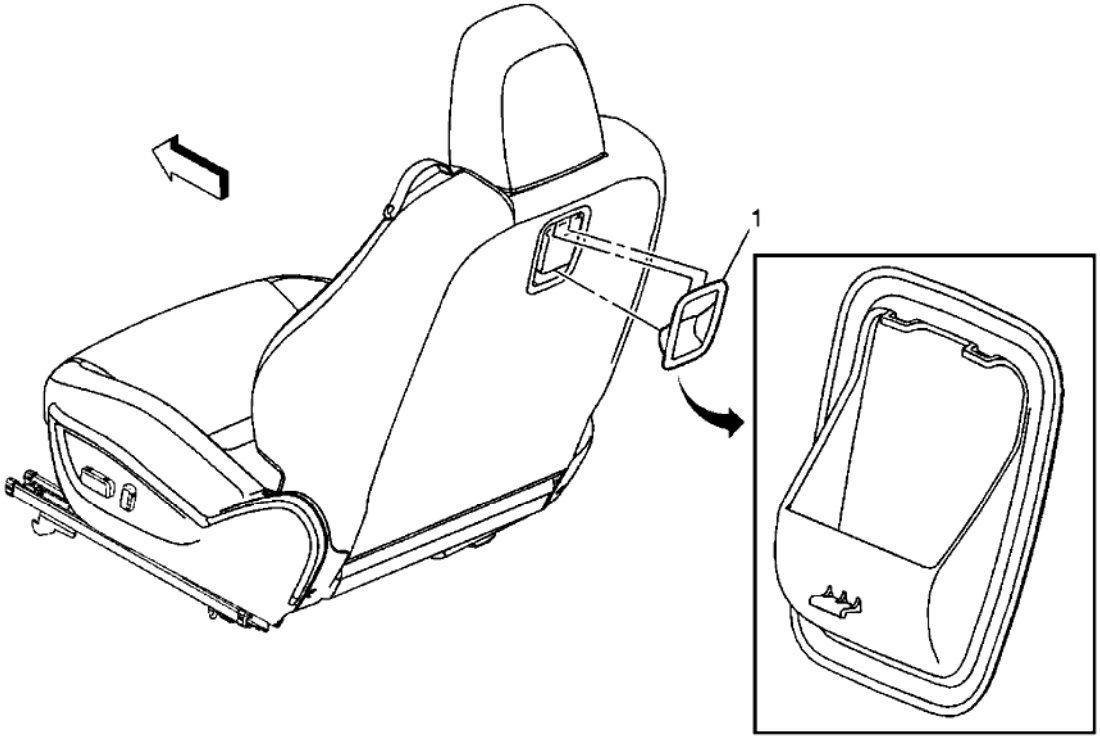


Fig. 20: Driver Or Passenger Seat Recliner Handle Bezel Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Recliner Handle Bezel Bracket **Tip:** Use a flat-bladed tool to release the handle bezel bracket lower tab.

DRIVER OR PASSENGER SEAT BACK CUSHION LATCH RELEASE HANDLE REPLACEMENT

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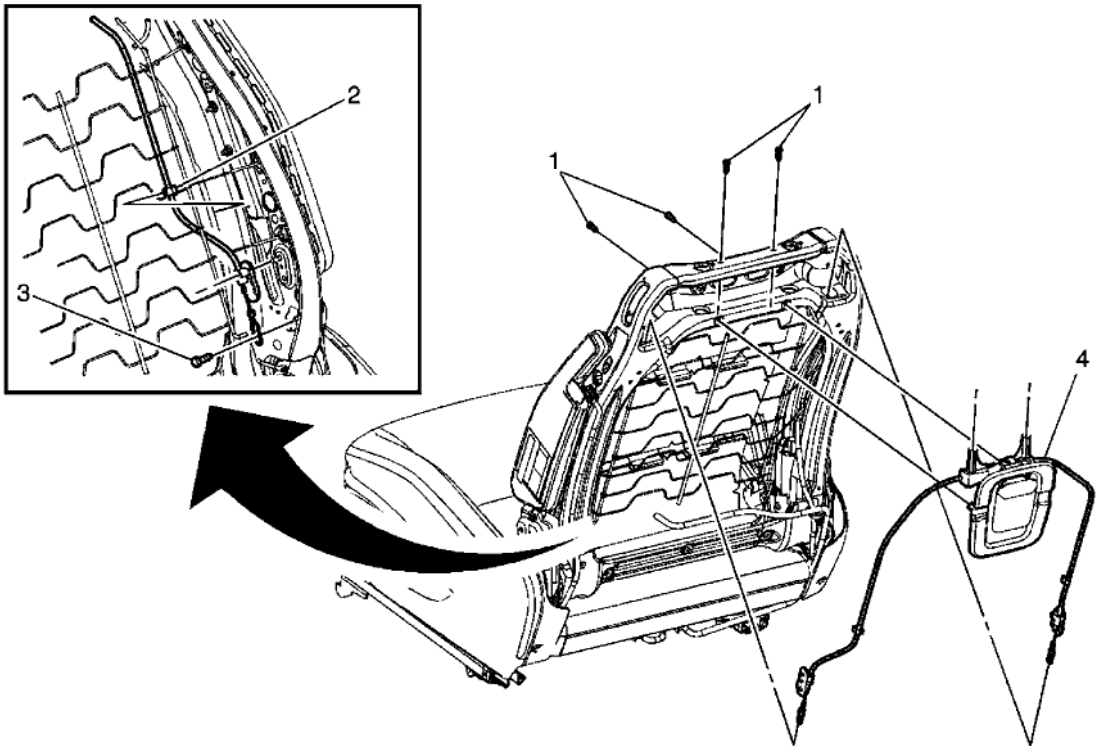


Fig. 21: Driver Or Passenger Seat Back Cushion Latch Release Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .** **Preliminary Procedures** 1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove the driver or passenger seat back cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement**.	
1	Driver or Passenger Seat Back Cushion Latch Release Handle Screw (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 3 N.m (26 lb in)
2	Driver or Passenger Seat Back Cushion Latch Release Handle Clip (Qty: 2) **Procedure:** Disengage both the cable and clips from the seat back cushion frame.
3	Driver or Passenger Seat Back Cushion Latch Release Handle Screw (Qty: 2) **Procedure:**

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	Remove fasteners holding the cables to the seat back cushion frame.
4	Driver or Passenger Seat Back Cushion Latch Release Handle Assembly **Procedure** 1. Note the location and routing of the cable prior to removal in order to ensure proper reinstallation. 2. Disconnect both ends of the cable and remove from the seat assembly.

DRIVER OR PASSENGER SEAT LUMBAR SUPPORT REPLACEMENT

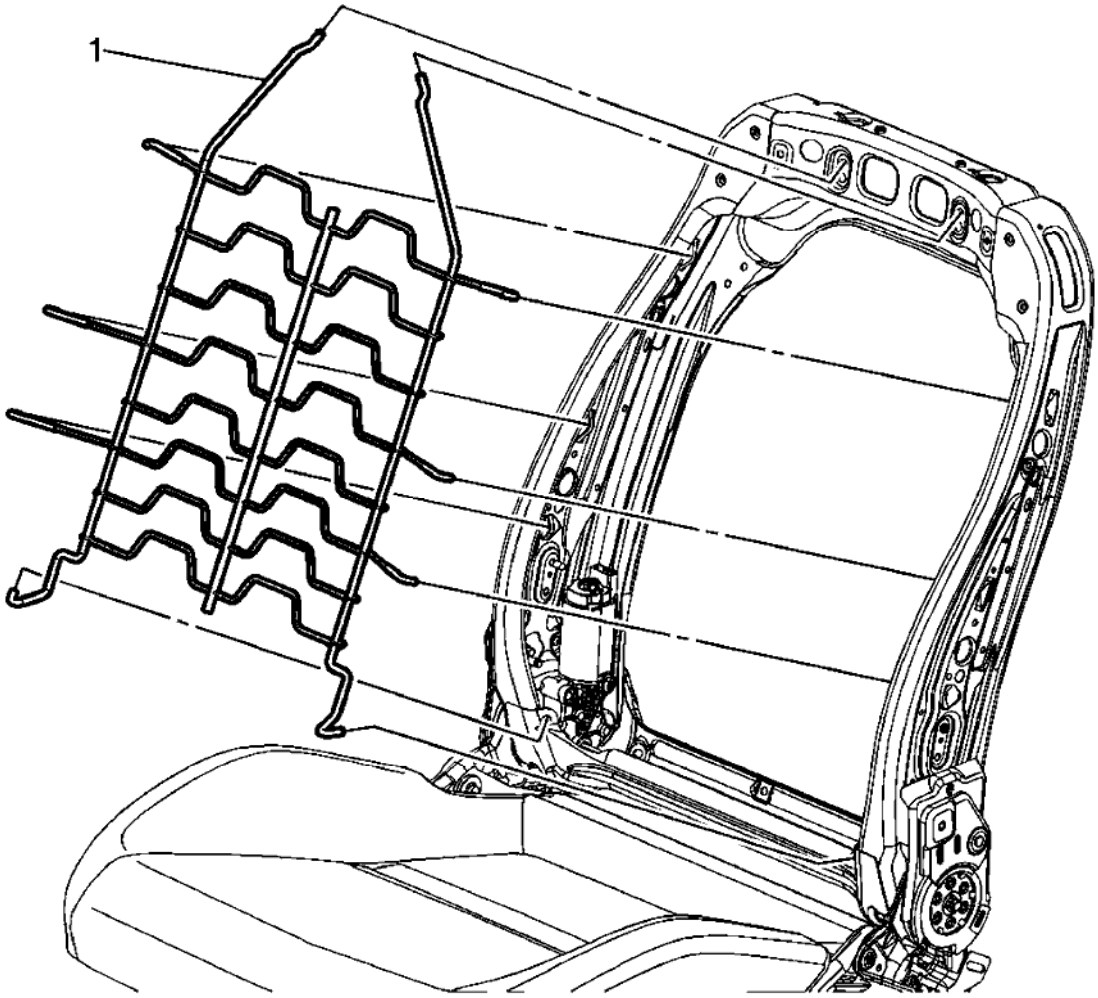


Fig. 22: Driver Or Passenger Seat Lumbar Support
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	

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	1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove the driver or passenger seat back cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement**.
1	Front Seat Lumbar Support **Procedure** 1. Disconnect the electrical connectors. 2. Pull outward at the bottom of the seat to release the bottom support wires. 3. Pull the bottom of the lumbar forward and up until the lumbar support wires disengage from the seat back frame.

REAR SEAT CUSHION COVER REPLACEMENT

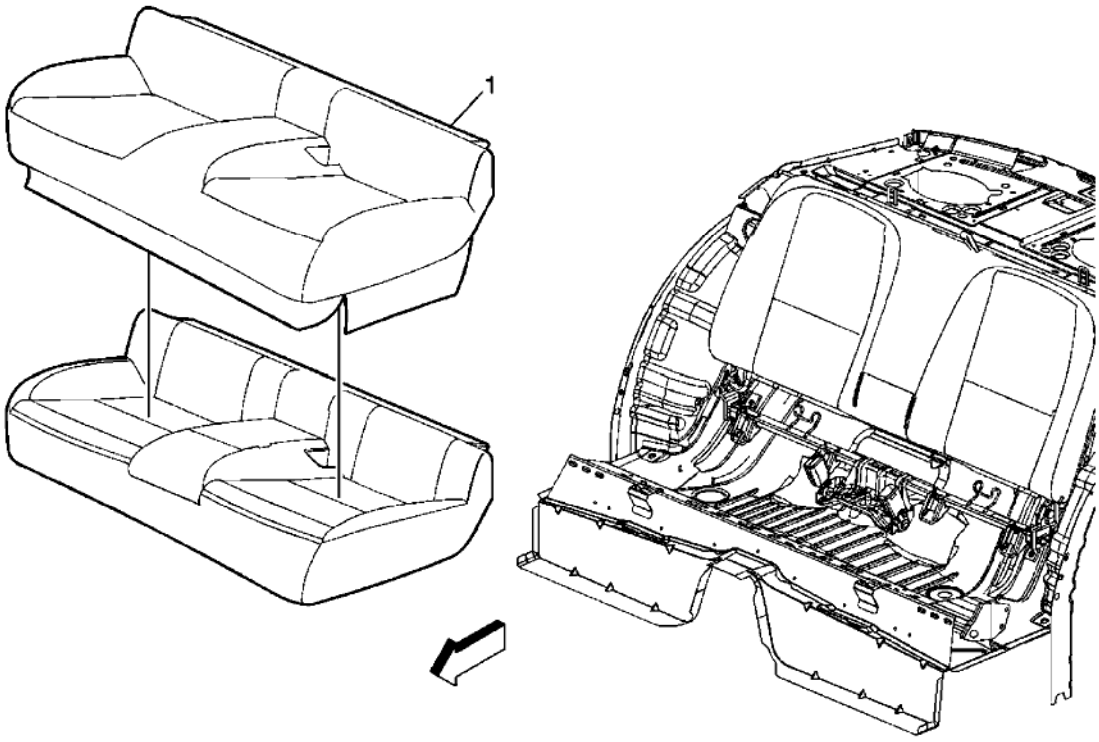


Fig. 23: Rear Seat Cushion Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement**.	
	Rear Seat Cushion Cover **Procedure**

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1	1. Remove the hog rings from the under side of the rear seat cushion. 2. Pull the cover away from the pad to disengage any retainers. **Tip:** When installing the rear seat cushion cover, pull the cover tightly in all corners to ensure that no creasing occurs.

REAR SEAT CUSHION REPLACEMENT

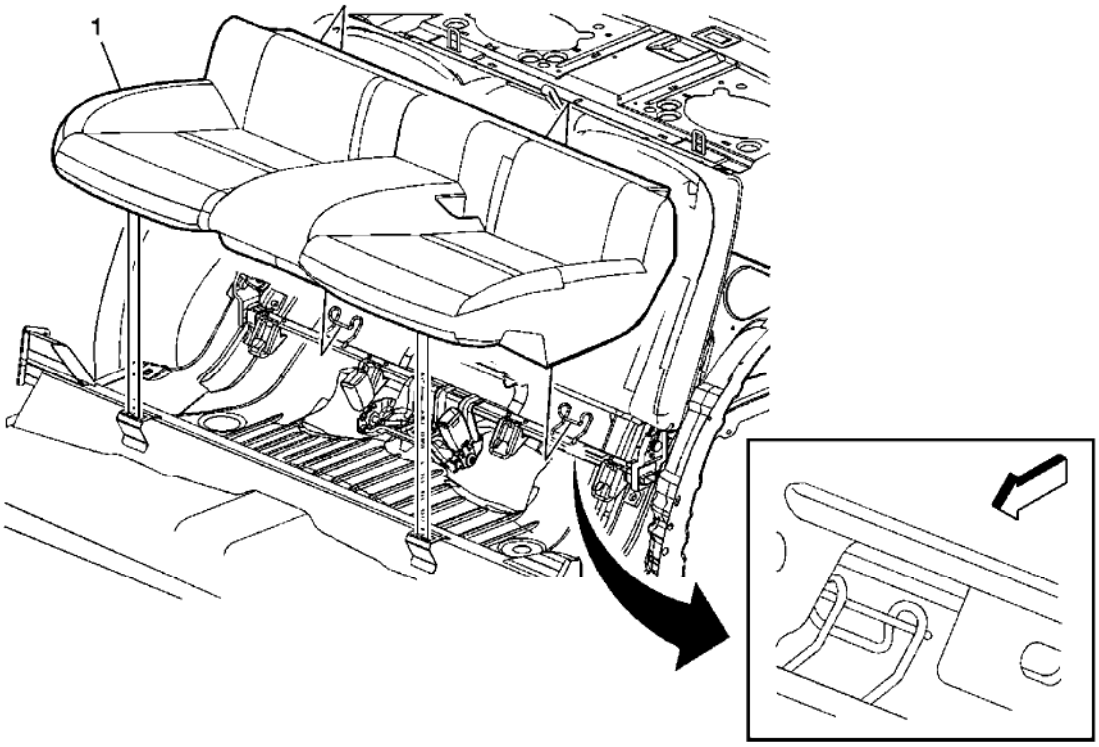


Fig. 24: Rear Seat Cushion
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Cushion **Procedure** 1. Lift up on the front of the seat cushion to disengage the cushion from the floor retainers. 2. Push down on the rear of the seat to unhook the cushion wire from the lower cross bar hinges.

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REAR SEAT BACK CUSHION LATCH CABLE REPLACEMENT

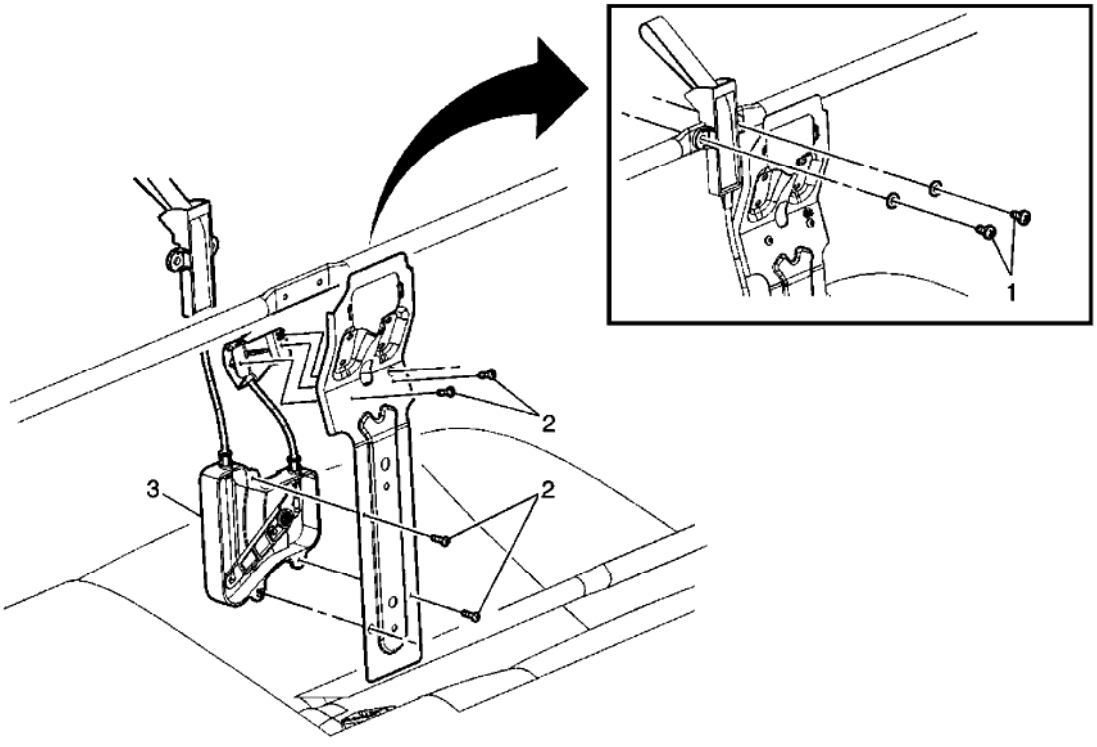


Fig. 25: Rear Seat Back Cushion Latch Cable
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion pad. Refer to **Rear Seat Back Cushion Pad Replacement**. 2. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**.	
1	Rear Seat Back Cushion Latch Cable Strap Retainer (Qty: 2) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 10 N.m (88 lb in)
2	Rear Seat Back Cushion Latch Cable Retainer (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 3 N.m (26 lb in)

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3	Rear Seat Back Cushion Latch Cable Assembly **Procedure:** Disconnect the cable from the latch actuator.

REAR SEAT BACK CUSHION REPLACEMENT

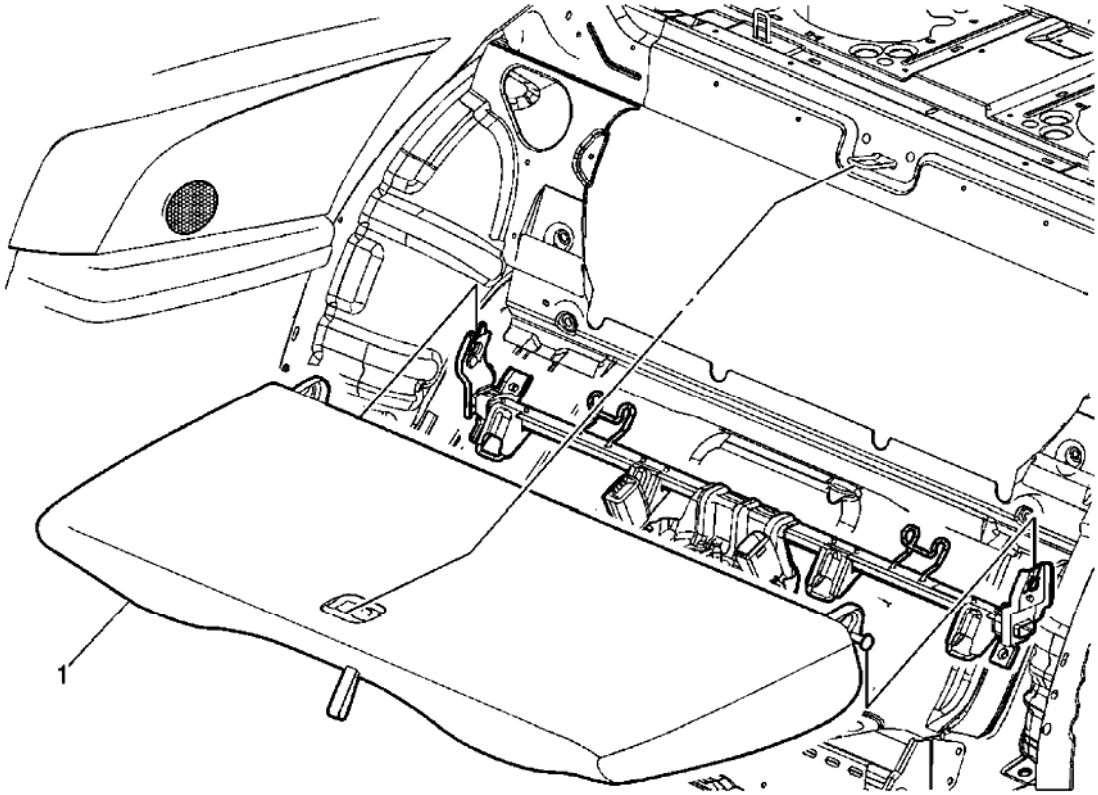


Fig. 26: Rear Seat Back Cushion
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the rear seat cushion. Refer to Rear Seat Cushion Replacement.**	
1	Rear Seat Back Cushion **Procedure** 1. Pull the release strap located in the center of the seat back, folding the rear seat forward. 2. Push rearward on both lower cross bar hinge locks to release the seat back frame. 3. Pull the seat back cushion forward and upward to remove it from the vehicle. 4. Transfer components as necessary.

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REAR SEAT BACK CUSHION PANEL REPLACEMENT

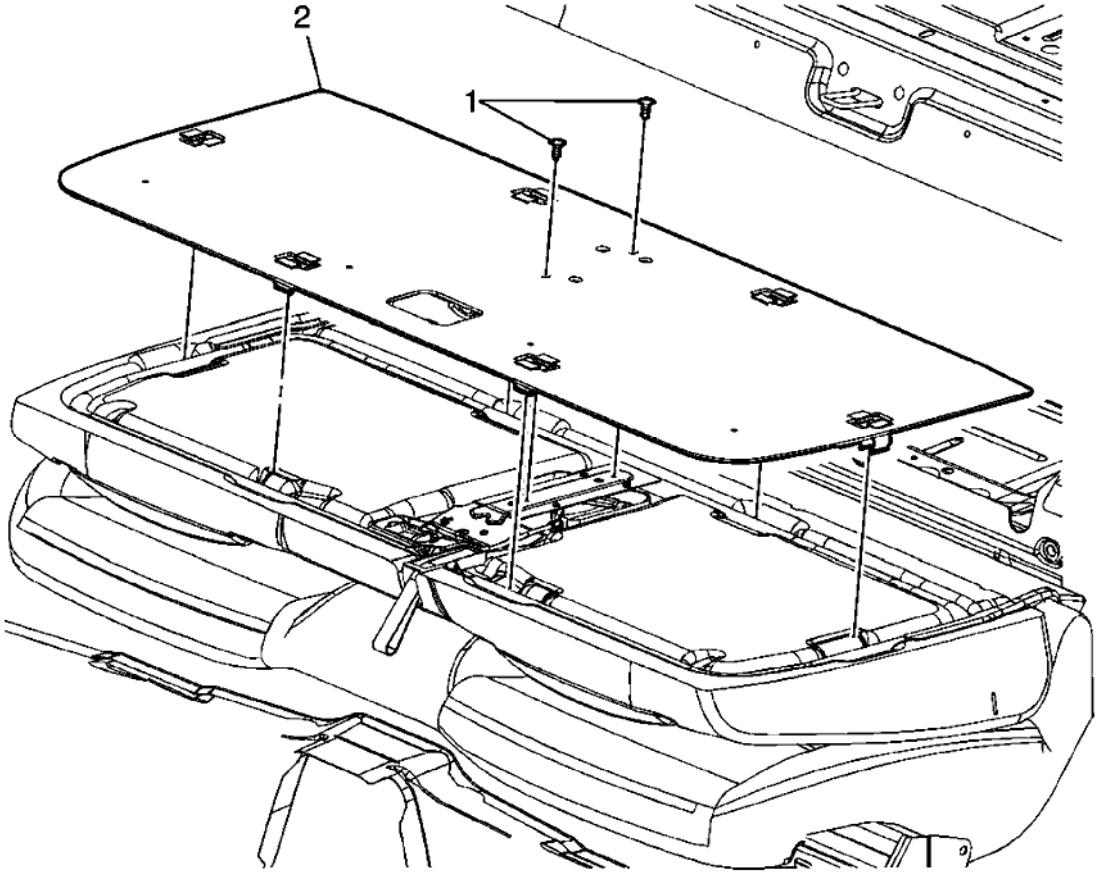


Fig. 27: Rear Seat Back Cushion Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear seat back cushion pad. Refer to **Rear Seat Back Cushion Pad Replacement**.	
1	Rear Seat Back Cushion Panel Retainer (Qty: 2) **Tip:** Use a flat-bladed tool for retainer removal.
2	Rear Seat Back Cushion Panel **Procedure:** Release the seat back panel integral retainers from the seat back frame. **Tip:** Lay the seat down before trying to remove the seat back cushion panel.

REAR SEAT BACK CUSHION PAD REPLACEMENT

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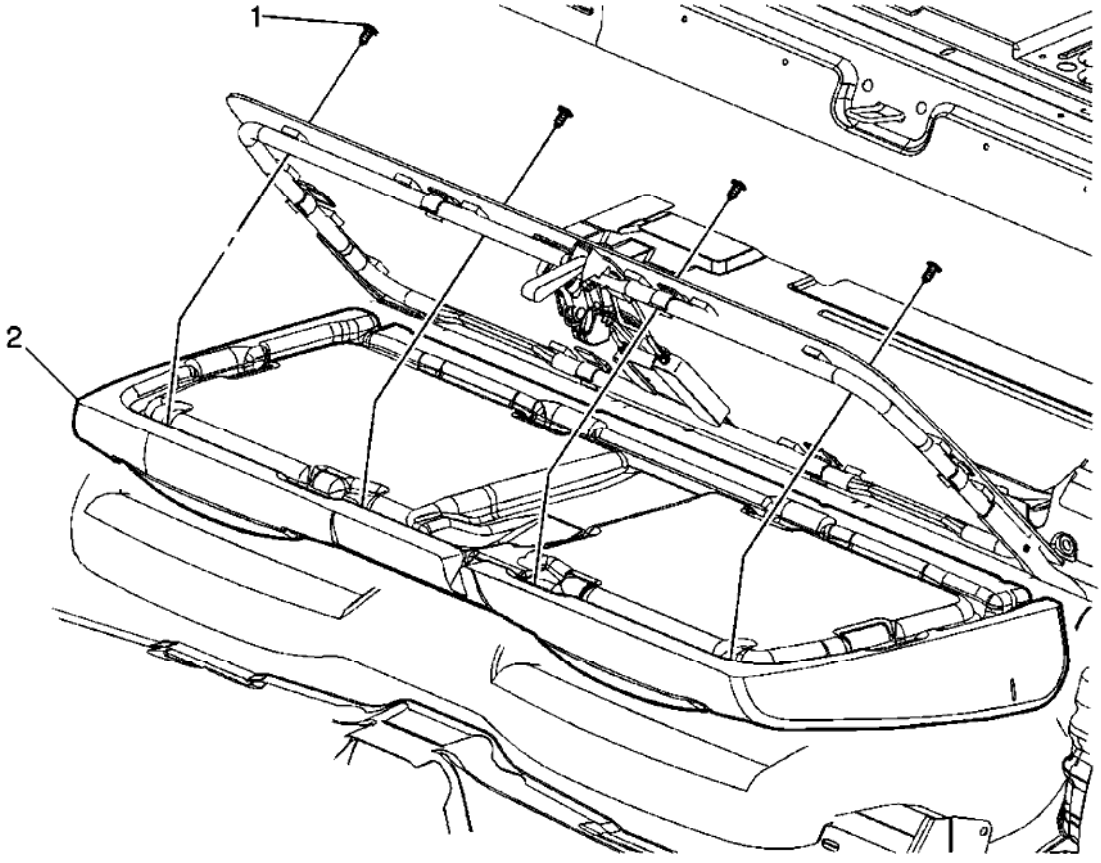


Fig. 28: Rear Seat Back Cushion Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion cover. Refer to **Rear Seat Back Cushion Cover Replacement**. 2. Remove the rear seat back cushion latch cover. Refer to **Rear Seat Back Cushion Latch Cover Replacement**.	
1	Rear Seat Back Cushion Pad Retainer (Qty: 4) **Tip:** Use a flat bladed tool for retainer removal.
2	Rear Seat Back Cushion Pad **Tip:** Lay the seat down before trying to remove the seat back cushion pad.

REAR SEAT BACK CUSHION REAR LOWER CENTER COVER CARPET REPLACEMENT

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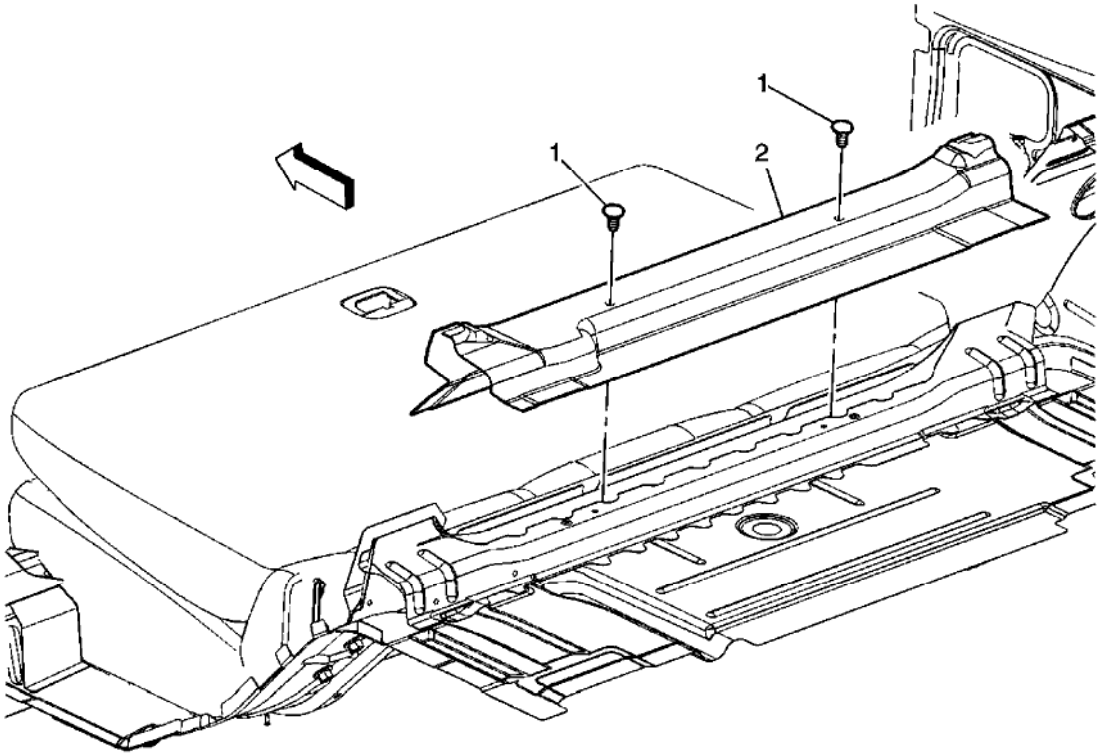


Fig. 29: Rear Seat Back Cushion Rear Lower Center Cover Carpet
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Back Cushion Rear Lower Center Cover Carpet Retainer (Qty: 2) **Tip:** Pull the release strap located in the center of the seat back, folding the rear seat forward. **Tip:** Use a flat-bladed tool to release the carpet retainers from the floor.
2	Rear Seat Back Cushion Rear Lower Center Cover Carpet

REAR SEAT BACK CUSHION LOWER CROSS BAR REPLACEMENT

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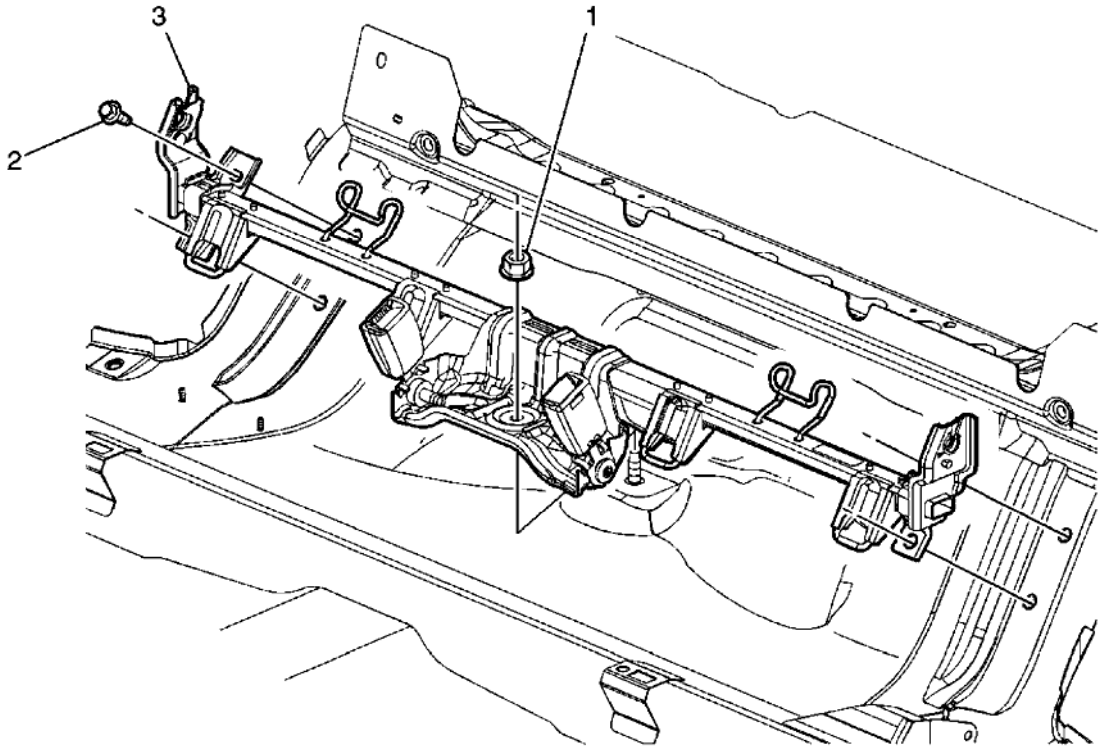


Fig. 30: Rear Seat Back Cushion Lower Cross Bar
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement** 2. Remove the rear seat back cushion. Refer to **Rear Seat Back Cushion Replacement**	
1	Rear Seat Back Cushion Lower Cross Bar Nut **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 74 N.m (55 lb ft)
2	Rear Seat Back Cushion Lower Cross Bar Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 49 N.m (36 lb ft)
3	Rear Seat Back Cushion Lower Cross Bar **Procedure:** After removing all retainers, pull upward on the lower cross bar to remove it off the center

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REAR SEAT BACK CUSHION COVER REPLACEMENT

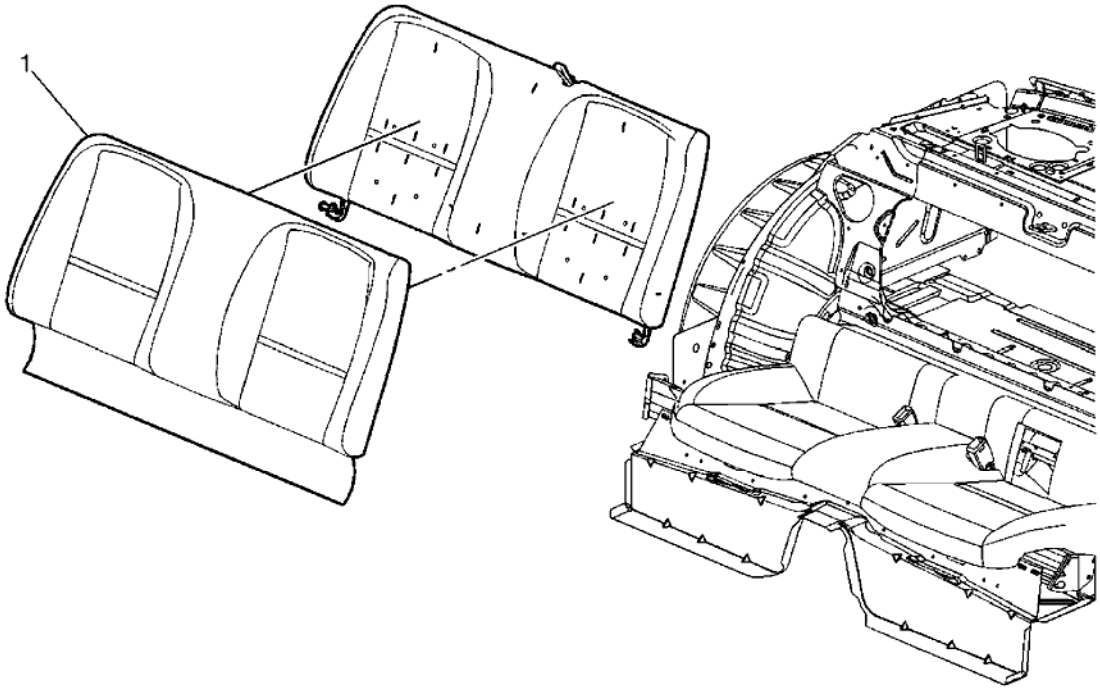


Fig. 31: Rear Seat Back Cushion Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the rear seat back cushion latch cover. Refer to **Rear Seat Back Cushion Latch Cover Replacement**. 2. Remove the rear seat back cushion. Refer to **Rear Seat Back Cushion Replacement**.	
1	Rear Seat Back Cushion Cover **Procedure** 1. Push rearward on both lower cross bar hinge locks to release the seat back frame. 2. Disengage the J-channel retainers from the seat back cushion frame. 3. Remove the hog rings from the under side of the rear seat back cushion cover. 4. Pull the cover away from the pad to disengage the hook and loop retainers. **Tip:** When installing the rear seat back cover, pull the cover tightly in all corners to ensure

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	that no creasing occurs.

REAR SEAT BACK CUSHION LATCH COVER REPLACEMENT

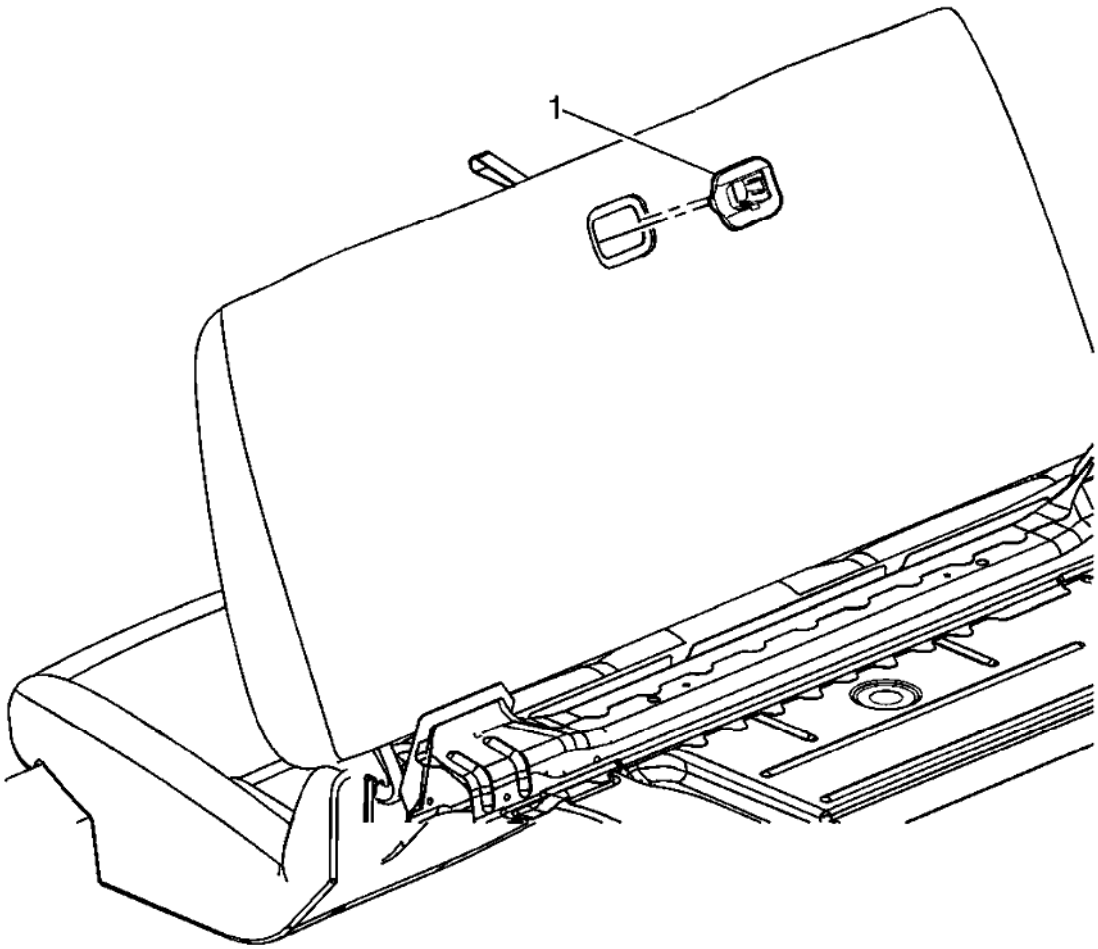


Fig. 32: Rear Seat Back Cushion Latch Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Back Cushion Latch Cover **Procedure** 1. Lay the seat down before trying to remove the latch cover. 2. Use a flat bladed tool to release both tabs inside the cover to avoid breakage.

REAR SEAT BACK CUSHION FRAME REPLACEMENT

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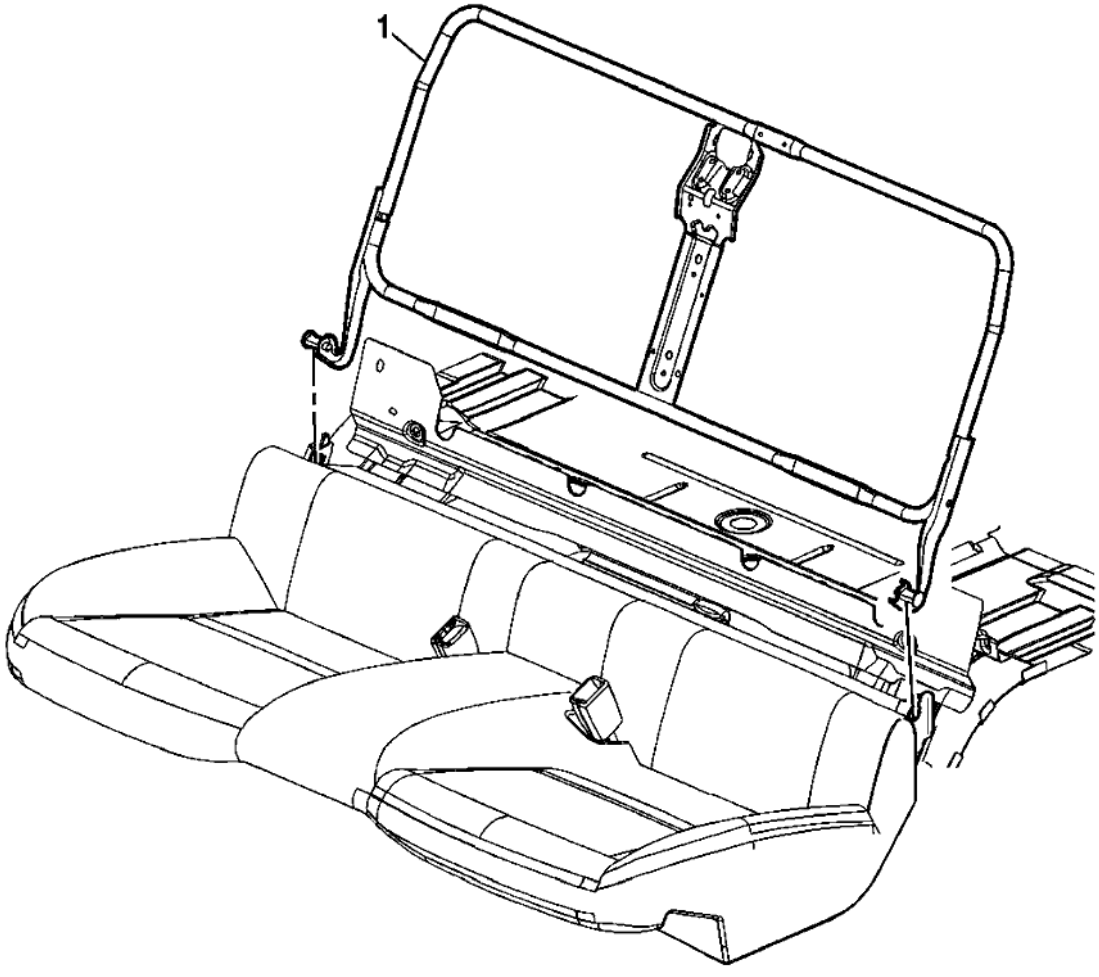


Fig. 33: Rear Seat Back Cushion Frame
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**. 2. Remove the rear seat back cushion latch actuator. Refer to **Rear Seat Back Cushion Stowage Latch Actuator Replacement**.	
1	Rear Seat Back Cushion Frame Assembly **Procedure:** Transfer components as necessary.

REAR SEAT BACK CUSHION STOWAGE LATCH ACTUATOR REPLACEMENT

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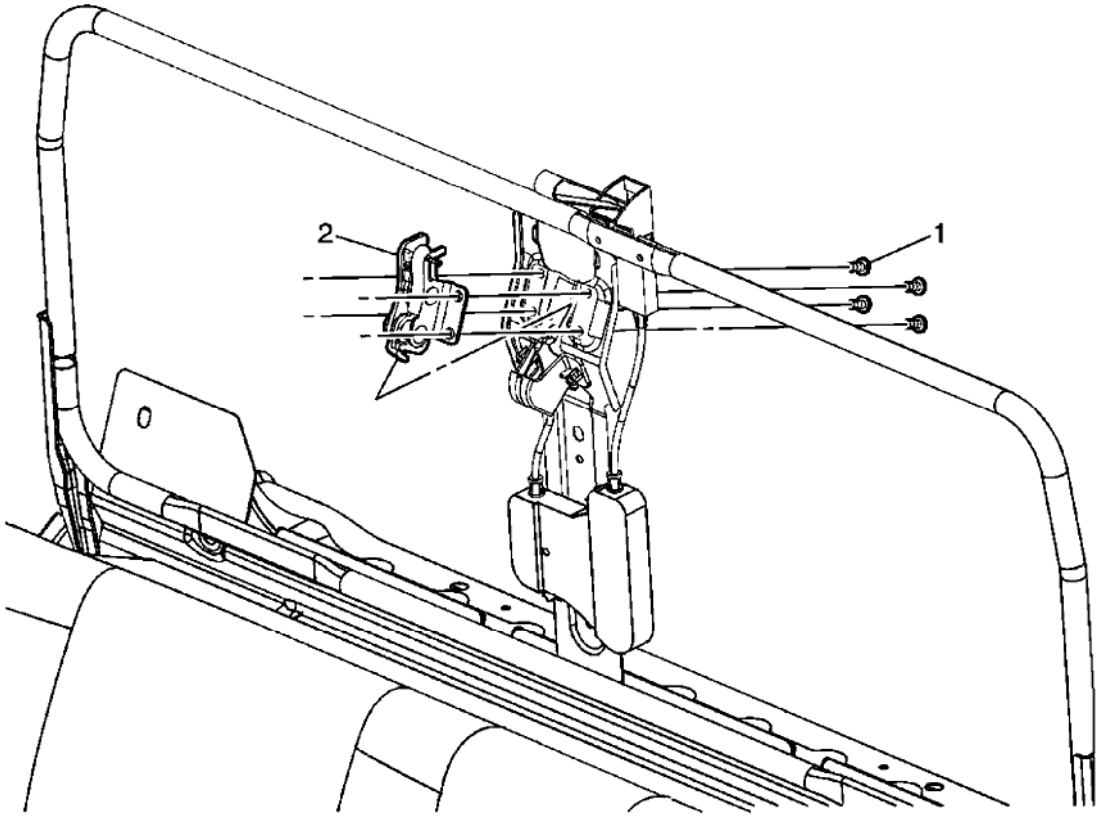


Fig. 34: Rear Seat Back Cushion Stowage Latch Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion latch cable. Refer to **Rear Seat Back Cushion Latch Cable Replacement**. 2. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**.	
1	Rear Seat Back Cushion Stowage Latch Actuator Retainer (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 7.5 N.m (66 lb in)
2	Rear Seat Back Cushion Stowage Latch Actuator Assembly **Procedure:** Disconnect the cable from the latch actuator.

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2010 ACCESSORIES & BODY, CAB

Seat Heating and Cooling - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Seat Heater Control Module	4 N.m	35 lb in

SCHEMATIC AND ROUTING DIAGRAMS

HEATED/COOLED SEAT SCHEMATICS

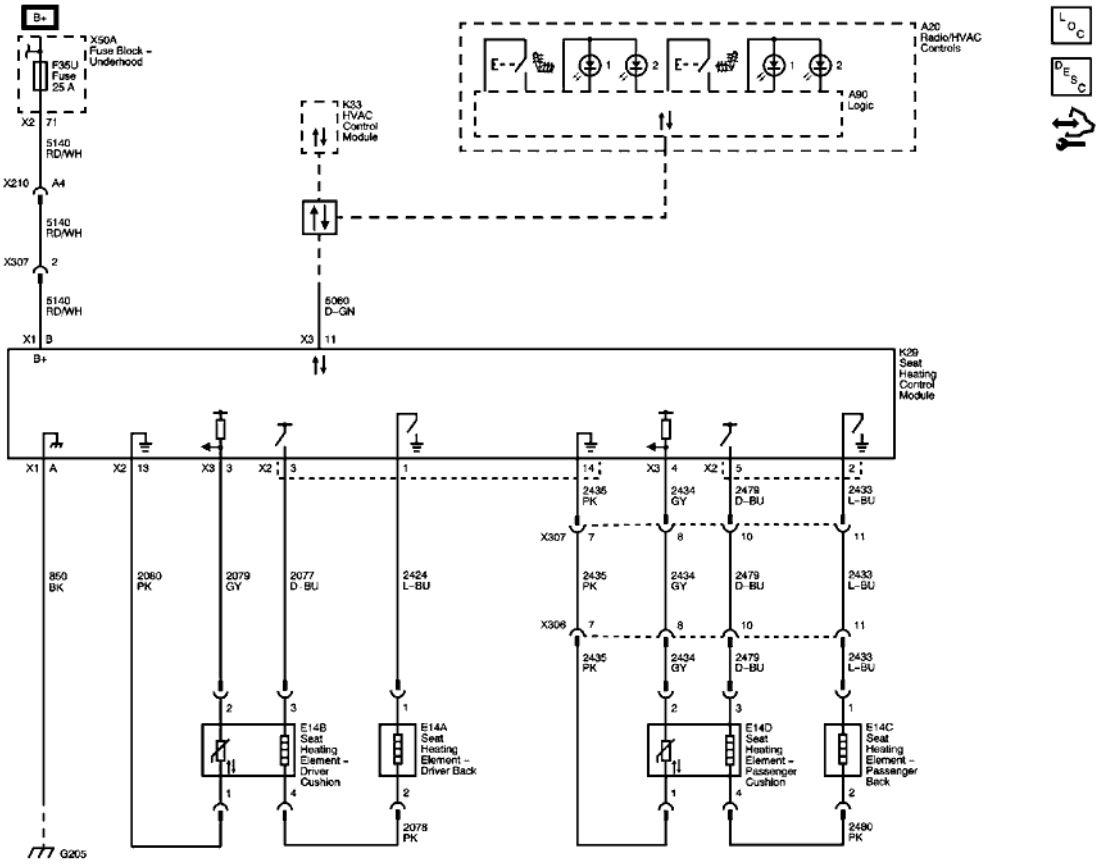


Fig. 1: Heated/Cooled Seat
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DIAGNOSTIC INFORMATION AND PROCEDURES

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DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1925 or B2170	B1925 02: Driver Seat Cushion Heater Sensor Circuit Short to Ground B1925 05: Driver Seat Cushion Heater Sensor Circuit High Voltage/Open B2170 02: Passenger Seat Cushion Heater Sensor Circuit Short to Ground B2170 05: Passenger Seat Cushion Heater Sensor Circuit High Voltage/Open
DTC B2345	B2345 13: Seat Heater Disable Circuit Low Voltage/High Temperature
DTC B2425 or B2430	B2425 0B: Driver Seat Cushion Heater Circuit High Current B2425 0D: Driver Seat Cushion Heater Circuit High Resistance B2425 0E: Driver Seat Cushion Heater Circuit Low Resistance B2430 0B: Passenger Seat Cushion Heater Circuit High Current B2430 0D: Passenger Seat Cushion Heater Circuit High Resistance B2430 0E: Passenger Seat Cushion Heater Circuit Low Resistance
DTC B242A	B242A 01: Seat Heaters Common Circuit Short to Battery B242A 02: Seat Heaters Common Circuit Short to Ground

DTC B1925 OR B2170

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1925 02

Driver Seat Cushion Heater Sensor Circuit Short to Ground

DTC B1925 05

Driver Seat Cushion Heater Sensor Circuit High Voltage/Open

DTC B2170 02

Passenger Seat Cushion Heater Sensor Circuit Short to Ground

DTC B2170 05

Passenger Seat Cushion Heater Sensor Circuit High Voltage/Open

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Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Heated Seat Element Control Terminal 3 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Element Control Terminal 1 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Cushion Temperature Sensor Signal	B1925 02	B1925 05	B1925 05	B2345 13
Driver Heated Seat Cushion Temperature Sensor Low Reference	-	B1925 05	-	B2345 13
Passenger Heated Seat Element Control Terminal 5 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Element Control Terminal 2 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Cushion Temperature Sensor Signal	B2170 02	B2170 05	B2170 05	B2345 13
Passenger Heated Seat Cushion Temperature Sensor Low Reference	-	B2170 05	-	B2345 13

Circuit/System Description

The heated seat temperature sensor that set this diagnostic trouble code (DTC) is located in the seat cushion just under the seat cover with the seat heating element. The seat heating control module supplies a 5 V reference voltage through the temperature sensor signal circuit and a ground through the low reference circuit to the sensor. The module monitors the voltage of the sensor signal circuit to determine the temperature of the seat. The temperature sensor varies in resistance based on the temperature of the heating element causing the signal voltage to change. Once the seat reaches the set temperature, the module will then cycle the control circuit of the heating elements ON and OFF in order to maintain the desired seat temperature based on the feedback voltage from the sensor.

Conditions for Running the DTC

- DTC B1325 must not be present.
- The seat heating control module must be powered.

Conditions for Setting the DTC

B1925 02 or B2170 02

The temperature sensor voltage drops below 0.6 V for more than 1 second.

B1925 05 or B2170 05

The temperature sensor voltage is greater than 5 V for more than 1 second.

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Action Taken When the DTC Sets

The heated seat function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC will clear and set the code to history 3 seconds after the reference voltage returns to normal operating range and the ignition is cycled OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Heated Seats Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

B1925 02 or B1925 05

1. Ignition OFF, disconnect the X2, X3 harness connectors at the K29 seat heating control module.
2. Test for 500 ohms - 300 kohms between the signal circuit terminal 3 X3 and the low reference circuit terminal 13 X2.
    - If less than the specified range, test for a short between the signal and low reference circuits. If the circuits test normal, replace the E14B seat cushion heating element.
    - If greater than the specified range, test the signal circuit and low reference circuit for a short to voltage or an open/high resistance. If the circuits test normal, replace the seat cushion heating

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element.

3. Connect the X2, X3 harness connectors at the K29 seat heating control module and disconnect the harness connector at the E14B seat cushion heating element.
4. Ignition ON, test for 4.8 - 5.2 V between the signal circuit terminal 2 and ground.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K29 seat heating control module.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K29 seat heating control module.
5. If all circuits test normal, replace the K29 seat heating control module.

B2170 02 or B2170 05

1. Ignition OFF, disconnect the X2, X3 harness connectors at the K29 seat heating control module.
2. Test for 500 ohms - 300 kohms between the signal circuit terminal 4 X3 and the low reference circuit terminal 14 X2.
    - If less than the specified range, test for a short between the signal and low reference circuits. If the circuits test normal, replace the E14D seat cushion heating element.
    - If greater than the specified range, test the signal circuit and the low reference circuit for a short to voltage or an open/high resistance. If the circuits test normal, replace the E14D seat cushion heating element.
3. Connect the X2, X3 harness connectors at the K29 seat heating control module and disconnect the E14D seat cushion heating element.
4. Ignition ON, test for 4.8 - 5.2 V between the signal circuit terminal 2 and ground.
    - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K29 seat heating control module.
    - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K29 seat heating control module.
5. If all circuits test normal, replace the K29 seat heating control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Cushion Heater Replacement**
- **Passenger Seat Cushion Heater Replacement**
- **Control Module References** for seat heating control module replacement, setup, and programming

DTC B2345

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

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- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2345 13

Seat Heater Disable Circuit Low Voltage/High Temperature

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Heated Seat Element Control Terminal 3 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Element Control Terminal 1 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Cushion Temperature Sensor Signal	B1925 02	B1925 05	B1925 05	B2345 13
Driver Heated Seat Cushion Temperature Sensor Low Reference	-	B1925 05	-	B2345 13
Passenger Heated Seat Element Control Terminal 5 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Element Control Terminal 2 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Cushion Temperature Sensor Signal	B2170 02	B2170 05	B2170 05	B2345 13
Passenger Heated Seat Cushion Temperature Sensor Low Reference	-	B2170 05	-	B2345 13

Circuit/System Description

The seat heating control module controls seat heating operation for the driver and front passenger seats. The heating elements are controlled through individual high side and low side control circuits. The low side control circuits for both seats are connected to a common reference point internal to the module. This reference point is biased to approximately 2.5 V. Before the seat heating control module will allow heated seat operation, it checks to see if this biased voltage is shorted to ground or voltage. Once the module verifies that it is not closing to a shorted heating element, it allows for heated seat operation. The module will then continue to monitor the heating elements for a shorted circuit.

Conditions for Running the DTC

- Engine must be running.
- The seat heating control module must be powered.

Conditions for Setting the DTC

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B2345 13

Any temperature sensor input that remains below 1.5 V for more than 1 second.

Action Taken When the DTC Sets

The heated seat function for both seats will be disabled.

Conditions for Clearing the DTC

- The current DTC will clear and set the code to history 3 seconds after the reference voltage returns to the normal operating range and the ignition is cycled OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Heated Seats Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X2, X3 harness connectors at the K29 seat heating control module.
2. Test for greater than 3.0 kohms between the signal and the low reference circuit terminals listed below:
    - Driver seat cushion terminal 3 X3 and terminal 13 X2
    - Passenger seat cushion terminal 4 X3 and terminal 14 X2
    - If less than the specified range, test for a short between the signal and low reference circuits. If the

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circuits test normal, replace the appropriate E14 seat cushion heating element.

3. If all circuits test normal, replace the K29 seat heating control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Cushion Heater Replacement**
- **Passenger Seat Cushion Heater Replacement**
- **Control Module References** for K29 seat heating control module replacement, setup and programming

DTC B2425 OR B2430

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2425 0B

Driver Seat Cushion Heater Circuit High Current

DTC B2425 0D

Driver Seat Cushion Heater Circuit High Resistance

DTC B2425 0E

Driver Seat Cushion Heater Circuit Low Resistance

DTC B2430 0B

Passenger Seat Cushion Heater Circuit High Current

DTC B2430 0D

Passenger Seat Cushion Heater Circuit High Resistance

DTC B2430 0E

Passenger Seat Cushion Heater Circuit Low Resistance

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Heated Seat Element Control Terminal 3 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Element Control Terminal 1 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Cushion Temperature Sensor Signal	B1925 02	B1925 05	B1925 05	B2345 13
Driver Heated Seat Cushion Temperature Sensor Low Reference	-	B1925 05	-	B2345 13
Passenger Heated Seat Element Control Terminal 5 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Element Control Terminal 2 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Cushion Temperature Sensor Signal	B2170 02	B2170 05	B2170 05	B2345 13
Passenger Heated Seat Cushion Temperature Sensor Low Reference	-	B2170 05	-	B2345 13

Circuit/System Description

The driver and front passenger heated seats are controlled by the front seat heating control module that is located under the driver seat cushion. When the heated seat is active, the module applies power through a common voltage supply circuit to the seat heater elements. The module controls the seat temperature by providing a pulse width modulation (PWM) ground through the seat heater element control circuit to the heater elements. The module then monitors the current flow through the heating elements and the rate of change of the temperature sensor to verify correct heated seat operation.

Conditions for Running the DTC

- DTC B1325 must not be present.
- Engine must be running.
- The seat heating control module must be powered and the heated seat must be enabled.

Conditions for Setting the DTC

B2425 0D or B2430 0D

By measuring current and voltage output to the seat heating elements every 10 seconds, the seat heating control module calculates that the heating element resistance is above the maximum resistance.

B2425 0B, B2425 0E, B2430 0B, or B2430 0E

By measuring current and voltage output to the seat heating elements every 10 seconds, the seat heating control module calculates that the heating element resistance is below the minimum resistance.

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Action Taken When the DTC Sets

The heated seat function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC clears when the malfunction is no longer present, and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Heated Seats Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

B2425 0B, B2425 0D, or B2425 0E

1. Ignition OFF, disconnect the harness connector at the E14A seat back heating element.

   NOTE: Element resistance must be measured twice to ensure that all failure conditions are simulated. First with the seat unoccupied, then with the seat occupied.

2. Test for 0.5 - 5 ohms between terminal 1 and terminal 2.

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- If not within the specified range, replace the E14A seat back heating element.

3. Connect the harness connector at the E14A seat back heating element and disconnect the X2 harness connector at the K29 seat heating control module.

NOTE: Element resistance must be measured twice to ensure that all failure conditions are simulated. First with the seat unoccupied, then with the seat occupied.

4. Test for 1 - 7 ohms between control circuit terminal 3 and control circuit terminal 1.
   - If less than the specified range, test for a short between the control circuits. If the circuits test normal, replace the E14B seat cushion heating element.
   - If greater than the specified range, test the control circuits for an open/high resistance. If the circuits test normal, replace the E14B seat cushion heating element.
5. If all circuits test normal, replace the K29 seat heating control module.

B2430 0B, B2430 0D, or B2430 0E

1. Ignition OFF, disconnect the harness connector at the E14C seat back heating element.

NOTE: Element resistance must be measured twice to ensure that all failure conditions are simulated. First with the seat unoccupied, then with the seat occupied.

2. Test for 0.5 - 5 ohms between terminal 1 and terminal 2.
   - If not within the specified range, replace the E14C seat back heating element.
3. Connect the harness connector at the E14C seat back heating element and disconnect the X2 harness connector at the K29 seat heating control module.

NOTE: Element resistance must be measured twice to ensure that all failure conditions are simulated. First with the seat unoccupied, then with the seat occupied.

4. Test for 1 - 7 ohms between control circuit terminal 5 and control circuit terminal 2.
   - If less than the specified range, test for a short between the control circuits. If the circuits test normal, replace the E14D seat cushion heating element.
   - If greater than the specified range, test the control circuits for an open/high resistance. If the circuits test normal, replace the E14D seat cushion heating element.
5. If all circuits test normal, replace the K29 seat heating control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Cushion Heater Replacement**

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- **Passenger Seat Cushion Heater Replacement**
- **Control Module References** for front seat heating control module replacement, setup, and programming

DTC B242A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B242A 01

Seat Heaters Common Circuit Short to Battery

DTC B242A 02

Seat Heaters Common Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Heated Seat Element Control Terminal 3 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Element Control Terminal 1 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Cushion Temperature Sensor Signal	B1925 02	B1925 05	B1925 05	B2345 13
Driver Heated Seat Cushion Temperature Sensor Low Reference	-	B1925 05	-	B2345 13
Passenger Heated Seat Element Control Terminal 5 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Element Control Terminal 2 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Cushion Temperature Sensor Signal	B2170 02	B2170 05	B2170 05	B2345 13
Passenger Heated Seat Cushion Temperature Sensor Low Reference	-	B2170 05	-	B2345 13

Circuit/System Description

The seat heating control module controls seat heating operation for both the driver and front passenger seats.

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The heating elements are controlled through individual high side and low side control circuits. The low side control circuits for both seats are connected to a common reference point internal to the module. This reference point is biased to approximately 2.5 V. Before the seat heating control module will allow heated seat operation, it checks to see if this biased voltage is shorted to ground or voltage. Once the module verifies that it is not closing to a shorted heating element, it allows for heated seat operation. The module will then continue to monitor the heating elements for a shorted circuit.

Conditions for Running the DTC

- DTC B1325 must not be present.
- The seat heating control module must be powered.

Conditions for Setting the DTC

B242A 01

The seat heating control module detects a short to voltage on the heater element control circuits.

B242A 02

The seat heating control module detects a short to ground on the heater element control circuits.

Action Taken When the DTC Sets

The heated seat function for both seats will be disabled.

Conditions for Clearing the DTC

- The current DTC will clear and set a history code 3 seconds after the reference voltage returns to normal operating range and the ignition is cycled OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Heated Seats Description and Operation

Electrical Information Reference

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- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the K29 seat heating control module.
2. Test for infinite resistance between the control circuit terminal 3 and ground.
   - If not the specified value, test the control circuit for a short to ground.
3. Test for infinite resistance between the control circuit terminal 5 and ground.
   - If not the specified value, test the control circuit for a short to ground.
4. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 3 and ground.
   - If the test lamp illuminates, test the control circuit for a short to voltage.
5. Verify that a test lamp does not illuminate between the control circuit terminal 5 and ground.
   - If the test lamp illuminates, test the control circuit for a short to voltage.
6. If all circuits test normal, replace the K29 seat heating control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for seat heating control module replacement, setup, and programming

SYMPTOMS - SEAT HEATING AND COOLING

NOTE: The following steps must be completed before using the symptom tables.

1. When diagnosing a heated seat system condition perform the **Diagnostic System Check - Vehicle** , before using the symptom tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control module(s) can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Heated Seats Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the power seats. Refer to **Checking Aftermarket Accessories** .

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- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the seat adjuster track for conditions which may cause binding or objects within the seat adjustment range which obstruct movement or interfere with wiring.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to the **Front Heated Seat Malfunction** diagnostic procedure in order to diagnose the symptom.

FRONT HEATED SEAT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Heated Seat Element Control Terminal 3 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Element Control Terminal 1 X2	B242A 02	B2425 0D	B242A 01	B2425 0B, B2425 0E
Driver Heated Seat Cushion Temperature Sensor Signal	B1925 02	B1925 05	B1925 05	B2345 13
Driver Heated Seat Cushion Temperature Sensor Low Reference	-	B1925 05	-	B2345 13
Passenger Heated Seat Element Control Terminal 5 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Element Control Terminal 2 X2	B242A 02	B2430 0D	B242A 01	B2430 0B, B2430 0E
Passenger Heated Seat Cushion Temperature Sensor Signal	B2170 02	B2170 05	B2170 05	B2345 13
Passenger Heated Seat Cushion Temperature Sensor Low Reference	-	B2170 05	-	B2345 13

Circuit/System Description

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The driver and passenger heated seats are controlled by separate heated seat switches that are located in the radio/HVAC controls. When a heated seat switch is pressed, a serial data message is sent from the radio/HVAC controls to the HVAC control module indicating the heated seat command. The HVAC control module serves as a gateway to transmit the message to the seat heating control module via the serial data line. In response to this message, the seat heating control module applies or removes battery voltage through the element supply voltage circuit to the appropriate seat heating elements. The seat heating control module then sends a serial data message back to the HVAC control module to gateway the information to the radio/HVAC controls to either illuminate or turn off the appropriate temperature indicator.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Heated Seats Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine ON, observe the scan tool Driver Seat Heating/Venting/Cooling Mode parameter while pressing the driver HEATED seat switch. The reading should change between Off and Back & Cushion Heat.
    - If not the specified value, replace the A20 radio/HVAC controls.
2. Observe the scan tool Passenger Seat Heating/Venting/Cooling Mode parameter while pressing the passenger HEATED seat switch. The reading should change between Off and Back & Cushion Heat.
    - If not the specified value, replace the A20 radio/HVAC controls.
3. If all scan tool parameter readings test normal, there are no DTCs set, and the driver and/or passenger heated seat is inoperative, replace the K29 seat heating control module.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Control Assembly Replacement**
- **Control Module References** for seat heating control module replacement, setup, and programming

REPAIR INSTRUCTIONS

FRONT SEAT HEATER CONTROL MODULE REPLACEMENT

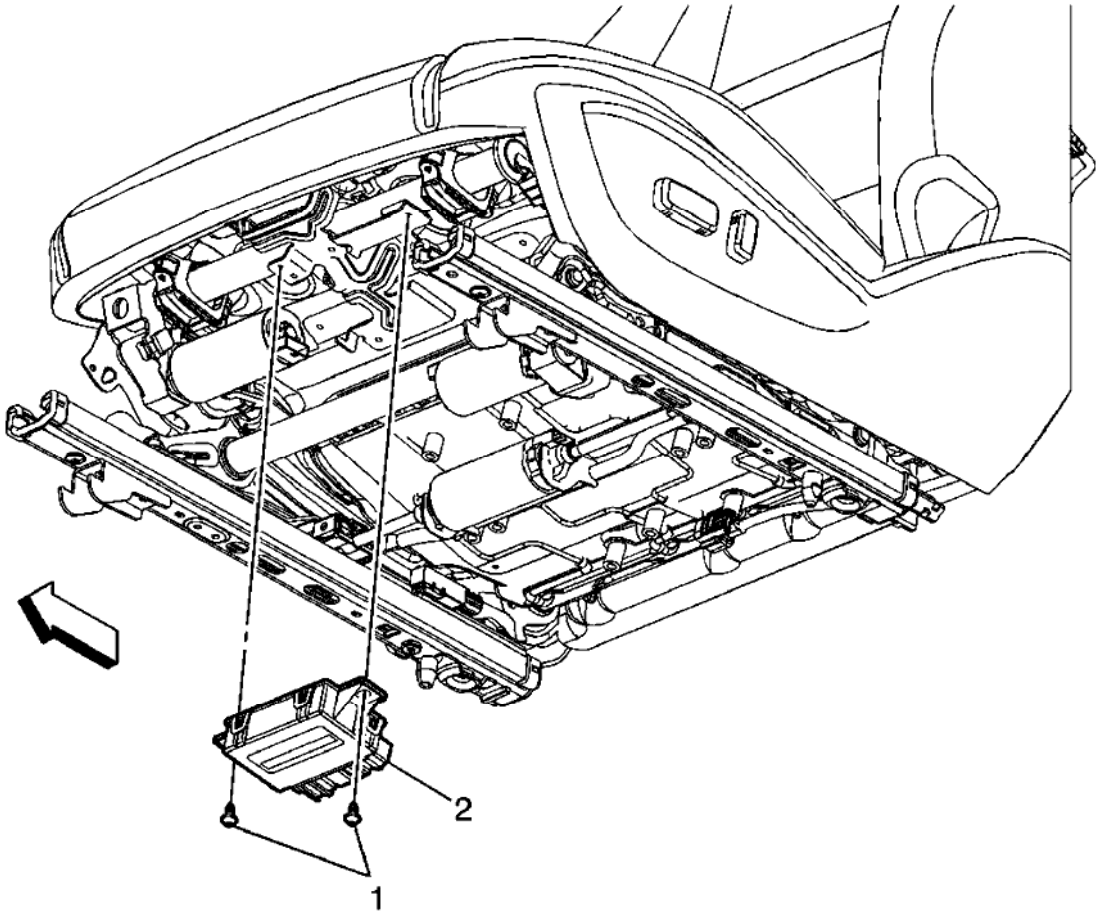


Fig. 2: Front Seat Heater Control Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Seat Heater Control Module Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .**

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	Tighten: 4 N.m (35 lb in)
2	Front Seat Heater Control Module **Procedure** 1. Disconnect the electrical connector. 2. Disconnect the module from the bracket if nessasary, then pull downward away from the bottom of the seat. 3. Refer to **Control Module References** for replacement and setup information.

DRIVER OR PASSENGER SEAT BACK CUSHION HEATER REPLACEMENT

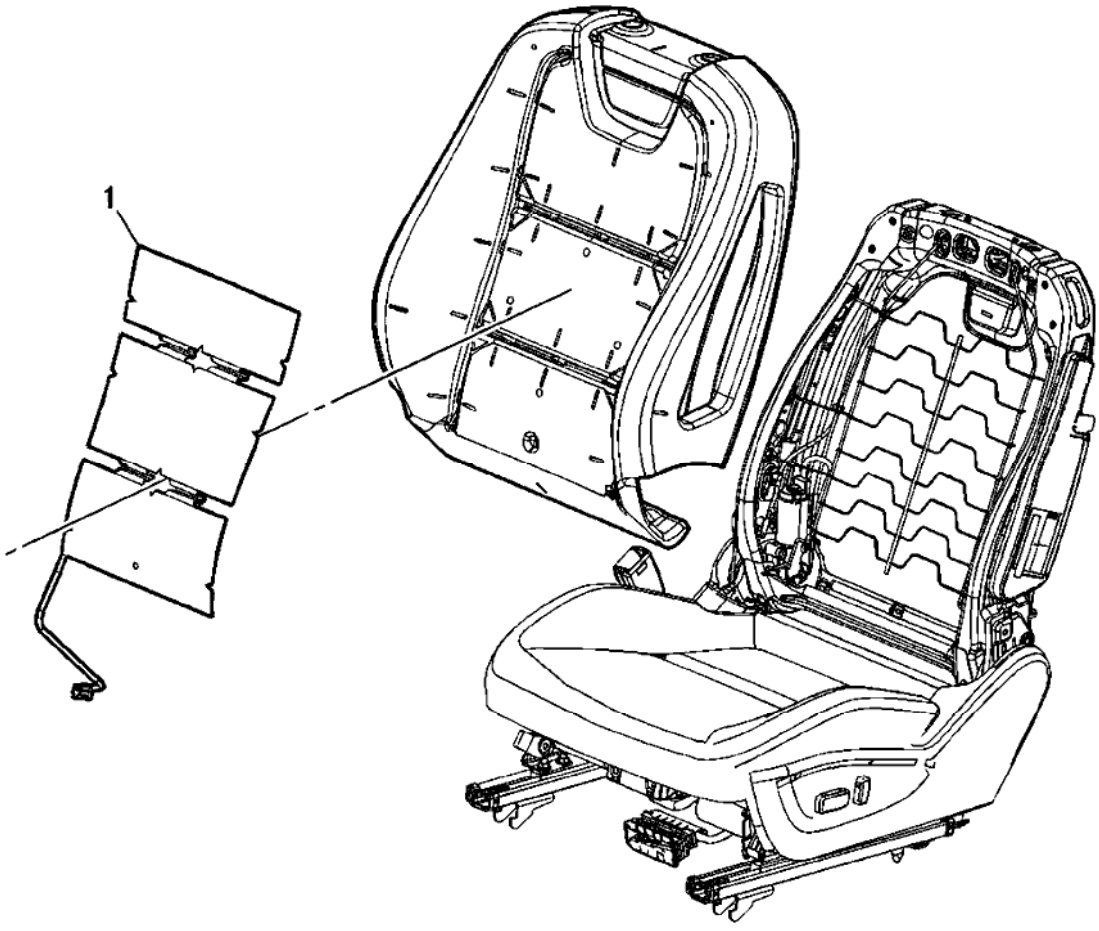


Fig. 3: Driver Or Passenger Seat Back Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .**	

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Preliminary Procedure

1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement** .
2. Remove the front seat cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement** .

1	Driver or Passenger Seat Back Cushion Heater **Procedure** 1. Disconnect the electrical connector. 2. Remove the heater element leaving the old adhesive strips intact on the seat cushion. The new seat heater adhesive strips will be placed over the old adhesive strips.

DRIVER SEAT CUSHION HEATER REPLACEMENT

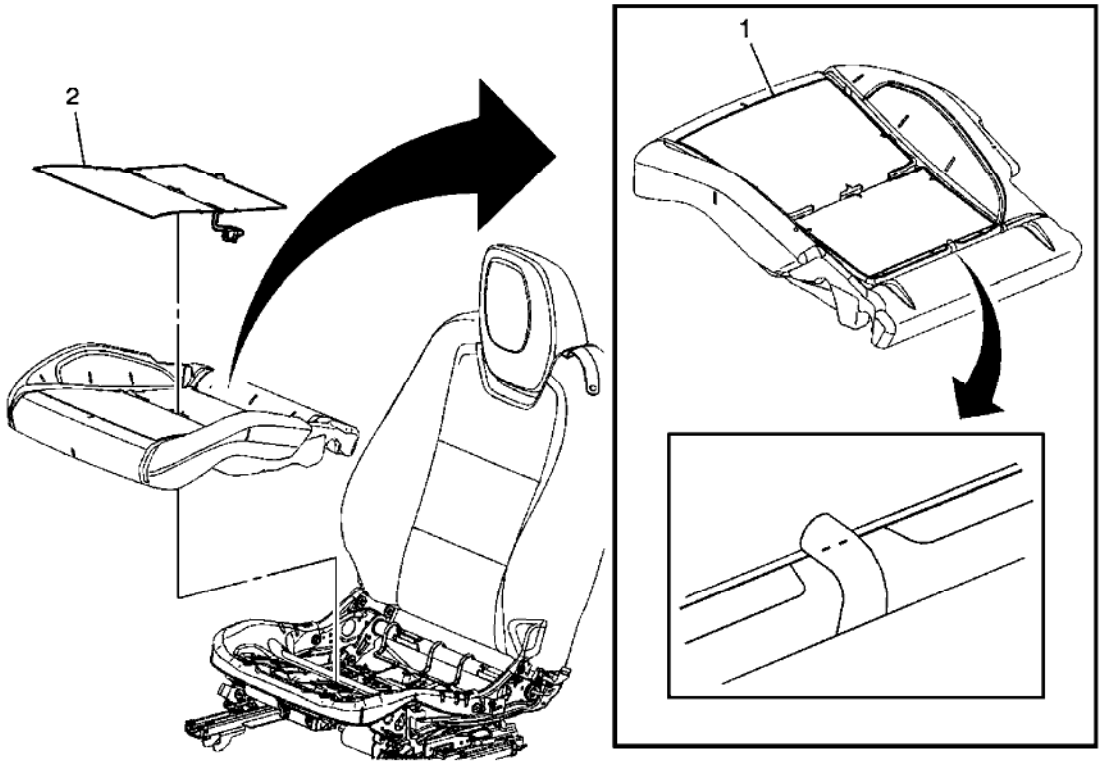


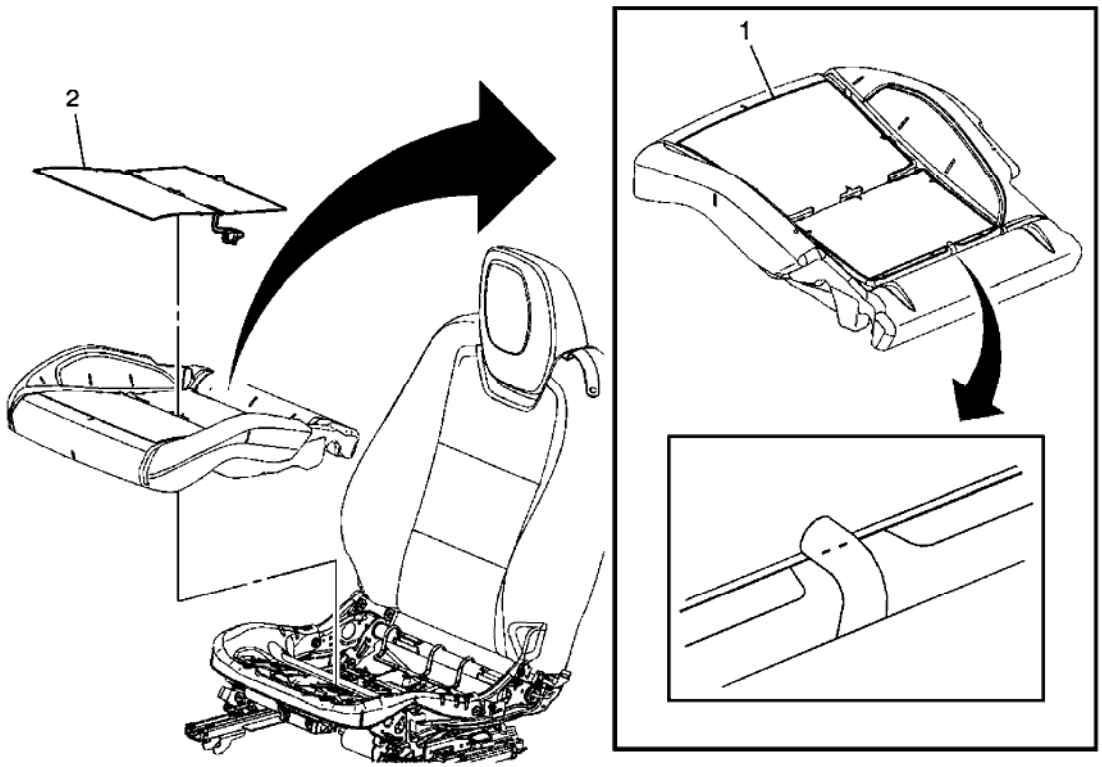
Fig. 4: Driver Seat Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .**	

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Preliminary Procedure 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement** . 2. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement** .	
1	Driver Front Seat Cushion Heater (Faulty) **Procedure** 1. Disconnect the electrical connector. 2. Using a pair of scissors cut the original pigtail wire flush to the faulty heater element. 3. Remove the original pigtail from the faulty heater element and discard it. 4. Leave the faulty heater element in tack on the seat cushion pad. **Tip:** In case of a broken heating wire, DO NOT repair by sodering the two ends.
2	Driver Front Seat Cushion Heater (New) **Procedure:** Apply the new heater element double stacked on top of the orignal faulty heater element. **Tip:** Note the routing of the original pigtail and connector location for installation.

PASSENGER SEAT CUSHION HEATER REPLACEMENT



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Fig. 5: Passenger Seat Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	WARNING: **Refer to SIR Warning .** **WARNING:** **To avoid personal injuries, re-zero the passenger presence system whenever you remove or replace the seat cushion or trim. Failure to do so may cause the system to malfunction.** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement** . 2. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement** .
1	Passenger Front Seat Cushion Heater (Faulty) **Procedure** 1. Disconnect the electrical connector. 2. Using a pair of scissors cut the original pigtail wire flush to the faulty heater element and then add electrical tape to the exposed end. 3. Remove the original pigtail from the faulty heater element and discard it. 4. Leave the faulty heater element in tack on the seat cushion pad. **Tip:** In case of a broken heating wire, DO NOT repair by soldering the two ends.
2	Passenger Front Seat Cushion Heater (New) **Procedure:** Apply the new heater element double stacked on top of the original faulty heater element. **Tip:** The passenger presence system is an integral part of the pad on the passenger seat cushion.

DESCRIPTION AND OPERATION

HEATED SEATS DESCRIPTION AND OPERATION

Heated Seat Components

The driver and passenger heated seats consist of the following components:

- Left heated seat switch
- Right heated seat switch

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- Radio/HVAC control
- Seat heating control module
- Driver seat cushion heating element
- Driver seat back heating element
- Driver seat cushion temperature sensor
- Passenger seat cushion heating element
- Passenger seat back heating element
- Passenger seat cushion temperature sensor

Power and Ground

Battery positive voltage is supplied at all times to the seat heating control module through a 30 A fuse located in the underhood fuse block. This voltage is used by the module to supply power to the seat heating elements. Ground for the module is provided at G307.

Heated Seat Operation

The driver and passenger heated seats are controlled by a single seat heating control module that is located under the driver seat cushion. Both heated seats are controlled by separate heated seat switches that are located in the radio/HVAC control. When a heated seat switch is pressed, a serial data message is sent from the radio/HVAC control to the HVAC control module indicating the heated seat command. The HVAC control module serves as a gateway to transmit the message to the seat heating control module via the serial data line. In response to this signal, the seat heating control module applies battery positive voltage through the element supply voltage circuit to the appropriate seat heating elements. The seat heating control module then sends a serial data message back to the HVAC control module to gateway the information to the radio/HVAC control to either illuminate or turn off the appropriate temperature indicator.

Temperature Regulation

When the engine ON, the heated seats will initialize in the OFF state. With each activation of the heated seat switch, the seat heating control module will cycle the temperature setting in the following manner: HIGH, LOW, and OFF.

The seat heating control module monitors the seat temperature through the temperature sensor signal circuit and the temperature sensor (thermistor) that is located in the seat cushion. The temperature sensor is a variable resistor, it's resistance changes as the temperature of the seat changes. When the temperature sensor resistance indicates to the seat heating control module that the seat has reached the desired temperature, the module opens the ground path of the seat heating elements through the heated seat element control circuit. The module will then cycle the element control circuit open and closed in order to maintain the desired temperature.

Load Management

The electrical power management function is designed to monitor the vehicle electrical load and determine when the battery is potentially in a high discharge condition. The heated seat system is one of the vehicle loads that is subject to reduction during a battery discharge condition. For more information on load management refer to **Electrical Power Management Description and Operation** .

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Secondary and Configurable Customer Controls - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

STEERING WHEEL SECONDARY/CONFIGURABLE CONTROL SCHEMATICS

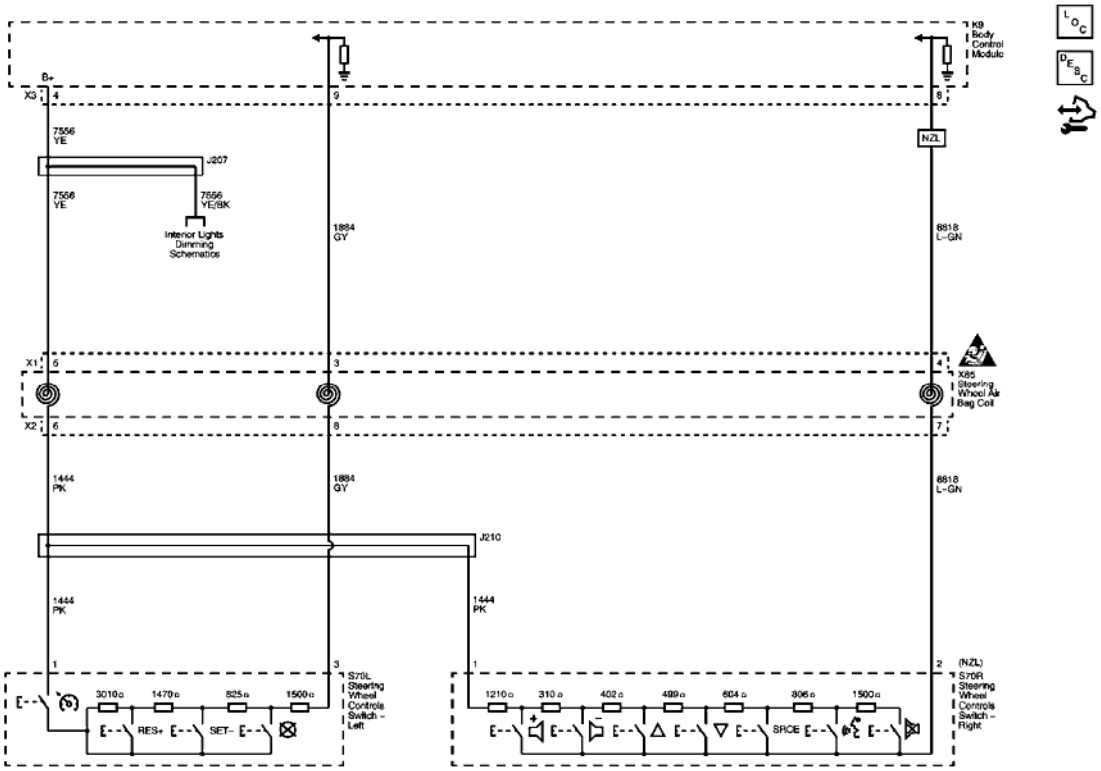


Fig. 1: Steering Wheel Secondary/Configurable Control
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1529	B1529 03: Control Module Voltage Reference Output 5 Circuit Low Voltage B1529 07: Control Module Voltage Reference Output 5 Circuit High Voltage
DTC B3622	B3622 07: Steering Wheel Controls Signal Circuit High Voltage

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DTC B1529

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1529 03

Control Module Voltage Reference Output 5 Circuit Low Voltage

DTC B1529 07

Control Module Voltage Reference Output 5 Circuit High Voltage

Diagnostic Fault Information

Electrical DTCs

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12V Reference	B1529 03	1	-	-
Steering Wheel Control Switch Signal	1	1	B3622 07	-
1. Steering Wheel Controls Inoperative				

Circuit/System Description

The body control module (BCM) supplies voltage to the steering wheel control switches and monitors the return signal. Each switch state is associated to a set resistance value and when pressed a specific voltage drop occurs across the resistor unique to the switch. The BCM identifies the switch selection and activates the feature.

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The ignition is ON.

Conditions for Setting the DTC

B1529 03

- The BCM detects a short to ground in the 12 V reference circuit.
- The above condition is present for greater than 30 s.

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B1529 07

- The BCM detects a short to voltage in the 12 V reference circuit.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

The BCM will ignore switch inputs.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction free ignition cycles have occurred.

Reference Information

Schematic Reference

Steering Wheel Secondary/Configurable Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Steering Wheel Controls Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the X85 Steering Wheel Air Bag Coil.
2. Ignition ON, test for greater than 11 V between the voltage reference circuit terminal 6 (X2) male side and ground.
    - If less than the specified value, test the voltage reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.

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3. Test for greater than 11 V between the voltage reference circuit terminal 6 (X2) male side and the signal circuit terminal 7 (X2) male side.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
4. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
5. Test for infinite resistance between the signal circuit terminal 7 (X2) male side at the X85 Steering Wheel Air Bag Coil and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70R Steering Wheel Controls Switch - Right.

Component Testing

Static Test

1. Disconnect the harness connector at the X85 Steering Wheel Air Bag Coil.
2. Test the resistance between the terminals 6 (X2) female side and 7 (X2) female side of the X85 Steering Wheel Air Bag Coil.
    - If any of the resistance measurements for the individual switches are not within the specified resistance values, replace the S70R Steering Wheel Controls Switch - Right.

Function Switch	Minimum Resistance Value	Maximum Resistance Value
Volume Up	1.0 kohms	1.4 kohms
Volume Down	1.3 kohms	1.7 kohms
Seek Up	1.7 kohms	2.1 kohms
Seek Down	2.2 kohms	2.6 kohms
Source	2.8 kohms	3.2 kohms
Phone/Push to Talk	3.6 kohms	4.0 kohms
Hang Up/Audio Mute	5.1 kohms	5.5 kohms
No Switch Pressed	O.L.	O.L.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio and Telephone Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DTC B3622

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

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- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3622 07

Steering Wheel Controls Signal Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12V Reference	B1529 03	1	-	-
Steering Wheel Control Switch Signal	1	1	B3622 07	-
1. Steering Wheel Controls Inoperative				

Circuit/System Description

The body control module (BCM) monitors the steering wheel control signal circuit voltage. If the voltage level is too high, damage may result in the system. When a high voltage condition is detected, the BCM will ignore the switch command.

Conditions for Running the DTC

- Battery voltage is between 9-16 V.
- The ignition is ON.

Conditions for Setting the DTC

The BCM detects a short to voltage in the steering wheel control switch signal circuit.

Action Taken When the DTC Sets

The BCM will ignore switch inputs.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction free ignition cycles have occurred.

Reference Information

Schematic Reference

Steering Wheel Secondary/Configurable Control Schematics

Connector End View Reference

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Component Connector End Views

Description and Operation

Steering Wheel Controls Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the X85 Steering Wheel Air Bag Coil.
2. Ignition ON, test for greater than 11 V between the voltage reference circuit terminal 6 (X2) male side and ground.
    - If less than the specified value, test the voltage reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
3. Test for greater than 11 V between the voltage reference circuit terminal 6(X2) male side and the signal circuit terminal 7 (X2) male side.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
4. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
5. Test for infinite resistance between the signal circuit terminal 7 (X2) male side at the X85 Steering Wheel Air Bag Coil and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70R Steering Wheel Controls Switch - Right.

Component Testing

Static Test

1. Disconnect the harness connector at the X85 Steering Wheel Air Bag Coil.
2. Test the resistance between the terminals 6 (X2) female side and 7 (X2) female side of the X85 Steering Wheel Air Bag Coil.
    - If any of the resistance measurements for the individual switches are not within the specified resistance values, replace the S70R Steering Wheel Controls Switch - Right.

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Function Switch	Minimum Resistance Value	Maximum Resistance Value
Volume Up	1.0 kohms	1.4 kohms
Volume Down	1.3 kohms	1.7 kohms
Seek Up	1.7 kohms	2.1 kohms
Seek Down	2.2 kohms	2.6 kohms
Source	2.8 kohms	3.2 kohms
Phone/Push to Talk	3.6 kohms	4.0 kohms
Hang Up/Audio Mute	5.1 kohms	5.5 kohms
No Switch Pressed	O.L.	O.L.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio and Telephone Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

SYMPTOMS - SECONDARY AND CONFIGURABLE CUSTOMER CONTROLS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system description and operation in order to familiarize yourself with the system functions. Refer to **Steering Wheel Controls Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the steering wheel controls. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components, for obvious damage or conditions, which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

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Refer to **Steering Wheel Controls Malfunction** in order to diagnose the symptom.

STEERING WHEEL CONTROLS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B1529 03	1	-	B1529 05
Steering Wheel Control Switch Signal	1	1	B3622 07	-
1. Steering Wheel Controls Inoperative				

Circuit/System Description

The body control module (BCM) supplies voltage to the audio steering wheel control switches and monitors the return signal. Each switch state is associated to a set resistance value and when pressed a specific voltage drop occurs across the resistor unique to the switch. The BCM identifies the switch selection and activates the feature.

Diagnostic Aids

- This diagnostic is for the audio steering wheel controls.
- Before diagnosis of the steering wheel controls, ensure the primary controls of the associated component are functioning properly.
- If a single switch function is inoperative, test the suspect switch. Refer to component testing.

Reference Information

Schematic Reference

Steering Wheel Secondary/Configurable Control Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Steering Wheel Controls Description and Operation

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Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the X85 Steering Wheel Air Bag Coil.
2. Ignition ON, test for greater than 11 V between the voltage reference circuit terminal 6 X2 male side and ground.
    - If less than the specified value, test the voltage reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
3. Test for greater than 11 V between the voltage reference circuit terminal 6 X2 male side and the signal circuit terminal 7 X2 male side.
    - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
4. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
5. Test for infinite resistance between the signal circuit terminal 7 X2 male side at the X85 Steering Wheel Air Bag Coil and ground.
    - If less than the specified value, test the signal circuit for a short to ground.
6. If all circuits test normal, test or replace the S70R Steering Wheel Controls Switch - Right.

Component Testing

Static Test

1. Disconnect the harness connector at the X85 Steering Wheel Air Bag Coil.
2. Test the resistance between the terminals 6 X2 female side and 7 X2 female side of the X85 Steering Wheel Air Bag Coil.
    - If any of the resistance measurements for the individual switches are not within the specified resistance values, replace the S70R Steering Wheel Controls Switch - Right.

Function Switch	Minimum Resistance Value	Maximum Resistance Value
Volume Up	1.0 kohms	1.4 kohms
Volume Down	1.3 kohms	1.7 kohms
Seek Up	1.7 kohms	2.1 kohms

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Seek Down	2.2 kohms	2.6 kohms
Source	2.8 kohms	3.2 kohms
Phone/Push to Talk	3.6 kohms	4.0 kohms
Hang Up/Audio Mute	5.1 kohms	5.5 kohms
No Switch Pressed	O.L.	O.L.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio and Telephone Control Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DESCRIPTION AND OPERATION

STEERING WHEEL CONTROLS DESCRIPTION AND OPERATION

The steering wheel control switches duplicate the function of the primary controls of the associated component, through a network of momentary contact switches and a series of resistors. The body control module (BCM) supplies voltage to the switches and monitors the return signal. When a switch is pressed, a specific voltage drops across the resistor unique to that switch. The BCM identifies the switch selected and sends a serial data message to the component controlled by the switch, activating the feature.

This section is intended to diagnose the circuits between the BCM and the steering wheel control switches. If the primary control for the device is inoperative, refer to the appropriate section for the component the steering wheel control switch is used for.

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2010 STEERING

Steering Wheel and Column - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Steering Column Bolts	22 N.m	16 lb ft
Steering Column Shroud Bolts	2.5 N.m	22 lb in
Steering Gear Pinion Bolt	50 N.m	37 lb ft
Steering Wheel Bolt	30 N.m	22 lb ft
Upper Intermediate Steering Shaft Bolt	36 N.m	26.5 lb ft

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Steering Gear Pinion Bolt Thread Locking Adhesive	Blue Loctite® 242	12345382	10953489
Upper Intermediate Steering Shaft Bolt Thread Locking Adhesive	Blue Loctite® 242	12345382	10953489

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - STEERING WHEEL AND COLUMN

Review the system description and operation in order to familiarize yourself with the system functions. Refer to **Steering Wheel and Column Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the steering wheel and column.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptoms List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Steering Column Tilt Function Inoperative**
- **Ignition Key Cannot Be Removed from the Ignition Lock Cylinder**

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- **Ignition Key Cannot Turn or Sticks in Any Position**
- **Noise in Steering Column**
- **High Shift Effort**
- **Looseness in Steering Column**

STEERING COLUMN TILT FUNCTION INOPERATIVE

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to **Step 2**	Go to **Symptoms - Steering Wheel and Column**
2	Verify that the steering column tilt function is inoperative. Does the steering column tilt function operate normally?	System OK	Go to **Step 3**
3	Verify that the following components are not seized or corroded: • Tilt pivot pins • Tilt head lock shoes Are the components seized or corroded?	Go to **Step 7**	Go to **Step 4**
4	Inspect the tilt pivot pins for binding. Are the tilt pivot pins binding?	Go to **Step 8**	Go to **Step 5**
5	Inspect for a weak or broken steering column tilt spring. Is the steering column tilt spring weak or broken?	Go to **Step 9**	Go to **Step 6**
6	Inspect the steering column wiring harness routing for tightness. Was the steering column wiring harness routed correctly?	Go to **Step 11**	Go to **Step 10**
7	Replace the steering column. Refer to **Steering Column Replacement**. Did you complete the repair?	Go to **Step 11**	-
8	If serviceable, replace the pivot pins. If not serviceable replace the steering column. Refer to **Steering Column Replacement**. Did you complete the repair?	Go to **Step 11**	-
9	Replace the tilt spring. Did you complete the repair?	Go to **Step 11**	-
10	Route the steering column wiring harness to the correct location. Did you correctly rout the wiring harness?	Go to **Step 11**	-

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11	Operate the steering column tilt function in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

NOISE IN STEERING COLUMN

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and perform the necessary inspections?	Go to **Step 2**	Go to **Steering Wheel and Column Description and Operation**
2	Verify that noise is present in the steering column during operation. Is noise present in the steering column during operation?	Go to **Step 3**	System OK
3	Inspect the steering column mounting features for the following conditions: • Steering column mounting fasteners for looseness • Steering column mounting features are sheared Are the steering column mounting features loose?	Go to **Step 9**	Go to **Step 4**
4	Inspect the SIR/SRS coil for noise. Is the SIR/SRS coil noisy?	Go to **Step 10**	Go to **Step 5**
5	Inspect the lock plate retaining ring for correct installation. Is the lock plate retaining ring installed incorrectly?	Go to **Step 11**	Go to **Step 6**
6	Inspect the steering column upper and lower bearings for the following conditions: • Damage • Lubrication • Wear • Proper seating Are the bearings in need of repair or replacement?	Go to **Step 12**	Go to **Step 7**
7	Does the tilt joint need to be lubricated?	Go to **Step 13**	Go to **Step 8**
8	**IMPORTANT:** **This is best evaluated while driving the vehicle, turning the steering and applying the brake pedal.** Inspect the steering column intermediate shaft for		

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	noise.Is the steering column intermediate shaft noisy?	Go to **Step 14**	Go to **Step 15**
9	**IMPORTANT:** **If the steering column mounting feature is damaged or sheared, the steering column will need to be replaced. Refer to Steering Column Replacement.** Tighten the steering column mounting fastener to specifications. Refer to **Fastener Tightening Specifications**.Did you complete the repair?	Go to **Step 15**	-
10	Replace the SIR/SRS coil. Refer to **Steering Wheel Inflatable Restraint Module Coil Replacement** . Did you complete the repair?	Go to **Step 15**	-
11	Install the lock plate retaining ring correctly. Did you complete the repair?	Go to **Step 15**	-
12	**IMPORTANT:** **If the steering column upper and/or lower bearings are not serviceable, the steering column will need to be replaced. Refer to Steering Column Replacement.** Replace the upper and/or lower bearings, if serviceable.Did you complete the replacement?	Go to **Step 15**	-
13	Lubricate the tilt joint. Did you complete the repair?	Go to **Step 15**	-
14	Replace the appropriate steering intermediate shaft component. Did you complete the repair?	Go to **Step 15**	-
15	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

HIGH SHIFT EFFORT

Step	Action	Yes	No
DEFINITION: Abnormally high shift effort is required to shift the transmission out of the Park (P) position.			
1	Did you review the Steering Wheel and Column Description and Operation?	Go to **Step 2**	Go to **Steering Wheel and Column Description and Operation**
2	Verify that a high column shift effort is required in order to shift out of the PARK position. Does the column shifter operate normally?	System OK	Go to **Step 3**
3	Inspect for worn or worn or damaged automatic transmission range selector shift cable. Is the transmission range selector shift cable worn or damaged?	Go to **Step 6**	Go to **Step 4**

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4	Inspect the automatic transmission range selector shift cable for binding or mis-adjustment. Is the automatic transmission range selector shift cable binding or mis-adjusted?	Go to **Step 7**	Go to **Step 5**
5	Inspect the column linear shift assembly for damage. Is the column linear shift assembly damaged?	Go to **Step 8**	Go to **Step 9**
6	Replace the automatic transmission range selector shift cable. Did you complete the repair?	Go to **Step 9**	-
7	Adjust the automatic transmission range selector shift cable. Did you complete the repair?	Go to **Step 9**	-
8	**IMPORTANT:** **If the column linear shift assembly is not serviceable, then the steering column will need to be replaced. Refer to Steering Column Replacement.** Replace the column linear shift assembly, if serviceable.Did you complete the replacement?	Go to **Step 9**	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

LOOSENESS IN STEERING COLUMN

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to **Step 2**	Go to **Steering Wheel and Column Description and Operation**
2	Verify that the steering column is loose. Is the steering column loose?	Go to **Step 3**	System OK
3	Inspect the steering column mounting features for the following conditions. • Steering column mounting fasteners for looseness • Steering column mounting features are sheared Are the steering column mounting features loose?	Go to **Step 5**	Go to **Step 4**
4	Inspect the upper and/or lower bearings for looseness. Are any of the bearings worn or loose?	Go to **Step 6**	Go to **Step 7**
	IMPORTANT: **If the steering column mounting feature is damaged or sheared, the steering column will need to be**		

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	replaced. Refer to Steering Column Replacement.		
5	Tighten the steering column mounting fastener to specifications. Refer to **Fastener Tightening Specifications**.Did you complete the repair?	Go to **Step 7**	-
6	**IMPORTANT:** **If the steering column upper and/or lower bearings are not serviceable, the steering column will need to be replaced. Refer to Steering Column Replacement.** Replace the upper and/or lower bearings, if serviceable.Did you complete the repair?	Go to **Step 7**	-
7	Operate the steering column in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

REPAIR INSTRUCTIONS

INTERMEDIATE STEERING SHAFT REPLACEMENT

Removal Procedure

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- **The steering column**
- **The intermediate shaft(s)**
- **The steering gear**

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has became un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. LOCK the steering column and verify the front wheels are in the straight ahead position.
2. Ensure the tilt and telescope lever is in the locked position with the steering column tilted to the highest position and telescoped to the maximum rearward position.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

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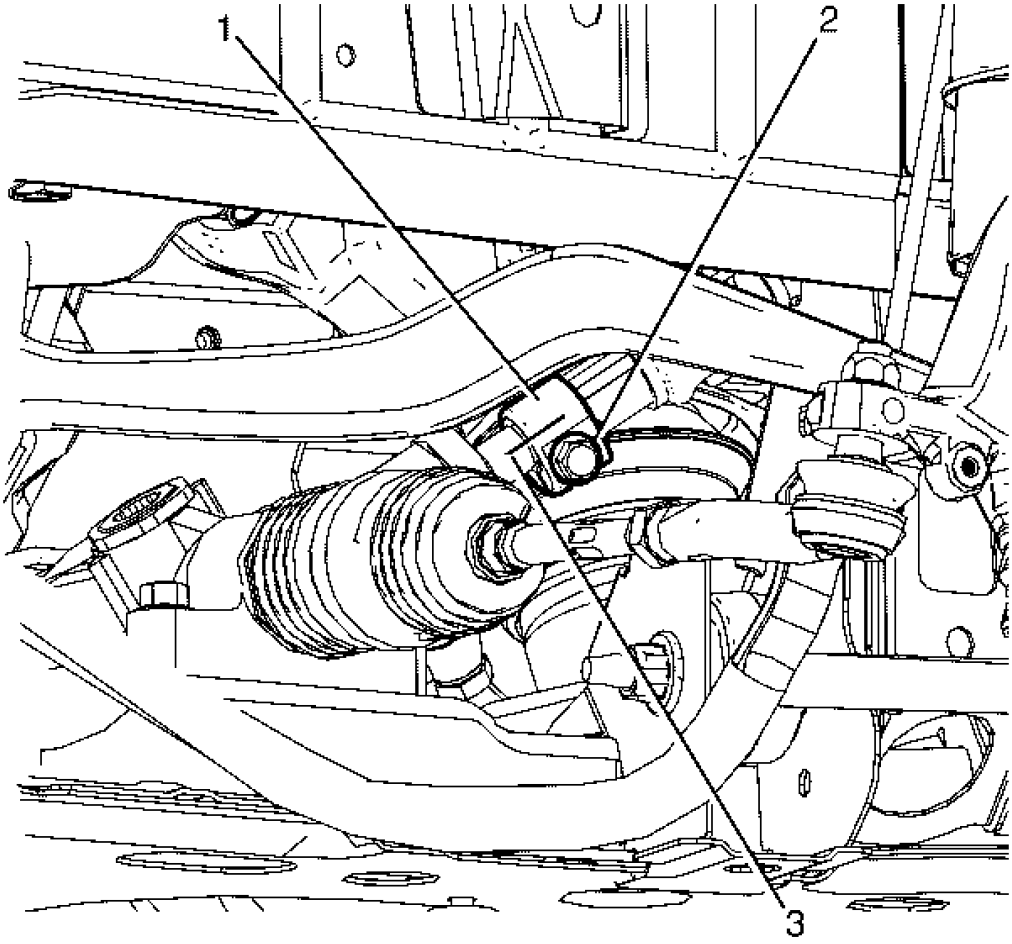


Fig. 1: Identifying Intermediate Steering Shaft To Pinion Shaft Retaining Bolt
Courtesy of GENERAL MOTORS CORP.

4. Working under the vehicle, use paint in order to place match marks on the intermediate steering shaft (1) and on the steering gear pinion shaft (3).
5. Remove the steering gear pinion bolt (2).
6. Remove the thread locking patch and clean the threads on the steering gear pinion bolt.
7. Disconnect the intermediate steering shaft from the steering gear pinion shaft.

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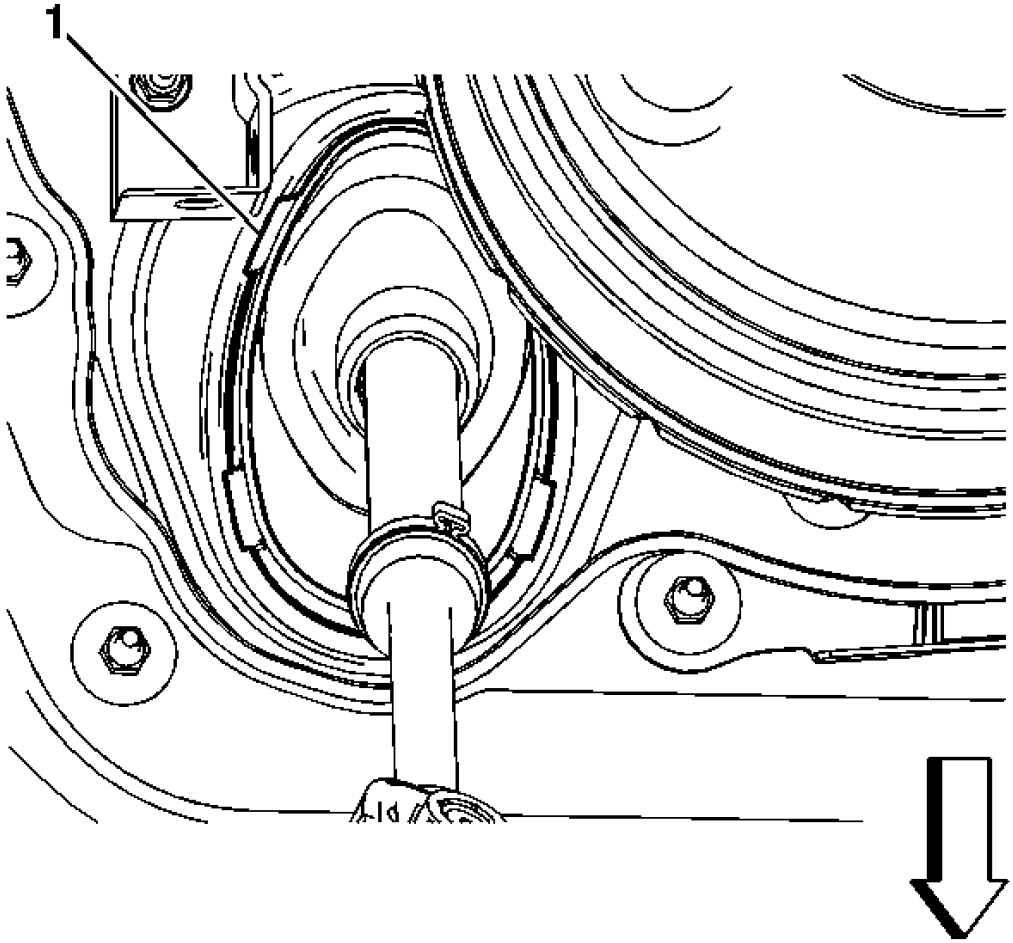


Fig. 2: Intermediate Shaft Seal Tabs
Courtesy of GENERAL MOTORS CORP.

8. Working under the vehicle, disengage the 4 tabs (1) on the intermediate shaft seal.

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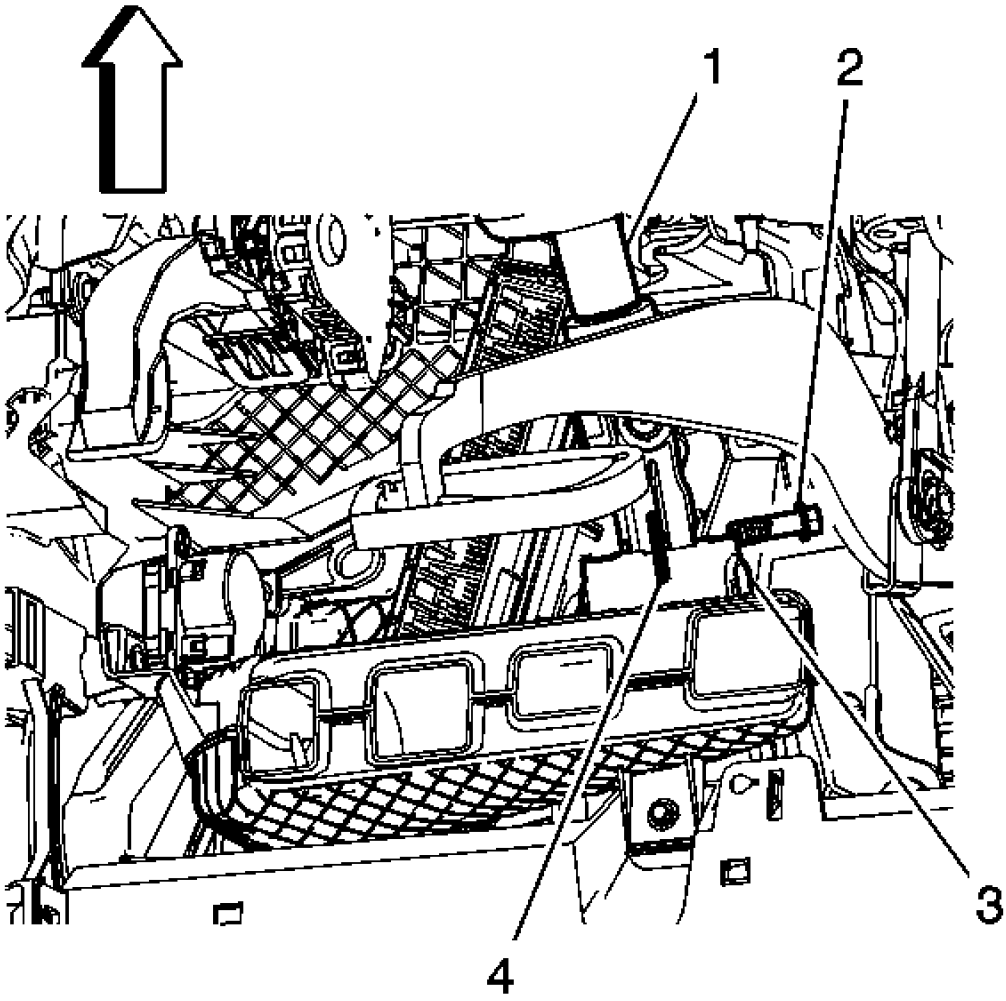


Fig. 3: Steering Column Shaft & Intermediate Steering Shaft Match Marks
Courtesy of GENERAL MOTORS CORP.

9. Working under the instrument panel, use paint in order to place match marks (4) on the steering column shaft (1) and on the intermediate steering shaft (3).
10. Remove the upper intermediate shaft bolt (2).
11. Remove the thread locking patch and clean the threads on the upper intermediate shaft bolt.
12. Disconnect the intermediate steering shaft from the steering column shaft.

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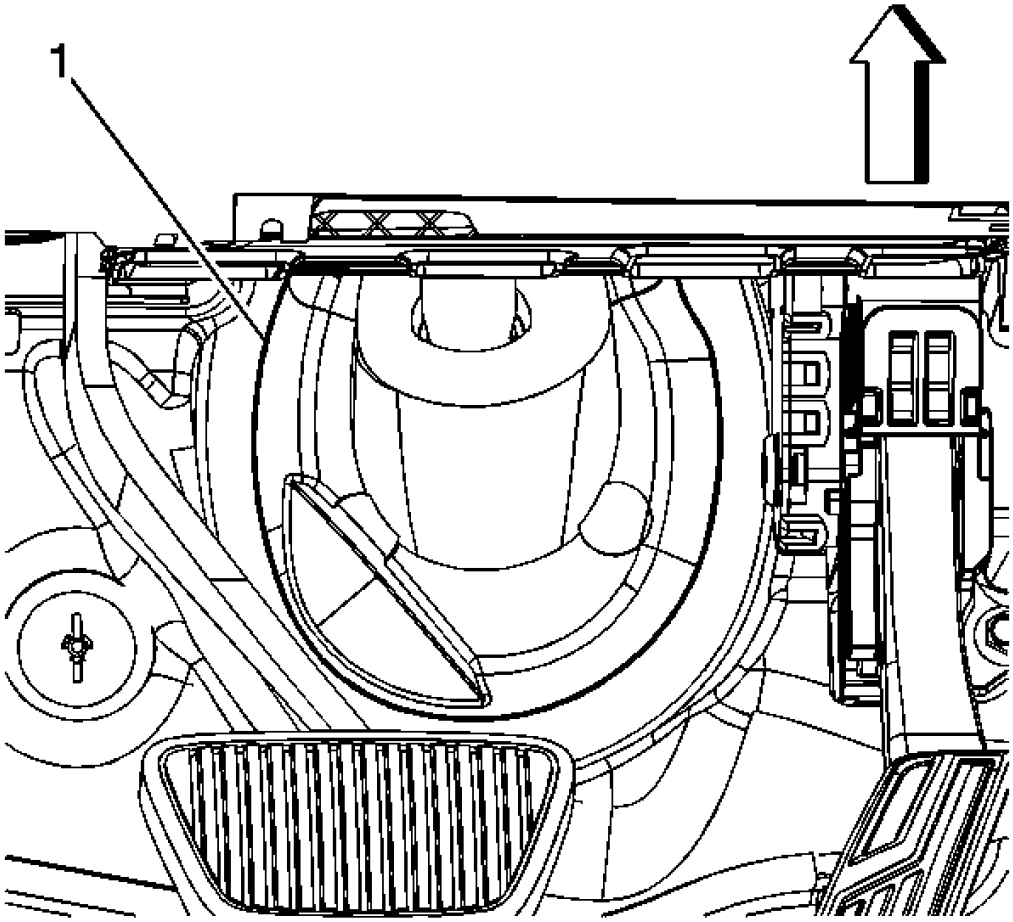


Fig. 4: Intermediate Shaft Seal
Courtesy of GENERAL MOTORS CORP.

13. Working under the instrument panel, remove the intermediate shaft seal (1) from the dash panel.
14. Remove the intermediate steering shaft and the seal as an assembly from the vehicle.

Installation Procedure

1. If you are replacing the intermediate steering shaft, copy the match marks from the old shaft to the new shaft.
2. Ensure the tilt and telescope lever is in the locked position with the steering column tilted to the highest position and telescoped to the maximum rearward position.
3. Position the intermediate steering shaft and intermediate shaft seal assembly in the vehicle on the driver's floor.

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4. Position the intermediate steering shaft in the dash panel opening.

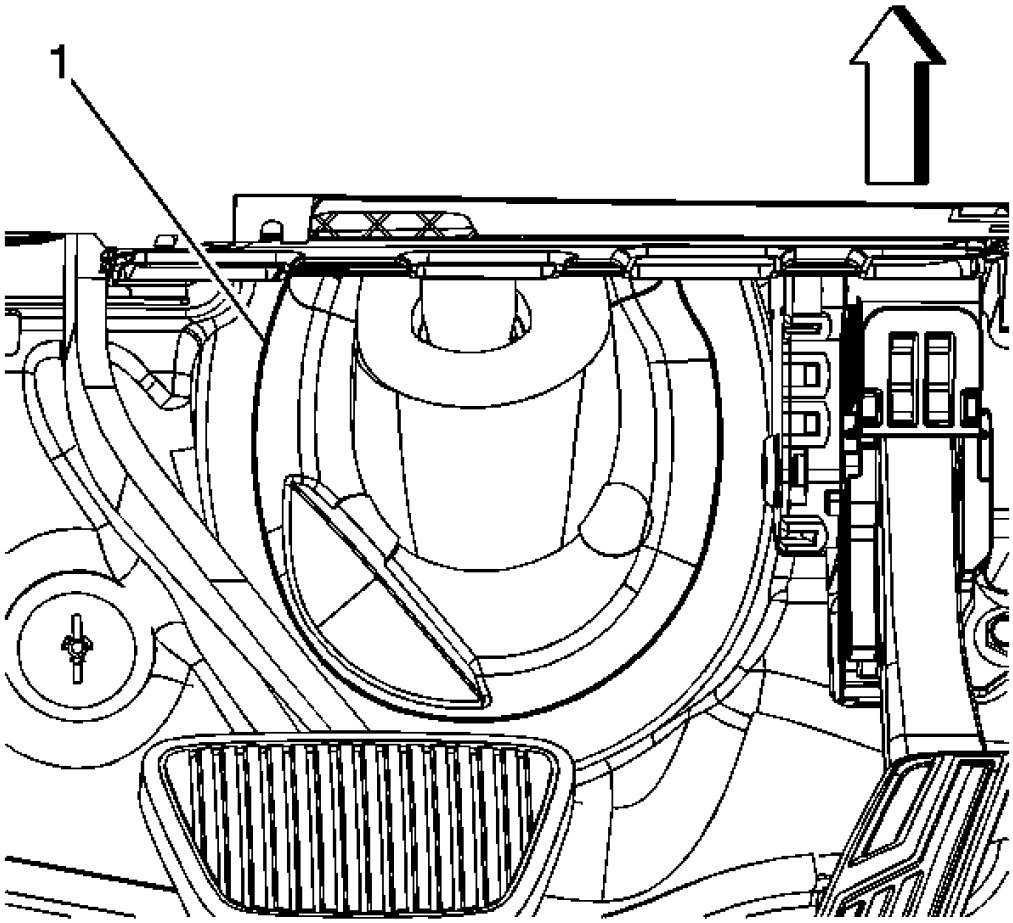


Fig. 5: Intermediate Shaft Seal
Courtesy of GENERAL MOTORS CORP.

5. Working under the instrument panel, install the intermediate shaft seal (1) to the dash panel. Apply pressure to the seal in order to engage the 4 tabs.

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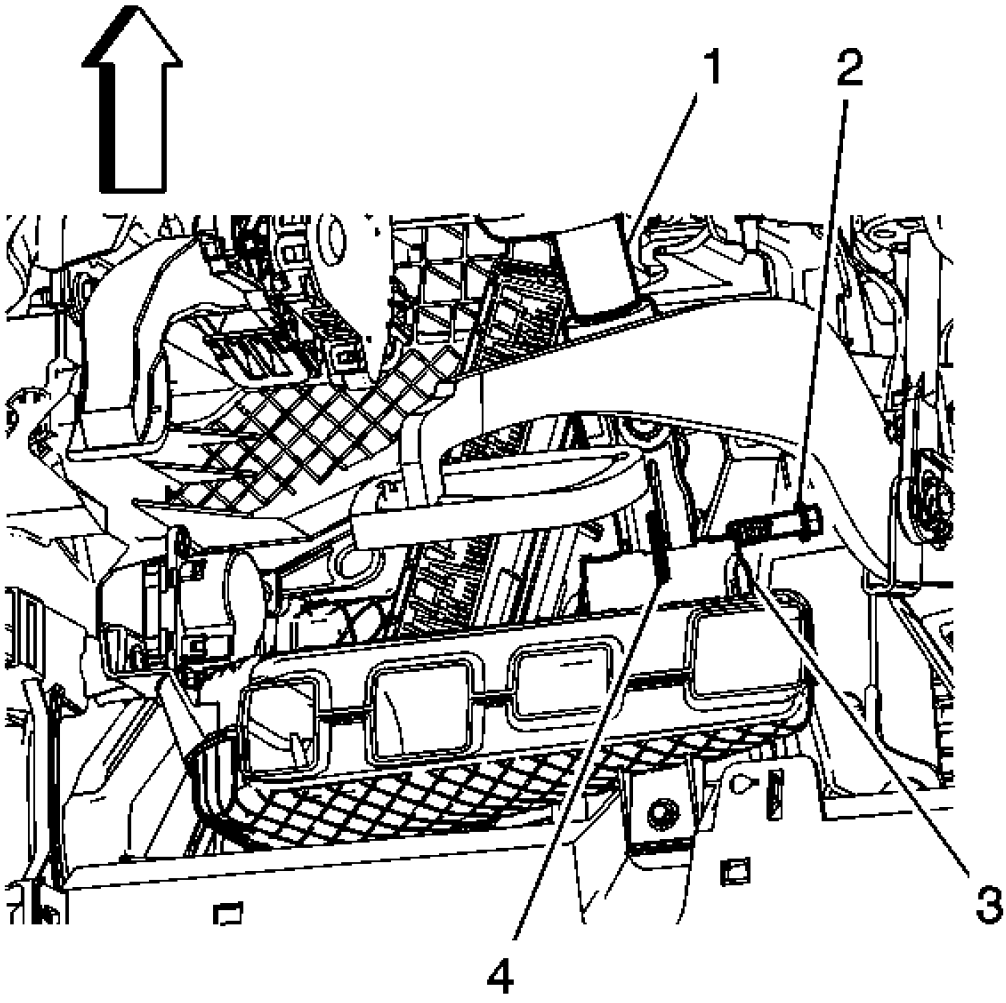


Fig. 6: Steering Column Shaft & Intermediate Steering Shaft Match Marks
Courtesy of GENERAL MOTORS CORP.

6. Working under the instrument panel, align the match marks (4) and connect the intermediate steering shaft (3) to the steering column shaft (1).
7. Apply thread locking adhesive to the upper intermediate steering shaft bolt (2). Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

CAUTION: Refer to Fastener Caution .

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8. Install the upper intermediate steering shaft bolt and tighten to 36 N.m (26.5 lb ft).

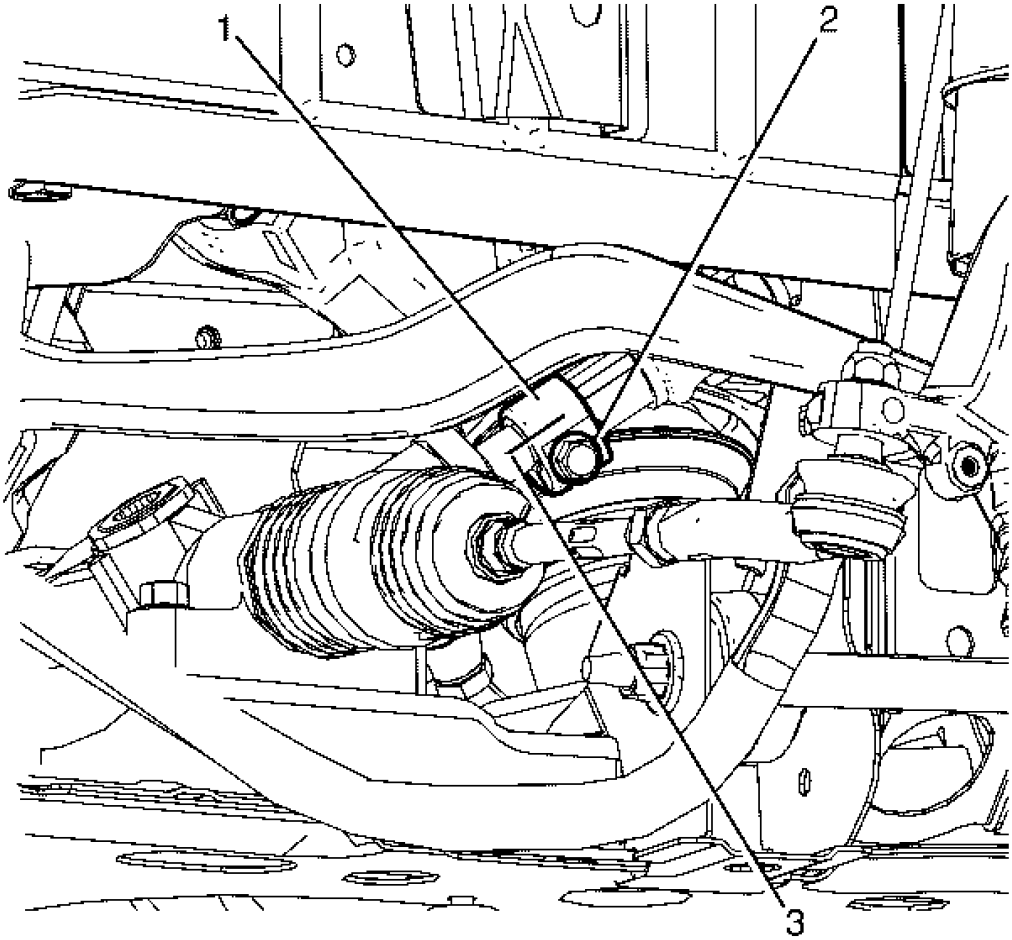


Fig. 7: Identifying Intermediate Steering Shaft To Pinion Shaft Retaining Bolt
Courtesy of GENERAL MOTORS CORP.

9. Working under the vehicle, align the match marks and connect the intermediate steering shaft (1) to the steering gear pinion shaft (3).
10. Apply thread locking adhesive to the steering gear pinion bolt (2). Refer to **Adhesives, Fluids, Lubricants, and Sealers**.
11. Install the steering gear pinion bolt and tighten to 50 N.m (37 lb ft).

