Vehicle Diagnostic Information

Specifications

Body Control Module Scan Tool Information

Body Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON, Vehicle in Park, All Doors Closed			
5 V Ignition Switch	—	Accessory / Key Out	The scan tool displays Off, Accessory, Run, or Crank. This parameter displays the ignition switch mode.
Accent Lighting 1 Command	—	Varies	This parameter displays the interior lighting ambient 1 command as a percentage.
Accessory	—	Active	The scan tool displays Active or Inactive.
Accessory Power Mode Indicator Command	—	Varies	This parameter displays ignition switch accessory LED PWM command as a percentage.
Accessory Relay Command	—	Active	The scan tool displays Active or Inactive.
Accessory/Retained Accessory Power Relay Command	—	Active	The scan tool displays Active or Inactive. This parameter displays the retained accessory power relay status.
All Door Lock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the door lock status.
Ambient Light Sensor	—	Varies	The scan tool displays volts. This parameter displays the ambient light sensor signal voltage.
Ambient Light Status	—	Night	The scan tool displays Unknown, Night, or Day. This parameter displays the ambient light level status.
Automatic Headlamps Disable Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the headlamp disable switch status.
Automatic Transmission Manual Shift Switch	—	Off	The scan tool displays Off or On. This parameter displays the transmission tap up tap down switch status.
Backup Lamps Relay Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the backup lamps relay status.
Battery Low at Start	—	Inactive	The scan tool displays Active or Inactive. This parameter displays Active when the battery level is low when the vehicle starts.
Battery Reconnect Detected	—	No	The scan tool displays No or Yes when a battery disconnect/reconnect event has been detected.
Battery Voltage	—	Varies	The scan tool displays the current battery voltage.
BCM-Controlled Charging Voltage	—	Active	The scan tool displays Active or Inactive.
BCM-Requested Charging Voltage Reduction	—	Inactive	The scan tool displays Active or Inactive. This parameter displays Active when the BCM has detected a low battery voltage condition.
Boot Software Part Number	—	Varies	The scan tool displays the boot software part number.
Brake Lamp Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the brake lamp command status.
Brake Pedal Initial Travel Position Achieved	—	No	The scan tool displays No or Yes.
Brake Pedal Position Sensor High Voltage During Learn	—	No	The scan tool displays No or Yes.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Brake Pedal Position Sensor Learn	—	No	The scan tool displays No or Yes. This parameter displays Yes when the brake pedal position sensor has learned.
Brake Pedal Position Sensor Learned Home Position	—	Yes	The scan tool displays No or Yes. This parameter displays Yes when the brake pedal position sensor has learned the home position.
Brake Pedal Position Sensor Low Voltage During Learn	—	No	The scan tool displays No or Yes.
Brake Pedal Position Sensor Move During Learn	—	No	The scan tool displays No or Yes. This parameter displays the brake pedal sensor learn status.
Brake Pedal Position Sensor Pulled Up from Home Position	—	No	The scan tool displays No or Yes.
Brake Pedal Position Sensor Reference	—	Varies	The scan tool displays the brake pedal position as voltage value. This parameter displays the current brake pedal position sensor reference.
Brake Pedal Pulled Up from Home Position	—	No	The scan tool displays No or Yes.
Brake Transmission Shift Interlock Solenoid Actuator	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the remote start diagnostic status history.
Brake Transmission Shift Interlock Solenoid Actuator Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the last remote start diagnostic status history.
Calibration Part Number 1-20	—	Varies	The scan tool displays the software module calibration part number.
Center Brake Lamp Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the center brake lamp status.
Central Door Lock Switch on Center Console	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver door lock switch status.
Child Security Lock Indicator Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the child security lock indicator command status.
Content Theft Deterrent Alarm Status	—	Disarmed	The scan tool displays Off, Armed, or Disarmed. This parameter displays the content theft alarm status.
Content Theft Deterrent Disarmed Until Vehicle Closed	—	No	The scan tool displays No or Yes. This parameter displays the content theft deterrent system status.
Content Theft Deterrent Mode	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Content Theft Deterrent Trigger History 1-3	—	None	The scan tool displays None, Driver door, Passenger door, Left rear door, Right rear door, Rear closure, Midgate, Tonneau Cover, Hood, Ignition Voltage, Intrusion, Inclination, Telematics enhanced service alarm, Battery reconnect detected, Unauthorized PWM change, Security Indicates Tamper, or Glass Breakage. This parameter displays the content theft deterrent trigger history status.
Courtesy Lamps Duty Cycle Command	—	Varies	This parameter displays the interior lights dimming command as a percentage.
Crank Abort	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Cruise Charging Set Level	—	Varies	This parameter displays cruise charging set level.
Cruise Control Switch Status	—	OFF	The scan tool displays CANCEL, OFF, ON, RESUME, SET or ERROR. This parameter displays the cruise control switch status.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Current Content Theft Deterrent Trigger	—	None	The scan tool displays None, Driver door, Passenger door, Left rear door, Right rear door, Rear closure, Midgate, Tonneau Cover, Hood, Ignition Voltage, Intrusion, Inclination, Telematics enhanced service alarm, Battery reconnect detected, Unauthorized PWM change, Security Indicates Tamper, Glass Breakage. This parameter displays the content theft deterrent current alarm trigger.
Current Driver	—	1-8	This parameter displays the current driver in vehicle.
Disable Battery Saver Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Dome Lamp Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the dome lamp switch status.
Driver Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver door Ajar switch status.
Driver Door Unlock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver door unlock command status.
Driver Window Learned	—	Yes	The scan tool displays No or Yes.
Driver Window Main Control Down Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver window main control down switch input status.
Driver Window Main Control Express Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver window switch express input status.
Driver Window Main Control Up Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver window switch UP input status.
Driver Window Motor Mode	—	Local Switch Overridden	The scan tool displays Down, Express Down, Express, Up, Error, Inhibit, or Local Switch Overridden. This parameter displays the driver window motor mode status.
Enable Battery Saver Relay Command	—	Inactive	The scan tool displays Active or Inactive.
End Model Part Number	—	Varies	This parameter displays the end model part number.
Engine Stalled	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Environment Identification	—	Unknown	The parameter displays the vehicle environment identification successful status.
Environment Identification	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the front fog lamps status.
Front Fog Lamps Relay Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the front fog lamp relay status.
Front Fog Lamps Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the front fog lamp switch status.
Front Passenger Window Main Control Down Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the front passenger window down switch status.
Front Passenger Window Main Control Express Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger window switch express input status.
Front Passenger Window Main Control Up Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger window switch UP input status.
Front Tire Pressure on Placard	—	Varies	The scan tool displays kPa or PSI. This parameter displays the specified tire pressure placard information programmed in the BCM for tire pressure monitoring.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Fuel Economy Mode Inhibited - Low Charging Voltage	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the fuel economy mode status.
Generator Regulator Setpoint	—	Varies	The scan tool displays percentage.
Hazard Lamps Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the hazard lamps switch status.
Hazard Lamps Switch Backlight Command	—	Varies	The scan tool displays percentage. This parameter displays hazard switch backlight level PWM command status.
Headlamps On Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the headlamp on switch status.
Headlamps Flash Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the headlamps flash to pass switch status.
High Beam Select Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the high beam switch status.
High Beam Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the high beam command status.
Hood Ajar Switch	—	Inactive	This parameter display the remote start diagnostic status history or the last remote start diagnostic status history.
Hood Ajar Switch Signal 1	—	Inactive	This parameter display the remote start diagnostic status history or the last remote start diagnostic status history.
Hood Position	—	CLOSED	The scan tool displays CLOSED, AJAR, or OPENED. This parameter displays the hood position.
Horn Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Horn Switch	—	Inactive	The scan tool displays Active or Inactive.
Idle Boost Level 2-3 Counter	—	Varies	This parameter displays the state of the idle boost level as counts.
Idle Charging Set Level	—	Varies	This parameter displays idle charging set level.
Ignition Mode Switch Dimming Command	—	Varies	The scan tool displays as a percentage.
Ignition Switch Reference	—	Varies	This parameter displays the ignition switch voltage reference.
Ignition Switch Signal Voltage	—	Varies	This parameter displays the ignition switch signal voltage.
Ignition Switch Status	—	Inactive	This parameter displays the ignition switch status.
Immobilizer Allows Engine To Start	—	Unknown	The scan tool displays Unknown, Incorrect, Not Allowed, or Valid. This parameter displays the immobilizer status.
Immobilizer Automatic Learn Timer	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the automatic learn timer status.
Immobilizer Environment Device 1-4	—	Unknown	The scan tool displays Incorrect, Correct, Not Received, Not Programmed or Unknown. This parameter displays the immobilizer source status.
Immobilizer Password Learn	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the password learn status.
Immobilizer Password Learn Scan Tool Delay	—	Varies	This parameter displays the auto learn timer status.
Immobilizer Security Code Accepted	—	No	The scan tool displays No or Yes.
Immobilizer Security Code Lockout	—	No	The scan tool displays No or Yes.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Immobilizer Security Code Programmed	—	Yes	The scan tool displays No or Yes.
In Park Switch Status	—	On	The scan tool displays On or Off. This parameter displays the park switch status.
Inadvertent Load Command	—	Active	The scan tool displays Active or Inactive.
Indicator Dimming Duty Cycle Command	—	Varies	The scan tool displays percentage. This parameter displays indicator lighting PWM command status.
Interior/Courtesy Lighting Master Switch	—	Door	The scan tool displays Door or other lighting switch status.
Interior Trunk Lid/Liftgate Window Unlatch Switch	—	Inactive	The scan tool displays Active or Inactive.
Key Capture Solenoid Actuator	—	Active	The scan tool display Active or Inactive. This parameter displays column lock input status.
Key Fob 1-4 Battery Status	—	OK	The scan tool displays OK or other key fob battery status. This parameter displays the key fob battery status.
Key Fob 1-4 Function	—	Undefined	The scan tool displays Inactive, Lock, Unlock Driver Door, All Door Unlock, Release Rear Closure, Actuate Left Sliding Door, Actuate Right Sliding door, Panic Alarm, Release Fuel door, Actuate Power Windows, Actuate Folding Top, Start Engine, Stop Engine, Programmed, Locator Alarm, Close Liftgate, Open Liftgate, Stop Liftgate While Closing, Stop Liftgate While opening, Deadlock All Doors, Stop Liftgate Motion, Start Liftgate Motion, Stop Left Sliding Door Motion, Stop Right Sliding Door Motion, Comfort open, or Comfort close. This parameter displays the key fob function status.
Key Fob in Vehicle	—	Inactive	This parameter displays the current key fob in the vehicle.
Key In Cylinder Switch	—	Active	The scan tool displays Active or Inactive.
Key In Cylinder Switch/Key Fob in Vehicle	—	Yes	The scan tool displays No or Yes.
Key in Ignition Status	—	Inactive	The scan tool displays Key Out or Key In. This parameter displays the key in ignition status.
Key Part Number	—	Varies	This parameter displays the key part number.
Key Type	—	Master Key	The scan tool displays Unknown, Master Key, Valet Key, Fleet Key, or Unconfigured. This parameter displays the key type.
Last Door Lock Function	—	All Doors Lock	The scan tool displays NO Action, PC UNDB Lock, PC Unlock, Unlock, Unlock Driver, Unlock Passenger, Unlock Left Rear, Unlock Right Rear, Unlock Cargo Liftgate, Unlock Driver Side, Unlock Passenger Side, Unlock Non Driver, Unlock All, Lock All, DBL Lock, or UNDBL Lock.
LED Backlight Dimming Command	—	Varies	The scan tool displays as a percentage. This parameter displays LED backlight dimming PWM command status.
Left Brake Lamp Command	—	Varies	The scan tool displays percentage. This parameter displays left brake lamp command status.
Left Dedicated Daytime Running Lamp Command	—	Varies	The scan tool displays percentage. This parameter displays left dedicated daytime running lamp command status.
Left Front Tire Pressure	—	Varies	This parameter displays left front tire pressure in PSI.
Left Front Tire Pressure Identification	—	Varies	This parameter displays left front tire pressure sensor ID.
Left Front Tire Pressure Sensor Location Learned	—	Yes	The scan tool displays No or Yes. This parameter display tire pressure monitor system learned status.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Left Front Tire Pressure Sensor Mode	—	Learn Mode — Pressure Triggered	The scan tool parameter displays Learn Mode, Undefined, Remeasure Data Mode, Rolling Mode, Enter Off Mode, Exit Off Mode, or Learn Mode Pressure Triggered.
Left Front Tire Pressure Status	—	Normal	The scan tool displays Unknown, Normal, Very Low Pressure, Low, Weak Signal, or High.
Left Front Turn Signal Bulb Out Feedback	—	Inactive	The scan tool displays Active or Inactive.
Left Front Turn Signal/ Hazard Lamp Command	—	Inactive	The scan tool displays Active or Inactive.
Left Low Beam/Daytime Running Lamp Command	—	Varies	The scan tool displays percentage. This parameter displays left low beam/daytime running lamp status.
Left Park Lamps Command	—	Varies	The scan tool displays percentage. This parameter displays rear exterior lighting status.
Left Rear Door Ajar Switch	—	Inactive	This parameter displays Active or Inactive. This parameter displays the left rear door ajar switch status.
Left Rear Tire Pressure	—	Varies	This parameter displays left rear tire pressure in PSI.
Left Rear Tire Pressure Identification	—	Varies	This parameter displays left rear tire pressure sensor ID.
Left Rear Tire Pressure Sensor Location Learned	—	Yes	The scan tool displays No or Yes. This parameter displays tire pressure monitor system learned status.
Left Rear Tire Pressure Sensor Mode	—	Stationary	The scan tool displays Learn Mode, Undefined, Remeasure Data Mode, Rolling Mode, Enter Off Mode, Exit Off Mode, or Learn Mode Pressure Triggered.
Left Rear Tire Pressure Status	—	Normal	The scan tool displays Unknown, Normal, Very Low Pressure, Low, Weak Signal, or High.
Left Rear Turn Signal Bulb Out Feedback	—	Inactive	The scan tool displays Active or Inactive. The parameter displays turn lamp outage status.
Left Rear Turn Signal/Hazard Lamp Command	—	Inactive	The scan tool displays Active or Inactive.
Left Rear Window Main Control Down Switch	—	Inactive	The scan tool display Active or Inactive. This parameter displays driver window switch inputs.
Left Rear Window Main Control Express Switch	—	Inactive	The scan tool display Active or Inactive. This parameter displays driver window switch inputs.
Left Rear Window Main Control Up Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays driver window switch inputs.
Left Rear Window Motor Mode	—	Local Switch Overridden	The scan tool displays Down, Express, Up, Inhibit, or Local Switch Overridden.
Left Rear Window Switch at Door	—	Inactive	The scan tool displays Active or Inactive.
Left Turn Signal Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the left turn signal switch status.
License Plate Lamps Command	—	Inactive	The scan tool displays Active or Inactive.
Load Reduction Level 2-3 Counter	—	Varies	The scan tool display as counts.
Low Beam Relay Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the headlamp low beam relay status.
Manufacturers Enable Counter	—	Varies	This parameter tool displays various counter values.
Master Keys Learned	—	Varies	This parameter displays the total number of master keys learned.
Module Diagnostic Address	—	Varies	This parameter displays module diagnostic address.
Number of Key Fobs In Vehicle	—	1	This parameter displays the number of fobs located in the vehicle.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Odometer	—	Varies	This parameter displays the vehicle mileage.
Outside Rear View Mirror Courtesy Lamp Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays front exterior lighting status.
Park Brake Switch	—	Active	The scan tool displays Active or Inactive. This parameter displays front exterior lighting status.
Park Lamps Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays Active when the parklamp switch is activated.
Passenger Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger door ajar switch status.
Passenger Door Lock Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger door lock switch status.
Passenger Door Unlock Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger door unlock switch status.
Passenger Door(s) Unlock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger door unlock status.
Passenger Window Learned	—	Yes	The scan tool displays No or Yes. This parameter displays the passenger window learned status.
Passenger Window Motor Mode	—	Local Switch Overridden	The scan tool displays Down, Express, Up, Inhibit, or Local Switch Overridden.
Passenger Window Switch at Door	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger window switch status.
Previous Key Type	—	Unknown	This parameter displays previous driver identification device type.
Primary Key Status	—	Yes	The scan tool displays No or Yes.
Push Button Ignition Switch	—	Inactive	The scan tool displays Active or Inactive.
Push Button Ignition Switch Voltage	—	Varies	This parameter displays the push button ignition switch voltage.
Rear Closure Ajar Switch	—	Active	The scan tool displays Active or Inactive.
Rear Closure Cylinder Lock Switch	—	Inactive	The scan tool displays Active or Inactive.
Rear Closure Cylinder Unlock Switch	—	Inactive	The scan tool displays Active or Inactive.
Rear Tire Pressure on Placard	—	Varies	This parameter displays the rear tire pressure in kPa or PSI. This parameter displays the specified tire pressure placard information programmed in the BCM for tire pressure monitoring.
Regulated Voltage Control Mode	—	Voltage	The scan tool displays voltage.
Remote Vehicle Start Attempts Exhausted	—	Varies	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history or remaining start attempts.
Remote Vehicle Start Crank Time	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Remote Vehicle Start Disabled by Driver	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Remote Vehicle Start Source	—	Ignition Switch Start	The scan tool displays Body Control module or Power Take-off Start.
Remote Vehicle Starts Exhausted	—	Varies	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history or remaining remote starts.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Right Brake Lamp Command	—	Varies	The scan tool display percentage. This parameter displays right brake lamp PWM command status.
Right Dedicated Daytime Running Lamp Command	—	Varies	The scan tool display percentage. This parameter displays right dedicated DRL PWM command status.
Right Front Tire Pressure	—	Varies	This parameter displays right front tire pressure in PSI.
Right Front Tire Pressure Identification	—	Varies	This parameter displays right front tire pressure sensor ID.
Right Front Tire Pressure Sensor Location Learned	—	Yes	The scan tool displays No or Yes.
Right Front Tire Pressure Sensor Mode	—	Stationary	The scan tool displays Learn Mode, Undefined, Remeasure Data Mode, Rolling Mode, Enter Off Mode, Exit Off Mode or Learn Mode Pressure Triggered.
Right Front Tire Pressure Status	—	Normal	The scan tool displays Unknown, Normal, Very Low Pressure, Low, Weak Signal, or High.
Right Front Turn Signal Bulb Out Feedback	—	Inactive	The scan tool displays Active or Inactive.
Right Front Turn Signal/ Hazard Lamp Command	—	Inactive	The scan tool displays Active or Inactive.
Right Low Beam/Daytime Running Lamp Command	—	Varies	The scan tool displays percentage. This parameter displays right low beam/daytime running lamp status.
Right Park Lamps Command	—	Varies	The scan tool displays percentage. This parameter displays rear exterior lighting status.
Right Rear Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Tire Pressure	—	Varies	This parameter displays right rear tire pressure in PSI.
Right Rear Tire Pressure Identification	—	Varies	This parameter displays right rear tire pressure sensor ID.
Right Rear Tire Pressure Sensor Location Learned	—	Yes	The scan tool displays No or Yes.
Right Rear Tire Pressure Sensor Mode	—	Learn Mode — Pressure Triggered	The scan tool displays Learn Mode, Undefined, Remeasure Data Mode, Rolling Mode, Enter Off Mode, Exit Off Mode, or Learn Mode Pressure Triggered. This parameter displays the pressure sensor mode status.
Right Rear Tire Pressure Status	—	Normal	The scan tool displays Unknown, Normal, Very Low Pressure, Low, Weak Signal or High. This parameter displays the right rear tire pressure status.
Right Rear Turn Signal Bulb Out Feedback	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Turn Signal/ Hazard Lamp Command	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Main Control Down Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Main Control Express Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Main Control Up Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Motor Mode	—	Local Switch Overridden	The scan tool displays Down, Express, Up, Inhibit, or Local Switch Overridden.
Right Rear Window Switch at Door	—	Inactive	The scan tool displays Active or Inactive.
Right Turn Signal Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the right turn signal switch status.
Run Abort	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Run Relay Command	—	Active	The scan tool displays Active or Inactive.
Run/Crank	—	Inactive	The scan tool displays Active or Inactive.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Run/Crank Relay Command	—	Active	The scan tool displays Active or Inactive.
Run/Start Power Mode Indicator Command	—	Varies	The scan tool displays percentage. This parameter displays ignition switch run LED PWM command status.
Secondary Key Status	—	No	The scan tool displays No or Yes.
Security Indicator Command	—	Varies	The scan tool displays percentage. This parameter displays security LED PWM command status.
Selected Front Tire Type	—	Standard Load	The scan tool displays No Tire Type, Metric Standard Load, Metric Extra Load, Load Range C, Load Range D, or Load Range E. This parameter displays the front tire type.
Selected Rear Tire Type	—	Standard Load	The scan tool displays No Tire Type, Metric Standard Load, Metric Extra Load, Load Range C, Load Range D, or Load Range E. This parameter displays the rear tire type.
Start-Up State of Charge	—	Varies	The scan tool displays percentage. This parameter displays startup state of charge status.
State of Charge	—	Varies	The scan tool displays percentage. This parameter displays state of charge status.
Sunroof Enabled	—	Active	The scan tool displays Active or Inactive.
Sunroof Motor Overtemperature	—	Inactive	The scan tool displays Active or Inactive.
Sunroof Not Learned	—	Inactive	The scan tool displays Active or Inactive.
Sunroof Position	—	Closed	The scan tool displays Closed, Open, Venting, Comfort Open, Closing, Opening. This parameter displays the current sunroof position.
Sunroof Remote Command	—	Inactive	The scan tool displays Sunroof Secure Close, Venting, Close, or Open. This parameter displays the last sunroof remote command.
Sunroof Slide Switch	—	Inactive	The scan tool displays Inactive, Express Open, Open, Express Close, Close, Short to Ground, Short to Battery, or Stuck. This parameter displays the sunroof slide switch status.
Sunroof Slide Switch	—	Inactive	The scan tool displays Inactive, Open, Close, Short to Ground, Short to Battery or Stuck. This parameter displays the sunroof tilt switch status. When the switch experiences a malfunction Short to Ground, Short to Battery or Stuck will be displayed.
Sunroof/Sunshade Motor Overtemperature	—	Inactive	The scan tool displays Active or Inactive.
Sunroof/Sunshade Switch	—	Inactive	The scan tool displays Inactive, Express Open, Open, Express Close, Close, Short to Ground, Short to Battery, or Stuck. This parameter displays the sunroof or sunshade switch status.
Sunshade Enabled	—	Active	The scan tool displays Active or Inactive.
Sunshade Not Learned	—	Inactive	The scan tool displays Active or Inactive.
Sunshade Position	—	Closed	The scan tool displays Ajar, Closed, Opened, Closing, or Opening. This parameter displays the sunshade position status.
Sunshade Remote Command	—	Inactive	The scan tool displays Close or Open. This parameter displays the last sunshade remote command.
Tamper Status	—	No	The scan tool displays No or Yes.
Telematics Enhanced Service Override Active	—	No	The scan tool displays No or Yes. This parameter displays vehicle theft deterrent system status.
Total Keys Learned	—	Varies	This parameter displays the number of keys learned.

