2004 ACCESSORIES & EQUIPMENT

Instrument Panel, Gages & Console - C/K SUV

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Clock Retaining Screws	2 N.m	18 lb in
Console Compartment Door Screws	1.6 N.m	14 lb in
Console Extension Trim Bezel Screws	2 N.m	18 lb in
Data Link Connector (DLC) Screw	2 N.m	18 lb in
DIC and Power Outlet Bracket Screws	1.6 N.m	14 lb in
Floor Console to the Floor Console Bracket Bolts	3.5 N.m	31 lb in
Floor Console End Panel Screws	1.6 N.m	14 lb in
Floor Console Storage Bin Screws	1.6 N.m	14 lb in
Instrument Panel Assembly to Carrier Support Screws and Nuts	9 N.m	80 lb in
Instrument Panel Carrier Side Bolts	50 N.m	37 lb ft
Instrument Panel Carrier Top Bolts	50 N.m	37 lb ft
Instrument Panel Center Support Bracket Bolt	25 N.m	18 lb ft
Instrument Panel Cluster Screws	1.6 N.m	14 lb in
Instrument Panel Compartment Screws	1.9 N.m	17 lb in
Instrument Panel Cupholder Screws	2 N.m	18 lb in
Instrument Panel to Console Screws	2 N.m	18 lb in
Instrument Panel Trim Pad Retaining Screws	2 N.m	18 lb in
Instrument Panel Upper Bracket Bolts	2 N.m	18 lb in
Knee Bolster Deflector Nuts	9 N.m	80 lb in
Knee Bolster Screws	2 N.m	18 lb in
Lower Instrument Panel Trim Panel Screws	2 N.m	18 lb in
Power Outlet Cover Screws	1.6 N.m	14 lb in
Underhood Ground and Connection Nut	9 N.m	80 lb in
Volume Compensation Microphone Screws	2 N.m	18 lb in

FUEL LEVEL SPECIFICATIONS

The information in this table is intended for use with the **J 33431-C** Signal Generator and Instrument Panel Tester. See **Special Tools and Equipment**. The fuel level sensor values represent the test values to be used on the Signal Generator to drive the fuel gage display to the indicated positions. Vehicles that require more than one fuel level sensor calculate gage position from many possible resistance combinations of fuel levels between

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the two tanks. Therefore, the values in the table may not correlate directly to readings taken from the vehicle primary or secondary sending units.

The values in the table are approximate values based on information obtained from properly operating vehicles. Actual results may vary slightly.

Fuel Level Specifications

Fuel Gage Display	Resistance	Sender Voltage	Fuel Level	Fuel Remaining
26.0 Gallon Tank (Short Bed Pickup and 4-Door Utility)				
E	197-250 ohms	2.5 V	0-13%	0-11.9 L (0-3.1 gal)
1/4	150-190 ohms	2.2 V	30-35%	32.8 L (8.7 gal)
1/2	118-140 ohms	1.6 V	50-55%	51.3 L (13.5 gal)
3/4	83-110 ohms	1.25 V	72-78%	74.3 L (19.7 gal)
F	40-66 ohms	1.0 V	88-100%	92.8-98.4 L (24.5-25.9 gal)
Low Fuel Indicator On	208-218 ohms	2.4 V	11-17%	16.5 L (4.3 gal)
Low Fuel Indicator Off	195-206 ohms	2.3 V	14-25%	18.9 L (5 gal)
31.0 Gallon Tank (Suburban 1500 and 2500 Series)				
E	199-250 ohms	2.5 V	0-13%	0-15.1 L (0-4 gal)
1/4	155-195 ohms	2.3 V	30-35%	41.6 L (11 gal)
1/2	118-148 ohms	1.9 V	50-55%	68.1 L (18 gal)
3/4	83-110 ohms	1.25 V	68-78%	89 L (23.5 gal)
F	40-58 ohms	0.9 V	88-100%	111.3-117 L (29.4-30.9 gal)
Low Fuel Indicator On	211-235 ohms	2.5 V	11-17%	14.3 L (3.80 gal)
Low Fuel Indicator Off	210-220 ohms	2.4 V	14-26%	19.3 L (5.1 gal)
34.0 Gallon Tank (Long Bed Pickup)				
E	196-250 ohms	2.5 V	4-14%	4.5-15.7 L (1.2-4.1 gal)
1/4	155-195 ohms	2.1 V	30-36%	43.8 L (11.6 gal)
1/2	117-151 ohms	1.8 V	50-58%	70.4 L (18.6 gal)
3/4	80-112 ohms	1.5 V	70-80%	97.2 L (25.7 gal)
F	40-62 ohms	1.0 V	88-99%	123.6-126.9 L (32.6-33.4 gal)
Low Fuel Indicator On	218-229 ohms	2.4 V	11-14%	22.7 L (6 gal)
Low Fuel Indicator Off	207-214 ohms	2.3 V	13-25%	25.7 L (6.8 gal)
37.0 Gallon Tank (Suburban 2500 Series)				

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IMPORTANT:
The resistance values only reflect the specified fuel level when the signal circuits for both the primary and secondary fuel level senders are tied together.
The fuel remaining values are approximate.

E	190-250 ohms	2.4 V	2-14%	18.9 L (5 gal)
1/4	130-158 ohms	2.0 V	31-34%	43.2 L (11.4 gal)
1/2	85-128 ohms	1.8 V	50-58%	70 L (18.5 gal)
3/4	60-80 ohms	1.5 V	70-76%	93.5 L (24.7 gal)
F	24-58 ohms	1.0 V	87-100%	132.5-140.1 L (35-37 gal)
Low Fuel Indicator On	220-240 ohms	2.5 V	11-13%	28.3 L (7.5 gal)
26.0 Gallon Tank (Short Bed Pickup and 4-Door Utility) 5.3L Only				
E	40-66 ohms	1.0 V	0-13%	0-11.9 L (0-3.1 gal)
1/4	83-110 ohms	1.25 V	30-35%	32.8 L (8.7 gal)
1/2	118-140 ohms	1.6 V	50-55%	51.3 L (13.5 gal)
3/4	150-190 ohms	2.2 V	72-78%	74.3 L (19.7 gal)
F	197-250 ohms	2.5 V	88-100%	92.8-98.4 L (24.5-25.9 gal)
Low Fuel Indicator On	62-72 ohms	1.1 V	11-17%	16.5 L (4.3 gal)
Low Fuel Indicator Off	74-83 ohms	1.2 V	14-25%	18.9 L (5 gal)
31.0 Gallon Tank (Suburban 1500 and 2500 Series) 5.3L Only				
E	40-58 ohms	0.9 V	0-13%	0-15.1 L (0-4 gal)
1/4	83-110 ohms	1.25 V	30-35%	41.6 L (11 gal)
1/2	118-148 ohms	1.9 V	50-55%	68.1 L (18 gal)
3/4	155-195 ohms	2.3 V	68-78%	89 L (23.5 gal)
F	199-250 ohms	2.5 V	88-100%	111.3-117 L (29.4-30.9 gal)
Low Fuel Indicator On	55-69 ohms	0.9 V	11-17%	14.3 L (3.80 gal)
Low Fuel Indicator Off	70-80 ohms	1.1 V	14-26%	19.3 L (5.1 gal)
34.0 Gallon Tank (Long Bed Pickup) 5.3L Only				
E	40-62 ohms	1.0 V	4-14%	4.5-15.7 L (1.2-4.1 gal)
1/4	80-112 ohms	1.5 V	30-36%	43.8 L (11.6 gal)
1/2	117-151 ohms	1.8 V	50-58%	70.4 L (18.6 gal)
3/4	155-195 ohms	2.1 V	70-80%	97.2 L (25.7 gal)
F	196-250 ohms	2.5 V	88-99%	123.6-126.9 L (32.6-33.4 gal)

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Low Fuel Indicator On	61-72 ohms	1.1 V	11-14%	22.7 L (6 gal)
Low Fuel Indicator Off	76-83 ohms	1.2 V	13-25%	25.7 L (6.8 gal)
Low Fuel Indicator Off	208-218 ohms	2.4 V	14-16%	30.2 L (8 gal)

SCHEMATIC AND ROUTING DIAGRAMS

INSTRUMENT CLUSTER SCHEMATICS

Refer to Instrument Cluster in SYSTEM WIRING DIAGRAMS .

DRIVER INFORMATION SYSTEM SCHEMATICS

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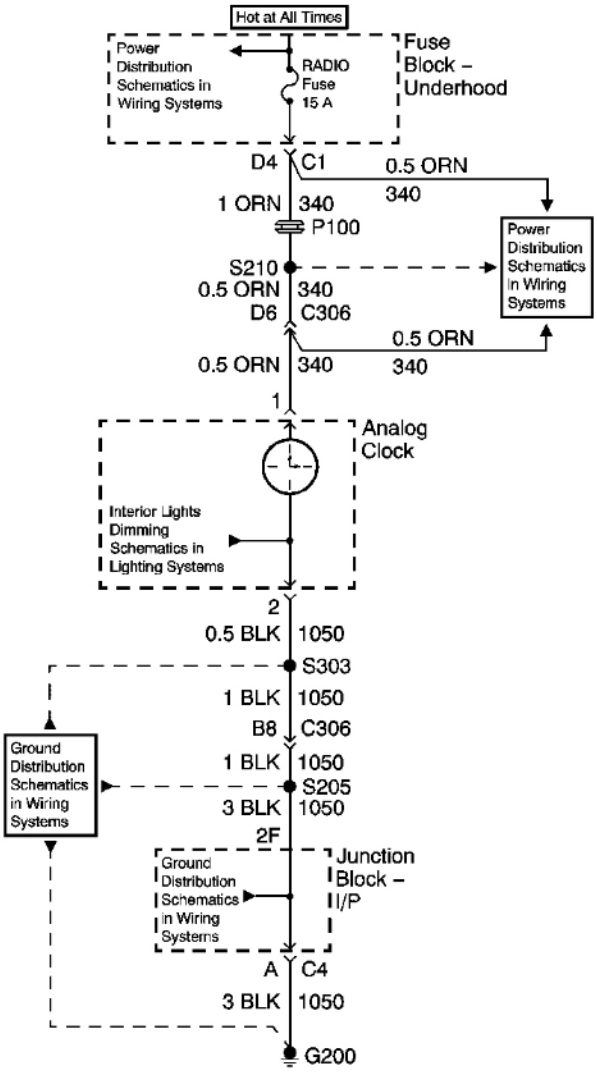


Fig. 1: Analog Clock Schematic - Z75 Only
Courtesy of GENERAL MOTORS CORP.

AUDIBLE WARNINGS SCHEMATICS

Refer to Warning Systems in SYSTEM WIRING DIAGRAMS .

THERMO COOLER/CUPHOLDER SCHEMATICS

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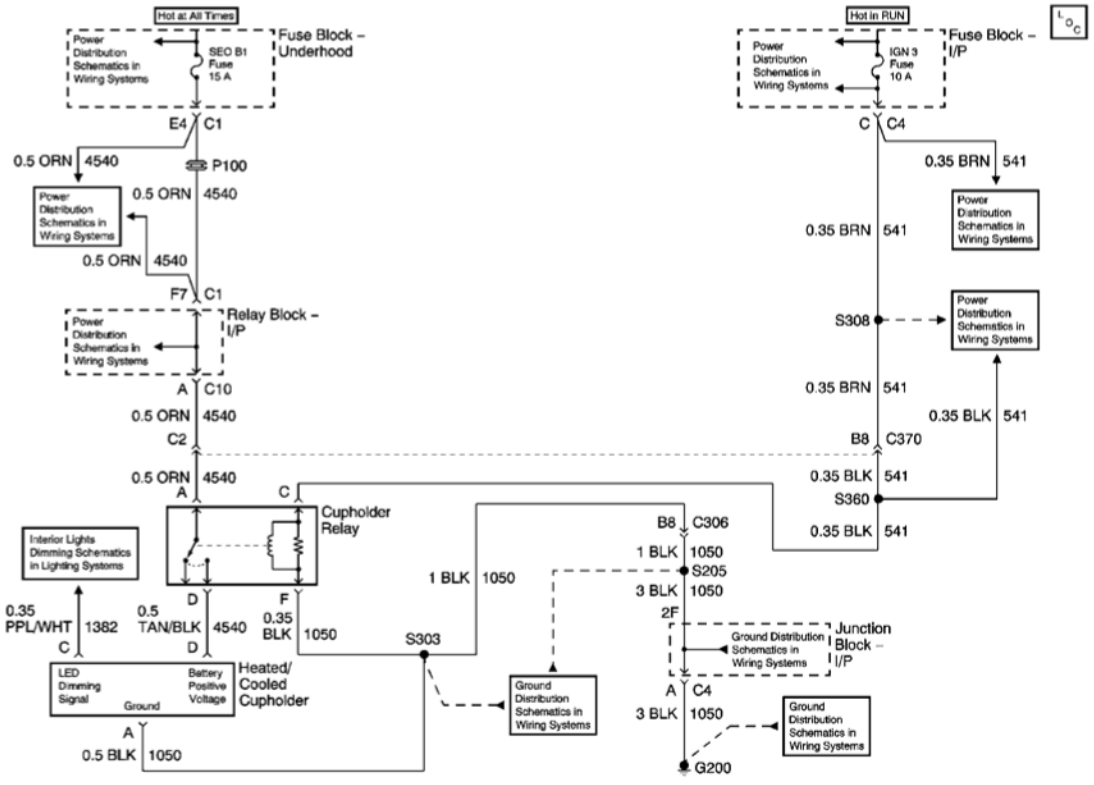


Fig. 2: Thermo Cooler/Cupholder Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

INSTRUMENT PANEL, GAGES, AND CONSOLE COMPONENT VIEWS

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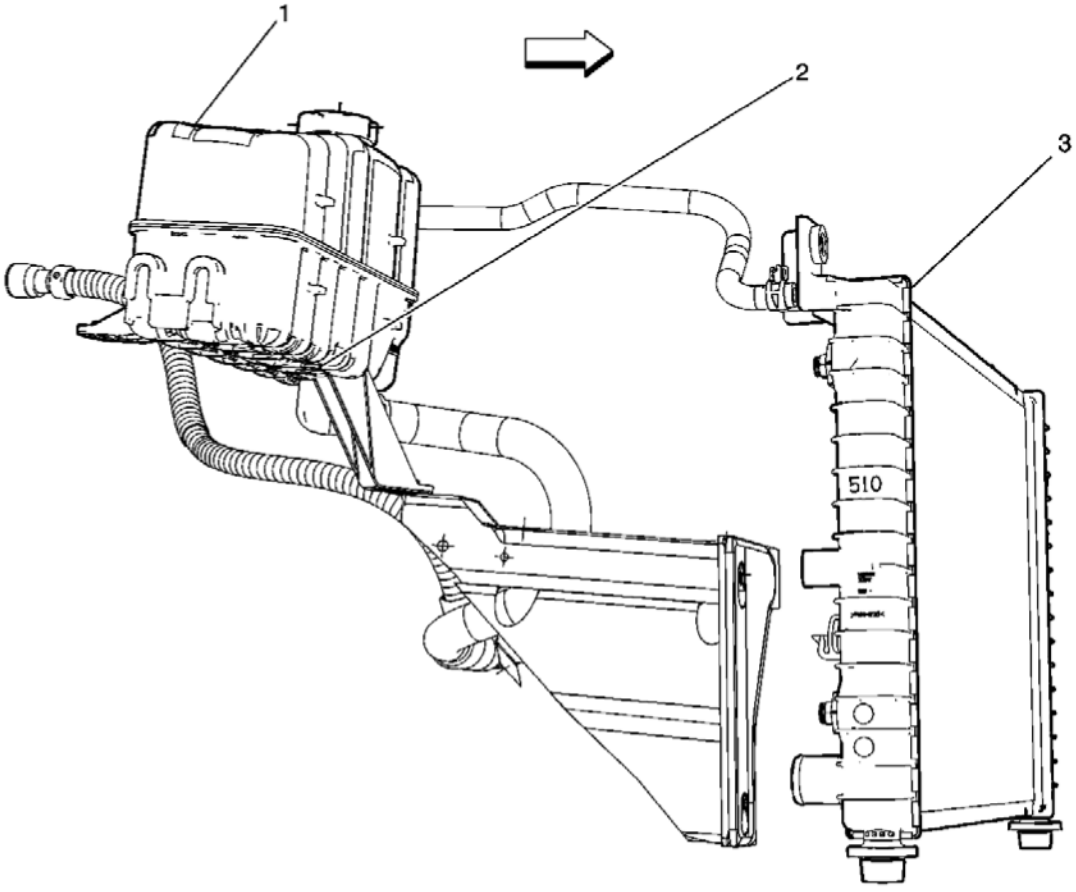


Fig. 3: RF Of Engine Compartment Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Coolant Recovery Reservoir
2	Coolant Level Switch
3	Radiator

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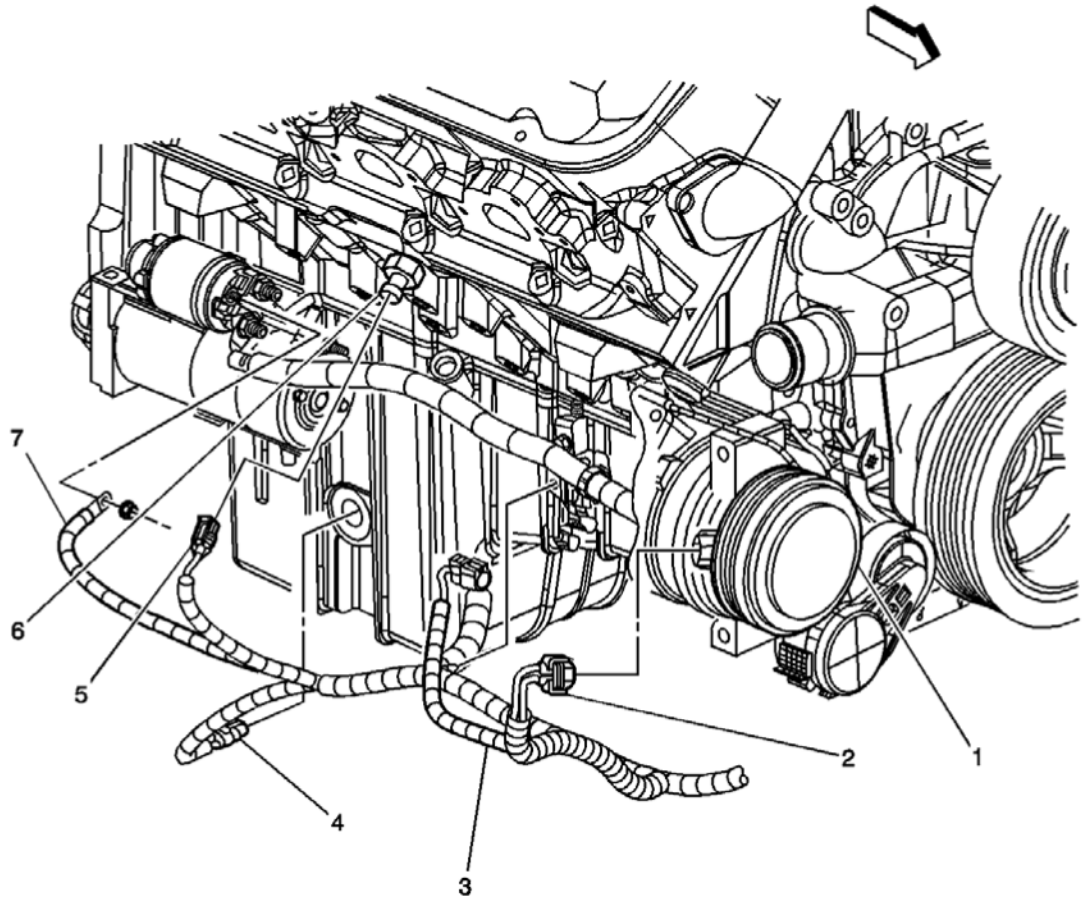


Fig. 4: Engine Oil Level Switch Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	A/C Compressor Clutch
2	A/C Compressor Clutch Connector
3	Engine Wiring Harness
4	Engine Oil Level Sensor Connector
5	Knock Sensor (KS) 2 Connector
6	Knock Sensor (KS) 2
7	Starter Relay Output (S-Terminal Feed)

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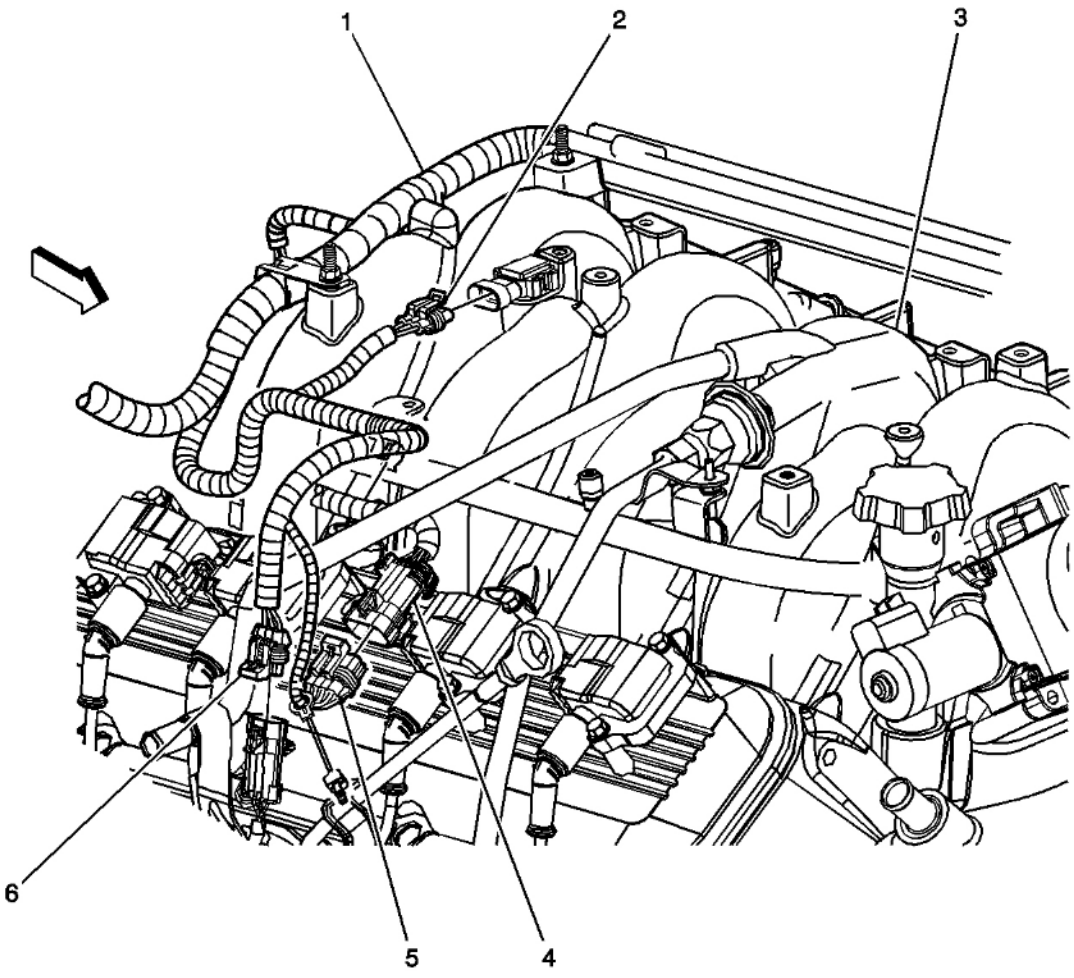


Fig. 5: Engine View - Upper Right Component View (8.1L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Engine Harness
2	Manifold Absolute Pressure (MAP) Sensor
3	Intake Manifold
4	Ignition Coil Connector-Harness Side
5	Ignition Coil Connector-Component Side
6	Engine Coolant Temperature (ECT) Sensor Connector

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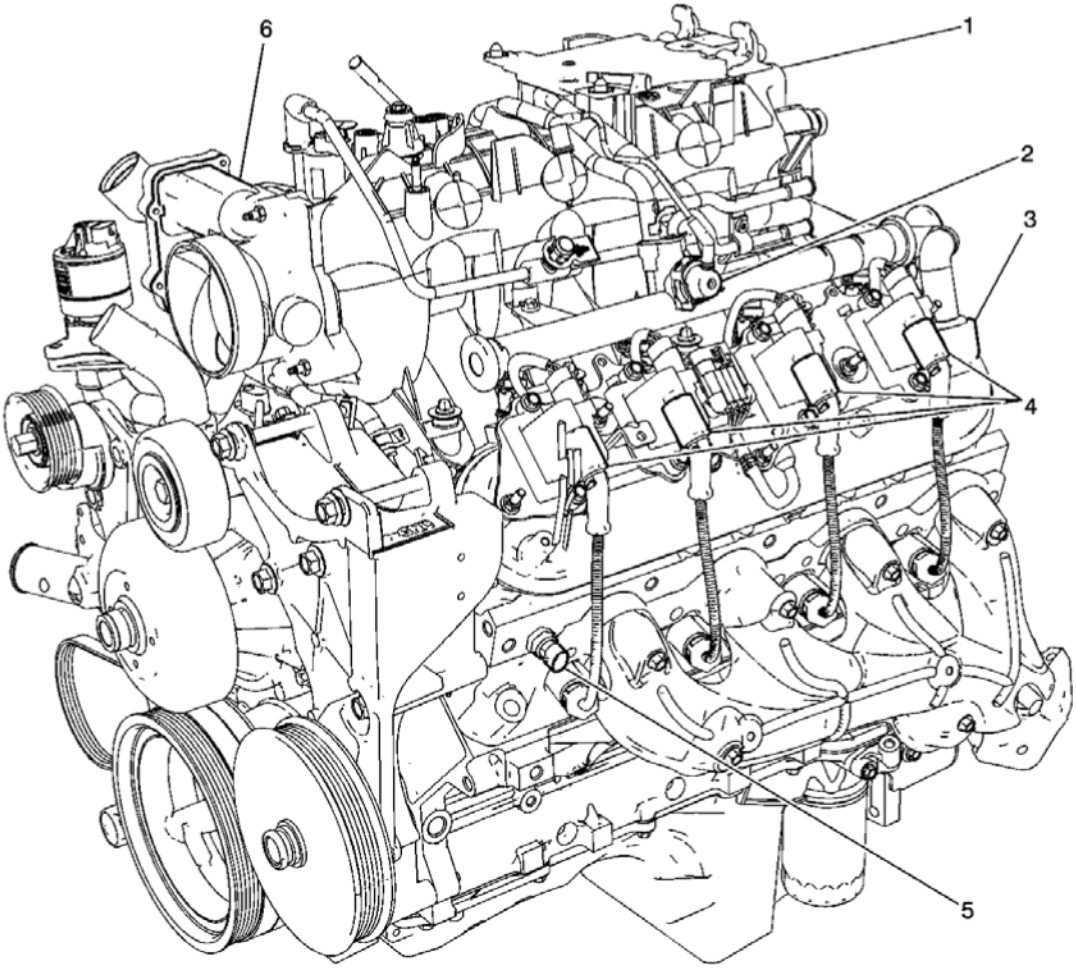


Fig. 6: Engine View - Left Side Component View (5.3L, 6.0L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
1	Manifold Absolute Pressure (MAP) Sensor
2	Fuel Pressure Regulator
3	Positive Crankcase Ventilation (PCV) Valve
4	Left Bank Ignition Coils
5	Engine Coolant Temperature (ECT) Sensor
6	Throttle Body

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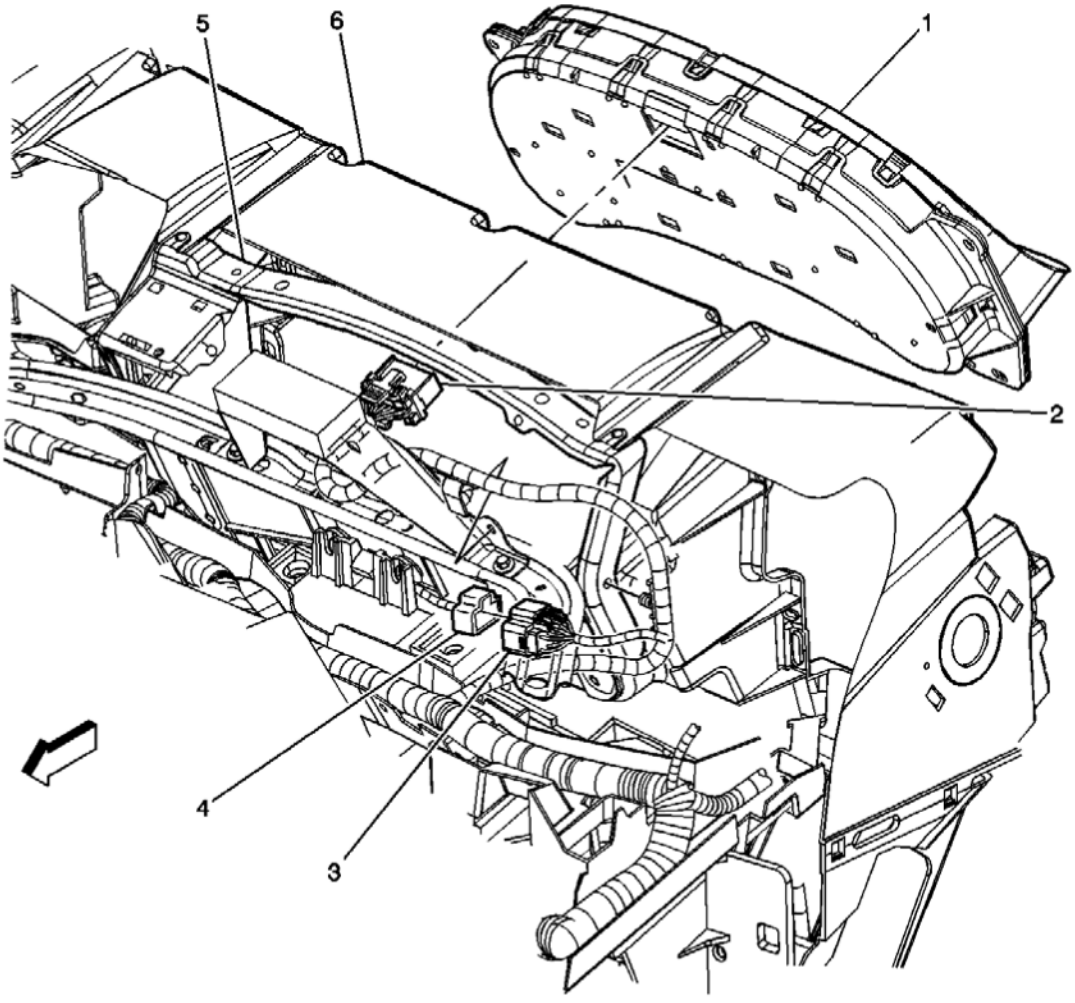


Fig. 7: Instrument Panel - Left Rear Top Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 7

Callout	Component Name
1	Instrument Cluster
2	Instrument Cluster Connector
3	C214-I/P Side
4	C214-Headliner Side
5	Instrument Cluster Brace
6	Instrument Panel

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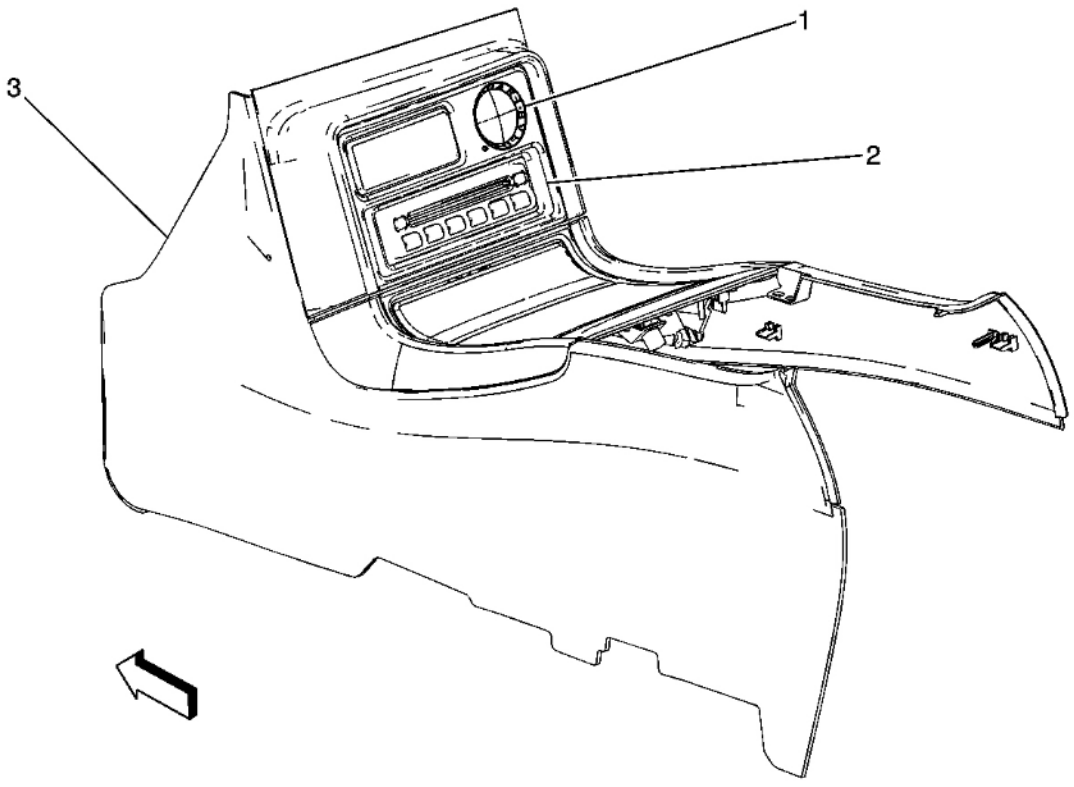


Fig. 8: Analog Clock Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 8

Callout	Component Name
1	Analog Clock
2	Remote Playback Device-CD Player
3	Console Extension

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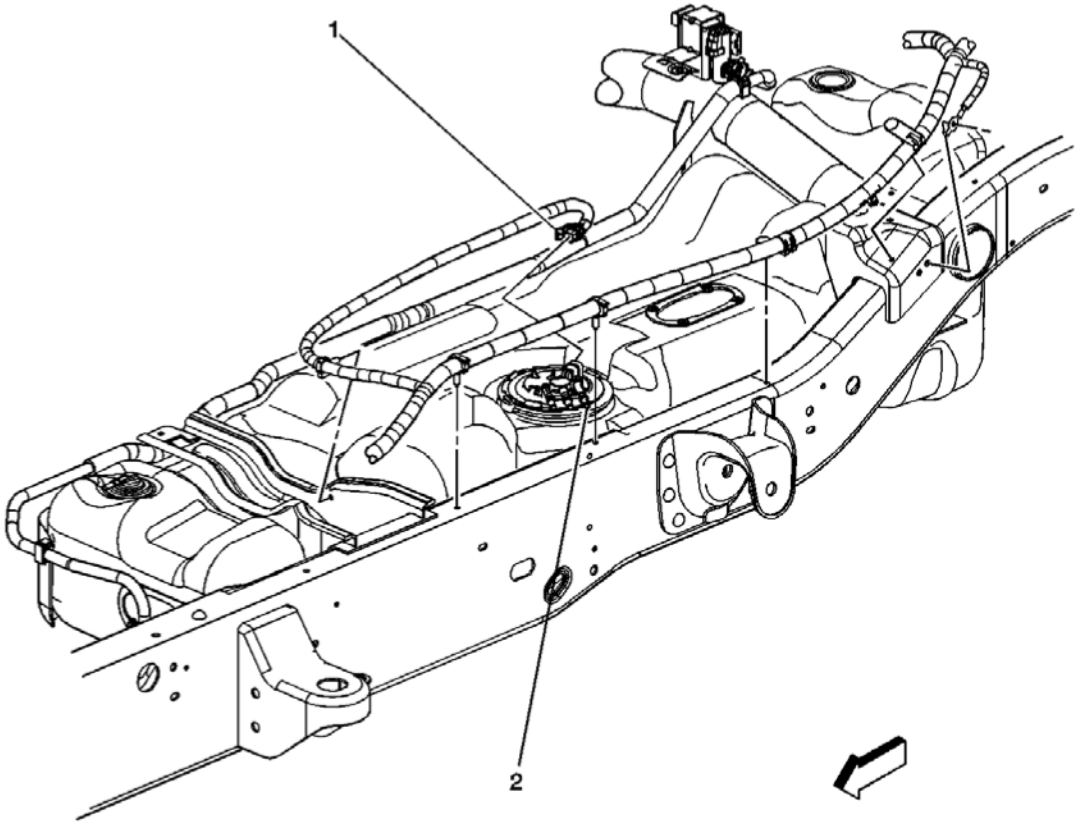


Fig. 9: Fuel Pump & Sender Assembly - Primary Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 9

Callout	Component Name
1	Fuel Pump and Sender Assembly-Primary Connector
2	Fuel Pump and Sender Assembly-Primary

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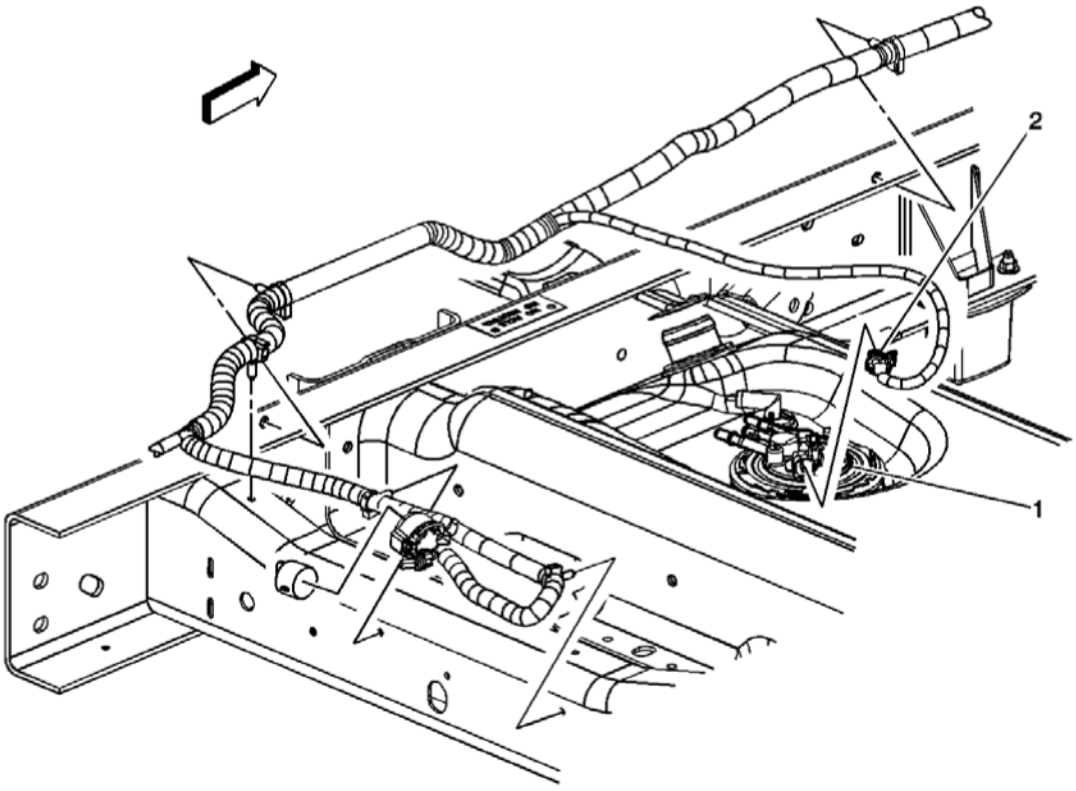


Fig. 10: Fuel Pump & Sender Assembly - Secondary Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 10

Callout	Component Name
1	Fuel Pump and Sender Assembly-Secondary
2	Fuel Pump and Sender Assembly-Secondary Connector

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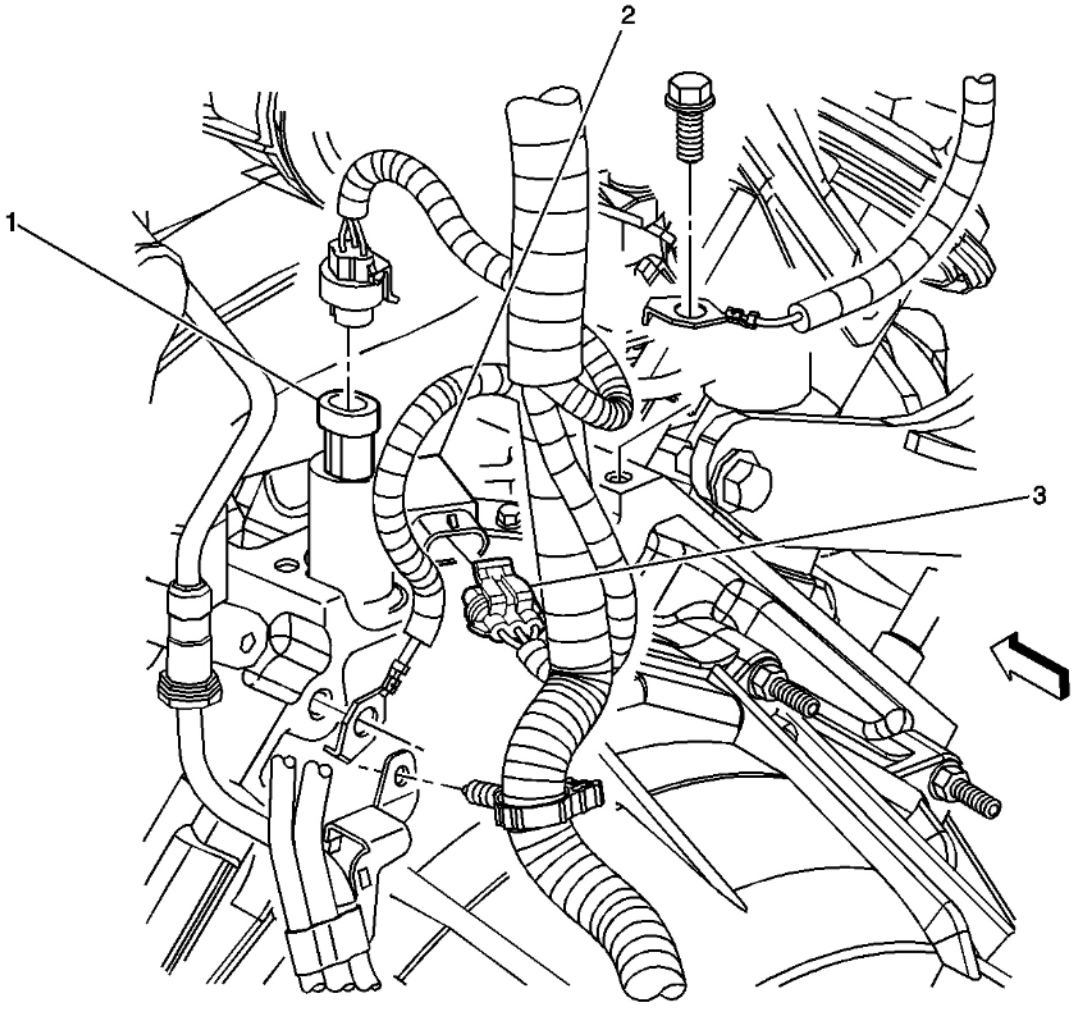


Fig. 11: Engine Oil Pressure (EOP) Sensor Component View (4.8L, 5.3L 6.0L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 11

Callout	Component Name
1	Engine Oil Pressure (EOP) Sensor
2	Camshaft Position (CMP) Sensor
3	Camshaft Position (CMP) Sensor Connector

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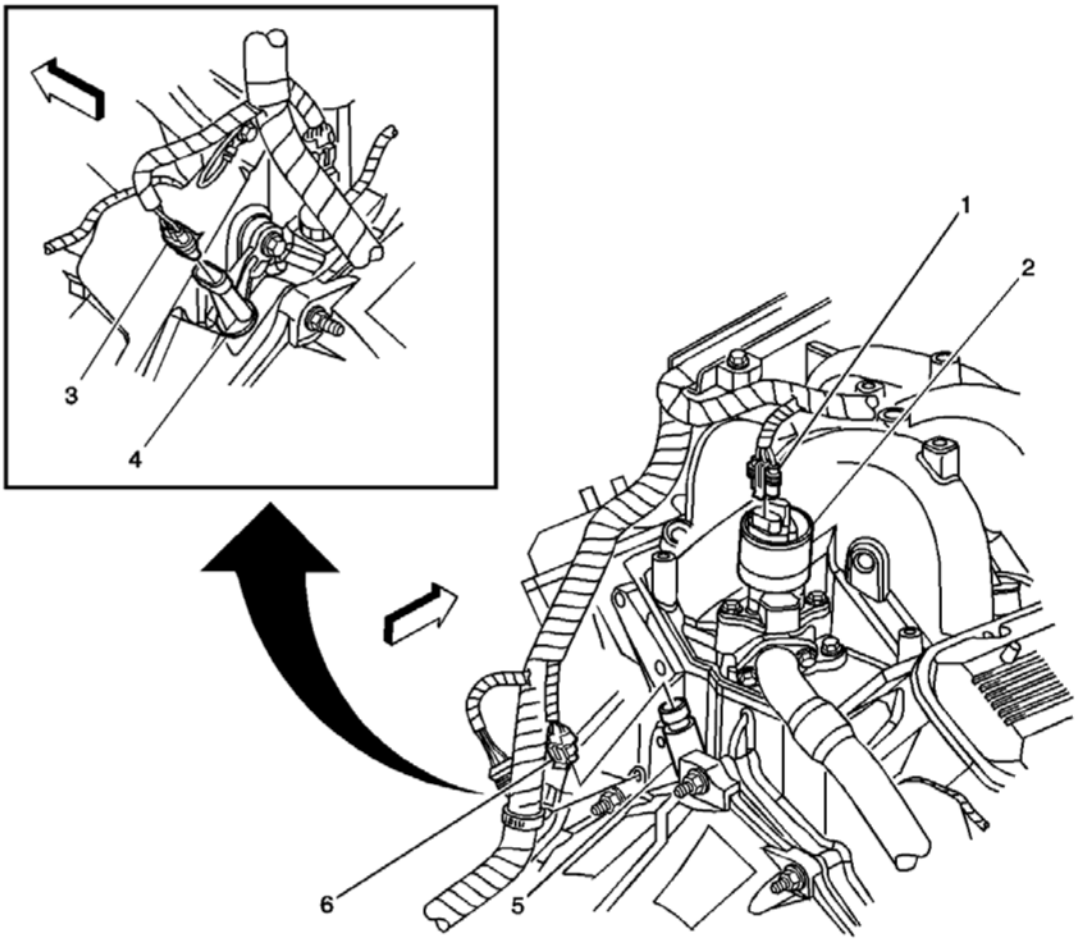


Fig. 12: Engine Oil Pressure (EOP) Sensor Component View (8.1L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 12

Callout	Component Name
1	Exhaust Gas Recirculation (EGR) Connector
2	Exhaust Gas Recirculation (EGR) Valve
3	Crankshaft Position (CKP) Sensor Connector
4	Crankshaft Position (CKP) Sensor
5	Engine Oil Pressure (EOP) Sensor
6	Engine Oil Pressure (EOP) Sensor Connector

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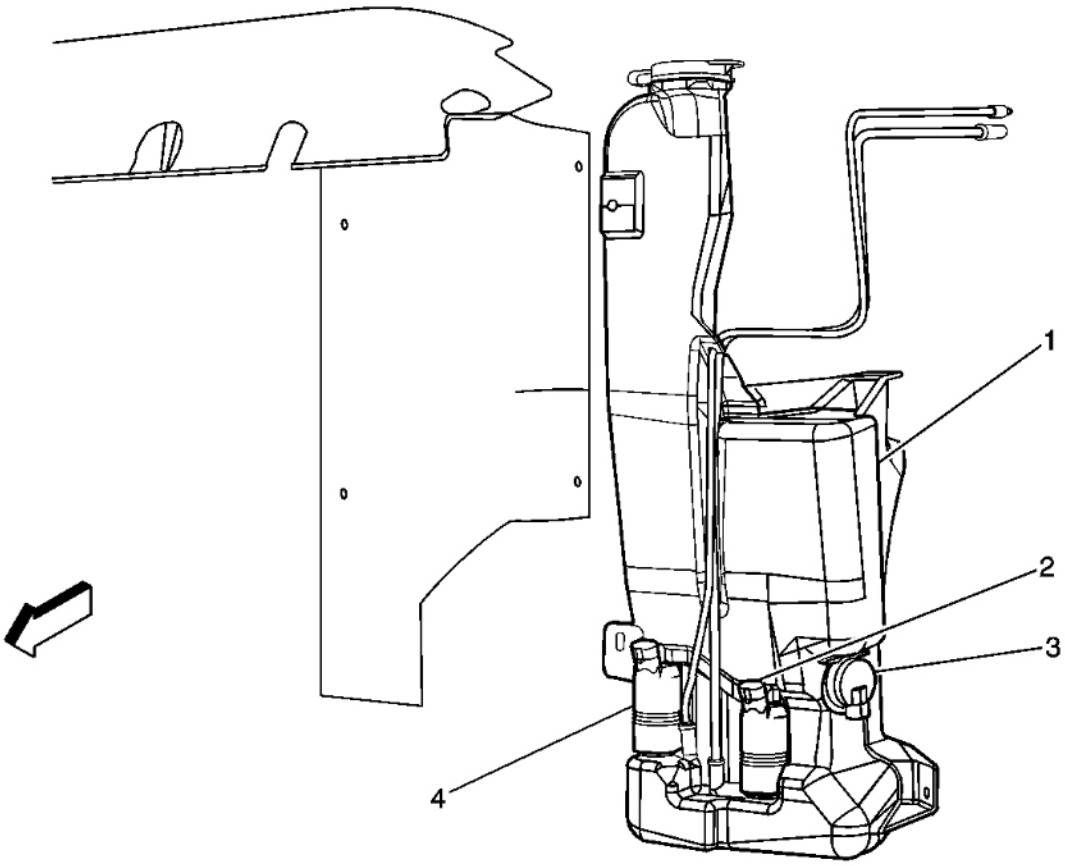


Fig. 13: LF Corner Of Vehicle Wiper/Washer Components View
Courtesy of GENERAL MOTORS CORP.

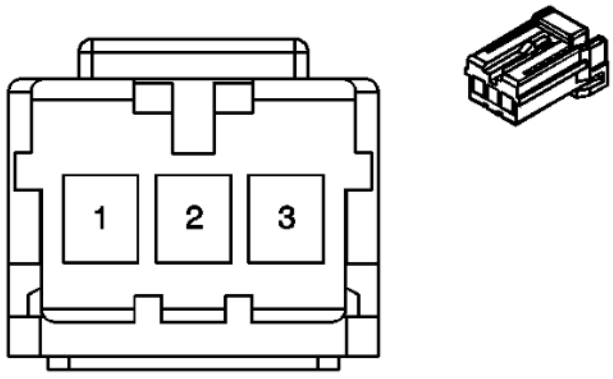
Callouts For Fig. 13

Callout	Component Name
1	Windshield Washer Reservoir
2	Windshield Washer Fluid Pump-Front
3	Washer Fluid Level Sensor
4	Windshield Washer Fluid Pump-Rear (C25)

INSTRUMENT PANEL, GAGES, AND CONSOLE CONNECTOR END VIEWS

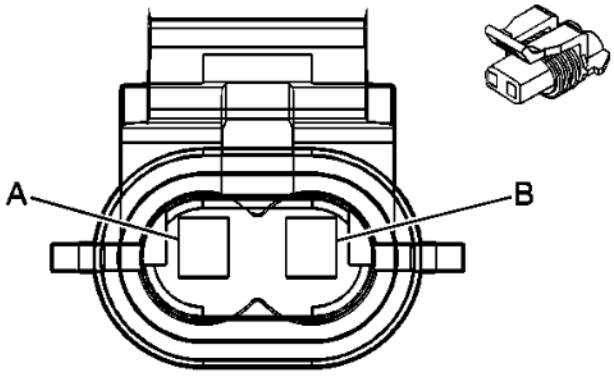
Analog Clock Terminal Identification (w/Z75)

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Connector Part Information		• 15368694 • 3-Way F	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	ORN	340	Battery Positive Voltage
2	BLK	1050	Ground
3	BRN/WHT	230	Instrument Panel Lamps Dimming Control

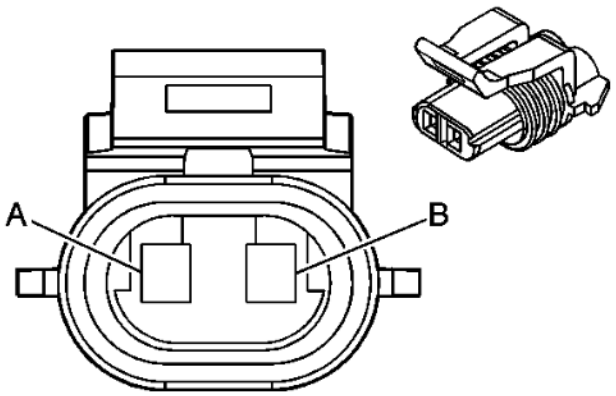
Coolant Level Switch Terminal Identification (8.1L)



Connector Part Information		• 15324243 • 2-Way F Metri-Pack 150 Series (GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	LT GRN	1478	Coolant Level Switch Signal
B	BLK	550	Ground

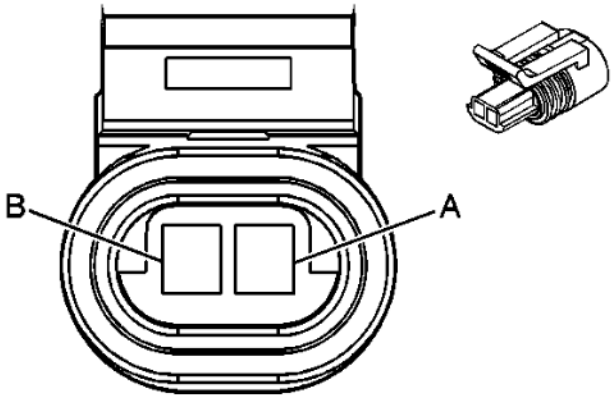
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Coolant Level Switch Terminal Identification (Except 8.1L)



Connector Part Information		• 12052644 • 2-Way F Metri-Pack 150 Series (GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	LT GRN	1478	Coolant Level Switch Signal
B	BLK	550	Ground

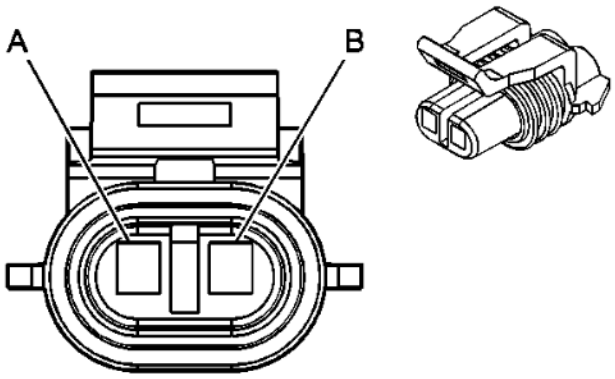
Engine Oil Level Switch Terminal Identification (8.1L)



Connector Part Information		• 15324478 • 2-Way F Metri-Pack 150 Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BRN	1174	Oil Level Switch Signal
B	BLK/WHT	451	Ground

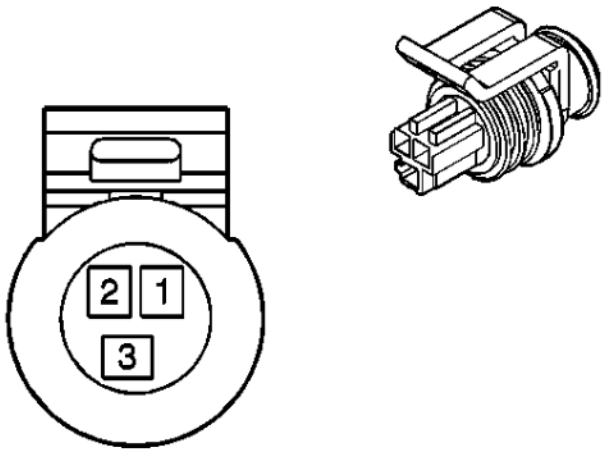
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Engine Oil Level Switch Terminal Identification (Except 8.1L)



Connector Part Information		• 12052641 • 2-Way F Metri-Pack 150 Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BRN	1174	Oil Level Switch Signal
B	BLK/WHT	451	Ground

Engine Oil Pressure (EOP) Sensor Terminal Identification

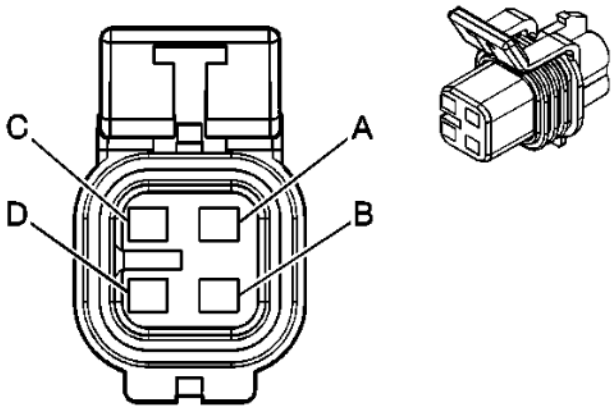


Connector Part Information		• 15344137 • 3-Way F GT 150 Series Sealed (LT GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	BLK	2755	Low Reference

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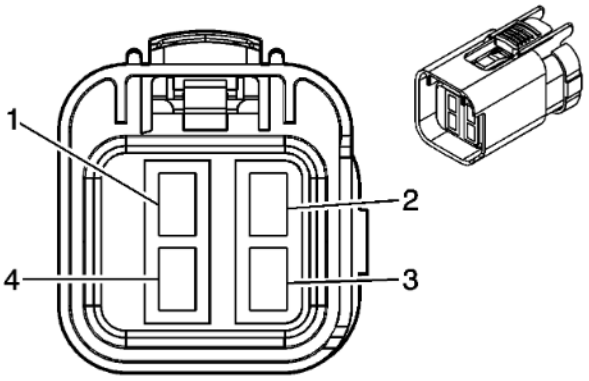
2	GRY	2705	5-Volt Reference
3	TAN/WHT	332	Oil Pressure Sensor Signal

Fuel Pump and Sender Assembly - Primary Terminal Identification (Tahoe/Yukon/Escalade)



Connector Part Information		• 12160482 • 4-Way F Metri-Pack 150 Series Sealed (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	PPL	1589	Fuel Level Sensor Signal - Primary
B	GRY	120	Fuel Pump Supply Voltage
C	BLK	2150	Ground
D	BLK	470	Low Reference

Fuel Pump and Sender Assembly - Primary Terminal Identification (L59)

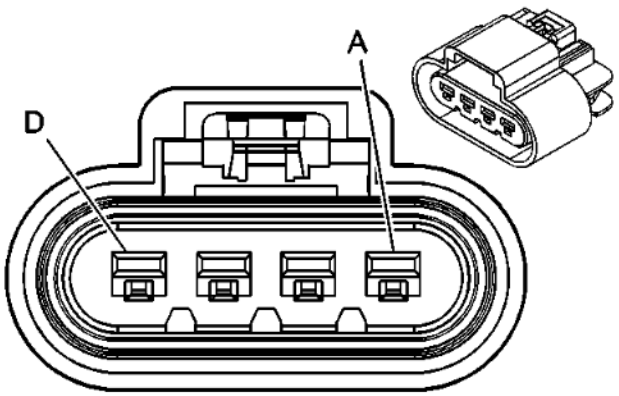


Connector Part Information		• 15324862 • 4-Way F ASM Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**

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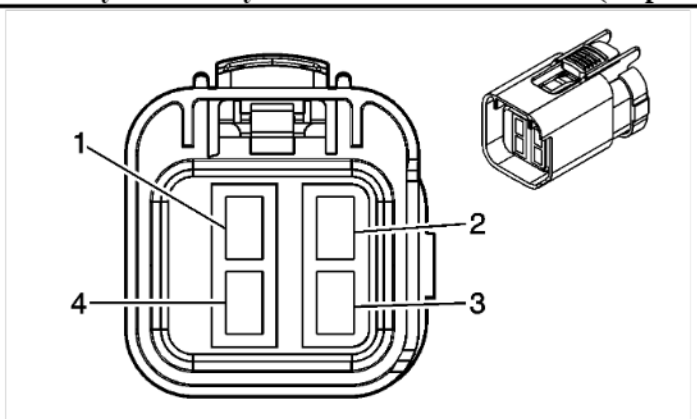
1	GRY	120	Fuel Pump Supply Voltage
2	BLK	470	Low Reference
3	BLK	2150	Ground
4	PPL	1589	Fuel Level Sensor Signal - Primary

Fuel Pump and Sender Assembly - Primary Terminal Identification (Suburban/Yukon XL/Avalanche/Escalade EXT)



Connector Part Information		• 15326631 • 4-Way F GT 280 Series Sealed (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK	2150	Ground
B	PPL	1589	Fuel Level Sensor Signal - Primary
C	BLK	470	Low Reference
D	GRY	120	Fuel Pump Supply Voltage

Fuel Pump and Sender Assembly - Primary Terminal Identification (Export Suburban/Yukon XL)

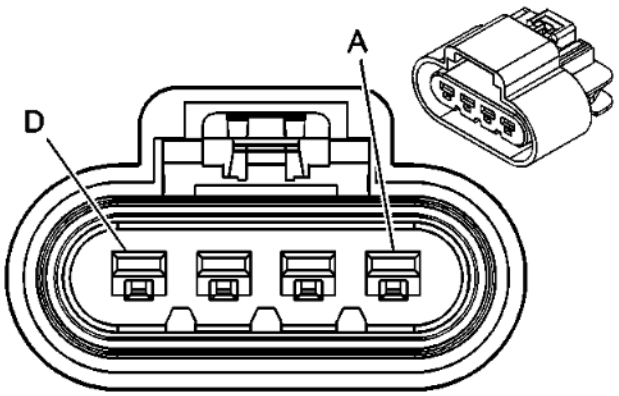


Connector Part Information	• 15324862

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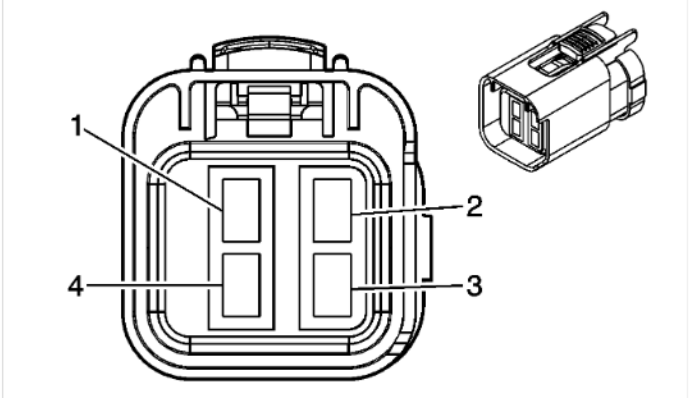
		• 4-Way F ASM Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	GRY	120	Fuel Pump Supply Voltage
2	PPL	1589	Fuel Level Sensor Signal - Primary
3	BLK	2150	Ground
4	BLK	470	Low Reference

Fuel Pump and Sender Assembly Terminal Identification (Suburban/Yukon XL/Avalanche)



Connector Part Information		• 15326631 • 4-Way F GT 280 Series Sealed (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK	2150	Ground
B	DK BLU	1936	Fuel Level Sensor Signal - Secondary
C	BLK	470	Low Reference
D	LT GRN	1058	Fuel Balance Pump Supply Voltage

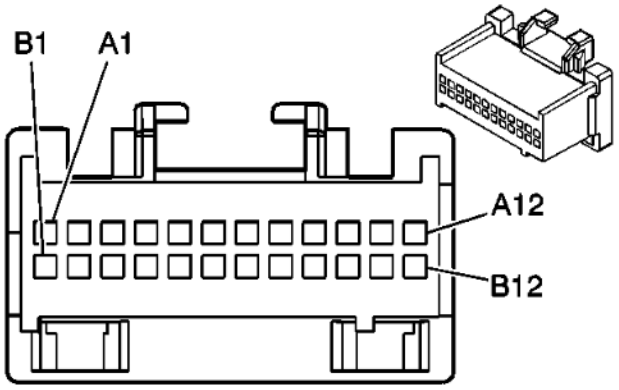
Fuel Pump/Sender Assembly - Secondary Terminal Identification (Export Suburban/Yukon XL)



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Connector Part Information		• 15324862 • 4-Way F ASM Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	LT GRN	1058	Fuel Balance Pump Supply Voltage
2	DK BLU	1936	Fuel Level Sensor Signal
3	BLK	2150	Ground
4	BLK	470	Low Reference

Instrument Panel Cluster (IPC) Terminal Identification



Connector Part Information		• 12110088 • 24-Way F Micro-Pack 100 Series (GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A1	BRN/WHT	419	MIL Control
A2	-	-	Not Used
A3	BLK/WHT	174	Low Washer Fluid Indicator Supply Voltage
A4	DK GRN/WHT	817	Vehicle Speed Signal
A5	WHT	121	Engine Speed Signal
A6	GRY	1036	IPC Class 2 Serial Data
A7	-	-	Not Used
A8	DK BLU	2115	Right Turn Signal Lamps Supply Voltage
A9	-	-	Not Used
A10	DK GRN/WHT	1932	Transmission Shift Select Switch (Park) Signal
A11	RED	2353	Instrument Panel Lamps Dimming Supply Voltage
A12	BLK	1050	Ground
B1	LT BLU	2114	Left Turn Signal Lamps Supply Voltage

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B2-B3	-	-	Not Used
B4	ORN	1816	DIC Mode Switch Signal
B5	DK BLU	894	DIC Toggle Switch Signal
B6	DK GRN/WHT	1358	DIC Switch Signal
B7	YEL	1327	DIC Fuel Signal
B8	-	-	Not Used
B9	PNK	639	Ignition 1 Voltage (w/o 8S8)
	PNK	739	Ignition 1 Voltage (w/ 8S8)
B10	-	-	Not Used
B11	ORN	2840	Battery Positive Voltage (w/o 8S8)
	ORN	4540	Battery Positive Voltage (w/ 8S8)
B12	BLK/WHT	1851	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - INSTRUMENT PANEL, GAGES AND CONSOLE

Begin the system diagnosis with **Diagnostic System Check - Instrument Cluster**, **Diagnostic System Check - Driver Information Systems** or **Diagnostic System Check - Audible Warnings**. The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system
- The ability of the control module(s) to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

Begin the audible warning system diagnosis by reviewing the system operation. Reviewing the operation information will help you determine the correct symptom diagnostic procedure when an audible warning malfunction exists. Reviewing the operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Instrument Panel, Gages and Console** in order to identify the correct procedure for diagnosing the audible warning system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - INSTRUMENT CLUSTER

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

4: The symptom list in Symptoms will determine the correct diagnostic procedure to use.