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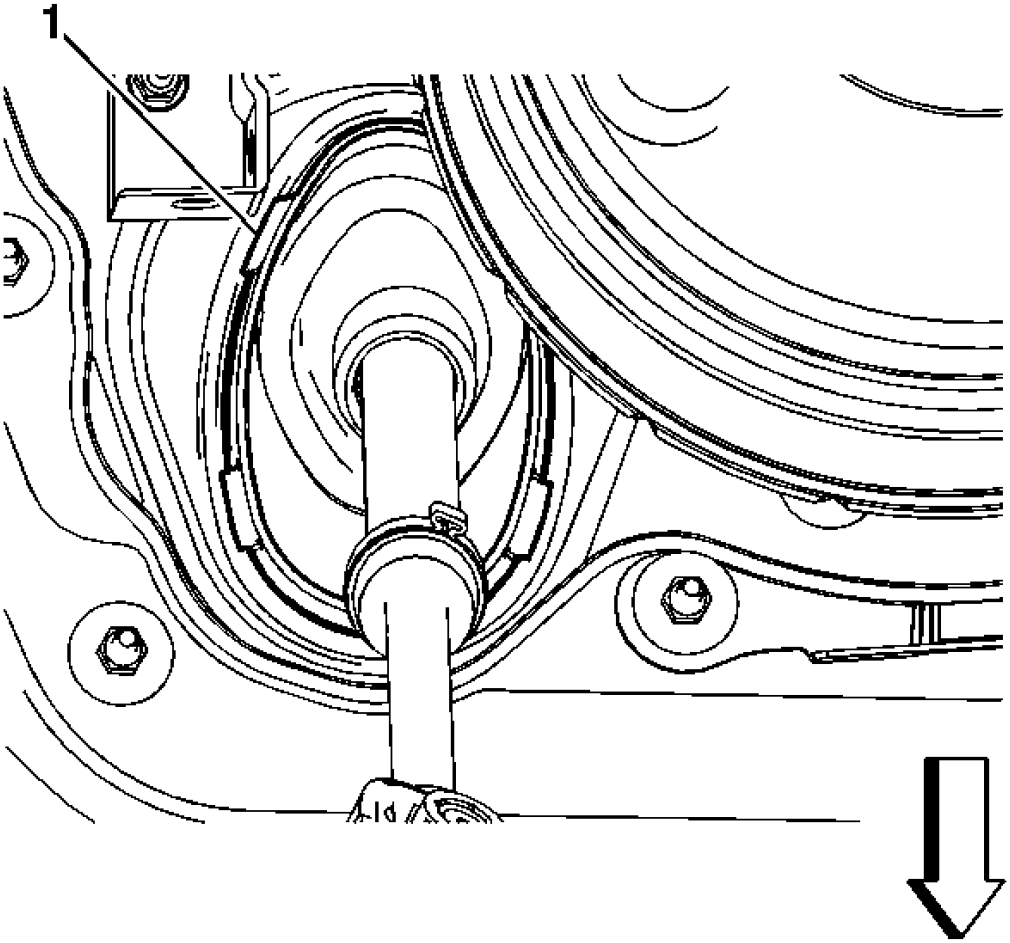


Fig. 8: Intermediate Shaft Seal Tabs
Courtesy of GENERAL MOTORS CORP.

12. Working under the vehicle, ensure the 4 tabs (1) on the intermediate shaft seal engage the dash panel.
13. Lower the vehicle.

STEERING COLUMN ACCIDENT DAMAGE INSPECTION

Inspection Procedure

1. Remove the turn signal switch bracket. Refer to **Turn Signal Switch Bracket Replacement**.

NOTE: **Vehicles involved in accidents resulting in frame damage, major body or sheet metal damage, where the steering column has been impacted, or**

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where the supplemental inflatable restraint systems deployed, may have a damaged or misaligned steering column.

2. Remove the steering column from the vehicle. Refer to **Steering Column Replacement**.
3. Rotate the steering column shaft. Verify the shaft turns freely and without interference.

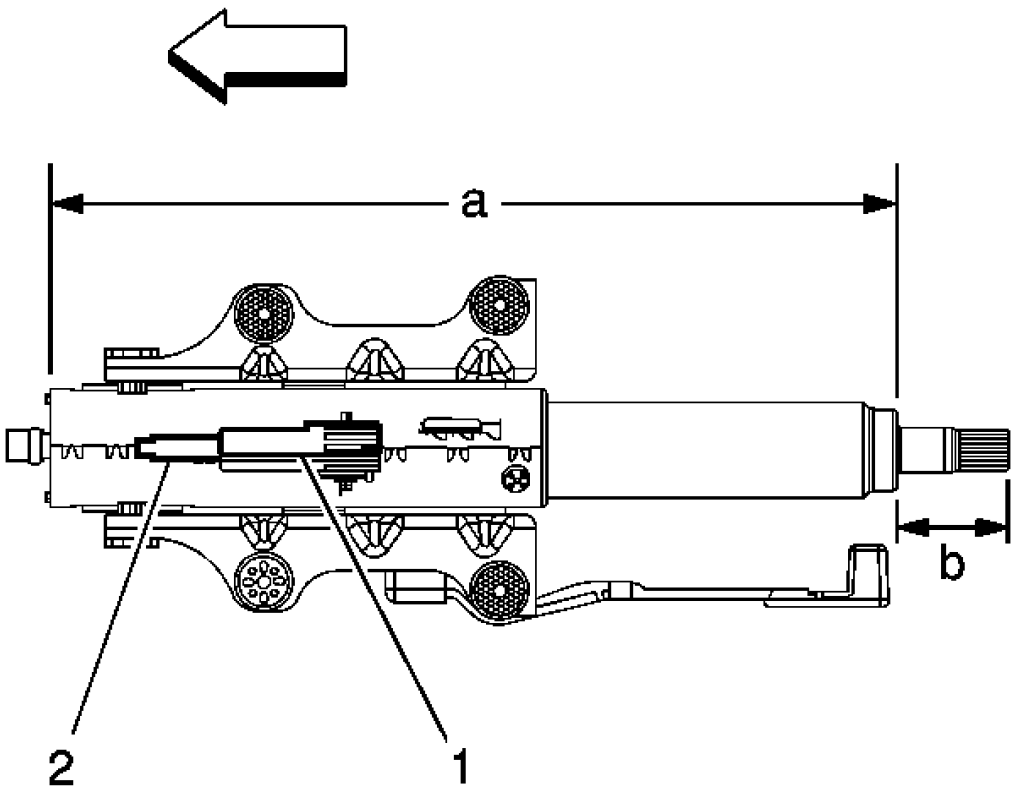


Fig. 9: Steering Column Components
Courtesy of GENERAL MOTORS CORP.

4. Verify the E/A strap retainer (1) is firmly seated on the jacket.
5. Verify there is no visual damage to the E/A strap (2).
6. Measure the length of the upper shaft (b) from the end of the upper jacket to the tip. The length of the upper shaft must not be less than 57 mm (2.2 in).
7. Measure the length of the upper and lower jacket assembly (a). The length of the upper and lower jacket assembly must not be less than 441 mm (17.4 in).
8. If the steering column does not meet the specifications, the steering column is damaged. Discard the damaged steering column. Install a NEW steering column.

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If the steering column meets the specifications, install the steering column. Refer to **Steering Column Replacement**.

9. Install the turn signal switch bracket. Refer to **Turn Signal Switch Bracket Replacement**.

STEERING COLUMN SHROUD REPLACEMENT

Removal Procedure

1. Lower the tilt and telescope lever. Keep the lever in the released position.

   Telescope the steering column to the maximum rearward position.

   Tilt the steering column to the lowest position.

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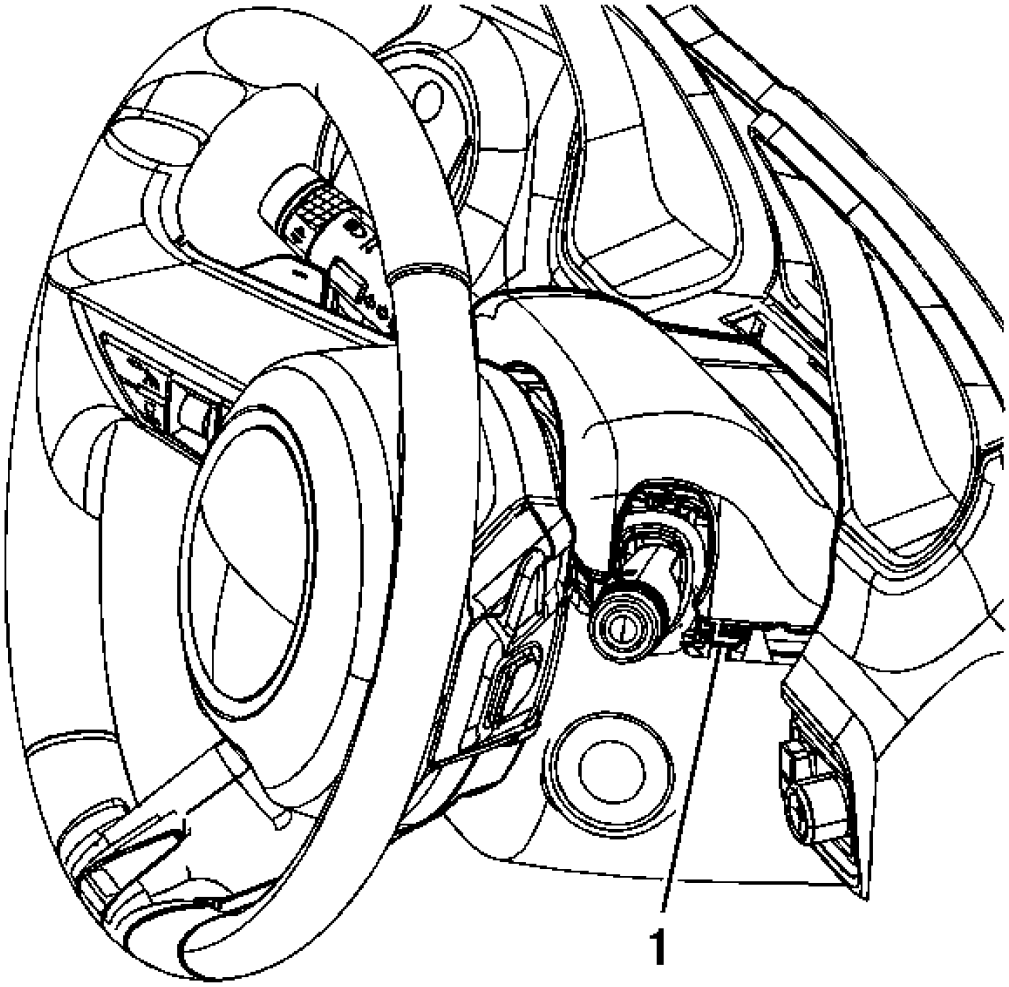


Fig. 10: Right Side Upper Steering Column Shroud Tab
Courtesy of GENERAL MOTORS CORP.

2. Release the 1 tab (1) that secures the right side of the upper steering column shroud to the steering column.

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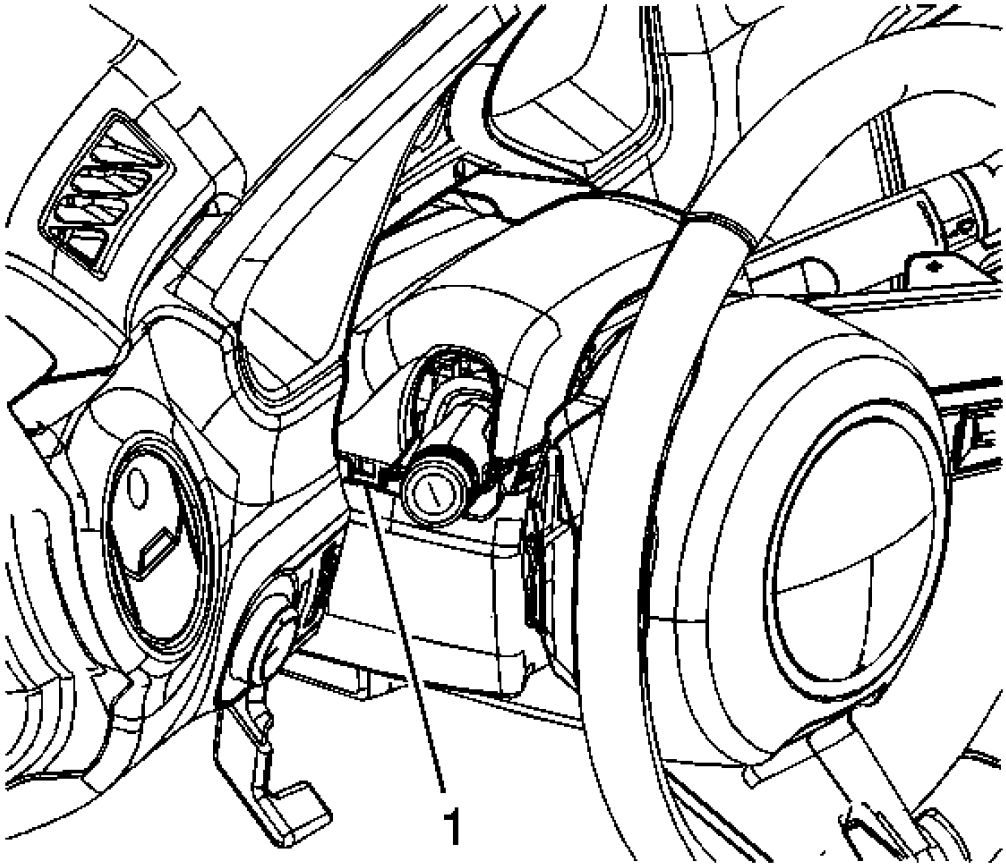


Fig. 11: Left Side Upper Steering Column Shroud Tab
Courtesy of GENERAL MOTORS CORP.

3. Release the 1 tab (1) that secures the left side of the upper steering column shroud to the steering column.

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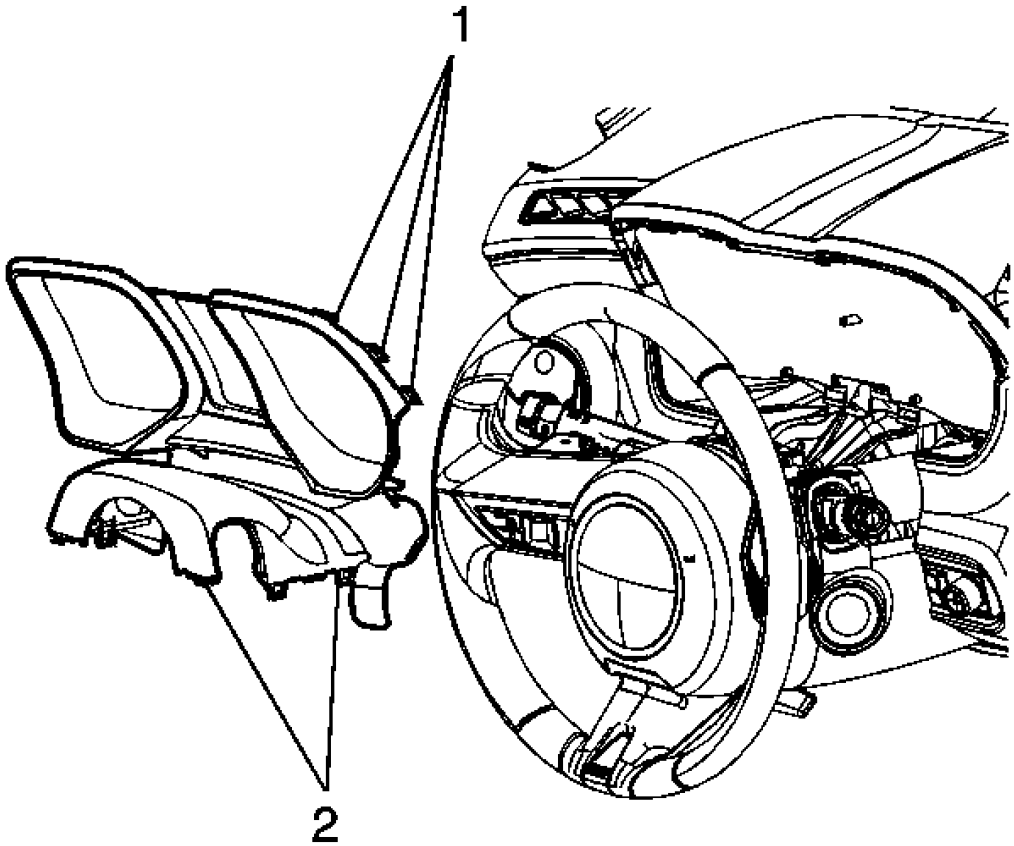


Fig. 12: Right Side Upper Steering Column Shroud Tabs
Courtesy of GENERAL MOTORS CORP.

4. Release the 2 tabs (2) that secure the right side of the upper steering column shroud to the steering column.
5. Release the 2 tabs that secure the left side of the upper steering column shroud to the steering column.
6. Use a flat bladed plastic trim tool in order to release the retaining tabs (1) securing the instrument panel cluster trim plate to the instrument panel.
7. Remove the upper steering column shroud and the instrument panel cluster trim plate as an assembly from the instrument panel.

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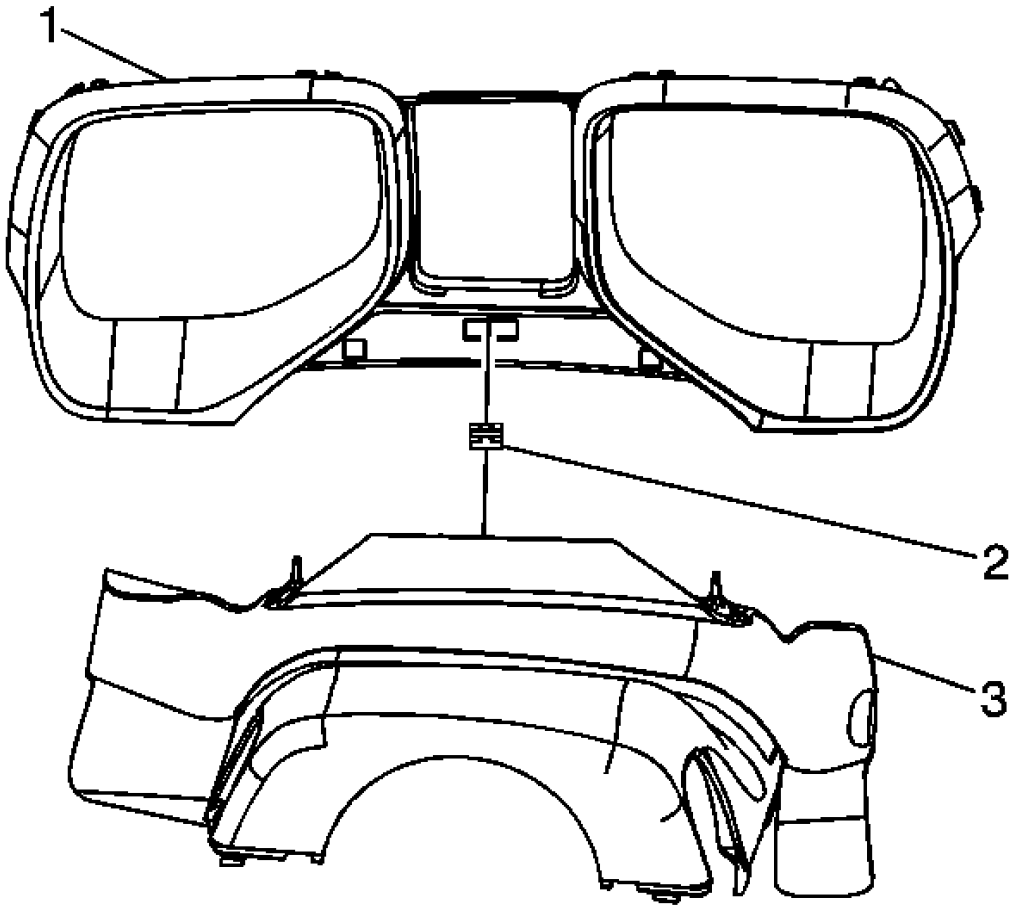


Fig. 13: Upper Steering Column Shroud & Instrument Panel Cluster Trim Plate
Courtesy of GENERAL MOTORS CORP.

8. Use a flat bladed plastic trim tool in order to release the clip (2) and the 2 retainers.

   Remove the upper steering column shroud (3) from the instrument panel cluster trim plate (1).

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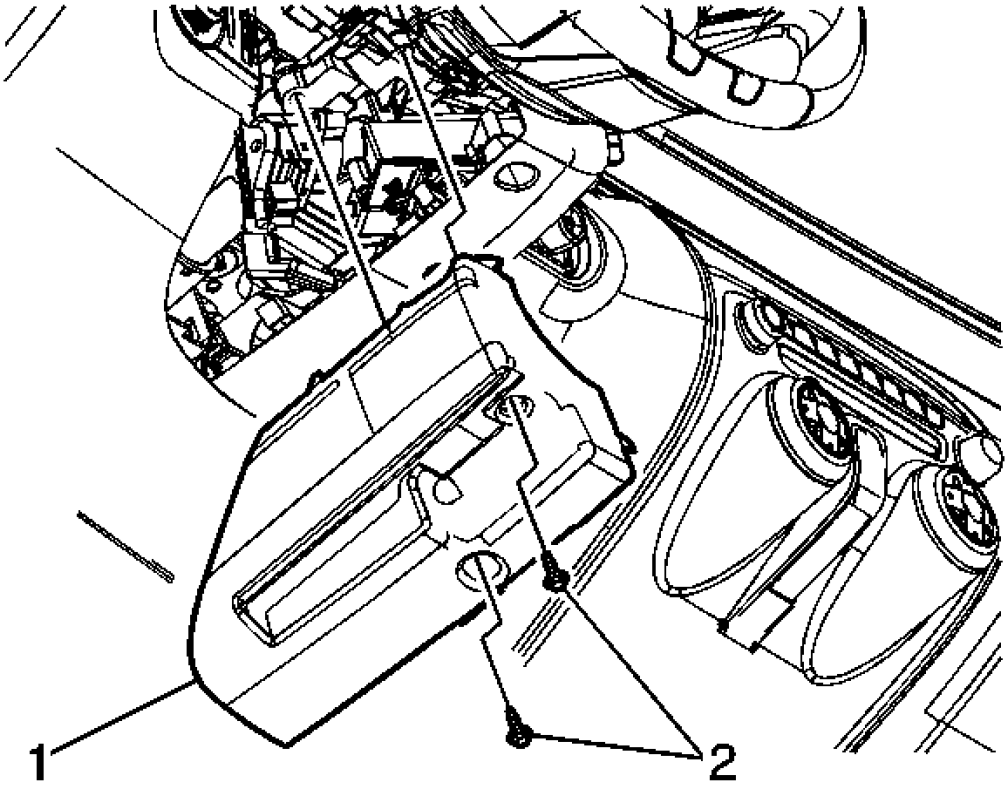


Fig. 14: Lower Left Steering Column Shroud & Bolts
Courtesy of GENERAL MOTORS CORP.

9. Remove the 2 bolts (2) from the lower left steering column shroud (1).
10. Disengage the 4 tabs and remove the lower left steering column shroud from the steering column.

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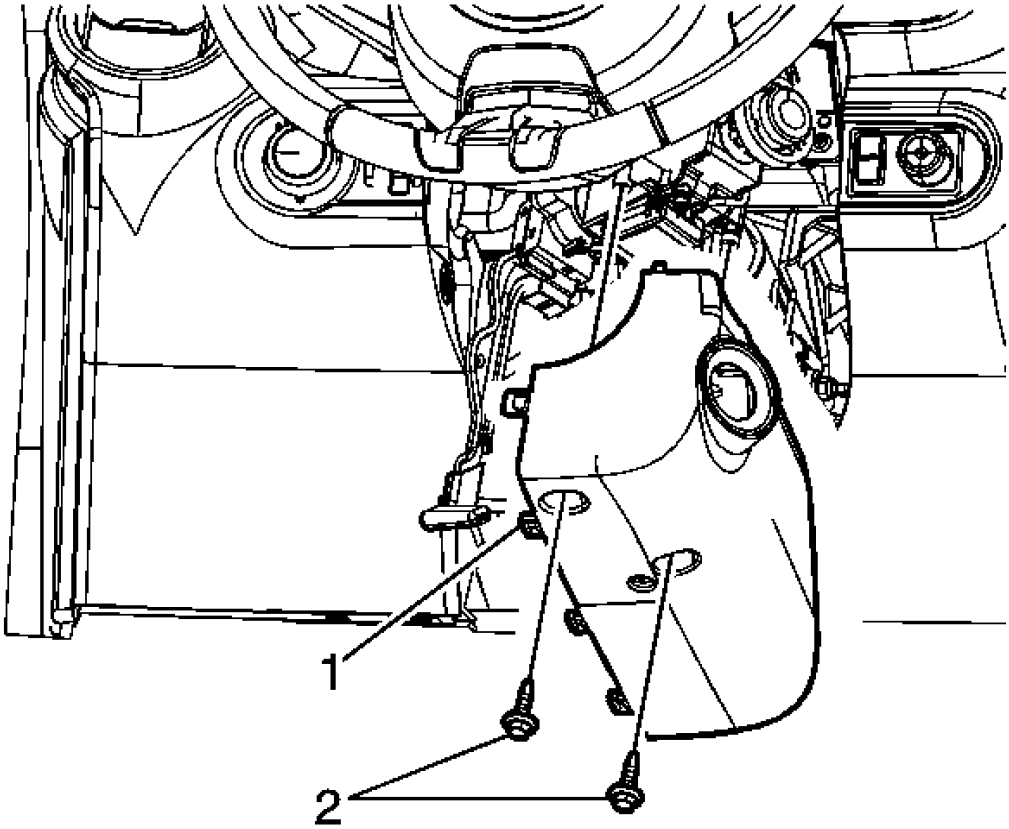


Fig. 15: Lower Right Steering Column Shroud & Bolts
Courtesy of GENERAL MOTORS CORP.

11. Remove the 2 bolts (2) from the lower right steering column shroud (1).
12. Disengage the instrument panel harness retainer from the lower right steering column shroud.
13. Remove the lower right steering column shroud from the vehicle.

Installation Procedure

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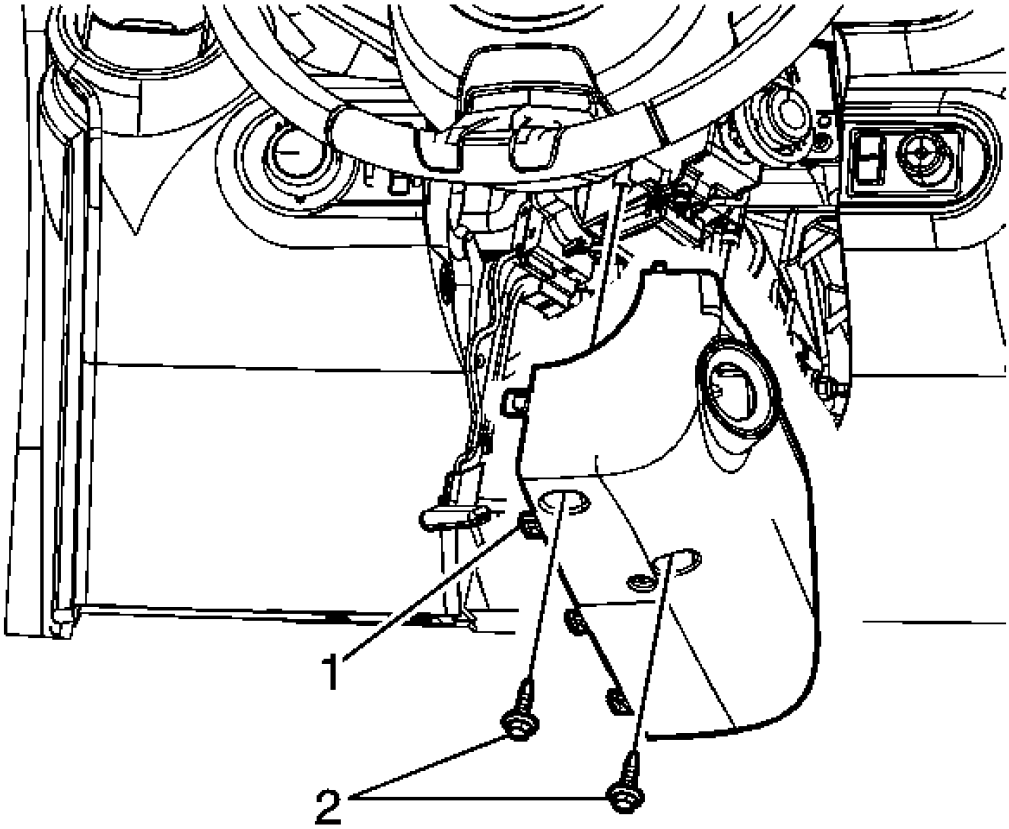


Fig. 16: Lower Right Steering Column Shroud & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Secure the instrument panel harness retainer to the lower right steering column shroud (1).

CAUTION: Refer to Fastener Caution .

2. Install the lower right steering column shroud to the steering column with the 2 bolts (2) and tighten to 2.5 N.m (22 lb in)..

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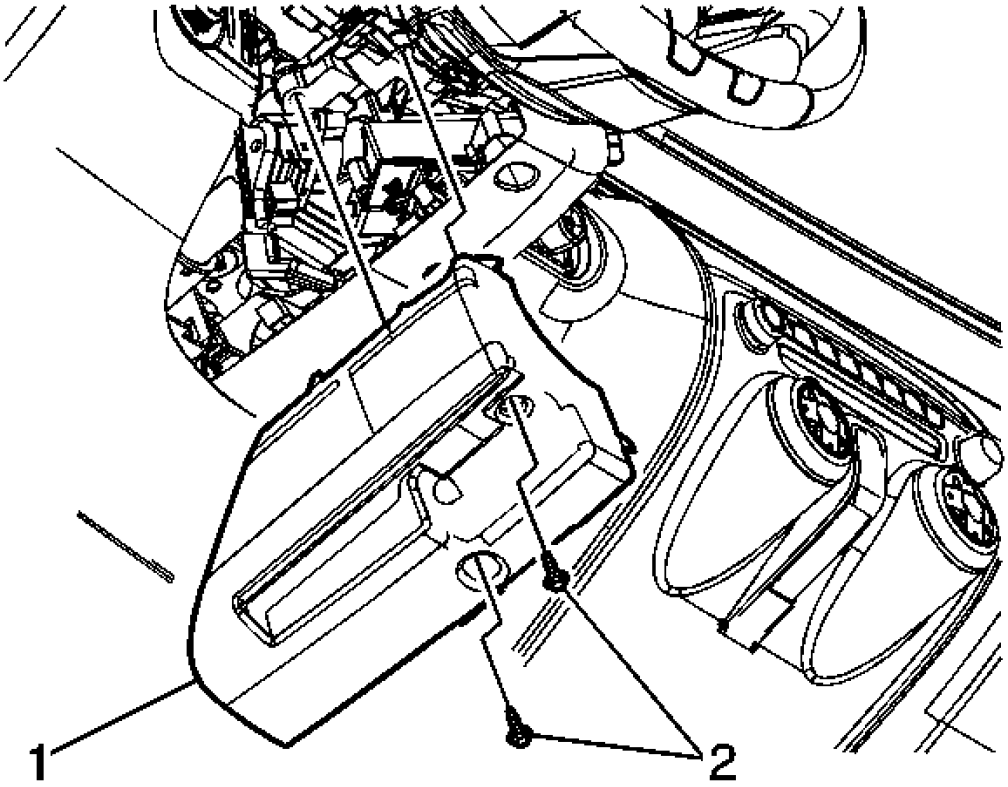


Fig. 17: Lower Left Steering Column Shroud & Bolts
Courtesy of GENERAL MOTORS CORP.

3. Route the tilt and telescope lever through the opening in the lower left steering column shroud (1).

   Install the lower left steering column shroud to the steering column and engage the 4 tabs.

4. Install the 2 bolts (2) to the lower left steering column shroud.

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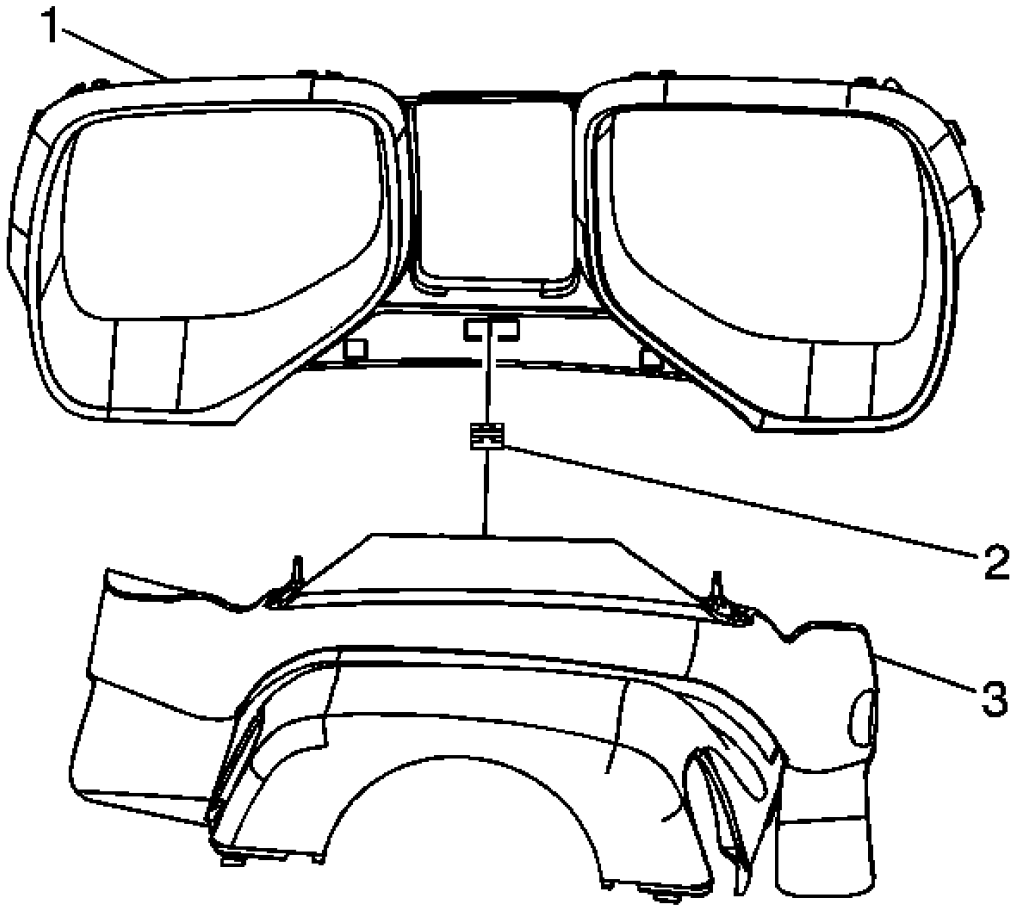


Fig. 18: Upper Steering Column Shroud & Instrument Panel Cluster Trim Plate
Courtesy of GENERAL MOTORS CORP.

5. Install the instrument panel cluster trim plate (1) to the instrument panel assembly.
6. Install the upper steering column shroud (3) to the instrument panel cluster trim plate with the clip (2) and the 2 retainers.
7. Install the left side of the upper steering column shroud to the steering column with the 2 tabs.
8. Install the right side of the upper steering column shroud to the steering column with the 2 tabs.

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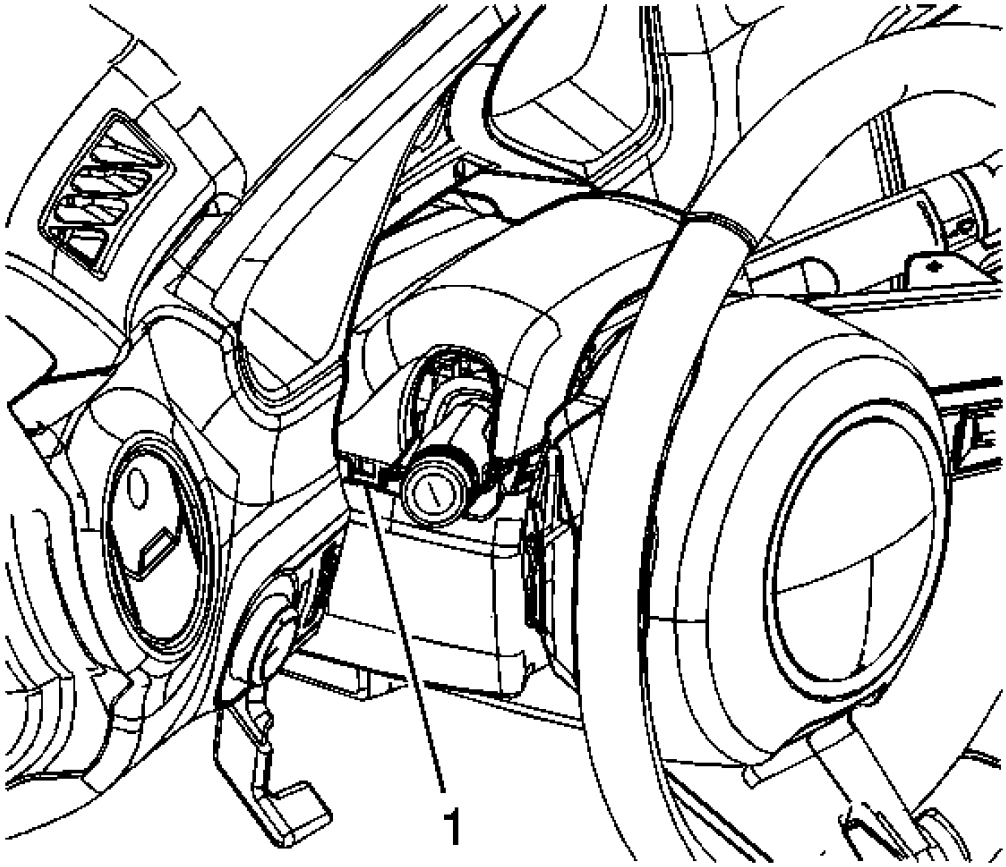


Fig. 19: Left Side Upper Steering Column Shroud Tab
Courtesy of GENERAL MOTORS CORP.

9. Install the left side of the upper steering column shroud to the steering column with the 1 tab (1).

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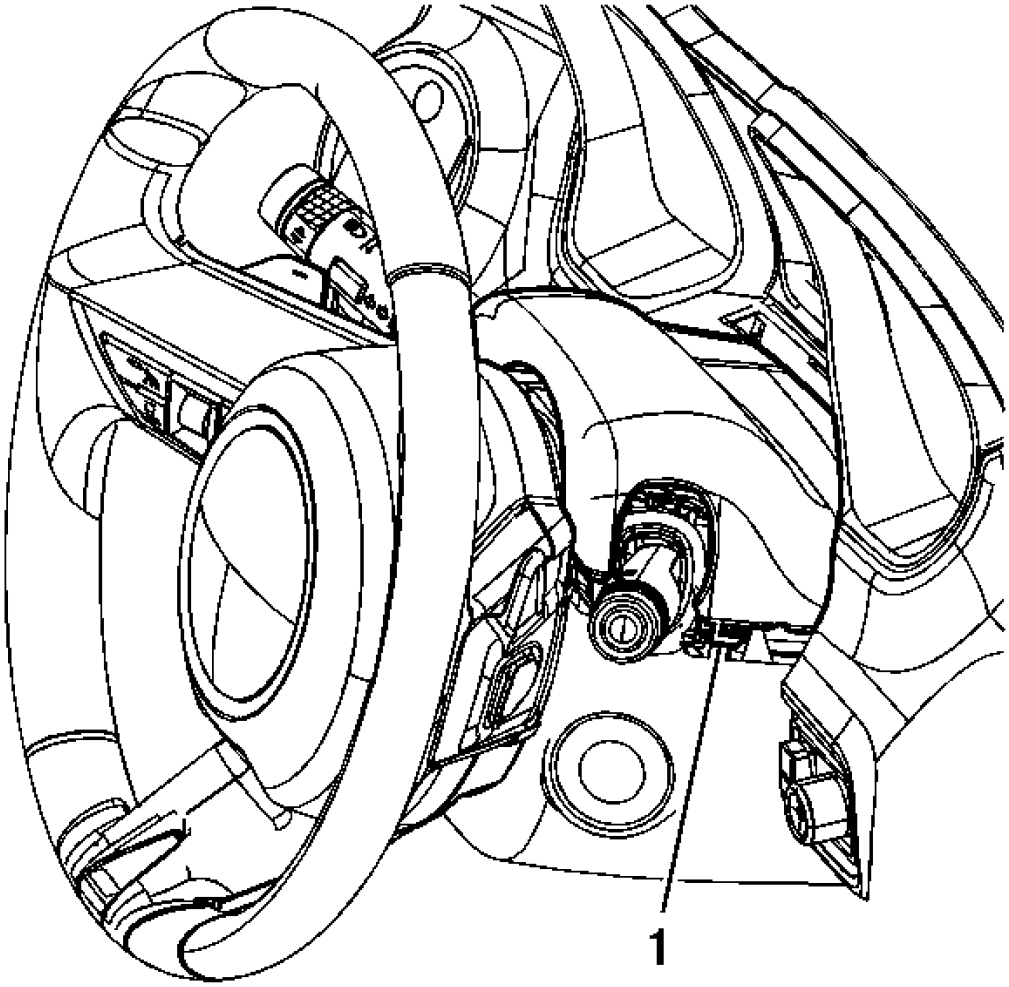


Fig. 20: Right Side Of Upper Steering Column Shroud Tab
Courtesy of GENERAL MOTORS CORP.

10. Install the right side of the upper steering column shroud to the steering column with the 1 tab (1).
11. Raise the tilt and telescope lever to the secured position.

TURN SIGNAL SWITCH BRACKET REPLACEMENT

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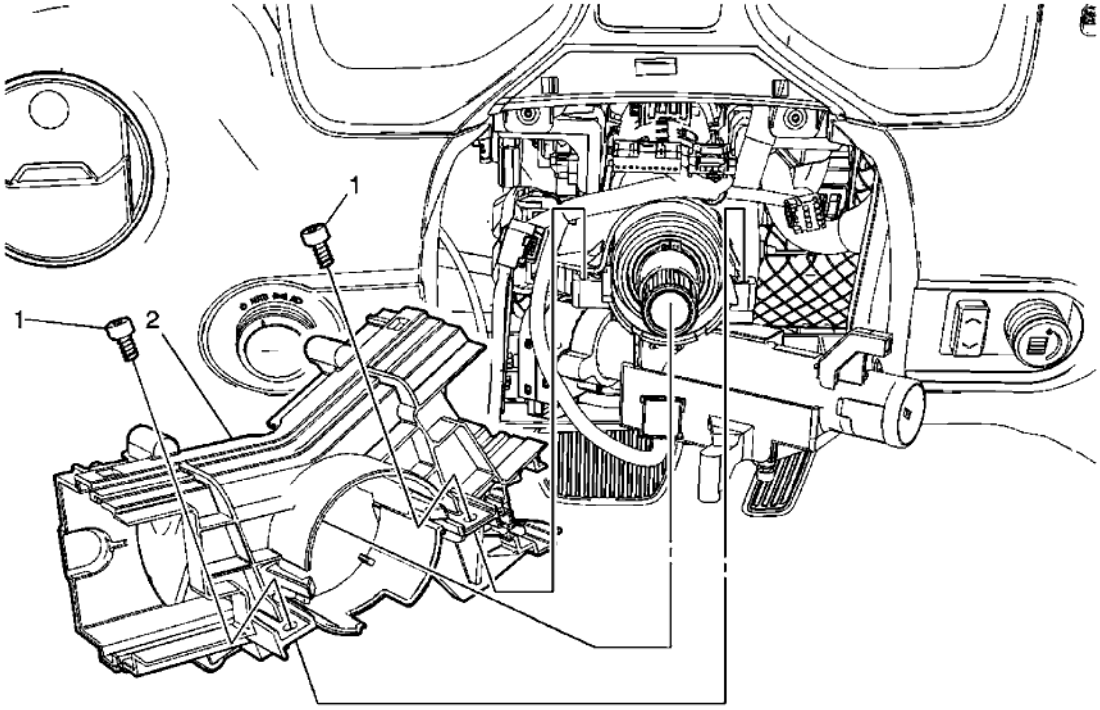


Fig. 21: Turn Signal Switch Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the inflatable restraint steering wheel module coil. Refer to **Steering Wheel Inflatable Restraint Module Coil Replacement** .	
1	Turn Signal Switch Bracket Fastener (Qty: 2)
2	Turn Signal Switch Bracket **Procedure** 1. Disconnect any electrical connectors as necessary. 2. Transfer any parts as necessary. Refer to **Turn Signal Multifunction Switch Replacement** and to **Windshield Wiper and Washer Switch Replacement** .

TURN SIGNAL MULTIFUNCTION SWITCH REPLACEMENT

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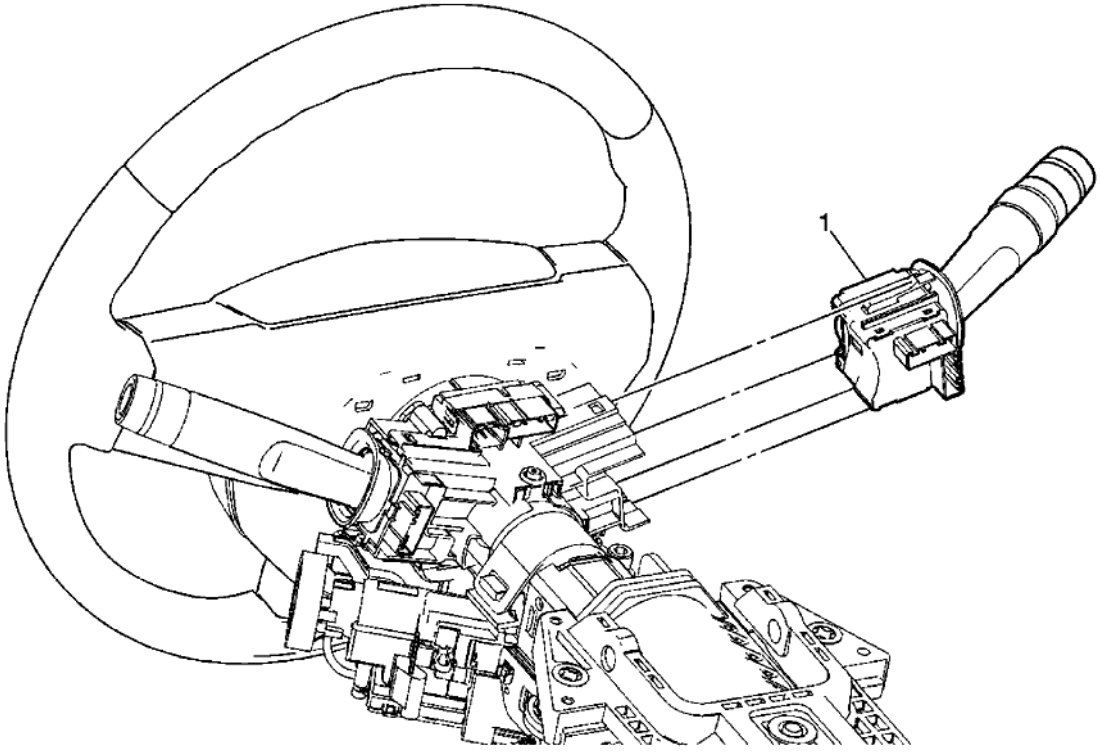


Fig. 22: Turn Signal Multifunction Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the steering column shroud. Refer to **Steering Column Shroud Replacement**.	
1	Turn Signal Multifunction Switch **Procedure** 1. Disconnect any electrical connectors as needed. 2. Release the plastic retaining tabs and remove the turn signal multifunction switch from the turn signal switch bracket.

STEERING WHEEL REPLACEMENT

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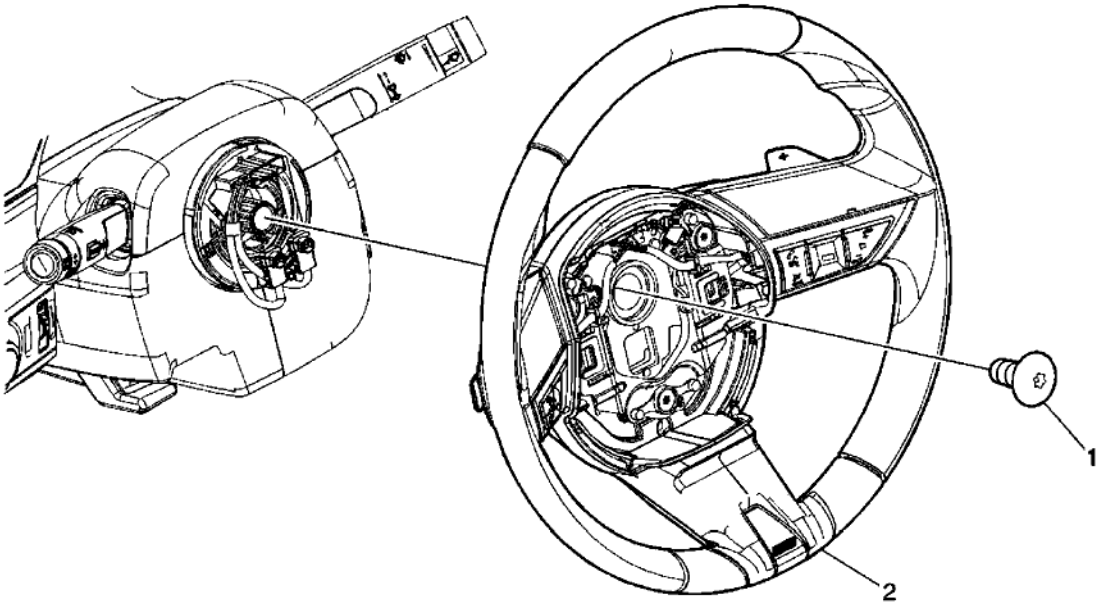


Fig. 23: Steering Wheel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the steering wheel inflatable restraint module airbag. Refer to **Steering Wheel Inflatable Restraint Module Airbag Replacement** . 2. Use paint in order to place match marks on the steering wheel and on the steering column shaft.	
1	Steering Wheel Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 30 N.m (22 lb ft)
2	Steering Wheel **Procedure** 1. Disconnect all electrical connectors as needed. 2. Remove the steering wheel. 3. Copy the match marks from the old steering wheel to the new steering wheel. 4. Transfer any parts as needed.

STEERING WHEEL SPOKE CONTROL SWITCH BEZEL REPLACEMENT

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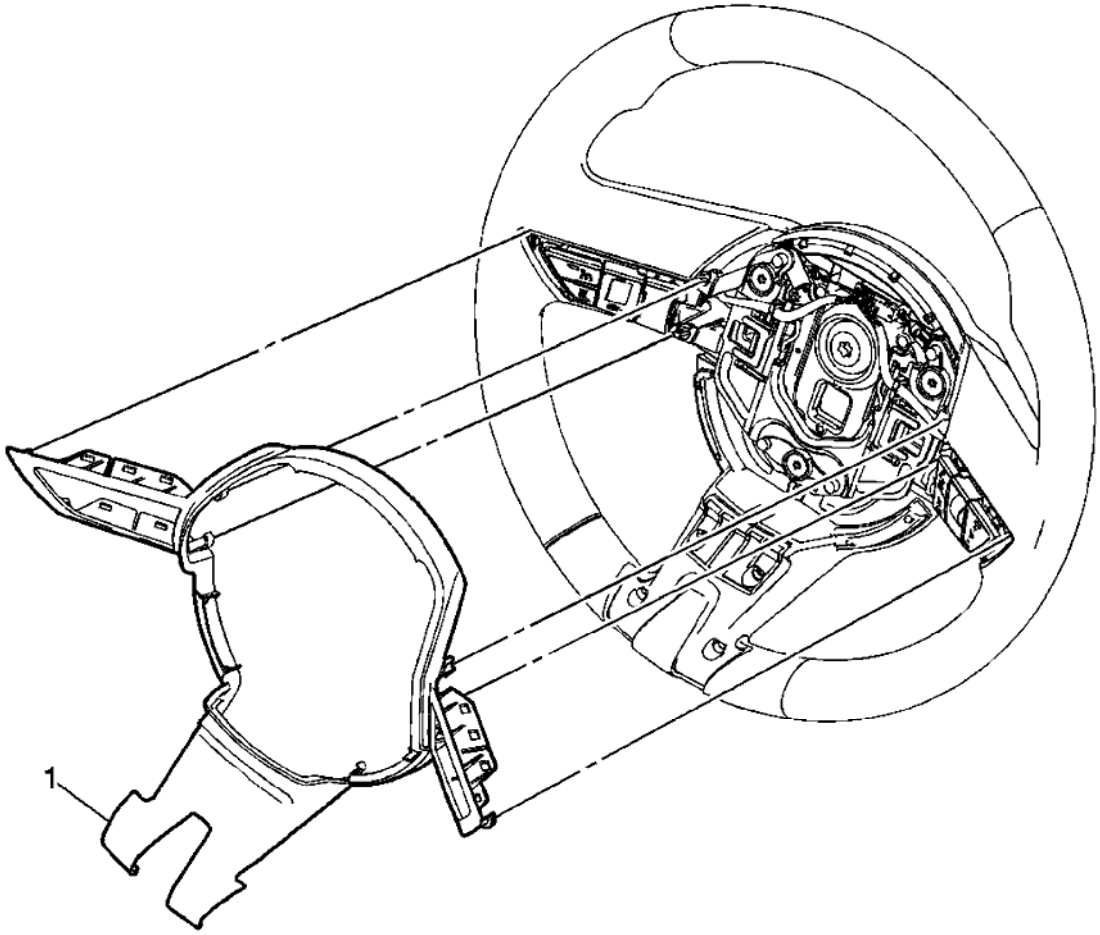


Fig. 24: Steering Wheel Spoke Control Switch Bezel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the inflatable restraint steering wheel module. Refer to **Steering Wheel Inflatable Restraint Module Airbag Replacement** .	
1	Steering Wheel Spoke Control Switch Bezel **Procedure:** Using the appropriate tool, release the retainers to remove the bezel.

STEERING COLUMN REPLACEMENT

Removal Procedure

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column

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will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- **The steering column**
- **The intermediate shaft(s)**
- **The steering gear**

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has became un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. LOCK the steering column and verify the front wheels are in the straight ahead position.
2. Remove the steering column shroud. Refer to **Steering Column Shroud Replacement**.
3. Ensure the tilt and telescope lever is in the locked position with the steering column tilted to the highest position and telescoped to the maximum rearward position.
4. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
5. Disconnect any electrical connectors as necessary.

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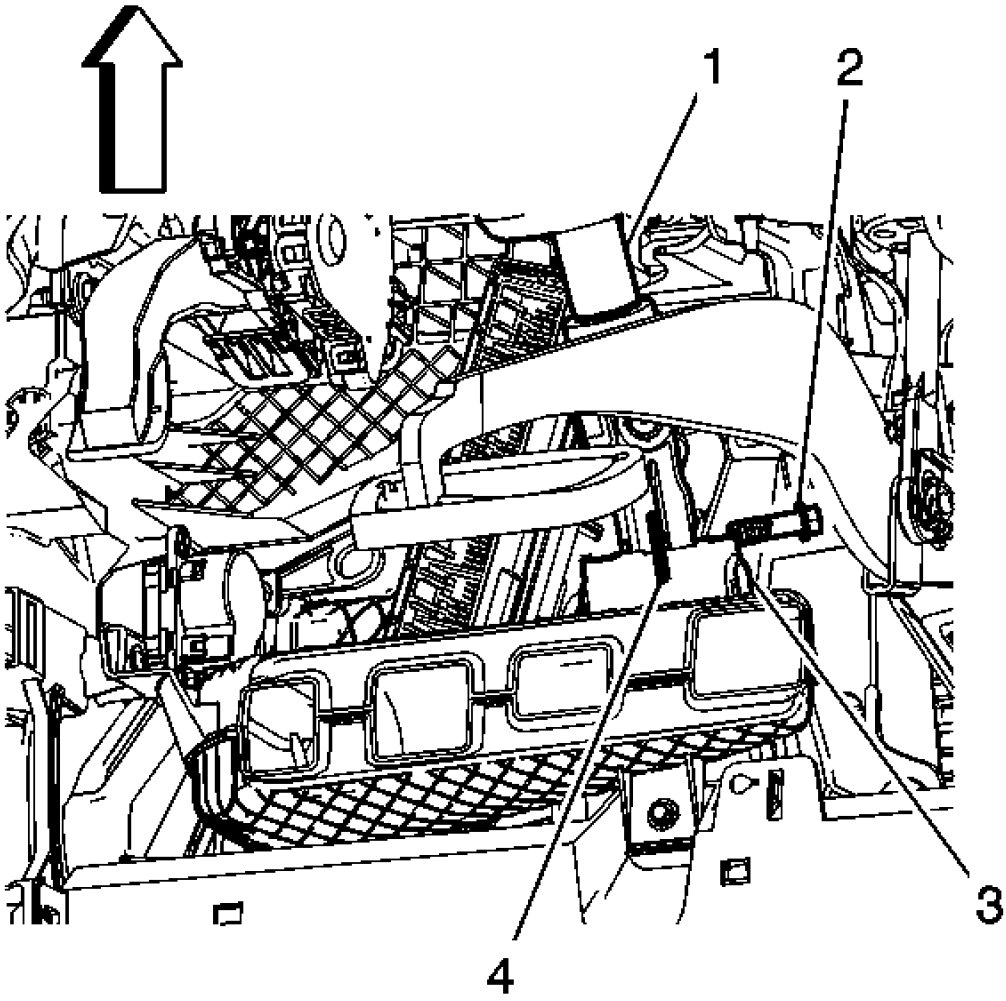


Fig. 25: Steering Column Shaft & Intermediate Steering Shaft Match Marks
Courtesy of GENERAL MOTORS CORP.

6. Use paint in order to place match marks (4) on the steering column shaft (3) and on the intermediate steering shaft (1).
7. Remove the upper intermediate steering shaft bolt (2).
8. Separate the upper intermediate steering shaft from the steering column. Do not pull the intermediate steering shaft lower seal.
9. Support the steering column.

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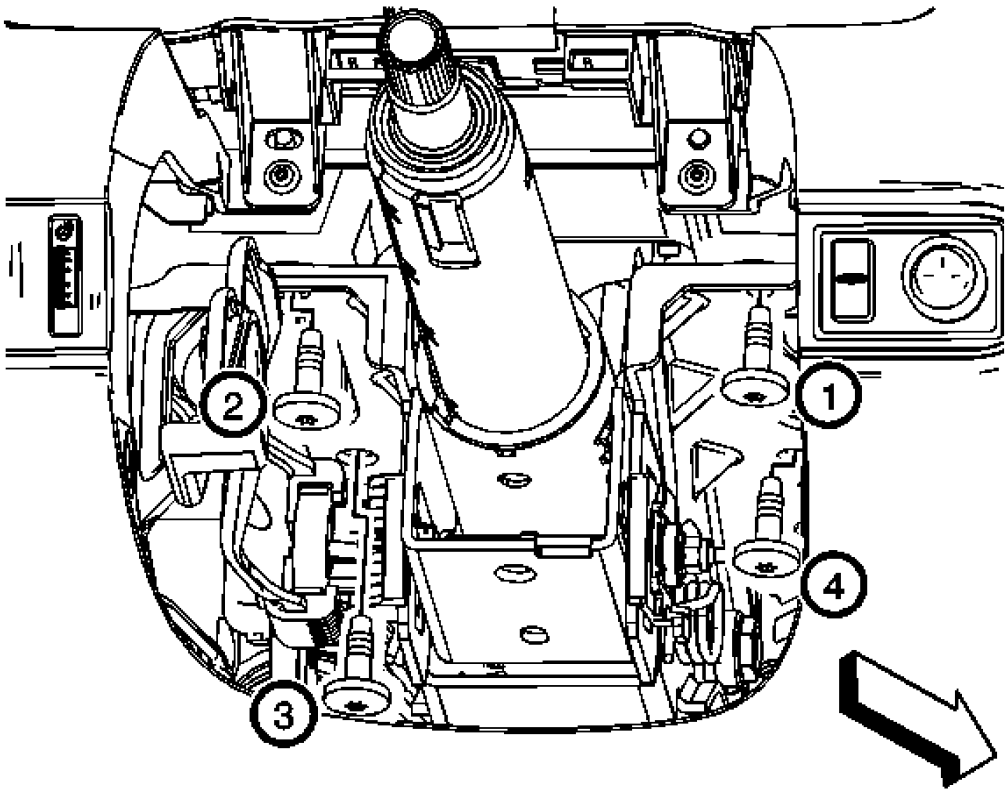


Fig. 26: Steering Column Bolt Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

10. Remove the 4 steering column bolts (1, 2, 3, 4).

CAUTION: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

11. Remove the steering column from the vehicle.
12. Transfer components as necessary.

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Installation Procedure

1. If you are replacing the steering column, copy the match marks from the old column to the new column.
2. Ensure the tilt and telescope lever is in the locked position with the steering column tilted to the highest position and telescoped to the maximum rearward position.
3. Position the steering column in the vehicle.

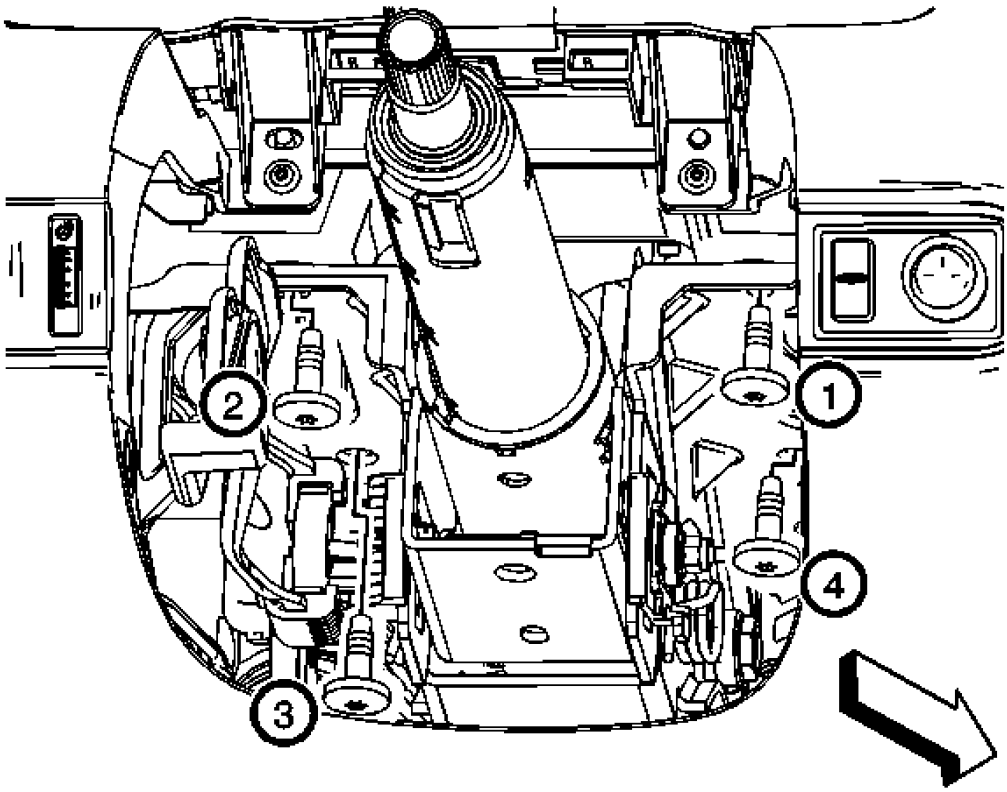


Fig. 27: Steering Column Bolt Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

4. Support the steering column and install, but DO NOT tighten, the 4 steering column bolts (1, 2, 3, 4).

CAUTION: Refer to Fastener Caution .

NOTE: Tighten the bolts in sequence.

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5. Tighten the steering column bolts in sequence to 22 N.m (16 lb ft).

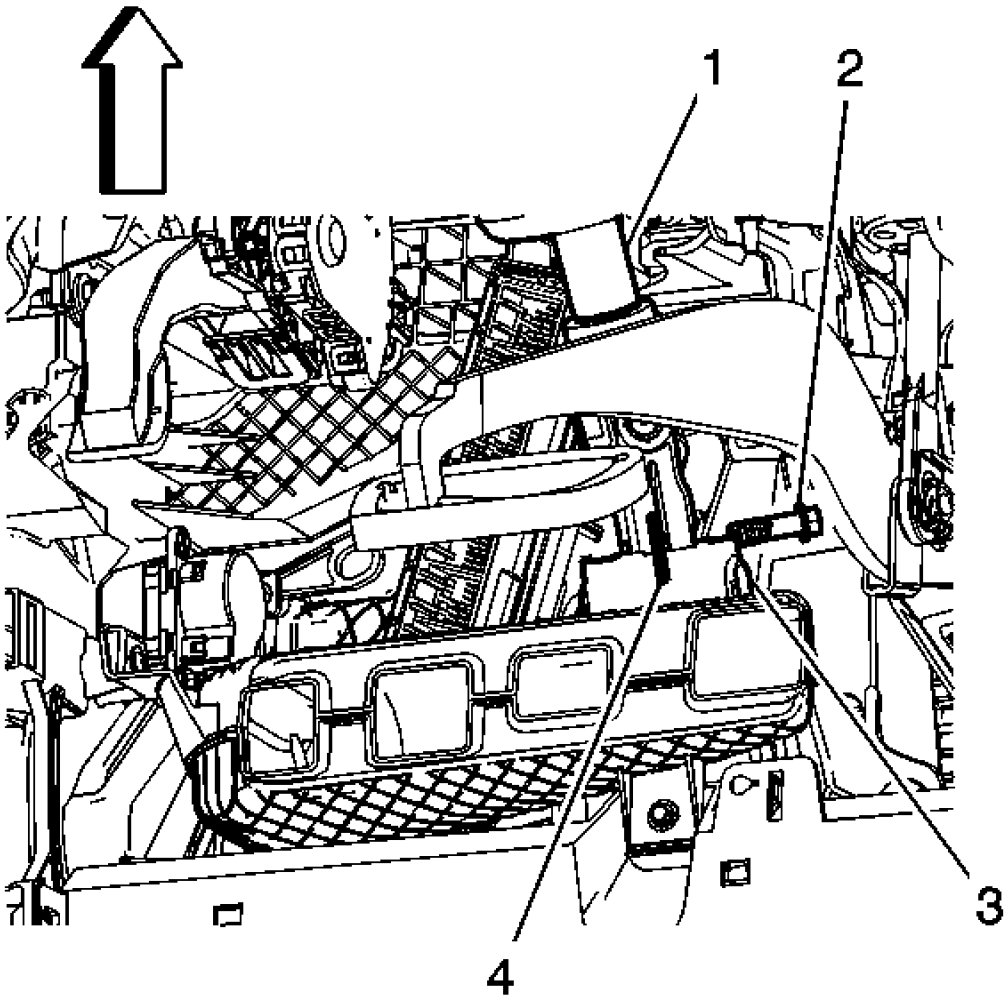


Fig. 28: Steering Column Shaft & Intermediate Steering Shaft Match Marks
Courtesy of GENERAL MOTORS CORP.

6. Align the match marks (4) and install the upper intermediate steering shaft (1) to the steering column shaft (3).
7. Ensure the intermediate steering shaft upper seal is seated correctly.
8. Install the upper intermediate steering shaft bolt (2) and tighten to 36 N.m (26.5 lb ft).
9. Connect all electrical connectors as necessary.
10. Install the steering column shroud. Refer to **Steering Column Shroud Replacement**.

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11. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .

STEERING ANGLE SENSOR REPLACEMENT

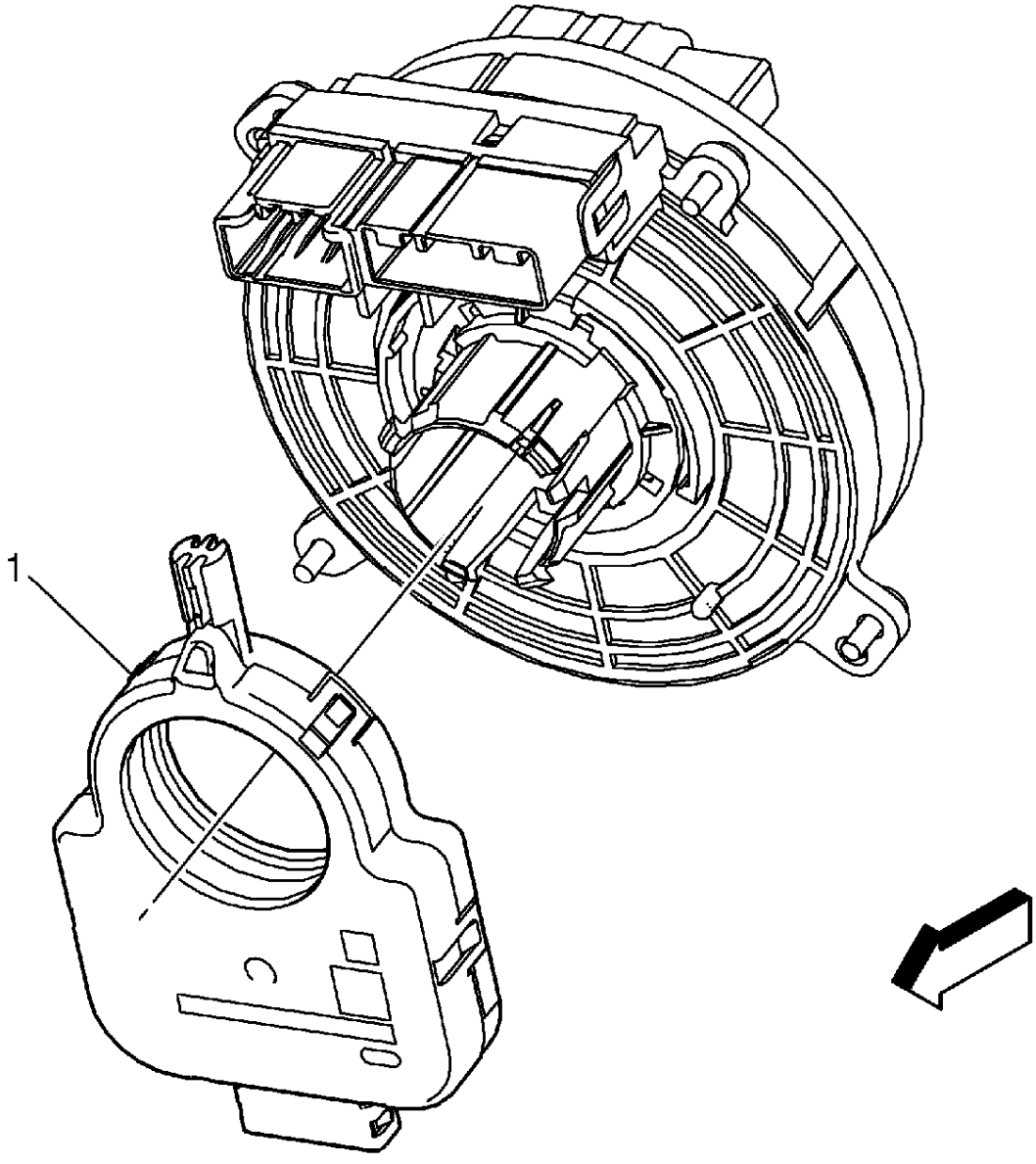


Fig. 29: Steering Angle Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the steering wheel inflatable restraint module coil. Refer to **Steering Wheel Inflatable Restraint Module Coil Replacement** .	
	Steering Angle Sensor

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1	**Procedure** 1. Press in the clip on the steering wheel inflatable restraint module coil in order to remove the sensor. 2. After installation, center the steering angle sensor. Refer to **Steering Angle Sensor Centering** .

DESCRIPTION AND OPERATION

STEERING WHEEL AND COLUMN DESCRIPTION AND OPERATION

The steering wheel and column has 4 primary functions:

- Heated Steering Wheel
- Vehicle steering
- Vehicle security
- Driver convenience
- Driver safety

Heated Steering Wheel

The heated steering wheel control module controls the heated steering wheel and the heated steering wheel ON indicator based on an input from the heated steering wheel switch. When the heated steering wheel switch is pressed, the switch signal circuit is pulled to ground. This indicates to the heating steering wheel control module that steering wheel heat is requested. When the request is seen, the heated steering wheel control module supplies ground to the indicator lamp and supplies voltage to the heating elements, which are internal to the steering wheel. The heated steering wheel temperature is monitored through an internal temperature sensor. When the steering wheel reaches operating temperature the module will cycle the voltage on and off to maintain the operating temperature.

Vehicle Steering

The steering wheel is the first link between the driver and the vehicle. The steering wheel is fastened to a steering shaft within the column. At the lower end of the column, the intermediate shaft connects the column to the steering gear.

Vehicle Security, Found on Some Vehicle Models

Theft deterrent components are mounted and designed into the steering column. The following components allow the column to be locked in order to minimize theft:

- The ignition switch-location varies
- The steering column lock-content varies
- The ignition cylinder-location varies
- The theft deterrent module-location varies

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Driver Convenience

The steering wheel and column may also have driver controls attached for convenience and comfort. The following controls may be mounted on or near the steering wheel or column.

- The turn signal switch
- The hazard switch
- The headlamp dimmer switch
- The wiper/washer switch
- The horn pad/cruise control switch
- The redundant radio/entertainment system controls
- The manual/power tilt or tilt/telescoping functions
- The power pedal adjustment control switch
- The navigation/OnStar® features
- The HVAC controls

Driver Safety

The steering wheel and column has safety features to protect the driver. The following components may be mounted on or near the steering column:

Energy-Absorbing Steering Column

The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance of injury to the driver. The energy-absorbing feature, collapsible steering shaft, and break away mounting features help reduce the injury in the event of an accident. In addition to these features, the following driver safety features may be on the steering column. To inspect the steering column for damage, refer to **Steering Column Accident Damage Inspection**.

Electronic Park Lock (EPL)/Ignition Lock Cylinder Control Actuator

If the vehicle is equipped with automatic transmission and a floor mounted console gear shift, it has an ignition lock cylinder control actuator system in the steering column. The ignition lock cylinder control actuator purpose is to prevent the ignition key from being turned to the OFF position when the transmission is in any position other than PARK and the vehicle may still be moving. The column ignition lock system consists of an ignition lock cylinder control actuator, and a park position switch that is located in the automatic transmission shift lock control switch. The ignition lock cylinder control actuator contains a pin that is spring loaded to mechanically prevent the ignition key cylinder from being turned to the lock position when the vehicle transmission is not in the PARK position. If vehicle power is lost, and/or the transmission is not in the PARK position the operator will not be able to turn the ignition key to the lock position and will not be able to remove the ignition key from the column.

Linear Shift Assembly

If the vehicle is equipped with a column mounted gear shift, it has a linear shift assembly on the steering

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column. The linear shift assembly has a cable that runs from the linear shift assembly to the ignition lock cylinder case. The purpose of this cable is to prevent the ignition key from being turned to the OFF position when the transmission is in gear and the vehicle may still be moving. The linear shift assembly cable contains a pin that is spring loaded to mechanically prevent the ignition key cylinder from being turned to the lock position when the vehicle transmission is not in the PARK position. If vehicle power is lost, and/or the transmission is not in the PARK position the operator will not be able to turn the ignition key to the lock position and will not be able to remove the ignition key from the column.

SIR Coil and Module

For additional information on the operation of the SIR coil and module, refer to **SIR System Description and Operation** .

Automatic Transmission Shift Lock Actuator

The automatic transmission shift lock control system is a safety device that prevents an inadvertent shift out of PARK when the engine is running. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components: the automatic transmission shift lock control solenoid, the automatic transmission shift lock control switch, the body control module (BCM), the powertrain control module (PCM)/engine control module (ECM). With the ignition in the ON position, voltage is supplied to automatic transmission shift lock control switch. Voltage flows through the normally closed contacts of the automatic transmission shift lock control switch to the automatic transmission shift lock control solenoid. When the BCM receives a class 2 message from the PCM/ECM indicating the transmission is in the park position the BCM then grounds the automatic transmission shift lock solenoid control circuit. This energizes the automatic transmission shift lock control solenoid causing the transmission shift lever to be physically locked in the PARK position. When the brake pedal is pressed the contacts in the automatic transmission shift lock control switch open, de-energizing the automatic transmission shift lock control solenoid. This allows the shift lever to be move out of the PARK position.

Steering Wheel Angle Sensor or Steering Wheel Position Sensor

The steering wheel position sensor is located somewhere along the steering shaft assembly. The sensor measures the position of the steering wheel and the speed at which it is rotated. A signal representing this measurement is provided to the vehicle stability enhancement system (VSES) module. The VSES module uses this signal, along with several others representing different vehicle conditions, to monitor the driving behavior of the vehicle and ensure that it stays in control. If the VSES module determines that the vehicle is out of control it provides signals to the powertrain control module (PCM) and the ABS module. These output signals are used to modulate the transmission torque and brake pressure of each of the vehicles wheels in order to regain control of the vehicle.

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Theft Deterrent - Camaro

SCHEMATIC AND ROUTING DIAGRAMS

THEFT DETERRENT SYSTEM SCHEMATICS

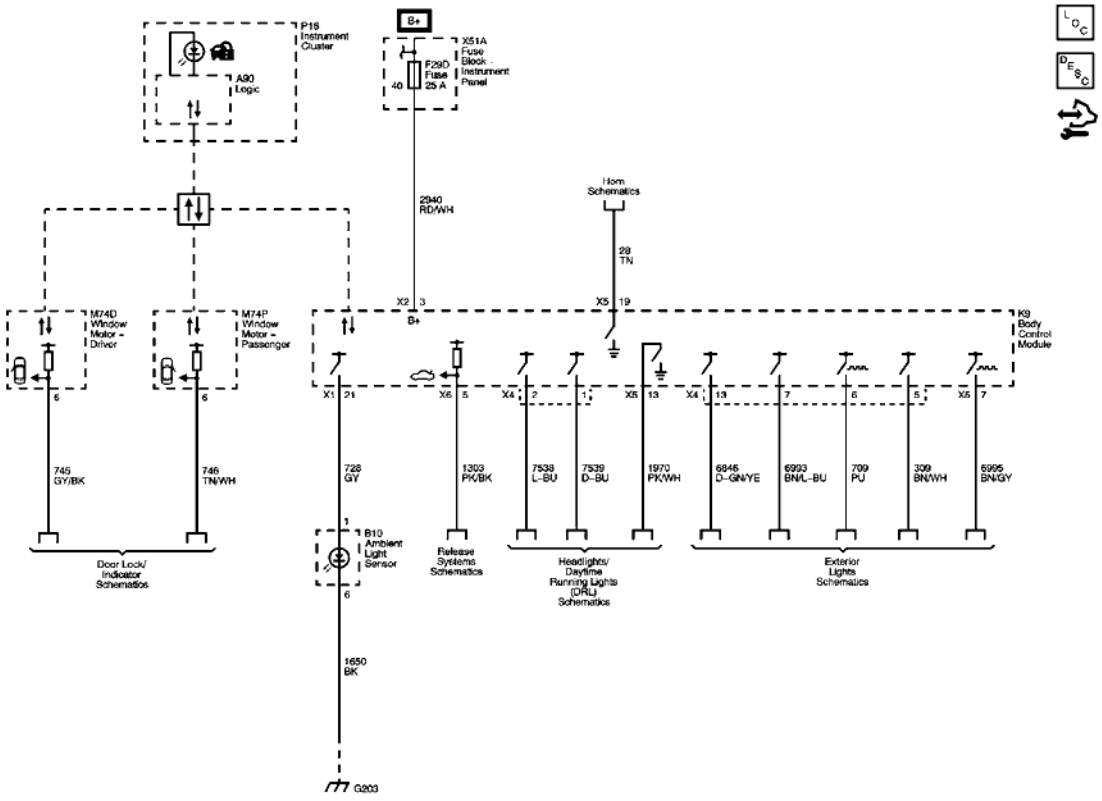


Fig. 1: Theft Deterrent System
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0685	B0685 02: Security System Indicator Circuit Short to Ground

DTC B0685

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0685 02

Security System Indicator Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Security LED Control	B0685 02	1	1	-
Ground	-	1	-	-
1. Security Indicator Malfunction				

Circuit/System Description

The security LED is controlled by the body control module (BCM) based on commands from the content theft deterrent system. The security LED is located in the dash as part of the ambient light sensor and is supplied ground at all times. When the content theft deterrent system requests the LED be commanded ON, the BCM applies voltage to the security indicator control circuit, illuminating the LED.

Conditions for Running the DTC

The system voltage is at least 9 V and no more than 16 V.

Conditions for Setting the DTC

- The BCM detects a short to ground on the security indicator control circuit.
- The above condition exist for 1 second.

Action Taken When the DTC Sets

Security LED output is disabled

Conditions for Clearing the DTC

- A current DTC is cleared when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

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Theft Deterrent System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Content Theft Deterrent (CTD) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Arm the content theft deterrent system. The security LED should illuminate and/or flash during the arming sequence.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B10B Light/Sunload Ambient Sensor.
2. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for less than 1V between the control circuit terminal 1 and ground.
   - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
4. Command the security LED ON. Test for B+ between the control circuit terminal 1 and ground.
   - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the B10B Light/Sunload Ambient Sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming

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SYMPTOMS - THEFT DETERRENT

NOTE: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Vehicle** in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to the following **Content Theft Deterrent (CTD) Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Theft Deterrent System. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Content Theft Deterrent Malfunction**
- **Security Indicator Malfunction**

CONTENT THEFT DETERRENT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The content theft deterrent system is a software based system in which the body control module (BCM) actively monitors certain inputs to determine if unauthorized vehicle access is being attempted. Based on inputs such as the door ajar switches, the rear compartment ajar switch, and the hood ajar switch, the BCM determines whether a content theft deterrent alarm is warranted. If unauthorized access is being detected, the BCM will pulse the vehicle horn and flash the turn signals as a means of theft deterrence.

Reference Information

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Schematic Reference

Theft Deterrent System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Content Theft Deterrent (CTD) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, individually open and close each vehicle door while observing the door ajar indicator/message. The indicator/message should accurately transition between the door ajar and door closed state when each door is opened and closed.
    - If the door ajar indicator/message does not properly transition when each door is opened and closed, refer to **Door Ajar Indicator Malfunction** .
2. Completely lower the driver door window and close all vehicle doors.
3. Ignition OFF, arm the content theft deterrent system. Verify the scan tool Content Theft Deterrent Alarm Status parameter is Armed.
    - If not the specified value, refer to **Keyless Entry System Malfunction** .
4. Without disarming the system, reach in through the open driver window, unlock and open the driver door. Verify the scan tool Content Theft Deterrent Alarm Status parameter is Alarm.
    - If not the specified value, replace the K9 body control module.
5. With the door open, verify the vehicle horn is pulsing and the exterior lamps are flashing.
    - If the horn is not pulsing, refer to **Horns Malfunction** .
    - If the exterior lights are not flashing, refer to **Headlamps Malfunction (T4A)** or **Headlamps Malfunction (T4F)** .

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming

SECURITY INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0685 02

Security System Indicator Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Security LED Control	B0685 02	1	1	-
Ground	-	1	-	-
1. Security Indicator Malfunction				

Circuit/System Description

The security LED is controlled by the body control module (BCM) based on commands from the content theft deterrent system. The security LED is located in the dash as part of the ambient light sensor and is supplied ground at all times. When the content theft deterrent system requests the LED be commanded ON, the BCM applies voltage to the security indicator control circuit, illuminating the LED.

Conditions for Running the DTC

The system voltage is at least 9 V and no more than 16 V.

Conditions for Setting the DTC

- The BCM detects a short to ground on the security indicator control circuit.
- The above condition exist for 1 second.

Action Taken When the DTC Sets

Security LED output is disabled

Conditions for Clearing the DTC

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- A current DTC is cleared when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 40 malfunction free ignition cycles.

Reference Information

Schematic Reference

Theft Deterrent System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Content Theft Deterrent (CTD) Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Arm the content theft deterrent system. The security LED should illuminate and/or flash during the arming sequence.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B10B Ambient Light Sensor/TDI.
2. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 1 and the ground circuit terminal 6.
4. Command the security LED ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.

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5. If all circuits test normal, replace the B10B Ambient Light Sensor/TDI.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup, and programming

DESCRIPTION AND OPERATION

CONTENT THEFT DETERRENT (CTD) DESCRIPTION AND OPERATION

When armed, the content theft deterrent system is designed to deter vehicle content theft by pulsing the horns and exterior lamps for approximately 30 seconds when an unauthorized vehicle entry is detected. However, the content theft deterrent system does not affect engine starting.

An unauthorized entry can be any of the following with the content theft deterrent system armed:

- Unauthorized entry into the underhood area
- Unauthorized entry into the rear compartment
- When any door is opened without using the UNLOCK command from a keyless entry transmitter
- After a battery reconnect, if the battery was disconnected with the content theft deterrent system armed

The components of the content theft deterrent system are:

- Body Control Module (BCM)
- Remote function receiver module/Remote control door lock receiver
- Security Indicator
- Door Ajar Switches
- Rear Compartment Ajar Switch
- Hood Ajar Switch

Arming the Content Theft Deterrent System

Use the following procedure in order to arm the system:

1. Place the shift lever in P (park).
2. Turn OFF the ignition.
3. Open any door.

NOTE: The system is not armed if the doors are locked manually; the power door lock switch or remote keyless entry transmitter must be used to arm the content theft deterrent system.

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4. Lock the doors with the power door lock switch or the LOCK button on the transmitter. The system is in standby mode and will not start the arming timer until all doors are closed.
5. The system will begin the arm sequence immediately after the last door is closed. If the keyless entry transmitter is used the arm the system after the vehicle doors are closed, the arm sequence will begin as soon as the LOCK command is received by the transmitter.
6. Double clicking the LOCK command on the keyless entry transmitter will bypass the delayed arming function and force the system to arm.
7. If the vehicle is equipped with passive locks, the vehicle will start the arming sequence when a keyless entry transmitter is no longer detected.

Locking the Vehicle Without Arming the Content Theft Deterrent System

Locking the vehicle may be accomplished without arming the content theft deterrent system. Use of the manual door locks or using the key to lock the doors will lock the vehicle, but will not arm the content theft deterrent system.

Disarming an Armed System/Silencing an Alarm

If system arming has been requested by the power door lock switch or the keyless entry transmitter, it must be disarmed.

NOTE: Disconnecting the battery or pulling fuses does not disable the arm mode, since the BCM stores the content theft deterrent mode status in memory.

- To disarm the content theft deterrent system in standby mode, perform one of the following:
  - Press either power door unlock switch.
  - Press the UNLOCK button on the keyless entry transmitter.
  - Insert a valid key into the ignition and switch to the ON position.
- To disarm the content theft deterrent system in the armed mode (non-event) or when activated (during an alarm event):
  - Press the UNLOCK button on the keyless entry transmitter.
  - Insert a valid key into the ignition and switch to the ON position

Content Theft Deterrent Circuit Description

The following is a description of each component used in the content theft deterrent system:

Body Control Module

The content theft deterrent system is an internal function of the BCM which utilizes serial data and various switch inputs information to perform content theft deterrent functions. When the BCM detects an unauthorized entry, it activates the horns and exterior lamps. The BCM has 4 basic modes (disarmed, standby, armed, and alarm) for operating the content theft deterrent system. The different modes are described below.

1. The BCM has the content theft deterrent system in a disarmed mode until the following conditions are

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detected:

- Ignition key turned to the OFF position.
- Doors locked by either the power door lock switch or the LOCK button on the transmitter.

2. The BCM enters the standby mode when the above conditions are detected. If a door was already opened when the arm mode was requested, the standby mode does not start the timer until the last door is closed.
3. When the last door is closed, a 15 second timer is activated. Once the timer has expired, the BCM enters the armed mode. After this delay, any forced entry activates the alarm mode.
4. When the BCM detects a forced entry, the BCM enters the alarm mode. The BCM activates the horns and exterior lamps for 30 seconds. This is followed by a three minute time-out with the horn no longer active. If no new intrusions are detected after the time-out, the horn is not active. The system must be disarmed or the intrusion condition removed after the time-out for the system to exit alarm mode.

Remote Function Receiver Module/Remote Control Door Lock Receiver

The keyless entry system can arm and disarm the content theft deterrent system. When the keyless entry module receives a door lock or unlock signal from the transmitter, the keyless entry module sends a message to the BCM via serial data to perform the appropriate arm/disarm functions.

Security Indicator

The security LED is illuminated on the upper I/P by the BCM. The content theft deterrent system uses the security LED to inform the driver of system status prior to arming.

Door Ajar Switches

The content theft deterrent system uses the door ajar switches as a status indicator to activate the alarm. The door ajar switches are monitored by the body control module via a discrete input from each door ajar switch. If the BCM receives a signal indicating a door is opened when the content theft deterrent system is armed, the BCM activates the alarm.

Hood Ajar Switch

The content theft deterrent system uses the hood ajar switch as a status indicator to activate the alarm. The BCM monitors the hood ajar switch via a discrete input from the switch. If the BCM receives a signal indicating the hood has been opened when the content theft deterrent system is armed, the BCM activates the alarm.

Rear Compartment Ajar Switch

The content theft deterrent system uses the rear compartment ajar switch as a status indicator to activate the alarm. The BCM monitors the rear compartment ajar switch via a discrete input from the switch. If the BCM receives a signal indicating the rear compartment has been opened when content theft deterrent system is armed, the BCM activates the alarm.

Inputs

The BCM monitors the following inputs for content theft deterrent:

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- The door ajar switches
- The keyless entry transmitter LOCK/UNLOCK buttons; a message from the Remote function receiver module/Remote control door lock receiver
- The immobilizer status-The BCM uses the immobilizer status for disarming the system or silencing an alarm when the correct vehicle key is used to start the vehicle
- The rear compartment ajar switch
- The hood ajar switch

Outputs

The BCM controls the following for content theft deterrent:

- The horn relay
- The exterior lamps

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2010 SUSPENSION

Tire Pressure Monitoring - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC C0569	C0569 00: System Configuration Malfunction
DTC C0750, C0755, C0760, or C0765	C0750 03: Left Front Tire Pressure Sensor Low Voltage C0750 29: Left Front Tire Pressure Sensor Too Few Pulses C0750 39: Left Front Tire Pressure Sensor Internal Malfunction C0755 03: Right Front Tire Pressure Sensor Low Voltage C0755 29: Right Front Tire Pressure Sensor Too Few Pulses C0755 39: Right Front Tire Pressure Sensor Internal Malfunction C0760 03: Left Rear Tire Pressure Sensor Low Voltage C0760 29: Left Rear Tire Pressure Sensor Too Few Pulses C0760 39: Left Rear Tire Pressure Sensor Internal Malfunction C0765 03: Right Rear Tire Pressure Sensor Low Voltage C0765 29: Right Rear Tire Pressure Sensor Too Few Pulses C0765 39: Right Rear Tire Pressure Sensor Internal Malfunction
DTC C0775	C0775 00: Low Tire Pressure System Sensors Malfunction

DTC C0569

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0569 00

System Configuration Malfunction

Circuit/System Description

If the tire type and pressure selection information is not entered with the scan tool during the body control modue (BCM) setup, the tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete. If equipped, the driver information center (DIC) will also display a service tire monitor type message. Under these circumstances, DTC C0569 will be set and the tire type and pressure information will need to be entered

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for the system to function correctly.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The BCM has not undergone the tire type and pressure selection setup procedure.

Action Taken When the DTC Sets

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays a service tire monitor type warning message.

Conditions for Clearing the DTC

A current DTC will clear when the BCM has undergone the tire type and pressure selection setup procedure and 1 ignition cycle has occurred.

Diagnostic Aids

A newly replaced BCM will set DTC C0569 on its initial ignition ON cycle if the module setup information has not been entered. The Tire Type and Tire Pressure Selection setup must be performed with the scan tool.

Reference Information

Description and Operation

Tire Pressure Monitor Description and Operation

Scan Tool Reference

Control Module References for scan tool information

Special Tools

J-46079 Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

Circuit/System Verification

Verify that the DTC C0569 is not set.

- If the DTC is set, perform the BCM tire type and pressure selection setup with the scan tool and cycle the ignition. If the DTC resets, replace the K9 BCM.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming.

DTC C0750, C0755, C0760, OR C0765

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0750 03

Left Front Tire Pressure Sensor Low Voltage

DTC C0750 29

Left Front Tire Pressure Sensor Too Few Pulses

DTC C0750 39

Left Front Tire Pressure Sensor Internal Malfunction

DTC C0755 03

Right Front Tire Pressure Sensor Low Voltage

DTC C0755 29

Right Front Tire Pressure Sensor Too Few Pulses

DTC C0755 39

Right Front Tire Pressure Sensor Internal Malfunction

DTC C0760 03

Left Rear Tire Pressure Sensor Low Voltage

DTC C0760 29

Left Rear Tire Pressure Sensor Too Few Pulses

DTC C0760 39

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Left Rear Tire Pressure Sensor Internal Malfunction

DTC C0765 03

Right Rear Tire Pressure Sensor Low Voltage

DTC C0765 29

Right Rear Tire Pressure Sensor Too Few Pulses

DTC C0765 39

Right Rear Tire Pressure Sensor Internal Malfunction

Circuit/System Description

The tire pressure monitor (TPM) system has a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly. As vehicle speed increases, centrifugal force closes the sensors internal roll switch, which puts the sensor into Rolling mode. The body control module (BCM) receives and translates the data contained in the tire pressure sensor RF transmissions into sensor presence, sensor mode, and tire pressure. Once vehicle speed is greater than 40km/h (25 mph), the BCM waits for the first sensor to go into Rolling mode, then checks if all sensors have gone into Rolling mode. If one or more sensors do not go into these modes, or do not transmit at all, the BCM will set DTC C0750, C0755, C0760, or C0765 respectively.

Conditions for Running the DTC

Vehicle speed is greater than 40 km/h (25 mph).

Conditions for Setting the DTC

- A sensor does not transmit for 18 minutes.
- A sensor low battery condition.

Action Taken When the DTC Sets

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) flashes for 1 minute and then remains illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays the suspect tire pressure as dashes.
- If equipped, the DIC displays a service tire monitor type message.

Conditions for Clearing the DTC

- A current DTC will clear when the malfunction is no longer present and 1 ignition cycle occurs.
- The BCM automatically clears the history DTC when a current DTC is not detected in 100 consecutive drive cycles.

Diagnostic Aids

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- Some aftermarket wheel valve stem holes are located further from the wheel rim than original equipment wheels. When using the TPM special tool to activate a sensor, ensure the tool antenna is no further than 15 cm (6 in) from the sensor and is aiming upward.
- Aftermarket wheel valve stem locations can cause a sensor to not function correctly.
- A sensor may have been damaged due to a previous wheel/tire service or flat tire event.
- The use of other than GM approved tire sealants can obstruct the sensor pressure sensing port and cause inaccurate tire pressure readings. If this condition is verified, remove the sealer from the tire and replace the sensor. Refer to **Tire Pressure Indicator Sensor Replacement**.
- Occasionally sensor transmissions are not received by the BCM due to vehicle level RF interference from items such as but not limited to aftermarket ignition systems, DVD players, CB radios, or metallic type window tinting.
- The sensor activation procedure may have to be repeated up to 3 times before determining a sensor is malfunctioning. In the event a particular sensor information is displayed on the special tool upon activation but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the RF signal is being blocked by another component.
- Occasionally sensors can become mislocated due to previous tire rotations where the sensor learn procedure was not performed or stray sensor transmissions have been received from other vehicles. Always learn the sensors to ensure the DTC set is for that actual physical corner of the vehicle. Refer to **Tire Pressure Indicator Sensor Learn**.
- A sensor low battery condition will set a sensor DTC but will not illuminate the low tire pressure indicator or display a message on the DIC, if equipped. The sensor battery condition can be verified in the scan tool BCM data list. If a sensor low battery condition is indicated on the scan tool, the sensor will need to be replaced. Refer to **Tire Pressure Indicator Sensor Replacement**.

Reference Information

Description and Operation

Tire Pressure Monitor Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

J-46079 Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

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Circuit/System Verification

1. Using the **J-46079** , activate each tire pressure sensor and record each sensors transmission data and physical location. See **Special Tools**. Verify **J-46079** displays the 8-digit ID number, accurate tire pressure +/- 27. See **Special Tools**.6 kPa (4 psi), Learn Mode, and at least a 1/4 graph signal strength displayed.
    - If any of the parameters listed above are not displayed, replace the suspect tire pressure sensor.
2. With the scan tool, verify tire pressure sensors ID and locations displayed on the scan tool match the IDs and locations recorded from the special tool.
    - If the IDs and locations do not match, perform the **Tire Pressure Indicator Sensor Learn**.
3. Enable the TPM learn mode. Use the **J-46079** in simulate mode to learn 4 simulated sensor transmissions into the BCM. See **Special Tools**. Verify that all 4 simulated sensor locations, IDs, and tire pressures displayed on the TPM special tool match the corresponding scan tool parameters displayed.
    - If the scan tool does not match, replace the K9 BCM.
4. Test drive the vehicle above 40 km/h (25 mph) for greater than 2 minutes. With the scan tool, observe the suspect Pressure Sensor Mode data parameter. Verify the sensor mode changes to Rolling.
    - If the Pressure Sensor Mode does not change, replace the suspect tire pressure sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Replacement**
- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for BCM replacement, setup and programming.

DTC C0775

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0775 00

Low Tire Pressure System Sensors Malfunction

Circuit/System Description

If the tire pressure sensor learn procedure has not been performed, the tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete. If equipped, the driver information center (DIC) will also

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display a service tire monitor type message. Under these circumstances, DTC C0775 will be set and the tire pressure sensor learn procedure will need to be performed for the system to function correctly.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The body control module (BCM) has not undergone the tire pressure sensor learn procedure.

Action Taken When the DTC Sets

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays a service tire monitor type warning message.

Conditions for Clearing the DTC

A current DTC will clear when the BCM has undergone the tire pressure sensor learn procedure and 1 ignition cycle has occurred.

Reference Information

Description and Operation

Tire Pressure Monitor Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

J-46079 Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

Circuit/System Verification

Verify that the DTC C0775 is not set.

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- If the DTC is set, perform the tire pressure sensor learn procedure. Cycle the ignition. If the DTC resets, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for BCM replacement, setup and programming.

SYMPTOMS - TIRE PRESSURE MONITORING

1. Perform the **Diagnostic System Check - Vehicle** , before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Tire Pressure Monitor Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Tire Pressure Monitoring (TPM) System. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to **Low Tire Pressure Indicator Malfunction** in order to diagnose the symptom.

LOW TIRE PRESSURE INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The body control module (BCM) receives a radio frequency (RF) transmission from each tire pressure sensor.

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Each sensor has its own unique identification (ID) code, which it transmits as part of each RF message, that must be learned into the BCM memory. Once all 4 IDs have been learned and vehicle speed is greater than 40 km/h (25 mph), the BCM continuously compares IDs in received transmission to its learned IDs to determine if all 4 sensors are present. If the BCM detects a low tire pressure condition or a malfunction in the system, it will send a serial data message to the instrument panel cluster (IPC) requesting the appropriate tire pressure monitor indicator illumination and also to display the appropriate data message on the driver information center (DIC), if equipped.

Diagnostic Aids

- If unsure about the condition, cycle the ignition and observe the tire pressure monitor indicator icon. If the tire pressure monitor indicator icon is continuously illuminated after the IPC bulb check is completed, a low tire pressure condition is present. Check the tires for damage or leaks and inflate to the tire placard specifications. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** . If the tire pressure monitor indicator icon flashes for 1 minute after the IPC bulb check is completed and then remains illuminated, a tire pressure monitor system DTC is set. Perform the **Diagnostic System Check - Vehicle** to proceed with the proper diagnosis.
- Temperature can greatly effect tire pressures. Low tire pressure on a cold morning may cause the tire pressure monitor indicator icon to turn ON. The air pressure in the tire increases as the ambient temperature rises or as the tire warms up while the vehicle is driven. The pressure may increase enough to exceed the predetermined low pressure threshold which will turn OFF the tire pressure monitor indicator icon.
- Some aftermarket wheel valve stem holes are located further from the wheel rim than original equipment wheels. When using the TPM special tool to activate a sensor, ensure the tool antenna is no further than 15 cm (6 in) from the sensor and is aiming upward.
- Aftermarket wheel value stem locations can cause a sensor to not function correctly.
- A sensor may have been damaged due to a previous wheel/tire service or flat tire event.
- The use of other than GM approved tire sealants can obstruct the sensor pressure sensing port and cause inaccurate tire pressure readings. If this condition is verified, remove the sealer from the tire and replace the sensor. Refer to **Tire Pressure Indicator Sensor Replacement**.
- Occasionally sensor transmissions are not received by the BCM due to vehicle level RF interference from items such as but not limited to aftermarket ignition systems, DVD players, CB radios, or metallic type window tinting.
- The sensor activation procedure may have to be repeated up to 3 times before determining a sensor is malfunctioning. In the event a particular sensor's information is displayed on the special tool upon activation but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the RF signal is being blocked by another component.
- Occasionally sensors can become mislocated due to previous tire rotations where the sensor learn procedure was not performed or stray sensor transmissions have been received from other vehicles. Always learn the sensors to ensure the DTC set is for that actual physical corner of the vehicle. Refer to **Tire Pressure Indicator Sensor Learn**.

Reference Information

Description and Operation

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Tire Pressure Monitor Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Special Tools

J-46079 Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

Circuit/System Verification

NOTE: Low tire pressure in one or more tires is indicated by a continuously illuminated tire pressure monitor indicator icon after the IPC bulb check is completed. If equipped with a DIC, a check tire pressure type message will also be displayed. It is not necessary to perform the Learn procedure for a low tire condition. When a TPM DTC is set, the tire pressure monitor indicator icon will flash for 1 minute after the IPC bulb check is completed and then remains illuminated. If equipped with a DIC, a service tire monitor type message will also be displayed.

1. Verify all tires are inflated to the proper pressure ±10%. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** .
    - If not within the specified range, adjust all tire pressures to specification and drive the vehicle over 40 km/h (25 mph) for greater than 2 minutes. Verify the tire pressure monitor indicator icon is OFF.
2. Using the **J-46079** , activate each tire pressure sensor and record each sensor tire pressure reading. See **Special Tools**. Check the tire pressures with a known accurate hand held tire pressure gauge. Verify that the pressure readings from the special tool do not differ more than 27.6 kPa (4 psi) from the actual tire pressure readings.
    - If not within the specified range, replace the appropriate tire pressure sensor.
3. Using a scan tool, enable the TPM learn mode. Use the **J-46079** in simulate mode to learn 4 simulated sensor transmissions into the BCM. See **Special Tools**. Observe tire pressures in the scan tool data display. Verify the simulated tire pressures do not differ more than +/-27.6 kPa (4 psi) of the scan tool reading.
    - If not within the specified range, replace the K9 BCM.
4. Using a scan tool, perform the instrument panel special functions Lamp Test. Command the instrument panel warning lamps ON and OFF. Verify the tire pressure monitor indicator icon turns ON and OFF.
    - If the tire pressure monitor icon does not turn ON and OFF, replace the P16 IPC.

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5. Ignition ON, use the scan tool to setup the Tire Type/Pressure Selection in the BCM Module Setup menu. Refer to the **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** . Drive the vehicle over 40 km/h (25 mph) for greater than 2 minutes. Verify the tire pressure monitor indicator icon is OFF.
    - If the tire pressure monitor indicator icon is ON, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Replacement**
- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for IPC or BCM replacement, setup, and programming

REPAIR INSTRUCTIONS

TIRE PRESSURE INDICATOR SENSOR REPLACEMENT

Removal Procedure

1. Raise the vehicle on a suitable support. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire/wheel assembly from the vehicle. Refer to **Tire and Wheel Removal and Installation** .
3. Dismount the tire from the rim. Refer to **Tire Dismounting and Mounting** .

NOTE: When servicing the tire pressure sensor always use a new Schrader® tire pressure monitoring (TPM) sensor and a new TORX screw during installation.

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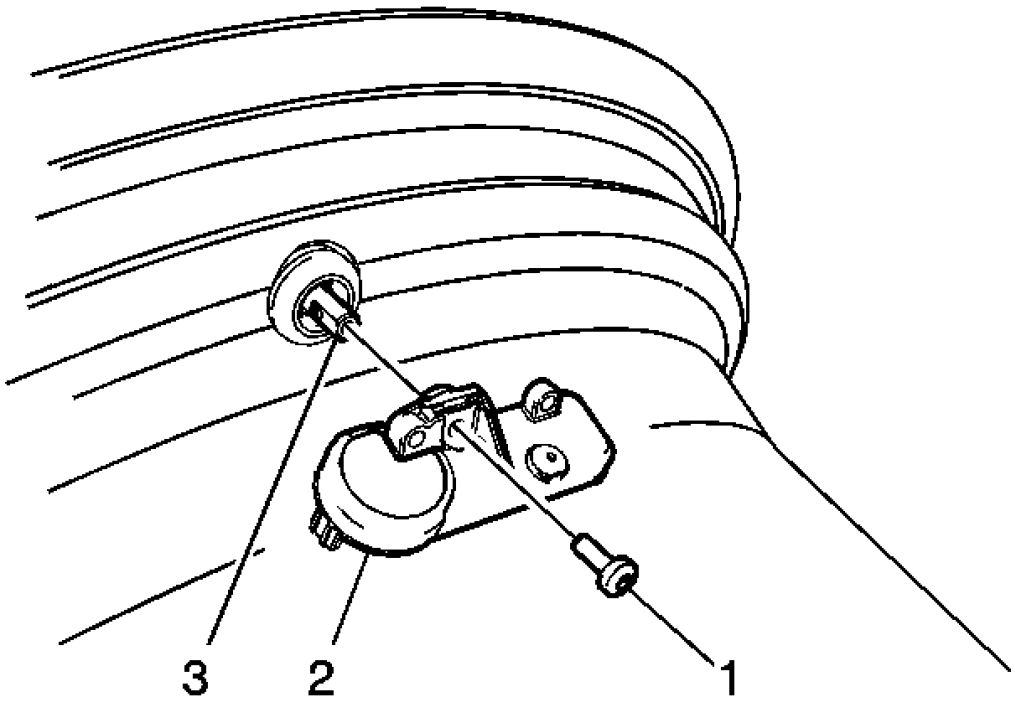


Fig. 1: Tire Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

4. Remove the TORX screw (1) from the tire pressure sensor (2) and pull it straight off the tire pressure valve stem (3).

CAUTION: Do not scratch or damage the clear coating on aluminum wheels with the tire changing equipment. Scratching the clear coating could cause the aluminum wheel to corrode and the clear coating to peel from the wheel.

5. Remove the tire pressure valve stem by pulling it through the rim.

Installation Procedure

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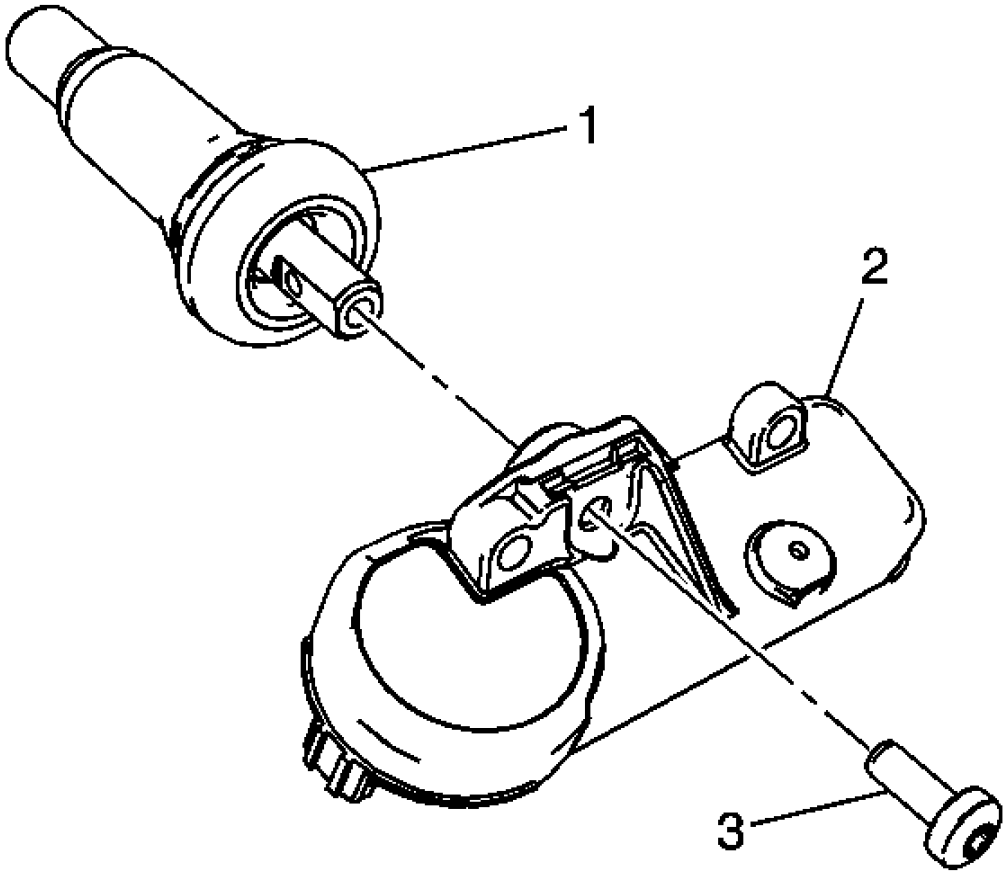


Fig. 2: Identifying Tire Pressure Sensor Components
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

NOTE:

- **Ensure the flat of the valve, lines up with the flats of the snap in the enclosure.**
- **TPM valves and TORX screws are single use items.**

1. Assemble the tire pressure sensor (2) to the valve stem and install the new TORX screw (3), tighten to 1.3 N.m (11.5 lb in).

NOTE: Use an approved tire mounting lubricant. DO NOT use silicon or corrosive

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base compounds to lubricate the tire bead and the wheel rim. A corrosive type compound can cause tire or rim deterioration.

2. Apply tire soap to the rubber portion of the valve stem (1).

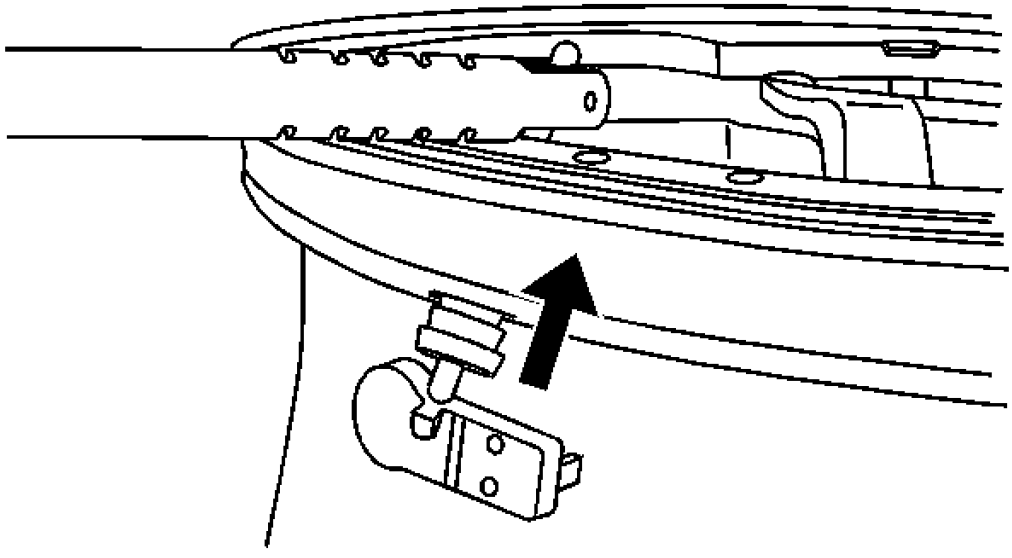


Fig. 3: View Of Tire Valve Stem Mounting Tool
Courtesy of GENERAL MOTORS CORP.

3. Using a tire valve stem mounting tool, pull the valve stem through in a direction parallel to the valve hole on the rim.

NOTE: Snap Fit TPM sensors are shipped in the OFF mode. The sensor will exit its OFF state when the tire is inflated.

4. Mount the tire to the rim. Refer to **Tire Dismounting and Mounting** .
5. Install the tire/wheel assembly on the vehicle. Refer to **Tire and Wheel Removal and Installation** .
6. Lower the vehicle.
7. Learn the tire pressure sensors. Refer to **Tire Pressure Indicator Sensor Learn**.

TIRE PRESSURE INDICATOR SENSOR LEARN

Special Tools

J-46079 Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

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Relearn Mode Description

The tire pressure monitor (TPM) system uses the instrument panel cluster (IPC), body control module (BCM), 4 radio frequency transmitting pressure sensors, and the serial data circuit to perform the TPM Relearn mode functions. The sensor Relearn procedure must be performed after every tire rotation, BCM replacement, or sensor replacement. Once the relearn mode has been enabled, each of the sensors unique identification codes can be learned into the BCM memory. When a sensor ID has been learned, the BCM sends a serial data message to the BCM to sound a horn chirp. This verifies the sensor has transmitted its ID and the BCM has received and learned it. The BCM must learn the sensor IDs in the proper sequence to determine correct sensor location. The first learned ID is assigned to the left front location, the second to right front, the third to right rear and the fourth to left rear. The turn signals will individually illuminate indicating which location is to be learned in the proper sequence.

Sensor Functions Using J-46079 or EL-46079

Each sensor has an internal low frequency coil. When the **J-46079** is used in activate mode, it produces a low frequency transmission that activates the sensor. See **Special Tools**. The sensor responds to a low frequency activation by transmitting in learn mode. When the BCM receives a learn mode transmission while in TPM learn mode, it will assign that sensors ID to the location on the vehicle relative to the order in which it was learned.

Sensor Functions Using Pressure Increase/Decrease Method

Each sensor takes a pressure measurement sample once every 30 seconds while in stationary mode. If the tire pressure increases, or decreases by more than 8.3 kPa (1.2 psi) from the last pressure measurement, another measurement will occur immediately to verify the change in pressure. If a pressure change has indeed occurred, the sensor transmits in Learn mode. When the BCM receives a Learn mode transmission while in TPM learn mode, it will assign that sensor's ID to the location on the vehicle relative to the order in which it was learned.

Relearn Mode Cancellation

The Relearn mode will cancel if the ignition is cycled to OFF or if more than 2 minutes has elapsed for any sensor that has not been learned. If the relearn mode is cancelled before the first sensor is learned, the original sensor IDs will be maintained. If the relearn mode is canceled after the first sensor is learned, the following will occur:

- All stored sensor IDs will be invalidated in the BCM memory.
- If equipped, the DIC will display dashes instead of tire pressures.
- DTC C0775 will be set.

These conditions will now require the relearn procedure to be repeated for the system to function properly.

TPM Relearn Procedure

NOTE: If using the scan tool to enable the relearn mode, the J-46079 must be used to activate the sensors. See Special Tools. When this preferred method is used, any stray sensor signals will not affect the relearn procedure. In the event a particular sensor's information is displayed on the special tool upon activation

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but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the sensor signal is being blocked by another component.
If using the DIC buttons to enable the relearn mode, the J-46079 or Pressure Increase/Decrease Method may be used. See Special Tools. Before proceeding with this method, ensure that no other learn procedure is being performed simultaneously or that tire pressures are not being adjusted on another TPM equipped vehicle within close proximity. Stray signals from other TPM equipped vehicles just driving by can be inadvertently learned. If any random horn chirps are heard from the vehicle while performing the learn procedure, most likely a stray sensor has been learned and the procedure will need to be cancelled and repeated. Under these circumstances, performing the TPM Relearn Procedure away from other vehicles would be highly recommended. In the event a particular sensor activation does not cause the horn to chirp, it may be necessary to rotate the wheel valve stem to a different position due to the sensor signal is being blocked by another component.

Preferred Scan Tool Relearn Enable Method

1. Apply park brake (manual transmission only).
2. Ignition ON, using a scan tool, initiate the Tire Pressure Sensors Learn mode. A double horn chirp will sound indicating the Relearn mode has been enabled. The left front turn signal will also be illuminated.
3. Starting with the left front tire, active the sensor by holding the antenna of the **J-46079** aimed upward against the tire sidewall close to the wheel rim at the valve stem location. See **Special Tools**. Press and release the Activate button and wait for a horn chirp. Once the horn chirp has sounded, the sensor information is learned and the turn signal in the next location to be learned will illuminate.
4. After the horn chirp has sounded and the right front turn signal is illuminated, repeat step 2 for the remaining 3 sensors in the following order:
    1. Right front
    2. Right rear
    3. Left rear
5. When the left rear sensor has been learned and a double horn chirp has sounded, the learn process is complete and the BCM exits the Relearn mode.
6. Ignition OFF, adjust all tires to the recommended pressures. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** .

Alternate DIC Relearn Enable Method

1. Apply park brake (manual transmission only).
2. Ignition ON, activate the Relearn mode with the driver information center (DIC) display controls. A double horn chirp sounds indicating the Relearn mode has been enabled and the left front turn signal will also be illuminated.
3. Starting with the left front tire, activate the tire pressure sensor by using one of the following methods:
    - Hold the antenna of the **J-46079** aimed upward against the tire sidewall close to the wheel rim at

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the valve stem location. See **Special Tools**. Press and release the activate button and wait for a horn chirp. Once the horn chirp has sounded, the sensor information is learned and the turn signal in the next location to be learned will illuminate.

WARNING: Over inflating tires may cause personal injury or damage to the tires and wheels. When increasing tire pressure do not exceed the maximum inflation pressure as noted on the tire sidewall.

- Increase/decrease the tire pressure for 8-10 seconds then wait for a horn chirp. The horn chirp may occur before or up to 30 seconds after the 8-10 second pressure increase/decrease time period has been reached. Once the horn chirp has sounded, the sensor information is learned and the turn signal in the next location to be learned will illuminate.

4. After the horn chirp has sounded and the right front turn signal is illuminated, repeat step 2 for the remaining 3 sensors in the following order:
    1. Right front
    2. Right rear
    3. Left rear
5. When the left rear sensor has been learned and a double horn chirp has sounded, the learn process is complete and the BCM exits the Relearn mode.
6. Ignition OFF, adjust all tires to the recommended pressures. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** .

DESCRIPTION AND OPERATION

TIRE PRESSURE MONITOR DESCRIPTION AND OPERATION

The tire pressure monitor (TPM) system warns the driver when a significant loss, or gain of tire pressure occurs in any of the 4 tires and allows the driver to display the individual tire pressures and their locations on the driver information center (DIC).

The system uses the body control module (BCM), driver information center (DIC), instrument panel cluster (IPC), a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly, and the serial data circuit to perform the system functions. Each sensor has an internal power supply with a 10 year service life.

When the vehicle is stationary, the sensors internal accelerometer is inactive, which puts the sensors into a stationary state. In this state the sensors sample tire pressure once every 30 seconds and do not transmit at all if the tire pressure does not change. As vehicle speed increases, centrifugal force activates the sensors internal accelerometer causing the sensors to go into rolling mode. In this mode, the sensors sample tire pressure once every 30 seconds and transmit in rolling mode once every 60 seconds. The BCM receives and translates the data contained in each sensors RF transmission into sensor presence, sensor mode, and tire pressure. The BCM sends the tire pressure and tire location data to the DIC via the serial data circuit where they are displayed.

The sensors continuously compare their last pressure sample to their current pressure sample and will transmit in re-measure mode if a 8.3 kPa (1.2 psi) change in tire pressure has been detected in either a stationary or rolling state. When the TPM system detects a significant loss, or gain of tire pressure, the tire pressure monitor indicator icon is illuminated on the IPC and if equipped, a check tire pressure type message is displayed on the

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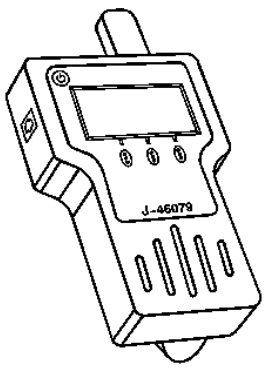
DIC. Both the indicator icon and DIC message can be cleared by adjusting the tire pressures to the recommended kPa/psi and driving the vehicle above 40 km/h (25 mph) for at least 2 minutes.

If power is disconnected from the BCM or if the vehicle battery is disconnected each TPM sensor ID is retained but all of the tire pressure information is lost. Under these circumstances the BCM cannot assume that the tire pressures were maintained over an unknown period of time. If equipped, the DIC will display all dashes and the scan tool will indicate a default tire pressure value of 1020 kPa (148 psi) for each tire. Driving the vehicle above 40 km/h (25 mph) for at least 2 minutes will activate the sensors causing the DIC to display the current tire pressures. The **J-46079** TPM special tool or the pressure increase/decrease method may also be used to activate the sensors as well. See **Special Tools**.

The BCM has the ability to detect malfunctions within the TPM system. In the event a DTC is set, the tire pressure monitor indicator icon on the IPC will flash for 1 minute and then remain illuminated after the ignition is turned ON and the IPC bulb check has been completed. Any malfunction detected will cause the DIC to display a service tire monitor system type message. For more information on other functions of the BCM, refer to **Keyless Entry System Description and Operation** .

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	EL 46079 J 46079 Tire Pressure Monitor Diagnostic Tool

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2010 ACCESSORIES & BODY, CAB

Vehicle Access - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Side Door Lock Cylinder Clamp Screw	5 N.m	44 lb in
Front Side Door Latch Screws	10 N.m	89 lb in
Front Side Door Interlock Striker Bolt	10 N.m	89 lb in
Front Side Door Outside Handle Screw	10 N.m	89 lb in
Front Side Door Latch Striker Screws	25 N.m	18 lb ft
Front Side Door Interlock Striker Plate Screws	10 N.m	89 lb in
Rear Compartment Lid Latch Bolts	10 N.m	89 lb in
Rear Compartment Lid Latch Striker Bolts	10 N.m	89 lb in

SCHEMATIC AND ROUTING DIAGRAMS

DOOR LOCK/INDICATOR SCHEMATICS

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Fig. 1: Door Lock/Indicator
Courtesy of GENERAL MOTORS CORP.

RELEASE SYSTEMS SCHEMATICS

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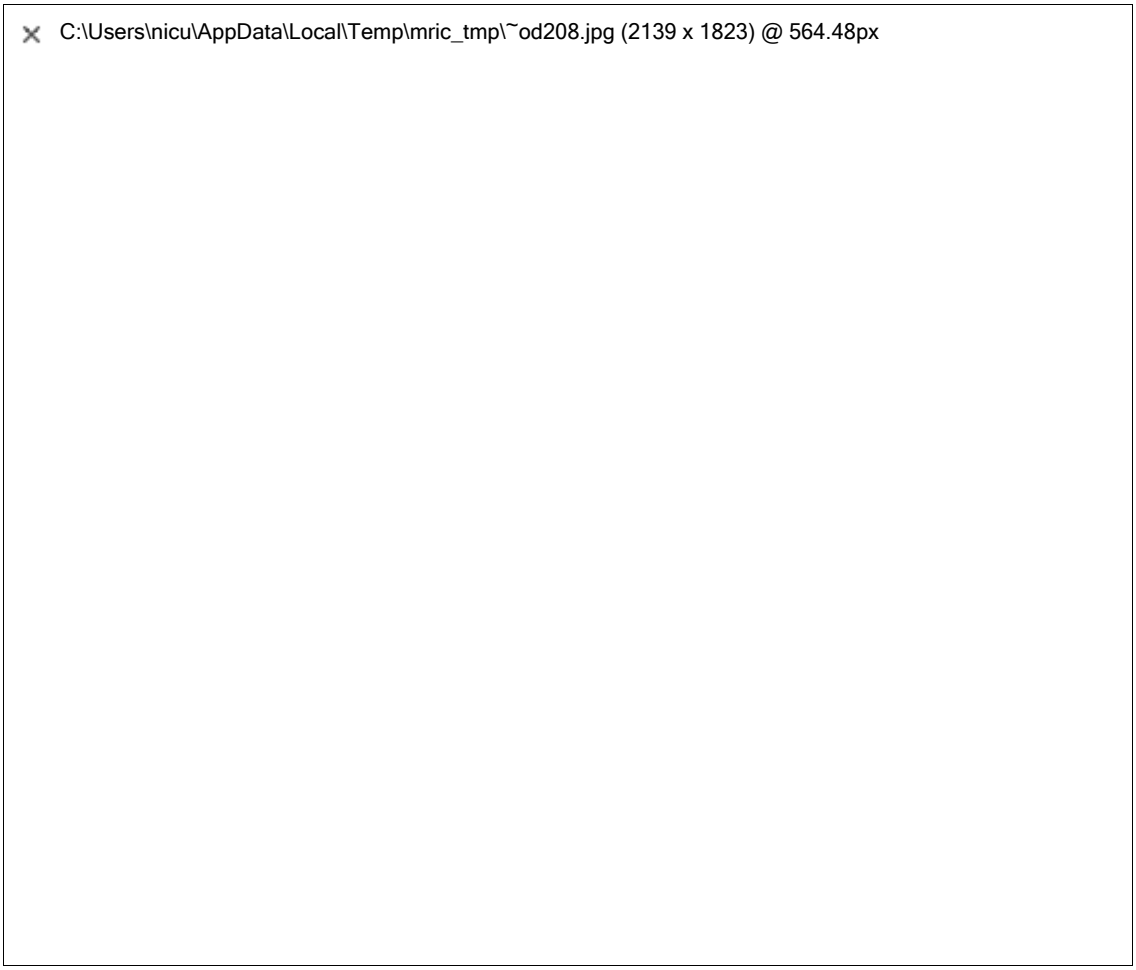


Fig. 2: Release Systems
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2730	B2730 00: Interior Trunk Lid Unlatch Switch Circuit
DTC B3125, B3130, or B3135	B3125 02: Driver Door Only Unlock Circuit Short to Ground B3130 02: All Doors Unlock Circuit Short to Ground B3135 02: All Doors Lock Circuit Short to Ground
DTC B3140 or B3150	B3140 00: Driver Unlock Switch Circuit B3150 00: Driver Lock Switch Circuit
DTC B3265	B3265 02: Trunk Lid Unlatch Output Circuit Short to Ground

DTC B2730

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Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2730 00

Interior Trunk Lid Unlatch Switch Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Compartment Lid Release Switch Signal	B2730 00	1	1	-
Rear Compartment Lid Unlatch Switch Ground	-	1	1	-
1. Rear Compartment Lid Unlatch Switch Malfunction				

Circuit/System Description

When the ignition is ON, the body control module (BCM) supplies a signal to the rear compartment lid unlatch switch through the trunk release switch signal circuit. When the rear compartment lid unlatch switch is pressed, the voltage within the signal circuit is pulled low and in response, the BCM will energize the trunk release relay.

Conditions for Running the DTC

The system voltage is 9-16 volts.

Conditions for Setting the DTC

TThe BCM detects a short to ground in the rear compartment lid release switch signal circuit for greater than 60 seconds

Action Taken When the DTC Sets

The BCM ignores the input from the rear compartment lid unlatch switch.

Conditions for Clearing the DTC

- This DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.

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- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Release Systems Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Luggage Compartment Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter while pressing and releasing the S58 rear compartment lid unlatch switch. The parameter should change between Active and Inactive.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S58 rear compartment lid unlatch switch.
2. Ignition ON, verify the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal C for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Install a 3A fused jumper wire between the signal circuit terminal C and the ground circuit terminal A. Verify the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the S58 rear compartment lid unlatch switch.

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Component Testing

Trunk Release Switch

1. Ignition OFF, disconnect the harness connector at the S58 rear compartment lid unlatch switch.
2. Test for infinite resistance between the signal terminal C and the ground terminal A with the switch in the open position.
   - If not the specified value, replace the S58 rear compartment lid unlatch switch.
3. Test for less than 2 ohms between the signal terminal C and the ground terminal A with the switch in the closed position.
   - If greater than the specified range, replace the S58 rear compartment lid unlatch switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming

DTC B3125, B3130, OR B3135

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3125 02

Driver Door Only Unlock Circuit Short to Ground

DTC B3130 02

All Doors Unlock Circuit Short to Ground

DTC B3135 02

All Doors Lock Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
BCM B+	B3125 02, B3130 02,	B3125 02, B3130 02,	-	-

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	B3135 02	B3135 02		
Door Latch Control	B3125 02, B3130 02, B3135 02	2	2	-
Driver Door Lock Motor Lock Control	B3125 02, B3130 02, B3135 02	1	1	-
Door Lock Actuator Unlock Control	B3125 02, B3130 02, B3135 02	1, 2	1, 2	-
1. Driver Door Latch Malfunction 2. Passenger Door Latch Malfunction				

Circuit/System Description

The body control module (BCM) controls the driver and passenger door latches. When the BCM receives a driver door unlock, passenger door unlock or all door lock command, it will provide voltage to the appropriate door lock circuits and ground to the opposite door lock circuits causing the actuator to perform the lock or unlock function.

Conditions for Running the DTC

When the output is actively being requested by the BCM.

Conditions for Setting the DTC

B3125 02, B3130 02 and B3135 02

- A short to ground or an open/high resistance in the BCM B+ circuit.
- The BCM detects a short to ground on the driver or passenger door latch control circuit.

Action Taken When the DTC Sets

The power door locks will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Door Lock/Indicator Schematics

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Connector End View Reference

Component Connector End Views

Description and Operation

Power Door Locks Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Command the doors to LOCK and UNLOCK by using the central door lock switch, the doors should LOCK and UNLOCK when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, replace the BCM.
3. Ignition OFF, connect the X2 harness connector and disconnect the X6 harness connector at the K9 BCM.
4. Test for infinite resistance between the control circuit terminals listed below and ground:
    - Control terminal 1
    - Control terminal 2
    - Control terminal 4
    - If not the specified value, test the control circuit for a short to ground. If the circuit tests normal, test or replace the appropriate A23 door latch assembly.
5. If all circuits test normal, replace the K9 BCM.

Component Testing

1. Ignition OFF, disconnect the harness connector at the appropriate A23 door latch assembly.
2. Install a 25 A fused jumper wire between one of the control terminals and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times,

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the A23 door latch assembly should perform the LOCK and UNLOCK functions.

- If it does not perform as specified, replace the A23 door latch assembly

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Latch Replacement**
- **Control Module References** for BCM replacement, setup and programming

DTC B3140 OR B3150

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3140 00

Driver Unlock Switch Circuit

DTC B3150 00

Driver Lock Switch Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Central Door Lock Switch Lock Signal	B3150 00	1	1	-
Central Door Lock Switch Unlock Signal	B3140 00	1	1	-
1. Door Lock Switch Malfunction				

Circuit/System Description

The body control module (BCM) monitors the voltage level of the door lock and door unlock signal circuits. When the central door lock switch is in the open position, the voltage level in the signal circuit will be near 12 V. When the central door lock switch is pressed to the lock or unlock position, the voltage level in the appropriate signal circuit will drop to 0V and the BCM will detect the votlage drop and command the door latches to perform the requested lock or unlock command.

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Conditions for Running the DTC

The system voltage is 9-16 V.

Conditions for Setting the DTC

B3140 00

The BCM detects short to ground in the unlock signal circuit for greater than 60 seconds.

B3150 00

The BCM detects a short to ground in the lock signal circuit for greater than 60 seconds.

Action Taken When the DTC Sets

The door lock switch will malfunction.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Door Lock/Indicator Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Door Locks Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool BCM Central Door Lock Switch on Console parameter. The reading should be Inactive and change to Lock and Unlock when pushing the appropriate switch.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the A20 radio/HVAC control.
2. Ignition ON, verify the scan tool Central Door Lock Switch on Center Console parameter is Inactive.
    - If the value is Lock, test the signal circuit terminal 12 for a short to ground. If the circuit tests normal, replace the K9 BCM.
    - If the value is Unlock, test the signal circuit terminal 13 for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. If all circuits test normal, replace the A20 radio/HVAC control.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM and HVAC control replacement, setup and programming

DTC B3265

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3265 02

Trunk Lid Unlatch Output Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Closure Relay B+	1	1	-	-
Rear Closure Relay Control	B3265 02	1	1	-
Rear Closure Relay Ground	-	1	-	-
1. Rear Compartment Lid Release Malfunction				

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Circuit/System Description

The body control module (BCM) applies battery positive voltage to the trunk relay control circuit, which energizes the coil side of the rear closure relay. The switch side of the rear closure relay then closes, supplying battery positive voltage through the relay and the relay controlled output circuit to the rear compartment lid latch. The rear compartment lid latch then releases the trunk lid so that it may be manually raised to an open position.

Conditions for Running the DTC

When the rear compartment lid latch release is actively being requested by the BCM.