Body Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Definition
Traction Control Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays Active when the traction control switch is active.
Transponder Authentication	—	Initializing	The scan tool displays Inactive, Initializing, ID Received, Password Received, Data Reception Complete, or Data Transmission Complete. This parameter displays the transponder key communication status.
Transponder Key Status	—	OK	The scan tool displays OK, LIN Bus Initialization Malfunction, Antenna Initialization Malfunction, Password Error, No Valid Key Detected, LIN Bus Communication Malfunction, or Antenna Malfunction. This parameter displays the transponder key communication error status.
Trunk Lamp Command	—	Varies	The scan tool displays as percentage.
Trunk Lid/Liftgate Window Exterior Unlatch Switch	—	Inactive	The scan tool displays Active or Inactive.
Trunk Lid/Liftgate Window Unlatch Command	—	Inactive	The scan tool displays Active or Inactive.
Valet Keys Learned	—	Varies	This parameter displays the number of valet keys learned.
Valet Mode Status	—	Inactive	This parameter displays the remote start diagnostic status history or the last remote start diagnostic status history.
Valet switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays Active when the valet switch is on.
Vehicle Identification Number (VIN)	—	Varies	This parameter displays the vehicle identification number.
Window Lockout Switch	—	Inactive	The scan tool displays Active or Inactive.
Window Lockout Switch Indicator Command	—	Inactive	The scan tool displays Active or Inactive.
Windshield Washer Relay Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the windshield washer relay status.
Windshield Washer Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the windshield washer switch status.
Windshield Wiper Park Switch	—	Active	The scan tool displays Active or Inactive.
Windshield Wiper High Speed Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Windshield Wiper High Speed Switch	—	Inactive	The scan tool displays Active or Inactive.
Windshield Wiper Motor Relay Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the windshield wiper relay status.
Windshield Wiper Stalled During Sweep	—	Inactive	The scan tool displays Active or Inactive.
Windshield Wiper Stalled in Park Position	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the windshield wiper stalled status.
Windshield Wiper Switch	—	Off	The scan tool displays Off, Delay 1, Delay 2, Delay 3, Delay 4, Delay 5, or Low. This parameter displays the windshield wiper switch status.

Body Control Module Scan Tool Output Controls

Scan Tool Output Control	Description
Accent Lighting 1 Command	The BCM activates the accent lighting when you select On. The value should be 100%. All accent lighting should illuminate until commanded Off.
Accessory Power Mode Indicator Command	The BCM activates the accessory indicator when you select On. The value should be 100%. The yellow LED accessory indicator on start button should illuminate until commanded Off.
Accessory/Retained Accessory Power Relay Command	The BCM actuates the retained accessory power relay when you select On. The retained accessory power relay should turn on allowing specific vehicle functions to operate.
All Doors Lock Command	The BCM activates all doors lock when you select Lock. All doors should lock.
Backup Lamps Command	The BCM actuates the backup lamps relay when you select On. The backup lamps should illuminate until commanded Off. Engine must be running.
Battery Saver Relay	The BCM activates the battery saver relay when you select Enable. This command sets the low power mode relay in the state in which it does not supply power to the non-essential parts of the vehicle. This is used to prevent the battery from being depleted when the vehicle is not used for a long period of time.
Brake Pedal Position Sensor Learn	The BCM activates the brake pedal position sensor learn when you select Learn. The brake pedal position sensor learn procedure should start.
Center Brake Lamp Command	The BCM activates the center brake lamp when you select On. The center brake lamp should illuminate until commanded Off.
Child Security Lock Motors Command	The BCM actuates the child security door motor when you select Lock. The child security doors should lock.
Clear Driver Window Learned Values	When you select Clear the clear driver window learn procedure should start.
Clear Passenger Window Learned Values	When you select Clear the clear left rear window learn procedure should start.
Courtesy Lamps Command	The BCM activates the courtesy lamps when you select On. The value should be 100%. The courtesy lamps should illuminate until commanded Off.
Driver Door Unlatch Command	The BCM activates the output circuit to unlatch the driver door with a passive entry passive start when you select Unlatch. There is NO door handle on this type of vehicle to open the door. Instead, there is a pad that you press to unlatch the door.
Driver Door Unlock Command	The BCM pulses the driver door unlock motor when you select Unlock. The driver door should unlock.
Driver Window Motor Mode	The BCM activates the driver window motor when you select Up/Down/Stop/Express Up/Express Down. The driver window should follow the appropriate command.
Front Fog Lamps Command	The BCM actuates the front fog lamps relay when you select On. The front fog lamps relay should turn on.
Hazard Lamps Switch Backlight Command	The BCM activates the hazard lamps switch when you select On. The value should be 100%. The hazard lamps switch backlight should illuminate until commanded Off.
High Beams	The BCM activates the high beam command when you select On. The high beam lights should illuminate. The headlamps have to be on.
Horn Relay	The BCM activates the horn when you select On. The horn should sound.
Inadvertent Load Command	The BCM activates the inadvertent load command when you select On. (It is an electronic request to shut down an electrical or electronic device that is drawing power from the battery at a time when there should be no activity, usually after the key has been removed from the ignition for a period of time.)
LED Backlight Dimming Command	The BCM activates the LED backlight dimming when you select On. The values should be 100%. The LED backlight dimming for control switches should illuminate until commanded Off.
Left Brake Lamp Command	The BCM activates the left brake lamp when you select On. The values should be 100%. The left brake lamp should illuminate until commanded Off.
Left Dedicated Daytime Running Lamp Command	The BCM activates the left dedicated daytime running lamp when you select ON. The value changes to 100%. The left daytime running lamp should illuminate.
Left Front Turn Signal Lamp Command	The BCM activates the left front turn signal lamp when you select On. The left front turn signal lamp should illuminate until commanded Off.
Left Park Lamps Command	The BCM activates the left park lamps when you select ON with a value of 100%. The left park lamps should illuminate.