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5: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Instrument Cluster

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules: • Transfer Case Electronic Control (TREC) • Body Control Module (BCM) • Electronic Brake Control Module (EBCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) • Sensing and Diagnostic Module (SDM) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	**IMPORTANT:** **The engine may start during the following step. Turn the engine OFF as soon as you have observed the Crank Power mode.** 1. Access the Class 2 Power Mode in the Diagnostic Circuit Check on the scan tool. 2. Rotate the ignition switch through all positions while observing the Ignition Switch Power Mode parameter. Does the Ignition Switch parameter reading match the ignition switch position for all switch positions?	Go to **Step 4**	Go to **Power Mode Mismatch** in Body Control System
4	Select the display DTCs function on the scan tool for the following control modules: • Transfer Case Electronic Control (TREC) • Body Control Module (BCM) • Electronic Brake Control Module (EBCM) • Instrument Panel Cluster (IPC)		

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	• Powertrain Control Module (PCM) • Sensing and Diagnostic Module (SDM) Does the scan tool display any DTCs for the control modules listed above?	Go to **Step 5**	Go to **Symptoms - Instrument Panel, Gages and Console**
5	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 6**
6	Does the scan tool display DTC B1000 or B1440?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 7**
7	Does the scan tool display DTC P0562, P0563, P0615, P1637 or P1638?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

DIAGNOSTIC SYSTEM CHECK - DRIVER INFORMATION SYSTEMS

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The symptom list in Symptoms will determine the correct diagnostic procedure to use.

4: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Driver Information Systems

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules:		

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2	• Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	Select the display DTCs function on the scan tool for the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool display any DTCs for the control modules listed above?	Go to **Step 4**	Go to **Symptoms - Instrument Panel, Gages and Console**
4	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 5**
5	Does the scan tool display DTC B1000 or B1440?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 6**
6	Does the scan tool display DTC P0562, P0563, P0615, P1637 or P1638?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

DIAGNOSTIC SYSTEM CHECK - AUDIBLE WARNINGS

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The symptom list in Symptoms will determine the correct diagnostic procedure to use.

4: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

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Diagnostic System Check - Audible Warnings

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	Select the display DTCs function on the scan tool for the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool display any DTCs for the control modules listed above?	Go to **Step 4**	Go to **Symptoms - Instrument Panel, Gages and Console**
4	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 5**
5	Does the scan tool display DTC B1000 or B1440?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 6**
6	Does the scan tool display DTC P0562, P0563, P0615, P1637 or P1638?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

SCAN TOOL OUTPUT CONTROLS

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Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
IPC Gages	-	The IPC drives all gages to the maximum physical position when you select On. The IPC drives all gages to the minimum physical position when you select Off.
Lamp Test	-	The IPC illuminates the following indicators when you select On: • ABS • Air Bag • Battery • Brake • Cargo Lamp On • CRUISE • Fasten safety belt • Four Wheel Drive • High beam • Low Fuel • Overdrive Disable • SECURITY • SERVICE ENGINE SOON • Tire Pressure Low • Tow/Haul • Traction Off • Upshift • Wait to Start The indicators should illuminate until commanded Off.
PRNDL Display	-	An underscore illuminates under each indicator in the PRNDL display until commanded Off.
Segments Test	-	All DIC and Odometer segments illuminate until commanded Off.

SCAN TOOL DATA LIST

The scan tool data lists contain all the instrument panel, gages, and console related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The data list column indicates the location of the parameter within the scan tool menu selections.

Use the scan tool data lists as directed by a diagnostic table or in order to supplement the diagnostic procedures.

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Begin all of the diagnostic procedures with **Diagnostic System Check - Instrument Cluster**, **Diagnostic System Check - Driver Information Systems** or **Diagnostic System Check - Audible Warnings**.

Use the scan tool data lists only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom procedure indicated by the diagnostic system check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions specified in the first row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Audio Amplifier Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition in RUN, Radio ON			
Balance	Data	Value	-50 to +50
Battery Voltage	Data	Volts	0-18V
Chime Volume	Data	Percent	0-100%
Fade	Data	Value	-50 to +50
Volume	Data	Percent	0-100%

Body Control Module (BCM) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/High Beams Off/Doors Closed/Trunk Closed/Park Brake Unapplied/Seatbelt Buckled			
Battery Voltage	Data	Volts	0-18V
Cargo Door Ajar Switch	Inputs	Open/Closed	Closed
Cargo Lamp Switch	Inputs	On/Off	Off
Courtesy Lamp Switch	Inputs	Active/Inactive	Inactive
Driver Door Ajar Switch w/o DDM	Inputs	On/Off	Off
Hazard Switch Signal	Outputs	On/Off	Off
Headlamp Switch	Inputs	Active/Inactive	Inactive
Headlamps On Indicator	Outputs	On/Off	Off
High Beam Relay	Outputs	On/Off	Off
High Beam Switch	Inputs	On/Off	Off
Hood Ajar Switch	Inputs	Active/Inactive	Inactive
Key In Ignition	Inputs	Yes/No	Yes
Left Rear Cargo Door Ajar Switch	Inputs	On/Off	Off
Low Beam Output	Outputs	On/Off	Off
Park Brake Switch	Inputs	Set/Released	Released
Park Lamp Relay	Outputs	On/Off	Off

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Park Lamp Switch	Inputs	Active/Inactive	Inactive
Passenger Door Ajar Switch w/o PDM	Inputs	On/Off	Off
RAP Relay	Outputs	On/Off	On
Right Rear Door Ajar Switch	Inputs	On/Off	Off

Chime Module Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/High Beams Off/Doors Closed/Trunk Closed/Park Brake Unapplied/Seatbelt Buckled			
Ign. Since Current DTC	Data	Cycles	0-255
Chime Duration	Data	Cycles	Varies
Chime	Data	On/Off	Off
Chime Type	Data	Fast/Medium/Slow	Varies
Chime Frequency	Data	Hz	Varies
Indicator Type	Data	On/Off	Varies

Instrument Panel Cluster (IPC) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Seat Belt Buckled/High Beams OFF/Park Brake Unapplied/Park Lamps ON			
8- Digit GM Part Number	Module Information 1	-	-
ABS Lamp	Input/Output	On/Off	Off
Air Bag Lamp	Input/Output	On/Off	Off
Battery	Input/Output	On/Off	On
Battery Voltage	Data 1	Volts	9.0-16 V (Varies)
Brake Assist (if equipped)	Input/Output Data 1	Active/Inactive	Inactive
Brake Lamp	Input/Output	On/Off	Off
Cargo Lamp On	Input/Output	On/Off	Off
Cruise Control	Input/Output	On/Off	Off
DIC Fuel Info	Input/Output	On/Off	Off
DIC Personalization	Input/Output	On/Off	Off
DIC Select	Input/Output	On/Off	Off
DIC Trip Info.	Input/Output	On/Off	Off
Display Dimming	Input/Output	Active/Inactive	Inactive
Display Units	Input/Output	Metric/English	English
Displayed Coolant Temp	Data 1	Celsius (Fahrenheit)	32-127°C (89-260°F) (Varies)

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Displayed Fuel Level	Data 1	Percent	0-100% (Varies)
Displayed Odometer	Data 2	Kilometers (Miles)	Varies with the mileage of vehicle
Displayed Oil Pressure	Data 1	kPa (psi)	0 kPa (0 psi)
Displayed Trans Oil Temp	Data 1	Celsius (Fahrenheit)	29-157°C (84-315°F) (Varies)
Engine Speed	Data 1	RPM	0 RPM
Fasten Seat Belt	Input/Output	On/Off	Off
High Beam Lamp	Inputs	On/Off	Off
Hour Meter	Data 1	Hours	Varies
Ignition 1	Data 1	Volts	9.0-16 V (Varies)
Ign. Since Current DTC	Data 1	Cycles	0-255
Julian Date of Build	Module Information 1	Numeric	Varies
Language	Input/Output	English/French/Spanish/German/Arabic	English
Left Turn Input	Input/Output	Open/Closed	Open
Low Fuel Lamp	Input/Output	On/Off	Off
Low Washer Fluid	Input/Output	On/Off	Off
Monitored Coolant Temp	Data 1	Celsius (Fahrenheit)	82-93°C (180-200°F)
Monitored Fuel Level	Data 1	Percent	0-100% (Varies)
Monitored Oil Pressure	Data 1	kPa (psi)	0 kPa (0 psi)
Over Drive Defeat	Input/Output	Active/Inactive	Inactive
PRNDL State	Inputs	Park / Reverse / Neutral / First / Second / Third / Drive	Park
Right Turn Input	Input/Output	Open/Closed	Open
Security Lamp	Input/Output	On/Off	Off
Service 4WD	Input/Output	On/Off	Off
Software Part Number	Module Information 2	Numeric	Varies
Software Revision Number	Module Information 2	Numeric	Varies
Tow/Haul	Input/Output	On/Off	Off
Trip Odometer A	Data 2	Miles (Kilometers)	Varies
Trip Odometer B	Data 2	Miles (Kilometers)	Varies
Trip Reset Switch	Inputs	Active/Inactive	Inactive
Upshift Lamp	Input/Output	On/Off	Off
Vehicle Speed	Data 1	Miles (Kilometers)	0 km/h (0 mph)

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Year Model Built	Module Information 1	Numeric	Varies

Driver Door Module (DDM)/Passenger Door Module (PDM) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine OFF/Vehicle in PARK/All doors closed			
Battery 1 (Low Current)	Data	Volts	12.8 V
Battery 2 (High Current)	Data	Volts	12.8 V
Door Ajar Switch	Inputs	On/Off	Off

Powertrain Control Module (PCM) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Engine Idling/Normal Operating Temperature			
ECT Sensor	Engine Data 1 Engine Data 2 Enhanced EVAP Data Fuel Trim Data HO2S Data Misfire Data	Celsius (Fahrenheit)	85-105°C (185-220° F) (Varies)
Coolant Level Switch	Engine Data 2	OK/Low	OK
Engine Oil Level Switch	Engine Data 2	OK/Low	OK
Engine Oil Life Remaining	Engine Data 2	Percent	0-100% (Varies)
Engine Oil Pressure Sensor	Engine Data 2	Volts	0-5 Volts (Varies)
Engine Speed	Cruise Control Data Engine Data 1 Engine Data 2 Enhanced EVAP Data Fuel Trim Data HO2S Data TAC Data	RPM	+/-100 RPM from Desired Idle Speed
Fuel Level Sensor	Engine Data 1 Enhanced EVAP Data	Volts	0-5 Volts (Varies)
Fuel Level Sensor Rear Tank (If Equipped)	Engine Data 1 Enhanced EVAP Data	Volts	0-5 Volts (Varies)
Fuel Tank Level Remaining	Enhanced EVAP Data	Gallons (Liters)	Varies
Fuel Tank Level Remaining	Enhanced EVAP Data	Percent	0-100% (Varies)
	Enhanced EVAP		

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Fuel Tank Rated Capacity	Data	Gallons (Liters)	Varies
Ignition 1 Signal	Cruise Control Data Engine Data 1 Engine Data 2 Enhanced EVAP Data Fuel Trim Data TAC Data	Volts	9-16 V (Varies)
Low Oil Lamp Command	Engine Data 2	On/Off	Off
MIL (Malfunction Indicator Lamp) Command	Engine Data 2	On/Off	Off
Reduced Engine Power	Engine Data 1	Active/Inactive	Inactive
Trans. Fluid Temp	Trans Data	Celsius (Fahrenheit)	85-105°C (185-220° F) (Varies)
Vehicle Speed Sensor	Cruise Control Data Engine Data 1 Engine Data 2 Enhanced EVAP Data Fuel Trim Data HO2S Data Misfire Data TAC Data	Miles per hour (Kilometers per hour)	0 km/h (0 mph)

Radio Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition in RUN, Radio ON			
Balance	Data	Value	-50 to +50
Battery Voltage	Data	Volts	0-18V
Chime Type	Outputs	None/Headlamp/Turn Signal/Key in Ignition/Seat Belt/ Park Brake	None
Fade	Data	Value	-50 to +50
Personalization	Inputs	Fuel/Trip/Re/Set/Fuel Econ	Varies
Volume	Data	Percent	0-100%

SCAN TOOL DATA DEFINITIONS

8-Digit GM Part Number

The scan tool displays the part number of the control module.

ABS Lamp

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The scan tool displays On or Off. This is the state of the ABS indicator as commanded by the IPC.

Air Bag Lamp

The scan tool displays On or Off. The state of the air bag indicator as commanded by the IPC.

Balance

The scan tool displays 0-100%. The amount of left to right balance selected.

Battery

The scan tool displays On or Off. This is the state of the charge indicator as commanded by the IPC.

Battery 1 Low Current

The scan tool displays 0-18 volts. The voltage measured at the battery positive voltage circuit of the driver/passenger door module.

Battery 2 High Current

The scan tool displays 0-18 volts. The voltage measured at the battery positive voltage circuit of the driver/passenger door module.

Battery Voltage

The scan tool displays 0-18 volts. This is the voltage at the battery positive voltage circuit of the BCM.

Battery Voltage

The scan tool displays 0-18 volts. The battery voltage as monitored by the IPC.

Brake Assist

The scan tool displays Active or Inactive. This is the state of the brake assist as monitored by the IPC.

Brake Lamp

The scan tool displays On or Off. This is the state of the BRAKE indicator as commanded by the IPC.

Cargo Door Ajar Switch

The scan tool displays Open or Closed. The BCM monitors the signal circuit of the cargo door ajar switch. An open switch is displayed as Open with the door open.

Cargo Lamp On

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The scan tool displays On or Off. This is the state of the cargo lamp as commanded by the IPC.

Cargo Lamp Switch

The scan tool displays On or Off. The scan tool displays On when the cargo lamps are requested from the switch.

Chime

The scan tool displays the commanded state of the audible chime. The scan tool displays NONE when no audible chime is commanded. The scan tool displays HEAD LAMP, KEY IN IGNITION, SEAT BELT, TURN SIGNAL and PARK BRAKE as commanded.

Chime Duration

The scan tool displays the chime rate in cycles corresponding to whether the chime is a fast, medium, or slow rate chime.

Chime Frequency

The scan tool displays the frequency of the chime in Hertz.

Chime Type

The scan tool displays Fast/Medium/Slow. The selected chime rate is displayed

Chime Type

The scan tool displays the commanded state of the audible chime. The scan tool displays NONE when no audible chime is commanded. The scan tool displays HEAD LAMP, KEY IN IGNITION, SEAT BELT, TURN SIGNAL and PARK BRAKE as commanded.

Chime Volume

The scan tool displays 0-100%. The chime volume selected.

Coolant Level Switch

The scan tool displays OK or Low. The PCM monitors the coolant level switch signal circuit and a closed switch is displayed as OK.

Courtesy Lamp Switch

The scan tool displays Active or Inactive. The BCM monitors the signal circuit of the courtesy lamp switch. A closed switch is displayed as Active.

Cruise Control

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The scan tool displays On or Off. The state of the cruise control indicator as commanded by the IPC.

DIC Fuel Info

The scan tool displays On or Off. The IPC monitors the Fuel button of the DIC switch. A closed switch is displayed as On.

DIC Personalization

The scan tool displays On or Off. The IPC monitors the personalization button of the DIC switch. A closed switch is displayed as On.

DIC Select

The scan tool displays On or Off. The IPC monitors the Select button of the DIC switch. A closed switch is displayed as On.

DIC Trip Info

The scan tool displays On or Off. The IPC monitors the Trip button of the DIC switch. A closed switch is displayed as On.

Display Dimming

The scan tool displays Active or Inactive. The IPC monitors the display dimming signal circuit. When the panel dimmer switch is turned Off the signal is displayed as Inactive.

Display Units

The scan tool displays what units is being displayed on the DIC, English or Metric.

Displayed Coolant Temp

The scan tool displays 32-127°C (89-260°F). This is the displayed coolant temperature gage data. This data may differ from the monitored coolant temperature from the PCM.

Displayed Fuel Level

The scan tool displays 0- 100%. This is the displayed fuel gage data. The data may differ from the monitored fuel level in the PCM.

Displayed Odometer

The scan tool displays 0- 999999 km (miles). The scan tool displays the data on the odometer in the IPC.

Displayed Oil Pressure

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The scan tool displays 0-682 kPa (0-99 psi). The displayed oil pressure gage value in the IPC.

Displayed Trans Oil Temp

The scan tool displays 29-157°C (84-315°F). This is the displayed transmission oil gage data. The data may differ from the monitored trans oil temperature from the PCM.

Displayed Trip Odometer

The scan tool displays 9999.9 km (miles). The scan tool displays the data on the trip odometer in the IPC.

Door Ajar Switch

The scan tool displays On or Off. The DDM/PDM monitors the signal circuit of the door ajar switch. An open switch is displayed as On with the door open.

Driver Door Ajar Switch

The scan tool displays On or Off. The BCM monitors the signal circuit of the driver door ajar switch. An open switch is displayed as On with the door open.

ECT Sensor

The scan tool displays -39 to +140°C (-38 to +284°F). This is the engine coolant temperature as monitored by the PCM. The voltage is inversely proportional to the engine coolant temperature.

Engine Oil Level Switch

The scan tool displays OK or Low. This is the state of the engine oil level switch as monitored by the PCM. A closed switch is displayed as OK.

Engine Oil Life Remaining

The scan tool displays 0 to 100 percent. This is the engine oil life index that is calculated and maintained by the PCM.

Engine Oil Pressure Sensor

The scan tool displays 0 to 5 volts. The PCM monitors the engine oil pressure sensor signal circuit where a low voltage indicates low pressure.

Engine Speed

The scan tool displays 0-9999 RPM. Engine speed is computed by the PCM from the 3X reference input. It should remain close to desired idle under various engine loads with the engine idling.

Engine Speed

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The scan tool displays 0-9999 RPM. The IPC receives the engine speed from the PCM via the engine speed signal circuit.

Fade

The scan tool displays 0-252 counts. The amount of front to rear fade selected.

Fasten Seat Belt

The scan tool displays On or Off. This is the state of the fasten safety belt indicator as commanded by the IPC.

Fuel Capacity

The scan tool displays Gallons. The DIC receives a class 2 message from the PCM indicating the fuel capacity.

Fuel Level Sensor

The scan tool displays 0 to 5 volts. The PCM monitors the fuel level sensor signal circuit where 0 V is an empty tank.

Fuel Level Sensor Rear Tank (If Equipped)

The scan tool displays 0 to 5 volts. The PCM monitors the rear tank fuel level sensor signal circuit where 0 V is an empty tank.

Fuel Tank Level Remaining

The scan tool displays gallons (liters). This is the amount of fuel remaining in the fuel tank as determined by the PCM.

Fuel Tank Level Remaining

The scan tool displays 0 to 100%. The scan tool displays in percentage the amount of fuel remaining in the fuel tank as determined by the PCM.

Fuel Tank Rated Capacity

The scan tool displays gallons (liters). This is the fuel tank rated capacity as determined by the PCM.

Hazard Switch Signal

The scan tool displays On or Off. The BCM monitors the hazard switch signal circuit. When the hazard switch is turned Off the signal is displayed as Off.

Headlamp Relay Feedback

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The scan tool displays On or Off. This is the state of the headlamp and the panel dimmer switch. The scan tool displays On when the headlamp and the panel dimmer switch is turned On or in auto position with the ambient light sensor in its dark state.

Headlamp Switch

The scan tool displays Active or Inactive. The BCM monitors the signal circuit of the headlamp switch. A closed switch is displayed as Active.

Headlamps On Indicator

The scan tool displays Off or On. Indicates if the headlamps on indicator is currently On.

High Beam Lamp

The scan tool displays On or Off. This is the state of the high beam indicator as commanded by the IPC.

High Beam Relay

The scan tool displays the commanded state of the high beam relay. The scan tool displays On when the BCM allows the high beam relay to go to ground to activate the high beam lamps.

High Beam Switch

The scan tool displays On or Off. This is the position of the high beam switch where an active switch is displayed as On.

Hood Ajar Switch

The scan tool displays Active or Inactive. The BCM monitors the signal circuit of the hood ajar switch. An open switch is displayed as Active with the hood Open.

Hour Meter

The scan tool displays 0-10,000 hours. This is the PCM accumulated engine run time hours provided to the IPC via the class 2 serial data link.

Ign. Since Current DTC

The scan tool displays 0-50. The IPC counts the number of times the ignition is cycled since the current DTC was set.

Ignition 1

The scan tool displays Active or Inactive. The scan tool displays Active when the ignition switch is in the RUN or CRANK position

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Ignition 3

The scan tool displays Active or Inactive. The scan tool displays Active when the ignition switch is in the RUN position only.

Ignition 1 Signal

The scan tool displays 0 to 16 V. The ignition 1 signal represents the system voltage detected by the PCM at the ignition voltage circuit.

Indicator Type

The scan tool displays On or Off. The IPC determines when to illuminate and what indicator to illuminate based on the class 2 message from the chime module.

Julian Date of Build

The scan tool displays the date upon which the instrument panel cluster (IPC) was manufactured.

Key In Ignition

The scan tool displays Yes or No. The BCM monitors the signal circuit of the ignition key alarm switch. The scan tool displays Yes when the ignition key is fully inserted into the ignition switch cylinder.

Language

The scan tool displays what language is being displayed on the DIC.

Left Rear Cargo Door Ajar Switch

The scan tool displays On or Off. The BCM monitors the signal circuit of the left rear cargo door ajar switch. An open switch is displayed as On with the door open.

Left Turn Input

The scan tool displays Open or Closed. The IPC monitors the left turn signal supply voltage circuit. An active turn signal toggles between Open and Closed.

Low Beam Output

The scan tool displays On or Off. The BCM monitors the low beam output signal. When the low beam switch is turned Off the signal is displayed as Off.

Low Fuel Lamp

The scan tool displays On or Off. The IPC determines when to illuminate the indicator based on the class 2 message from the PCM indicating the fuel level percent.

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Low Oil Lamp Command

The scan tool displays On or Off. This the state of the low oil lamp command as monitored by the PCM.

Low Washer Fluid

The scan tool displays On or Off. The IPC monitors the windshield washer solvent level switch, where a closed switch with low washer fluid is displayed as On.

MIL (Malfunction Indicator Lamp) Command

The scan tool displays On or Off. This is the commanded state of the MIL (Malfunction Indicator Lamp) by the PCM.

Monitored Coolant Temp

The scan tool displays -40°C to +215°C (-40°F to +419°F). This is the PCM monitored coolant temperature data as provided to the IPC via the class 2 serial data link.

Monitored Fuel Level

The scan tool displays 0-100%. This is the PCM monitored fuel level percent as provided to the IPC via the class 2 serial data link.

Monitored Oil Pressure

The scan tool displays 0-682 kPa (0-99 psi). The IPC monitored oil pressure as provided by the PCM via the class 2 serial data link.

Over Drive Defeat

The scan tool displays Active or Inactive. This is the state of the over drive defeat indicator as commanded by the IPC.

Park Brake Switch

The scan tool displays Set or Released. The BCM monitors the park brake signal circuit, where a closed switch with the park brake applied is displayed as Set.

Park Lamp Relay

The scan tool displays the commanded state of the park lamp relay. The scan tool displays On when the BCM allows the park lamp relay to go to ground to activate the park lamps.

Park Lamp Switch

The scan tool displays Active or Inactive. The BCM monitors the signal circuit of the parklamp switch. A

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closed switch is displayed as Active.

Passenger Door Ajar Switch

The scan tool displays On or Off. The BCM monitors the signal circuit of the passenger door ajar switch. An open switch is displayed as On with the door open.

Personalization

The scan tool displays the commanded state of the DIC switches. The scan tool displays FUEL, TRIP, RE/SET, and FUEL ECON.

PRNDL State

The scan tool displays the PRNDL display of the vehicle. This is the state of the PRNDL range as communicated to the IPC by the PCM. The value of this data corresponds to the PRNDL display.

RAP Relay

The scan tool displays On or Off. This is the state of the RAP relay as monitored by the BCM.

Reduced Engine Power

The scan tool displays Inactive or Active. This is the state of the Reduced Engine Power indicator as monitored by the PCM.

Right Rear Door Ajar Switch

The scan tool displays On or Off. The BCM monitors the signal circuit of the right rear door ajar switch. An open switch is displayed as On with the door open.

Right Turn Input

The scan tool displays Open or Closed. The IPC monitors the right turn signal lamps supply voltage circuit. An active turn signal toggles between Open and Closed.

Security Lamp

The scan tool displays On or Off. This is the state of the security lamp indicator as commanded by the IPC in the message center.

Service 4WD

The scan tool displays On or Off. This is the state of the service 4WD indicator as commanded by the IPC.

Software Part Number

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The scan tool displays the software identification number (ID) in the IPC.

Software Revision Number

The scan tool displays the latest version of the software in the IPC.

Tow/Haul

The scan tool displays On or Off. This is the state of the Tow/Haul indicator as commanded by the IPC.

Trans. Fluid Temp

The scan tool displays -40°C to +215°C (-40°F to +419°F). This is the PCM monitored transmission fluid temperature data as provided to the IPC via the class 2 serial data link.

Trip Odometer A

The scan tool displays miles. The IPC calculates trip odometer information from the vehicle speed data received from the PCM.

Trip Odometer B

The scan tool displays miles. The IPC calculates trip odometer information from the vehicle speed data received from the PCM.

Trip Reset Switch

The scan tool displays Active or Inactive. The IPC monitors the TRIP RESET button of the DIC switch. A closed switch is displayed as Active.

Upshift Lamp

The scan tool displays On or Off. This is the state of the upshift lamp as commanded by the IPC.

Vehicle Speed Sensor

The scan tool displays kilometers per hour (miles per hour). The IPC receives the vehicle speed from the PCM 4 kppm vehicle speed signal circuit.

Vehicle Speed Sensor

The scan tool displays 0-255 km/h (0-159 mph). The PCM monitors the voltage at the signal circuit of the vehicle speed sensor. The voltage is proportional to the vehicle speed.

Volume

The scan tool displays 0-100%. The volume selected.

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Year Model Built

The scan tool displays 1990-2020. The production year the module was manufactured.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module(s)
B0540	**DTC B0540**	IPC
B0560	**DTC B0560**	IPC
B1372	**DTC B1372**	BCM
B2961	**DTC B2961**	BCM
P0461	**DTC P0461 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P0461 (5.3L Engine)**	PCM
P0462	**DTC P0462 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P0462 (5.3L Engine)**	PCM
P0463	**DTC P0463 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P0463 (5.3L Engine)**	PCM
P0522	**DTC P0522**	PCM
P0523	**DTC P0523**	PCM
P0608	**DTC P0608**	PCM
P0654	**DTC P0654**	PCM
P2066	**DTC P2066 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P2066 (5.3L Engine)**	PCM
P2067	**DTC P2067 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P2067 (5.3L Engine)**	PCM
P2068	**DTC P2068 (4.8L, 6.0L, and 8.1L Engines)** or **DTC P2068 (5.3L Engine)**	PCM
PXXXX	Refer to: • **Diagnostic Trouble Code (DTC) List** in Engine Controls - 4.8L, 5.3L and 6.0L • **Diagnostic Trouble Code (DTC) List** in Engine Controls - 8.1L	PCM

DTC B0540

Circuit Description

The IPC monitors the vehicle speed signal to determine the speedometer position. If the IPC determines the vehicle speed signal voltage is out of the normal operating range, a DTC will set.

Conditions for Running the DTC

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- The vehicle speed is more than 10 km/h (6 mph).
- The ignition voltage is between 9.0 and 18.0 volts.

Conditions for Setting the DTC

- The IPC detects that the commanded state of the driver and the actual state of the control circuit do not match.
- The condition above must be present for a minimum of 5 seconds.

Action Taken When the DTC Sets

- The IPC stores a DTC B0540 in memory.
- The speedometer defaults to 0 km/h (0 mph).
- No driver warning message will be displayed for this DTC.

Conditions for Clearing the DTC

- The history DTC clears after 100 malfunction free warm-up cycles.
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The IPC receives the clear code command from the scan tool.

DTC B0540

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views**			
1	Did you perform the IPC Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Raise the vehicle's drive wheels. Refer to **Lifting and Jacking the Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for an automatic transmission and third gear for a manual transmission. 5. With the scan tool, observe the Vehicle Speed Sensor parameter in the PCM Engine Data 1 data list. Does the Vehicle Speed Sensor parameter match the	Go to **Testing for Intermittent Conditions and Poor Connections**	

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	speedometer display?	in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the PCM connector C2. 3. Install the **J 33431-C** Signal Generator and Instrument Panel Tester lead to the vehicle speed signal circuit at the PCM harness connector, and the other lead to a good ground. See **Special Tools and Equipment**. 4. Turn the ignition ON, with the engine OFF. 5. Set the **J 33431-C** to generate a speedometer signal. See **Special Tools and Equipment**. Does the vehicle speedometer indicate a reading?	Go to **Step 5**	Go to **Step 4**
4	Test the vehicle speed signal circuit for an open, short to voltage or a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the PCM connector. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for a poor connection at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 9**	-
8	**IMPORTANT:** **Program the replacement IPC** **Replace the IPC. Refer to Instrument Panel Cluster (IPC) Replacement.**		-

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	Did you complete the replacement?	Go to **Step 9**	
9	1. Use the scan tool in order to clear the DTC's. 2. Operate vehicle within the conditions for running this DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC B0560

Circuit Description

The IPC monitors the engine speed signal to determine the tachometer position. If the IPC determines the engine speed signal voltage is out of the normal operating range, a DTC will set.

Conditions for Running the DTC

- The engine speed is greater than 800 RPM.
- The ignition voltage is greater than 9.0 volts, but less than 18 volts.

Conditions for Setting the DTC

- The IPC detects that the commanded state of the driver and the actual state of the control circuit do not match.
- The above condition is present for at least 5.0 seconds.

Action Taken When the DTC Sets

The IPC stores the DTC in memory.

Conditions for Clearing the DTC

- A last test failed (current DTC) clears when the diagnostic runs and does not fail.
- A history DTC clears after 100 consecutive malfunction free warm-up cycles.
- The IPC receives the clear code command from the scan tool.

DTC B0560

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views**			
1	Did you perform the IPC Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**

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2	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Engine Speed parameter in the IPC Data 1 data list. Does the Engine Speed parameter match the tachometer display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the PCM connector C2. 3. Install the **J 33431-C** Signal Generator and Instrument Panel Tester lead to the engine speed signal circuit at the PCM harness connector, and the other lead to a good ground. See **Special Tools and Equipment**. 4. Turn the ignition ON, with the engine OFF. 5. Set the **J 33431-C** to generate a tachometer signal. See **Special Tools and Equipment**. Does the vehicle tachometer indicate an RPM reading?	Go to **Step 5**	Go to **Step 4**
4	Test the engine speed signal circuit for an open, a short to voltage or a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the PCM connector. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L		-

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	Did you complete the replacement?	Go to **Step 9**	
8	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 9**	-
9	1. Use the scan tool in order to clear the DTC's. 2. Operate vehicle within the conditions for running this DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC B1372

Circuit Description

When the ignition switch is in the UNLOCK position, certain class 2 messages do not transmit. The instrument cluster suspends the operation of the indicators and the gages that are dependent on these messages until the ignition switch is no longer in the UNLOCK position.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

There is a difference of at least 75% between the ignition 1 voltage circuit and the IPC battery positive voltage circuit for 3 seconds.

Action Taken When the DTC Sets

- The odometer and the PRNDL displays do not illuminate.
- The fuel gage and the engine coolant temperature gage default to 0.
- The scan tool does not communicate with the instrument cluster.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 100 malfunction free warm-up cycles.
- The IPC receives the clear code command from the scan tool.

Diagnostic Aids

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- When the instrument cluster detects low voltage at the ignition 1 voltage circuit, the instrument cluster will not communicate with the scan tool, and the odometer and PRNDL displays will not be illuminated. The season odometer will display if the trip reset switch is pressed, and the instrument cluster will communicate with the scan tool until the trip reset switch is released.
- An intermittent condition is likely to be caused by an open condition in the ignition 1 voltage circuit.
- DTC B1372 can only be read by the scan tool as a history code once the fault is removed. Refer to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications for diagnosis of a loss of communication with the instrument cluster.

DTC B2961

Circuit Description

The body control module (BCM) monitors the ignition key alarm switch. When the key is in the ignition, the ignition key alarm switch is closed with the signal circuit as low. When the key is not in the ignition, the ignition key alarm switch is open with the signal circuit as high.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The ignition 1 input is active and the key in ignition switch signal circuit is inactive and the signal circuit is high.
- The above conditions must be present for more than 5 seconds.

Action Taken When the DTC Sets

The BCM stores DTC B2961 in memory.

Conditions for Clearing the DTC

- The DTC becomes 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.
- The BCM receives the clear code command from the scan tool.

DTC B2961

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views or Body Control System Connector End Views			
1	Did you perform the Audible Warnings Diagnostic System Check?		Go to **Diagnostic System Check -**

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		Go to **Step 2**	**Audible Warnings**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Key In Ignition parameter in the BCM Inputs data list. Does the Key In Ignition parameter display Yes?	Go to **Step 3**	Go to **Step 4**
3	1. Turn the ignition ON, with the engine OFF. 2. Observe the Battery Voltage parameter in the BCM Data data list. 3. Turn the ignition OFF. Does the Battery Voltage parameter display Active with the ignition off?	Go to **Step 8**	Go to **Step 7**
4	Test the key in ignition signal circuit for an open or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 5**
5	Test the ground circuit of the ignition key alarm switch for an open or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the ignition switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
7	Inspect for poor connections at the harness connector of the BCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
8	Repair the short to voltage in the ignition 1 voltage circuit. Refer to **Wiring Repairs** in Wiring Systems. Did you correct the condition?	Go to **Step 11**	-
9	Replace the ignition switch. Refer to **Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 11**	-
10	**IMPORTANT:** **Perform the set up procedure for the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you		-

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	complete the replacement?	Go to **Step 11**	
11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0461 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The fuel level sensor changes resistance in response to the fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the PCM senses a high signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for a stuck fuel level sensor signal. The PCM sets this DTC if the fuel level sensor signal appears to be stuck based on a lack of signal variation expected during normal operation.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

The PCM does not detect a change in fuel level of at least 3.0 L (0.79 gal) over a distance of 320 km (200 miles).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

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- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0461 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level sender. 2. Inspect for the following items: • The fuel level sensor is stuck, perhaps due to an interference with the fuel strainer. • The fuel tank contains foreign material, for instance, ice. Did you find and correct the condition?	Go to **Step 4**	Go to **Step 3**
3	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

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DTC P0461 (5.3L ENGINE)

Circuit Description

The fuel level sensor changes resistance in response to the fuel level. The PCM monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sensor resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a stuck fuel level sensor signal. The PCM sets this DTC if the fuel level sensor signal appears to be stuck based on a lack of signal variation expected during normal operation.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

The PCM does not detect a change in fuel level of at least 3.0 L (0.79 gal) over a distance of 320 km (200 miles).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

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DTC P0461 (5.3L Engine)

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level sender. 2. Inspect for the following items: • The fuel level sensor is stuck, perhaps due to an interference with the fuel strainer. • The fuel tank contains foreign material, for instance, ice. Did you find and correct the condition?	Go to **Step 4**	Go to **Step 3**
3	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0462 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The fuel level sensor changes resistance in response to fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the PCM senses a low signal voltage. When the fuel tank is empty, the sensor

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resistance is high and the PCM senses a high signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The sender output is less than 0.39 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P0462 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics				

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Connector End View Reference: **Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is greater than the specified value?	98%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C152. 3. Turn the ignition ON, with the engine OFF. 4. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?	4%	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sensor for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sensor for a short to ground between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent**	-		

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	Conditions and Poor Connections and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?		Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 10**	-
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 10**	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0462 (5.3L ENGINE)

Circuit Description

The fuel level sensor changes resistance in response to fuel level. The PCM monitors the signal circuit of the

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fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sensor resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The sender output is less than 0.39 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P0462 (5.3L Engine)

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Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List**				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?	4%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C152. 3. Turn the ignition ON, with the engine OFF. 4. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is greater than the specified value?	98%	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sensor for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sensor for a short to ground between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
	Inspect for poor connections at the harness connector of the fuel level			

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6	sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 10**	-
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine	-		-

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	Controls - 8.1L Did you complete the replacement?		Go to **Step 10**	
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0463 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The fuel level sensor changes resistance in response to fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the PCM senses a high signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The sender output is greater than 2.9 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

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Diagnostic Aids

- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range.

DTC P0463 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?	4%	Go to **Step 3**	Go to Diagnostic Aids
	1. Turn the ignition OFF. 2. Disconnect C152. 3. Connect a 3-ampere fused jumper wire between the signal circuit of the fuel level sensor and the low reference circuit of the fuel level sensor on the [male] terminal side of			

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	the connector. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, clear the DTCs. 6. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is greater than the specified value?	98%	Go to **Step 6**	Go to **Step 4**
4	Test the signal circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	Test the low reference circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the low reference circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the	-		

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	condition?		Go to **Step 12**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the fuel level sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
	IMPORTANT: **Program the replacement PCM.** Replace the PCM. Refer to the following procedures:			

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11	• **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0463 (5.3L ENGINE)

Circuit Description

The fuel level sensor changes resistance in response to fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sensor resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The sender output is greater than 2.9 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays the failure information in the Failure Records on the scan tool.

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Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame/Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data may help in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also help in determining the number of ignition cycles that the diagnostic test reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, including those for RPM, for engine load, for vehicle speed, for temperature, and for others. This will isolate at what point the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range.

DTC P0463 (5.3L Engine)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is greater than the specified value?	98%	Go to **Step 3**	Go to Diagnostic Aids
	1. Turn the ignition OFF. 2. Disconnect C152. 3. Connect a 3-ampere fused			

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3	jumper wire between the signal circuit of the fuel level sensor and the low reference circuit of the fuel level sensor on the [male] terminal side of the connector. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, clear the DTCs. 6. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?	4%	Go to **Step 6**	Go to **Step 4**
4	Test the signal circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	Test the low reference circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the low reference circuit of the fuel level sensor for an open, for a high resistance, or for a short to voltage between C152 and the fuel level sensor. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the fuel level sensor. Refer to **Testing for Intermittent Conditions and Poor**	-		

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	Connections and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?		Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the fuel level sensor. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
11	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-

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12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0522

Circuit Description

The engine oil pressure (EOP) sensor changes resistance based on engine oil pressure. The PCM monitors the signal circuit of the EOP sensor. When the oil pressure is high, the sensor resistance is high, and the PCM senses a high signal voltage. When the oil pressure is low, the sensor resistance is low, and the PCM senses a low signal voltage. The PCM sends the engine oil pressure information to the IPC via the class 2 serial data circuit.

Conditions for Running the DTC

- The engine is running.
- DTC P0641 is not present.

Conditions for Setting the DTC

- The PCM detects that the EOP sensor signal circuit is less than 0.4 volts.
- The above condition is present for greater than 9 seconds.

Action Taken When the DTC Sets

- The PCM records the operating conditions at the time the diagnostic test fails. The PCM displays this information in the Failure Records on the scan tool.
- The instrument panel cluster (IPC) illuminates the engine oil pressure indicator.

Conditions for Clearing the 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.
- The PCM receives a clear code command from the scan tool.

Diagnostic Aids

Using the Failure Records data may help locate an intermittent condition. If you cannot duplicate the DTC, the information in the Failure Records can help determine how many miles since the DTC set. The Fail Counter and

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Pass Counter can help determine how many ignition cycles that the diagnostic test reported a pass and/or a fail.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

4: This step tests for the proper operation of the circuit in the high voltage range.

DTC P0522

Step	Action	Values	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views**				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Engine Oil Pressure Sensor parameter in the PCM Engine Data 2 data list. Does the Engine Oil Pressure Sensor parameter display less than the specified value?	0.4 V	Go to **Step 3**	Go to Diagnostic Aids
3	Is DTC P0641 current in the PCM?	-	Go to **DTC P0641** in Engine Controls - 4.8L, 5.3L, and 6.0L or **DTC P0641** in Engine Controls - 8.1L	Go to **Step 4**
4	1. Turn the ignition OFF. 2. Disconnect the engine oil pressure (EOP) sensor. 3. Connect a 3-ampere fused jumper between the EOP sensor signal circuit and the 5 volt reference circuit of the EOP sensor.	4.6 V		

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	4. With the scan tool, observe the Engine Oil Pressure Sensor parameter. Does the Engine Oil Pressure Sensor parameter display greater than the specified value?		Go to **Step 8**	Go to **Step 5**
5	1. Disconnect the fused jumper. 2. Measure the voltage between the 5 volt reference circuit of the EOP sensor and the low reference circuit of the EOP sensor. Does the voltage measure greater than the specified value?	4.6 V	Go to **Step 7**	Go to **Step 6**
6	Test the 5 volt reference circuit of the EOP sensor for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
7	Test the EOP sensor signal circuit for an open, for a short to ground, or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
8	Inspect for poor connections at the harness connector of the EOP sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the engine oil pressure sensor. Refer to the following procedures: • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 4.8L, 5.3L and 6.0L • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 8.1L	-		-

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	Did you complete the replacement?		Go to **Step 12**	
11	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0523

Circuit Description

The engine oil pressure (EOP) sensor changes resistance based on engine oil pressure. The PCM monitors the signal circuit of the EOP sensor. When the oil pressure is high, the sensor resistance is high, and the PCM senses a high signal voltage. When the oil pressure is low, the sensor resistance is low, and the PCM senses a low signal voltage. The PCM sends the engine oil pressure information to the IPC via the class 2 serial data circuit.

Conditions for Running the DTC

- The engine is running.
- DTC P0641 is not present.

Conditions for Setting the DTC

- The PCM detects that the EOP sensor signal circuit is greater than 4.6 volts.
- The above condition is present for greater than 9 seconds.

Action Taken When the DTC Sets

The PCM records the operating conditions at the time that the diagnostic test fails. The PCM displays this information in the Failure Records on the scan tool.

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Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC is cleared after 40 malfunction-free warm-up cycles.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Using the Failure Records data may help locate an intermittent condition. If you cannot duplicate the DTC, the information in the Failure Records can help in determining how many miles since the DTC set. The Fail Counter and the Pass Counter can help determine how many ignition cycles that the diagnostic test reported a pass and/or a fail.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: This step tests for the proper operation of the circuit in the low voltage range.

DTC P0523

Step	Action	Values	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Engine Oil Pressure Sensor parameter in the PCM Engine Data 2 data list. Does the Engine Oil Pressure Sensor parameter display greater than the specified value?	4.6 V	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect the engine oil pressure (EOP) sensor. 3. With the scan tool, observe the Engine Oil	0.4 V		

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	Pressure Sensor parameter. Does the Engine Oil Pressure Sensor parameter display less than the specified value?		Go to **Step 4**	Go to **Step 5**
4	1. Turn the ignition OFF. 2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnect/Connect Procedure** in Engine Electrical. 3. Measure the resistance from the low reference circuit of the EOP sensor to a good ground. Is the resistance less than the specified value?	5 ohms	Go to **Step 7**	Go to **Step 6**
5	Test the EOP sensor signal circuit for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 8**
6	1. Disconnect the PCM. 2. Test the low reference circuit of the EOP sensor for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the EOP sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 9**
8	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
9	Replace the engine oil pressure sensor. Refer to the following procedures: • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 4.8L, 5.3L and 6.0L • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine	-		-

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	Mechanical - 8.1L Did you complete the replacement?		Go to **Step 11**	
10	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 11**	-
11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0608

Circuit Description

The PCM creates the vehicle speed output signal by pulsing the circuit to ground. The PCM pulses the circuit at the same rate as the vehicle speed signal input. The PCM monitors the voltage on the vehicle speed output circuit. If the PCM determines the voltage is out of the normal operating range, a DTC sets.

Conditions for Running the DTC

- The engine speed is greater than 400 RPM.
- The ignition voltage is greater than 6 volts but less than 18 volts.

Conditions for Setting the DTC

- The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.
- The condition must be present for a minimum of 5 seconds.

Action Taken When the DTC Sets

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- The PCM stores the DTC information in memory.
- The PCM records the operating conditions at the time the DTC sets. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The history DTC clears after 40 malfunction free warm-up cycles.
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

IMPORTANT: Remove any debris from the PCM connector surfaces before servicing the PCM. Inspect the PCM connector gaskets when diagnosing/replacing the PCM. Ensure that the gaskets are installed correctly. The gaskets prevent water intrusion into the PCM.

Using Freeze Frame and/or Failure Records data may aid in locating an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data can aid in determining how many miles since the DTC set. The Fail Counter and Pass Counter can also aid determining how many ignition cycles the diagnostic reported a pass and/or a fail. Operate the vehicle within the same freeze frame conditions (RPM, load, vehicle speed, temperature etc.) that you observed. This will isolate when the DTC failed.

For an intermittent, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0608

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition OFF. 2. Raise the vehicle drive wheels. Refer to **Lifting and Jacking the Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for an automatic transmission or third gear for	-		

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	manual transmission. Does the vehicle speedometer indicate a vehicle speed?		Go to Diagnostic Aids	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the PCM connector C2. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage from the vehicle speed signal circuit of the PCM to a good ground. Does the voltage measure greater than the specified value?	9.5 V	Go to **Step 4**	Go to **Step 6**
4	Test the vehicle speed signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 5**
5	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 7**
6	Repair the short to ground in the vehicle speed signal circuit. Refer to **Wiring Repairs** in Wiring Systems. Did you complete the repair?	-	Go to **Step 8**	-
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 8**	-
	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions			

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8	for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0654

Circuit Description

The PCM creates the engine speed output signal by pulsing the circuit to ground at a predetermined hertz rate. The PCM pulses the circuit at the same rate as the engine speed signal input. The PCM monitors the voltage on the engine speed output circuit. If the PCM determines the voltage is out of the normal operating range, a DTC sets.

Conditions for Running the DTC

- The engine speed is greater than 400 RPM.
- The ignition voltage is greater than 6 volts and less than 18 volts.

Conditions for Setting the DTC

- The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.
- All conditions are present for a minimum of 5 seconds.

Action Taken When the DTC Sets

- The PCM stores the DTC information into memory when the diagnostic runs and fails.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The history DTC clears after 40 malfunction free warm-up cycles.
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

IMPORTANT: Remove any debris from the PCM connector surfaces before servicing the PCM. Inspect the PCM connector gaskets when diagnosing/replacing the PCM. Ensure that the gaskets are installed correctly. The gaskets prevent water intrusion into the PCM.

Using Freeze Frame and/or Failure Records data may aid in locating an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data can aid in

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determining how many miles since the DTC set. The Fail Counter and Pass Counter can also aid determining how many ignition cycles the diagnostic reported a pass and/or a fail. Operate the vehicle within the same freeze frame conditions (RPM, load, vehicle speed, temperature etc.) that you observed. This will isolate when the DTC failed.

For an intermittent, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0654

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Start the engine. 2. Observe the tachometer in the IPC. Does the tachometer indicate engine RPM?	-	Go Diagnostic Aids	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the PCM connector C2. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage from the engine speed signal circuit to a good ground. Does the voltage measure greater than the specified value?	9.5 V	Go to **Step 4**	Go to **Step 6**
4	Test the engine speed signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 5**
5	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and repair the condition?	-	Go to **Step 8**	Go to **Step 7**
6	Repair the short to ground in the vehicle speed signal circuit. Refer to **Wiring Repairs** in Wiring Systems.	-		-

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	Did you find and correct the condition?		Go to **Step 8**	
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P2066 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tank is full, the resistance of both fuel level senders are low and the PCM senses a low signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are high and the PCM senses a high signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for a stuck secondary fuel level sender signal. The PCM sets this DTC if the secondary fuel level sender signal appears to be stuck based on a lack of signal variation expected during normal operation.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

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The PCM does not detect a change in the secondary fuel level of at least 3.0 L (0.79 gal) over a distance of 320 km (200 mi).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, engine load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P2066 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level sender. 2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank, i.e. ice Did you find and correct the condition?	Go to **Step 4**	Go to **Step 3**
	Replace the fuel level sender. Refer to the following procedures:		

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3	• **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P2066 (5.3L ENGINE)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The PCM monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tank is full, the resistance of both fuel level senders are high and the PCM senses a high signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are low and the PCM senses a low signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a stuck secondary fuel level sender signal. The PCM sets this DTC if the secondary fuel level sender signal appears to be stuck based on a lack of signal variation expected during normal operation.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

The PCM does not detect a change in the secondary fuel level of at least 3.0 L (0.79 gal) over a distance of 320 km (200 mi).

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Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, engine load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P2066 (5.3L Engine)

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level sender. 2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank, i.e. ice Did you find and correct the condition?	Go to **Step 4**	Go to **Step 3**
	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor**		

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3	**Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P2067 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tank is full, the resistance of both fuel level senders are low and the PCM senses a low signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are high and the PCM senses a high signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for a lower than normal secondary fuel level sender signal.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The secondary sender output is less than 0.39 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.

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- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, engine load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P2067 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install the scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Fuel Tank Level Remaining % parameter in the PCM Enhanced EVAP Data list. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is greater than the	98%		Go to

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	specified value?		Go to **Step 3**	Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C152. 3. Turn the ignition ON, with the engine OFF. 4. With the scan tool, observe the Fuel Tank Level Remaining % parameter. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is less than the specified value?	4%	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sender for a short to ground between C152 and the fuel level sender. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L	-		-

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	Did you complete the replacement?		Go to **Step 10**	
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 10**	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P2067 (5.3L ENGINE)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The PCM monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tank is full, the resistance of both fuel level senders are high and the PCM senses a high signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are low and the PCM senses a low signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of remaining fuel in the tank. The PCM sends the fuel level percentage via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a lower than normal secondary fuel level sender signal.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The secondary sender output is less than 0.39 volts.

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- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, engine load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P2067 (5.3L Engine)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
	1. Install the scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Fuel Tank			

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2	Level Remaining % parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is less than the specified value?	4%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C152. 3. Turn the ignition ON, with the engine OFF. 4. With the scan tool, observe the Fuel Tank Level Remaining % parameter. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is greater than the specified value?	98%	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sender for a short to ground between C152 and the fuel level sender. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)**	-		-

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	in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?		Go to **Step 10**	
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 10**	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P2068 (4.8L, 6.0L, AND 8.1L ENGINES)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tanks are full, the resistance of both fuel level senders are low and the PCM senses a low signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are high and the PCM senses a high signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of the remaining fuel in the tank. The PCM sends the fuel level percent via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for a higher than normal secondary fuel level sender signal.

Conditions for Running the DTC

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The engine is running.

Conditions for Setting the DTC

- The secondary sender output is greater than 2.9 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range.

DTC P2068 (4.8L, 6.0L, and 8.1L Engines)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**

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2	1. Install the scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Fuel Tank Level Remaining % parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is less than the specified value?	4%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C152. 3. Connect a 3-amp fused jumper wire between the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender on the male terminal side. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, clear the DTCs. 6. With the scan tool, observe the Fuel Tank Level Remaining % parameter. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is greater than the specified value?	98%	Go to **Step 6**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for an open, a high resistance, or a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	Test the low reference circuit of the fuel level sender for an open, a high resistance, or a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the fuel level sender for an open, a high resistance, or a short to voltage between C152 and the fuel level sender. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
	Test the low reference circuit of the fuel level sender for an open, a high resistance, or a short to voltage between C152 and the fuel level sender.			

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7	Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
11	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
	1. Use the scan tool in order to clear the			

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12	DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P2068 (5.3L ENGINE)

Circuit Description

The primary fuel level sender and the secondary fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to determine the fuel level. When the fuel tanks are full, the resistance of both fuel level senders are high and the PCM senses a high signal voltage on both the signal circuits of the primary fuel level sender and the secondary fuel level sender. When the fuel tanks are empty, the resistance of the fuel level senders are low and the PCM senses a low signal voltage. The PCM uses the signal circuits of the primary fuel level sender and the secondary fuel level sender in order to calculate the percentage of the remaining fuel in the tank. The PCM sends the fuel level percent via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for a higher than normal secondary fuel level sender signal.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

- The secondary sender output is greater than 2.9 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the 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.
- The PCM receives the clear code command from the scan tool.

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Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions (RPM, load, vehicle speed, temperature, etc.). This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range.

DTC P2068 (5.3L Engine)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install the scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Fuel Tank Level Remaining % parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is greater than the specified value?	98%	Go to **Step 3**	Go to Diagnostic Aids
	1. Turn the ignition OFF. 2. Disconnect C152. 3. Connect a 3-amp fused jumper wire between the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender on the male			

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3	terminal side. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, clear the DTCs. 6. With the scan tool, observe the Fuel Tank Level Remaining % parameter. Does the scan tool indicate that the Fuel Tank Level Remaining % parameter is less than the specified value?	4%	Go to **Step 6**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for an open, a high resistance, or a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	Test the low reference circuit of the fuel level sender for an open, a high resistance, or a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the fuel level sender for an open, a high resistance, or a short to voltage between C152 and the fuel level sender. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the low reference circuit of the fuel level sender for an open, a high resistance, or a short to voltage between C152 and the fuel level sender. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for**			

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8	**Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 12**	-
11	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L	-		

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	• **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?		Go to **Step 12**	-
12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

SYMPTOMS - INSTRUMENT PANEL, GAGES AND CONSOLE

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Instrument Cluster**, **Diagnostic System Check - Driver Information Systems** or **Diagnostic System Check - Audible Warnings** 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:
   - **Instrument Panel Cluster (IPC) Description and Operation**
   - **Indicator/Warning Message Description and Operation**
   - **Driver Information Center (DIC) Description and Operation**
   - **Audible Warnings Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Instrument Cluster or Audible Warning Systems. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect for 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** in Wiring Systems.