Conditions for Setting the DTC

The BCM detects a short to ground in the rear closure relay control circuit.

Action Taken When the DTC Sets

The rear compartment lid latch will malfunction.

Conditions for Clearing the DTC

- This DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Release Systems Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Luggage Compartment Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, command the M40 rear compartment lid latch to UNLATCH with a scan tool. The M40 rear compartment lid latch should release the trunk lid.

Circuit/System Testing

1. Ignition OFF, disconnect the K609 REAR CLOSURE relay.
2. Test for less than 10 ohms between the ground circuit terminal 85 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
4. Ignition ON, command the M40 rear compartment lid latch to UNLATCH with a scan tool, the test lamp should turn ON while commanding the UNLATCH state.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the K609 REAR CLOSURE relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the K609 REAR CLOSURE relay.
2. Test for 60-180 ohms between terminals 85 and 86.
    - If not within the specified range, replace the K609 REAR CLOSURE relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the K609 REAR CLOSURE relay.
4. Install a 25A fused jumper wire between relay terminal 85 and 12V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
    - If greater than the specified range, replace the K609 REAR CLOSURE relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for BCM replacement, setup and programming

SYMPTOMS - VEHICLE ACCESS

NOTE: The following steps must be completed before using a symptom table.

- Perform the **Diagnostic System Check - Vehicle** before using a symptom table in order to verify that all of the following conditions are true:
  - There are no DTCs set.
  - The control modules can communicate via the serial data link.
- Review the system description and operation in order to familiarize yourself with the system functions. Refer to the following:
  - **Luggage Compartment Description and Operation**
  - **Power Door Locks Description and Operation**
  - **Door Ajar Indicator Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the power door locks or trunk release. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Thoroughly inspect the wiring and connectors. An incomplete inspection of the wiring and connectors may result in misdiagnosis causing part replacement with the reappearance of the malfunction. If an intermittent malfunction exists, refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Door Ajar Indicator Malfunction**
- **Power Door Locks Malfunction**
- **Trunk Release Malfunction**
- **Trunk Ajar Indicator Malfunction**

DOOR AJAR INDICATOR MALFUNCTION

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Door Ajar Switch Signal	1	2	2	-
Passenger Door Ajar Switch Signal	1	2	2	-
Driver Door Latch Assembly Ground	-	2	-	-
Passenger Door Latch assembly Ground	-	2	-	-
1. Door Ajar Indicator Always Illuminated 2. Door Ajar Indicator Inoperative				

Circuit/System Description

The driver window motor supplies a reference voltage to the driver door ajar switch and the passenger window motor supplies a reference voltage to the passenger door ajar switch. The door ajar switches are normally open when the doors are fully closed. When a door is opened, the door ajar switch contacts close providing a path to ground. The respective window motor detects the drop in the reference voltage and will send a serial data message to the body control module (BCM) indicating the door is ajar, the BCM in turn sends a serial data message to the driver information center which displays the appropriate door ajar message.

Reference Information

Schematic Reference

Door Lock/Indicator Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Door Locks Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, observe the scan tool Driver Door Ajar Switch parameter while opening and closing the driver door. The parameter should change between Inactive and Active.
    - If the value does not change, refer to Driver Door Ajar Malfunction
2. Observe the scan tool Passenger Door Ajar Switch parameter while opening and closing the passenger door. The parameter should change between Inactive and Active.
    - If the value does not change, refer to Passenger Door Ajar Malfunction.

Circuit/System Testing

Driver Door Ajar Malfunction

1. Ignition OFF, disconnect the harness connector at the A23D door latch assembly-driver.
2. Ignition ON, test for less than 10 ohms between the ground circuit terminal 8 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify the scan tool Driver Door Ajar Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 6 for a short to ground. If the circuit tests normal, replace the M74D window motor-driver.
4. Install a 3A fused jumper wire between the signal circuit terminal 6 and the ground circuit terminal 8. Verify the scan tool Driver Door Ajar Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74D window motor-driver.
5. If all circuits test normal, test or replace the A23D door latch assembly-driver.

Passenger Door Ajar Malfunction

1. Ignition OFF, disconnect the harness connector at the A23P door latch assembly-passenger.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Passenger Door Ajar Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 1 for a short to ground. If the circuit tests normal, replace the M74P window motor-passenger.
4. Install a 3A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 3. Verify the scan tool Passenger Door Ajar Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the M74P window motor-passenger.

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5. If all circuits test normal, test or replace the A23P door latch assembly-passenger.

Component Testing

Door Ajar Switch

1. Ignition OFF, disconnect the harness connector at the appropriate A23 door latch assembly.
2. Test for infinite resistance between the terminals listed below with the switch in the open position:
   - A23D door latch assembly-driver terminal 6 and terminal 8
   - A23P door latch assembly-passenger terminal 1 and terminal 3
   - If not the specified value, replace the door latch.
3. Test for less than 2.0 ohms between the terminals listed below with the switch in the closed position:
   - A23D door latch assembly-driver terminal 6 and terminal 8
   - A23P door latch assembly-passenger terminal 1 and terminal 3
   - If greater than the specified range, replace the A23 door latch-assembly.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Latch Replacement**
- **Front Side Door Window Regulator Motor Replacement**

POWER DOOR LOCKS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
BCM B+	B3125 02, B3130 02, B3135 02	B3125 02, B3130 02, B3135 02	-	-
Central Door Lock Switch Lock Signal	B3150 00	3	3	-
Central Door Lock Switch Unlock Signal	B3140 00	3	3	-
Door Lock Control	B3125 02, B3130 02,	1, 2	1, 2	-

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	B3135 02			
Driver Unlock Control	B3125 02, B3130 02, B3135 02	1	1	-
Passenger Unlock Control	B3125 02, B3130 02, B3135 02	2	2	-
1. Driver Door Lock Malfunction 2. Passenger Door Lock Malfunction 3. Central Door Lock Switch Malfunction				

Circuit/System Description

The body control module (BCM) monitors the voltage level of the door lock and door unlock signal circuits. When the central door lock switch is in the open position, the voltage level in the signal circuit will be near 12 volts. When the central door lock switch is pressed to the lock or unlock position, a signal will be sent to the K9 BCM requesting a lock or unlock command.

The BCM, upon receipt of a lock switch lock or unlock signal, will supply battery voltage to the door lock actuator lock or unlock control circuits. Since the opposite side of the lock actuator is connected to ground through the other lock actuator control circuit, the doors will then lock or unlock as commanded.

Reference Information

Schematic Reference

Door Lock/Indicator Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Door Locks Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

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Circuit/System Verification

1. Ignition ON, observe the scan tool Central Door Lock Switch on Center Console parameter while using the central door lock switch. The reading should be Inactive and change to Lock and Unlock when pushing the appropriate switch.
    - If the value does not change, refer to Central Door Lock Switch Malfunction.
2. Command the doors to LOCK and UNLOCK by using the central door lock switch, the doors should LOCK and UNLOCK when changing between the commanded states.
    - If a door does not LOCK or UNLOCK, refer to Door Lock Malfunction.
    - If all doors do not LOCK or UNLOCK, refer to All Door Locks Inoperative.

Circuit/System Testing

Central Door Lock Switch Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the A20 radio/HVAC control.
2. Ignition ON, verify the scan tool Central Door Lock Switch on Center Console parameter is Inactive.
    - If the value is Lock, test the signal circuit terminal 12 for a short to ground. If the circuit tests normal, replace the K9 BCM.
    - If the value is Unlock, test the signal circuit terminal 13 for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Install a 3 A fused jumper wire between the signal circuit terminal 12 and ground. Verify the scan tool Central Door Lock Switch on Center Console parameter is Lock.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal 13 and ground. Verify the scan tool Central Door Lock Switch on Center Console parameter is Unlock.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the A20 radio/HVAC control.

Door Lock Malfunction

1. Ignition OFF, disconnect the harness connector at the A23 door latch assembly.
2. Connect a test lamp between the control circuit terminals listed below:
    - A23D door latch assembly-driver terminal 2 and terminal 3
    - A23P door latch assembly-passenger terminal 7 and terminal 8
3. Ignition ON, command the door to LOCK and UNLOCK by using the central door lock switch. The test lamp should briefly illuminate when commanding the LOCK and UNLOCK states.
    - If the test lamp is always OFF, test either control circuit for an open/high resistance. If the circuits test normal, replace the K9 BCM.
    - If the test lamp is always ON, test either control circuit for a short to voltage. If the circuits test normal, replace the K9 BCM.

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4. If all circuits test normal, test or replace the A23 door latch assembly.

All Door Locks Inoperative

1. Ignition OFF, disconnect the X2 harness connector at the K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, disconnect the X6 harness connector at the K9 BCM.
4. Test for infinite resistance between the control circuit terminals listed below and ground:
    - Control terminal 1
    - Control terminal 2
    - Control terminal 4
    - If not the specified value, test the control circuit for a short to ground. If the circuit tests normal, test or replace the appropriate A23 door latch assembly.
5. If all circuits test normal, replace the K9 BCM.

Component Testing

1. Ignition OFF, disconnect the harness connector at the appropriate A23 door latch.
2. Install a 25 A fused jumper wire between one of the control terminals and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the door latch should perform the LOCK and UNLOCK functions.
    - If it does not perform as specified, replace the A23 door latch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Latch Replacement**
- **Control Module References** for BCM and radio/HVAC control replacement, setup and programming

TRUNK RELEASE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

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Trunk Relay B+	2	2	-	-
Rear Compartment Lid Release Switch Signal	B2730 00	1	1	-
Trunk Relay Control	B3265 02	2	2	-
Rear Compartment Lid Latch Control	2	2	2	-
Rear Compartment Lid Release Switch Ground	-	1	1	-
Rear Compartment Lid Latch Ground	-	2	2	-
Trunk Relay Ground	-	2	2	-
1. Rear Compartment Lid Release Switch Malfunction 2. Rear Compartment Lid Release Malfunction				

Circuit/System Description

The body control module (BCM) supplies a reference voltage to the rear compartment lid unlatch switch through the release switch signal circuit. When the rear compartment lid unlatch switch is pressed, the release switch signal circuit is grounded through the rear compartment lid unlatch switch ground circuit and the reference voltage is pulled low within the BCM. In response, the BCM applies battery positive voltage to the TRUNK RLY relay control circuit, which energizes the coil side of the relay. The switch side of the TRUNK RLY relay then closes, supplying battery positive voltage through the relay and the rear compartment lid latch control circuit activating the latch so that the trunk lid may be manually raised to an open position.

Reference Information

Schematic Reference

Release Systems Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Luggage Compartment Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, observe the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter while pressing and releasing the S58 rear compartment lid unlatch switch. The parameter should be Inactive and change to Active when the switch is pressed.
    - If the value does not change, refer to Trunk Release Switch Inoperative.
2. Command the M40 rear compartment lid latch to UNLATCH with a scan tool. The M40 rear compartment lid latch should release the deck lid.
    - If theM40 rear compartment lid latch does not release the deck lid, refer to Release Actuator Inoperative.

Circuit/System Testing

Trunk Release Switch Inoperative

1. Ignition OFF, disconnect the harness connector at the S58 rear compartment lid unlatch switch.
2. Ignition ON, test for less than 20 ohms between the ground circuit terminal A and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal C for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal C and ground. Verify the scan tool Interior Trunk Lid/Liftgate Window Unlatch Switch parameter is Active.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the S58 rear compartment lid unlatch switch.

Release Actuator Inoperative

1. Ignition OFF for 10 minutes, disconnect the K609 rear closure relay.
2. Test for less than 5 ohms between the ground circuit terminal 85 and ground.
    - If greater than the specified range, test for an open/high resistance.
3. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.
    - If the test lamp illuminates, test the control circuit for a short to voltage.
4. Verify that a test lamp illuminates between the B+ circuit terminal 87 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, test the control circuit terminal 30 for a short to ground. If the circuit tests normal, test or replace the K609 rear closure relay.
5. Ignition OFF, disconnect the harness connector at the M40 rear compartment lid latch.
6. Test for less than 5 ohms between the ground circuit terminal 2 and ground.

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- If greater than the specified range, test the ground circuit for an open/high resistance.

7. Connect the harness connector at the M40 rear compartment lid latch.
8. Ignition ON, connect a 10 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30. Verify the M40 rear compartment lid latch is activated.
    - If the M40 rear compartment lid latch does not activate, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the M40 rear compartment lid latch.
9. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
10. Command the Trunk Lid/Liftgate window Unlatch Command to UNLATCH with a scan tool. The test lamp should turn ON during the UNLATCH command.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
11. If all circuits test normal, test or replace the K609 rear closure relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the K609 rear closure relay.
2. Test for 60-180 ohms between terminals 85 and 86.
    - If not within the specified range, replace the K609 rear closure relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the K609 rear closure relay.
4. Install a 25 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
    - If greater than the specified range, replace the K609 rear closure relay

Rear Compartment Lid Latch

1. Ignition OFF, disconnect the harness connector at the M40 rear compartment lid latch.
2. Install a 10 A fused jumper wire between the control terminal 1 and 12 V. Install a jumper wire between the ground terminal 2 and ground. Verify the M40 rear compartment lid latch activates.
    - If the latch does not perform as specified, replace the M40 rear compartment lid latch.

Trunk Release Switch

1. Ignition OFF, disconnect the harness connector at the M40 rear compartment lid unlatch switch.

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2. Test for infinite resistance between the signal terminal C and the ground terminal A with the switch in the open position.
    - If not the specified value, replace the M40 rear compartment lid unlatch switch.
3. Test for less than 2 ohms between the signal terminal C and the ground terminal A with the switch in the closed position.
    - If greater than the specified range, replace the M40 rear compartment lid unlatch switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Rear Compartment Lid Latch Replacement**
- **Control Module References** for BCM replacement, setup and programming

TRUNK AJAR INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Compartment Lid Ajar Switch Signal	1	2	2	-
Rear Compartment Lid Latch Ground	-	3	3	-
1. Trunk Ajar Message Always Illuminated 2. Trunk Ajar Message Inoperative 3. Trunk Release Inoperative				

Circuit/System Description

The body control module (BCM) receives a discrete input from the rear compartment lid ajar switch signal circuit. When the rear compartment lid latch releases the rear compartment lid, the rear compartment lid ajar switch, which is internal to the rear compartment lid latch, is supplied with ground which causes the trunk ajar switch signal circuit to be pulled low. The BCM interprets this and communicates via serial data to the driver information center which will display the Trunk Open message.

Reference Information

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Schematic Reference

Release Systems Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Door Ajar Indicator Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Rear Closure Ajar Switch parameter while opening and closing the trunk. The parameter should change between Inactive and Active.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the M40 rear compartment lid latch.
2. Ignition ON, verify the scan tool Rear Closure Ajar Switch parameter is Inactive.
    - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Install a 3 A fused jumper wire between the signal circuit terminal 4 and ground. Verify the scan tool Rear Closure Ajar Switch parameter is Active.
    - If not the specified value, test the signal circuit terminal 4 for a short to voltage or and open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the M40 rear compartment lid latch.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the M40 rear compartment lid latch.

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2. Test for infinite resistance between the signal terminal 4 and the ground terminal 2 with the switch in the open position.
    - If not the specified value, replace the M40 rear compartment lid latch.
3. Test for less than 2 ohms between the signal terminal 4 and the ground terminal 2 with the switch in the closed position.
    - If greater than the specified range, replace the M40 rear compartment lid latch.

Repair Procedures

Perform the **Diagnostic Repair Verification**

- **Rear Compartment Lid Latch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DOOR WILL NOT OPEN/CLOSE, DOOR BINDING, OR LOCKS, HANDLES, OR CYLINDERS DO NOT FUNCTION

Step	Action	Yes	No
DEFINITION: This diagnostic table is designed to address the mechanical diagnosis of the door latching system, which could include the inside and outside handles, latch rods/cables, latches, or latch cylinders.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	Were you sent here from a Vehicle Access Symptom Table?	Go to **Step 3**	Go to **Symptoms - Vehicle Access**
3	Does the door open with the outside handle?	Go to **Step 4**	Go to **Step 10**
4	Does the door open with the inside handle?	Go to **Step 5**	Go to **Step 11**
5	Does the manual latch knob latch and unlatch the latch smoothly without binding?	Go to **Step 6**	Go to **Step 12**
6	Does the door latch switch and/or the keyless entry transmitter latch and unlatch the door latch or door latches?	Go to **Step 7**	Go to **Step 14**
7	Is the outside key cylinder loose or does it rattle or fall out? (if equipped)	Go to **Step 15**	Go to **Step 8**
8	Does the outside key cylinder latch and unlatch the latch and function smoothly without binding? (if equipped)	Go to **Step 9**	Go to **Step 16**
9	Does the door bind, does it take excessive effort to open, or is it misaligned?	Go to **Step 17**	Go to **Step 18**
	If the door will not open with the outside handle, or the handle is obstructed or loose, check the following: • For cold weather freezing, thaw as necessary. • Check the handle for foreign material. Remove material as necessary.		

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10	• Check the handle grab bar for looseness or damage. Repair as necessary. • Check the handle for full travel. If the issue is not resolved, remove the trim panel as necessary to gain access to door hardware and check the following: • Check the handle chassis for loose fasteners, broken chassis inserts, loose or missing spring, or a loose, missing or bent rod lever. • Check for bent rod to the outside handle. • Check that the handle grab bar engages the rod lever properly. • Check for interference of rod and handle to other components in the door. • Check that handle rod is securely attached at both latch and handle. • Check if rod is positioned properly in the clip on the latch. At rest position, the handle should be fully against the down stop and the latch lever should be at the bottom of its travel. Correct by opening clip, repositioning rod in clip and closing clip till it snaps, as necessary. Did you find and correct the condition?	Go to **Step 18**	Go to **Step 11**
11	Door will not open with the inside handle: • Check the inside handle for foreign material. Remove material as necessary. • Check that the handle is secure. Correct as necessary. • If rear door, verify child security is not engaged. • Remove the trim panel as necessary to and check the inside handle rod/cable attachments at both the latch and handle. If the cable is kinked or pinched, correct as necessary. Did you find and correct the condition?	Go to **Step 18**	Go to **Step 12**
	The door will not or is difficult to unlatch with the inside manual latch knob:		

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12	• For cold weather freezing, thaw as necessary • Check the latch knob for a loose condition. Repair or replace as necessary. Check the latch knob for binding or dragging using the following procedure: 1. Remove the latch knob. 2. If condition goes away, check for drag/interference of the latch knob against the inner belt seal, or the trim panel. Correct as required. If further action is required, remove the trim panel and check the latch rod and latch knob for interference with the following: • Water deflector/paper • Side Impact Foam • Rod Grommet in sheet metal • Glass Run Channel • Other rods or cables • Trim panel Did you find and correct the condition?	Go to **Step 18**	Go to **Step 13**
13	With a manual lock, if the latch will not function properly do the following: 1. Function the lock/unlatch lever on the latch to unlatch the latch. Check for high internal resistance. 2. With the door open, manually close the latch with a screwdriver. 3. Check the latch for internal binding by actuating the latch with the inside door handle lever. 4. Manually close the latch with a screwdriver again. 5. Check the latch for internal binding by actuating the latch with the outside door handle lever. Did you find and correct the condition?	Go to **Step 18**	Go to **Step 14**

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14	If power locks are included in vehicle options and do not function with either the keyless entry transmitter or switch: 1. For cold weather freezing, thaw as necessary. 2. Remove trim pad as required and check the following: • Verify door harness has appropriate power connectors for switches and latch. • Check harness connector pins for corrosion. • Assure wire harness connectors are seated and locked properly at latch and switch. Remove and re-seat if required. • Check door harness for cuts/chafing/corrosion. Correct/replace as required. • Check for 12V at latch and door switch. Correct/proceed accordingly. • Check BCM for trouble codes. Correct/proceed accordingly. 3. If power locks still do not function do the following: • Remove latch from door cavity. • Connect latch to electrical connector outside the door. • Function power lock/unlatch switch in both latch and unlatch directions. Watch for lock/unlatch lever on latch to move completely from one position to the other. • If lever does not move, remove connector from old latch and attach to new latch outside of door cavity. • Verify new latch is functional, if so, attach rods and install new latch in door. Did you find and correct the condition?	Go to **Step 18**	Go to **Step 15**
15	If the key cylinder is loose do the following: • Remove the trim if necessary. • Check that the retaining clip is properly seated. (if equipped) • Check that the fastener is properly torqued. (if		

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	equipped) Did you find and correct the condition?	Go to **Step 18**	Go to **Step 16**
16	The outside key cylinder will not latch and unlatch the latch and function smoothly without binding: 1. For cold weather freezing, thaw as necessary 2. Remove trim if required. 3. Check that the key cylinder rod is securely attached both to the key cylinder pawl and the latch. 4. Check that key cylinder lever, rod and latch lever are free of interferences. Remove interferences as required. 5. Check that latch cylinder rod is routed properly. Re-route as required. 6. Remove rod from latch cylinder and actuate cylinder. Check for internal resistance. Lubricate latch cylinder as required 7. Verify Cylinder rotates with vehicle key. If not, code and replace cylinder to match vehicle key. See latch cylinder coding and replacing. Did you find and correct the condition?	Go to **Step 18**	Go to **Step 17**
17	The door is difficult to open: • Check for interference with the fender, adjacent door, body opening or door striker and adjust as necessary. • Check for binding door hinges. Lubricate or align/adjust as necessary. • Check the door check link for binding. Lubricate as necessary. • Adjust the door as necessary. Did you find and correct the condition?	Go to **Step 18**	Go to Side Door Adjustment
	Verify proper operation of the door closing system. • Outside Handle • Inside Handle • Manual lock/unlatch		

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18	○ Outside Key Cylinder ○ Inside latch knob ○ Double pull handle • Power lock/unlatch ○ Key Fob ○ Door switches • Door opening/closing effort Is the condition still present?	Go to **Step 1**	System OK

REPAIR INSTRUCTIONS

FRONT SIDE DOOR INSIDE HANDLE CABLE REPLACEMENT



Fig. 3: Front Side Door Inside Handle Cable
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
	Front Side Door Latch

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1	**Procedures** 1. Remove the water deflector. 2. Refer to **Front Side Door Latch Replacement**.
2	Front Side Door Inside Handle Cable **Procedures** 1. The cable end hooks into the lock release arm, twist and turn to remove. 2. Inspect the door latch system for proper operation.

FRONT SIDE DOOR LOCK CYLINDER REPLACEMENT

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Fig. 4: Front Side Door Lock Cylinder
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Access Hole Plug **Procedures** 1. Do Not remove the front inside door trim panel to access door lock cylinder clamp

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	screw. 2. Use a suitable tool, remove the access hole plug located on the inside opening of the door that conceals the screw for the lock cylinder clamp.
2	Front Side Door Lock Cylinder Clamp Screw **CAUTION:** **Refer to Fastener Caution Fastener Caution.** **Procedures** 1. The screw for the lock cylinder clamp will not come out completely. 2. The lock cylinder clamp screw must be unscrewed to a hard stop before the lock cylinder and bezel can be removed. **Tighten:** 5 N.m (44 lb in)
3	Front Side Door Lock Cylinder Bezel **Procedure:** Pull the lock cylinder out of the handle to remove the bezel. **Tip:** The door lock cylinder bezel clips over the lock cylinder.
4	Front Side Door Lock Cylinder **Procedure:** Inspect the door latch system for proper operation. **Tip:** When reinstalling the lock cylinder ensure the gasket is in place with the cylinder.

FRONT SIDE DOOR OUTSIDE HANDLE REPLACEMENT

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Fig. 5: Front Side Door Outside Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Outside Handle **Procedures** 1. Do Not remove the front inside door trim panel to access door lock cylinder clamp screw. 2. Remove the access hole plug located on the inside opening of the door that conceals the screw for the lock cylinder clamp. Refer to **Front Side Door Lock Cylinder Replacement** 3. Pull and hold the door handle in the open position. 4. While holding the door handle, unscrew the lock cylinder clamp screw until it comes to a hard stop. 5. Release the handle, by now the handle should stay in the open position. 6. Remove the lock cylinder, gently pull it straight out. 7. Remove the outside door handle by sliding rearwards and then out in a swinging motion. 8. Inspect the door latch system for proper operation.

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	Tip: While screwing in the screw for the lock cylinder hold the handle in the open position, this will avoid the door handle from snapping once the spring pressure is relieved and the door handle returns to the close position.

FRONT SIDE DOOR OUTSIDE HANDLE BRACKET REPLACEMENT



Fig. 6: Front Side Door Outside Handle Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** . 2. Remove the front side door outside handle. Refer to **Front Side Door Outside Handle Replacement**.	
1	Front Side Door Outside Handle Bracket Fastener **CAUTION:** **Refer to Fastener Caution .** **Procedures**

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	1. Remove the front side door water deflector. 2. Release the front side door outside handle rod mechanism at shift linkage lever - clip. 3. Release the front side door lock cylinder rod from the door latch. **Tighten:** 10 N.m (89 lb in)
2	Front Side Door Outside Handle Insulator
3	Front Side Door Outside Handle Bracket **Procedure** 1. Transfer components as necessary. 2. Inspect the door latch system for proper operation.

REAR COMPARTMENT LID INSIDE HANDLE REPLACEMENT



Fig. 7: Rear Compartment Lid Inside Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear compartment lid carpet. Refer to **Rear Compartment Lid Carpet Replacement** .	
1	Rear Compartment Lid Inside Latch Handle Access Cover **Procedure:** Depress the retainers and slide the access cover to access the cable.

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2	Rear Compartment Lid Inside Latch Handle Cable **Procedure:** Disconnect the rear compartment lid inside latch handle cable from the latch.
3	Rear Compartment Lid Inside Latch Handle Cable Retainer
4	Rear Compartment Lid Inside Latch Handle

FRONT SIDE DOOR LATCH REPLACEMENT



Fig. 8: Front Side Door Latch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Latch Screw (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedures** 1. Remove the front side door water deflector. 2. Disconnect the electrical connector.

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	3. Release the front side door outside handle rod mechanism at shift linkage lever - clip. 4. Release the front side door lock cylinder rod from the door latch. **Tighten:** 10 N.m (89 lb in)
2	Front Side Door Latch **Procedure:** Inspect the door latch system for proper operation.

REAR COMPARTMENT LID LATCH REPLACEMENT

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Fig. 9: Rear Compartment Lid Latch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Disconnect the inside handle from the compartment lid. Refer to **Rear Compartment Lid Inside Handle Replacement**.	
1	Rear Compartment Lid Latch Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)

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2	Rear Compartment Lid Latch Locator Tab/Retainer **Procedure:** Slide the latch to release from the tab/retainers.
3	Rear Compartment Lid Latch

FRONT SIDE DOOR LOCKING ROD REPLACEMENT



Fig. 10: Front Side Door Locking Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Latch **Procedures** 1. Remove the water deflector. 2. Refer to **Front Side Door Latch Replacement**.
2	Front Side Door Latch Rod **Procedure:** Inspect the door latch system for proper operation. **Tip:** Turn the door latch until the door latch rod releases.

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FRONT SIDE DOOR LOCK CYLINDER ROD REPLACEMENT



Fig. 11: Front Side Door Lock Cylinder Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** . 2. Remove the front side door latch. Refer to **Front Side Door Latch Replacement**.	
1	Front Side Door Locking Rod **Procedure:** Inspect the door latch system for proper operation.

FRONT SIDE DOOR OUTSIDE HANDLE ROD ADJUSTMENT

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Fig. 12: Front Side Door Outside Handle Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement**	
1	Front Side Door Outside Handle Rod Retainer **Procedures** 1. Remove the water deflector. 2. Use a flat-head tool, open the retaining clip from the threaded end of the rod that is connected to the latch for the outside handle.
	Front Side Door Outside Handle Rod **Procedures**

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2	1. Position the outside handle rod into the retaining clip. 2. Adjust the handle rod by removing the threaded end of the rod up or down in the retaining clip. 3. Closed the retaining clip over the threaded end of the handle rod. 4. Inspect the door latch system for proper operation.

FRONT SIDE DOOR OUTSIDE HANDLE ROD REPLACEMENT

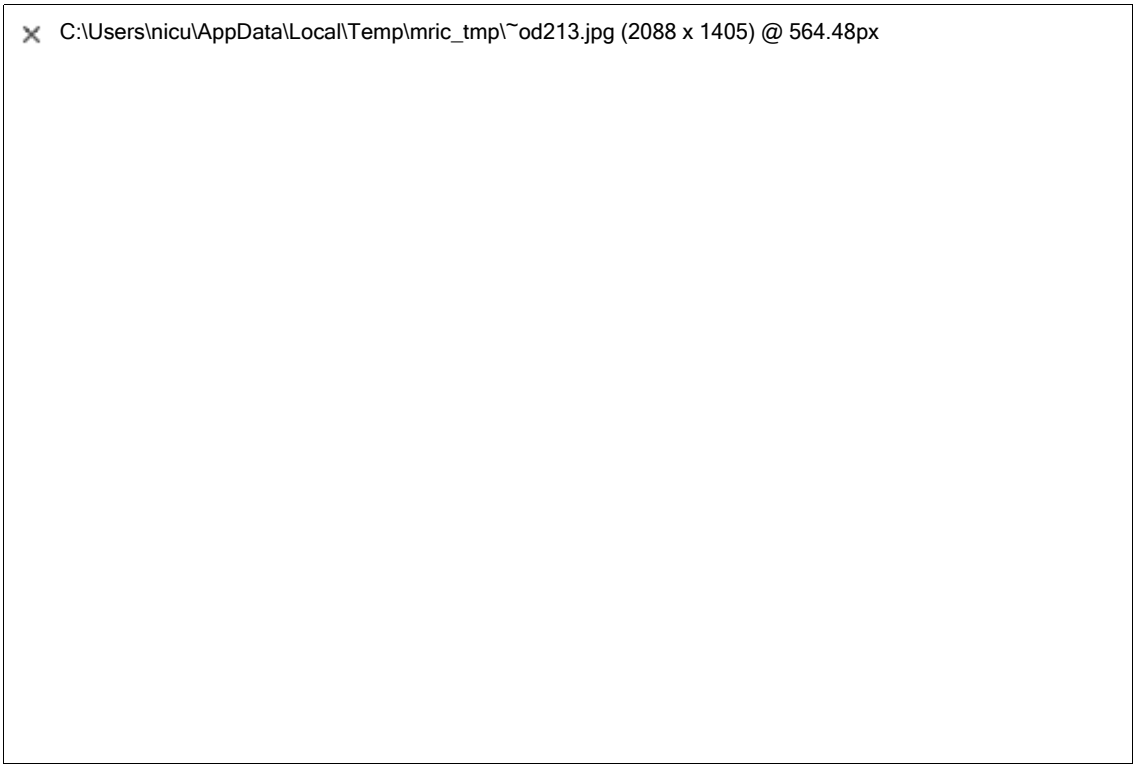


Fig. 13: Front Side Door Outside Handle Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Outside Handle Rod **Procedures** 1. Remove the water deflector. 2. Opening mechanism at shift linkage lever - clip 3. Inspect the door latch system for proper operation.

FRONT SIDE DOOR LOCK STRIKER ADJUSTMENT

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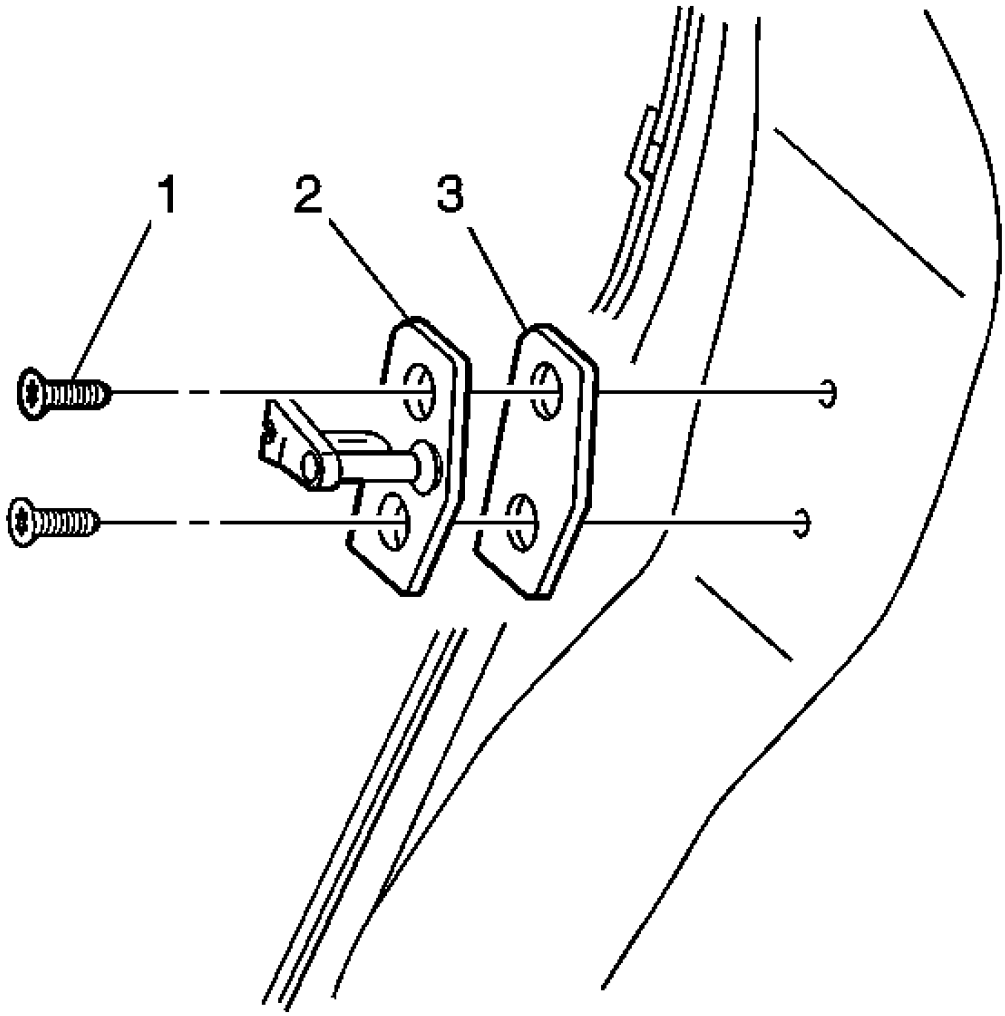


Fig. 14: Identifying Door Lock Striker & Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: To determine if the striker adjustment is required, proceed as follows.

1. Ensure that the door is properly aligned with the door opening before proceeding with the striker adjustment.
2. Open and close the door on the striker (2). Note if the door drags on the striker causing the door to move upward or downward upon contact with the striker. Also note the closing effort to fully engage the latch.

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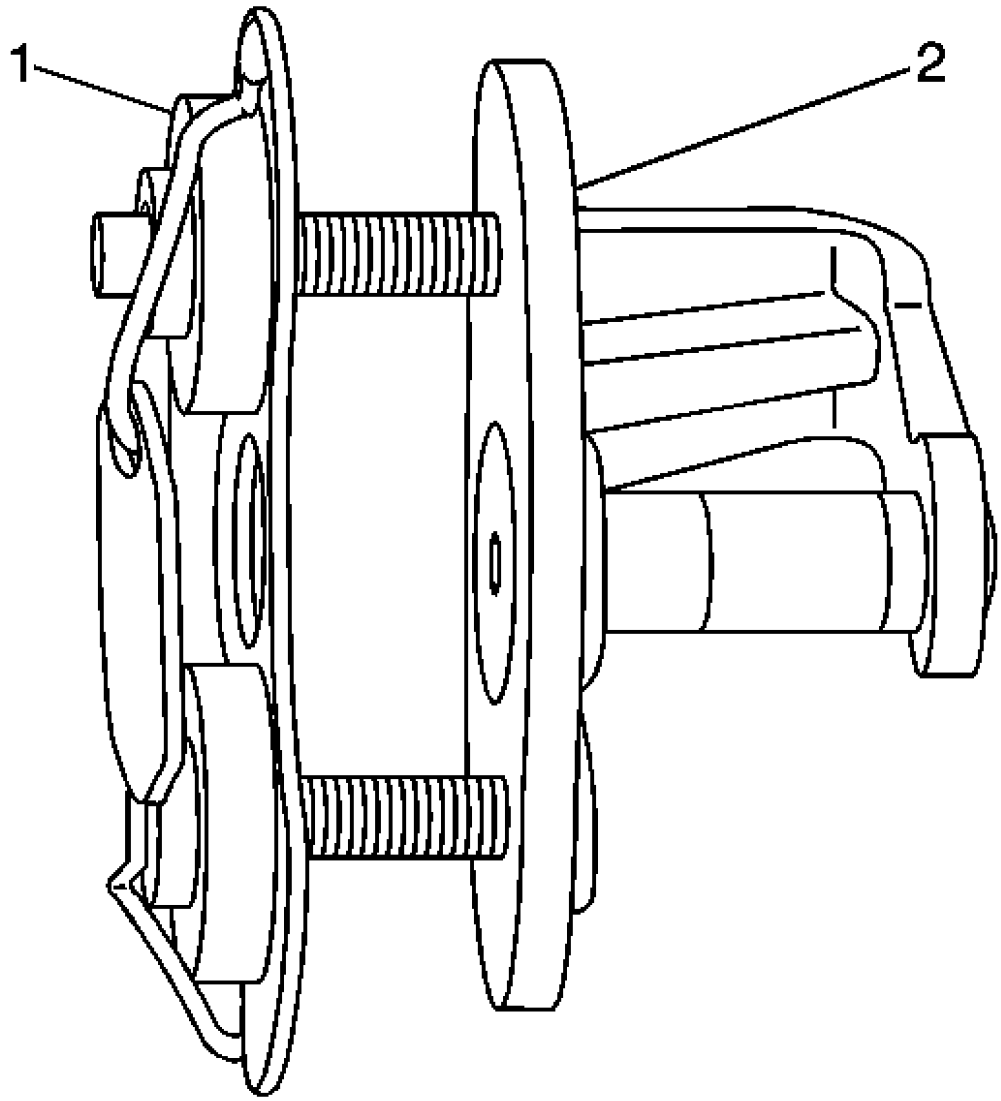


Fig. 15: Identifying Door Striker & Anchor Plate
Courtesy of GENERAL MOTORS CORP.

NOTE: When the striker bolts have been removed, the striker anchor plate (1) will slip down in the door pillar or quarter panel and the trim will need to be removed to gain access.

3. Using a soft marker, mark around the striker (2) for reference of the original position. Loosen the striker screws just enough to allow the movement of the door striker and shims if equipped.

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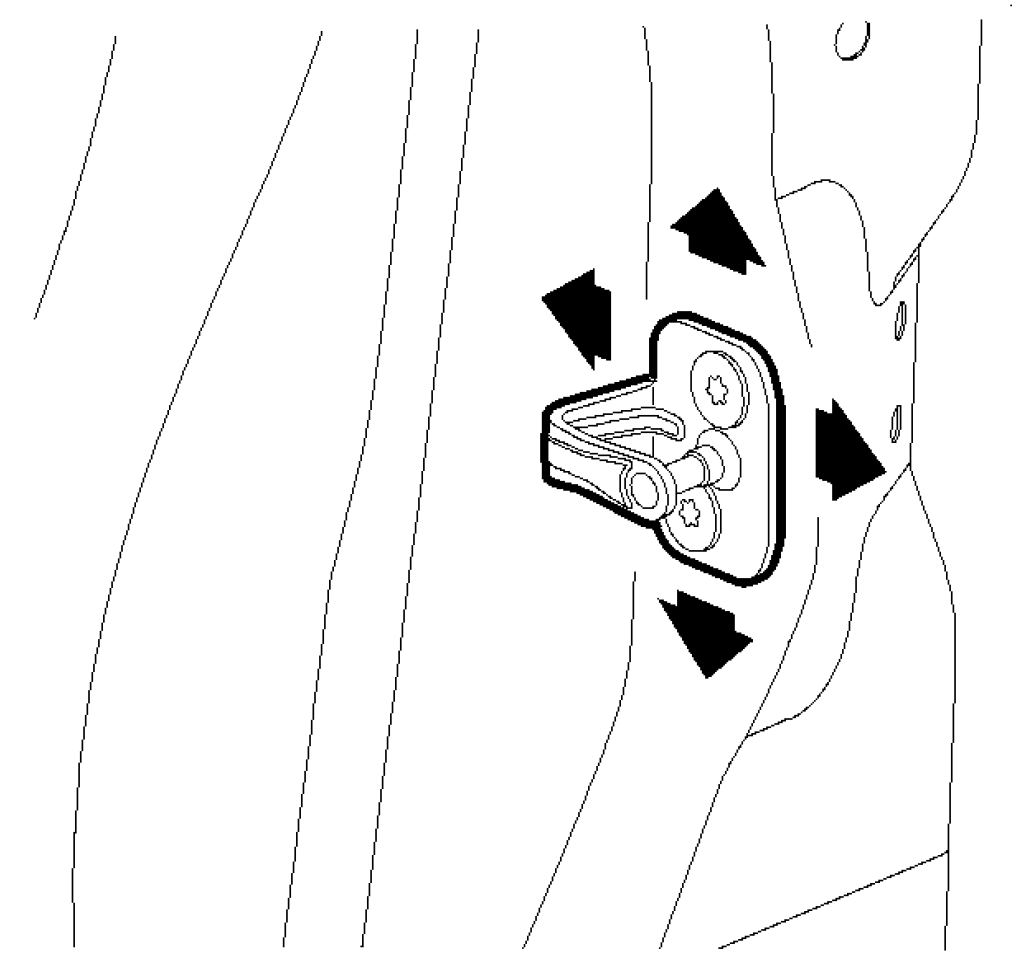


Fig. 16: View Of Door Striker
Courtesy of GENERAL MOTORS CORP.

NOTE: The striker plate in relation to the welded portion of the bendable link is located on the back side of the lock pillar. When adjusting the striker use a rubber mallet or a suitable tool. Use a rubber mallet or a suitable tool to aid in the adjustment, this will not damage the striker plate.

4. Use a rubber mallet or a suitable tool to adjust door striker up or down or inboard or outboard as required.
5. Move the striker to eliminate drag on the striker and door latch and to achieve proper door position within door opening. Start with up/down position, then position the striker to achieve proper alignment to the door opening. Set the in/out adjustment for proper door seal engagement ensuring that the door closing efforts are correct.

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CAUTION: Refer to Fastener Caution .

6. Adjust the spacers as required and tighten the screws to 25 N.m (18 lb ft).
7. Inspect the door latch system for proper operation.
8. Close the door.

FRONT SIDE DOOR LOCK STRIKER REPLACEMENT



Fig. 17: Front Side Door Lock Striker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Latch Striker Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 25 N.m (18 lb ft)
	Front Side Door Latch Striker **Procedure**

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2	1. Ensure that all spacers are installed with the striker. 2. Ensure that all spacers are in place. Refer to **Front Side Door Lock Striker Adjustment** 3. Inspect the door latch system for proper operation.

FRONT SIDE DOOR INTERLOCK STRIKER REPLACEMENT



Fig. 18: Front Side Door Interlock Striker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Interlock Striker Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Front Side Door Interlock Striker Plate Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .**

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	Tighten: 10 N.m (89 lb in)
3	Front Side Door Interlock Striker Plate **Procedure:** After replacing the interlock striker plate close the door lightly to ensure alignment to the interlock striker bolt. If the front door needs alignment. Refer to **Front Side Door Replacement** .

REAR COMPARTMENT LID LATCH STRIKER REPLACEMENT



Fig. 19: Rear Compartment Lid Latch Striker
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear end trim finish panel. Refer to **Rear End Trim Finish Panel Replacement** .	
1	Rear Compartment Lid Latch Striker Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Use a grease pencil to outline the striker before removing the bolts.

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	Tighten: 10 N.m (89 lb in)
2	Rear Compartment Lid Latch Striker **Tip:** Adjust the rear compartment lid latch striker after replacing, if needed.

DESCRIPTION AND OPERATION

DOOR AJAR INDICATOR DESCRIPTION AND OPERATION

Door/Trunk Open Indicator System Components

The door/trunk open indicator system consists of the following components:

- Body control module (BCM)
- Instrument panel cluster
- Driver information center
- Driver door latch
- Passenger door latch
- Rear compartment lid latch
- Driver window motor
- Passenger window motor

Driver Door Open

The driver window motor receives a discrete input from the driver door ajar switch within the driver door latch to indicate the status of the door. The window motor then communicates this status to the instrument cluster via GMLAN message. The instrument panel cluster, upon receipt of this GMLAN message, will illuminate the Driver Door Open message in the driver information.

Passenger Door Open

The passenger window motor receives a discrete input from the passenger door ajar switch within the passenger door latch to indicate the status of the door. The window motor then communicates this status to the instrument cluster via GMLAN message. The instrument panel cluster, upon receipt of this GMLAN message, will illuminate the Passenger Door Open message in the driver information center.

Trunk Open

The BCM receives a discrete input from the trunk ajar switch to indicate the status of the trunk. The BCM then communicates this status to the instrument panel cluster via GMLAN serial data. The instrument panel cluster, upon receipt of this message, will illuminate the Trunk Open message in the driver information center.

LUGGAGE COMPARTMENT DESCRIPTION AND OPERATION

Rear Compartment Lid Release System Components

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- Body control module (BCM)
- Rear compartment lid release switch
- Rear compartment lid latch
- TRUNK relay

Rear Compartment Lid Release Operation

When the rear compartment lid release switch is pressed, the trunk release switch signal circuit is switched to ground. The BCM responds by applying battery voltage to the relay control circuit which energizes the relay. The relay is supplied with battery voltage at all times from the F23 fuse. With the relay coil energized, the relay switch contacts close allowing battery voltage to flow to the rear compartment lid latch causing the rear compartment lid to release. The rear compartment lid release switch is permanently grounded to a fixed body ground.

POWER DOOR LOCKS DESCRIPTION AND OPERATION

Door Lock System Components

The power door lock system consists of the following components:

- Door lock switch-located in the center of the instrument panel
- Body control module (BCM)
- Driver door latch
- Passenger door latch

Door Lock System Controls

The power door lock system can be controlled by any of the following:

- Power door lock switch activation
- Keyless entry lock or unlock command
- Delayed locking command
- Automatic door lock command

Door Lock and Unlock Operation

When a door lock switch is activated in the lock or unlock position the BCM will receive a ground signal on either the door lock switch lock or unlock signal circuits.

The BCM, upon receipt of a lock switch lock or unlock signal, will supply battery voltage to the door lock actuator lock or unlock control circuits. Since the opposite side of the lock actuator is connected to ground through the other lock actuator control circuit the doors will then lock or unlock as commanded.

The following three circuits are used to operate the lock:

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- Driver door unlock
- Passenger door unlock
- All door lock

The driver door lock actuator is isolated so it can be unlocked by itself using the keyless entry transmitter.

Automatic Door Lock Operation

This feature can be personalized to driver preference.

The BCM will automatically lock the vehicle doors if the following conditions exist:

- All vehicles doors are closed.
- The ignition is in the ON position
- The vehicle is shifted out of Park.

The BCM will then unlock the doors when vehicle is shifted back into Park.

Delayed Locking Operation

With any door open and a door lock switch is activated in the lock position, the BCM will give three audible chimes. When the door is closed, the BCM will cycle the internal door lock relay to lock the doors after approximately five seconds. This feature can be overridden by activating the door lock switch a second time and the doors will lock even with a door open.

Lockout Prevention Operation

The BCM will lock all doors and unlock the driver door with a door lock switch lock activation if a vehicle door is open and the ignition key is fully inserted in the ignition. The lockout prevention feature can be overridden if a lock command is received from the keyless entry system.

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2010 ACCESSORIES & BODY, CAB

Wipers and Washers - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Windshield Washer Solvent Container Bolts	15 N.m	11 lb ft
Windshield Wiper Arm Nut	37 N.m	27 lb ft
Windshield Wiper Transmission Assembly	6 N.m	53 lb in

SCHEMATIC AND ROUTING DIAGRAMS

WIPER/WASHER SCHEMATICS

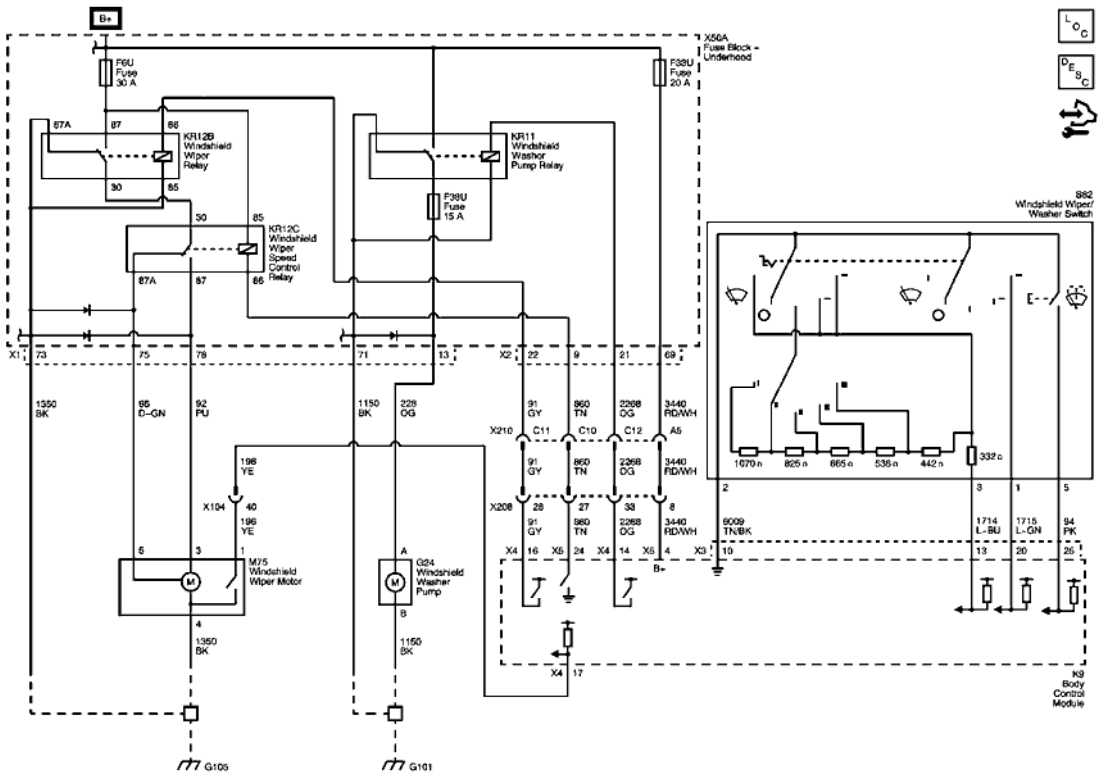


Fig. 1: Wiper/Washer System
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

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DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3715 or B3875	B3715 01: Windshield Wiper Relay Circuit Short to Battery B3715 02: Windshield Wiper Relay Circuit Short to Ground B3715 04: Windshield Wiper Relay Circuit Open B3875 01: Windshield Wiper High Speed Relay Circuit Short to Battery B3875 02: Windshield Wiper High Speed Relay Circuit Short to Ground B3875 04: Windshield Wiper High Speed Relay Circuit Open
DTC B3810	B3810 02: Headlamp Washer Relay Circuit Short to Ground
DTC B3873	B3873 01: Front Washer Relay Circuit Short to Battery B3873 02: Front Washer Relay Circuit Short to Ground B3873 04: Front Washer Relay Circuit Open

DTC B3715 OR B3875

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3715 01

Windshield Wiper Relay Circuit Short to Battery

DTC B3715 02

Windshield Wiper Relay Circuit Short to Ground

DTC B3715 04

Windshield Wiper Relay Circuit Open

DTC B3875 01

Windshield Wiper High Speed Relay Circuit Short to Battery

DTC B3875 02

Windshield Wiper High Speed Relay Circuit Short to Ground

DTC B3875 04

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Windshield Wiper High Speed Relay Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper High Speed Relay B+	1, 2	1, 2	-	-
Windshield Wiper Switch Low Signal	1	1	1	-
Windshield Wiper Switch High Signal	4	2	2	-
Windshield Wiper Motor Park Switch Signal	3	3	-	-
Front Wiper Relay Control	B3715 02	B3715 04	B3715 01	-
Windshield Wiper High Speed Relay Control	B3875 02	B3875 04	B3875 01	-
Windshield Wiper High Speed Relay Control	2	2	4	-
Front Wiper Motor Low Speed Control	1	1	4	-
Windshield Wiper Switch Low Reference	-	1, 2	1, 2	-
Windshield Wiper Motor Ground	-	1, 2, 3	-	-
Front Wiper Relay Ground	-	1	-	-
1. Delay or Low Speed Wipers Inoperative 2. High Speed Wipers Inoperative 3. Wipers Do Not Park 4. Wipers Always ON				

Circuit/System Description

The Body Control Module (BCM) controls the windshield wiper motor based on input from the windshield wiper/washer switch. The BCM monitors the wiper/washer switch through two separate signal circuits and a ground circuit. The windshield wiper switch high signal circuit is used to determine high speed wiper operation, the windshield wiper switch low signal is used to determine low speed, intermittent, and mist operation through the use of a resistor ladder, and windshield washer switch signal circuit is used to determine washer operation.

The BCM controls the windshield wiper motor through two output controls, controlling two relays which determine the desired wiper speed, high or low.

Conditions for Running the DTC

- The DTC runs only when a wiper output is actively being requested by the BCM.
- The system voltage is between 9-16 V.

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Conditions for Setting the DTC

- A short to voltage is detected in the Front Wiper Relay control circuit or in the High Speed Relay control circuit.
- A short to ground or an open/high resistance is detected in the Front Wiper Relay control circuit or in the High Speed Relay control circuit.

Action Taken When the DTC Sets

The BCM will not activate the wiper output.

Conditions for Clearing the DTC

- A current DTC will clear when the condition for setting the fault is no longer present.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for diagnostic tester information.

Circuit/System Verification

- Ignition ON, S80 Window Wiper/Washer Switch in LOW position. Verify the front wipers are cycling at low speed.
- Ignition ON, S80 Window Wiper/Washer Switch in the HIGH position. Verify the front wipers are

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cycling at high speed.

Circuit/System Testing

DTC B3715

1. Ignition OFF, disconnect the KR12B Windshield Wiper Relay.
2. Connect a test lamp between the control circuit terminal 86 and ground.
3. Ignition ON, command the low speed wipers ON and OFF using the wiper switch. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
    - If the test lamp is always OFF, test for a short to ground or an open/high resistance on the control circuit. If the circuit tests normal, replace the K9 Body Control Module.
4. If all circuits test normal, test or replace the KR12B Windshield Wiper Relay.

DTC B3875

1. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
2. Connect a test lamp between the control circuit terminal 86 and B+.
3. Ignition ON, command the high speed wipers ON and OFF using the S80 Window Wiper/Washer Switch. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 Body Control Module.
    - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
4. If all circuits test normal, test or replace the KR12C Windshield Wiper Speed Control Relay.

Component Testing

DTC B3715 - Relay Test

1. Ignition OFF, disconnect the KR12B Windshield Wiper Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
    - If the resistance is not within the specified range, replace the KR12B Windshield Wiper Relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the KR12B Windshield Wiper Relay.
4. Test for less than 5 ohms between terminals 30 and 87A.

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- If greater than the specified value, replace the KR12B Windshield Wiper Relay.

5. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
   - If greater than the specified range, replace the KR12B Windshield Wiper Relay.

DTC B3875 - Relay Test

1. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
   - If the resistance is not within the specified range, replace the KR12C Windshield Wiper Speed Control Relay.
3. Test for infinite resistance between the following terminals:
   - 30 and 86
   - 30 and 87
   - 30 and 85
   - 85 and 87
   - If not the specified value, replace the KR12C Windshield Wiper Speed Control Relay.
4. Test for less than 5 ohms between terminals 30 and 87A.
   - If greater than the specified value, replace the KR12C Windshield Wiper Speed Control Relay.
5. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
   - If greater than the specified value, replace the KR12C Windshield Wiper Speed Control Relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**

DTC B3810

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3810 02

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Headlamp Washer Relay Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Washer Fluid Pump Control	1	1	2	-
Headlamp Washer Relay Control	B3810 02	1	1	-
Headlamp Washer Fluid Pump Ground	-	1	1	-
1. Headlamp Washer Inoperative 2. Headlamp Washers Always ON				

Circuit/System Description

The Body Control Module (BCM) controls the washer motor based on an input from the windshield wiper washer switch. The BCM monitors the washer switch through the windshield washer switch signal circuit. When the WASH switch is closed, ground is supplied to the front washer switch signal circuit. When this is seen, the BCM will command the front washer fluid pump and the low speed wipers on. When Headlamp Wash Equipped, the headlamps shall be sprayed with wash fluid as a result of an extended Windshield Wash Switch Activation. In order to preserve wash fluid, the feature shall only be allowed to activate if the Low or High Beam Headlamps are active. In addition, after the initial Headlamp Wash operation has been performed, additional headlamp washes shall not be performed for the next 4 Windshield Wash activations or for 48 hours whichever comes first.

Conditions for Running the DTC

- Ignition ON.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

A short to ground is detected in the headlamp washer relay control circuit.

Action Taken When the DTC Sets

Washer operation is suspended.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Diagnostic Aids

The headlamp wash feature shall only be allowed to be activated if the low or high beam headlamps are active

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too.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for diagnostic tester information

Circuit/System Verification

Operate the washers using the S80 Window Wiper/Washer Switch. Verify the G16 Headlamp Washer Fluid Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the KR2 Headlamp Washer Fluid Pump Relay.
2. Connect a test lamp between the control circuit terminal 86 and ground.
3. Ignition ON, command the headlamp washer ON and OFF using the wiper switch. The test lamp should turn ON and OFF when changing between the commanded states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
    - If the test lamp is always OFF, test for a short to ground or an open/high resistance on the control circuit. If the circuit tests normal, replace the K9 Body Control Module.
4. If all circuits test normal, test or replace the KR2 Headlamp Washer Fluid Pump Relay.

Component Testing

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Relay Test

1. Ignition OFF, disconnect the KR2 Headlamp Washer Fluid Pump Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
    - If the resistance is not within the specified range, replace the KR2 Headlamp Washer Fluid Pump Relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the KR2 Headlamp Washer Fluid Pump Relay.
4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
    - If greater than the specified range, replace the KR2 Headlamp Washer Fluid Pump Relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**

DTC B3873

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3873 01

Front Washer Relay Circuit Short to Battery

DTC B3873 02

Front Washer Relay Circuit Short to Ground

DTC B3873 04

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Front Washer Relay Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	2	1	1	-
Windshield Washer Fluid Pump Control	1	1	2	-
Windshield Washer Relay Control	B3873 02	B3873 04	B3873 01	-
Windshield Washer Fluid Pump Ground	-	1	1	-
1. Front Washer Inoperative 2. Front Washer Always ON				

Circuit/System Description

The body control module (BCM) controls the windshield washer fluid pump based on an input from the turn signal/multifunction switch. The BCM monitors the washer switch through the windshield washer switch signal circuit. When the wash switch is closed, ground is supplied to the front washer switch signal circuit. When this is the case, the BCM will command the windshield washer fluid pump and the low speed wipers on.

Conditions for Running the DTC

- Ignition ON.
- A washer request is present.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

- A short to ground or an open/high resistance is detected in the windshield washer relay control circuit.
- A short to voltage is detected in the windshield washer relay control circuit.

Action Taken When the DTC Sets

Washer operation is suspended.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

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Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for diagnostic tester information.

Circuit/System Verification

Operate the front washer by using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X2 at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X4 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 21 X2 at the X50A Fuse Block - Underhood and the signal circuit terminal 14 X4 at the K9 Body Control Module.
    - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 21 X2 at the X50A Fuse Block - Underhood and ground.
    - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Component Testing

Relay Test

1. Ignition OFF, disconnect the harness connector X1 at the X50A Fuse Block - Underhood.
2. Test for 60-200 ohms between control circuit terminal 21 X2 and ground circuit terminal 71 X1.

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- If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Output Control Tests

Ignition ON, command the Windshield Washer Relay Command ON and OFF with a scan tool. Observe that the KR11 Windshield Washer Pump Relay clicks and the G24 Windshield Washer Pump runs.

- If the KR11 Windshield Washer Pump Relay does not work, replace the X50A Fuse Block - Underhood.
- If the KR11 Windshield Washer Pump Relay works, but the G24 Windshield Washer Pump does not run, test the washer fluid pump control circuit and the washer fluid pump ground circuit.
- If all circuits test normal, replace the G24 Windshield Washer Pump.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for BCM replacement, setup, and programming
- **Windshield Washer Pump Replacement**

SYMPTOMS - WIPER/WASHER SYSTEMS

NOTE: The following steps must be completed before using the symptom tables:

1. Perform **Diagnostic System Check - Vehicle** , in order to verify that all of the following conditions are true:
   - No DTCs are set.
   - The control modules can communicate via the serial data link.
2. Refer to **Wiper/Washer System Description and Operation** in order to familiarize yourself with the system functions.

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the windshield wiper/washer system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which may cause the symptom.
- Inspect the washer fluid reservoir for the proper fluid level.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

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Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Windshield Wiper System Malfunction**
- **Washer Malfunction**
- **Headlamp Washer Malfunction**

WINDSHIELD WIPER SYSTEM MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper High Speed Relay B+	1, 2	1, 2	-	-
Windshield Wiper Switch Low Signal	1	1	1	-
Windshield Wiper Switch High Signal	4	2	2	-
Windshield Wiper Motor Park Switch Signal	3	3	-	-
Front Wiper Relay Control	B3715 02	B3715 04	B3715 01	-
Windshield Wiper High Speed Relay Control	B3875 02	B3875 04	B3875 01	-
Windshield Wiper High Speed Relay Control	2	2	4	-
Front Wiper Motor Low Speed Control	1	1	4	-
Windshield Wiper Switch Low Reference	-	1, 2	1, 2	-
Windshield Wiper Motor Ground	-	1, 2, 3	-	-
Front Wiper Relay Ground	-	1	-	-
1. Delay or Low Speed Wipers Inoperative 2. High Speed Wipers Inoperative 3. Wipers Do Not Park 4. Wipers Always ON				

Circuit/System Description

The Body Control Module (BCM) controls the wiper motor based on input from the windshield wiper/washer

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switch. The BCM monitors the wiper/washer switch through two separate signal circuits and a ground circuit. The windshield wiper switch high signal circuit is used to determine high speed wiper operation, the windshield wiper switch low signal is used to determine low speed, intermittent, and mist operation through the use of a resistor ladder, and the windshield washer switch signal circuit is used to determine washer operation.

The BCM controls the windshield wiper motor through two output controls, controlling two relays which determine the desired wiper speed, high or low.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, S80 Window Wiper/Washer Switch in the OFF position, verify the scan tool Windshield Washer Switch parameter is Inactive.
    - If not the specified value, refer to Multifunction Switch Circuit Malfunction.
2. Ignition ON, S80 Window Wiper/Washer Switch in the LOW position, verify the scan tool Windshield Wiper Switch parameter is Low.
    - If not the specified value, refer to Multifunction Switch Circuit Malfunction.
3. Ignition ON, S80 Window Wiper/Washer Switch in the HIGH position, verify the scan tool Wiper High Speed Switch parameter is Active.
    - If not the specified value, refer to Multifunction Switch Circuit Malfunction.
4. Ignition ON, S80 Window Wiper/Washer Switch in the INT position, cycling the delay adjustment switch

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from long delay to short delay. observe the scan tool Wiper Delay Setting parameter while cycling the delay adjustment switch from long delay to short delay. The parameter should cycle between D1 and D5 as each delay position is selected.

- If not the specified value, refer to Multifunction Switch Circuit Malfunction.

Circuit/System Testing

Wiper/Washer Switch Circuit Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the S80 Window Wiper/Washer Switch.
2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
   - If greater than the specified value, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
3. Disconnect the X3 harness connector at the K9 Body Control Module.
4. Test for less than 5 ohms between the signal circuit terminal 3 X1 at the S80 Window Wiper/Washer Switch and the signal circuit terminal 13 X3 at the K9 Body Control Module.
   - If greater than the specified value, test the signal circuit for an open/high resistance.
5. Test for less than 5 ohms between the signal circuit terminal 1 X1 at the S80 Window Wiper/Washer Switch and the signal circuit terminal 20 X3 at the K9 Body Control Module.
   - If greater than the specified value, test the signal circuit for an open/high resistance.
6. Test for infinite resistance between the signal circuit terminal 3 X1 at the S80 Window Wiper/Washer Switch and the signal circuit terminal 13 X3 at the K9 Body Control Module.
   - If not the specified value, test the signal circuit for a short to ground.
7. Test for infinite resistance between the signal circuit terminal 1 X at the S80 Window Wiper/Washer Switch and the signal circuit terminal 20 X3 at the K9 Body Control Module.
   - If not the specified value, test the signal circuit for a short to ground.
8. If all circuits test normal, test or replace the S80 Window Wiper/Washer Switch.

Windshield Wiper Motor Circuit Malfunction

1. Ignition OFF, disconnect KR12B Windshield Wiper Relay.
2. Test for less than 5 ohms between the ground circuit terminal 85 and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Test for less than 5 ohms between the ground circuit terminal 87A and ground.
   - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 87 and ground.
   - If the test lamp does not illuminate, test or replace the underhood fuse block.
5. Install a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
6. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
   - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.

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- If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.

7. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay.
8. Test for less than 5 ohms between the control circuit terminal 30 at the KR12B Windshield Wiper Relay socket and the control circuit terminal 30 at the KR12C Windshield Wiper Speed Control Relay socket.
   - If greater than the specified range, replace the underhood fuse block.
9. Connect the KR12B Windshield Wiper Relay.
10. Test for less than 5 ohms between the control circuit terminal 30 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
    - If greater than the specified range, test or replace the KR12B Windshield Wiper Relay.
11. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 85 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
    - If the test lamp does not illuminate, test or replace the underhood fuse block.
12. Install a test lamp between the control circuit terminal 30 from the KR12C Windshield Wiper Speed Control Relay socket and ground.
13. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON. The test lamp should illuminate.
    - If the test lamp does not illuminate, replace the KR12B Windshield Wiper Relay.
14. Install a test lamp between the B+ circuit terminal from the KR12C Windshield Wiper Speed Control Relay socket and the control circuit terminal 86 from the KR12C Windshield Wiper Speed Control Relay socket.
15. Using the S80 Window Wiper/Washer Switch, command the high speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
    - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 Body Control Module.
    - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
16. Ignition OFF, connect the KR12C Windshield Wiper Speed Control Relay. Disconnect the harness connector X1 at the M75 Windshield Wiper Motor.
17. Test for less than 5 ohms between the ground circuit terminal 4 and ground.
    - If greater than the specified value, test the ground circuit for an open/high resistance.
18. Connect a test lamp between the control circuit terminal 5 and ground.
19. Using the S80 Window Wiper/Washer Switch, command the low speed wipers ON and OFF. The test lamp should turn ON and OFF as commanded.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
20. Connect a test lamp between the control circuit terminal 3 and ground.
21. Using the S80 Window Wiper/Washer Switch, command the high speed wipers ON and OFF. The test

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lamp should turn ON and OFF as commanded.

- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.
- If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the KR12C Windshield Wiper Speed Control Relay.

22. Ignition ON, wipers OFF, test for greater than 11 V between the signal circuit terminal 1 and ground.
    - If less than 11 V, test the signal circuit for a short to ground or an open high resistance. If the circuit tests normal, replace the K9 Body Control Module.
23. If all circuits test normal, test or replace the M75 Windshield Wiper Motor.

Component Testing

Wiper/Washer Switch - Static Test

1. Disconnect the harness connector at the S80 Window Wiper/Washer Switch.
2. With the S80 Window Wiper/Washer Switch in the HIGH position, test for less than 5 ohms between the terminal 2 and the signal terminal 1.
    - If greater than the specified value, replace the S80 Window Wiper/Washer Switch.
3. While cycling the S80 Window Wiper/Washer Switch through each delay and speed position, test for the specified resistance between the low reference terminal 2 and the signal terminal 3.

NOTE: If the switch tests open in any switch position other than OFF, test the signal circuits for a short to voltage before replacing the switch.

Wiper/Washer Switch Values

Switch Position	Resistance
Off	Infinite
Mist	300-364 ohms
Delay 1	3.70-4.10 kohms
Delay 2	2.60-3.20 kohms
Delay 3	1.80-2.20 kohms
Delay 4	1.10-1.50 kohms
Delay 5	650-1000 ohms
Low	300-364 ohms
High	300-364 ohms

- If any switch position is not within the specified range, replace the S80 Window Wiper/Washer Switch.

Windshield Wiper Motor - Dynamic Test

1. Ignition OFF, disconnect the harness connector at the M75 Windshield Wiper Motor.
2. Install a 25 A fused jumper wire between the control terminal B and 12 V. Install a jumper wire between

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the ground terminal 4 and ground.

3. Verify the M75 Windshield Wiper Motor is operating in the low speed mode.
    - If the M75 Windshield Wiper Motor is not in the low speed mode, replace the M75 Windshield Wiper Motor.
4. Install a 25 A fused jumper wire between the control terminal 3 and 12 V. Install a jumper wire between the ground terminal 4 and ground.
5. Verify the M75 Windshield Wiper Motor is operating in the high speed mode.
    - If the M75 Windshield Wiper Motor is not in the high speed mode, replace the M75 Windshield Wiper Motor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure

- **Windshield Wiper Motor Replacement**
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Windshield Wiper and Washer Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

WASHER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Signal	2	1	1	-
Windshield Washer Fluid Pump Control	1	1	2	-
Windshield Washer Relay Control	B3873 02	B3873 04	B3873 01	-
Windshield Washer Fluid Pump Ground	-	1	-	-
1. Front Washer Inoperative 2. Front Washer Always ON				

Circuit/System Description

The body control module (BCM) controls the windshield washer fluid pump based on an input from the

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wiper/washer switch. The BCM monitors the washer switch through the wiper/washer switch signal circuit. When the wash switch is closed, ground is supplied to the windshield washer switch signal circuit. When this is the case, the BCM will command the windshield washer fluid pump and the low speed wipers on.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References

Circuit/System Verification

1. Ignition ON, observe the scan tool Windshield Washer Switch parameter while activating the S80 Window Wiper/Washer Switch. The parameter should change between Active and Inactive.
    - If the value does not change, refer to Wiper/Washer Switch Malfunction.
2. Operate the windshield washer using the S80 Window Wiper/Washer Switch. Verify the G24 Windshield Washer Pump activates. Verify the washer fluid reservoir is filled up.
    - If the G24 Windshield Washer Pump does not run, refer to Washer Pump Malfunction.

Circuit/System Testing

NOTE: You must perform the Circuit/System Verification before proceeding with Circuit/System Testing.

Wiper/Washer Switch Malfunction

1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module. Wait for one minute.

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2. Test for less than 5 ohms between the signal circuit terminal 10 X3 and the signal low reference terminal 25 X3 while activating the wash function.
    - If greater than the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the S80 Window Wiper/Washer Switch.
3. If all circuits test normal, test or replace the K9 Body Control Module.

Washer Relay Malfunction

1. Ignition OFF, disconnect the harness connector X2 at the X50A Fuse Block - Underhood.
2. Disconnect the harness connector X4 at the K9 Body Control Module.
3. Test for less than 5 ohms between the control circuit terminal 21 X2 at the X50A Fuse Block - Underhood and the signal circuit terminal 14 X4 at the K9 Body Control Module.
    - If the value is not within the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, test or replace the K9 Body Control Module.
4. Test for infinite resistance between the control circuit terminal 21 X2 at the X50A Fuse Block - Underhood and ground.
    - If the value is not within the specified range, test the control circuit for a short to ground.
5. If all circuits test normal, test or replace the X50A Fuse Block - Underhood.

Washer Pump Malfunction

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump.
2. Ignition ON, verify a test lamp does not illuminate between the control circuit terminal 1 and the ground circuit terminal 2.
    - If the test lamp illuminates, test the control circuit for a short to voltage.
3. Verify a test lamp illuminates between the control circuit terminal 1 and the ground circuit terminal 2 while activating the wash function.
    - If the test lamp does not illuminate, test the control circuit for an open/high resistance.
4. Verify a test lamp illuminates between the control circuit terminal 1 and the ground circuit terminal 2 while activating the wash function.
    - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
5. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
    - If greater than the specified value, test the ground circuit for an short to voltage or an open/high resistance.
    - If all circuits test normal, replace the X50A Fuse Block - Underhood.

Component Testing

Wiper/Washer Switch

Static Test

1. Ignition OFF, disconnect the Harness Connector at the S80 Window Wiper/Washer Switch. Test for less

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than 5 ohms between the Wiper/Washer Switch terminal 2 and 5 while activating the washer function.
    - If not the specified value, replace the S80 Window Wiper/Washer Switch.

Washer Pump Malfunction

1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump.
2. Install a 10 A fused jumper wire between the control terminal 1 and 12 V. Install a jumper wire between the ground terminal 2 and ground.
3. Verify the G24 Windshield Washer Pump is activated.
    - If the G24 Windshield Washer Pump does not activate, replace the G24 Windshield Washer Pump.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Windshield Wiper and Washer Switch Replacement**
- **Windshield Washer Pump Replacement**
- **Control Module References**

HEADLAMP WASHER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Washer Fluid Pump Control	1	1	2	-
Headlamp Washer Relay Control	B3810 02	1	1	-
Headlamp Washer Fluid Pump Ground	-	1	1	-
1. Headlamp Washer Inoperative 2. Headlamp Washers Always ON				

Circuit/System Description

The body control module (BCM) controls the washer motor based on an input from the windshield wiper washer switch. The BCM monitors the washer switch through the windshield washer switch signal circuit. When the WASH switch is closed, ground is supplied to the front washer switch signal circuit. When this is seen, the BCM will command the front washer fluid pump and the low speed wipers on. When Headlamp Wash

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Equipped, the headlamps shall be sprayed with wash fluid as a result of an extended Windshield Wash Switch Activation. In order to preserve wash fluid, the feature shall only be allowed to activate if the Low or High Beam Headlamps are active. In addition, after the initial Headlamp Wash operation has been performed, additional headlamp washes shall not be performed for the next 4 Windshield Wash activations or for 48 hours whichever comes first.

Diagnostic Aids

The headlamp wash feature shall only be allowed to be activate, if the low or high beam headlamps are active too.

Reference Information

Schematic Reference

Wiper/Washer Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for diagnostic tester information

Circuit/System Verification

Operate the headlamp washer using the S80 Window Wiper/Washer Switch. Verify the G16 Headlamp Washer Fluid Pump activates. The low or high beam headlamps are ON.

Circuit/System Testing

1. Ignition OFF, disconnect the KR2 Headlamp Washer Fluid Pump Relay.
2. Connect a test lamp between the control circuit terminal 86 and ground.
3. Ignition ON, command the headlamp washer ON and OFF using the S80 Window Wiper/Washer Switch.

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The test lamp should turn ON and OFF when changing between the commanded states.

- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
- If the test lamp is always OFF, test for a short to ground or an open/high resistance on the control circuit. If the circuit tests normal, replace the K9 Body Control Module.

4. If all circuits test normal, test or replace the KR2 Headlamp Washer Fluid Pump Relay.

Component Testing

Window Wiper/Washer Switch

Static Test

1. Ignition OFF, disconnect the harness connector at the S80 Window Wiper/Washer Switch.
2. Test for less than 5 ohms between Window Wiper/Washer Switch terminal 2 and terminal 7 while activating the S80 Window Wiper/Washer Switch.
   - If the resistance is not within the specified range, replace the S80 Window Wiper/Washer Switch.

Dynamic Test

1. Ignition OFF, disconnect the KR2 Headlamp Washer Fluid Pump Relay.
2. Install a 30 A fused jumper wire between the relay terminals 85, 87 and 12 V. Install a jumper wire between the relay terminal 86 and ground.
3. Connect a test lamp between relay terminal 30 and ground.
4. Observe the test lamp turns ON and OFF by grounding the relay terminal 86 briefly several times.
   - If the function does not perform as specified, replace the KR2 Headlamp Washer Fluid Pump Relay.

Relay Test

1. Ignition OFF, disconnect the KR2 Headlamp Washer Fluid Pump Relay.
2. Test for 60-200 ohms between terminals 85 and 86.
   - If the resistance is not within the specified range, replace the KR2 Headlamp Washer Fluid Pump Relay.
3. Test for infinite resistance between the following terminals:
   - 30 and 86
   - 30 and 87
   - 30 and 85
   - 85 and 87
   - If not the specified value, replace the KR2 Headlamp Washer Fluid Pump Relay.
4. Install a 10 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 5 ohms between terminals 30 and 87.
   - If greater than the specified range, replace the KR2 Headlamp Washer Fluid Pump Relay.

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Washer Pump

Dynamic Test

1. Ignition OFF, disconnect the harness connector at the G16 Headlamp Washer Fluid Pump.
2. Install a 10 A fused jumper wire between the control terminal 1 and 12 V. Install a jumper wire between the ground terminal 2 and ground.
3. Verify the G16 Headlamp Washer Fluid Pump is activated.
    - If the G16 Headlamp Washer Fluid Pump does not activate, replace the G16 Headlamp Washer Fluid Pump.

Repair Procedures

- Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.
- **Control Module References** for BCM replacement, setup, and programming
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Headlamp Washer Pump Replacement**
- **Windshield Wiper and Washer Switch Replacement**

REPAIR INSTRUCTIONS

WINDSHIELD WIPER AND WASHER SWITCH REPLACEMENT

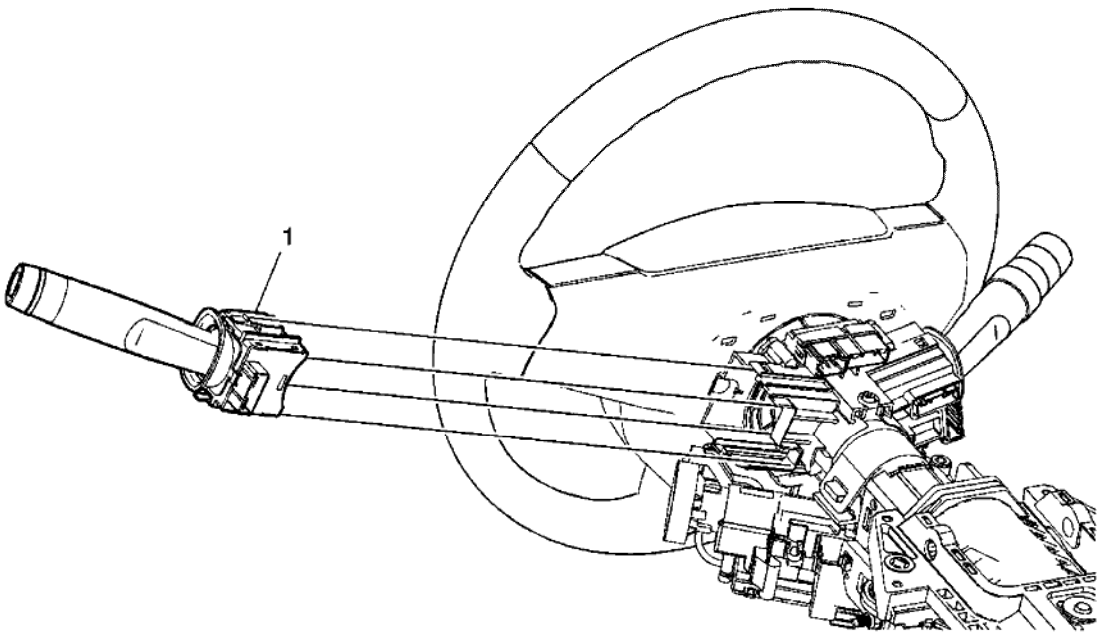


Fig. 2: Windshield Wiper & Washer Switch
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedure: Remove the steering column shroud. Refer to **Steering Column Shroud Replacement** .	
1	Windshield Wiper and Washer Switch **Procedure** 1. Disconnect any electrical connectors as needed. 2. Release the plastic retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket.

WINDSHIELD WASHER NOZZLE REPLACEMENT

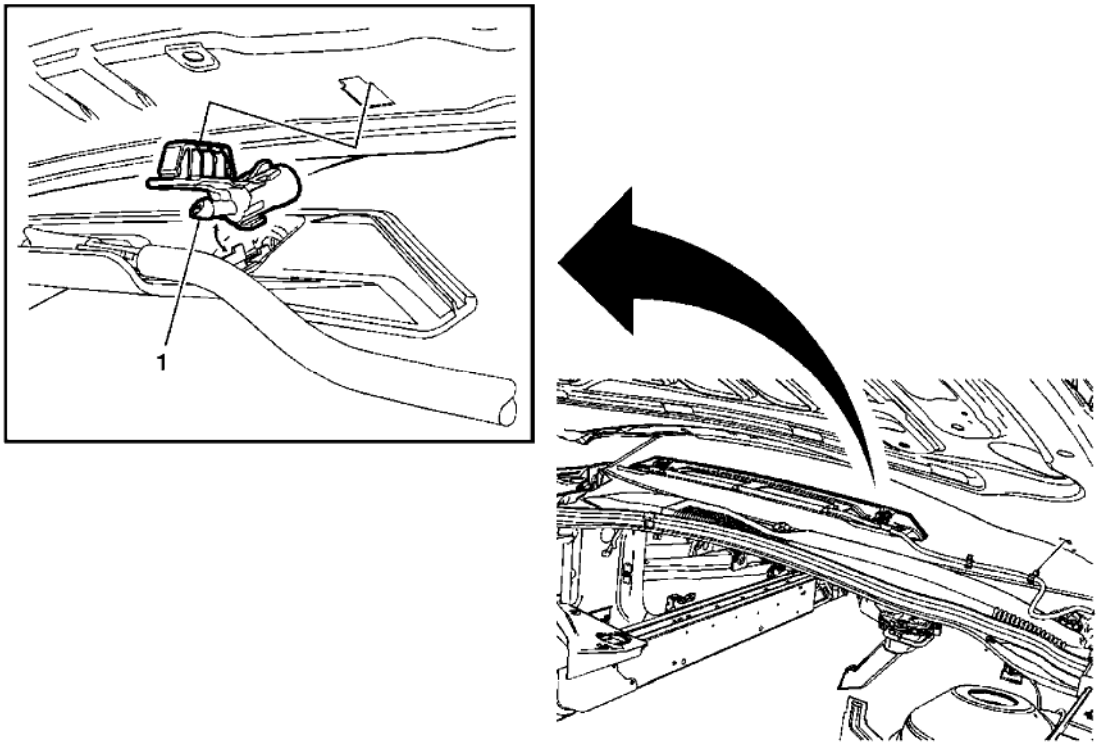


Fig. 3: Windshield Washer Nozzle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open and support the hood. 2. Release the hood inner panel assembly from the inner hood panel. 3. Use a small flat-bladed tool in order to release the washer nozzle locking tab from the inner hood panel.	

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4. Release the washer nozzle from the hood inner panel assembly.

1	Windshield Washer Hose Nozzle **Procedure** 1. Disengage the windshield washer hose from the windshield washer nozzle. 2. Adjust the windshield washer nozzles. Refer to **Windshield Washer Nozzle Adjustment**.

WINDSHIELD WASHER NOZZLE ADJUSTMENT

Spray Pattern Adjustment

NOTE: All adjustments must be completed with the hood assembly in the FULL closed position.

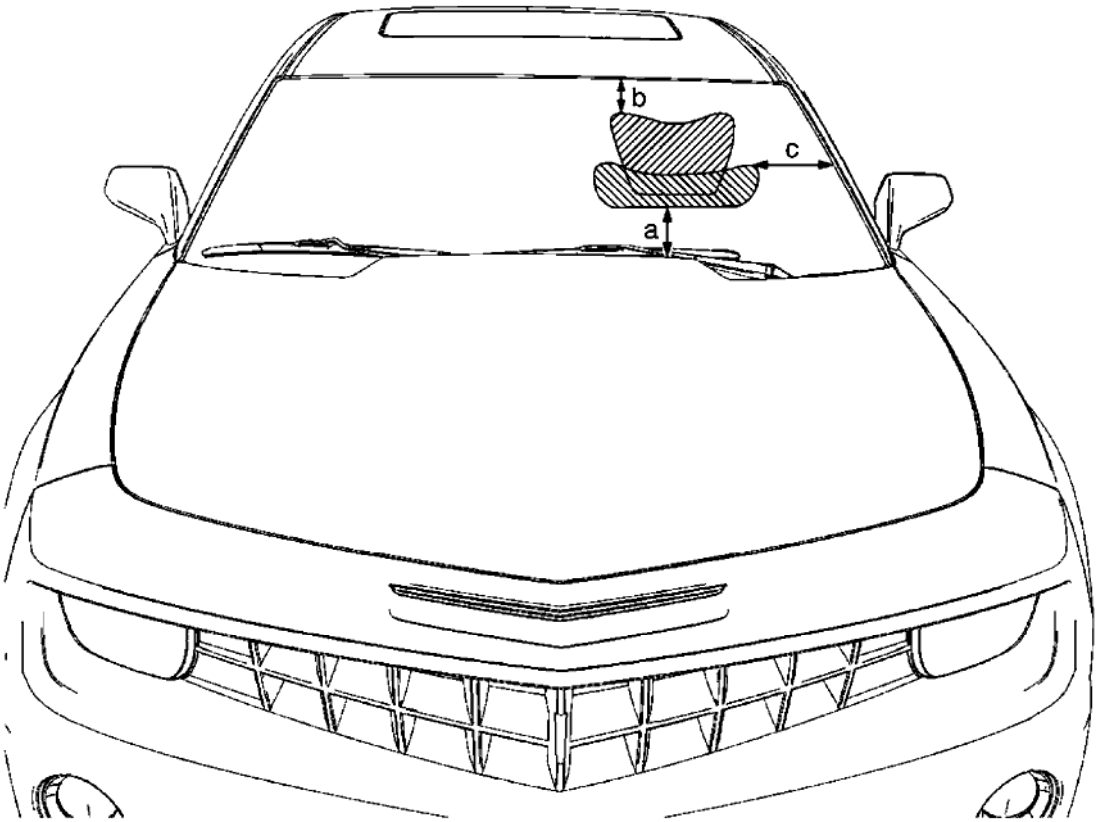


Fig. 4: Marking Windshield Washer Spray Pattern
Courtesy of GENERAL MOTORS CORP.

1. The first measurement (a) is from the top of the C-line molding, at the windshield washer nozzle, vertical, up the windshield either from the passenger side or driver side.

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2. This measurement is the bottom edge of the lower spray pattern.
3. Measure from the top edge of the lower windshield molding (a) in an upward vertical line between 169-209 mm (6.7-8.2") to have the location for the bottom edge of the lower spray pattern.
4. Make a small mark with a wax-pencil to use as a reference point when the windshield washer spray pattern is tested.
5. Measure from the top edge of the windshield (b) in a downward vertical line between 69-355 mm (2.7-13.9") to have the location for the top edge of the upper spray pattern.
6. Make a small mark with a wax-pencil to use as a reference point when the windshield washer spray pattern is tested.
7. Measure from the outer edge of the lower windshield (c) in a horizontal line between 161-270 mm (6.3-10.6") to have the location for the outer edge of the lower spray pattern.
8. Make a small mark with a wax-pencil to use as a reference point when the windshield washer spray pattern is tested.
9. Operate the windshield washers and notice the spray contact patterns as the washer nozzles spray.
10. Turn OFF the wiper system and make any needed adjustment to the windshield washer nozzles.
11. Use a small flat-bladed tool in order to move and adjust the ball socket within the windshield washer nozzle.
12. After every adjustment, re-check the spray pattern location, (as shown) of the windshield washer solvent contact to the windshield glass surface.
13. Clean the windshield, removing the wax-pencil marks made previously from the spray pattern reference points.
14. Fill the windshield washer solvent container to full capacity with new windshield washer solvent.

HEADLAMP WASHER NOZZLE REPLACEMENT

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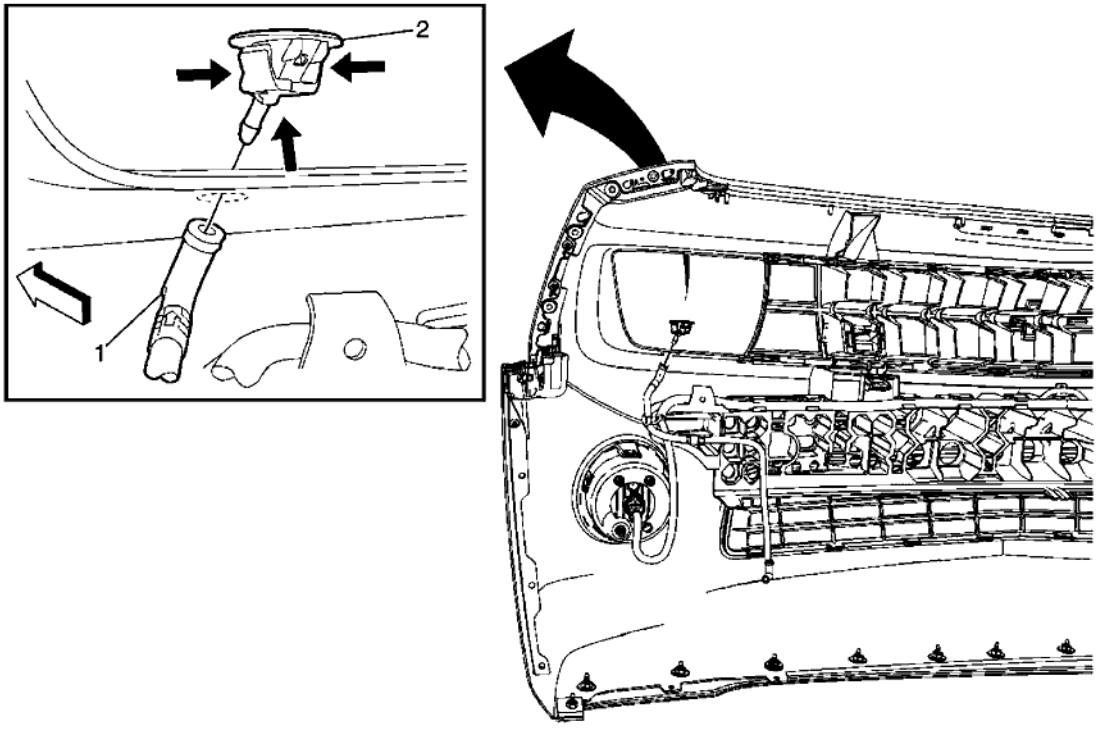


Fig. 5: Headlamp Washer Nozzle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement** . 2. Disconnect the headlamp washer pump hose from the main headlamp washer nozzle assembly.	
1	Headlamp Washer Hose **Tip:** Disconnect the headlamp washer hose from the headlamp washer nozzle spout.
2	Headlamp Washer Nozzle Assembly **Procedure** 1. Pinch the tabs inward on the washer nozzle and push the nozzle upward and forward out of the front bumper fascia. 2. Remove the headlamp washer nozzle.

WINDSHIELD WASHER PUMP HOSE REPLACEMENT

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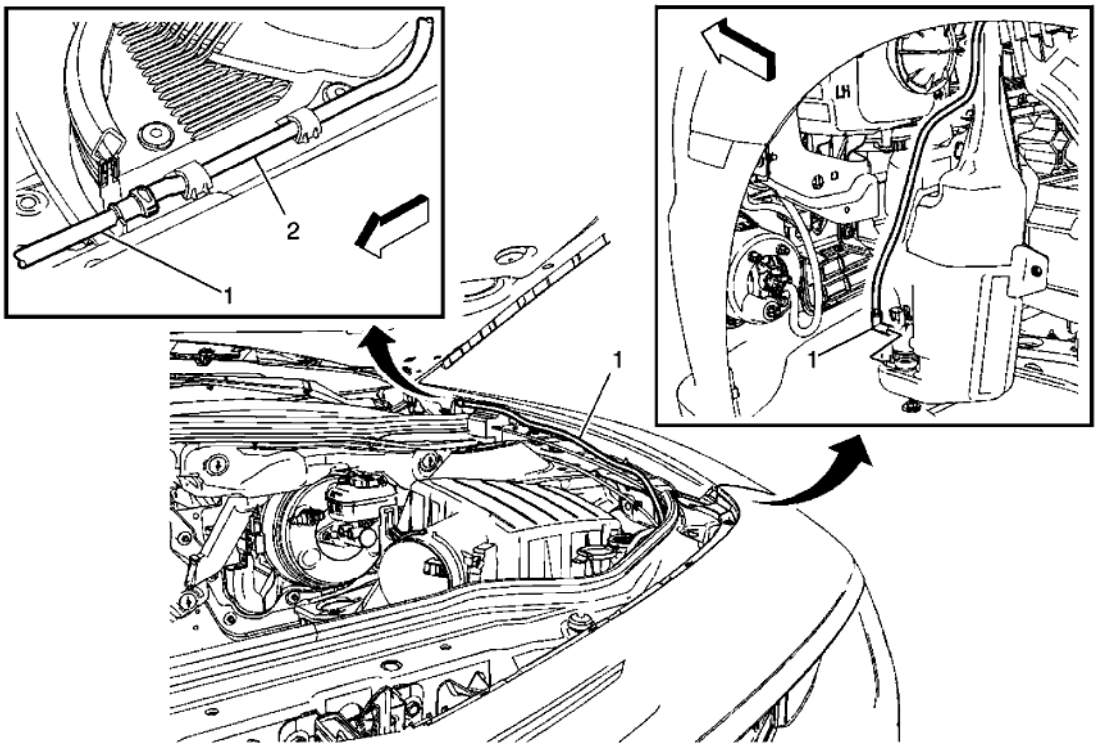


Fig. 6: Windshield Washer Pump Hose
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Pinch the washer pump hose connector in order to disengage the windshield washer nozzle hose from the washer pump hose at the air inlet grille panel. 3. Remove the front driver side wheelhouse panel liner. Refer to **Front Wheelhouse Liner Replacement** . 4. Place a clean suitable drain pan under the washer container in order to contain any loss windshield washer solvent. 5. Disconnect the washer hose elbow from the windshield washer pump. 6. Disengage the washer pump hose from the windshield washer container.	
1	Windshield Washer Pump Hose **Tip:** Carefully remove the washer pump hose from the engine compartment.
2	Windshield Washer Nozzle Hose

HEADLAMP WASHER HOSE REPLACEMENT

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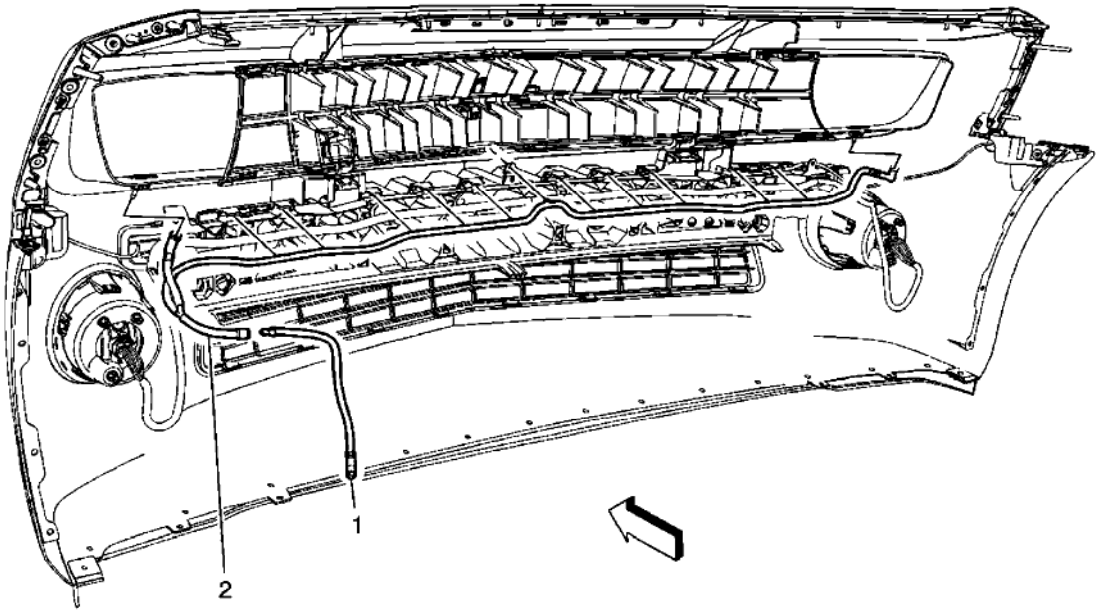


Fig. 7: Headlamp Washer Hose
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement** . 2. Disconnect the headlamp washer pump jumper hose from the main headlamp washer hose assembly. 3. Disengage the center retainer for the main electrical harness and remove the harness from the clips within the front bumper energy absorber.	
1	Headlamp Washer Pump Jumper Hose **Tip:** Disconnect the jumper from the main headlamp washer hose.
2	Headlamp Washer Hose Assembly **Procedure** 1. Disengage the center retainer securing the headlamp washer hose to the front bumper energy absorber. 2. Disconnect both hose elbows from the headlamp washer nozzles. 3. Release and remove the headlamp washer hose from the retention clips on the front bumper energy absorber.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT

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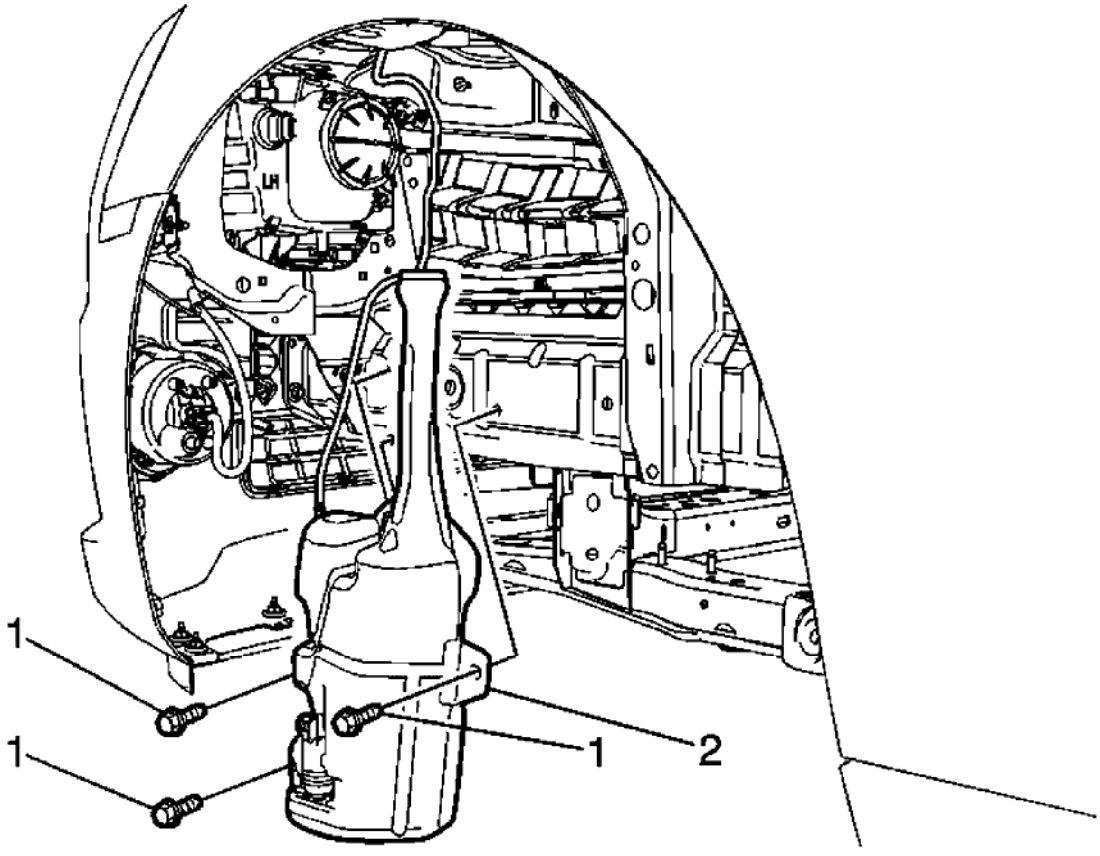


Fig. 8: Windshield Washer Solvent Container
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** . 2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** . 3. Remove the left front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** . 4. Disconnect the body front electrical wiring harness connector from the washer pump. 5. Disconnect the washer pump hose from the windshield washer nozzle hose at the upper front fender flange. 6. Contain any spilled windshield washer solvent from the fender flange area.	
1	Windshield Washer Solvent Container Screw (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 15 N.m (11 lb ft)

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2	Windshield Washer Solvent Container **Procedure** 1. Carefully lower and remove the washer container from the front frame rail. 2. Transfer parts as required to the new windshield washer solvent container. • Washer solvent container cap • Washer pump hose • Washer container clips • Washer pump • Washer pump filter grommet **Tip:** Empty the windshield washer solvent into a clean suitable container once removed from the vehicle.

HEADLAMP WASHER PUMP REPLACEMENT

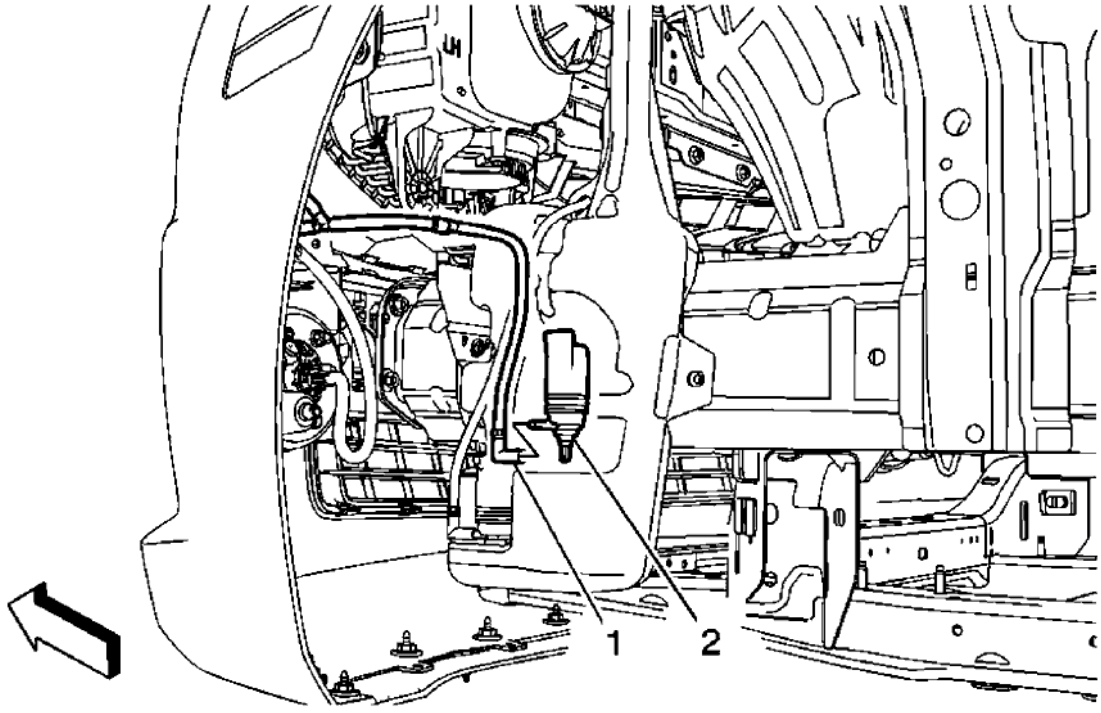


Fig. 9: Headlamp Washer Pump
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure:	

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Remove the front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .	
1	Headlamp Washer Pump Jumper Hose **Procedure** 1. Place a clean suitable drain pan under the washer container area to retain loss windshield washer solvent. 2. Remove the headlamp washer jumper hose from the headlamp washer pump spout.
2	Headlamp Washer Pump Assembly **Procedure** 1. Disconnect the electrical connector from the headlamp washer pump. 2. Disengage the top of the washer pump from the washer solvent container by pulling the top of the pump outward. 3. Using two medium sized flat-bladed tools, place the flat edge under each side of the washer pump above the washer pump seal. 4. Using an opposite twisting motion, pry the headlamp washer pump from the washer solvent container. 5. Remove the headlamp washer pump. 6. Remove and discard the washer pump seal.

WINDSHIELD WASHER PUMP REPLACEMENT

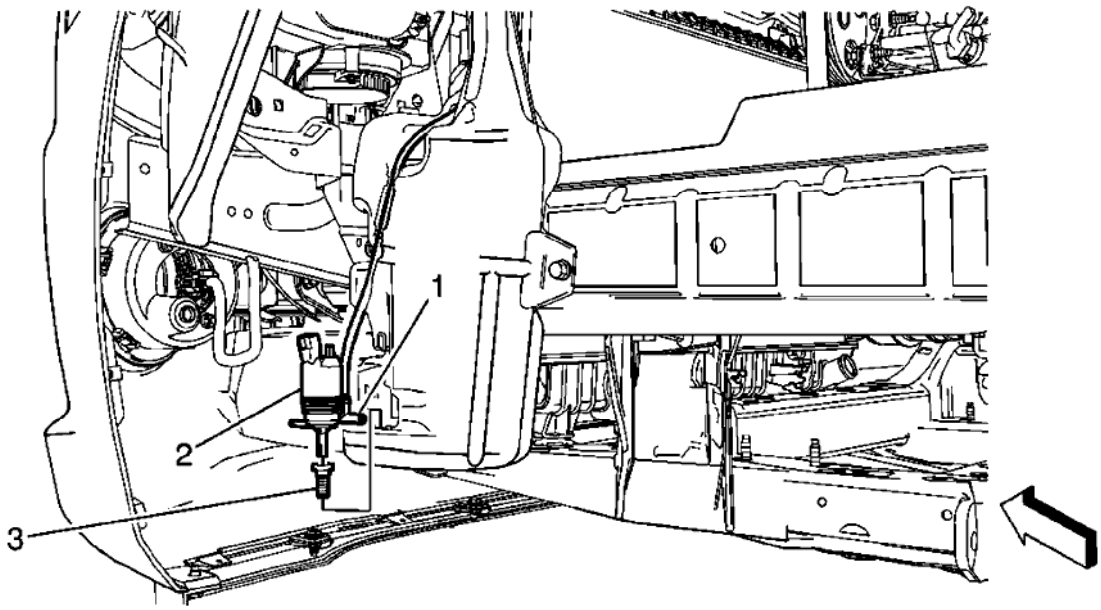


Fig. 10: Windshield Washer Pump
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedures 1. Remove the front driver side wheelhouse panel liner. Refer to **Front Wheelhouse Liner Replacement** . 2. Disconnect the windshield washer pump electrical connector.	
1	Windshield Washer Pump Hose **Tip:** Disconnect the washer pump hose from the washer pump spout.
2	Windshield Washer Pump **Procedure** 1. Place a clean suitable drain pan under the washer container in order to contain the windshield washer solvent. 2. Using two medium sized flat-bladed tools, place the tools under the washer pump and pry upward, releasing the washer pump from the washer container filter grommet. 3. Remove the washer pump filter grommet and discard.
3	Windshield Washer Pump Filter Grommet **Tip:** Install a new washer pump filter grommet upon replacement of the washer pump.

AIR INLET GRILLE PANEL REPLACEMENT

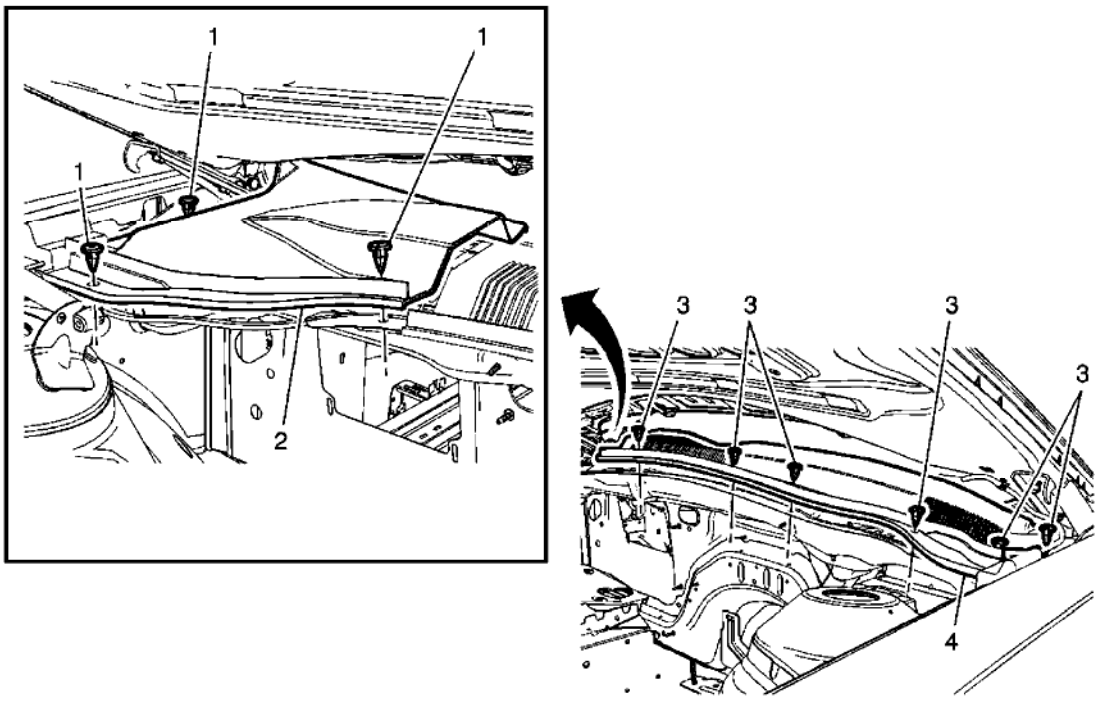


Fig. 11: Air Inlet Grille Panel
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Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove both wiper arm assemblies. Refer to **Windshield Wiper Arm Replacement**. 3. Remove the hood rear weatherstrip from the air inlet grille upper panel. Refer to **Hood Rear Weatherstrip Replacement** . 4. Release the passenger side windshield retainer at the windshield far enough to remove only the passenger side panel.	
1	Rivet Type Retainer (Qty: 3) **Tip:** Use a small bladed tool in order to release the center of the rivet and pull the entire rivet from the air inlet grille upper panel.
2	Air Inlet Grille Upper Panel - Passenger Side
3	Rivet Type Retainer (Qty: 6) **Tip:** Release the center pin and pull the retainer from the plenum hole.
4	Air Inlet Grille Upper Panel - Driver Side **Tip:** Release the windshield washer nozzle hose from the integral clip on the outer side of the air inlet grille panel.

AIR INLET GRILLE PANEL SEAL REPLACEMENT

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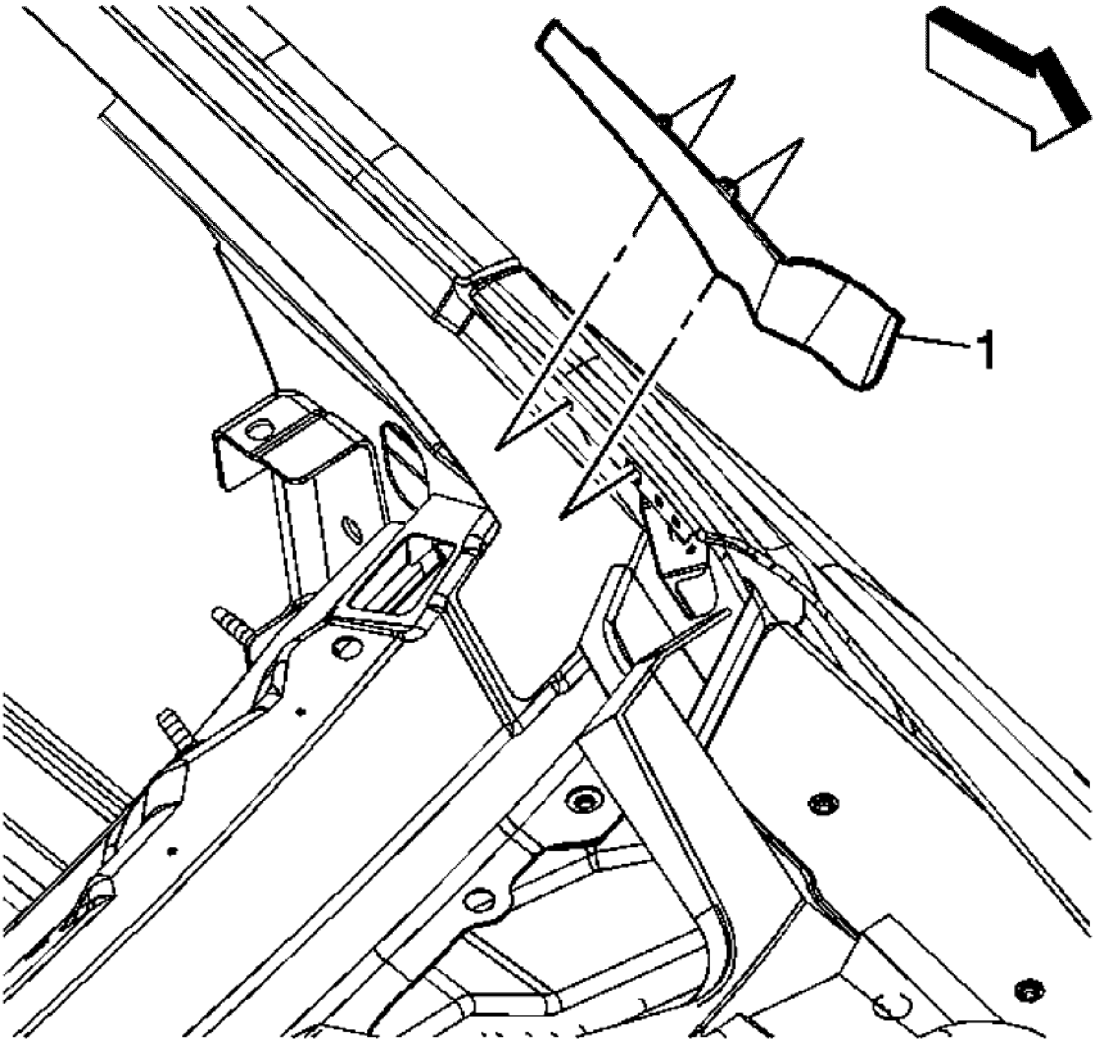


Fig. 12: Air Inlet Grille Panel Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and support hood in order to access the air inlet grille panel side seal.	
1	Air Inlet Grille Panel Side Seal **Procedure** 1. Release the tabs securing the air inlet grille panel side seal to the rear upper fender flange. 2. Disengage the rearward edge of the seal from under the top edge of the fender flange.

WINDSHIELD WIPER ARM REPLACEMENT

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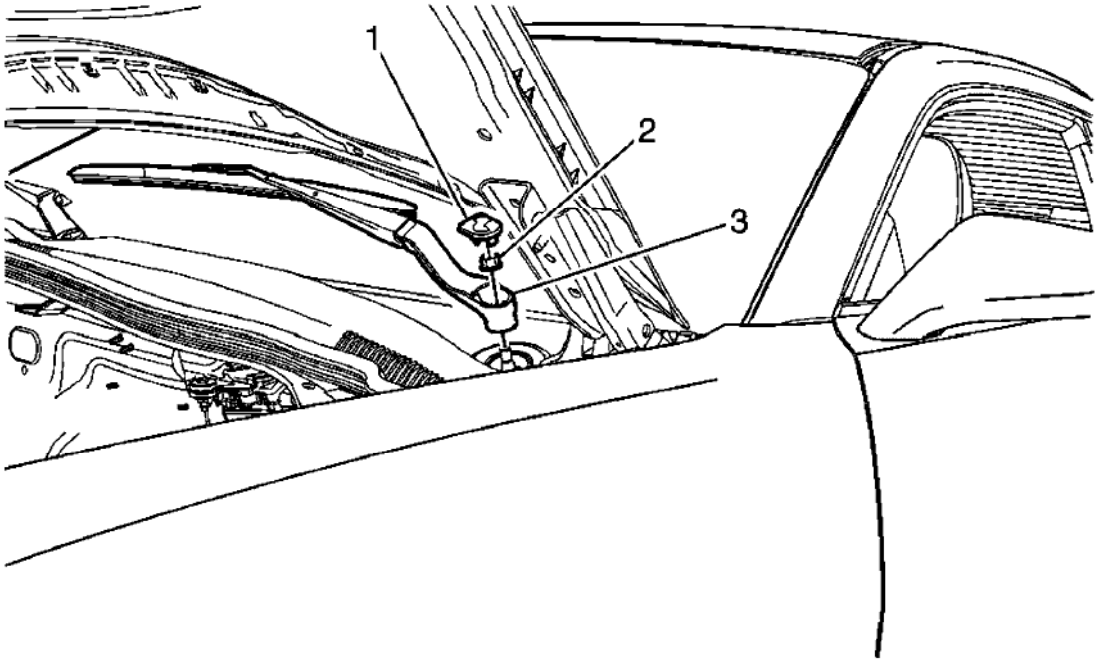


Fig. 13: Windshield Wiper Arm
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and support the hood in order to access the wiper arm assembly.	
1	Windshield Wiper Arm Nut Cap **Tip:** Use a small flat-bladed tool in order to release the cap from the wiper arm.
2	Windshield Wiper Arm Nut **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 29 N.m (21 lb ft)
3	Windshield Wiper Arm **Procedure** 1. Grasp the outer end of the wiper arm and rock the arm back and forth while holding the wiper blade off the windshield. 2. Lift the arm assembly from the wiper motor pivot shaft. 3. Clean the knurls on the wiper motor pivot shaft with a soft wire brush. 4. Align the wiper blade tip to the small clear circle in the lower windshield blackout and hold into position while torquing the nut. 5. Electrically cycle the wiper arms and re-check the blade alignment to the lower

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	windshield alignment circles.

WINDSHIELD WIPER BLADE REPLACEMENT

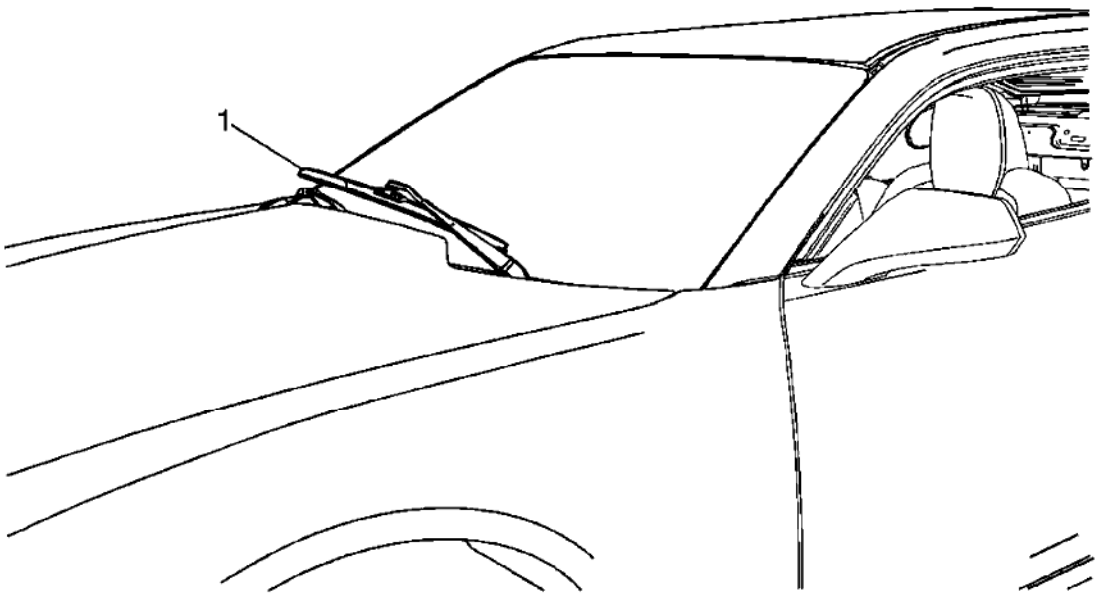


Fig. 14: Windshield Wiper Blade
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Lift the wiper arm assembly off the windshield and hold.	
1	Windshield Wiper Blade **Procedure** 1. Lift and release the locking tab from the top side of the wiper blade. 2. Slightly rotate the wiper blade downward. 3. Slide the wiper blade off the wiper arm sheep hook. 4. Gently set the bare wiper arm on the protected windshield surface.

WINDSHIELD WIPER MOTOR REPLACEMENT

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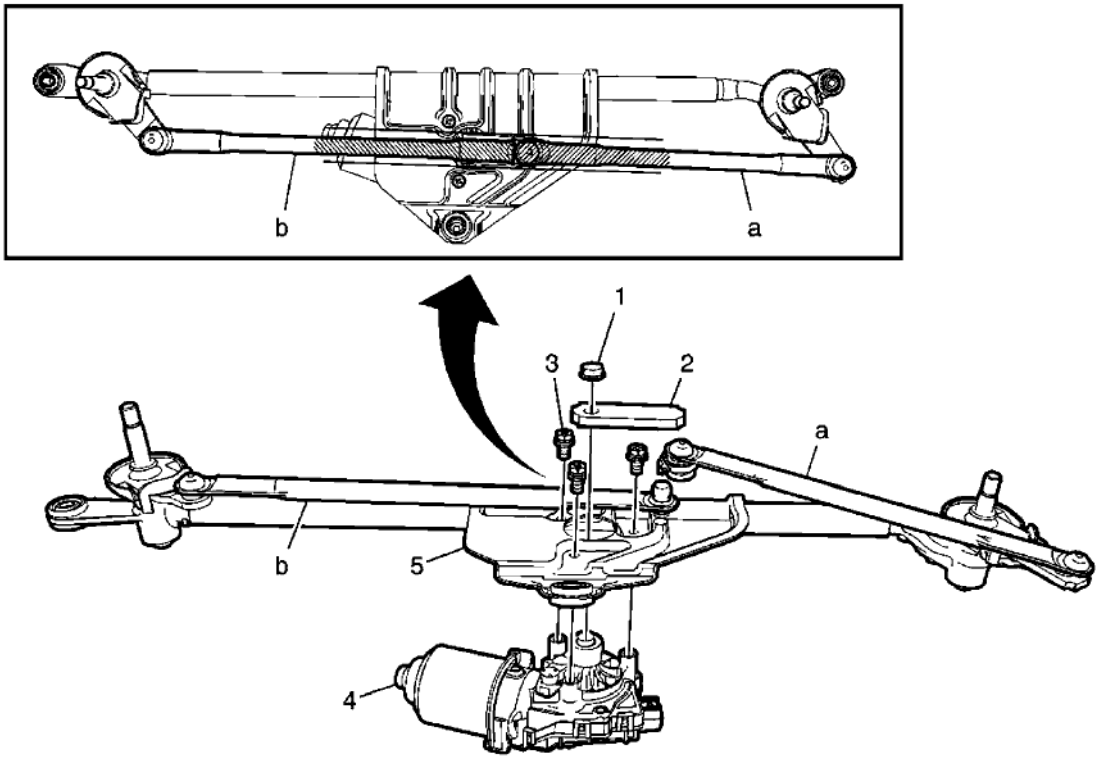


Fig. 15: Windshield Wiper Motor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the windshield wiper transmission assembly. Refer to **Windshield Wiper Transmission Replacement**. 2. Remove the crank arm nut then arm.	
1	Wiper Motor Crank Arm Nut **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 32 N.m (24 lb ft)
	Wiper Motor Crank Arm **Procedure** 1. Using a **J-39232:** separator or equivalent, disconnect the wiper linkage ball sockets (a) from the wiper transmission linkage (b) when removing. 2. Using a **J-39529:** installer or equivalent, connect the wiper linkage ball sockets (a) to the wipers transmission linkage (b) when reinstalling.

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2	3. When aligning the transmission, ensure both the drive arm (a) and the driven arm (b) are in alignment with each other as shown prior to installing the wiper module into the plenum. **Special Tools** • **J-39232:** Wiper Linkage Separator • **J-39529:** Wiper Linkage Installer For equivalent regional tools, refer to **Special Tools**.
3	Windshield Wiper Motor Bolt (Qty: 3) **Tighten:** 5.5 N.m (49 lb in)
4	Windshield Wiper Motor **Tip:** The new wiper motor will come pre-timed from the factory. Do not electrically charge the new motor unless the old motor is being re-installed.
5	Windshield Wiper Transmission Assembly

WINDSHIELD WIPER TRANSMISSION REPLACEMENT

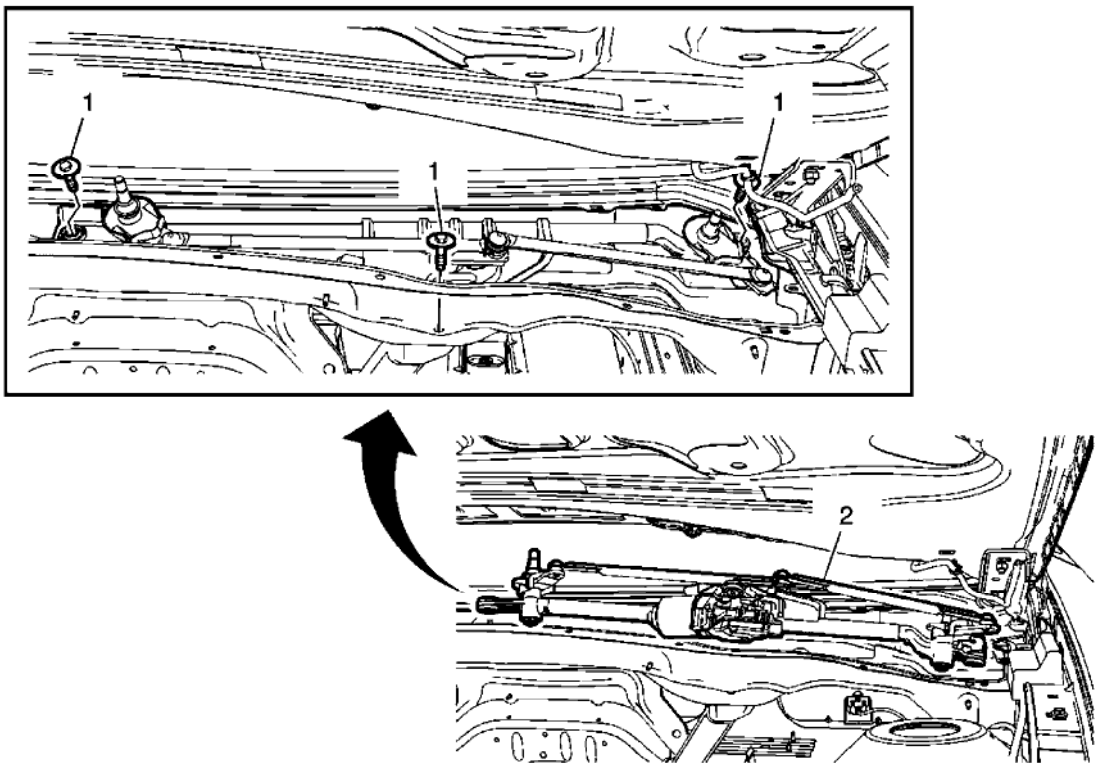


Fig. 16: Windshield Wiper Transmission
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Callout	Component Name
Preliminary Procedure: Remove the air inlet grille panel assembly. Refer to **Air Inlet Grille Panel Replacement**.	
1	Windshield Wiper Transmission Bolt (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 5.5 N.m (49 lb in)
2	Windshield Wiper Transmission **Procedure** 1. Lift the front edge of the wiper transmission out from the plenum. 2. Disconnect the wiper motor electrical connector. 3. Remove the wiper transmission assembly from the vehicle. 4. Remove the windshield wiper motor from the transmission. Refer to **Windshield Wiper Motor Replacement**.

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Wiper/Washer System Components

The wiper/washer system consists of the following electrical components:

- Windshield Wiper Relay
- Windshield Wiper Speed Control Relay
- Windshield Washer Pump Relay
- Windshield Washer Fluid Pump
- Windshield Wiper Motor
- Window Wiper/Washer Switch
- Windshield Wiper Motor 30 A Fuse
- Windshield Washer Fluid Pump 15 A Fuse
- Body Control Module (BCM)
- Headlamp Washer Fluid Pump Relay
- Headlamp Washer Fluid Pump 15 A Fuse
- Windshield Washer Fluid Level Switch

Windshield Wiper System

The body control module (BCM) determines the front wipe/wash system mode of operation by monitoring

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several signals from the front wipe/wash switch as indicated in the wiper switch

The front wipe/wash switch receives a reference ground signal from the BCM. Each input of the BCM provides a switched battery pull-up for each front wiper/washer switch output signal it receives. All the BCM inputs are recognized as active when the wiper switch provides a path to the referenced ground signal. The first signal received by the BCM is the result of 6 resistors in the front wiper switch configured as a resistor ladder network. This signal is connected to a BCM analog to digital input. Depending on the function selected (High, Low, Intermittent 1 thru 5, Mist, Off), the front wiper control switch connects a different set of resistors into the circuit resulting in different voltages appearing on the BCM A/D input. By monitoring this voltage, the BCM determines how to control the wiper motor On/Off Relay. It should be noted that High, Low, and Mist all have the same value on this signal circuit. The second signal received from the front wiper switch is active only when the front wiper switch is in the high speed wiper position. When the wiper switch is not in the high speed position, the switch is open and the signal circuit is pulled to battery by the BCM. When the wiper switch is in the high speed position, the switch pulls the circuit low. The BCM determines how to control the Wiper high/low speed relay from this input. The third signal received from the front wiper switch is from the momentary windshield wash control switch. When the washer switch is not active the switch is open and the signal circuit is pulled to battery by the BCM. When the washer switch is active, the switch pulls the circuit low. The BCM controls the windshield wash and windshield wash activated wiper operation based on this input.

The BCM controls front wiper motor operation through two output signals and the monitoring of one input signal. The two outputs (one high side drive, one low side drive) are used to control two external wiper motor relays: front wiper motor on/off relay: which provides the wiper motor with battery power when it is activated by the high side drive signal (switched battery) from the BCM. When left deactivated, the normally closed contacts provide a ground to the wiper motor. Wiper high/low speed relay: when activated by a low side drive signal (ground) from the BCM, it switches the power supplied by the wiper motor's on/off relay to the motors high speed input. When left deactivated, the normally closed contacts connect the power supplied by the wiper motor's on/off relay to the motor's low speed input. The input used by the BCM is from the park switch located in the wiper motor assembly. When the wiper blades are not in the park position, the wiper park switch is open and the circuit is pulled up to battery by the BCM. When the wiper blades are in the park position at the bottom of the glass, the wiper park switch closes to ground pulling the park signal circuit low.

To initiate low speed operation, the BCM only energizes the front wiper motor on/off relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the wiper motor on/off relay, through the normally closed contacts of the wiper high/low speed relay, to the low speed control circuit of the windshield wiper motor.

Redundant high speed switch pass through. The BCM provides redundant circuitry which places battery power on its wiper motor on/off relay output with activation of its low assertion high speed wiper switch input. The BCM shall be capable of doing this, even if the module has lost all microprocessor control. This redundant circuit shall supply power while in the RUN and CRANK power modes. however; while in the CRANK power mode, the pass through shall only be active if the BCM is NOT in a computer operating properly state.

To initiate high speed operation, the BCM energizes both the front wiper motor on/off relay and the wiper high/low speed relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the wiper motor on/off relay, through the switched contacts of the wiper high/low speed relay, to the high speed control circuit of the windshield wiper motor.