Body Control Module Scan Tool Output Controls (cont'd)

Scan Tool Output Control	Description
Left Rear Turn Signal Lamp Command	The BCM activates the left rear turn signal lamp when you select On. The left rear turn signal lamp should illuminate until commanded Off.
Left Rear Window Motor	The BCM activates the left rear window motor when you select Up/Down/Stop/Express Down. The left rear window should follow the appropriate command.
License Plate Lamps Command	The BCM activates the license plate lamps when you select On. The license plate lights should turn on until commanded Off.
Liftgate Unlatch	The BCM actuates the rear compartment lid release actuator when you select Unlatch. The trunk or liftgate should open.
LIN Bus Device Identification Data	When you select Update the LIN Bus Device part number and calibration part number should be updated.
Low Beam Relay Command	The BCM activates the low beams when you select On. The low beam lights should turn on.
Outside Rear View Mirror Courtesy Lamp Command	The BCM activates the outside rear view mirror courtesy lamp when you select On. The outside rear view mirror courtesy lamp (at the bottom) should illuminate.
Passenger Door(s) Unlatch Command	The BCM activates the output circuit to unlatch the passenger door with a passive entry passive start when you select Unlatch. There is NO door handle on this type of vehicle to open the door. Instead, there is a pad that you press to unlatch the door.
Passenger Door(s) Unlock Command	The BCM pulses the passenger door unlock motor when you select Unlock. The passenger door should unlock.
Passenger Window Motor	The BCM activates the passenger window motor when you select Up/Down/Stop/Express Up/ Express Down. The passenger window should follow the appropriate command.
Right Brake Lamp Command	The BCM activates the right brake lamp when you select On. The value should be 100%. The right brake lamp should illuminate until commanded Off.
Right Dedicated Daytime Running Lamp Command	The BCM activates the right dedicated daytime running lamp when you select On. The value should be 100%. The right daytime running lamp should illuminate.
Right Front Turn Signal Lamp Command	The BCM activates the right front turn signal lamp when you select On. The right front turn signal/ hazard lamp should illuminate.
Right Park Lamps Command	The BCM activates the right park lamps when you select ON with a value of 100%. The right park lamps should illuminate.
Right Rear Turn Signal Lamp Command	The BCM activates the right rear turn signal/hazard lamp when you select On. The right rear turn signal lamp should illuminate until commanded Off.
Right Rear Window Motor	The BCM activates the right rear window motor when you select Up/Down/Stop/Express Down. The right rear window should follow the appropriate command.
Run Relay Command	The BCM actuates the run relay when you select On. The run relay should turn on.
Run/Crank Relay Command	The BCM actuates the run/crank relay when you select On. The run/crank relay should turn on.
Run/Start Power Mode Indicator Command	The BCM activates the run/start lamp when you select On. The value should be 100%. The green LED on engine start/stop button should illuminate until commanded Off.
Security Indicator Command	The BCM activates the security indicator command when you select On. The security indicator at center of dash (or at DRL sensor) should illuminate until commanded Off.
Tire Pressure Sensors Learn	The BCM activates the tire pressure sensor learn procedure when you select Learn.
Tire Type/Pressure Selection	When you select OK, you can change tire type and load range.
Transmission Range Indicator	The BCM activates the transmission range indicator when you select On. The transmission range indicator at the shifter should illuminate until commanded Off.
Trunk Lamp Command	The BCM activates the trunk lamp when you select On. The value should be 100%. The trunk lamp should illuminate until commanded Off.
Windshield Washer Relay Command	The BCM actuates the windshield washer relay when you select On. The windshield washer relay should turn on.

Body Control Module Scan Tool Output Controls (cont'd)

Scan Tool Output Control	Description
Windshield Wiper High Speed Relay Command	The BCM actuates the windshield wiper high speed relay when you select On. The windshield wiper high speed relay should turn on.
Windshield Wiper Motor Relay Command	The BCM actuates the windshield wiper motor relay when you select On. The windshield wiper motor relay should turn on.

Communication Interface Module Scan Tool Information

Telematics Communication Interface Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
GPS Data			
Dead Reckoning Calibration Status	—	Calibrated or Not Calibrated	Indicates the dead reckoning calibration status.
Position Calibration Method	—	Varies	Indicates the method used to determine current location. (0) GPS, (1) Wheel Speed Dead Reckoning only, (2) Combined Wheel Speed and GPS, (3) Gyro only, (4) Combined Gyro and GPS, (5) No Fix
Month	—	MM	This displays the current month.
Day	—	DD	This displays the current day of the month.
Year	—	YY	This displays the current year.
Hour	—	HH	This displays the GPS current hour (24 hour format – GMT).
Minute	—	MM	This displays the GPS current minute.
Second	—	SS	This displays the GPS current second.
GPS Signal	—	Varies	The scan tool displays Yes or No. Yes is displayed if there is a GPS signal received by the telematics communication interface control module.
Signal Strength Data			
Current Transceiver Identifier	—	Varies	The scan tool displays a 2–5 digit value. This is the transceiver identification number.
GSM Signal Strength	—	Varies	The scan tool displays 0–127. This is the telematics communication interface control module signal strength.
Signal Type	—	Digital	This is the signal type received by the telematics communication interface control module.
Bluetooth Data			
Bluetooth	—	Enabled	Indicates if the Bluetooth system is enabled or disabled.
Bluetooth Link Status	—	Varies	Indicates the current link status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
Bluetooth Link Quality	—	Varies	The scan tool displays a decimal value between 0 and 255.
Bluetooth Phone to Telematics Communication Interface Control Module Authentication Status	—	Active or Inactive	Displays the bluetooth phone to telematics communication interface control module authentication status.
Bluetooth Phone to Telematics Communication Interface Control Module Communication Status	—	Active or Inactive	Displays the bluetooth phone to telematics communication interface control module status.
Bluetooth Phone Voice Recognition Status	—	Active or Inactive	Displays the bluetooth phone to voice recognition status.

Telematics Communication Interface Control Module Scan Tool Output Controls

Output Control	Description
B1000 Information	This shows the data recorded when DTC B1000 was set in the telematics communication interface control module.
Green Indicator	The telematics communication interface control module illuminates the green LED when ON is selected.
Phone Call Test	When ON is selected, telematics communication interface control module commands OnStar to connect to the OnStar Center.
Red Indicator	The telematics communication interface control module illuminates the red LED when ON is selected.
Preferred Roaming List Update	The telematics communication interface control module performs a preferred roaming list (PRL) update when this is selected.
Remote Vehicle Speed Limiting Reset	This function resets the speed limiting feature.

Driver Seat and Passenger Seat Heater Control Module Scan Tool Information

Front Seat Heating Control Module Scan Tool Data Parameters

Parameter	Expected Value	Description
Operating Conditions: Engine Running		
Driver Seat Cushion Heating Command	Inactive	The scan tool displays Inactive or Active. This parameter displays the commanded output from the seat heating control module to the seat heater elements.
Driver Seat Cushion Temperature Sensor	Varies	The scan tool displays 0 – 5 V. The voltage displayed is an input to the seat heating control module from the seat cushion temperature sensor. Higher voltage readings indicate cooler seat temperatures while lower voltage readings indicate warmer seat temperatures.
Driver Seat Heating/Venting/ Cooling Level	Off	The scan tool displays Off, High Medium, or Low. When the heated seat is active, this parameter displays the selected temperature setting.
Driver Seat Heating/Venting/ Cooling Mode	Off	The scan tool displays Off or Back & Cushion Heat. This parameter indicates the heated seat mode of operation.
Passenger Seat Cushion Heating Command	Inactive	The scan tool displays Inactive or Active. This parameter displays the commanded output from the seat heating control module to the seat heater elements.
Passenger Seat Cushion Temperature Sensor	Varies	The scan tool displays 0 – 5 V. The voltage displayed is an input to the seat heating control module from the seat cushion temperature sensor. Higher voltage readings indicate cooler seat temperatures while lower voltage readings indicate warmer seat temperatures.
Passenger Seat Heating/Venting/ Cooling Level	Off	The scan tool displays Off, High Medium, or Low. When the heated seat is active, this parameter displays the selected temperature setting.
Passenger Seat Heating/Venting/ Cooling Mode	Off	The scan tool displays Off or Back & Cushion Heat. This parameter indicates the heated seat mode of operation.

Front Seat Heating Control Module Scan Tool Output Controls

Control Functions	Description
Operating Conditions: Engine Running	
Driver Seat Cushion Heating	This output control is used to command the driver seat heater elements On.
Passenger Seat Cushion Heating	This output control is used to command the passenger seat heater elements On.

Electronic Brake Control Module Scan Tool Information (Without FX3)

The electronic brake control module (EBCM) scan tool data parameters list contains all ABS related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.

Electronic Brake Control Module Scan Tool Data Parameter

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
ABS Pump Motor Voltage	—	0 V	The scan tool displays the pump motor voltage.
Antilock Braking System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the ABS is defective.
Brake Fluid Level Sensor	—	Panic Brake Assist Status	The scan tool displays OK when the brake fluid is at correct level and Low when the brake fluid is low.
Brake Pedal Position Sensor	Brake pedal released	Inactive	The scan tool displays Inactive or Active depending on the state of the brake pedal.
	Brake pedal applied	Active	
Brake Pressure Sensor	Brake pedal released	0–1 V	The scan tool displays 0–5 V depending on the applied hydraulic brake pressure.
	Brake pedal applied	1–5 V	
Dynamic Rear Proportioning Status	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the dynamic rear proportioning system is defective.
Left Front Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left front inlet solenoid valve is commanded ON.
Left Front Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left front outlet solenoid valve is commanded ON.
Left Front Wheel Speed Sensor	—	0 km/h	The scan tool displays km/h depending on the current speed of the left front wheel speed sensor.
Left Rear Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear inlet solenoid valve is commanded ON.
Left Rear Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear outlet solenoid valve is commanded ON.
Left Rear Wheel Speed Sensor	—	0 km/h	The scan tool displays km/h depending on the current speed of the left rear wheel speed sensor.
Panic Brake Assist Status	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the panic brake assist system is defective.
Pump Motor Relay Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the pump motor is commanded ON.
Primary Isolation Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Primary Prime Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.
Right Front Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front inlet solenoid valve is commanded ON.
Right Front Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front outlet solenoid valve is commanded ON.
Right Front Wheel Speed Sensor	—	0 km/h	The scan tool displays km/h depending on the current speed of the right front wheel speed sensor.

Electronic Brake Control Module Scan Tool Data Parameter (cont'd)

Parameter	System State	Expected Value	Description
Right Rear Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear inlet solenoid valve is commanded ON.
Right Rear Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear outlet solenoid valve is commanded ON.
Right Rear Wheel Speed Sensor	—	0 km/h	The scan tool displays km/h depending on the current speed of the right rear wheel speed sensor.
Secondary Isolation Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Secondary Prime Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.
Steering Wheel Angle	—	Varies	The scan tool displays °. This is the current position of the steering angle sensor.
System Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Traction Control System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the traction control system is defective.
Vehicle Stability Enhancement System Relay Feedback	—	Inactive	The scan tool displays Inactive or Active depending on the state of the stability control.
Vehicle Stability Enhancement System Switch	Traction control switch released	Active	The scan tool displays Active or Inactive depending on the status of the TCS/ESC switch.
	Traction control switch pressed	Inactive	
Vehicle Stability System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the vehicle stability enhancement system is defective.

Electronic Brake Control Module Scan Tool Output Controls

Output Control	Description
ABS Pump Motor	Commands the ABS pump motor Increase or Decrease.
Front Traction Control Isolation Valve	Commands the solenoid valve ON or OFF.
Front Traction Control Prime Valve	Commands the solenoid valve ON or OFF.
Left Front ABS Solenoid Valves	Commands the solenoid valves ON or OFF.
Left Rear ABS Solenoid Valves	Commands the solenoid valves ON or OFF.
Rear Traction Control Isolation Valve	Commands the solenoid valve ON or OFF.
Rear Traction Control Prime Valve	Commands the solenoid valve ON or OFF.
Right Front ABS Solenoid Valves	Commands the solenoid valves ON or OFF.
Right Rear ABS Solenoid Valves	Commands the solenoid valves ON or OFF.

Electronic Brake Control Module Scan Tool Information (With FX3)

The Electronic Brake Control Module scan tool data parameters list contains all ABS related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.

Electronic Brake Control Module Scan Tool Data Parameter

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Acceleration Pedal Position Signal Received from ECM	—	Invalid	The scan tool displays Invalid or Valid depending on the accelerator pedal signal received from the ECM.
ABS Pump Motor Voltage	—	0 V	The scan tool displays the pump motor voltage.
Antilock Braking System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the ABS detects a fault.
Brake Fluid Level Sensor	—	OK	The scan tool displays OK when the brake fluid is at correct level and Low when the brake fluid is low.
Brake Pedal Position Sensor	Brake pedal released	Inactive	The scan tool displays Inactive or Active depending on the state of the brake pedal.
	Brake pedal applied	Active	
Brake Pressure Sensor	Brake pedal released	0–1 V	The scan tool displays 0–5 V depending on the applied hydraulic brake pressure.
	Brake pedal applied	1–5 V	
Brake Switch, Traction Control Switch Signal Received From Body Control Module	—	Invalid	The scan tool displays Invalid or Valid depending on the signal received from the BCM.
Dynamic Rear Proportioning Status	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the dynamic rear proportioning system is defective.
Lateral Acceleration	—	Varies	The scan tool displays m/s^2. This is the current rate of the vehicle acceleration or deceleration as reported by the lateral accelerometer sensor.
Left Front Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left front inlet solenoid valve is commanded ON.
Left Front Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left front outlet solenoid valve is commanded ON.
Left Front Wheel Speed Sensor	—	0 km/h (MPH)	The scan tool displays km/hr (MPH) depending on the current speed of the left front wheel speed sensor.
Left Rear Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear inlet solenoid valve is commanded ON.
Left Rear Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear outlet solenoid valve is commanded ON.
Left Rear Wheel Speed Sensor	—	0 km/h (MPH)	The scan tool displays km/h (MPH) depending on the current speed of the left rear wheel speed sensor.
Longitudinal Acceleration	—	Varies	The scan tool displays m/s^2. This is the current rate of the vehicle acceleration or deceleration as reported by the longitudinal accelerometer sensor.
Panic Brake Assist Status	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the panic brake assist system is defective.
Pump Motor Relay Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the pump motor is commanded ON.
Primary Isolation Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Primary Prime Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.

Electronic Brake Control Module Scan Tool Data Parameter (cont'd)

Parameter	System State	Expected Value	Description
Right Front Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front inlet solenoid valve is commanded ON.
Right Front Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front outlet solenoid valve is commanded ON.
Right Front Wheel Speed Sensor	—	0 km/h (MPH)	The scan tool displays km/hr (MPH) depending on the current speed of the right front wheel speed sensor.
Right Rear Inlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear inlet solenoid valve is commanded ON.
Right Rear Outlet Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear outlet solenoid valve is commanded ON.
Right Rear Wheel Speed Sensor	—	0 km/h (MPH)	The scan tool displays km/h (MPH) depending on the current speed of the right rear wheel speed sensor.
Secondary Isolation Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Secondary Prime Solenoid Valve Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.
Steering Wheel Angle	—	Varies	The scan tool displays °. This is the current position of the steering angle sensor.
Steering Wheel Angle Sensor Centering	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the steering angle sensor center position is not learned.
System Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Traction Control System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the traction control system detects a fault.
Traction Control Switch	—	Inactive	The scan tool displays Inactive or Active depending on the state of the traction control switch.
Torque Signal Received From ECM	—	Invalid	The scan tool displays Invalid or Valid depending on the torque signal received from the ECM.
Torque Signal Received From TCM	—	Invalid	The scan tool displays Invalid or Valid depending on the torque signal received from the TCM.
Vehicle Stability Enhancement System Relay Feedback	—	Inactive	The scan tool displays Inactive or Active depending on the state of the stability control.
Vehicle Stability Enhancement System Switch	Traction control switch released	Inactive	The scan tool displays Active or Inactive depending on the status of the vehicle stability control switch.
	Traction control switch pressed and held for five seconds.	Active	
Vehicle Stability System	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the vehicle stability enhancement system is defective.
Yaw Rate Signal	—	Varies	This displays °/sec. The scan tool displays the signal received from the yaw rate sensor.