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Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Gages and Odometer

- **Instrument Cluster Inoperative**
- **Instrument Cluster Inoperative**
- **Engine Oil Pressure Gage Inaccurate or Inoperative**
- **Fuel Gage Inaccurate or Inoperative (Dual Tanks)** or **Fuel Gage Inaccurate or Inoperative (Single Tank)**
- **Instrument Panel Cluster (IPC) Gages Inoperative**
- **Odometer Trip/Reset Switch Inoperative**
- **Speedometer and/or Odometer Inaccurate or Inoperative**
- **Tachometer Inaccurate or Inoperative**
- **Volt Gage Inaccurate or Inoperative**
- **Change Engine Oil Indicator Always On**
- **Low Engine Oil Level Indicator Always On**

Indicators

- **ABS Indicator Always On** in Antilock Brake System
- **ABS Indicator Inoperative** in Antilock Brake System
- **Air Bag Indicator Circuit Malfunction** in SIR
- **Brake Warning Indicator Always On** in Hydraulic Brakes
- **Brake Warning Indicator Inoperative** in Hydraulic Brakes
- **Change Engine Oil Indicator Always On**
- **Charge Indicator Always On** in Engine Electrical
- **Charge Indicator Inoperative** in Engine Electrical
- **Cruise Control Indicator Always On** in Cruise Control
- **Cruise Control Indicator Inoperative** in Cruise Control
- **High Beam Indicator Always On** in Lighting Systems
- **Engine Coolant Temperature Indicator Always On** in Engine Cooling
- **Engine Overheated Indicator Always On** in Engine Cooling
- **High Beam Indicator Inoperative** in Lighting Systems
- **Low Engine Coolant Indicator Always On** in Engine Cooling
- **Low Engine Oil Level Indicator Always On**
- **Low Washer Fluid Indicator Malfunction** in Wipers/Washer Systems
- **Malfunction Indicator Lamp (MIL) Inoperative** in Engine Controls - 4.8L, 5.3L, and 6.0L
- **Malfunction Indicator Lamp (MIL) Always On** in Engine Controls - 4.8L, 5.3L, and 6.0L

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- **Security Indicator Always On or Flashing** in Theft Deterrent
- **Security Indicator Inoperative** in Theft Deterrent
- **Service Indicator Always On** in Transfer Case - BW 4482-NR4
- **Service Indicator Inoperative** in Transfer Case - BW 4482-NR4
- **Service Indicator Always On** in Transfer Case - NVG 246-NP8
- **Service Indicator Inoperative** in Transfer Case - NVG 246-NP8
- **Tow/Haul Switch/Indicator Always On or Inoperative** in Automatic Transmission - 4L60-E
- **Tow/Haul Switch/Indicator Always On or Inoperative** in Automatic Transmission - 4L80-E
- **Traction Off Indicator Always On** in Antilock Brake System
- **Traction Off Indicator Inoperative** in Antilock Brake System
- **Turn Signal Lamps and/or Indicators Always On or Flashing** in Lighting Systems
- **Turn Signal Lamps and/or Indicators Inoperative** in Lighting Systems

Instrument Cluster Dimming

- **Interior Backlighting Inoperative** in Lighting Systems
- **Interior Backlighting Does Not Dim** in Lighting Systems

Driver Information Center (DIC)

- **Driver Information Center (DIC) Switch(es) Inoperative**

Audible Warnings

- **Chime Always On**
- **Chime Inoperative**

INSTRUMENT CLUSTER INOPERATIVE

Instrument Cluster Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views**			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Observe the instrument cluster. Does the instrument cluster perform the displays	Go to **Testing for Intermittent Conditions and Poor Connections** in	

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	test?	Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the IPC. 3. Turn the ignition ON, with the engine OFF. 4. Connect a test lamp between the ignition 1 voltage circuit and a good ground. Does the test lamp illuminate?	Go to **Step 4**	Go to **Step 7**
4	Connect a test lamp between the ignition 1 voltage circuit of the instrument cluster and the ground circuit of the instrument cluster. Does the test lamp illuminate?	Go to **Step 5**	Go to **Step 6**
5	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
6	Repair the open or a high resistance in the ground circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you complete the repair?	Go to **Step 9**	-
7	Repair the open, short to ground or high resistance in the ignition 1 voltage circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you complete the repair?	Go to **Step 9**	-
8	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**. Did you complete the replacement?	Go to **Step 9**	-
9	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 3**

ENGINE OIL PRESSURE GAGE INACCURATE OR INOPERATIVE

Engine Oil Pressure Gage Inaccurate or Inoperative

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views** in Engine Controls-4.8L, 5.3L and 6.0L, or **Powertrain Control Module (PCM) Connector End Views** in Engine Controls-8.1L				
	Did you perform the Instrument Cluster Diagnostic System Check?			Go to **Diagnostic**

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1		-	Go to **Step 2**	**System Check - Instrument Cluster**
2	Start the engine. Does the engine oil pressure (EOP) gage display within the specified range?	34-483 kPa (5-70 psi) - 8.1L only 207-483 kPa (30-70 psi)	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, perform the Displays Test in the IPC scan tool Output Controls. Does the engine oil pressure gage move up and down when commanded?	-	Go to **Step 4**	Go to **Step 10**
4	1. Turn the ignition OFF. 2. Disconnect the negative battery cable. 3. Disconnect the EOP sensor. 4. Measure the resistance from the low reference circuit of the EOP sensor to a good ground. Does the resistance measure less than the specified value?	5 ohms	Go to **Step 6**	Go to **Step 5**
5	Test the low reference circuit of the EOP sensor for high resistance or for an open. Refer to **Circuit Testing** and to**Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the EOP sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 9**

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8	Replace the engine oil pressure sensor. Refer to the following procedures: • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical-4.8L, 5.3L and 6.0L • **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical-8.1L Did you complete the replacement?	-	Go to **Step 11**	-
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls-4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls-8.1L Did you complete the replacement?	-	Go to **Step 11**	-
10	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement**. Did you complete the replacement?	-	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**

FUEL GAGE INACCURATE OR INOPERATIVE (DUAL TANKS)

Diagnostic Aids

- Ensure that the fuel level is in the same range as the customer concern.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Fuel Level Specifications** in order to verify the correct fuel level sender readings. The fuel level is available on the scan tool in the Fuel Tank Level Remaining (%) parameter in the PCM Enhanced Evap Data list.

Test Description

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The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for high resistance in the signal circuits and the low reference circuit of the fuel level senders.

13: DTCs will be set in the PCM when you perform this diagnostic table.

Fuel Gage Inaccurate or Inoperative (Dual Tanks)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Disconnect C152. 2. Connect a jumper wire between the signal circuit of the primary fuel level sender and the signal circuit of the secondary fuel level sender-male terminal side. 3. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuits of the fuel level senders and the low reference circuit of the fuel level senders-male terminal side. See **Special Tools and Equipment**. 4. Turn ON the ignition, with the engine OFF. 5. Vary the resistance on the **J 33431-C** from 40-250 ohms. See **Special Tools and Equipment**. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment.** 6. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel gage display. Does the fuel gage display the correct fuel level?	-	Go to **Step 4**	Go to **Step 3**
	1. Install the scan tool. 2. Turn ON the ignition, with the engine			

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3	OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment.** 3. Vary the resistance on the **J 33431-C** from 40-250 ohms. See **Special Tools and Equipment**. 4. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel level percent. **IMPORTANT:** **Turn OFF the ignition momentarily between the resistance settings in order to quickly update the scan tool display.** 5. With the scan tool, observe the Fuel Tank Level Remaining % parameter in the PCM Enhanced EVAP Data list. Does the scan tool display the correct fuel level percent?	-	Go to **Step 11**	Go to **Step 5**
4	Inspect for the following items: • A poor connection at the harness connectors of the fuel level senders- Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. • A high resistance in the signal circuits or the low reference circuit between the fuel level senders and C152 • A misaligned primary or secondary fuel level sender • A deformed primary or secondary fuel tank Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 7**
5	Test the signal circuits of the fuel level senders for a high resistance between C152 and the powertrain control module (PCM). Refer to	-		

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	Circuit Testing and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?		Go to **Step 13**	Go to **Step 6**
6	Test the low reference circuit of the fuel level senders for a high resistance between C152 and the PCM. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 9**
7	1. Remove the fuel level senders. 2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tanks, ice Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 8**
8	1. With the **J 39200** DMM, measure the resistance of the fuel level senders while moving the float arm. 2. Observe both the analog and digital displays on the DMM. Does the resistance change smoothly across the specified range?	40-250 ohms	Go to Diagnostic Aids	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**
10	Replace the primary or the secondary fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L, and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor**	-		

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	Replacement (Rear Tank) in Engine Controls - 8.1L Did you complete the replacement?		Go to **Step 13**	-
11	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement**. Did you complete the replacement?	-	Go to **Step 13**	-
12	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L, and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 13**	-
13	1. Use the scan tool in order to clear the PCM DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

FUEL GAGE INACCURATE OR INOPERATIVE (SINGLE TANK)

Diagnostic Aids

- Ensure that the fuel level is in the same range as the customer concern.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Fuel Level Specifications** in order to verify the correct fuel level sender readings. The fuel level is available on the scan tool in the Fuel Tank Level Remaining (%) parameter in the PCM Enhanced Evap Data list.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for high resistance in the signal circuit and the low reference circuit of the fuel level

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sender.

13: DTCs will be set in the PCM when you perform this diagnostic table.

Fuel Gage Inaccurate or Inoperative (Single Tank)

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Disconnect C152. 2. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender (male terminal side). See **Special Tools and Equipment**. 3. Turn ON the ignition, with the engine OFF. 4. Vary the resistance on the **J 33431-C** from 40-250 ohms. See **Special Tools and Equipment**. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment.** 5. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel gage display. Does the fuel gage display the correct fuel level?	-	Go to **Step 4**	Go to **Step 3**
	1. Install the scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Vary the resistance on the **J 33431-C** from 40-250 ohms. See **Special Tools and Equipment**. **IMPORTANT:** **Verify the J 33431-C resistance settings**			

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3	**with a DMM. See Special Tools and Equipment.** 4. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel level percent. **IMPORTANT:** **Turn OFF the ignition momentarily between the resistance settings in order to quickly update the scan tool display.** 5. With the scan tool, observe the Fuel Tank Level Remaining % parameter in the PCM Enhanced EVAP Data list. Does the scan tool display the correct fuel level percent?	-	Go to **Step 11**	Go to **Step 5**
4	Inspect for the following items: • A poor connection at the harness connector of the fuel level sender-Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. • A high resistance in the signal circuit or the low reference circuit between the fuel level sender and C152 • A misaligned fuel level sender • A deformed fuel tank Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 7**
5	Test the signal circuit of the fuel level sender for a high resistance between C152 and the powertrain control module (PCM). Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 6**
6	Test the low reference circuit of the fuel level sender for a high resistance between C152 and the PCM. Refer to **Circuit Testing** and**Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 9**
	1. Remove the fuel level sender.			

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7	2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank, i.e. ice Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 8**
8	1. With the DMM, measure the resistance of the fuel level sender while moving the float arm. 2. Observe both the analog and digital displays on the DMM. Does the resistance change smoothly across the specified range?	40-250 ohms	Go to Diagnostic Aids	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**
10	Replace the fuel level sender. Refer to the following procedures: • **Fuel Level Sensor Replacement (4.8L and 5.3L Engines)** or **Fuel Level Sensor Replacement (5.3L (L59) Engine)** or **Fuel Level Sensor Replacement (6.0L Engine - Front Tank)** or **Fuel Level Sensor Replacement (6.0L Engine - Rear Tank)** in Engine Controls - 4.8L, 5.3L, and 6.0L • **Fuel Level Sensor Replacement (Front Tank)** or **Fuel Level Sensor Replacement (Rear Tank)** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 13**	-
11	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement**. Did you complete the replacement?	-	Go to **Step 13**	-

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12	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L, and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	-	Go to **Step 13**	-
13	1. Use the scan tool in order to clear the PCM DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

HOURMETER INACCURATE OR INOPERATIVE

Hourmeter Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	Verify the hourmeter operation. Refer to **Instrument Panel Cluster (IPC) Description and Operation**. Does the hourmeter operate normally?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

INSTRUMENT PANEL CLUSTER (IPC) GAGES INOPERATIVE

Instrument Panel Cluster (IPC) Gages Inoperative

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Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics DEFINITION: This diagnostic procedure applies only to the serial data gages located in the instrument cluster which include the engine coolant temperature gage, and the transmission fluid temperature gage.			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. With the scan tool, perform the Displays Test in the IPC scan tool Output Controls. Does the gage move from 0 to its maximum value and back to 0 when you perform the Displays Test?	Go to **Step 3**	Go to **Step 4**
3	1. Install a scan tool. 2. Start the engine. 3. Observe the appropriate parameter in the PCM Data list. Refer to **Scan Tool Data List**. Does the parameter match the gage display?	Go to **Diagnostic System Check - Engine Controls** in Engine Controls - 4.8L, 5.3L, and 6.0L or **Diagnostic System Check - Engine Controls** in Engine Controls - 8.1L	Go to **Step 4**
4	**IMPORTANT:** **Program the replacement instrument panel cluster (IPC).** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 5**	-
5	1. Use the scan tool in order to clear any induced DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

ODOMETER TRIP/RESET SWITCH INOPERATIVE

Diagnostic Aids

Refer to **Instrument Panel Cluster (IPC) Description and Operation** in order to determine if the condition described by the customer concerning the season and trip odometers is normal operation.

Odometer Trip/Reset Switch Inoperative

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Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Press the trip odometer reset switch. Does the odometer toggle between the season odometer, the trip odometer, and the hourmeter?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	**IMPORTANT:** **Program the replacement instrument panel cluster (IPC).** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

SPEEDOMETER AND/OR ODOMETER INACCURATE OR INOPERATIVE

Speedometer and/or Odometer Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views**			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn ON the ignition, with the engine OFF. 2. Install a scan tool. 3. With the scan tool, perform the segments test in the instrument panel cluster (IPC) scan tool output controls. Do all of the segments of the driver information center (DIC) illuminate?	Go to **Step 3**	Go to **Step 6**
	1. Install a scan tool. 2. Raise the vehicles drive wheels. Refer to **Lifting and Jacking the Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for automatic		

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3	transmission or third gear for manual transmission. 5. With the scan tool, observe the Vehicle Speed Sensor (VSS) parameter in the IPC Data 1 data list. Does the VSS parameter match the speedometer display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 4**
4	Test the vehicle speed signal circuit for a high resistance between the IPC and the powertrain control module (PCM). Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 7**	Go to **Step 5**
5	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 7**	Go to **Step 6**
6	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 7**	-
7	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

TACHOMETER INACCURATE OR INOPERATIVE

Tachometer Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views**			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to**Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Engine Speed parameter in the IPC Data 1 data list. Does the Engine Speed parameter match the tachometer display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
	Test the engine speed signal circuit for a high		

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3	resistance between the IPC and PCM. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Inspect for poor connections at the harness connector of the instrument cluster. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 5**
5	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

VOLT GAGE INACCURATE OR INOPERATIVE

Volt Gage Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. With the scan tool, perform the Displays Test in the IPC scan tool Output Controls. Does the gage move from 0 to its maximum value and back to 0 when you perform the Displays Test?	Go to **Step 3**	Go to **Step 4**
3	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Battery Voltage parameter in the BCM Data list. Does the Battery Voltage parameter match the gage display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 4**
4	**IMPORTANT:** **Program the replacement IPC.** Replace the instrument panel cluster (IPC). Refer to		-

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	Instrument Panel Cluster (IPC) Replacement.Did you complete the replacement?	Go to **Step 5**	
5	1. Use the scan tool in order to clear any induced DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

CHANGE ENGINE OIL INDICATOR ALWAYS ON

Change Engine Oil Indicator Always On

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	Start the engine. Does the CHANGE ENGINE OIL indicator illuminate in the Driver Information Center?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	1. Install a scan tool. 2. With the scan tool, observe the Engine Oil Life Remaining parameter in the PCM Engine Data 2 data list. Does the Engine Oil Life Remaining parameter display 0%?	Go to **Step 4**	Go to **Step 5**
4	Reset the engine oil life. Refer to **GM Oil Life System - Resetting** in Maintenance and Lubrication. Does the CHANGE ENGINE OIL indicator turn off?	Go to **Step 6**	Go to **Step 5**
5	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

LOW ENGINE OIL LEVEL INDICATOR ALWAYS ON

Low Engine Oil Level Indicator Always On

Step	Action	Yes	No

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Schematic Reference: Instrument Cluster Schematics
Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views, Powertrain Control Module (PCM) Connector End Views , or Powertrain Control Module (PCM) Connector End Views

1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Engine Oil Level Switch parameter in the PCM Engine Data 2 data list. Does the Engine Oil Level Switch parameter display Ok?	Go to **Step 3**	Go to **Step 4**
3	Does the CHECK ENG OIL LEVEL indicator remain illuminated after the displays test?	Go to **Step 11**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
4	1. Turn the ignition OFF. 2. Disconnect the engine oil level switch. 3. Connect a 3-ampere fused jumper between the signal circuit of the engine oil level switch and a good ground. 4. Turn the ignition ON, with the engine OFF. 5. With the scan tool, observe the Engine Oil Level Switch parameter. Does the Engine Oil Level Switch parameter display Ok?	Go to **Step 6**	Go to **Step 5**
5	Test the signal circuit of the engine oil level switch for a short to battery voltage, for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 8**
6	Test the ground circuit of the engine oil level switch for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 7**
7	Inspect for poor connections at the harness connector of the engine oil level switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems.		

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	Did you find and correct the condition?	Go to **Step 12**	Go to **Step 9**
8	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 10**
9	Replace the engine oil level switch. Refer to the following procedures: • **Engine Oil Level Sensor and/or Switch Replacement** in Engine Mechanical - 4.8L, 5.3L and 6.0L • **Engine Oil Level Sensor and/or Switch Replacement** in Engine Mechanical - 8.1L Did you complete the replacement?	Go to **Step 12**	-
10	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to the following procedures: • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Replacement** in Engine Controls - 8.1L Did you complete the replacement?	Go to **Step 12**	-
11	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 12**	-
12	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) SWITCH(ES) INOPERATIVE

Driver Information Center (DIC) Switch(es) Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views or**			

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Inline Harness Connector End Views

1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Press and release each of the DIC switches. 4. With a scan tool, observe the DIC switch parameters in the IPC Input/Output data list. Does the scan tool display On when each switch is pressed and Off when each switch is released?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Does the scan tool display Off when each switch is pressed?	Go to **Step 9**	Go to **Step 4**
4	Does the scan tool always display On for the suspect switch even when the switch is released?	Go to **Step 5**	Go to **Step 6**
5	1. Turn the ignition OFF. 2. Disconnect the DIC switch connector. 3. Turn the ignition ON, with the engine OFF. 4. With a scan tool, observe the suspect DIC switch parameter. Does the scan tool display On for the suspect switch?	Go to **Step 7**	Go to **Step 12**
6	1. Turn the ignition OFF. 2. Disconnect the DIC switch connector. 3. Connect a 3 amp fused jumper wire between the signal circuit of the suspect DIC switch and a good ground. Refer to **Circuit Testing** in Wiring Systems. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, observe the suspect DIC switch parameter. Does the scan tool display On for the suspect switch?	Go to **Step 10**	Go to **Step 8**
7	Test the signal circuit of the suspect DIC switch for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 14**	Go to **Step 11**
8	Test the signal circuit of the suspect DIC switch for an open or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 14**	Go to **Step 11**

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9	Test the ground circuit of the DIC switch for an open or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 14**	Go to **Step 10**
10	Inspect for poor connections at the harness connector of the DIC switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 14**	Go to **Step 12**
11	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 14**	Go to **Step 13**
12	Replace the DIC switch. Refer to **Steering Wheel Control Switch Assembly Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 14**	-
13	**IMPORTANT:** **Program the replacement IPC.** Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement**.Did you complete the replacement?	Go to **Step 14**	-
14	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

CHIME ALWAYS ON

Chime Always On

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics **Connector End View Reference: Master Electrical Component List** in Wiring Systems			
1	Did you perform the Audible Warnings Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	Do any indicators illuminate when the chime sounds?	Go to **Symptoms - Instrument Panel, Gages and Console**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Remove the key from the ignition. 3. Turn the headlamp switch to OFF. 4. Close all of the vehicle doors. 5. Open one or more of the vehicle doors		

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	Does the chime sound at all times regardless if the doors are open or closed?	Go to **Step 16**	Go to **Step 4**
4	1. Close all of the vehicle doors. 2. With a scan tool observe the Driver Door Ajar Switch and the Passenger Door Ajar Switch parameters in the body control module (BCM) inputs data list or the Door Ajar Switch parameters in the DDM/PDM inputs data list. Do all of the Door Ajar Switch parameters display Off or Inactive?	Go to **Step 5**	Go to **Courtesy Lamps Always On** in Lighting Systems
5	With a scan tool observe the Left Rear Cargo Door Ajar Switch and the Right Rear Door Ajar Switch parameters in the BCM inputs data list. Do all of the Door Switch parameters display Inactive?	Go to **Step 6**	Go to **Courtesy Lamps Always On** in Lighting Systems
6	With a scan tool, observe the Cargo Door Ajar Switch and the Hood Ajar Switch parameters in the BCM inputs data list. Does the Cargo Door Ajar Switch and the Hood Ajar Switch parameters display Inactive?	Go to **Step 7**	Go to **Courtesy Lamps Always On** in Lighting Systems
7	1. Turn the ignition OFF. 2. Remove the key from the ignition. 3. Turn the headlamp switch to OFF. 4. Open the driver door. Does the chime sound?	Go to **Step 8**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
8	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Parklamp Switch parameter in the BCM inputs data list. Does the Parklamp Switch parameter display Inactive?	Go to **Step 9**	Go to **Step 11**
9	With a scan tool, observe the Headlamp Switch parameter in the BCM inputs data list. Does the Headlamp Switch parameter display Inactive?	Go to **Step 10**	Go to **Step 11**
10	1. Turn the ignition OFF. 2. Remove the key from the ignition. 3. With a scan tool, observe the Key In Ignition parameter in the BCM inputs data list. Does the Key In Ignition parameter display No?	Go to **Step 15**	Go to **Step 12**

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11	Test the headlamp input signal circuit and the park lamp signal circuit at the BCM for a short to voltage. Refer to **Circuit Testing** and**Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 13**
12	Test the key in ignition signal circuit for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 14**
13	Inspect for poor connections at the harness connector of the headlamp switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 17**
14	Inspect for poor connections at the harness connector of the ignition key alarm switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 18**
15	Inspect for poor connections at the harness connector of the BCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 19**
16	Inspect for poor connections at the harness connector of the radio or audio amplifier. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 21**	Go to **Step 20**
17	Replace the headlamp switch. Refer to **Headlamp Switch Replacement** in Lighting Systems. Did you complete the replacement?	Go to **Step 21**	-
18	Replace the ignition switch. Refer to **Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 21**	-
19	**IMPORTANT:** **Program the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	Go to **Step 21**	-
20	**IMPORTANT:** **Program the replacement radio or audio amplifier.** Replace the radio. Refer to **Radio Replacement**		-

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	or**Amplifier Replacement** in Entertainment.Did you complete the replacement?	Go to **Step 21**	
21	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

CHIME INOPERATIVE

Chime Inoperative

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics DEFINITION: One or more chime functions are inoperative.			
1	Did you perform the Audible Warning Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	1. Turn the ignition OFF, with the key in the ignition. 2. Open the driver's door. Does the chime sound?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Do the courtesy lights turn on when you open the drivers door?	Go to **Step 4**	Go to **Courtesy Lamps Inoperative** in Lighting Systems
4	1. Turn the ignition ON, with the engine OFF. 2. Turn the radio ON. 3. Adjust the radio balance and fade to the left front speaker. Does the speaker operate properly?	Go to **Step 5**	Go to **Speakers Inoperative - One or More** in Entertainment
5	**IMPORTANT:** **Program the replacement radio or audio amplifier.** Replace the radio. Refer to **Radio Replacement** or **Amplifier Replacement** in Entertainment.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 1**

REPAIR INSTRUCTIONS

ACCESSORY SWITCH REPLACEMENT

Removal Procedure

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1. Remove the IP trim bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
2. Grasp the accessory switch assembly and pull outwards to remove the button assembly.
3. Disconnect the electrical connectors for the switches in the assembly.
4. Remove the switches and the button assembly.

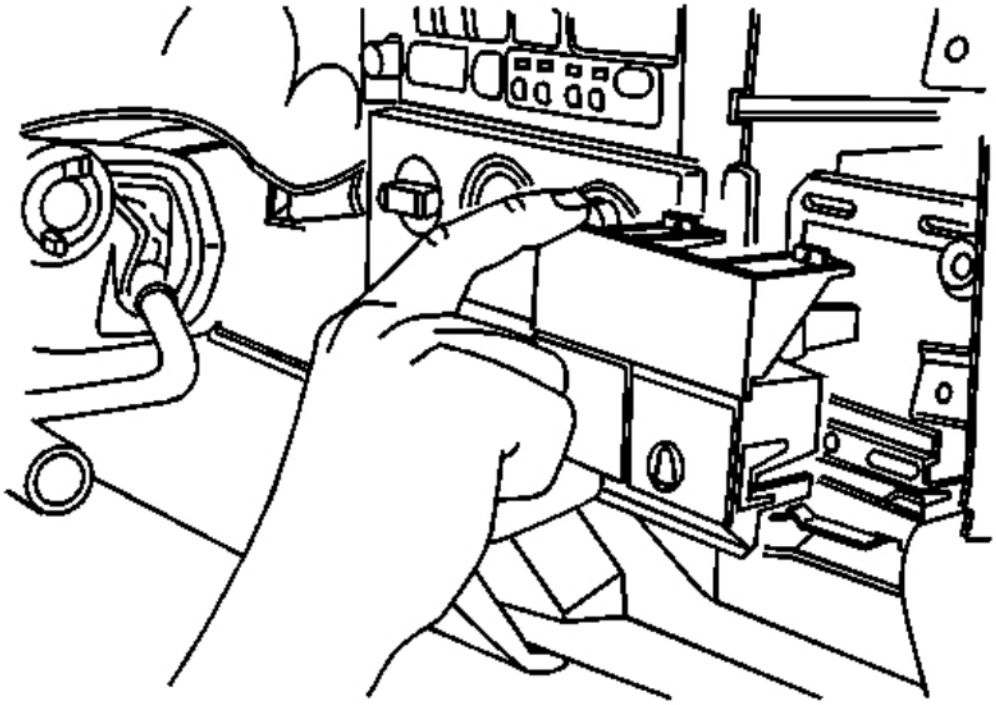


Fig. 14: Removing Switches & Button Assembly
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the electrical connectors to the switches in the assembly
2. Install the accessory switch assembly into the IP till it snaps into place.

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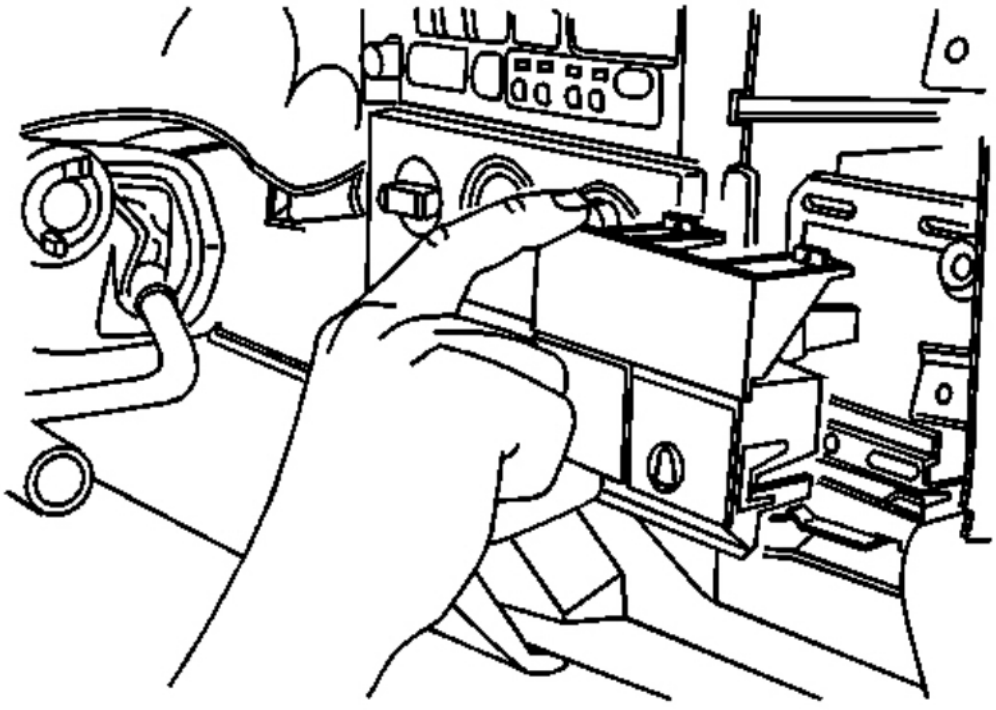


Fig. 15: Installing Accessory Switch Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the IP trim bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

INSUALTOR REPLACEMENT - INSTRUMENT PANEL (I/P)

Removal Procedure

1. Remove the retaining bolts.
2. Remove the insulator (1) from the HVAC module by pulling downwards.

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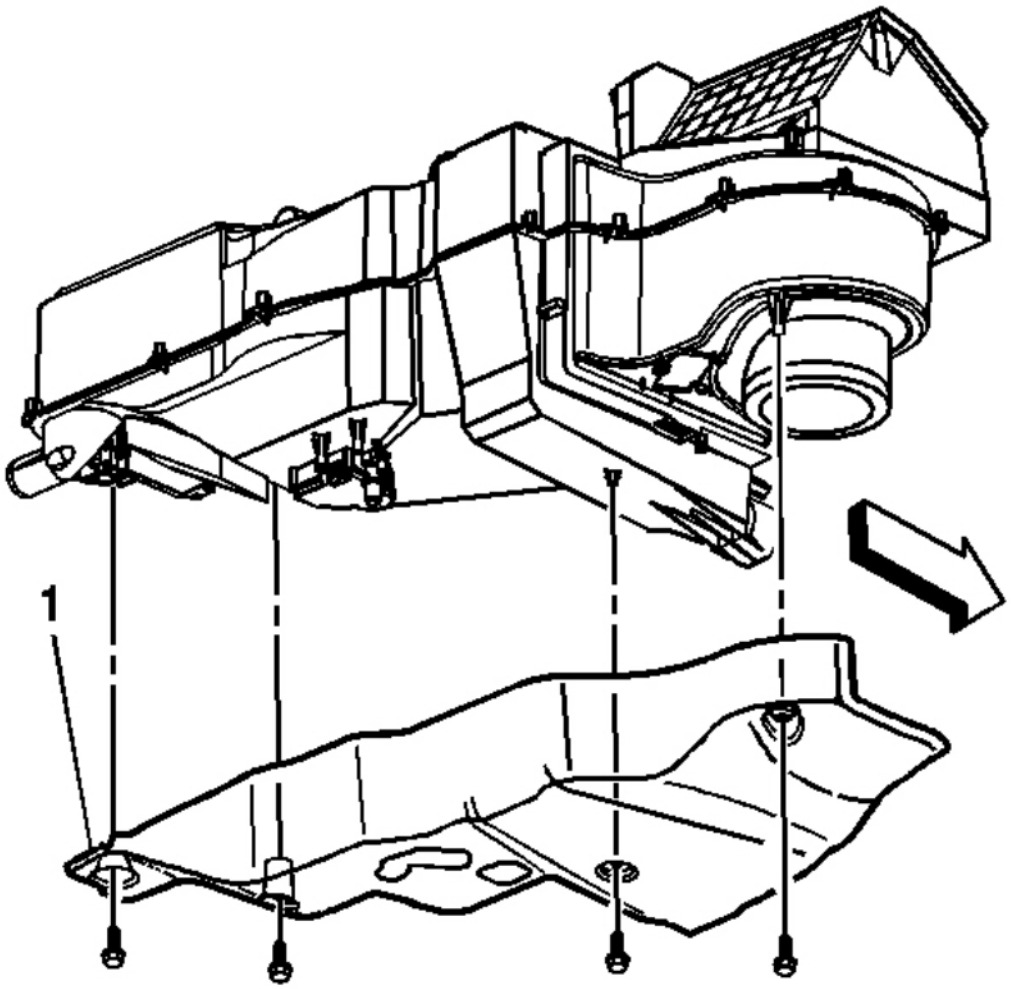


Fig. 16: Removing Instrument Panel Insulator
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the insulator (1) to the HVAC module.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the retaining bolts.

Tighten: Tighten the bolts to 1.6 N.m (14 lb in)

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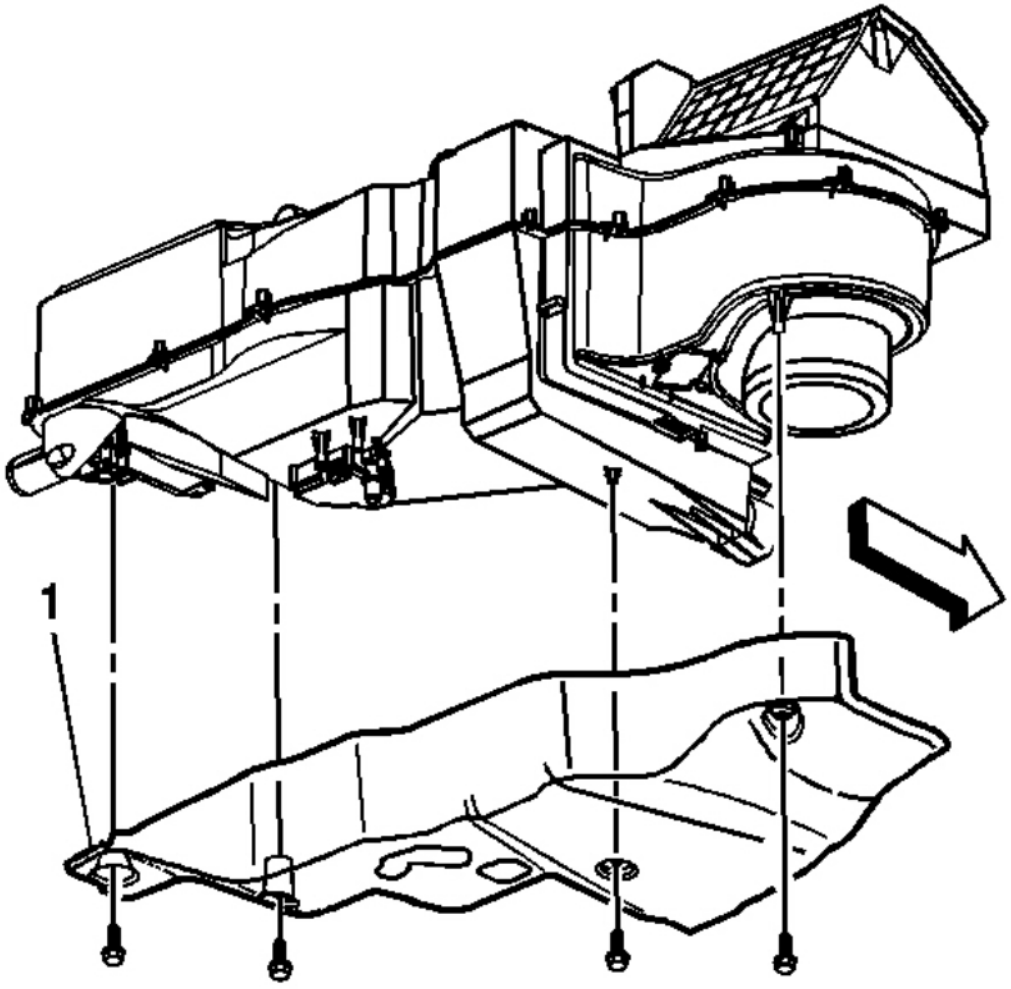


Fig. 17: Installing Instrument Panel Insulator
Courtesy of GENERAL MOTORS CORP.

KNEE BOLSTER REPLACEMENT

Removal Procedure

1. Remove the I/P cluster trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

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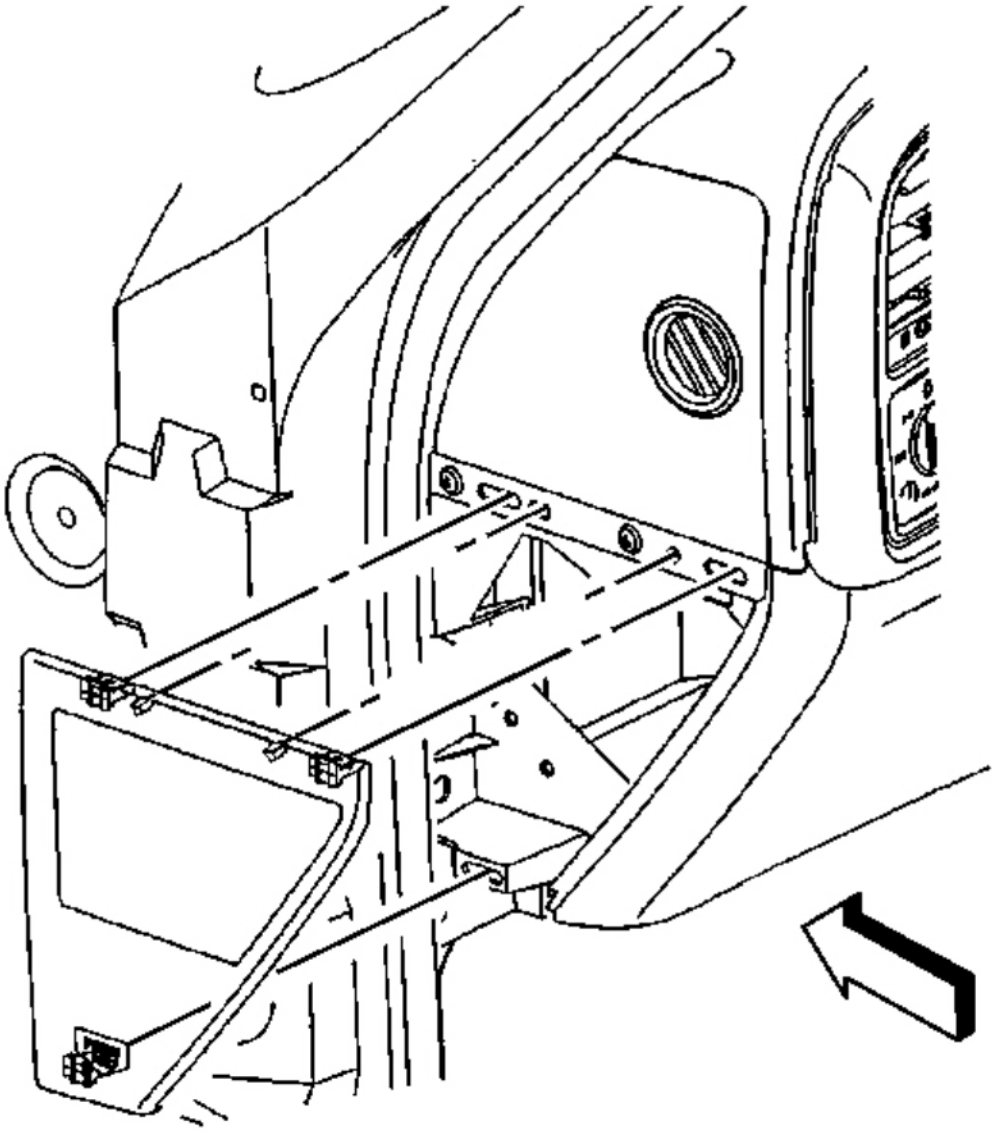


Fig. 18: Removing I/P Cluster Trim Plate Bezel
Courtesy of GENERAL MOTORS CORP.

2. Remove the knee bolster screws.
3. Unsnap the top of the knee bolster from the I/P assembly.

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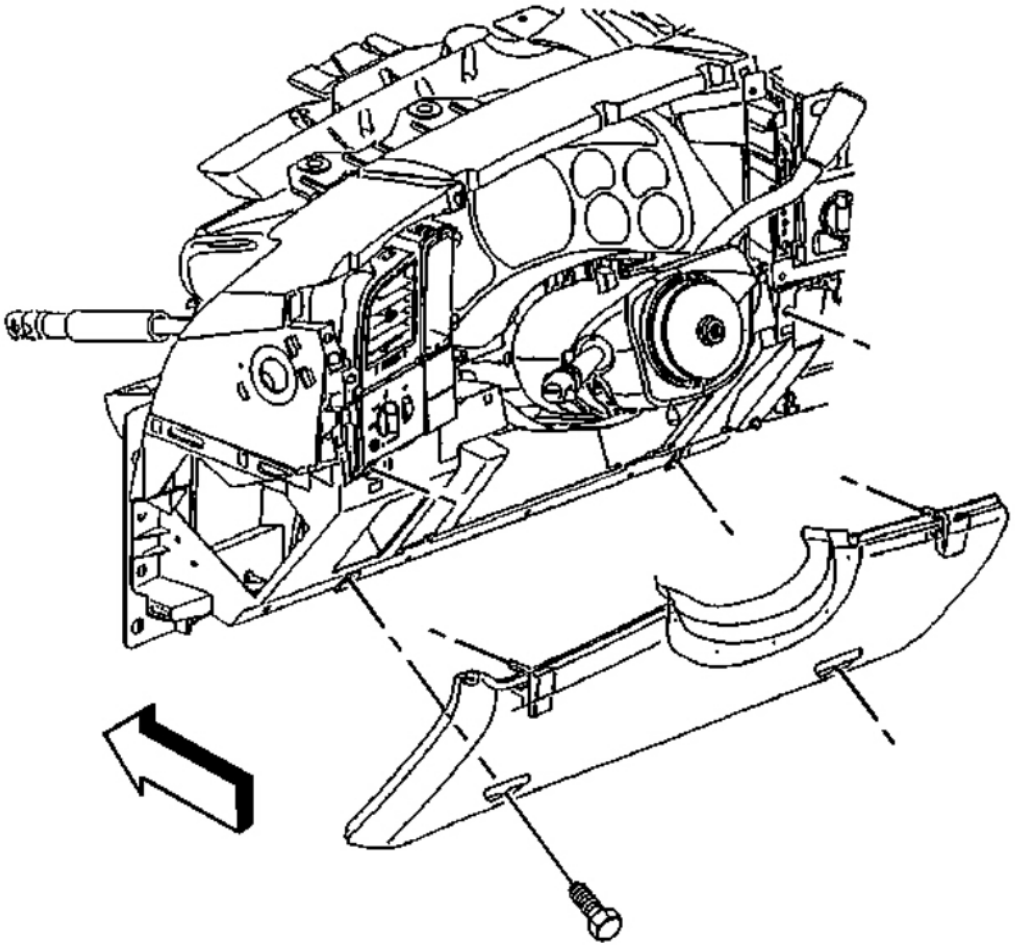


Fig. 19: Removing Knee Bolster
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Snap the top of the knee bolster into the I/P assembly.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the knee bolster screws.

   Tighten: Tighten the screws to 2 N.m (18 lb in).

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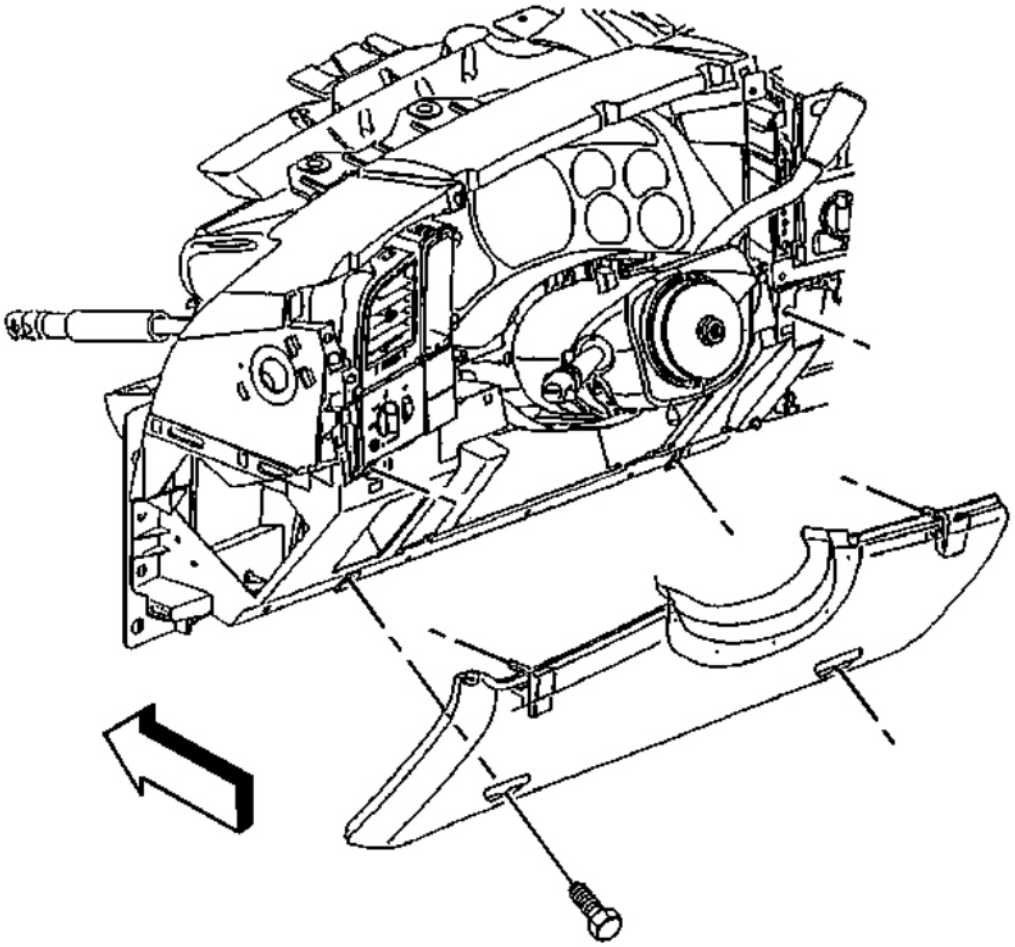


Fig. 20: Installing Knee Bolster
Courtesy of GENERAL MOTORS CORP.

3. Install the I/P cluster trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

TRIM PANEL REPLACEMENT - INSTRUMENT PANEL (I/P) UPPER

Removal Procedure

1. If equipped with air conditioning (A/C), set the air flow control to the instrument panel (IP) vent position.
2. Apply the parking brake to prevent the vehicle from moving.
3. If the transmission is automatic, move the shift lever all the way down.
4. Tilt the steering wheel to the full down position.

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5. Remove the IP cluster trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
6. Remove the end panels. The left panel is shown, and the right panel is similar.
7. Remove the right side air outlets.

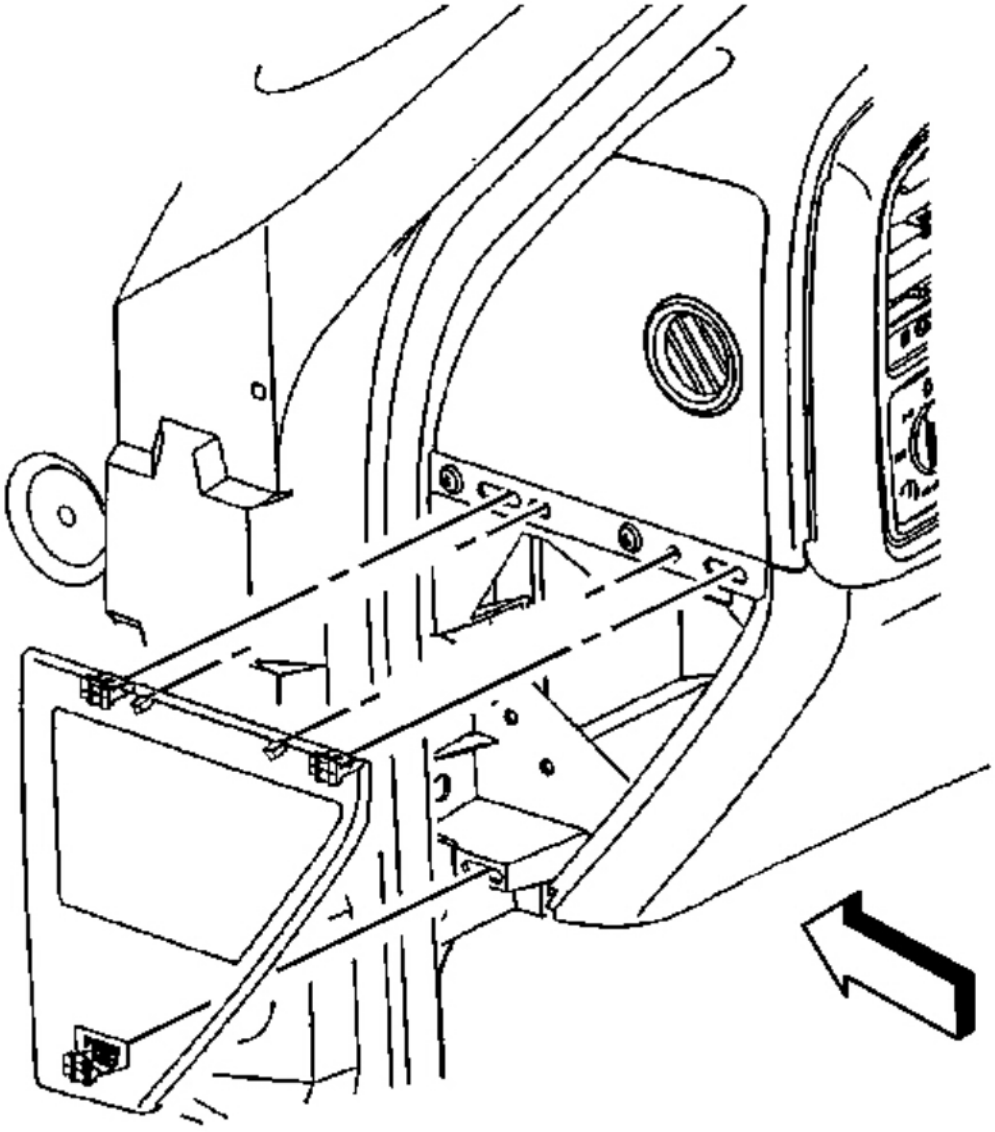


Fig. 21: Removing End Panels
Courtesy of GENERAL MOTORS CORP.

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8. Remove the assist handle by depressing the release tabs accessed through the air outlet duct holes.
9. Remove the windshield pillar garnish moldings. Refer to **Garnish Molding Replacement - Windshield Pillar** in Interior Trim.
10. Remove the bolts retaining the panel to IP assembly.

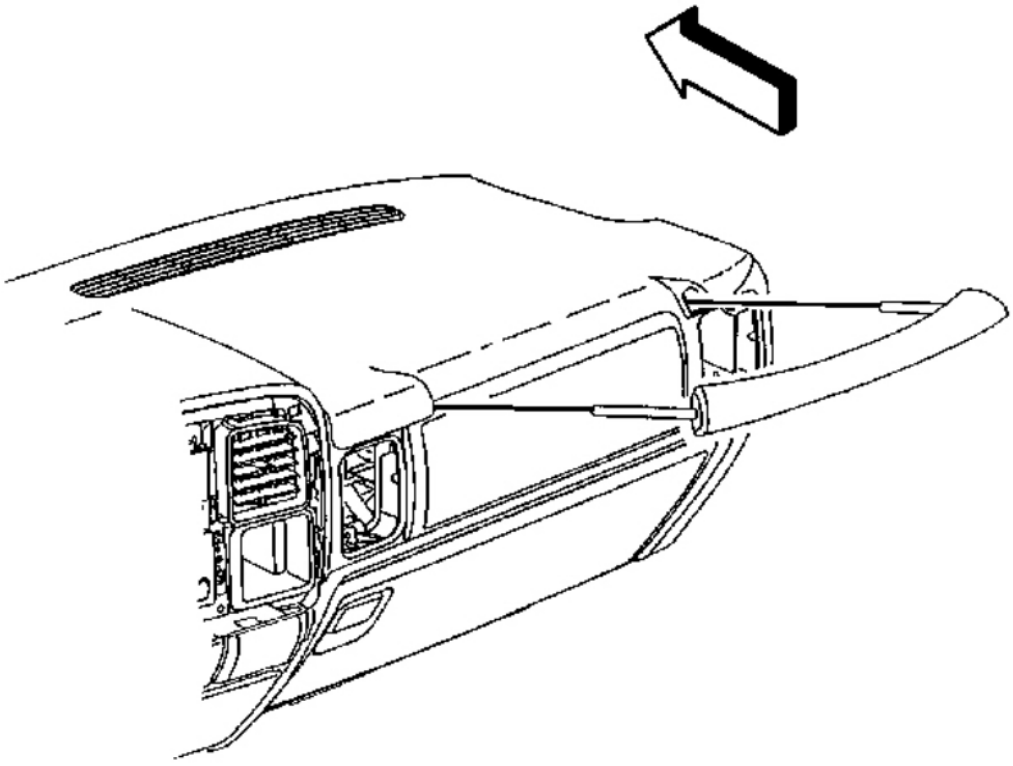


Fig. 22: Removing Assist Handle
Courtesy of GENERAL MOTORS CORP.

11. Lift the trim panel up to disconnect the electrical connector (1) to the ambient light sensor on the underside of the trim panel.

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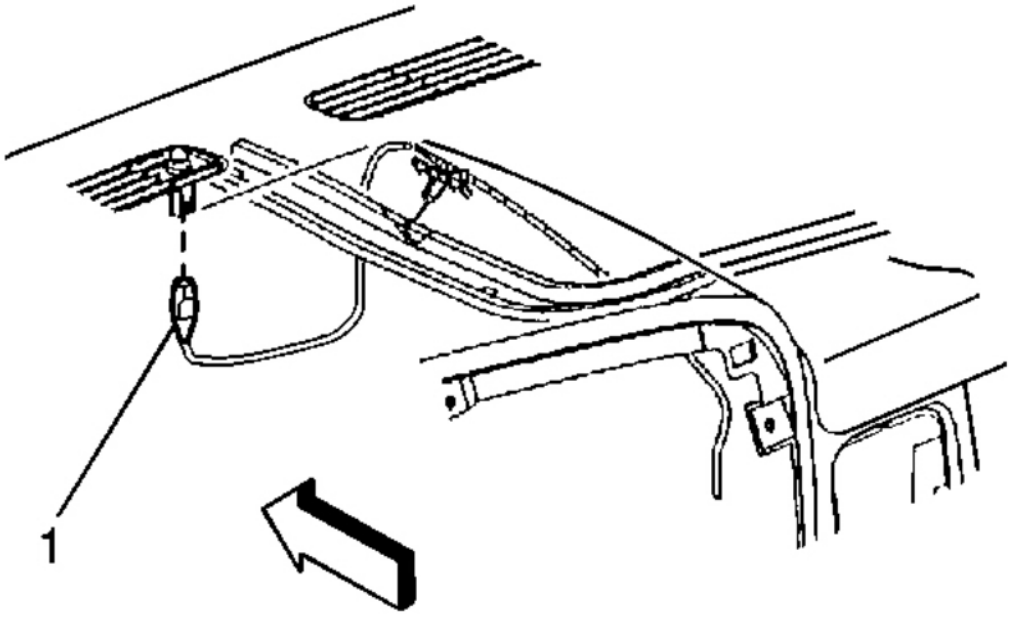


Fig. 23: Disconnecting Electrical Connector From Ambient Light Sensor
Courtesy of GENERAL MOTORS CORP.

12. Remove the trim panel from the IP assembly.

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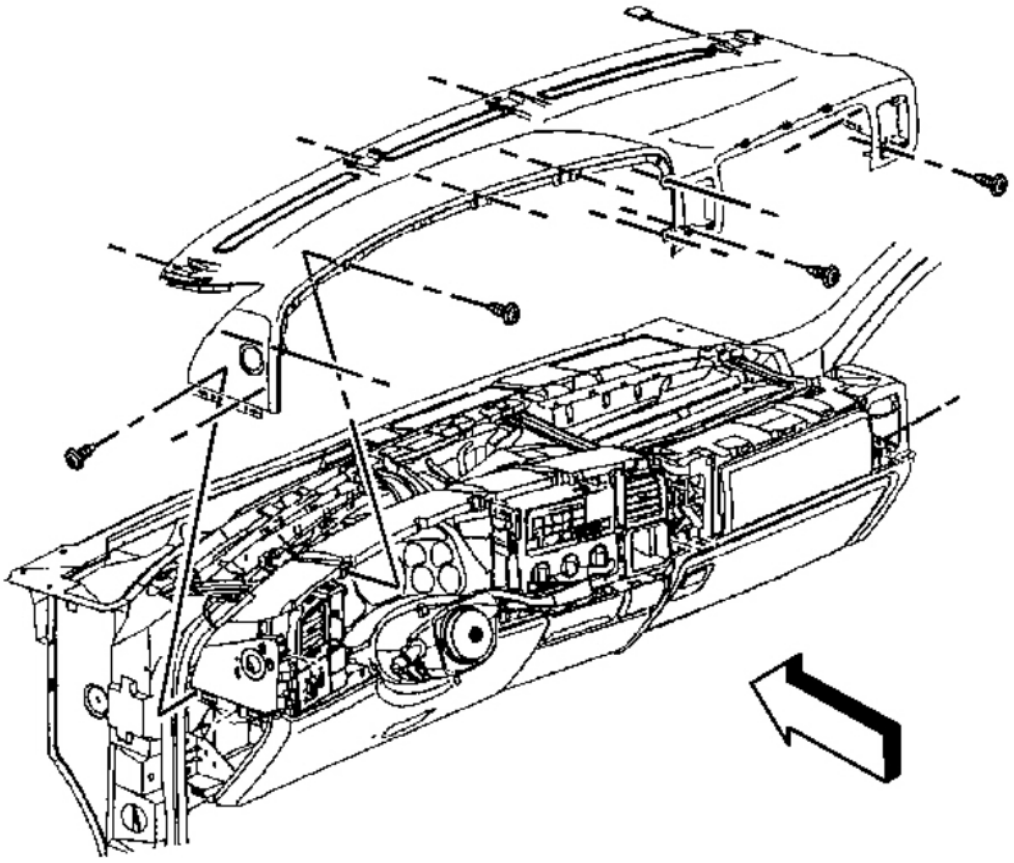


Fig. 24: Removing I/P Assembly Trim Panel
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the electrical connector (1) to the ambient light sensor on the underside of the trim panel.

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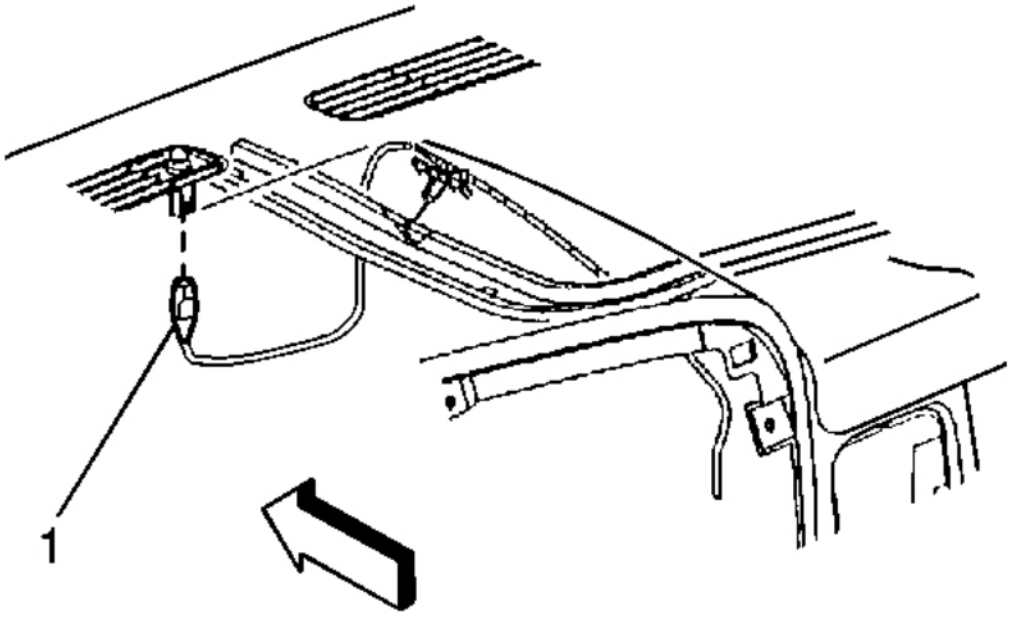


Fig. 25: Connecting Electrical Connector To Ambient Light Sensor
Courtesy of GENERAL MOTORS CORP.

2. Install the trim panel to the IP assembly.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the trim panel retaining screws.

Tighten: Tighten the trim panel retaining screws to 2 N.m (18 lb in).

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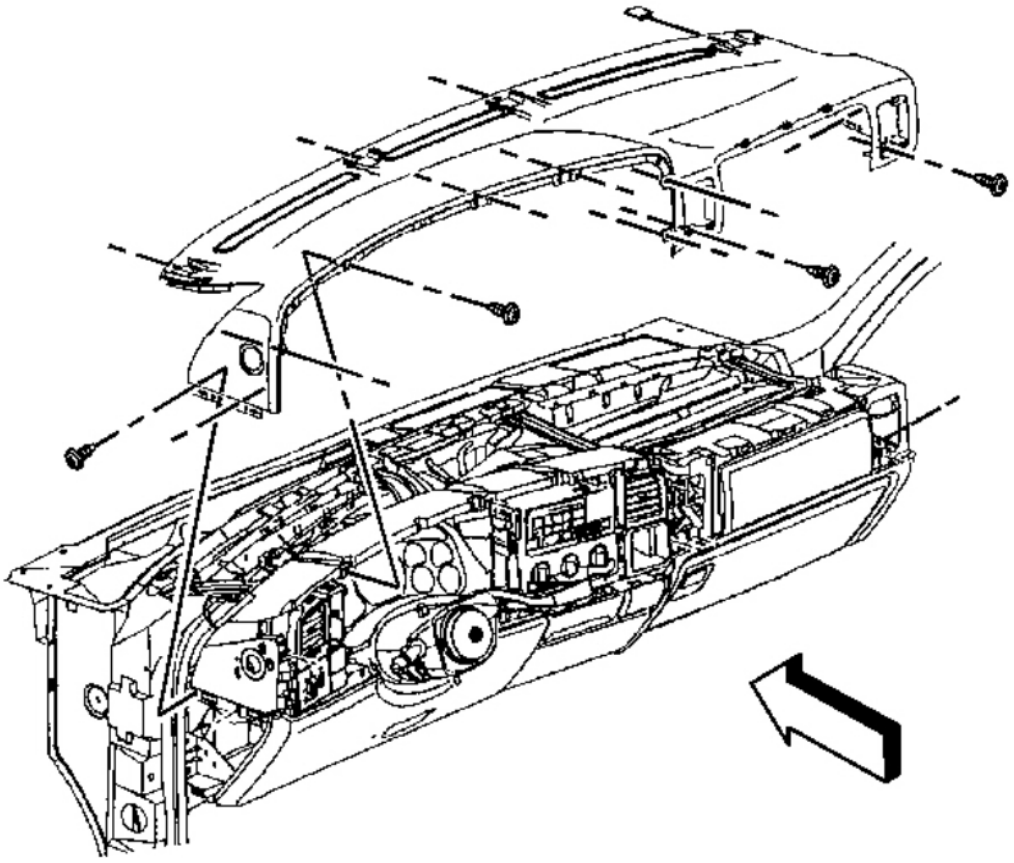


Fig. 26: Installing I/P Assembly Trim Panel
Courtesy of GENERAL MOTORS CORP.