Parking the wiper motor. In order to perform an accurate read of the park switch and to ensure the wipers will

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come to rest while still in the park position, parking of the wipers only occurs while in a low speed wiper mode. This requires that if the wipers are performing a high speed wiper operation at the time they are required to park, the BCM shall transition the Wipers to low speed by deactivating the wiper high/low relay before attempting to park. In order to park the wipers, the BCM monitors the park circuit until the park switch pulls the park circuit to ground. At this time, the BCM will immediately deactivate the wiper motor on/off relay. The relay contacts will switch back to their normally closed position and will apply ground to the wiper motor power inputs through the normally closed contacts of the wiper high/low relay. This deactivates and dynamically brakes the wiper motor in the park position. When the wiper switch is turned to the OFF position while the wiper motor is somewhere in mid-cycle, the BCM will continue to operate the motor until the wipers reach the park position. If the BCM is running the wiper motor and does not see a state transition of the park switch after 8 secs, the wipers will stop immediately when the wiper switch is turned to OFF. If the ignition is turned OFF while the wipers are in mid-cycle, the wipers will stop immediately, regardless of position. The BCM will park the wipers next time the ignition is turned ON.

The windshield wiper system MIST operation is identical to LOW speed operation, except that the MIST switch is a press and release type switch. When the wiper switch is moved to the MIST position and released, low speed wiper motor operation is started and will continue until 1 cycle is complete. If the wiper switch is moved to the MIST position and held, the wiper motor will operate in the LOW speed mode until the switch is released.

Windshield wiper intermittent operation is a low speed wiper motor function with a variable delay interval between the wiper motor cycles. The duration of the delay is controlled by the front wiper control switch's intermittent 1 thru intermittent 5 settings. The wiper operation is as follows

1. The BCM will initiate a single wipe by activating its front wiper ON/OFF relay output.
2. At the completion of a single wipe, the BCM will park the wipers as described above.
3. The BCM will then pause the wipers in their park position for the time duration associated with intermittent delay switch setting.
4. When the delay time expires repeat Steps 1 and 3 until the system is turned off or taken out of intermittent mode. If the wiper switch is moved from a longer delay interval to a shorter delay interval, the BCM will command an immediate wipe cycle and reset the delay timer to the shorter delay interval.

Intermittent wiper operation may be vehicle speed sensitive. When enabled, the speed compensated intermittent feature causes the intermittent wiper delay intervals to become shorter as a function of increased speed. As vehicle speed is reduced the intervals will become closer to the predetermined

Windshield Washer System

The BCM controls the windshield wash operation and windshield wash activated wiper operation. When the BCM detects the activation of the momentary windshield wash control switch, it activates its washer pump relay drive output which supplies battery power to the coil of the washer pump relay. This energizes the relay, which switches battery power to the pump motor. The BCM will also activate continuous low speed windshield wipes as described above. Upon deactivation of the windshield wash control switch, the wiper control module (BCM) shall deactivate the wash motor and will also park the wiper motor as described above unless the drip wipe feature is enabled. On some vehicles the drip wipe feature will be enabled and cause the system to provide additional wiping of the windshield after the switch has been released and fluid is no longer being applied. The front wash feature may attempt to detect a stuck switch. When enabled, activation of the wash feature shall be

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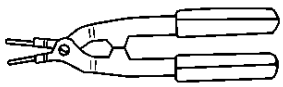
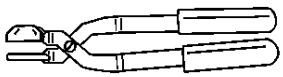
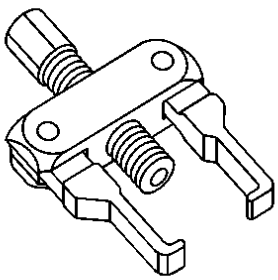
limited to 10 seconds.

Headlamp Washer System

When Headlamp Wash Equipped, the headlamps shall be sprayed with wash fluid as a result of an extended Windshield Wash Switch Activation. In order to preserve wash fluid, the feature shall only be allowed to activate if the Low or High Beam Headlamps are active. In addition, after the initial Headlamp Wash operation has been performed, additional headlamp washes shall not be performed for the next 4 Windshield Wash activations or for 48 hours whichever comes first. In the event that the system has detected a Stuck Front Wash Switch condition, the Headlamp Wash Feature shall be disabled.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 39232 Wiper Linkage Separator
	J 39529 Wiper Linkage Installer
	J 39822 Wiper Arm Puller

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Wiring Systems and Power Management - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1370-B1379, B1380-B1389, or B1440-B1443	B1370 01: Control Module Ignition On and Start Circuit Short to Battery B1370 04: Control Module Ignition On and Start Circuit Open B1380 01: Control Module Ignition Accessory Circuit Short to Battery B1380 04: Control Module Ignition Accessory Circuit Open B1441 01: Control Module Ignition Off, Run, and Start Circuit Short to Battery B1441 04: Control Module Ignition Off, Run, and Start Circuit Open
DTC B1445	B1445 02: Control Module Voltage Output Circuit Short to Ground
DTC B144B	B144B 02: RUN/CRNK Relay Circuit Short to Ground

DTC B1370-B1379, B1380-B1389, OR B1440-B1443

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1370 01

Control Module Ignition On and Start Circuit Short to Battery

DTC B1370 04

Control Module Ignition On and Start Circuit Open

DTC B1380 01

Control Module Ignition Accessory Circuit Short to Battery

DTC B1380 04

Control Module Ignition Accessory Circuit Open

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DTC B1441 01

Control Module Ignition Off, Run, and Start Circuit Short to Battery

DTC B1441 04

Control Module Ignition Off, Run, and Start Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B1370 04, B1380 04	B1370 04, B1380 04	-	-
Ignition Terminal 1	B1370 04, B1380 04	B1370 04, B1380 04	B1370 01	-
Ignition Terminal 3	B1370 04, B1380 04	B1380 04	B1380 01	-
Ignition Terminal 4	B1370 04, B1380 04, B1441 04	B1441 04	B1441 01	-
5 V REF	-	1	-	-
1. Power Mode Mismatch				

Circuit/System Description

The vehicle power mode master is the body control module (BCM). The ignition switch is a low current switch with multiple discrete circuits to the BCM. The BCM logic uses the ignition switch positions to identify the operator's desired power mode and activate specific discrete signals, and serial data messages for the operation of different subsystems as necessary. Other modules which have switched voltage inputs may operate in a default mode if the power mode master serial data message does not match what the individual module can detect from its own connections.

The power mode master will activate relays and other direct outputs of the power mode master as needed according to the calculated power mode. Some relays controlled by the BCM are switched ignition voltage outputs that are pass through circuits within the BCM directly from the ignition switch. If these circuits short to ground, the B+ circuit fuse to the ignition switch will open.

Conditions for Running the DTC

B1370 01, B1370 04

Ignition switch is in the RUN or CRANK positions.

B1380 01, B1380 04

Ignition switch is in the RUN or ACCESSORY positions.

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B1441 01, B1441 04

Ignition switch is in the CRANK position.

Conditions for Setting the DTC

B1370 01

Ignition circuit is shorted to voltage.

B1370 04

- Ignition circuit is open.
- Ignition, accessory, or off/run/crank circuit shorted to ground.
- B+ circuit of the ignition switch is open or shorted to ground.
- Ignition relay control circuit open, including relay coil and ground.

B1380 01

Ignition, accessory circuit is shorted to voltage.

B1380 04

- Ignition, accessory circuit is open.
- Ignition, accessory, or off/run/crank circuit shorted to ground.
- B+ circuit of the ignition switch is open or shorted to ground.

B1441 01

Ignition, off/run/crank signal circuit is shorted to voltage.

B1441 04

Ignition, off/run/crank signal circuit is open.

Actions Taken When the DTC Sets

- The BCM operates in a fail-safe power mode dependent on the last valid power mode detected and the state of the engine run flag data on the serial data communications circuits.
- The other modules on the vehicle operate in a fail-safe power mode dependent on the last valid power mode transmitted by the BCM and the state of the engine run flag on the serial data communications circuits.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

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Reference Information

Schematic Reference

- **Body Control System Schematics**
- **Power Distribution Schematics**
- **Power Moding Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Power Mode Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

With a scan tool, access Power Mode data display list and compare all parameters listed with the corresponding ignition key position. The Power Mode Parameters table below illustrates the correct state of these input parameters in correspondence to the S39 ignition switch position. The circuits which the individual parameters are related to are in parentheses.

Power Mode Parameters

Ignition Switch Position	5 V IGN (Ignition Switch, Terminal 4 and 6)	Accessory (Ignition Switch, Terminal 3)	Run/Crank (Ignition Switch, Terminal 1)
Off Key Out	Key Out/ACC	Inactive	Inactive
Off Key IN	Key In/Off	Inactive	Inactive
Accessory	Key Out/ACC	Active	Inactive
Run	Run	Active	Active
Start	Crank Request	Inactive	Active

Circuit/System Testing

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1. Disconnect the harness connector at the S39 ignition switch.
2. Verify that a test lamp illuminates between B+ circuit terminal 2 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, test the ignition circuits listed below for a short to ground.

      NOTE: To help isolate a short to ground, it may be necessary to disconnect modules that are connected to the following circuits:

      - terminal 1
      - terminal 3
      - terminal 4
      - terminal 6
3. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal 6 and ground.
    - If less than 4.8 V, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
    - If greater than 5.2 V, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the BCM.
4. Verify the scan tool ignition 5 V reference signal is less than 4.2 V.
    - If greater than 4.2 V, test the ignition signal circuit terminal 4 for a short to voltage. If the circuit tests normal, replace the BCM.
5. Install a 3 A fused jumper wire between the ignition signal circuit terminal 4 and the 5 V reference circuit terminal 6. Verify the scan tool Ignition Signal Voltage parameter is greater than 4.2 V.
    - If less than 4 V, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
6. Connect the harness connector at the S39 ignition switch.
7. Ignition OFF, key out, disconnect the X3 harness connector at the K9 BCM. Verify that a test lamp does not illuminate between the ignition circuit terminals listed below and ground:
    - terminal 5
    - terminal 6
    - terminal 15
    - terminal 22
    - If the test lamp illuminates, test the ignition circuits for a short to voltage. If the circuit tests normal, replace the S39 ignition switch.
8. Ignition in the ACCESSORY position, verify that a test lamp illuminates between the terminal 5 and ground.
    - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, replace the S39 ignition switch.
9. Ignition in the CRANK position, verify that a test lamp illuminates between terminal 6 and ground.
    - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit

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tests normal, replace the S39 ignition switch.

10. If all of the circuits test normal, replace the K9 BCM.

Component Testing

Ignition Switch

1. Ignition OFF, disconnect the harness connector at the S39 ignition switch.
2. Verify the resistance between the terminals listed below match for each S39 ignition switch position.
    - If not the specified value, replace the S39 ignition switch.

Resistance Test

Ignition Switch Position	Terminals 1 and 2	Terminals 2 and 3	Terminals 2 and 4	Terminals 2 and 6	Terminals 4 and 6
Off Key Out	Infinite	Infinite	Infinite	Infinite	Infinite
Off Key IN	Infinite	Infinite	< 5.0 ohms	Infinite	Infinite
Accessory	Infinite	< 5.0 ohms	Infinite	Infinite	Infinite
Run	< 5.0 ohms	< 5.0 ohms	Infinite	Infinite	< 5.0 ohms
Start	< 5.0 ohms	Infinite	Infinite	Infinite	1275-1325 ohms

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Ignition and Start Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DTC B1445

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1445 02

Control Module Voltage Output Circuit Short to Ground

Diagnostic Fault Information

	Short to	Open/High	Short to	Signal

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Circuit	Ground	Resistance	Voltage	Performance
RAP/ACCY Relay Switch B+	1	1	1	-
RAP/ACCY Relay Control	B1445 02	1	1	-
RAP/ACCY Relay Ignition	1	1	1	-
RAP/ACCY Relay Ground	-	1	-	-
1. Retained Accessory Power Malfunction				

Circuit/System Description

The body control module (BCM) controls the wired accessory power components by applying voltage to the ignition voltage circuit at harness connector X4 terminal 12. Voltage is applied when the ignition switch is in the ACCESSORY or the ON position.

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The DTC can only set when the output is actively being requested by the module. Refer to Circuit/System Description for specific conditions.

Conditions for Setting the DTC

The DTC will set only when the module requests the output and there is a short to ground in the ignition voltage circuit.

Action Taken When the DTC Sets

The module output driver will be shut down and not supply voltage to the circuit.

Conditions for Clearing the DTC

- The current DTC will clear when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

Power Distribution Schematics

Power Moding Schematics

Connector End View Reference

Component Connector End Views

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Description and Operation

Retained Accessory Power Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the KR70 RAP/ACCY relay.
2. Test for less than 10 ohms between the ground control circuit terminal 86 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 30 and ground.
    - If the test does not illuminate, test the B+ circuit for short to ground or an open/high resistance.
4. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
5. Command the RAP/ACCY relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the command states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
6. Connect the RAP/ACCY relay. Disconnect the harness connector at the center console accessory power outlet.
7. Connect a test lamp between the ignition circuit terminal A and ground.
8. Command the RAP/ACCY relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the command states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR70 RAP/ACCY relay.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the KR70 RAP/ACCY relay.

Component Testing

1. Ignition OFF, disconnect the KR70 RAP/ACCY relay.
2. Test for 70-150 ohms between terminals control circuit terminal 85 and ground terminal 86.

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- If not within the specified range, replace the KR70 RAP/ACCY relay.

3. Test for infinite resistance between the following terminals:
   - 30 and 86
   - 30 and 87
   - 30 and 85
   - 85 and 87
   - If not the specified value, replace the KR70 RAP/ACCY relay.
4. Install a 3 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
   - If greater than the specified range, replace the KR70 RAP/ACCY relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for BCM replacement, setup, and programming

DTC B144B

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B144B 02

RUN/CRNK Relay Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
RUN/CRNK Relay Control	B144B 02	1	2	-
1. No Start. 2. Vehicle will start and continue to run after the ignition key is removed.				

Circuit/System Description

The body control module (BCM) controls the RUN/CRNK relay through the control circuit by applying voltage

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to the circuit. The ignition RUN/CRNK is energized when the ignition switch is in ON or START, or when a remote start is requested.

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The DTC can only run when the output is activated.

Conditions for Setting the DTC

The BCM detects a short to ground in the RUN/CRNK relay control circuit.

Action Taken When the DTC Sets

The module output driver will be shut down and not supply voltage to the RUN/CRNK relay control circuit.

Conditions for Clearing the DTC

- The current DTC will clear when the module request for the output is removed or the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

Short to voltage in the RUN/CRNK relay control circuit will cause the malfunction indicator lamp (MIL) to illuminate with the ignition key OFF, and the engine will remain running if started and the ignition key is removed.

Reference Information

Schematic Reference

- **Body Control System Schematics**
- **Power Distribution Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Power Mode Description and Operation

Electrical Information Reference

- **Circuit Testing**

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the KR73 RUN/CRNK relay.
2. Connect a test lamp between the relay control circuit terminal 85 and terminal 86.
3. Cycle the ignition ON and OFF. The test lamp should turn ON and OFF when changing S39 ignition switch positions.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the KR73 RUN/CRNK relay.

Component Testing

1. Ignition OFF, disconnect the KR73 RUN/CRNK relay.
2. Test for 70-150 ohms between terminals 85 and 86.
    - If the resistance is not within the specified range, replace the KR73 RUN/CRNK relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If less than specified, replace the KR73 RUN/CRNK relay.
4. Install a 3 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and 86. Measure for less than 5 ohms between terminals 87 and 85.
    - If greater than specified, replace the KR73 RUN/CRNK relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for BCM replacement, setup, and programming

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SYMPTOMS - WIRING SYSTEMS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data links.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to:
   - **Power Mode Description and Operation**
   - **Retained Accessory Power Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the systems. Refer to **Checking Aftermarket Accessories**.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Power Mode Mismatch**
- **Retained Accessory Power Malfunction**

IGNITION CAN/CANNOT BE TURNED OFF WITH TRANSMISSION IN ANY GEAR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Accessory Voltage	2	2	-	-
Steering Column Key Cylinder				

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Lock Solenoid Control	2	1	1	-
Park Position Switch Ground	-	2	-	-
1. Ignition key will not turn to OFF with vehicle in park. 2. Ignition key will turn to OFF with vehicle out of park.				

Circuit/System Description

If the vehicle is equipped with automatic transmission and a floor mounted console gear shift, it has an electronic park lock (EPL) system. The EPL system purpose is to prevent the ignition key from being turned to the OFF position when the transmission is in any position other than PARK and the vehicle may still be moving. The EPL system consists of an ignition lock cylinder solenoid, and a park position switch that is located in the A/T shift lock control switch. The ignition lock cylinder solenoid contains a pin that is spring loaded to mechanically prevent the ignition key cylinder from being turned to the lock position when it is not energized. The park position switch receives voltage from the body control module (BCM) when the ignition is turned ON. When the transmission shift selector is in PARK, the park position switch closes and energizes the ignition lock cylinder solenoid (actuator) retracting the pin, allowing the ignition switch to be turned OFF. If vehicle power is lost, and/or the transmission is not in the Park position the operator will not be able to turn the ignition key to the lock position and will not be able to remove the ignition key from the column.

Diagnostic Aids

Verify that the transmission shift selector indicator matches the position of the gear shift lever while selecting between the Park, Reverse, Drive and Low positions.

Reference Information

Schematic Reference

Ignition Lock Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Electronic Park Lock Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Verification

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1. Ignition OFF, with the gear shift selector in the PARK position, turn the ignition to the ON position. The automatic transmission shift lock control solenoid should allow the ignition to be turned to the ON position.
2. Ignition ON, with the gear shift selector in any position except the PARK position, turn the ignition to the OFF and to the LOCK positions. The automatic transmission shift lock control solenoid should not allow the ignition to be turned to the LOCK position.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B81B park position switch.
2. Test for less than 30 ohms between the ground circuit terminal 1 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition OFF, connect the harness connector at the B81B park position switch.
4. Disconnect the harness connector at the M93 ignition cylinder lock control actuator.
5. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 1 and ground.
    - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. With the gear shift selector in any position except the PARK position, verify that a test lamp does not illuminate between the ignition circuit terminal 1 and the control circuit terminal 2.
    - If the test lamp illuminates, test the control circuit for a short to ground. If the circuit tests normal, test or replace the B81B park position switch.
7. With the gear shift selector in the PARK position, verify that a test lamp illuminates between the ignition circuit terminal 1 and the control circuit terminal 2.
    - If the test lamp does not illuminate, test the control circuit for a short to voltage or open/high resistance. If the circuit tests normal, test or replace the B81B park position switch.
8. If all circuits test normal, test or replace the M93 ignition cylinder lock control actuator.

Component Testing

Park Switch

1. Ignition OFF, disconnect the harness connector at the B81B park position switch.
2. Test for infinite resistance between the control terminal 3 and the ground terminal 1 with the switch in the open position.
    - If not the specified value, replace the B81B park position switch.
3. Test for less than 2 ohms between the control terminal 3 and the ground terminal 1 with the switch in the closed position.
    - If greater than the specified value, replace the B81B park position switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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- **Ignition and Start Switch Replacement**
- **Control Module References** for the BCM replacement, setup, and programming

POWER MODE MISMATCH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1370 01

Control Module Ignition On and Start Circuit Short to Battery

DTC B1370 04

Control Module Ignition On and Start Circuit Open

DTC B1380 01

Control Module Ignition Accessory Circuit Short to Battery

DTC B1380 04

Control Module Ignition Accessory Circuit Open

DTC B1441 01

Control Module Ignition Off, Run, and Start Circuit Short to Battery

DTC B1441 04

Control Module Ignition Off, Run, and Start Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B1370 04, B1380 04	B1370 04, B1380 04	-	-
5 V REF	-	1	-	-
Ignition Terminal 1	B1370 04, B1380 04	B1370 04, B1380 04	B1370 01	-

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Ignition Terminal 3	B1370 04, B1380 04	B1380 04	B1380 01	-
Signal Terminal 4	B1370 04, B1380 04, B1441 04	B1441 04	B1441 01	-
1. Power Mode Mismatch				

Circuit/System Description

The vehicle power mode master is the body control module (BCM). The ignition switch is a low current switch with multiple discrete circuits to the BCM. The BCM logic uses the ignition switch positions to identify the operator's desired power mode and activate specific discrete signals, and serial data messages for the operation of different subsystems as necessary. Other modules which have switched voltage inputs may operate in a default mode if the power mode master serial data message does not match what the individual module can detect from its own connections.

The power mode master will activate relays and other direct outputs of the power mode master as needed according to the calculated power mode. Some relays controlled by the BCM are switched ignition voltage outputs that are pass through circuits within the BCM directly from the ignition switch. If these circuits short to ground, the B+ circuit fuse to the ignition switch will open.

Conditions for Running the DTC

B1370 01, B1370 04

Ignition switch is in the RUN or CRANK positions.

B1380 01, B1380 04

Ignition switch is in the RUN or ACCESSORY positions.

B1441 01, B1441 04

Ignition switch is in the CRANK position.

Conditions for Setting the DTC

B1370 01

Ignition circuit is shorted to voltage.

B1370 04

- Ignition circuit is open.
- Ignition, accessory, or off/run/crank circuit shorted to ground.
- B+ circuit of the ignition switch is open or shorted to ground.
- Ignition relay control circuit open, including relay coil and ground.

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B1380 01

Accessory circuit is shorted to voltage.

B1380 04

- Accessory circuit is open.
- Ignition, accessory, or off/run/crank circuit shorted to ground.
- B+ circuit of the ignition switch is open or shorted to ground.

B1441 01

Off/run/crank signal circuit is shorted to voltage.

B1441 04

Off/run/crank signal circuit is open.

Actions Taken When the DTC Sets

- The BCM operates in a fail-safe power mode dependent on the last valid power mode detected and the state of the engine run flag data on the serial data communications circuits.
- The other modules on the vehicle operate in a fail-safe power mode dependent on the last valid power mode transmitted by the BCM and the state of the engine run flag on the serial data communications circuits.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Body Control System Schematics**
- **Power Distribution Schematics**
- **Power Moding Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Power Mode Description and Operation

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Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

With a scan tool, access Power Mode data display list and compare all parameters listed with the corresponding ignition key position. The Power Mode Parameters table below illustrates the correct state of these input parameters in correspondence to the S39 ignition switch position. The circuits which the individual parameters are related to are in parentheses.

Power Mode Parameters

Ignition Switch Position	5 V IGN (Ignition Switch, Terminal 4 and 6)	Accessory (Ignition Switch, Terminal 3)	Run/Crank (Ignition Switch, Terminal 1)
Off Key Out	Key Out/ACC	Inactive	Inactive
Off Key IN	Key In/Off	Inactive	Inactive
Accessory	Key Out/ACC	Active	Inactive
Run	Run	Active	Active
Start	Crank Request	Inactive	Active

Circuit/System Testing

1. Disconnect the harness connector at the S39 ignition switch.
2. Verify that a test lamp illuminates between B+ circuit terminal 2 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, test the ignition circuits listed below for a short to ground.

NOTE: To help isolate a short to ground, it may be necessary to disconnect modules that are connected to the following circuits:

- Terminal 1
- Terminal 3
- Terminal 4
- Terminal 6

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3. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal 6 and ground.
    - If less than 4.8 V, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
    - If greater than 5.2 V, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the BCM.
4. Verify the scan tool ignition switch signal voltage is less than 4.2 V.
    - If greater than 4.2 V, test the ignition switch signal circuit terminal 4 for a short to voltage. If the circuit tests normal, replace the BCM.
5. Install a 3 A fused jumper wire between the ignition switch signal circuit terminal 4 and the 5 V reference circuit terminal 6. Verify the scan tool Ignition Switch Signal Voltage parameter is greater than 3 V.
    - If less than 3 V, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
6. Connect the harness connector at the S39 ignition switch.
7. Ignition OFF, key out, disconnect the X3 harness connector at the K9 BCM. Verify that a test lamp does not illuminate between the ignition circuit terminals listed below and ground:
    - Terminal 5
    - Terminal 6
    - Terminal 15
    - Terminal 22
    - If the test lamp illuminates, test the ignition circuits for a short to voltage. If the circuit tests normal, replace the S39 ignition switch.
8. Ignition in the ACCESSORY position, verify that a test lamp illuminates between the terminal 5 and ground.
    - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, replace the S39 ignition switch.
9. Ignition in the CRANK position, verify that a test lamp illuminates between terminal 6 and ground.
    - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, replace the S39 ignition switch.
10. If all of the circuits test normal, replace the K9 BCM.

Component Testing

Ignition Switch

1. Ignition OFF, disconnect the harness connector at the S39 ignition switch.
2. Verify the resistance between the terminals listed below match for each S39 ignition switch position.
    - If not the specified value, replace the S39 ignition switch.

Resistance Test

S39 Ignition Switch Position	Terminals 1 and 2	Terminals 2 and 3	Terminals 2 and 4	Terminals 2 and 6	Terminals 4 and 6
Off Key Out	Infinite	Infinite	Infinite	Infinite	Infinite

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Off Key IN	Infinite	Infinite	< 5.0 ohms	Infinite	Infinite
Accessory	Infinite	< 5.0 ohms	Infinite	Infinite	Infinite
Run	< 5.0 ohms	< 5.0 ohms	Infinite	Infinite	< 5.0 ohms
Start	< 5.0 ohms	Infinite	Infinite	Infinite	1275-1325 ohms

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Ignition and Start Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

RETAINED ACCESSORY POWER MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
RAP/ACCY Relay Switch B+	3	4	2	-
RAP/ACCY Relay Control	B1445 02	1	1	-
RAP/ACCY Relay Ignition	3	4	2	-
RAP/ACCY Relay Ground	-	1	-	-

1. All relay controlled retained power accessory functions inoperative.
2. Relay retained power accessory remains on past the timer limit after key out and will not turn off when a vehicle door is opened.
3. Partial relay controlled retained power accessory functions inoperative with open fuse.
4. Partial relay controlled retained power accessory functions inoperative with fuse OK.

Circuit/System Description

The retained accessory power system allows specific vehicle functions to operate after the ignition is turned OFF for a predetermined time. Relay retained accessory power is controlled by the body control module (BCM) using inputs from the door ajar switches to determine control of the relay when the ignition is turned OFF. Radio retained accessory power is controlled by a serial data message from the BCM using inputs from the driver door open switch. Refer to **Retained Accessory Power Description and Operation** for more detail on subsystems using retained accessory power.

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Diagnostic Aids

The radio retained accessory power mode is a separate function and will still operate properly. The radio retained accessory power function is controlled by serial data and the specific module. These functions are not affected by the BCM retained accessory power relay circuits.

Reference Information

Schematic Reference

- **Power Distribution Schematics**
- **Power Moding Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Retained Accessory Power Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Battery voltage must remain above 9.6 V for retained accessory power to operate properly.

Radio Retained Accessory Power

1. With all passenger doors closed, observe the courtesy lamps while opening and closing the driver door. The courtesy lamps should illuminate when the door is opened and turn off approximately 30 seconds after closing the door.
    - If the courtesy lamp operation is incorrect from the drivers door, refer to **Courtesy Lamps Malfunction** .
2. If courtesy lamp operation is correct, and the radio is the only retained accessory power concern, replace the radio.

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Relay Retained Accessory Power

1. Ignition ON, observe the appropriate scan tool parameters listed below while opening and closing each vehicle door. The reading should change between Door Closed/Door Ajar.
    - Driver Door Ajar Switch
    - Left Rear Door Ajar Switch
    - Passenger Door Ajar Switch
    - Right Rear Door Ajar Switch
    - If any parameter does not change as specified, refer to **Door Ajar Indicator Malfunction** .
2. Command the scan tool Accessory/Retained Accessory Power Relay Command OFF. Attempt to operate any retained accessory power relay controlled component within 5 seconds. The component should not operate.
3. Command the scan tool Accessory/Retained Accessory Power Relay Command ON. Attempt to operate any retained accessory power relay controlled component within 5 seconds. The component should operate.
4. Ignition ON, all doors closed. Observe the scan tool parameter Accessory/Retained Accessory Power Relay Command. Ignition OFF, key removed, the reading should be ON for approximately 10 minutes then change to OFF.
    - If the parameter does not respond as specified, replace the K9 BCM.

Circuit/System Testing

1. Ignition OFF, disconnect the KR70 RAP/ACCY relay.
2. Test for less than 10 ohms between the ground control circuit terminal 86 and ground.
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 30 and ground.
    - If the test does not illuminate, test the B+ circuit for short to ground or an open/high resistance.
4. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
5. Command the RAP/ACCY relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the command states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
6. Connect the RAP/ACCY relay. Disconnect the harness connector at the center console accessory power outlet.
7. Connect a test lamp between the ignition circuit terminal A and ground.
8. Command the RAP/ACCY relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the command states.
    - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, test or replace the KR70 RAP/ACCY relay.
    - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high

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resistance. If the circuit tests normal, test or replace the KR70 RAP/ACCY relay.

Component Testing

1. Ignition OFF, disconnect the KR70 RAP/ACCY relay.
2. Test for 70-150 ohms between terminals control circuit terminal 85 and ground terminal 86.
    - If not within the specified range, replace the KR70 RAP/ACCY relay.
3. Test for infinite resistance between the following terminals:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - If not the specified value, replace the KR70 RAP/ACCY relay.
4. Install a 2 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
    - If greater than the specified range, replace the KR70 RAP/ACCY relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for module replacement, setup, and programming

GENERAL ELECTRICAL DIAGNOSIS

Basic Knowledge Required

Without a basic knowledge of electricity, it will be difficult to use the diagnostic procedures contained in the service manual. You should understand the basic theory of electricity, and know the meaning of voltage (V), current (A), and resistance (ohms). You should also be able to read and understand a wiring diagram, as well as understand what happens in a circuit with an open or a shorted wire.

CHECKING AFTERMARKET ACCESSORIES

WARNING: Refer to SIR Warning .

CAUTION: The OBD II symbol is used on the circuit diagrams in order to alert the technician that the circuit is essential for proper OBD II emission control circuit operation. Any circuit which fails and causes the malfunction indicator lamp (MIL) to turn ON, or causes emissions-related component damage, is identified as an OBD II circuit.

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Do not connect aftermarket accessories into the following circuits:

- SIR circuits, all such circuits are indicated on circuit diagrams with the SIR symbol.
- OBD II circuits, all such circuits are indicated on circuit diagrams with the OBD II symbol.

Always check for aftermarket accessories (non-OEM) as the first step in diagnosing electrical problems. If the vehicle is so equipped, disconnect the system to verify that these add-on accessories are not the cause of the problems.

Possible causes of vehicle problems related to aftermarket accessories include:

- Power feeds connected to points other than the battery
- Antenna location
- Transceiver wiring located too close to vehicle electronic modules or wiring
- Poor shielding or poor connectors on antenna feed line
- Check for recent service bulletins detailing installation guidelines for aftermarket accessories.

CIRCUIT TESTING

The Circuit Testing section contains the following diagnostic testing information. Using this information along with the diagnostic procedures will identify the cause of the electrical malfunction.

- **Using Connector Test Adapters**
- **Probing Electrical Connectors**
- **Troubleshooting with a Digital Multimeter**
- **Troubleshooting with a Test Lamp**
- **Using Fused Jumper Wires**
- **Measuring Voltage**
- **Measuring Voltage Drop**
- **Measuring Frequency**
- **Testing for Continuity**
- **Testing for Short to Ground**
- **Testing for a Short to Voltage**
- **Testing for Intermittent Conditions and Poor Connections**
- **Inducing Intermittent Fault Conditions**
- **Testing for Electrical Intermittents**
- **Scan Tool Snapshot Procedure**
- **Circuit Protection - Fuses**
- **Circuit Protection - Circuit Breakers**
- **Circuit Protection - Fusible Links**

BASIC DIGITAL MULTIMETER REQUIREMENTS

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Digital Multimeter (DMM) Basic Requirements

Service information is validated using digital multimeters that meet or exceed the following requirements. Using a multimeter that does not meet these basic requirements may give inaccurate readings which could lead to an incorrect diagnosis.

Display and Settings

1. Four digits displayed
2. Voltage, amperage, resistance, frequency, diode test settings, and min-max function
3. Display positive and negative values

Voltage

1. Have at least 10 Mohms input impedance
2. Test a DC voltage range of 0.1-1000 V.
3. Test an AC voltage range of 0.1-1000 V.

Amperage

1. Test a DC amperage range of 0.1µA-10 A.
2. Test an AC amperage range of 0.1µA-10 A.

Resistance

Test a resistance range of 0.1 ohms-40 Mohms and displays infinite for a value greater than 40 Mohms (O.L. (Over-load))

Frequency

Test for a frequency range of 0.5 HZ-199 K HZ

Diode Test

1. Apply at least 1 mA when performing the diode bias test
2. Display the break over voltage drop (0-3 V) of a forward biased diode
3. Display infinite (O.L. (Over-load)) when a diode is reverse biased

Min-Max Readings

1. Can update at a 1 ms sample rate
2. Saves and displays minimum and maximum values

USING CONNECTOR TEST ADAPTERS

CAUTION: Do not insert test equipment probes (DMM etc.) into any connector or fuse

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block terminal. The diameter of the test probes will deform most terminals. A deformed terminal will cause a poor connection, which will result in a system failure. Always use the EL-35616 GM-Approved Terminal Test Kit in order to front probe terminals. Do not use paper clips or other substitutes to probe terminals.
When using the EL-35616 GM-Approved Terminal Test Kit, ensure the terminal test adapter choice is the correct size for the connector terminal. Do not visually choose the terminal test adapter because some connector terminal cavities may appear larger than the actual terminal in the cavity. Using a larger terminal test adapter will damage the terminal. Refer to the EL-35616 GM-Approved Terminal Test Kit label on the inside of the EL-35616 GM-Approved Terminal Test Kit for the correct adapter along with the connector end view for terminal size.

PROBING ELECTRICAL CONNECTORS

NOTE: Always be sure to reinstall the connector position assurance (CPA) and terminal position assurance (TPA) when reconnecting connectors or replacing terminals.

Front probe

Disconnect the connector and probe the terminals from the mating side (front) of the connector.

CAUTION: Refer to Test Probe Caution .

NOTE: When probing female 0.64 terminals, it is important to use the correct adapter. There have been some revisions to the test adapter for 0.64 terminals. The proper adapter for 0.64 terminals is the EL-35616-64B which has a gold terminal and a black wire between the base and tip. Failure to use the proper test adapter may result in damage to the terminal being tested and improper diagnosis.

NOTE: The proper adapter for probing the terminals for fuses, relays, or diodes in an electrical center is EL-35616-35. Using any other tool or adapter may damage the terminal being tested.

Refer to the following table as a guide in selecting the correct test adapter for front probing connectors:

Test Adapter	Description
J-35616-2A	150 Male Probe Adapter (gray)
J-35616-3	150 Female Probe Adapter (gray)
J-35616-4A	280 Male Probe Adapter (purple)
J-35616-5	280 Female Probe Adapter (purple)

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J-35616-6	100W Male (round) Probe Adapter (brown)
J-35616-7	100W Female (round) Probe Adapter (brown)
J-35616-8	Weather Pack Male Probe Adapter (orange)
J-35616-9	Weather Pack Female Probe Adapter (orange)
J-35616-10	100W Male (round) Probe Adapter (green)
J-35616-11	100W Female (round) Probe Adapter (green)
J-35616-12	130 Male Probe Adapter (blue)
J-35616-13	130 Female Probe Adapter (blue)
J-35616-14	150 Male Probe Adapter (green)
J-35616-16	100 Male Probe Adapter (lt green)
J-35616-17	100 Female Probe Adapter (lt green)
J-35616-18	220 Male Probe Adapter (black)
J-35616-19	220 Female Probe Adapter (black)
J-35616-21	950 Female Probe Adapter (red)
J-35616-22	950 Male Probe Adapter (red)
J-35616-31	500 Male Probe Adapter (orange)
J-35616-32	500 Female Probe Adapter (orange)
J-35616-33	160/180 Male Probe Adapter (yellow)
J-35616-34	160/180 Female Probe Adapter (yellow)
J-35616-35	280 Male Probe Adapter (violet)
J-35616-40	480 Male Probe Adapter (dk blue)
J-35616-41	480 Female Probe Adapter (dk blue)
J-35616-42	630 Male Probe Adapter (red)
J-35616-43	630 Female Probe Adapter (red)
J-35616-44	800 Male Probe Adapter (yellow)
J-35616-45	800 Female Probe Adapter (yellow)
J-35616-54	280 Male (round) Probe Adapter (tan)
J-35616-55	280 Female (round) Probe Adapter (tan)
J-35616-64B	0.64 Male Probe Adapter (lt blue)
J-35616-65B	0.64 Female Probe Adapter (lt blue)
J-35616-66	150 Male (round) Probe Adapter (yellow)
J-35616-67	150 Female (round) Probe Adapter (yellow)

Backprobe

NOTE:

- **Backprobe connector terminals only when specifically required in diagnostic procedures.**
- **Do not backprobe a sealed (Weather Pack®) connector, less than a 280 series Metri-Pack connector, a Micro-Pack connector, or a flat wire (dock and lock) connector.**
- **Backprobing can be a source of damage to connector terminals. Use care**

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in order to avoid deforming the terminal, either by forcing the test probe too far into the cavity or by using too large of a test probe.

- **After backprobing any connector, inspect for terminal damage. If terminal damage is suspected, test for proper terminal contact.**

Do not disconnect the connector and probe the terminals from the harness side (back) of the connector.

TROUBLESHOOTING WITH A DIGITAL MULTIMETER

Special Tools

EL 39200: Digital Multimeter (DMM)

CAUTION: Refer to Test Probe Caution .

Digital Multimeter (DMM) Basic Requirements

Service information is validated using digital multimeters that meet or exceed the following requirements. Using a multimeter that does not meet these basic requirements may give inaccurate readings which could lead to an incorrect diagnosis.

Display and Settings

1. Four digits displayed
2. Voltage, amperage, resistance, frequency, diode test settings, and min-max function
3. Display positive and negative values

Voltage

1. Have at least 10 Mohms input impedance
2. Test a DC voltage range of 0.1-1000 V.
3. Test an AC voltage range of 0.1-1000 V.

Amperage

1. Test a DC amperage range of 0.1µA-10 A.
2. Test an AC amperage range of 0.1µA-10 A.

Resistance

Test a resistance range of 0.1 ohms-40 Mohms and displays infinite for a value greater than 40 Mohms (O.L. (Over-load))

Frequency

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Test for a frequency range of 0.5 HZ-199 K HZ

Diode Test

1. Apply at least 1 mA when performing the diode bias test
2. Display the break over voltage drop (0-3 V) of a forward biased diode
3. Display infinite (O.L. (Over-load)) when a diode is reverse biased

Min-Max Readings

1. Can update at a 1 ms sample rate
2. Saves and displays minimum and maximum values

NOTE: Circuits which include any solid state control modules, such as the powertrain control module (PCM), should only be tested with a 10 Mohms or higher impedance digital multimeter such as the EL-39200.

The EL-39200 instruction manual is a good source of information and should be read thoroughly upon receipt of the DMM as well as kept on hand for future reference.

A DMM should be used instead of a test lamp in order to test for voltage in high impedance circuits. While a test lamp shows whether voltage is present if the impedance is low enough, a DMM indicates how much voltage is present. In other words, if there is not enough current, the test lamp will not illuminate even though voltage is present.

The ohmmeter function on a DMM shows how much resistance exists between 2 points along a circuit. Low resistance in a circuit means good continuity.

NOTE: Disconnect the power feed from the suspect circuit when measuring resistance with a DMM. This prevents incorrect readings. DMMs apply such a small voltage to measure resistance that the presence of voltages can upset a resistance reading.

Diodes and solid state components in a circuit can cause a DMM to display a false reading. To find out if a component is affecting a measurement take a reading once, then reverse the leads and take a second reading. If the readings differ the solid state component is affecting the measurement.

Following are examples of the various methods of connecting the DMM to the circuit to be tested:

- Probe both ends of the connector and either hold the leads in place while manipulating the connector or tape the leads to the harness for continuous monitoring while you perform other operations or test driving. Refer to **Probing Electrical Connectors**.
- Disconnect the harness at both ends of the suspected circuit where it connects either to a component or to other harnesses.
- If the system that is being diagnosed has a specified pinout or breakout box, it may be used in order to simplify connecting the DMM to the circuit or for testing multiple circuits quickly.

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TROUBLESHOOTING WITH A TEST LAMP

Special Tools

EL-35616-200: Test Light - Probe Kit

For equivalent regional tools, refer to **Special Tools** .

CAUTION: Refer to Test Probe Caution .

A test lamp can simply and quickly test a low impedance circuit for voltage. A DMM should be used instead of a test lamp in order to test for voltage in high impedance circuits. While a test lamp shows whether voltage is present if the impedance is low enough, a DMM indicates how much voltage is present. In other words, if there is not enough current, the test lamp will not illuminate even though voltage is present.

The **EL-35616-200:** kit is Micro-Pack compatible and comprised of a 12-volt light bulb with an attached pair of leads.

To properly operate this tool use the following procedures.

When testing for voltage:

1. Attach one lead to ground.
2. Touch the other lead to various points along the circuit where voltage should be present.
3. When the bulb illuminates, there is voltage at the point being tested.

When testing for ground:

1. Attach one lead to battery positive voltage.
2. Touch the other lead to various points along the circuit where ground should be present.
3. When the bulb illuminates, there is ground at the point being tested.

USING FUSED JUMPER WIRES

Special Tools

EL 35616-20F: Fused Jumper Wire

For equivalent regional tools, refer to **Special Tools** .

NOTE: A fused jumper may not protect solid state components from being damaged.

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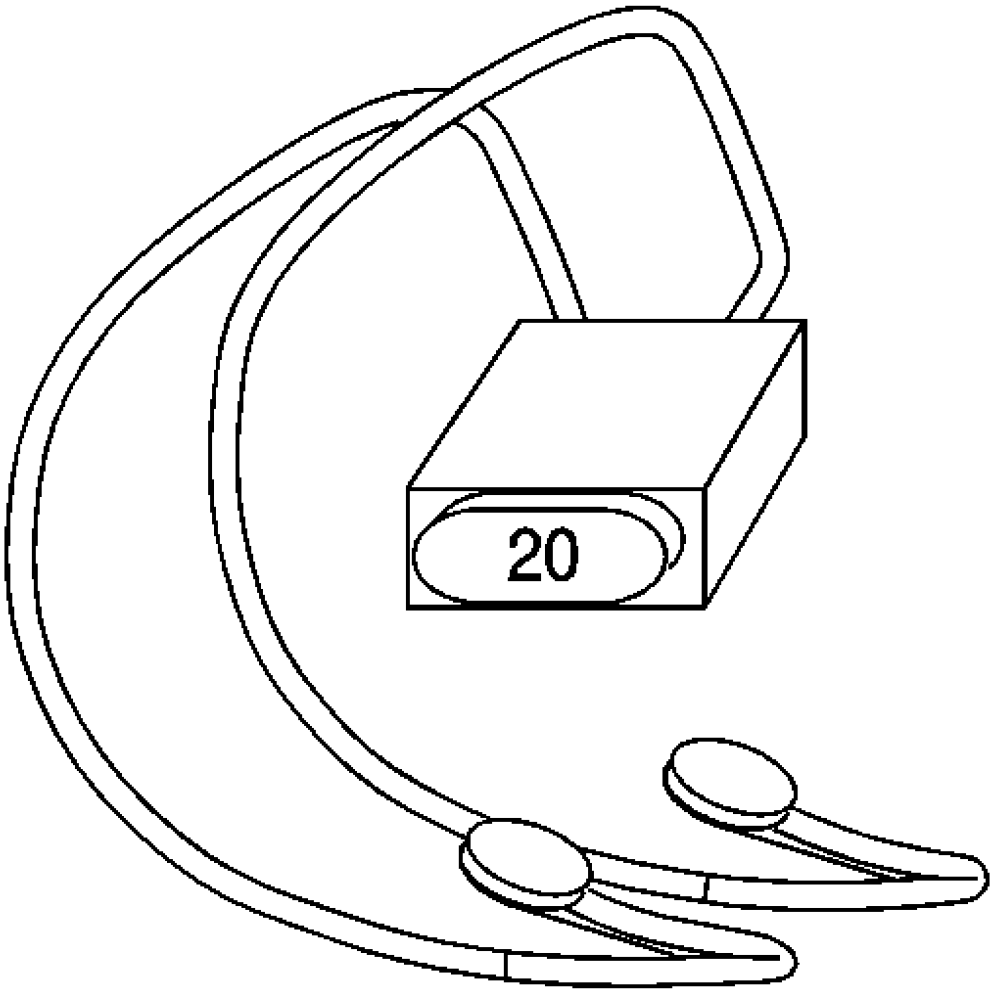


Fig. 1: Fused Jumper Wire
Courtesy of GENERAL MOTORS CORP.

The **EL 35616-20F:** Fused Jumper Wire includes small clamp connectors that provide adaptation to most connectors without damage. This fused jumper wire is supplied with a 20 A fuse which may not be suitable for some circuits. Do not use a fuse with a higher rating than the fuse that protects the circuit being tested.

MEASURING VOLTAGE

CAUTION: Refer to Test Probe Caution .

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The following procedure measures the voltage at a selected point in a circuit.

1. Disconnect the electrical harness connector for the circuit being tested, if necessary.
2. Enable the circuit and/or system being tested. Use the following methods:
    - Turn ON the ignition, with the engine OFF.
    - Turn ON the engine.
    - Turn ON the circuit and/or system with a scan tool in Output Controls.
    - Turn ON the switch for the circuit and/or system being tested.
3. Select the V (AC) or V (DC) position on the DMM.
4. Connect the positive lead of the DMM to the point of the circuit to be tested.
5. Connect the negative lead of the DMM to a good ground.
6. The DMM displays the voltage measured at that point.

MEASURING VOLTAGE DROP

CAUTION: Refer to Test Probe Caution .

The following procedure determines the difference in voltage potential between 2 points.

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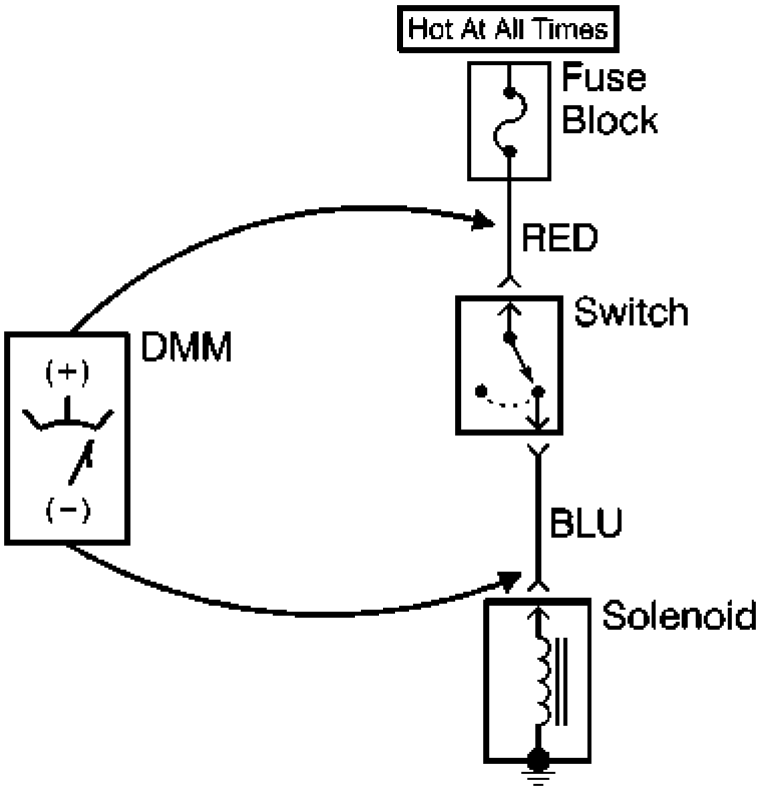


Fig. 2: Measuring Voltage Drop
Courtesy of GENERAL MOTORS CORP.

1. Set the rotary dial of the DMM to the V (DC) position.
2. Connect the positive lead of the DMM to one point of the circuit to be tested.
3. Connect the negative lead of the DMM to the other point of the circuit.
4. Operate the circuit.
5. The DMM displays the difference in voltage between the 2 points.

MEASURING FREQUENCY

CAUTION: Refer to Test Probe Caution .

The following procedure determines the frequency of a signal.

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NOTE: Connecting the DMM to the circuit before pressing the Hz button will allow the DMM to autorange to an appropriate range.

1. Apply power to the circuit.
2. Set the rotary dial of the DMM to the V (AC) position.
3. Connect the positive lead of the DMM to the circuit to be tested.
4. Connect the negative lead of the DMM to a good ground.
5. Press the Hz button on the DMM.
6. The DMM will display the frequency measured.

TESTING FOR CONTINUITY

CAUTION: Refer to Test Probe Caution .

The following procedures verify good continuity in a circuit.

With a Digital Multimeter (DMM)

1. Set the rotary dial of the DMM to the ohms position.
2. Disconnect the power feed (i.e. fuse, control module) from the suspect circuit.
3. Disconnect the load.
4. Press the MIN MAX button on the DMM.
5. Connect one lead of the DMM to one end of the circuit to be tested.
6. Connect the other lead of the DMM to the other end of the circuit.
7. If the DMM displays low or no resistance, the circuit has good continuity.

With a Test Lamp

NOTE: Only use the test lamp procedure on low impedance power and ground circuits.

1. Remove the power feed (i.e. fuse, control module) from the suspect circuit.
2. Disconnect the load.
3. Connect one lead of the test lamp to one end of the circuit to be tested.
4. Connect the other lead of the test lamp to battery positive voltage.
5. Connect the other end of the circuit to ground.
6. If the test lamp illuminates (full intensity), then the circuit has good continuity.

TESTING FOR SHORT TO GROUND

CAUTION: Refer to Test Probe Caution .

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The following procedures test for a short to ground in a circuit.

With a Digital Multimeter (DMM)

1. Remove the power feed (i.e. fuse, control module) from the suspect circuit.
2. Disconnect the load.
3. Set the rotary dial of the DMM to the ohms position.
4. Connect one lead of the DMM to one end of the circuit to be tested.
5. Connect the other lead of the DMM to a good ground.
6. If the DMM does NOT display infinite resistance (OL), there is a short to ground in the circuit.

With a Test Lamp

1. Remove the power feed (i.e. fuse, control module) from the suspect circuit.
2. Disconnect the load.
3. Connect one lead of the test lamp to battery positive voltage.
4. Connect the other lead of the test lamp to one end of the circuit to be tested.
5. If the test lamp illuminates, there is a short to ground in the circuit.

Fuse Powering Several Loads

1. Review the system schematic and locate the fuse that is open.
2. Open the first connector or switch leading from the fuse to each load.
3. Connect a DMM across the fuse terminals (be sure that the fuse is powered).
    - When the DMM displays voltage the short is in the wiring leading to the first connector or switch.
    - If the DMM does not display voltage refer to the next step.
4. Close each connector or switch until the DMM displays voltage in order to find which circuit is shorted.

TESTING FOR A SHORT TO VOLTAGE

CAUTION: Refer to Test Probe Caution .

The following procedure tests for a short to voltage in a circuit.

1. Remove the power feed (i.e. fuse, control module) from the suspect circuit.
2. Disconnect the load.
3. Set the rotary dial of the DMM to the V (DC) position.
4. Connect the positive lead of the DMM to one end of the circuit to be tested.
5. Connect the negative lead of the DMM to a good ground.

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6. Turn ON the ignition and operate all accessories.
7. If the voltage measured is greater than 1 V, there is a short to voltage in the circuit.

TESTING FOR INTERMITTENT CONDITIONS AND POOR CONNECTIONS

Special Tools

EL-35616 Terminal Test Probe Kit

For equivalent regional tools, refer to **Special Tools** .

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- Poor terminal to wire connection-Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to **Testing for Electrical Intermittents** for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to **Scan Tool Snapshot Procedure** for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since

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vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add Nyogel lubricant 760G (dielectric grease) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the EL-35616 when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use EL-35616-35 to test for proper terminal contact. Failure to use EL-35616-35 can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal / terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire (Dock and Lock) Connectors

There are no serviceable parts for flat wire (dock and lock) connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

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1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter from the on the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Ensure that the circuit can carry the current necessary to operate the component. Refer to **Circuit Testing** and **Power Distribution Schematics** .
- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point. Inspect the connections at the component and in splice packs, where applicable. Ensure that the circuit can carry the current necessary to operate the component. Refer to **Circuit Testing** and **Ground Distribution Schematics** .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
  - High ambient temperatures
  - Underhood/engine generated heat
  - Circuit generated heat due to a poor connection, or high electrical load
  - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
  - Low ambient temperatures-In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
  - The condition only occurs on a cold start.
  - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature

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related.

- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A misrouted harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc.-These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch-These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Improper installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc.-These accessories may lead to interference while in use, but do not fail when the accessories are not in use. Refer to **Checking Aftermarket Accessories**.
- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
  - A new service control module is installed.
  - A control module from another vehicle is installed.
  - Revised software/calibration files have been released for this vehicle.

NOTE: DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to **Control Module References** for replacement, setup, and programming.

INDUCING INTERMITTENT FAULT CONDITIONS

Special Tools

J-25070: Heat Gun

For equivalent regional tools, refer to **Special Tools** .

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Many intermittent open or shorted circuits are affected by harness/connector movement that is caused by vibration, engine torque, bumps/rough pavement, etc. In order to duplicate the customer's concern, it may be necessary to manipulate the wiring harness if the malfunction appears to be vibration related. Manipulation of a circuit can consist of a wide variety of actions, including:

- Wiggling the harness
- Disconnecting a connector and reconnecting
- Stressing the mechanical connection of a connector
- Pulling on the harness or wire in order to identify a separation/break inside the insulation
- Relocating a harness or wires

All these actions should be performed with some goal in mind. For instance, with a scan tool connected, wiggling the wires may uncover a faulty input to the control module. The snapshot option would be appropriate here. Refer to **Scan Tool Snapshot Procedure**. Another option is, with the component commanded ON and OFF by the scan tool, move related connectors and wiring and observe the component operation. With the engine running, move related connectors and wiring while monitoring engine operation. If harness or connector movement affects the data displayed, component/system operation, or engine operation, inspect and repair the harness/connections as necessary.

You may need to load the vehicle in order to duplicate the concern. This may require the use of weights, floor jacks, jackstands, frame machines, etc. In these cases you are attempting to duplicate the concern by manipulating the suspension or frame. This method is useful in finding harnesses that are too short and their connectors pull apart enough to cause a poor connection. A DMM set to Peak Min/Max mode and connected to the suspect circuit while testing can yield desirable results. Refer to **Testing for Electrical Intermittents**.

Certainly, using the senses of sight, smell, and hearing while manipulating the circuit can provide good results as well.

There may be instances where circuit manipulation alone will not meet the required criteria for the fault condition to appear. In such cases it may be necessary to expose the suspect circuit to other conditions while manipulating the harness. Such conditions would include high moisture conditions, along with exceptionally high or low temperatures. The following discusses how to expose the circuit to these kinds of conditions.

Salt Water Spray

Some compounds possess the ability to conduct electricity when dissolved in water such as ordinary salt. By mixing table salt with water in sufficient quantities, you can enhance the conductive properties of water so that any circuit which may be sensitive to moisture will more readily fail when liberally sprayed with this mixture.

Mixing 0.35L (12 oz) of water with approximately 1 tablespoon of salt will yield a salt solution of 5 percent. Fill a normal spray bottle with this mixture. This mixture is sufficient to enhance the water's own conductivity. This may cause the circuit to fail more easily when sprayed. Once the mixture is completed, spray the suspect area liberally with the solution. Then, while monitoring either a scan tool or DMM, manipulate the harness as discussed previously.

High Temperature Conditions

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If the complaint tends to be heat related, you can simulate the condition using the **J-25070:** heat gun.

Using the heat gun, you can heat up the suspected area or component. Manipulate the harnesses under high temperature conditions while monitoring the scan tool or DMM to locate the fault condition.

The high temperature condition may be achieved simply by test driving the vehicle at normal operating temperature. If a heat gun is unavailable, consider this option to enhance your diagnosis. This option does not allow for the same control, however.

Low Temperature Conditions

Depending on the nature of the fault condition, placing a fan in front of the vehicle while the vehicle is in the shade can have the desired effect.

If this is unsuccessful, use local cooling treatments such as ice or a venturi type nozzle (one that provides hot or cold air). This type of tool is capable of producing air stream temperatures down to -18°C (0°F) from one end and +71°C (160°F) from the other. This is ideally suited for localized cooling needs.

Once the vehicle, component, or harness has been sufficiently cooled, manipulate the harness or components in an effort to duplicate the concern.

Duplicating Failure Conditions

- If none of the previous tests are successful, attempt to duplicate and/or capture the failure conditions.
- Freeze Frame/Failure Records data, where applicable, contains the conditions that were present when the DTC set.
    1. Review and record Freeze Frame/Failure Records data.
    2. Clear the DTCs using the scan tool.
    3. Turn the key to OFF and wait 15 seconds.
    4. Operate the vehicle under the same conditions that were noted in Freeze Frame/Failure Records data, as closely as possible. The vehicle must also be operating within the Conditions for Running the DTC. Refer to Conditions for Running the DTC in the supporting text if a DTC is being diagnosed.
    5. Monitor DTC Status for the DTC being tested. The scan tool will indicate Ran, when the enabling conditions have been satisfied long enough for the DTC to run. The scan tool will also indicate whether the DTC passed or failed.
- An alternate method is to drive the vehicle with the DMM connected to a suspected circuit. An abnormal reading on the DMM when the concern occurs, may help you locate the concern.

TESTING FOR ELECTRICAL INTERMITTENTS

Special Tools

EL-39200 Digital Multimeter

For equivalent regional tools, refer to **Special Tools** .

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Perform the following procedures while wiggling the harness from side to side. Continue this at convenient points (about 6 inches apart) while watching the test equipment.

- **Testing for Short to Ground**
- **Testing for Continuity**
- **Testing for a Short to Voltage**

If the fault is not identified, perform the procedure below using the MIN MAX feature on the EL-39200 DMM. This feature allows you to manipulate the circuit without having to watch the EL-39200. The EL-39200 will generate an audible tone when a change is detected.

NOTE: The EL-39200 must be used in order to perform the following procedure since the EL-39200 can monitor current, resistance or voltage while recording the minimum (MIN), and maximum (MAX) values measured.

1. Connect the EL-39200 to both sides of a suspected connector (still connected), or from one end of a suspected circuit to the other. Refer to **Troubleshooting with a Digital Multimeter** for information on connecting the EL-39200 to the circuit.
2. Set the rotary dial of the EL-39200 to the V (AC) or V (DC) position.
3. Press the range button of the EL-39200 in order to select the desired voltage range.
4. Press the MIN MAX button of the EL-39200. The EL-39200 displays 100 ms RECORD and emits an audible tone (beep).

   NOTE: The 100 ms RECORD mode is the length of time an input must stay at a new value in order to record the full change.

5. Simulate the condition that is potentially causing the intermittent connection, either by wiggling the connections or the wiring, test driving, or performing other operations. Refer to **Inducing Intermittent Fault Conditions**.
6. Listen for the audible Min Max Alert which indicates that a new minimum or maximum value has been recorded.
7. Press the MIN MAX button once in order to display the MAX value and note the value.
8. Press the MIN MAX button again in order to display the MIN value and note the value.
9. Determine the difference between the MIN and MAX values.
   - If the variation between the recorded MIN and MAX voltage values is 1 V or greater an intermittent open or high resistance condition exists. Repair the condition as necessary.
   - If the variation between the recorded MIN and MAX voltage values is less than 1 V, an intermittent open or high resistance condition does not exist.

SCAN TOOL SNAPSHOT PROCEDURE

Using Snapshots in Global Diagnostic System (GDS)

Overview

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A snapshot is a recording of what a control module on the vehicle was receiving for information while the snapshot is being made. A snapshot may be used to analyze the data during the time a vehicle condition is current. This allows you to concentrate on making the condition occur, rather than trying to view all the data in anticipation of the fault. To record a snapshot in GDS, select, Record Snapshot, from the options at the top right portion of any of the various pages that allow snapshots to be taken (e.g. Data Display, Control Functions, etc.). When you are finished recording, select, Stop Snapshot recording. The snapshot will now be available for replay.

Snapshot Replay

The Snapshot Replay function allows reviews of previously recorded vehicle snapshot data. This information can be used in analysis of vehicle problems and detection of trigger error conditions. The graph function can be used to compare parameters to see if a component is functioning properly. Recorded snapshots can be selected for viewing by the following three methods:

- Selecting a snapshot file from the Vehicle Home Page and clicking on the Review selection.
- Double clicking on the selected snapshot from the Vehicle Home Page.
- Entering the Tools selection from the Menu selection and selecting Snapshot replay. Next, open the Snapshot Manager. Double click on the snapshot file you wish to view or click on the Load Snapshot selection and select a snapshot file.

Regardless of selection method, a File Loaded pop-up window will be displayed from the Snapshot Replay screen. Select OK from the pop-up window.

Snapshot Play Functions

There are several snapshot play functions that are used to replay recorded snapshots

- The Play function is used to play the snapshot forward by clicking on this selection. A marker will move across the screen when this selection is used. All selections in this area turn grey when they are active.
- The Pause function is used to pause play of the snapshot. When this selection is clicked a second time the snapshot will start playing where it left off.
- The Stop function is used to stop playing the snapshot. The snapshot will start from the beginning, if Play is selected after using the Stop function.

Time Control

Time control is used to control the snapshot replay. This function allows selection of a specific time frame, display of different views, and control of display speed. The following functions can be selected directly under Time Control.

- The Bookmark selection allows you to add a specific comment in the current display and return to this point in the future. When this option is selected, a pop-up window is displayed. Enter a bookmark name and select OK.
- The Note Pad can be selected to add comments to the snapshot replay file at the current point of time. When this option is selected, a pop-up window is displayed. Enter a comment for the snapshot file and select OK.

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- The Load Snapshot (blue folder) opens a snapshot file and makes it ready for further analysis. This function is also available by clicking on an available snapshot file from the Snapshot Manager.
- The Down Arrow displays all Time Control options when selected. Individual options can also be selected by clicking on the item you want.
- The Snapshot Display Speed can be controlled by selecting this option. Slow speeds of 1/8X, 1/4X, and 1/2X can be selected. The real time speed can also be selected at 1. Faster speeds of 2X, 4X, and 8X can also be obtained by using this selection.

View Selections

Each View Selection provides a different way of displaying vehicle data for analysis. The following functions can be selected under Available Views:

NOTE: The parameter name will be shown in the original language used for capture if no translation is available for the name.

- Parameter List View - Displays incoming information from the snapshot file. The current value of the parameters is displayed on the screen.
- Log View - Contains all the information from the snapshot file. All parameter values are listed in the order they were recorded. Specific parameters can be added or removed from a watchlist by clicking on the appropriate item.
- State View - Shows the values of all parameters in a specific time frame. These values can be used for comparison with the trigger view.
- Trigger View - Displays all system and user defined triggers. This function can be used when there is a combination of factors involved in a diagnostic problem. When a Trigger condition is met a caution triangle will be displayed on the screen.

Triggers:

- Load Triggers - Allows you to load a file containing trigger definitions.
- Save Triggers - Allows you to save the trigger to your computer's hard drive.
- Remove Trigger - Allows you to remove the current trigger. It will no longer be present.
- Edit Trigger - Displays a pop-up window where you can modify the limits and parameters contained within a trigger.
- Adds Trigger - Displays a pop-up window to configure a trigger.
- DTC View - After the Play function is selected and this option is selected this function opens the list of recorded DTCs.
- Line Graph View - Displays data that can be visualized against the time-axis. From this view, specific parameters can be selected for graphing by checking the box under Selected. At the bottom of the graph there are four functions Zoom In (increase size), Zoom Out (decrease size), Bookmarks, and Pause Scrolling. Each of these functions can be accessed by clicking on them.

CIRCUIT PROTECTION - FUSES

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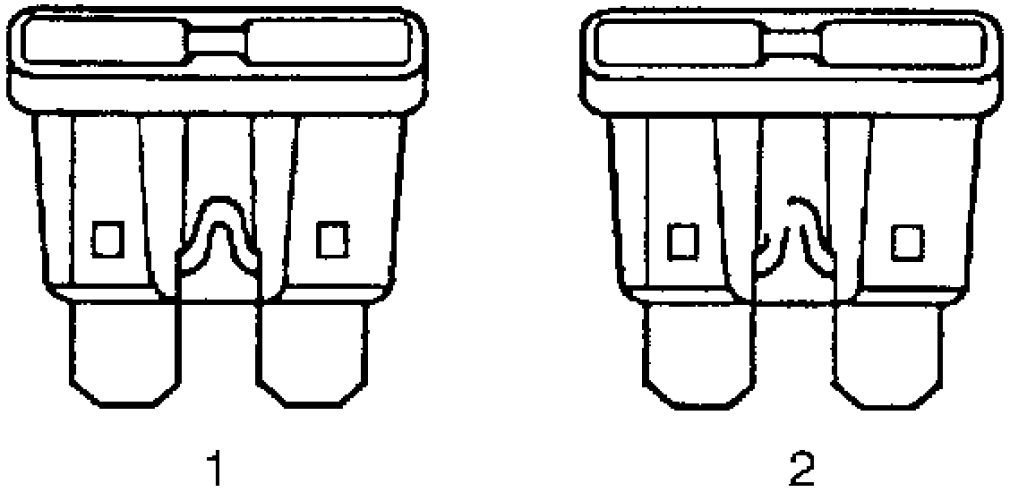


Fig. 3: Identifying Open Fuse Element
Courtesy of GENERAL MOTORS CORP.

The fuse is the most common method of an automotive wiring circuit protection. Whenever there is an excessive amount of current flowing through a circuit the fusible element will melt and create an open or incomplete circuit. Fuses are a one time protection device and must be replaced each time the circuit is overloaded. To determine if a fuse is open, remove the suspected fuse and examine the element in the fuse for an open (2). If not broken (1), also check for continuity using a DMM or a continuity tester. If the element is open or continuity is suspect, replace the fuse with one of equal current rating.

Fuse Types

Current Rating Amperes	Color
Auto Fuses, Mini Fuses	
2	Gray
3	Violet
5	Tan
7.5	Brown
10	Red
15	Blue
20	Yellow
25	White or Natural
30	Green
Maxi Fuses	
20	Yellow

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30	Light Green
40	Orange or Amber
60	Blue
50	Red
J-Case Fuses	
20	Blue
30	Pink
40	Green
50	Red
60	Yellow

CIRCUIT PROTECTION - CIRCUIT BREAKERS

A circuit breaker is a protective device that is designed to open the circuit when a current load is in excess of the rated breaker capacity. If there is a short or other type of overload condition in the circuit, the excessive current will open the circuit between the circuit breaker terminals. Two types of circuit breakers are used.

Circuit Breaker

This type opens when excessive current passes through it for a period of time. It closes again after a few seconds, and if the cause of the high current is still present, it will open again. The circuit breaker will continue to cycle open and closed until the condition causing the high current is removed.

Positive Temperature Coefficient (PTC) Circuit Breaker

This type greatly increases its resistance when excessive current passes through it. The excessive current heats the PTC device, as the device heats its resistance increases. Eventually the resistance gets so high that the circuit is effectively open. Unlike the ordinary circuit breaker the PTC unit will not reset until the circuit is opened, by removing the voltage from its terminals. Once the voltage is removed the circuit breaker will re-close within a second or 2.

CIRCUIT PROTECTION - FUSIBLE LINKS

Fusible link is wire designed to melt and break continuity when excessive current is applied. It is often located between or near the battery and starter or electrical center. Use a continuity tester or a DMM at each end of the wire containing the fusible link in order to determine if it is broken. If broken, it must be replaced with fusible link of the same gauge size.

Repairing a Fusible Link

NOTE: Fusible links cut longer than 225 mm (approximately 9 in) will not provide sufficient overload protection.

WIRING REPAIRS

The Wiring Repairs section contains the following types of wiring repair information. Using these elements

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together will make wiring repair faster and easier:

- **Testing for Intermittent Conditions and Poor Connections**
- **Flat Wire Repairs**
- **GMLAN Wiring Repairs**
- **High Temperature Wiring Repairs**
- **Heated Oxygen Sensor Wiring Repairs**
- **Splicing Copper Wire Using Splice Sleeves**
- **Splicing Twisted or Shielded Cable**
- **Splicing Inline Harness Diodes**
- **SIR/SRS Wiring Repairs**

REPAIRING DAMAGED WIRE INSULATION

If the conductive portion of the wire is not damaged, locate the problem and apply tape around the wire. If the damage is more extensive, replace the faulty segment of the wire. Refer to **Splicing Copper Wire Using Splice Sleeves** and follow the instruction to repair the wire.

Wire Size Conversion

Metric Wire Sizes (mm 2)	AWG Sizes
0.13	26
0.21	24
0.32	22
0.52	20
0.83	18
1.31	16
2.09	14
3.31	12
5.27	10
8.37	8
13.3	6
21.2	4
33.6	2
53.5	1/0

FLAT WIRE REPAIRS

The flat wire within the flex wiring harness is not serviceable. If an open or short exists within the flex wiring harness the complete harness must be replaced.

GMLAN WIRING REPAIRS

Special Tools

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- **EL-38125-10:** Splice Sleeve Crimping Tool
- **J 38125-5:** Ultra Torch Special Tool
- DuraSeal splice sleeves
- A wire stripping tool

For equivalent regional tools, refer to **Special Tools** .

The DuraSeal splice sleeves have the following 2 critical features:

- A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.
- A cross hatched (knurled) core crimp provides necessary contact integrity for the sensitive, low energy circuits.

The GM Local Area Network (GMLAN) System requires special wiring repair procedures due to the sensitive nature of the circuitry. Follow the specific procedures and instructions when working on GMLAN connectors and terminals.

GMLAN Repairs

NOTE: When making a repair to any GMLAN network, the original wire length after the repair must be the same length as before the repair. If the network is a twisted pair, the twist must be maintained after the repair is completed.

GMLAN has 2 types of networks, low speed and high speed. Low speed GMLAN has a single wire and works at slow speeds. High speed GMLAN has 2 wires in a twisted pair and works at higher speeds. For more information on GMLAN, refer to **Data Link Communications Description and Operation** .

GMLAN Connector Terminal Repair

NOTE: A terminated lead can be used to replace damaged connector terminals for both high speed and low speed GMLAN systems. When making a connector terminal repair on a GMLAN high speed system with twisted pair wires, do not untwist the wires more than necessary to make the repair.

If the individual terminals are damaged on any GMLAN connection, use the appropriate connector repair procedure in order to repair the terminal. Refer to **Connector Repairs** for the appropriate connector repair procedure.

GMLAN Wire Repair

NOTE: Refer to Wiring Repairs in order to determine the correct wire size for the circuit you are repairing. You must obtain this information in order to ensure circuit integrity.

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If any wire except the pigtail is damaged, repair the wire by splicing in a new section of wire of the same gauge size (0.5 mm, 0.8 mm, 1.0 mm etc.). Use the DuraSeal splice sleeves and **EL-38125-10:** tool. Use the following wiring repair procedures in order to ensure the integrity of the DuraSeal splice sleeves.

Splice Sleeve Color	Crimp Tool Nest Color	Wire Gauge mm^2 / (AWG)
Salmon (Yellow-Pink) 12089189	Red (1)	0.035-0.8/(18-20)
Blue 12089190	Blue (2)	1-2/(14-16)
Yellow 12089191	Yellow (3)	3-5/(10-12)
Green 88988379	Red (1)	0.22-0.35/(22-26)

NOTE: **You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.**

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
   - Strip approximately 7.5 mm (0.313 in) of insulation from each wire to be spliced.
   - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
   - If the wire is damaged, repeat this procedure after removing the damaged section.
4. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

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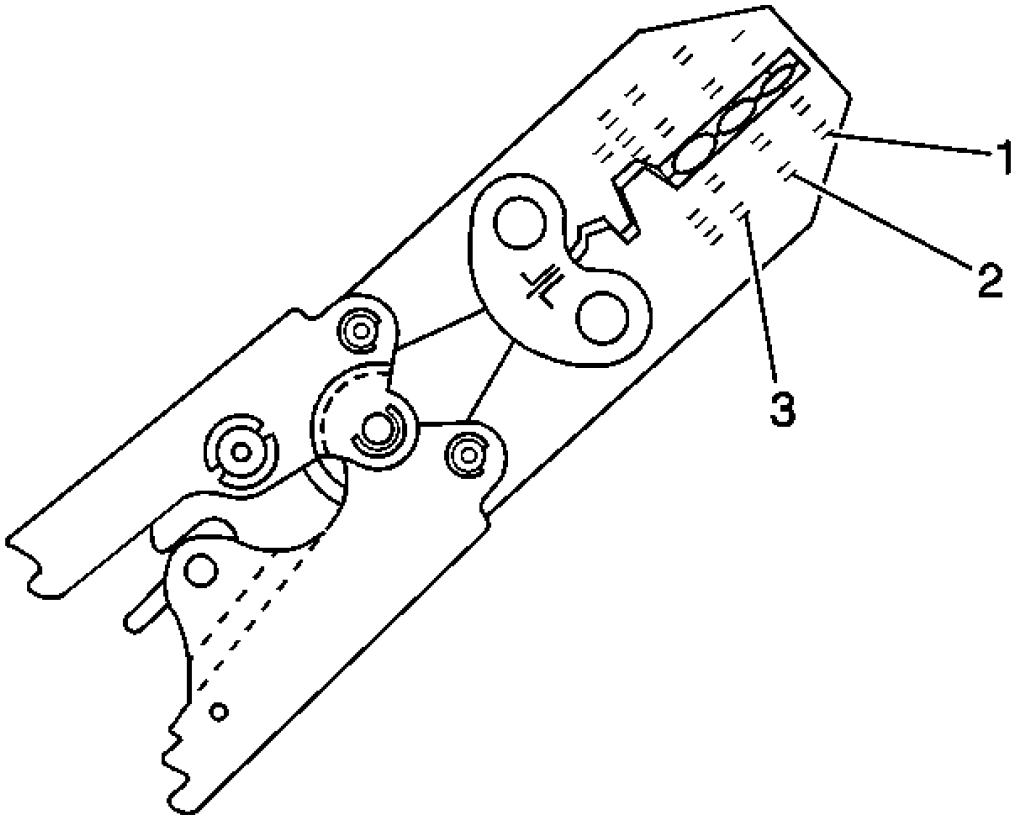


Fig. 4: Identifying Splice Crimp Tool Nests
Courtesy of GENERAL MOTORS CORP.

5. Use the **EL-38125-10:** tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. The crimp tool has four nests, one for each color.

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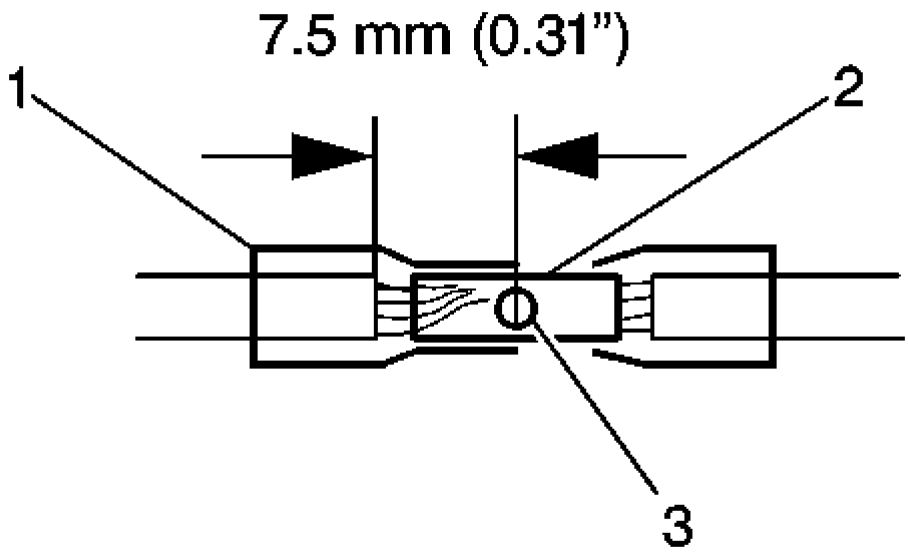


Fig. 5: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

6. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 6: Identifying Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

7. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop.

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8. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 5 for the opposite end of the splice.



Fig. 7: Identifying Heated Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

9. Using the heat torch, apply heat to the crimped area of the barrel.
10. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

HIGH TEMPERATURE WIRING REPAIRS

Special Tools

- **EL-38125-10:** Splice Sleeve Crimping Tool
- **J 38125-5:** Ultra Torch
- DuraSeal splice sleeves, in order to repair the SIR/SRS wiring

For equivalent regional tools, refer to **Special Tools** .

High Temperature Wiring

Wiring that is exposed to high temperatures, 135°C (275°F) or higher, for prolonged periods of time may use materials i.e. wires, connectors, and shielding that has a higher heat rating than typical wiring. When making a repair in a high temperature area observe the following:

- Use high temperature bulk wire rated at 150°C (302°F) continuous temperature to replace any damaged wire.
- Replace any heat shielding that is removed.
- Cover any DuraSeal splice sleeves with SCT1 shrink tubing.

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- After making a wiring repair, ensure that the location of the wiring is not moved closer to the heat source.

Identifying High Temperature Wiring

Wiring that is exposed to high temperature, 135°C (275°F) or higher, for prolonged periods of time need special considerations when making wiring repairs. Areas that may be exposed to higher temperatures can be identified by heat resistant materials that are being used in those areas. These materials may include heat reflective tape, moon tape, and high temperature shrink tubing. Also conduit and other protective coverings may be used. Because conduit or similar coverings are used throughout the vehicle regardless of the temperature, it may be necessary for the technician to determine if an area is exposed to excessive heat before making a wiring repair. Obvious areas of consideration would be any area located near the exhaust manifolds, catalytic converter, and exhaust pipes.

Items Required

- DuraSeal splice sleeves to crimp and seal connections
- High temperature SCT1 shrink tubing to protect the splice sleeves
- Terminated leads or pigtails
- The correct tools to remove the terminals from the connectors

Use high temperature bulk wire rated at 150°C (302°F) continuous temperature of the same or larger gauge size as the original wire when repair damage wire. Also replace any reflective tape that you remove during the repair.

High Temperature Wire Repair

NOTE: Refer to Wiring Repairs in order to determine the correct wire size for the circuit you are repairing. You must obtain this information in order to ensure circuit integrity.

If any wire except the pigtail is damaged, repair the wire by splicing in a new section of wire rated at 150°C (302°F) continuous temperature rating of the same gauge size (0.5 mm, 0.8 mm, 1.0 mm etc.). Use the DuraSeal splice sleeves and the **EL-38125-10:** tool and then encapsulate the splice sleeve using the high temperature SCT1 shrink tubing. Use the following wiring repair procedures in order to ensure the integrity of the sealed splice.

Splice Sleeve Color	Crimp Tool Nest Color	Wire Gauge mm^2 / (AWG)
Salmon (Yellow-Pink) 12089189	Red (1)	0.035-0.8/(18-20)
Blue 12089190	Blue (2)	1-2/(14-16)
Yellow 12089191	Yellow (3)	3-5/(10-12)
Green 88988379	Red (1)	0.22-0.35/(22-26)

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NOTE: **You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.**

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
   - Strip approximately 7.5 mm (0.313 in) of insulation from each wire to be spliced.
   - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
   - If the wire is damaged, repeat this procedure after removing the damaged section.
4. Slide a section of high temperature SCT1 shrink tubing down the length of wire to be spliced. Ensure that the shrink tubing will not interfere with the splice procedure.
5. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

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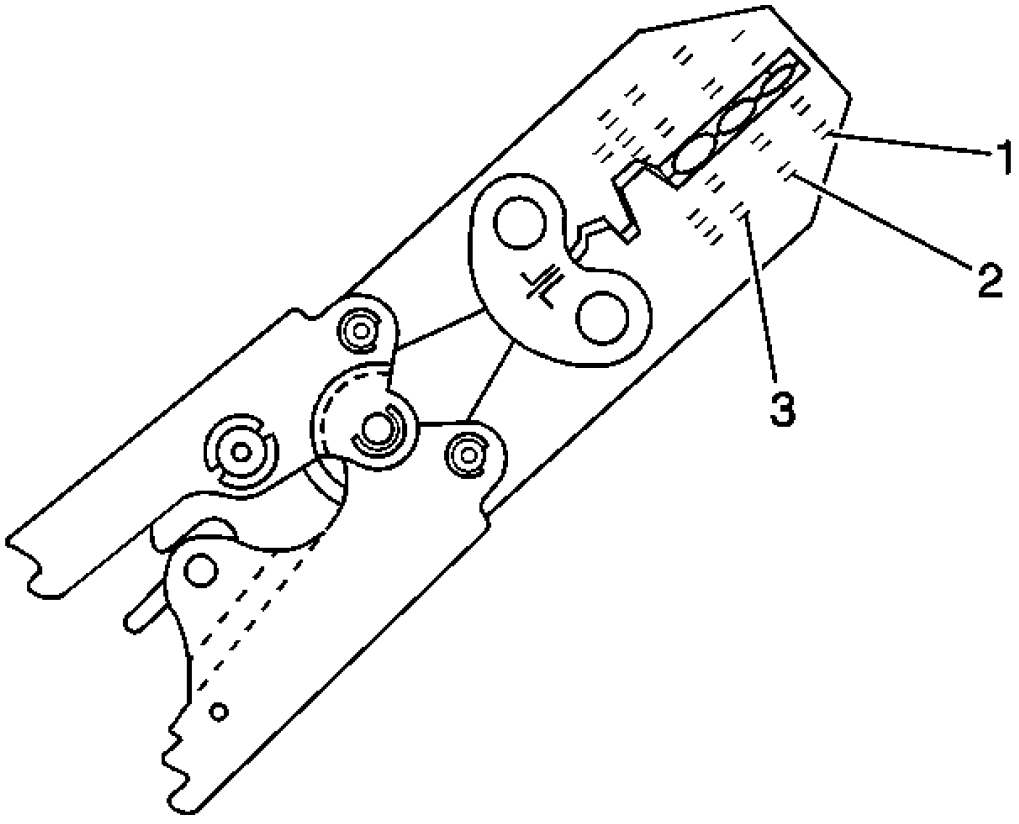


Fig. 8: Identifying Splice Crimp Tool Nests
Courtesy of GENERAL MOTORS CORP.

6. Use the **EL-38125-10:** tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. The crimp tool has four nests, one for each color.

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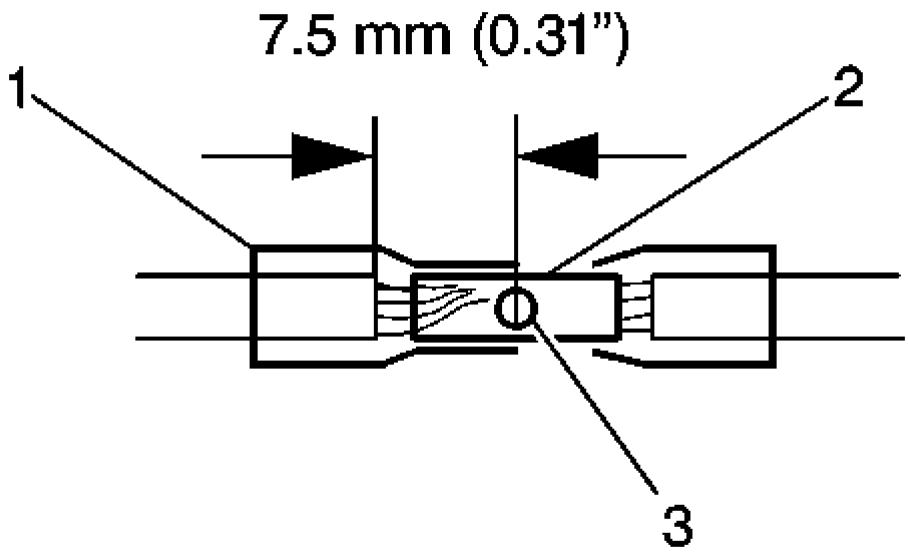


Fig. 9: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

7. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 10: Identifying Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

8. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop.

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9. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 5 for the opposite end of the splice.



Fig. 11: Identifying Heated Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

10. Using the heat torch, apply heat to the crimped area of the barrel.
11. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

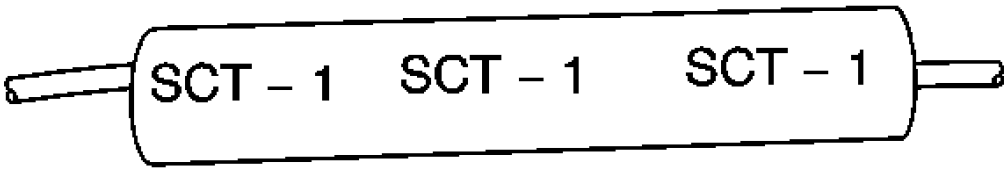


Fig. 12: View Of High Temperature SCT1 Shrink Tube
Courtesy of GENERAL MOTORS CORP.

12. Center the high temperature SCT1 shrink tube over the DuraSeal splice sleeve.
13. Using the heat torch, apply heat to the high temperature heat shrink tubing.
14. Gradually move the heat from the center to the open end of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is

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achieved.

15. Replace any reflective tape and clips that may have been remove during the repair.

HEATED OXYGEN SENSOR WIRING REPAIRS

CAUTION: Do not solder repairs under any circumstances as this could result in the air reference being obstructed.

If the heated oxygen sensor pigtail wiring, connector, or terminal is damaged the entire oxygen sensor assembly must be replaced. Do not attempt to repair the wiring, connector, or terminals. In order for the sensor to function properly it must have a clean air reference. This clean air reference is obtained by way of the oxygen sensor signal and heater wires. Any attempt to repair the wires, connectors or terminals could result in the obstruction of the air reference and degrade oxygen sensor performance.

The following guidelines should be used when servicing the heated oxygen sensor:

- Do not apply contact cleaner or other materials to the sensor or vehicle harness connectors. These materials may get into the sensor, causing poor performance. Also, the sensor pigtail and harness wires must not be damaged in such a way that the wires inside are exposed. This could provide a path for foreign materials to enter the sensor and cause performance problems.
- Neither the sensor nor vehicle lead wires should be bent sharply or kinked. Sharp bends, kinks, etc., could block the reference air path through the lead wire.
- Do not remove or defeat the oxygen sensor ground wire (where applicable). Vehicles that utilize the ground wire sensor may rely on this ground as the only ground contact to the sensor. Removal of the ground wire will also cause poor engine performance.
- To prevent damage due to water intrusion, be sure that the peripheral seal remains intact on the vehicle harness connector.

SPLICING COPPER WIRE USING SPLICE SLEEVES

Special Tools

- **EL-38125-10:** Splice Sleeve Crimping Tool
- **J 38125-5:** Ultra Torch
- DuraSeal splice sleeves, in order to repair the SIR/SRS wiring

For equivalent regional tools, refer to **Special Tools** .

NOTE: Use only DuraSeal splice sleeves. Other splice sleeves may not protect the splice from moisture or provide a good electrical connection.

Use DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except tefzel and coaxial. Use DuraSeal splice sleeves where there is special requirements such as moisture sealing. Follow the instructions below in order to splice copper wire using DuraSeal splice sleeves.

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Splice Sleeve Color	Crimp Tool Nest Color	Wire Gauge mm^2 / (AWG)
Salmon (Yellow-Pink) 12089189	Red (1)	0.35-0.8/(18-20)
Blue 12089190	Blue (2)	1-2/(14-16)
Yellow 12089191	Yellow (3)	3-5/(10-12)
Green 88988379	Red (1)	0.22-0.35/(22-26)

NOTE: You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
   - Strip approximately 7.5 mm (0.313 in) of insulation from each wire to be spliced.
   - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
   - If the wire is damaged, repeat this procedure after removing the damaged section.
4. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

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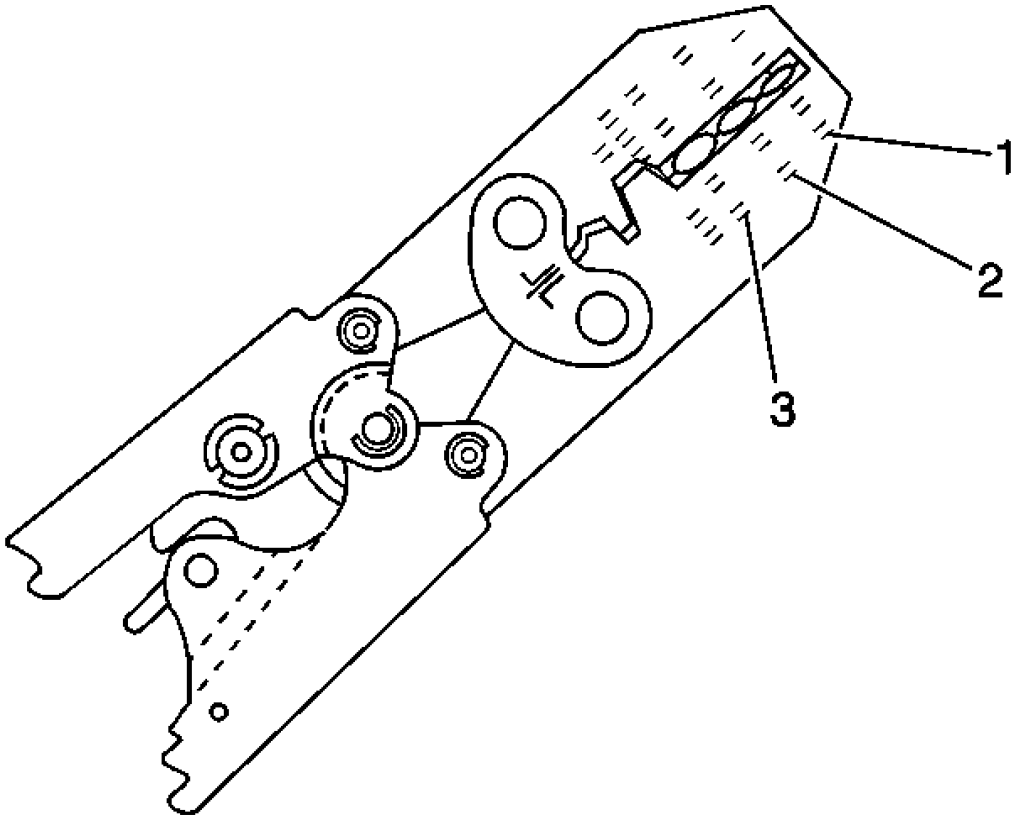


Fig. 13: Identifying Splice Crimp Tool Nests
Courtesy of GENERAL MOTORS CORP.

5. Use the **EL-38125-10:** tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. The crimp tool has four nests, one for each color.

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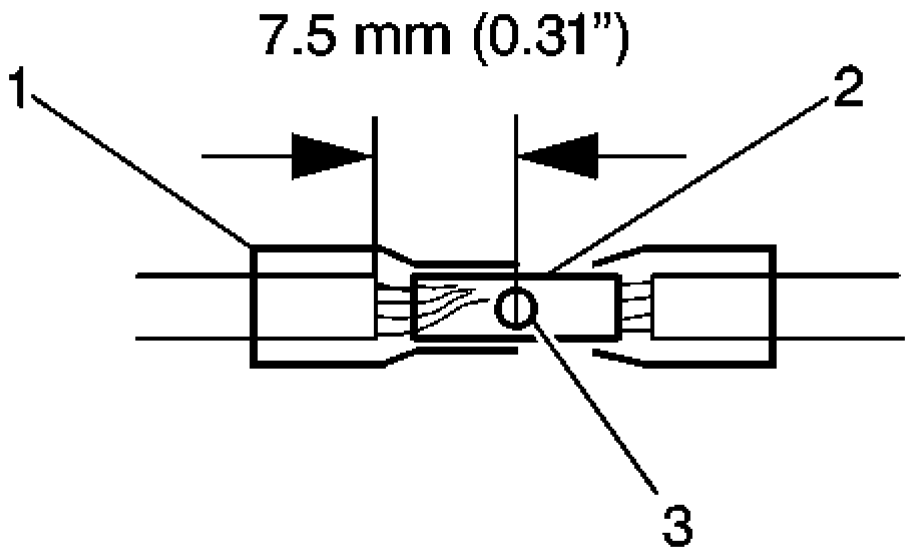


Fig. 14: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

6. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 15: Identifying Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

7. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop.

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8. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 5 for the opposite end of the splice.



Fig. 16: Identifying Heated Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

9. Using the heat torch, apply heat to the crimped area of the barrel.
10. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

SPLICING TWISTED OR SHIELDED CABLE

Twisted/shielded cable is used in order to protect wiring from electrical noise. Two-conductor cable of this construction is used between the radio and the Delco-Bose® speaker/amplifier units and other applications where low level, sensitive signals must be carried. Follow the instructions below in order to repair the twisted/shielded cable.

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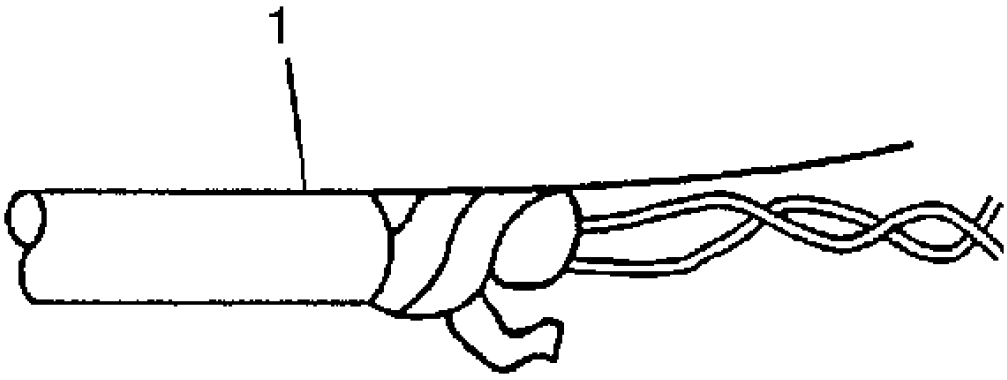


Fig. 17: View Of Outer Wiring Jacket
Courtesy of GENERAL MOTORS CORP.

1. Remove the outer jacket (1). Use care not to cut into the drain wire of the mylar tape.
2. Unwrap the tape. Do not remove the tape. Use the tape in order to rewrap the twisted conductors after the splice is made.



Fig. 18: Identifying Staggered Splices
Courtesy of GENERAL MOTORS CORP.

3. Prepare the splice. Untwist the conductors and follow the instructions for **Splicing Copper Wire Using Splice Sleeves**. Staggering the splices by 65 mm (2.5 in) is recommended.

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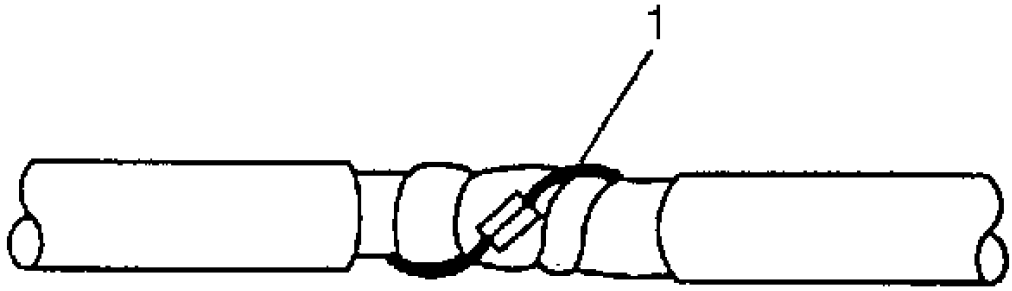


Fig. 19: Identifying Diode On Wire
Courtesy of GENERAL MOTORS CORP.

NOTE: Apply the mylar tape with the aluminum side inward. This ensures good electrical contact with the drain wire.

4. Re-assemble the cable.
   - Rewrap the conductors with the mylar tape. If the mylar tape is damaged, use 3M product AL-36FR to replace the damaged mylar tape.
   - Use caution not to wrap the drain wire in the tape (1).
   - Follow the splicing instructions for copper wire and splice the drain wire.
   - Wrap the drain wire around the conductors and tape with electrical tape to replace the outer insulation.



Fig. 20: View Of Repaired Wire Covered With Electrical Tape
Courtesy of GENERAL MOTORS CORP.

5. Tape over the entire cable. Use a winding motion when you apply the tape.

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SPLICING INLINE HARNESS DIODES

Many vehicle electrical systems use a diode to isolate circuits and protect the components from voltage spikes. When installing a new diode use the following procedure.

1. Open the harness.
   - If the harness is taped, remove the tape.
   - To avoid wiring insulation damage, use a sewing ripper in order to cut open the harness.
   - If the harness has a black plastic conduit, pull out the diode.
2. If the diode is taped to the harness, remove all of the tape.
3. Check and record the current flow direction and orientation of diode.
4. Remove the inoperative diode from the harness with a suitable soldering tool.

   NOTE: If the diode is located next to a connector terminal remove the terminal(s) from the connector to prevent damage from the soldering tool.

5. Carefully strip away a section of insulation next to the old soldered portion of the wire(s). Do not remove any more than is needed to attach the new diode.
6. Check current flow direction of the new diode, being sure to install the diode with correct bias. Reference the appropriate service manual wiring schematic to obtain the correct diode installation position.
7. Attach the new diode to the wire(s) using 60/40 rosin core solder. Before soldering attach some heat sinks (aluminum alligator clips) across the diode wire ends to protect the diode from excessive heat. Follow the manufacturer's instruction for the soldering equipment.
8. Reinstall terminal(s) into the connector body if previously removed.

   NOTE: To prevent shorts to ground and water intrusion, completely cover all exposed wire and diode attachment points with tape.

9. Tape the diode to the harness or connector using electrical tape.

SIR/SRS WIRING REPAIRS

Special Tools

- **EL-38125-10:** Splice Sleeve Crimping Tool
- **J 38125-5:** Ultra Torch
- DuraSeal splice sleeves, in order to repair the SIR/SRS wiring

For equivalent regional tools, refer to **Special Tools** .

The DuraSeal splice sleeves have the following 2 critical features:

- A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.

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- A cross hatched (knurled) core crimp provides the necessary low resistance contact integrity for these sensitive, low energy circuits.

The Supplemental Inflatable Restraint (SIR) System/Supplemental Restraint System (SRS) requires special wiring repair procedures due to the sensitive nature of the circuitry. Follow the specific procedures and instructions when working with the SIR/SRS, and the wiring components, such as connectors and terminals.

SIR/SRS Connector Repair (Plastic Body and Terminal Metal Pin)

NOTE: Do not use the terminals in the kit in order to replace damaged SIR/SRS system terminals. Use either an SIR/SRS pigtail or a terminated lead from the SIR Repair Kit Tray.

The terminals in the SIR/SRS system are made with a special plating. This plating provides the necessary contact integrity for the sensitive, low energy circuits.

Pigtail repair packs are available for SIR/SRS connectors with eight or less terminals. Only the connector body is available for connectors with more than eight terminals. Terminated leads can be used to replace damaged terminals when replacing the connector body.

SIR/SRS Component Wire Pigtail Repair

NOTE: Do not make wire, connector, or terminal repairs on components with wire pigtails.

A wire pigtail is a wire or wires attached directly to the device, not by a connector. If a wiring pigtail is damaged, you must replace the entire component, with pigtail. The inflatable restraint steering wheel module coil is an example of a pigtail component.

SIR/SRS Wire Repair

NOTE: Refer to Wiring Repairs in order to determine the correct wire size for the circuit you are repairing. You must obtain this information in order to ensure circuit integrity.

If any wire except the pigtail is damaged, repair the wire by splicing in a new section of wire of the same gauge size (0.5 mm, 0.8 mm, 1.0 mm etc.). Use the DuraSeal splice sleeves and **EL-38125-10:** tool. Use the following wiring repair procedures in order to ensure the integrity of the DuraSeal splice sleeves.

Splice Sleeve Color	Crimp Tool Nest Color	Wire Gauge mm^2 / (AWG)
Salmon (Yellow-Pink) 12089189	Red (1)	0.035-0.8/(18-20)
Blue 12089190	Blue (2)	1-2/(14-16)
Yellow 12089191	Yellow (3)	3-5/(10-12)

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Green 88988379	Red (1)	0.22-0.35/(22-26)

NOTE: **You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.**

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
   - Strip approximately 7.5 mm (0.313 in) of insulation from each wire to be spliced.
   - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
   - If the wire is damaged, repeat this procedure after removing the damaged section.
4. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

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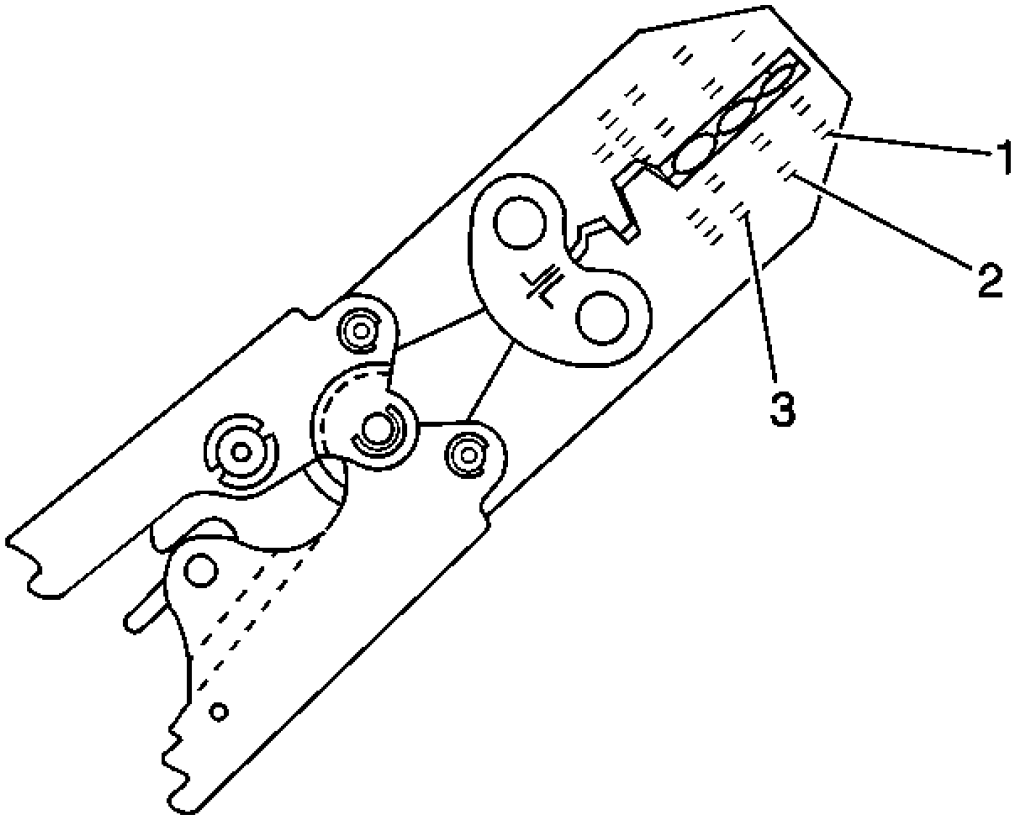


Fig. 21: Identifying Splice Crimp Tool Nests
Courtesy of GENERAL MOTORS CORP.

5. Use the **EL-38125-10:** tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. The crimp tool has four nests, one for each color.

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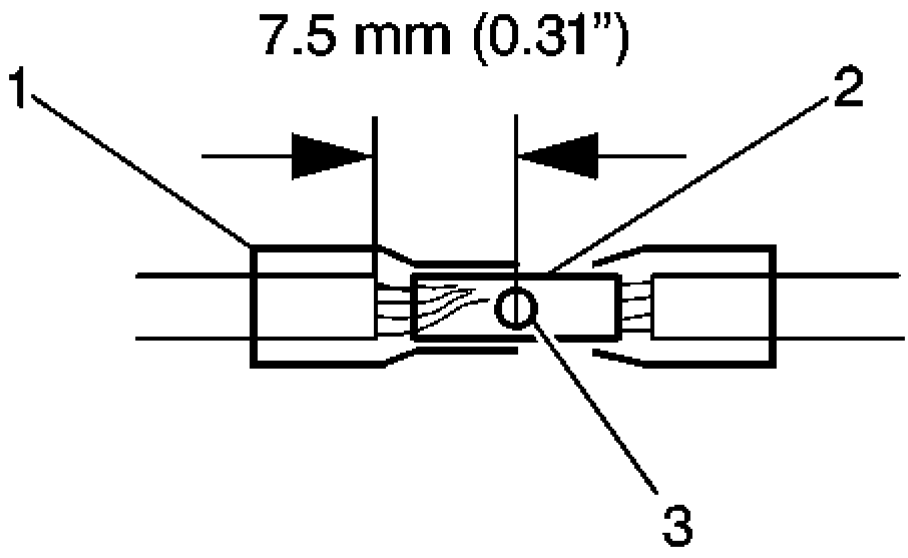


Fig. 22: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

6. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 23: Identifying Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

7. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop.

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8. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 5 for the opposite end of the splice.



Fig. 24: Identifying Heated Splice Sleeve
Courtesy of GENERAL MOTORS CORP.

9. Using the heat torch, apply heat to the crimped area of the barrel.
10. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

Connector Position Assurance (CPA)

The connector position assurance (CPA) is a small plastic insert that fits through the locking tabs of a connector. CPAs are used in all SIR System connectors and also in some connectors of other systems. The CPA ensures that the connector halves cannot vibrate apart. You must have the CPA in place in order to ensure good contact between the mating terminals of a connection.

Terminal Position Assurance (TPA)

The terminal position assurance (TPA) insert resembles the plastic combs used in the control module connectors. The TPA keeps the terminal securely seated in the connector body. Do not remove the TPA from the connector body unless you remove a terminal for replacement.

CONNECTOR REPAIRS

Connector Repairs contains a list of all connector repairs. The connector repairs are listed by the connector manufacturer and then by connector type. If the technician cannot identify the manufacturer of the connector, refer to Identifying Connectors below. Knowing the connector manufacturer will assist in finding the correct connector repair from the following list:

- **Connector Position Assurance Locks**

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- **Terminal Position Assurance Locks**
- **Bosch Connectors (BSK)** or **Bosch Connectors (0.64)** or **Bosch Connectors (2.8 JPT)** or **Bosch Connectors (ECM)**
- **Delphi Connectors (Weather Pack)** or **Delphi Connectors (Push To Seat)** or **Delphi Connectors (Pull To Seat)** or **Delphi Connectors (Micro-Pack 100W)** or **Delphi Connectors (Micro .64)** or **Delphi Connectors (12-Way)**
- **Tyco/AMP Connectors (CM 42-Way)** or **Tyco/AMP Connectors (Sensor)** or **Tyco/AMP Connectors (0.25 Cap)** or **Tyco/AMP Connectors (43-Way)** or **Tyco/AMP Connectors (Door Module)** or **Tyco/AMP Connectors (102-Way Inline)** or **Tyco/AMP Connectors (Seat)** or **Tyco/AMP Connectors (SIR)**
- **Yazaki Connectors (2-Way)** or **Yazaki Connectors (16-Way)**
- **Repairing Connector Terminals**

Connector Anatomy

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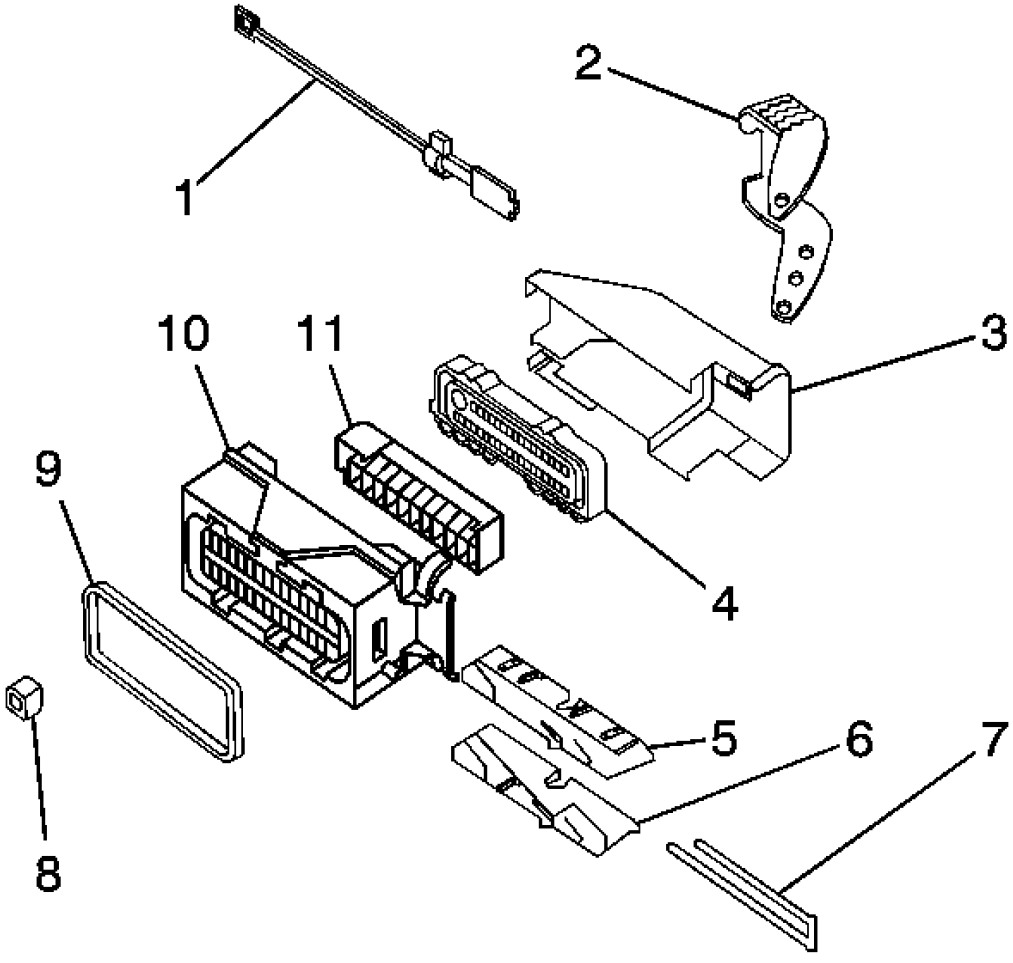


Fig. 25: Connector Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Connector Positive Assurance (CPA)
2	Assist Lever
3	Wiredress Cover
4	Seal Strain/Relief
5	Slide Left Hand
6	Slide Right Hand
7	Terminal Positive Assurance (TPA)
8	Terminal Positive Assurance (TPA)

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9	Connector Seal
10	Connector Housing
11	Inner Connector

Identifying Connectors

Knowing the connector manufacturer is helpful when trying to locating the correct connector repair procedure. There are many different connector designs used on GM vehicles and it is sometimes difficult to identify the connector manufacturer. The information in this document should help with the identification of connector manufactures.

The following connector manufacturers make most of the connectors found in GM vehicles:

- AFL/EPC (Alcoa Fujikura Ltd./Engineered Plastics Components)
- Bosch
- Delphi
- FCI (Framatome Connectors International)
- JAE (Japan Aviation Electronics)
- JST (Japan Solderless Terminals)
- Kostel
- Molex
- Sumitomo
- Tyco/AMP
- Yazaki

Identifying the manufacturer of a connector is often difficult. When trying to determine the manufacturer of a connector, look for specific identifying marks that are unique to that connector supplier. Most of these identify marks are hard to find or see. Check the connector carefully and refer to the information below for pictures and descriptions of connector identification markings.

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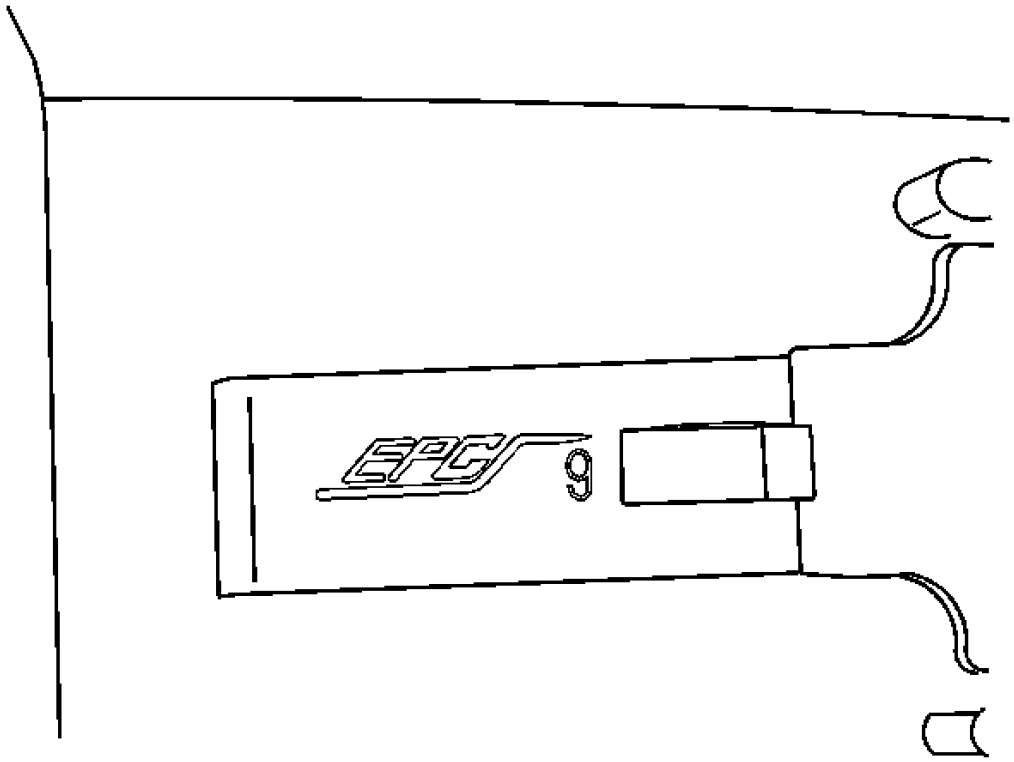


Fig. 26: View Of EPC Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- Most of AFLs connectors have EPC on their connector body. Some of the smaller connectors will not have any markings on them.

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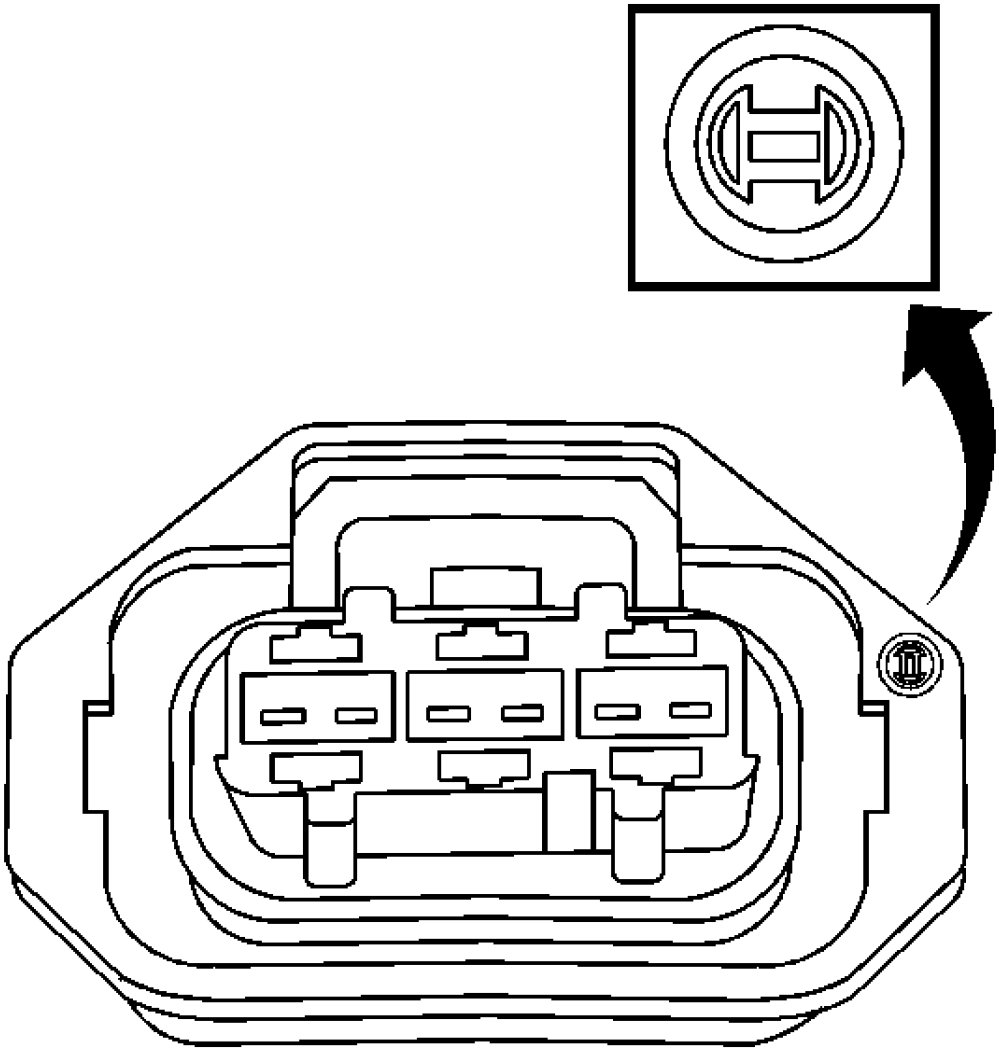


Fig. 27: View Of Bosch Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- In some cases Bosch will actually be printed on the connector. If Bosch does not appear on the connector, look for the Bosch logo. The Bosch logo is a circle with a blunted arrow inside. This logo can appear anywhere on the connector and is often very small.

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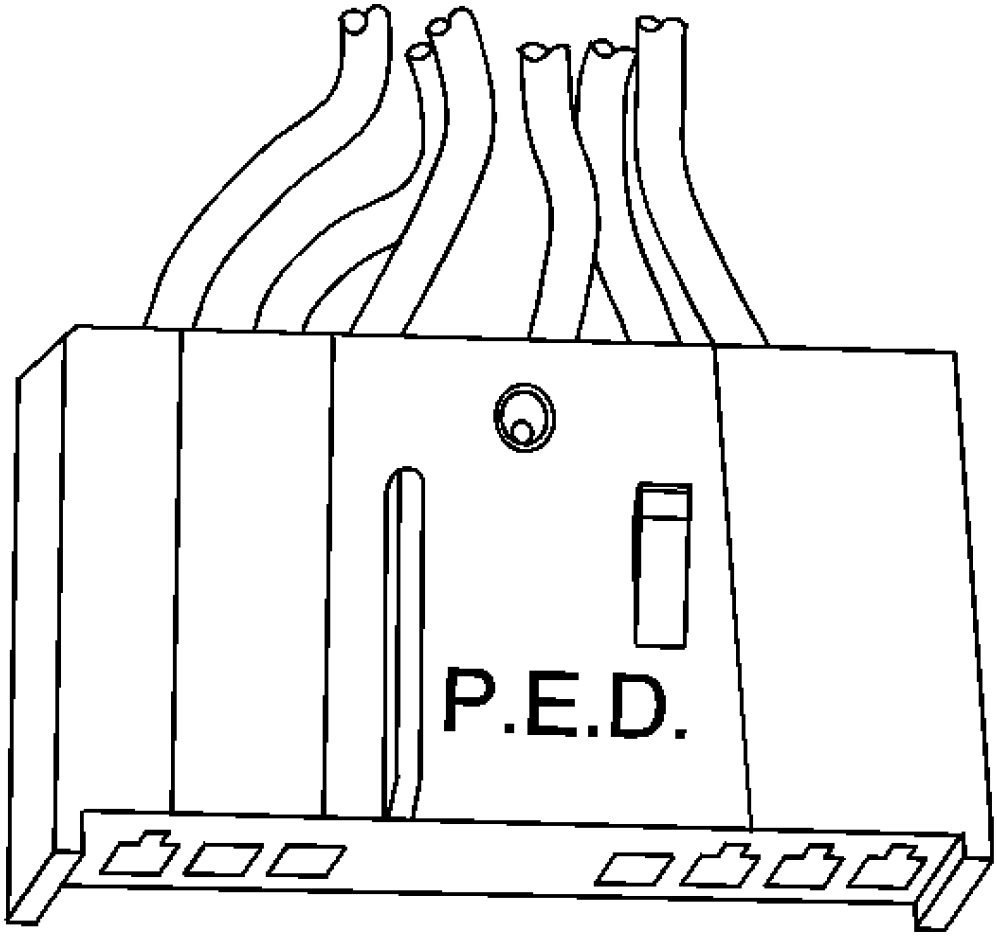


Fig. 28: View Of PED Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- In some cases Delphi will actually be printed on the connector. If Delphi is not printed on the connector, look for PED. In both cases there is no specific orientation for Delphi or PED and they can appear anywhere on the connector.

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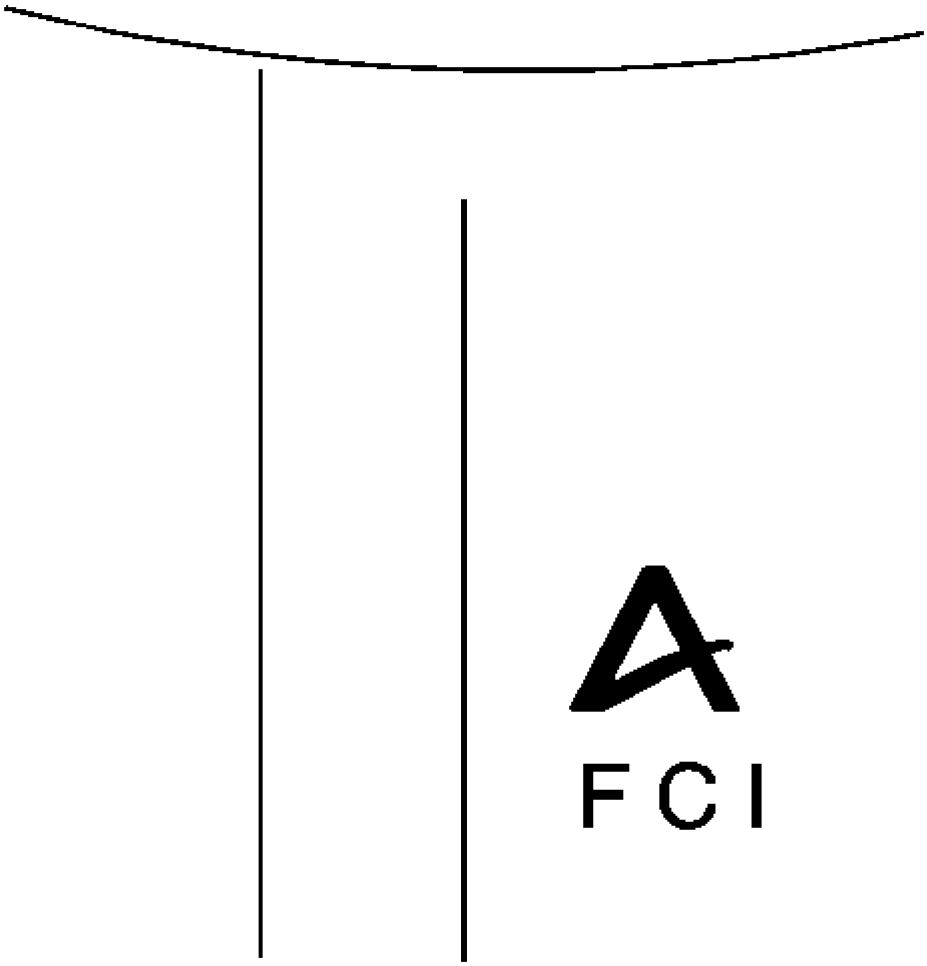


Fig. 29: View Of FCI Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- FCI connectors may have the FCI logo on their connectors. The logo is the letters FCI with an "A" above it.

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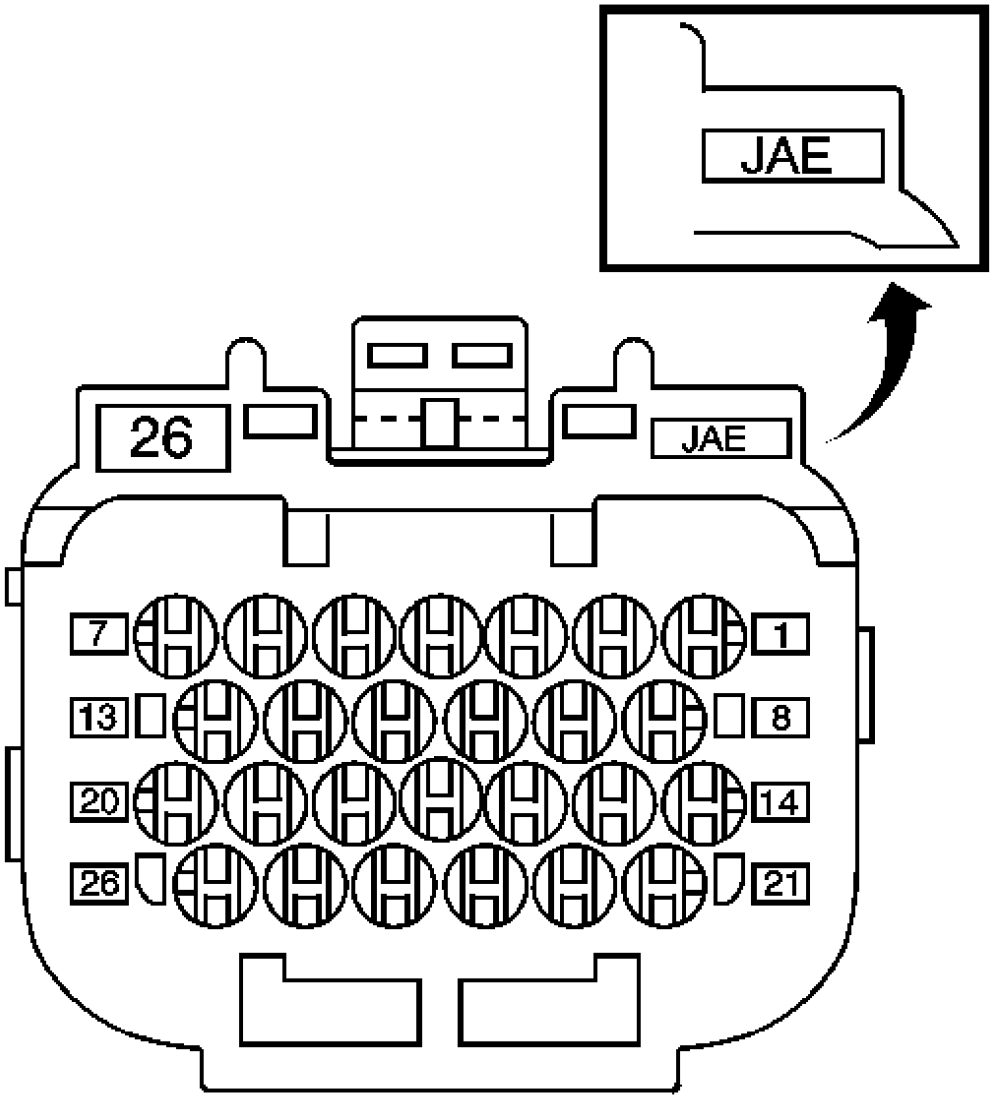


Fig. 30: View Of JAF Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- JAE connector have JAE in small letters on their connectors.

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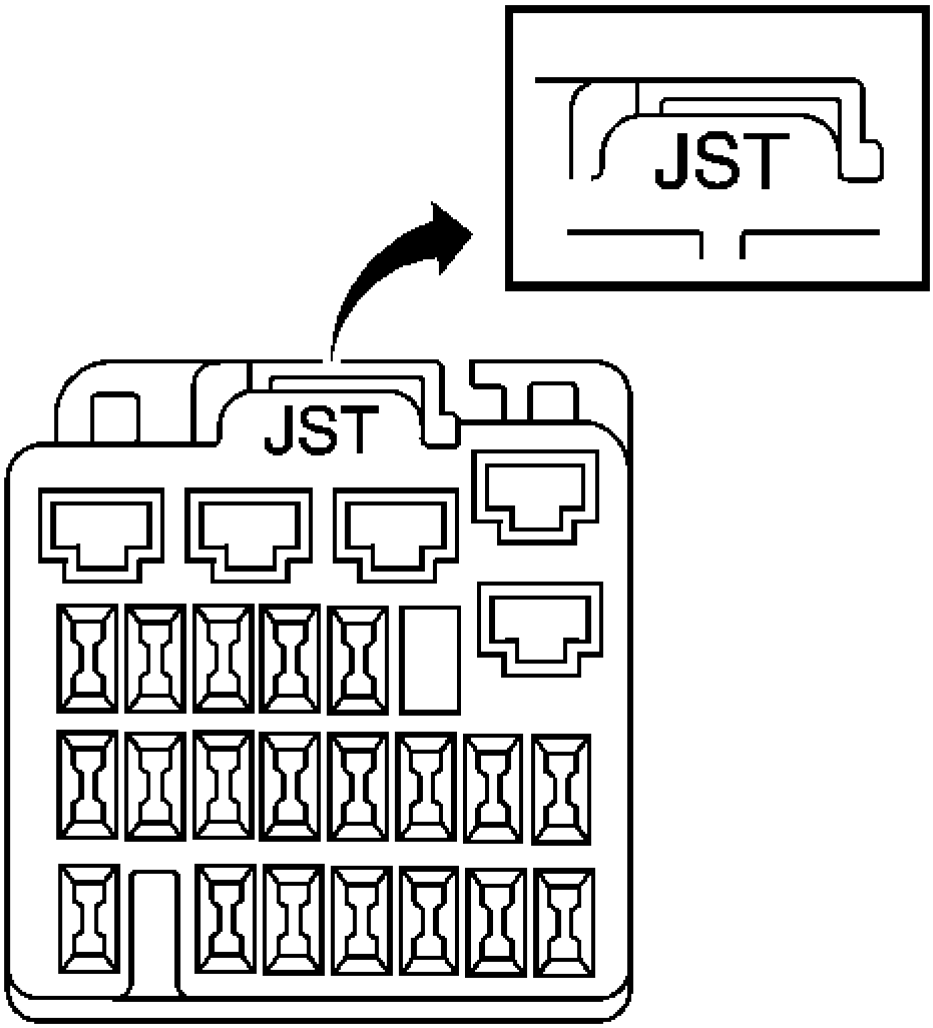


Fig. 31: View Of JST Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- JST connectors have JST in small letters on their connectors, similar to that above. The location of the logo will vary with the connector size and style.