Electronic Brake Control Module Scan Tool Output Controls

Output Control	Description
ABS Pump Motor	Commands the ABS pump motor Increase or Decrease.
Automated Brake Bleed	This is used in order to bleed the ABS hydraulics.
Traction Control Left Front Solenoid Valves	Commands the solenoid valve ON or OFF.
Traction Control Left Rear Solenoid Valves	Commands the solenoid valve ON or OFF.
Traction Control Right Front Solenoid Valves	Commands the solenoid valves ON or OFF.
Traction Control Right Rear Solenoid Valves	Commands the solenoid valves ON or OFF.
ABS Left Front Solenoid Valves	Commands the solenoid valve ON or OFF.
ABS Left Rear Solenoid Valves	Commands the solenoid valve ON or OFF.
ABS Right Front Solenoid Valves	Commands the solenoid valves ON or OFF.
ABS Right Rear Solenoid Valves	Commands the solenoid valves ON or OFF.

Engine Control Module Scan Tool Information

The Engine Control Module Scan Tool Data List contains all engine related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists, and in some cases may appear more than once, or in more than one data list in order to group certain related parameters together.

Use the Engine Scan Tool Data List only after the following is determined:

- The *Diagnostic System Check - Vehicle on page 6-66* is completed.
- No diagnostic trouble codes (DTCs) are set.
- On-board diagnostics are functioning properly.

The scan tool values from a properly running engine may be used for comparison with the engine you are diagnosing. The Engine Scan Tool Data List represents values that may be seen on a normally running engine.

Note: A scan tool that displays faulty data should not be used. The scan tool concern should be reported to the manufacturer. Use of a faulty scan tool can result in misdiagnosis and unnecessary parts replacement.

Only the parameters listed below are referenced in this service manual for use in diagnosis. If all values are within the typical range described below, refer to *Symptoms - Engine Controls on page 9-511* for engine diagnosis.

Engine Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Engine Idling/Radiator Hose Hot/Closed Throttle/Park or Neutral/Closed Loop/Accessories Off/Brake Pedal Released			
5 Volt Reference 1, 2, or 3	Ignition ON	5 V	This parameter displays the voltage sensed on the 5 V reference circuits at the control module. The scan tool will display a higher value at higher voltage. The scan tool will display a lower value at lower voltage.
5 Volt Reference 1, 2, or 3 Circuit Status	Ignition ON	OK	This parameter displays OK if there is no 5 V reference circuit condition. If the circuit is shorted to ground or shorted to B+, Fault is displayed.
A/C High Side Pressure Sensor	A/C OFF	0.75–1.5 V*	This parameter displays the voltage from the A/C high side pressure sensor signal circuit to the control module. *Varies with temperature and relative humidity.
	A/C ON	1.3–2.5 V*	
A/C High Side Pressure Sensor	A/C OFF	450–650 kPa* (65–95 (PSI)*	This parameter displays the pressure from the A/C high side pressure sensor signal circuit to the control module. *Varies with temperature and relative humidity.
	Engine Speed at 2 000 RPM	1 117–2 350 kPa* (162–341 PSI)*	
A/C Off for WOT	A/C ON	No	This parameter displays whether the control module is commanding the A/C compressor clutch relay OFF for wide open throttle (WOT).
A/C Disable A/C Pressure Out of Range	A/C ON	No	This parameter displays whether the A/C pressure is out of range for normal operation as determined by the control module.

Engine Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
A/C Compressor Clutch Relay Command	A/C ON	On	This parameter displays the state of the air conditioning (A/C) clutch relay control circuit as commanded by the control module.
A/C Request Signal	A/C ON	Yes	This parameter displays the state of the A/C request input to the control module from the heating, ventilation, and air conditioning (HVAC) controls.
Accelerator Pedal Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the accelerator pedal position (APP) as calculated by the control module using the signals from the APP sensors.
	Accelerator pedal fully actuated	100%	
Air/Fuel Equivalence Ratio Command	—	Varies	This parameter displays the ratio of air to fuel as calculated by the control module based on various sensor inputs. The scan tool will display a lower air fuel ratio when a richer air to fuel mixture is commanded. The scan tool will display a higher air fuel ratio when a leaner air to fuel mixture is commanded. In closed loop operation the air fuel ratio should normally be approximately 14.7 : 1.
APP Sensor 1	Accelerator pedal not actuated	0.88–1.08 V	This parameter displays the actual voltage on the accelerator pedal position (APP) Sensor 1 signal circuit as measured by the control module.
	Accelerator pedal fully actuated	4.17–4.37 V	
APP Sensor 2	Accelerator pedal not actuated	0.39–0.59 V	This parameter displays the actual voltage on the accelerator pedal position (APP) Sensor 2 signal circuit as measured by the control module.
	Accelerator pedal fully actuated	2.02–2.22 V	
BARO	—	65–104 kPa (8–16 PSI) Varies with altitude	This parameter displays the barometric pressure (BARO). The control module uses the barometric pressure sensor input for fuel control to compensate for altitude differences.
Control Module Voltage Signal	—	B+	This parameter displays the state of the ignition system voltage available at the control module.
Cooling Fan Relay 1 Command	—	Varies	This parameter displays the commanded state of the cooling fan relay 1 control circuit. The cooling fan relay 1 should be ON when the scan tool indicates the fan control relay 1 command is ON. The cooling fan relay 1 should be OFF when the scan tool indicates the fan control Relay 1 Command is OFF.
Cooling Fan Relay 2 Command	—	Varies	This parameter displays the commanded state of the cooling fan relay 2 control circuit. The cooling fan relay 2 should be ON when the scan tool indicates the fan control Relay 2 command is ON. The cooling fan relay 2 should be OFF when the scan tool indicates the fan control Relay 2 command is OFF.
Cooling Fan Relay 3 Command	—	Varies	This parameter displays the commanded state of the cooling fan relay 3 control circuit. The cooling fan relay 3 should be ON when the scan tool indicates the fan control Relay 3 command is ON. The cooling fan relay 3 should be OFF when the scan tool indicates the fan control Relay 3 command is OFF.
CPP Learned Apply Position	—	V	This parameter displays the position learned for the clutch pedal position (CPP) sensor when the clutch pedal is fully applied during the associated learn procedure.
CPP Learned Release Position	—	V	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is released.

Engine Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
CPP Sensor	—	Varies	This parameter displays the displacement of the clutch pedal (corrected and normalized based upon its learned released and fully applied positions), where 0% corresponds to the clutch pedal being released and 100% corresponds to the clutch pedal being fully applied.
CPP Sensor	—	Varies	This parameter displays the clutch pedal position sensor analog input as a percentage of its reference voltage.
Current Gear	Transmission in Park or Neutral	1–6	Displays Unknown, 1, 2, 3, 4, 5, or 6. This parameter indicates the current commanded gear position.
Desired ECT	—	Varies	This parameter displays the desired engine coolant temperature (ECT) in degrees.
Desired Idle Speed	—	600–950 RPM	This parameter displays the desired engine idle speed as commanded by the control module.
Desired Throttle Position	—	2–6%	This parameter displays the desired throttle position angle commanded by the control module.
Distance Since DTC Cleared	—	Varies	This parameter displays the distance accumulated since an emission diagnostic trouble code was cleared. The scan tool will display increasing distance as the vehicle is driven.
Distance Since Last Malfunction	—	Varies	This parameter displays the distance accumulated when the emission diagnostic trouble code last failed.
Distance This Driving Cycle	—	Varies	This parameter displays the distance accumulated since an emission diagnostic trouble code was cleared. The scan tool will display increasing distance as the vehicle is driven.
ECT Sensor 1	—	−39 to +140°C (−38 to +284°F) Varies	This parameter displays the temperature of the engine coolant based on input to the control module from the engine coolant temperature (ECT) sensor 1.
ECT Sensor 2	—	−39 to +140°C (−38 to +284°F) Varies	This parameter displays the temperature of the radiator coolant based on input to the control module from the radiator coolant temperature (ECT) sensor 2.
Engine Controls Ignition Relay Feedback Signal	—	B+	This parameter displays the voltage available at the engine control ignition relay pin of the control module.
Engine Coolant Temperature	—	−39 to +140°C (−38 to +284°F) Varies	This parameter displays the temperature of the engine coolant based on input to the control module from the engine coolant temperature (ECT) sensor 1.
Engine Coolant Thermostat Heater Command	—	0–100%	This parameter displays the commanded duty cycle for the engine coolant thermostat.
Engine Load	Engine Idling	11–20% Varies	This parameter displays the calculated engine load in percent based on inputs to the control module from various engine sensors.
	Engine speed at 2 500 RPM	25–40%	
Engine Oil Level Switch	—	OK	This parameter displays if the level of the engine oil is within range as determined by the control module from information received from the engine oil level switch.

Engine Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Engine Oil Pressure Switch	—	OK	This parameter displays the state of the engine oil pressure as determined by the control module. The control module monitors the engine oil pressure switch to determine if the engine oil pressure is sufficient. The scan tool displays Low when the engine oil pressure is below a predetermined value.
Engine Run Time	Engine Operating	Varies	This parameter displays the time elapsed since the engine was started. The scan tool will display the time in hours, minutes and seconds. The engine run time will reset to zero when the engine stops running.
Engine Speed	Engine Cranking	Greater than 60 RPM	This parameter displays the speed of the engine crankshaft rotation from information received from the crankshaft position sensor.
	Engine Idling	Approximately 650–950 RPM	
EVAP Purge Solenoid Valve Command	—	10–20%	This parameter displays the on-time or duty cycle of the evaporative emission (EVAP) canister purge solenoid commanded by the control module. Zero percent indicates no purge. One hundred percent indicates full purge.
Exhaust Camshaft Position Active Counter	Engine Idling	0–255	This parameter displays an incrementing counter when the control module receives a signal from the exhaust camshaft position (CMP) sensor.
Exhaust Camshaft Position Command	—	45–75%	This parameter displays the commanded duty cycle for the exhaust camshaft as commanded by the control module.
Fuel Level Sensor	—	Varies	This parameter displays the approximate fuel level in the fuel tank as a voltage. The control module calculates this level using the signal from the sensor used to monitor the fuel in the tank. The scan tool will display a low reading when the fuel level in the tank is near empty. The scan tool will display a high reading when the fuel level in the tank is high or near full.
Fuel Pump Relay Command	Ignition ON, engine OFF	Fuel pump on for 2 s	This parameter displays the control modules commanded state of the fuel pump relay control circuit.
	Engine idling	On	
Fuel Tank Pressure Sensor	—	0.00 inch	This parameter displays the pressure/vacuum inside the fuel tank. A negative value indicates a vacuum, while a positive value indicates a pressure.
Fuel Tank Pressure Sensor	—	1.3–1.7 V	This parameter displays the voltage signal received by the control module from the fuel tank pressure sensor.
Generator F-Terminal Signal	—	40–70%	This parameter indicates the generator field duty cycle as commanded by the voltage regulator or control module. The scan tool will display a higher value for a higher commanded generator output, and a lower value for a lower commanded generator output.
HO2S 1 or HO2S 2	Ignition ON, Engine OFF	50–900 mV	This parameter indicates the heated oxygen sensor (HO2S) sensor 1 or 2, output voltage as measured by the control module. The scan tool will display a higher value during a rich condition, and a lower value during a lean condition.
	Engine Operating	Varies	
HO2S Heater Sensor 1 or 2	—	0.42–0.62 A	This parameter displays the amperage of the HO2S heater commanded by the control module.

Engine Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
HO2S 1 or HO2S 2 Heater Command	—	0–99%	This parameter displays the commanded state of the HO2S 1 or HO2S 2 heater by the control module. The scan tool will display a higher value as the heater command is increased, and a lower value if the heater is not commanded ON.
IAT Sensor	—	−39 to +140°C (−38 to +284°F)	This parameter displays the temperature of the air entering the air induction system based on input to the control module from the intake air temperature (IAT) sensor.
IAT Sensor	—	0–5 V	This parameter displays the voltage calculated by the control module from the intake air temperature sensor.
Ignition Accessory Signal	—	ON	This parameter displays the state of the ignition accessory position input to the control module from the ignition switch.
Ignition Switch Status	—	Active	This parameter displays active when the ignition switch is supplying battery voltage to the control module ignition circuit.
Intake Camshaft Position Command	—	45–75%	This parameter displays the commanded duty cycle for the intake camshaft as commanded by the control module.
Intake Manifold Tuning Control Valve Control Circuit Command	—	Off	This parameter displays the state of the intake manifold tuning valve solenoid control circuit as commanded by the control module.
Long Term Fuel Trim	—	−5 to +5%	This parameter displays the commanded Long Term Fuel Trim correction by the control module.
MAP Sensor	—	26–52 kPa	This parameter displays the pressure from the manifold absolute pressure (MAP) sensor to the control module.
MAP Sensor	—	0.98–1.42 V	This parameter displays the signal voltage from the MAP sensor to the control module.
Park/Neutral Position Switch	—	Park/Neutral	This parameter displays the position of the transmission selection as Park/Neutral or in gear.
Reduced Engine Power	—	Inactive	This parameter displays the status of the operating mode of the control module used to reduce engine power to prevent catalyst or engine damage or due to an affected throttle actuator control (TAC) system.
Remaining Fuel in Tank	—	0–100% Varies	This parameter displays the amount of fuel remaining in the fuel tank as measured in percentage. The control module determines the amount of fuel remaining in the tank by using information from the fuel level sensors. The scan tool will display a higher value with a full fuel tank, and a lower value with an empty fuel tank.
Reverse Position Switch	—	OFF	Manual Transmission Reverse Switch ON indicates that the reverse switch hard wire input to the ECM is active.
Short Term Fuel Trim	—	−5 to +5%	This parameter displays the short term correction to the fuel delivery by the control module in response to oxygen sensor. If the oxygen sensor indicates a lean air/fuel mixture, the control module will add fuel increasing the short term fuel trim above 0. If the oxygen sensor indicates a rich air/fuel mixture, the control module will reduce fuel decreasing the short term fuel trim below 0.