4. Install the windshield pillar garnish moldings. Refer to **Garnish Molding Replacement - Windshield Pillar** in Interior Trim.
5. Align the assist handle with the holes in the IP assembly. Push the handle in order to engage the retaining tabs.

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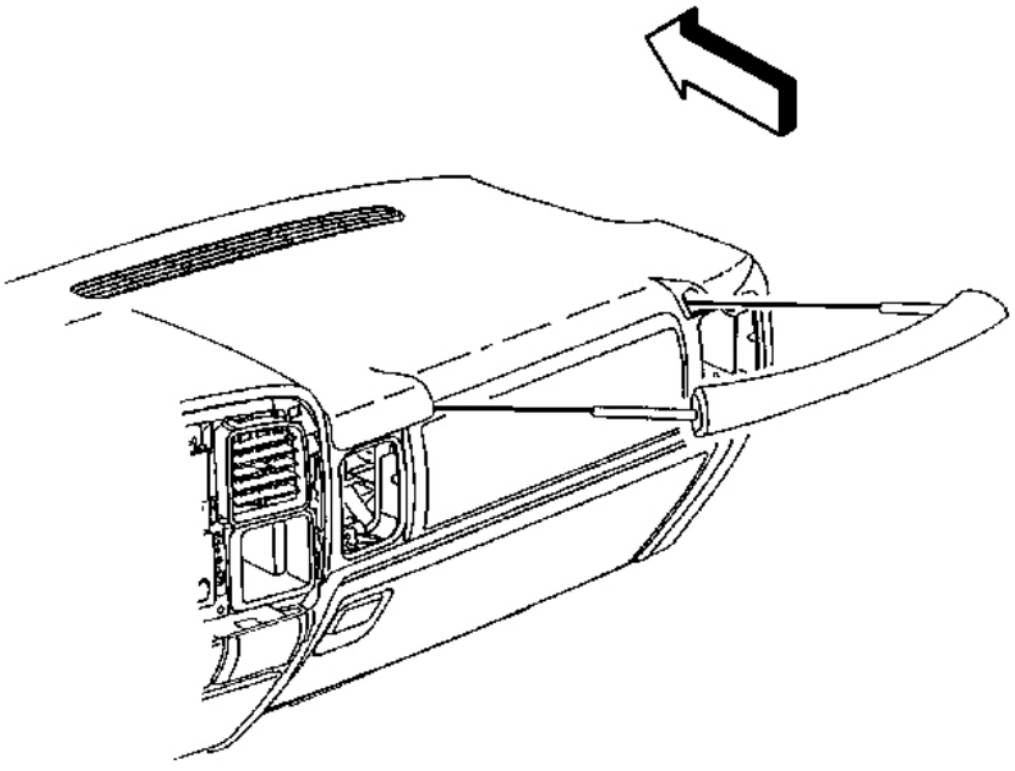


Fig. 27: Installing Assist Handle
Courtesy of GENERAL MOTORS CORP.

6. Install the right side air outlets.
7. Install the end panels. The left panel is shown, and the right panel is similar.

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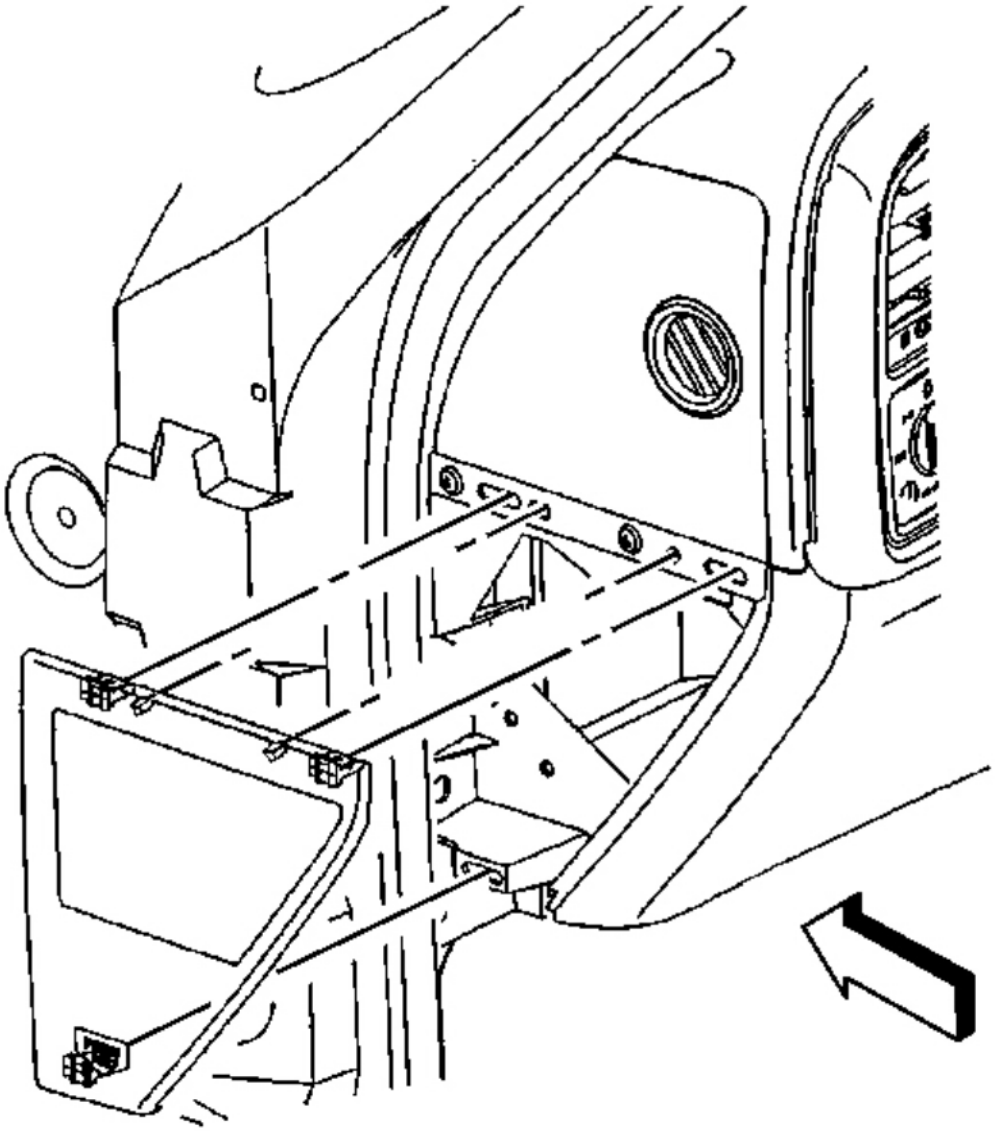


Fig. 28: Installing End Panels
Courtesy of GENERAL MOTORS CORP.

8. Install the IP cluster trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
9. Tilt the steering wheel to the normal driving position.
10. If the transmission is automatic, move the shift lever to the park position.
11. Disengage the parking brake.

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BEZEL REPLACEMENT - INSTRUMENT PANEL (I/P) CLUSTER

Removal Procedure

1. Apply the parking brake to prevent the vehicle from moving.
2. If equipped with an automatic transmission, move the shift lever all the way down to last gear.
3. Tilt the steering wheel to the full down position.
4. Pull gently rearward on the corners of the bezel from the instrument panel (IP) assembly.
5. Remove the bezel.

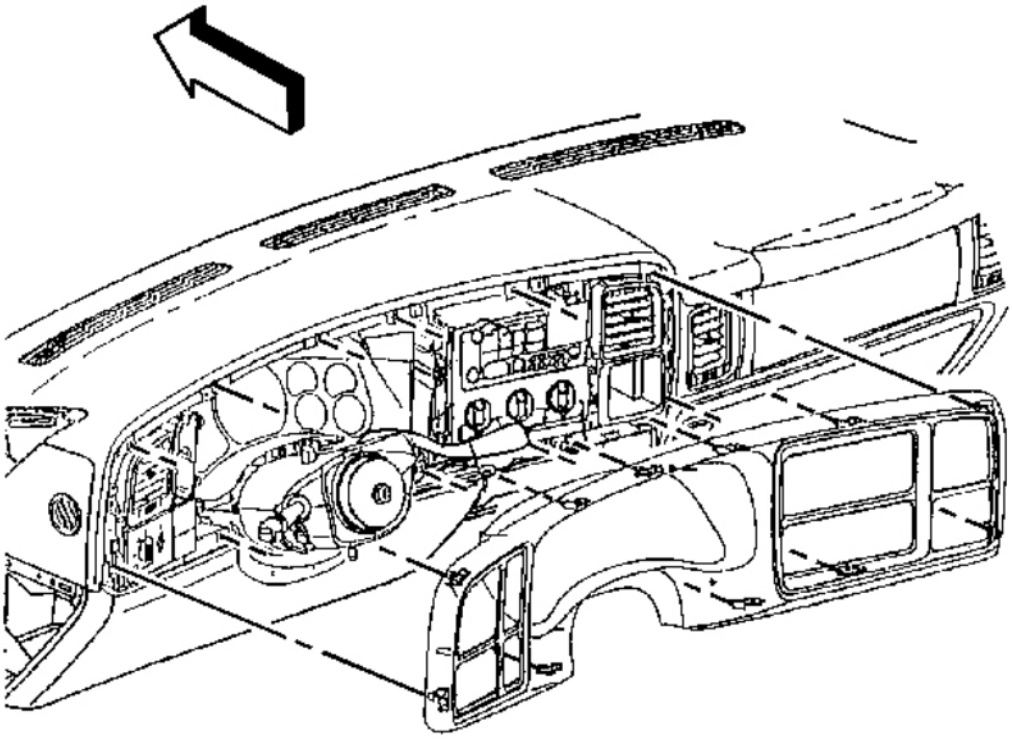


Fig. 29: Removing Instrument Panel Cluster Bezel
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Position the bezel to the IP assembly.
2. Attach the bezel to the IP assembly by pushing gently on the bezel till it is in place.

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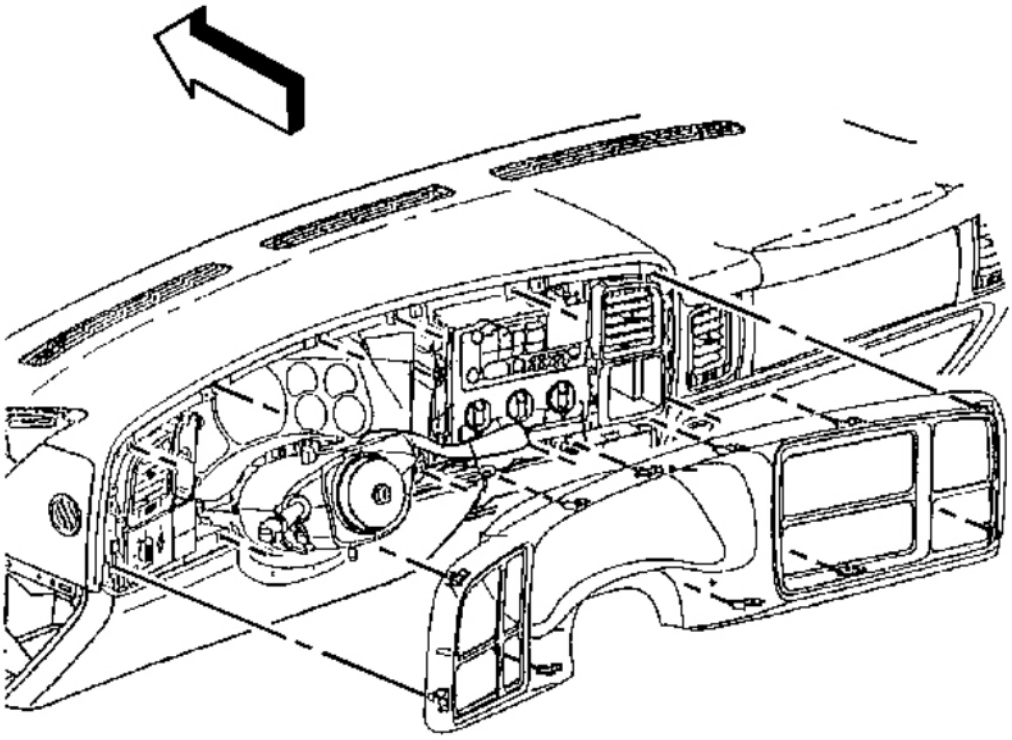


Fig. 30: Installing Instrument Panel Cluster Bezel
Courtesy of GENERAL MOTORS CORP.

3. Ensure all clips are in place.
4. Tilt the steering wheel to the normal drive position.
5. If equipped with an automatic transmission, move the shift lever to the park position.
6. Disengage the parking brake.

DOOR REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

1. Close the I/P compartment door.
2. Drill out the 2 rivets (2).
3. Remove I/P storage compartment door retaining screws (1) from the instrument panel.
4. Remove the I/P compartment door.

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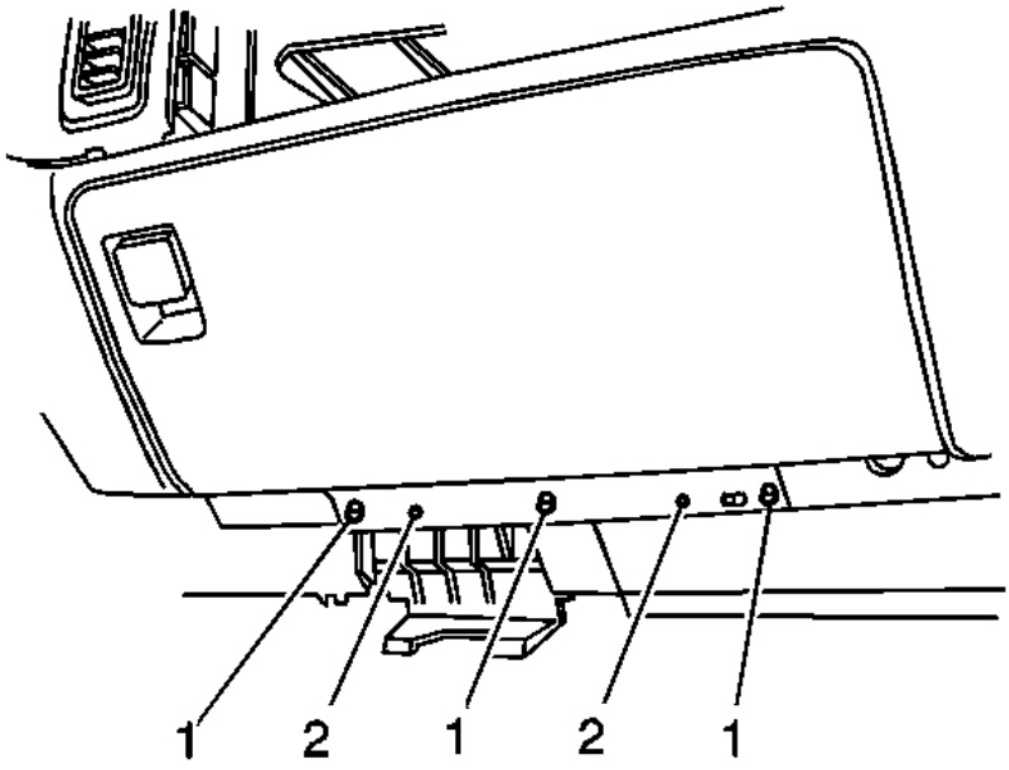


Fig. 31: Removing Rivets & I/P Storage Compartment Door Retaining Screws
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the I/P compartment door.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the I/P compartment retaining screws (1) to the instrument panel.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

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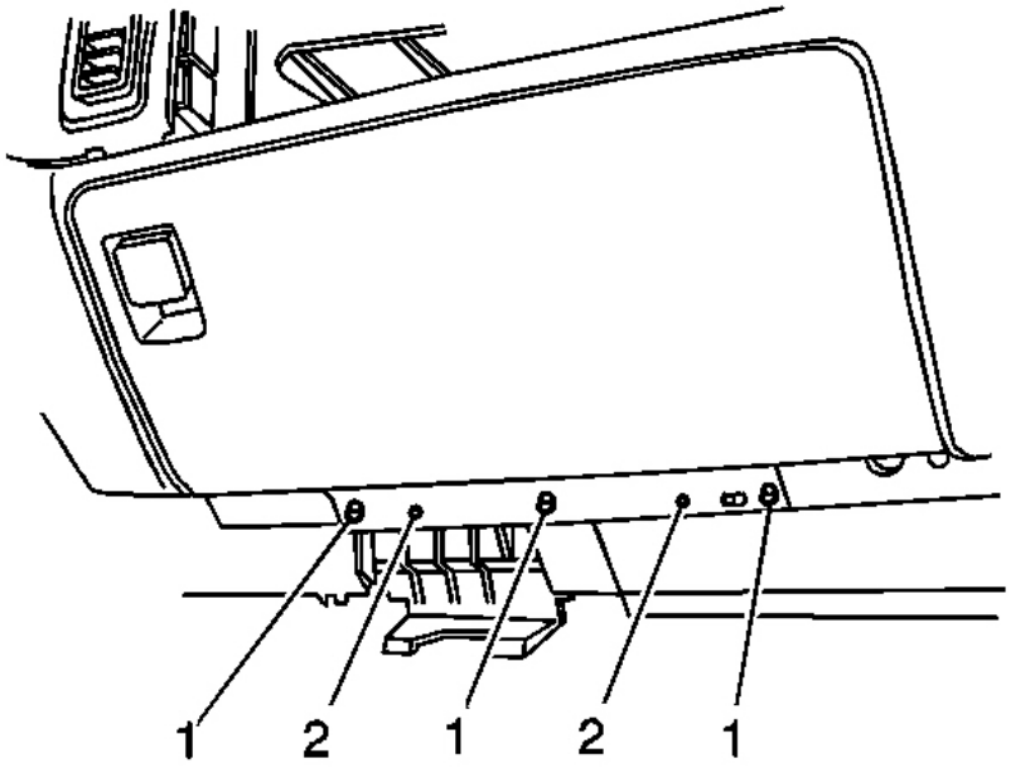


Fig. 32: Installing I/P Compartment Door Retaining Screws
Courtesy of GENERAL MOTORS CORP.

INSTRUMENT PANEL (I/P) ASSIST HANDLE REPLACEMENT

Removal Procedure

1. Remove both the passenger side air deflector louvers. Refer to **Deflector Replacement - Instrument Panel Air - Right** .
2. From the air deflector louver opening, press the release tabs on the instrument panel assist handle retainers on both sides.
3. Pull the assist handle from the instrument panel.

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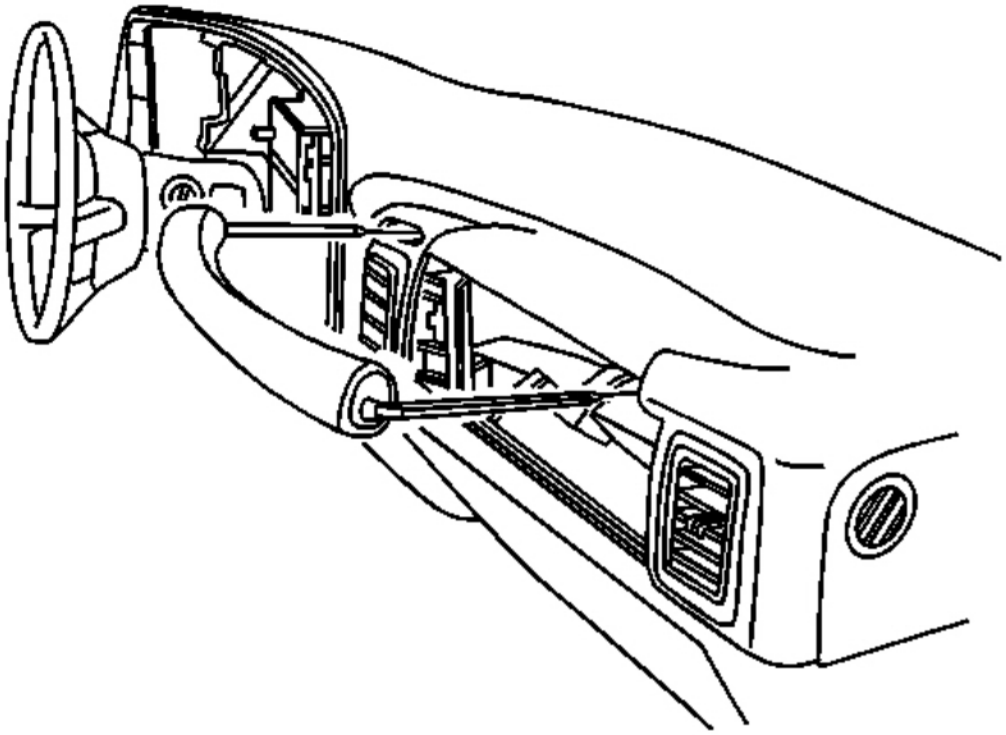


Fig. 33: Removing Instrument Panel Assist Handle
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the instrument panel assist handle by pushing until it locks into place.

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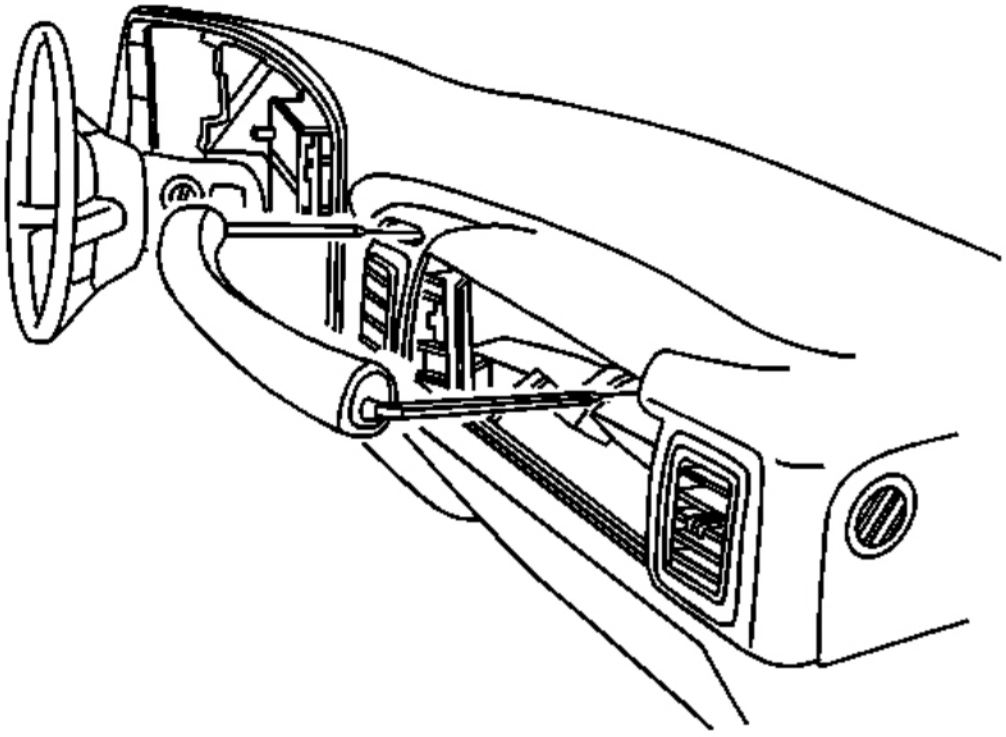


Fig. 34: Installing Instrument Panel Assist Handle
Courtesy of GENERAL MOTORS CORP.

2. Install both the passenger side air deflector louvers. Refer to **Deflector Replacement - Instrument Panel Air - Right** .

INSTRUMENT PANEL CLUSTER (IPC) REPLACEMENT

Removal Procedure

1. Remove the instrument panel cluster (IPC) trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
2. Remove the screws that retain the IPC to the instrument panel (I/P) assembly.

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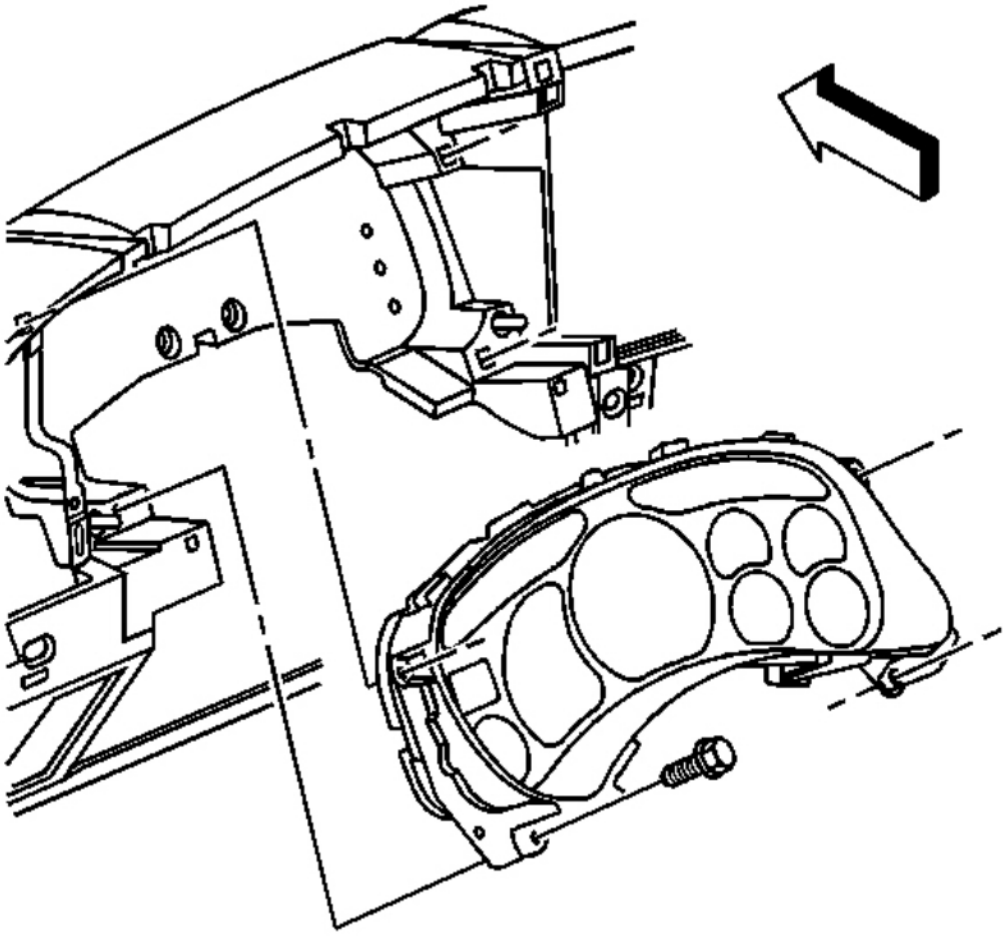


Fig. 35: Removing Instrument Panel Cluster Screws
Courtesy of GENERAL MOTORS CORP.

3. Remove the IPC (2) from the vehicle by tilting the bottom of the cluster outward.
4. Disconnect the IPC harness (1) from the IPC.

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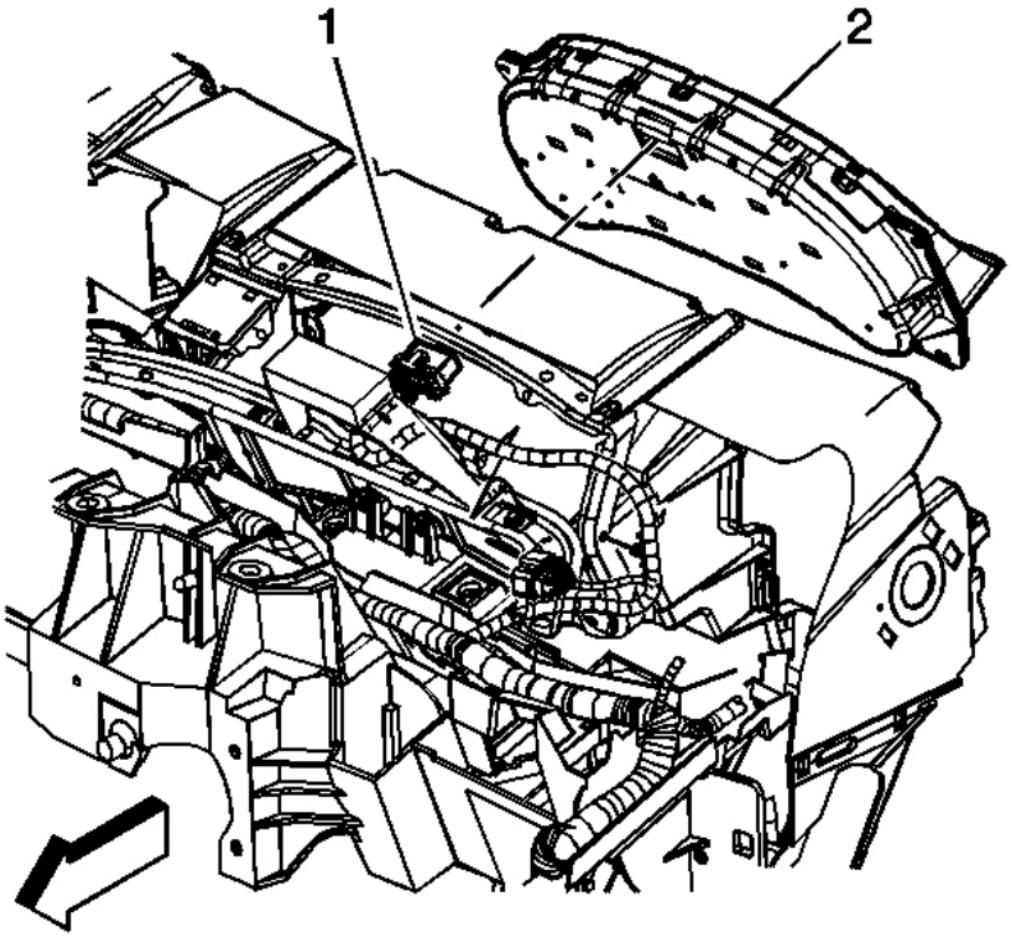


Fig. 36: Removing Instrument Panel Cluster & Disconnecting Harness
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the IPC harness (1) to the IPC (2).

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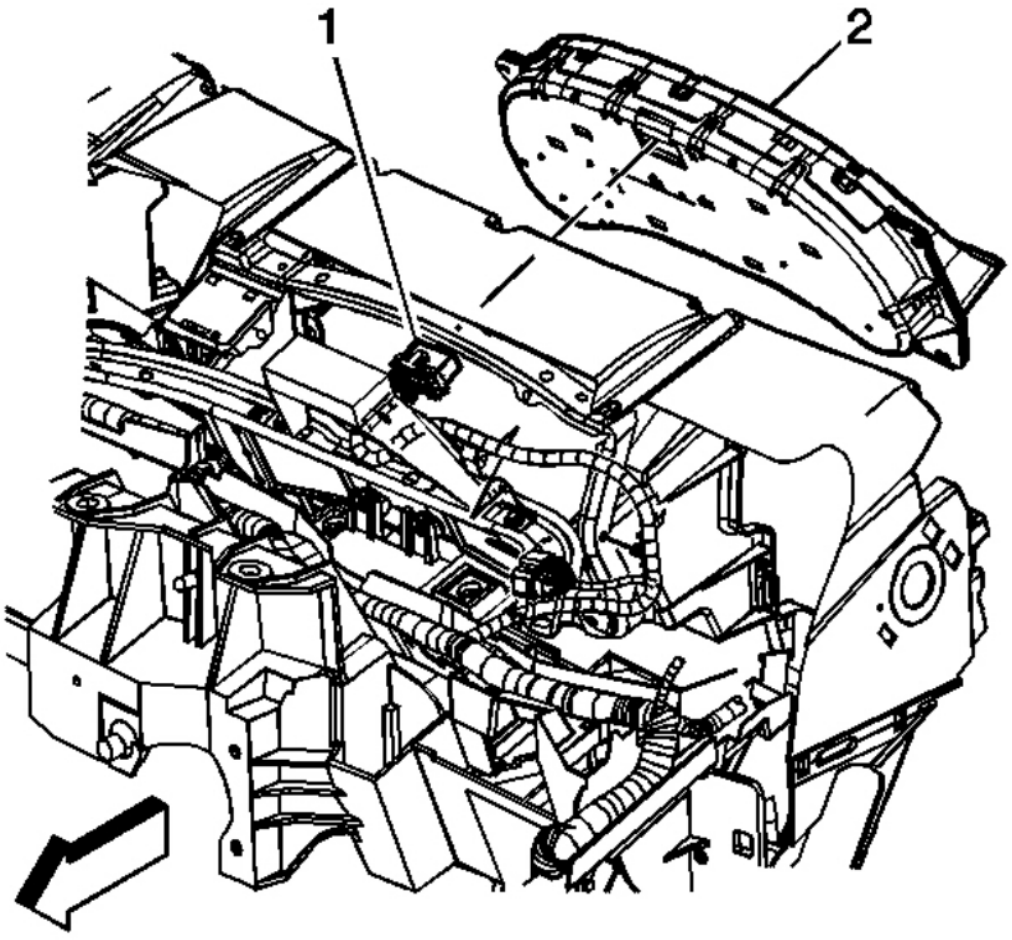


Fig. 37: Connecting Instrument Panel Cluster Harness
Courtesy of GENERAL MOTORS CORP.

2. Install the IPC onto the I/P with the screws. Tilt the top of the cluster into the retainer first to avoid damaging the flexible circuit connections.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws that retain the IPC to the I/P assembly.

Tighten: Tighten the screws to 1.6 N.m (14 lb in).

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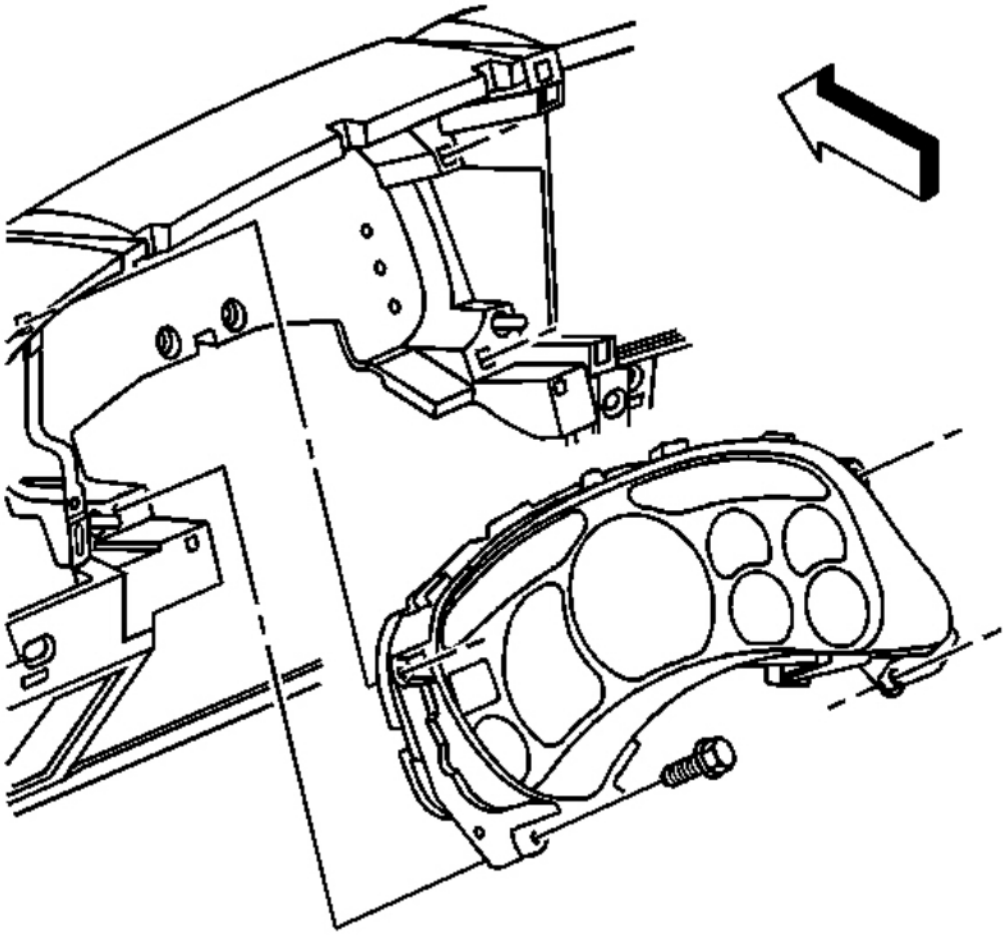


Fig. 38: Installing Instrument Panel Cluster & Screws
Courtesy of GENERAL MOTORS CORP.

4. Install the IPC trim plate bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

   When the IPC is replaced the new IPC will need to be programmed. Refer to **Service Programming System (SPS)** in Programming and Setup.

INSTRUMENT CLUSTER LAMP REPLACEMENT

Removal Procedure

IMPORTANT: This procedure calls for the replacement of incandescent bulbs only. The light

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emitting diodes (LEDs) are not replaceable individually. If LED replacement is needed, send the cluster to an AC Delco Service Center. Refer to Instrument Panel Cluster (IPC) Replacement.

1. Remove the instrument panel (IP) cluster. Refer to **Instrument Panel Cluster (IPC) Replacement**.
2. Unclip the IP cluster rear cover plate by prying gently on the tabs with a screwdriver.

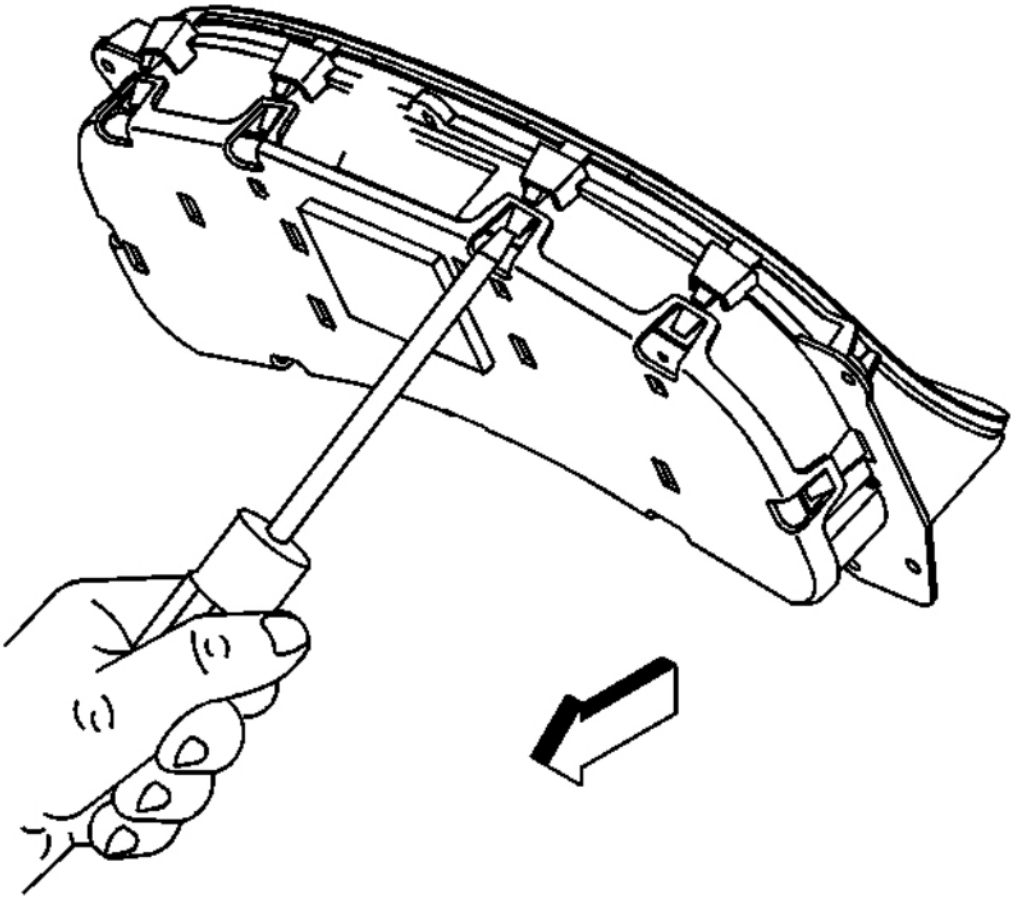


Fig. 39: Unclipping I/P Cluster Rear Cover Plate
Courtesy of GENERAL MOTORS CORP.

3. Remove the rear cover plate from the IP cluster.

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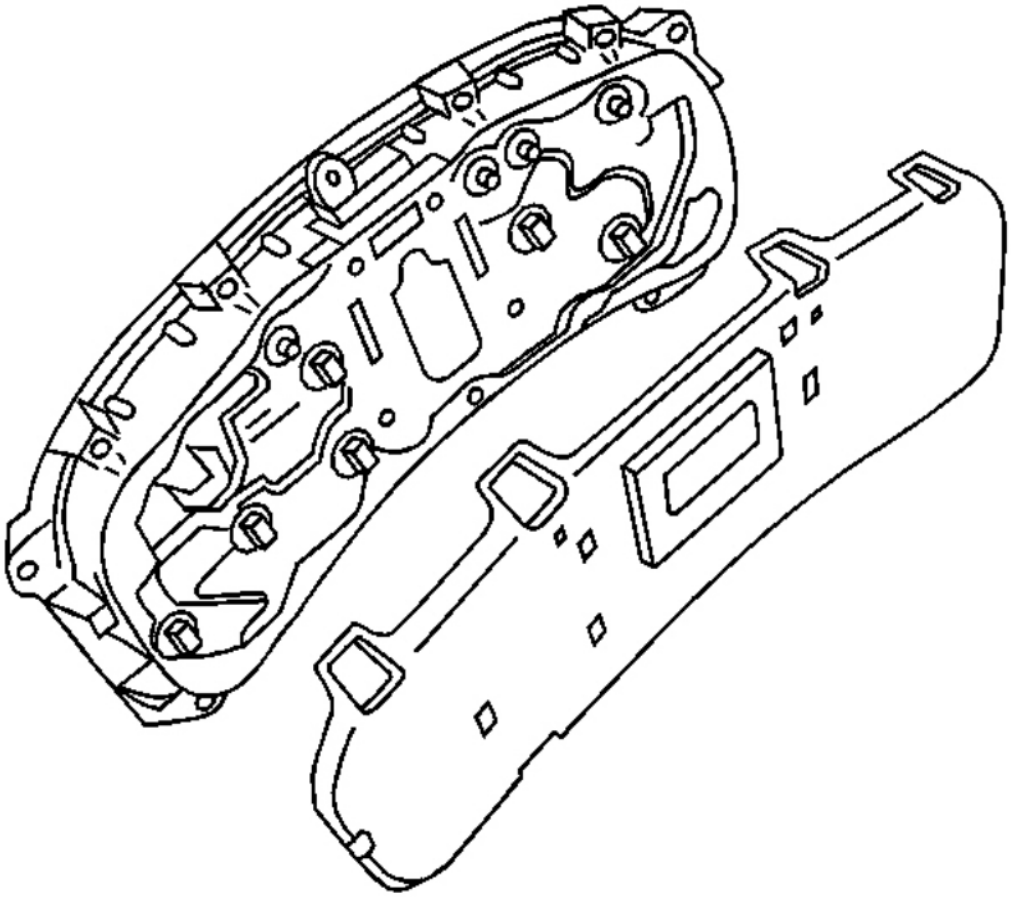


Fig. 40: Removing Rear Cover Plate From I/P Cluster
Courtesy of GENERAL MOTORS CORP.

4. Remove the bulb and base assembly by turning the bulb 1/2 turn counter clockwise and pulling outward.
5. Remove the bulb from the base by pulling outward.

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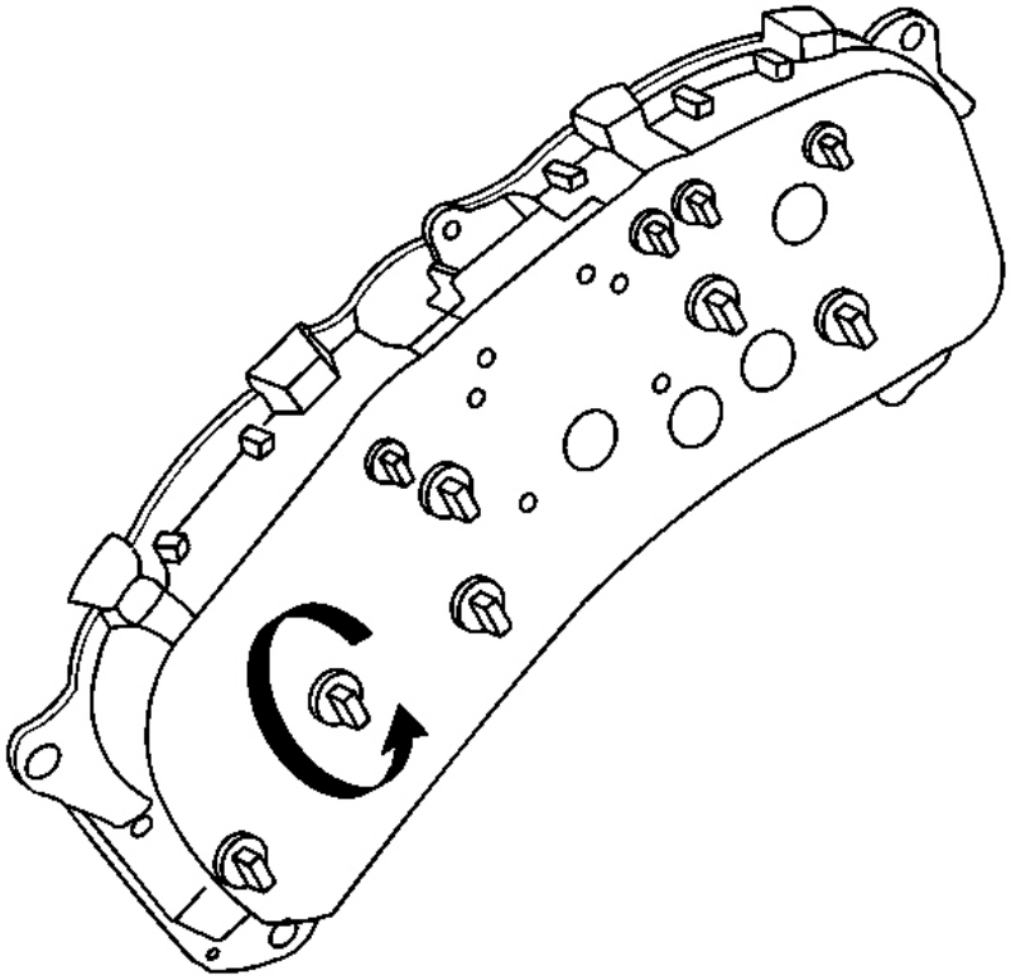


Fig. 41: Removing Instrument Cluster Bulb
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

IMPORTANT: This procedure calls for the replacement of incandescent bulbs only. The light emitting diodes (LEDs) are not replaceable individually. If LED replacement is needed, send the cluster to an AC Delco Service Center. Refer to Instrument Panel Cluster (IPC) Replacement.

1. Install the bulb to the base.
2. Install the bulb into the cluster by inserting the bulb and base assembly and turning the bulb 1/2 turn

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clockwise.

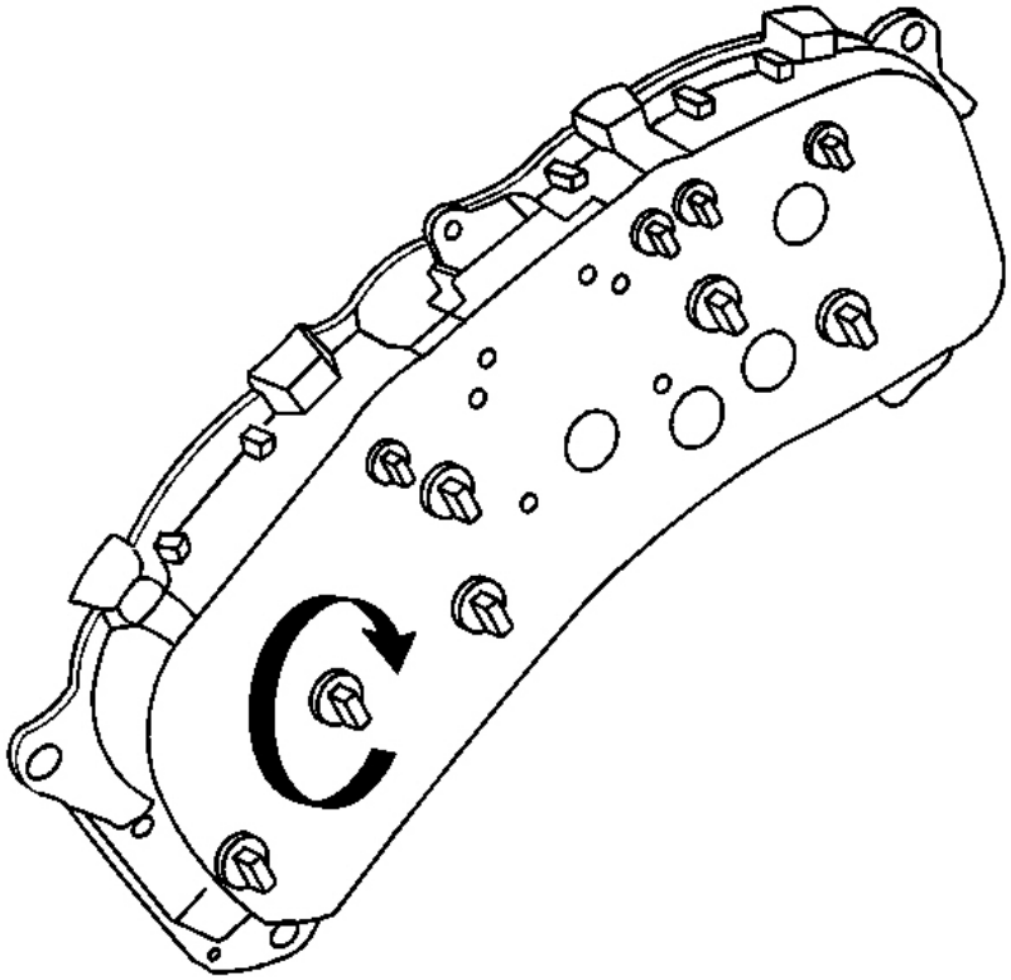


Fig. 42: Installing Instrument Cluster Bulb
Courtesy of GENERAL MOTORS CORP.

3. Carefully snap the rear cover plate to the IP cluster.

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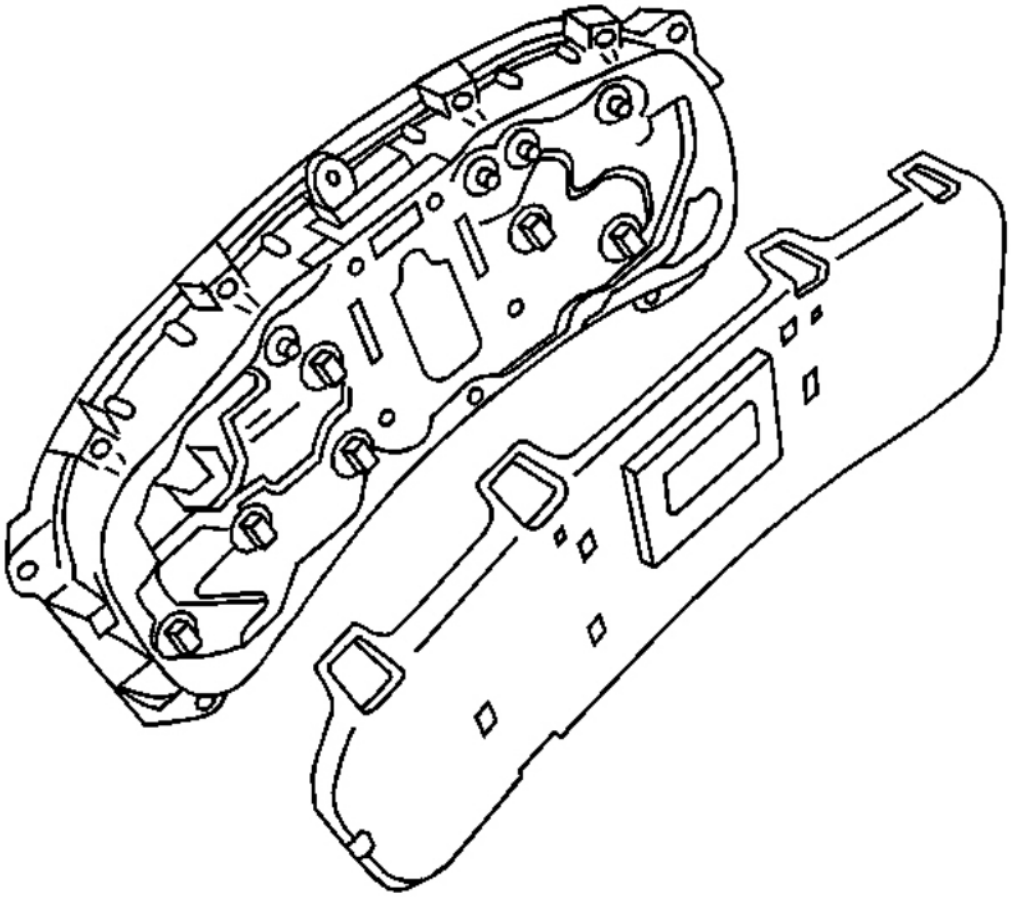


Fig. 43: Snapping Rear Cover Plate To I/P Cluster
Courtesy of GENERAL MOTORS CORP.

4. Install the IP cluster. Refer to **Instrument Panel Cluster (IPC) Replacement**.

ASHTRAY REPLACEMENT (NON-CONSOLE)

Removal Procedure

1. Open the ashtray and press the tab (1).

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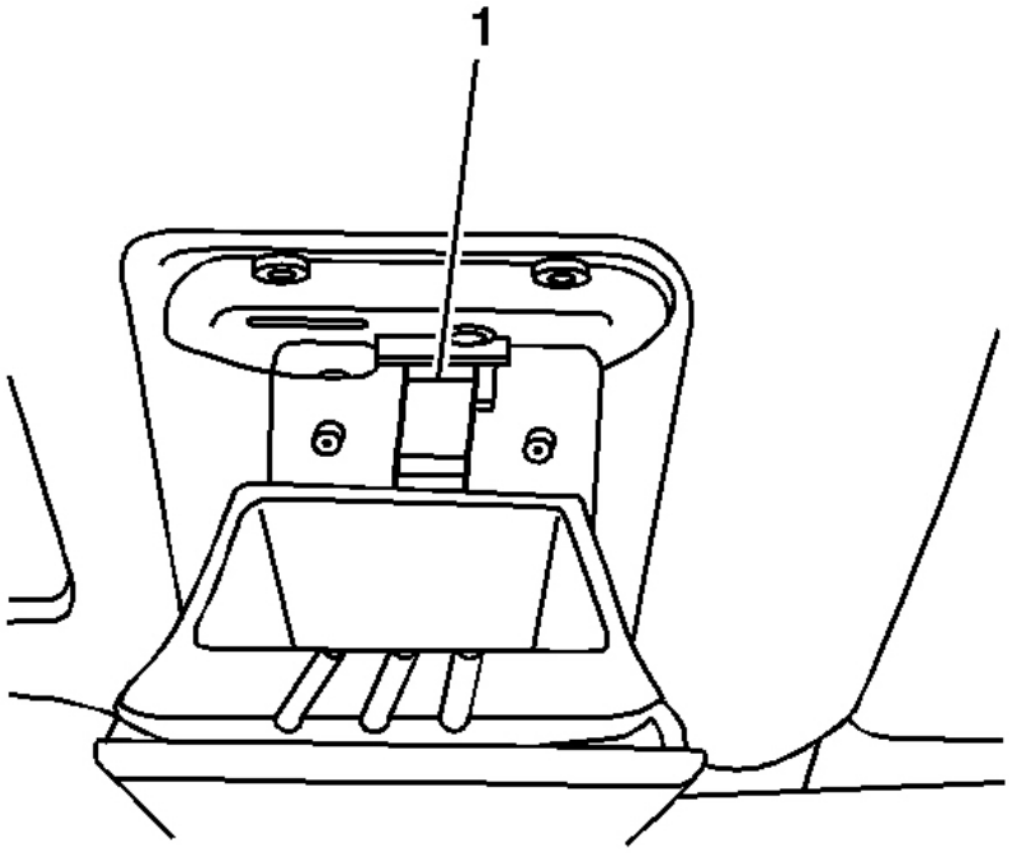


Fig. 44: Opening Ashtray & Pressing Tab
Courtesy of GENERAL MOTORS CORP.

2. Drill out the head of the rivet (1).
3. Remove the ashtray assembly from the trim panel.

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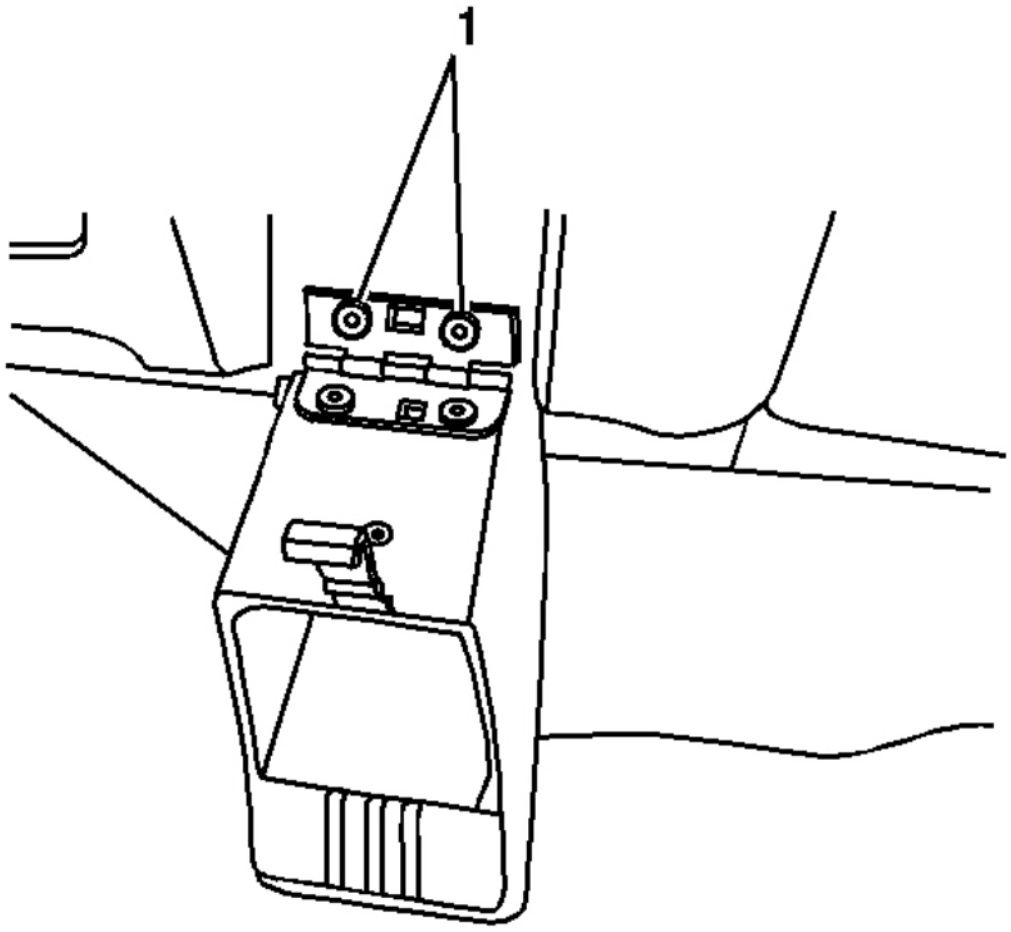


Fig. 45: Removing Rivets & Ashtray Assembly (Non-Console)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the ashtray assembly to the trim panel.
2. Install new rivets (1) to attach the ashtray to the trim panel.