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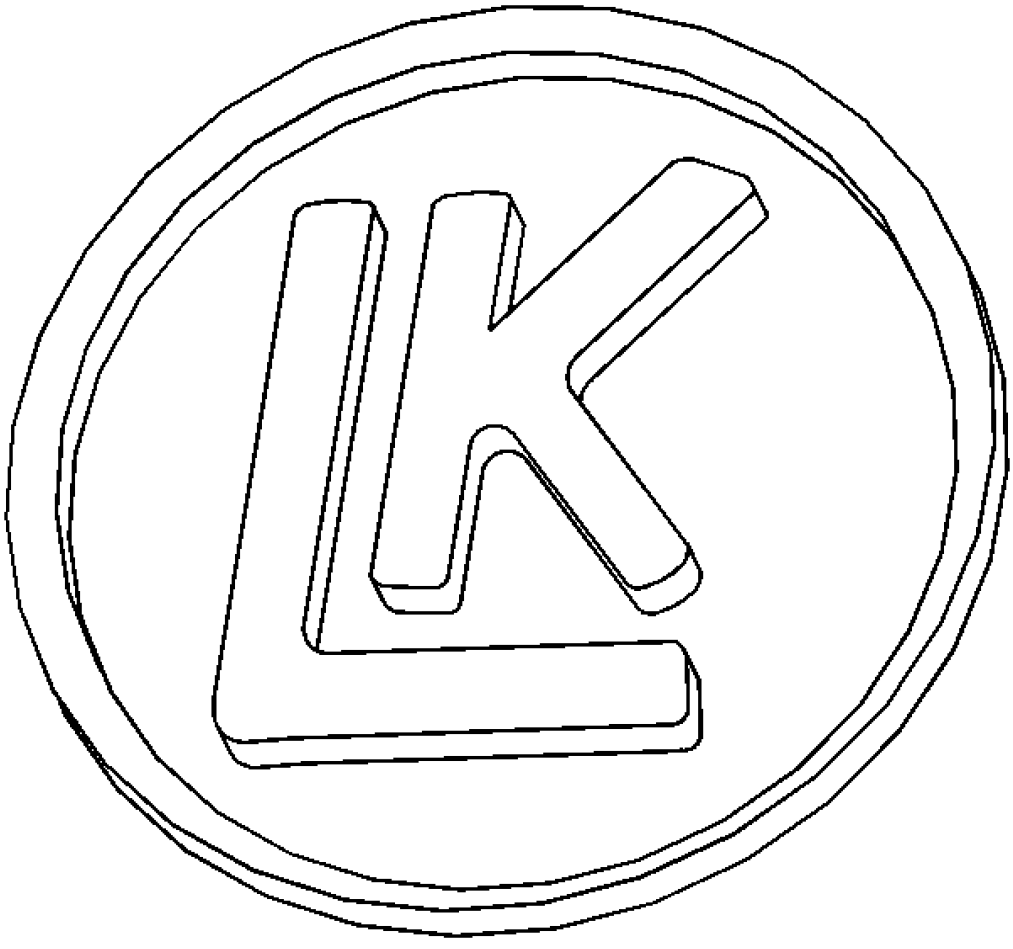


Fig. 32: View Of Kostel Connector Identifier
Courtesy of GENERAL MOTORS CORP.

- Kostel has an "LK" with a circle around it. These connector are usually used as a transmissions connection.

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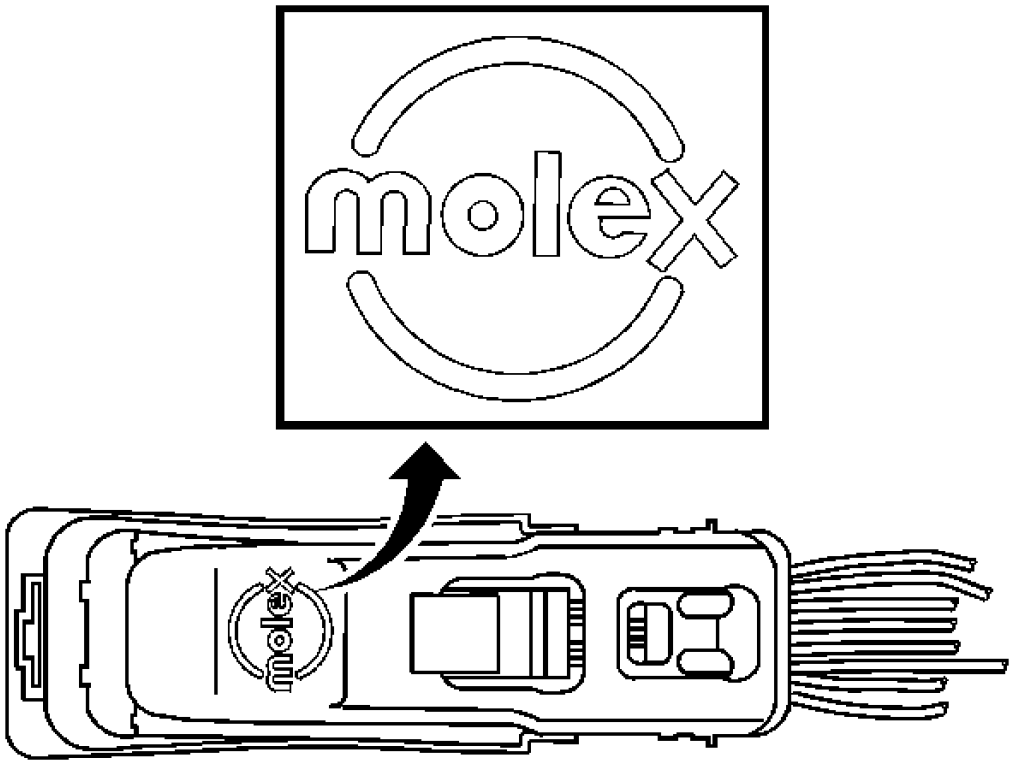


Fig. 33: View Of Molex Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

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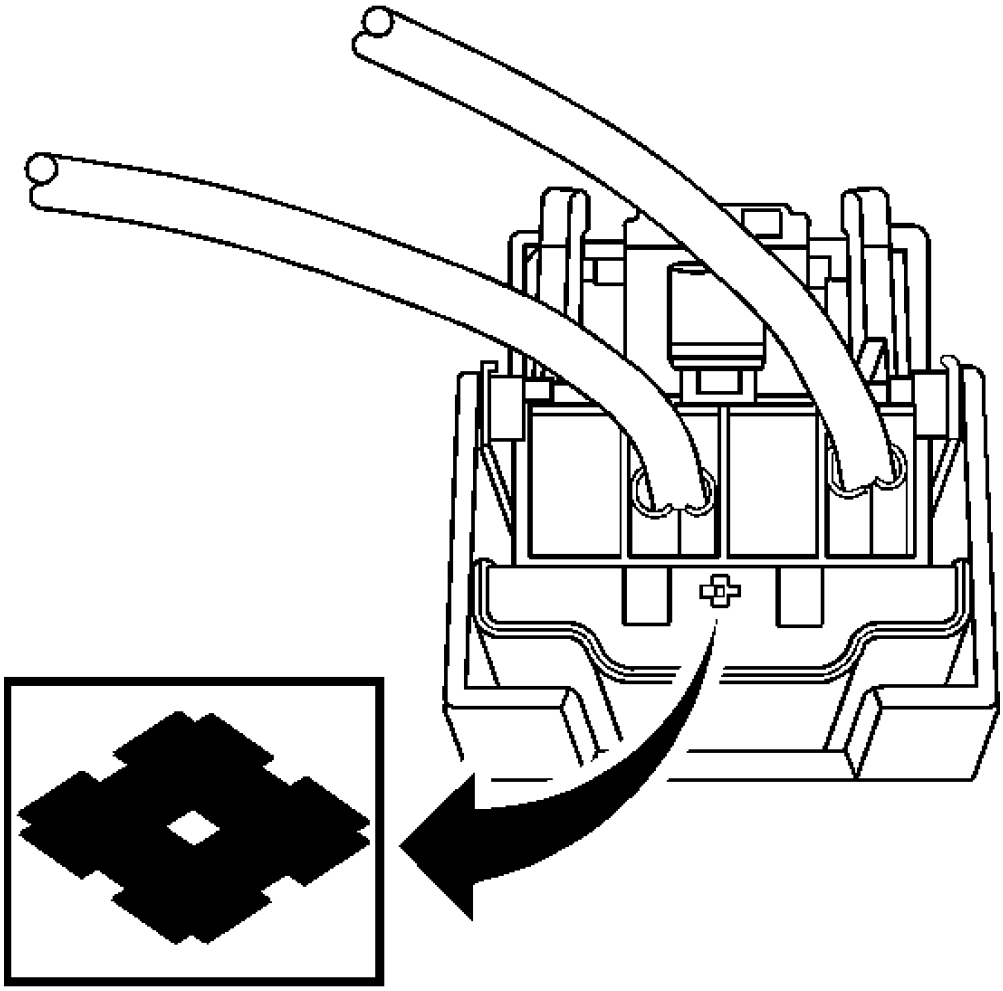


Fig. 34: View Of Sumitono Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- Most Molex connectors will have the Molex logo on the dresscover of the connector. In some cases the connectors may have MX followed by another letter. The third letter indicates where the connector was made. A connector with MXD is a Molex connector made in Detroit.

  Sumitomo has a unique symbol on their connector and possibly a part number. The symbol is similar to that of a diamond lying on its side, similar to that shown. The logo could appear anywhere but the most common place is at the wire side of the housing.

- Tyco/AMP has many different and unique connector designs. Some may or may not have identifiable marks on them.

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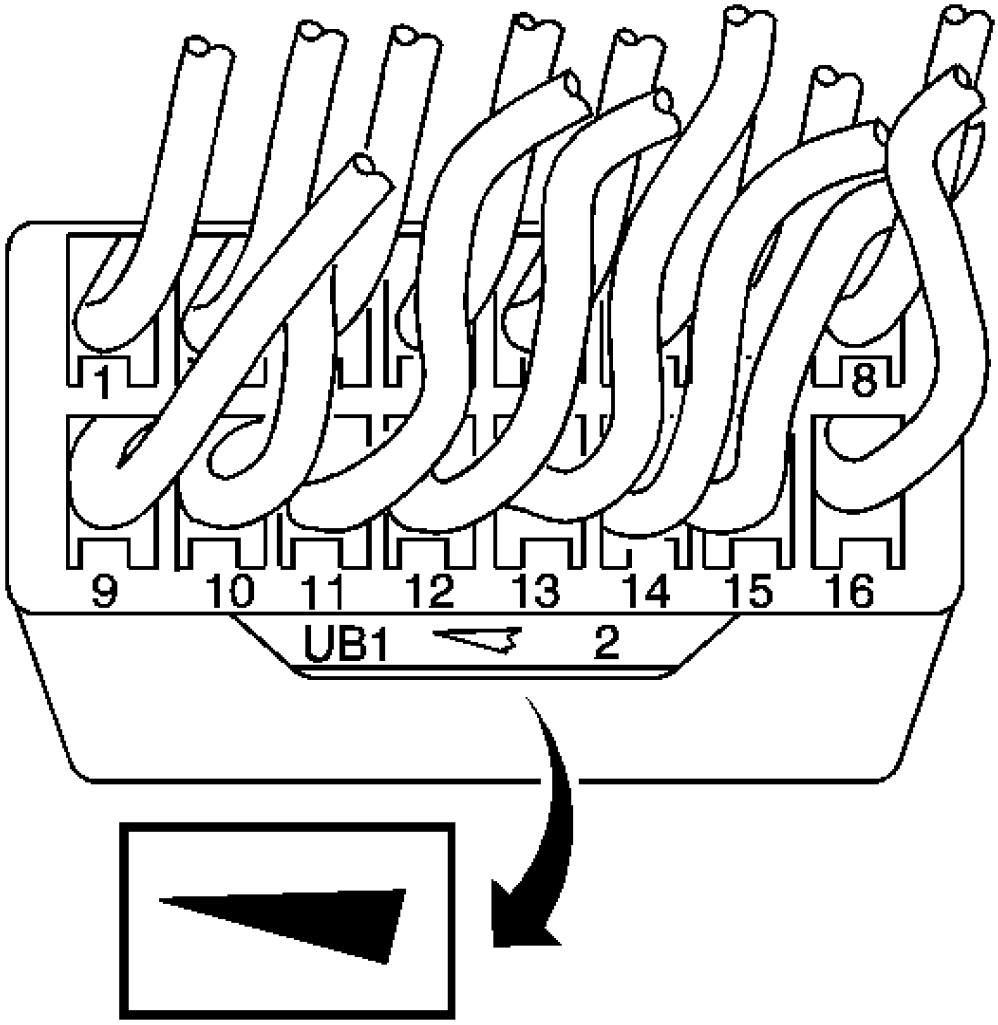


Fig. 35: View Of Yazaki Identification On Connector Body
Courtesy of GENERAL MOTORS CORP.

- Yazaki has a wedge or arrow shape, similar to that shown.

CONNECTOR POSITION ASSURANCE LOCKS

The connector position assurance (CPA) is a small plastic insert that fits through the locking tabs of the connector. CPAs are used in various connectors throughout the vehicle. CPAs are also used in all SIR system electrical connectors. The CPA ensures that the connector halves cannot vibrate apart. You must have the CPA in place in order to ensure good contact between the mating terminals, of the connector.

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TERMINAL POSITION ASSURANCE LOCKS

The terminal position assurance (TPA) insert resembles the plastic combs used in the control module connectors. The TPA keeps the terminal securely seated in the connector body. Do not remove the TPA from the connector body unless you remove a terminal for replacement.

AFL/EPC CONNECTORS

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

Follow the steps below in order to remove terminals from the connector.

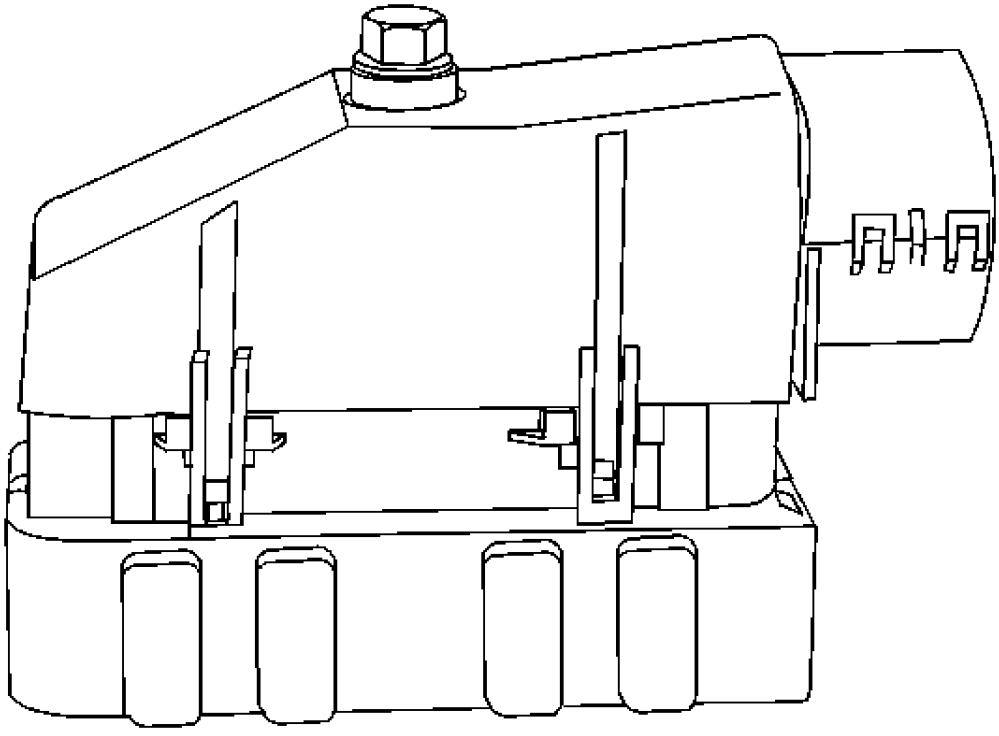


Fig. 36: View Of Bolt On Connector Cover
Courtesy of GENERAL MOTORS CORP.

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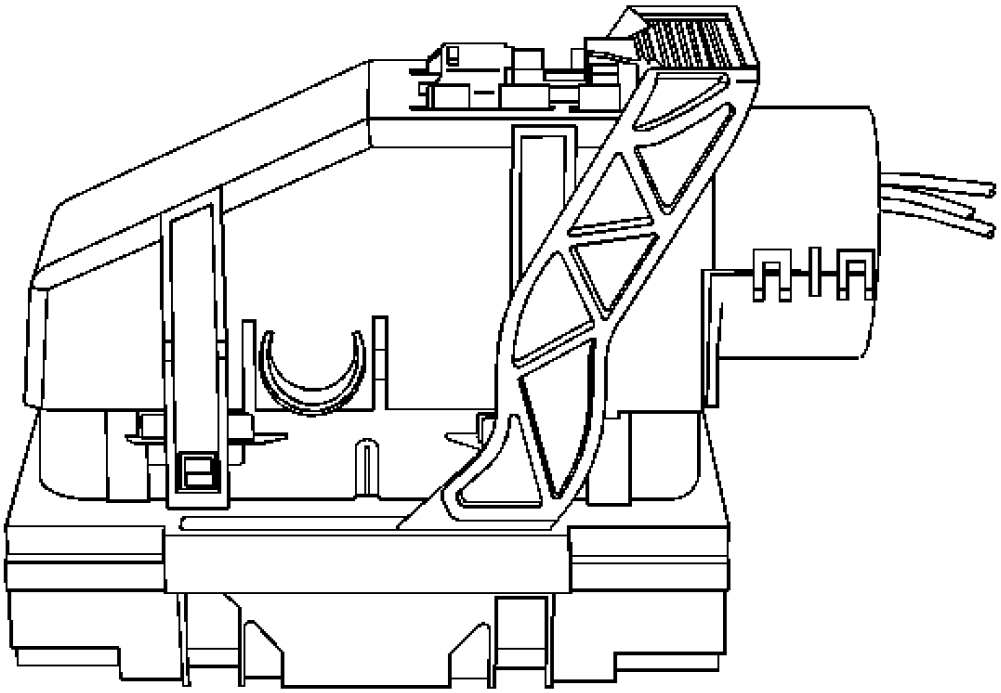


Fig. 37: Connector Position Assurance (CPA)
Courtesy of GENERAL MOTORS CORP.

1. For connectors with a bolt in the dress cover, turn the bolt counterclockwise to remove the connector from the component.
2. Locate the connector position assurance (CPA) on the top of the wire dress cover. Slide the CPA forward.

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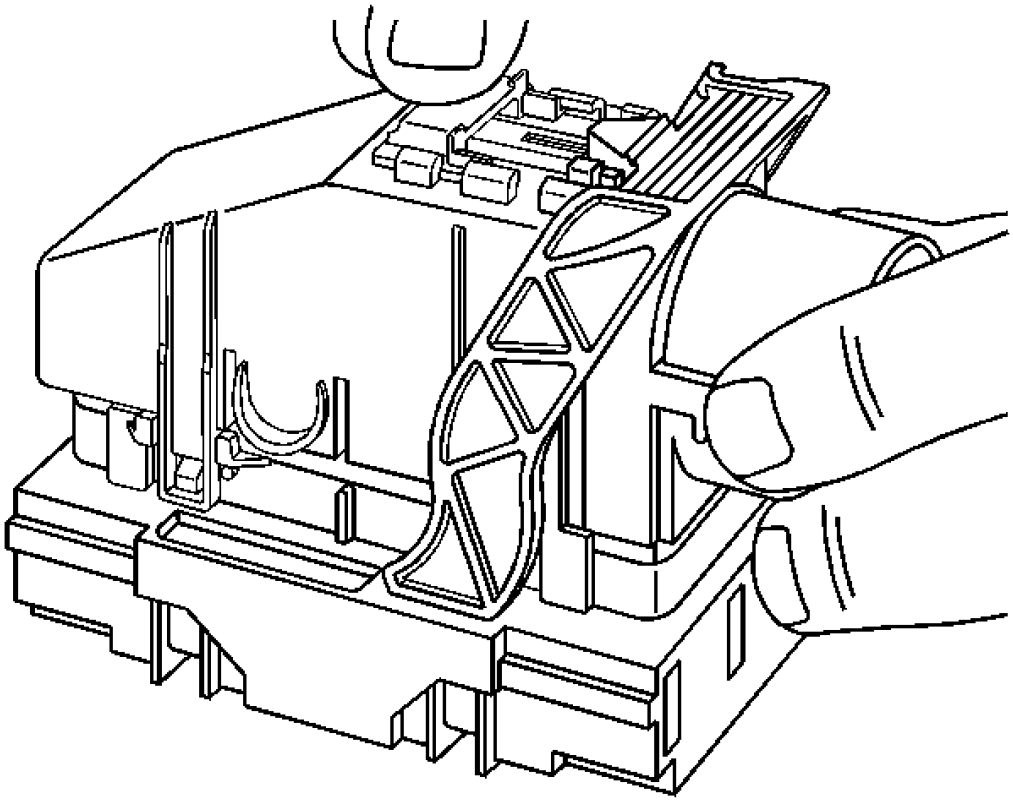


Fig. 38: Lever Lock & Lever Lock Release Tab
Courtesy of GENERAL MOTORS CORP.

3. Slide the lever lock forward while pressing down on the lever lock release tab.

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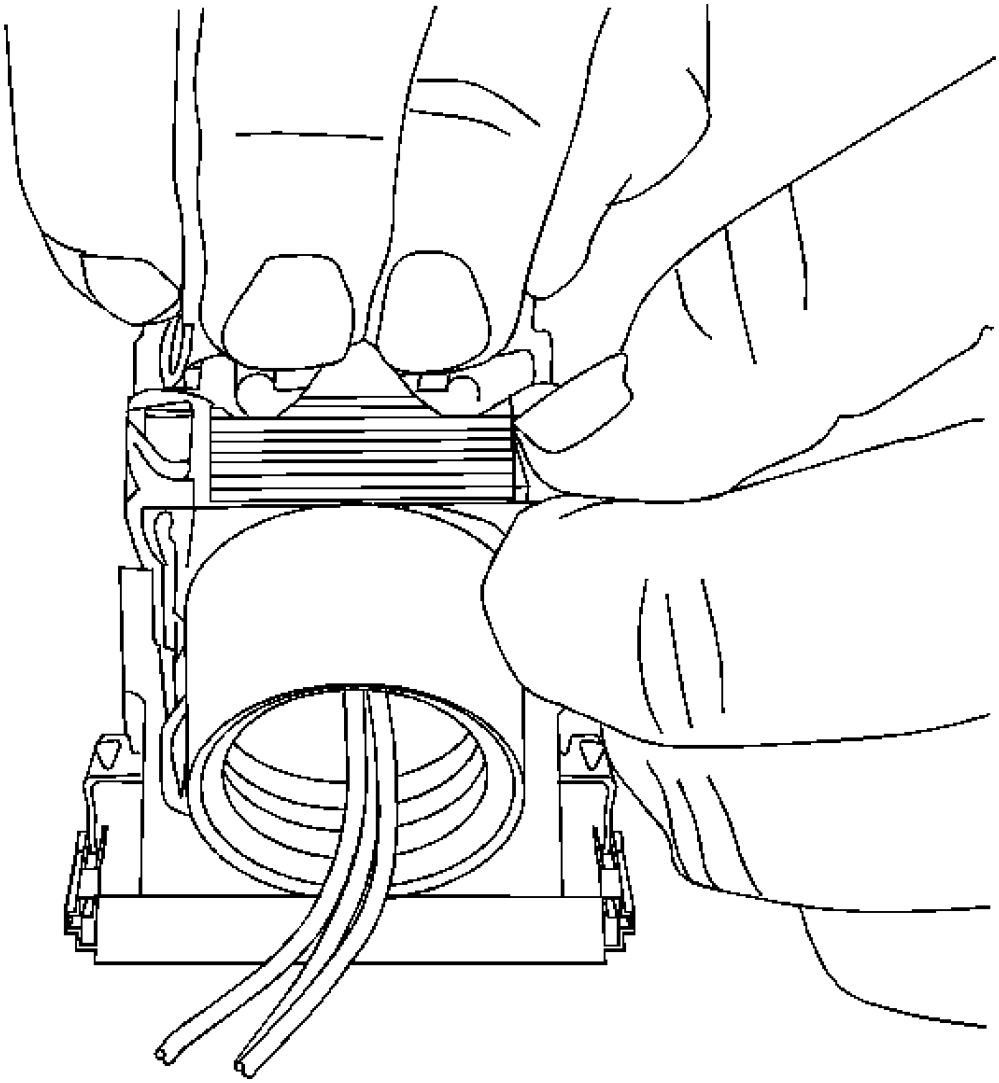


Fig. 39: Depressing Lever Lock Release Tab
Courtesy of GENERAL MOTORS CORP.

4. View showing depressing of the lever lock release tab.

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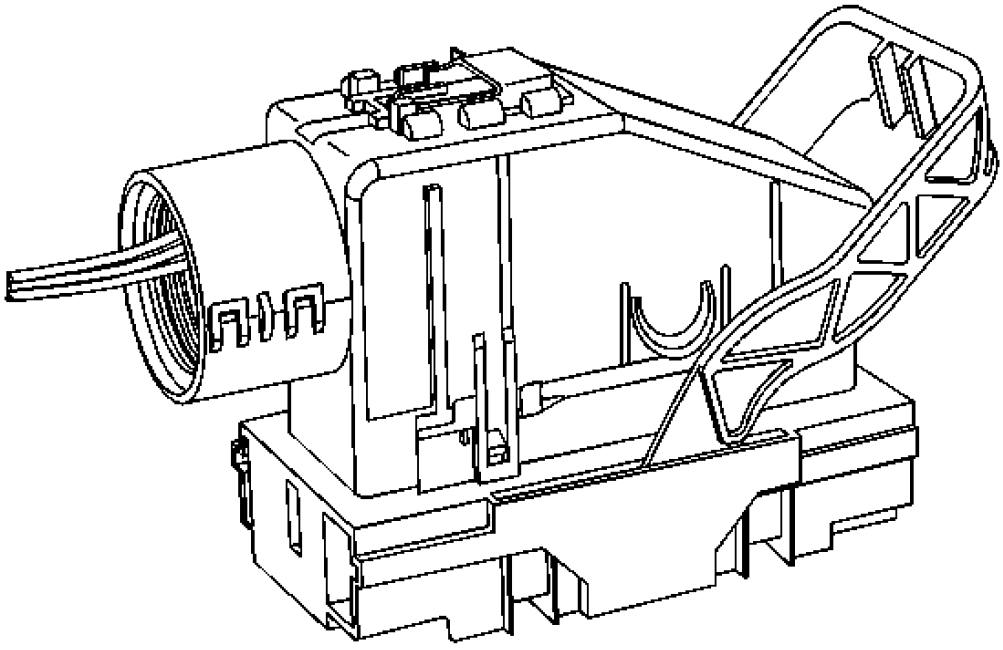


Fig. 40: Connector In Released Position
Courtesy of GENERAL MOTORS CORP.

5. View of connector in released position.
6. Disconnect the connector from the component.
7. Locate the dress cover locking tabs at the corners of the dress cover. Use a small flat-blade tool to release the locking tabs and remove the dress cover.

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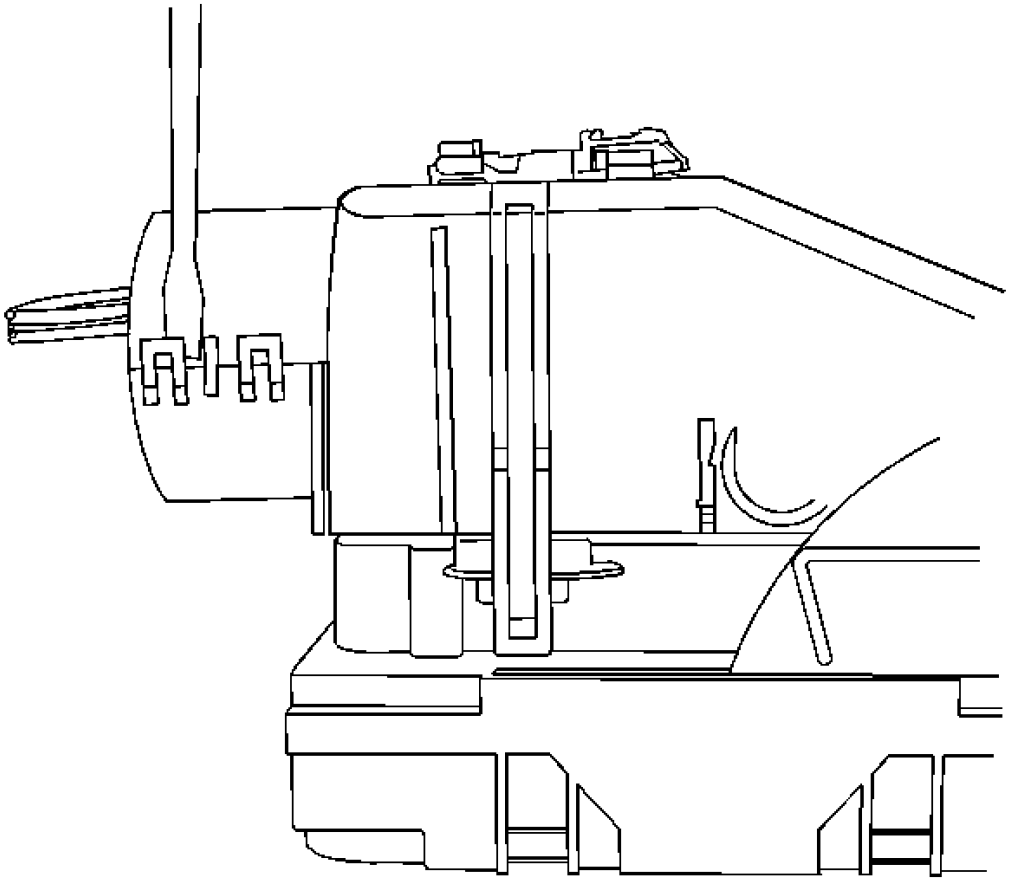


Fig. 41: Releasing Rear Lower Half Of Wiredress Cover
Courtesy of GENERAL MOTORS CORP.

8. Release the rear lower half of the wiredress cover.

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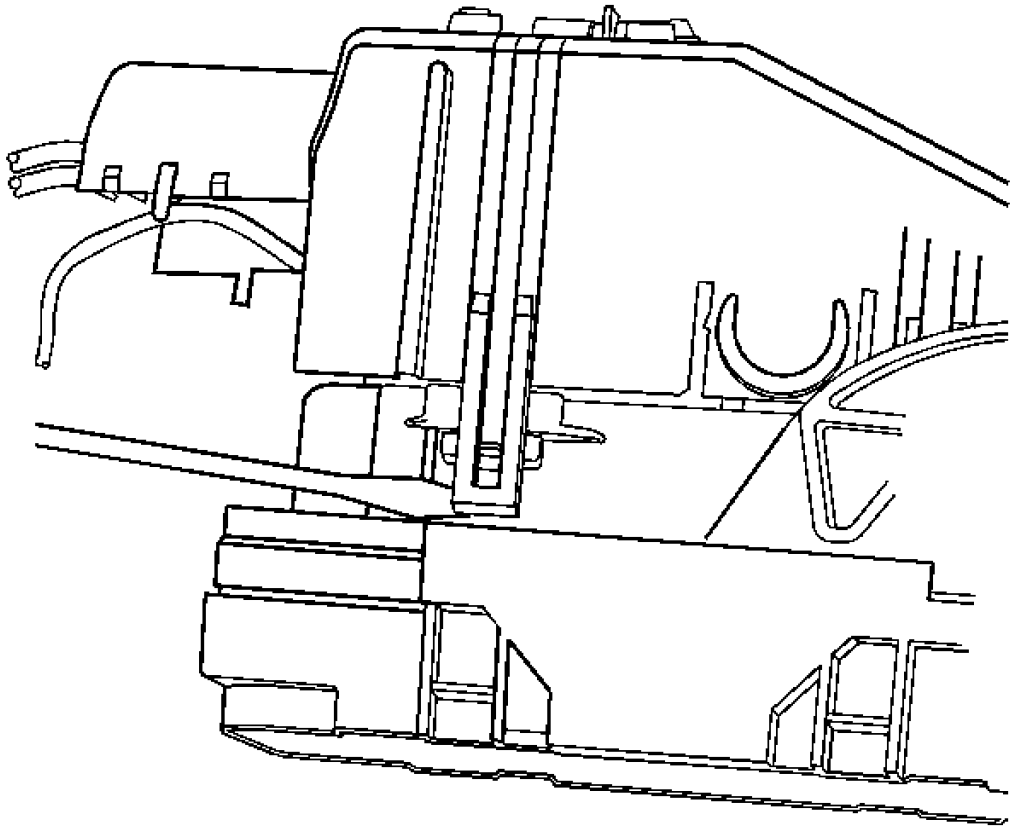


Fig. 42: Releasing Tabs Holding Wiredress Cover
Courtesy of GENERAL MOTORS CORP.

9. Release the tabs that are holding the wiredress cover to the connector body.
10. Remove the nose piece by inserting a small flat-blade tool into the slots on both ends of the connector body. Gently pry the nose piece out of the connector. EL-38125-216 can also be used to remove the nose piece.

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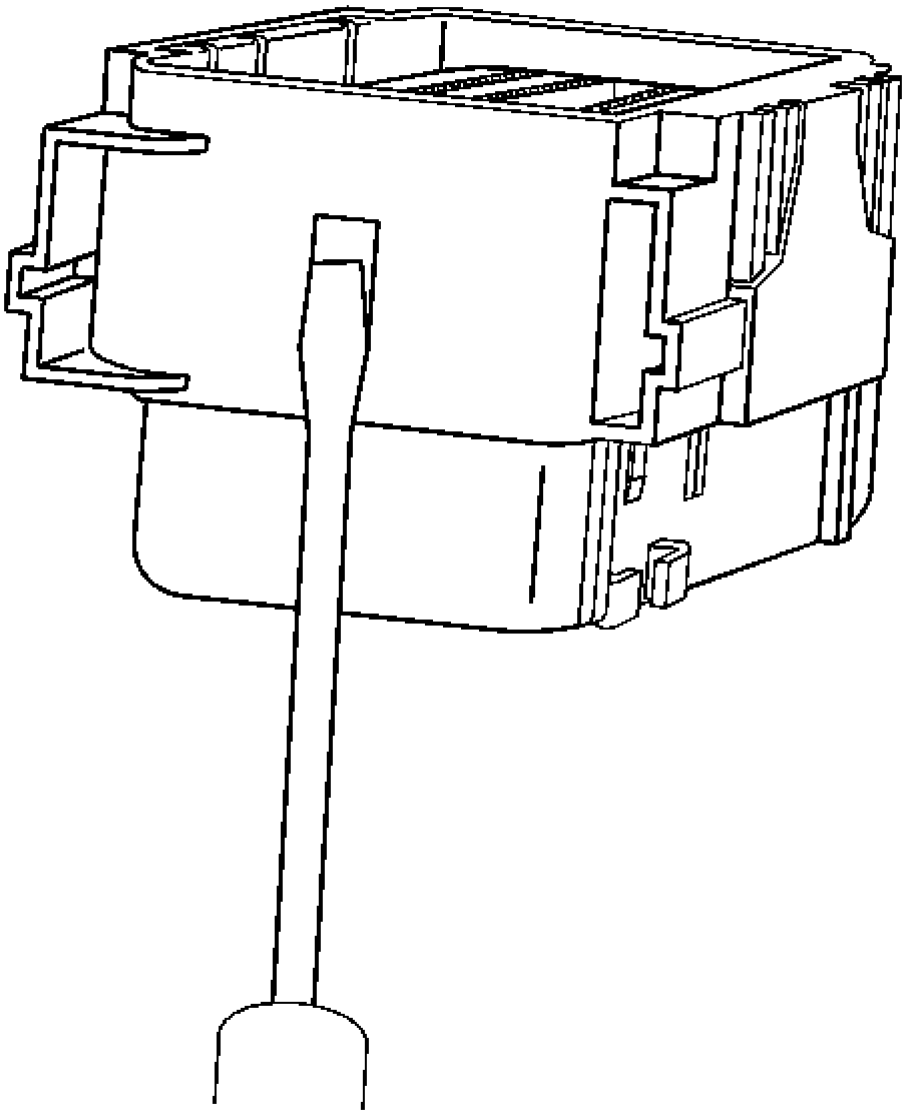


Fig. 43: Removing Nose Piece
Courtesy of GENERAL MOTORS CORP.

11. Use the EL-38125-12A tool to release the terminals by lifting the terminal retaining tabs on the inside of the connector.

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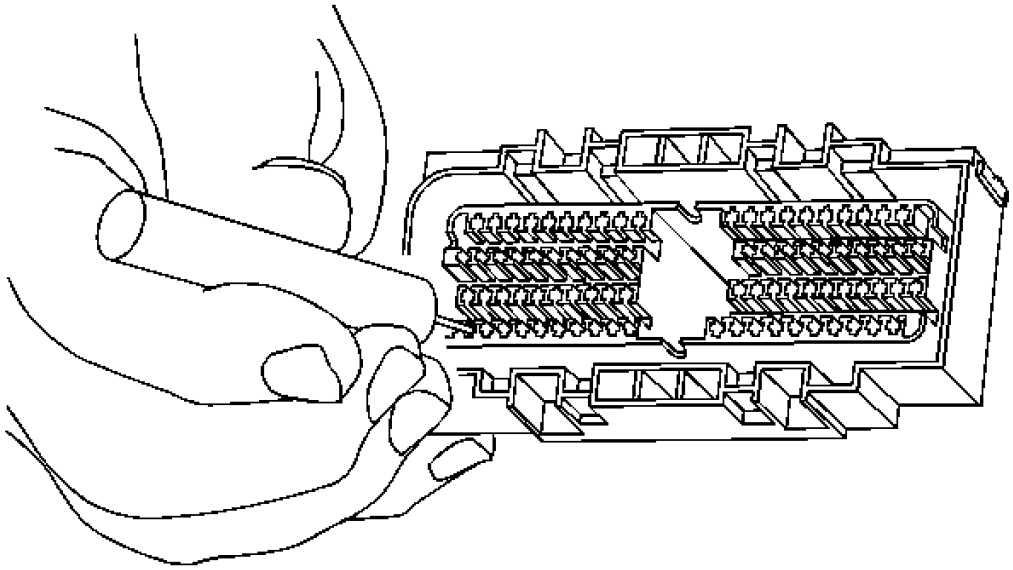


Fig. 44: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

12. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Repair Procedure

Use the appropriate terminal / terminated lead.

BOSCH CONNECTORS (BSK)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

1. Disconnect the connector from the component.
2. Remove the wire dress cover, if necessary.
3. Push the wire side of the terminal that is being removed toward the connector and hold it in position.

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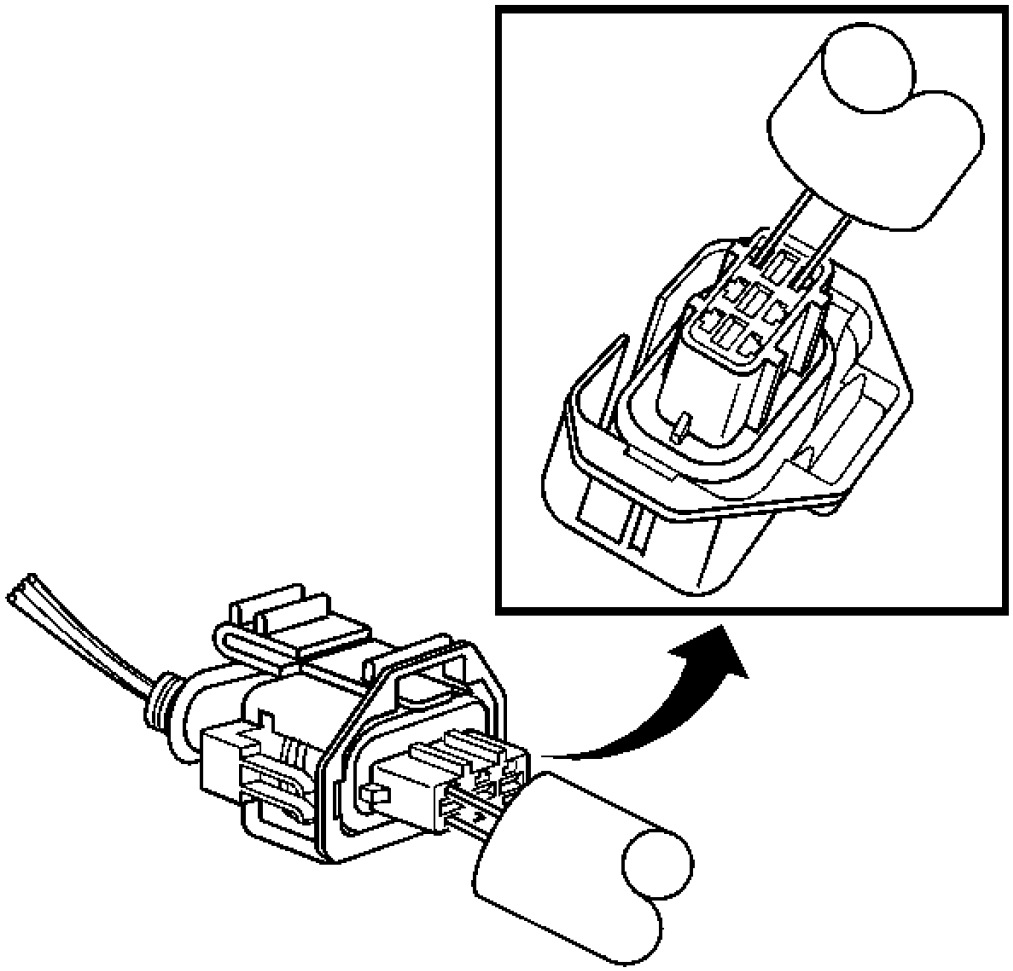


Fig. 45: View Of Bosch Connector Terminals (BSK)
Courtesy of GENERAL MOTORS CORP.

4. Insert the EL-38125-561 tool into the 2 cavities on each side of the terminal at the front of the connector and push until you feel the tool disengage the terminal retainers.
5. Carefully pull the terminal out of the connector. Always remember never use force when pulling a terminal out of a connector. If the terminal is difficult to remove, repeat the entire procedure.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.

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4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

BOSCH CONNECTORS (0.64)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

1. Locate the lever lock on the wire dress cover. While pressing the lock, pull the lever over and past the lock until the lever is at the end of its travel.
2. Disconnect the connector from the component.
3. Pull the rubber boot that covers the wires back to expose the end of the connector dress cover.
4. Place the connector locking lever in the center of the connector.

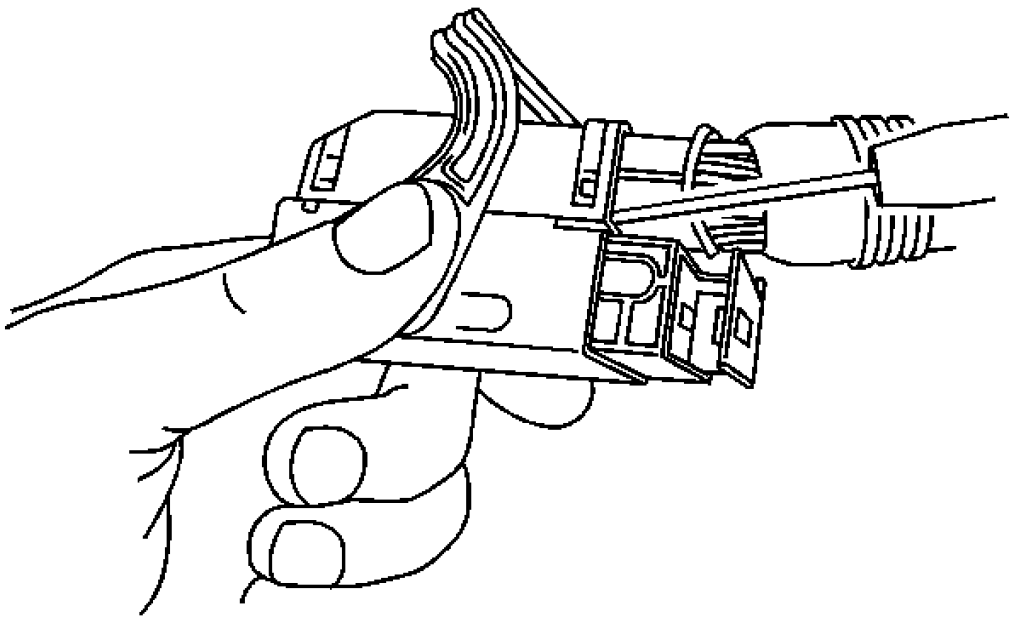


Fig. 46: Inserting Flat-Bladed Tool Between Cover & Connector Body
Courtesy of GENERAL MOTORS CORP.

5. Locate the 2 dress cover locking tabs that are on the wire end of the connector. Insert a small flat-bladed tool between the cover and connector body and pry up.

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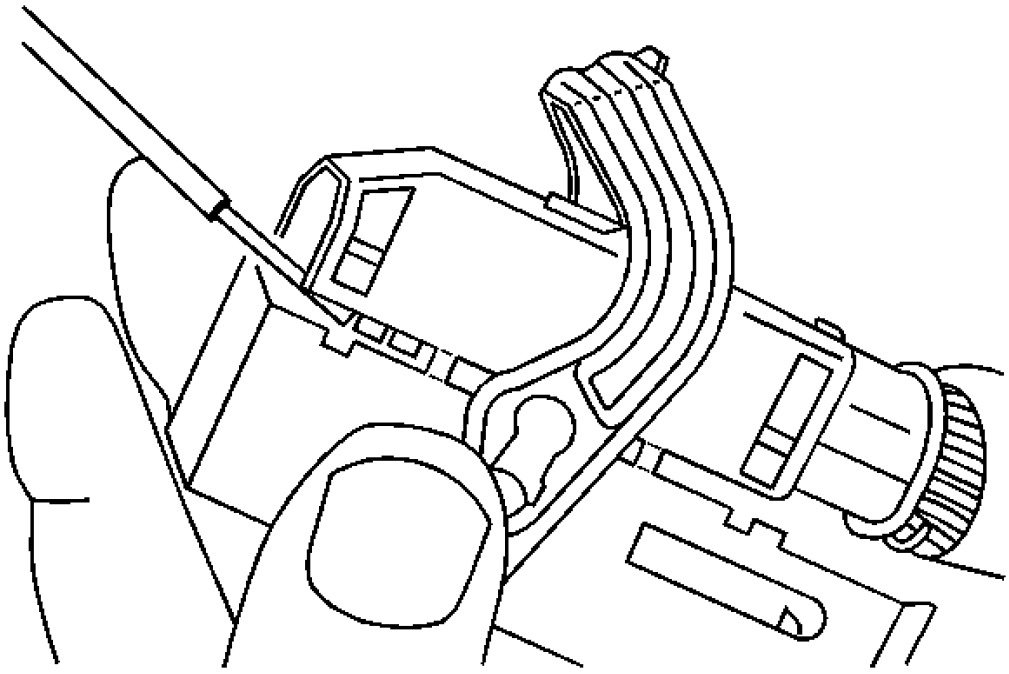


Fig. 47: Inserting Flat-Bladed Tool Between Cover & Connector End
Courtesy of GENERAL MOTORS CORP.

6. Locate the 2 dress cover locking tabs located on the opposite side of the connector. Insert a small flat-bladed tool between the cover at the connector end and pry up.
7. Remove the dress cover.
8. Cut the tie wrap on the wire bundle.

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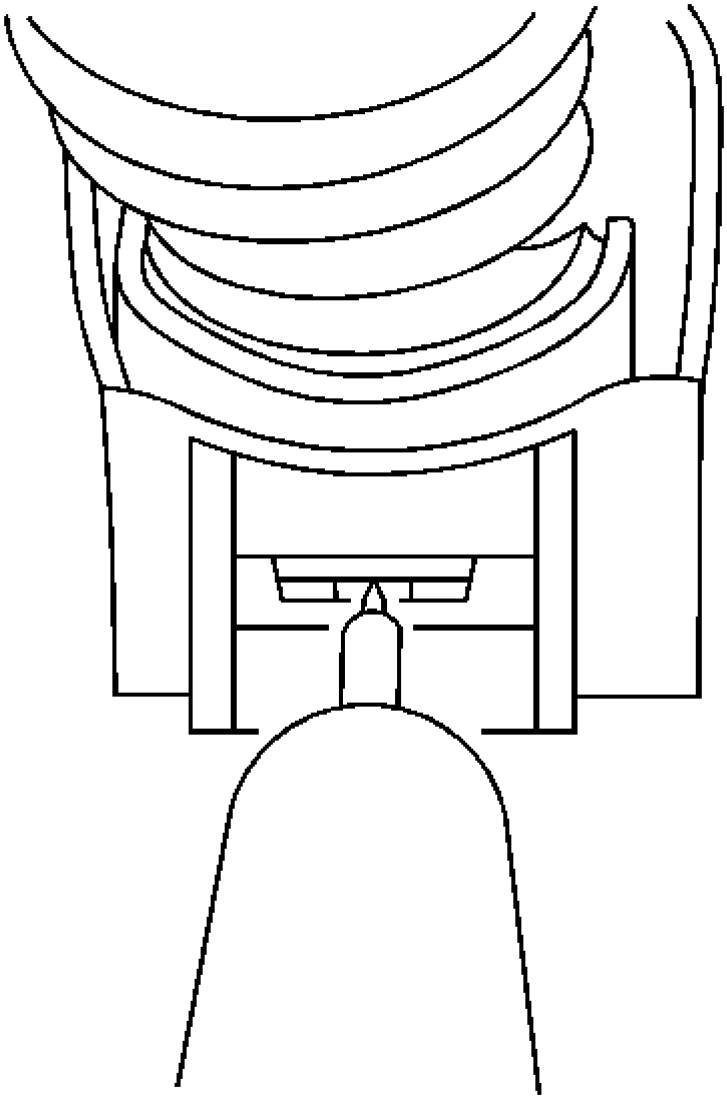


Fig. 48: Removing Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

9. Remove the terminal position assurance (TPA) by inserting a small flat-bladed tool into the small slot in the end of the slider and pushing on the TPA until it comes out of the connector. When the TPA exits the opposite side of the connector, gasp the TPA and pull it completely out of the connector.
10. Push the wire side of the terminal that is being removed toward the connector and hold it in position.

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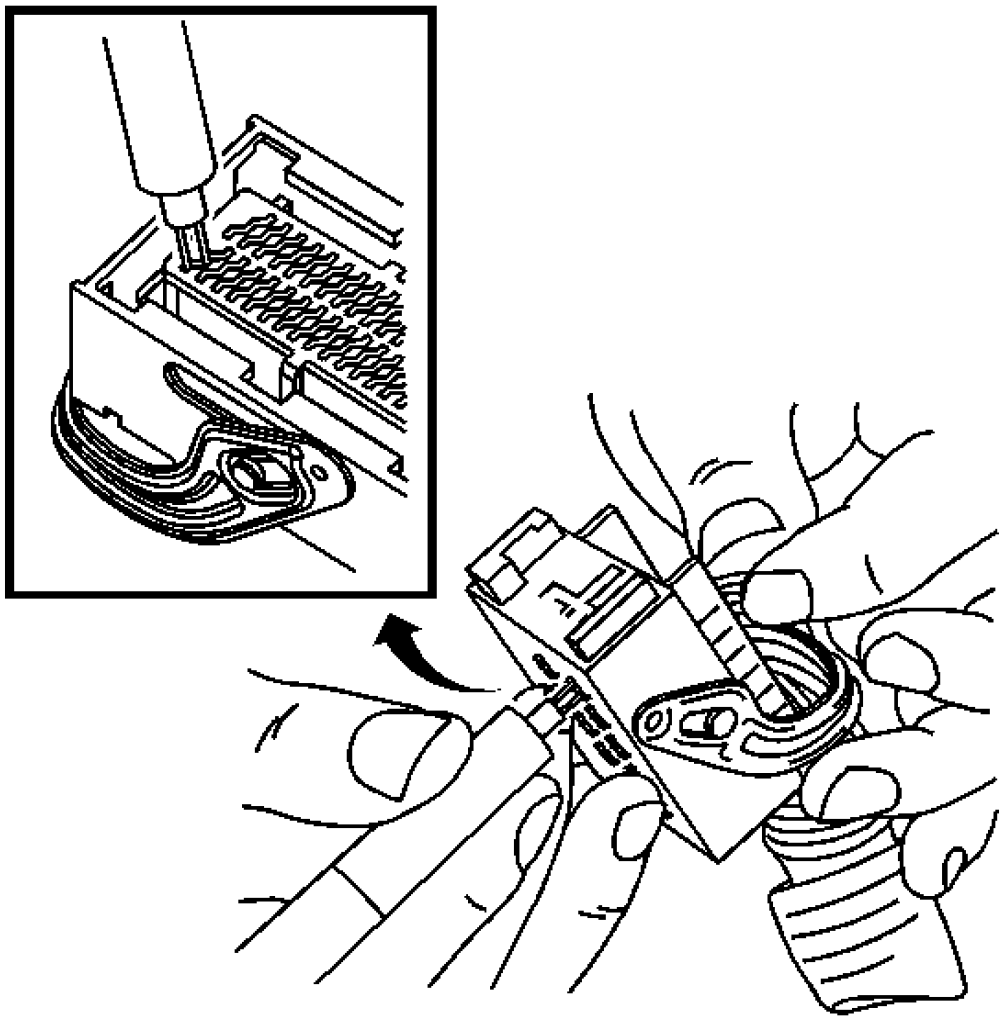


Fig. 49: Pulling Terminal Out Of Connector
Courtesy of GENERAL MOTORS CORP.

11. Insert the EL-38125-560 into the 2 triangular cavities on each side of the terminal at the front of the connector.
12. Carefully pull the terminal out of the connector. Always remember never use force when pulling a terminal out of a connector. If the terminal is difficult to remove, repeat the entire procedure.

Terminated Lead Repair

1. Remove the terminal.

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2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

Terminal Replacement Procedure

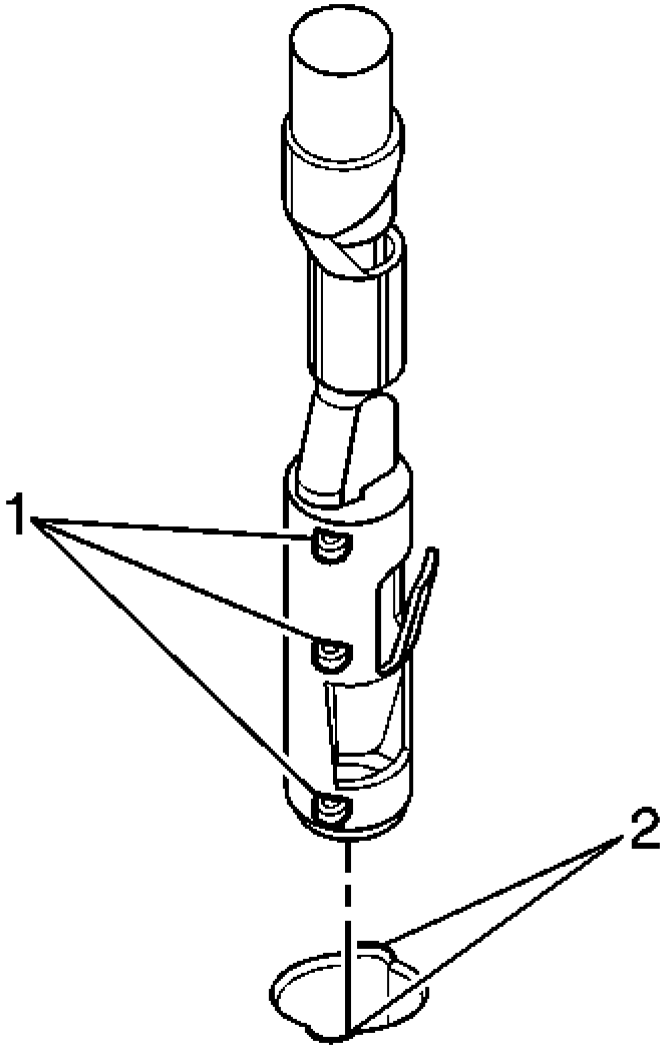


Fig. 50: Aligning Coding Lugs With Connector Coding Grooves
Courtesy of GENERAL MOTORS CORP.

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1. Prior to installation the terminal must be aligned so the (1) coding lugs align with the (2) coding grooves on the connector.
2. Once the terminal is aligned, slide the terminal into the cavity until the retainer has engaged in the cavity of the connector.
3. Slide the TPA in the connector body and seat it using a small flat bladed tool. The TPA is seated when it is flush with the contact housing.
4. Secure the wires to the connector body using a tie wrap and replace the dress cover and grommet.

BOSCH CONNECTORS (2.8 JPT)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

1. Pull out the slider on the connector position assurance (CPA) until it is at the end of its travel.
2. Disconnect the connector from the component.
3. Remove the wire dress cover, if necessary.
4. Push the wire side of the terminal that is being removed toward the connector and hold it in position.

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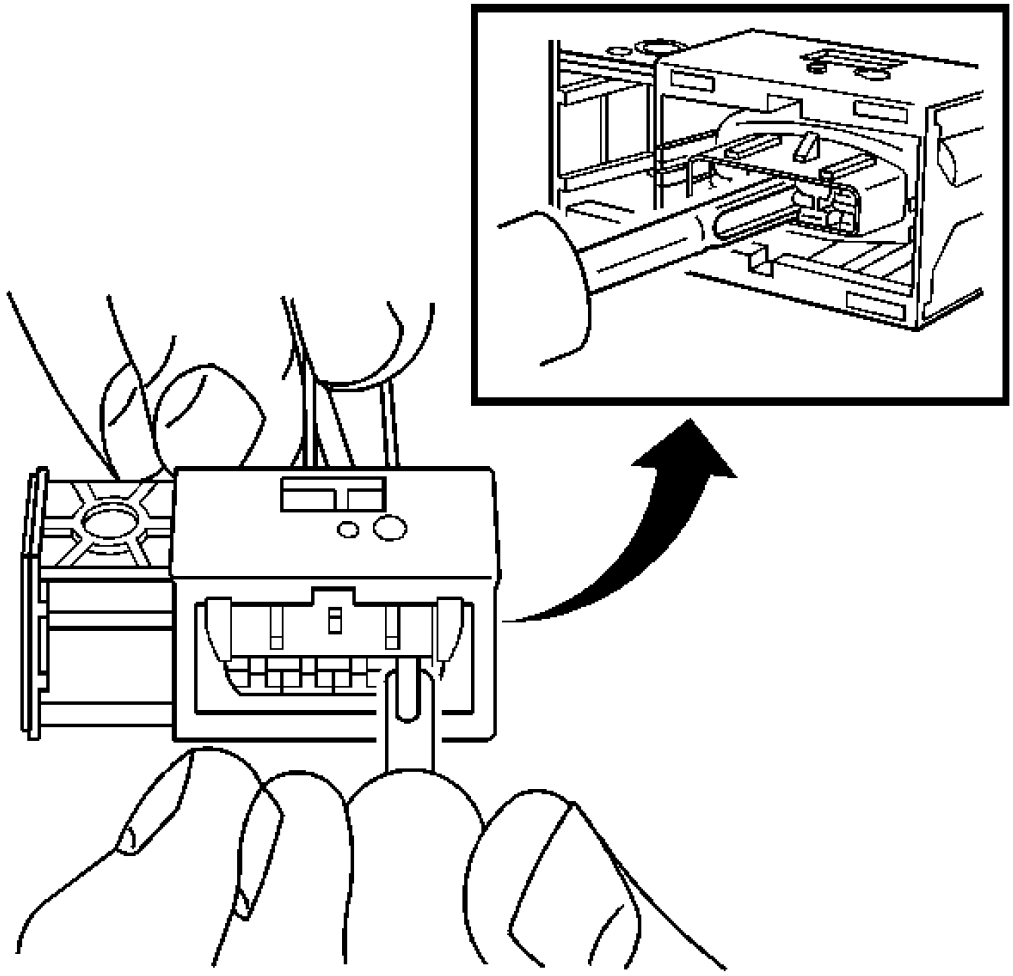


Fig. 51: View Of Bosch Connector Terminals (2.8 JPT)
Courtesy of GENERAL MOTORS CORP.

5. Insert the EL-38125-557 into the 2 cavities on each side of the terminal at the front of the connector and push until you feel the tool disengage the terminal retainers.
6. Carefully pull the terminal out of the connector. Always remember never use force when pulling a terminal out of a connector. If the terminal is difficult to remove, repeat the entire procedure.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.

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4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

BOSCH CONNECTORS (ECM)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

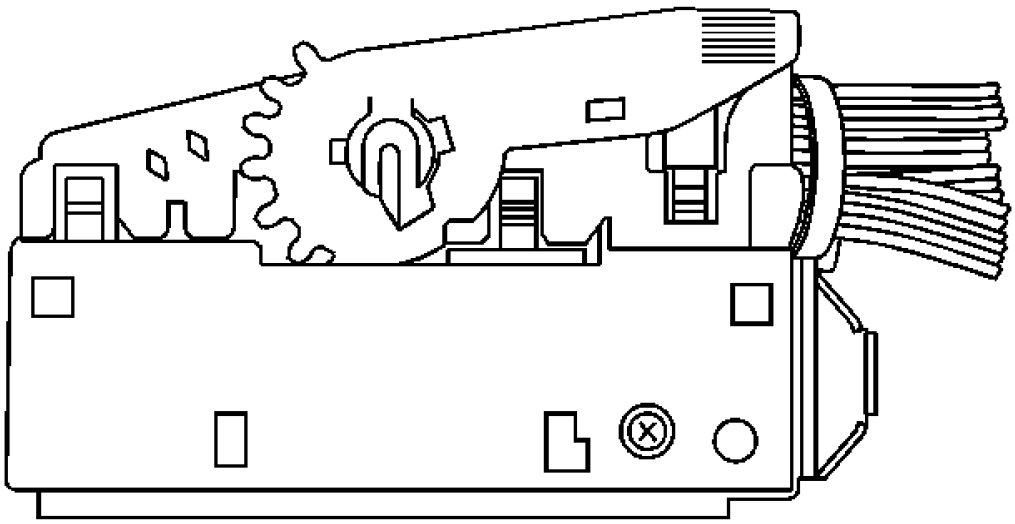


Fig. 52: Assist Lever
Courtesy of GENERAL MOTORS CORP.

1. Locate the assist lever on the top of the connector. Move the assist lever to the forward position.

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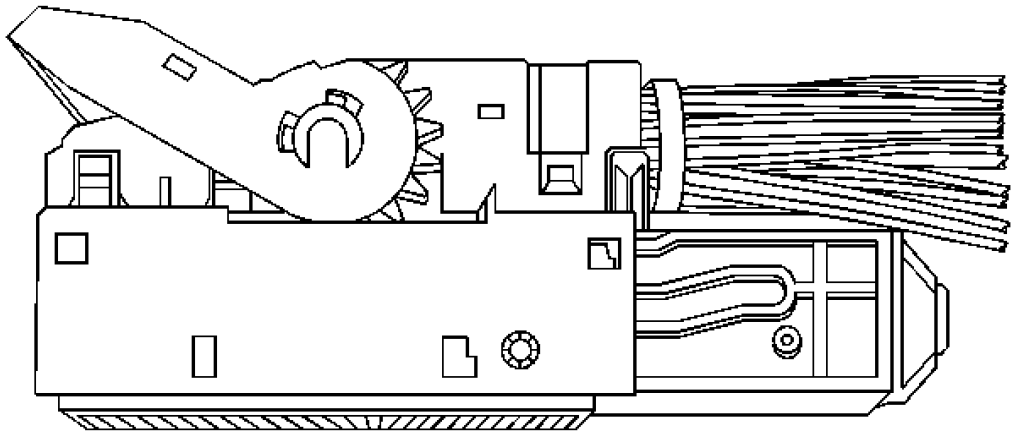


Fig. 53: View Of Assist Lever In Forward Position
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the connector from the component.

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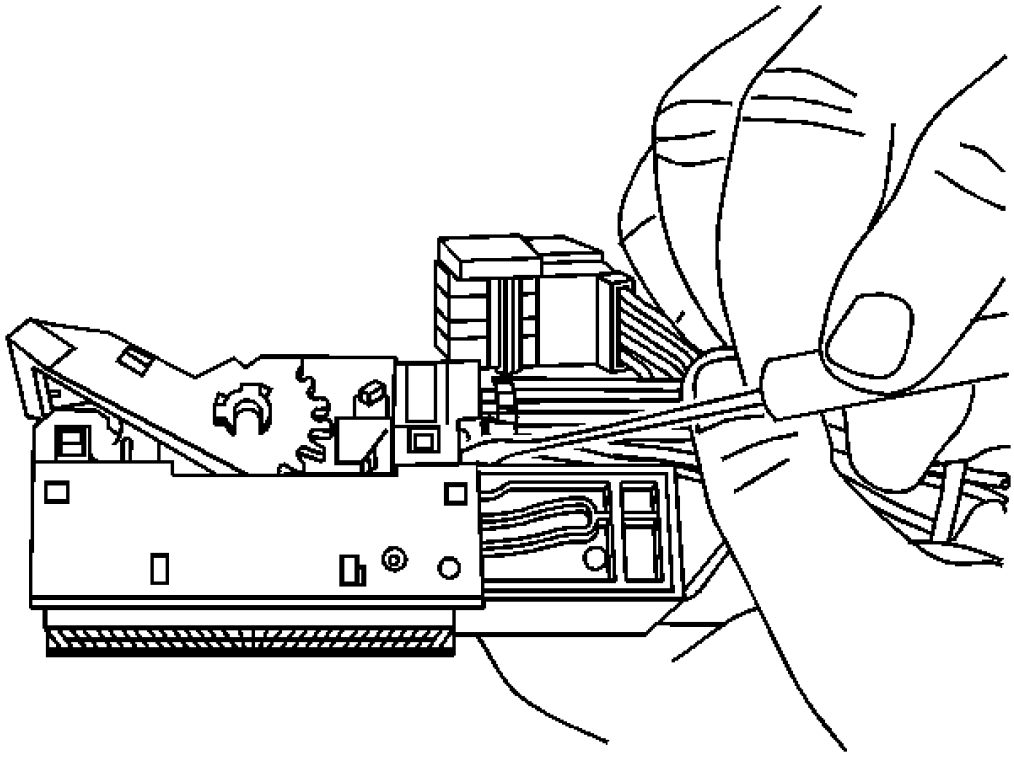


Fig. 54: Releasing Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Locate the dress cover locking tabs at the corners of the connector. Use a small flat-blade tool to release the locking tabs and remove the dress cover.

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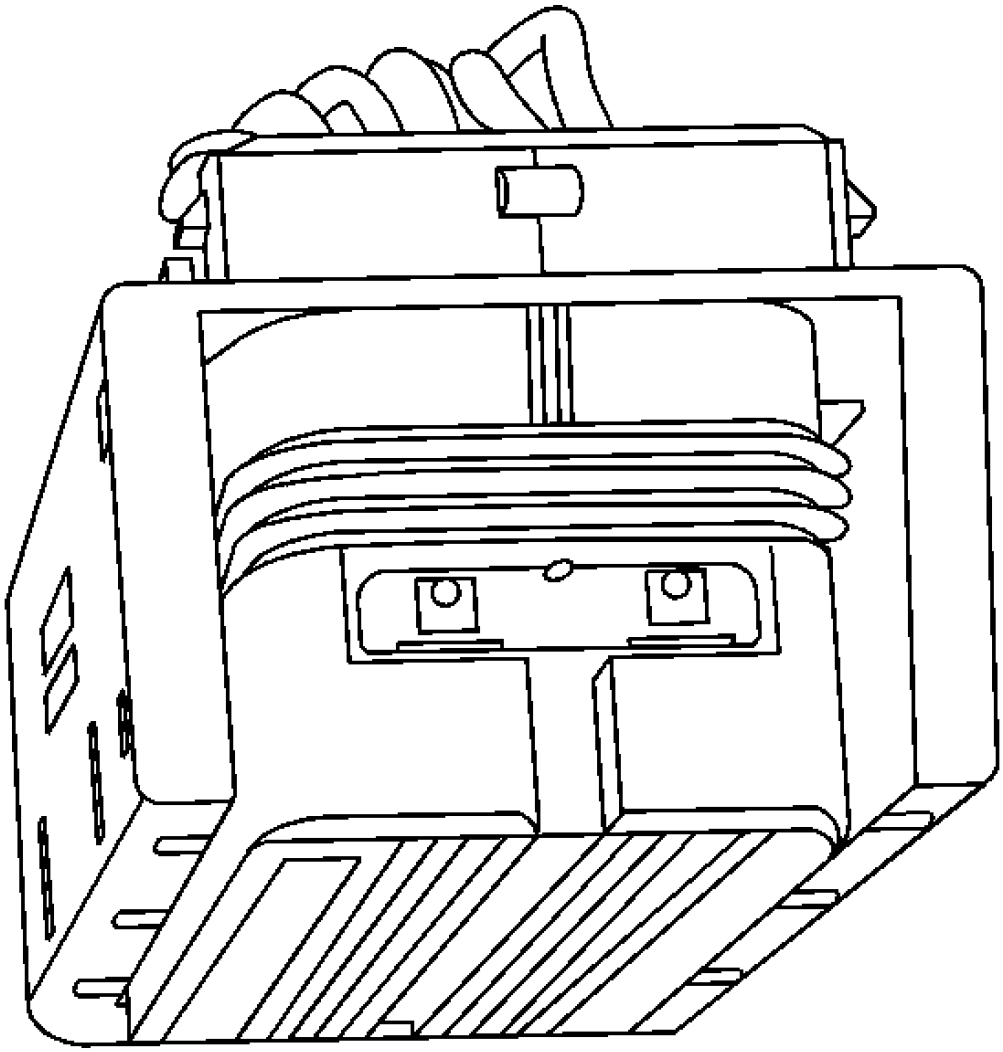


Fig. 55: View Of Terminal Positive Assurance (TPA) Connector
Courtesy of GENERAL MOTORS CORP.

4. The terminal positive assurance (TPA) is located in the front of the connector.

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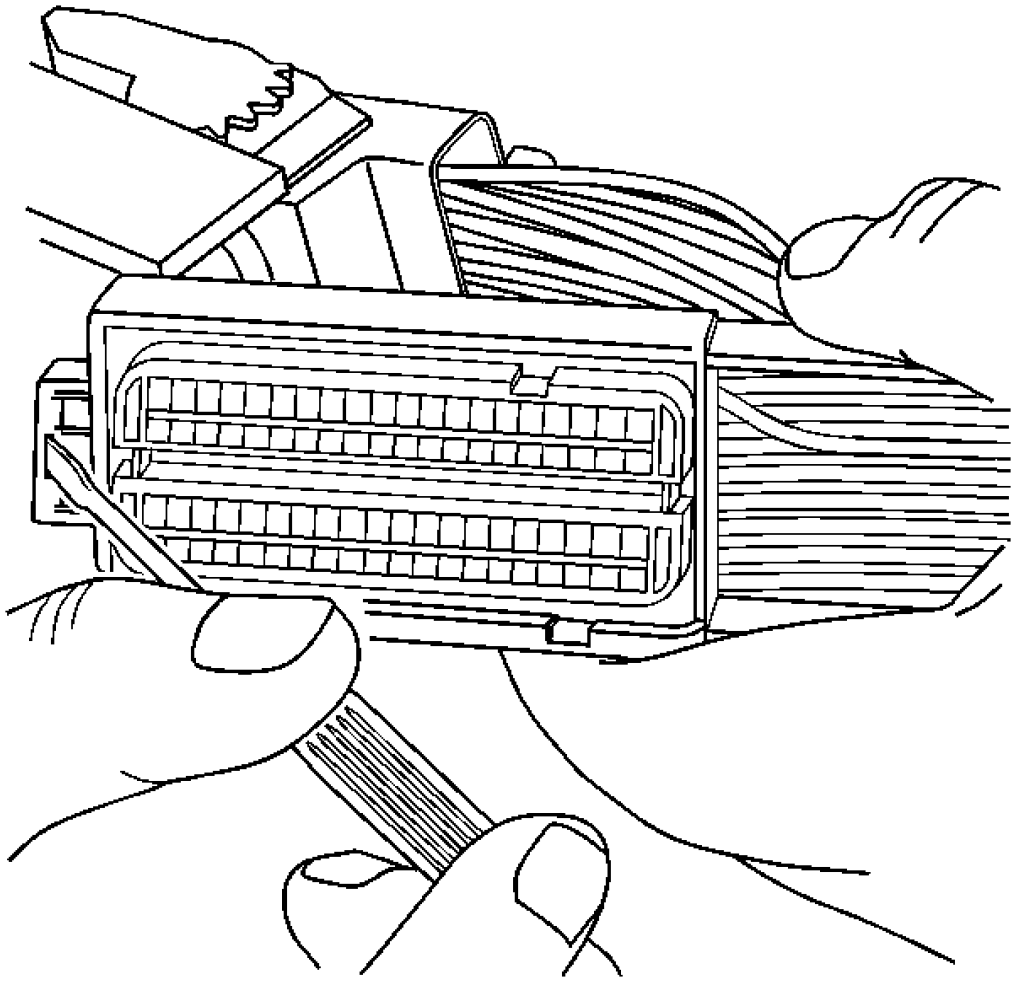


Fig. 56: Removing TPA From Connector
Courtesy of GENERAL MOTORS CORP.

5. Use a small flat-blade tool to remove TPA from the connector.

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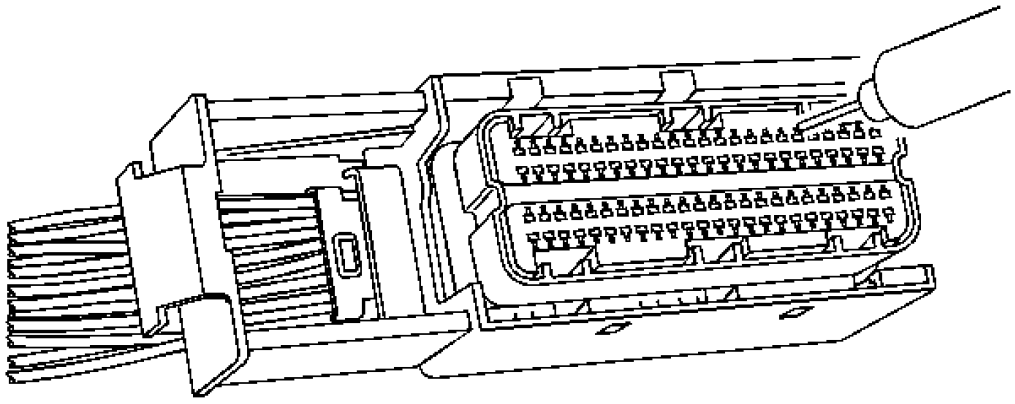


Fig. 57: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

6. Use the EL-38125-213 or the EL-38125-556 tool to release the terminals by inserting the tool into the terminal release cavity.
7. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminal Repair Procedure

The Micro-Pack 100W connectors have small terminals that are difficult to handle and hold when crimping. In order to aid the technician when crimping these terminals, a new crimping tool was developed. The J 38125-101 (W jaw) crimping tool was developed to crimp Micro-Pack 100W terminals. The J 38125-101 (W jaw) crimping tool has a terminal holding block that will hold the terminal in place while the terminal is being crimped. After the terminal is removed from the connector perform the following procedure in order to repair Micro-Pack 100 terminals.

1. Cut the wire as close to the terminal as possible.

NOTE: After cutting the damaged terminal from the wire, determine if the remaining wire is long enough to reach the connector without putting a strain on the wire. If the wire is not long enough, splice a small length of the same gauge wire to the existing wire, then crimp the new terminal on the added wire.

2. Strip 5 mm (3/16 in) of insulation from the wire.

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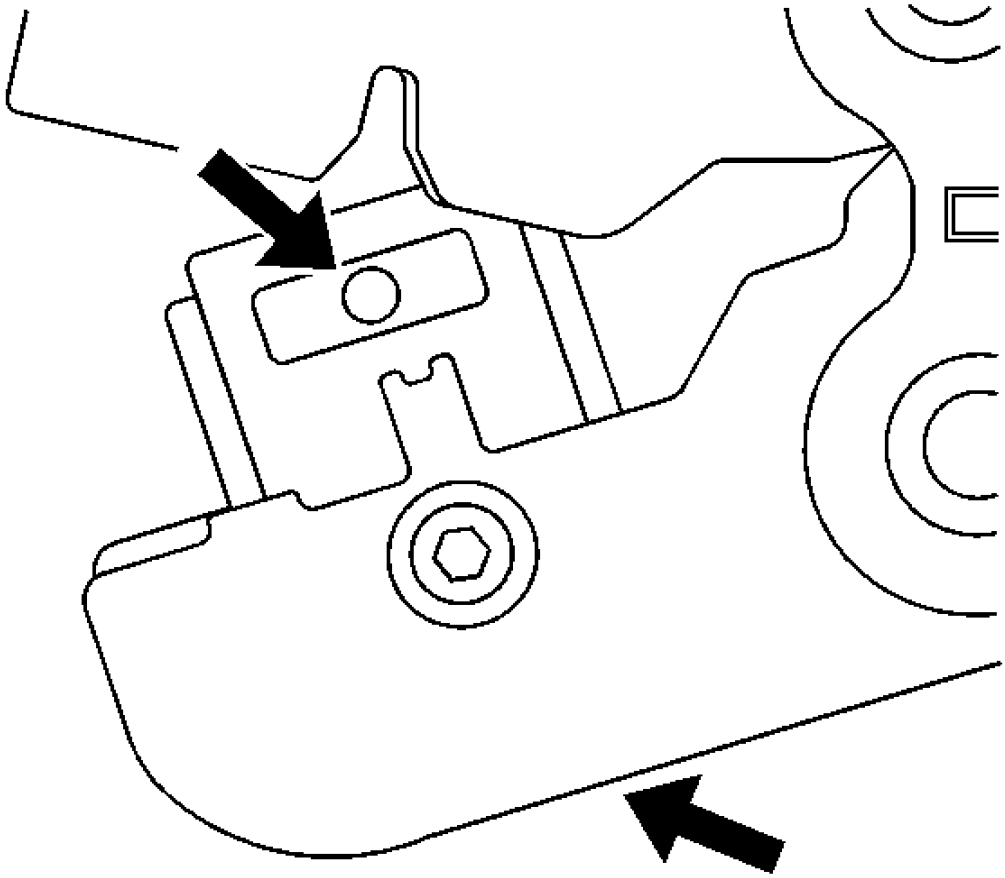


Fig. 58: View Of Crimping Tool Spring Loaded Locator
Courtesy of GENERAL MOTORS CORP.

3. Depress the spring loaded locator of the J 38125-101 (W jaw) crimping tool until the terminal holder is completely visible.

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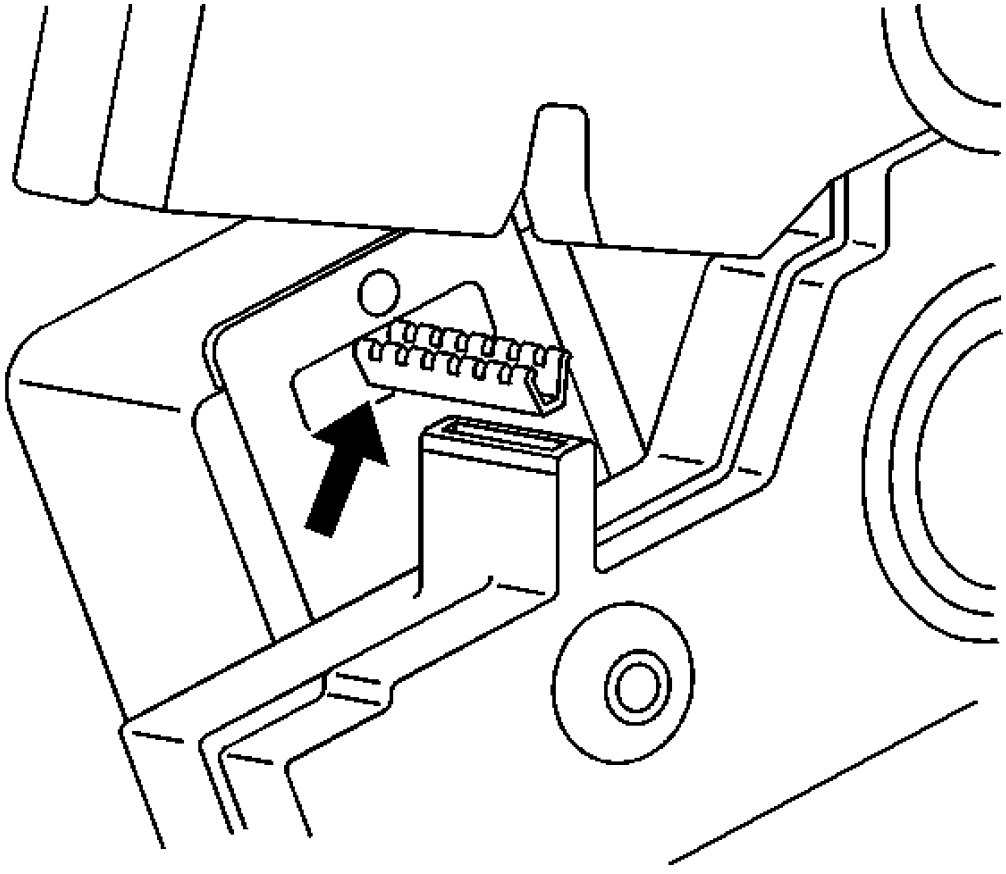


Fig. 59: Locating Terminal In Crimping Tool
Courtesy of GENERAL MOTORS CORP.

4. Insert the terminal into the crimp tool until the core wings are flush with the anvil on the crimp tool. Be sure that the wings are pointed toward the crimp tool former and release the spring locator. The locator will hold the terminal in place. Inspect the alignment of the terminal wings with the crimp tool former. If the terminal wings are wider than the crimp tool former, remove the terminal and bend the terminal wings in slightly.
5. Place stripped wire into terminal.
6. Crimp the new terminal to the wire. If a jam occurs, press the emergency release to open applicator.

Terminated Lead Repair

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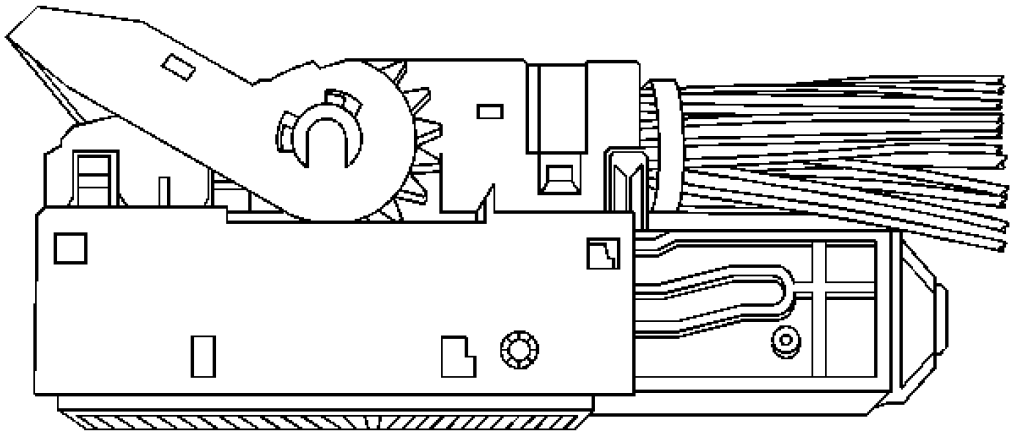


Fig. 60: View Of Assist Lever In Forward Position
Courtesy of GENERAL MOTORS CORP.

NOTE: Ensure that the dress cover and connector body are both in the released position before reassembling. Failure to do so may cause damage to the connector and component.

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

DELPHI CONNECTORS (WEATHER PACK)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

The following is the proper procedure for the repair of Weather Pack® Connectors.

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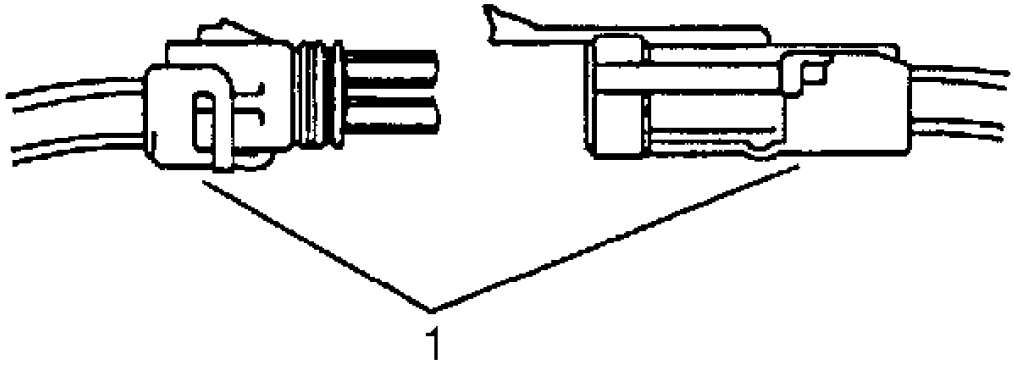


Fig. 61: View Of Connector Halves
Courtesy of GENERAL MOTORS CORP.

1. Separate the connector halves (1).
2. Open the secondary lock. A secondary lock aids in terminal retention and is usually molded to the connector (1).
3. Grasp the wire and push the terminal to the forward most position. Hold the wire in this position.

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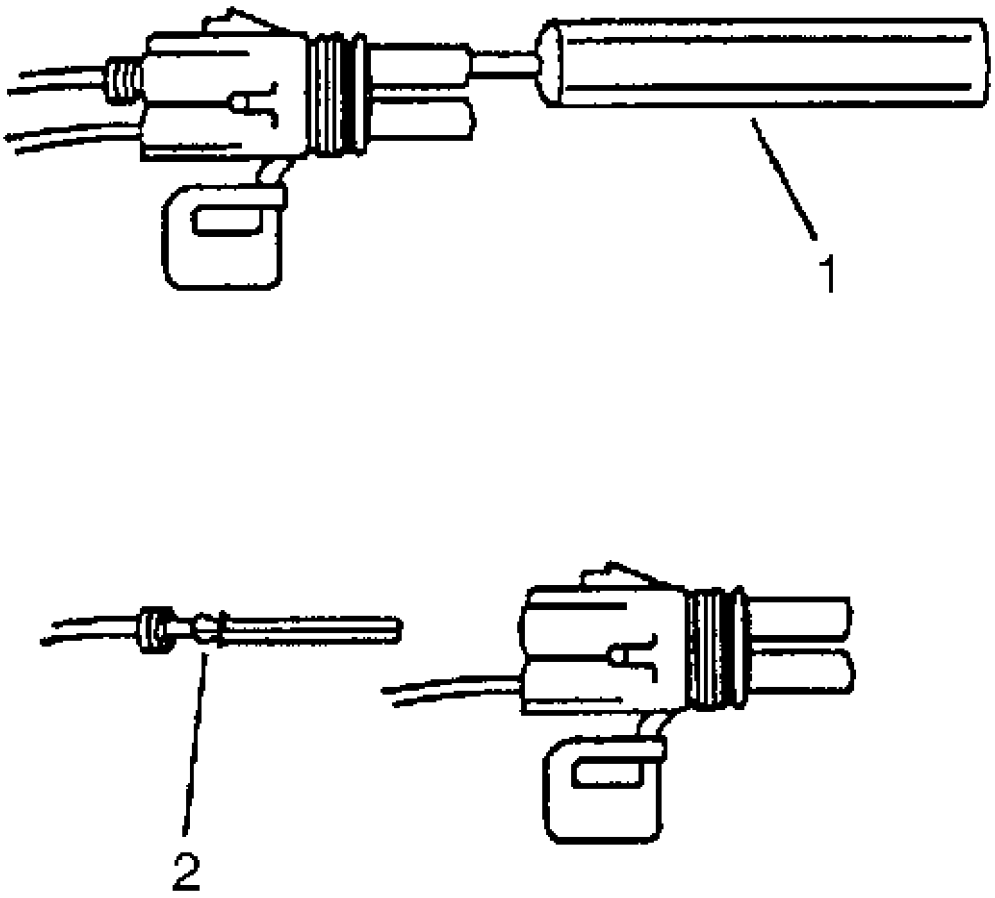


Fig. 62: Identifying Removal Tool & Terminal
Courtesy of GENERAL MOTORS CORP.

4. Insert the Weather Pack® terminal removal tool EL-38125-10A into the front (mating end) of the connector cavity until it rests on the cavity shoulder (1).
5. Gently pull on the wire to remove the terminal through the back of the connector (2).

NOTE: Never use force to remove a terminal from a connector.

6. Inspect the terminal and connector for damage. Repair as necessary. Refer to **Repairing Connector Terminals**.
7. Reform the lock tang (2) and reset terminal in connector body.
8. Close secondary locks and join connector halves.

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9. Verify that circuit is complete and working satisfactorily.
10. Perform system check.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

DELPHI CONNECTORS (PUSH TO SEAT)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal

Follow the steps below in order to repair push to seat connectors.

1. Remove the terminal position assurance (TPA) device, the connector position assurance (CPA) device, and/or the secondary lock.

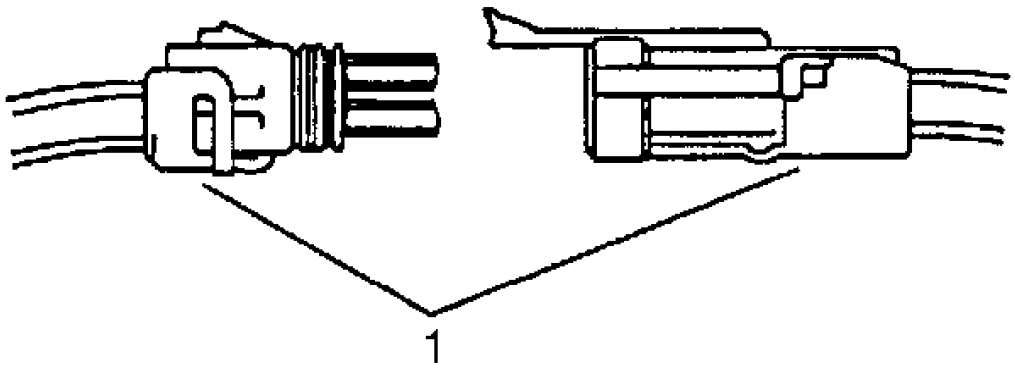


Fig. 63: View Of Connector Halves
Courtesy of GENERAL MOTORS CORP.

2. Separate the connector halves (1).

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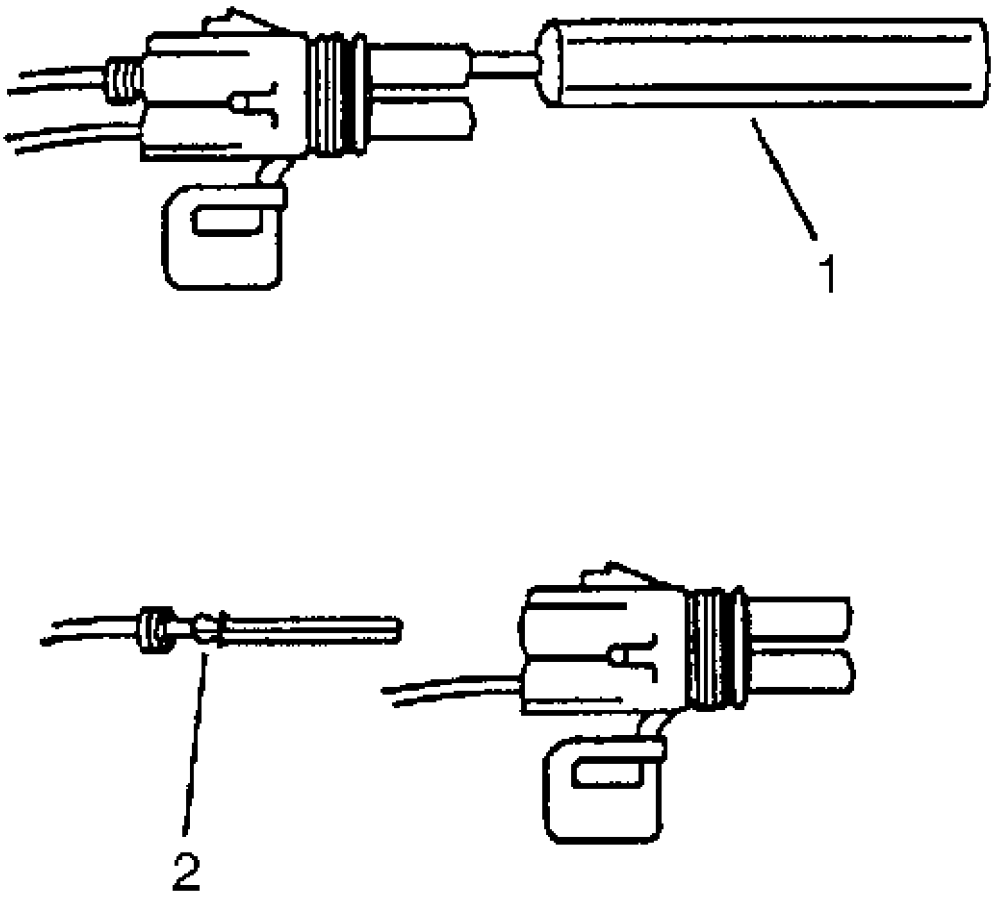


Fig. 64: Identifying Removal Tool & Terminal
Courtesy of GENERAL MOTORS CORP.

3. Use the proper pick or removal tool (1) in order to release the terminal.
4. Gently pull the cable and the terminal (2) out of the back of the connector.

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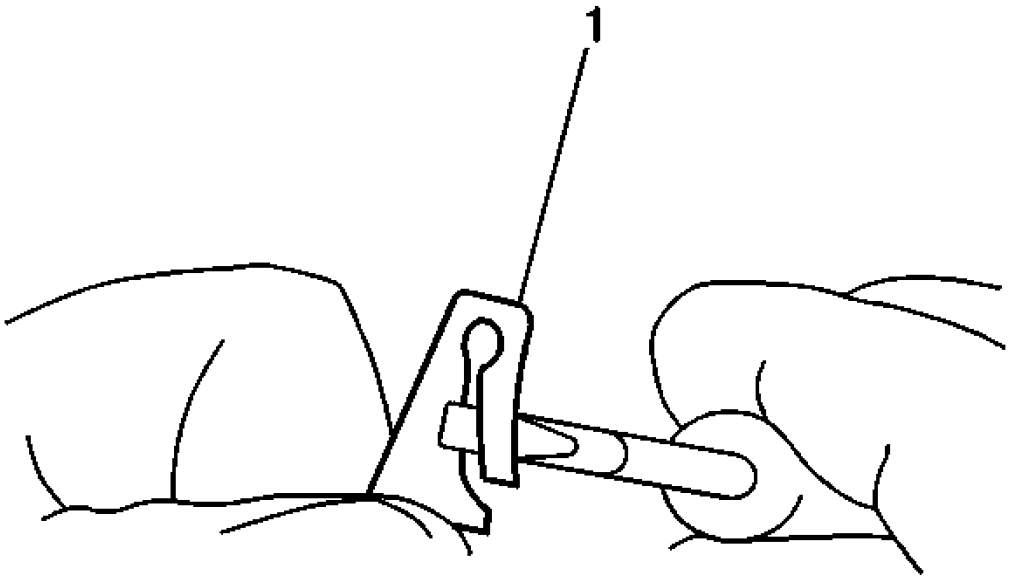


Fig. 65: Identifying Locking Device
Courtesy of GENERAL MOTORS CORP.

5. Re-form the locking device if you are going to reuse the terminal (1).
6. To repair the terminal, refer to Terminal Repair.

Reinstalling Terminal

1. In order to reuse a terminal or lead assembly, refer to **Wiring Repairs**.
2. Ensure that the cable seal is kept on the terminal side of the splice.
3. Insert the lead from the back until it catches.
4. Install the TPA, CPA, and/or the secondary locks.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

DELPHI CONNECTORS (PULL TO SEAT)

Special Tools

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For equivalent regional tools, refer to **Special Tools** .

Terminal Removal

If the terminal is visibly damaged or is suspected of having a faulty connection, the terminal should be replaced.

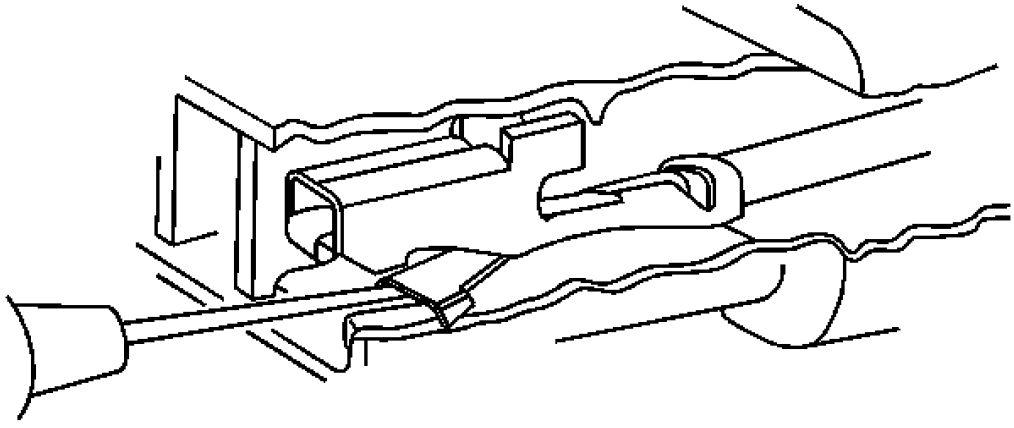


Fig. 66: Inserting Removal Tool
Courtesy of GENERAL MOTORS CORP.

Follow the steps below in order to repair pull-to-seat connectors:

1. Remove the connector position assurance (CPA) device and/or the secondary lock.
2. Disconnect the connector from the component or separate the connectors for in-line connectors.
3. Remove the terminal position assurance (TPA) device.
4. Insert the proper pick or removal tool into the front of the connector body.

NOTE: On connectors with more than one terminal the service loop may not be large enough to remove the terminal and crimp on a new one. If the terminal wire does not have a large enough service loop for removal, cut the wire 5 cm (2 in) behind the connector before removal.

5. Grasp the wire at the back of the connector body and gently push the terminal out the front of the connector body.

Terminal Repair

1. If the wire needed to be cut in order to remove the terminal, gently push a small length of the same size wire through the back of the connector cavity until there is enough wire exposed in order to crimp on a

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new terminal. If the wire was not cut, cut the existing wire as close to the old terminal as possible.
2. Strip 5 mm (3/16 in) of insulation from the wire.
3. Crimp a new terminal to the wire.
4. Solder the crimp with rosin core solder.

Terminal Installation

1. Align the terminal and pull the wire from the back of the connector in order to seat the terminal.
2. If necessary, cut the new wire to proper length and splice with existing circuit. Refer to **Splicing Copper Wire Using Splice Sleeves**.
3. If the connector is outside of the passenger compartment, apply dielectric grease to the connector.
4. Install the TPA, CPA, and/or the secondary locks.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

DELPHI CONNECTORS (MICRO-PACK 100W)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

There are 2 styles of Micro-Pack 100W connectors. These connectors are very similar but use different terminals and have some minor physical differences also.

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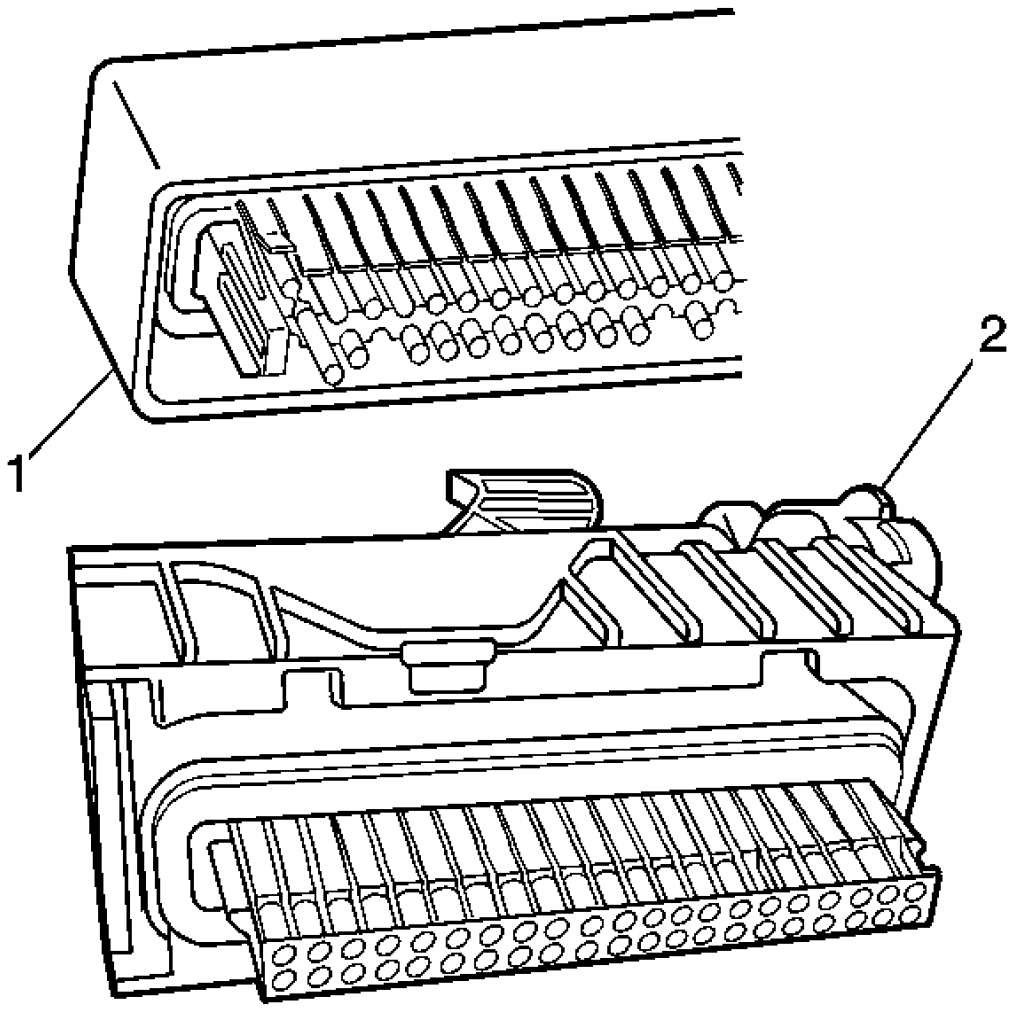


Fig. 67: Identifying Micro-Pack 100W First & Second Connector Designs
Courtesy of GENERAL MOTORS CORP.

The first connector design of the Micro-Pack 100W (1) has a white connector interface that holds the terminals. The second design of the Micro-Pack 100W (2) has a gray interface to hold the terminals. Also, the first design has terminal cavities that are further apart (3 mm centerline) and offset from the other row of terminal cavities in the connector. The second design has terminals cavities that are closer together (2.54 mm centerline) and aligned vertically. One other way to identify the second design is the thin strip of material that runs along the outside of the cavities.

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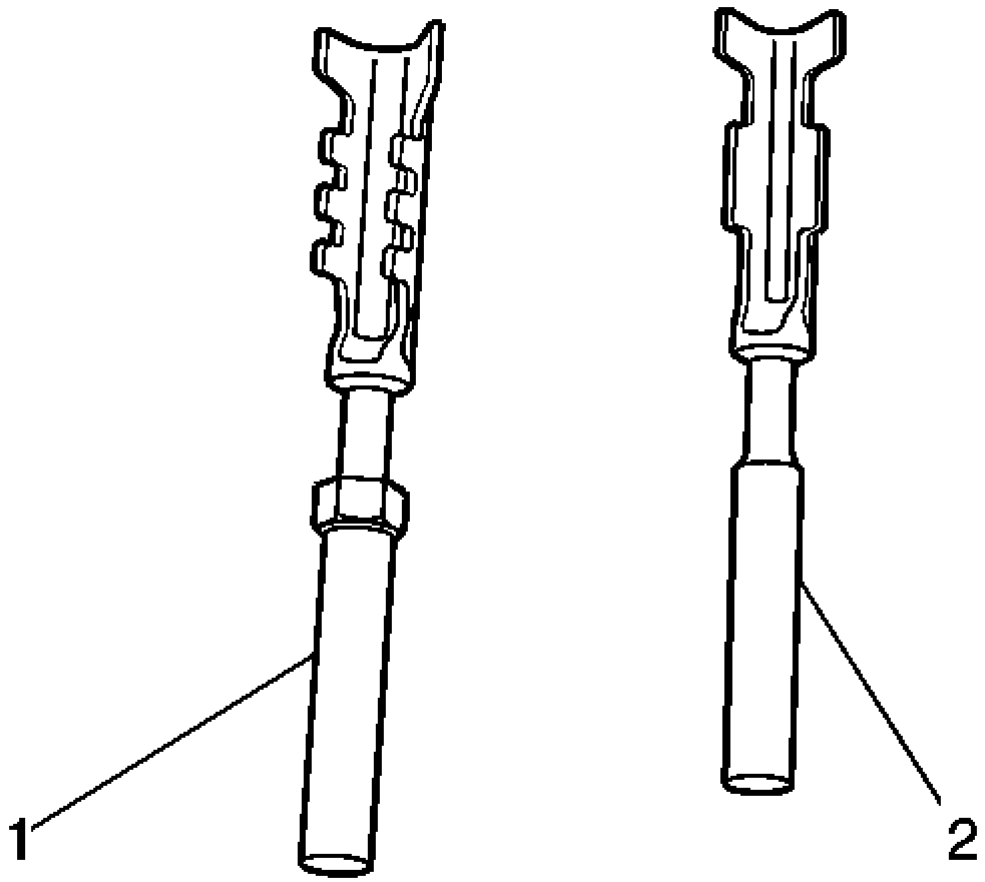


Fig. 68: Identifying Micro-Pack 100W Short & Long Terminals
Courtesy of GENERAL MOTORS CORP.

NOTE: There are 2 styles of Micro-Pack 100W terminals which are very similar. Ensure that you have the correct terminal before crimping the new terminal to the wire. The first design connector uses the longer terminal (1) that has a raised area in front of the recess in the terminal. The second design connector uses the shorter terminal without the raised area.

Follow the steps below in order to remove terminals from Micro-Pack 100W connectors. Some Micro-Pack 100W connector disassembly procedures will vary. Use this procedure as a guide.

1. Disconnect the connector from the component.

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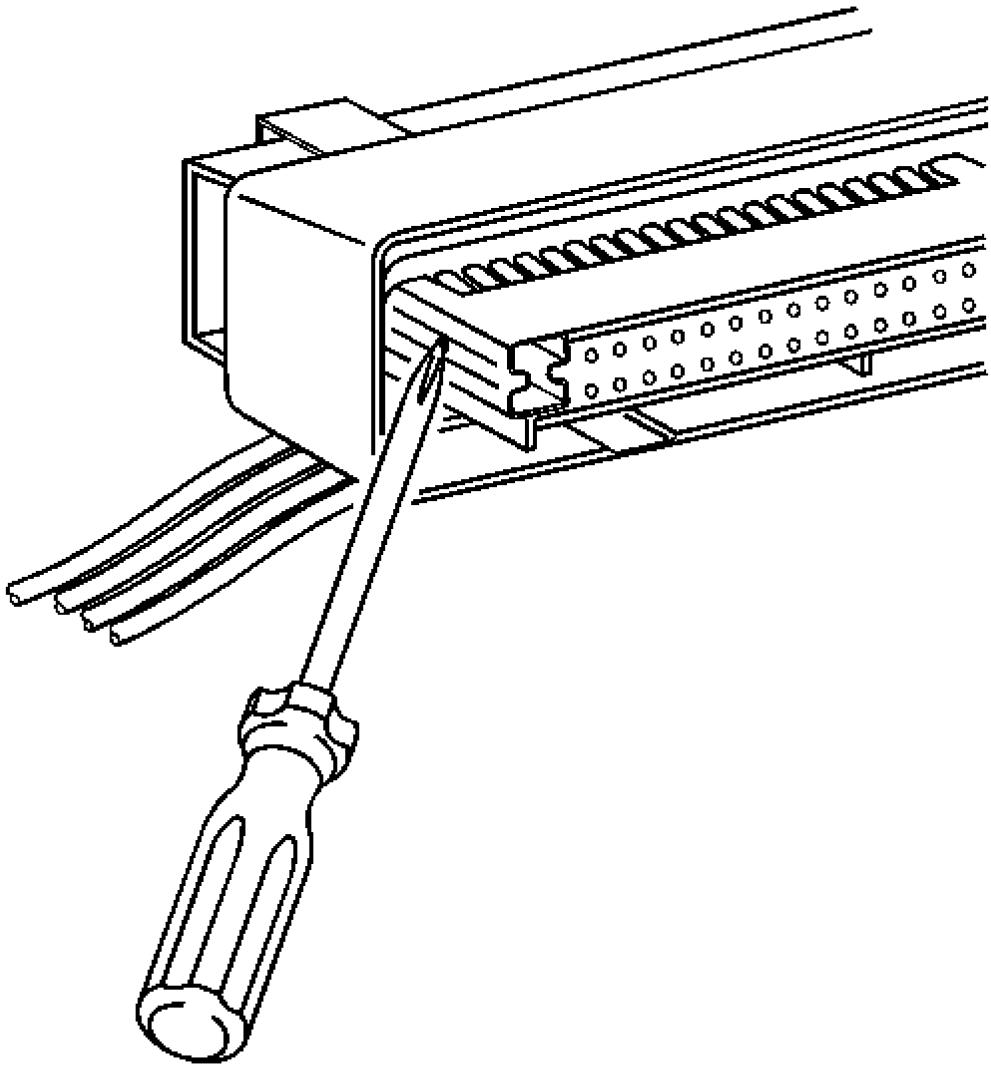


Fig. 69: Locating Nose Piece Locking Tabs
Courtesy of GENERAL MOTORS CORP.

2. Locate the nose piece locking tabs that are positioned on the side of the connector nose piece. The connector nose piece acts as a terminal positive assurance (TPA) and may be referred to as such.

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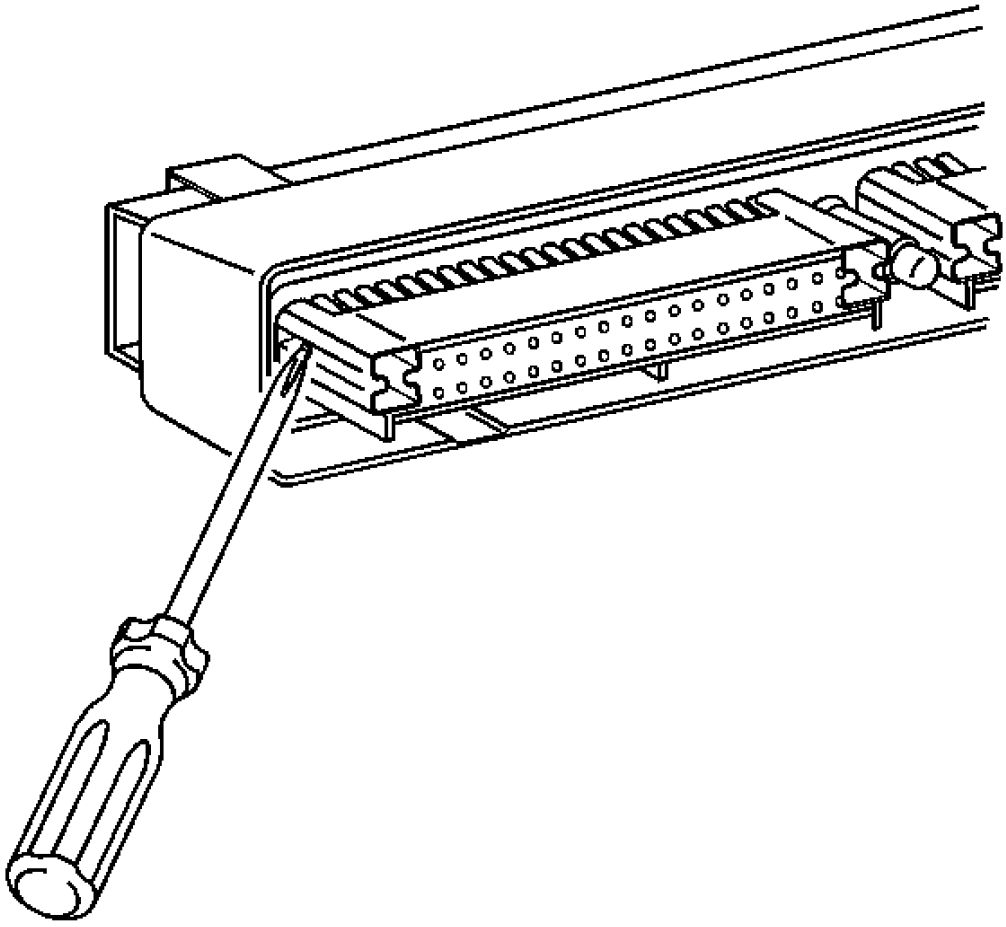


Fig. 70: Loosening Nose Piece Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Use a small flat-blade tool to push in one of the locking tabs while gently pulling on the same side of the nose piece.
4. Repeat the procedure for the other locking tab and remove the nose piece.
5. Remove the wire dress cover. The following is a general procedure for wire dress cover removal. Use this procedure as a guide, some dress cover removal procedures may vary.

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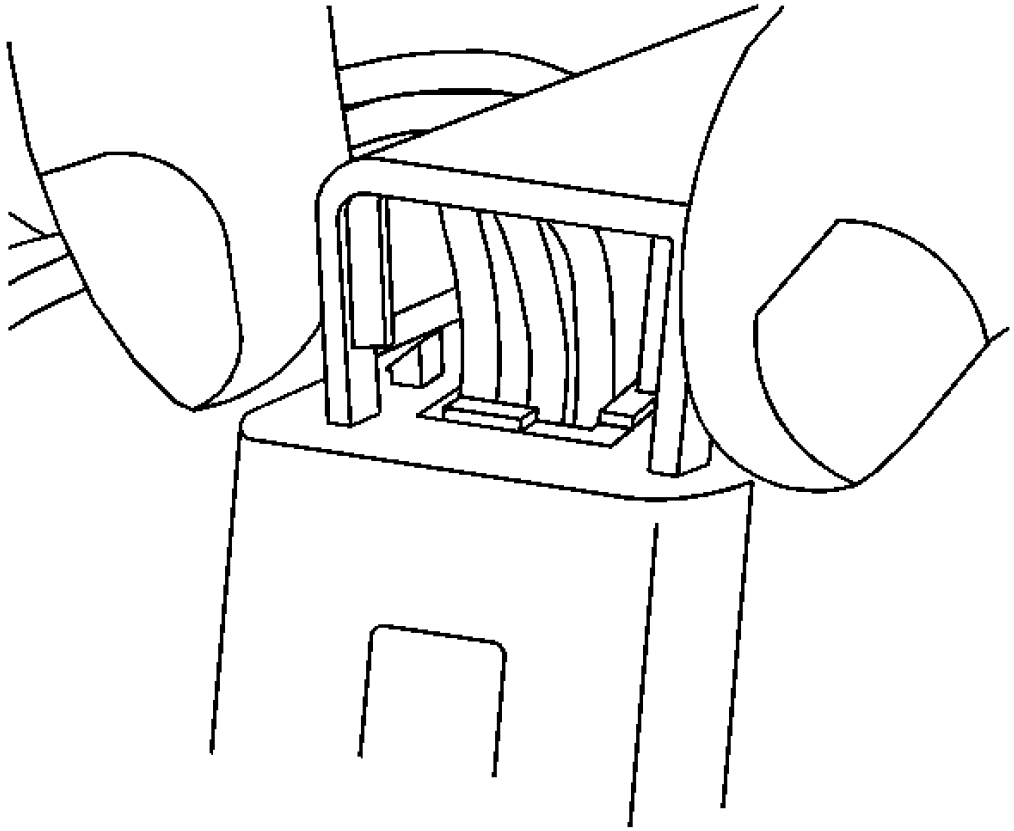


Fig. 71: Squeezing Cover Locking Legs
Courtesy of GENERAL MOTORS CORP.

6. Use fingers to squeeze the 2 locking legs of the cover.

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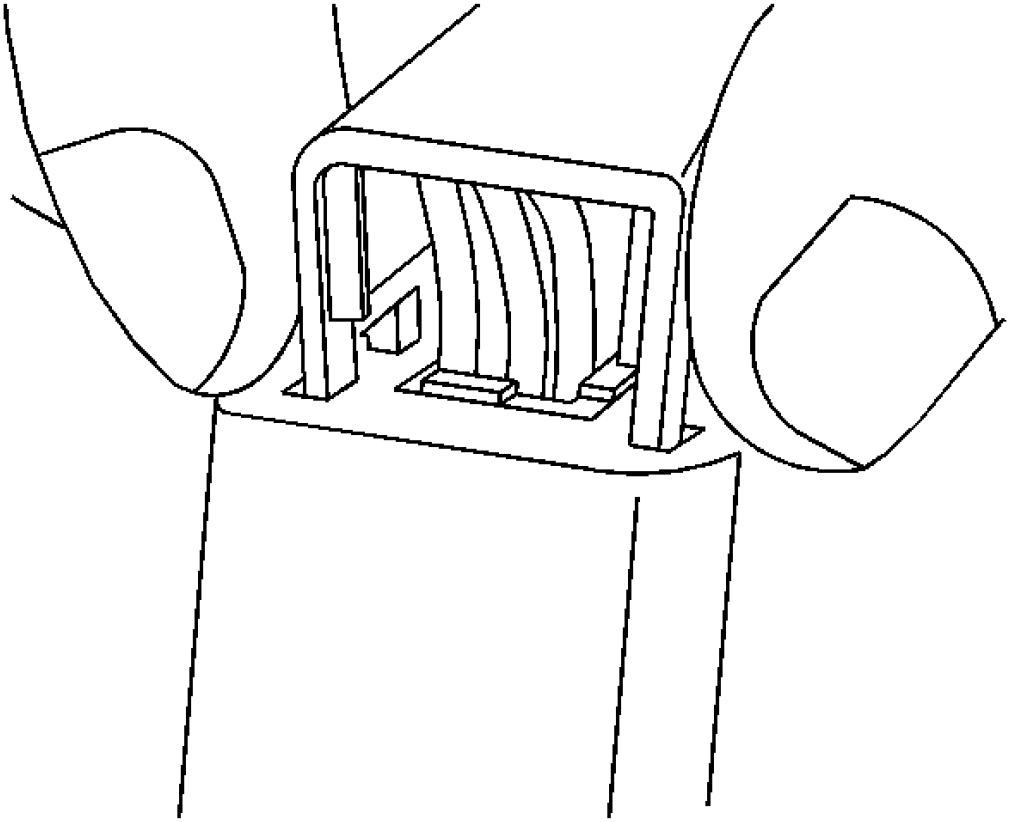


Fig. 72: Unseating Locking Leg
Courtesy of GENERAL MOTORS CORP.

7. Apply pressure and gently rock the cover until one locking leg is unseated.

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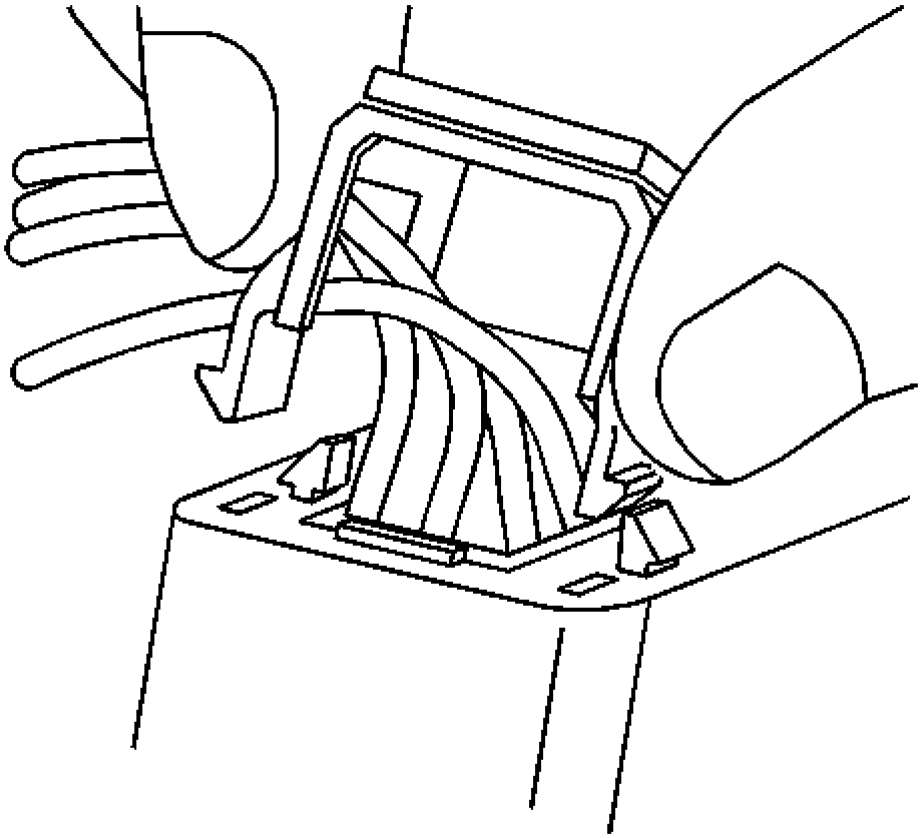


Fig. 73: Removing Cover
Courtesy of GENERAL MOTORS CORP.

8. Continue to apply pressure and rock the cover until the second locking leg is unseated. Repeat procedure for the other side of the dress cover and remove the cover.

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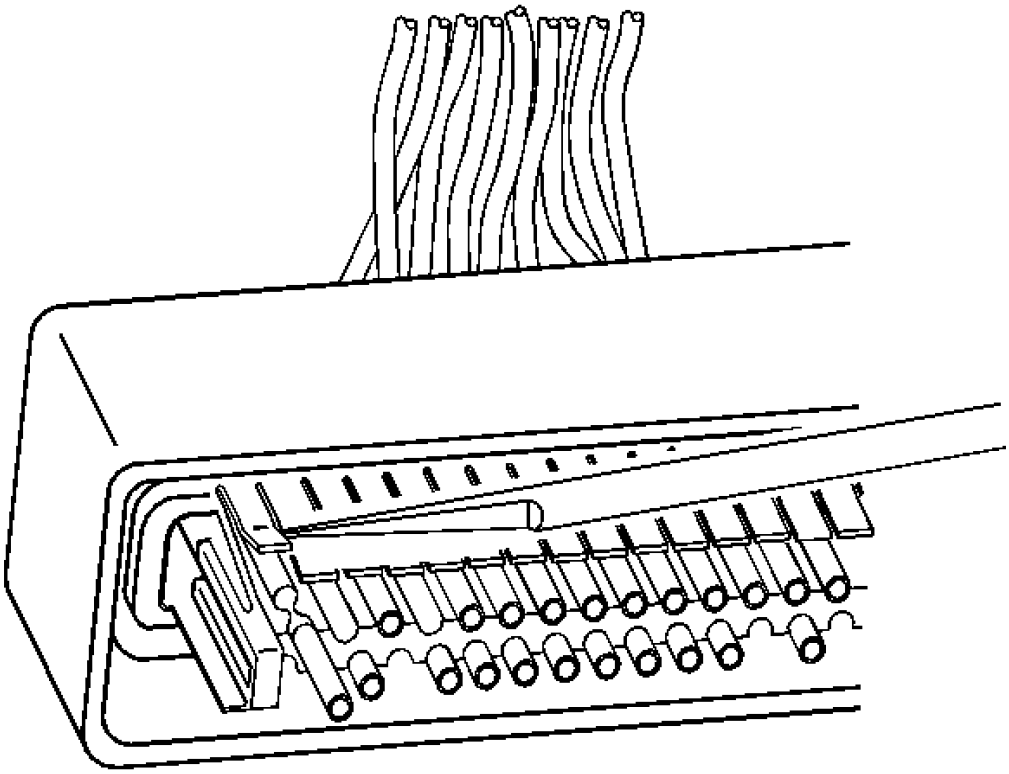


Fig. 74: Identifying Terminal Retaining Tab
Courtesy of GENERAL MOTORS CORP.

9. Use EL-38125-12A to gently lift the terminal retaining tab while gently pulling the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.
10. If the terminal is severely bent or damaged, it may be possible on some connectors to push the wire out of the front of the connector instead of pulling it through. This will prevent damage to the internal seals of the connector. Once the terminal is pushed out of the connector, cut the wire as close to the terminal as possible and pull the wire through the connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

Terminal Repair Procedure

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The Micro-Pack 100W connectors have small terminals that are difficult to handle and hold when crimping. In order to aid the technician when crimping these terminals, a new crimping tool was developed. The J 38125-101 (W jaw) crimping tool was developed to crimp Micro-Pack 100W terminals. The J 38125-101 (W jaw) crimping tool has a terminal holding block that will hold the terminal in place while the terminal is being crimped. After the terminal is removed from the connector perform the following procedure in order to repair Micro-Pack 100 terminals.

1. Cut the wire as close to the terminal as possible.

   NOTE: After cutting the damaged terminal from the wire, determine if the remaining wire is long enough to reach the connector without putting a strain on the wire. If the wire is not long enough, splice a small length of the same gauge wire to the existing wire, then crimp the new terminal on the added wire.

2. Strip 5 mm (3/16 in) of insulation from the wire.

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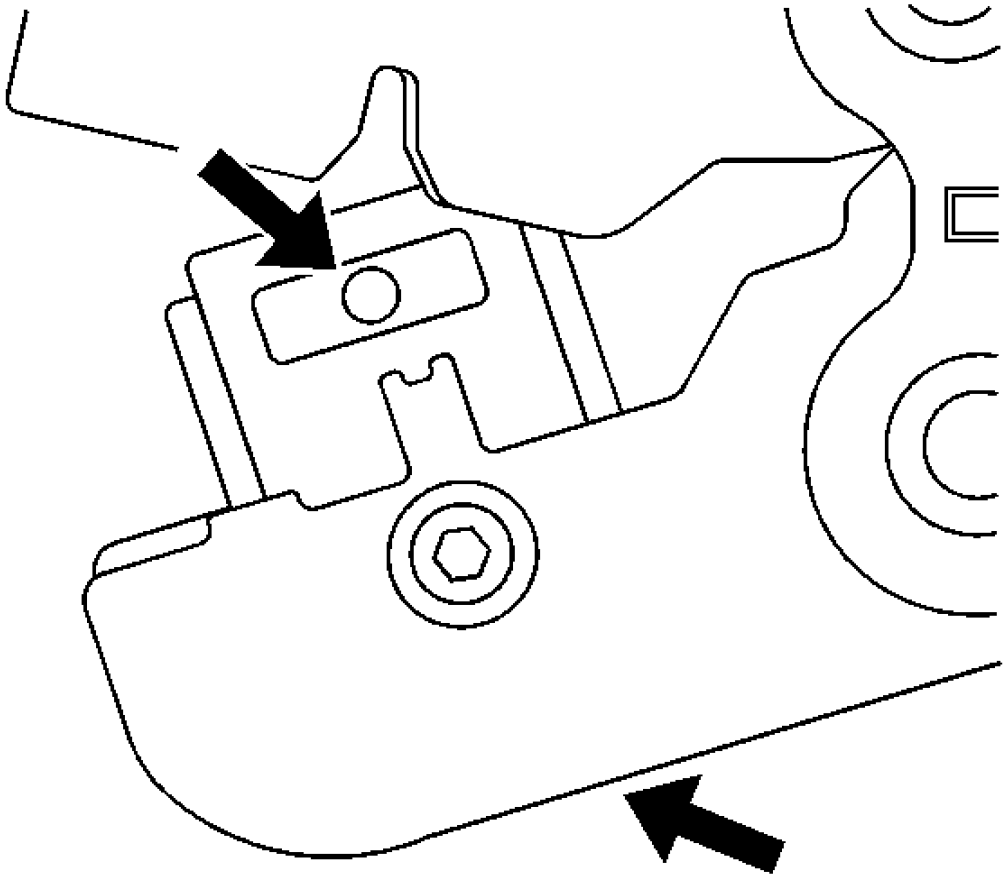


Fig. 75: Identifying Crimping Tool Spring Loaded Locator
Courtesy of GENERAL MOTORS CORP.

3. Depress the spring loaded locator of the J 38125-101 (W jaw) crimping tool until the terminal holder is completely visible.

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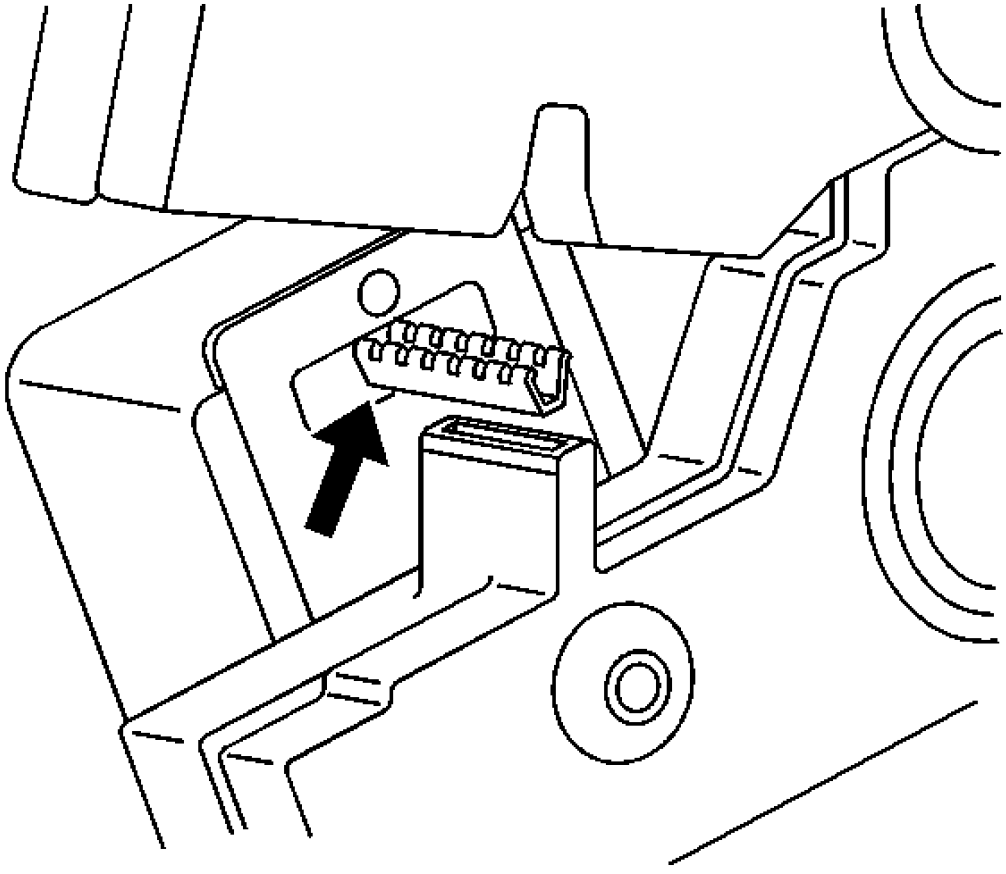


Fig. 76: Locating Terminal In Crimping Tool
Courtesy of GENERAL MOTORS CORP.