Engine Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Starter Relay Command	—	OFF	The scan tool displays ON or OFF. The scan tool displays OFF until the ignition is placed into the CRANK position.
TAC Forced Engine Shutdown	—	NO	This parameter indicates the status of TAC control by the control module. The scan tool will display YES if the engine has been shut down due to a throttle control fault. The scan tool will display NO if the engine has not been shut down by a throttle control fault.
TAC Motor	—	Enabled	This parameter indicates the status of the TAC motor driver by the ECM. The scan tool will display Enabled if TAC motor operation is allowed. The scan tool will display disabled if the TAC motor is disabled.
TAC Motor Command	—	0–100% Varies	This parameter displays the percentage of the commanded state of the TAC motor by the control module.
Throttle Position	—	2–6%	This parameter displays the actual throttle position angle indicated by the control module using information from the two throttle position sensors.
Throttle Position Sensor 1	Accelerator pedal not actuated	4.14–4.34 V	This parameter displays the voltage signal sent to the control module from throttle position sensor 1 of the throttle assembly. The throttle position sensor 1 is a range of values indicating a high voltage when the throttle is closed to a low voltage when the throttle plate is fully open.
	Accelerator pedal fully actuated	3.50–3.37 V	
Throttle Position Sensor 2	Accelerator pedal not actuated	0.68–0.88 V	This parameter displays the voltage signal sent to the control module from throttle position sensor 2 of the throttle assembly. The throttle position sensor 2 is a range of values indicating a low voltage when the throttle is closed to a high voltage when the throttle plate is fully open.
	Accelerator pedal fully actuated	1.35–1.55 V	
Torque Delivered Signal	—	Varies	This parameter displays a calculated valve based on engine load, throttle position, and other engine inputs. This parameter is calculated to within 20 N m (15 lb ft) of actual measured engine torque.
Total Knock Retard	—	0 Degrees	This parameter indicates how much ignition spark timing is being retarded due to all control systems monitored by the control module. The scan tool will display a high valve during extreme conditions such as high temperatures and antilock braking. The scan tool will display a lower value during lighter driving conditions.
Total Misfire	—	Counts	This parameter displays the total number of cylinder firing events that the control module detected as misfires for the last 200 crankshaft revolution sample period.
Vehicle Speed Sensor	—	0 km/h (0 MPH)	This parameter displays the speed of the vehicle as calculated by the transmission control module (TCM) from information received from the vehicle speed sensor (VSS).
Warm-ups Since DTC Cleared	—	Varies	This parameter displays the number of warm-ups since the DTC was cleared.

Engine Control Module (ECM) Scan Tool Output Controls

Output Control	Description
A/C Clutch Relay	This function activates the A/C compressor relay. The normal commanded state of the A/C relay is None. The A/C compressor will turn ON or OFF when commanded ON or OFF. The system remains in the commanded state until cancelled by the scan tool. The scan tool initiates the test when the following conditions are met: • In the correct power mode • A/C high side pressure is in range • Engine speed is in range • Ignition voltage is in range. • There are no A/C pressure sensor DTCs set.
Clutch Pedal Position Learn	This device control is used to trigger the procedure to learn the clutch pedal fully applied position.
Cooling Fan	This function controls the cooling fan relay 1. The normal commanded state of the fan relay is None. The scan tool initiates the test when the following conditions are met: • Engine coolant temperature is not out of range • In the correct power mode.
Engine Oil Life Reset	This function is used to reset the engine oil life. The engine oil remaining life is determined from engine revolutions and the distance driven since the last oil change.
EVAP Purge Solenoid Valve	This function controls the EVAP purge solenoid valve. The normal commanded state is None. The system will increase or decrease the amount of purge by changing the duty cycle of the purge valve in 10% increments within a range of 0–100%. The scan tool initiates the test when the following conditions are met: • The vacuum level in the EVAP purge system is within range. • There are no EVAP DTCs set. • The EVAP system test is not in progress. • In the correct Power Mode.
EVAP Test	Activates the on-board EVAP diagnostic test.
EVAP Vent Solenoid Valve	This function controls the EVAP vent solenoid. The normal commanded state is none. When commanded ON, the vent valve switches to not venting. When commanded OFF, the vent valve switches to venting. The scan tool indicates the test when the following conditions are met: • The vacuum level in the EVAP purge system is within range. • There are no EVAP DTCs set. • The EVAP system test in not in process. • In the correct power mode.
Exhaust Camshaft Position Actuator	This function controls the selected camshaft actuator solenoid. The normal commanded state is None. The system will increase or decrease the angle of the selected camshaft in 5 degree increments. The scan tool initiates the test when the following conditions are met: • The engine is operating. • The commanded camshaft position is not out of range. • There are no crankshaft position or camshaft position sensor DTCs set. • Engine oil temperature is not out of range. • In the correct power mode. If the actuator is disabled after 30 s, the actuator control is not allowed again on the same actuator for 60 s.
Fuel Pump Relay	This function controls the fuel pump relay. The normal commanded state is None. When commanded ON or OFF, the ECM turns the fuel pump ON or OFF. The scan tool initiates the test when the following conditions are met: • The engine speed is 0 RPM. • In the correct power mode. • The output control timer has not expired. • The ignition voltage is within range.
Fuel Trim Reset	This function is used to reset the learned fuel trim values to their initial values.

Engine Control Module (ECM) Scan Tool Output Controls (cont'd)

Output Control	Description
Generator L-Terminal	This function is used to override the state of the generator L terminal output. The commanded states are ON and OFF. Selecting OFF commands the ECM to turn OFF the generator and stop generating an output voltage. The scan tool initiates the test when the following conditions are met: • The engine is operating to turn OFF the component. • The vehicle speed is 0 km/h (0 MPH). • In the correct power mode. • The output control timer has not expired.
HO2S Heater Sensor 1 or 2	This function controls the selected HO2S heater. The normal commanded state is None, on, and off. Commanding the HO2S heater ON turns on the heater driver. The scan tool initiates the test when the following conditions are met: • The engine is operating. • The exhaust temperature is within range. • In the correct power mode. • The HO2S heaters are not over temperature. • The ignition voltage is not out of range while commanding the heaters ON.
Intake Camshaft Position Actuator	This function controls the selected camshaft actuator solenoid. The normal commanded state is None. The system will increase or decrease the angle of the selected camshaft in 5 degree increments. The scan tool initiates the test when the following conditions are met: • The engine is operating. • The commanded camshaft position is not out of range. • There are no crankshaft position or camshaft position sensor DTCs set. • Engine oil temperature is not out of range. • In the correct power mode. If the actuator is disabled after 30 s, the actuator control is not allowed again on the same actuator for 60 s.
Intake Manifold Runner Control Valve	This device control is used to override the state of the intake manifold tuning valve output. A output test is used to select whether commanding the intake manifold tuning valve output on or off results in the valve being commanded closed or open.
Malfunction Indicator Lamp (MIL)	This function controls the malfunction indicator lamp (MIL). The normal commanded state is None. When commanded ON or OFF, the ECM turns the malfunction indicator lamp (MIL) ON or OFF. This output can also be monitored on the scan tool data parameter MIL Command. The system remains in the commanded state until cancelled by the scan tool.
Throttle Position	This function controls the throttle valve in 10% increments. The scan tool initiates the test when the following conditions are met: • The engine speed is 0 RPM. • The vehicle speed is 0 km/h (0 MPH). The system remains in the commanded state until cancelled by the scan tool.

Fuel Pump Flow Control Module Scan Tool Information

Fuel Pump Flow Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Desired Fuel Pressure	—	306.8 kPa (44.5 psi)	This displays kPa (psi). This is the desired fuel pressure.
Fuel Pump Command	—	On	The scan tool displays On or Off. This is the current state of the fuel pump command.
Fuel Pump Signal Command	—	Varies	This displays %. This is the commanded fuel pump signal measured in percentage.
Fuel Pressure Sensor	—	296.4–310.3 kPa (43–45 psi)	This displays kPa (psi). This is the current pressure at the fuel pressure sensor.

Fuel Pump Flow Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Fuel Pressure Sensor	—	4.90–5.01 Volts	This displays Volts. This is the fuel pressure sensor voltage.
Ignition 1 Signal	—	Varies	This displays Volts. This is the current ignition 1 signal.
LT Fuel Pump Trim	—	Varies	This displays a numeric value. This is the long term (LT) fuel pump trim.
ST Fuel Pump Trim	—	Varies	This displays a numeric value. This is the short term (ST) fuel pump trim.

Fuel Pump Flow Control Module Scan Tool Output Controls

Output Control	Description
Fuel Pressure Control	This output control is used to control the fuel pressure.
Fuel Pump	This output control is used to command the fuel pump ON and OFF.
Fuel Pump Trim Reset	This output control is used to reset the fuel pump trim.

Active Grille Air Shutter Scan Tool Data Parameters (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Active Grille Air Shutter Position Command	—	Varies	This displays %. This is the commanded active grille air shutter position.
Active Grille Air Shutter Position	—	Varies	This displays %. This is the actual active grille air shutter position.
Cold Temperature Mode	—	On / Off	The scan tool displays On or Off. This is the current state of the Cold Temperature Mode.
Ambient Air Temperature	—	Varies	The scan tool displays °C (° F). This is the current ambient air temperature.

Active Grille Air Shutter Scan Tool Output Controls (If Equipped)

Output Control	Description
Active Grille Air Shutter Actuator	This output control is used to perform the Active Grille Air Shutter Actuator test. It is used to cycle the active grille air shutter open and closed. The test result will display pass or fail based on the ability of the louvers to cycle open and closed.

Exhaust Flow Control Valve Scan Tool Data Parameters (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Exhaust Flow Control Valve Command	—	Open/Closed	Exhaust Flow Valve Commanded State
Exhaust Flow Control Valve Command	—	%	Exhaust Flow Valve Commanded Duty Cycle (0%-100%)
Exhaust Flow Control Valve Performance Mode	—	Active/Inactive	Exhaust Flow Valve Control Status

Exhaust Flow Control Valve Scan Tool Data Parameters (If Equipped) (cont'd)

Parameter	System State	Expected Value	Description
Exhaust Flow Control Valve Rumble Mode	—	Active/Inactive	Exhaust Flow Valve Control Status
Exhaust Flow Control Valve	—	Active/Inactive	Exhaust Flow Valve Control Status

Exhaust Flow Control Valve Scan Tool Output Controls (If Equipped)

Output Control	Description
Exhaust Flow Control Valve Command	This output control is used to cycle the exhaust flow control valve open and closed.

Heating, Ventilation and Air Conditioning Control Module Scan Tool Information

Heating Ventilation and Air Conditioning Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
A/C Compressor Clutch Status	Engine running, A/C Off	Disengaged	The scan tool displays Engaged or Disengaged depending on the state of the A/C compressor.
	Engine running, A/C On	Engaged	
A/C Evaporator Temperature Sensor	—	−40 to +80°C (−40 to + 176°F)	The scan tool displays °C (°F). This is the current temperature at the A/C evaporator temperature sensor.
A/C High Side Pressure Sensor	—	Varies	The scan tool displays kPa. This is the current pressure of the A/C refrigerant.
A/C Indicator	A/C Off	Off	The scan tool displays On or Off depending on the state of the A/C mode.
	A/C On	On	
A/C Request Signal	A/C Off	Inactive	The scan tool displays Active or Inactive depending on the state of the A/C mode.
	A/C On	Active	
A/C Switch	A/C Switch released	Inactive	The scan tool displays Active or Inactive depending on the state of the A/C switch.
	A/C Switch pressed	Active	
Air Recirculation LED	Air recirculation mode is deactivated	Off	The scan tool displays On or Off depending on the state of the Recirculation mode.
	Air recirculation mode is activated	On	
Air Recirculation Mode Switch	Air recirculation switch released	Inactive	The scan tool displays Active or Inactive depending on the state of the air recirculation mode switch.
	Air recirculation switch pressed	Active	
Ambient Air Temperature (Filtered)	—	−40 to +80°C (−40 to + 176°F)	The scan tool displays °C (°F). This is the current temperature at the ambient air temperature sensor.
Battery Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Engine Coolant Temperature	—	−40 to +215°C (−40 to +419°F)	The scan tool displays °C (°F). This is the current engine coolant temperature.

Heating Ventilation and Air Conditioning Control Module Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Ignition Voltage	—	11–14 V	The scan tool displays V. This is the current ignition voltage.
Rear Defogger Indicator	Rear defogger is deactivated	Off	The scan tool displays On or Off depending on the state of the rear defogger.
	Rear defogger is activated	On	
Rear Defogger Switch	Rear defogger switch released	Inactive	The scan tool displays Active or Inactive depending on the state of the rear defogger switch.
	Rear defogger switch pressed	Active	

Heating Ventilation and Air Conditioning Control Module Scan Tool Output Controls

Output Control	Description
A/C Switch	This control function simulates the state of the A/C switch.
Air Recirculation Mode Switch	When On is selected, the HVAC control module commands the air recirculation door from outside air to recirculation. When Off is selected, the HVAC control module commands the air recirculation door from recirculation to outside air.
Illuminate All Indicators	This control function will illuminate all indicators on the HVAC control module.

Inflatable Restraint Passenger Presence System Scan Tool Information

Passenger Presence Module Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Base Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the PPS module which is stored in non volatile memory.
Battery Voltage	Volts	The scan tool will display battery voltage.
Calibration Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the calibration file in the PPS module.
End Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the PPS module in production.
Manufacturer's Traceability Number	Varies, 16 Digit Number	The scan tool displays the 16 digit traceability number in the PPS module.
Passenger Classification	Empty Seat	The scan tool displays Unknown, Calibration Mode, Empty Seat, Small Occupant Type 1, Small Occupant Type 2, Small Occupant Type 3, Small Occupant Type 4, Large Occupant Type 1, Large Occupant Type 2, Large Occupant Type 3, Large Occupant Type 4, Module Setup, Not Available, Child Seat Facing Rearward, Child Seat Facing Forward, Child Seat Facing Unknown Direction. This is the state of what occupies the passenger seat, as monitored by the passenger presence system.
Passenger Presence Module Primary Key	Hex Value	The scan tool indicates the primary key Hex value.
Passenger Presence System Reporting DTC(s)	Yes/No	The PPS module will report if there are DTCs set in the passenger presence module.
Passenger Seat Occupancy Status	Empty Seat	The scan tool displays Undefined, Empty Seat, Occupied, or Invalid. This is the state of the passenger seat if it is occupied or empty and monitored by the passenger presence system.
Power Mode	Off / Accessory / Run / Crank Request	The scan tool will display the power mode of the vehicle.

Passenger Presence Module Scan Tool Data Parameters (cont'd)

Parameter	Expected Value	Definition
Primary Key Status	Valid/Invalid	The scan tool displays Valid if the primary key matches what is stored to memory in the PPS module.
Received Primary Key	Hex Value	The scan tool displays a Hex value indicating the PPS module received primary key data.
Software Part Number	Varies, 8 Digit Number	The scan tool displays the software part number in the PPS module.

Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information

Sensing and Diagnostic Module Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Vehicle in Service Mode		
2nd Row Left Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the left rear seat belt reminder sensor pad is enabled to the SDM.
2nd Row Left Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the left rear seat belt reminder sensor pad has been learned by the SDM.
2nd Row Left Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the left rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the rear middle seat belt reminder sensor pad is enabled to the SDM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the rear middle seat belt reminder sensor pad has been learned by the SDM.
2nd Row Middle Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the middle rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the rear right seat belt reminder sensor pad is enabled to the SDM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the rear right seat belt reminder sensor pad has been learned by the SDM.
2nd Row Right Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the right rear seat belt switch when the seat belt is buckled or unbuckled.
Air Bag Malfunction Indicator	On/Off/Flashes	The scan tool will display On or Flashes if there is a problem with the SIR system. Any problems within the SIR system will illuminate the air bag indicator. The indicator will either flash or stay on.
Base Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the SDM which is stored in non volatile memory.
Calibration Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the calibration file in the SDM.
Deployment Loop 1-18 Enable Status	Enabled/Disabled	The scan tool displays Enabled or Disabled. This is the status of the air bag or pretensioner.
Deployment Loop 1-18 Learn Status	Learned/Not Learned	The scan tool displays Learned or Not learned. Learned is displayed if the SDM has defined the number loop programmed from an air bag or pretensioner.
Deployment Loop 1-18 Resistance	1.44–4.25 Ohms	The scan tool displays the resistance of the learned loop of the air bag or pretensioner when connected to the SDM.
Deployment Loop 1-18 Type	Varies	The scan tool displays the name of the air bag or pretensioner associated with the loop type 1–18.

Sensing and Diagnostic Module Scan Tool Data Parameters (cont'd)

Parameter	Expected Value	Definition
Driver Seat Belt Reminder Indicator	On/Off	The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Driver Seat Belt Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat belt sensor in the seat belt buckle is enabled to the SDM.
Driver Seat Belt Sensor Learn Status	Learned/Not learned	The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat belt sensor has been learned by the SDM.
Driver Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the driver seat belt switch when the seat belt is buckled or unbuckled.
Driver Seat Position Sensor	Rearward/Forward	The scan tool will display if the driver seat is forward or rearward of the sensor set position.
Driver Seat Position Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat position sensor is enabled to the SDM.
Driver Seat Position Sensor Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat position sensor has been learned by the SDM.
End Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the SDM in production.
Impact Sensor 1-8 Enable Status	Enabled/Disabled	The scan tool displays Enabled or Disabled This is the status of the impact sensor.
Impact Sensor 1-8 Learn Status	Learned/Not Learned	The scan tool displays Learned or Not learned. Learned is displayed if the SDM has learned and has assigned a number to that impact sensor.
Impact Sensor 1-8 Type	Equipped/Not Equipped	The scan tool displays the name of the impact sensor associated with the type 1–8.
Inflatable Restraint Sensing and Diagnostic Module Primary Key	Hex Value	The scan tool indicates the primary key Hex value.
Manufacturer's Traceability Number	Varies, 16 Digit Number	The scan tool displays the 16 digit traceability number in the SDM.
Module Setup	Incomplete/Complete	The scan tool indicates if the SDM is set up.
Passenger Air Bag Disabled Switch	On/Off	The scan tool displays Off when the customer manually turns the passenger airbag off with this switch.
Passenger Air Bag Off Indicator	On/Off	The scan tool displays Off when the passenger indicator is not illuminated. This indicator is off when the disable switch is in the off position or no one is sitting in the passenger seat.
Passenger Air Bag On Indicator	On/Off	The scan tool displays On when the passenger indicator is illuminated. This indicator is on when the disable switch is in the on position and someone is sitting in the passenger seat.
Passenger Air Bag Status	Enabled/Disabled	The scan tool displays if the passenger air bag is enabled to the SDM.
Passenger Air Bag Disable Indicator Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag disable indicator is enabled to the SDM.
Passenger Air Bag Disable Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag disable indicator.
Passenger Air Bag Disable Switch Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag disable switch is enabled to the SDM.
Passenger Air Bag Disable Switch Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag disable switch.
Passenger Air Bag Enable Indicator Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag enable indicator is enabled to the SDM.
Passenger Air Bag Enable Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag enable indicator.

Sensing and Diagnostic Module Scan Tool Data Parameters (cont'd)

Parameter	Expected Value	Definition
Passenger Classification	00–07	The scan tool will display what type of individual is sitting in the passenger seat.
Passenger Presence Detection System Enable Status	Enabled/Disabled	The scan tool displays if the passenger presence system is enabled to the SDM.
Passenger Presence Detection System Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the passenger presence system.
Passenger Presence Detection System Reporting DTC(s)	Yes/No	The SDM will report if there are DTCs set in the passenger presence module.
Passenger Seat Belt Reminder Indicator	On/Off	The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Passenger Seat Belt Reminder Indicator Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat belt reminder indicator is enabled to the SDM.
Passenger Seat Belt Reminder Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder indicator has been learned by the SDM.
Passenger Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat belt reminder sensor pad is enabled to the SDM.
Passenger Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder sensor pad has been learned by the SDM.
Passenger Seat Belt Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat position sensor is enabled to the SDM.
Passenger Seat Belt Sensor Learn Status	Learned/Not learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt sensor has been learned by the SDM.
Passenger Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the passenger seat belt switch when the seat belt is buckled or unbuckled.
Passenger Seat Occupancy Status	Empty Seat/Occupied	The scan tool displays Occupied if someone is sitting in the passenger seat.
Passenger Seat Position Sensor	Rearward/Forward	The scan tool will display if the passenger seat is forward or rearward of the sensor set position.
Passenger Seat Position Sensor Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat position sensor pad is enabled to the SDM.
Passenger Seat Position Sensor Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat position sensor has been learned by the SDM.
Power Mode	Off/Accessory/Run/ Crank Request	The scan tool will display the power mode of the vehicle.
Primary Key Status	Valid/Invalid	The scan tool displays Valid if the primary key matches what is stored to memory in the SDM.
Primary Key Status Last Ignition Cycle	Invalid/Valid	The SDM checks to see if the primary key data received is valid.
Received Primary Key	Hex Value	The scan tool displays a Hex value indicating the SDM received primary key data.
Rollover Sensor Enable Status	Disabled/Enabled	The scan tool displays if the rollover sensor is enabled to the SDM.
Rollover Sensor Learn Status	Learn/Unlearn	The scan tool displays Learned or Not Learned. Learned is displayed if the rollover sensor has been learned by the SDM.
Security Code Accepted	Yes/No	The SDM either accepts the security code or it does not. The scan tool displays Yes if the security code has been accepted by the SDM.
Security Code Lockout	Yes/No	The scan tool displays Yes if the SDM has been locked out because of the security code not being accepted.
Security Code Lockout Active Timer	Random Value	The SDM uses a timer before the security code is locked in the SDM.

Sensing and Diagnostic Module Scan Tool Data Parameters (cont'd)

Parameter	Expected Value	Definition
Security Code Programmed	Yes/No	The scan tool displays Yes if the SDM has been programmed with the security code.
Security Code Programming Counter	Random Value	The SDM uses a counter for the value of the security code programming.
Security Code Reset Counter	Random Value	The SDM uses a counter to reset the value of the security code.
Software Part Number	Varies, 8 Digit Number	The scan tool displays the software part number in the SDM.
Vehicle Identification Number	Varies, 17 Digit Number	The VIN number of the vehicle programmed into the SDM.
VIN Programmed	Yes/No	The scan tool displays Yes if the VIN has been programmed into the SDM.
VIN Programming Counter	Random Value	The SDM uses this counter while programming the VIN.

Instrument Cluster Scan Tool Information

Instrument Cluster Scan Tool Data Parameters

Parameter	Expected Value	Description
Operating Conditions: Ignition ON		
Battery Voltage	12–14 V	The scan tool displays Volts. This is the current battery voltage signal.
Key in Ignition Status	Active/Inactive	The scan tool displays Active or Inactive. This is the state of the key in ignition switch.
Driver Information Center Switch	Varies	The scan tool displays Volts. This is the current driver information center switch input voltage.
Driver Information Center Switch	Inactive	The scan tool displays either Inactive, Up, Down, or Menu. This is the state of the driver information center switch.
Reset Switch	Active/Inactive	The scan tool displays Active or Inactive. This is the state of the reset switch.
Ambient Air Temperature	15°C	The scan tool displays outside temperature in °C.
Washer Fluid Level Switch	Open	The scan tool displays either Open, Closed, or Not Available.
Odometer Lock Status	Active/Inactive	The scan tool displays Active or Inactive depending on the state of the odometer.
Engine Speed	0 RPM	The scan tool displays the filtered value of engine speed.
Vehicle Speed	0 km/h	The scan tool displays the filtered vehicle speed value.
Fuel Level Sensor	—	The scan tool displays the filtered value of the fuel level.
Engine Coolant Temperature	—	The scan tool displays the filtered value of the engine coolant temperature.
Engine Oil Pressure	—	The scan tool displays the filtered value of the engine oil pressure.

Instrument Cluster Scan Tool Output Controls

Output Control	Description
Instrument Cluster Gauge Sweep	This function is used to command the gauges to sweep from minimum to maximum.
Driver Information Center Dimming	This function is used to command the dimming of the driver information display to Increase or Decrease by 10%.
Instrument Panel Dimmer Switch	This function is used to command the dimming of the instrument cluster to Increase or Decrease by 10%.
Driver Information Center Segments	This function is used to command the driver information center segments ON and OFF.
All Indicators	This function is used to command all the indicators ON or OFF.
Driver Information Center Options	This function is used to command the driver information center buttons using the scan tool.

Instrument Cluster Scan Tool Output Controls (cont'd)

Output Control	Description
Odometer Programming	This function is used to command the odometer to reset.
CAN Bus Configuration Learn	This function is used to Reset the source ID for low speed CAN Bus communications.

Power Steering Control Module Scan Tool Information

The power steering control module scan tool data parameters list contains all power steering related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.

Power Steering Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Battery Voltage	—	Varies	This displays battery voltage.
Calculated System Temperature	—	Varies	This is the calculated temperature of the power steering system.
Power Steering Control Module Center Procedure	—	Varies	The scan tool displays if the center procedure has been completed or not.
Power Steering Control Module SPS Calibration Status	—	Varies	The scan tool displays if the calibration status has been completed or not.
Steering Input Torque	—	Varies	This displays N·m. This is the calculated force of the steering shaft, as monitored by the power steering control module.
Steering Wheel Angle	—	Varies	This displays the steering wheel angle in degrees.

Radio Scan Tool Information

Radio Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Antenna Module	Enabled	The scan tool displays Enabled or Disabled. This indicates if the system uses an antenna module and the output status between the radio and the antenna module.
Auxiliary Audio Input	Not Present	The scan tool displays Present or Not Present. This parameter displays present when an auxiliary input is connected.
Battery Voltage	Varies	The scan tool displays volts. This is the voltage at the input to the radio.
Digital Radio Receiver	Present	The scan tool displays Present or Not Present. This is the state of the Digital Audio Broadcast.
Power Mode	Run	The scan tool displays Off, Accessory, Run or Crank Request. This is the current power mode of the radio.
Radio Signal Strength	Varies	This displays the signal strength in dB. This is the signal strength of the currently tuned radio station.
Theft Lock Armed	Learned VIN	The scan tool displays Learned VIN or No VIN. This is the state of the VIN programming in the radio.
Radio Theft Lock Status	Inactive	The scan tool displays Active or Inactive. This is the state of the theft lock system. Active indicates the radio is locked. Inactive indicates the theft lock system is armed and the radio is unlocked.
Test Bench Mode	Inactive	The scan tool displays Active or Inactive. This parameter indicates if the radio is in bench or user mode.
End Model Part Number	Varies	End Model Part Number is the part number for the hardware of the control module with software and calibrations.

Radio Scan Tool Data Parameters (cont'd)

Parameter	Expected Value	Definition
Base Model Part Number	Varies	Base Model Part Number is the part number for the hardware without software and calibrations.
Boot Software Part Number	Varies	The scan tool displays the boot software ID number.
Calibration Part Number 1	Varies	The scan tool displays the software module ID 1.
Calibration Part Number 2	Varies	The scan tool displays the software module ID 2.
Calibration Part Number 3	Varies	The scan tool displays the software module ID 3.
Calibration Part Number 4	Varies	The scan tool displays the software module ID 4.
Calibration Part Number 5	Varies	The scan tool displays the software module ID 5.
Calibration Part Number 6	Varies	The scan tool displays the software module ID 6.
Calibration Part Number 7	Varies	The scan tool displays the software module ID 7.
Calibration Part Number 8	Varies	The scan tool displays the software module ID 8.
Calibration Part Number 9	Varies	The scan tool displays the software module ID 9.
Calibration Part Number 10	Varies	The scan tool displays the software module ID 10.
Digital Radio Receiver ID	Varies	The scan tool displays the Digital Audio Broadcast receiver ID.
Vin Digits 2-17	Varies	The scan tool displays the learned VIN digits 2-17.
Subscriber ID	Varies	Identifies the alphanumeric dealer code or the tester's (Tech2, MDI etc.) serial number. This string is programmed into the ECU memory during the last programming event.
Module Diagnostic Address	80	Displays the 2 digit diagnostic address of the control module.
Date Programmed	Varies	Displays the date when the ECU was last programmed.

Radio Scan Tool Output Controls

Scan Tool Output Control	Description
Left Front Speaker	This output control is used to command the speaker ON and OFF. Commanding the speaker ON will generate a test tone to be generated through the selected loudspeaker.
Left Rear Speaker	This output control is used to command the speaker ON and OFF. Commanding the speaker ON will generate a test tone to be generated through the selected loudspeaker.
Right Front Speaker	This output control is used to command the speaker ON and OFF. Commanding the speaker ON will generate a test tone to be generated through the selected loudspeaker.
Right Rear Speaker	This output control is used to command the speaker ON and OFF. Commanding the speaker ON will generate a test tone to be generated through the selected loudspeaker.
Eject	This output is a command to eject the disc.

Transmission Control Module Scan Tool Information (6T30/6T40/ 6T45/6T50)

The Transmission Control Module Scan Tool Data List contains all transmission related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists, and in some cases may appear more than once, or in more than one data list in order to group certain related parameters together.

The values below represent a typical display recorded from a properly functioning system.

Note: Do not use a scan tool that displays faulty data. Report the condition to the scan tool manufacturer. The use of a faulty scan tool can result in misdiagnosis and the unnecessary replacement of components.

Only the parameters listed below are used/referenced in this manual for diagnosis. If a scan tool displays other parameters, those values are not recommended by General Motors for use in diagnosis.

If all values are within the expected range described below, refer to *Symptoms - Automatic Transmission on page 17-157* for diagnosis.

The scan tool values from a properly functioning transmission may be used for comparison with the transmission you are diagnosing. The values below represent a typical display recorded from a properly functioning system.

Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Engine at idle, upper radiator hose hot, closed throttle, transmission in Park, closed loop operation, accessories OFF, brake pedal not applied.			
1–2 Shift Time	Varies	Seconds	This parameter displays the actual time of the last adaptable 1-2 shift. The shift time is based on the gear ratio change after the commanded 1-2 shift.
2–3 Shift Time	Varies	Seconds	This parameter displays the actual time of the last adaptable 2-3 shift. The shift time is based on the gear ratio change after the commanded 2-3 shift.
3–4 Shift Time	Varies	Seconds	This parameter displays the actual time of the last adaptable 3-4 shift. The shift time is based on the gear ratio change after the commanded 3-4 shift.
4–5 Shift Time	Varies	Seconds	This parameter displays the actual time of the last adaptable 4-5 shift. The actual shift time is obtained by measuring the time required for the input shaft to decelerate from the previous ratio to the current ratio.
5–6 Shift Time	Varies	Seconds	This parameter displays the actual time of the last 5-6 shift. The shift time is base on the gear ratio change after the commanded 5-6 shift.
Brake Pedal Switch	Released	Applied/Released	This parameter displays the status of the brake switch circuit input. Applied indicates a zero voltage input, brake pedal applied. Released indicates a voltage input, brake pedal released. The scan tool displays Applied or Released.
Calculated Throttle Position	Varies	%	This parameter displays a calculated value, which is determined by the accelerator pedal position and the actual throttle position, used to optimize transmission controls. It represents the driver's intended request for torque or acceleration. The range is 0-100%, where 0% represents an idle or coast request and 100% represents a request for wide open throttle (WOT).
Control Module Voltage Signal	9-19	Volts	This parameter displays the system voltage measured at the module wake up signal feed.
Driver Shift Control Mode	Inactive	Active/Inactive	This parameter displays Active or Inactive. The scan tool displays Active when the gear selector is in the manual mode (M) position or left of the D position, which enables TAP shift. The scan tool displays Inactive when the gear selector is not in the M or left of D position, TAP shift disabled.
Driver Shift Request	None	Upshift / Downshift / None / Invalid	This parameter displays the current request from the TAP Shift System. This parameter will display up shift, downshift or invalid depending on the amount of voltage measured at the remote shift selector input and also will display none when there is no request.
Engine Coolant Temperature	Varies	°C (°F)	This parameter displays the input signal from the engine coolant temperature (ECT) sensor. ECT is high at 151°C (304°F) when the signal voltage is low (0 V). ECT is low at −40°C (−40°F) when the signal voltage is high (5 V). This parameter value is determined by the engine control module and communicated to the TCM through the High Speed GMLAN Serial Data link.

Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Engine Speed	Varies	RPM	This parameter displays the rotational speed of the engine expressed as revolutions per minute. This parameter value is determined by the engine control module and communicated to the TCM through the High Speed GMLAN Serial Data link.
Engine Torque	Varies	N•m (lb ft)	This parameter displays a calculated value based on engine load, throttle position, mass air flow, and other engine inputs. This parameter is accurate to within 20 N•m (15 lb ft) of actual measured engine torque. This parameter value is determined by the engine control module and communicated to the TCM through the High Speed GMLAN Serial Data link.
Gear Command	1	1, 2, 3, 4, 5, or 6	This parameter displays the current commanded state of the shift solenoid valves. The scan tool displays 1, 2, 3, 4, 5, or 6.
Gear Ratio	Varies	Ratio	This parameter displays the actual transmission gear ratio. The scan tool displays the gear ratio calculated from the automatic transmission (AT) input speed sensor (ISS) and the automatic transmission (AT) output speed sensor (OSS) inputs.
High Side Driver 1	On	On/Off	This parameter displays the state of the High Side Driver 1. The scan tool displays On or Off.
High Side Driver 1 Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the high side driver 1 circuit. The scan tool displays OK, Malfunction, or Not Run.
High Side Driver 1 Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the high side driver 1 circuit. The scan tool displays OK, Malfunction, or Not Run.
High Side Driver 1 Circuit Open Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether an open exists in the high side driver 1 circuit. The scan tool displays OK, Malfunction, or Not Run.
Ignition Voltage	9–19	Volts	This parameter displays the system voltage measured at the ignition feed.
Internal Mode Switch	Park	Park–Drive 1, Open, Invalid	This parameter displays PARK, PARK/REVERSE, REVERSE, REVERSE/NEUTRAL, NEUTRAL, NEUTRAL/DRIVE 4, DRIVE 4, DRIVE 4/DRIVE 3, DRIVE 3, DRIVE 3/DRIVE 2, DRIVE 2, DRIVE 2/DRIVE 1, DRIVE 1 or INVALID. The IMS Range display represents a decoded status of the four inputs from the IMS. The combination of IMS inputs are used to determine what position the manual valve is in at any time.
Internal Mode Switch A/B/C/P	Varies	High/Low	This parameter displays the status of the four A/B/C/P inputs from the automatic transmission internal mode switch. HI indicates an ignition voltage signal and LOW indicates a 0 voltage signal. The scan tool will display High/Low, High/Low, High/Low, High/Low.
ISS/OSS Supply Voltage	OK	OK, Out of Range	This parameter displays OK, Out of Range.
Last Shift Time	Varies	Seconds	This parameter displays the actual time of the last up shift. This value is only accurate if the shift was adaptable.

Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Line Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the line pressure control valve 2 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Line Pressure Control Solenoid Valve Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the line pressure control valve 2 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Line Pressure Control Solenoid Valve Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exists in the line pressure control solenoid valve control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
Line Pressure Control Solenoid Valve Pressure Command	Varies	kPa (psi)	This parameter displays results in kPa (psi).
Pressure Control Solenoid Valve 2 Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the pressure control solenoid valve 2 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 2 Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the pressure control solenoid valve 2 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 2 Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exists in the pressure control solenoid valve 2 control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 2 Pressure Command	Varies	kPa (psi)	This parameter displays kPa (psi).
Pressure Control Solenoid Valve 3 Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the pressure control solenoid valve 3 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 3 Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the pressure control solenoid valve 3 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 3 Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exists in the pressure control solenoid valve 3 control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 3 Pressure Command	Varies	kPa (psi)	This parameter displays kPa (psi).
Pressure Control Solenoid Valve 4 Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the pressure control solenoid valve 4 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 4 Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the pressure control solenoid valve 4 control circuit. The scan tool displays OK, Malfunction, or Not Run.

Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Pressure Control Solenoid Valve 4 Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exists in the pressure control solenoid valve 4 control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 4 Pressure Command	Varies	kPa (psi)	This parameter displays kPa (psi).
Pressure Control Solenoid Valve 5 Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the pressure control solenoid valve 5 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 5 Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the pressure control solenoid valve 5 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 5 Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exists in the pressure control solenoid valve 5 control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
Pressure Control Solenoid Valve 5 Pressure Command	Varies	kPa (psi)	This parameter displays kPa (psi).
Replicated OSS CKT Status	OK	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts, Indeterminate.
Shift Solenoid Valve 1	On	On/Off	This parameter displays the commanded state of the reverse, 1st shift solenoid valve (S1). The scan tool displays On/Off.
Shift Solenoid Valve 1 Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the shift solenoid valve 1 control circuit. The scan tool displays OK, Malfunction, or Not Run.
1-2 Shift Solenoid Valve Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the shift solenoid valve 1 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Shift Solenoid Valve 1 Control Circuit Open Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether an open exists in the shift solenoid valve 1 control circuit. The scan tool displays OK, Malfunction, or Not Run.
Steady State TAP 1st Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 1st Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 2nd Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 2nd Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.

Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
Steady State TAP 3rd Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 3rd Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 4th Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 4th Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 5th Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 5th Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 6th Gear	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP 6th Gear TCC Applied	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
Steady State TAP Reverse	Varies	kPa (psi)	This parameter displays the amount of transmission adaptive pressure (TAP), which modifies the commanded clutch apply pressures.
TCC Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to ground exists in the TCC pressure control solenoid valve control circuit. The scan tool displays OK, Malfunction, or Not Run.
TCC Pressure Control Solenoid Valve Control Circuit High Voltage Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a short to voltage exists in the TCC pressure control solenoid valve control circuit. The scan tool displays OK, Malfunction, or Not Run.
TCC Pressure Control Solenoid Valve Performance Test Status	OK	OK, Malfunction, Not Run	This parameter displays whether a performance issue exist in the TCC pressure control solenoid valve control circuit by comparing the commanded current with the expected current. The scan tool displays OK, Malfunction, or Not Run.
TCC Pressure Control Solenoid Valve Pressure Command	Varies	kPa (psi)	This parameter displays results in kPa (psi).
TCC Slip Speed	Varies	RPM	This parameter displays the difference between transmission input speed and engine speed. A negative value indicates that the engine speed is less than the input speed, deceleration. A positive value indicates that the engine speed is greater than the input speed, acceleration. A value of zero indicates that the engine speed is equal to the input speed, TCC applied.

Scan Tool Data Parameters (cont'd)

Parameter	System State	Expected Value	Description
TCM Power-Up Temperature	Varies	°C (°F)	This displays the value of the temperature sensor inside the control solenoid and valve assembly.
TCM Temperature	Varies	°C (°F)	This displays the temperature of the TCM. This parameter displays results in °C (°F).
Transmission Fluid Pressure Switch 1	High/Low	High/Low	This parameter indicates the state of the normally closed transmission fluid pressure switch 1. Pressure to the switch is dependent on the position of the 3-5-Reverse clutch regulator valve. The scan tool displays High/Low.
Transmission Fluid Pressure Switch 3	High/Low	High/Low	This parameter indicates the state of the normally closed transmission fluid pressure switch 1. Pressure to the switch is dependent on the position of the 2-6 clutch regulator valve. The scan tool displays High/Low.
Transmission Fluid Pressure Switch 4	High/Low	High/Low	This parameter indicates the state of the normally closed transmission fluid pressure switch 1. Pressure to the switch is dependent on the position of the 1-2-3-4 clutch regulator valve. The scan tool displays High/Low.
Transmission Fluid Pressure Switch 5	High/Low	High/Low	This parameter indicates the state of the normally closed transmission fluid pressure switch 1. Pressure to the switch is dependent on the position of the R1/4-5-6 clutch regulator valve. The scan tool displays High/Low.
Transmission Fluid Life	Varies	%	This parameter displays the transmission oil life remaining. The scan tool displays the remaining oil life as a percentage. The transmission oil life is calculated based on fluid temperature and engine run time.
Transmission Fluid Temperature	Varies	°C (°F)	This parameter displays the input signal of the transmission fluid temperature sensor. Transmission fluid temperature is high 151°C (304°F) when signal voltage is low, 0 V, and transmission fluid temperature is low −40°C (−40°F) when signal voltage is high, 5 V.
Transmission Hot Mode	On/Off	On/Off	When The transmission fluid temperature is above a temperature which varies by calibration, the TCM will alter the shift pattern until the temperature drops below a value which varies by calibration.
Transmission ISS	Varies	RPM	This parameter displays the rotational speed of the transmission input shaft. The scan tool displays input shaft speed is revolutions per minute (RPM).
Transmission OSS	Varies	RPM	This parameter displays the rotational speed of the transmission output shaft expressed as revolutions per minute.

Scan Tool Output Controls

Output Control	Description
TCC Pressure Control Solenoid Valve	• The transmission control module (TCM) commands the torque converter clutch pressure control (TCC PC) solenoid pressure in order to apply and release the TCC. • When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF and vice versa. • When the engine is running, the following control limits apply: – If the transmission range is Park, and the transmission is in hot mode, the TCC PC solenoid may not be commanded OFF. If the solenoid is requested OFF, the message "TCC OFF command disabled in Hot Mode" appears on the scan tool display. – The TCC PC solenoid may not be commanded OFF for more than a calibrated amount of time. If the solenoid is commanded OFF, for a certain amount of time, the message "TCC OFF time has been exceeded" appears on the scan tool display.
Shift Solenoid: Shift Solenoid Valve 1	• The TCM commands Shift Solenoid 1 ON and OFF. • When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. • When the engine is running, the following control limits apply: – The transmission range must be in Park or Neutral. If the transmission range is not Park or Neutral, the message "Engine running and transmission range is not Park/ Neutral" appears on the scan tool display. – The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. – Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
Line Pressure Control Solenoid Valve	• The scan tool is used to request pressure in increments of 207 kPa (30 psi) from 0–1862 kPa (0–270 psi). The TCM will then command the solenoid to achieve the requested pressure. • When the ignition is ON, and the engine is OFF, the pressure request may be controlled within calibrated limits. There are no limits to the output control when the engine is OFF. • When the engine is running, the following control limits apply: – When the transmission range is Park or Neutral, the pressure request may be controlled within calibrated limits. The engine speed must be less than 1,500 RPM. If the engine speed is greater than 1,500 RPM, the message "TR in park/neutral and engine speed over 1,500 RPM" appears on the scan tool display. – When the transmission range is not Park or Neutral, the requested pressure can only be controlled equal to or greater than the pressure determined by the TCM. The TCM does not allow a pressure to be selected that may cause damage to the transmission. If the requested pressure is less than allowed by the TCM, the message "Requested pressure for the Line PC Solenoid is too low" appears on the scan tool display. – Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
Clutch PC Solenoids: • Pressure Control Solenoid Valve 2 • Pressure Control Solenoid Valve 3 • Pressure Control Solenoid Valve 4 • Pressure Control Solenoid Valve 5	• The TCM commands the pressure control solenoids in order to apply and release the clutches. • When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. • When the engine is running, the following control limits apply: – The transmission range must be in Park or Neutral. If the transmission range is not Park or Neutral, the message "Engine running and transmission range is not Park/ Neutral" appears on the scan tool display. – The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. – Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.