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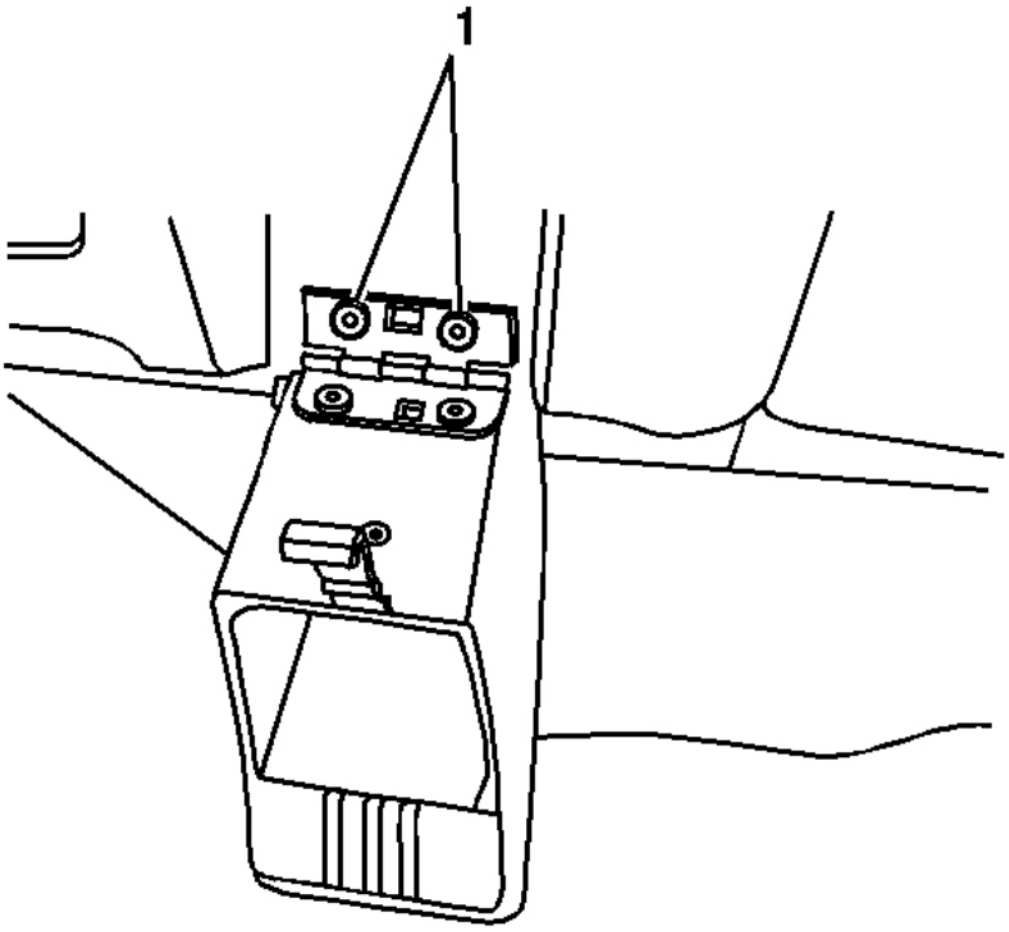


Fig. 46: Installing Ashtray Assembly & Rivets (Non-Console)
Courtesy of GENERAL MOTORS CORP.

3. Close the ashtray so that the tab (1) goes through the opening.

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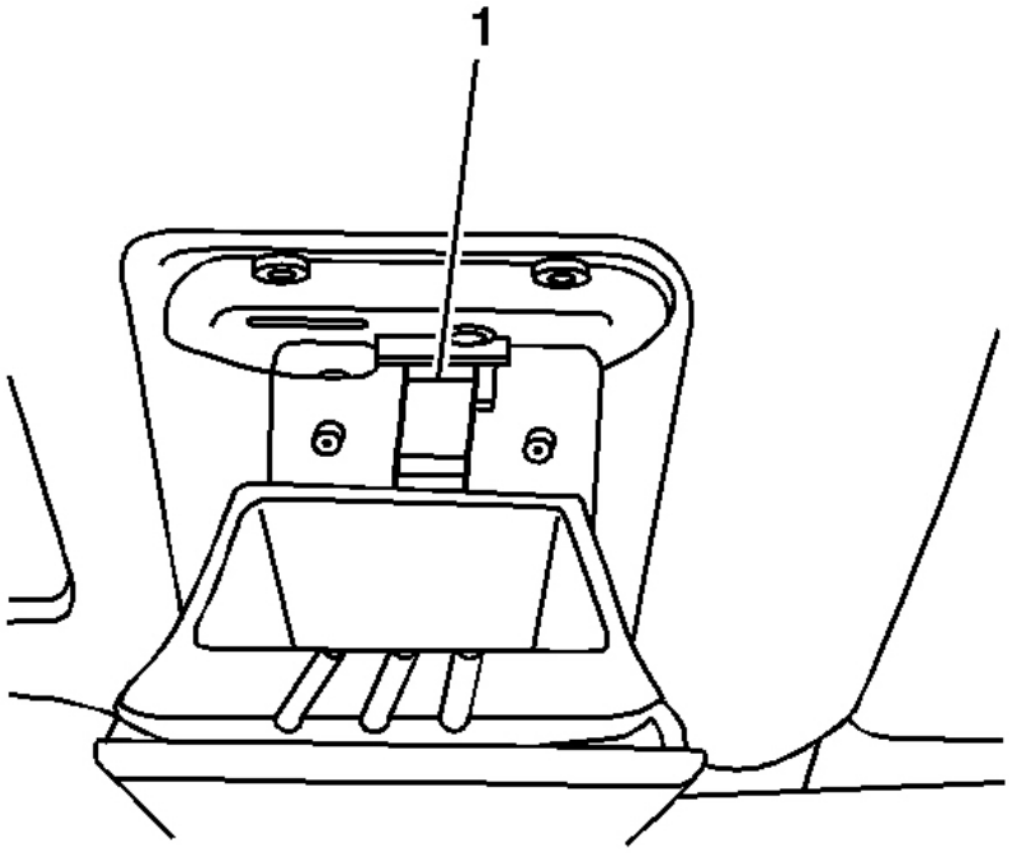


Fig. 47: Closing Ashtray
Courtesy of GENERAL MOTORS CORP.

ASHTRAY REPLACEMENT (CONSOLE)

Ashtray in the luxury console is replaced as an assembly with the cupholder. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.

CUPHOLDER REPLACEMENT (NON-LUXURY)

Removal Procedure

1. Grab the middle of the cup holder firmly and pull outwards to release the clips (1).
2. Remove the cup holder from the console.

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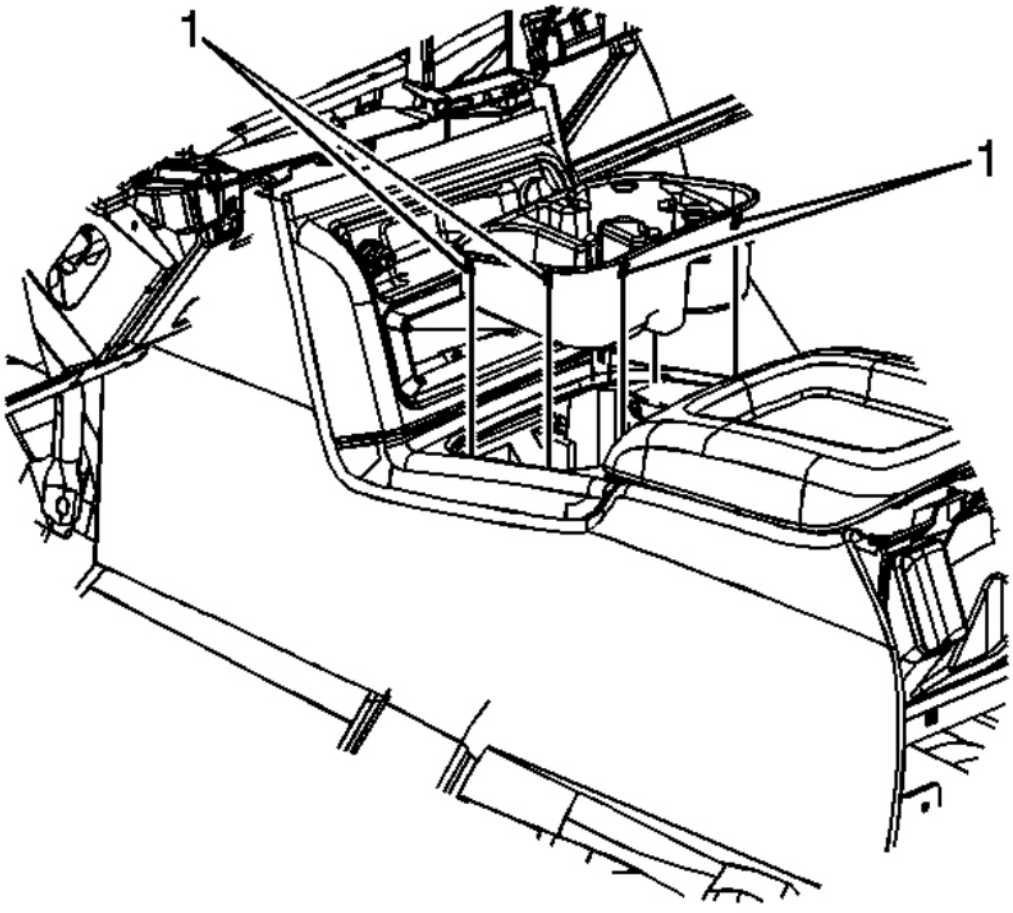


Fig. 48: Removing Cupholder (Non-Luxury)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the cup holder by pushing inwards till the clips (1) click in place.
2. Ensure around the corners of the cup holder is seated properly.

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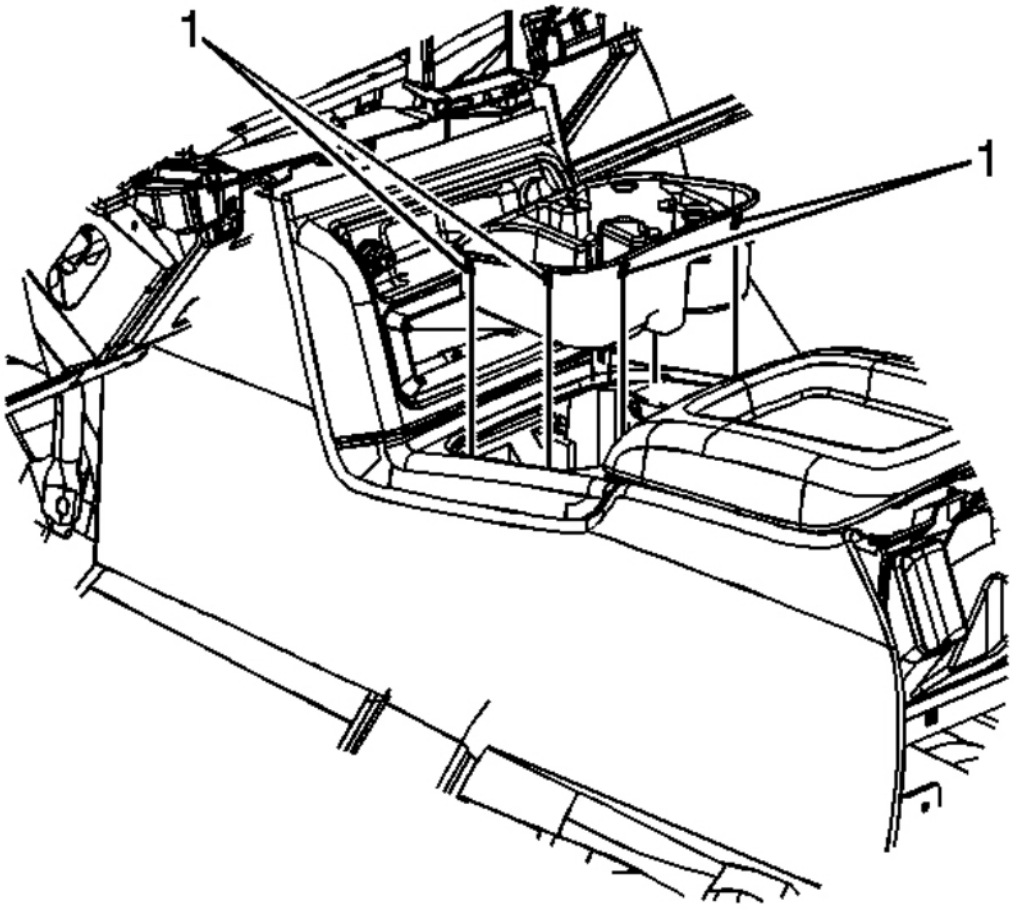


Fig. 49: Installing Cupholder (Non-Luxury)
Courtesy of GENERAL MOTORS CORP.

CUPHOLDER REPLACEMENT (LUXURY)

Removal Procedure

1. Remove the upper trim bezel from the center console. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
2. Remove the remote CD player if equipped. Refer to **Remote CD Player Replacement** in Entertainment.
3. Insert a flat bladed tool between the console and cupholder assembly.
4. Remove the cupholder assembly by prying the cupholder to release the clips (2).
5. Remove the wire connector for the cupholder.
6. Remove the cupholder from the console.

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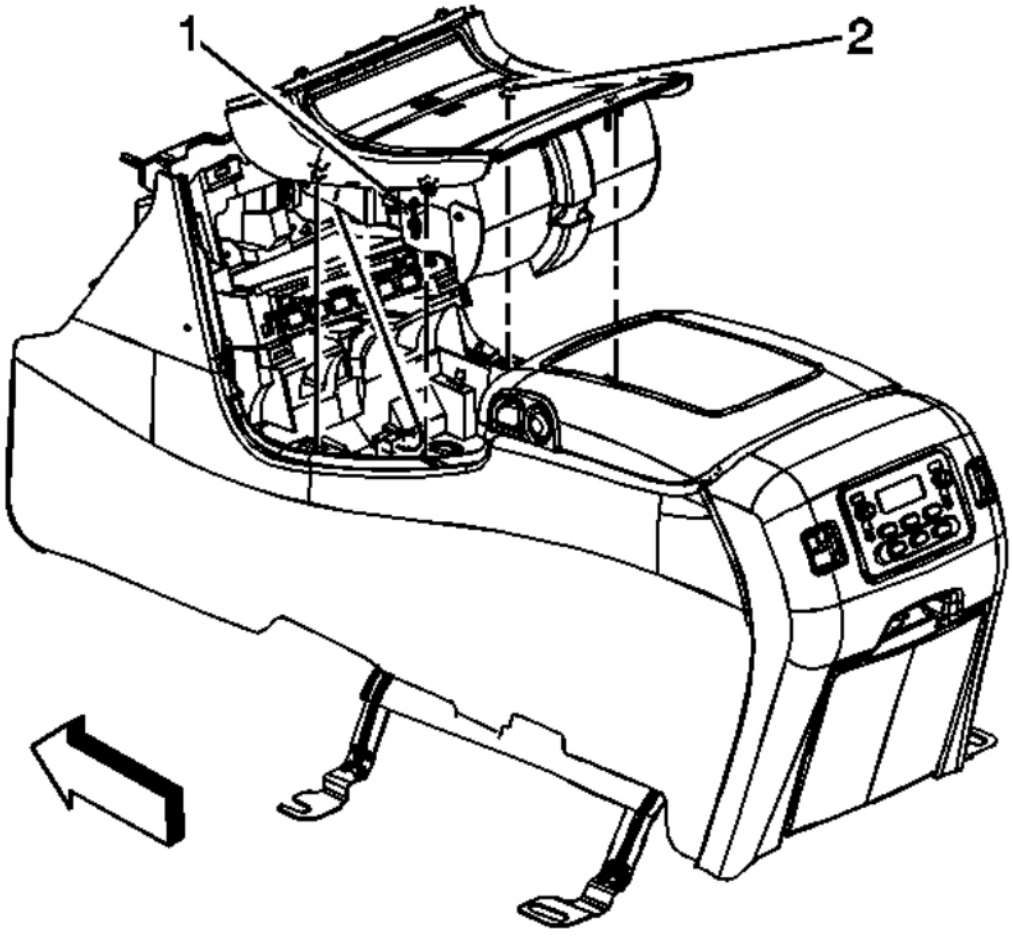


Fig. 50: Removing Cupholder (Luxury)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Place the cupholder assembly over the console.
2. Connect the wire connector to the cupholder assembly.
3. Push on the corners of the cupholder assembly till all the retaining clips (2) are seated.

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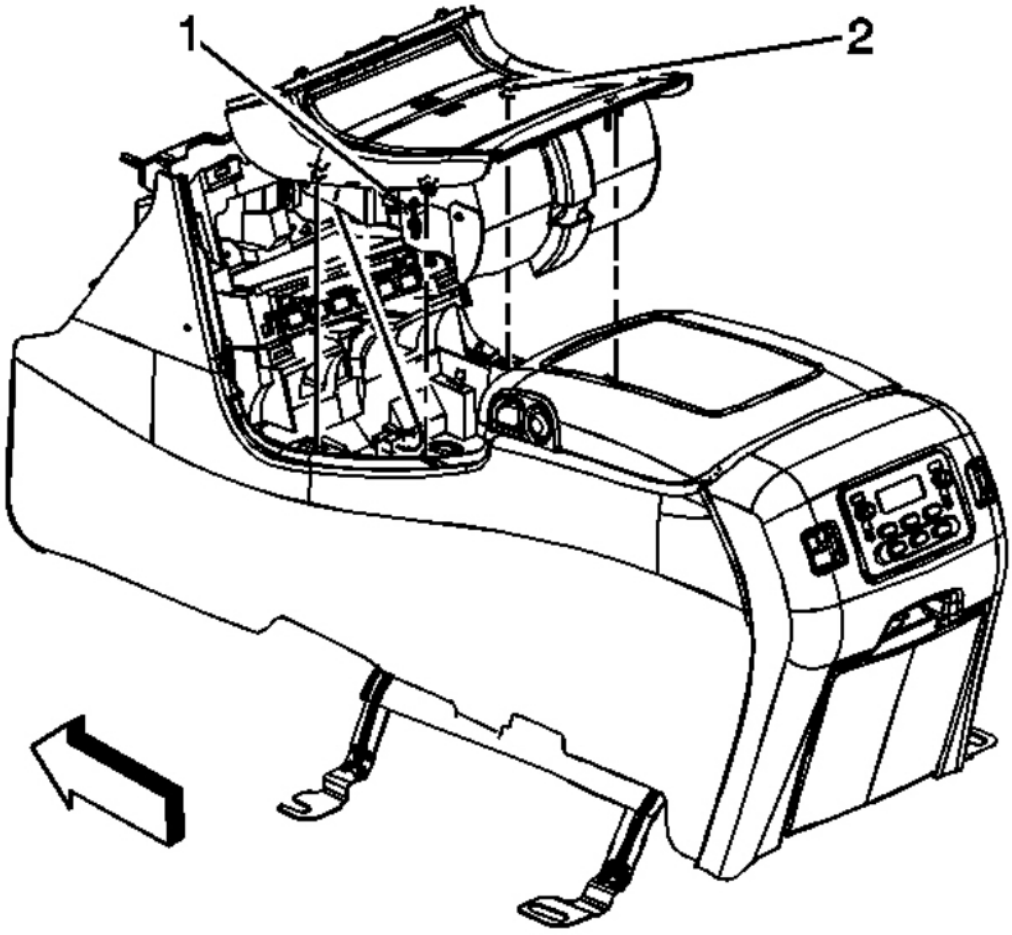


Fig. 51: Installing Cupholder (Luxury)
Courtesy of GENERAL MOTORS CORP.

4. Install the remote CD player if equipped. Refer to **Remote CD Player Replacement** in Entertainment.
5. Install the upper trim bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.

CUPHOLDER REPLACEMENT (REAR)

Removal Procedure

1. Lower the cupholder.
2. Insert a flat bladed tool between the cupholder hinge and the end panel.

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3. Pry off the cupholder from the console.

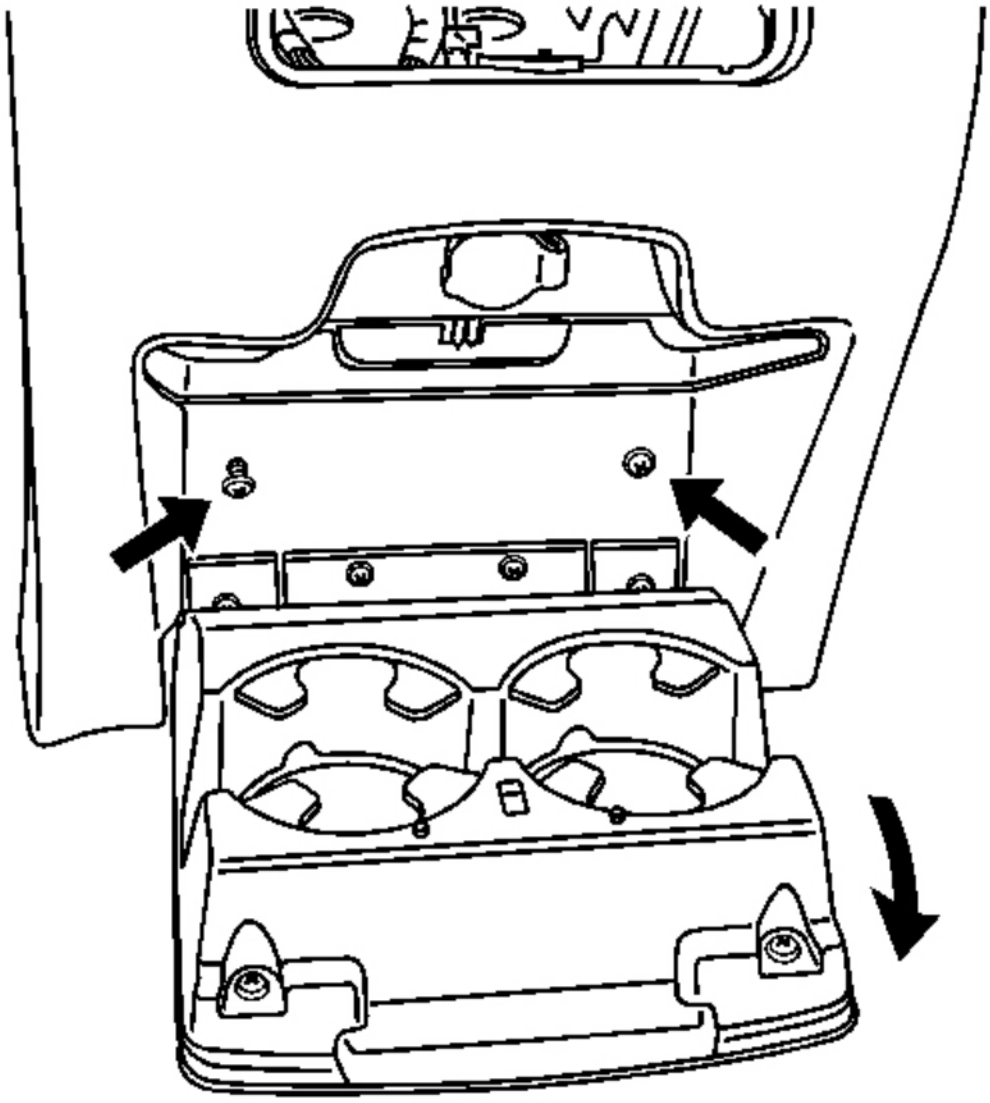


Fig. 52: Removing Cupholder (Rear)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install one of the hinge in the opening in the panel.

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2. Swing the cupholder assembly so that the other hinge can be installed in the other opening.
3. Inspect for correct operation.

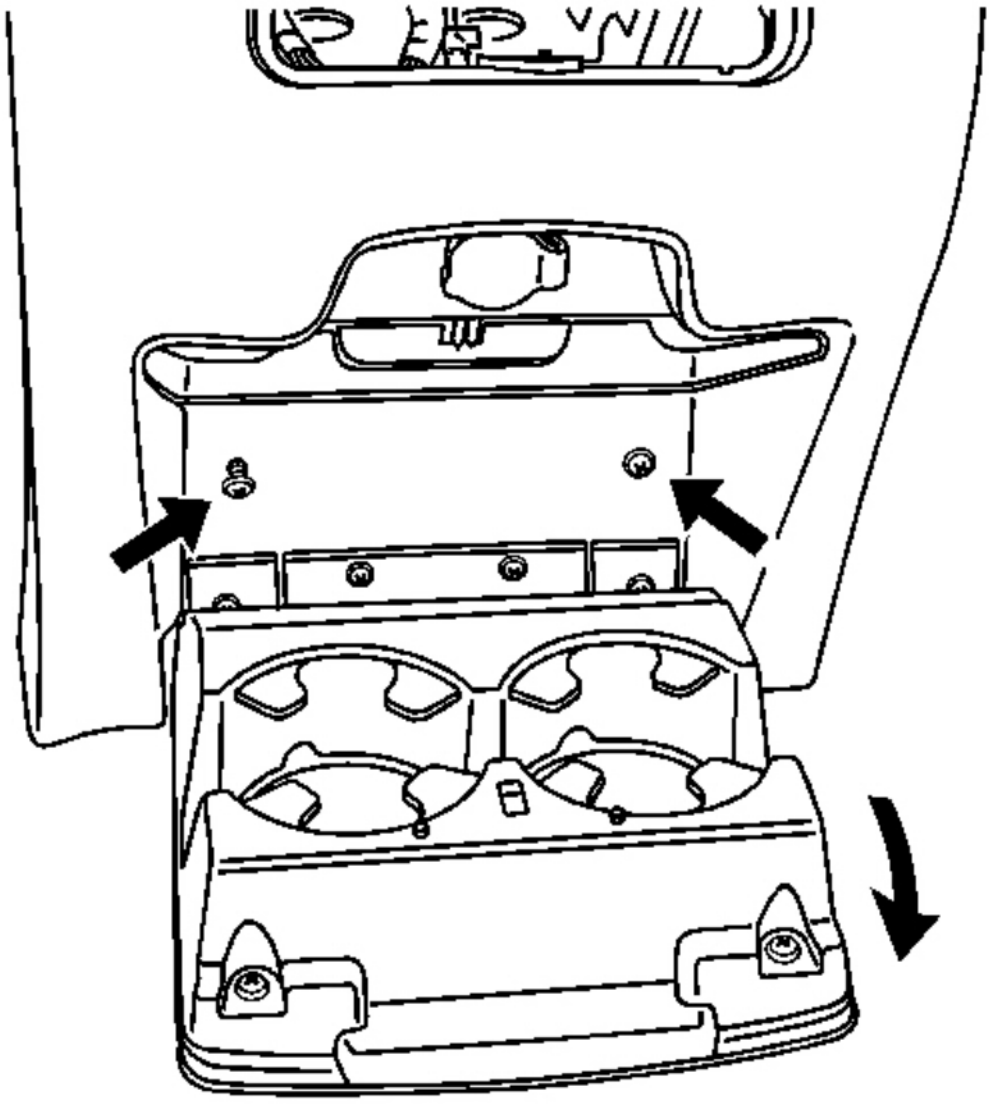


Fig. 53: Installing Cupholder (Rear)
Courtesy of GENERAL MOTORS CORP.

CUPHOLDER REPLACEMENT (PLATINUM)

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Removal Procedure

1. Remove the console bezel assembly. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
2. Remove the blower assembly. Refer to **Blower Replacement - Cupholder - Front Floor Console**.
3. Remove the four retaining screws.
4. Remove the plastic cover that the blower assembly slides into.
5. Slide the heat/cool unit from the front of the cup holder assembly.

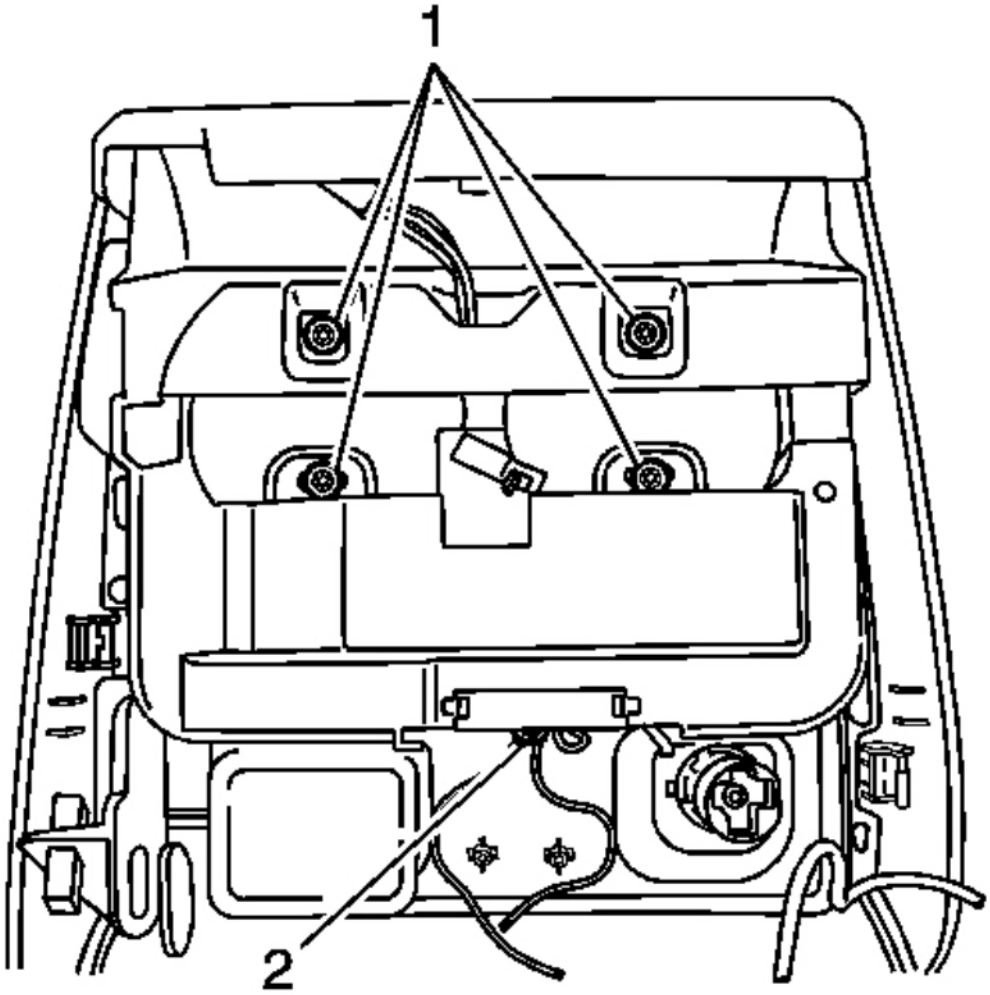


Fig. 54: Removing Cupholder (Platinum)

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Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the heat/cool unit in the cup holder assembly from the front of the assembly.
2. Install the plastic cover.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the four retaining screws.

   Tighten: Tighten the screws to 7 Nm (62 lb in).

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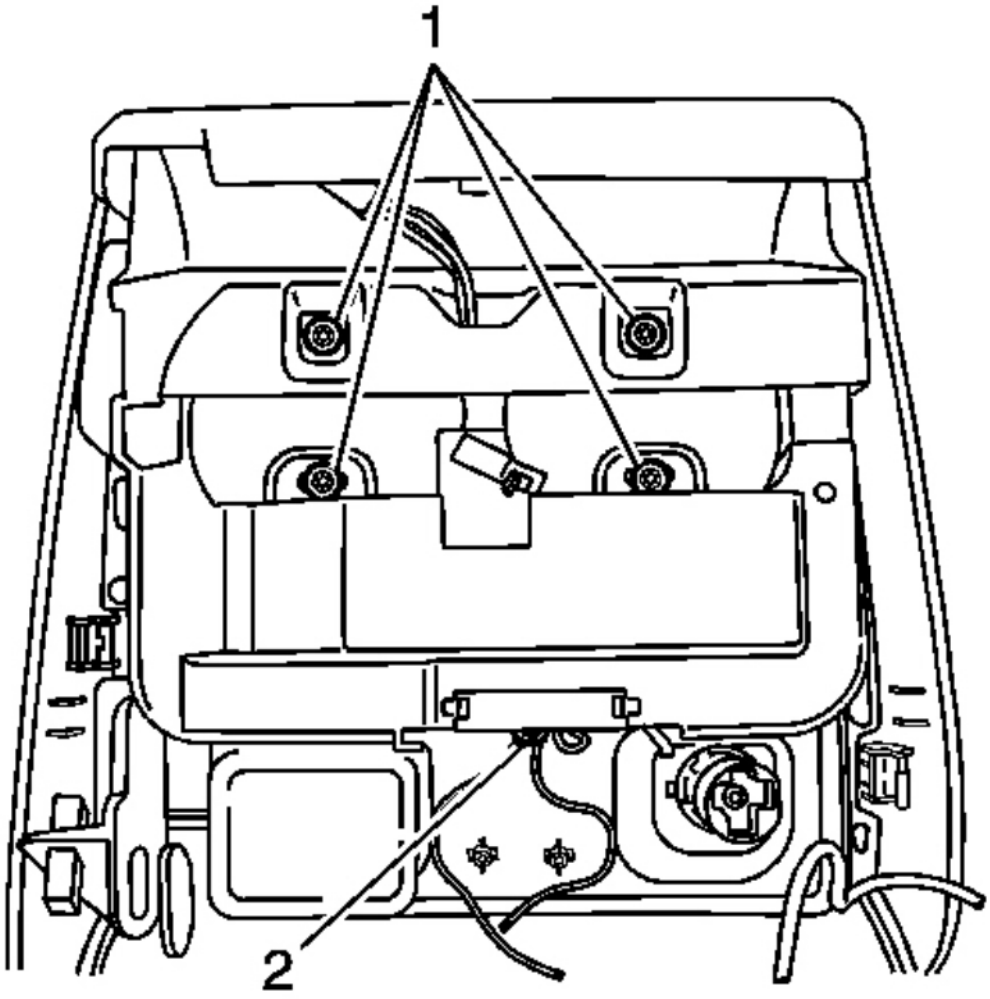


Fig. 55: Installing Cupholder (Platinum)
Courtesy of GENERAL MOTORS CORP.

4. Install the blower assembly. Refer to **Blower Replacement - Cupholder - Front Floor Console**.
5. Install the console bezel assembly to the console. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.

INSTRUMENT PANEL (I/P) TRIM PANEL REPLACEMENT - LOWER

Removal Procedure

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1. Remove the instrument panel (I/P) cluster trim bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
2. Remove the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.
3. Open the I/P compartment door.
4. Remove the bolts retaining the lower trim panel to the I/P assembly.

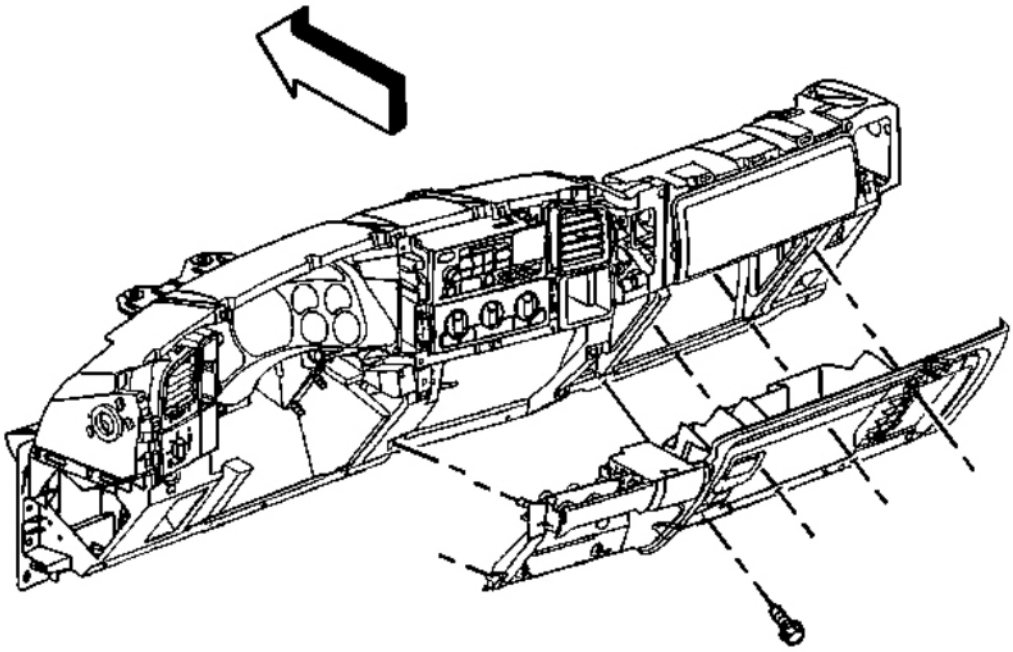


Fig. 56: Removing Bolts Retaining Lower Trim Panel To I/P Assembly
Courtesy of GENERAL MOTORS CORP.

5. Disconnect all of the electrical connectors (1, 2, 3).
6. Remove the lower trim panel from the I/P assembly.

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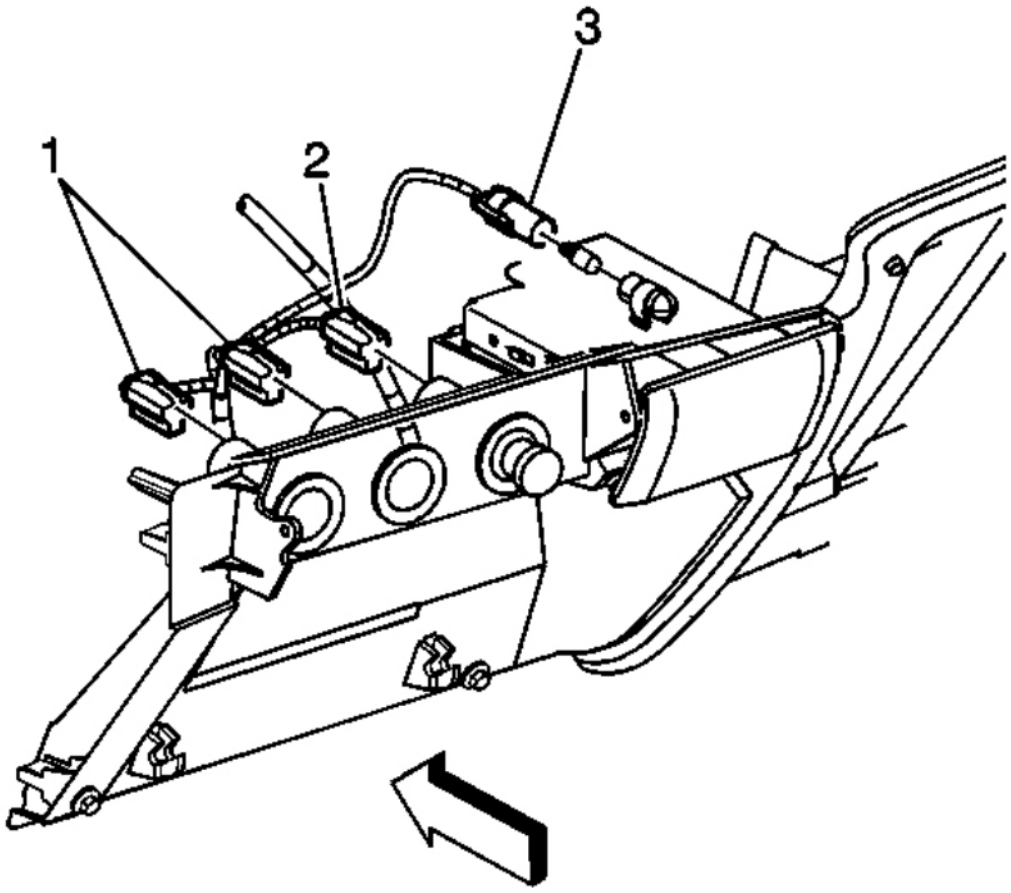


Fig. 57: Disconnecting Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect all of the electrical connectors (1, 2, 3).

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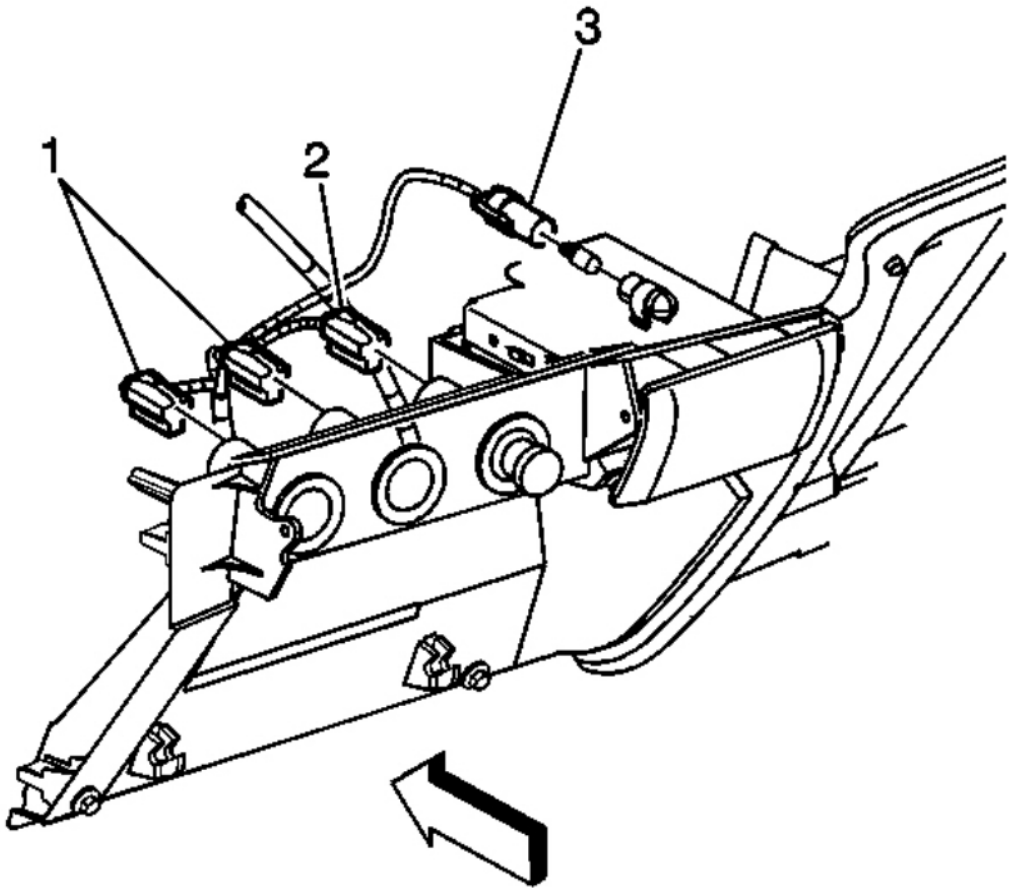


Fig. 58: Connecting Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the bolts connecting the lower trim panel to the I/P assembly.

   Tighten: Tighten the bolts to 2 N.m (18 lb in).

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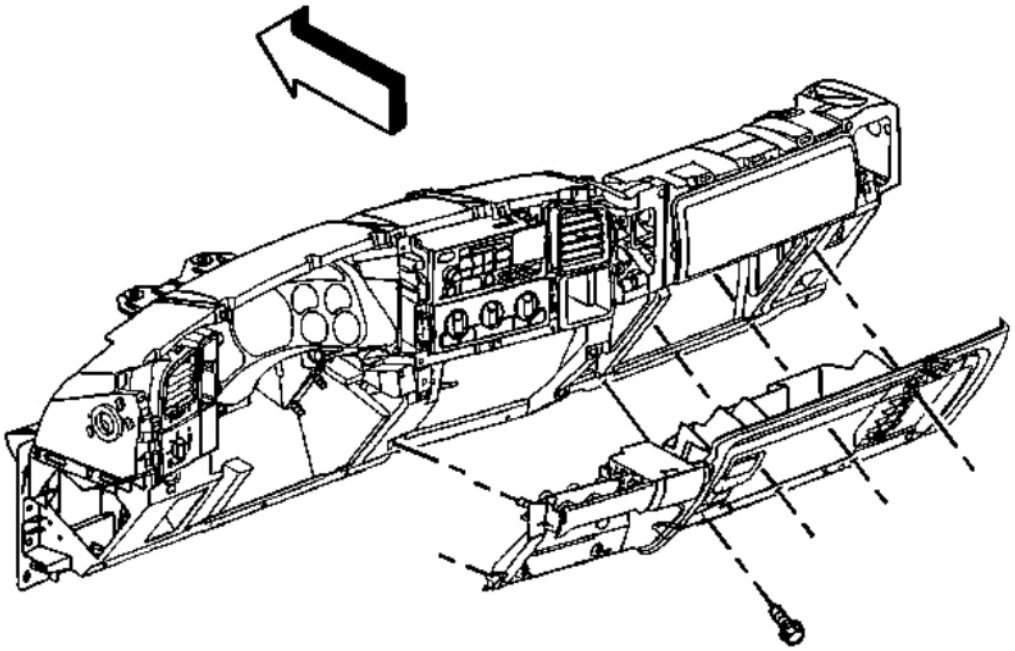


Fig. 59: Installing Bolts Securing Lower Trim Panel To I/P Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.
4. Install the I/P cluster trim bezel. Refer to **Instrument Panel Cluster (IPC) Replacement**.

INSTRUMENT PANEL (I/P) ASSEMBLY REPLACEMENT

Removal Procedure

CAUTION: Refer to Battery Disconnect Caution in Cautions and Notices.

CAUTION: Refer to SIR Caution in Cautions and Notices.

1. Remove the I/P trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper**.
2. Remove the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.

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3. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnect/Connect Procedure** .
4. Remove the driver side knee bolster. Refer to **Knee Bolster Replacement**.
5. Remove the lower I/P trim panel. Refer to **Instrument Panel (I/P) Trim Panel Replacement - Lower**.
6. Remove the passenger side air bag module. Refer to **Inflatable Restraint Instrument Panel Module Replacement** in SIR.
7. Remove the radio. Refer to **Radio Replacement** in Entertainment.
8. Remove the HVAC control. Refer to **HVAC Control Module Replacement** in HVAC Systems-Automatic or **HVAC Control Module Replacement** in HVAC Systems-Manual.
9. Remove the accessory switch housing. Refer to **Accessory Switch Replacement**.
10. Remove the left air louver housing. Refer to **Deflector Replacement - Instrument Panel Air - Left** in Heating, Ventilation and Air Conditioning.
11. Remove the steering column. Refer to **Steering Column Replacement** in Steering Wheel and Column.
12. Remove the communication interface module, if equipped. Refer to **Communication Interface Module Replacement** in Cellular Communication.
13. Remove the remote control door lock receiver module, if equipped. Refer to **Remote Control Door Lock Receiver Replacement** in Keyless Entry.
14. Remove the data link connector from the I/P. Refer to **Data Link Connector Replacement** in Data Link Communications.
15. Remove the park brake release lever from the I/P. Refer to **Park Brake Release Handle Assembly Replacement** in Park Brake.
16. Remove the I/P cluster. Refer to **Instrument Panel Cluster (IPC) Replacement**.
17. Remove both front window air ducts from the I/P assembly.
18. Remove the harness from the I/P. Refer to **Instrument Panel Electrical Center or Junction Block Replacement - Left** and **Instrument Panel Electrical Center or Junction Block Replacement - Right** .
19. Remove the I/P assembly retaining bolts (3) and nuts (4).
20. Remove all harness hold down retainers from the I/P assembly.
21. Remove the I/P assembly from the vehicle.

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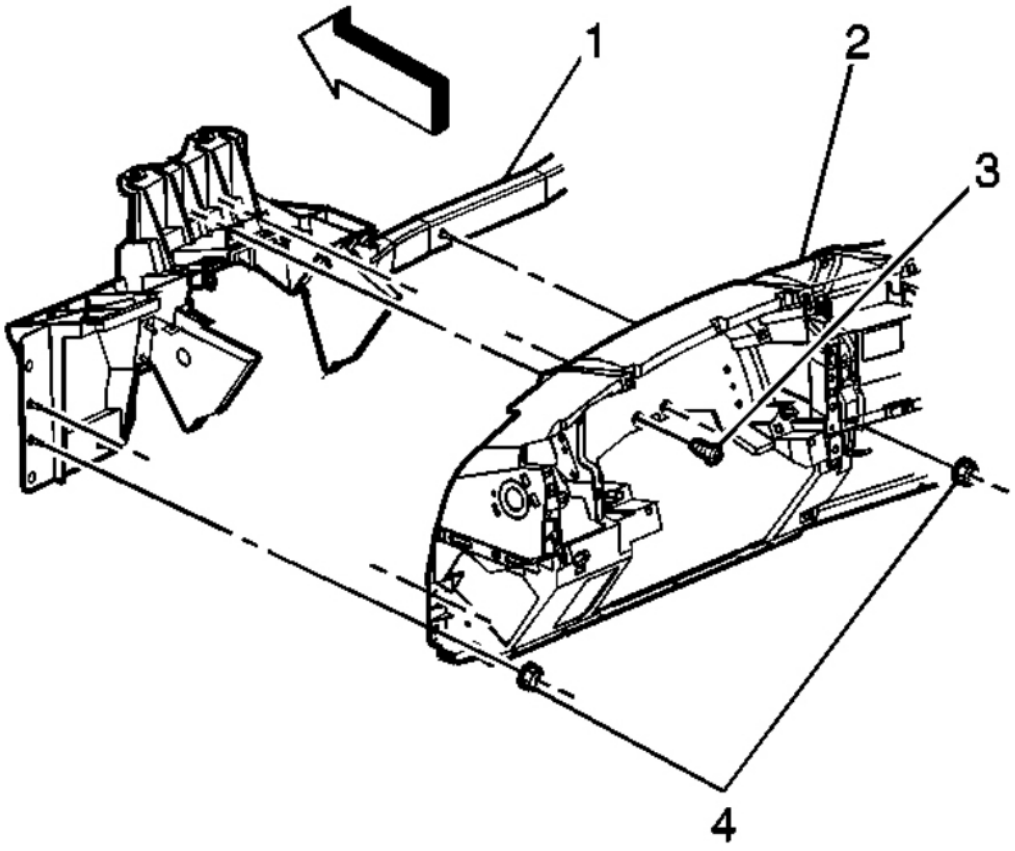


Fig. 60: Removing Instrument Panel Assembly Retaining Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the I/P assembly to the vehicle.
2. Install the harness hold down retainers to the I/P assembly.
3. Install the I/P assembly retaining bolts (3) and nuts (4).

Ensure the wire harness is routed to all of the openings.

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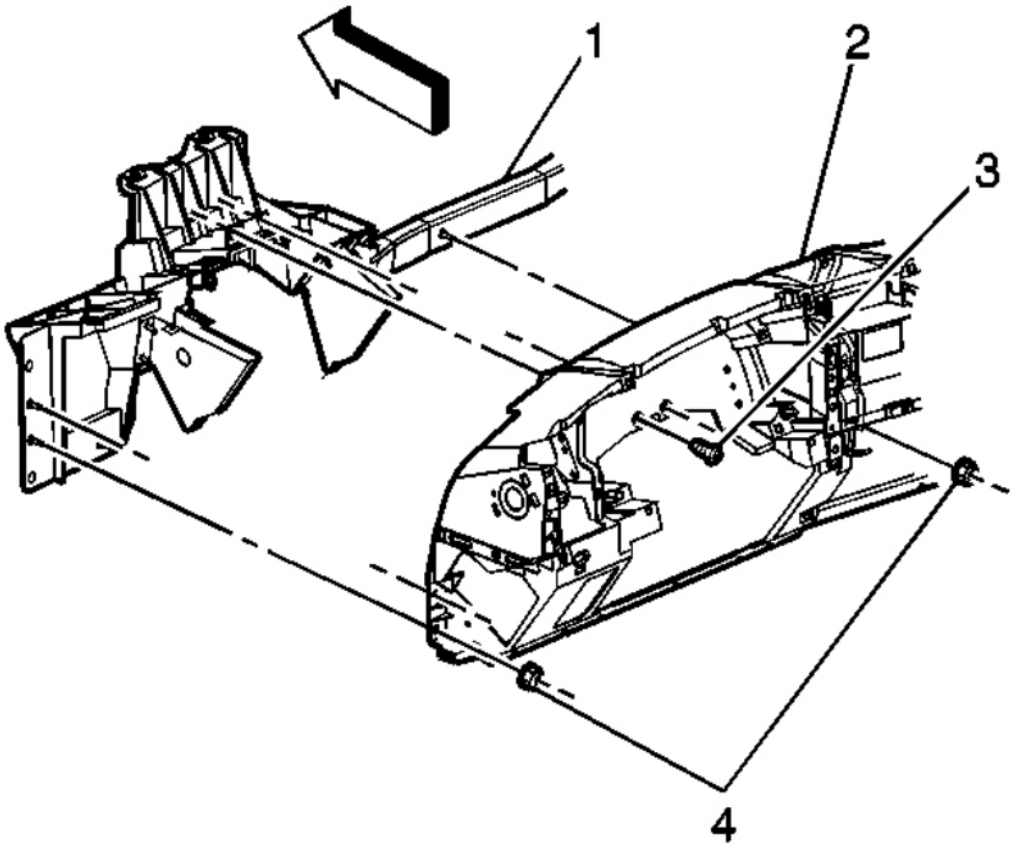


Fig. 61: Installing Instrument Panel Assembly Retaining Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

4. Install the harness to the I/P. Refer to **Instrument Panel Electrical Center or Junction Block Replacement - Left** and **Instrument Panel Electrical Center or Junction Block Replacement - Right** .
5. Install both front window air duct to the I/P assembly.
6. Install the I/P cluster assembly. Refer to **Instrument Panel Cluster (IPC) Replacement**.
7. Install the park brake release lever to the I/P. Refer to **Park Brake Release Handle Assembly Replacement** in Park Brake.
8. Install the data link connector to the I/P. Refer to **Data Link Connector Replacement** in Data Link Communications.
9. Install the remote control door lock receiver module, if equipped. Refer to **Remote Control Door Lock Receiver Replacement** in Keyless Entry.
10. Install the CIM, if equipped. Refer to **Communication Interface Module Replacement** in Cellular

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Communication.

11. Install the steering column. Refer to **Steering Column Replacement** in Steering Wheel and Column.
12. Install the left air louver housing. Refer to **Deflector Replacement - Instrument Panel Air - Left** in Heating, Ventilation and Air Conditioning.
13. Install the accessory switch housing. Refer to **Accessory Switch Replacement**.
14. Install the HVAC control. Refer to **HVAC Control Module Replacement** in HVAC Systems-Automatic or **HVAC Control Module Replacement** in HVAC Systems-Manual.
15. Install the radio. Refer to **Radio Replacement** in Entertainment.
16. Install the passenger side airbag module. Refer to **Inflatable Restraint Instrument Panel Module Replacement** in SIR.
17. Install the lower trim panel. Refer to **Instrument Panel (I/P) Trim Panel Replacement - Lower**.
18. Install the driver side knee bolster. Refer to **Knee Bolster Replacement**.
19. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnect/Connect Procedure** .
20. Install the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.
21. Install the I/P trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper**.

INSTRUMENT PANEL (I/P) CARRIER REPLACEMENT

Removal Procedure

CAUTION: Refer to Battery Disconnect Caution in Cautions and Notices.

CAUTION: Refer to SIR Caution in Cautions and Notices.

1. Remove the I/P trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper**.
2. Remove the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.
3. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnect/Connect Procedure** .
4. Remove the driver side knee bolster. Refer to **Knee Bolster Replacement**.
5. Remove the lower I/P trim panel. Refer to **Instrument Panel (I/P) Trim Panel Replacement - Lower**.
6. Remove the passenger side air bag module. Refer to **Inflatable Restraint Instrument Panel Module Replacement** in SIR.
7. Remove the radio. Refer to **Radio Replacement** in Entertainment.
8. Remove the HVAC control. Refer to **HVAC Control Module Replacement** in HVAC Systems-Automatic or **HVAC Control Module Replacement** in HVAC Systems-Manual.
9. Remove the accessory switch housing. Refer to **Accessory Switch Replacement**.

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10. Remove the left air louver housing. Refer to **Deflector Replacement - Instrument Panel Air - Left** in Heating, Ventilation and Air Conditioning.
11. Remove the steering column. Refer to **Steering Column Replacement** in Steering Wheel and Column.
12. Remove the CIM, if equipped. Refer to **Communication Interface Module Replacement** in Cellular Communication.
13. Remove the data link connector from the I/P. Refer to **Data Link Connector Replacement** in Data Link Communications.
14. Remove the park brake release lever from the I/P. Refer to **Park Brake Release Handle Assembly Replacement** in Park Brake.
15. Remove the I/P cluster. Refer to **Instrument Panel Cluster (IPC) Replacement**.
16. Remove both front window air duct from the I/P assembly.
17. Remove the harness from the I/P. Refer to **Instrument Panel Electrical Center or Junction Block Replacement - Left** and **Instrument Panel Electrical Center or Junction Block Replacement - Right** .
18. Remove the I/P assembly retaining nuts (4) and bolts (3).
19. Remove all harness hold down retainers from the I/P assembly.
20. Remove the I/P assembly from the vehicle.

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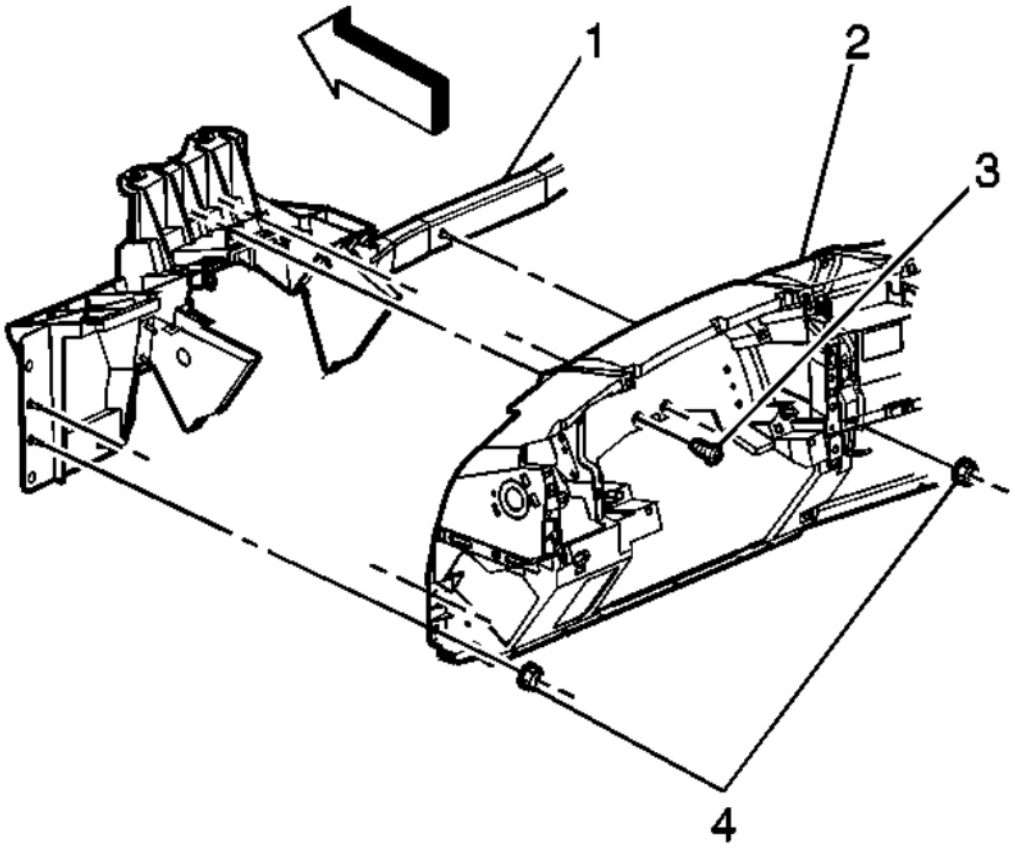


Fig. 62: Removing Instrument Panel Assembly Retaining Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

21. Remove the I/P upper brackets.

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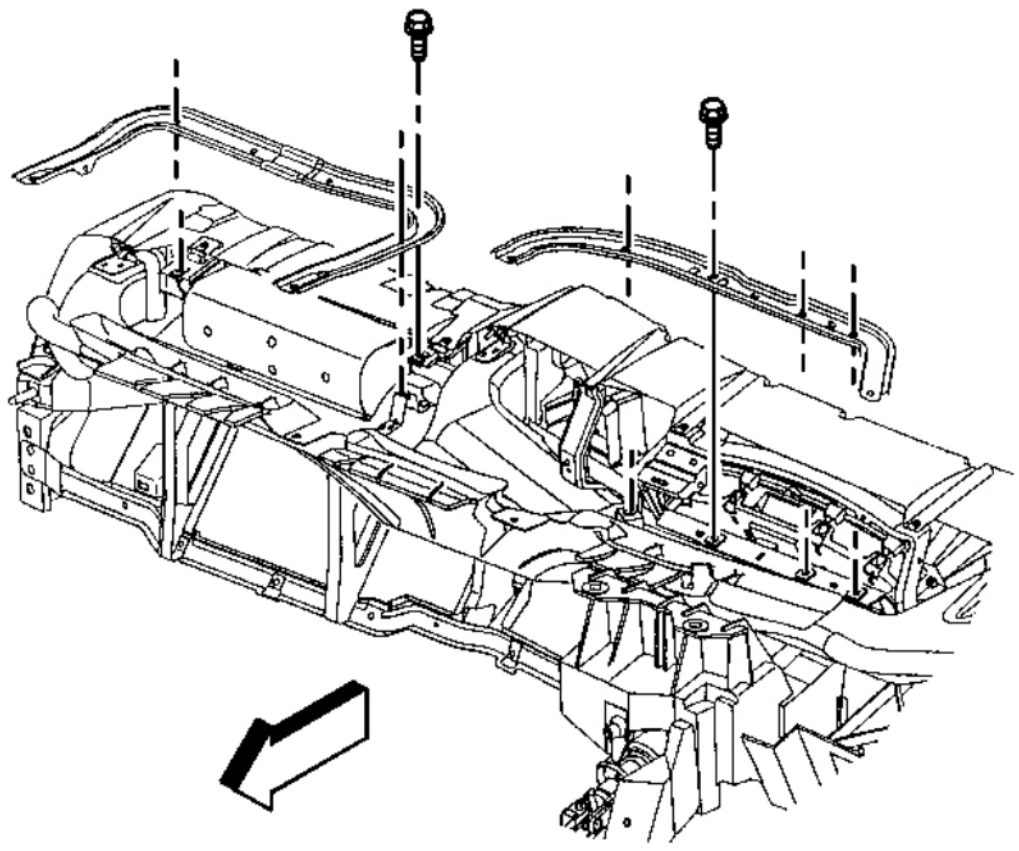


Fig. 63: Removing Instrument Panel Upper Brackets
Courtesy of GENERAL MOTORS CORP.