4. Insert the terminal into the crimp tool until the core wings are flush with the anvil on the crimp tool. Be sure that the wings are pointed toward the crimp tool former and release the spring locator. The locator will hold the terminal in place. Inspect the alignment of the terminal wings with the crimp tool former. If the terminal wings are wider than the crimp tool former, remove the terminal and bend the terminal wings in slightly.
5. Place stripped wire into terminal.
6. Crimp the new terminal to the wire. If a jam occurs, press the emergency release to open applicator.

Terminal Replacement Procedure

After the terminal is crimped to the wire perform the following procedure in order to replace Micro-Pack 100 terminals.

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1. Slide the new terminal into the correct cavity at the back of the connector.
2. Push the terminal into the connector until it locks into place. The new terminal should be even with the other terminals. Ensure that the terminal is locked in place by gently pulling on the wire.
3. To assemble the connector, reverse the Terminal Removal Procedure.

DELPHI CONNECTORS (MICRO .64)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

Follow the steps below in order to remove terminals from Micro .64 connectors.

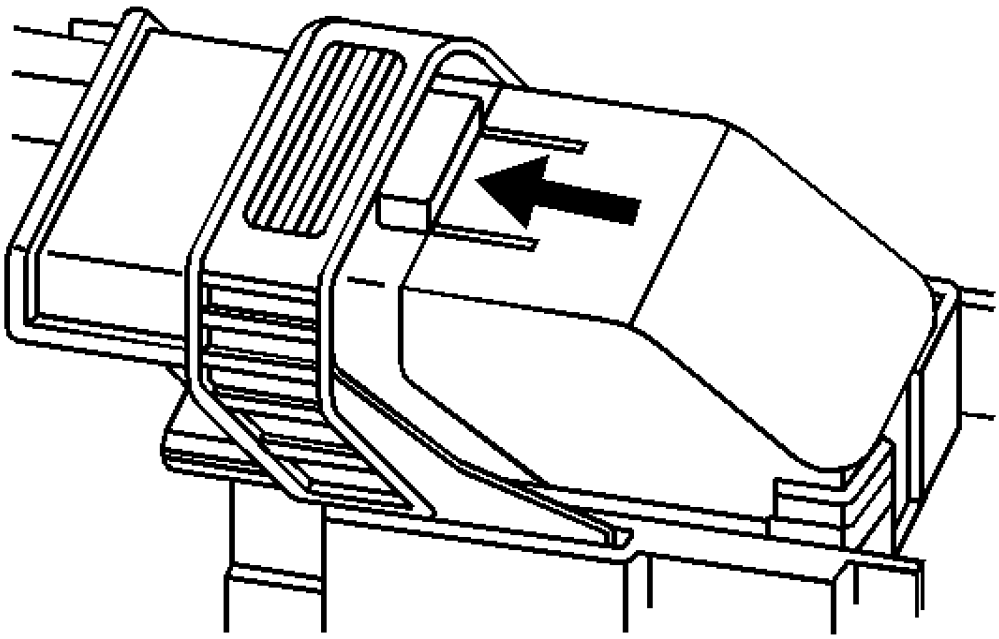


Fig. 77: Identifying Wire Dress Cover Lever Lock
Courtesy of GENERAL MOTORS CORP.

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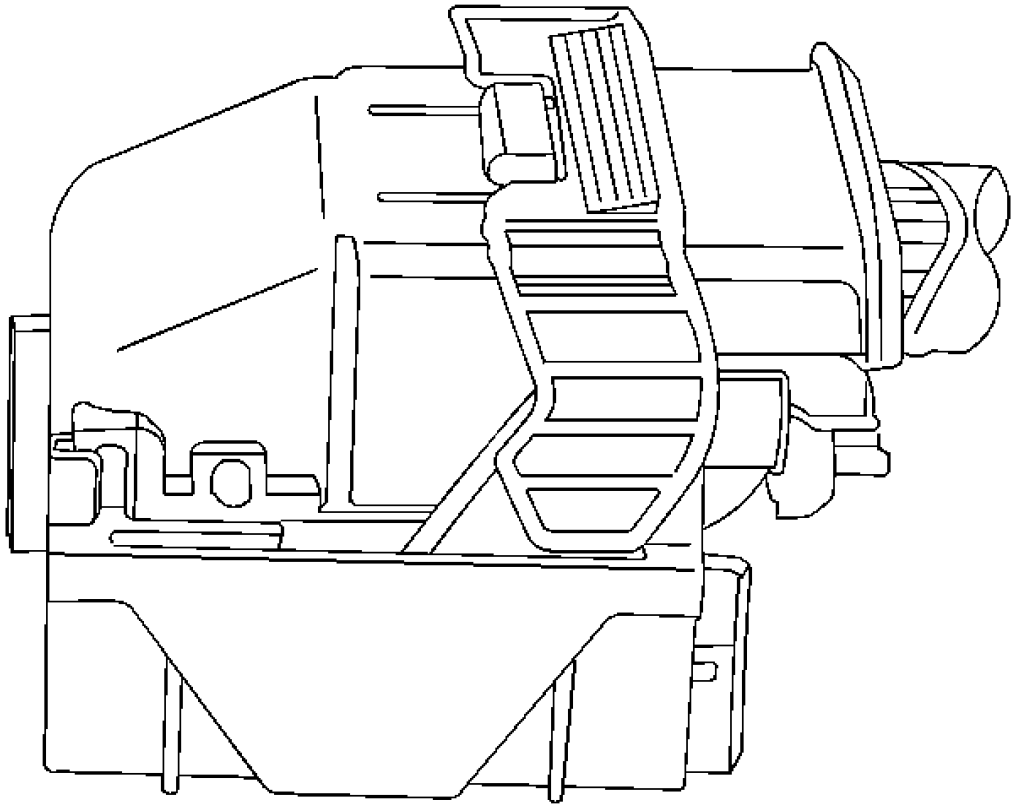


Fig. 78: View Of Typical Micro 64 Connector
Courtesy of GENERAL MOTORS CORP.

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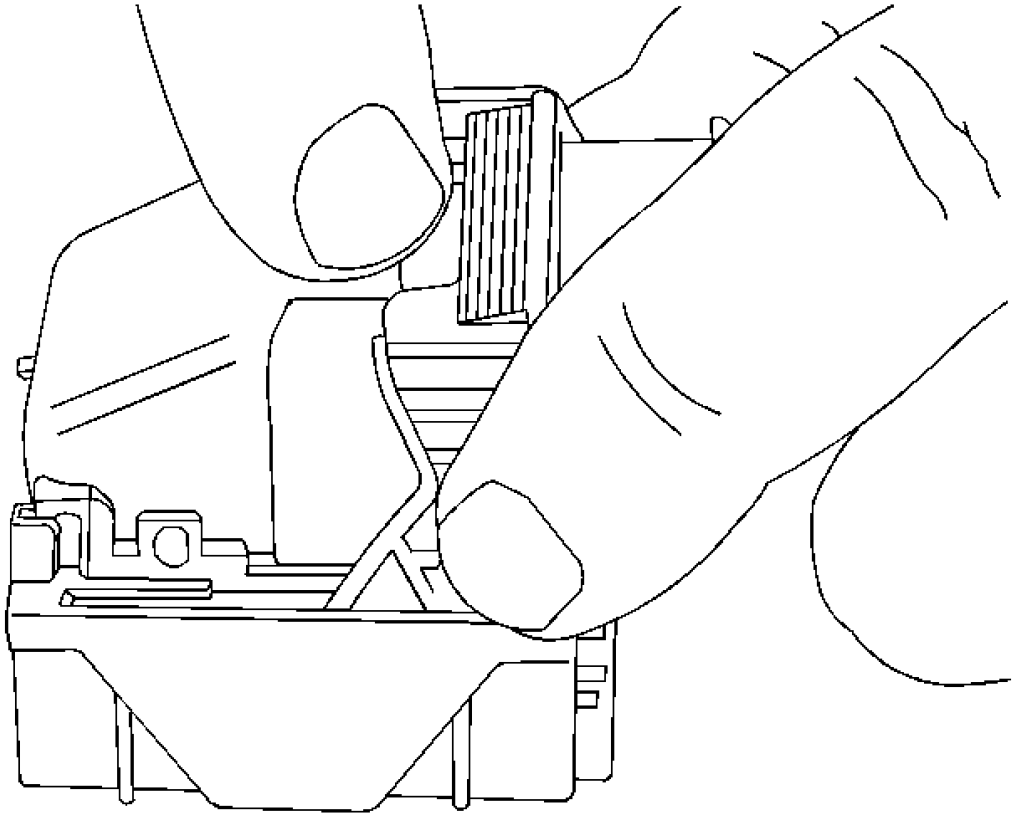


Fig. 79: Depressing Lock & Pulling Lever
Courtesy of GENERAL MOTORS CORP.

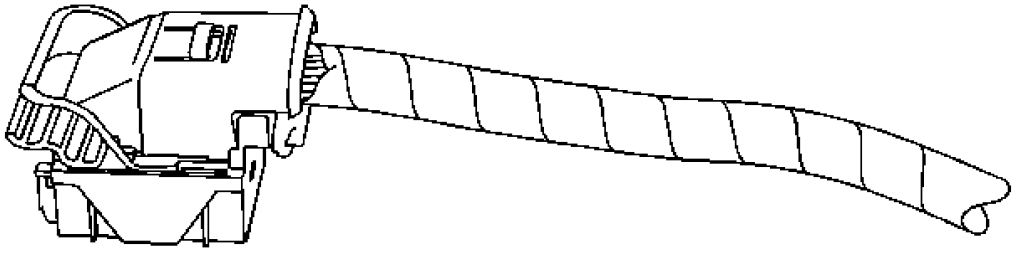


Fig. 80: View Of Connector When Released From Component

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Courtesy of GENERAL MOTORS CORP.

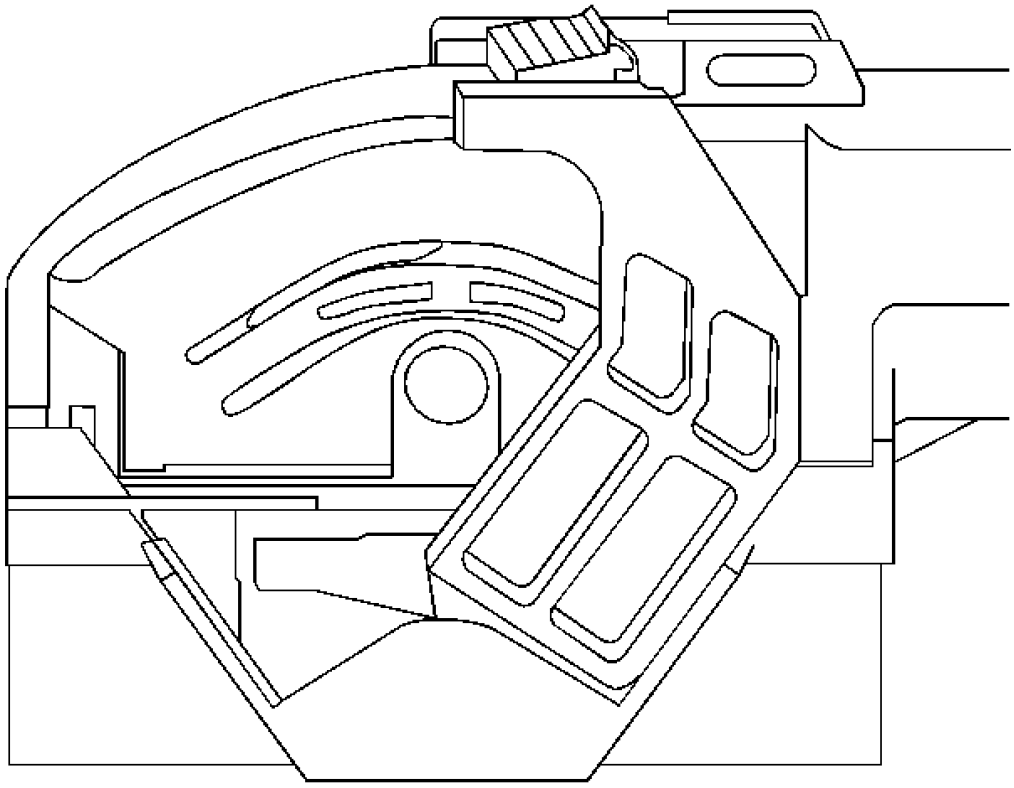


Fig. 81: View Of Another Type Of Micro 64 Connector
Courtesy of GENERAL MOTORS CORP.

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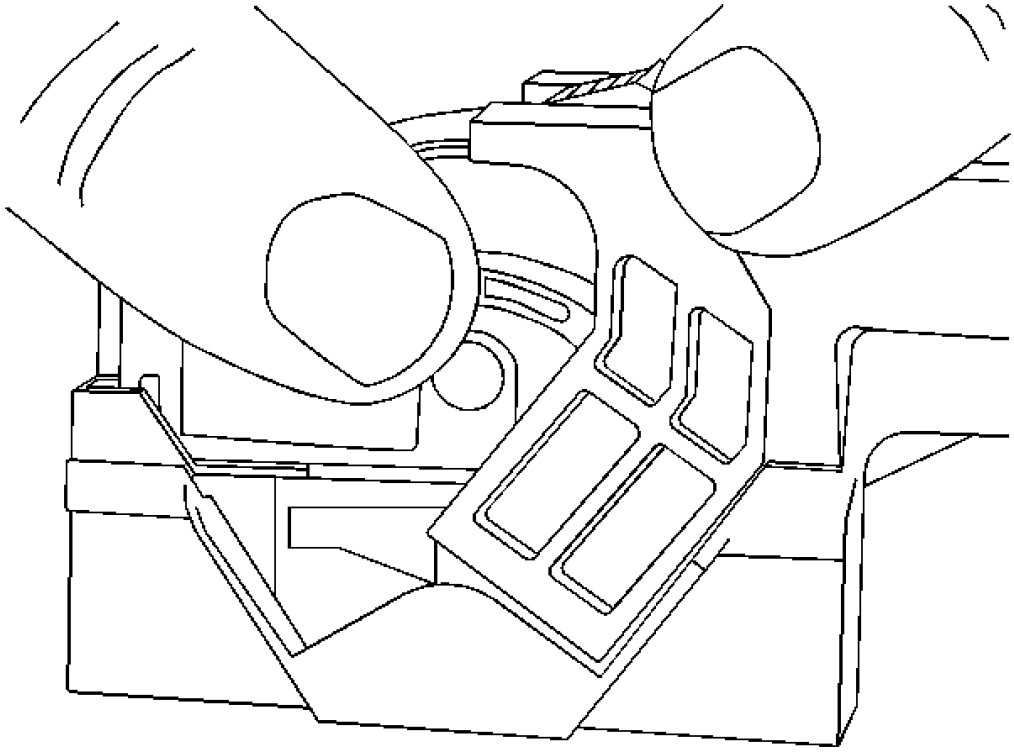


Fig. 82: Locating Locks On Both Sides Of Wire Dress Cover
Courtesy of GENERAL MOTORS CORP.

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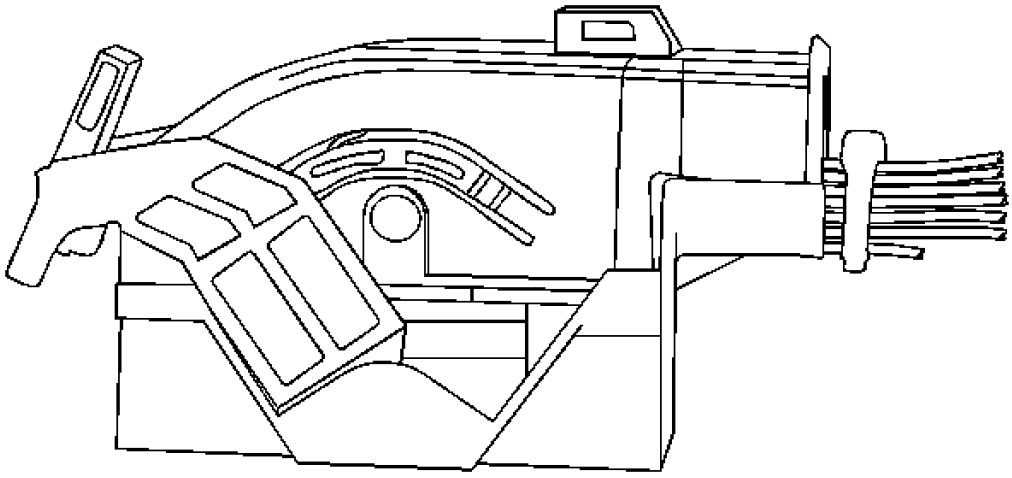


Fig. 83: View Of Connector When Released From Component
Courtesy of GENERAL MOTORS CORP.

1. Locate the lever lock on the wire dress cover. While depressing the lock, pull the lever over and past the lock. The lever lock may be located on the top or sides of the wire dress cover.

   View of a typical Micro 64 connector.

   Depress the lock and pull the lever over and past the lock.

   View of the connector when released from the component.

   View of another type of Micro 64 connector.

   Depress the locks that are located on both sides of the wire dress cover and pull the lever over and past the locks.

   View of the connector when released from the component.

2. Disconnect the connector from the component.

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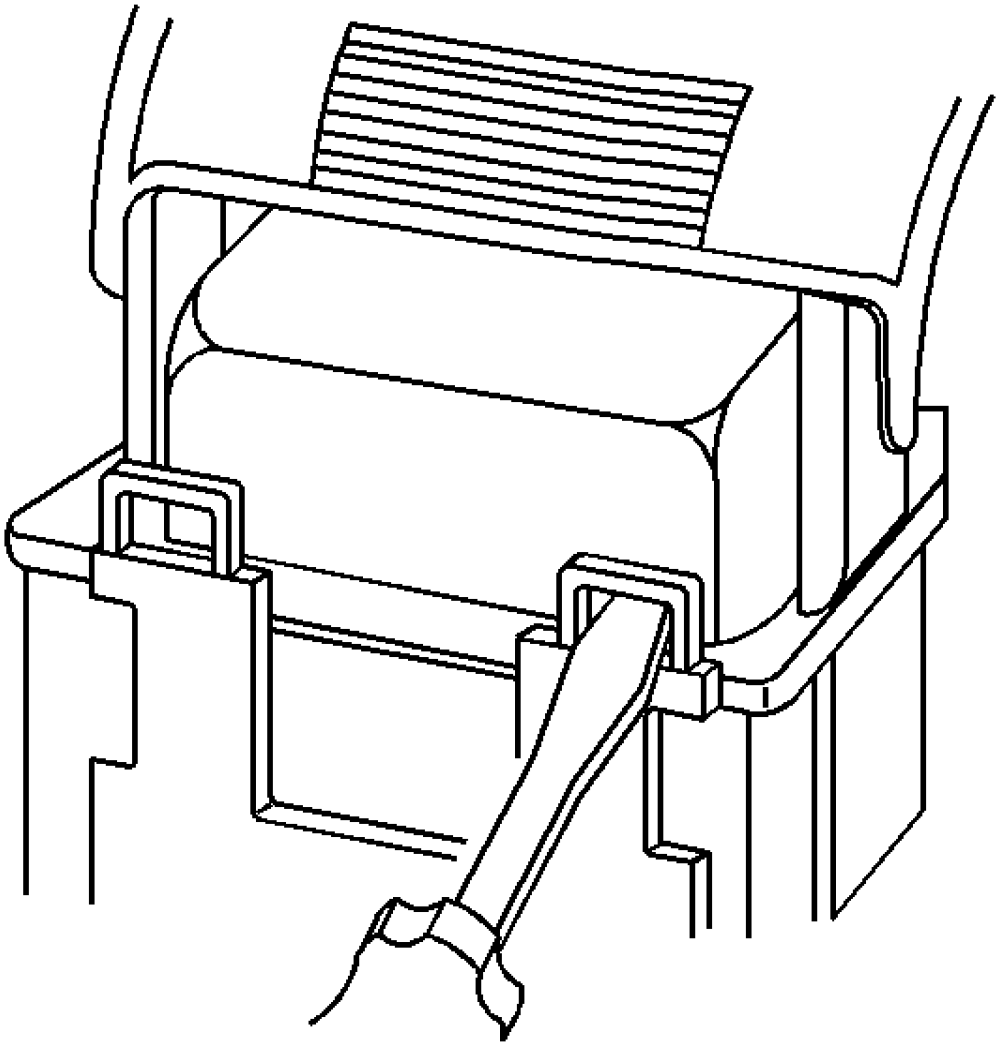


Fig. 84: Releasing Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Locate the dress cover locking tabs at the front of the connector. Using a small flat-blade tool push down on one of the locking tabs and pull the cover up until the dress cover releases. Repeat this procedure for the other locking tab.
4. Once the front 2 locks are unlocked, lift the front of the dress cover and pull it forward.

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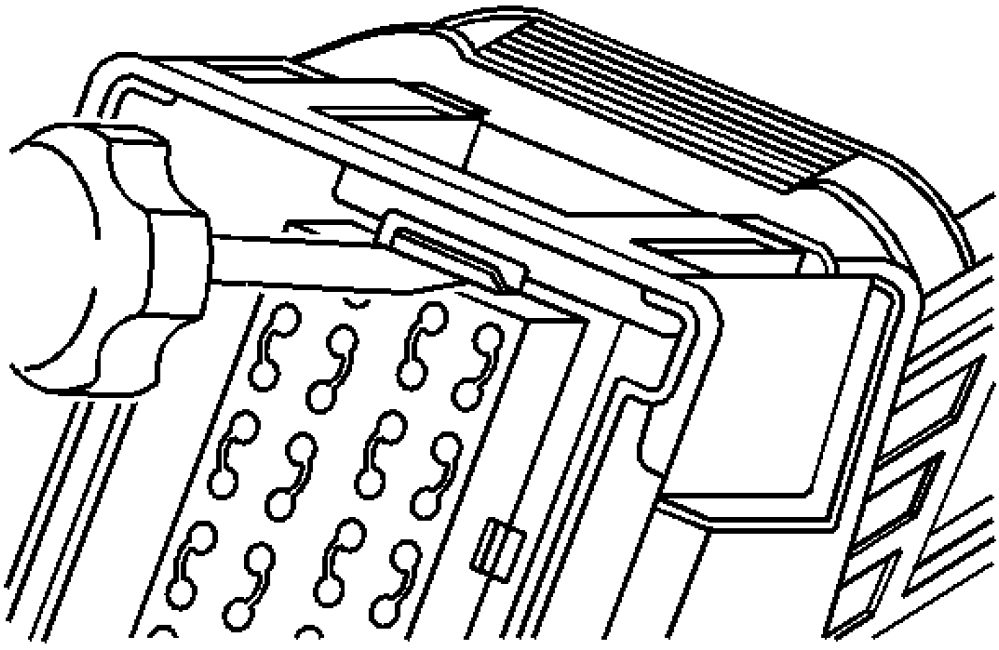


Fig. 85: Removing Terminal Position Assurance
Courtesy of GENERAL MOTORS CORP.

NOTE: Always use care when removing a terminal position assurance (TPA) in order to avoid damaging it.

5. Remove the TPA by inserting a small flat-blade tool into the small slot on the TPA and pushing down until the TPA releases. Gently pry the TPA out of the connector.

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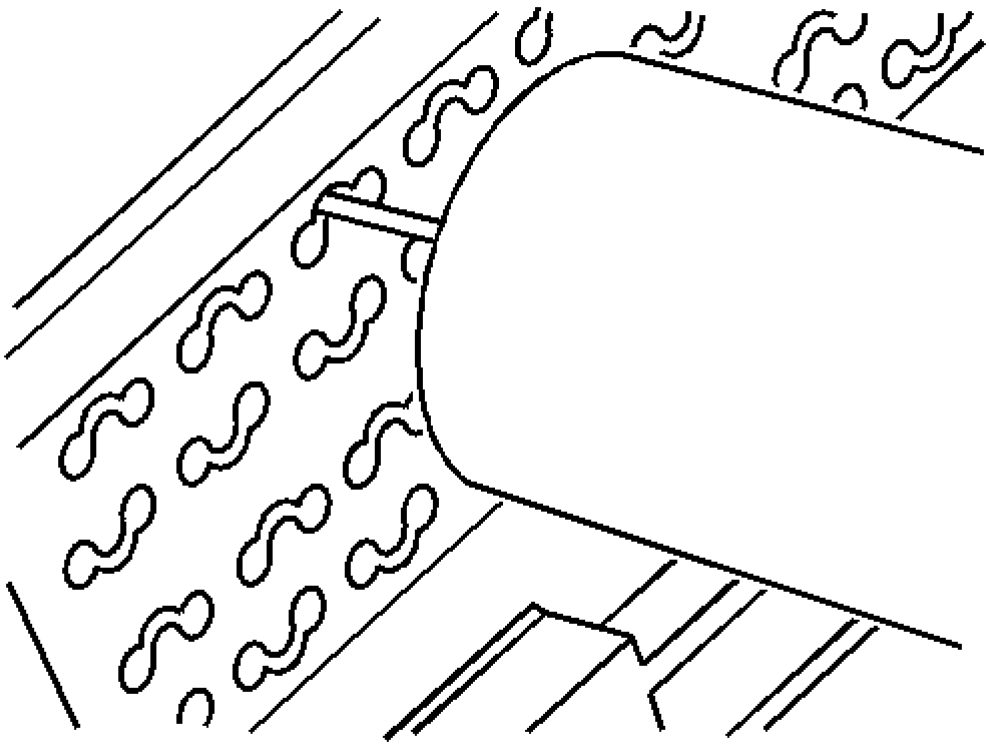


Fig. 86: Inserting Terminal Release Tool
Courtesy of GENERAL MOTORS CORP.

NOTE: Be careful not to angle or rock the EL-38125-21 tool when inserting it into the connector or the tool may break.

6. Insert the EL-38125-21 tool into the round canal between the terminals cavities at the front of the connector.

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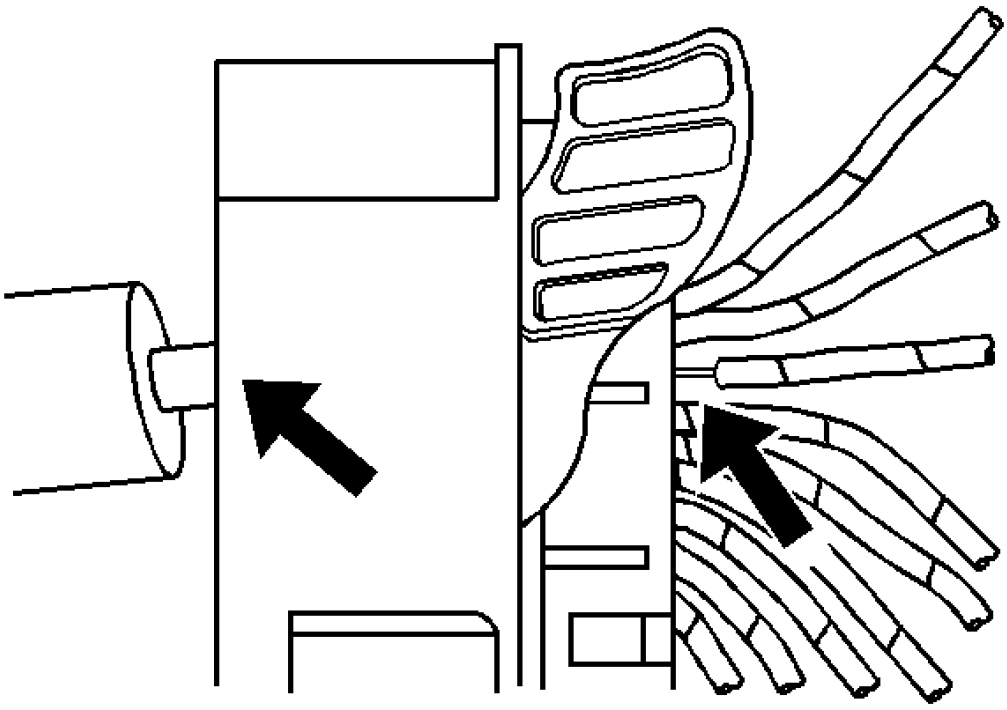


Fig. 87: Removing Wire From Back Of Connector
Courtesy of GENERAL MOTORS CORP.

7. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

DELPHI CONNECTORS (12-WAY)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

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Follow the steps below in order to remove terminals from the connector.

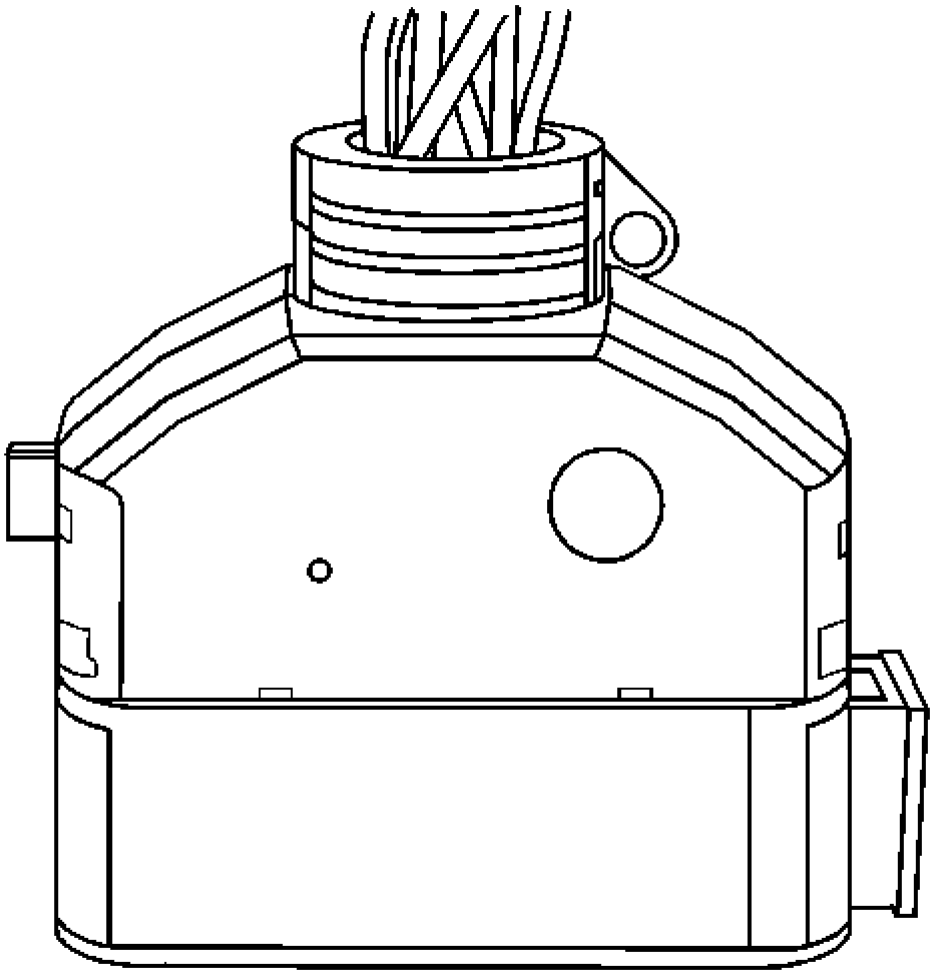


Fig. 88: Identifying Lever Lock
Courtesy of GENERAL MOTORS CORP.

1. Locate the lever lock on the wire dress cover. Remove the connector position assurance (CPA) and slide the lever lock away from the connector body.
2. Disconnect the connector from the component.

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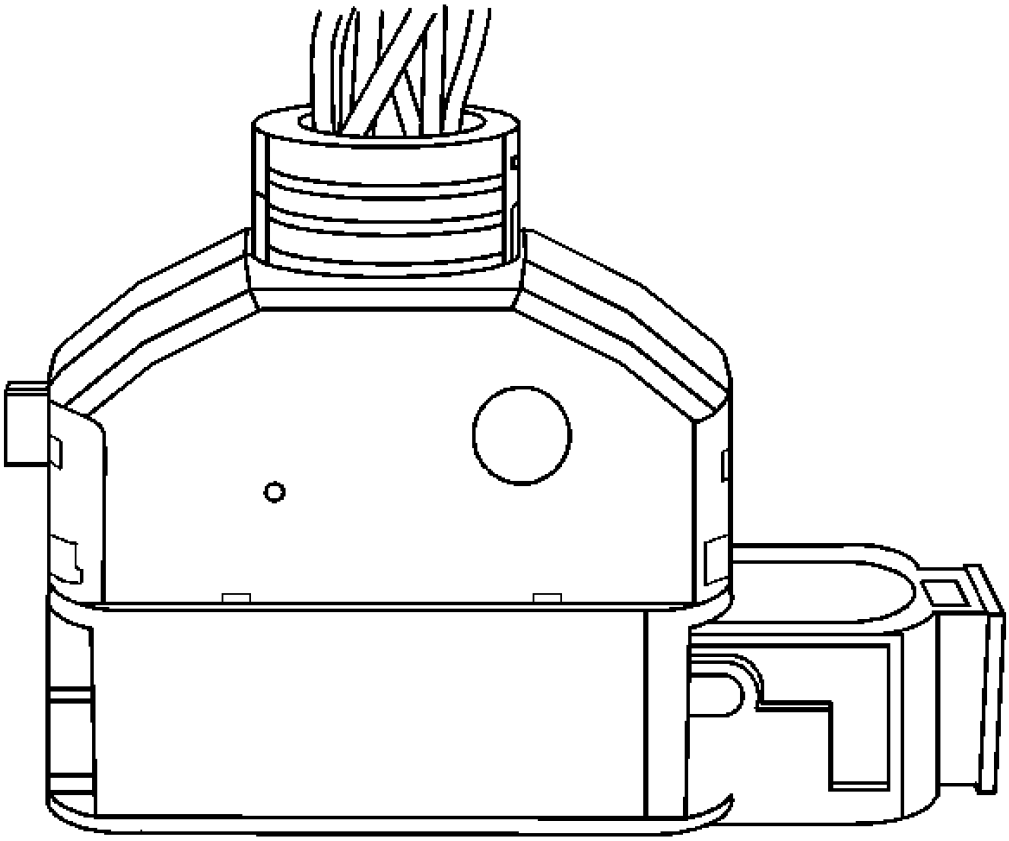


Fig. 89: Releasing Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Locate the dress cover locking tabs on the dress cover of the connector. Using a small flat-blade tool release all of the locking tabs.

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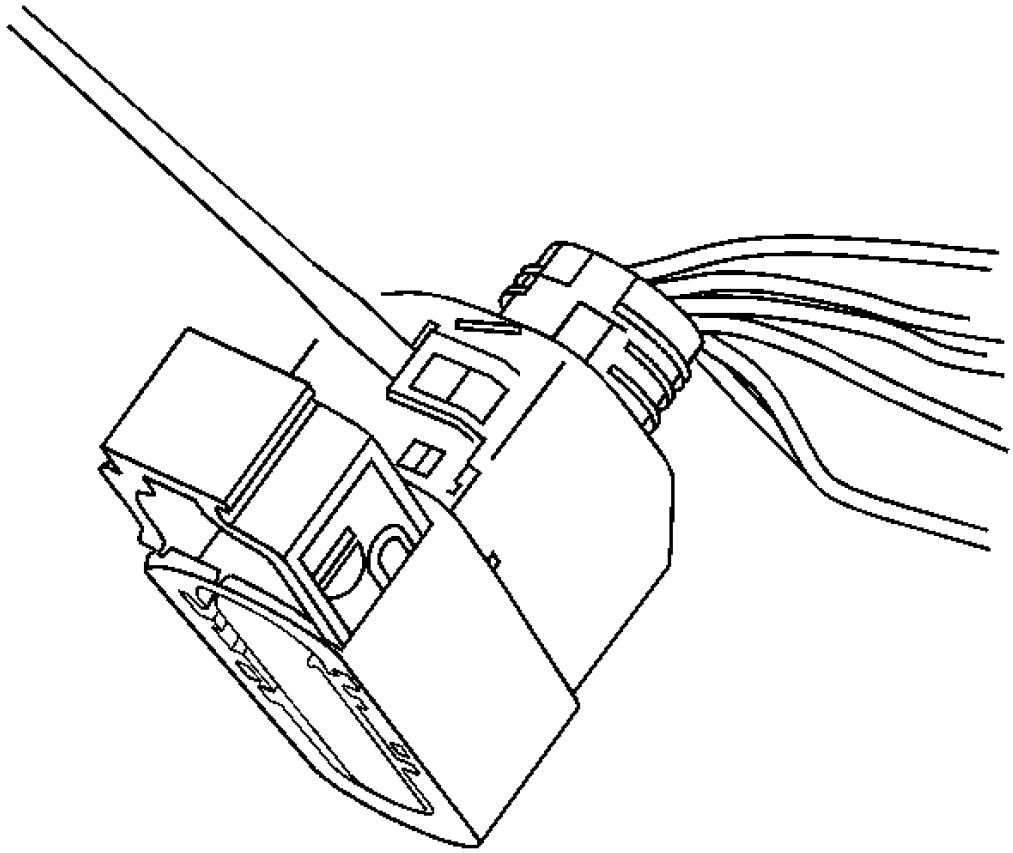


Fig. 90: Identifying Lower Wire Dress Cover Locking Tab
Courtesy of GENERAL MOTORS CORP.

4. Release the lower wire dress cover locking tab.

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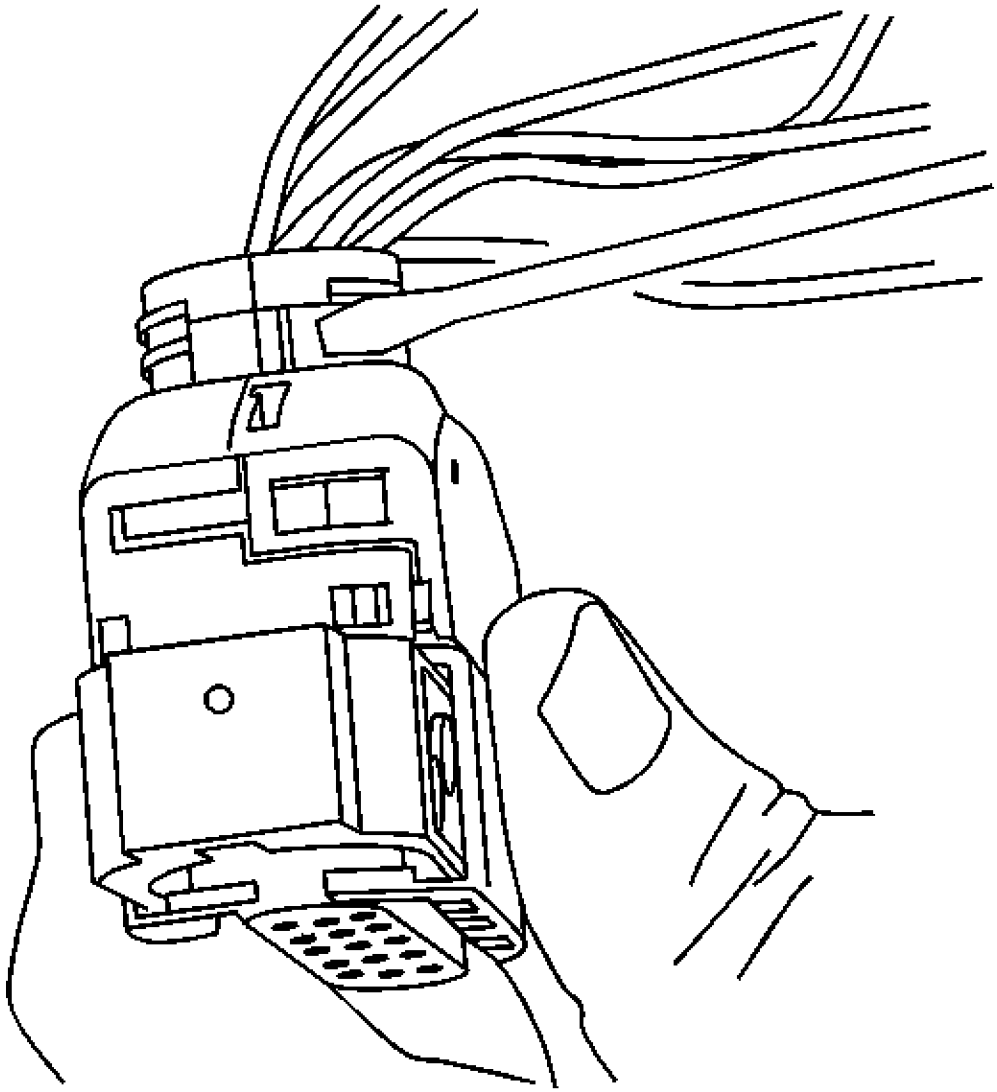


Fig. 91: Identifying Upper Wire Dress Cover Locking Tab
Courtesy of GENERAL MOTORS CORP.

5. Release the upper wire dress cover locking tab.
6. Once the locks are unlocked, lift the dress cover off.

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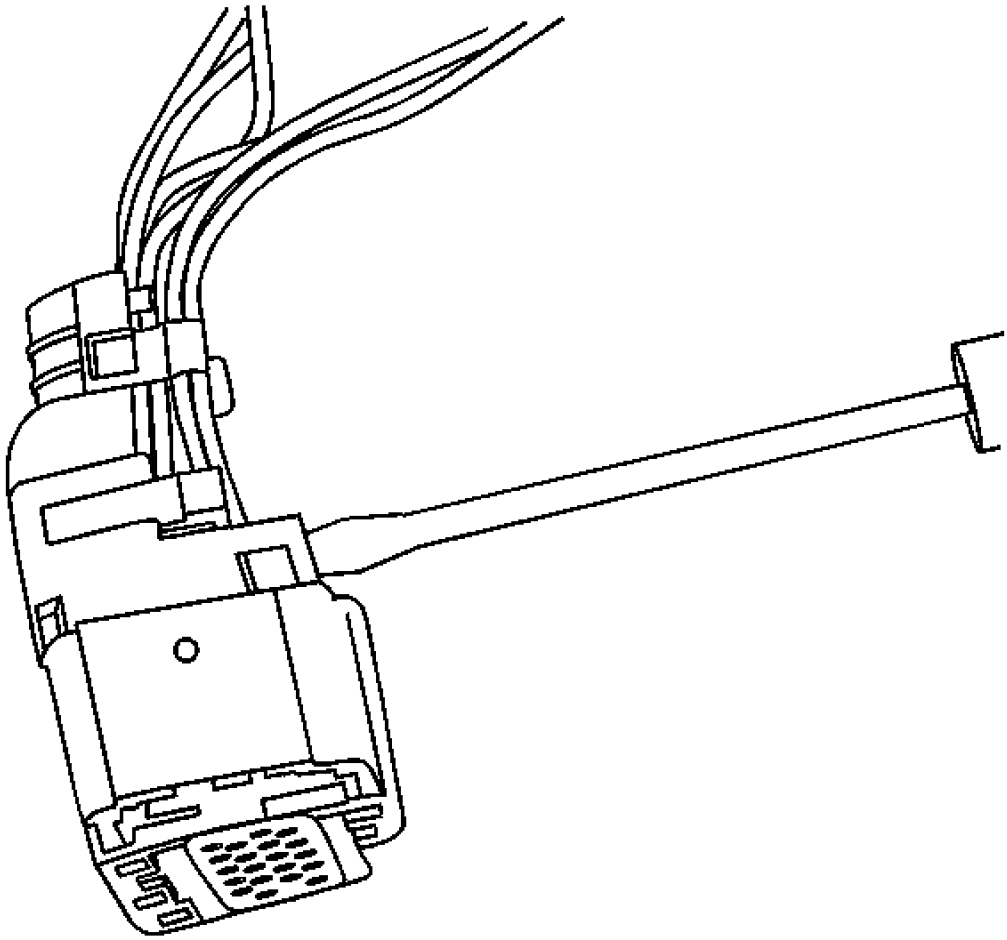


Fig. 92: Prying TPA Out Of Connector
Courtesy of GENERAL MOTORS CORP.

NOTE: Always use care when removing a terminal position assurance (TPA) in order to avoid damaging it.

7. Remove the TPA by inserting a small flat-blade tool into the locking tabs on both sides of the TPA. Gently pry the TPA out of the connector.

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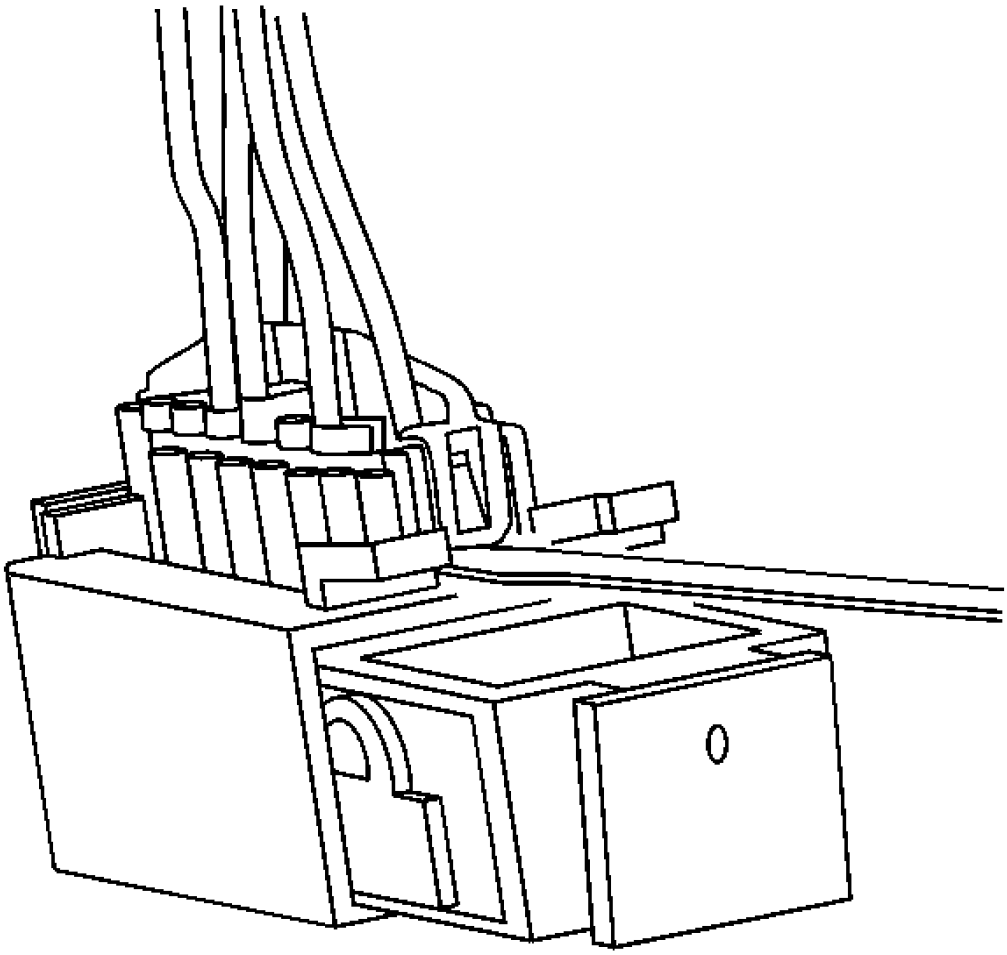


Fig. 93: Removing Nose Piece
Courtesy of GENERAL MOTORS CORP.

8. Remove the nose piece by inserting a small flat-blade tool into the locking tabs on both sides of the nose piece. Gently pry the nose piece out of the connector.

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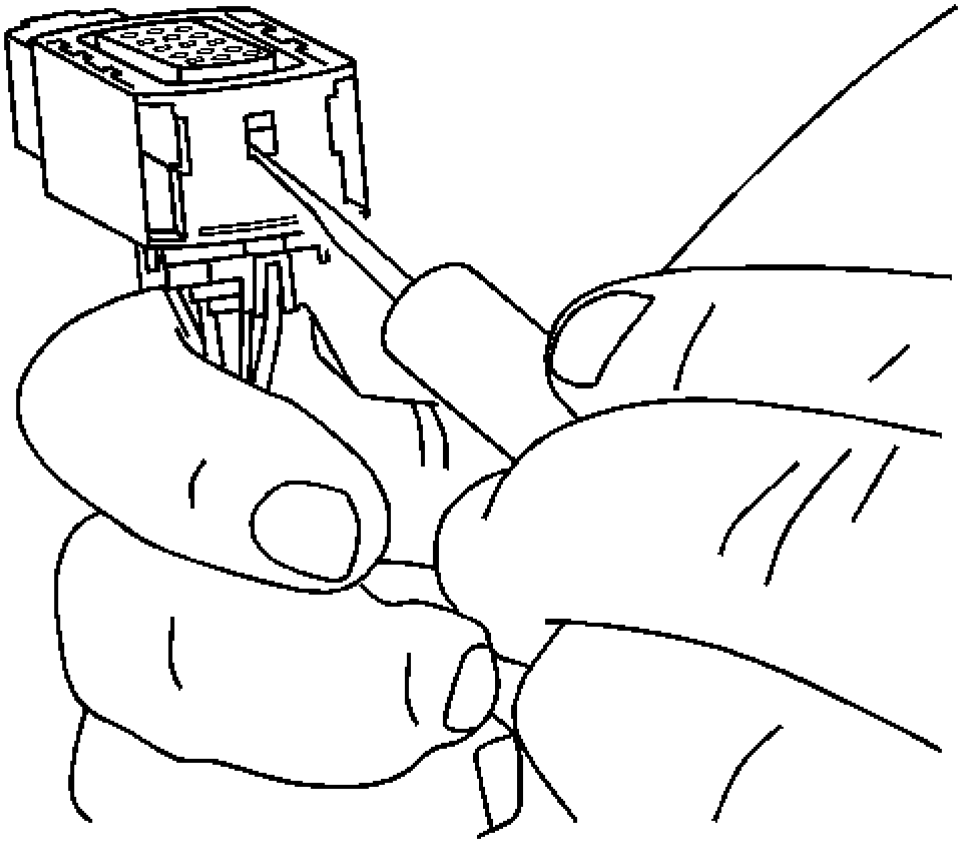


Fig. 94: Inserting J 38125-12A Into Terminal Release Cavity
Courtesy of GENERAL MOTORS CORP.

9. Insert the EL-38125-12A tool to release the terminals by inserting the tool into the terminal release cavity.

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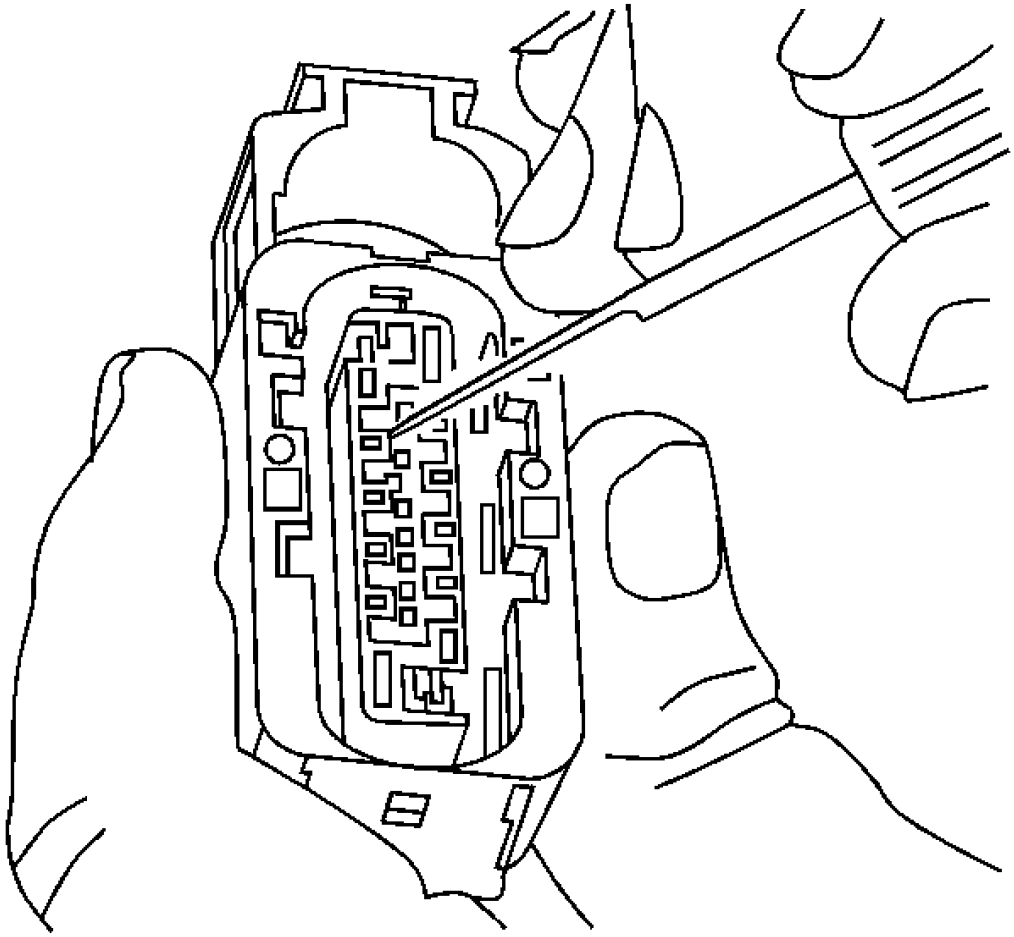


Fig. 95: Holding Removal Tool In Place
Courtesy of GENERAL MOTORS CORP.

10. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminal Repair Procedure

The Micro-Pack 100W connectors have small terminals that are difficult to handle and hold when crimping. In order to aid the technician when crimping these terminals, a new crimping tool was developed. The J 38125-101 (W jaw) crimping tool was developed to crimp Micro-Pack 100W terminals. The J 38125-101 (W jaw) crimping tool has a terminal holding block that will hold the terminal in place while the terminal is being crimped. After the terminal is removed from the connector perform the following procedure in order to repair Micro-Pack 100 terminals.

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1. Cut the wire as close to the terminal as possible.

NOTE: **After cutting the damaged terminal from the wire, determine if the remaining wire is long enough to reach the connector without putting a strain on the wire. If the wire is not long enough, splice a small length of the same gauge wire to the existing wire, then crimp the new terminal on the added wire.**

2. Strip 5 mm (3/16 in) of insulation from the wire.

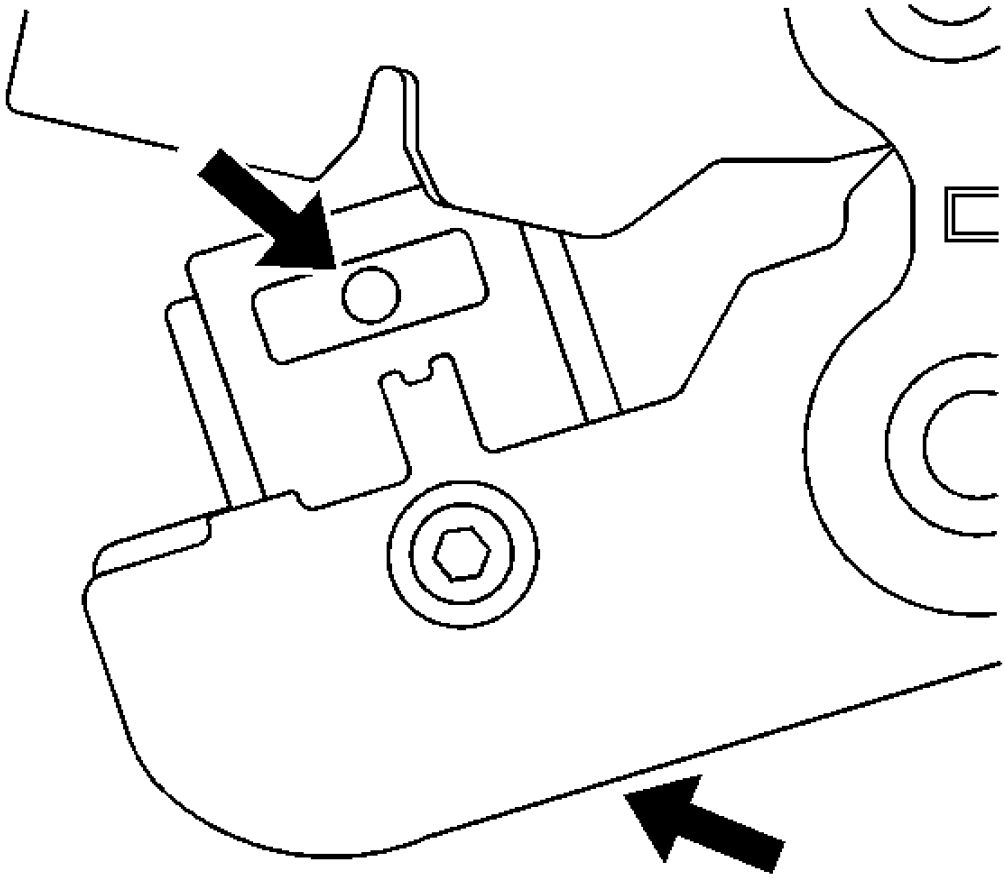


Fig. 96: Identifying Crimping Tool Spring Loaded Locator
Courtesy of GENERAL MOTORS CORP.

3. Depress the spring loaded locator of the J 38125-101 (W jaw) crimping tool until the terminal holder is completely visible.

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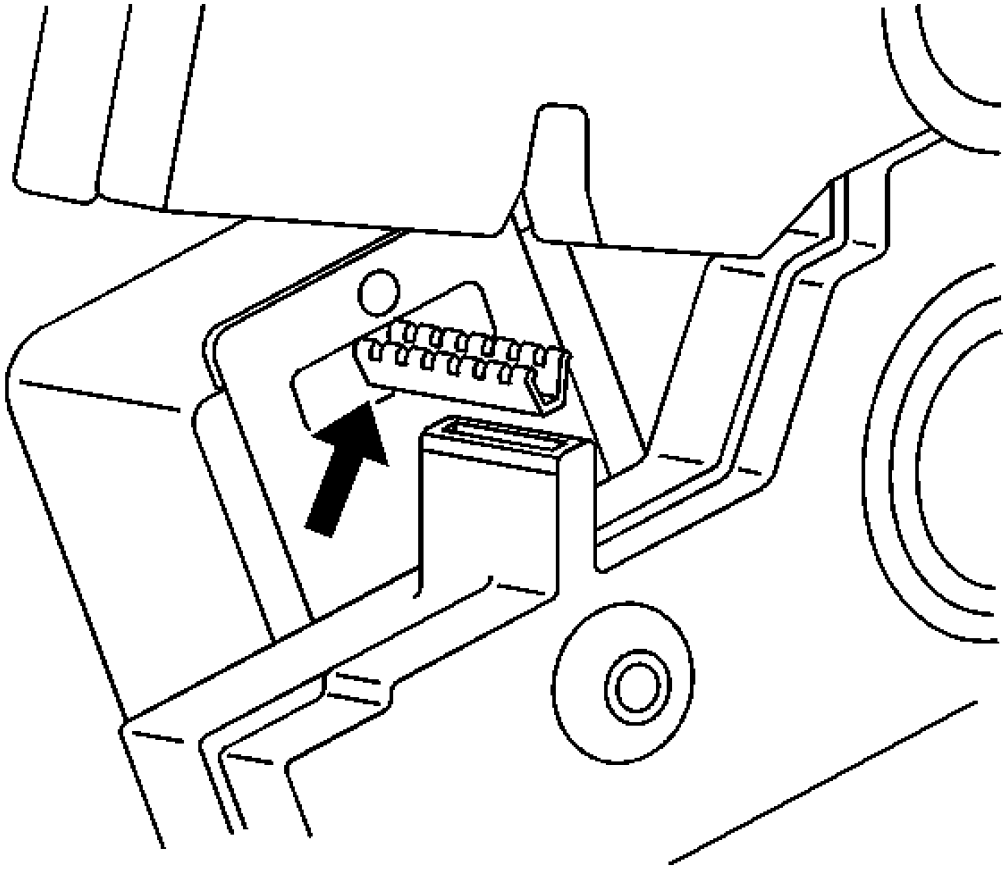


Fig. 97: Locating Terminal In Crimping Tool
Courtesy of GENERAL MOTORS CORP.

4. Insert the terminal into the crimp tool until the core wings are flush with the anvil on the crimp tool. Be sure that the wings are pointed toward the crimp tool former and release the spring locator. The locator will hold the terminal in place. Inspect the alignment of the terminal wings with the crimp tool former. If the terminal wings are wider than the crimp tool former, remove the terminal and bend the terminal wings in slightly.
5. Place stripped wire into terminal.
6. Crimp the new terminal to the wire. If a jam occurs, press the emergency release to open applicator.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.

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3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

FCI CONNECTORS (LEVER LOCK)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

Follow the steps below in order to remove terminals from the connector.

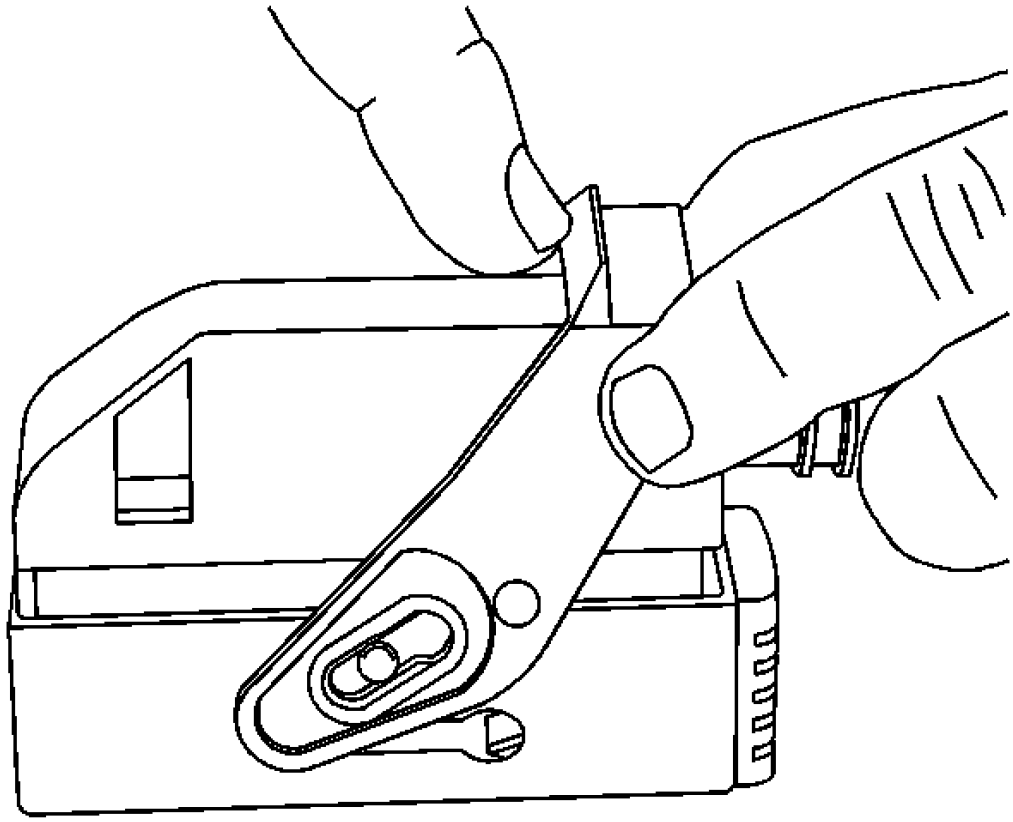


Fig. 98: Identifying Release Tab
Courtesy of GENERAL MOTORS CORP.

1. Slide the lever lock forward while pressing down on the lever lock release tab.

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2. The release tab is located on the top of the wiredress cover.

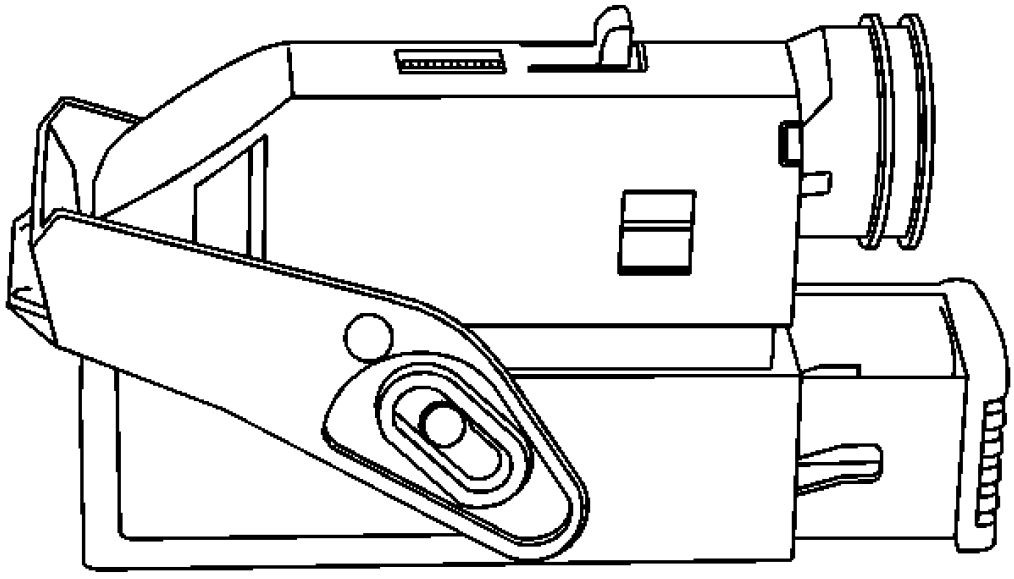


Fig. 99: View Of Connector In Released Position
Courtesy of GENERAL MOTORS CORP.

3. View of connector in released position.
4. Disconnect the connector from the component.
5. Locate the dress cover locking tabs at the corners of the dress cover. Use a small flat-blade tool to release the locking tabs and remove the dress cover.

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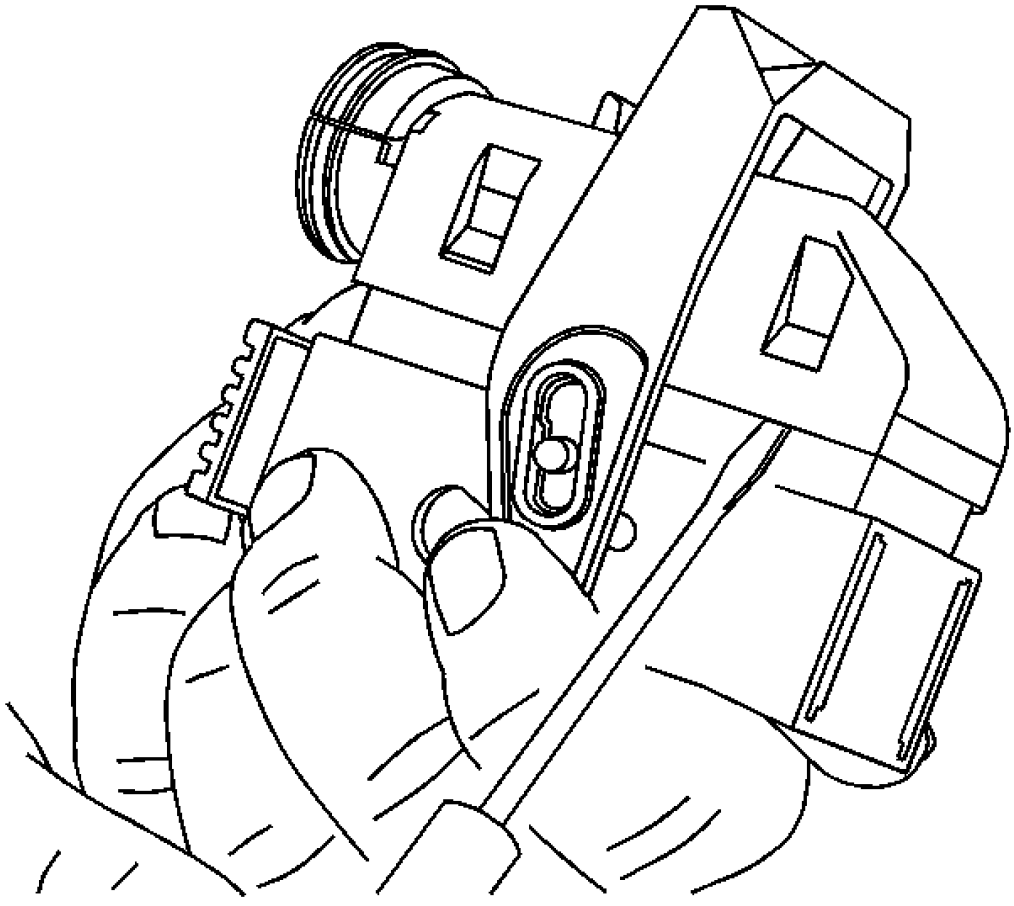


Fig. 100: Sliding Terminal Position Assurance Up One Notch
Courtesy of GENERAL MOTORS CORP.

6. Use a small flat-blade tool to slide the terminal position assurance (TPA) up one notch on both ends of the connector. The TPA is located underneath the wire dress cover.

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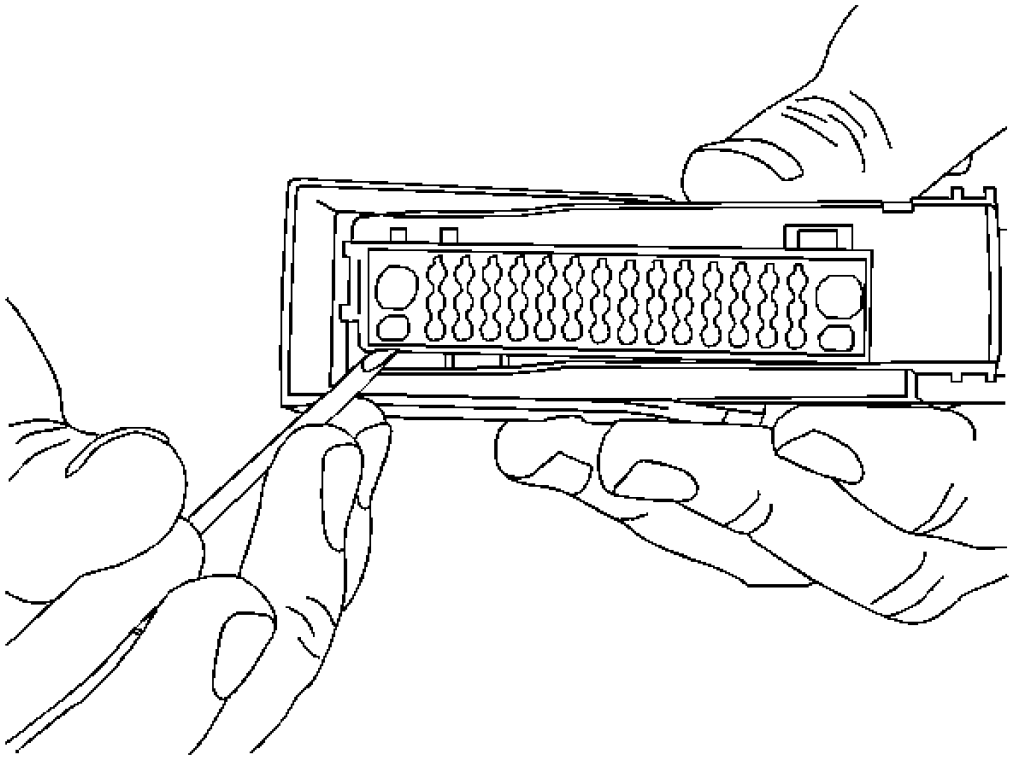


Fig. 101: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

For the larger terminals insert the EL-38125-556 tool to release the terminals by inserting the tool into the terminal release cavity. For the smaller terminals insert the EL-38125-560 tool to release the terminals by inserting the tool into the terminal release cavity.

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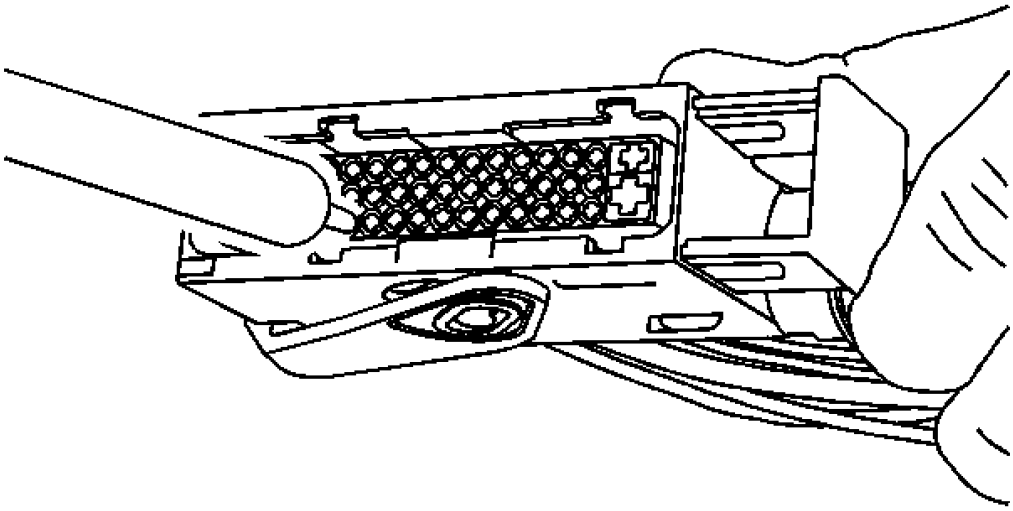


Fig. 102: Holding Removal Tool In Place
Courtesy of GENERAL MOTORS CORP.

7. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

JST CONNECTORS

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

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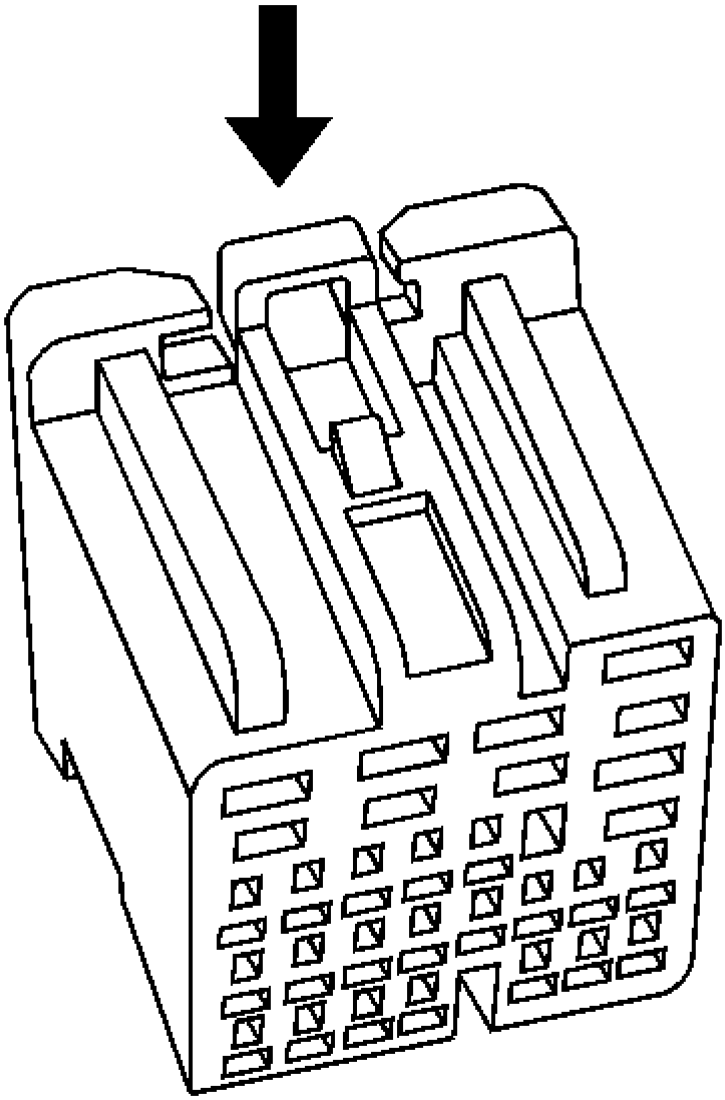


Fig. 103: Identifying Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

1. While depressing the lock, remove the connector from the component.

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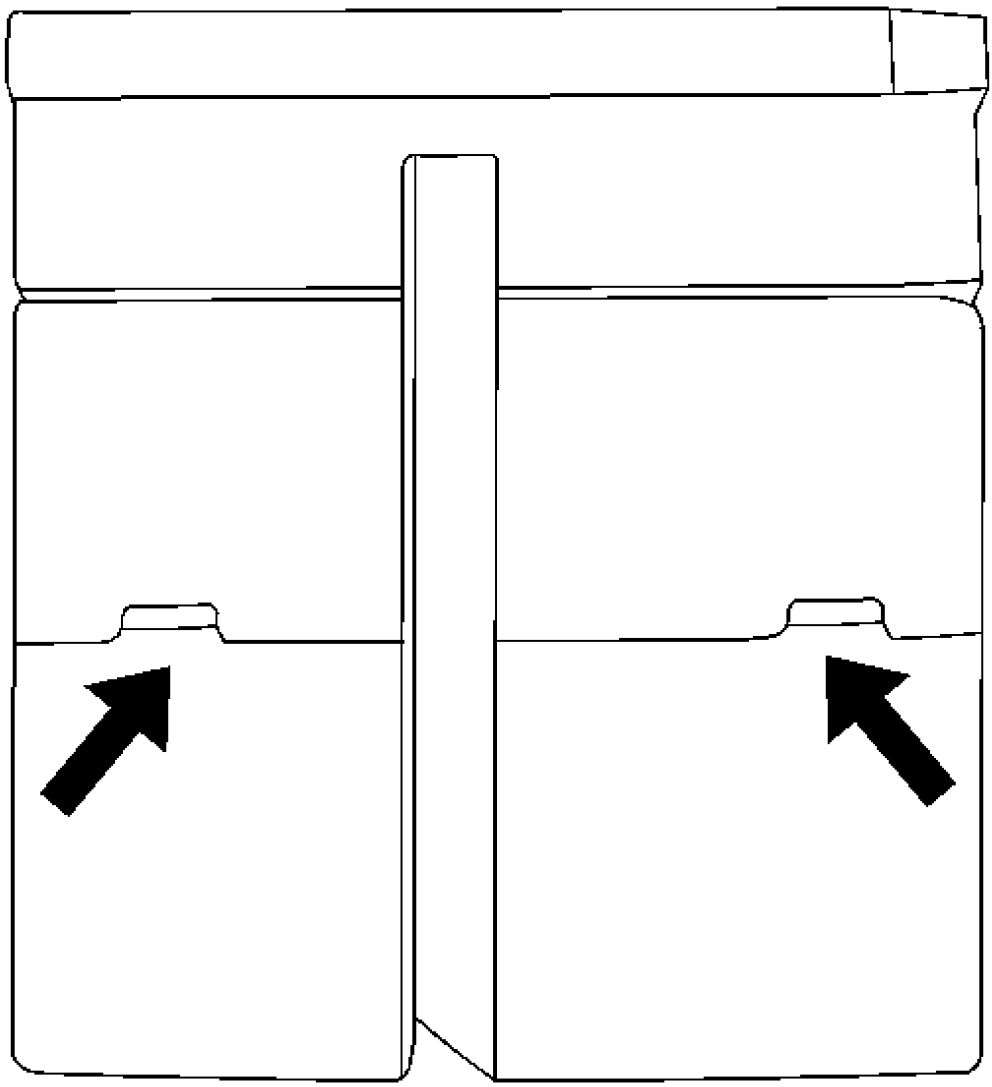


Fig. 104: Identifying TPA On Both Sides Of Connector
Courtesy of GENERAL MOTORS CORP.

2. Locate the two indents of the terminal position assurance (TPA) located on the bottom of the connector body.

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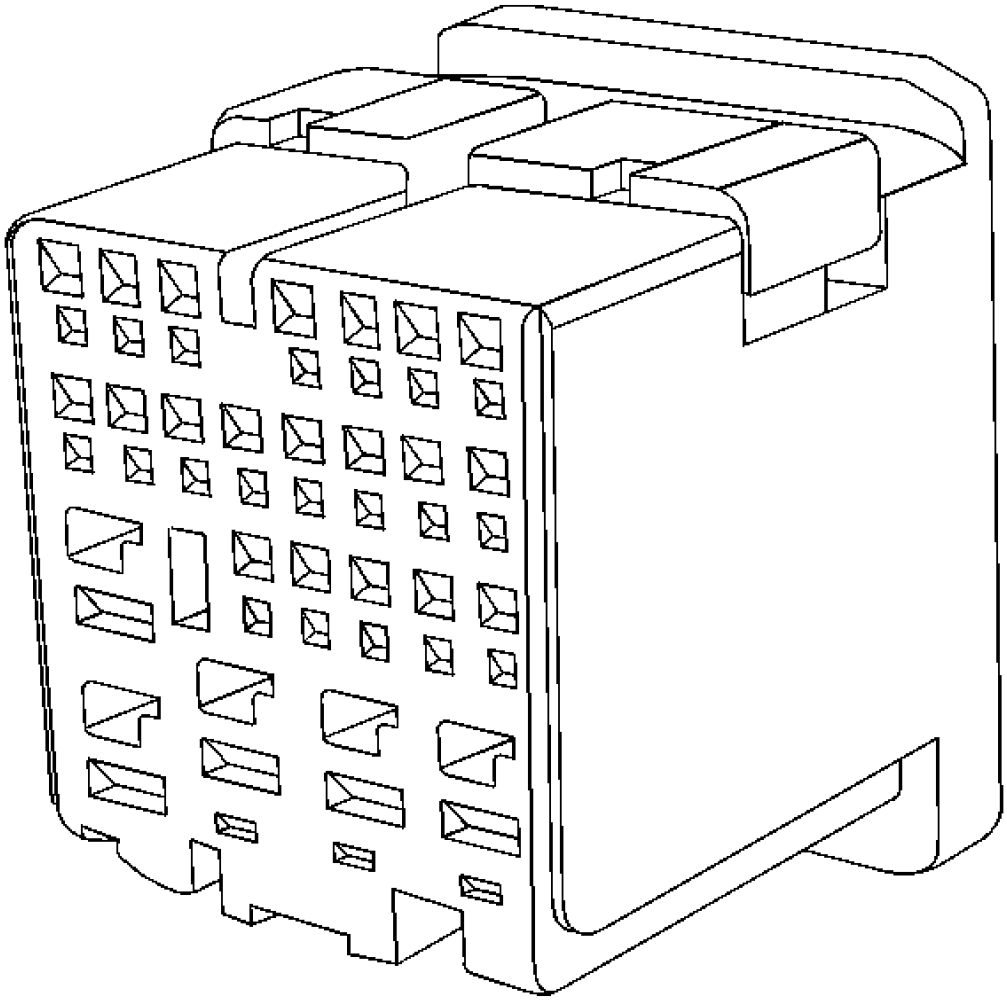


Fig. 105: Raising TPA On Both Sides Of Connector
Courtesy of GENERAL MOTORS CORP.

NOTE: The TPA cannot be removed from the connector while there are terminals present in the connector body.

3. Use a small flat-blade tool to very carefully raise the TPA on both sides of the connector.

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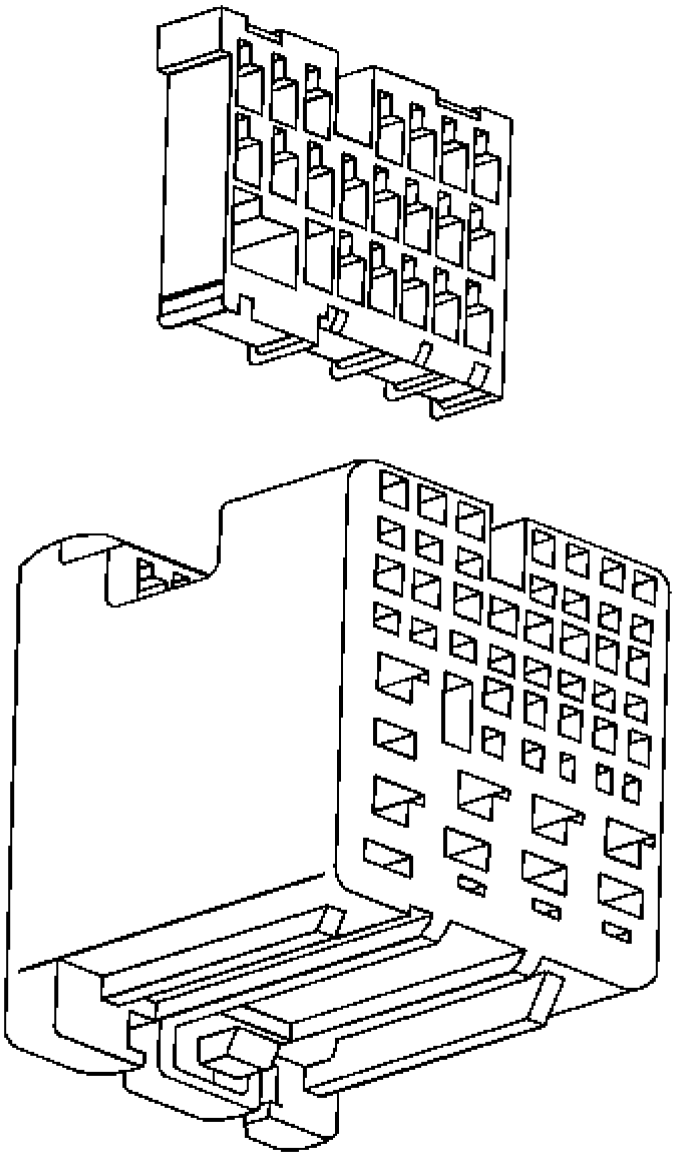


Fig. 106: View Of Terminal Position Assurance & Connector Body
Courtesy of GENERAL MOTORS CORP.

4. View of the TPA when removed from the connector body.

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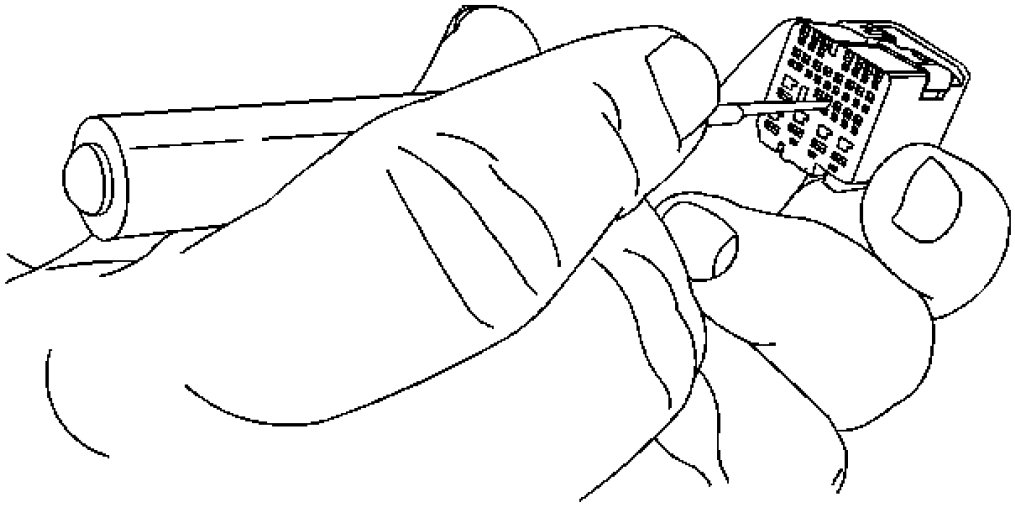


Fig. 107: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

5. Use the EL-38125-12A tool to release the terminals by inserting the tool into the left side of the terminal release cavity as shown in the graphic. Use the tool to move the terminal release to the right with a gentle prying motion.
6. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

KOSTAL CONNECTORS (GLOW PLUG CONTROL MODULE)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

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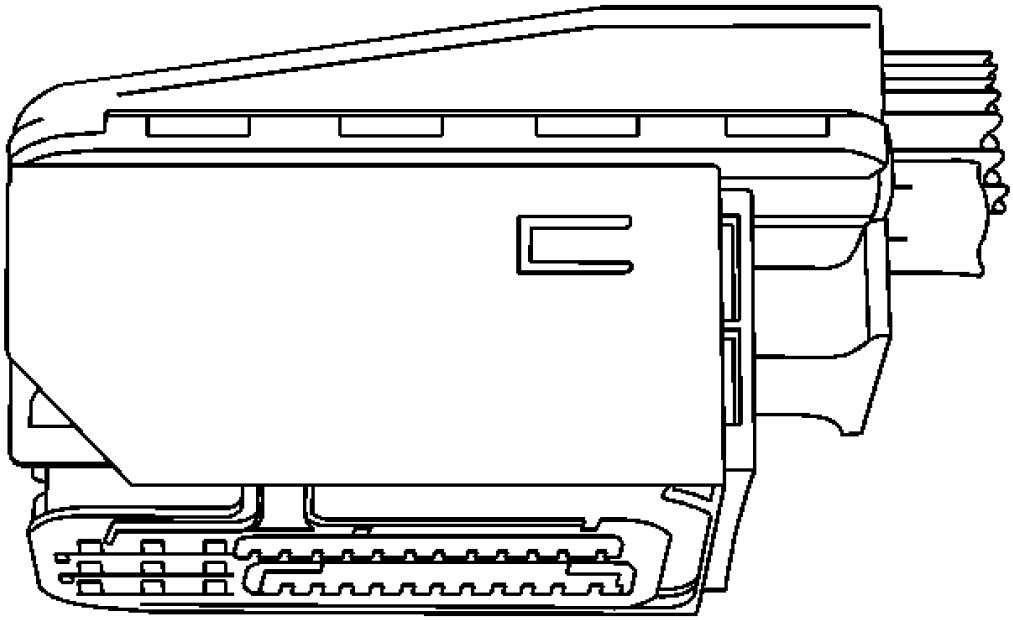


Fig. 108: View Of Typical Kostal Connector
Courtesy of GENERAL MOTORS CORP.

View of typical connector.

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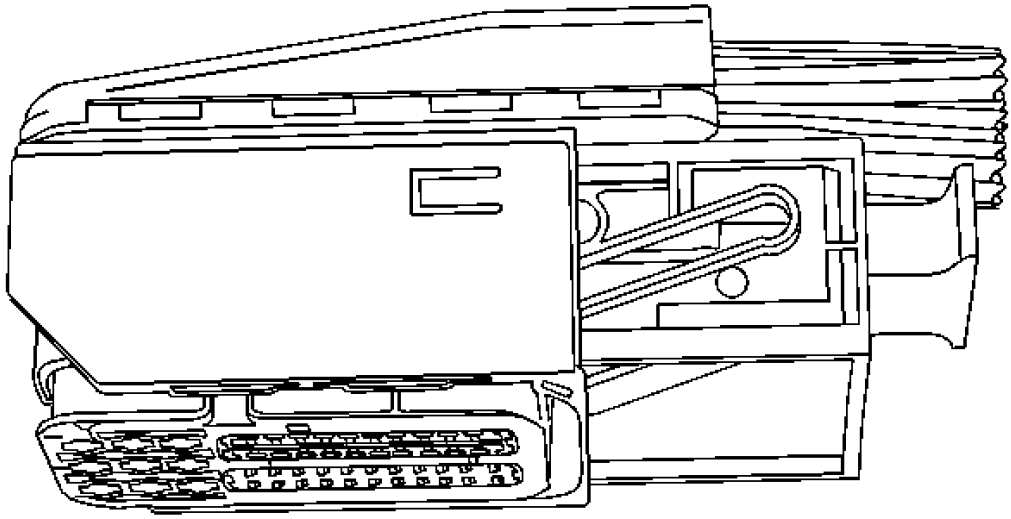


Fig. 109: View Of Connector In Released Position
Courtesy of GENERAL MOTORS CORP.

View of connector in released position.

1. Locate the assist lever at the back of the connector. Move the assist lever to the rear position.
2. Disconnect the connector from the component.

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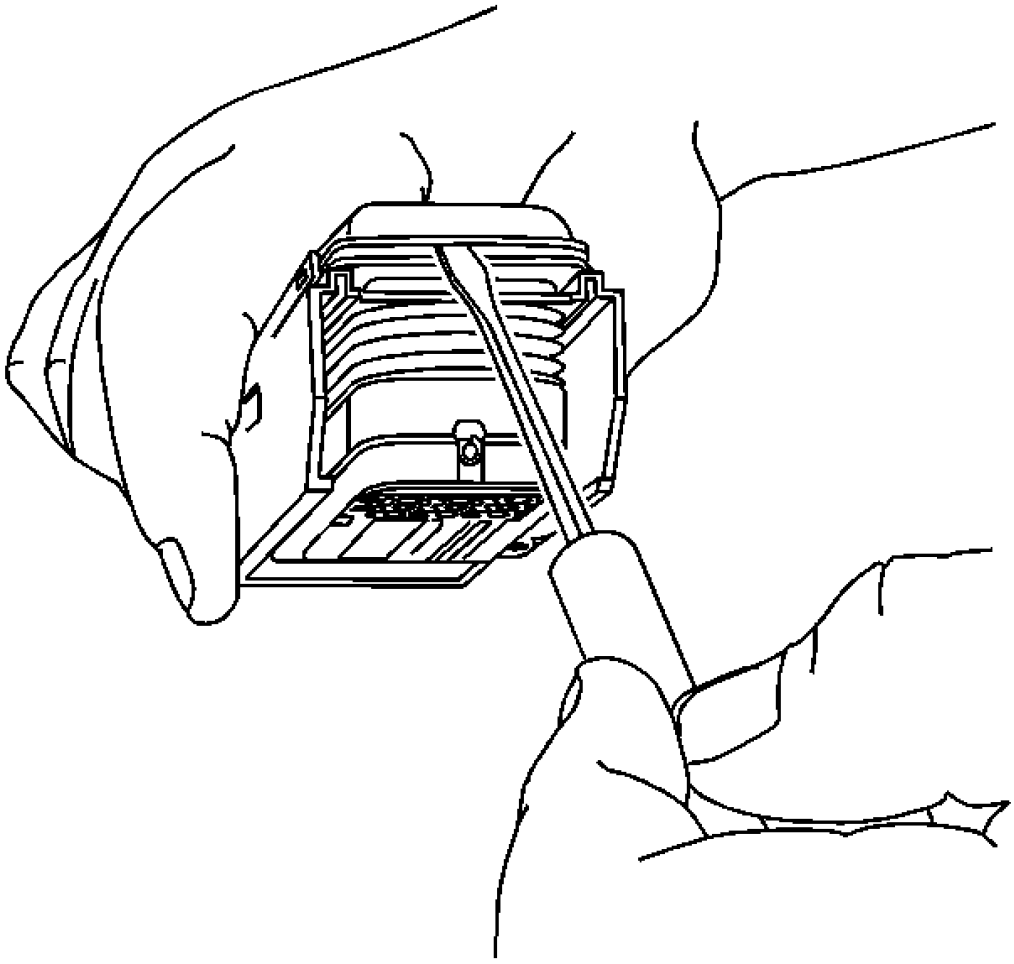


Fig. 110: Removing Dress Cover
Courtesy of GENERAL MOTORS CORP.

3. Use a small flat-blade tool to remove the dress cover.

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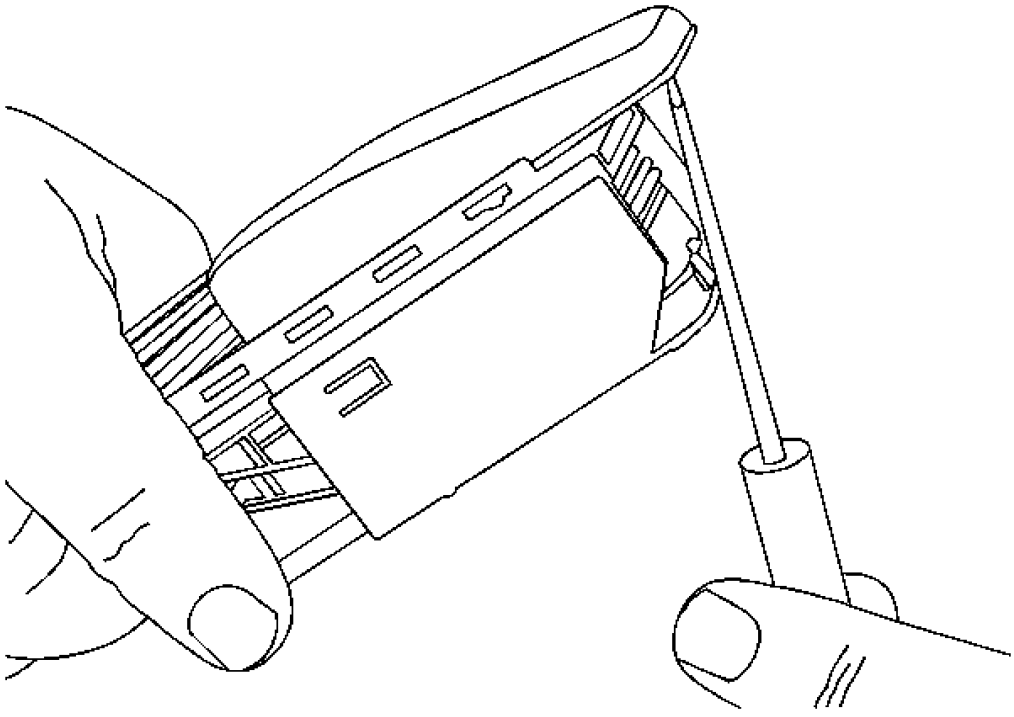


Fig. 111: Sliding Dress Cover Forward & Off Of Connector
Courtesy of GENERAL MOTORS CORP.

4. Slide the dress cover forward and off of the connector.

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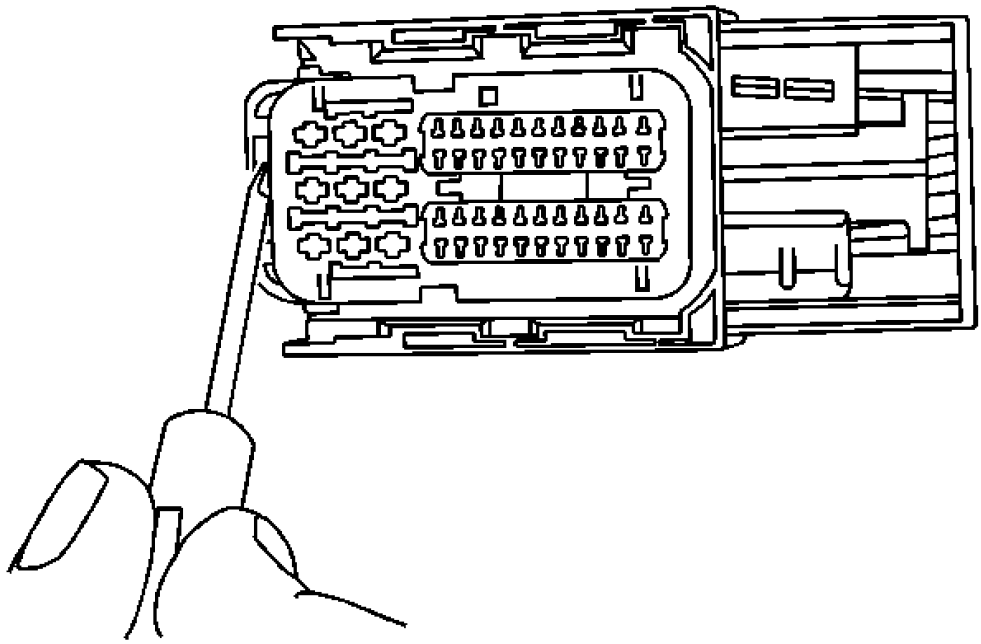


Fig. 112: Locating TPA In Front & Rear Of Connector
Courtesy of GENERAL MOTORS CORP.

5. The terminal positive assurance (TPA) is located in the front and rear of the connector.

NOTE: The front TPA cannot be removed from the connector. Only move it to the preset position.

6. Use a small flat-blade tool to move the front TPA to the preset position, outboard approximately 0.125 in. (3 mm).

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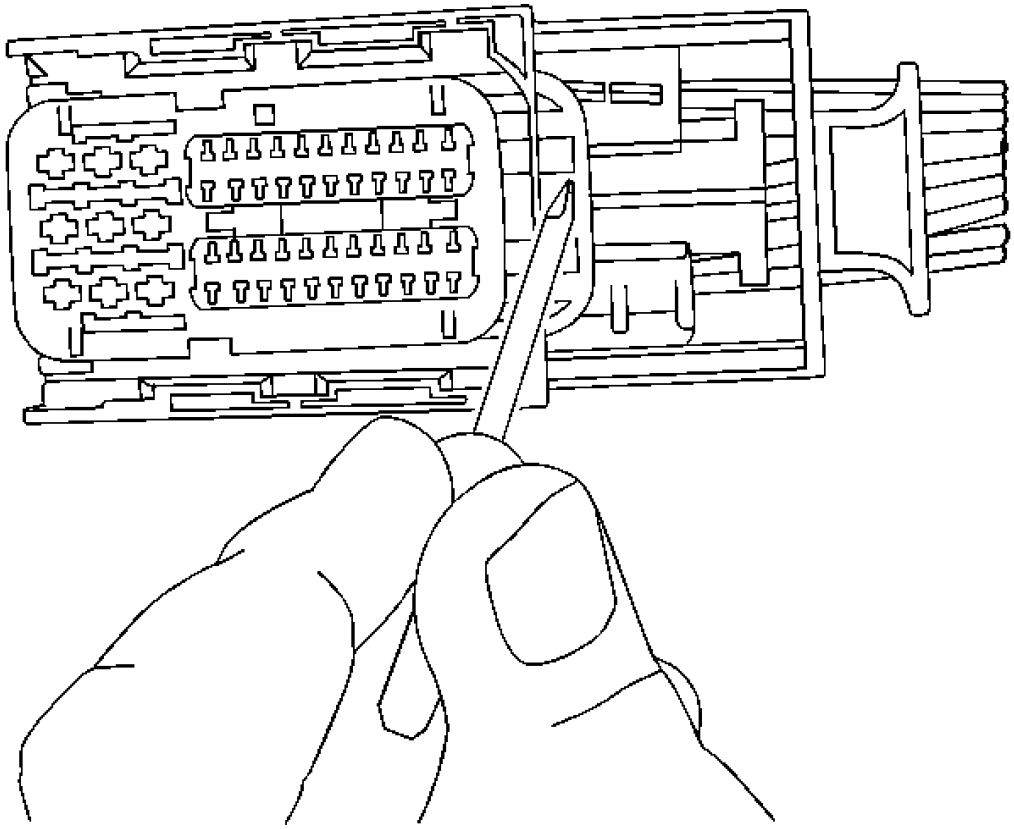


Fig. 113: Removing Rear TPA
Courtesy of GENERAL MOTORS CORP.

7. Use a small flat-blade tool to completely remove the rear TPA from the connector.

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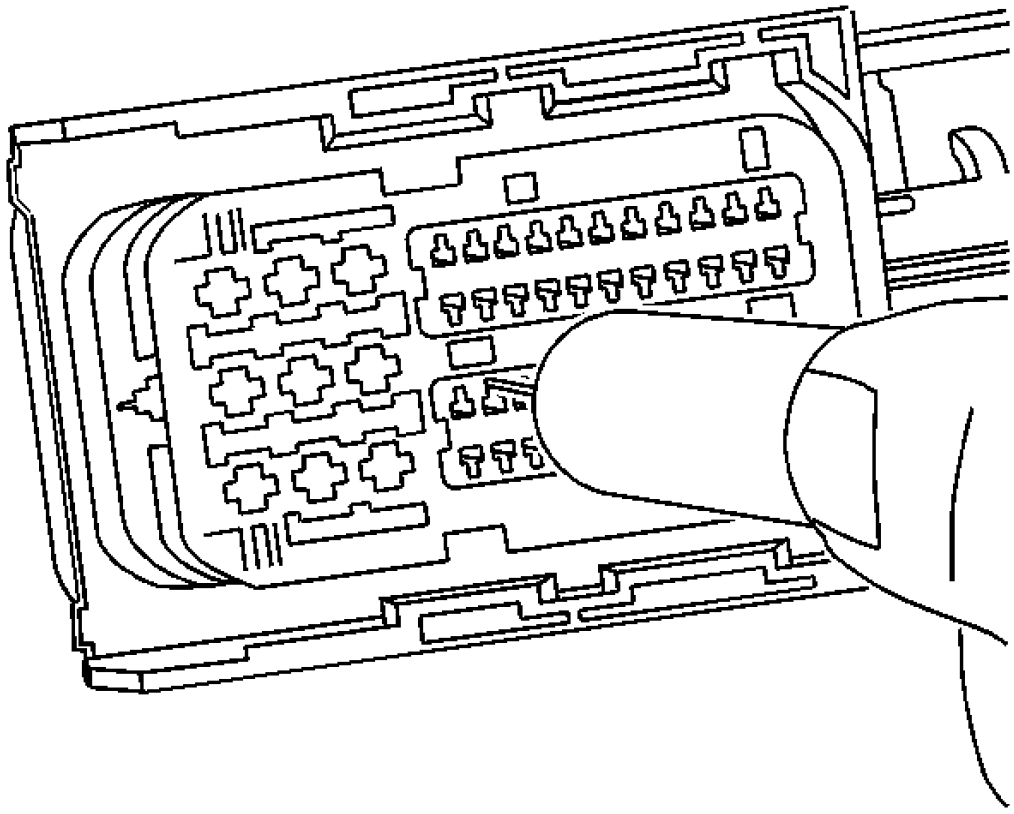


Fig. 114: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

8. Use the EL-38125-24 or the EL-38125-560 tool to release the terminals by inserting the tool into the terminal release cavity.
9. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

KOSTAL CONNECTORS (TRANSMISSION)

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Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

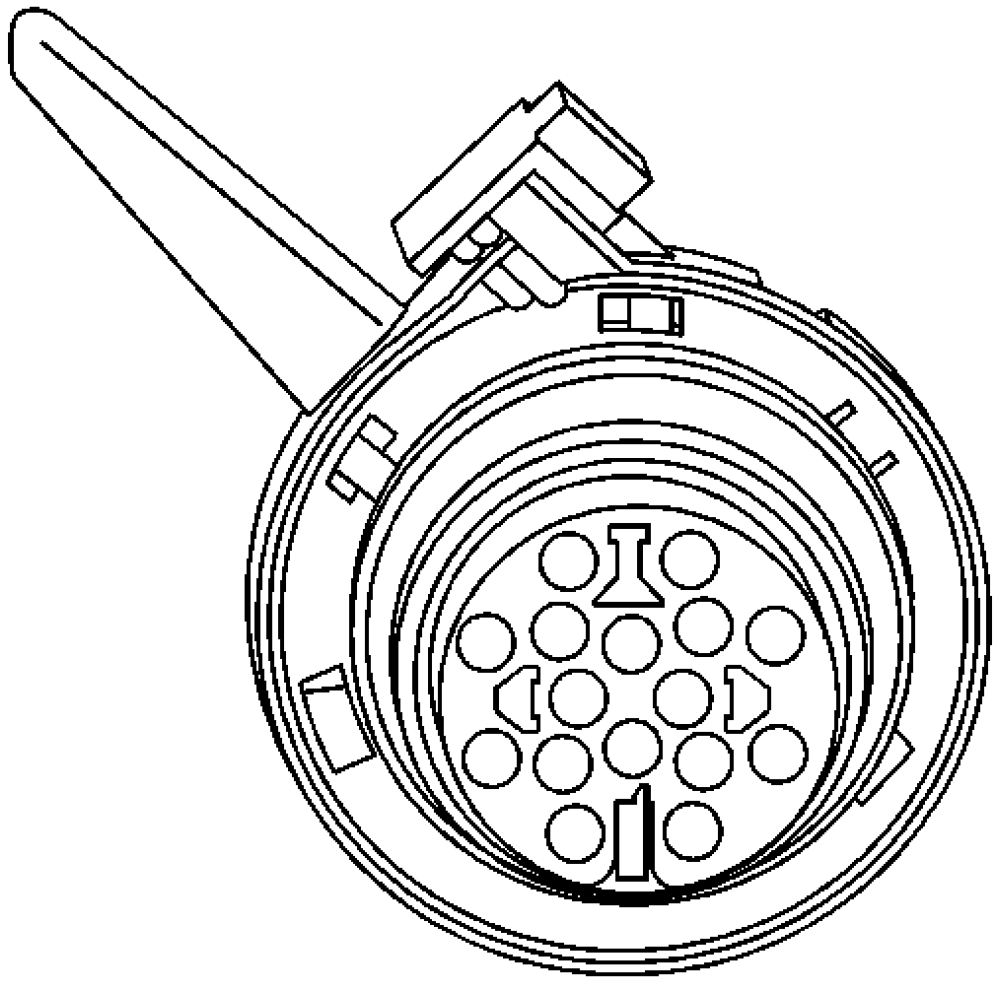


Fig. 115: View Of Connector & Lock
Courtesy of GENERAL MOTORS CORP.

1. While depressing the lock, twist and remove the connector from the component.

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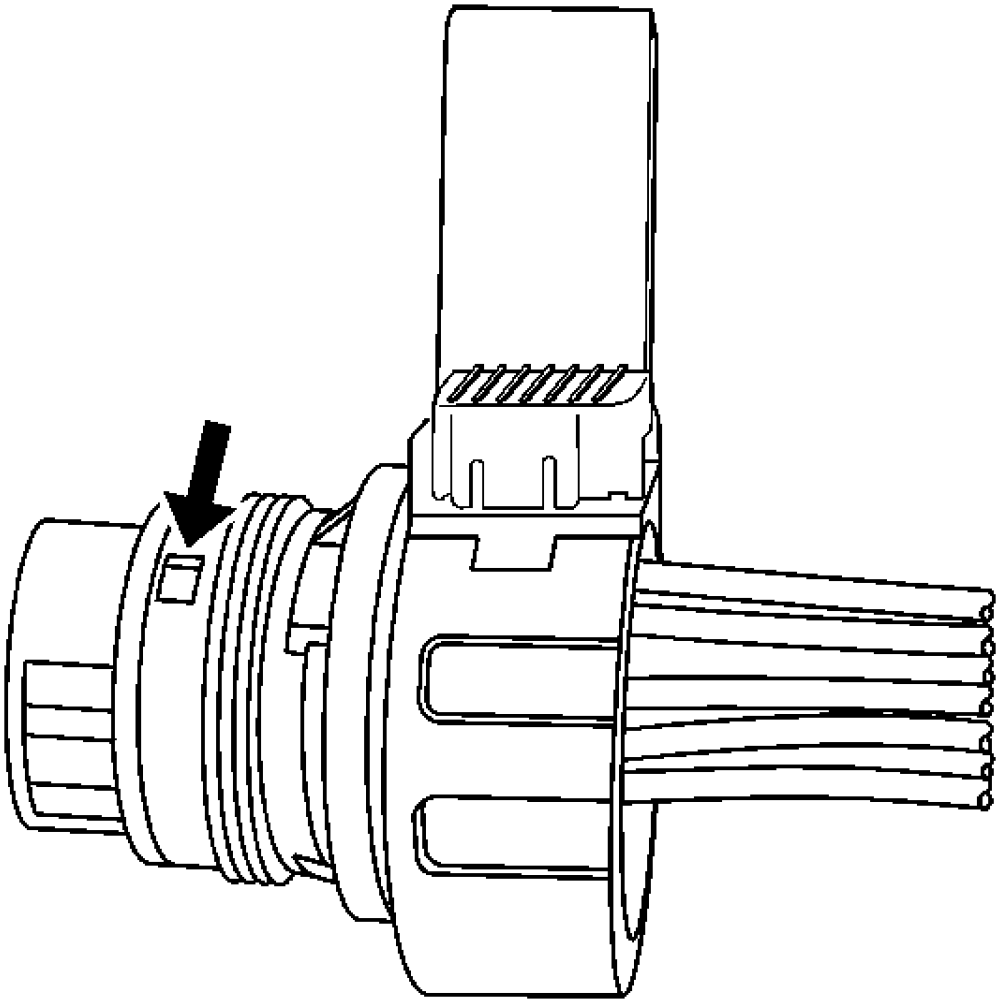


Fig. 116: View Of Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

2. Locate the terminal position assurance (TPA).

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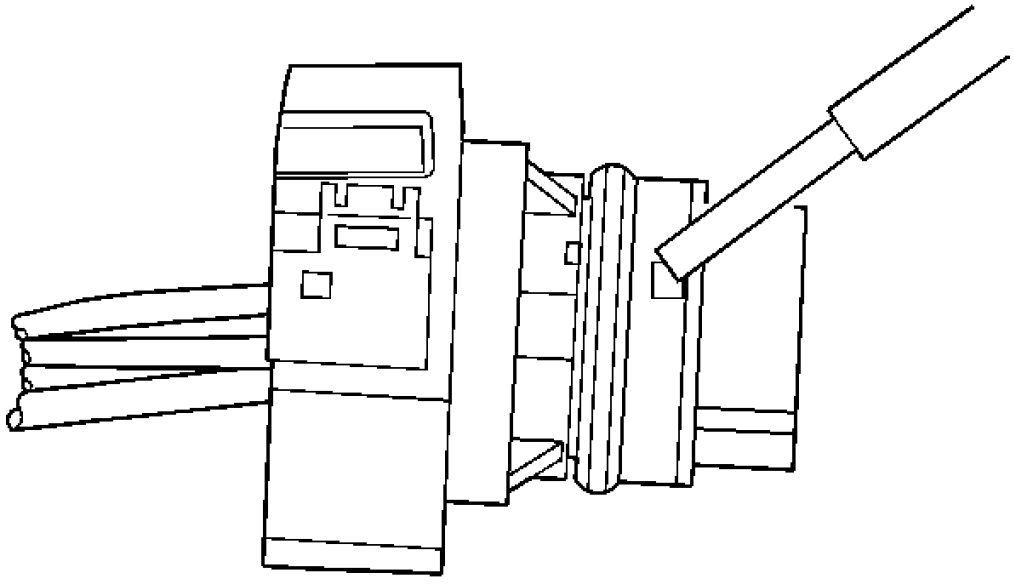


Fig. 117: Pushing TPA
Courtesy of GENERAL MOTORS CORP.

NOTE: The TPA cannot be removed from the connector while there are terminals present in the connector body.

3. Use a small flat-blade tool to push the TPA until it bottoms out.

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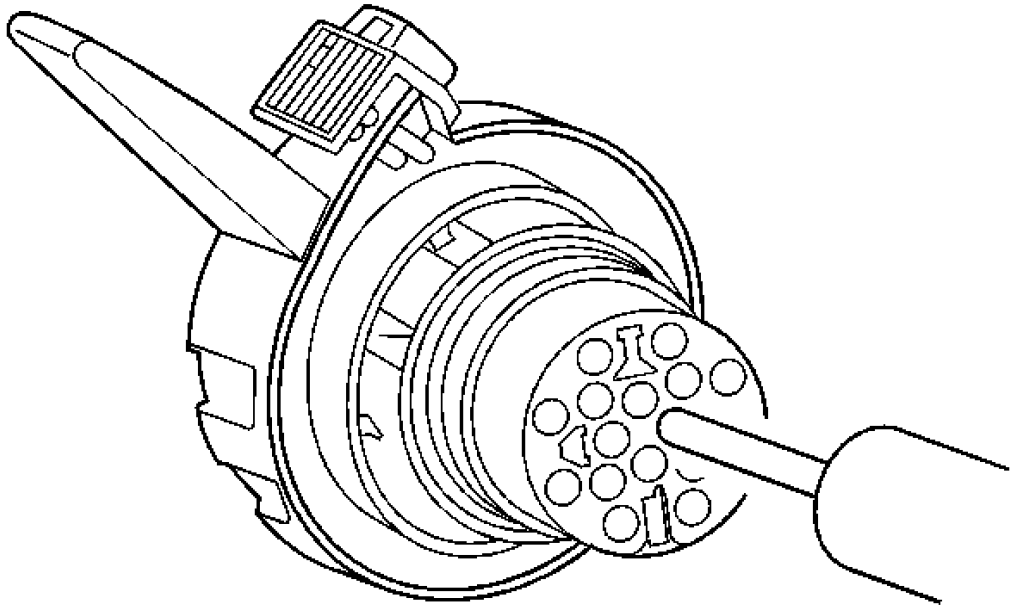


Fig. 118: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

4. Use the EL-38125-28 tool to release the terminals by inserting the tool into the terminal cavity as shown in the graphic.
5. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

Terminal Replacement Procedure

After the terminal is crimped to the wire, perform the following procedure in order to replace the terminal.

1. Slide the new terminal into the correct cavity at the back of the connector.
2. Push the terminal into the connector until it locks into place. The new terminal should be even with the other terminals. Ensure that the terminal is locked in place by gently pulling on the wire.

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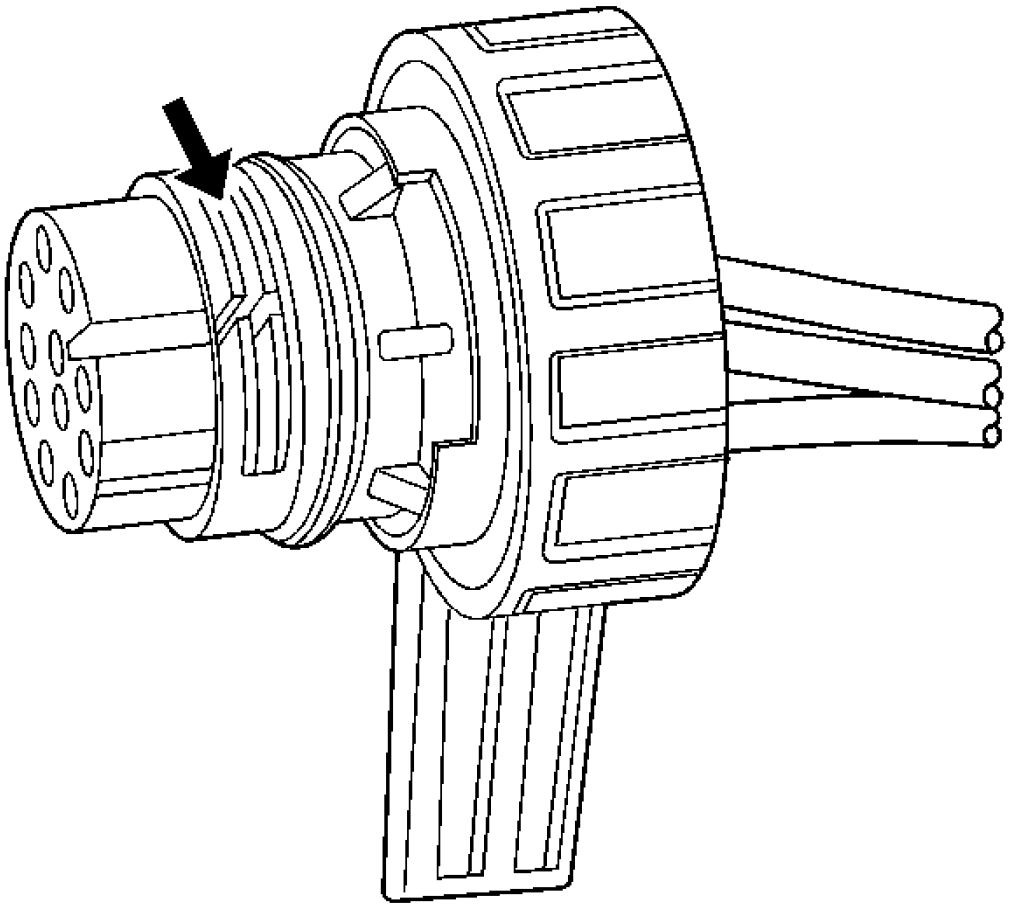


Fig. 119: Locating Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

3. Locate the terminal position assurance (TPA).

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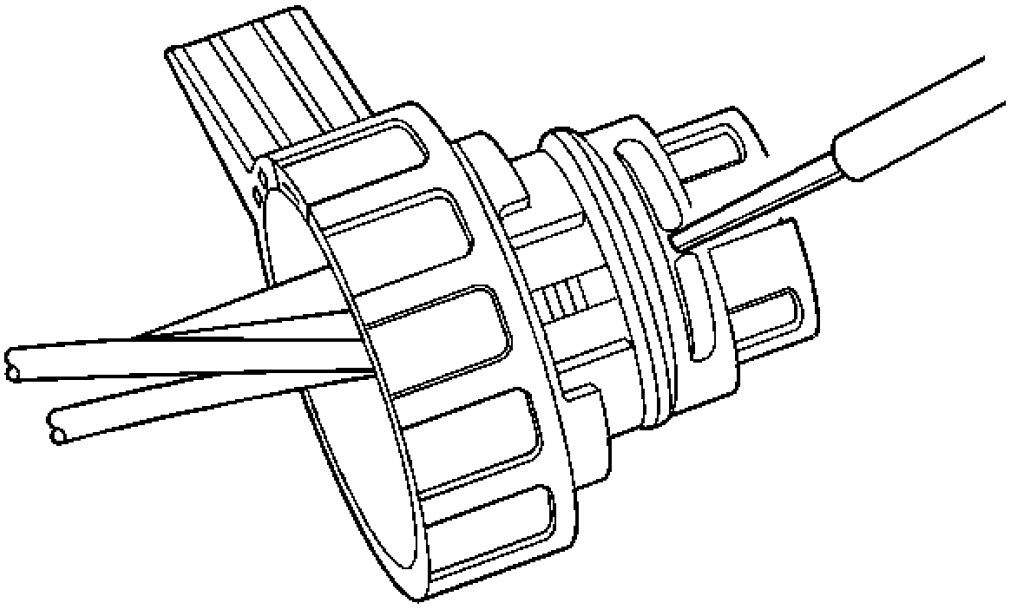


Fig. 120: View Of TPA & Flat-Bladed Tool
Courtesy of GENERAL MOTORS CORP.

4. Use a small flat-blade tool to push the TPA until it bottoms out.

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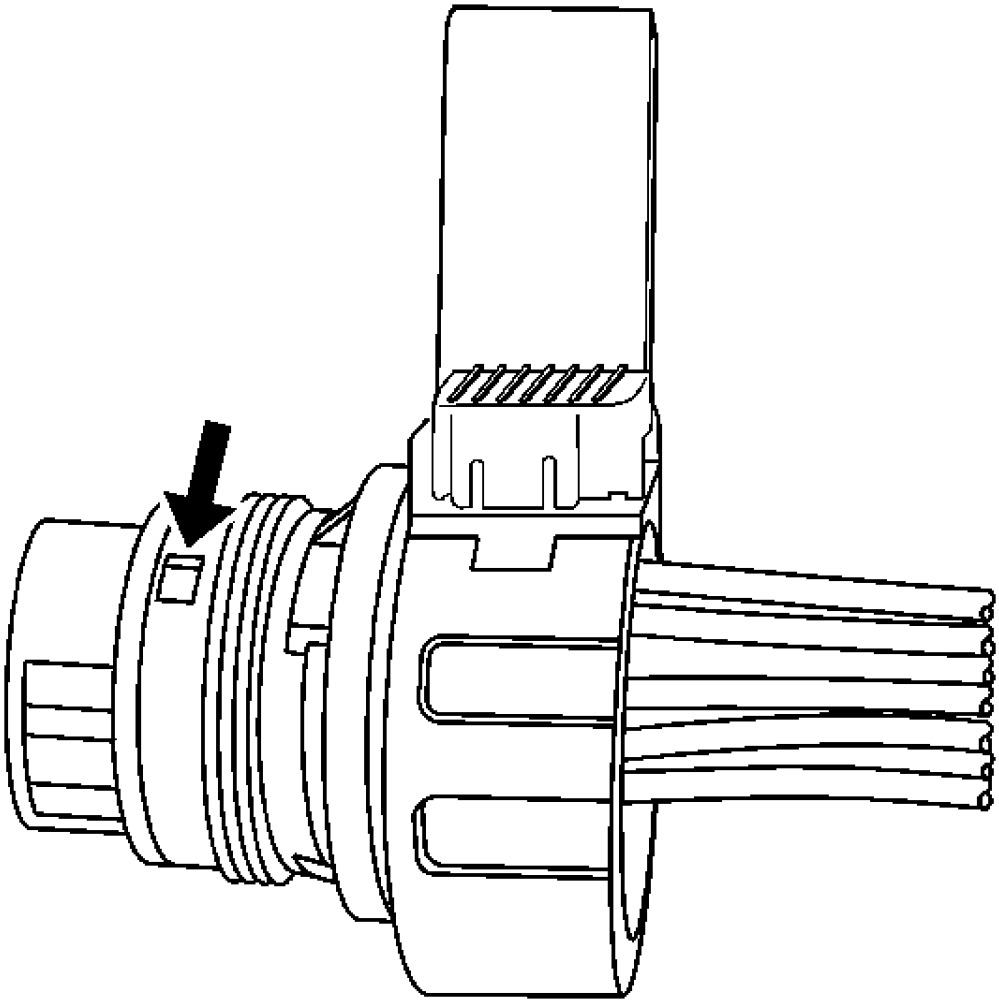


Fig. 121: View Of Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

5. Ensure the TPA is fully seated. The TPA should be centered and flush with the connector body when viewed.

MOLEX CONNECTORS

Special Tools

For equivalent regional tools, refer to **Special Tools** .

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Terminal Removal Procedure

1. Locate the connector position assurance (CPA) on the top of the wire dress cover. Slide the CPA forward.

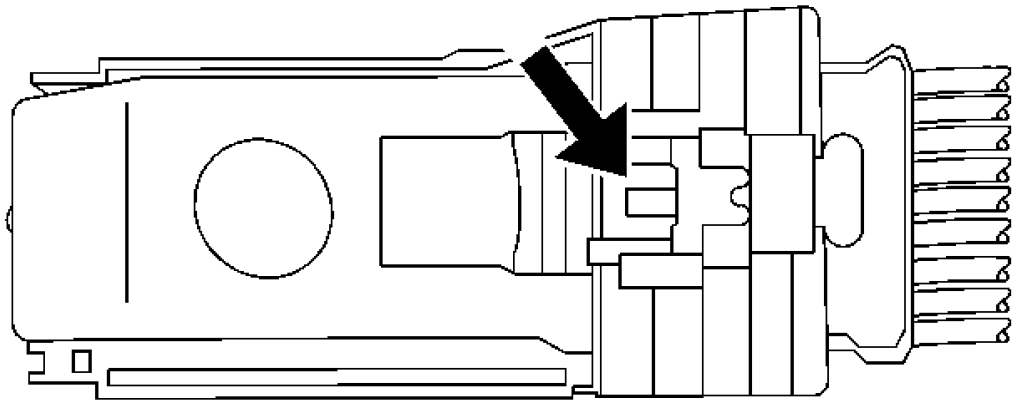


Fig. 122: Identifying Lever Lock Release Tab
Courtesy of GENERAL MOTORS CORP.

2. Slide the lever lock forward while pressing down on the lever lock release tab.

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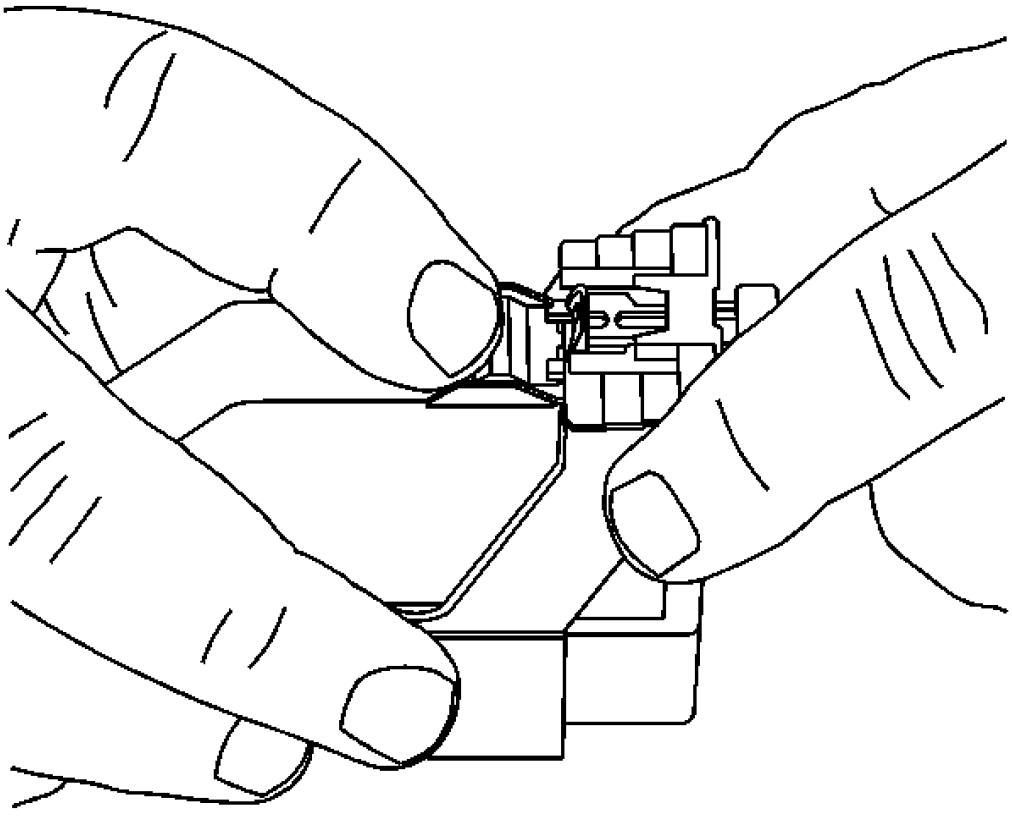


Fig. 123: View Of Lever In Full Forward Position
Courtesy of GENERAL MOTORS CORP.

3. The lever should be in the full forward position.

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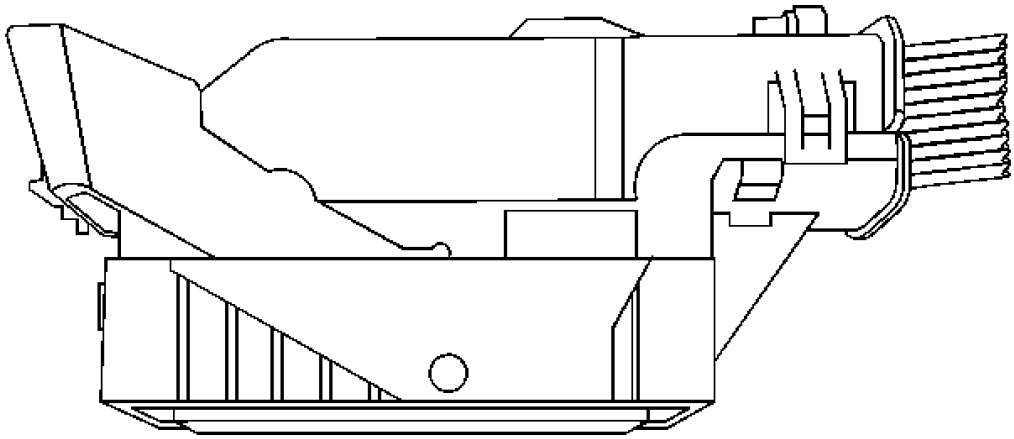


Fig. 124: View Of CPA Connector
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the connector from the component.