22. Disconnect all the electrical connectors from the wiring harness junction block. Refer to **Body Wiring Harness Junction Block Replacement** in Wiring Systems.
23. Remove the transfer case control module from the bracket, if equipped. Refer to **Transfer Case Shift Control Module Replacement** in Transfer Case NV6 246 - NP8.
24. Remove the antenna cable from the cross car duct.
25. Remove the cross car duct. Refer to **Air Distributor Duct Replacement** in Heating, Ventilation and Air Conditioning.
26. Remove the amplifier, if equipped. Refer to **Amplifier Replacement** in Entertainment.
27. Separate the I/P harness from the carrier.

    Do not remove the I/P harness from the vehicle.

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28. If replacing the HVAC module, remove the right side of the carrier from the vehicle to gain access to the module.

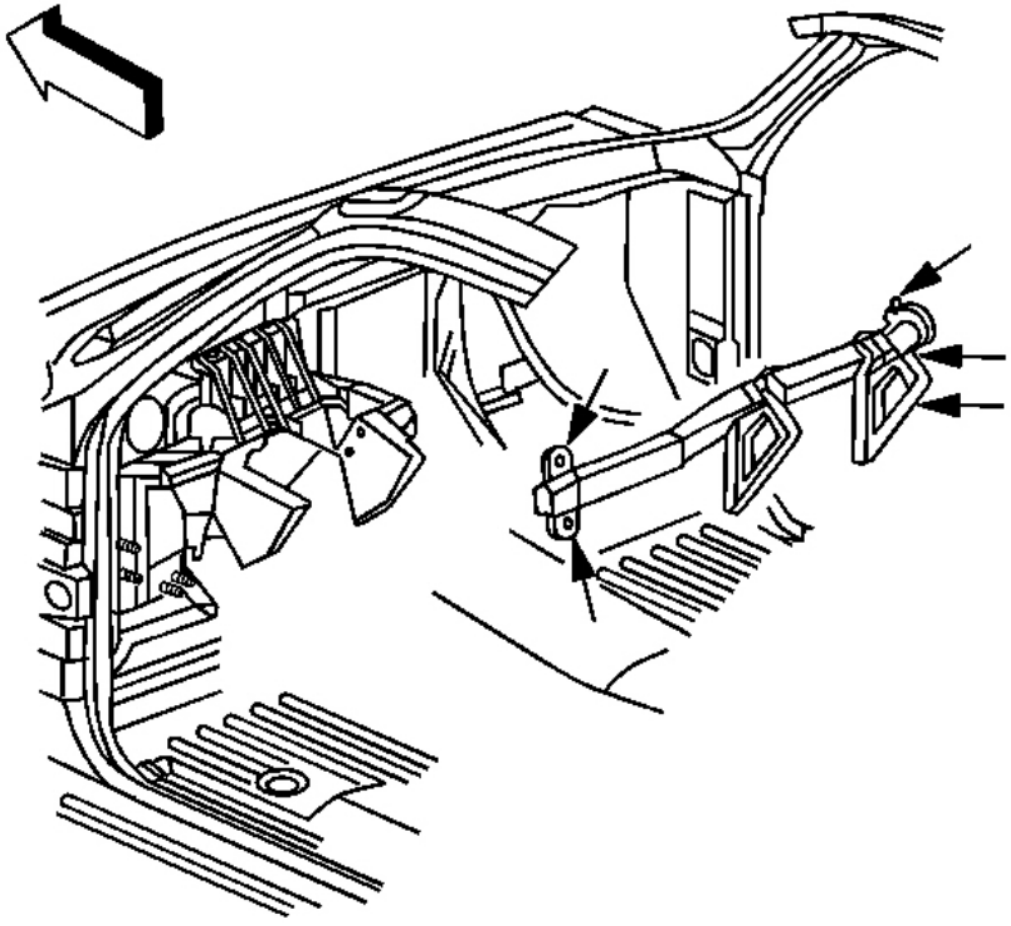


Fig. 64: Removing Right Side Of Carrier From Vehicle
Courtesy of GENERAL MOTORS CORP.

29. Remove the I/P center support bracket bezel (1).

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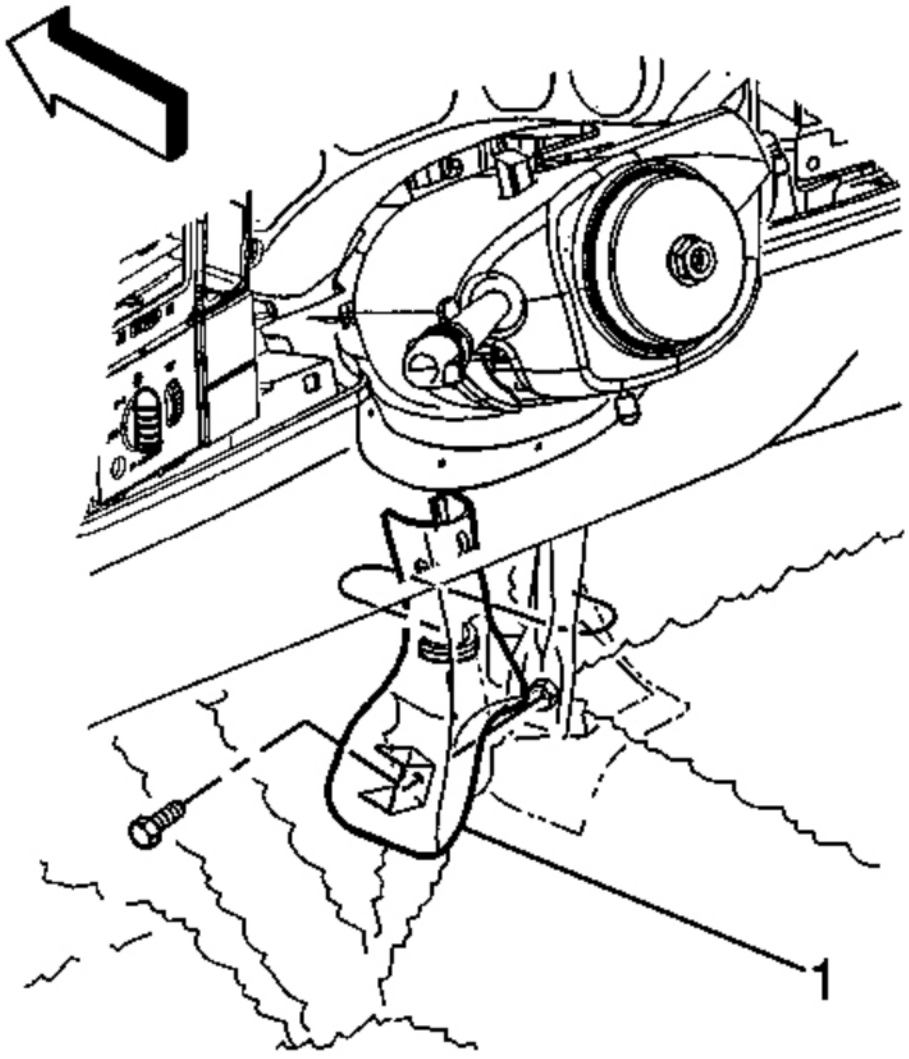


Fig. 65: Removing Instrument Panel Center Support Bracket Bezel
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Remove all of the parts of the I/P carrier assembly from the vehicle as a unit.

30. Remove the I/P center support bracket bolt.

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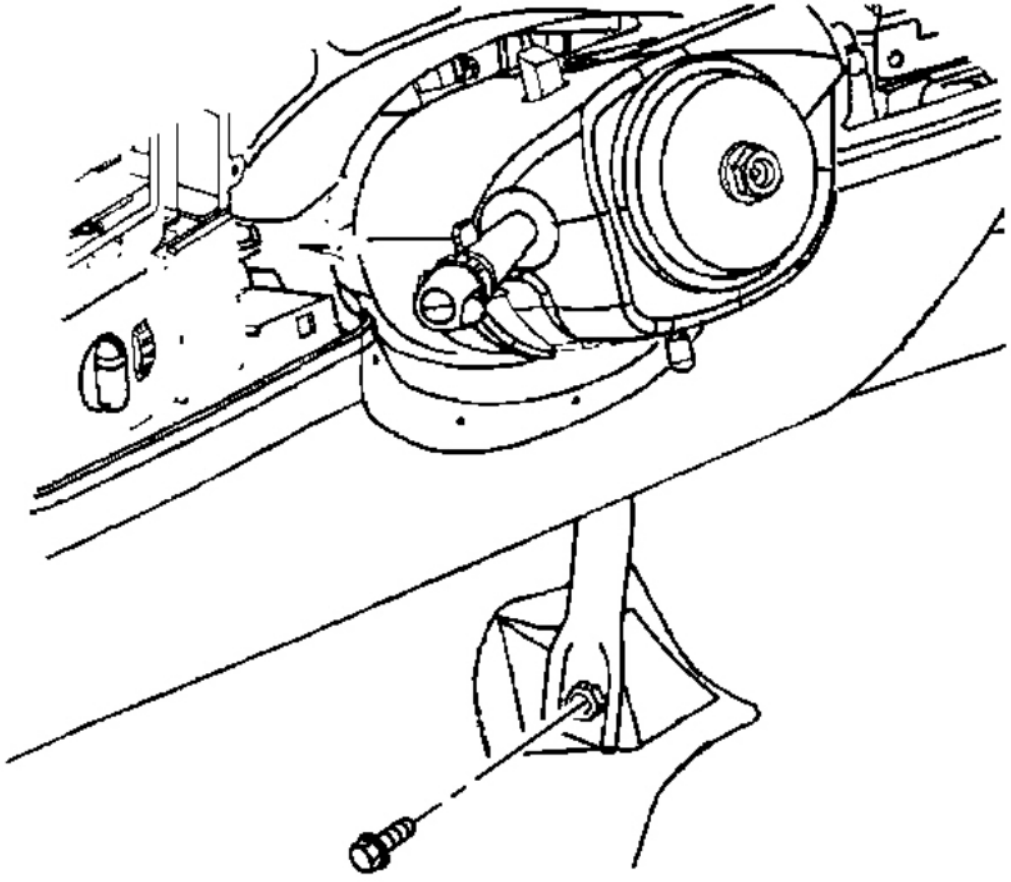


Fig. 66: Removing Instrument Panel Center Support Bracket Bolt
Courtesy of GENERAL MOTORS CORP.

31. Remove the I/P carrier retaining bolts.

    The left side is shown, the right side is similar.

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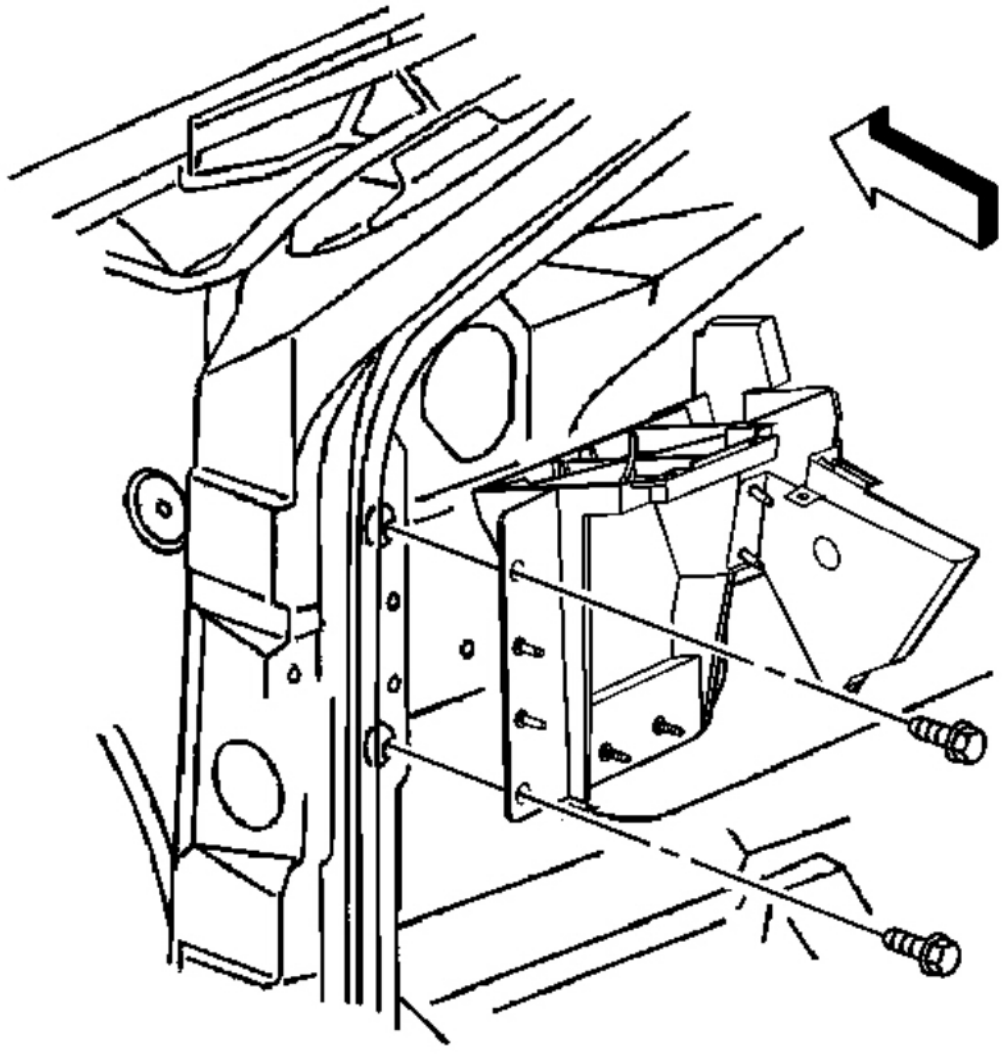


Fig. 67: Removing Instrument Panel Carrier Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

32. Remove the I/P carrier top bolts (1).

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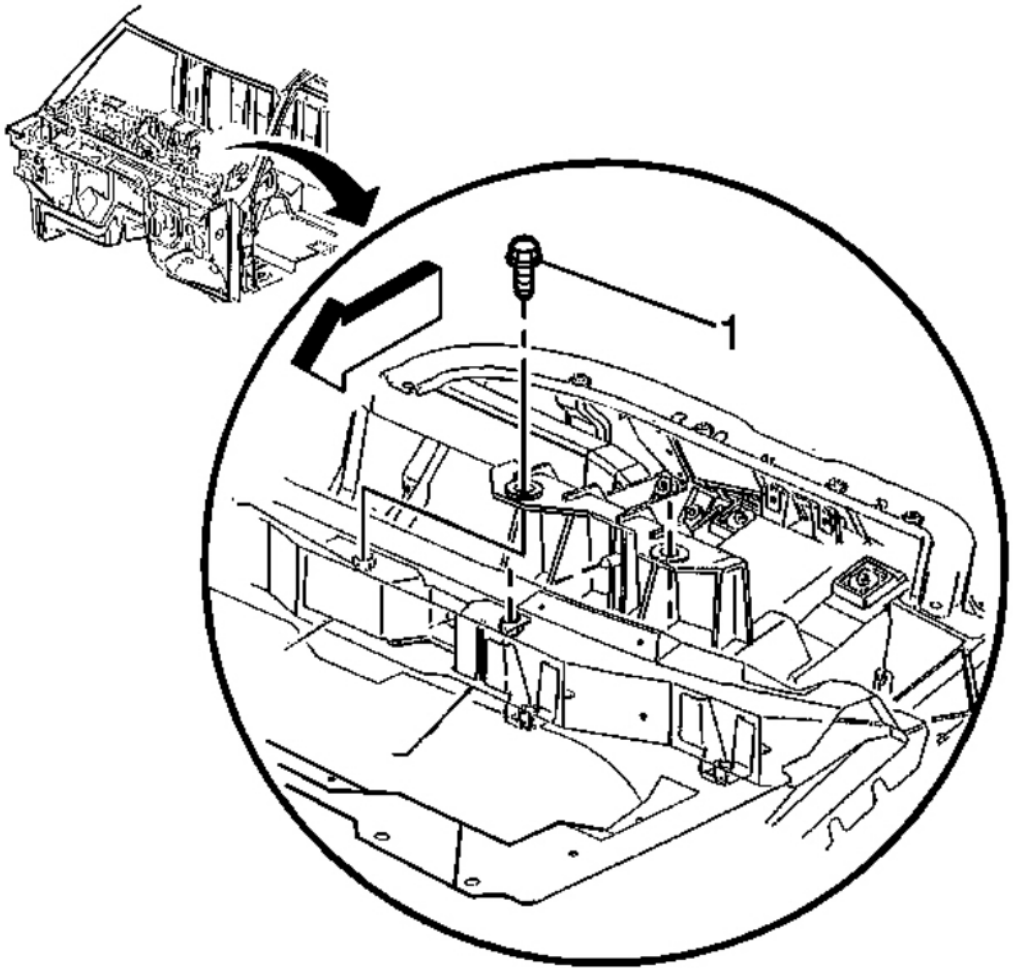


Fig. 68: Removing Instrument Panel Carrier Top Bolts
Courtesy of GENERAL MOTORS CORP.

33. Remove the I/P carrier (1) from the vehicle.

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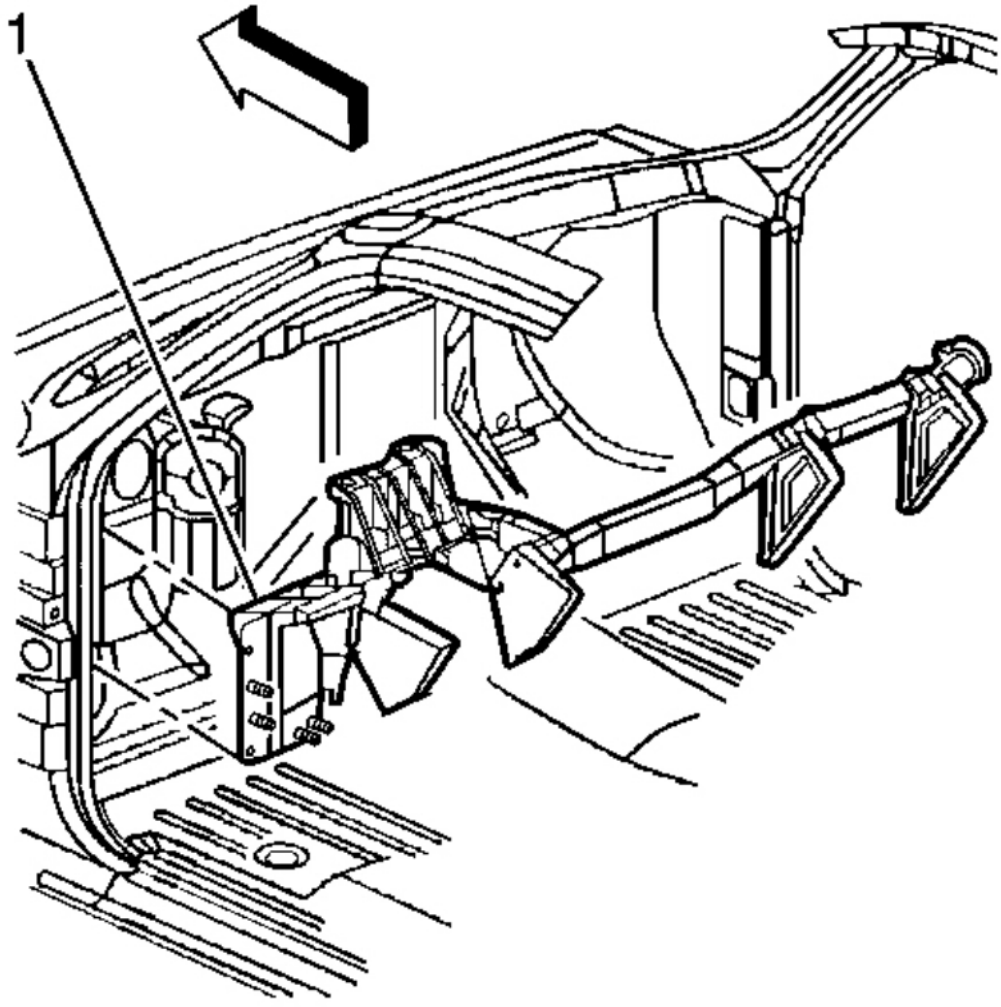


Fig. 69: Removing Instrument Panel Carrier
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Position the I/P carrier (1) in the vehicle.

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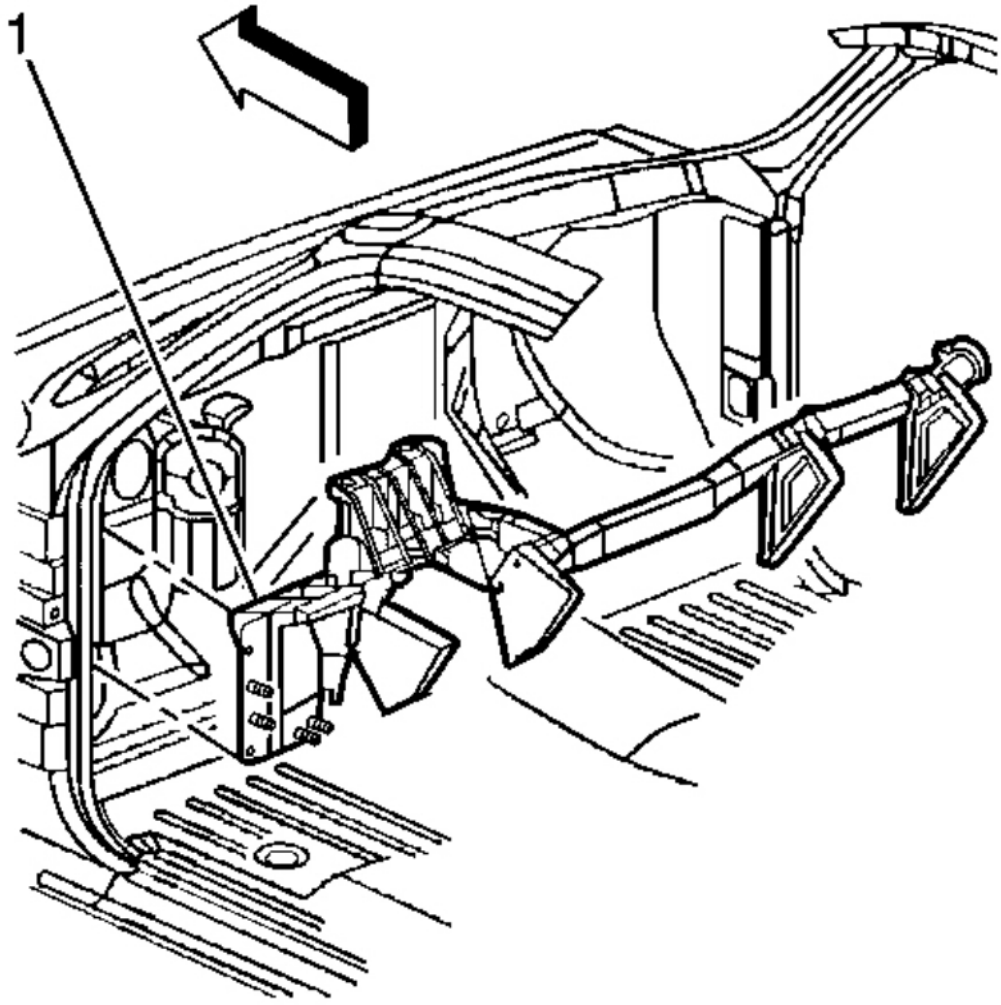


Fig. 70: Positioning Instrument Panel Carrier In Vehicle
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the I/P carrier top bolts (1).

Tighten: Tighten the bolts to 50 N.m (37 lb ft).

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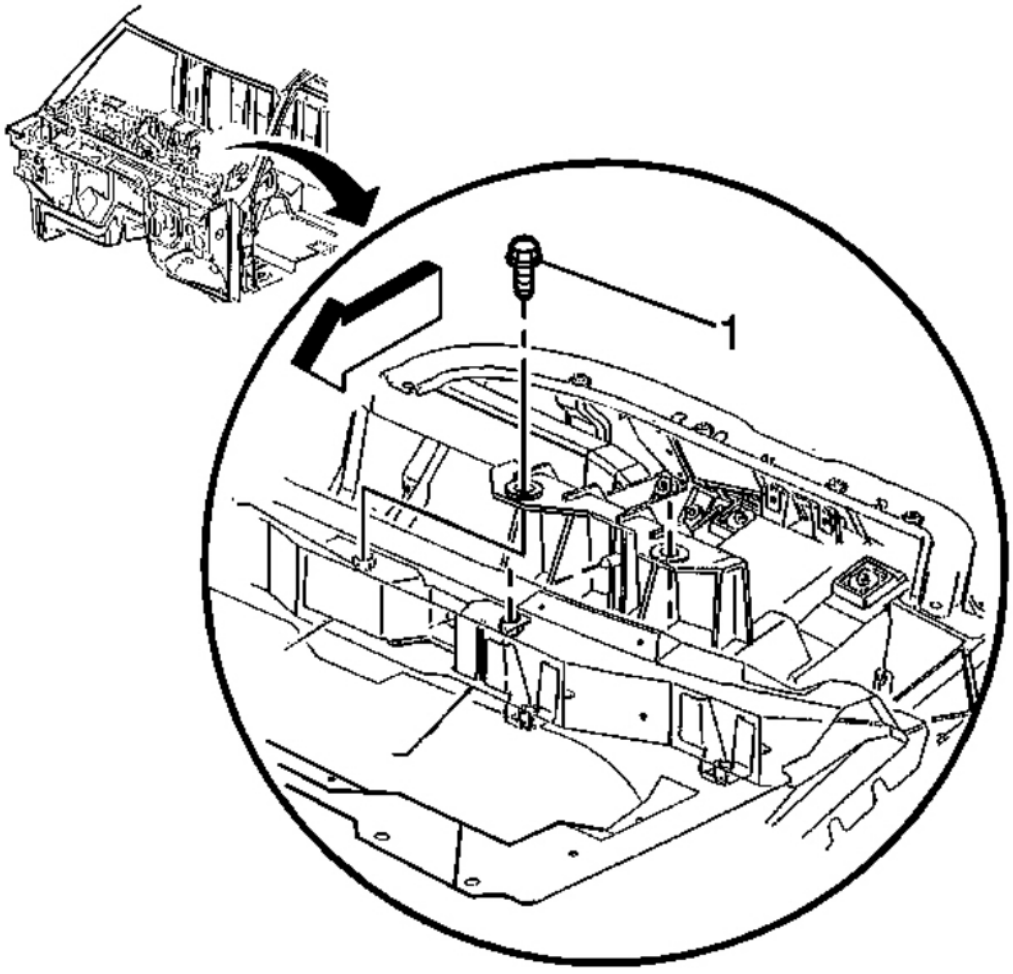


Fig. 71: Installing Instrument Panel Carrier Top Bolts
Courtesy of GENERAL MOTORS CORP.

3. Install the I/P carrier retaining bolts.

   The left side is shown, the right is similar.

   Tighten: Tighten the bolts to 50 N.m (37 lb ft).

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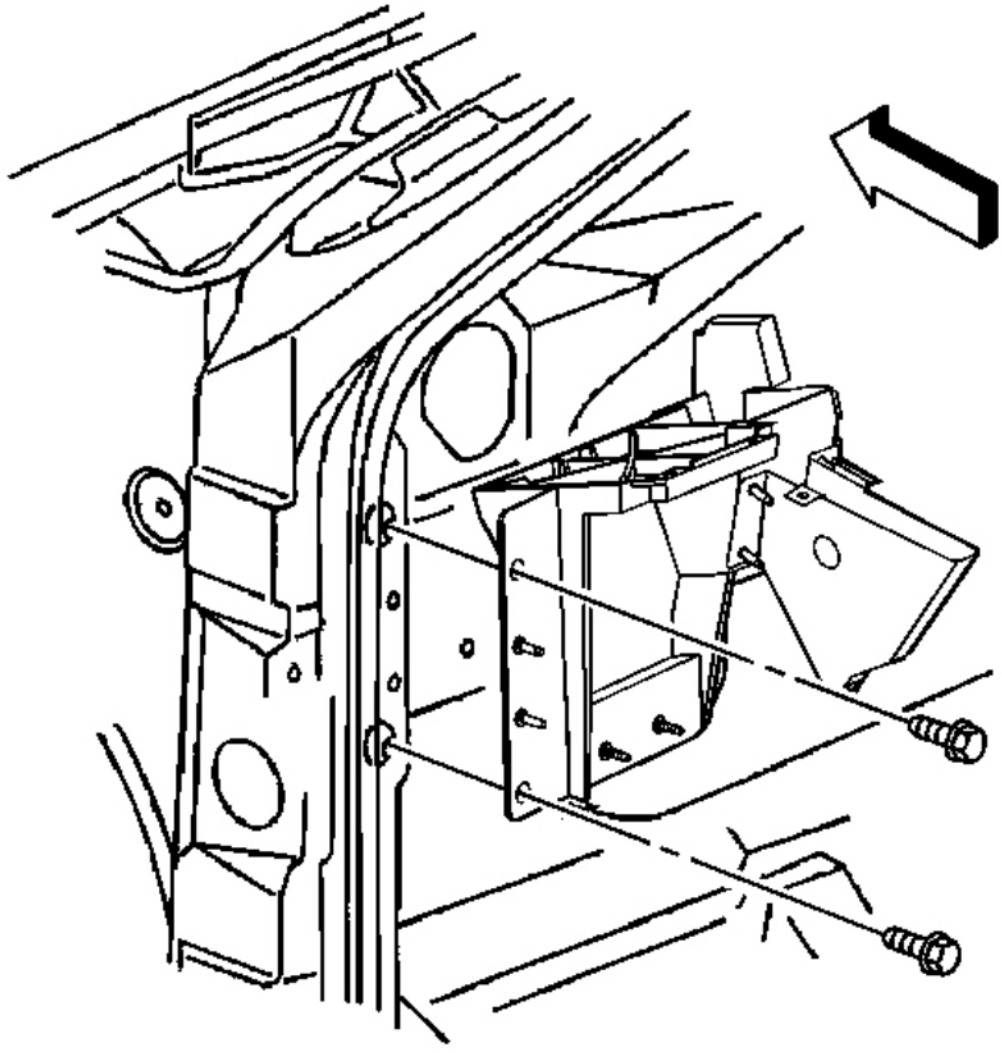


Fig. 72: Installing Instrument Panel Carrier Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

4. Install the I/P center support bracket bolt.

   Tighten: Tighten the bolt to 25 N.m (18 lb ft).

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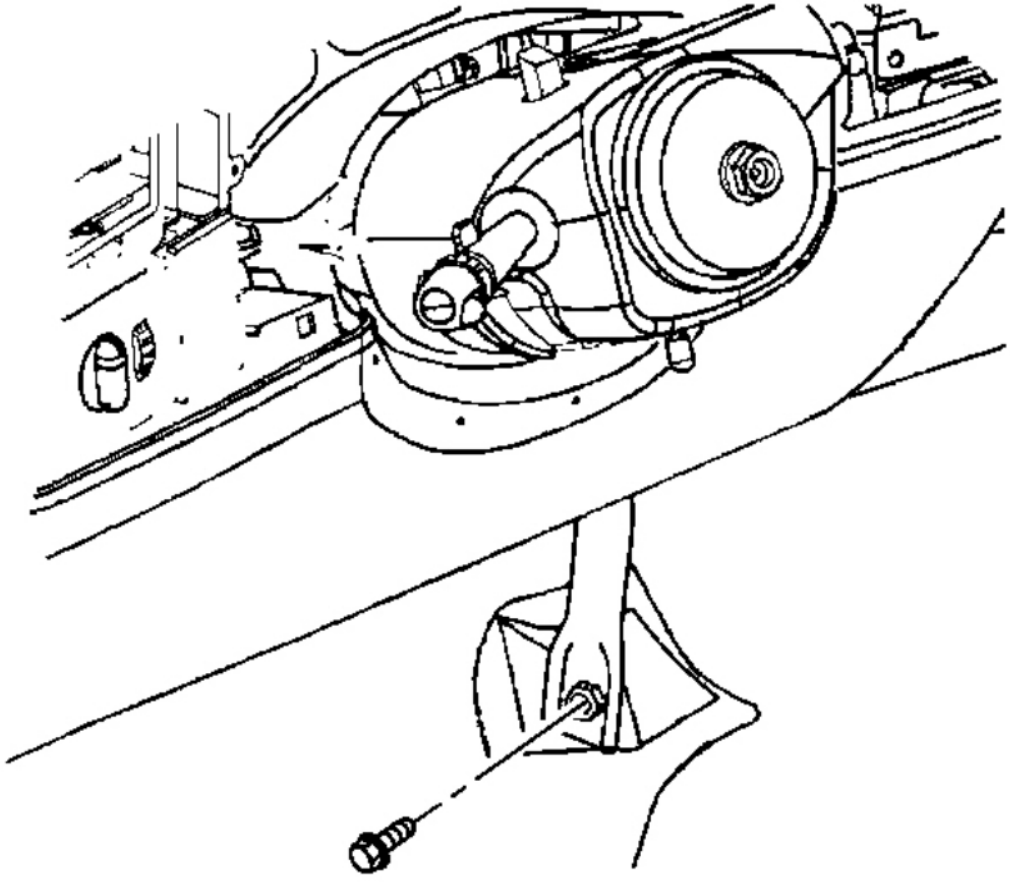


Fig. 73: Installing Instrument Panel Center Support Bracket Bolt
Courtesy of GENERAL MOTORS CORP.

5. Install the I/P center support bracket bezel (1).

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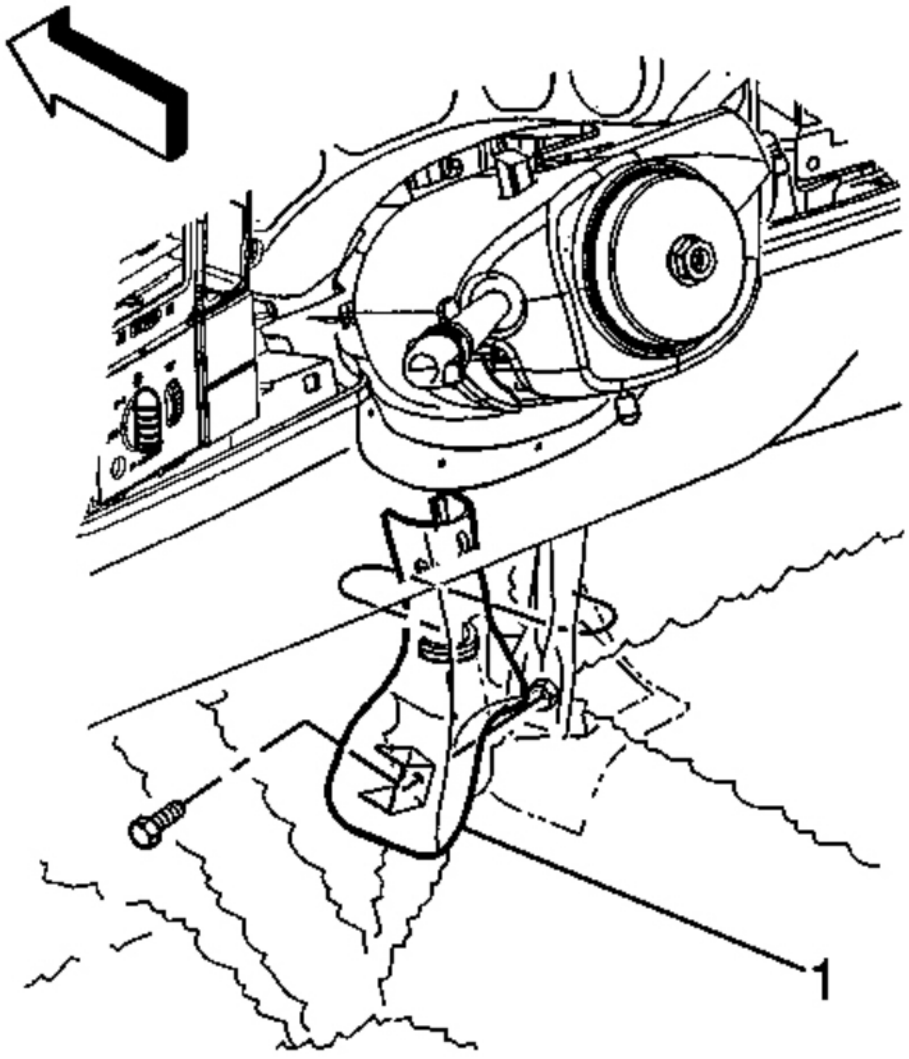


Fig. 74: Installing Instrument Panel Center Support Bracket Bezel
Courtesy of GENERAL MOTORS CORP.

6. Install the right side of the carrier to the vehicle, if the HVAC module was removed.

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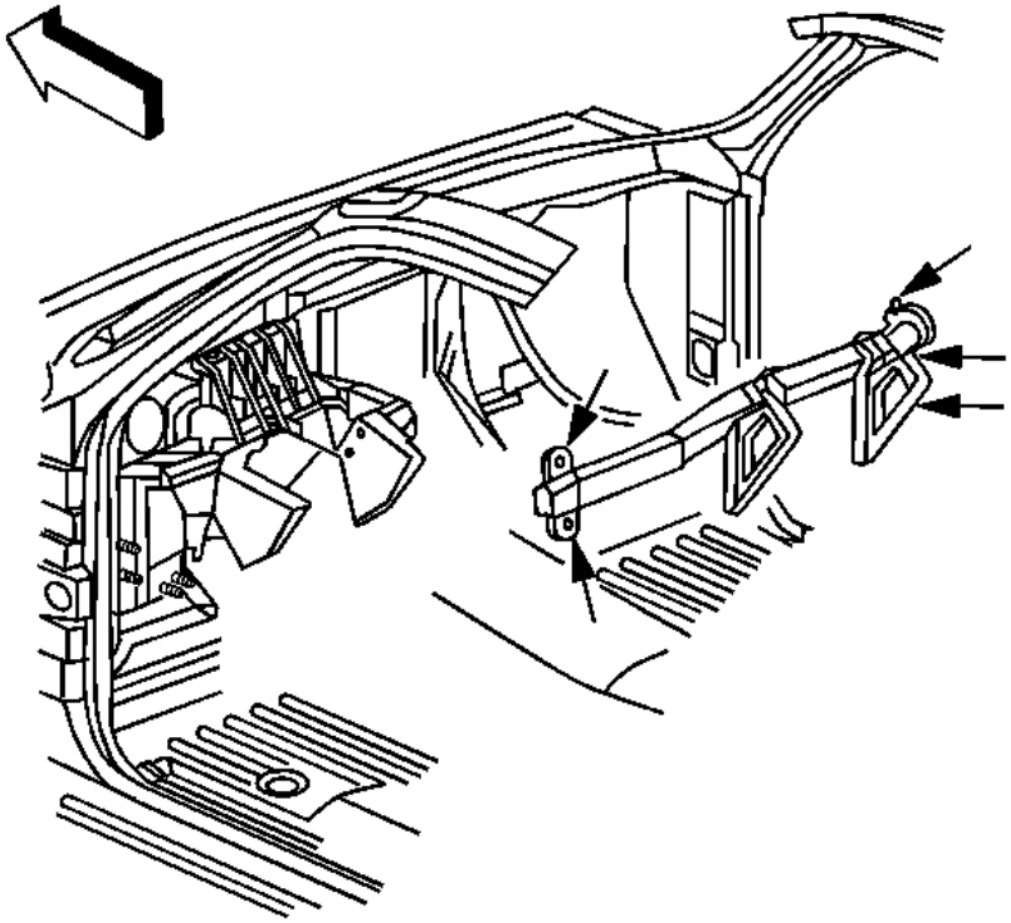


Fig. 75: Installing Right Side Of Carrier To Vehicle
Courtesy of GENERAL MOTORS CORP.

7. Install the retaining bolts.

   Tighten: Tighten the bolts to 50 N.m (37 lb ft).

8. Attach the I/P harness to the carrier.
9. Install the amplifier, if equipped. Refer to in **Amplifier Replacement** in Entertainment.
10. Install the cross car duct. Refer to **Air Distributor Duct Replacement** in Heating, Ventilation and Air Conditioning.
11. Install the antenna cable to the cross car duct.
12. Install the transfer case control module to the bracket, if equipped. Refer to **Transfer Case Shift Control**

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Module Replacement in Transfer Case NV6 246 - NP8.

13. Connect all of the electrical connectors to the wiring harness junction block. Refer to **Body Wiring Harness Junction Block Replacement** in Wiring Systems.
14. Install the I/P upper brackets.

    Tighten: Tighten the retaining bolts to 2 N.m (18 lb in).

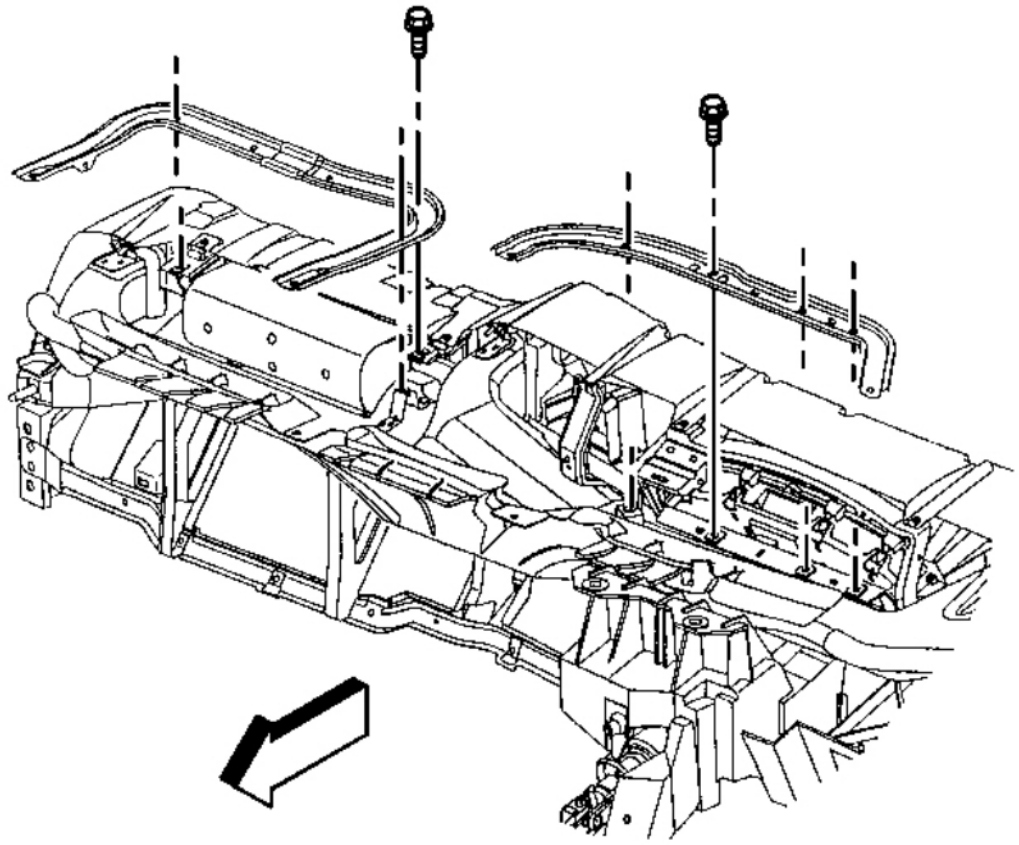


Fig. 76: Installing Instrument Panel Upper Brackets
Courtesy of GENERAL MOTORS CORP.

15. Install the I/P assembly to the vehicle.
16. Install the I/P assembly retaining bolts (3) and nuts (4).

    Ensure the wire harness is routed to all of the openings.

    Tighten: Tighten the retaining bolts and nuts to 9 N.m (80 lb in).

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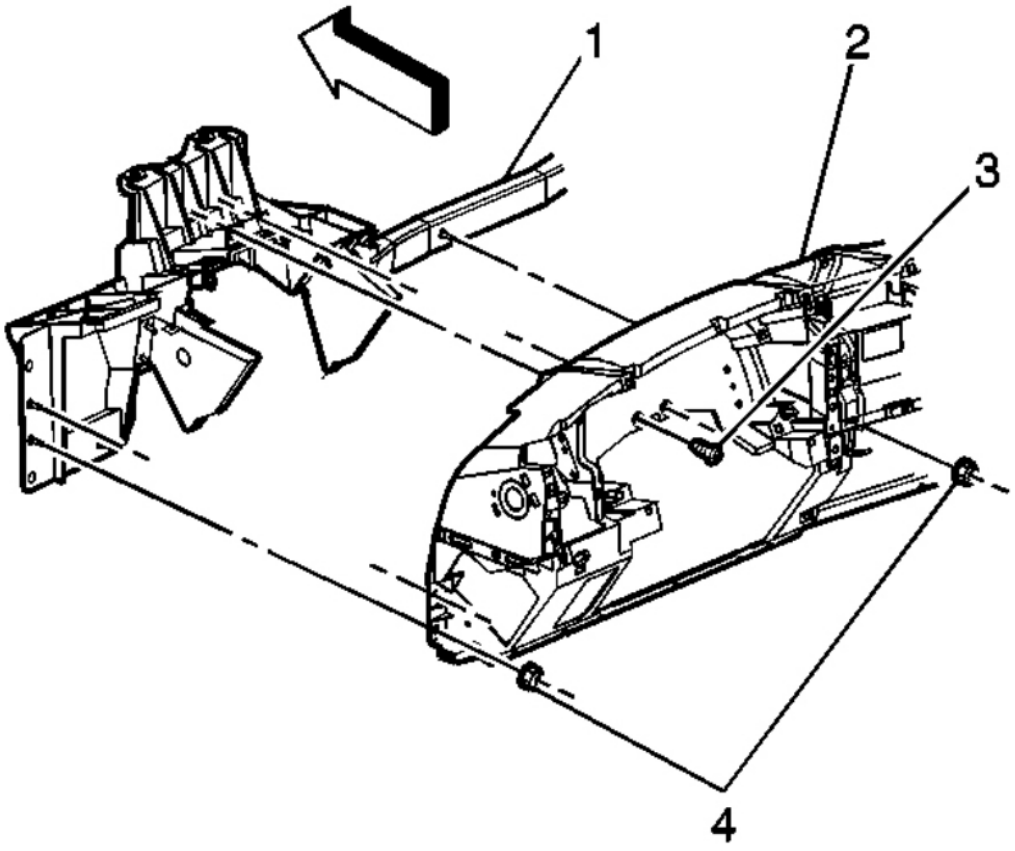


Fig. 77: Installing Instrument Panel Assembly Retaining Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

17. Install the harness hold down retainers to the I/P assembly.
18. Install the harness to the I/P. Refer to **Instrument Panel Electrical Center or Junction Block Replacement - Left** and **Instrument Panel Electrical Center or Junction Block Replacement - Right** .
19. Install both front window air duct to the I/P assembly.
20. Install the I/P cluster assembly. Refer to **Instrument Panel Cluster (IPC) Replacement**.
21. Install the park brake release lever to the I/P. Refer to **Park Brake Release Handle Assembly Replacement** in Park Brake.
22. Install the data link connector to the I/P. Refer to **Data Link Connector Replacement** in Data Link Communications.
23. Install the remote control door lock receiver module, if equipped. Refer to **Remote Control Door Lock Receiver Replacement** in Keyless Entry.

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24. Install the CIM, if equipped. Refer to **Communication Interface Module Replacement** in Cellular Communication.
25. Install the steering column. Refer to **Steering Column Replacement** in Steering Wheel and Column.
26. Install the left air louver housing. Refer to **Deflector Replacement - Instrument Panel Air - Left** in Heating, Ventilation and Air Conditioning.
27. Install the accessory switch housing. Refer to **Accessory Switch Replacement**.
28. Install the HVAC control. Refer to **HVAC Control Module Replacement** in HVAC Systems-Automatic or **HVAC Control Module Replacement** in HVAC Systems-Manual.
29. Install the radio. Refer to **Radio Replacement** in Entertainment.
30. Install the passenger side airbag module. Refer to **Inflatable Restraint Instrument Panel Module Replacement** in SIR.
31. Install the lower trim panel. Refer to **Instrument Panel (I/P) Trim Panel Replacement - Lower**.
32. Install the driver side knee bolster. Refer to **Knee Bolster Replacement**.
33. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnect/Connect Procedure** .
34. Install the center console, if equipped. Refer to **Console Replacement (w/Console Mounting Bracket)** or **Console Replacement (w/o Console Mounting Bracket)**.
35. Install the I/P trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper**.

DOOR REPLACEMENT - CONSOLE COMPARTMENT

Removal Procedure

1. Open the console lid and remove the four retaining screws.
2. Remove the console door from the console.

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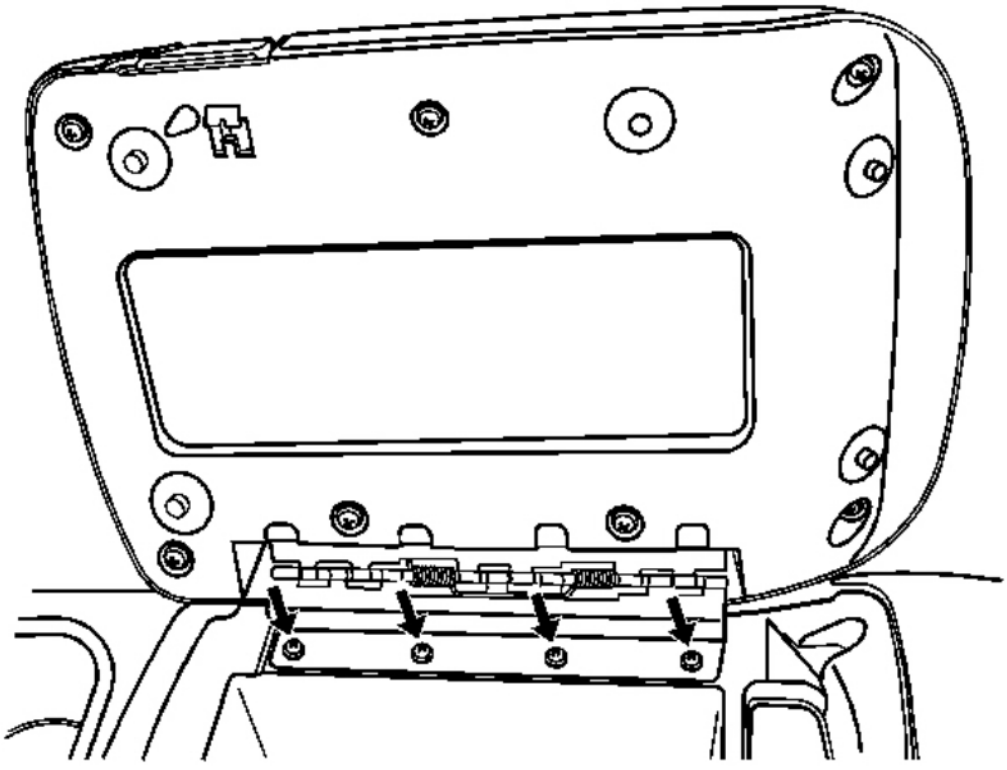


Fig. 78: Removing Console Compartment Door
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the console door to the console.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the four retaining screws.

   Tighten: Tighten the four retaining screws to 1.6 N.m (14 lb in).

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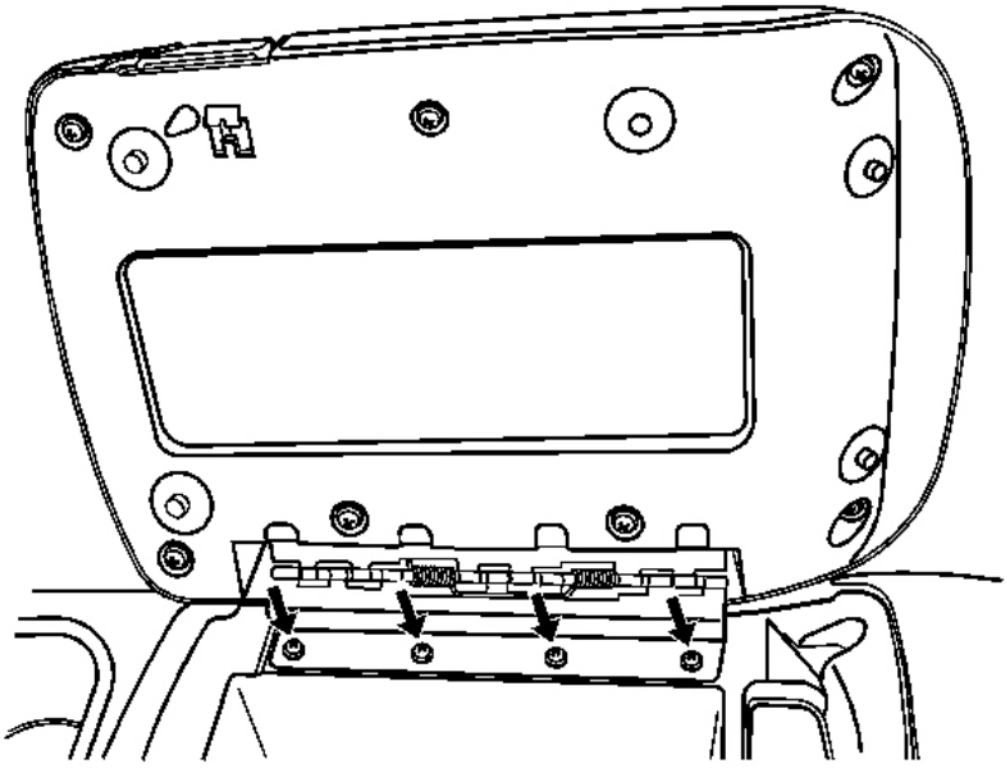


Fig. 79: Installing Console Compartment Door
Courtesy of GENERAL MOTORS CORP.

3. Close the lid and ensure the lid is properly aligned.

CONSOLE STORAGE BIN REPLACEMENT (EXCEPT PRO)

Removal Procedure

1. Remove the console compartment door. Refer to **Door Replacement - Console Compartment**.
2. Remove the bin retaining screws.
3. Remove the 4 lower bolts.
4. Remove the storage bin from the console.

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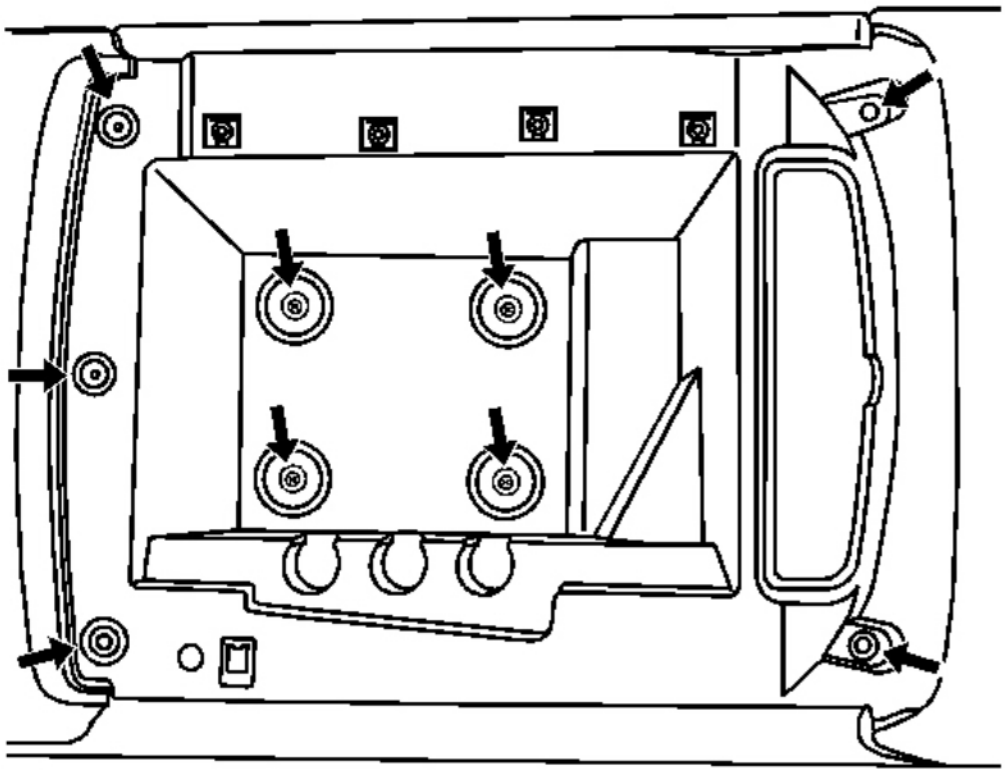


Fig. 80: Removing Console Storage Bin (Except Pro)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the storage bin in the console.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the bin retaining screws.

   Tighten: Tighten the retaining screws to 1.6 N.m (14 lb in).

3. Install the 4 lower bolts

   Tighten: Tighten the 4 bolts to 3.5 N.m (31 lb in).

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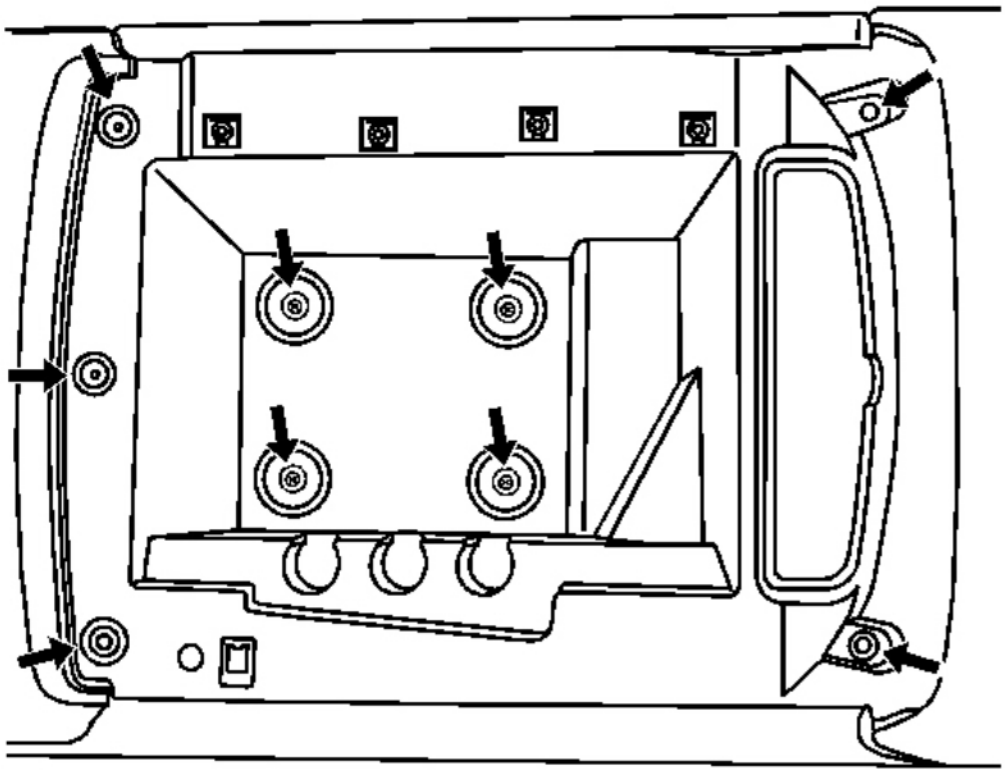


Fig. 81: Installing Console Storage Bin (Except Pro)
Courtesy of GENERAL MOTORS CORP.

4. Install the console compartment door. Refer to **Door Replacement - Console Compartment**.

CLOCK REPLACEMENT

Removal Procedure

1. Remove the console upper bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
2. From the back of the bezel remove the retaining screws.
3. Remove the clock from the bezel.

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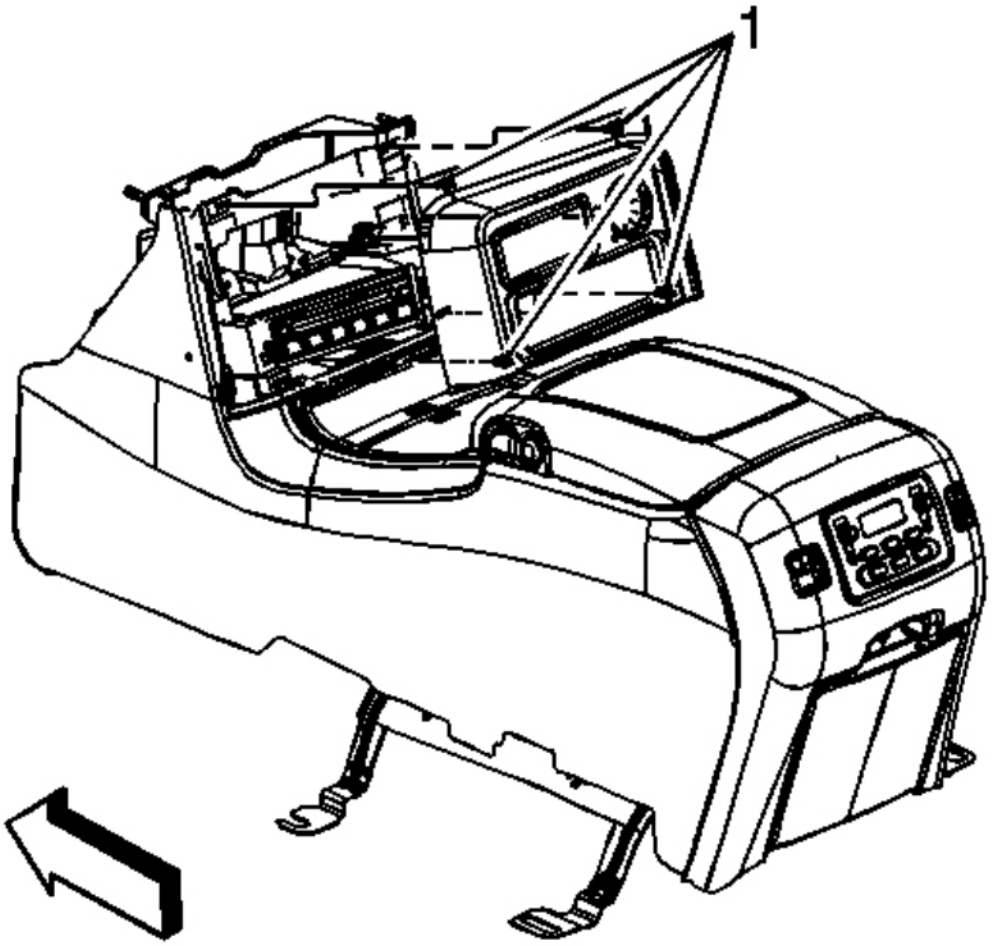


Fig. 82: Removing Clock From Bezel
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the clock to the bezel.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the retaining screws.

   Tighten: Tighten the retaining screws to 2 N.m (17 lb in).

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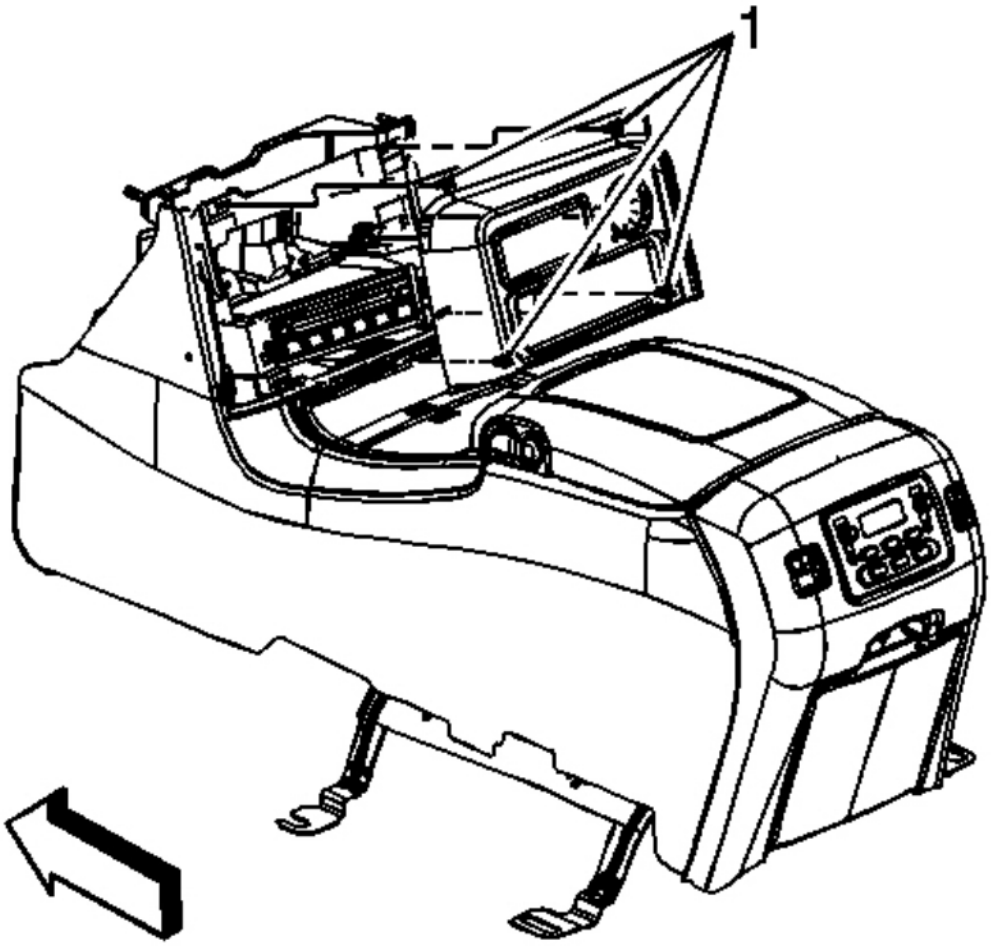


Fig. 83: Installing Clock To Bezel
Courtesy of GENERAL MOTORS CORP.

3. Install the bezel to the console. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.

BLOWER REPLACEMENT - CUPHOLDER - FRONT FLOOR CONSOLE

Removal Procedure

1. Remove the console cup holder assembly. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.

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2. Remove the 2 retaining screws.
3. Slide the blower assembly upwards.

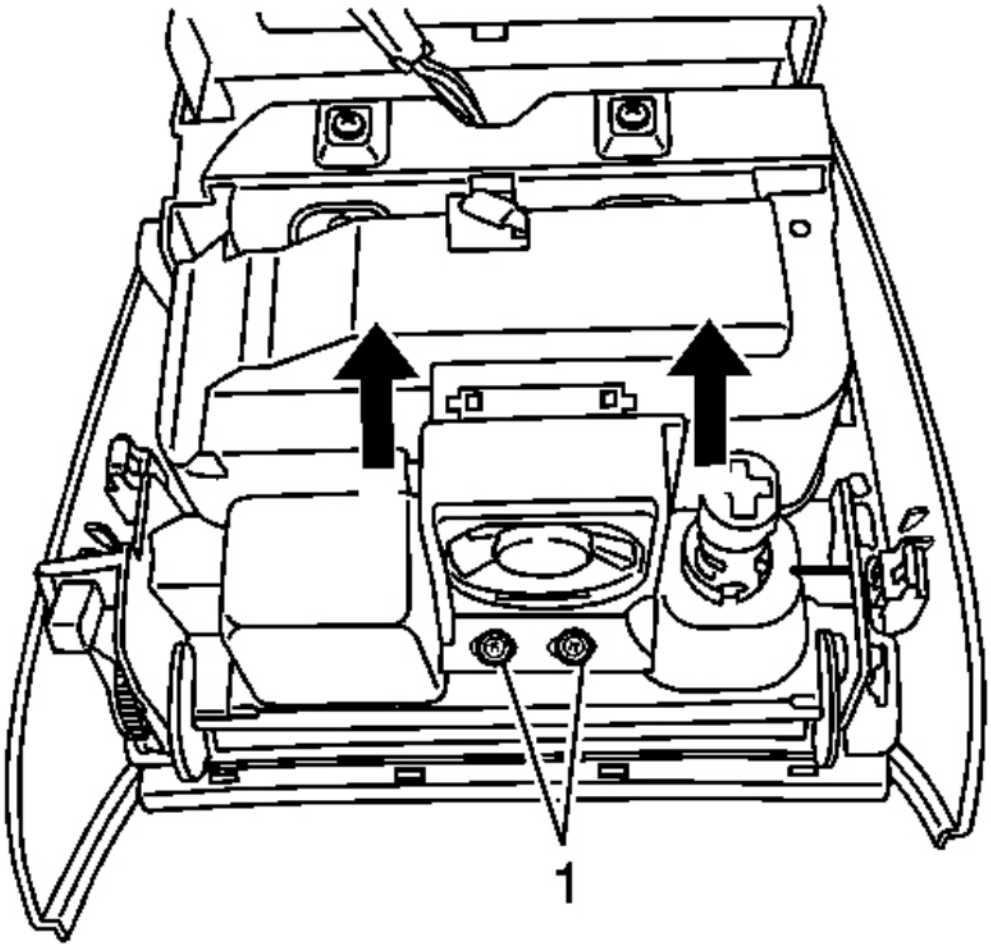


Fig. 84: Removing Retaining Screws & Sliding Blower Assembly Upwards
Courtesy of GENERAL MOTORS CORP.

4. Insert a small flat-bladed tool to release the tab (2) that secures the connector in place.
5. Remove the blower from the cupholder assembly.

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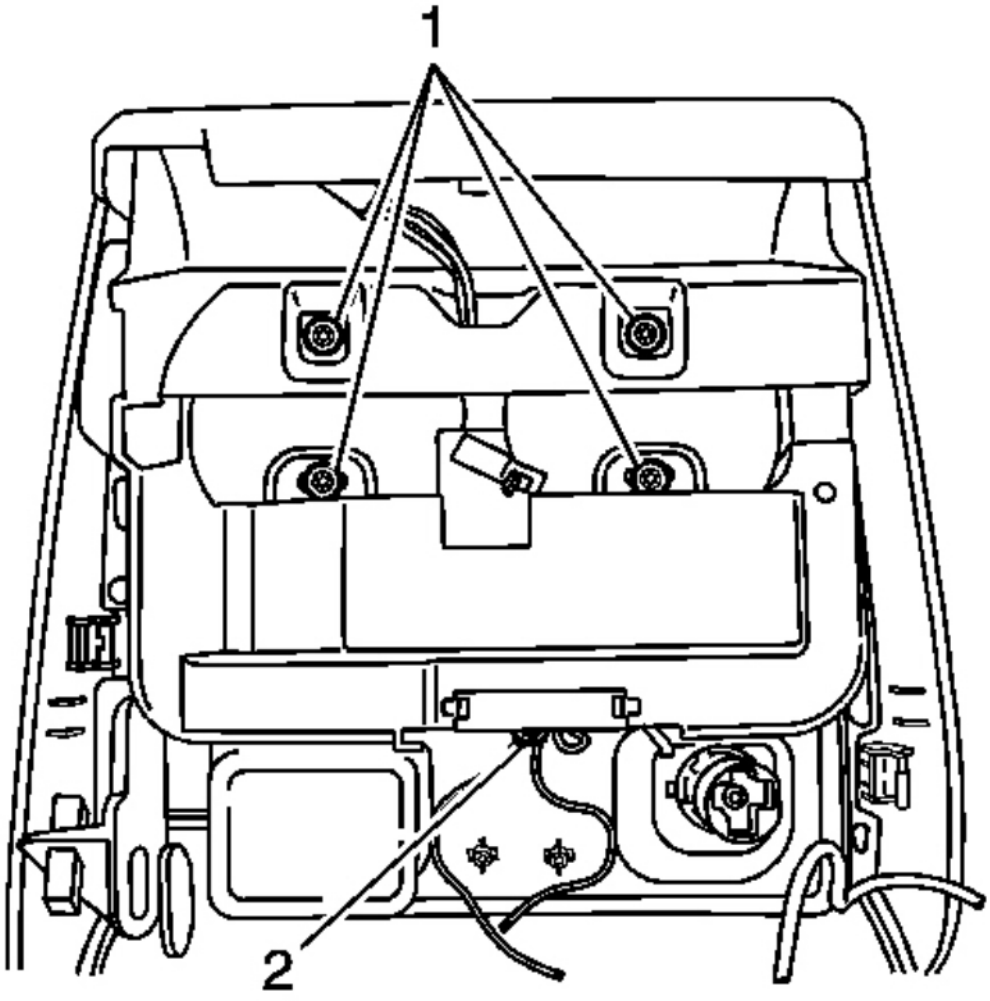


Fig. 85: Releasing Tab Securing Connector
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the connector (2).
2. Slide the blower assembly down.
3. Install the blower assembly.

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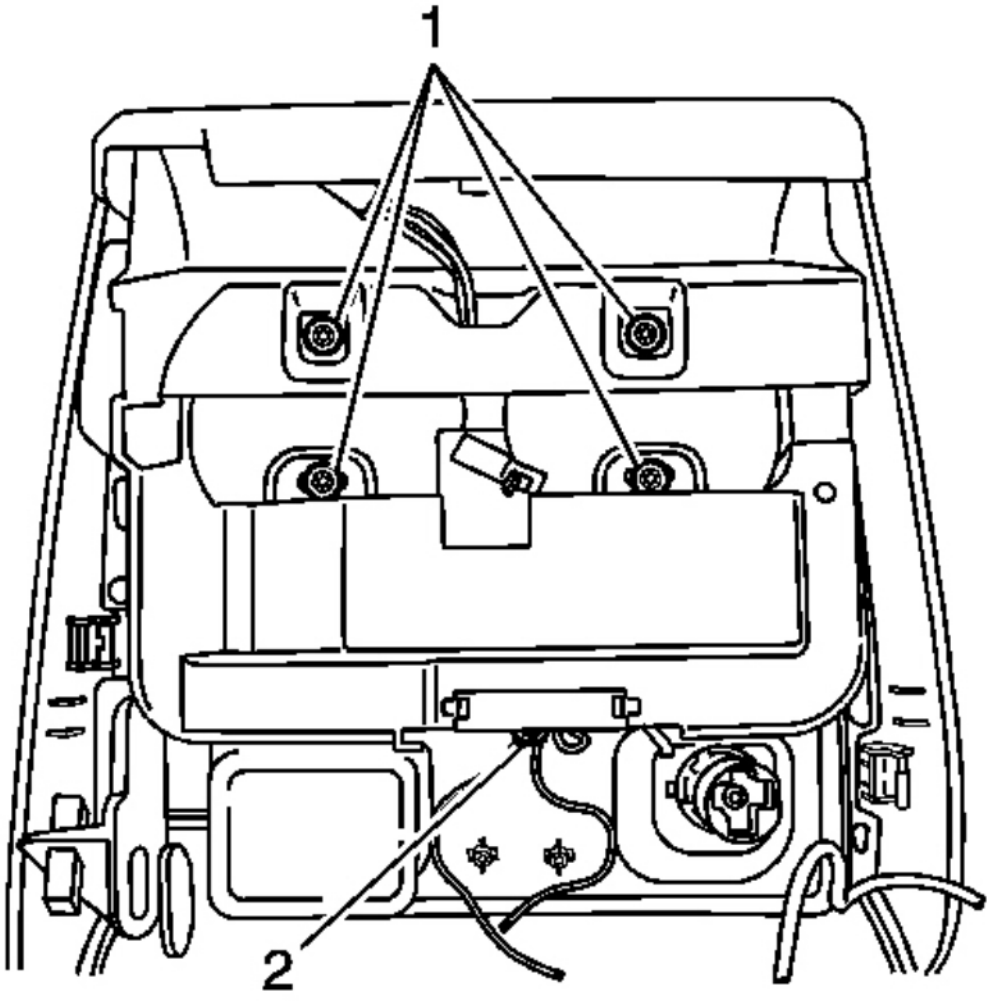


Fig. 86: Installing Connector
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the 2 retaining screws.

   Tighten: Tighten the screws to 7 N.m (62 lb in).

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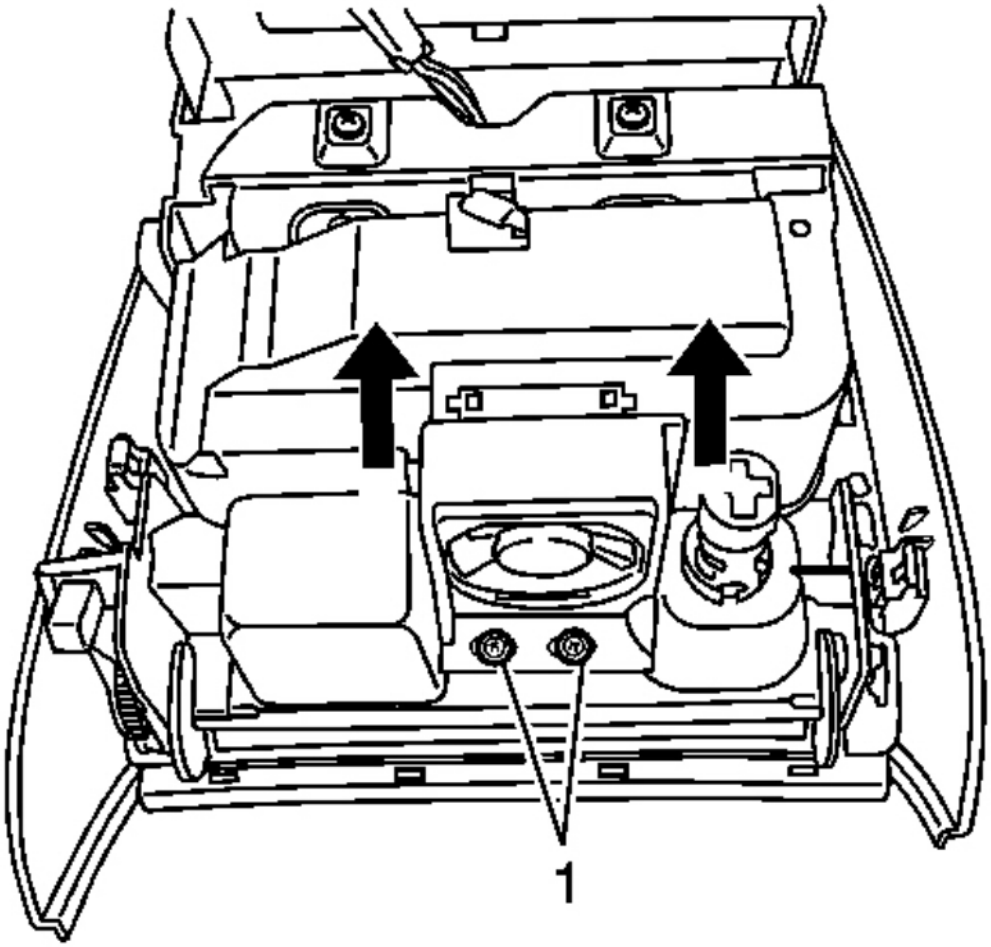


Fig. 87: Installing Blower Assembly Retaining Screws
Courtesy of GENERAL MOTORS CORP.

5. Install the console cup holder assembly. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.

CONSOLE REPLACEMENT (W/CONSOLE MOUNTING BRACKET)

Removal Procedure

1. Remove both front seats. Refer to **Seat Replacement - Front Bucket** in Seats.
2. If equipped with a Bose® amplifier, remove the radio amp fuse located under the hood electrical center.

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Refer to **Electrical Center Identification Views** in Wiring Systems.

3. Remove the upper console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
4. Remove the cupholder. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
5. Remove the screws (1) retaining the console to the I/P.
6. Disconnect the wire connectors.
7. Remove the console assembly from the vehicle.

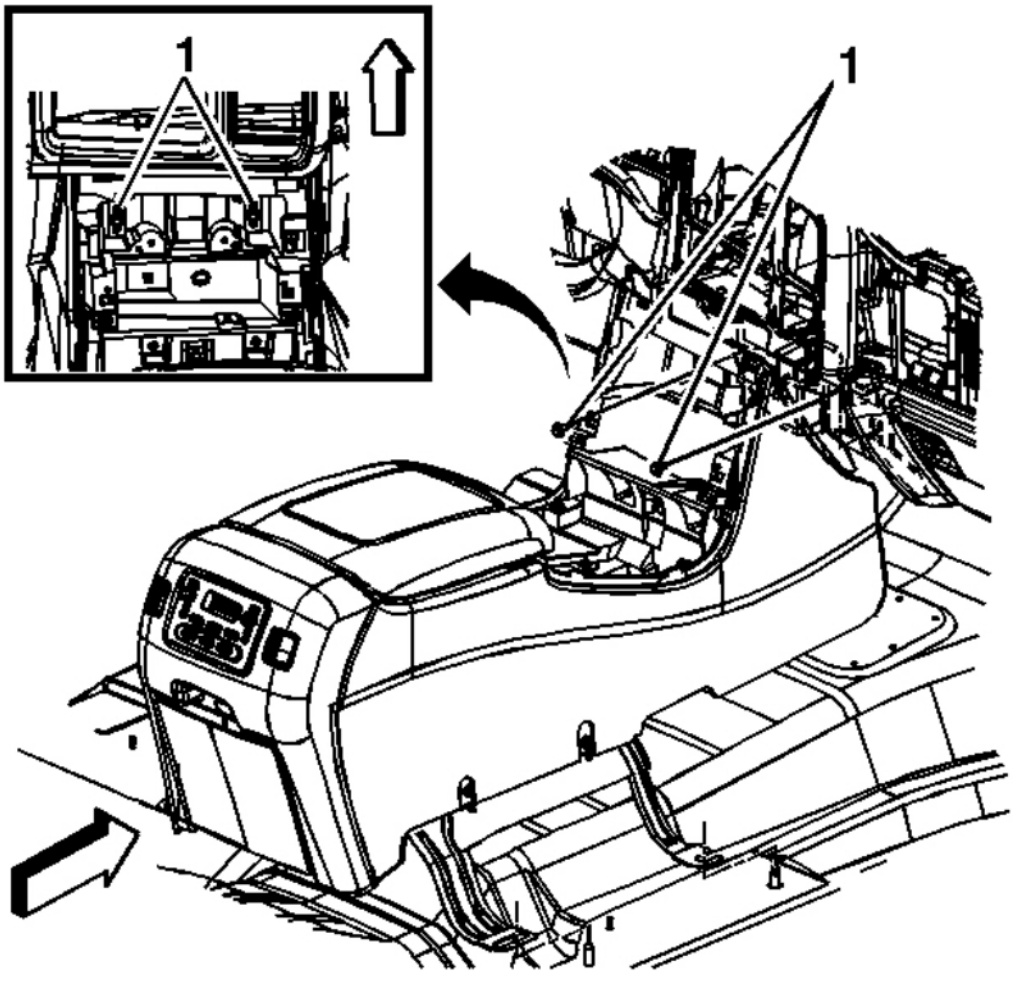


Fig. 88: Identifying Bolts Retaining Console To Instrument Panel
Courtesy of GENERAL MOTORS CORP.

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8. Remove the rear seat audio control from the console, if equipped. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.

Installation Procedure

1. Install the rear seat audio control to the console, if equipped. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.
2. Install the console in the vehicle.
3. Connect the wire connectors.
4. Move the console forward in order to install the retaining screws.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the 2 screws (1).

   Tighten: Tighten the screws to 4 N.m (35 lb in).

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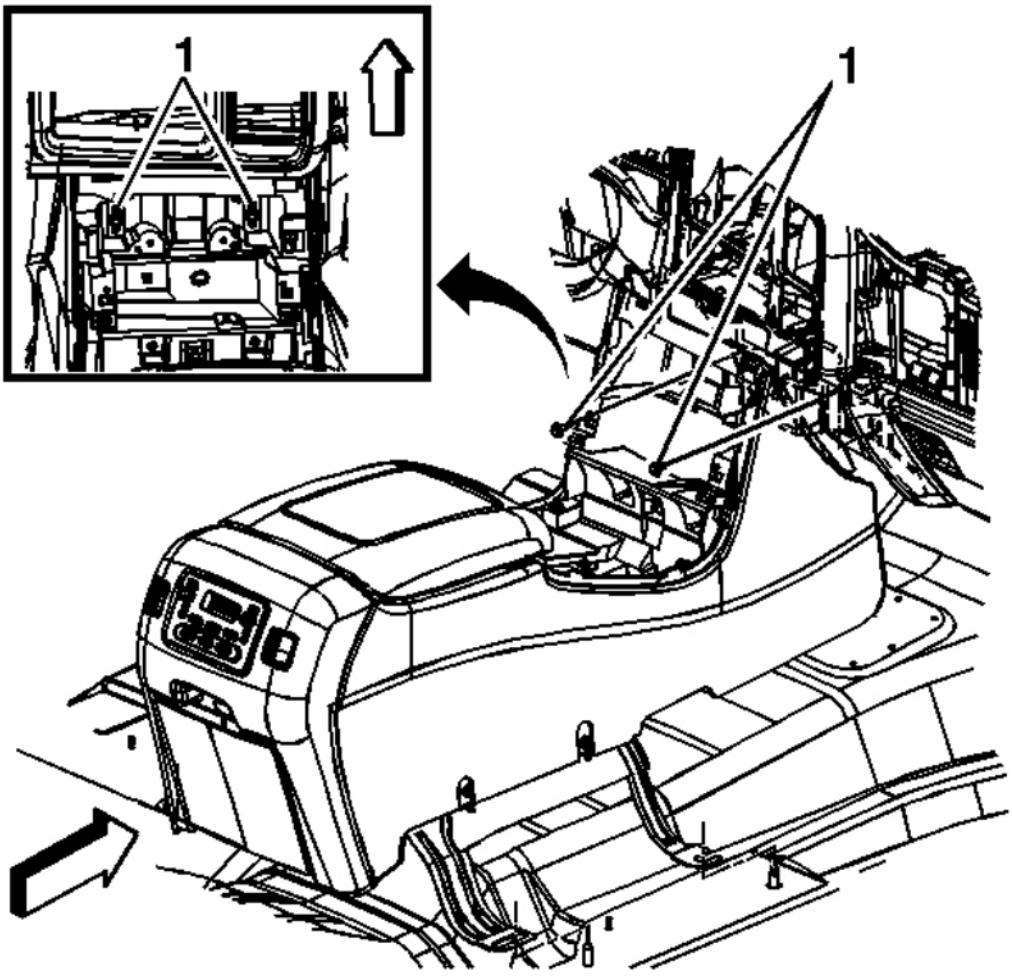


Fig. 89: Identifying Bolts Retaining Console To Instrument Panel
Courtesy of GENERAL MOTORS CORP.

6. Install the cupholder to the console. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
7. Install the upper console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
8. Install the radio amp fuse, if removed. Refer to **Electrical Center Identification Views** in Wiring Systems.
9. Install both front seats. Refer to **Seat Replacement - Front Bucket** in Seats.

CONSOLE REPLACEMENT (W/O CONSOLE MOUNTING BRACKET)

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Removal Procedure

1. If equipped with a Bose® amplifier, remove the radio amp fuse located under the hood electrical center. Refer to **Electrical Center Identification Views** in Wiring Systems.
2. Remove the floor console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
3. Remove the cupholder. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
4. Remove the bolts (1) retaining the console to the I/P.

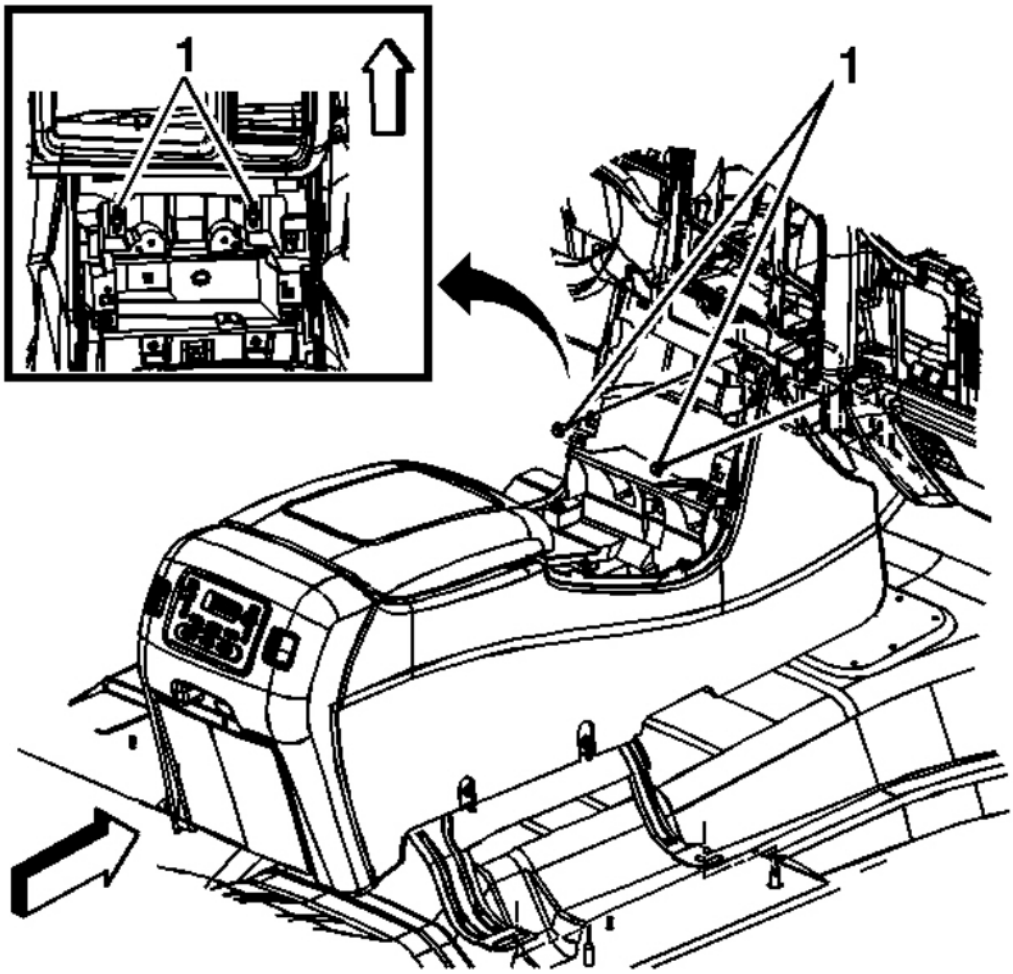


Fig. 90: Identifying Bolts Retaining Console To Instrument Panel
Courtesy of GENERAL MOTORS CORP.

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5. Remove the console storage bin. Refer to **Console Storage Bin Replacement (Except Pro)**.
6. Remove the center console end panel. Refer to **Center Console End Panel Replacement**.
7. Remove the 4 screws retaining the upper console bracket to the lower console bracket.

   The front 2 screws (1) are shown in the graphic.

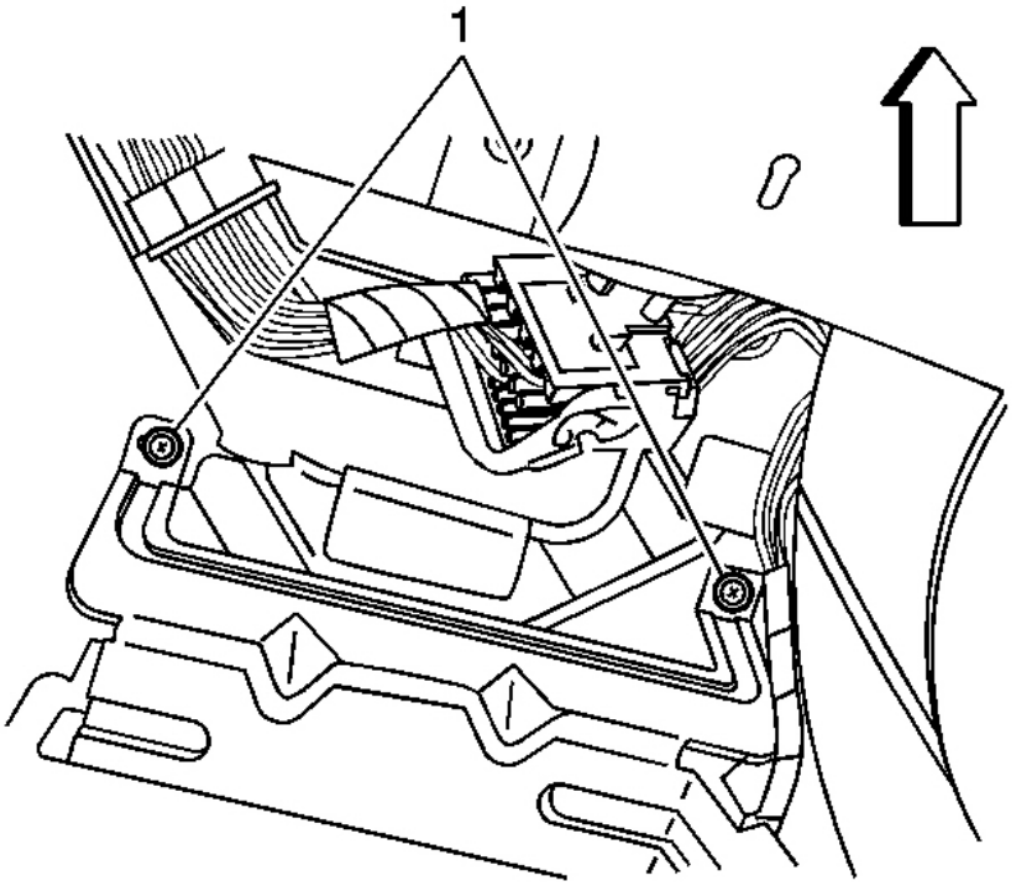


Fig. 91: Removing Screws Retaining Upper Console Bracket (W/O Console Mounting Bracket)
Courtesy of GENERAL MOTORS CORP.

8. Move both front seats to the fully forward.
9. Reposition the inboard seat track trim (1) in order to gain access to the rear console side panel screw (2).
10. Remove both rear console side panel screws.

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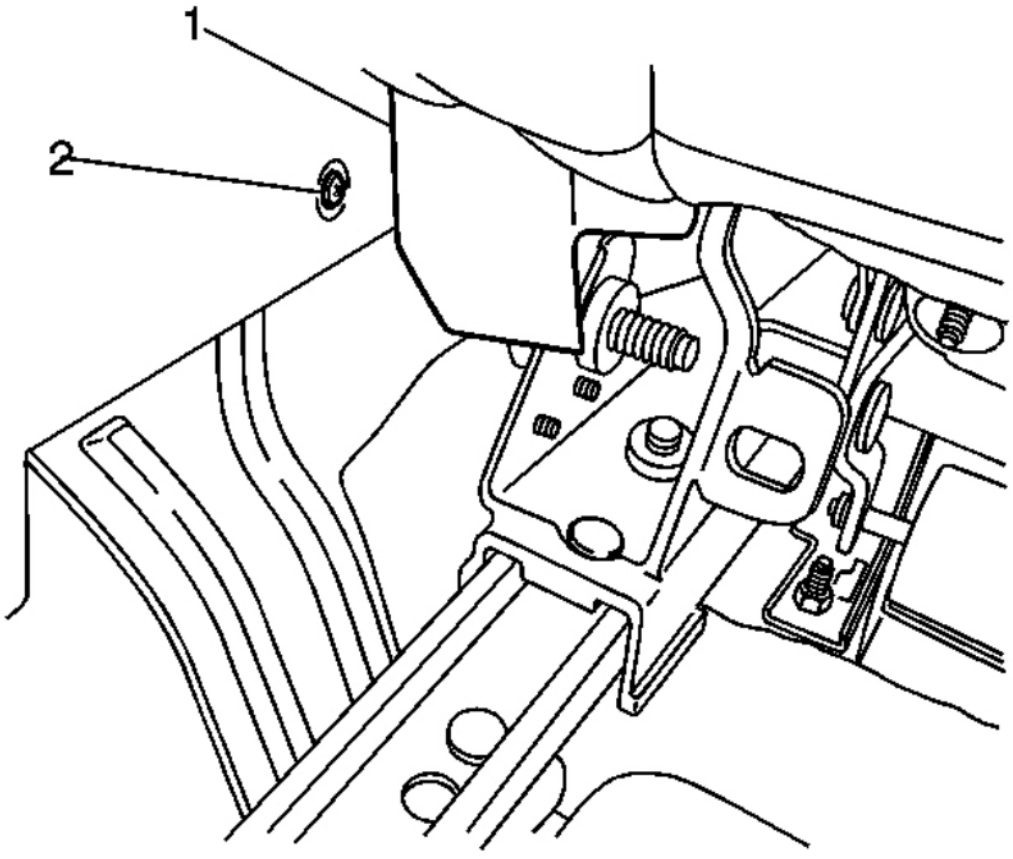


Fig. 92: View Of Seat Track Trim & Rear Console Side Panel Screw
Courtesy of GENERAL MOTORS CORP.

11. Move both front seats to the fully rearward.
12. Remove both front console side panel screws (1).
13. Disconnect the floor console electrical connector.
14. Remove the console assembly from the vehicle.

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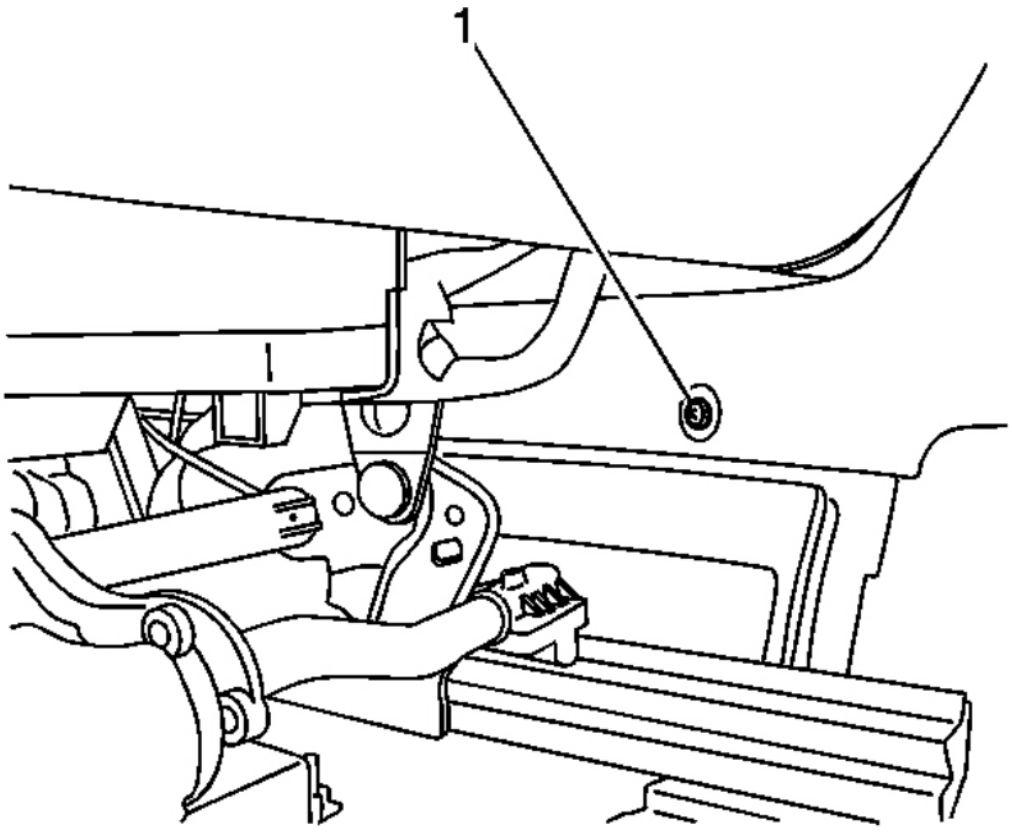


Fig. 93: Locating Console Side Panel Screw
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the floor console.
2. Connect the floor console electrical connector.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws (1) that retain the upper console bracket to the lower console bracket.

Tighten: Tighten the retaining screws to 2 N.m (18 lb in).

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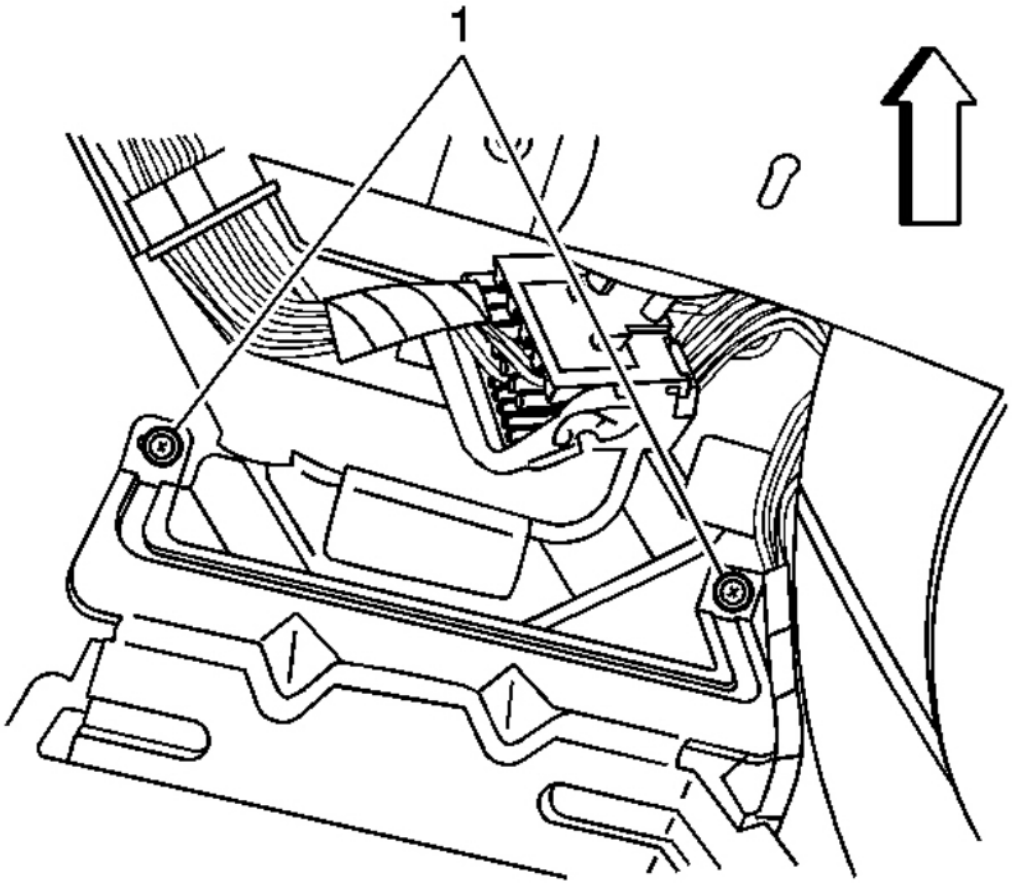


Fig. 94: Installing Screws Retaining Upper Console Bracket (W/O Console Mounting Bracket)
Courtesy of GENERAL MOTORS CORP.

4. Install the bolts (1) retaining the console to the I/P.

   Tighten: Tighten the bolts to 4 N.m (35 lb in).

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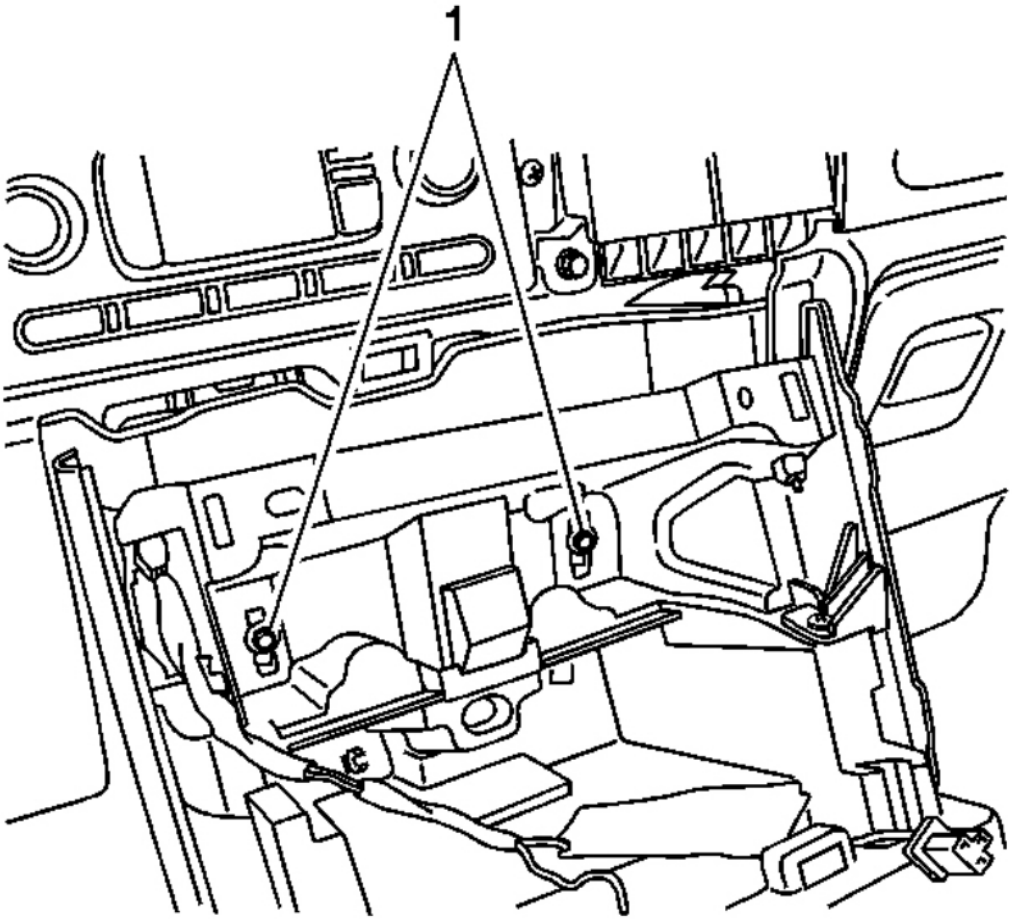


Fig. 95: Installing Bolts Retaining Console To I/P (W/O Console Mounting Bracket)
Courtesy of GENERAL MOTORS CORP.

5. Install both front console side panel screws (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

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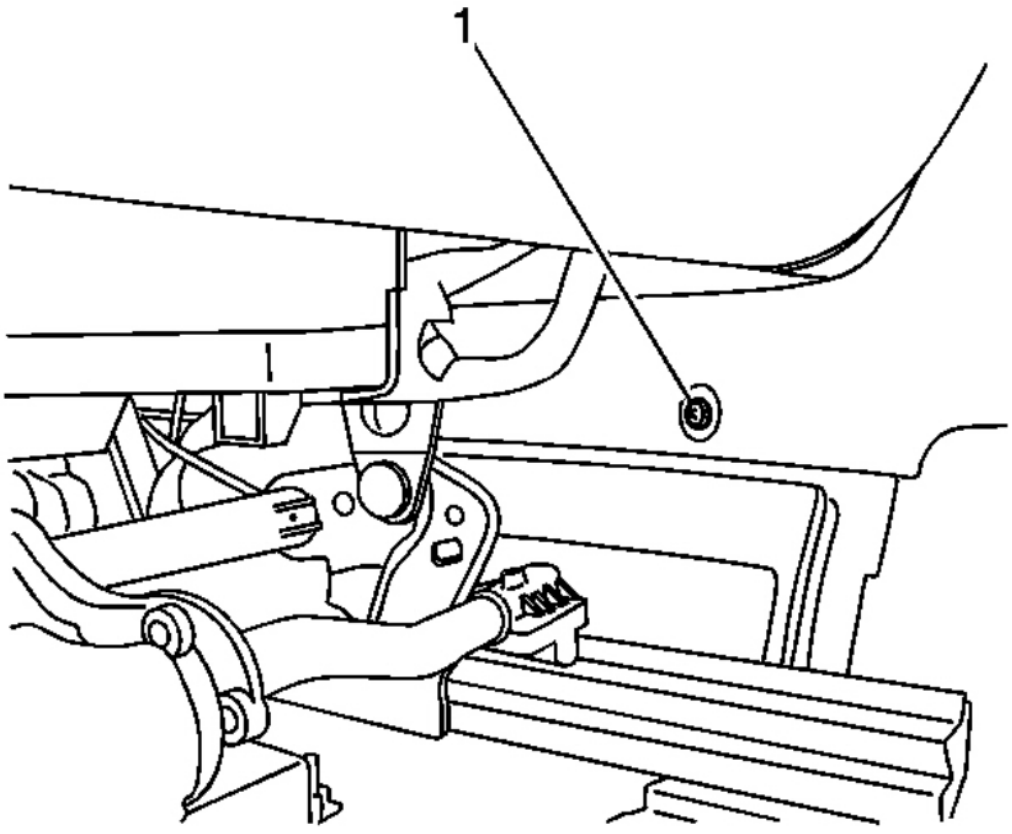


Fig. 96: Locating Console Side Panel Screw
Courtesy of GENERAL MOTORS CORP.

6. Move both front seats to the fully forward.
7. Install both rear console side panel screws (2).

   Tighten: Tighten the retaining screws to 2 N.m (18 lb in).

8. Reposition the inboard seat track trim (1).

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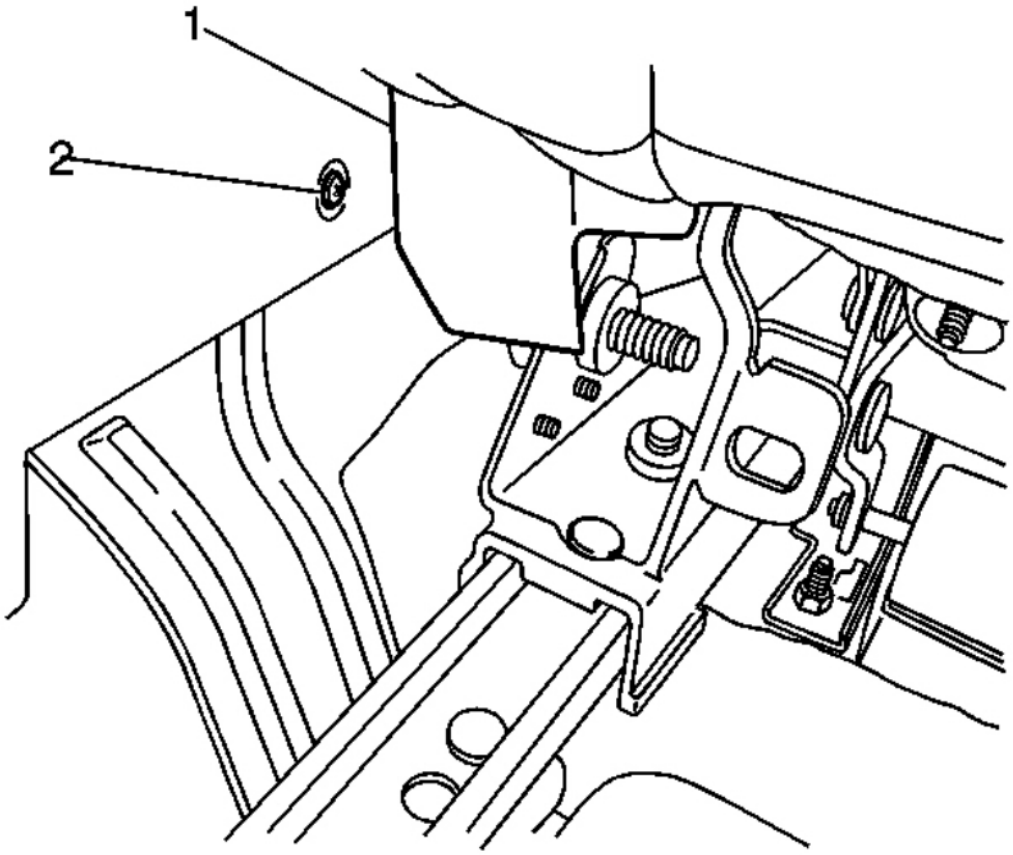


Fig. 97: View Of Seat Track Trim & Rear Console Side Panel Screw
Courtesy of GENERAL MOTORS CORP.

9. Connect the floor console electrical connector.
10. Install the center console end panel. Refer to **Center Console End Panel Replacement**.
11. Install the console storage bin. Refer to **Console Storage Bin Replacement (Except Pro)**.
12. Install the cupholder to the console. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
13. Install the upper console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
14. Install the radio amp fuse. Refer to **Electrical Center Identification Views** in Wiring Systems.

BEZEL REPLACEMENT - FLOOR CONSOLE (NON-LUXURY UPPER)

Removal Procedure

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1. Remove the I/P cluster bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
2. Insert a flat bladed tool between the Bezel assembly and the console.
3. Pry the bezel from the console outwards partially in order to gain access to the connectors.

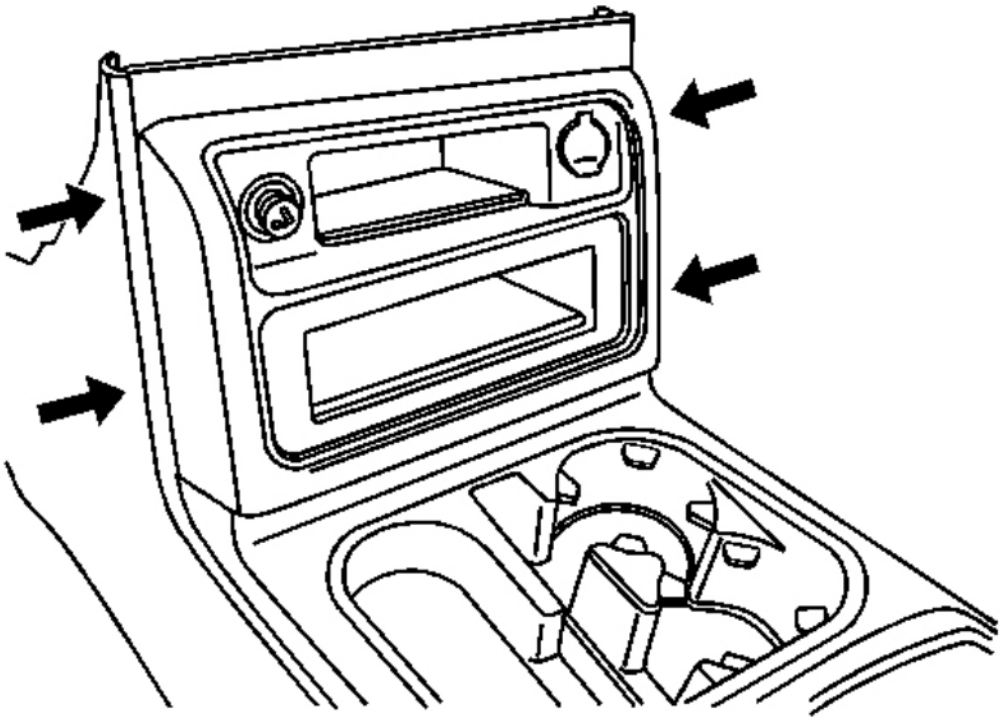


Fig. 98: Prying Floor Console Bezel From Console (Non-Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connectors (1) and (2).
5. Remove the bezel from the console.

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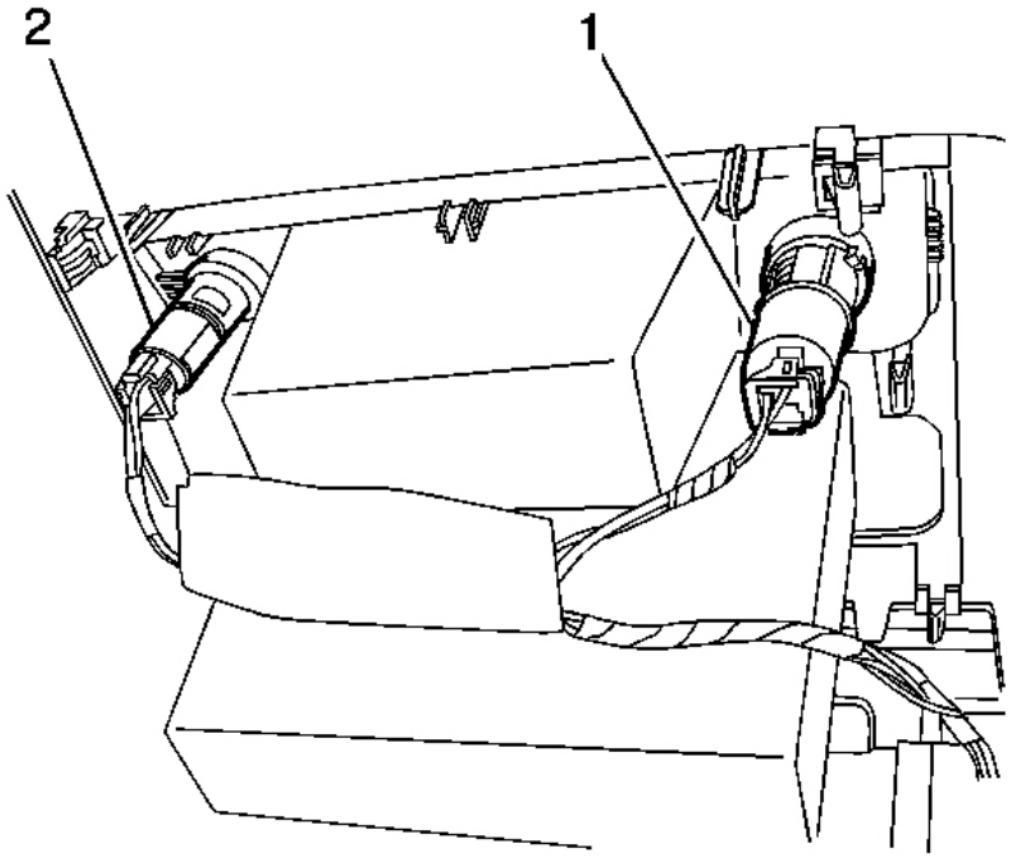


Fig. 99: Disconnecting Floor Console Bezel Electrical Connectors (Non-Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Place the bezel to the console.
2. Connect the electrical connectors (1) and (2).

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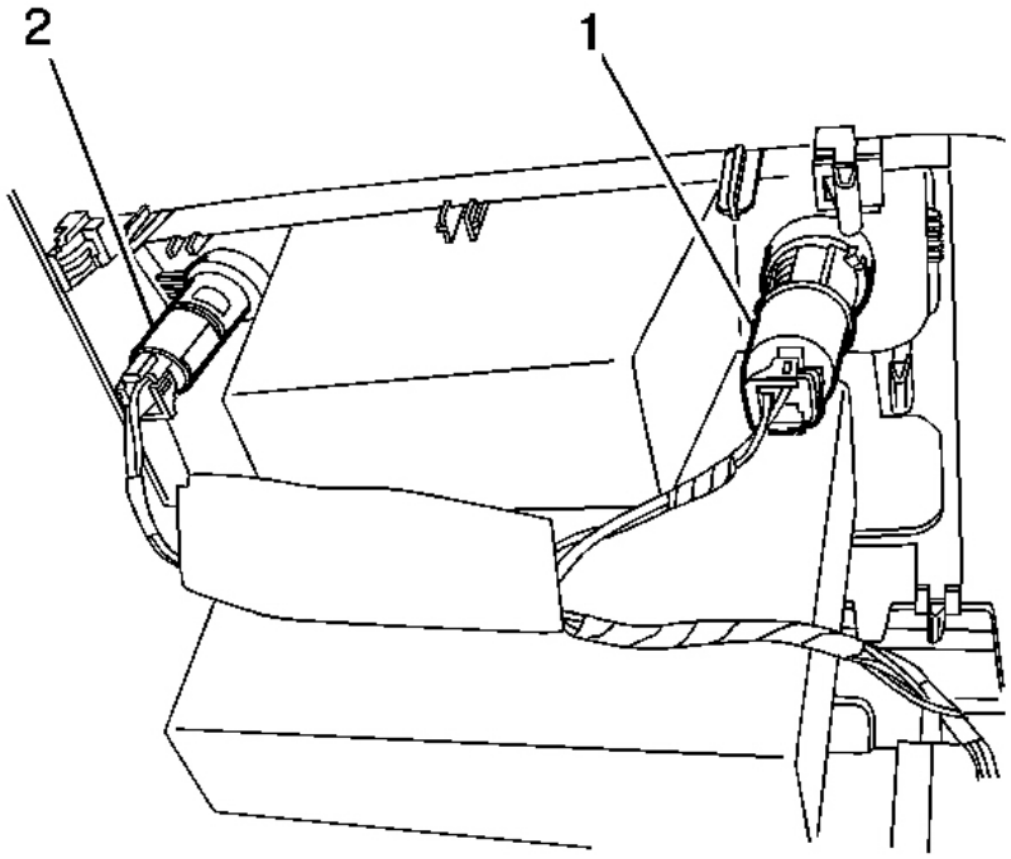


Fig. 100: Connecting Floor Console Bezel Electrical Connectors (Non-Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

3. Install the bezel to the console pushing on the corners till the retainers click in place.

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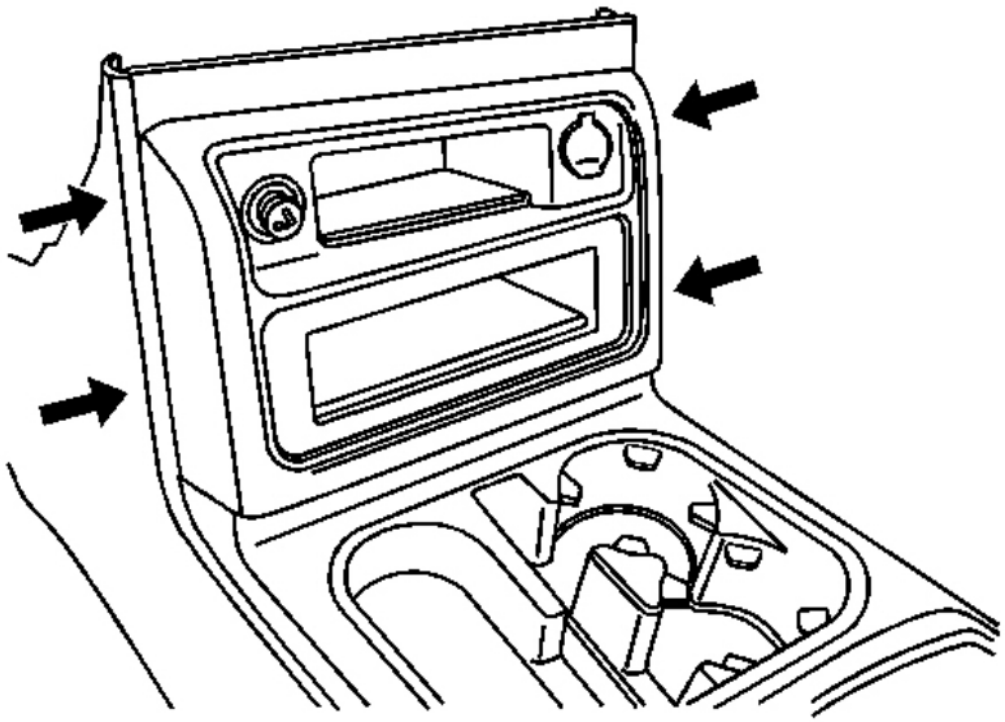


Fig. 101: Installing Floor Console Bezel To Console (Non-Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

4. Install the I/P cluster bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

BEZEL REPLACEMENT - FLOOR CONSOLE (LUXURY UPPER)

Removal Procedure

1. Remove the I/P cluster bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.
2. Insert a flat bladed tool between the Bezel assembly and the console.
3. Pry the bezel from the console outwards partially in order to gain access to the connectors.
4. Disconnect the electrical connectors (1).
5. Remove the bezel from the console.