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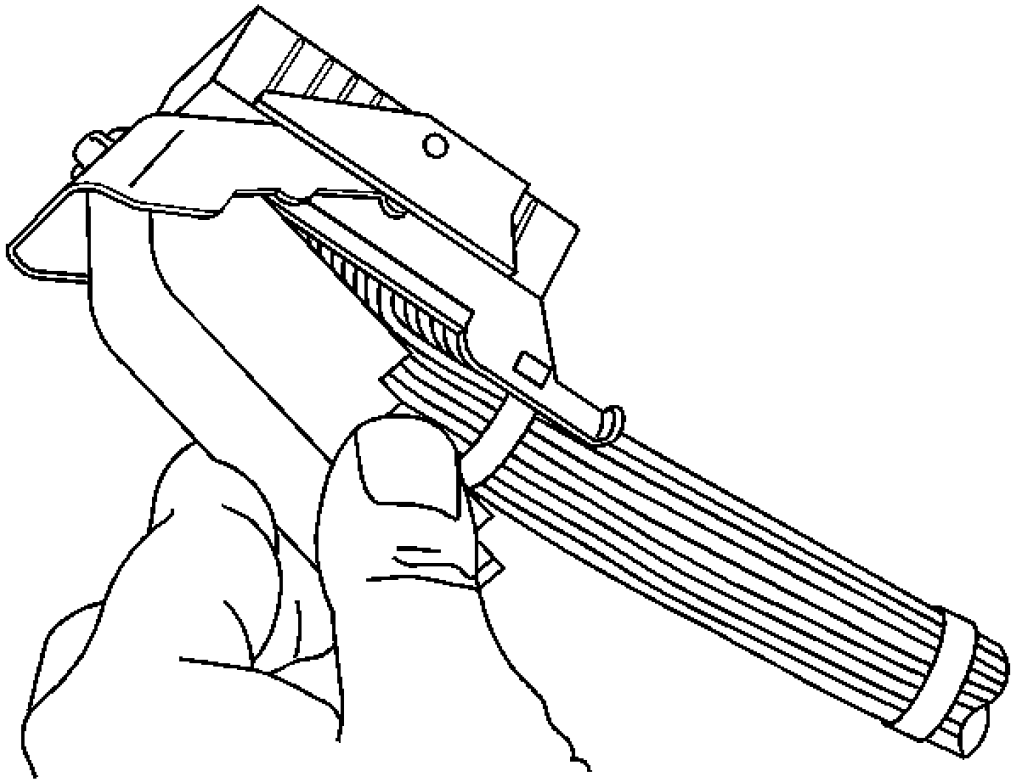


Fig. 125: Removing Dress Cover
Courtesy of GENERAL MOTORS CORP.

5. Remove the dress cover by using a flat bladed tool to release the dress cover locking tabs and lift up on the dress cover.
6. Cut the tie wrap that holds the wires to the connector body.

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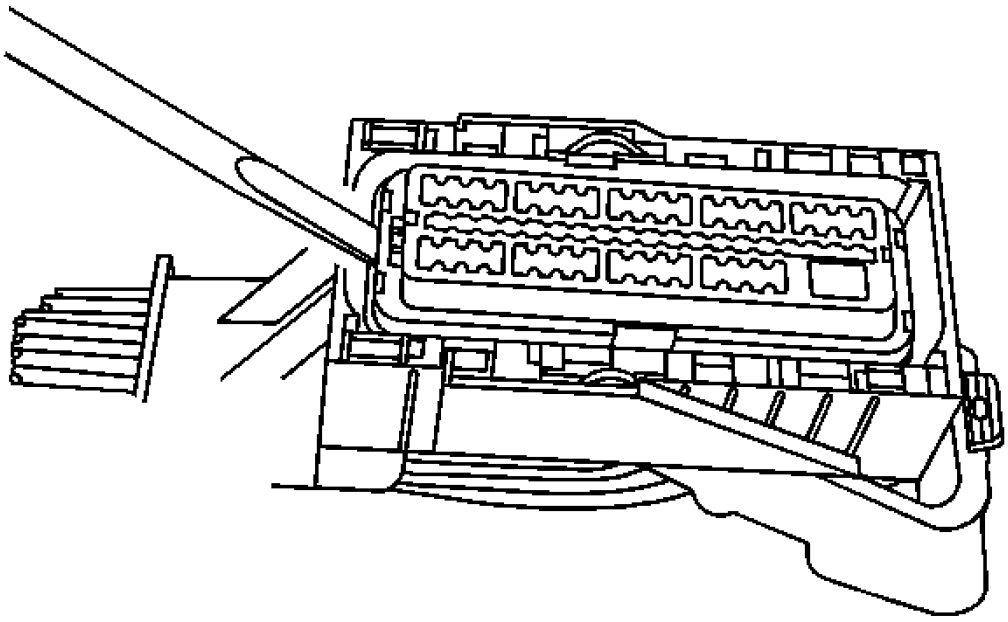


Fig. 126: Prying One Side Of Nose Piece
Courtesy of GENERAL MOTORS CORP.

7. Use a small flat-blade tool to pry one side of the nose piece up to the pre-stage position. When the nose piece is in the pre-staged position, the nose piece will be raised above the connector body the length of the step in the nose piece.

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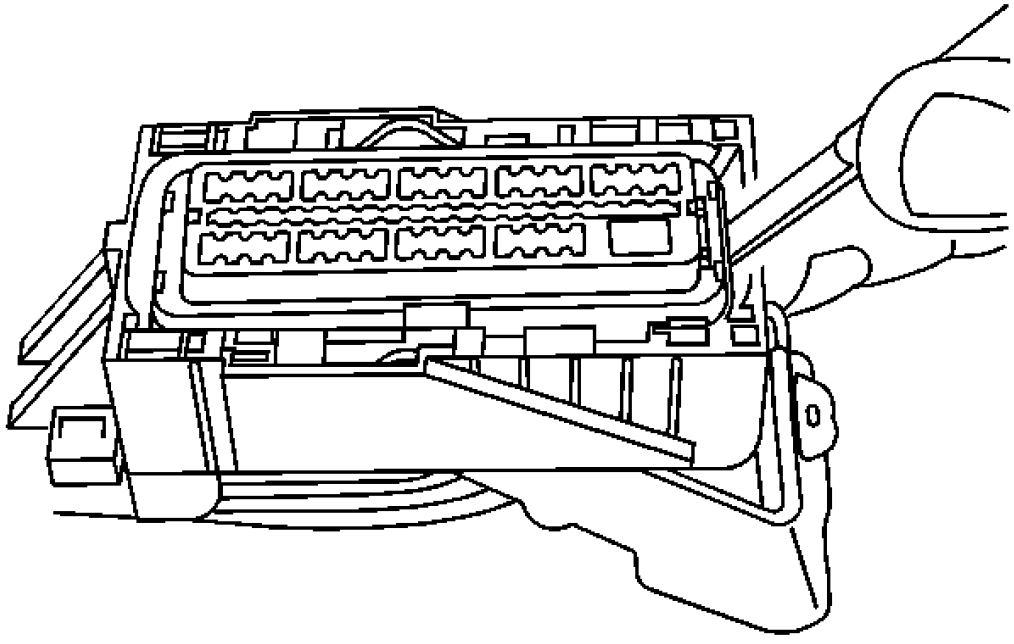


Fig. 127: Prying Side Of Nose Piece
Courtesy of GENERAL MOTORS CORP.

8. Use a small flat-blade tool to pry the other side of the piece to the pre-stage position. If the nose piece is higher than the first step in the nose piece, gently push down on the nose piece until it meets with resistance from the connector body, you should feel the nose piece click into position.

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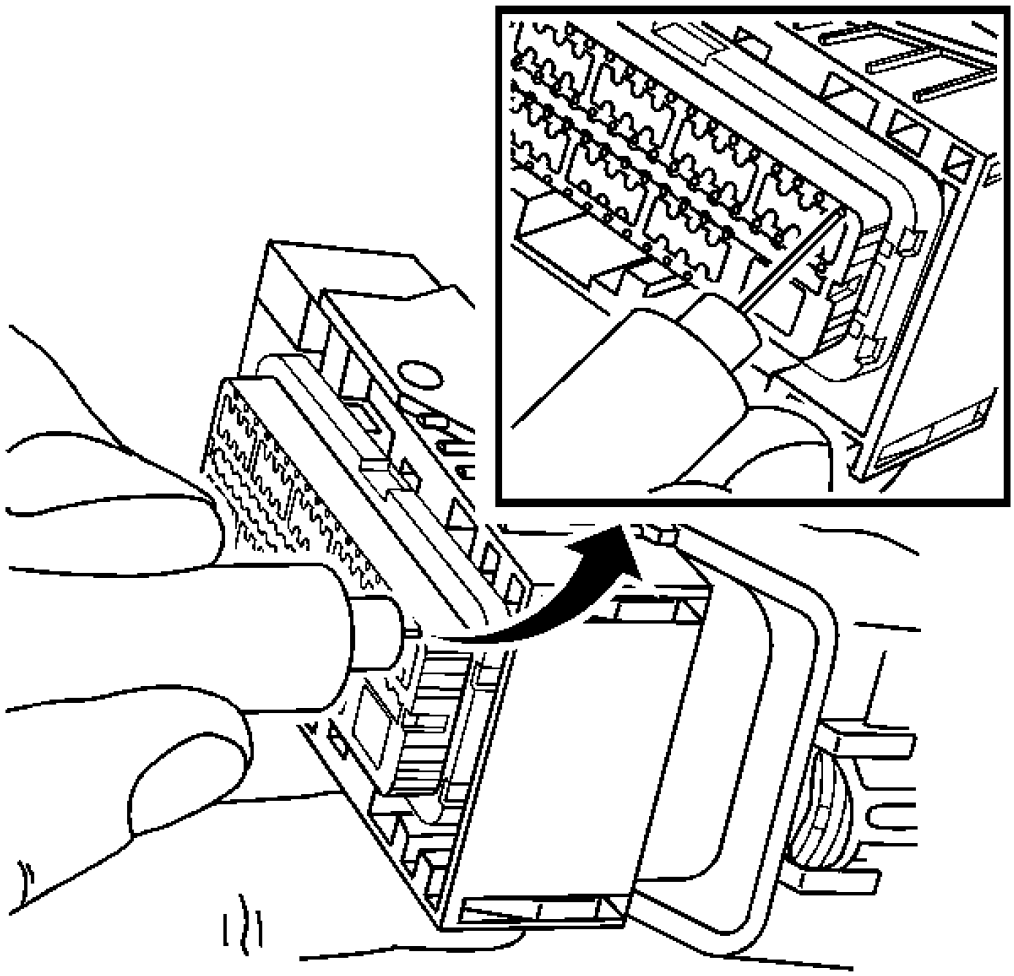


Fig. 128: Releasing Terminal
Courtesy of GENERAL MOTORS CORP.

9. Insert the EL-38125-213 into the small terminal release hole on the nose piece and gently pull on the back of the wire.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

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Terminal Replacement Procedure

After the terminal is crimped to the wire, perform the following procedure in order to replace the terminal.

1. Slide the new terminal into the correct cavity at the back of the connector.
2. Push the terminal into the connector until it locks into place. The new terminal should be even with the other terminals. Insure that the terminal is locked in place by gently pulling on the wire.
3. To assemble the connector, reverse the connector disassembly procedure.

SUMITOMO CONNECTORS

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

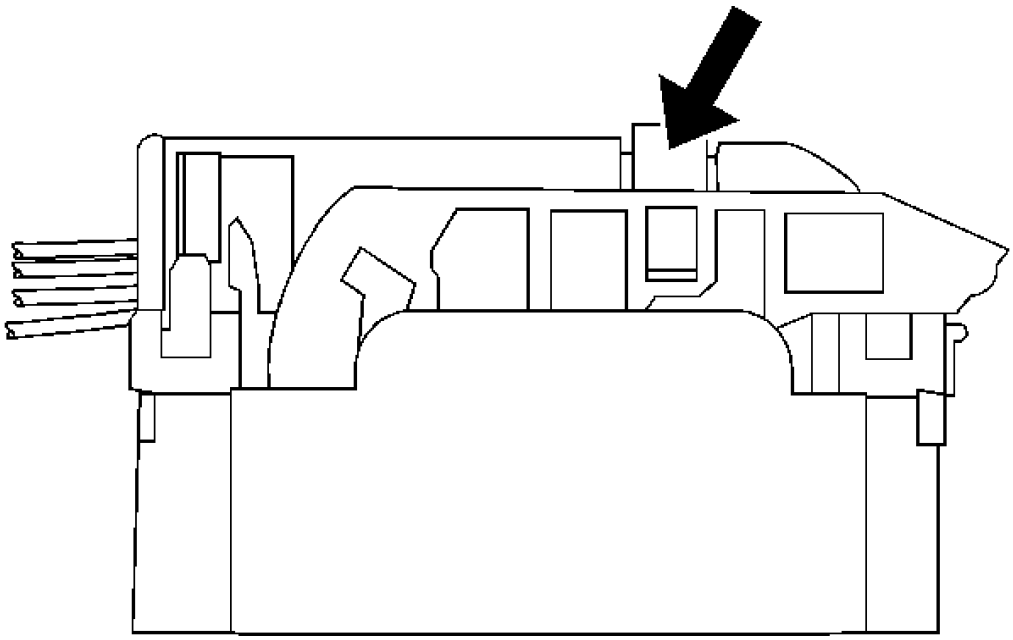


Fig. 129: Identifying Lever Lock
Courtesy of GENERAL MOTORS CORP.

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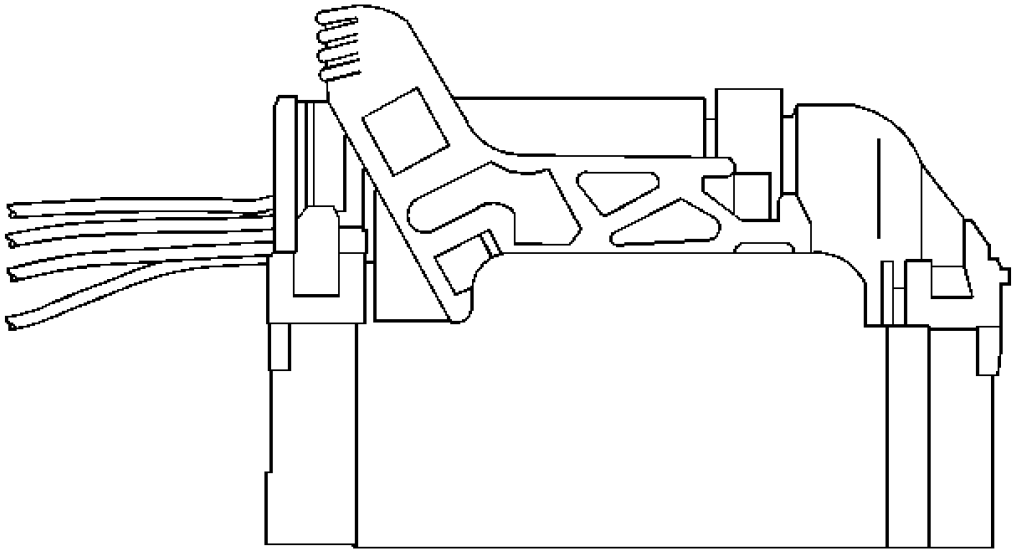


Fig. 130: View Of Lever Lock In Forward Position
Courtesy of GENERAL MOTORS CORP.

1. Slide the lever lock forward while pressing down on the lever lock release tab.
2. Disconnect the connector from the component.

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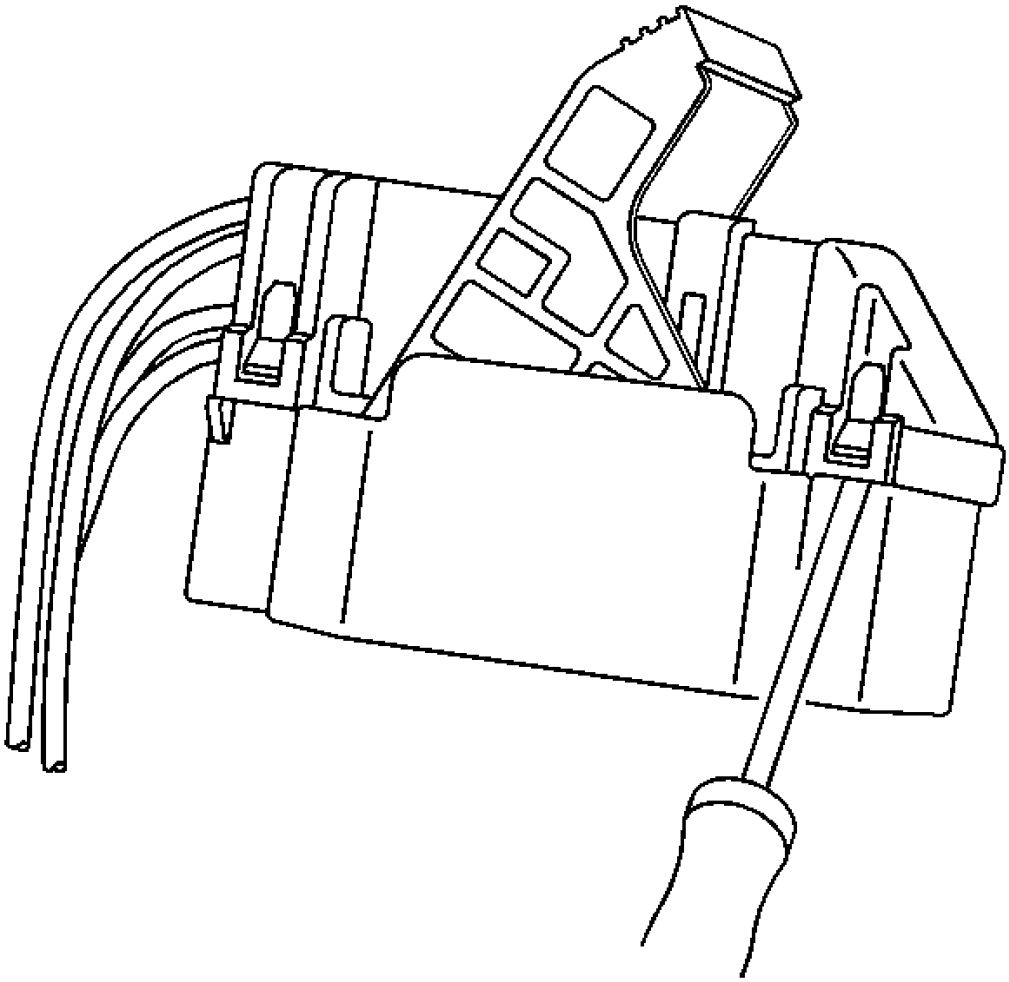


Fig. 131: Releasing Connector Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Remove the dress cover by using a flat-blade tool to release the connector locking tabs and pulling off the dress cover.

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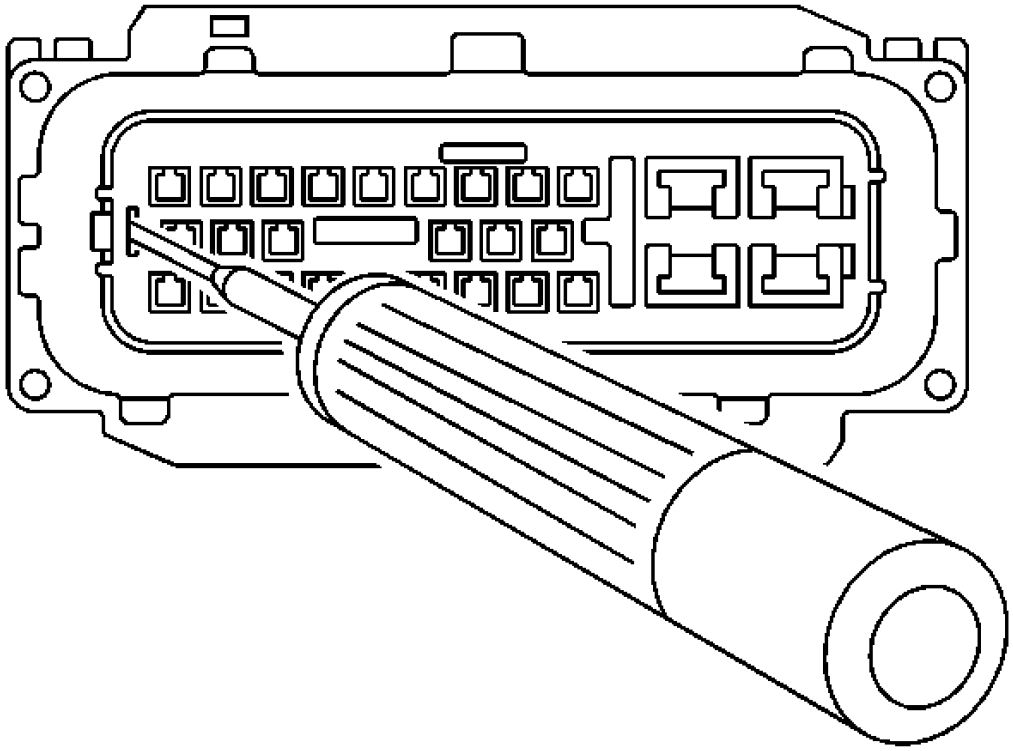


Fig. 132: Relieving Tension Of Nose Piece Retainers
Courtesy of GENERAL MOTORS CORP.

4. Relieve the tension on the nose piece retainers by inserting EL-38125-12A into the single retainer slot on the end of the nose piece and gently prying out the locking tab. Repeat the process for both of the nose piece locking tabs on the opposite side of the nose piece.

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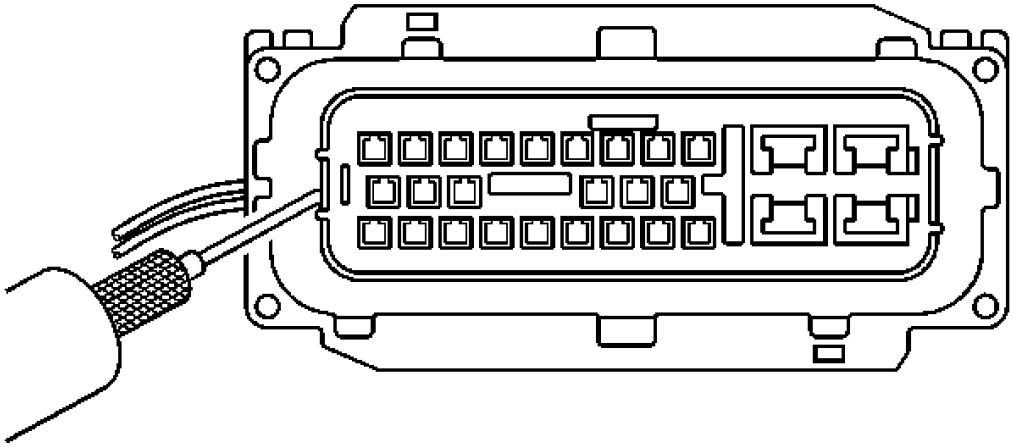
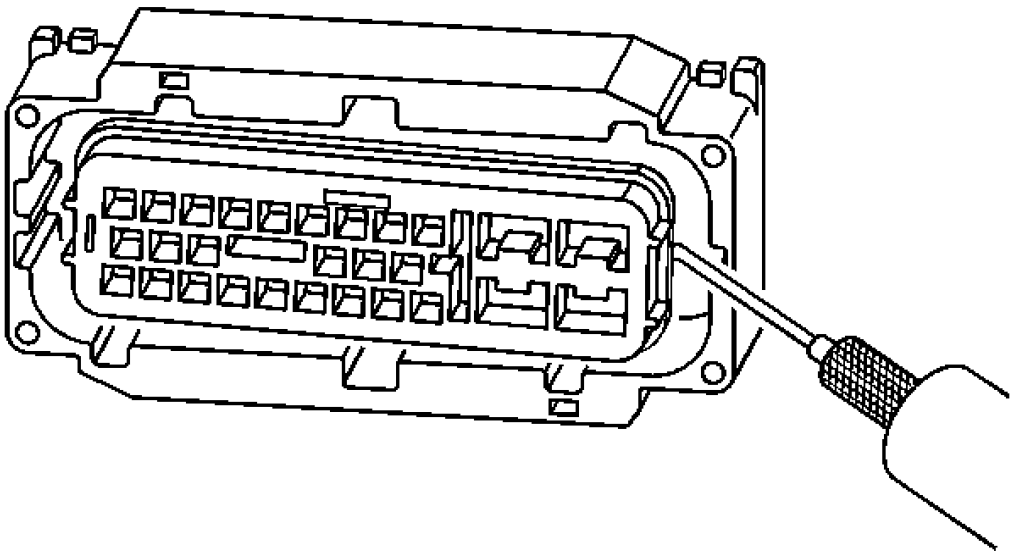


Fig. 133: Pulling Up Nose Piece
Courtesy of GENERAL MOTORS CORP.

5. Once the nose piece retainers are relaxed, use the EL-38125-552 to pull up the nose piece by hooking the tool under the nose piece and pulling up. The nose piece should raise slightly.



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Fig. 134: Pulling Up Other End Of Nose Piece
Courtesy of GENERAL MOTORS CORP.

6. On the opposite side of the nose piece, use the EL-38125-552 pull up the nose piece by hooking the tool under the nose piece and pulling up. The nose piece should release completely. If the nose piece does not come off, repeat the procedure on the opposite side.

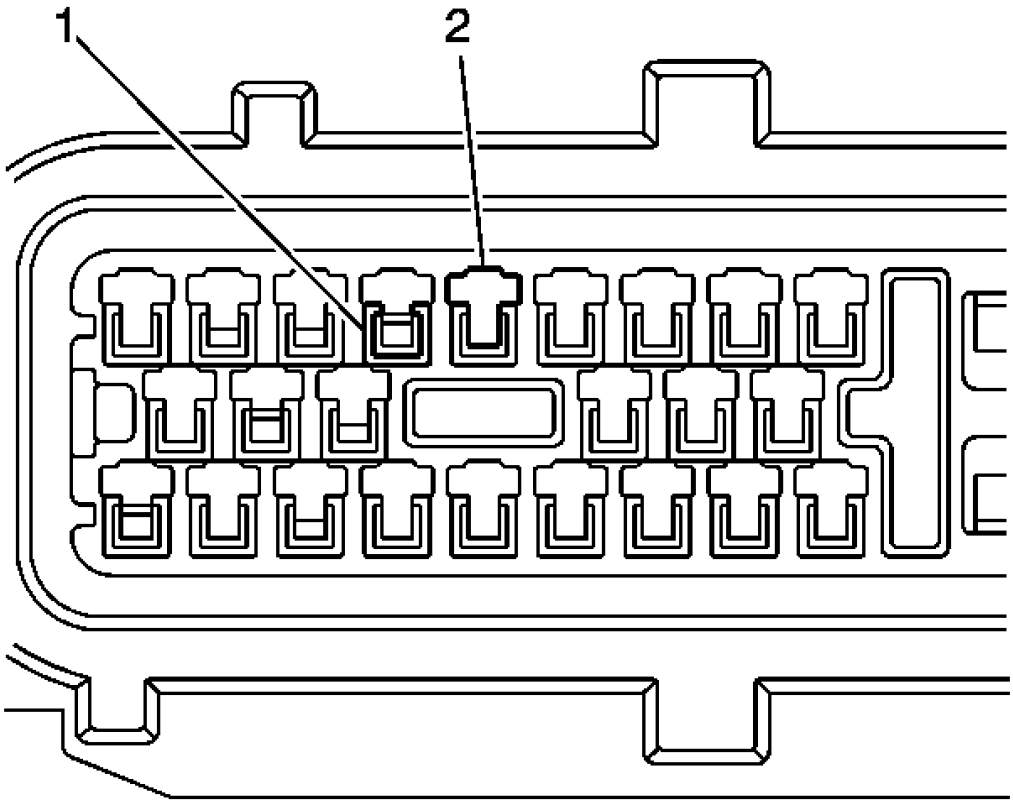


Fig. 135: Identifying Terminal & Entry Canal
Courtesy of GENERAL MOTORS CORP.

7. The illustration above identifies the entry canal where the terminal release tool will be inserted, and the terminal cavity.
    - Terminal (1)
    - Entry Canal (2)

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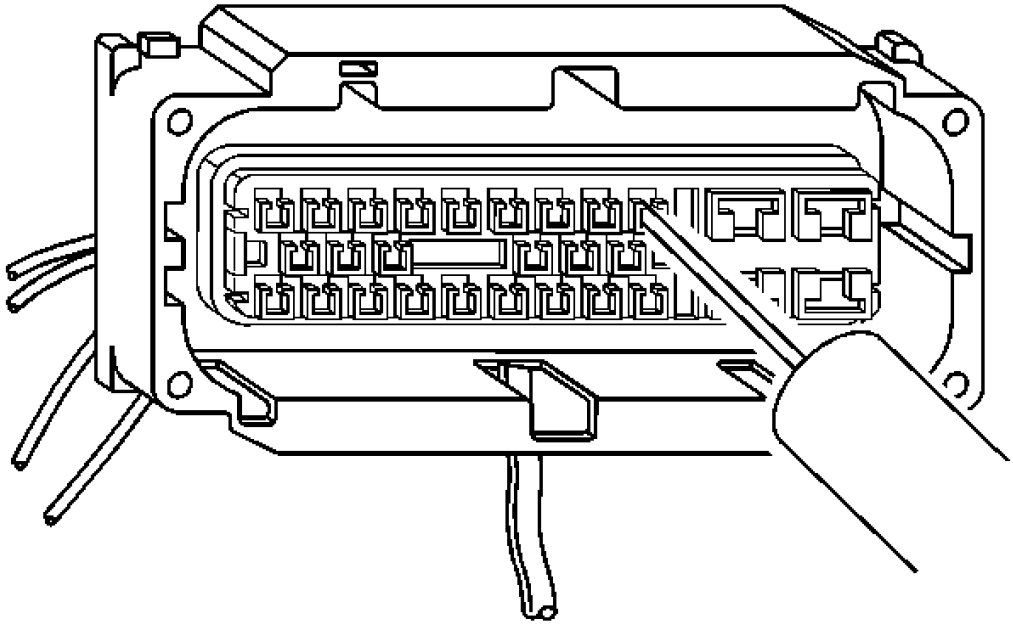


Fig. 136: Inserting Tool Into Entry Canal
Courtesy of GENERAL MOTORS CORP.

8. Insert the EL-38125-553 tool into the entry canal and pry up on the terminal retainer. The terminal retainer is a small plastic piece on the top of the terminal. The terminal retainer must be held up while the terminal is pulled out of the connector.

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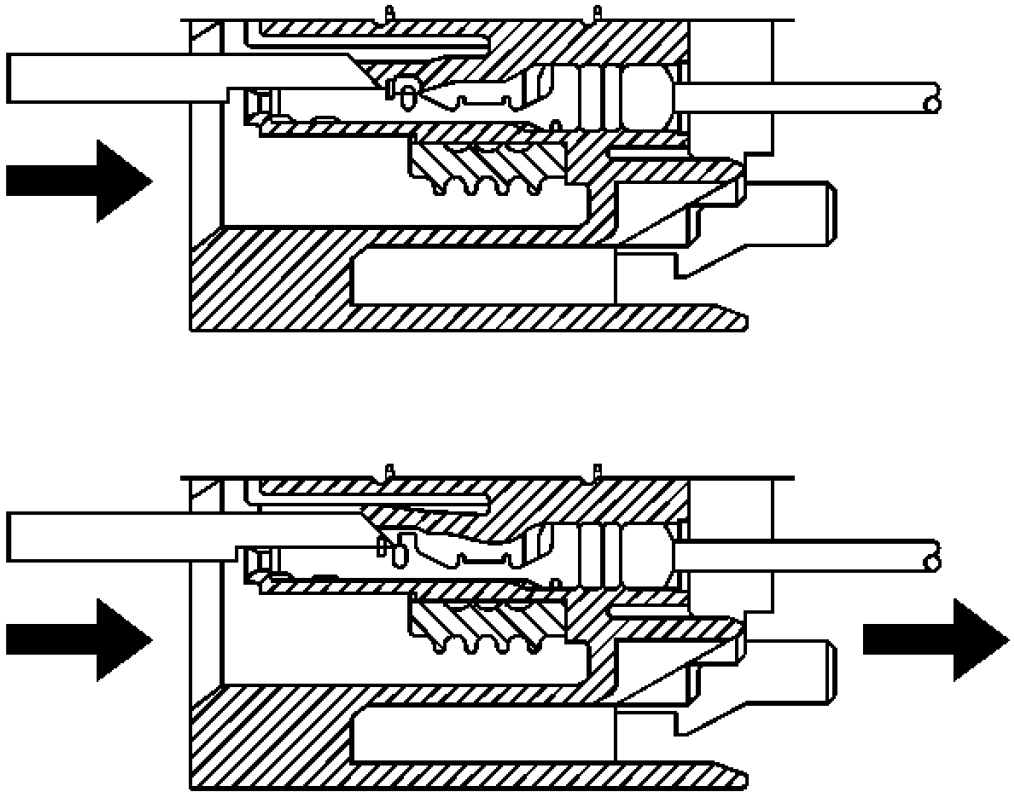


Fig. 137: Cutaway View Of Connector
Courtesy of GENERAL MOTORS CORP.

9. The illustration shows a cutaway view of the connector to aid the technician in releasing the terminal retainer.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

Terminal Replacement Procedure

After the terminal is crimped to the wire, perform the following procedure in order to replace the terminal.

1. Slide the new terminal into the correct cavity at the back of the connector.

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2. Push the terminal into the connector until it locks into place. The new terminal should be even with the other terminals. Ensure that the terminal is locked in place by gently pulling on the wire.
3. To assemble the connector, reverse the connector disassembly procedure.

TYCO/AMP CONNECTORS (CM 42-WAY)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

1. Locate the connector position assurance (CPA) on the connector body and pull the CPA out. The CPA is on the wire harness side of connector.
2. Disconnect the connector from the component.

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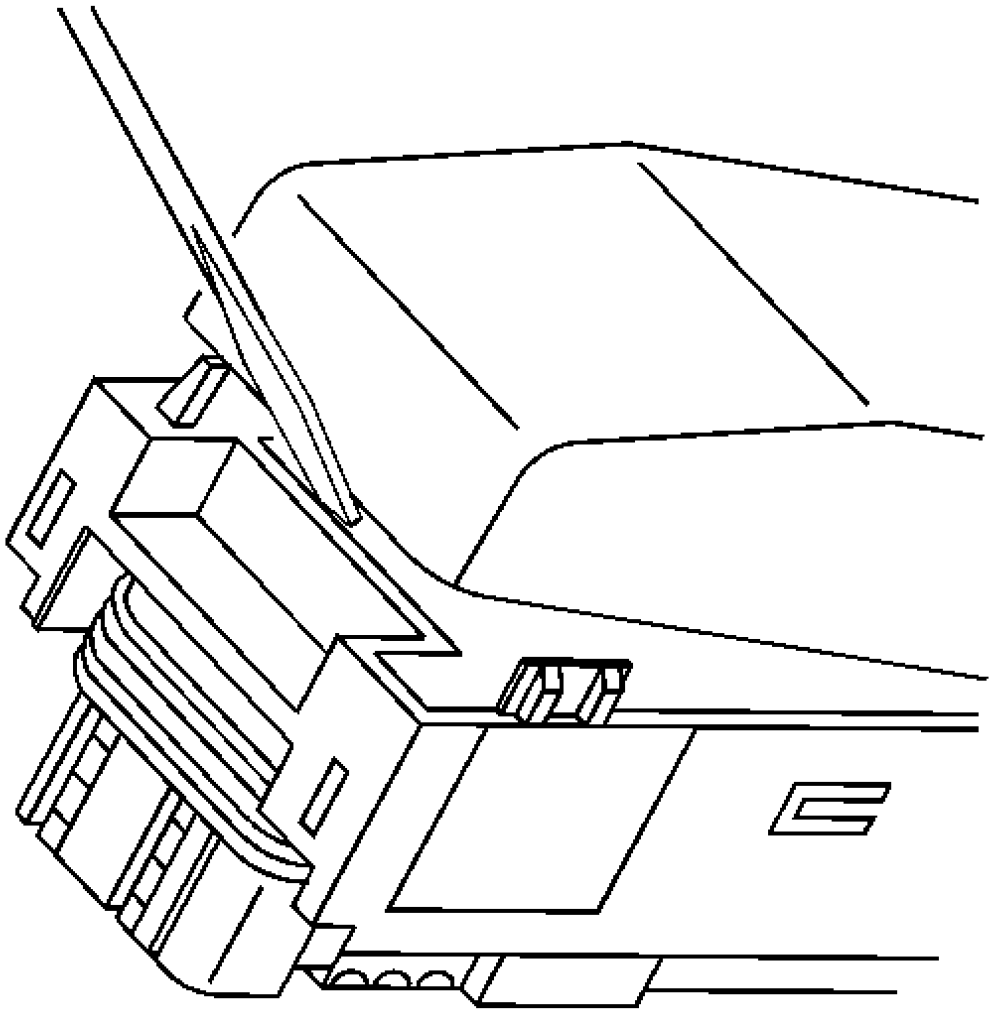


Fig. 138: Prying Off Dress Cover
Courtesy of GENERAL MOTORS CORP.

3. Use a small flat-bladed tool to gently pry off the dress cover by inserting the tool under the cover opposite the harness side and prying up.
4. Remove the cover.

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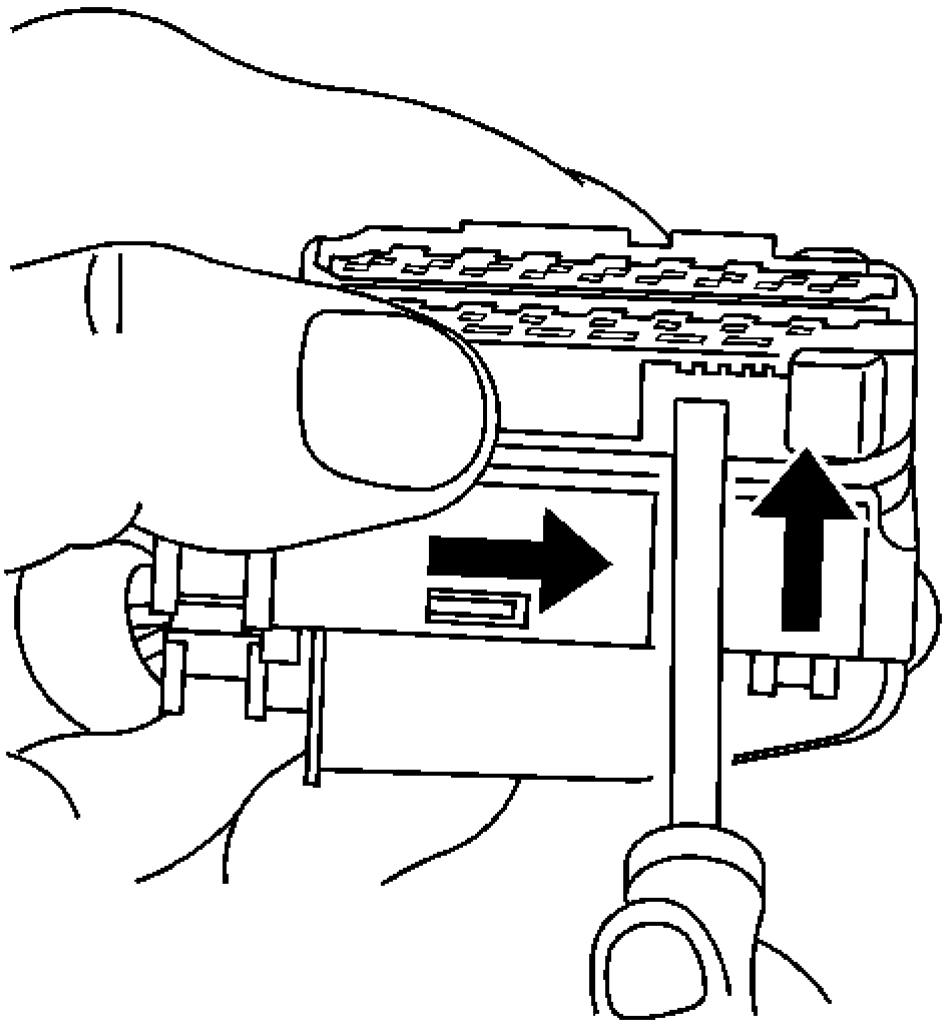


Fig. 139: View Of Terminal Position Assurance (TPA)
Courtesy of GENERAL MOTORS CORP.

5. Using a small flat-bladed tool, push on the side of the nose piece retainer while pushing the nose piece forward with your thumb. This will release the terminal position assurance (TPA).

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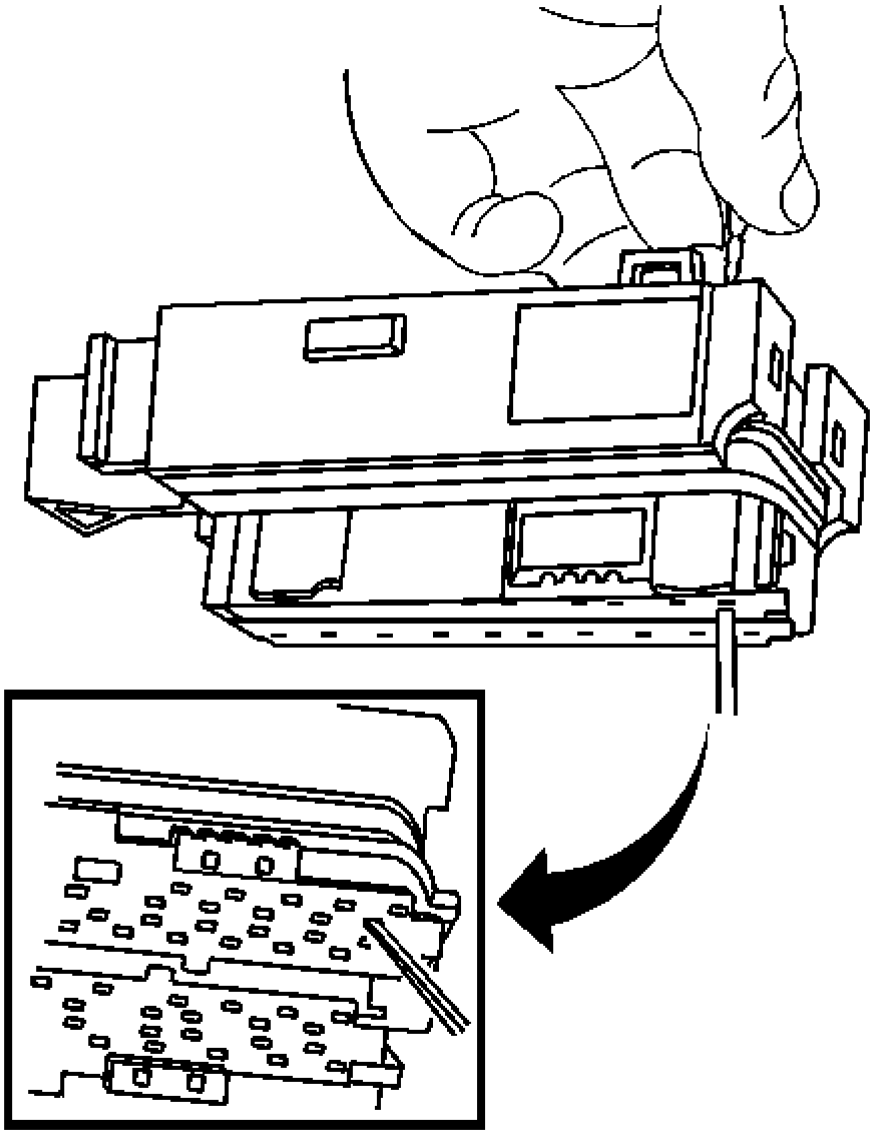


Fig. 140: Inserting Special Tool Into Terminal Release Cavity
Courtesy of GENERAL MOTORS CORP.

6. Insert the EL-38125-12A into the corresponding terminal release cavity. The release cavities are the 2 center rows of cavities on one half of the connector.

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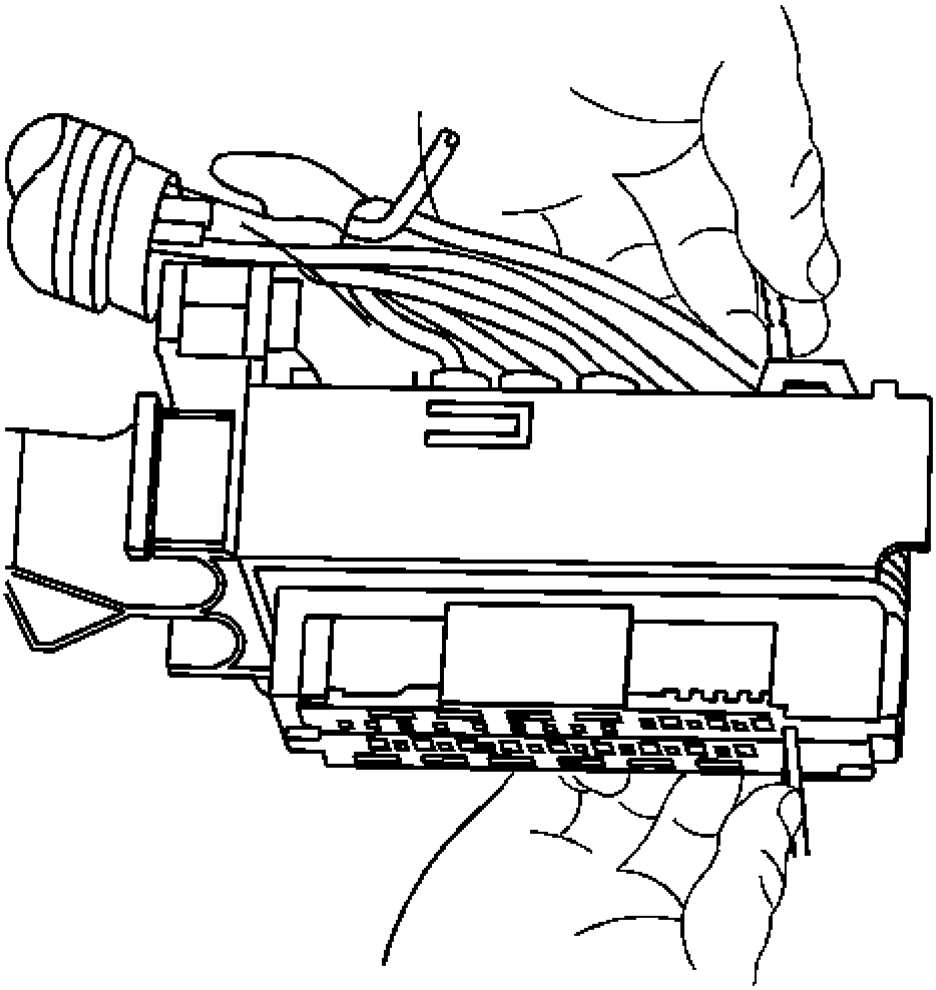


Fig. 141: Pulling Terminal Out Of Back Of Connector
Courtesy of GENERAL MOTORS CORP.

7. Pressing the EL-38125-12A tool in the release cavity of the terminal you are removing, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.

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3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (SENSOR)

Special Tools

J-38125 Terminal Repair Kit

Terminal Removal Procedure

1. Disconnect the connector from the component.

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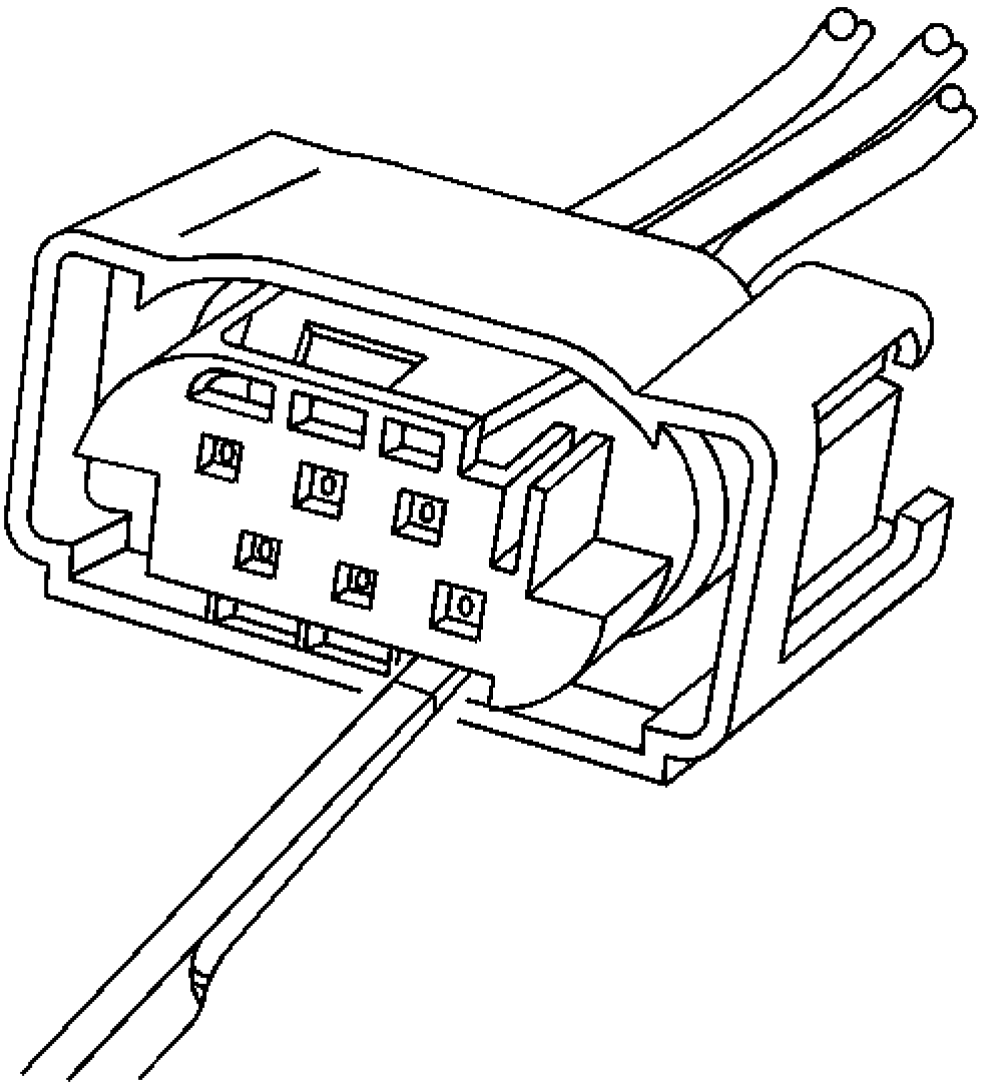


Fig. 142: Inserting Special Tool Into Lower Right Face Cavity
Courtesy of GENERAL MOTORS CORP.

2. Insert the EL-38125-11A tool into the cavity on the lower right hand face of the connector until the terminal release tang access panel slides over.

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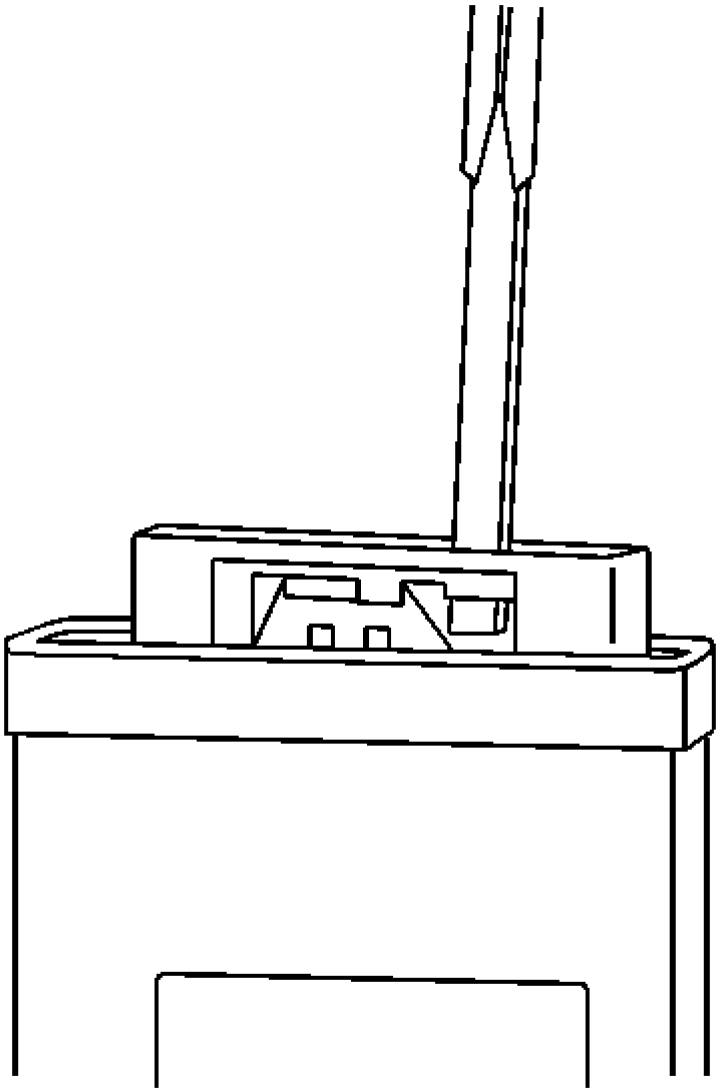


Fig. 143: Pushing Wire Side Of Terminal Toward Connector
Courtesy of GENERAL MOTORS CORP.

3. Ensure that the terminal release tang access panel is in the correct location to access the terminals.
4. Push the wire side of the terminal that is being removed toward the connector and hold it in position.

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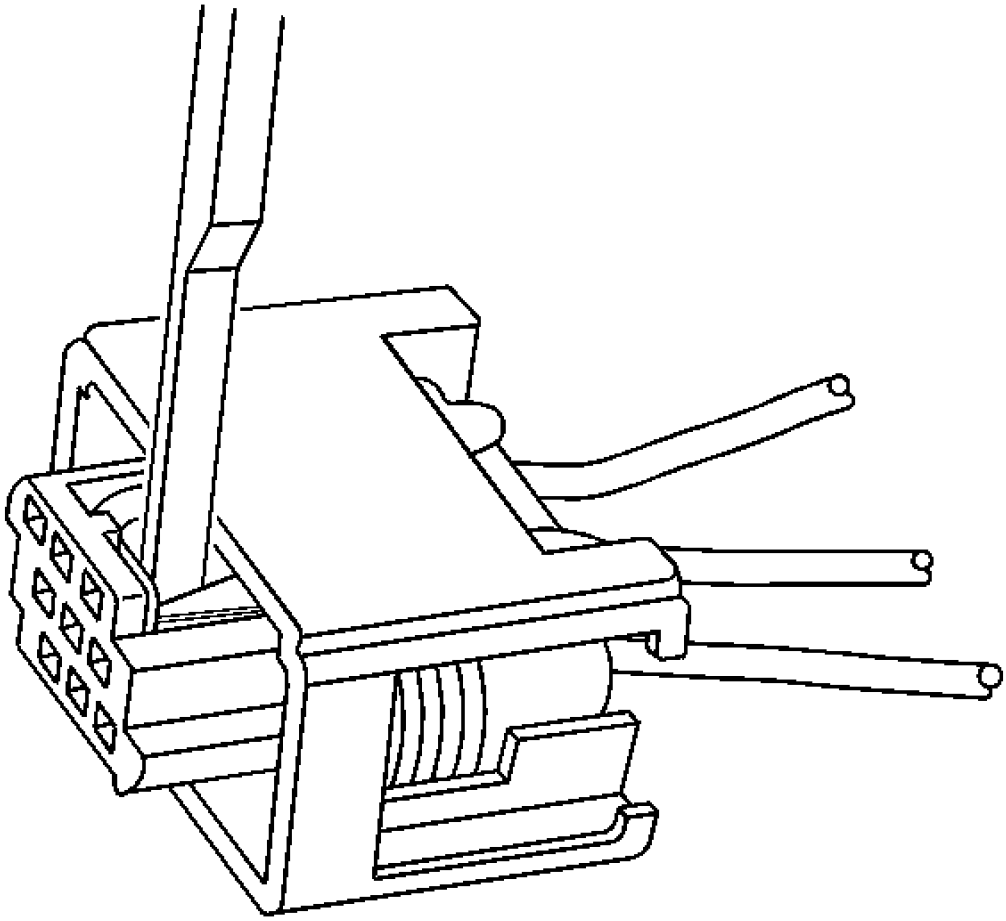


Fig. 144: Inserting Tool Into Terminal Release Tang Access Slot
Courtesy of GENERAL MOTORS CORP.

5. Insert the EL-38125-11A into the terminal release tang access slot located behind the access panel of the connector and press down on the terminal while carefully pulling the terminal out of the connector. Always remember never use force when pulling a terminal out of a connector. If the terminal is difficult to remove, repeat the entire procedure.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

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TYCO/AMP CONNECTORS (0.25 CAP)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Terminal Removal Procedure

1. Disconnect the connector from the component by pressing down on the connector position assurance (CPA).

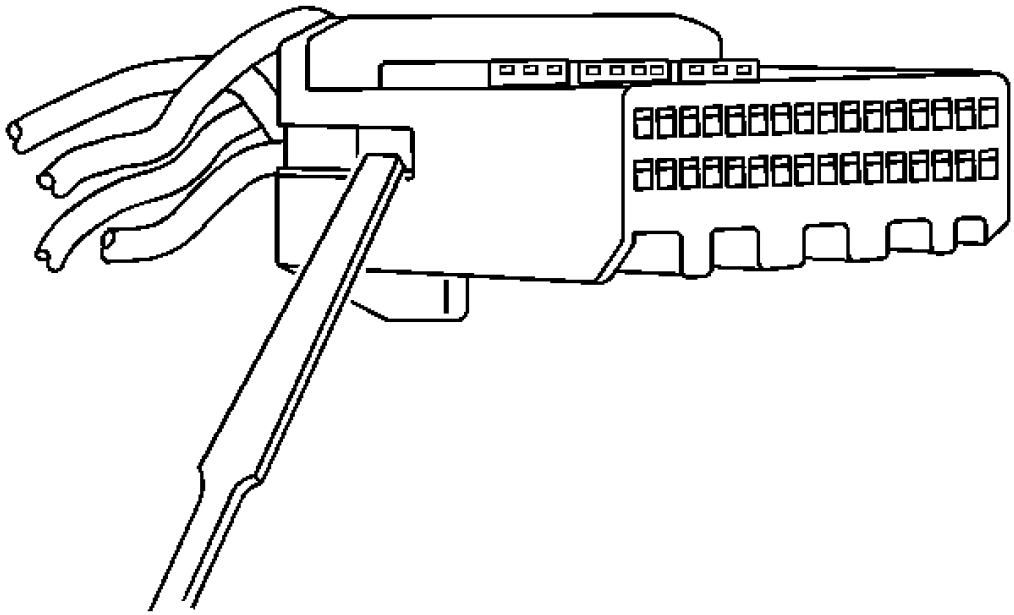


Fig. 145: Releasing TPA
Courtesy of GENERAL MOTORS CORP.

NOTE: The TPA on this connector cannot be removed unless the terminals are removed first. The TPA will come out of the connector body, but only slightly. When the TPA is slightly raised the terminals can be removed. Using excessive force to remove the TPA with the terminals still in the connector will damage the connector.

2. Use a small flat-bladed tool to release the terminal position assurance (TPA) by inserting the tool in the small recess on the side of the connector and pushing up until the TPA releases from the connector body. The TPA should raise just slightly. Do not try to remove the TPA.

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3. Repeat the process for the other side of the connector.

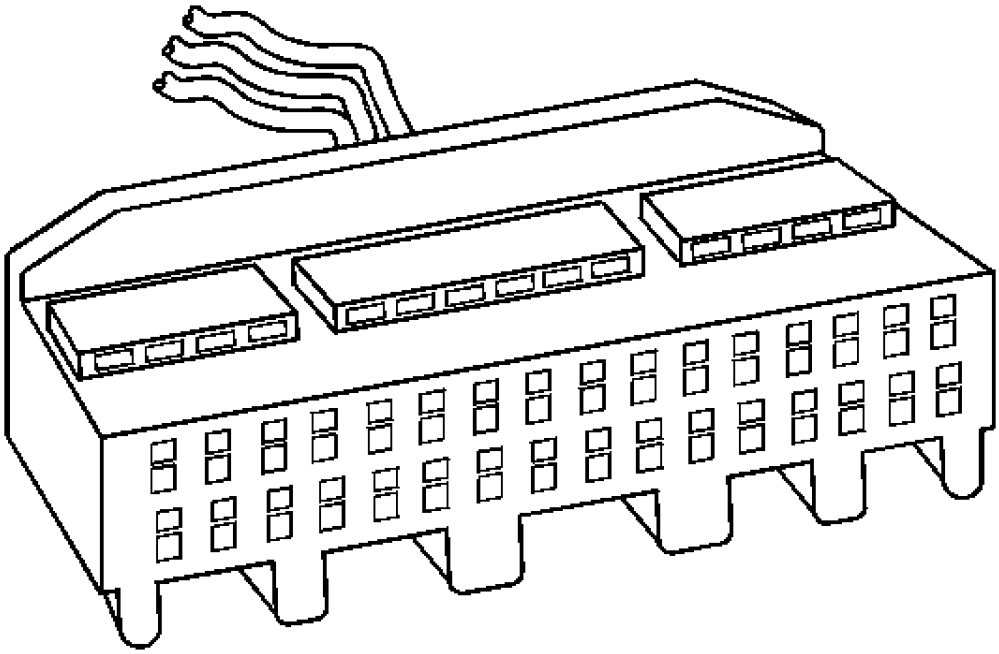


Fig. 146: View Of Terminal Position Assurance
Courtesy of GENERAL MOTORS CORP.

4. Ensure that the TPA is in the proper position to remove the terminals.

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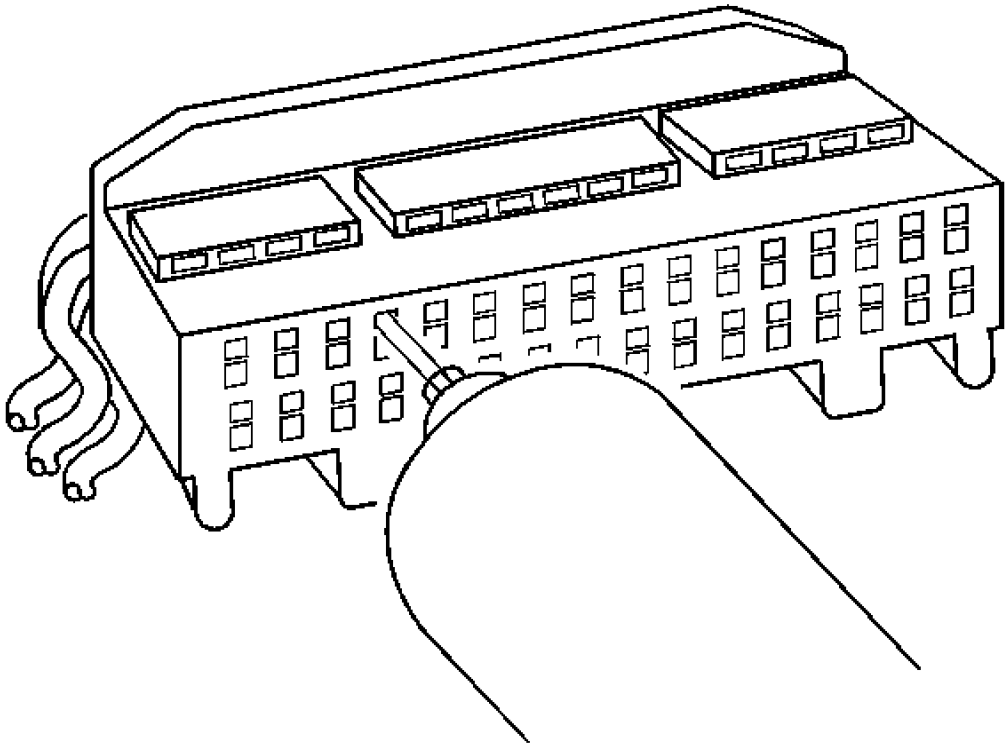


Fig. 147: Inserting Special Tool Into Release Cavity
Courtesy of GENERAL MOTORS CORP.

5. While pushing the terminal forward, insert the EL-38125-24 in the release cavity above the terminal you are removing, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (43-WAY)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

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Removal Procedure

Follow the steps below in order to remove terminals from the connector.

1. Locate the lever lock on the wire dress cover. Slide the lever lock away from the connector body.
2. Disconnect the connector from the component.
3. Locate the dress cover locking tabs on the dress cover of the connector. Using a small flat-blade tool release all of the locking tabs.
4. Once the locks are unlocked, lift the dress cover off.

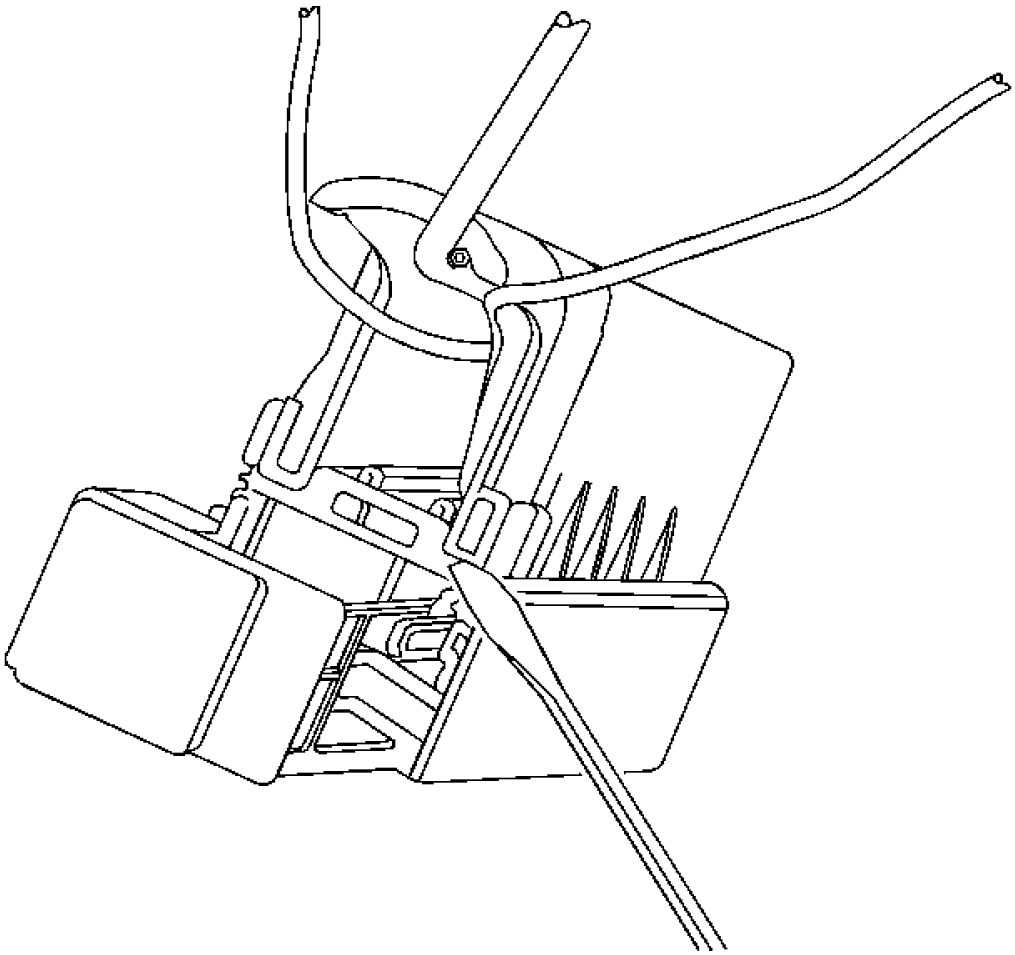


Fig. 148: Releasing TPA
Courtesy of GENERAL MOTORS CORP.

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NOTE: Always use care when removing a terminal position assurance (TPA) in order to avoid damaging it.

5. Release the TPA by inserting a small flat-blade tool into the blue locking tabs on both ends of the connector. Gently slide the TPA up to the released position on both ends.

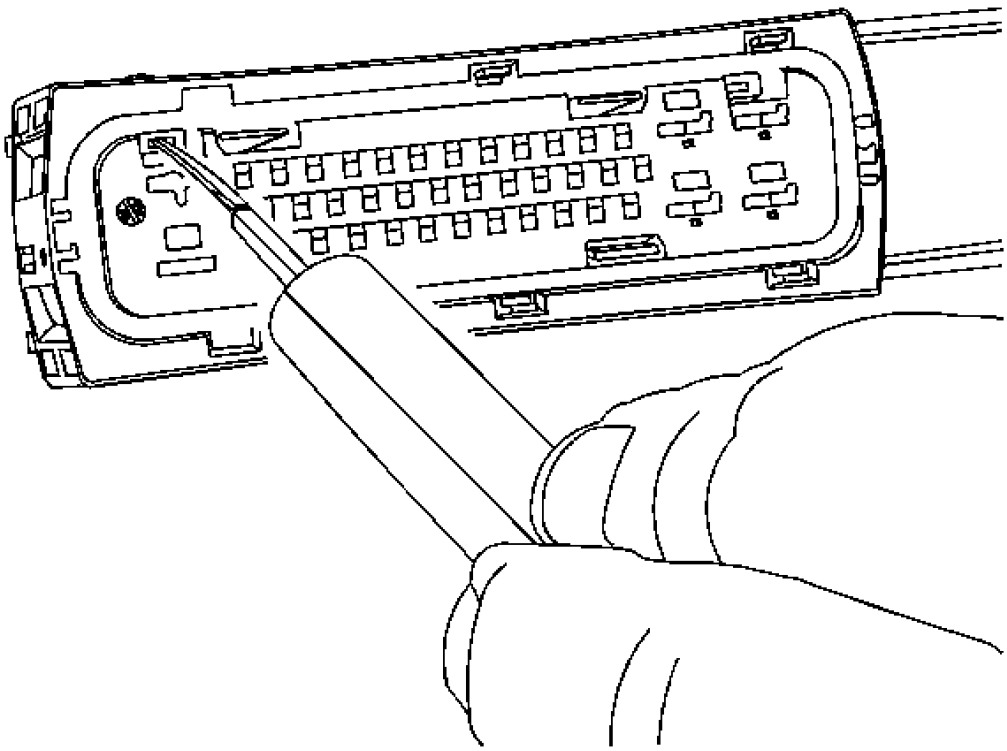


Fig. 149: Inserting Release Tool Into Terminal Release Cavity
Courtesy of GENERAL MOTORS CORP.

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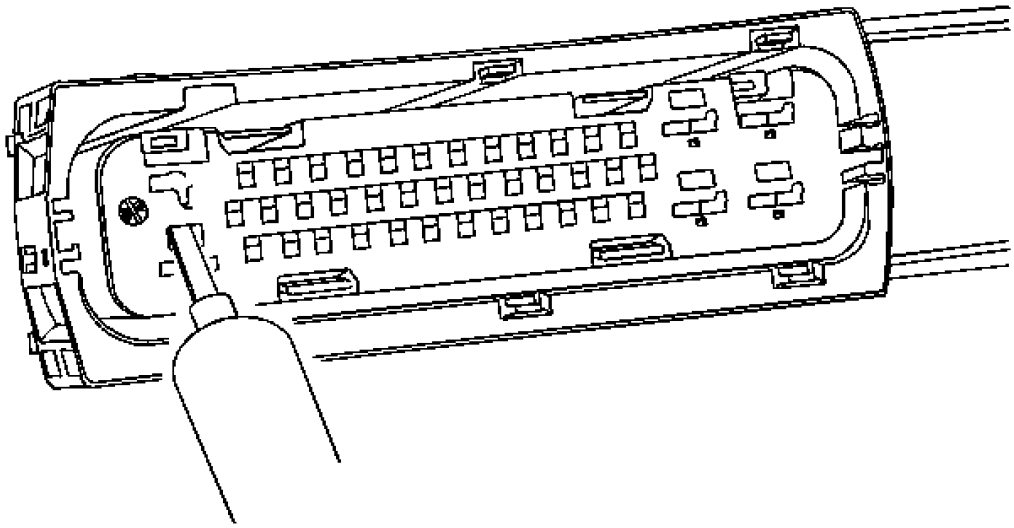


Fig. 150: View Of Release Tool Being Used For Larger Terminals
Courtesy of GENERAL MOTORS CORP.

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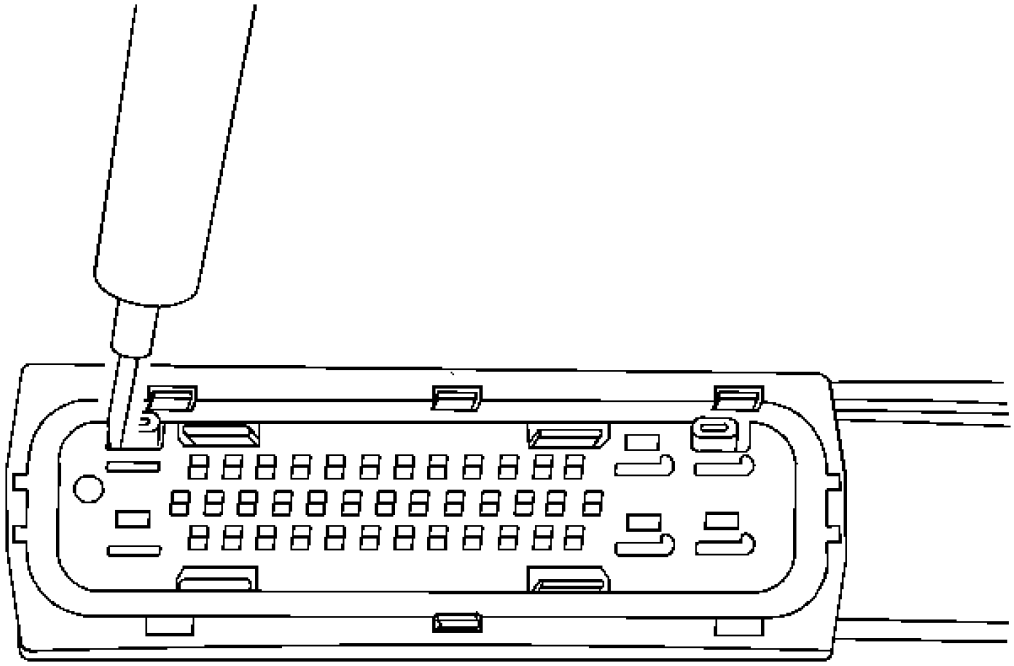


Fig. 151: View Of Release Tool Being Used For Larger Terminals
Courtesy of GENERAL MOTORS CORP.

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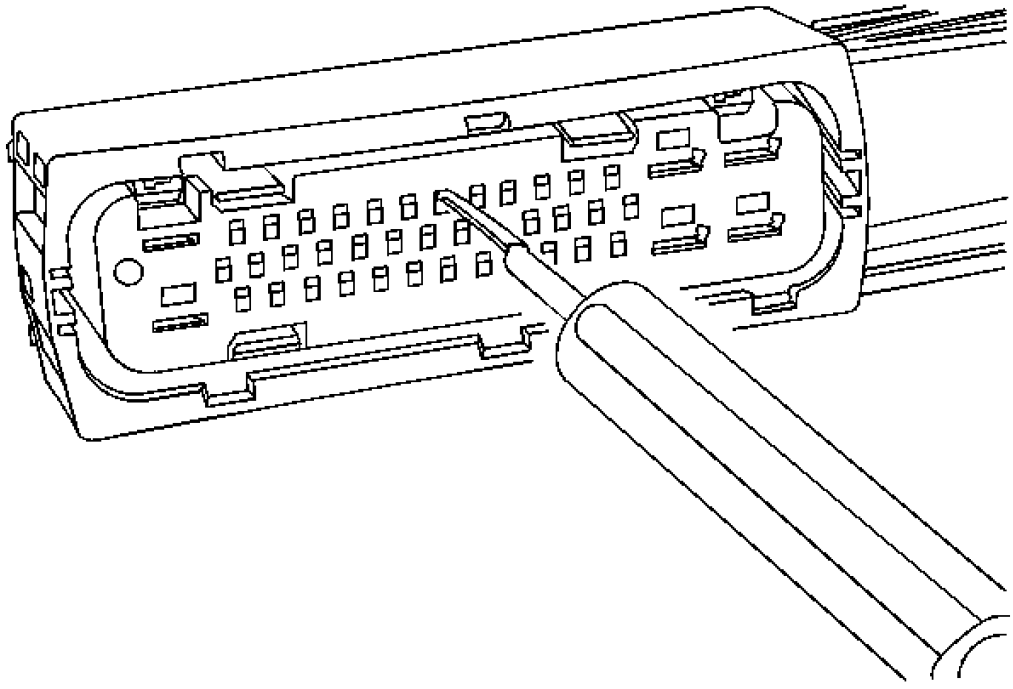


Fig. 152: View Of Release Tool Being Used For Smaller Terminals
Courtesy of GENERAL MOTORS CORP.

6. For the larger terminals insert the EL-38125-13A tool to release the terminals by inserting the tool into the terminal release cavity. For the smaller terminals insert the EL-38125-12A tool to release the terminals by inserting the tool into the terminal release cavity.

   View of the release tool being used for the larger terminals.

   View of the release tool being used for the larger terminals.

   View of the release tool being used for the smaller terminals.

7. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.

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4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (DOOR MODULE)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

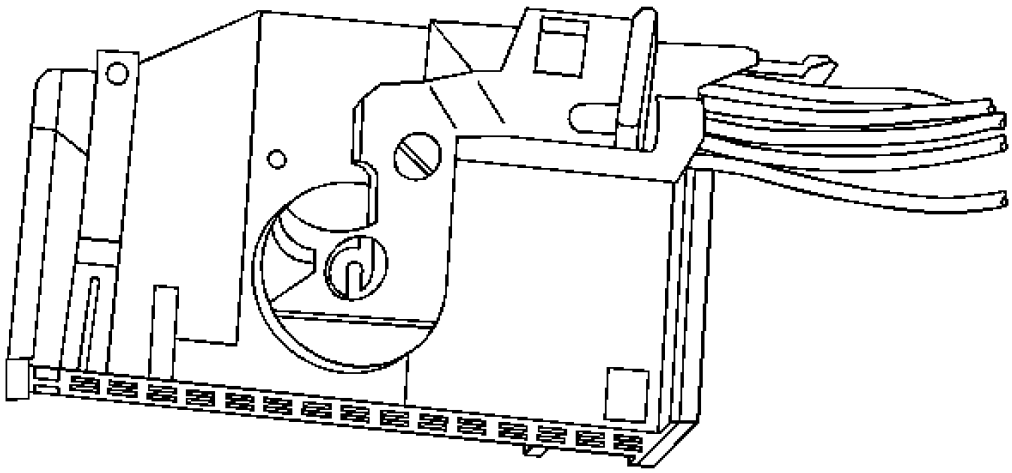


Fig. 153: Side View Of Tyco/AMP Connector
Courtesy of GENERAL MOTORS CORP.

Side view of connector.

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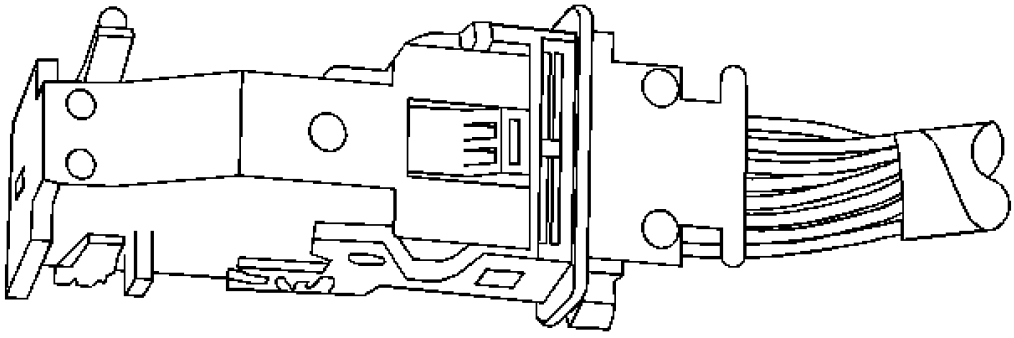


Fig. 154: Top View Of Tyco/AMP Connector
Courtesy of GENERAL MOTORS CORP.

View of top of connector.

1. Locate the assist lever and lock on the top of the connector.

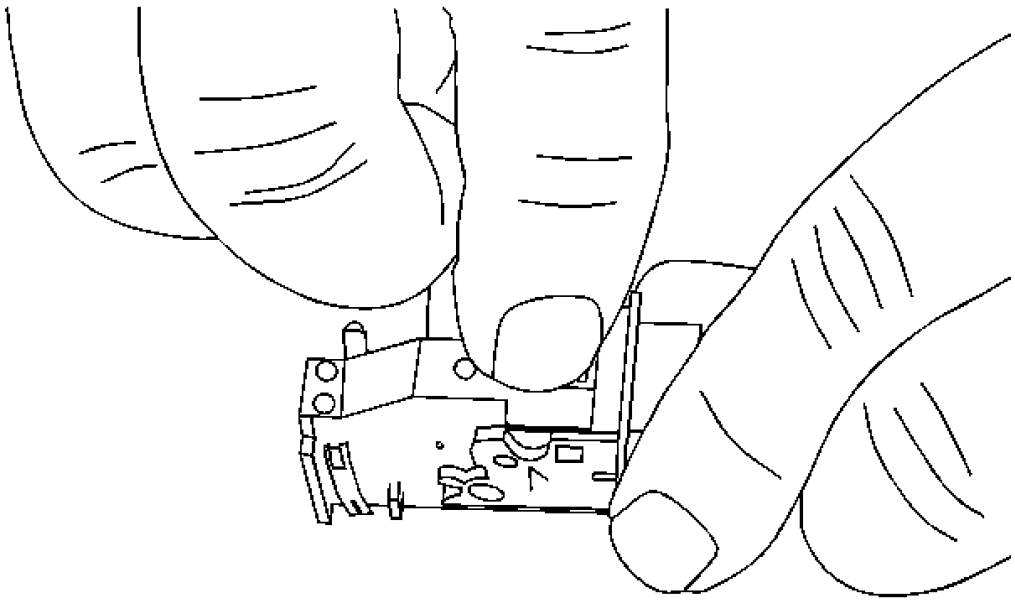


Fig. 155: Depressing Lock & Pulling Assist Lever

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Courtesy of GENERAL MOTORS CORP.

2. While depressing the lock, pull the lever over and past the lock.

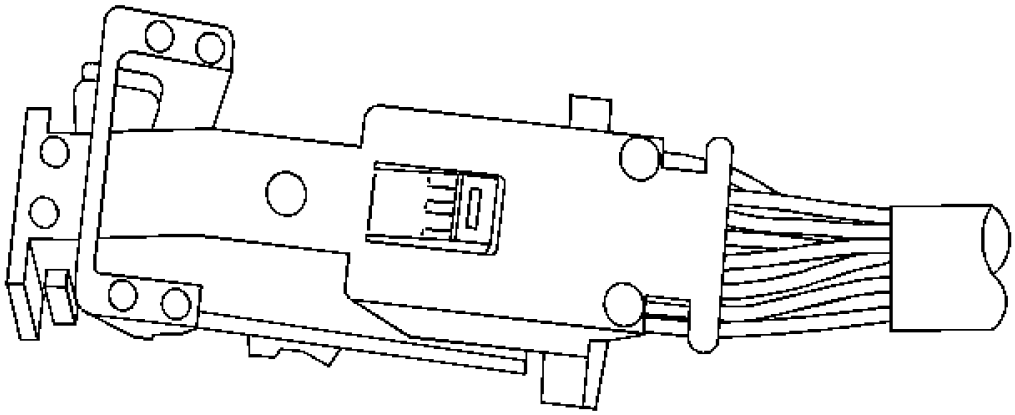


Fig. 156: View Of Component Connector
Courtesy of GENERAL MOTORS CORP.

3. Disconnect the connector from the component.

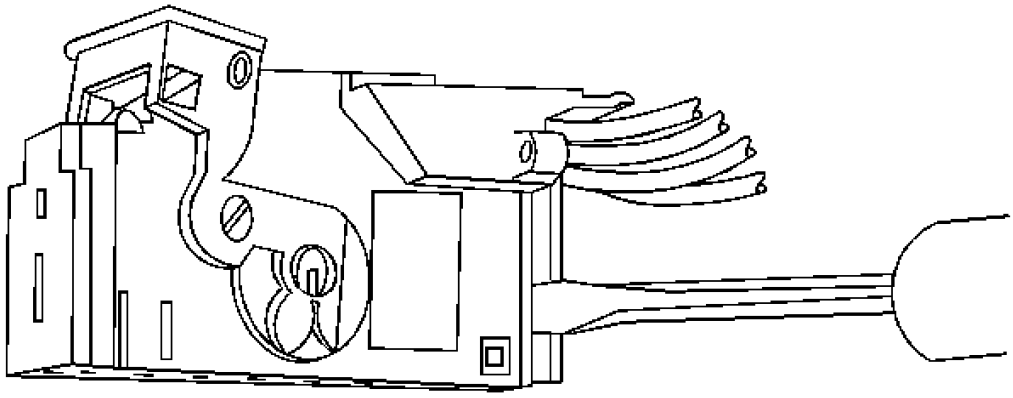


Fig. 157: Releasing Locking Tabs
Courtesy of GENERAL MOTORS CORP.

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4. Locate the dress cover locking tabs at the rear of the connector. Use a small flat-blade tool to release the locking tabs. Repeat this procedure for the other locking tab.

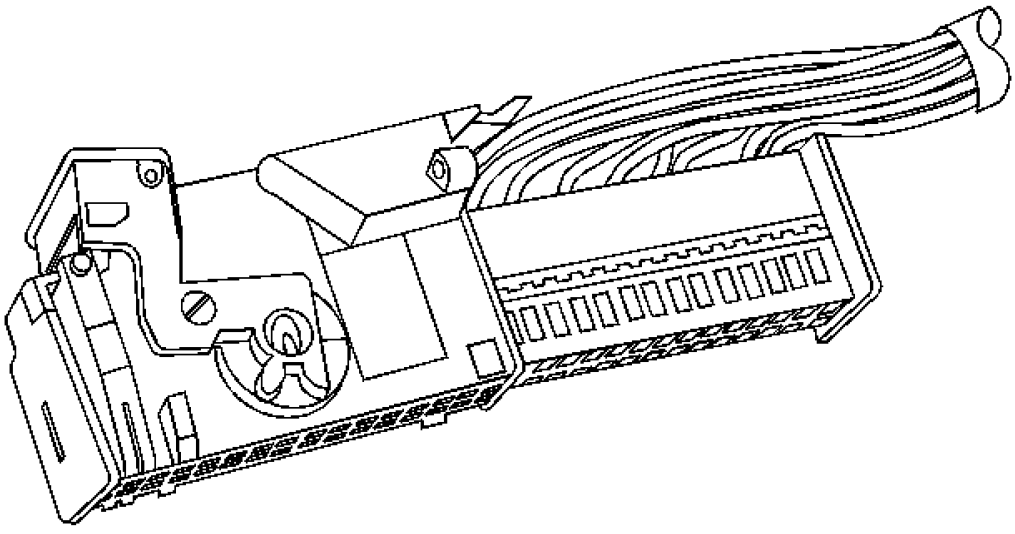


Fig. 158: Sliding Inner Connector Out Of Connector Housing
Courtesy of GENERAL MOTORS CORP.

5. Once the locking tabs are unlocked, slide the inner connector out of the rear of the connector housing.

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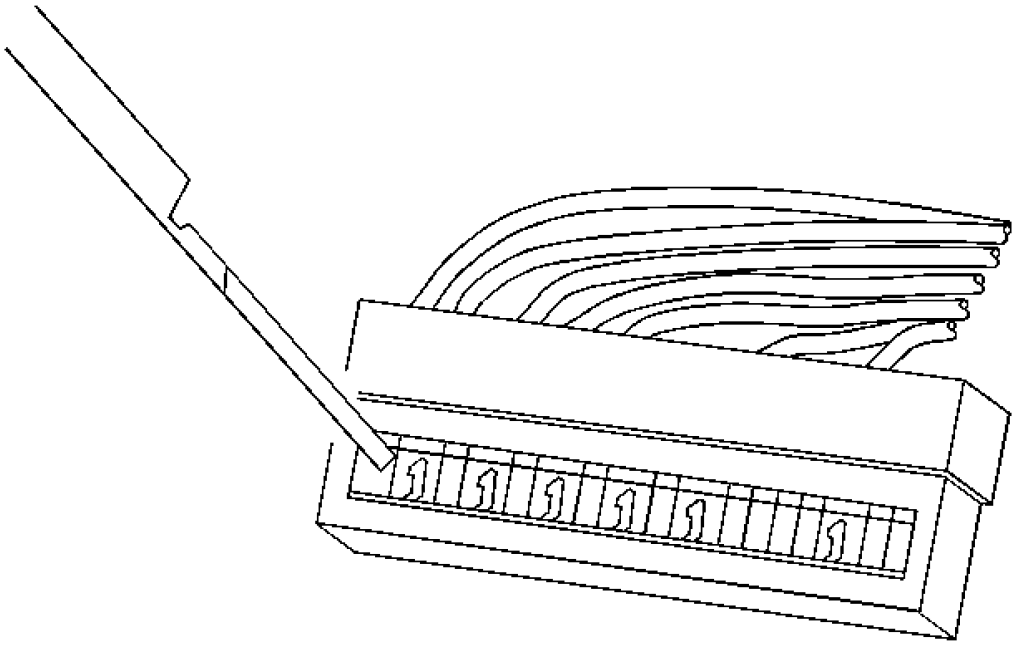


Fig. 159: Releasing Terminals
Courtesy of GENERAL MOTORS CORP.

6. Use the EL-38125-12A tool to release the terminals by pressing on the tang.
7. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (102-WAY INLINE)

Special Tools

For equivalent regional tools, refer to Special Tools **Special Tools** .

Removal Procedure

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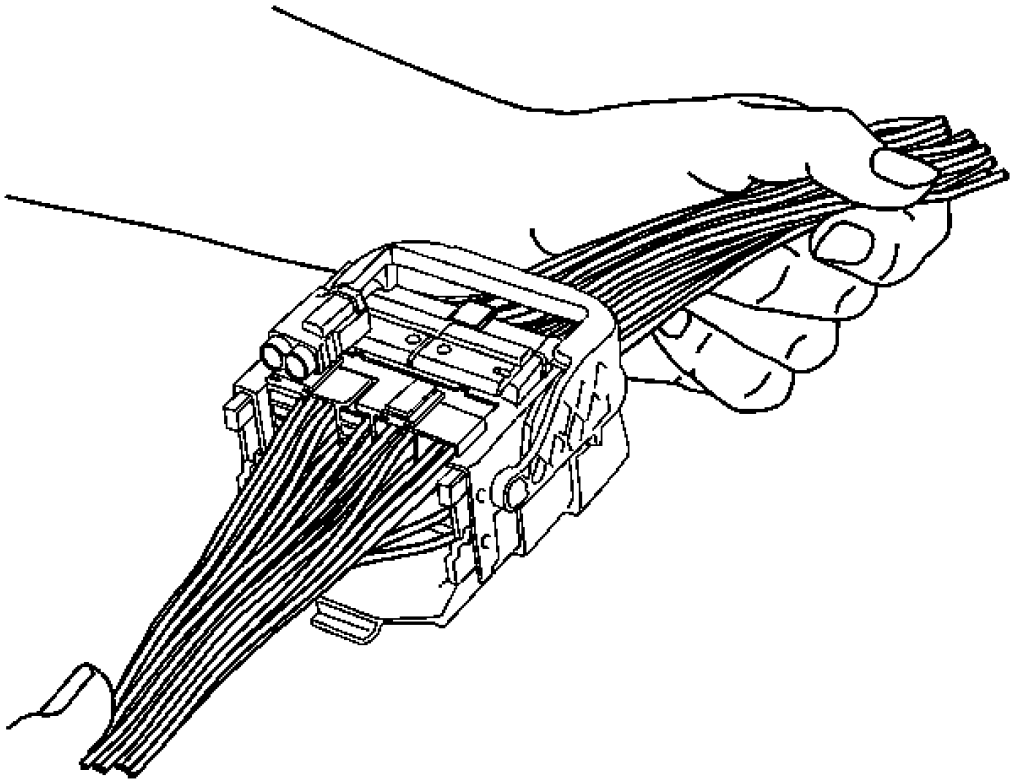


Fig. 160: View Of Typical Connector In Assembled Position
Courtesy of GENERAL MOTORS CORP.

View of a typical connector in the assembled position.

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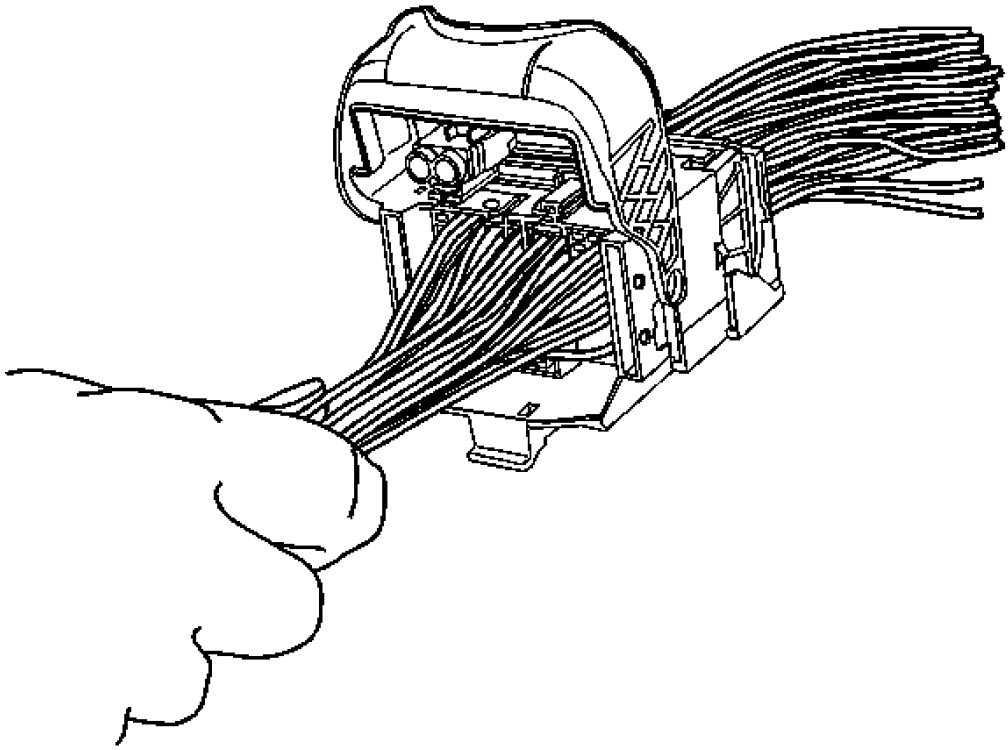


Fig. 161: View Of Locking Lever At 90 Degrees From Connector Body
Courtesy of GENERAL MOTORS CORP.

1. Pull the locking lever to the 90 degree position from the connector body.

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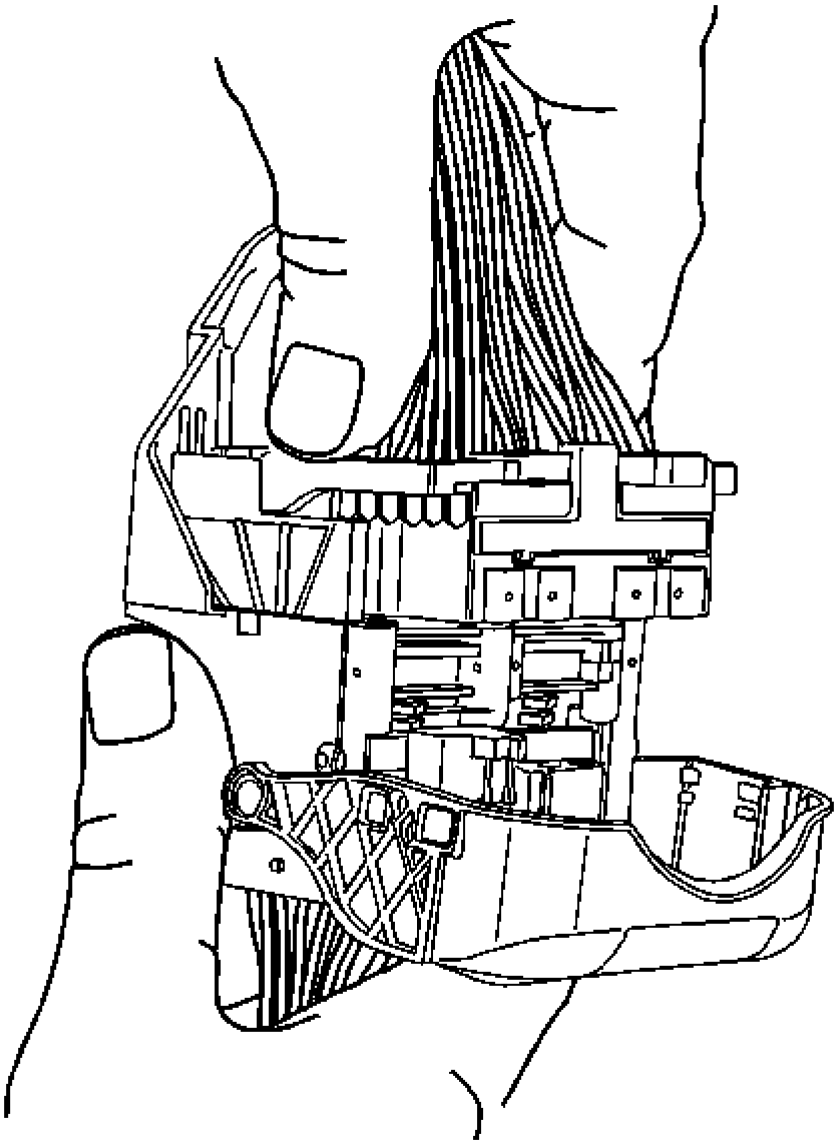


Fig. 162: Sliding Male Connector Body
Courtesy of GENERAL MOTORS CORP.

2. With the locking lever in the 90 degree position and the male connector body separated, it can be slid outward for removal.

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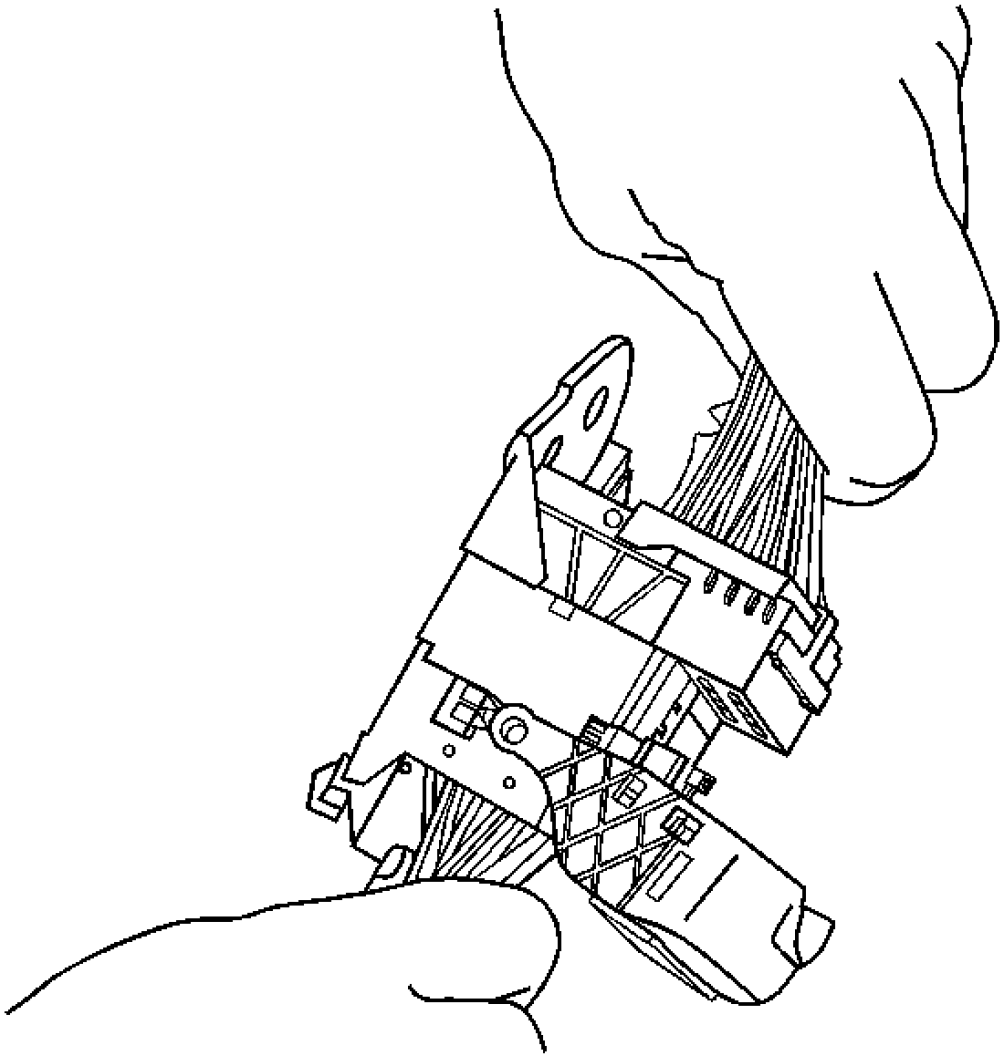


Fig. 163: Sliding Male Connector
Courtesy of GENERAL MOTORS CORP.

3. Slide the male connector body out away from the guide plates.

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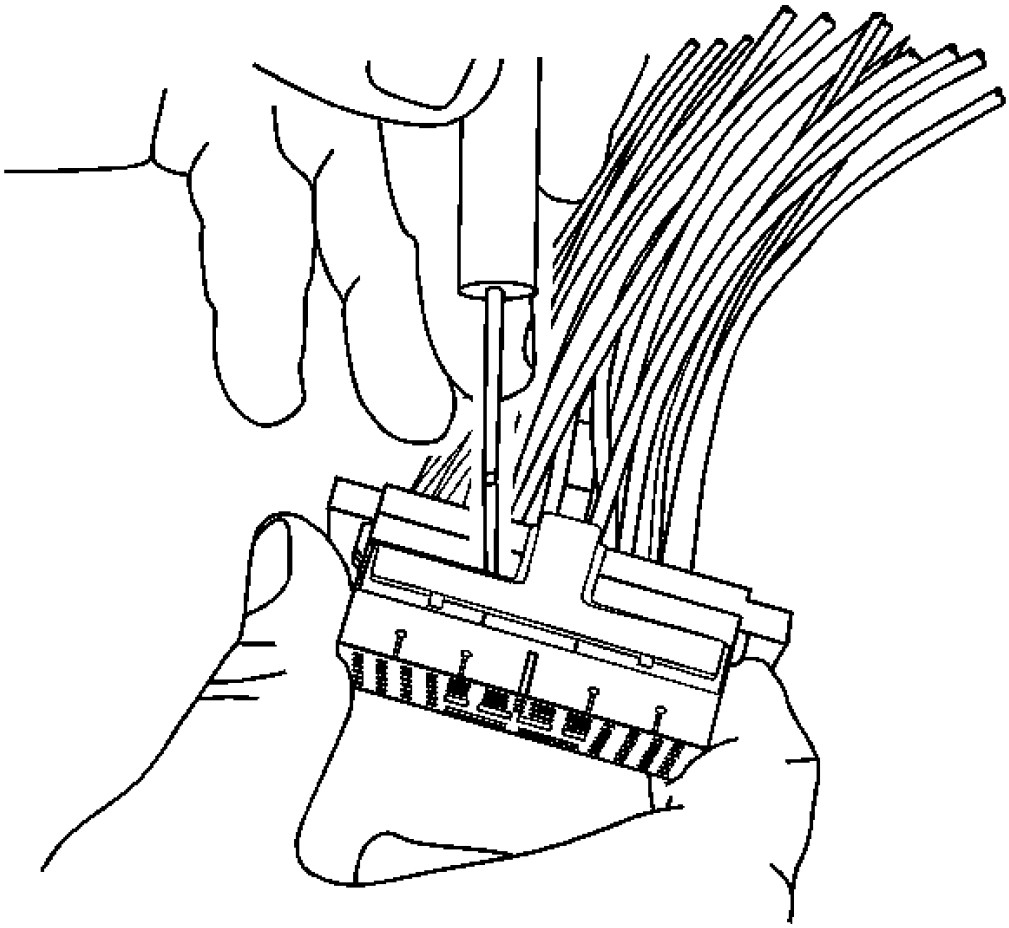


Fig. 164: Removing TPA From Connector Body
Courtesy of GENERAL MOTORS CORP.

NOTE: During assembly the TPA will not fully seat if any terminal is not fully seated.

4. Using terminal release tool J-38125-11A or equivalent, remove the TPA from the connector body.

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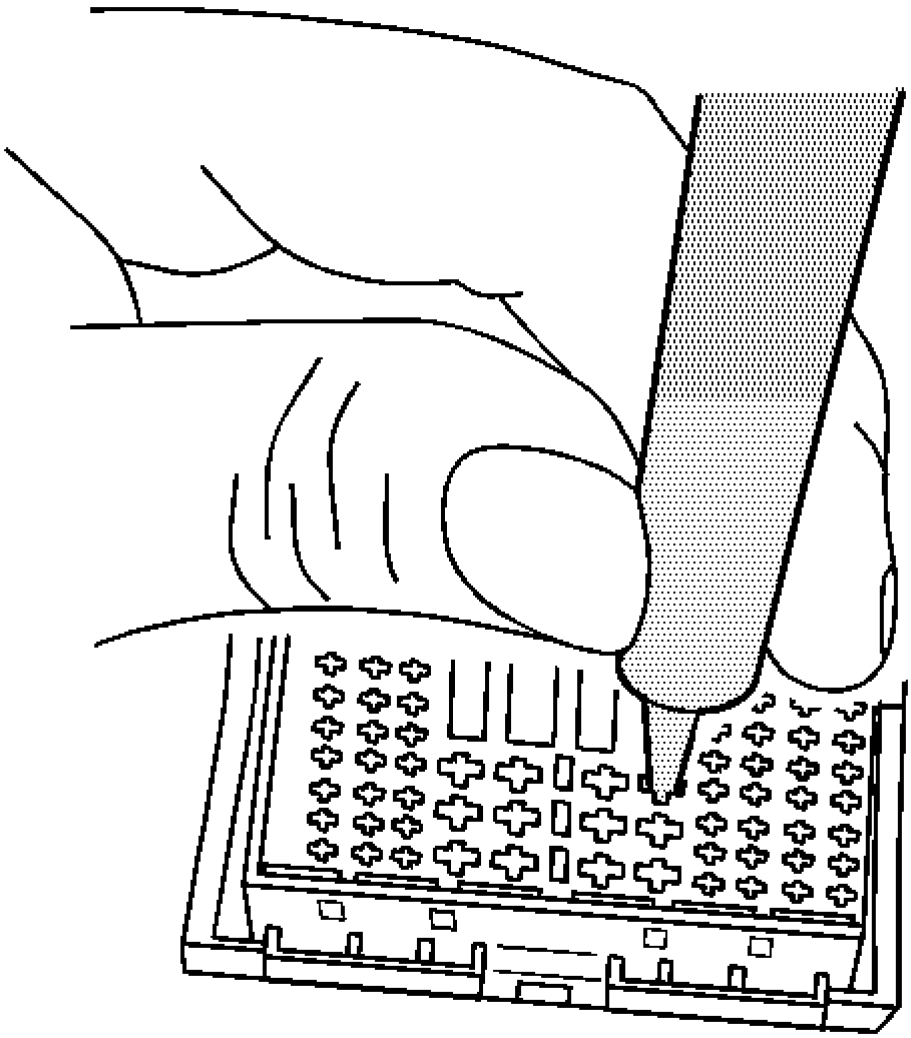


Fig. 165: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

5. Using terminal release tool J 38125-566, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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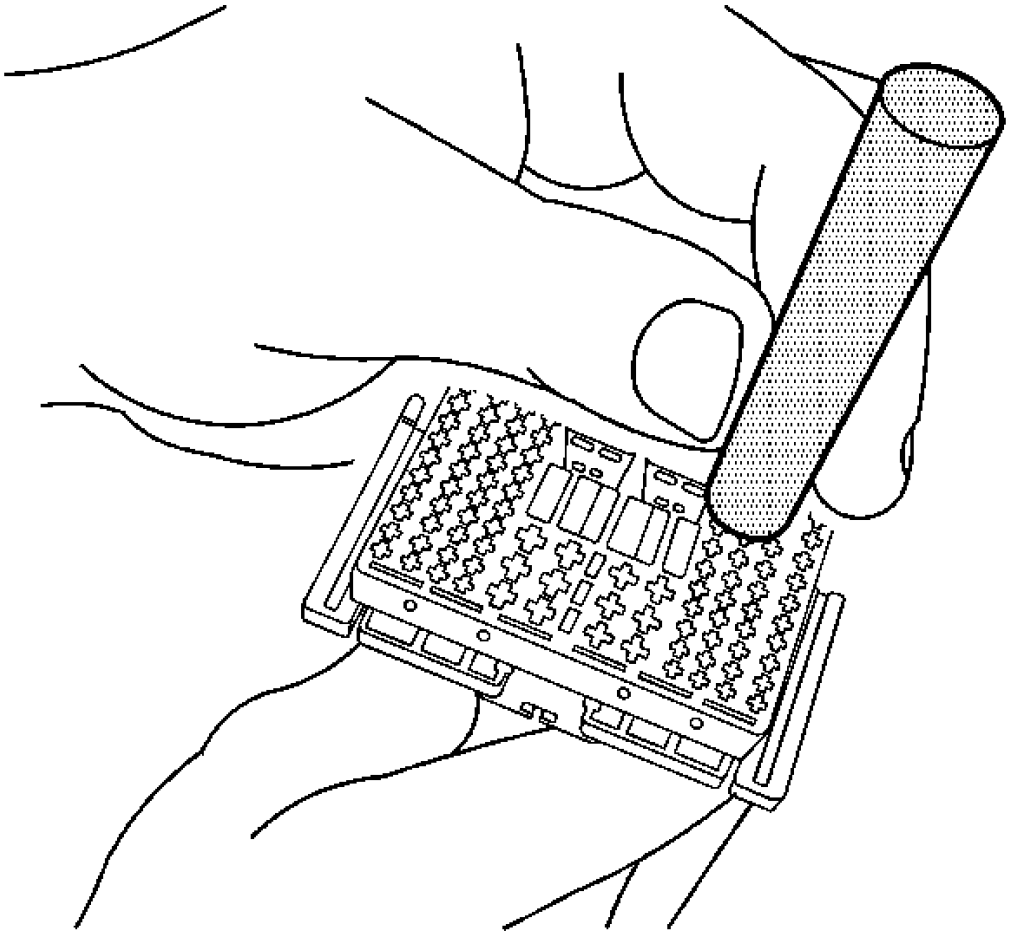


Fig. 166: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

6. Using terminal release tool J 38125-560, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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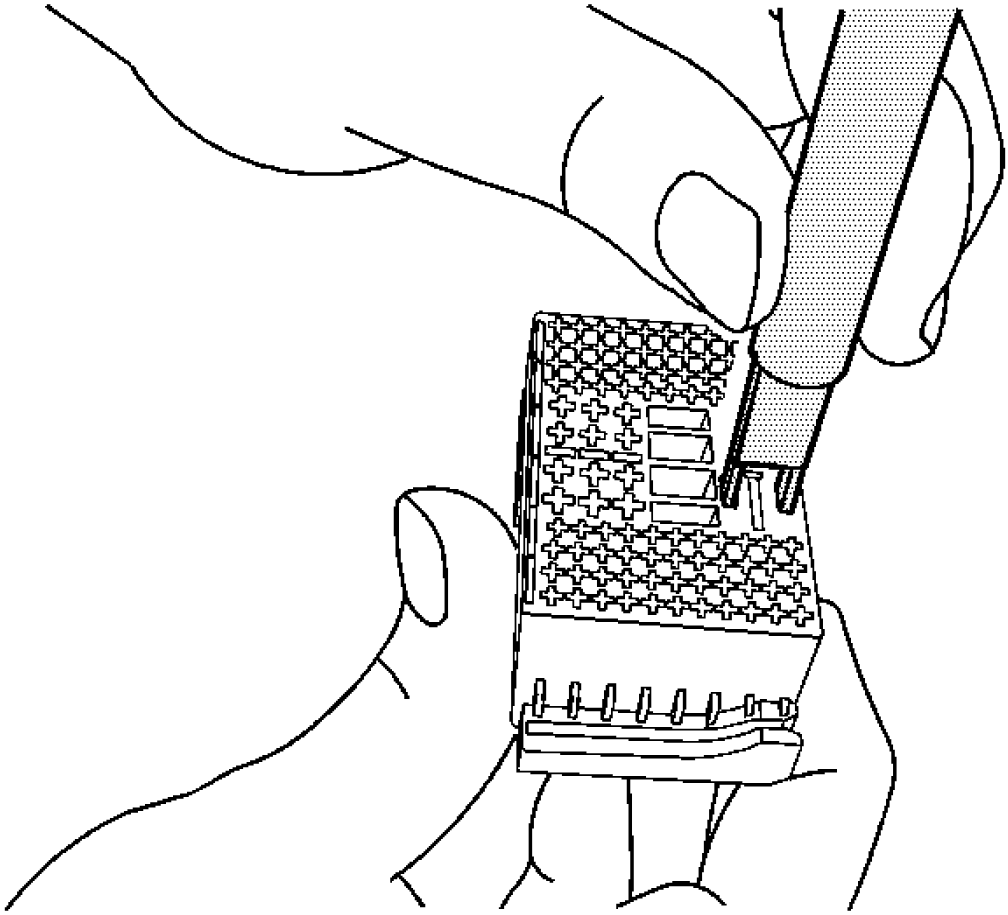


Fig. 167: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

7. Using terminal release tool J 38125-221, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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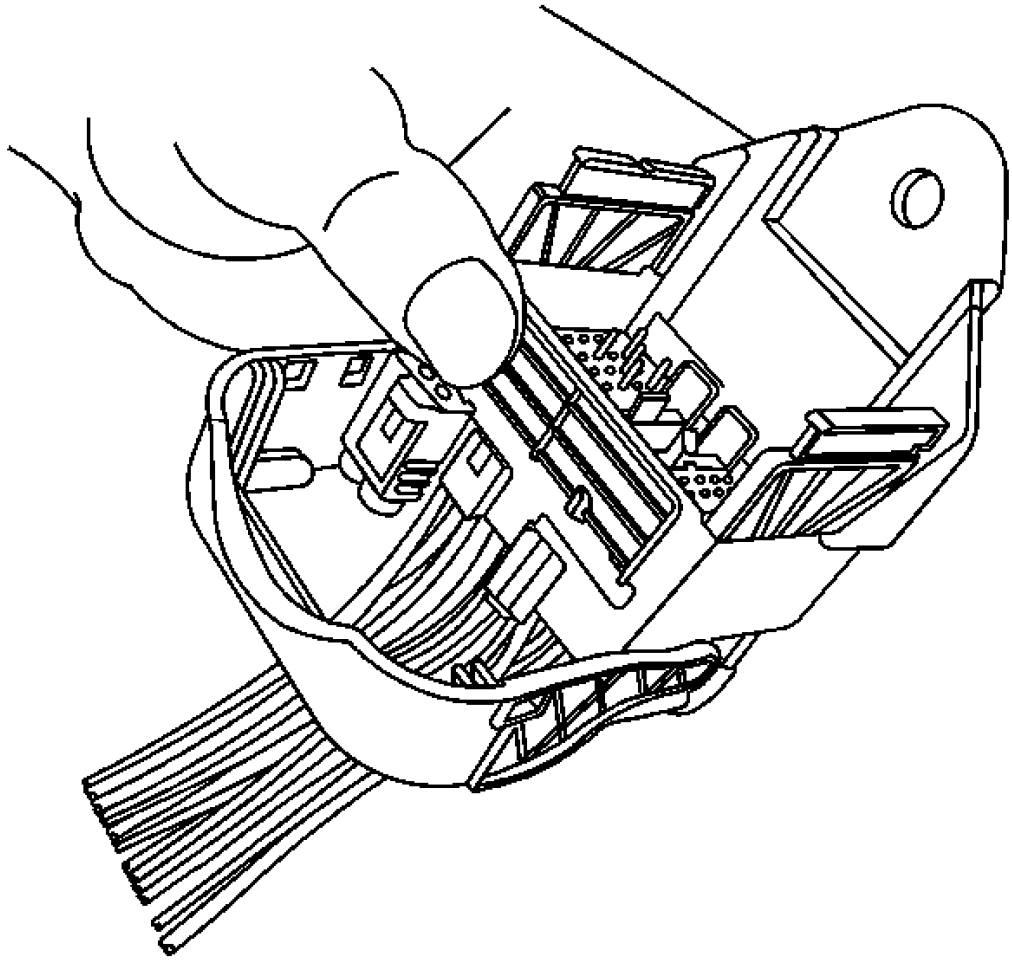


Fig. 168: View Of Female Connector Body
Courtesy of GENERAL MOTORS CORP.

8. The female connector body may have an additional connector hooked to the edge of the body. Use terminal release tool J-38125-11A or equivalent to release the locking tab and slide the connector off the female body.

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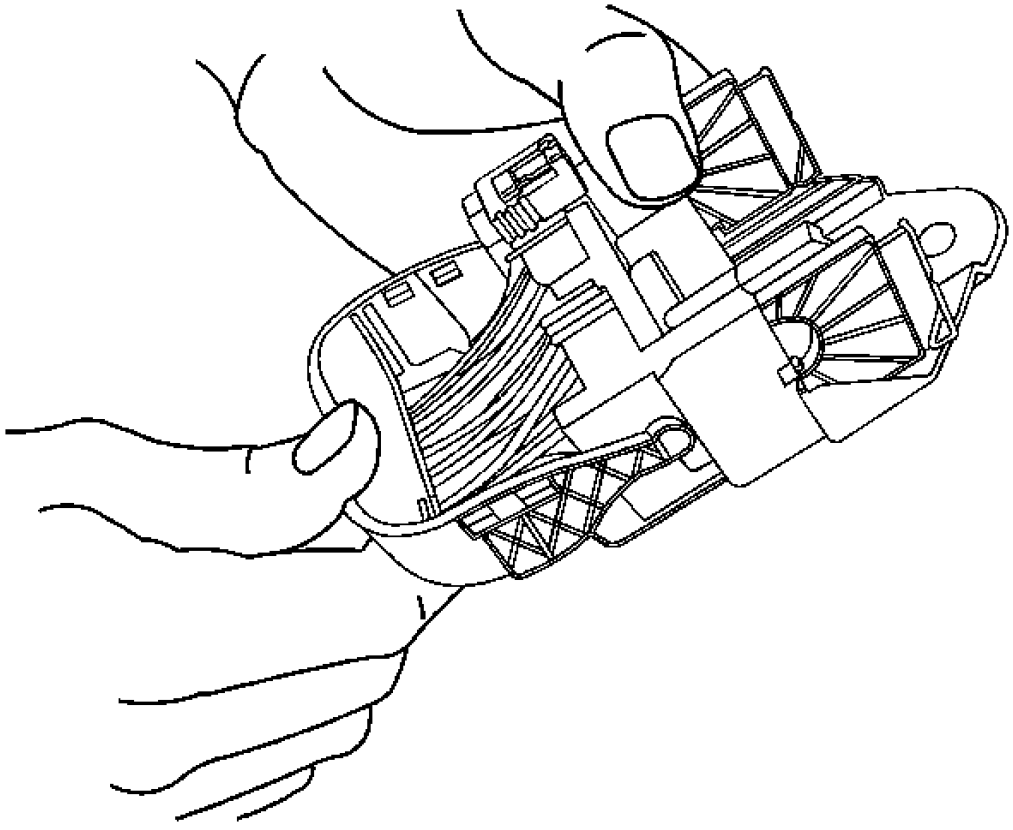


Fig. 169: Moving Locking Lever
Courtesy of GENERAL MOTORS CORP.

9. Move the locking lever 180 degrees from the connected position.

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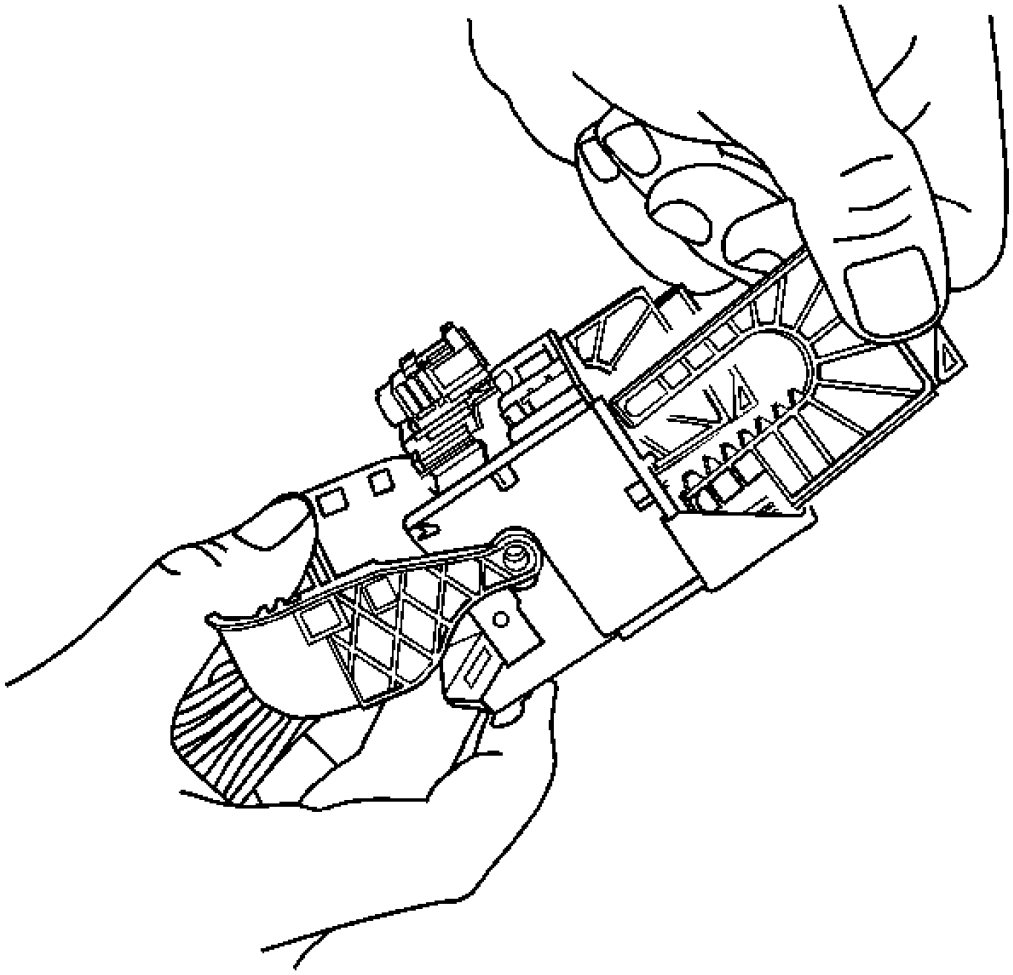


Fig. 170: Removing Guide Plates From Connector Body
Courtesy of GENERAL MOTORS CORP.

10. With the locking lever in the 180 degree position the guide plates can be removed from the connector body.

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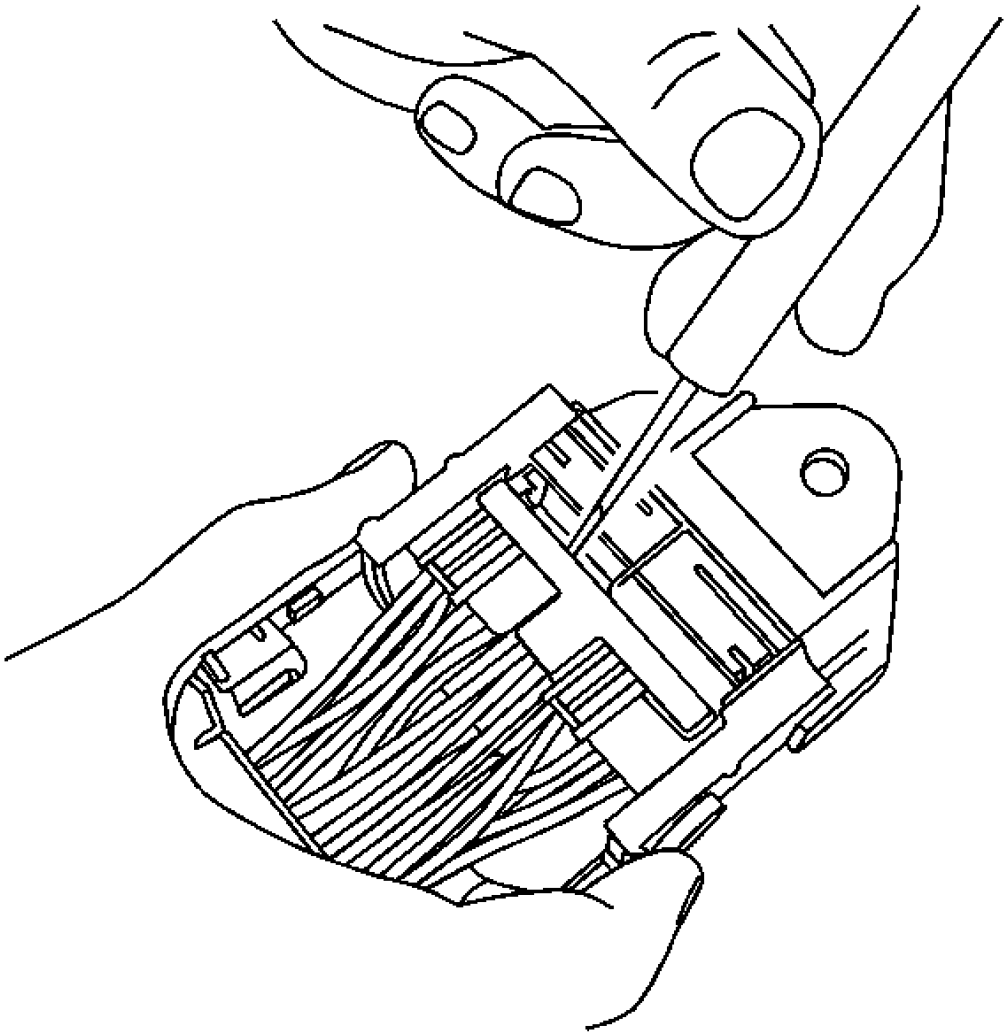


Fig. 171: Removing TPA
Courtesy of GENERAL MOTORS CORP.

NOTE: During assembly the TPA will not fully seat if any terminal is not fully seated.

11. Using terminal release tool J 38125-11A or equivalent, remove the TPA from the connector body.

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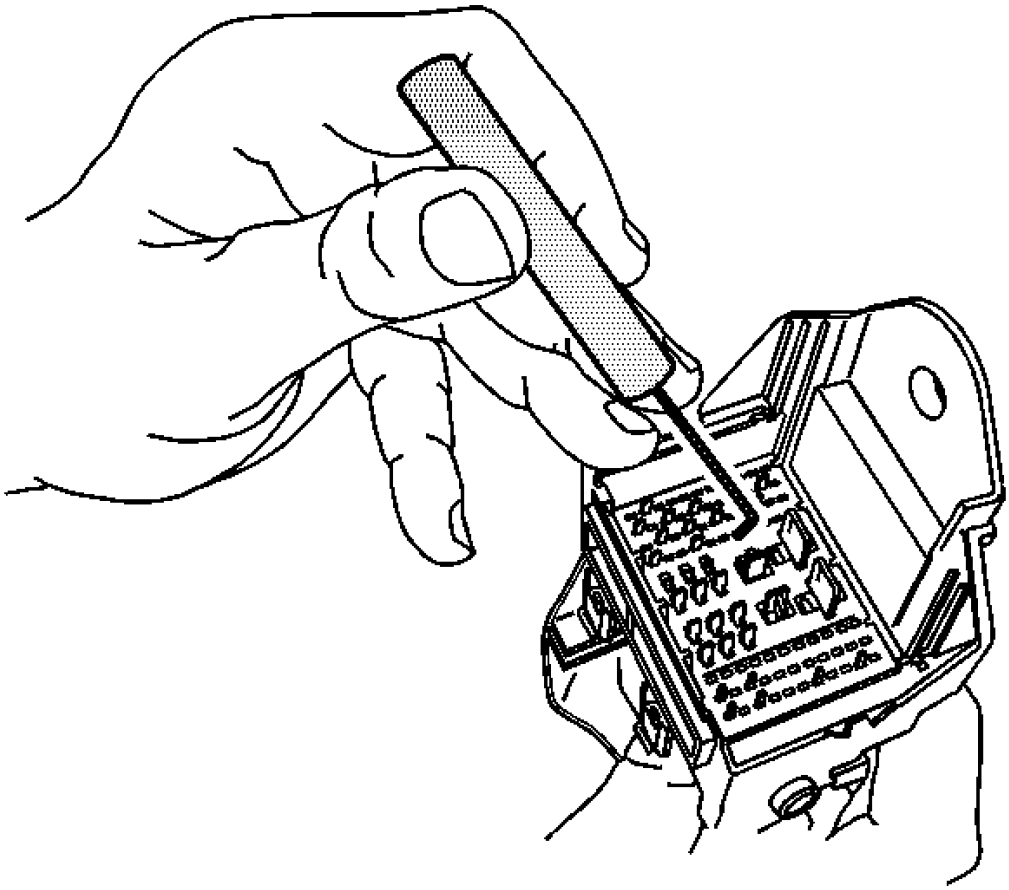


Fig. 172: Lifting Terminal Plate Past Terminals
Courtesy of GENERAL MOTORS CORP.

12. Using terminal release tool J 38125-216, lift the terminal plate past the terminals and out of the connector body cavity.