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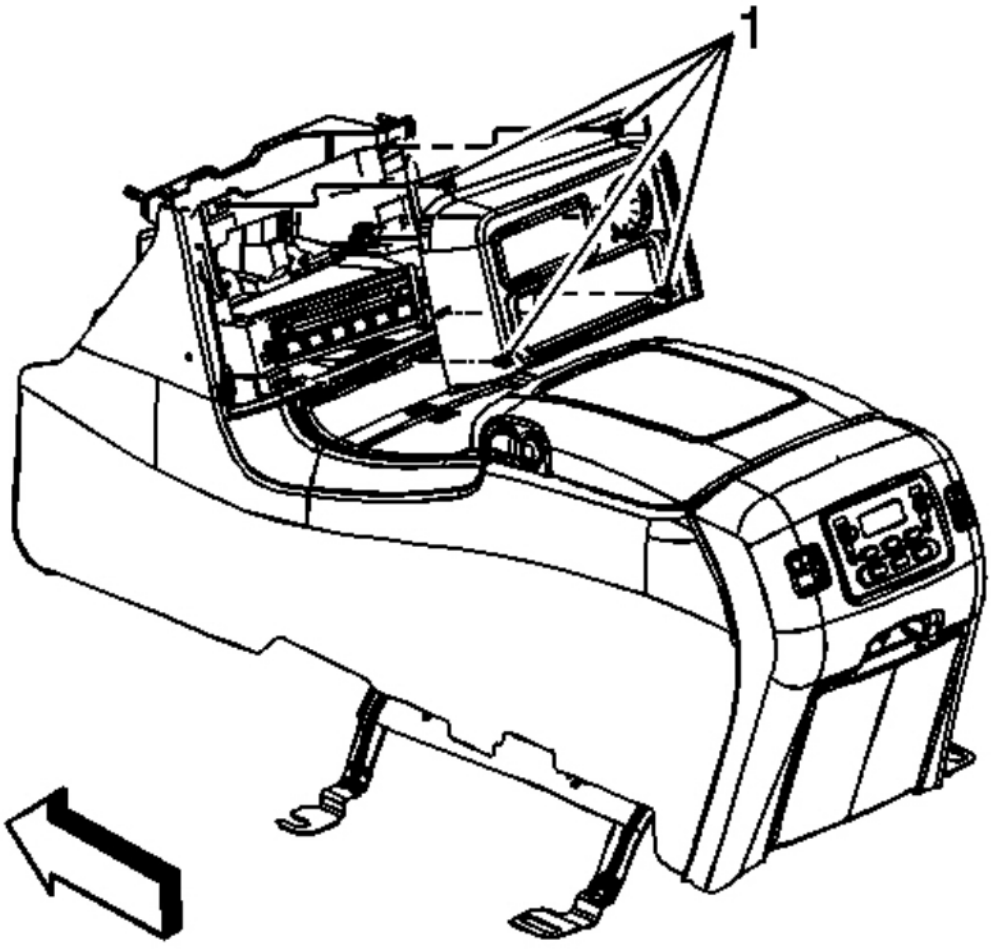


Fig. 102: Removing Floor Console Bezel (Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Place the bezel to the console.
2. Connect the electrical connectors.
3. Install the bezel to the console by pushing on the corners until the retainers (1) click in place.

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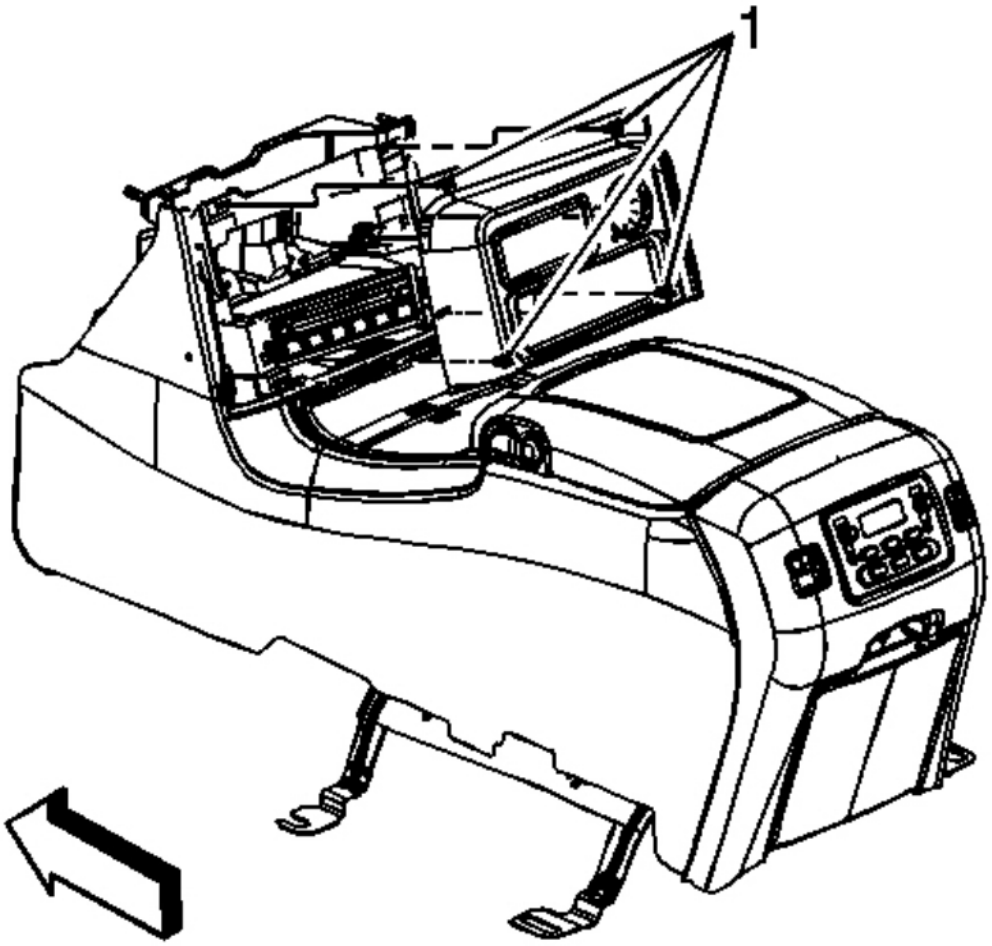


Fig. 103: Installing Floor Console Bezel (Luxury Upper)
Courtesy of GENERAL MOTORS CORP.

4. Install the I/P cluster bezel. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster**.

BRACKET REPLACEMENT - CONSOLE FLOOR

Removal Procedure

1. Remove both front seats. Refer to **Seat Replacement - Front Bucket** in Seats.
2. Remove the upper console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.

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3. Remove the cupholder. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
4. Remove the screws (1) retaining the console to the I/P.
5. Move the console assembly rearwards in order to disconnect the wire connectors.
6. Remove the console assembly from the vehicle.

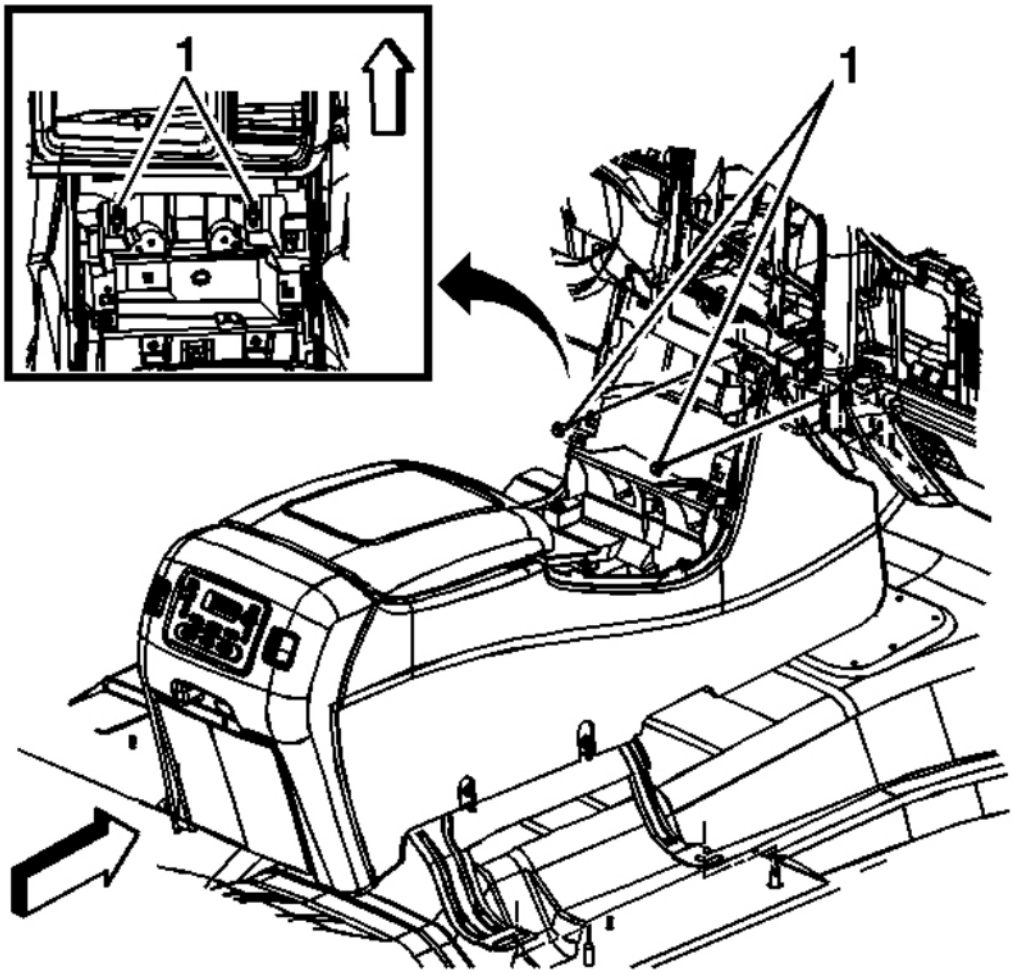


Fig. 104: Identifying Bolts Retaining Console To Instrument Panel
Courtesy of GENERAL MOTORS CORP.

7. Remove the console bin. Refer to **Console Storage Bin Replacement (Except Pro)**.
8. Remove the amplifier and bracket from the console bracket.

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9. Remove the vehicle sensor from the bracket. Refer to **Yaw Rate Sensor/Lateral Accelerometer Replacement** in Antilock Brake System.
10. Remove the fasteners retaining the console to the bracket.

Installation Procedure

1. Install the console to the bracket.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the fasteners retaining the console to the bracket.

   Tighten: Tighten the fasteners to 2 N.m (17 lb in).

3. Install the vehicle sensor to the bracket. Refer to **Yaw Rate Sensor/Lateral Accelerometer Replacement** Antilock Brake System.
4. Install the amplifier and bracket to the console bracket. Refer to **Amplifier Replacement** in Entertainment.
5. Install the console bin. Refer to **Console Storage Bin Replacement (Except Pro)**.
6. Install the rear seat audio control to the console, if equipped. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.
7. Install the console in the vehicle.
8. Connect the wire connectors.
9. Move the console forward in order to install the retaining screws.
10. Install the 2 screws (1).

    Tighten: Tighten the screws to 4 N.m (35 lb in).

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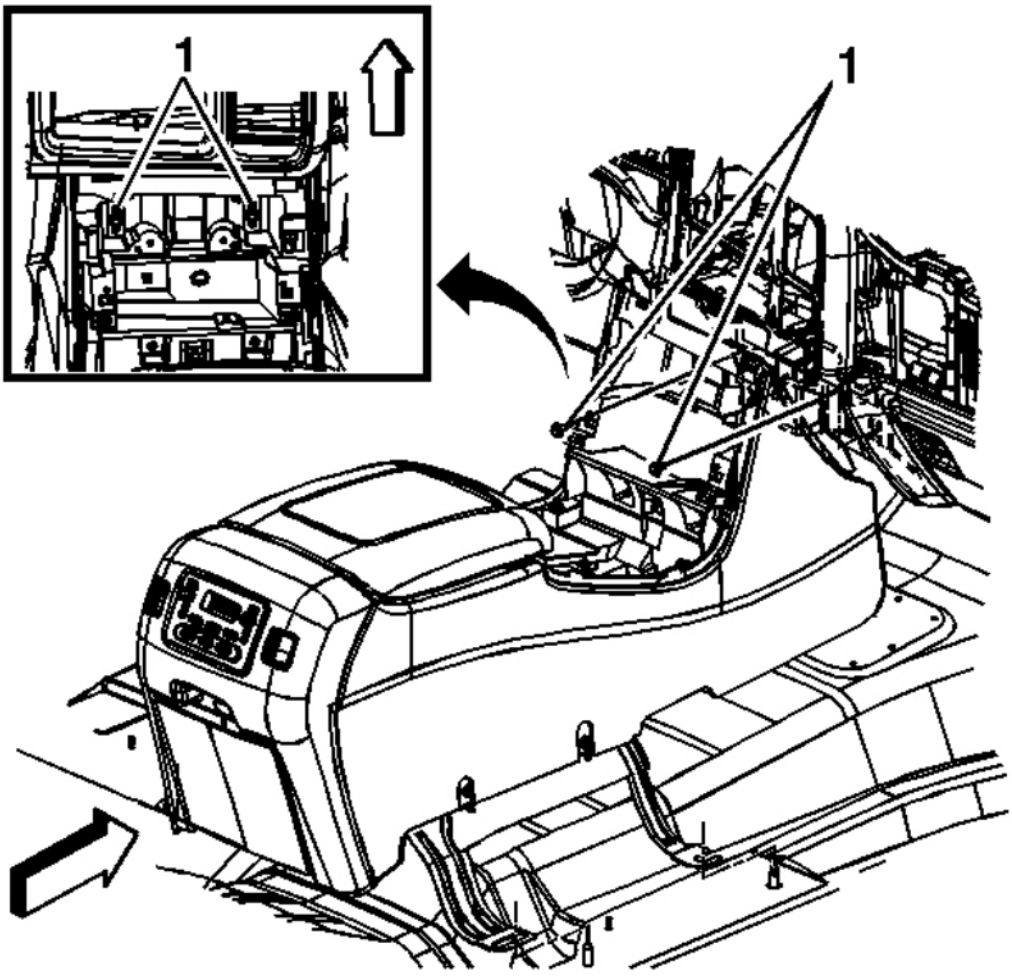


Fig. 105: Identifying Bolts Retaining Console To Instrument Panel
Courtesy of GENERAL MOTORS CORP.

11. Install the cupholder to the console. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
12. Install the upper console bezel. Refer to **Bezel Replacement - Floor Console (Non-Luxury Upper)** or **Bezel Replacement - Floor Console (Luxury Upper)**.
13. Install both front seats. Refer to **Seat Replacement - Front Bucket** in Seats.

CENTER CONSOLE END PANEL REPLACEMENT

Removal Procedure

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1. Remove the storage bin. Refer to **Console Storage Bin Replacement (Except Pro)**.
2. Remove the rear cupholder from the end panel. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
3. Remove the 2 retaining screws.

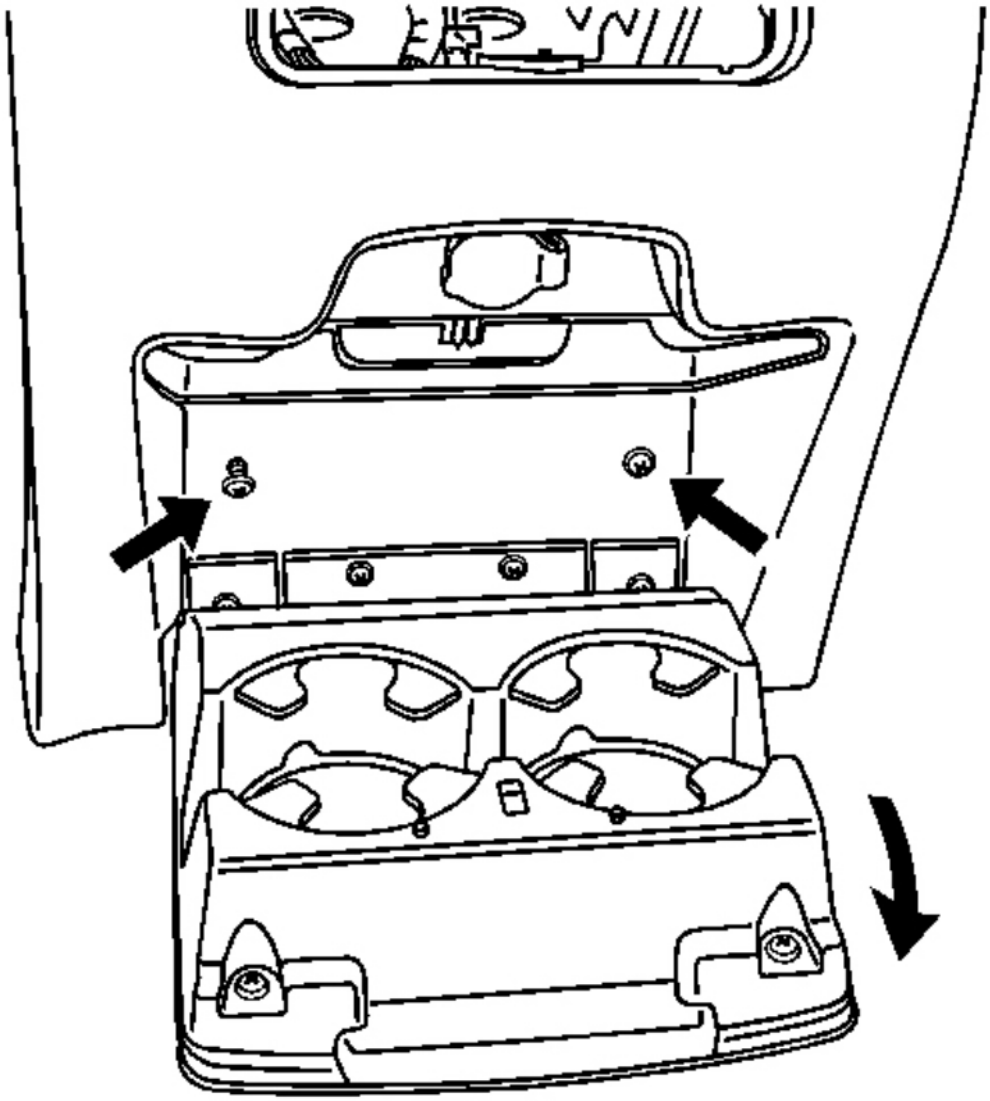


Fig. 106: Removing Center Console End Panel Retaining Screws

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Courtesy of GENERAL MOTORS CORP.

4. Remove the top 2 retaining screws.

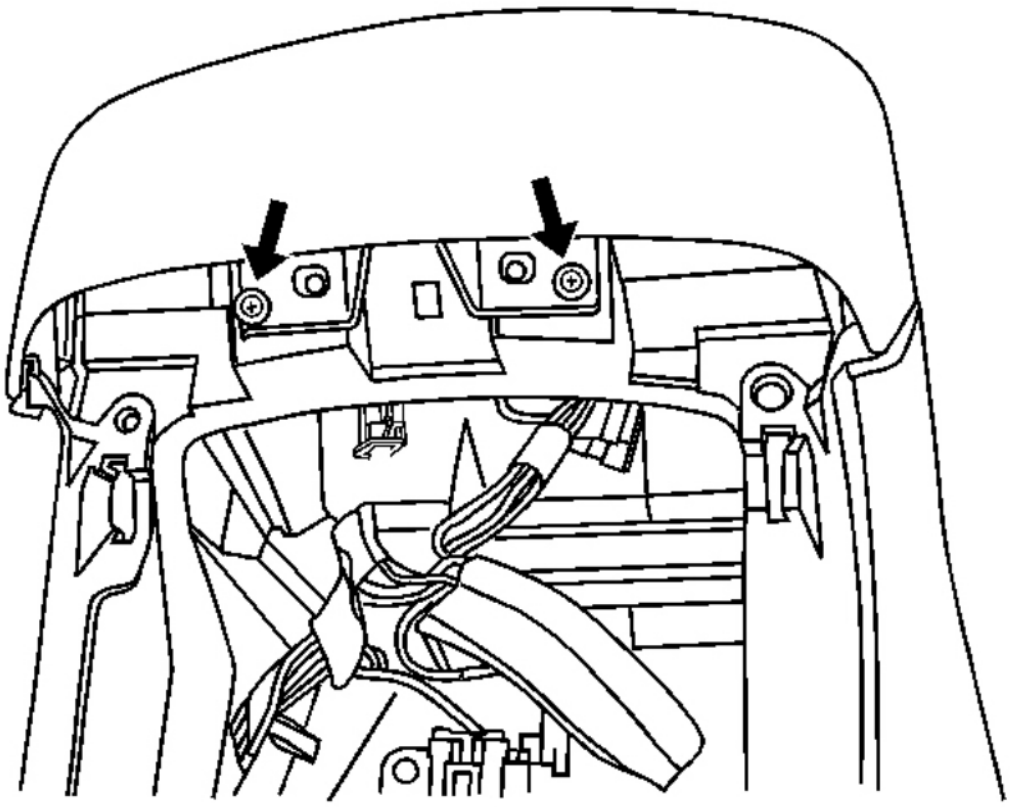


Fig. 107: Removing Center Console End Panel Top Retaining Screws
Courtesy of GENERAL MOTORS CORP.

5. Move the end panel rearwards to gain access to the electrical connectors.
6. Remove the end panel from the console.
7. Remove the rear seat heater switch, if equipped. Refer to **Heated Seat Switch Replacement - Rear** in Seats.
8. Remove the rear seat audio controls, if equipped. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.
9. Remove the power outlets from the end panel, if equipped. Refer to **Accessory Power Receptacle Replacement - 12 Volt** in Power Outlets.

Installation Procedure

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1. Install the power outlets to the end panel, if equipped. Refer to **Accessory Power Receptacle Replacement - 12 Volt** in Power Outlets.
2. Install the rear seat audio control, if equipped. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.
3. Install the rear seat heater switch, if equipped. Refer to **Heated Seat Switch Replacement - Rear** in Seats.
4. Connect all electrical connectors.
5. Install the end panel to the console.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the 2 top retaining screws.

Tighten: Tighten the screws to 1.6 N.m (14 lb in).

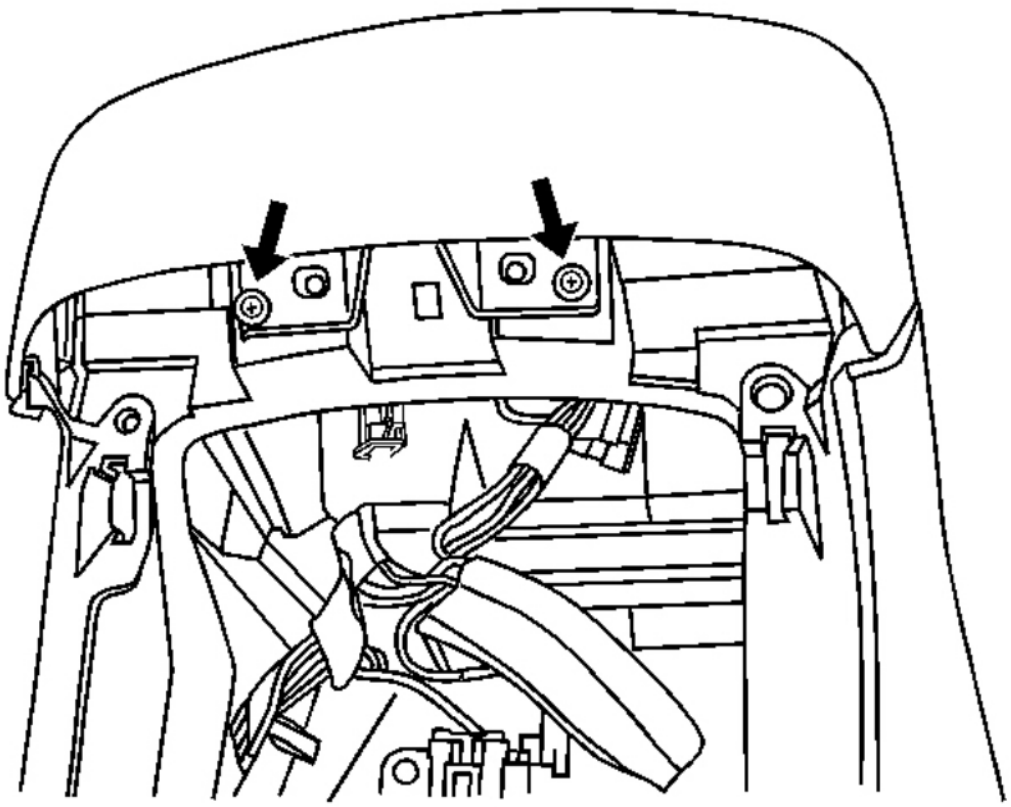


Fig. 108: Installing Center Console End Panel Top Retaining Screws

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Courtesy of GENERAL MOTORS CORP.

7. Install the 2 retaining screws.

   Tighten: Tighten the screws to 1.6 N.m (14 lb in).

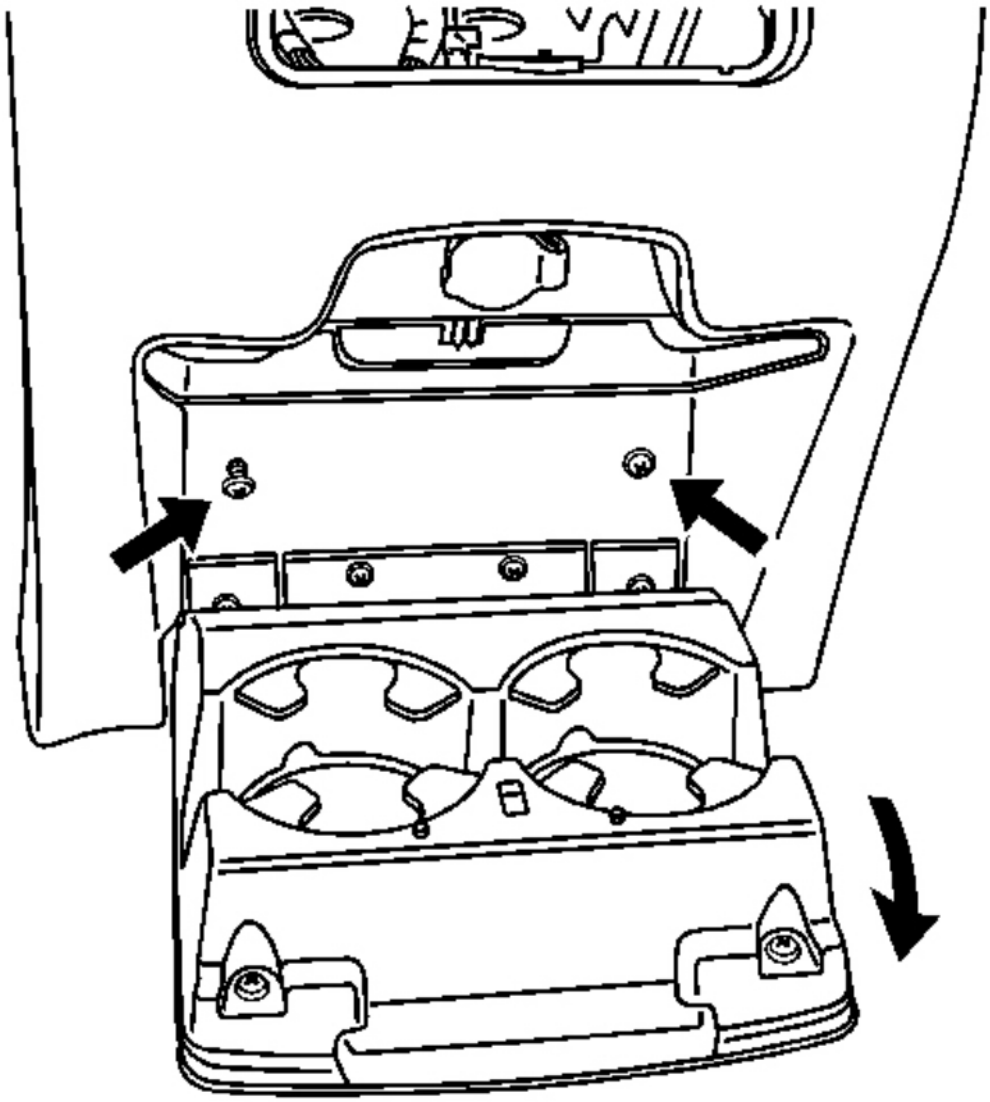


Fig. 109: Installing Center Console End Panel Retaining Screws
Courtesy of GENERAL MOTORS CORP.

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8. Install the rear cupholder to the end panel. Refer to **Cupholder Replacement (Non-Luxury)** or **Cupholder Replacement (Luxury)** or **Cupholder Replacement (Rear)** or **Cupholder Replacement (Platinum)**.
9. Install the storage bin. Refer to **Console Storage Bin Replacement (Except Pro)**.

INSTRUMENT PANEL (I/P) HARNESS REPLACEMENT

Removal Procedure

1. Remove the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement**.
2. Remove the driver's side hinge pillar trim panel. Refer to **Trim Panel Replacement - Hinge Pillar** in Interior Trim.
3. Remove the driver's side seat, if equipped with power. Refer to **Seat Replacement - Front Bucket** .
4. Disconnect the electrical harness from the underhood electrical center. Refer to **Underhood Electrical Center or Junction Block Replacement** .
5. Disconnect the wire harness from the hood, if equipped with underhood camp.
6. Remove the harness grommet from the cowl.
7. Remove the I/P harness from the vehicle.

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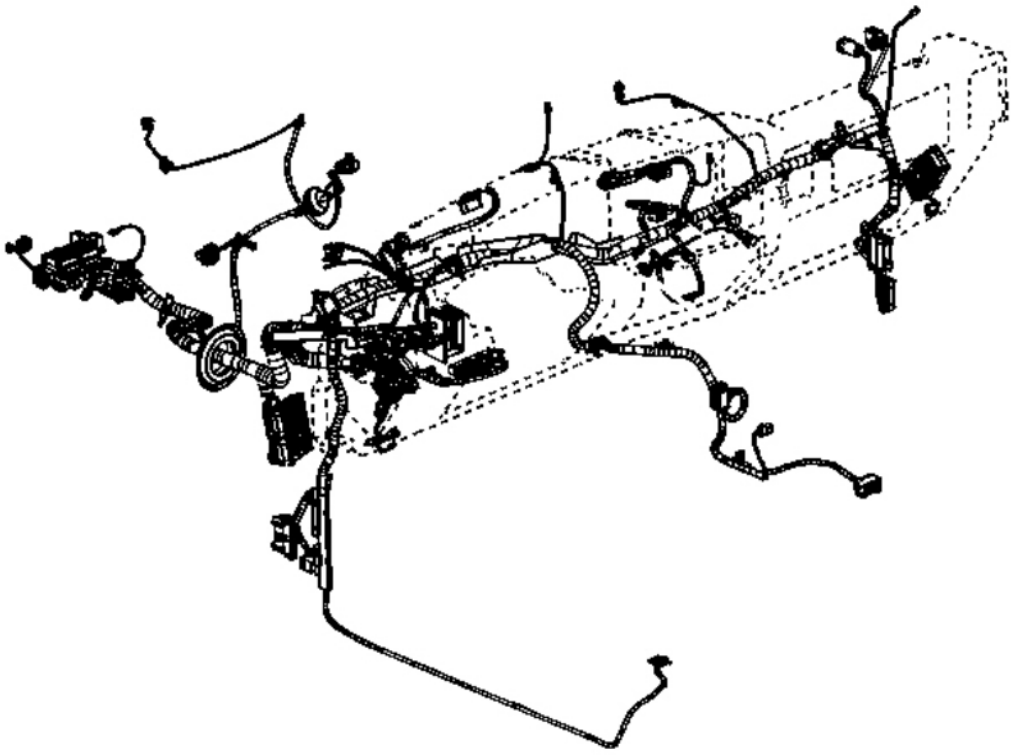


Fig. 110: Removing Instrument Panel Harness
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the I/P harness to the vehicle.
2. Install the harness grommet to the cowl.
3. Connect the wire harness to the hood, if equipped with underhood camp.

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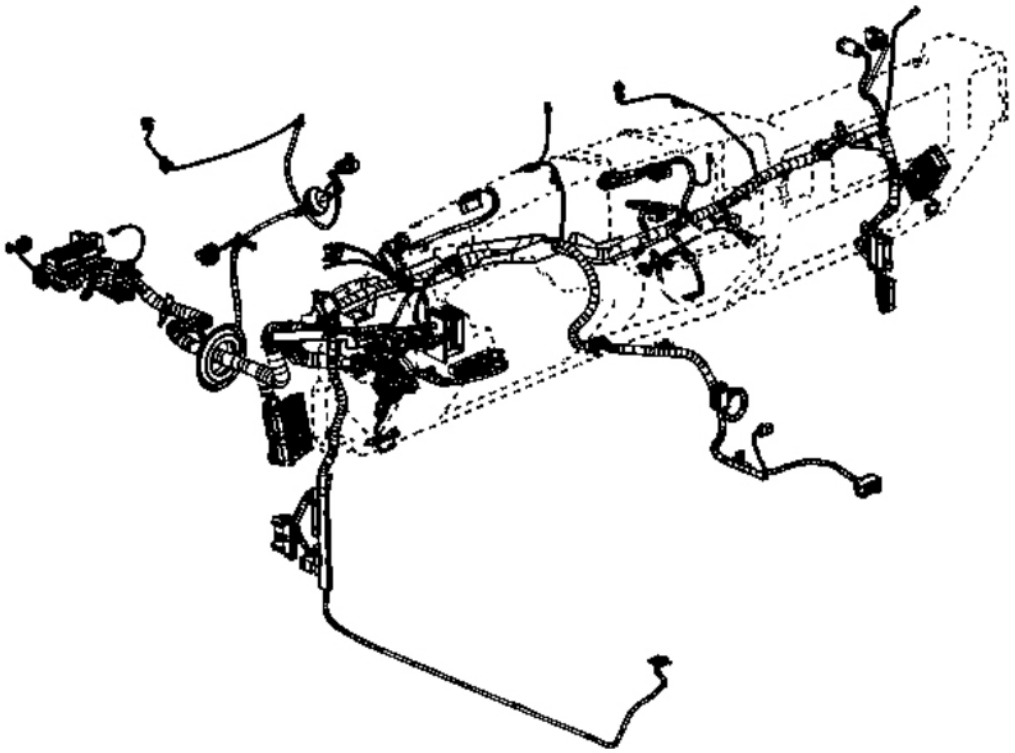


Fig. 111: Installing Instrument Panel Harness
Courtesy of GENERAL MOTORS CORP.

4. Connect the electrical harness from the underhood electrical center. Refer to **Underhood Electrical Center or Junction Block Replacement** .
5. Install the driver's side seat, if equipped with power. Refer to **Seat Replacement - Front Bucket**
6. Install the driver's side hinge pillar trim panel. Refer to **Trim Panel Replacement - Hinge Pillar** .
7. Install the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement**.

DESCRIPTION AND OPERATION

INSTRUMENT PANEL CLUSTER (IPC) DESCRIPTION AND OPERATION

Displays Test

Certain instrument panel cluster (IPC) features are tested when the ignition is turned on in order to verify the features are working properly. The following indicators illuminate for 3 seconds:

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- The ABS indicator
- The battery indicator
- The brake indicator
- The LOW FUEL indicator
- The park brake indicator
- Security indicator
- All gages sweep to their minimum physical position and then to their actual physical position.

The following indicators illuminate for the specified times:

- The AIR BAG indicator flashes 7 times.
- The fasten seatbelt indicator illuminates for 20 seconds followed by 55 seconds of flashing with the drivers seatbelt unfastened, or, the fasten seatbelt indicator will illuminate for 8 seconds with the drivers seatbelt fastened.
- The SERVICE ENGINE SOON indicator (MIL) illuminates briefly.
- All segments of the driver information center (DIC) illuminate briefly.
- All gages sweep to their minimum physical position and then to their actual physical position.

Indicators and Warning Messages

Refer to **Indicator/Warning Message Description and Operation**.

Engine Coolant Temperature Gage

The IPC displays the engine coolant temperature as determined by the powertrain control module (PCM). The IPC receives a class 2 message from the PCM indicating the engine coolant temperature. The engine coolant temperature gage defaults to 75°C (160°F) or below when:

- The PCM detects a malfunction in the engine coolant temperature sensor circuit.
- The IPC detects a loss of class 2 communication with the PCM.

Engine Oil Pressure Gage

The IPC displays the engine oil pressure as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the engine oil pressure. The engine oil pressure gage defaults to 0 kPa (0 psi) or below if:

- The PCM detects a malfunction in the engine oil pressure sensor circuit.
- The IPC detects a loss of class 2 communications with the PCM.

Fuel Gage

The IPC displays the fuel level as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the fuel level percent. The fuel gage defaults to empty if:

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- The PCM detects a malfunction in the fuel level sensor circuit.
- The IPC detects a loss of class 2 communications with the PCM.

When the fuel level is less than a pre-determined value, the low fuel indicator illuminates.

Reviewing the fuel system description will further explain how the system functions. Refer to:

- **Fuel System Description (Pickup and Utility)** in Engine Controls - 4.8L, 5.3L and 6.0L
- **Fuel System Description** in Engine Controls - 8.1L

Hourmeter

The IPC can display the accumulated engine run time hours using the VF display when the ignition is in the OFF AWAKE or ACC, RAP and in RUN positions. The IPC stores the accumulated engine run time hours in a non-volatile format. The hourmeter shall update every 6 minutes and will not change if the battery is disconnected or removed. When the ignition is in the OFF position and the trip reset switch is pushed in and held for more than 4 seconds, the IPC will display the accumulated hours for 30 seconds. The hourmeter will reset to 0.0 when 100,000 hours are accumulated, and begin to accumulate hours again.

Odometer

The IPC contains a season odometer, a trip odometer, and a hourmeter. Momentarily press the trip/reset switch on the IPC in order to toggle between the season odometer, the trip odometer, and the hourmeter. Press the trip/reset switch for greater than 1 second, while the trip odometer is displayed, in order to reset the trip odometer. For vehicles with steering controls, the Personal Trip On/Off (Business Trip On/Off) must be turned On in order for the trip odometer to accumulate. When the Personal Trip On/Off (Business Trip On/Off) parameter is displayed and the select button is pressed on the steering wheel, the On/Off state of the Personal Trip (Business Trip) shall be changed to the opposite state. The IPC displays the vehicle mileage and trip mileage as determined by the IPC. The IPC calculates the mileage based on the vehicle speed signal circuit from the PCM. The odometer will display 'error' if an internal IPC memory failure is detected. The odometer can be configured to display either miles or kilometers.

PRNDL Display

The IPC displays the selected gear position as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the gear position. The PRNDL display blanks if:

- The PCM detects a malfunction in the transmission range switch circuit.
- The IPC receives a class 2 message indicating the park position and the column park switch indicates a position other than park, open input.
- The IPC detects a loss of class 2 communications with the PCM.

Speedometer

The IPC displays the vehicle speed on the analog speedometer based on the vehicle speed signal from the PCM. The PCM converts the data from the vehicle speed sensor to a 4,000 pulses/mile signal. The IPC uses the

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vehicle speed signal circuit from the PCM in order to calculate the vehicle speed.

The speedometer defaults to 0 km/h (0 mph) if a malfunction in the vehicle speed signal circuit exists.

Tachometer

The IPC displays the engine speed on the analog tachometer based on the engine speed signal from the PCM. The IPC uses the engine speed signal circuit - 2 pulses/engine revolution - from the PCM in order to calculate the engine speed.

The tachometer defaults to 0 RPM if a malfunction in the engine speed signal circuit exists.

Transmission Temperature Gage

The IPC displays the transmission temperature as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the transmission temperature. The transmission temperature gage will default to 40°C (100°F) or below if:

- The PCM detects a malfunction in the transmission temperature sensor circuit.
- The IPC detects a loss of class 2 communications with the PCM.

Voltmeter

The IPC displays the system voltage as detected at the ignition 1 input of the IPC. When the engine is ON, the gage should be between 10 and 16 volts.

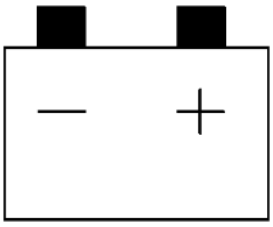
INDICATOR/WARNING MESSAGE DESCRIPTION AND OPERATION

Indicators

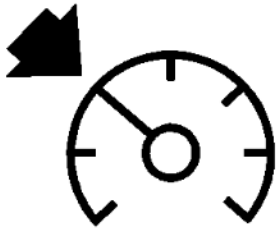
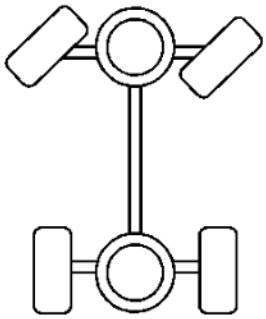
Indicators

Symbol	Description
	ABS: Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake System

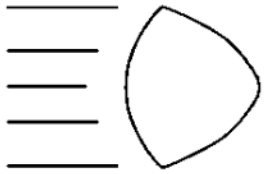
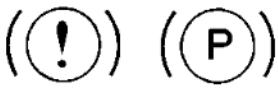
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	Air Bag: Refer to **SIR System Description and Operation** in SIR
  (Canada) BRAKE (U.S.)	Brake: Refer to **Brake Warning System Description and Operation** in Hydraulic Brakes
	Charge: Refer to **Charging System Description and Operation (W/O Generator/Battery Control Module)** in Engine Electrical

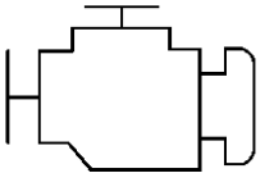
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 (Canada) CRUISE (U.S.)	CRUISE: Refer to **Cruise Control Description and Operation** in Cruise Control
	Fasten Safety Belt: Refer to **Seat Belt System Description and Operation** in Seat Belts
	SERVICE 4WD: Refer to • **Transfer Case Description and Operation** in Transfer Case - BW 4481-NR3 • **Transfer Case Description and Operation** in Transfer Case - BW 4482-NR4 • **Transfer Case Description and Operation** in Transfer Case - NVG 246-NP8

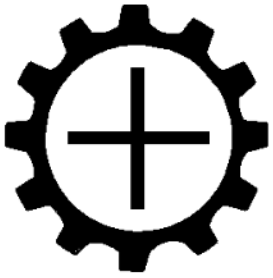
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	High Beam: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
Low Fuel	Low Fuel: Refer to Indicator/Warning Message Description and Operation
	• Overdrive Disable: Refer to **Transmission Indicators and Messages** in Automatic Transmission - 4L60-E/4L65-E • Refer to **Transmission Indicators and Messages** in Automatic Transmission - 4L80-E/4L85-E
 PARK BRAKE	Park Brake: Refer to **Park Brake System Description and Operation** in Park Brake
 (Canada) SECURITY (U.S.)	SECURITY: Refer to **Theft Systems Description and Operation** in Theft Deterrent

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 (Canada) SERVICE ENGINE SOON (U.S.)	Malfunction Indicator Lamp (MIL): Refer to • **Powertrain Control Module (PCM) Description** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Description** in Engine Controls - 8.1L
	Tire Pressure Monitor: Refer to **Tire Pressure Monitor Description and Operation** in Tire Pressure Monitoring
	Traction Off: Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake System
	TOW/HAUL: Refer to **Transmission Indicators and Messages** in Automatic Transmission - 4L60-E

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	Turn Signals: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
	Upshift Indicator: Refer to Indicator/Warning Message Description and Operation

DIC Warning Messages

DIC Warning Messages

Symbol	Description
BATTERY NOT CHARGING	Refer to **Charging System Description and Operation (W/O Generator/Battery Control Module)** in Engine Electrical
CARGO DOOR AJAR	Refer to **Cargo Door Description and Operation** in Body Rear End
CHANGE ENGINE OIL	Refer to Indicator/Warning Message Description and Operation
CHECK OIL LEVEL	Refer to Indicator/Warning Message Description and Operation
CHECK TIRE PRESSURE	Refer to **Tire Pressure Monitor Description and Operation** in Tire Pressure Monitoring
CHECK WASHER FLUID	Refer to **Wiper/Washer System Description and Operation** in Wiper/Washer System
DRIVER DOOR AJAR	Refer to **Door Ajar Indicator Description and Operation** in Doors
ENGINE COOLANT HOT	Refer to **Cooling System Description and Operation** in Engine Cooling
ENGINE OVERHEATED	Refer to **Cooling System Description and Operation** in Engine Cooling
FUEL LEVEL LOW	Refer to Indicator/Warning Message Description and Operation

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ICE POSSIBLE	Refer to Indicator/Warning Message Description and Operation
LEFT REAR DOOR AJAR	Refer to **Door Ajar Indicator Description and Operation** in Doors
LOW COOLANT LEVEL	Refer to **Cooling System Description and Operation** in Engine Cooling
OIL LIFE RESET	Refer to Indicator/Warning Message Description and Operation
OIL PRESSURE LOW	Refer to Indicator/Warning Message Description and Operation
OVERSPEED	Refer to Indicator/Warning Message Description and Operation
PASSENGER DOOR AJAR	Refer to **Door Ajar Indicator Description and Operation** in Doors
PROGRAM CLUSTER	Refer to Indicator/Warning Message Description and Operation
REAR ACCESS OPEN	• Refer to **Cargo Door Description and Operation** in Body Rear End • **Liftgate Ajar Indicator Description and Operation** in Body Rear End
REDUCED ENGINE POWER	Refer to • **Powertrain Control Module (PCM) Description** in Engine Controls - 4.8L, 5.3L and 6.0L • **Powertrain Control Module (PCM) Description** in Engine Controls - 8.1L
REPLACE LIFTGATE FUSE	Refer to **Power Door Locks Description and Operation** in Doors
RFA X BATTERY LOW	Refer to **Keyless Entry System Description and Operation** in Keyless Entry
RIGHT REAR DOOR AJAR	Refer to **Door Ajar Indicator Description and Operation** in Doors
SEATBELT REMINDER	Refer to **Seat Belt System Description and Operation** in Seat Belts
SERVICE 4 WHEEL STEER	Refer to **Rear Wheel Steering Description and Operation** in Rear Wheel Steering
SERVICE 4WD	Refer to • **Transfer Case Description and Operation** in Transfer Case - BW 4481-NR3 • **Transfer Case Description and Operation** in Transfer Case - BW 4482-NR4

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	• **Transfer Case Description and Operation** in Transfer Case - NVG 246-NP8
SERVICE AIR BAG	Refer to **SIR System Description and Operation** in SIR
SERVICE BRAKE BOOSTER	Refer to **Brake Warning System Description and Operation** in Hydraulic Brakes
SERVICE BRAKE SYSTEM	Refer to **Brake Warning System Description and Operation** in Hydraulic Brakes
SERVICE RIDE CONTROL	Refer to **Electronic Suspension Control Description and Operation** in Electronic Suspension Control (ESC)
SERVICE TIRE MONITOR	Refer to **Tire Pressure Monitor Description and Operation** in Tire Pressure Monitoring
SERVICE STABILITY	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
STABILITY SYSTEM ACTIVE	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
STABILITY SYSTEM DISABLED	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
STABILITY SYSTEM READY	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
TIGHTEN FUEL CAP	Refer to Indicator/Warning Message Description and Operation
TRACTION ACTIVE	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
TRACTION SYSTEM LIMITED	Refer to **ABS Description and Operation (W/JL4)** or **ABS Description and Operation (W/O JL4)** in Antilock Brake Systems
TRANS IN WARM UP	Refer to **Transmission Indicators and Messages** in Automatic Transmission - 4L60-E
TURN SIGNAL ON	Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
VEHICLE SPEED LIMITED	Refer to Indicator/Warning Message Description and Operation

CHANGE ENGINE OIL

The IPC illuminates the CHANGE ENGINE OIL message when the powertrain control module (PCM) determines that the engine oil should be changed. The IPC receives a class 2 message from the PCM requesting illumination. Once the oil is changed, perform the engine oil monitor reset procedure in order to clear the

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Change Engine Oil indicator. Refer to **GM Oil Life System - Resetting** in Maintenance and Lubrication.

CHECK OIL LEVEL

The IPC illuminates the CHECK OIL LEVEL message in the driver information center (DIC) when the powertrain control module (PCM) detects a low engine oil level condition. The PCM only monitors the oil level switch signal circuit for a brief period between key on and ignition crank. The IPC receives a class 2 message from the PCM requesting illumination.

FUEL LEVEL LOW

The IPC illuminates the FUEL LEVEL LOW message in the driver information center (DIC) and the LOW FUEL indicator when the IPC detects that the fuel level is less than a pre-determined value. The IPC receives a class 2 message from the powertrain control module (PCM) indicating fuel level percent.

ICE POSSIBLE

The IPC illuminates the ICE POSSIBLE message in the driver information center (DIC) when the outside air temperature drops below 2.5°C (36.5°F). The IPC receives a class 2 message from the body control module (BCM) indicating the outside air temperature.

OIL LIFE RESET

The IPC illuminates the OIL LIFE RESET message when the powertrain control module (PCM) determines that the engine oil should be changed. The IPC receives a class 2 message from the PCM indicating the remaining oil life percent. Once the oil is changed, perform the engine oil monitor reset procedure in order to clear the Change Engine Oil indicator. Refer to **GM Oil Life System - Resetting** in Maintenance and Lubrication.

OIL PRESSURE LOW

The IPC illuminates the OIL PRESSURE LOW message in the driver information center (DIC) when the powertrain control module (PCM) detects a low oil pressure condition with the signal circuit low. The IPC receives a class 2 message from the PCM requesting illumination.

OVERSPEED

The IPC illuminates the OVERSPEED indicator when the IPC detects that the vehicle speed is more than 120 km/h (75 mph).

PROGRAM CLUSTER

The IPC illuminates the PROGRAM CLUSTER message in the driver information center (DIC) when the IPC has not been programmed after an IPC replacement. Refer to **Service Programming System (SPS)** in Programming.

SHIFT INDICATOR

The IPC illuminates the shift indicator when the powertrain control module (PCM) determines that the vehicle

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should be shifted to the next higher gear. The IPC receives a class 2 message from the PCM requesting illumination.

TIGHTEN FUEL CAP

The IPC illuminates the TIGHTEN FUEL CAP message in the driver information center (DIC) when the powertrain control module (PCM) detects a low fuel pressure condition. The IPC receives a class 2 message from the PCM requesting illumination.

VEHICLE SPEED LIMITED

The IPC illuminates the VEHICLE SPEED LIMITED message in the driver information center (DIC).

DRIVER INFORMATION CENTER (DIC) DESCRIPTION AND OPERATION

Driver Information Center (DIC)

The driver information center (DIC) consists of a single line 22 character vacuum fluorescent (VF) display placed in the lower center area of the instrument panel cluster (IPC). The DIC will display vehicle information, configuration, and warning parameters to the driver.

The display parameters are cycled, changed, and acknowledged using 4 DIC buttons.

- Trip Information

  Button representation icon appears as a road to the horizon.

- Fuel Information

  Button representation icon appears as a gasoline pump.

- Personalization

  Button representation icon appears as a human next to vehicle.

- Select

  Button representation icon appears as an arrow.

DIC Displays

The DIC parameters are displayed by order of priority as follows (from highest to lowest):

- Service Diagnostics
- Driver Identifier
- Feature Programming

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- Driver Warnings
- Vehicle Information

Vehicle Information

Vehicle information provides feedback to the driver on vehicle performance, mileage, maintenance, or related information.

Vehicle information can only be displayed with the ignition switch in the RUN position.

When the English/Metric status changes, any applicable vehicle information data values will also change.

DIC Trip Information / Reset Capabilities

The available DIC Trip Information and reset capabilities are as follows:

- Odometer - Cannot be reset
- Personal Trip Odometer - Can be reset
- Business Trip Odometer - Can be reset
- Timer - Can be reset
- Hourmeter - Cannot be reset

Trip Reset Stem

The trip reset stem on the IPC operates in the following manner with the ignition switch in the RUN position:

1. Each time the trip reset stem is pushed the display will cycle to the next trip parameter. The trip parameters are as follows:
    - Odometer
    - Personal Trip odometer
    - Business Trip odometer
    - Timer
    - Hourmeter
2. Holding the trip reset stem for greater than 1 second or depressing the SWC Select button while either Personal Trip or Business Trip odometer is displayed will reset the displayed trip odometer and all other corresponding trip parameters to 0.0 upon release of the stem. The trip odometer will remain displayed after being reset.
3. If a trip information parameter is being displayed, pressing the DIC Trip Information button will display the next trip information parameter.
4. If the next Trip Information parameter to be displayed is Timer, Hourmeter, or blank, pressing the reset stem will return the display to the Odometer.

Odometer

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The odometer is capable of displaying values from 0 - 999,999 mi or km.

If the ignition is in the OFF or UNLOCK/ACC position, the odometer can be displayed by pressing the trip reset stem. The odometer will remain displayed for 5 seconds.

Trip Odometers

The DIC can display Personal Trip or Business Trip odometers.

The trip odometers are capable of displaying values from 0 - 999999.9 mi or km.

When the maximum value is reached, the trip odometer will roll over to 0.0.

Timer

The Timer is displayed as XX (hours) : XX (minutes) : XX (seconds).

The Timer is started and stopped using the DIC Select button.

Holding the Select button for longer than 1 second while the Timer parameter is displayed will reset the Timer to 00:00:00.

The Timer status and data value is retained in memory when the ignition is turned OFF. When the ignition is turned ON again, the Timer status and data value is resumed.

The Timer maximum value is 99:59:59. When the maximum is reached, the Timer rolls over to 00:00:00 and continues to operate.

Fuel Information

DIC Fuel Information / Reset Capabilities

The available DIC Fuel Information and reset capabilities are as follows:

- Range - Can not be reset
- Avg. Fuel Economy - Can be reset
- Inst. Fuel Economy - Can not be reset
- Engine Oil Life - Can be reset

Range

The range display is the estimated distance that the vehicle can travel under current fuel economy and fuel level conditions.

This range is calculated from odometer information and class 2 messages.

Fuel Range is capable of displaying values from 0-999 mi or km.

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Display appears as: RANGE: XXX MILES (English), RANGE: XXX km (Metric).

If the range is less than 40 miles, RANGE: LOW will be displayed.

Average Fuel Economy

The Average Fuel Economy (AFE) value is calculated by the cluster based on Trip Distance and Trip Fuel Used.

Pressing the Select button for longer than 1 second while the Average Fuel Economy is displayed in the DIC will reset to 0.0.

Average Fuel Economy is capable of displaying values from 0.0-99.9.

Display appears as: AVG ECON XX.X (English) MPG, AVG ECON XX.X L/100km (Metric).

Trip Distance and Trip Fuel Used accumulated values are stored in memory when the ignition is turned OFF.

Instantaneous Fuel Economy

Instantaneous Fuel Economy values are calculated by the cluster from odometer information and class 2 messages.

The cluster calculates instantaneous fuel economy based on distance and fuel.

Instantaneous fuel economy is capable of displaying values from 0.0 - 99.9.

Display appears as INST ECON XX.X (English), INST ECON XX.X L/100km (Metric).

Values for the Instantaneous fuel economy are not stored when the ignition is turned OFF.

Engine Oil Life

Engine Oil Life percentage values are based on class 2 messages to the IPC. The IPC requests this value when Engine Oil Life is selected on the DIC.

Engine Oil Life is capable of displaying values from 0-100 percent and the OIL LIFE RESET driver warning will be displayed.

Pressing the Select button for longer than 5 seconds while Engine Oil Life is displayed on the DIC the value will reset to 100 percent.

Display appears as ENGINE OIL LIFE: XXX%.

Feature Programming

Refer to **Personalization Description and Operation** in Personalization.

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Driver Warnings

For the list of Driver Warnings, refer to **Indicator/Warning Message 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 left front speaker. The radio receives audible warning requests via the class 2 serial data line. If the radio receives multiple audible warning requests, the warning with the highest priority sounds first. On vehicles with an audio amplifier, the amplifier instead of the radio generates the audible warnings and receives audible warnings requests via the class 2 serial data line. Either the radio or the audio amplifier is the chime producer. The following lists the audible warning priority and the pulse rate:

1. Fast rate chime (150 pulses per min)
2. Medium rate chime (100 pulses per min)
3. Slow rate chime (50 pulses per min)
4. Turn signal reminder (will pulse at turn signal flasher rate)

Door Ajar Warning

The chime producer activates the door ajar audible warning as requested by the instrument panel cluster (IPC). The IPC sends a class 2 message to the chime producer indicating the chime duration, 4 pulses. The door ajar warning sounds and the appropriate DOOR AJAR indicator illuminates in the driver information center (DIC) when the following occurs:

- The body control module (BCM) determines that a door; driver door, passenger door, left rear door, right rear door, is open, signal is low. The IPC receives a class 2 message from the BCM indicating the door ajar status.
- The vehicle is not in PARK. The IPC receives a class 2 message from the powertrain control module (PCM) indicating the gear position.
- The vehicle speed is greater than 8.05 km/h (5 mph). The IPC uses the vehicle speed signal circuit, 4000 pulses/mile, from the PCM in order to calculate the vehicle speed.

Fasten Safety Belt Warning

The inflatable restraint sensing and diagnostic module (SDM) senses that the drivers seat belt is not buckled and the signal is low. The SDM sends a class 2 message to the instrument panel cluster (IPC) requesting illumination of the seat belt indicator. The SDM sends a class 2 message to the chime producer indicating a chime at the rate of 50 pulses per minute, slow rate chime, for a duration of approximately 6 seconds. The fasten safety belt warning sounds and the seat belt indicator illuminates when the following occurs:

- Ignition switch transitions to ON.
- The seat belt switch signal to the SDM is low.

If the seat belt is buckled when the ignition is turned ON, the chime will not sound. If the seat belt is buckled while the chime is sounding, the chime stops.

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Key-In-Ignition Warning

When the body control module (BCM) detects the key is in the ignition and the signal is low with the driver door open, it activates an audible warning. The key-in-ignition chime sounds at the rate of 100 pulses per minute, medium rate chime, until the driver door is closed or the key removed from the ignition switch. The BCM activates the key-in-ignition warning when all of the following occurs:

- The ignition switch is OFF.
- The key-in-ignition switch signal is low.
- The driver door jamb switch signal is low with the driver door open.

Lights On Chime

The body control module (BCM) will activate an audible warning as a reminder that the headlamps are left ON when exiting the vehicle with the ignition switch in the OFF position. The lights ON warning sounds at the rate of 150 pulses per minute, fast rate chime, until the headlamp switch is turned OFF. The BCM receives a signal from the headlamp and panel dimmer switch via the headlamp relay. The BCM activates the lights on warning chime when the following occurs:

- The ignition is OFF.
- The park lamp switch input is active.
- The dimming potentiometer input is not in a maximum dimming state.

Turn Signal Warning

The body control module (BCM) activates an audible warning as a reminder that the turn signal has been on for a distance of more than 1.20 km (0.75 mi). The BCM receives the vehicle speed and distance via the vehicle speed signal circuit. The turn signal chime will use a tone that is synchronized with the turn signal flasher. The BCM will activate the turn signal chime when the following occurs:

- The ignition is ON.
- Left or right turn signal switch is ON.
- The vehicle has traveled further than 1.20 km (0.75 mi).

Park Brake Chime

The body control module (BCM) activates the park brake chime when the park brake is engaged and the signal circuit is low and vehicle is driven for at least 3 seconds at a speed above 4.8 km/h (3 mph). The chime will sound at the rate of 150 pulses per minute, fast rate chime. The park brake indicator will flash for any distance the vehicle is driven every half second until the park brake is no longer engaged.

Additional Warnings

The following warnings have an associated instrument panel cluster (IPC) indicator or driver information center (DIC) indicator:

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- Engine Overheated Stop Engine

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration, continuous.

- Ice Possible

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration.

- Liftgate Ajar/Rear Access Open

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration, 4 pulses.

- Low Fuel

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency, medium rate, and duration, 4 pulses.

- Oil Pressure Low Stop Engine

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration, continuous.

- Overspeed/Vehicle Overspeed

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration, continuous.

- Reduced Engine Power

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration.

- Service Stability System

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration.

- Stability System Disabled

  The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration.

- Trans Hot Idle Engine

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The chime producer activates the audible warning as requested by the IPC. The IPC sends a class 2 message to the chime producer indicating the chime frequency and duration, continuous.

Refer to **Indicator/Warning Message Description and Operation**.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/ Description
	J 33431-C Signal Generator and Instrument Panel Tester

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