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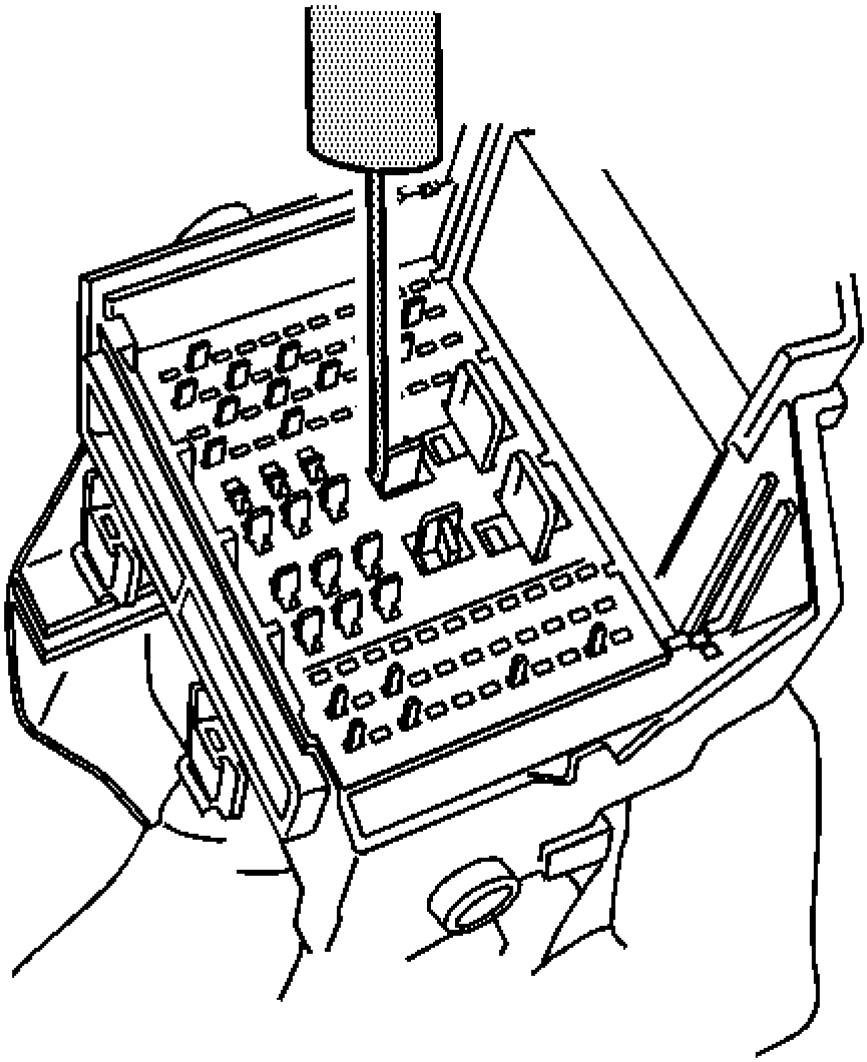


Fig. 173: View Of Terminal Plate
Courtesy of GENERAL MOTORS CORP.

13. Terminal plate will bind slightly on each corner.

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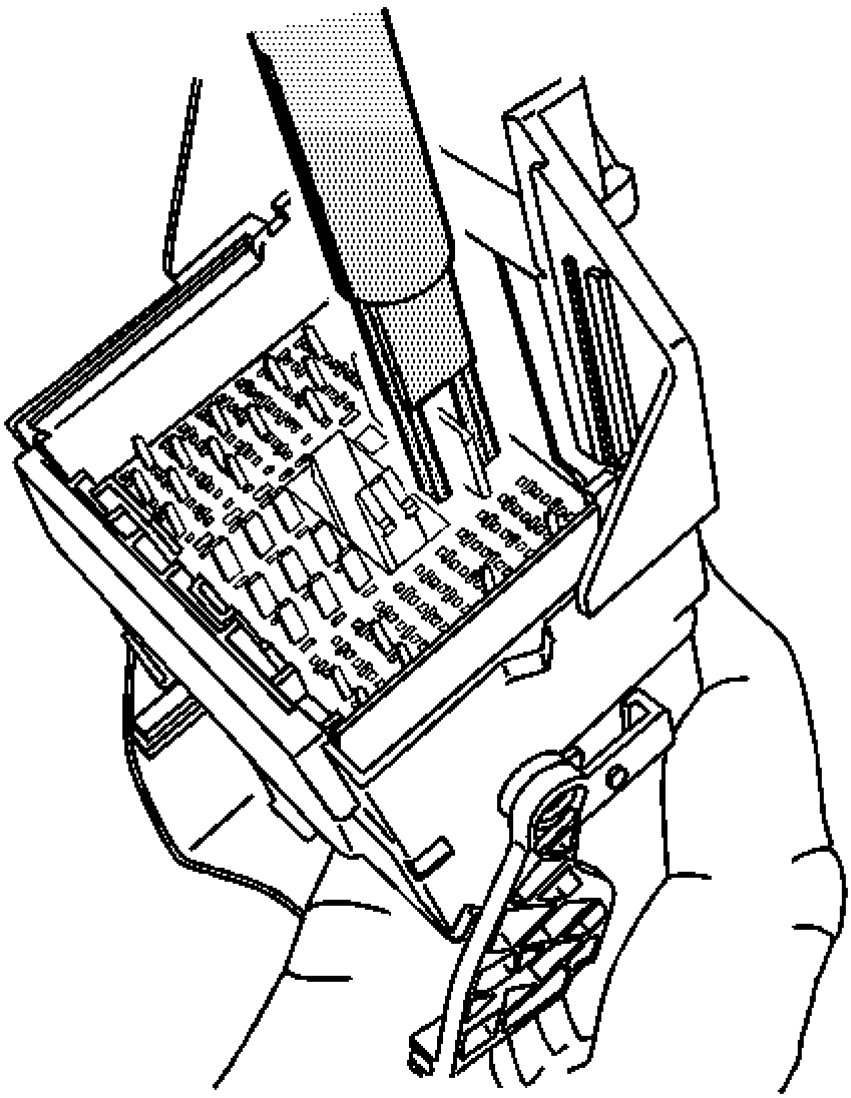


Fig. 174: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

14. Using terminal release tool J 38125-221, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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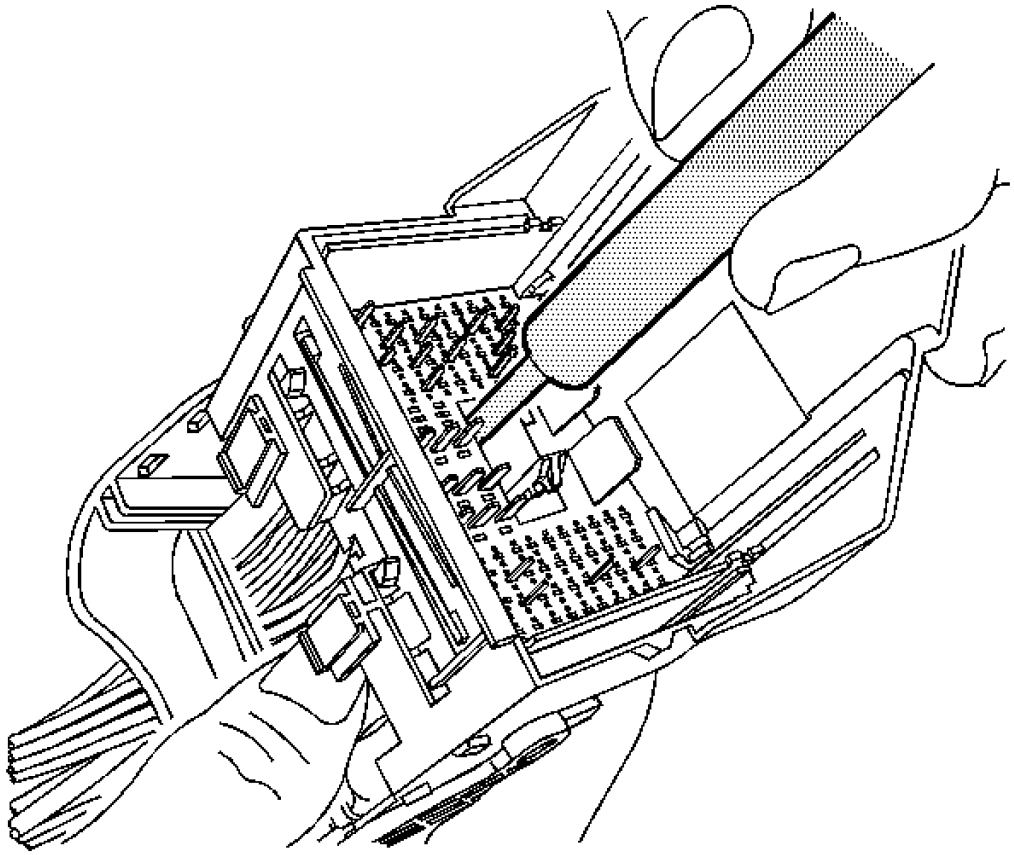


Fig. 175: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

15. Using terminal release tool J 38125-212, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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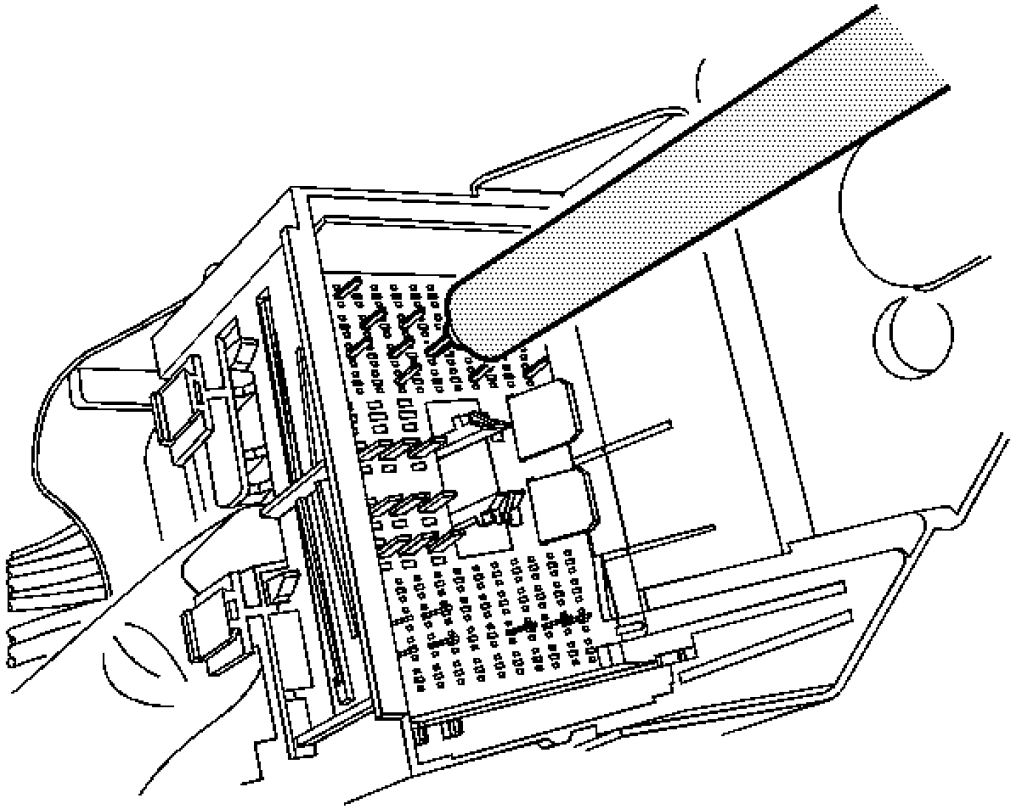


Fig. 176: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

16. Using terminal release tool J 38125-560, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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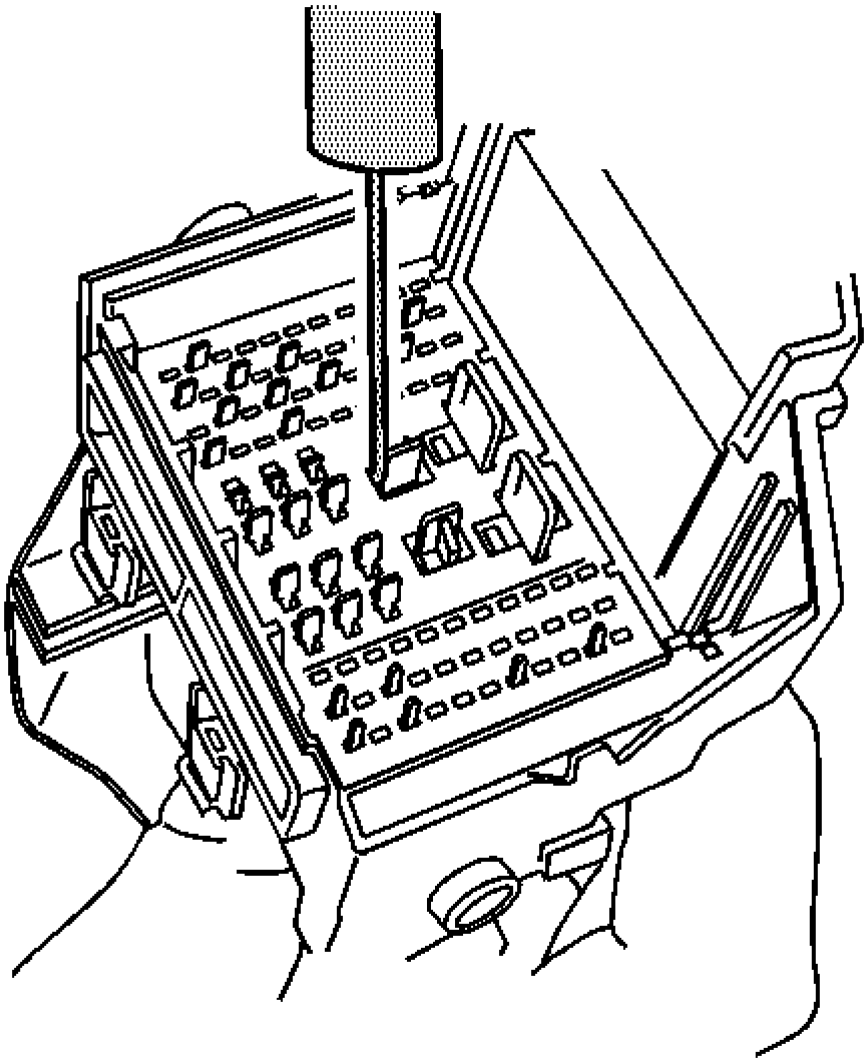


Fig. 177: View Of Terminal Plate
Courtesy of GENERAL MOTORS CORP.

17. Press the terminal plate back into the female connector to the preset position. The plate will bind slightly on each corner.

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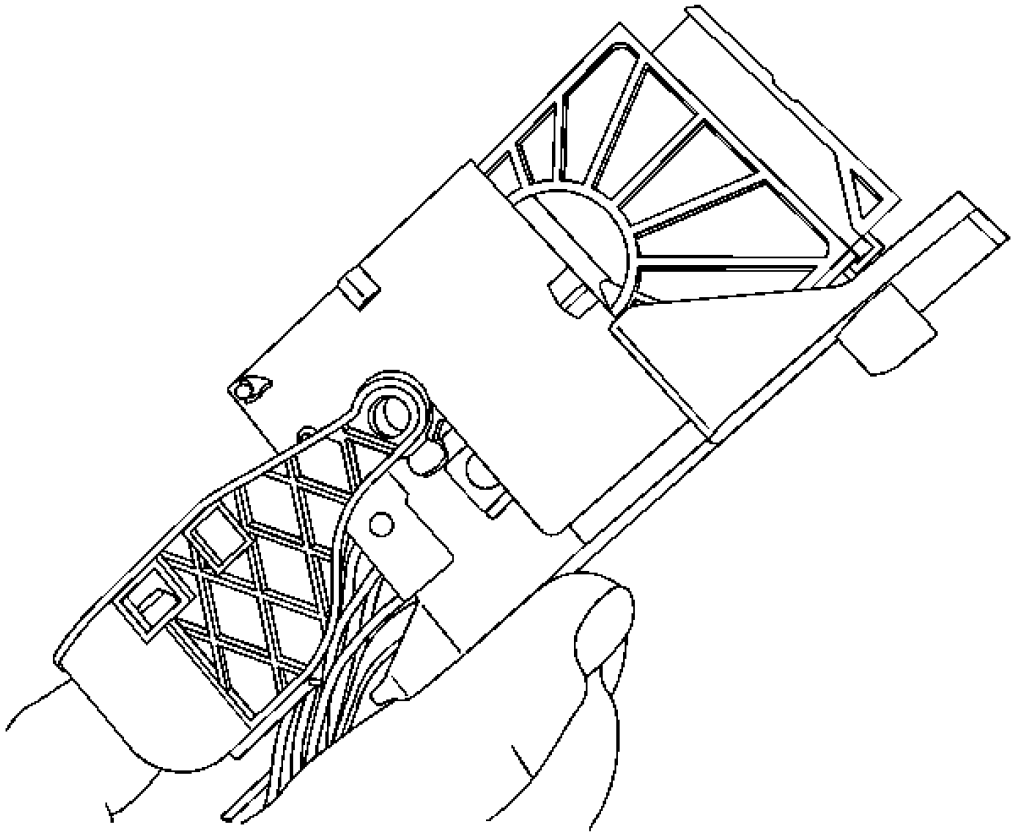


Fig. 178: Aligning Guide Plates To Mesh With Locking Lever Gears
Courtesy of GENERAL MOTORS CORP.

18. With the locking lever in the 180 degree position, align the guide plates to mesh with the gears on the locking lever.

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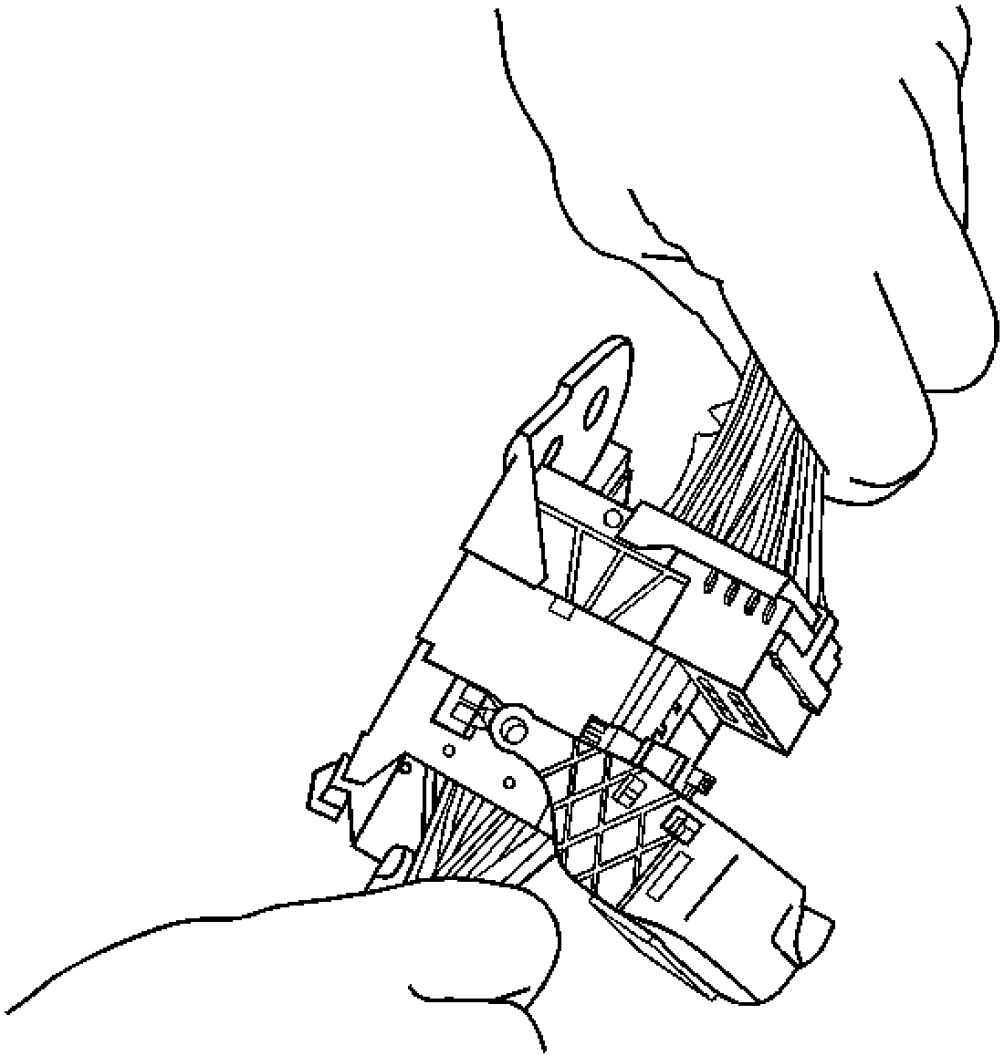


Fig. 179: Sliding Male Connector
Courtesy of GENERAL MOTORS CORP.

19. Slide the male connector body back inward toward the guide plates.

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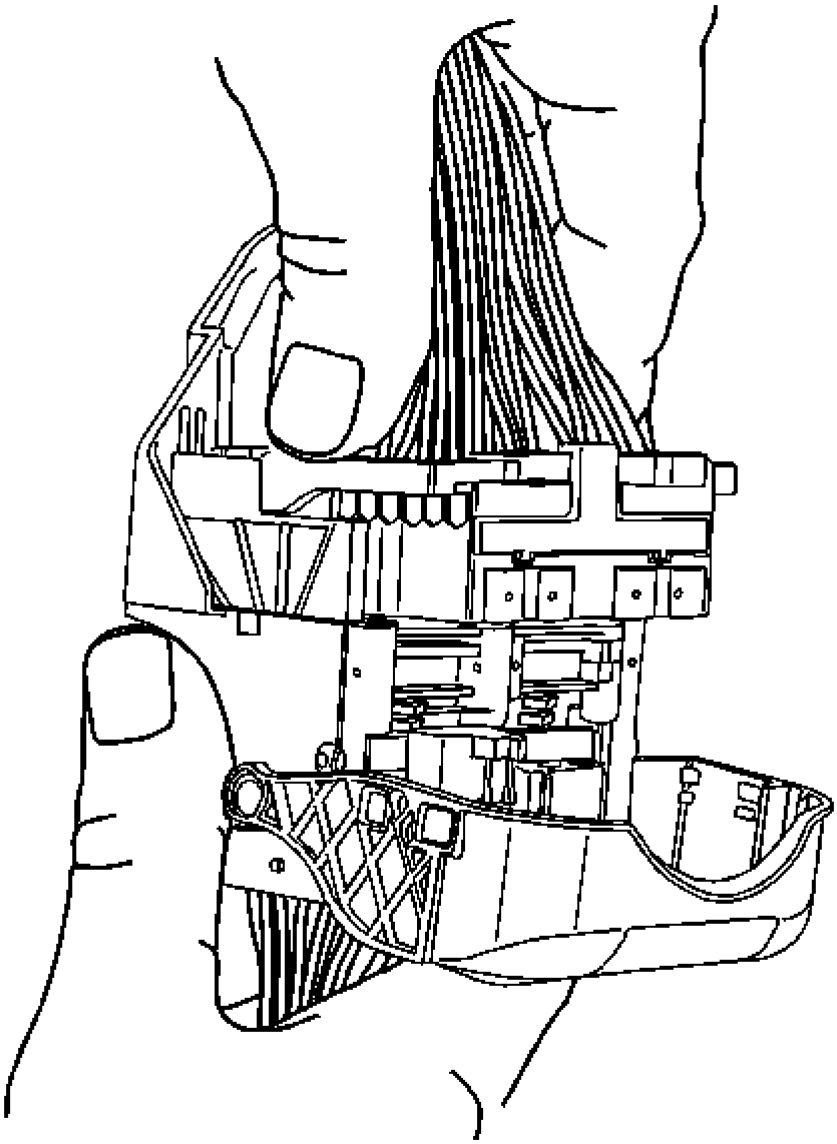


Fig. 180: Sliding Male Connector Body
Courtesy of GENERAL MOTORS CORP.

20. With the locking lever in the 90 degree position and the male connector body connected, it can be slid inward for assembly.

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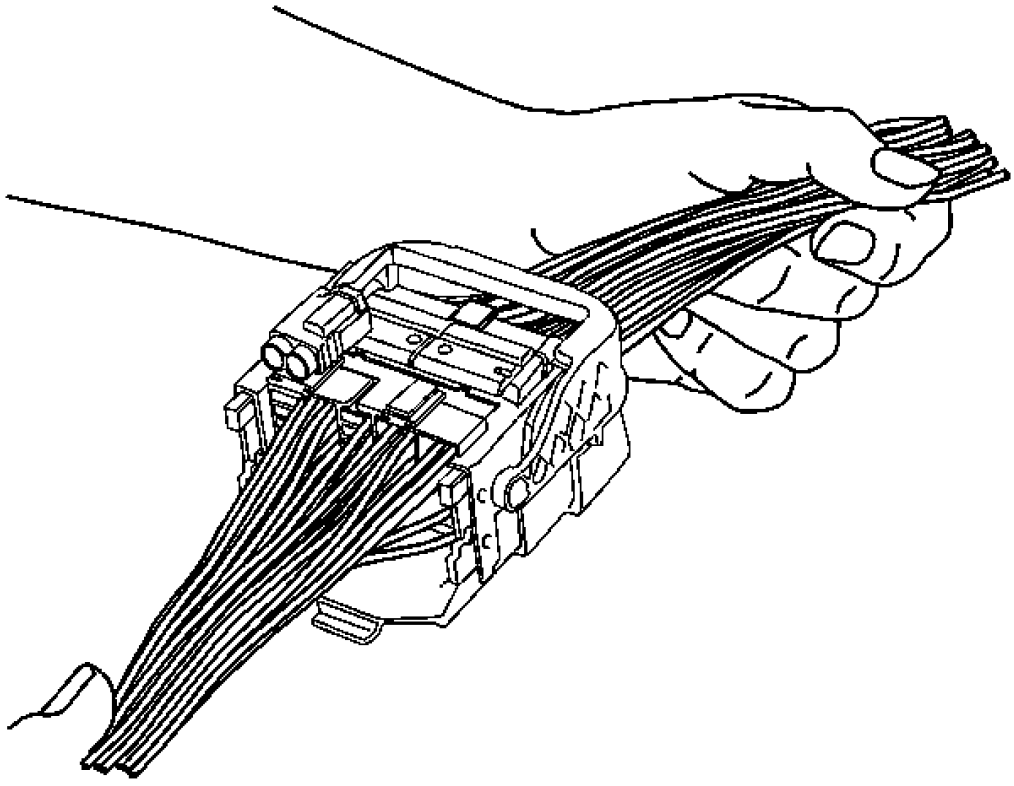


Fig. 181: View Of Typical Connector In Assembled Position
Courtesy of GENERAL MOTORS CORP.

21. Move the lever into the locked position or in the assembled position. This will pull the male connector down into the female connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (SEAT)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

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Removal Procedure

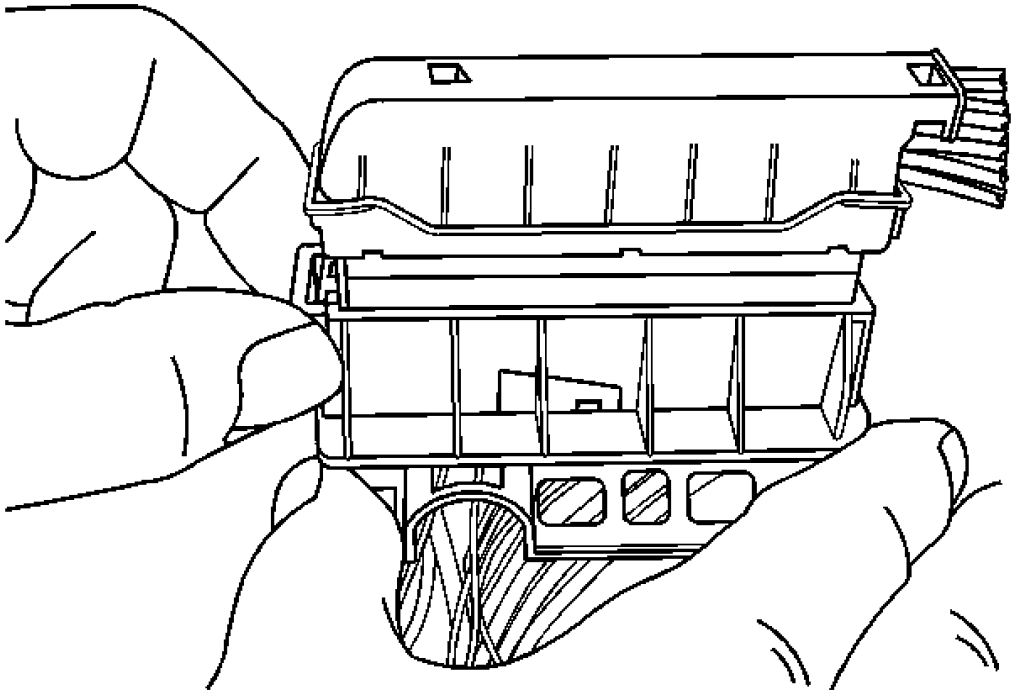


Fig. 182: Locating Locking Slide Lever
Courtesy of GENERAL MOTORS CORP.

1. Grasp the locking slide lever and pull outward from the end of the connector.

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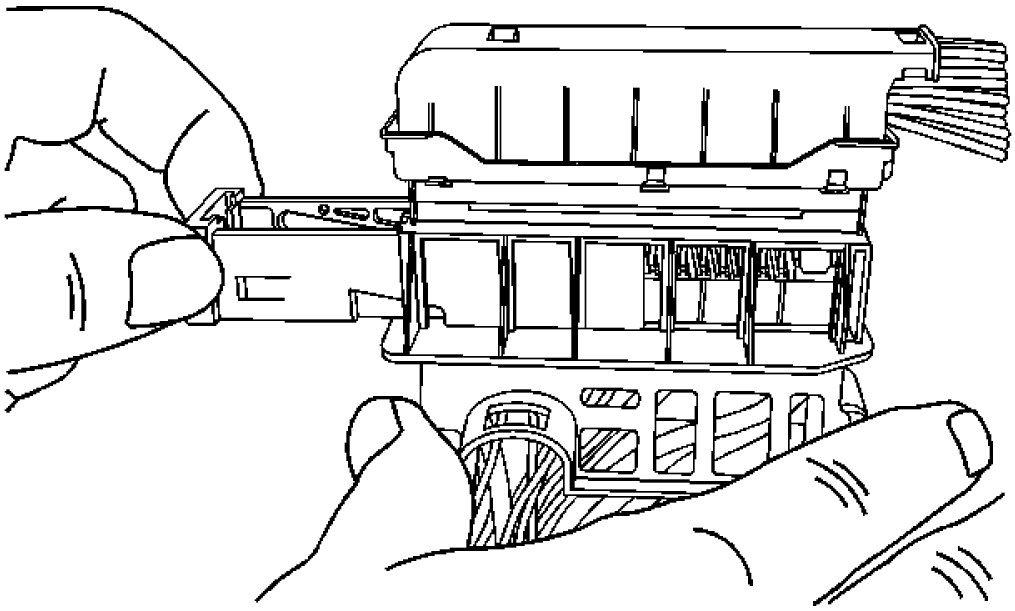


Fig. 183: Pulling Slide Lever Out Of Mating Connector
Courtesy of GENERAL MOTORS CORP.

2. As the slide lever is pulled out the mating connector is lifted from the seated position.

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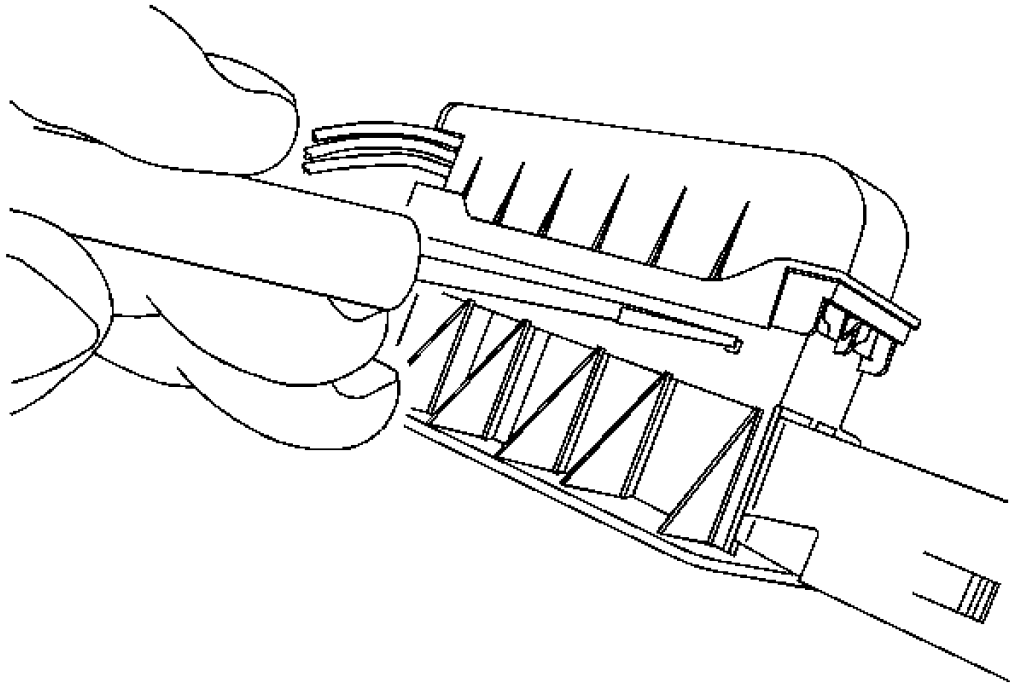


Fig. 184: Pushing TPA Tabs Into Connector Body
Courtesy of GENERAL MOTORS CORP.

NOTE: TPA is keyed and can only be inserted in one direction.

3. Using terminal release tool J-38125-11A or equivalent, push the TPA tabs into the connector body.

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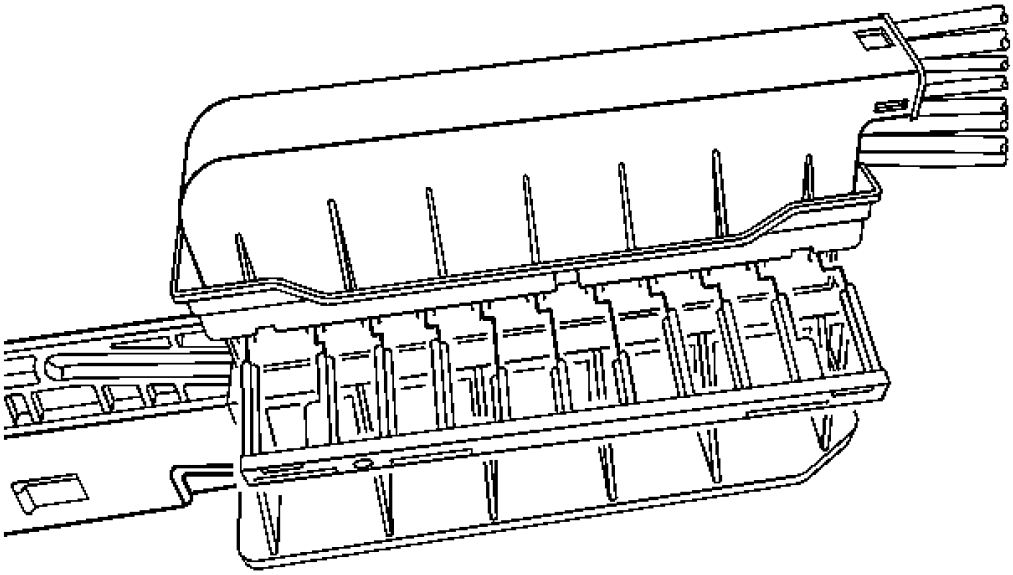


Fig. 185: Pulling TPA From Connector Body
Courtesy of GENERAL MOTORS CORP.

4. Pull the TPA from the connector body.

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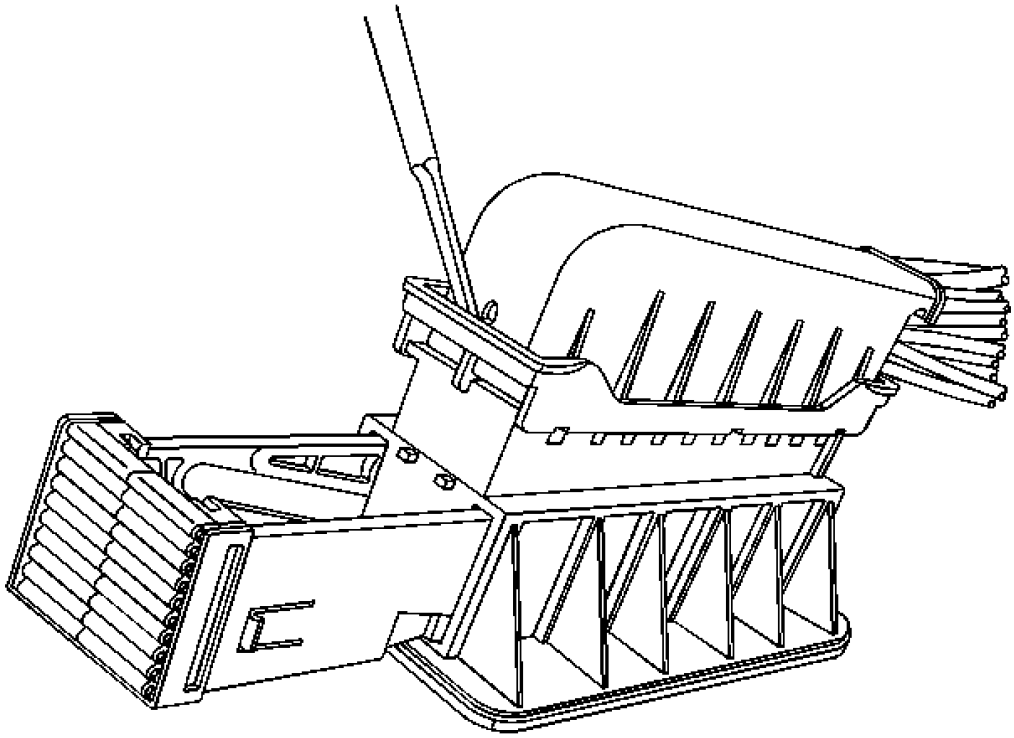


Fig. 186: Releasing Connector Wire Dress Cover Locking Tab
Courtesy of GENERAL MOTORS CORP.

5. Using terminal release tool J-38125-11A or equivalent, release the connector wire dress cover locking tab.

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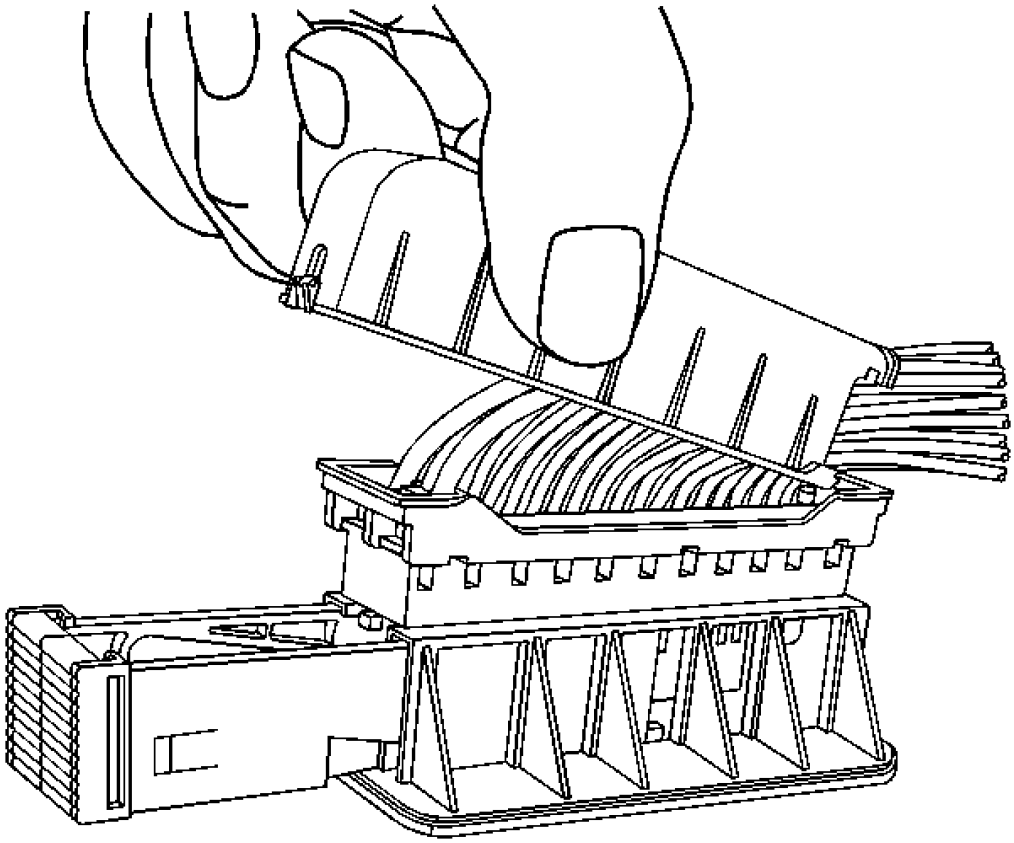


Fig. 187: Lifting Connector Wire Dress Cover From Connector Body
Courtesy of GENERAL MOTORS CORP.

6. With the lock tab released, lift the connector wire dress cover from the connector body.

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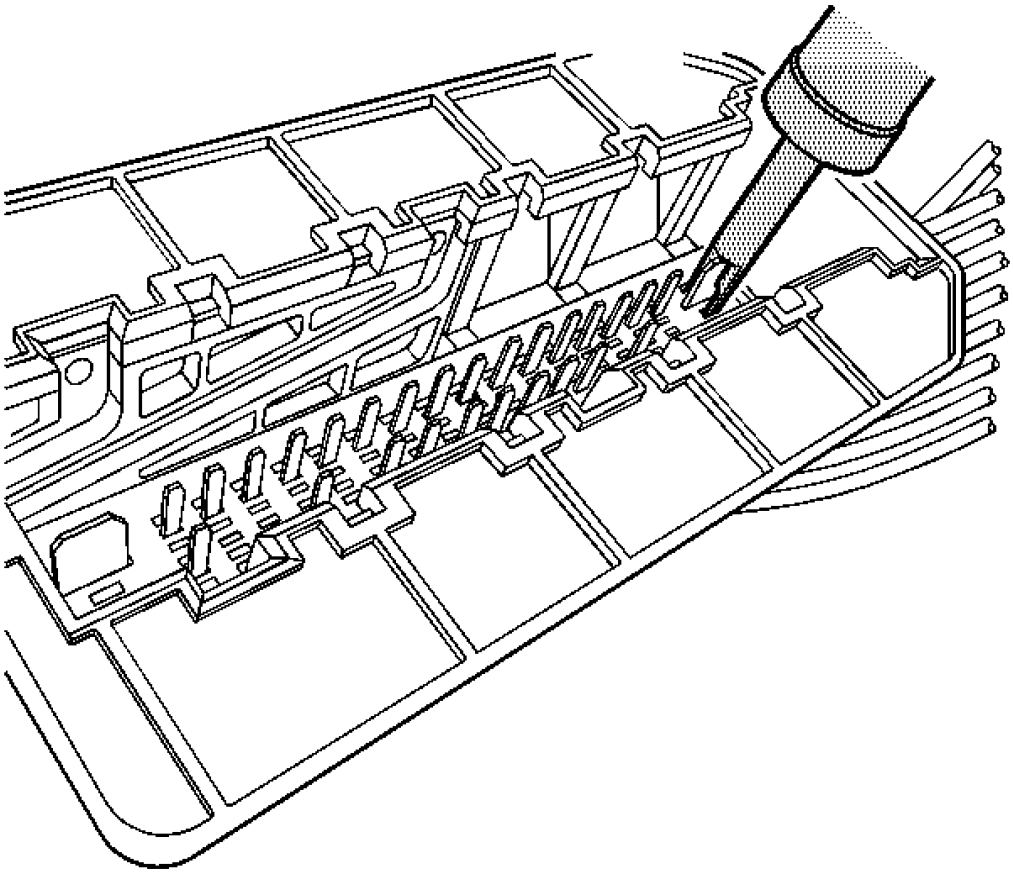


Fig. 188: Using Terminal Release Tool
Courtesy of GENERAL MOTORS CORP.

7. Using terminal release tool EL-38125-212, press the prongs into the holes each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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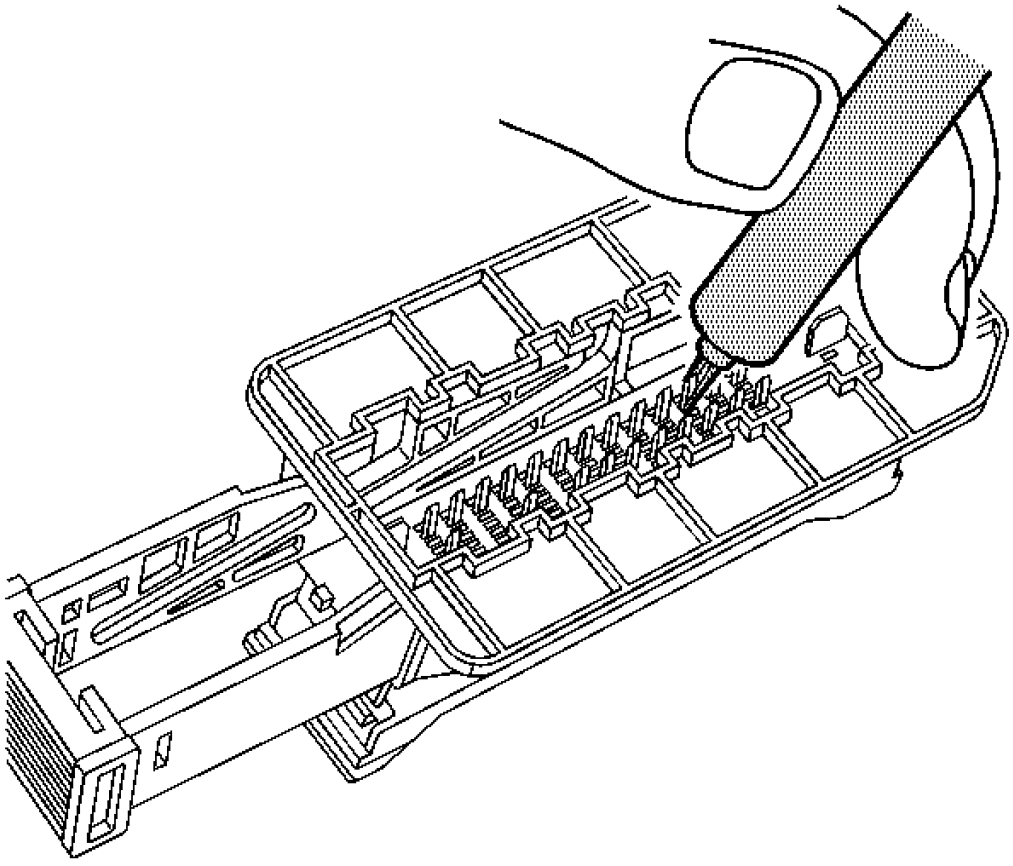


Fig. 189: Releasing Lock Tabs
Courtesy of GENERAL MOTORS CORP.

8. Using terminal release tool EL-38125-560, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

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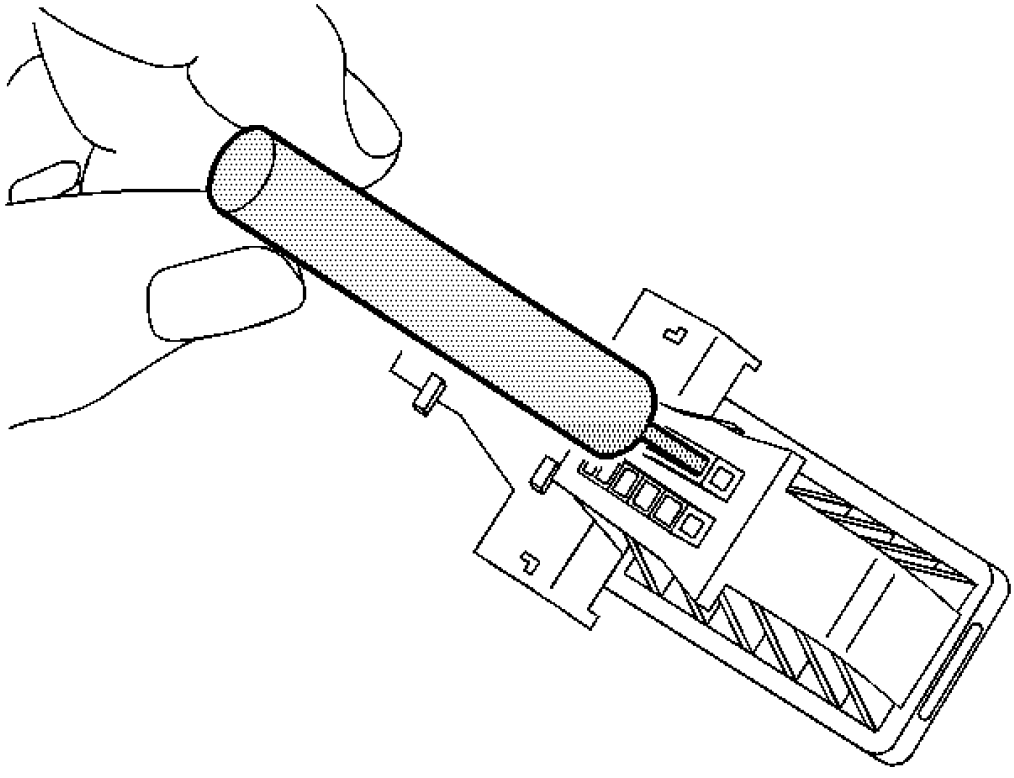


Fig. 190: Pressing Prongs Into Holes
Courtesy of GENERAL MOTORS CORP.

9. Using terminal release tool EL-38125-556, press the prongs into the holes on each side of the terminal to be removed to release the lock tabs and pull the terminal out of the connector body.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

TYCO/AMP CONNECTORS (SIR)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

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Removal Procedure

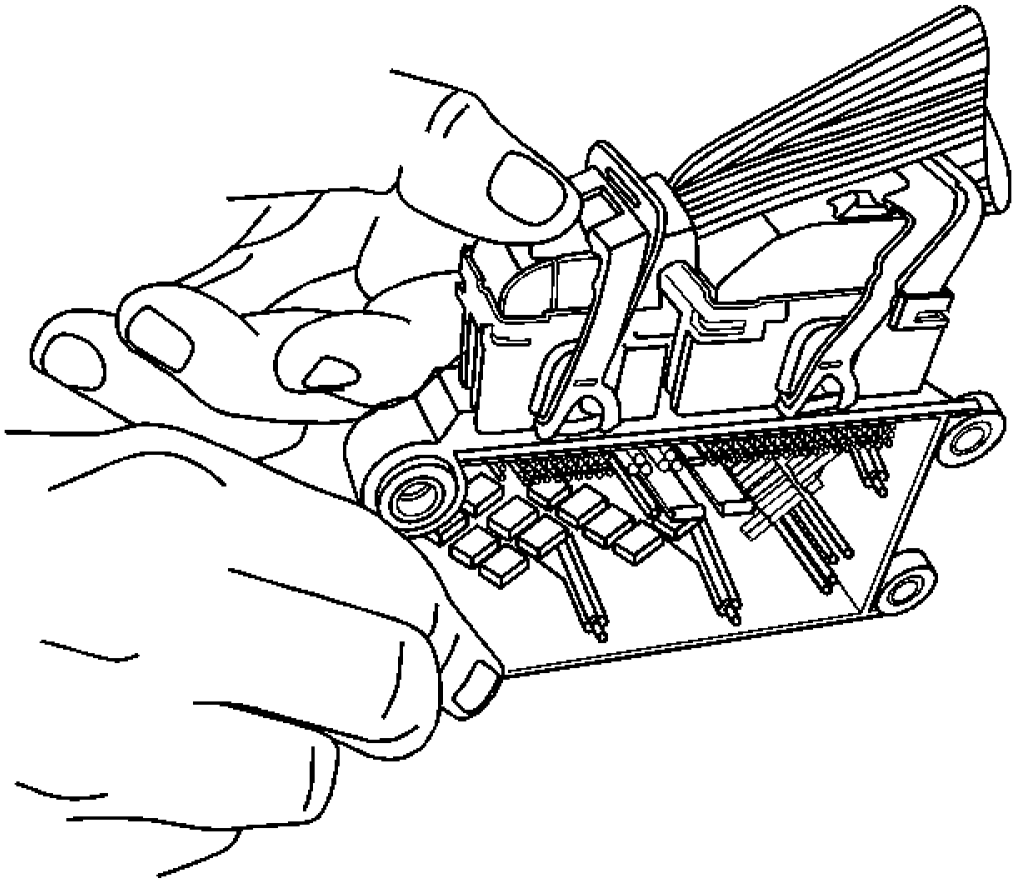


Fig. 191: Sliding Red CPA Away From Connector Lever
Courtesy of GENERAL MOTORS CORP.

1. Using your thumbs press down and slide the red CPA away from the connector lever.

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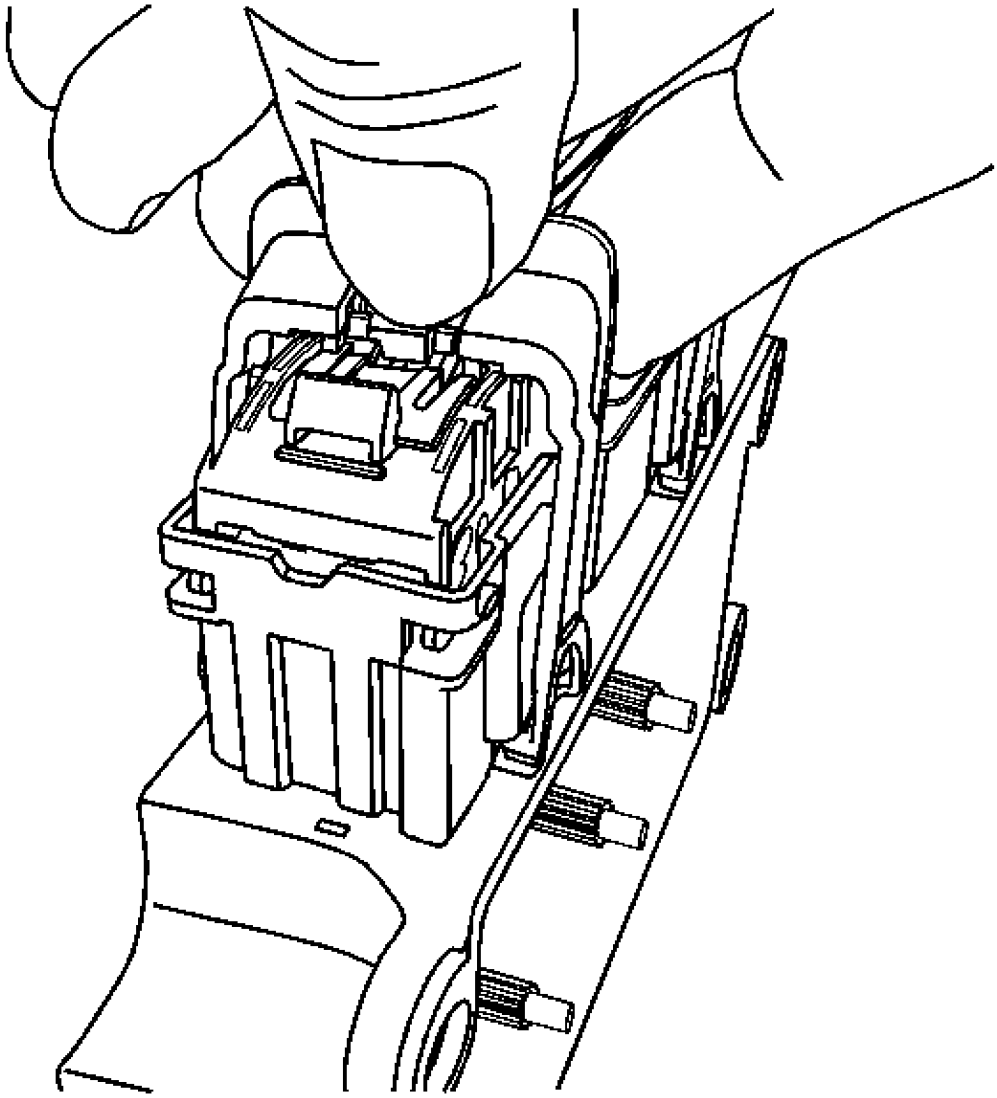


Fig. 192: Moving Lever To Released Position
Courtesy of GENERAL MOTORS CORP.

2. Using your thumb press down on the locking tab and move the lever to the released position.

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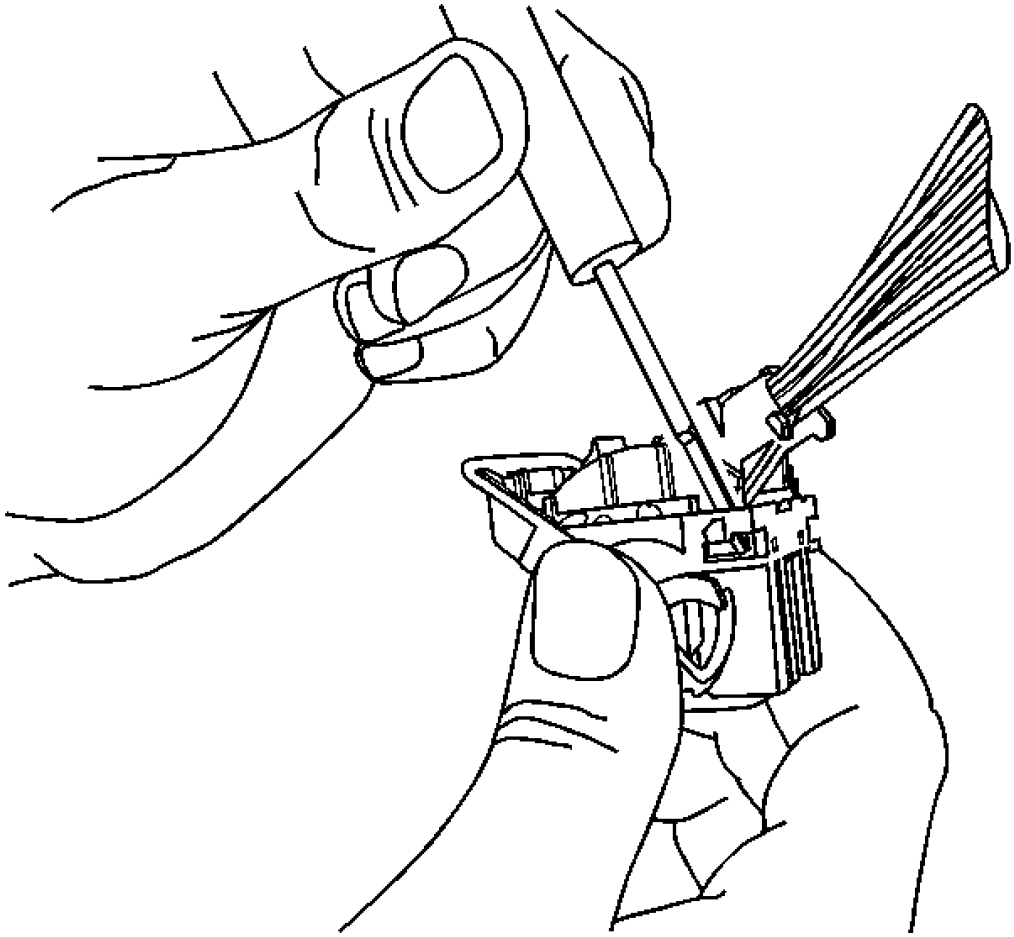


Fig. 193: Releasing Wire Dress Cover Locking Tabs
Courtesy of GENERAL MOTORS CORP.

3. Using terminal tool J-38125-11A or equivalent, release the wire dress cover locking tabs.

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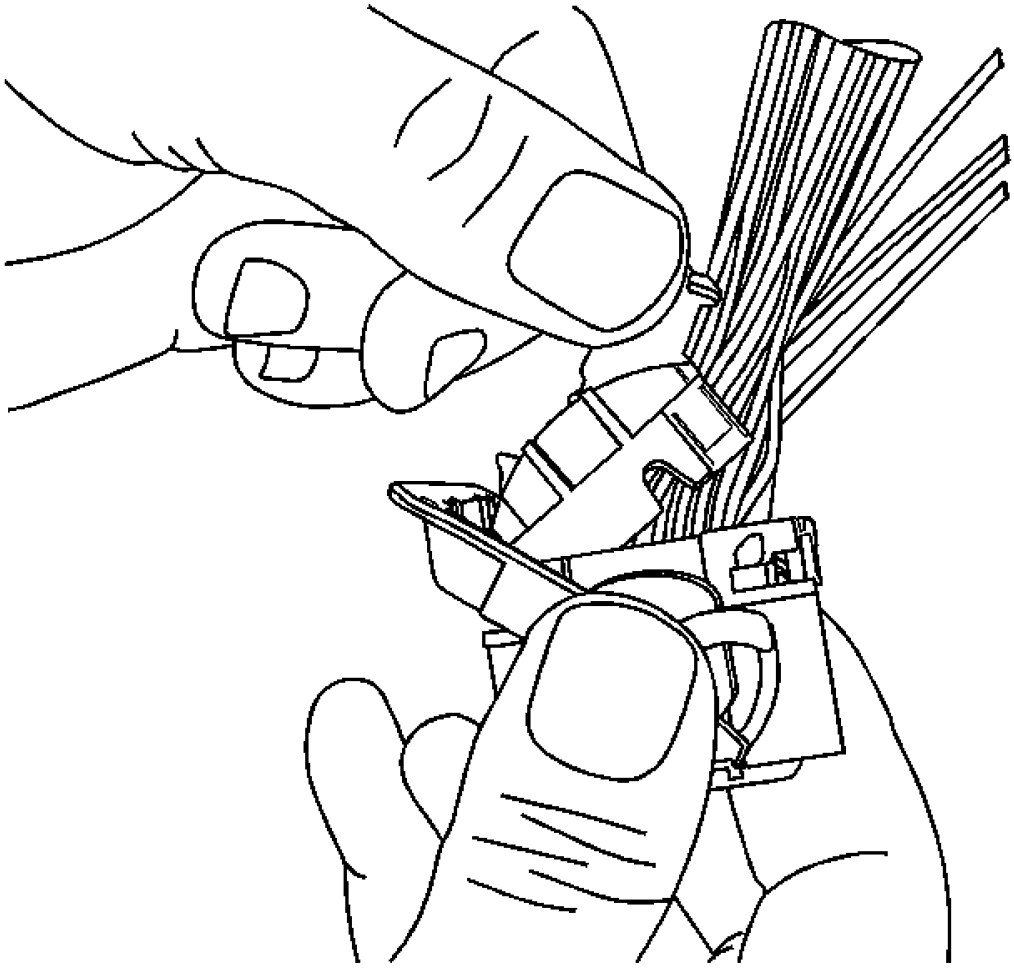


Fig. 194: Pivoting Connector Wire Dress Cover
Courtesy of GENERAL MOTORS CORP.

4. Pivot connector wire dress cover while removing from the connector body.

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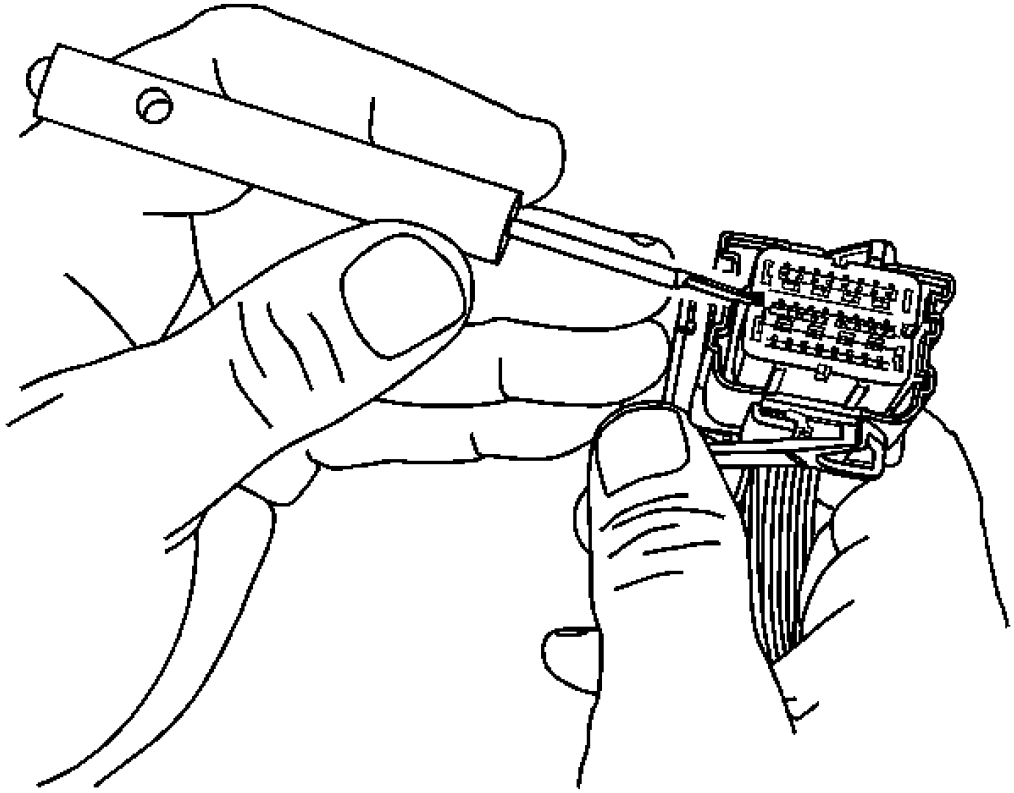


Fig. 195: Removing TPA
Courtesy of GENERAL MOTORS CORP.

5. Using terminal tool J-38125-11A or equivalent, remove the TPA by lifting straight off the connector body.

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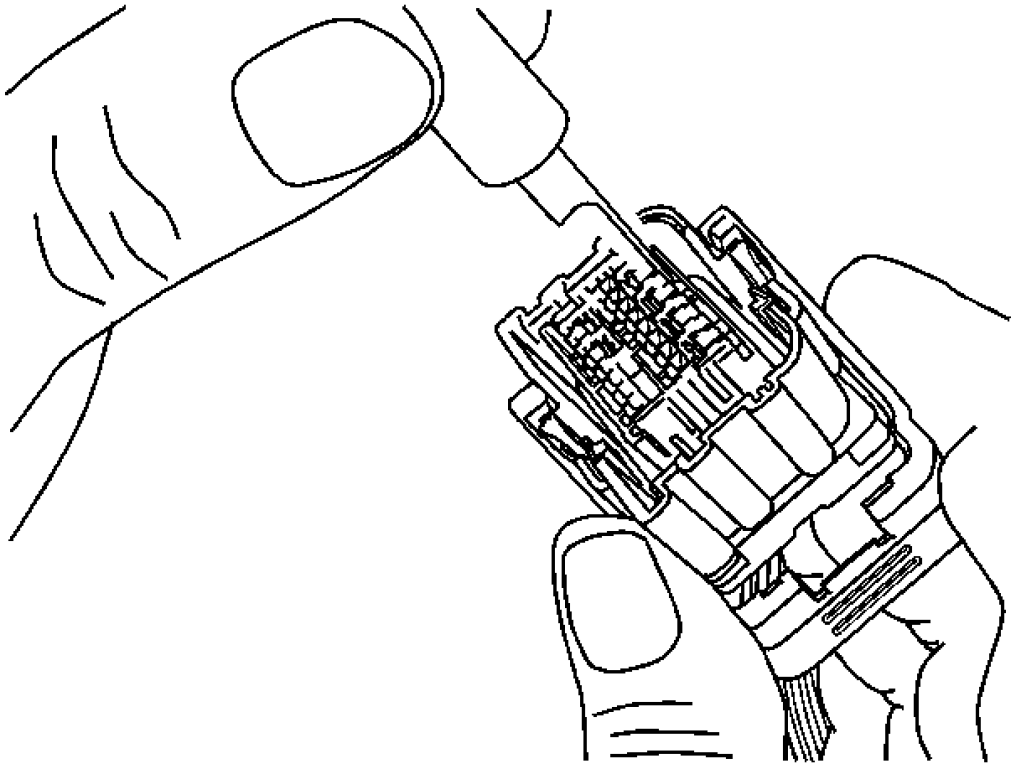


Fig. 196: Removing Rear Of Connector Body
Courtesy of GENERAL MOTORS CORP.

6. Using terminal release tool EL-38125-215A, place the tip of the tool on the outside edge next to the terminal and depress the lock tab and remove the rear of the connector body.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

YAZAKI CONNECTORS (2-WAY)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

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Terminal Removal Procedure

1. Disconnect the connector from the component.

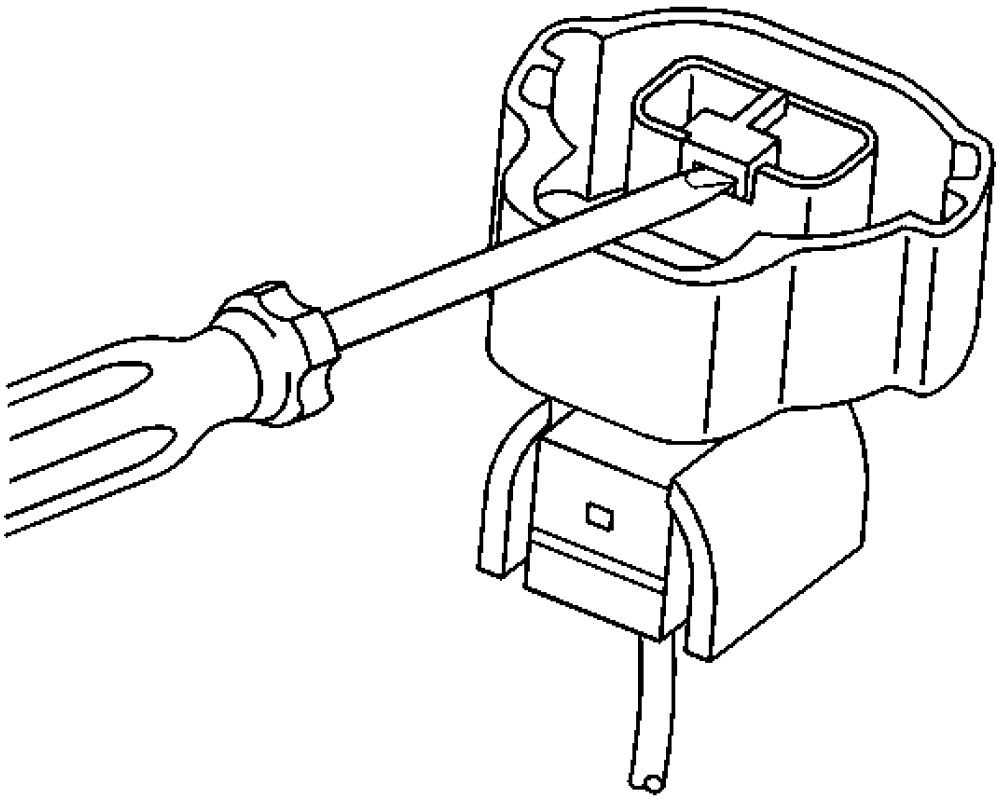


Fig. 197: Removing Terminal Position Assurance (Yazaki)
Courtesy of GENERAL MOTORS CORP.

2. Insert a small flat-blade tool in the slot below the front loaded terminal position assurance (TPA) and pry up.
3. Remove the TPA by pulling it out of the connector.
4. Push the wire side of the terminal that is being removed toward the connector and hold it in position.

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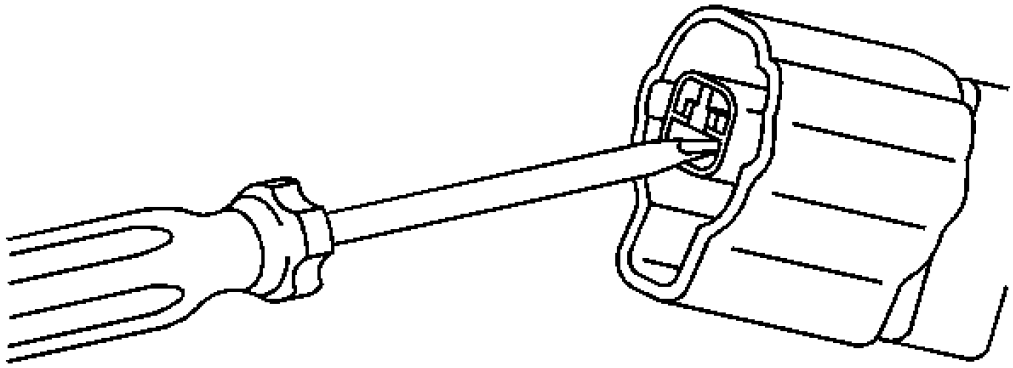


Fig. 198: Inserting Tool Into Terminal Cavity (Yakazi)
Courtesy of GENERAL MOTORS CORP.

5. Insert the EL 38125-553 on a slight upward angle into the cavity below the terminal to be removed. Ensure that the pointed on the end of the tool is facing the bottom of the terminal and it stays in contact with the terminal until it stops on the plastic terminal retainer.

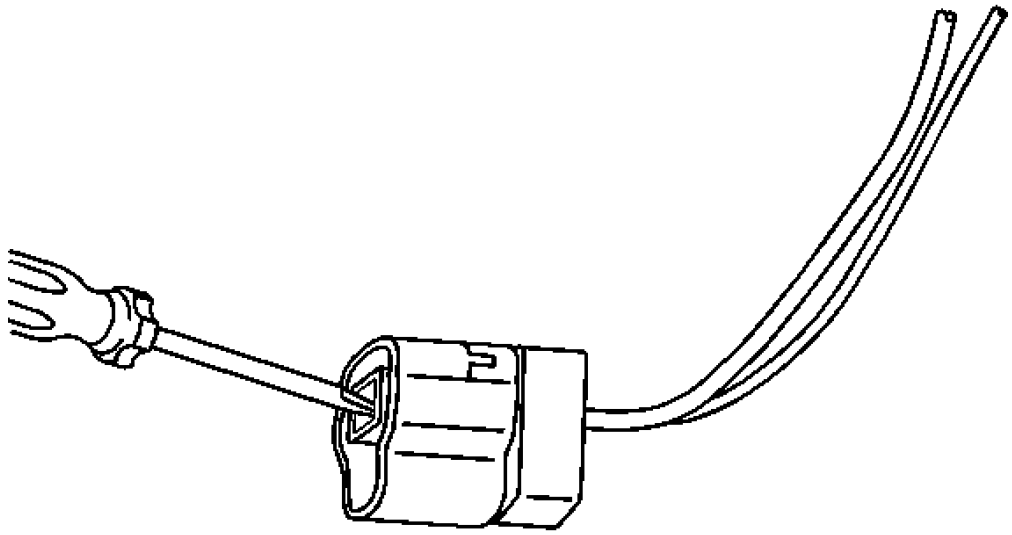


Fig. 199: Pulling Terminal Out Of Connector (Yakazi)

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Courtesy of GENERAL MOTORS CORP.

6. Gently pry the plastic terminal retainer down and carefully pull the terminal out of the connector. Always remember never use force when pulling a terminal out of a connector. If the terminal is difficult to remove, repeat the entire procedure.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

YAZAKI CONNECTORS (16-WAY)

Special Tools

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

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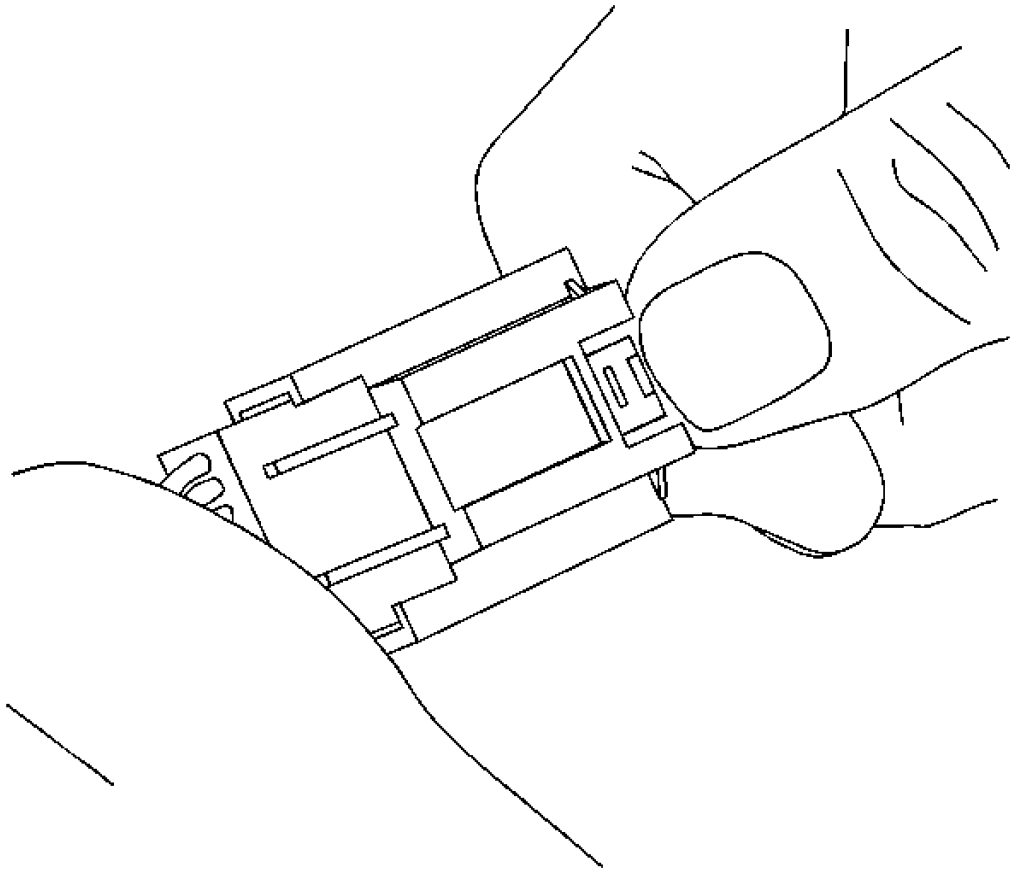


Fig. 200: Pulling Two Connector Halves Apart
Courtesy of GENERAL MOTORS CORP.

1. While depressing the lock, pull the two connector halves apart.

NOTE: The TPA is fragile and may break if not done carefully.

2. Use a small flat-blade tool to very carefully push the terminal position assurance (TPA) towards the face of the connector on both sides of the connector.

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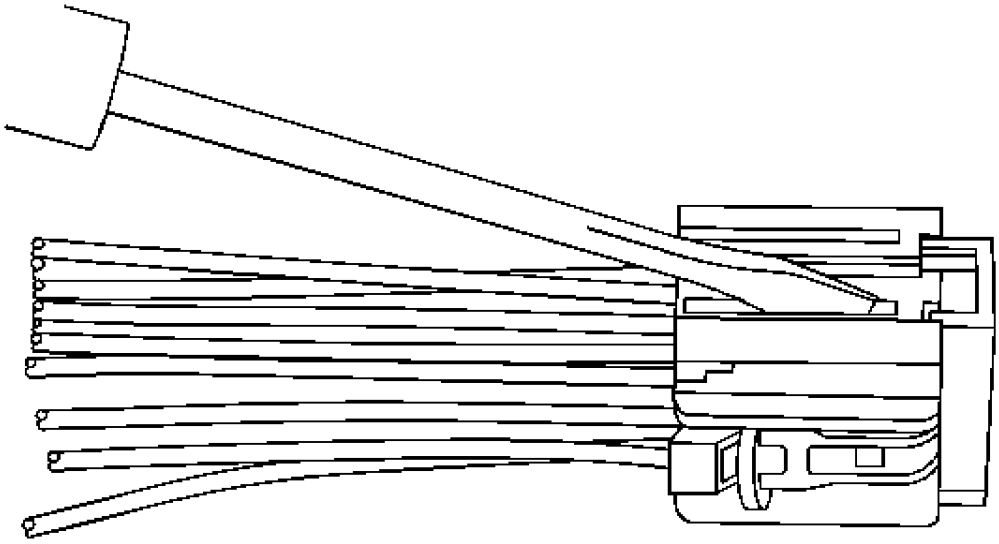


Fig. 201: View Of Male Connector Half & Female Terminals
Courtesy of GENERAL MOTORS CORP.

3. View of the male half of the connector with female terminals.

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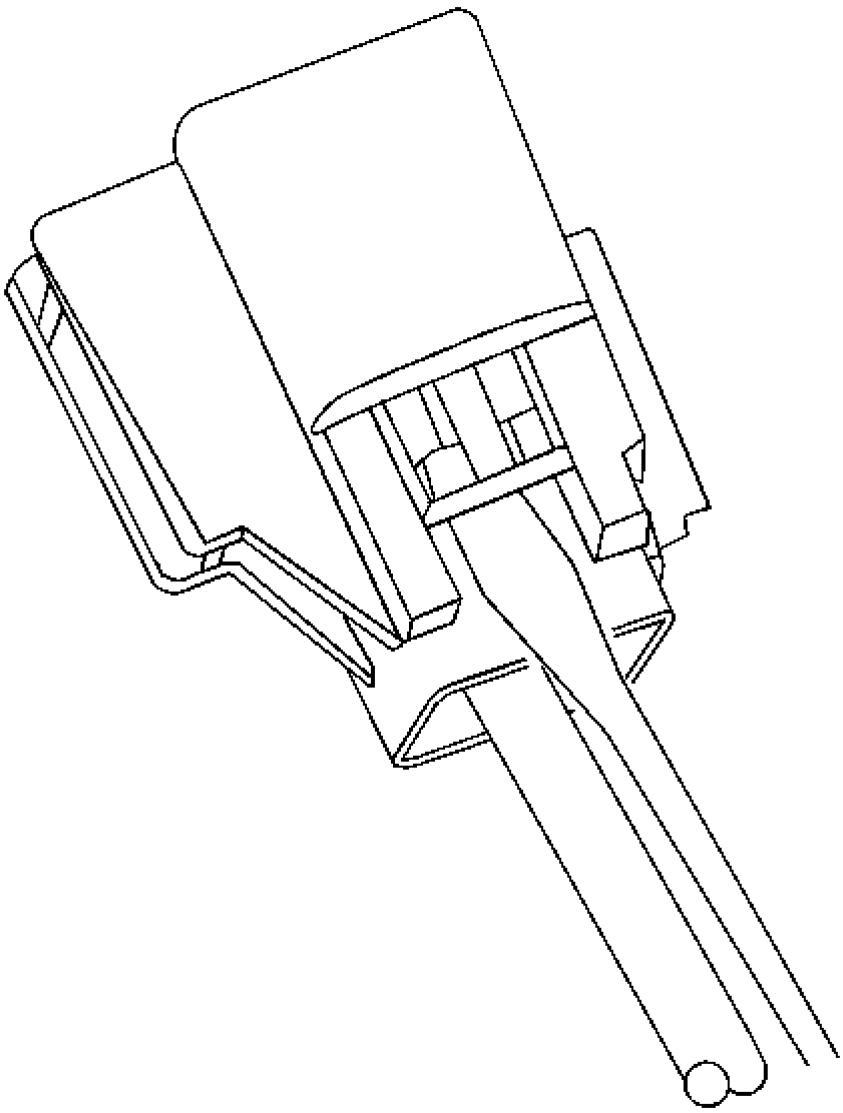


Fig. 202: View Of Female Half Of Connector With Male Terminals
Courtesy of GENERAL MOTORS CORP.

4. View of the female half of the connector with male terminals.
5. Use the EL 38125-215 tool to release the terminals by inserting the tool into the terminal release cavity.

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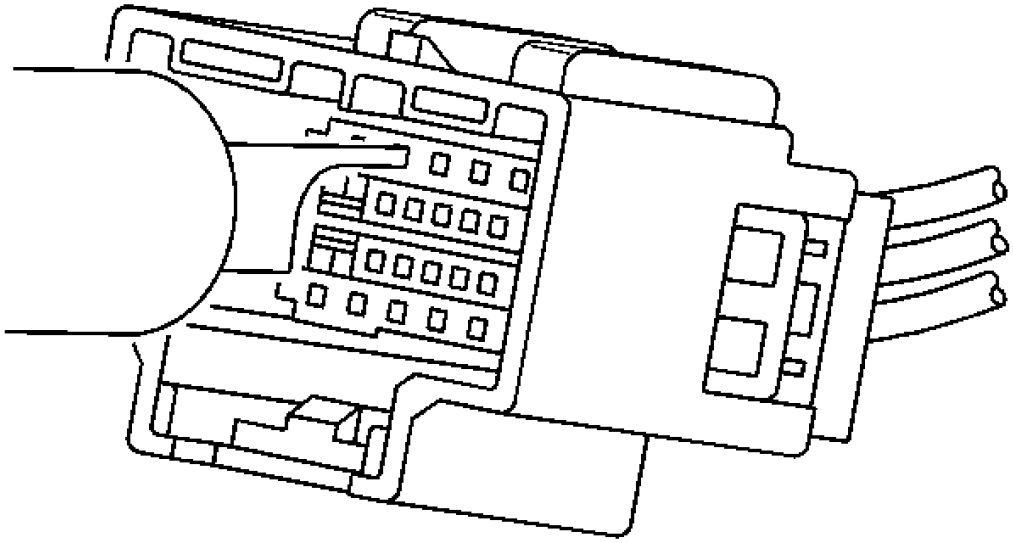
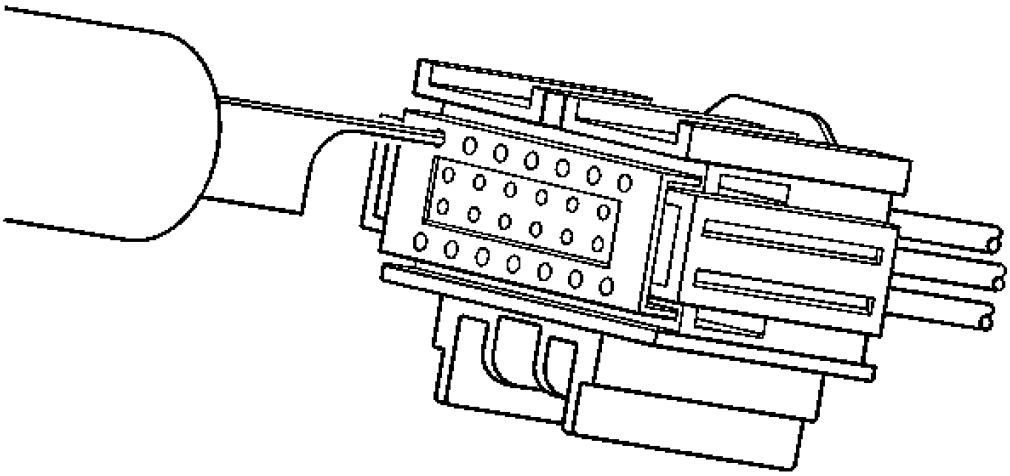


Fig. 203: Using Removal Tool On Female Half Of Connector
Courtesy of GENERAL MOTORS CORP.

6. View of the female half of the connector with male terminals.



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Fig. 204: Using Removal Tool On Male Half Of Connector
Courtesy of GENERAL MOTORS CORP.

7. View of the male half of the connector with female terminals.
8. While holding the removal tool in place, gently pull the wire out of the back of the connector. Always remember never use force when pulling a terminal out of a connector.

Terminated Lead Repair

1. Remove the terminal.
2. Find the appropriate terminated lead.
3. Use the appropriate splice sleeves depending on the gauge size.
4. Refer to **Splicing Copper Wire Using Splice Sleeves**.

REPAIRING CONNECTOR TERMINALS

Special Tools

- **EL-38215-10:** Splice Sleeve Crimp Tool
- **EL-35616-D:** Terminal Test Probe Kit
- **J 38125-5:** Ultra Torch
- Terminal Release Tool Kit

For equivalent regional tools, refer to **Special Tools** .

Making a Repair with a Terminated Lead or Connector Assembly

1. If using a terminated lead, remove the terminal to be replaced with the appropriate terminal release tool. Refer to the Terminal Release Tool Kit.
2. Cut and strip the wire insulation away from the terminal leaving enough wire length to reassemble the harness and connector without causing binding or a pinch condition.
3. Crimp the splice sleeve to the terminated lead or connector assembly to the harness wire using the **EL-38215-10:** tool. Refer to **Splicing Copper Wire Using Splice Sleeves**.
4. Use the **J 38125-5:** torch to seal the splice.
5. Repeat steps 2-4 if a connector assembly is being used to repair the vehicle.
6. Reassemble the connector and harness.
7. Verify the repair.

IGNITION KEY CANNOT BE REMOVED FROM THE IGNITION LOCK CYLINDER

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to **Step 2**	Go to **Symptoms - Steering Wheel and Column**

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2	Verify the ignition key cannot be removed from the ignition lock cylinder. Is the ignition key stuck in the lock cylinder?	Go to **Step 3**	System OK
3	Is the vehicle equipped with a manual transmission?	Go to **Step 8**	Go to **Step 4**
4	Turn the ignition key to the OFF position. Can the ignition key be turned to the OFF position and be removed?	Go to **Step 8**	Go to **Step 5**
5	Verify the adjustment of the shift control linkage. Refer to **Shift Control Linkage Adjustment** . Can the ignition key be turned to the OFF position and be removed?	System OK	Go to **Step 6**
6	Inspect for a faulty ignition lock cylinder. Is the ignition lock cylinder damaged?	Go to **Step 8**	Go to **Step 7**
7	Inspect the ignition/start switch housing. Is the housing worn, damaged or loose?	Go to **Step 9**	Go to **Step 10**
8	Replace the ignition lock cylinder. Refer to **Ignition Lock Cylinder Replacement** . Did you complete the repair?	Go to **Step 10**	-
9	Replace the ignition/start switch housing. Refer to **Ignition and Start Switch Housing Replacement** . Did you complete the repair?	Go to **Step 10**	-
10	Operate the system to verify the repair. Did you correct the condition?	System OK	-

IGNITION KEY CANNOT TURN OR STICKS IN ANY POSITION

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column System Description and perform the necessary inspections?	Go to **Step 2**	Go to **Steering Wheel and Column Description and Operation**
2	Verify that the ignition key sticks or cannot turn in any position. Is the key functioning correctly?	System OK	Go to **Step 3**
3	Inspect for an incorrect, worn, or damaged ignition key. Is the ignition key incorrect, worn, or damaged?	Go to **Step 7**	Go to **Step 4**
4	Inspect for a faulty ignition lock cylinder. Is the ignition lock cylinder damaged?	Go to **Step 8**	Go to **Step 5**
5	Inspect the ignition and start switch assembly for damage. Is the ignition and start switch assembly damaged?	Go to **Step 9**	Go to **Step 6**
6	Inspect the ignition and start switch housing for looseness. Is the ignition and start switch housing loose?	Go to **Step 10**	Go to **Step 11**

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7	Replace the ignition key. Did you complete the repair?	Go to **Step 11**	-
8	Replace the ignition lock cylinder. Refer to **Ignition Lock Cylinder Replacement** . Did you complete the repair?	Go to **Step 11**	-
9	Replace the ignition and start switch. Refer to **Ignition and Start Switch Replacement** . Did you complete the repair?	Go to **Step 11**	-
10	Tighten or replace the ignition and start switch housing. Refer to **Ignition and Start Switch Housing Replacement** Did you complete the repair?	Go to **Step 11**	-
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

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2010 ELECTRICAL

Wiring Systems and Power Management - Camaro

REPAIR INSTRUCTIONS

RELAY REPLACEMENT (ATTACHED TO WIRE HARNESS)

Removal Procedure

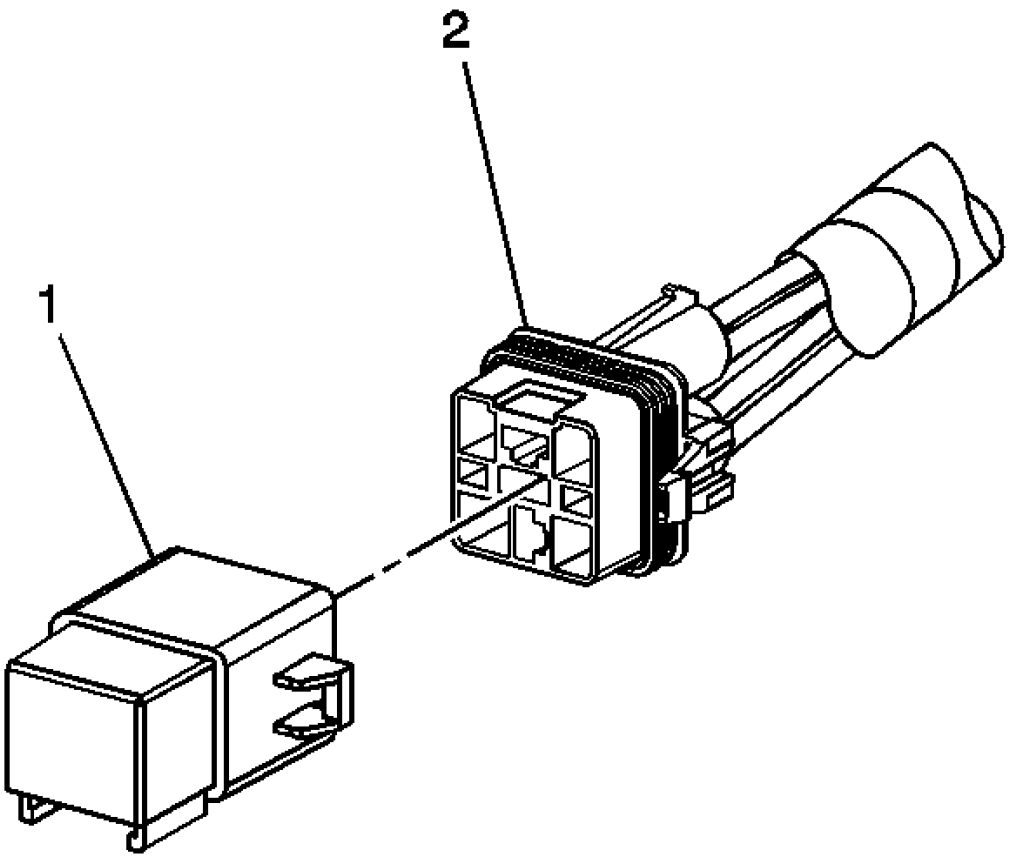


Fig. 1: Identifying Relay & Wire Harness Connector
Courtesy of GENERAL MOTORS CORP.

1. Locate the relay. Refer to the **Master Electrical Component List** to locate the relay in the vehicle.
2. Remove any fasteners which hold the relay in place.
3. Remove any connector position assurance (CPA) devices or secondary locks.

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NOTE: Use care when removing a relay in a wiring harness when the relay is secured by fasteners or tape.

4. Separate the relay (1) from the wire harness connector (2).

Installation Procedure

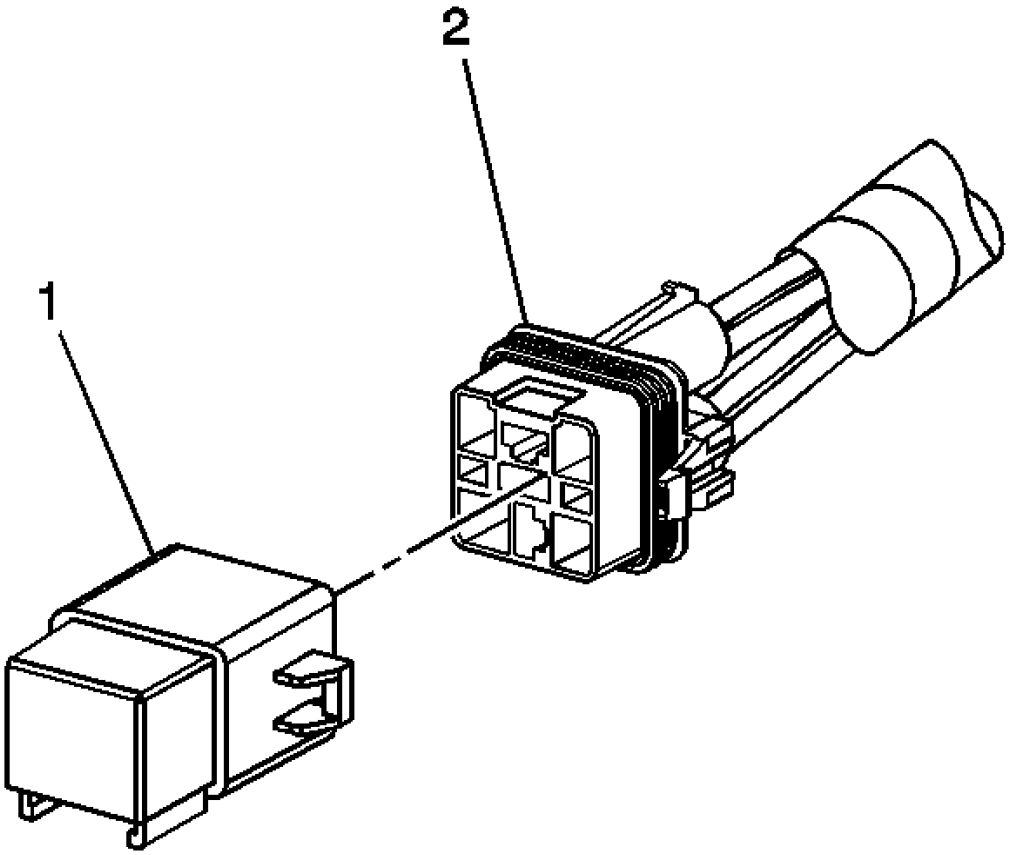


Fig. 2: Identifying Relay & Wire Harness Connector
Courtesy of GENERAL MOTORS CORP.

1. Connect the relay (1) to the wire harness connector (2).
2. Install any connector position assurance (CPA) devices or secondary locks.
3. Install the relay using any fasteners or tape that originally held the relay in place.

RELAY REPLACEMENT (WITHIN AN ELECTRICAL CENTER)

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Special Tools

EL 43244 Relay Puller Pliers

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

1. Remove the electrical center cover.
2. Locate the relay. Refer to **Electrical Center Identification Views** to locate the electrical center where the relay exists.

NOTE:

- **Always note the orientation of the relay.**
- **If equipped with a notch style relay; observe the location of the notch on the old relay to verify the new relay is installed with the notch in the same location.**
- **Ensure that the electrical center is secure, as not to put added stress on the wires or terminals.**

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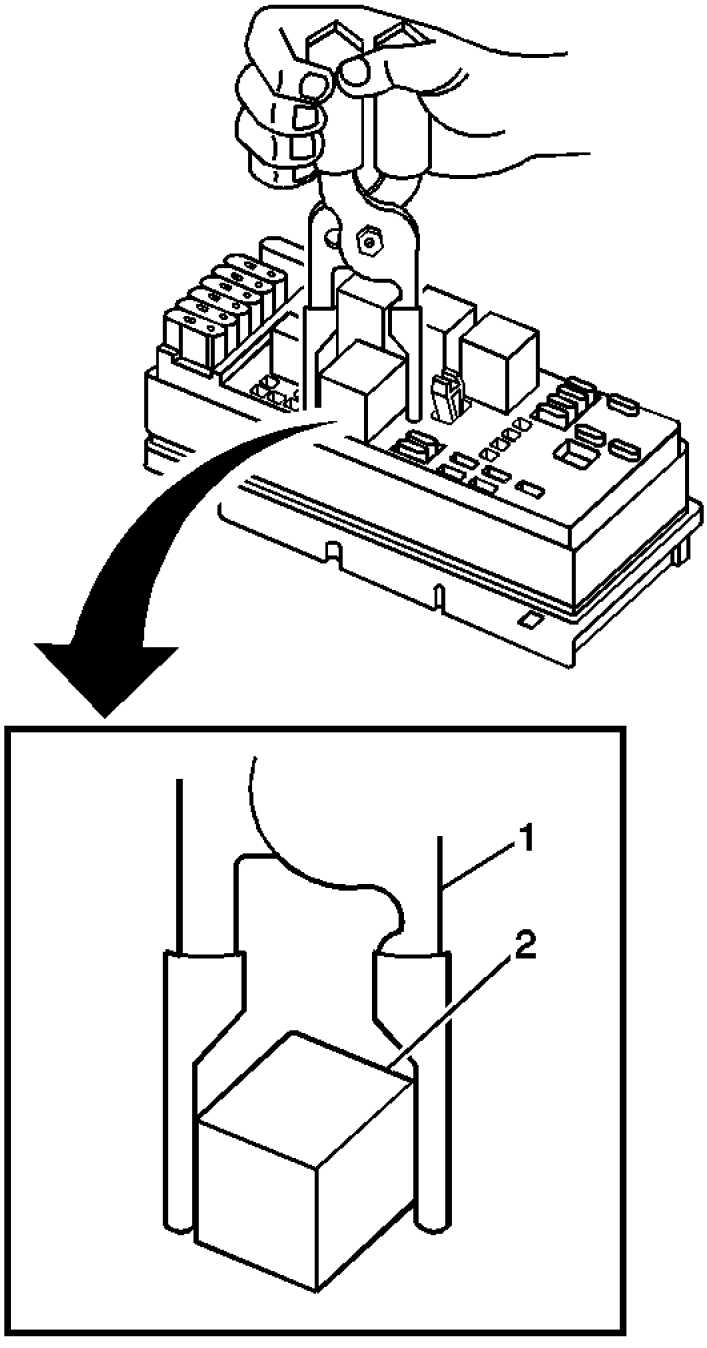


Fig. 3: Removing/Installing Relay Using Special Tool
Courtesy of GENERAL MOTORS CORP.

3. Using the EL 43244 (1) position the tool on opposing corners of the relay (2).

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CAUTION: Use EL-43244 to pull the relay straight out from the electrical center terminals. The use of pliers or a flat bladed tool could damage the electrical center.

4. Remove the relay (2) from the electrical center.

Installation Procedure

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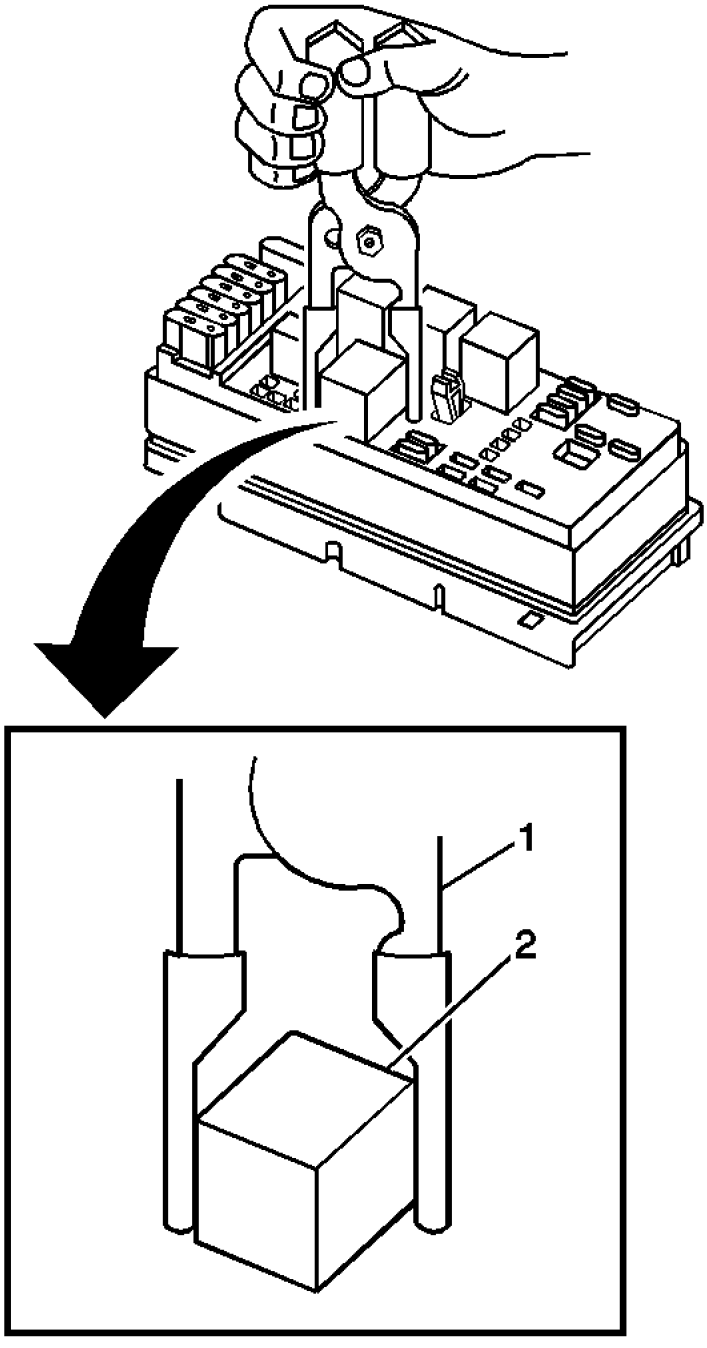


Fig. 4: Removing/Installing Relay Using Special Tool
Courtesy of GENERAL MOTORS CORP.

1. Install the relay (2) in the same position as removed.
2. Install the electrical center cover.

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GROUND REPAIR

Electrical Grounds

Proper electrical system function relies on secure, positive, corrosion-free ground connections. Loose, stripped, or corroded connections increase the possibility of improper system function and loss of module communication. These conditions may also lead to unnecessary repairs and component replacements.

In general, electrical ground connections are accomplished using one, or a combination of, three attachment methods:

- Welded M6 stud and nut
- Welded M6 nut and bolt
- Welded M8 nut and bolt

CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

Determine which attachment method is used, and carry out the appropriate repair.

M6 Weld Stud Replacement

1. Select a location adjacent the damaged or missing M6 ground stud having 20 mm (0.79 in) clearance behind the panel surface and 20 mm (0.79 in) clearance surrounding the M6 rivet stud flange.
2. Using GM approved residue-free solvent or equivalent, remove any grease from the repair site and allow to dry.

NOTE: Ensure 20 mm (0.79 in) clearance is maintained behind the panel to be drilled.

3. Drill a 10 mm (0.40 in) diameter hole through the panel.
4. Carefully remove paint and primer from the area surrounding the rivet stud flange until bare metal is visible.

CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

5. Select a replacement conductive M6 rivet stud. Refer to GM parts catalog for the correct part number and application.
6. Using a rivet stud installer, install the replacement conductive M6 rivet stud.
7. Ensure the new rivet stud is securely fastened, with no detectable movement.

NOTE: The rivet stud and surrounding panel area must be properly refinished prior to the installation of the ground terminal and nut to maintain positive

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electrical grounding.

8. Completely wrap the threads of the rivet stud with painters tape or equivalent.
9. Refinish the repair area using an anti-corrosion primer. Refer to **Anti-Corrosion Treatment and Repair** .
10. Allow the refinished repair area to cure sufficiently before removing the protective material applied to the rivet stud threads.
11. Remove the painters tape or equivalent from the rivet stud threads.
12. Using GM approved residue-free solvent or equivalent, thoroughly clean the rivet stud threads to remove any adhesive and allow to dry.
13. Carefully remove any corrosion from the electrical ground wire terminal. Refer to **Testing for Intermittent Conditions and Poor Connections** .
14. Using a small brush, apply Dielectric Lubricant GM P/N 12377900 (Canadian P/N 10953529) to the new conductive M6 rivet stud threads.
15. Install the ground terminal to the new rivet stud.
16. Select a new, conductive M6 nut. Refer to GM parts catalog for the correct part number and application.

CAUTION: Refer to Fastener Caution .

17. Install the M6 nut and tighten to 8 N.m (71 lb in).
18. Check for proper system operation.

M6 Weld Nut

CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

1. If the M6 weld nut at the electrical ground location is damaged or stripped, a new, conductive self-threading M7 bolt may be used to secure the ground terminal. Refer to GM parts catalog for the correct part number and application.
2. Using GM approved residue-free solvent or equivalent, remove any grease from the surface surrounding the weld nut and allow to dry.
3. Remove any loose metal particles from the damaged or stripped weld nut with a stiff brush.
4. Using a small brush, apply Dielectric Lubricant GM P/N 12377900 (Canadian P/N 10953529) to the new, conductive, self-threading M7 bolt threads.
5. Carefully remove any corrosion from the electrical ground terminal. Refer to **Testing for Intermittent Conditions and Poor Connections** .
6. Install the electrical ground terminal to the new, conductive M7 bolt.

CAUTION: Refer to Fastener Caution .

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7. Install the M7 bolt and tighten to 9 N.m (80 lb in).
8. Check for proper system operation.

M6 Weld Nut (Alternative Repair)

CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

1. If the electrical ground location is accessible from both sides of the panel, a conductive M6 bolt and a conductive M6 nut may be used to secure the electrical ground terminal. Refer to GM parts catalog for the correct part number and application.
2. Select a location adjacent the damaged M6 weld nut having 20 mm (0.79) clearance behind the panel surface and 20 mm (0.79) clearance surrounding the new electrical ground site.
3. Using GM approved residue-free solvent or equivalent, remove any grease from the surface surrounding the ground location and allow to dry.

NOTE: Ensure 20 mm (0.79 in) clearance is maintained behind the panel to be drilled.

4. Drill a 10 mm (0.40 in) diameter hole through the panel.
5. Carefully remove paint and primer from the area surrounding the new ground site until bare metal is visible.
6. Using a small brush, apply Dielectric Lubricant GM P/N 12377900 (Canadian P/N 10953529) to the new, conductive M6 bolt threads.
7. Carefully remove any corrosion from the electrical ground terminal. Refer to **Testing for Intermittent Conditions and Poor Connections** .
8. Install the electrical ground terminal and new, conductive M6 bolt to the ground location.

CAUTION: Refer to Fastener Caution .

9. Install the conductive M6 nut and tighten to 8 N.m (71 lb in).

NOTE: The repair area must be properly refinished to maintain positive electrical grounding.

10. Refinish the repair area using an anti-corrosion primer. Refer to **Anti-Corrosion Treatment and Repair** .
11. Check for proper system operation.

M8 Weld Nut

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CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

1. If the M8 weld nut electrical ground location is accessible from both sides of the panel, a conductive M8 bolt and a conductive M8 nut may be used to secure the ground terminal. Refer to GM parts catalog for the correct part numbers and application.
2. Select a location adjacent to M8 weld nut having 20 mm (0.79 in) clearance behind the panel surface and 20 mm (0.79 in) clearance surrounding the new electrical ground site.
3. Using GM approved residue-free solvent or equivalent, remove any grease from the surface surrounding the ground location and allow to dry.

NOTE: Ensure 20 mm (0.79 in) clearance is maintained behind the panel to be drilled.

4. Drill a 10 mm (0.40 in) diameter hole through the panel.
5. Carefully remove paint and primer from the area surrounding the new ground site until bare metal is visible.
6. Using a small brush, apply Dielectric Lubricant GM P/N 12377900 (Canadian P/N 10953529) to the new, conductive M8 bolt threads.
7. Carefully remove any corrosion from the electrical ground terminal. Refer to **Testing for Intermittent Conditions and Poor Connections** .
8. Install the electrical ground terminal and new, conductive M8 bolt to the ground location.

CAUTION: Refer to Fastener Caution .

9. Install the conductive M8 nut and tighten to 22 N.m (16 lb ft).

NOTE: The repair area must be properly refinished to maintain positive electrical grounding.

10. Refinish the repair area using an anti-corrosion primer. Refer to **Anti-Corrosion Treatment and Repair** .
11. Check for proper system operation.

M8 Weld Nut (Alternative Repair)

CAUTION: Use GM approved replacement fasteners with conductive finish for electrical ground repair.

1. If the M8 weld nut electrical ground location is not accessible from both sides of the panel, a conductive M6 rivet stud and a conductive M6 nut may be used to secure the ground terminal. Refer to GM parts catalog for the correct part numbers and application.

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2. Select a location adjacent the damaged M8 weld nut having 20 mm (0.79 in) clearance behind the panel surface and 20 mm (0.79 in) clearance surrounding the new, conductive M6 rivet stud flange.
3. Using GM approved residue-free solvent or equivalent, remove any grease from the repair site and allow to dry.

NOTE: Ensure 20 mm (0.79 in) clearance is maintained behind the panel to be drilled.

4. Drill a 10 mm (0.40 in) diameter hole through the panel.
5. Carefully remove paint and primer from the area surrounding the rivet stud flange until bare metal is visible.
6. Using a rivet stud installer, install the replacement conductive M6 rivet stud.
7. Ensure the new rivet stud is securely fastened, with no detectable movement.

NOTE: The rivet stud and surrounding panel area must be properly refinished prior to the installation of the ground terminal and nut to maintain positive electrical grounding.

8. Completely wrap the threads of the rivet stud with painters tape or equivalent.
9. Refinish the repair area using an anti-corrosion primer. Refer to **Anti-Corrosion Treatment and Repair** .
10. Allow the refinished repair area to cure sufficiently before removing the protective material applied to the rivet stud threads.
11. Remove the painters tape or equivalent from the rivet stud threads.
12. Using GM approved residue-free solvent or equivalent, thoroughly clean the rivet stud threads to remove any adhesive and allow to dry.
13. Carefully remove any corrosion from the electrical ground wire terminal. Refer to **Testing for Intermittent Conditions and Poor Connections** .
14. Using a small brush, apply Dielectric Lubricant GM P/N 12377900 (Canadian P/N 10953529) to the new conductive M6 rivet stud threads.
15. Install the ground terminal to the new, conductive M6 rivet stud.

CAUTION: Refer to Fastener Caution .

16. Install the conductive M6 nut and tighten to 8 N.m (71 lb in).
17. Check for proper system operation.

ACCESSORY WIRING JUNCTION BLOCK RETAINER REPLACEMENT

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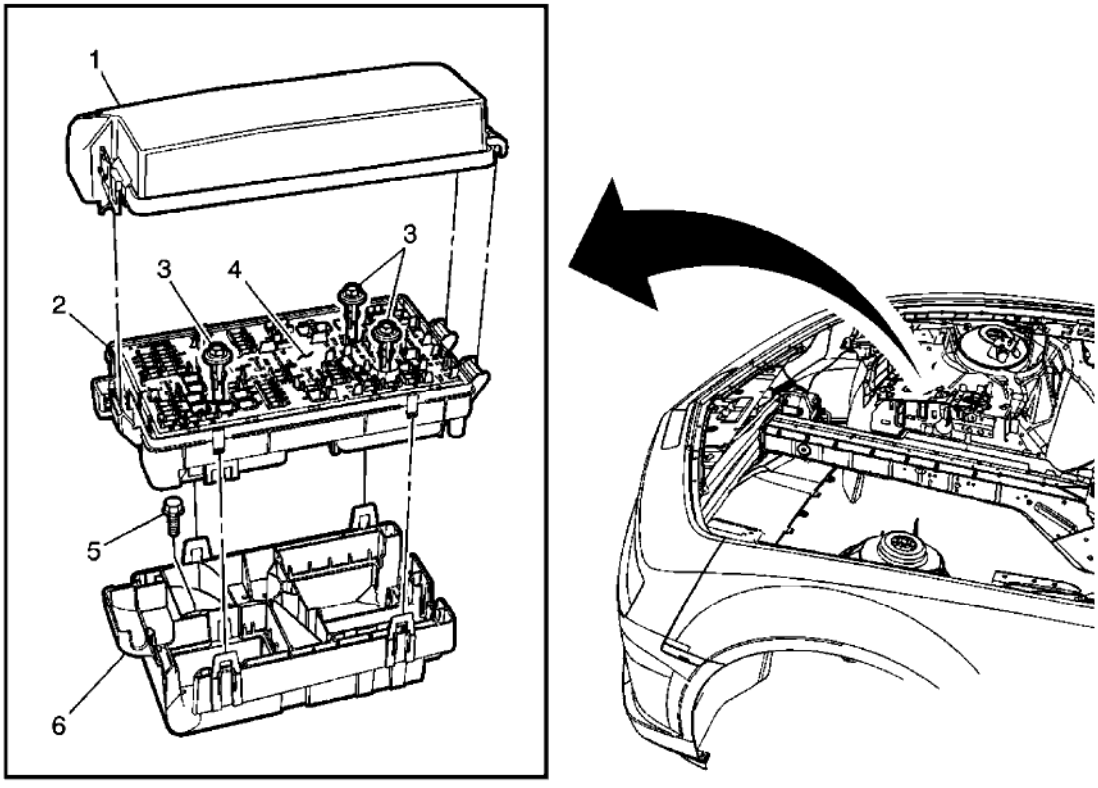


Fig. 5: Accessory Wiring Junction Block Retainer
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Disconnect the battery. Refer to **Battery Negative Cable Disconnection and Connection** .	
1	Accessory Wiring Junction Block Cover **Procedure:** Remove the accessory wiring junction block cover by pushing in on the 3 retainer tabs located on the ends of the cover and lift. To reinstall, fit together the retainer tabs located on the ends of the cover and push down on the cover until the tabs on the ends of the cover lock into place.
2	Battery Cable Nut **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Disconnect the battery positive cable from the junction block by removing the nut. **Tighten:** 7 N.m (62 lb in)

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3	Accessory Wiring Junction Block Harness Connector Bolt (Qty: 3) **Procedure:** Remove the accessory wiring harness from the accessory wiring junction block retainer. **Tighten:** 10 N.m (89 lb in)
4	Accessory Wiring Junction Block Retainer **Procedure:** Remove the accessory wiring junction block retainer by pushing in on the 4 retainer tabs located on the sides of the retainer and lift. To reinstall, fit together the retainer tabs located on the sides of the retainer and push down on the retainer until the tabs on the sides of the cover lock into place.
5	Accessory Wiring Junction Block Retainer Base Bolt **Tighten:** 20 N.m (15 lb ft)
6	Accessory Wiring Junction Block Retainer Base **Procedure:** Position the junction block retainer base alignment tab to the bracket first, then install the bolt.

IGNITION LOCK CYLINDER REPLACEMENT

Removal Procedure

1. Disconnect the battery negative cable. Refer to **Battery Negative Cable Disconnection and Connection** .
2. Remove the steering column shroud. Refer to **Steering Column Shroud Replacement** .
3. Insert the key into the ignition lock cylinder and turn the key to the RUN position.

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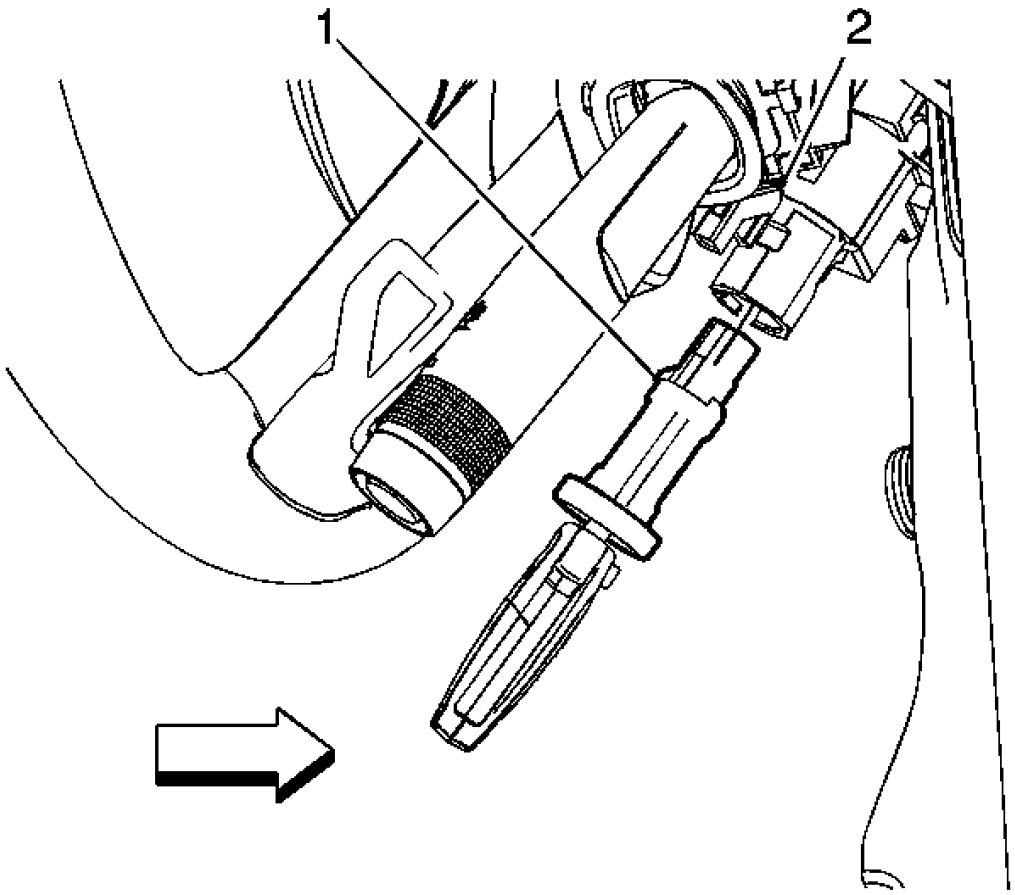


Fig. 6: Ignition Lock Cylinder & Lock Housing Access Hole
Courtesy of GENERAL MOTORS CORP.

4. Depress the retainer through the lock housing access hole (2) with a small Allen wrench or similar pick-type tool.
5. Remove the ignition lock cylinder (1) from the ignition and start switch housing.

Installation Procedure

1. If you are installing a new ignition lock cylinder, code the lock cylinder. Refer to **Lock Cylinder Coding - Ignition** .

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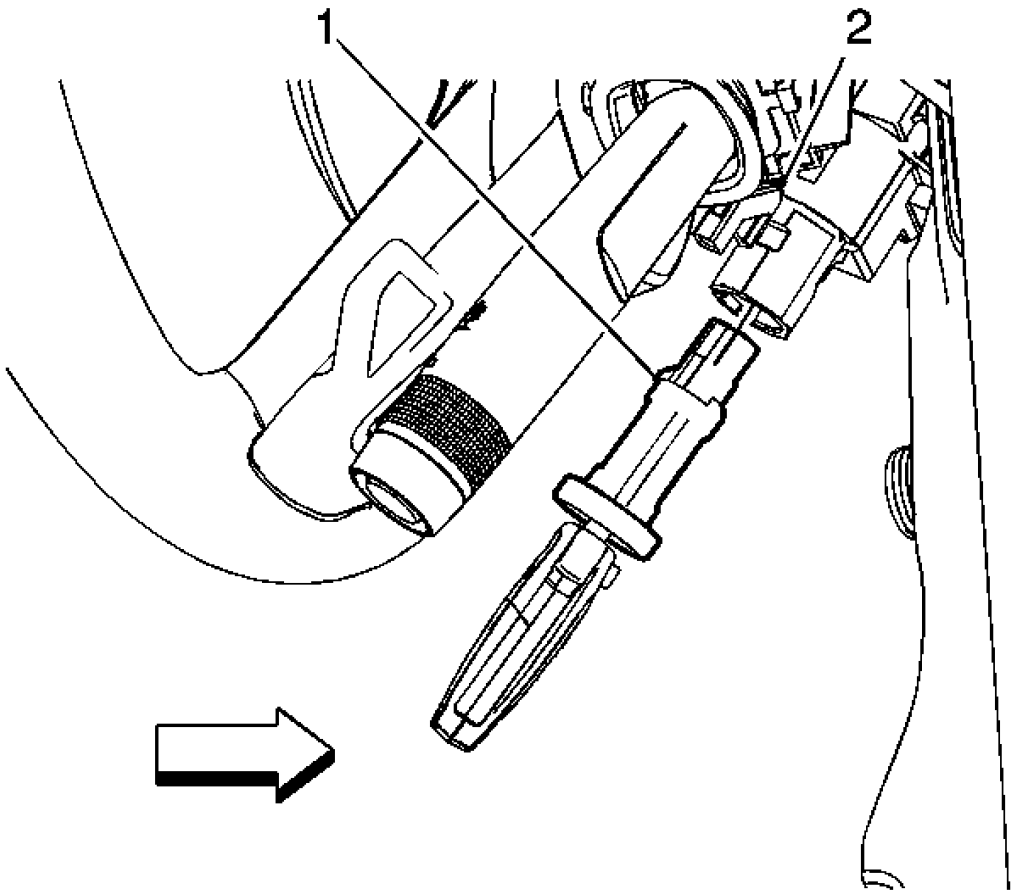


Fig. 7: Ignition Lock Cylinder & Lock Housing Access Hole
Courtesy of GENERAL MOTORS CORP.

2. Turn the key to the RUN position and insert ignition lock cylinder (1) into the ignition and start switch housing.
3. Turn the key to the LOCK position and remove the key from the ignition lock cylinder.
4. Install the steering column shroud. Refer to **Steering Column Shroud Replacement** .
5. Connect the battery negative cable. Refer to **Battery Negative Cable Disconnection and Connection** .

IGNITION AND START SWITCH REPLACEMENT

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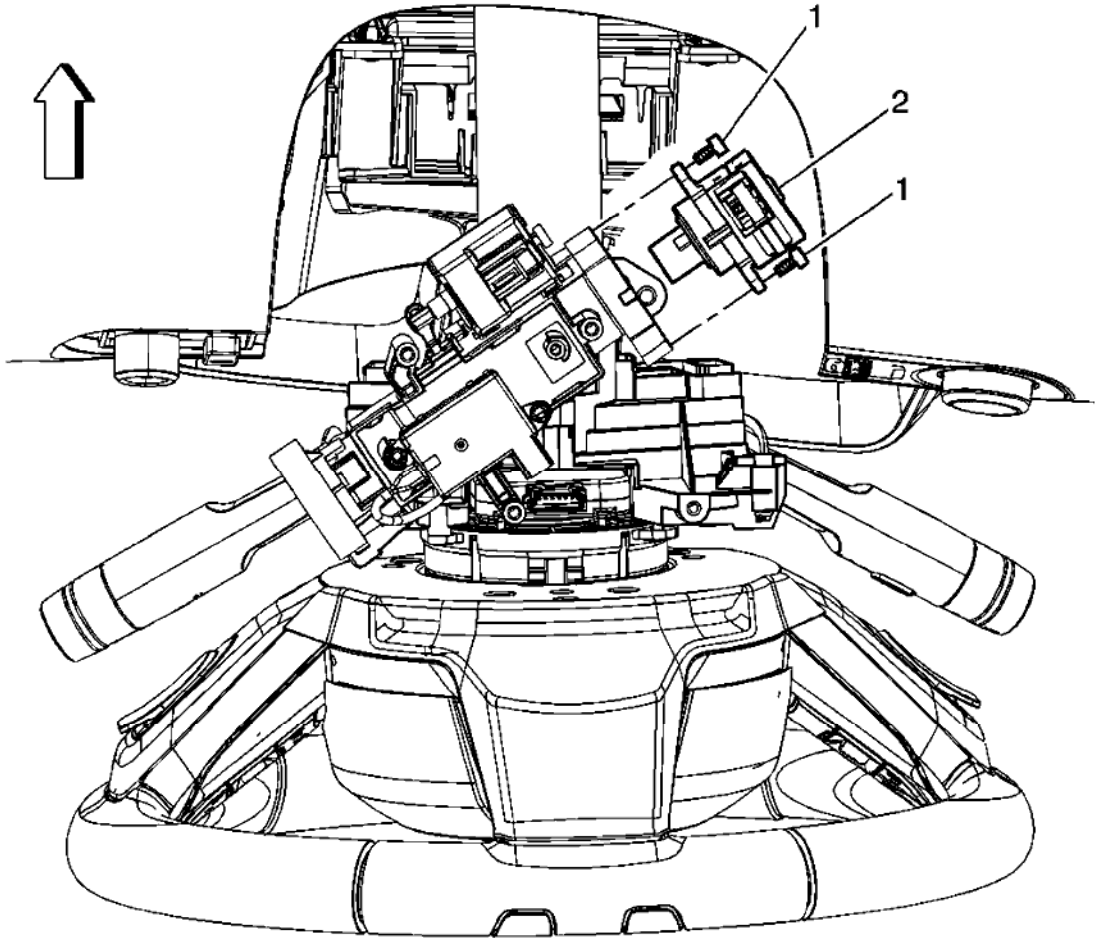


Fig. 8: Ignition & Start Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Disconnect the battery negative cable. Refer to **Battery Negative Cable Disconnection and Connection** . 2. Disable the supplemental inflatable restraint (SIR) system. Refer to **SIR Disabling and Enabling** . 3. Remove the steering column shroud. Refer to **Steering Column Shroud Replacement** .	
1	Ignition and Start Switch Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)
	Ignition and Start Switch

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2	**Procedure:** Disconnect the ignition switch electrical connector.

IGNITION AND START SWITCH HOUSING REPLACEMENT

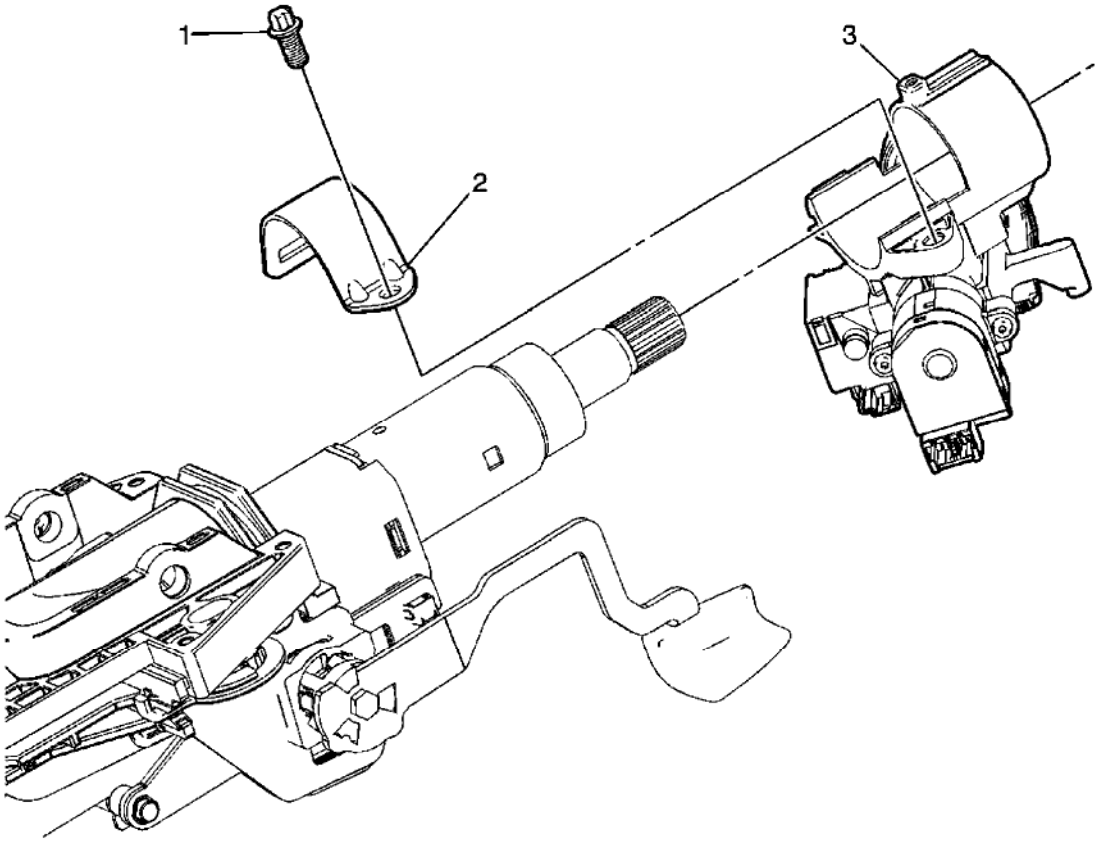


Fig. 9: Ignition & Start Switch Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the turn signal switch bracket. Refer to **Turn Signal Switch Bracket Replacement** .	
1	Ignition and Start Switch Housing Bolt **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 8 N.m (71 lb in)
2	Ignition and Start Switch Housing Strap
	Ignition and Start Switch Housing

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3	**Procedure** 1. Disconnect any electrical connectors as needed. 2. Transfer any parts as needed.

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