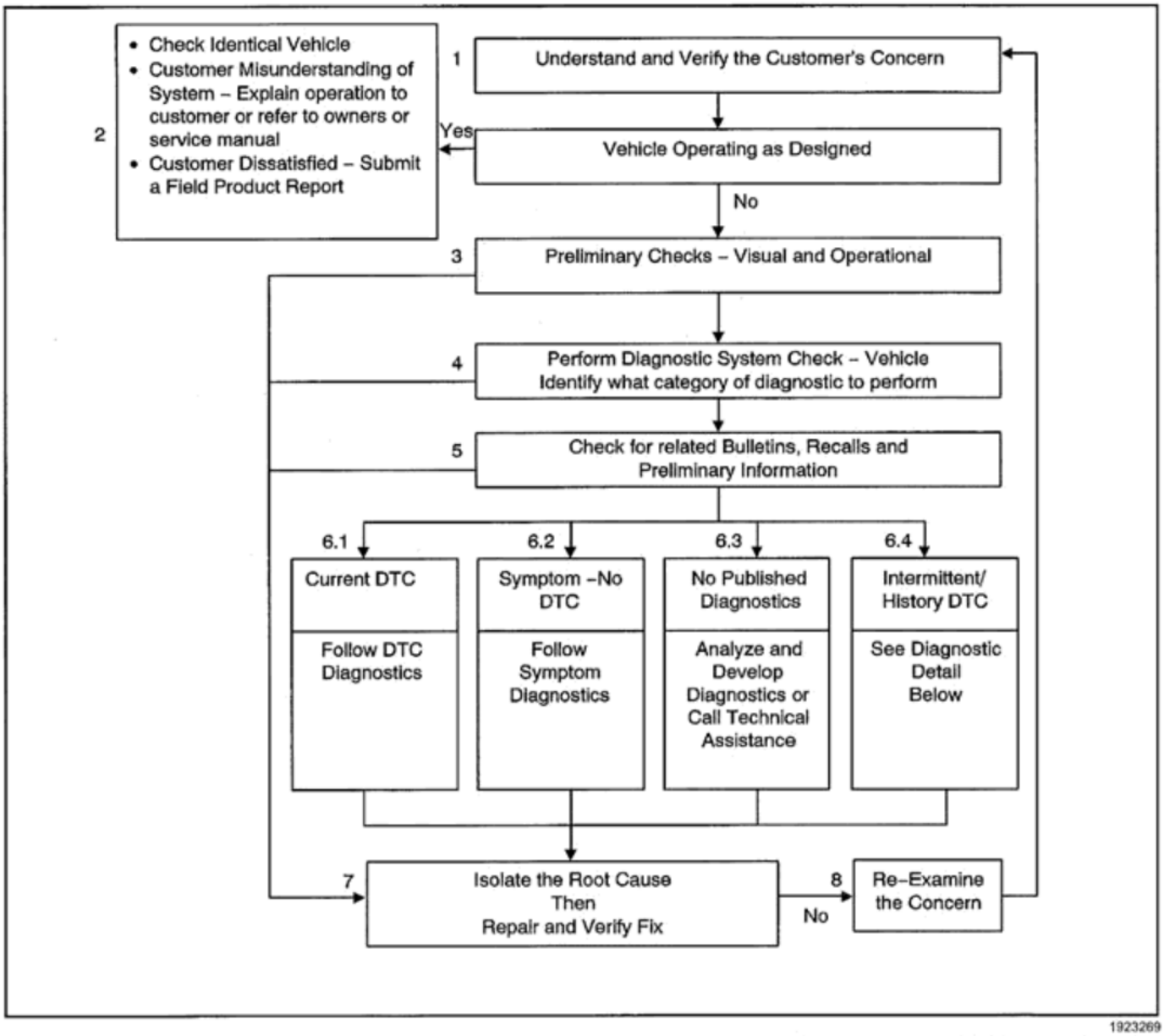
Scan Tool Output Controls (cont'd)

Output Control	Description
Shift Transmission Gear	• The TCM commands upshifts and downshifts. The scan tool Commanded Gear parameter should correspond with the shift solenoid combination. Refer to *Shift Solenoid Valve State and Gear Ratio on page 17-11*. • When the ignition is ON, and the engine is OFF, there are no limits to this control. The scan tool shift solenoid states change to match the Commanded Gear selected. • When the engine is running, the following control limits apply: – The TCM does not allow a shift if it causes the engine RPM to exceed a calibrated limit. If a gear is requested and the engine speed is too high, the message "Engine speed too high" appears on the scan tool display. – The TCM does not allow a 3–2 or 2–1 downshift if the vehicle speed exceeds a calibrated limit. If either downshift is requested and the vehicle speed is too high, the message "Eng. is on and veh. speed too hi for 3–2 or 2–1 downshift" appears on the scan tool display. – The TCM does not allow a 4–3 downshift if the vehicle speed exceeds a calibrated limit. If a 4–3 downshift is requested and the vehicle speed is too high, the message "Vehicle speed too high" appears on the scan tool display. – The TCM does not allow an upshift if the vehicle speed exceeds a calibrated limit. If an upshift is requested and the vehicle speed is too high, the message "Vehicle speed too high" appears on the scan tool display. – The TCM does not allow an upshift that is greater than the current selected transmission range (PRNDL). For example, 3rd gear is not allowed if the transmission range is D2. If an upshift is requested that is greater than the current selected transmission range, the message "Eng. running and gear request is greater than the current TR" appears on the scan tool display.
Transmission Adaptive Values Learn	The TCM commands pressure to the clutches to learn the transmission adaptive values. As the procedure is being performed, the scan tool provides operator instructions. Test may not start or may abort for the following conditions: • Transmission fluid temperature must be between 70–100°C (158–212°F). • Brakes and brake switch must function properly. • Closed throttle and engine speed increases above 1500 RPM. • Park/neutral position switch must be properly adjusted and functioning. • Line pressure control is able to command 1,000 kPa (145 psi). • Vehicle must be stopped. • Vehicle must not be vibrating excessive.

Diagnostic Information and Procedures

Strategy Based Diagnosis

The goal of Strategy Based Diagnosis is to provide guidance when you create a plan of action for each specific diagnostic situation. Following a similar plan for each diagnostic situation, you will achieve maximum efficiency when you diagnose and repair vehicles. Although each of the Strategy Based Diagnosis boxes is numbered, you are not required to complete every box in order to successfully diagnose a customer concern. The first step of your diagnostic process should always be Understand and Verify the Customer's Concern. The final step of your diagnostic process should be Repair and verify the Fix. Refer to the following chart for the correct Strategy Based Diagnosis.



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1. Understand and Verify the Customer's Concern: The first part of this step is to obtain as much information as possible from the customer. Are there aftermarket accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed.
2. Vehicle Operating as Designed: This condition exists when the vehicle is found to operate normally. The condition described by the customer may be normal. Compare with another like vehicle that is operating normally under the same conditions described by the customer. Explain your findings and the operation of the system to the customer. If the customer is dissatisfied submit a Field Product Report.

3. Preliminary Checks: Conduct a thorough visual inspection. Review the service history. Detect unusual sounds or odors. Gather diagnostic trouble code (DTC) information in order to achieve an effective repair.
4. Perform Published Diagnostic System Check-Vehicle: The *Diagnostic System Check - Vehicle on page 6-66* verifies the proper operation of the system. This will lead the technician in an organized approach to diagnostics and identify what category of diagnostic to perform.
5. Check for related Bulletins, Recalls and Preliminary Information (PI).
6. Diagnostic categories:
   6.1. Current DTC: Follow the designated DTC diagnostic in order to make an effective repair. Refer to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69*.
   6.2. Symptom - No DTC: Select the appropriate symptom diagnostic. Follow the diagnostic steps or suggestions in order to complete the repair. Refer to *Symptoms - Vehicle on page 6-90*.
   6.3. No Published Diagnostics: Analyze the Concern. Develop a plan for the diagnostics. The service manual schematics will help you to see system power, ground, input, and output circuits. You can also identify splices and other areas where multiple circuits are tied together. Look at component locations to see if components, connectors or harnesses may be exposed to extreme temperature, moisture, or corrosives (road salt, battery acid, oil or other fluids). Utilize the wiring diagrams, system description and operation, and system circuit description.
   6.4. Intermittent/History DTC: An intermittent condition is one that does not occur continuously, may be difficult to duplicate, and will only occur when certain conditions are met. Generally, an intermittent is caused by faulty electrical connections and wiring, malfunctioning components, electromagnetic/ radio frequency interference, driving conditions, or aftermarket equipment.

   The following approaches/tools may prove to be beneficial in locating and repairing an intermittent condition or history DTC.
   - Combining technicians knowledge with the available service information.
   - Evaluate the symptoms and conditions described by the customer on the *Customer Concern Verification Sheets on page 1-10*.
   - Follow the suggestions on *Testing for Intermittent Conditions and Poor Connections on page 11-531*.
   - Use the available scan tool, digital multi-meter, or *J-42598-B* vehicle data recorder with data capturing capabilities.
7. Isolate the Root Cause then Repair and Verify Fix: After isolating the root cause, make the repairs and validate for the correct operation by performing the *Diagnostic Repair Verification on page 6-92*. Verifying that the DTC or symptom has been corrected may involve road testing the vehicle.
8. Re-examine the Concern: If a technician cannot successfully find or isolate the concern, a re-evaluation is necessary. Re-verify the concern. The concern could be an intermittent or normal condition.

Diagnostic Procedure Instructions

The following is an overview of instructions for all 16 categories which may be included in a diagnostic procedure.

Diagnostic Instructions

A link to the *Diagnostic System Check - Vehicle on page 6-66* is provided here. This procedure should be performed prior to performing other diagnostic procedures, as this prevents misdiagnosis where there are integrated system dependencies.

A link to the *Strategy Based Diagnosis on page 6-58* is provided here. This provides an overview on how a technician should diagnose a vehicle.

A link to the *Diagnostic Procedure Instructions on page 6-59* is provided here. This information is an overview of instructions for all 16 categories which may be included in a diagnostic procedure.

DTC Descriptor

Describes what DTCs are diagnosed in this procedure. The DTC number, with Symptom Description when applicable, and descriptor are written out.

Diagnostic Fault Information

The diagnostic Fault Information table identifies each circuit that makes up an electrical subsystem and the associated circuit faults. DTCs and symptoms are listed in the table for all circuit fault modes. This information can be used to diagnose an electrical fault, or as a quick visual aid showing how the different symptoms and DTCs apply for the subsystem being diagnosed.

Even though all the DTCs and symptoms are shown in this table it does not mean they will all be diagnosed in the same procedure.

An example table from an engine coolant temperature (ECT) procedure:

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
ECT Sensor Signal	P0117	P0118	P0118	P0125, P0128
ECT Low Reference	—	P0118	P0118	P0125, P0128

Typical Scan Tool Data

The Typical Scan Tool Data table identifies a scan tool data parameter and its value in reference to potential circuit faults.

An example table from an ECT procedure:

ECT Sensor Temperature – PCM

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine Running **Parameter Normal Range:** −32 to +130°C (−26 to +275°F)			
ECT Signal	140°C (284°F)	−40°C (−40°F)	−40°C (−40°F)
Low Reference	—	−40°C (−40°F)	−40°C (−40°F)*
* Internal ECM damage may occur if shorted to B+			

Circuit/System Description

Circuit/System Description identifies how a circuit/system normally functions.

Conditions for Running the DTC

Conditions for Running the DTC, identifies what conditions must be present to allow the diagnostic to run.

Conditions for Setting the DTC

Conditions for Setting the DTC, identifies the condition(s) that must be present in order to fail the diagnostic and when to set the DTC.

Action Taken When the DTC Sets

Actions Taken When the DTC sets, identifies the default actions taken when a control module sets a DTC.

Conditions for Clearing the DTC

Conditions for Clearing the DTC, identifies the conditions that must be met in order to clear the DTC.

Diagnostic Aids

Diagnostic Aids are suggestions which explain other methods to diagnose the condition. It also provides unique information about the system used to assist the technician in finding and repairing a vehicle condition.

Reference Information

Reference Information includes links providing additional information for the diagnostic procedure.

For example:

- Schematic Reference
- Connector End View Reference
- Description and Operation
- Electrical Information Reference
- DTC Type Reference
- Scan Tool Reference
- Special Tools Required

Circuit/System Verification

The diagnostic format does not force a technician to any of the 3 diagnostic categories (Circuit/System Verification, Circuit/System Testing and Component Testing). However, performing the Circuit/System Verification category first, aids in determining if a vehicle condition is current. Some diagnostic categories may state that another category must be performed first when there are testing dependencies.

This category also serves to route the technician to other diagnostic procedures which should be performed first; for example, a DTC with a higher priority.

Note: Any diagnostic step that asks if a DTC is set is referring to a Set, Current, Present, Active DTC status. This does not include any other DTC status. For example History, Not Run, Passed and Failed.

Circuit/System Verification is a non-intrusive procedure outlining how to verify that a system or a portion of a system is functioning correctly. During the verification process, the vehicle is kept intact and tested as a complete system. This verification is used to assist the technician in determining whether a condition is current or intermittent. When a condition is determined to be intermittent, a technician can use the link in Electrical Information Reference: *Testing for Intermittent Conditions and Poor Connections on page 11-531* for additional testing information.

The technician should be able to identify if the fault is occurring on the input circuit - signal or on the output circuit - control when applicable. The technician will need to decide from the verification results if the system is working correctly or if further diagnosis needs to be performed in either Circuit/System Testing and/or Component Testing.

To assist the technician in identifying a common part a component code is used. These codes are not translated so they will always be the same even though the part name may have slight variance. The component codes will always be the same once assigned to a unique part name and will be found on the schematics and in the diagnostic procedure categories Circuit/System Verification, Circuit/System Testing, and Component Testing categories.

Component Codes

The component codes used on the schematics will have the base code with an extension to identify location or quantity. For example the ABS wheel speed sensors are identified on the schematic with a base code (B5) and a location extension (LF, RF, LR, and RR) as seen below:

- B5LF Wheel Speed Sensor (WSS)-Left Front
- B5RF Wheel Speed Sensor (WSS)-Right Front
- B5LR Wheel Speed Sensor (WSS)-Left Rear
- B5RR Wheel Speed Sensor (WSS)-Right Rear

B5 is the base code for the wheel speed sensor and the LF, RF, LR, and RR indicate the on vehicle location.

The diagnostic procedures will use the base code (B5) for a wheel speed sensor but may or may not use the extension identifying location (LF, RF, LR, and RR). Example: Ignition OFF, disconnect the harness connector at the appropriate B5 wheel speed sensor. This is done so the diagnostic procedure can be common for all four wheel speed sensors and not have to take into account part location or quantity.

Where the diagnostic states "the appropriate" it is up to the technician to identify which component is being diagnosed by the symptom stated on the RO (drivers door lock is inoperative) or by the DTC descriptor (DTC C0585 04: Left Rear Actuator Circuit Open).

Circuit/System Testing

The diagnostic format does not force a technician to any of the 3 diagnostic categories (Circuit/System Verification, Circuit/System Testing and Component Testing). However, beginning with the Circuit/System Verification category aids in determining if a vehicle condition is current. Some diagnostic categories may state that another category must be performed first when there are testing dependencies.

Circuit/System Testing is a step by step, positive-flow, testing sequence which allows the technician to perform each test step, in sequence, until a fault is detected. If the result of a numbered test step is achieved, the normal flow is to proceed to the next numbered test step (indicated by the down pass arrow). If the result of a numbered test step is NOT achieved, the right repair arrow bullet below the failed test will identify what actions need to take place.

Intrusive diagnostics are performed to locate the system fault. System harness connections are disconnected from the module or component to test individual circuit functions. The module or component will be used to assist in verifying the circuit function. When a test does not pass, the repair steps (right arrow) will indicate what circuit faults to test for example, short to voltage, short to ground or open/high resistance.

When testing for individual circuit faults, the technician is expected to include terminal inspections such as connection surfaces and terminal tension at both the harness and component/module. Additionally, a technician can use the links in Electrical Information Reference: *Testing for Intermittent Conditions and Poor Connections on page 11-531* or *Circuit Testing on page 11-526* for additional information.

The control modules and components will also be diagnosed during these test steps. A retest of a control module or component should always be performed before replacement. For example, re-connect all components and modules and retest the system to verify the condition still exists before replacing modules or components.

Component Testing

The diagnostic format does not force a technician to any of the 3 diagnostic categories (Circuit/System Verification, Circuit/System Testing and Component Testing). However, beginning with the Circuit/System Verification category aids in determining if a vehicle condition is current. Some diagnostic categories may state that another category must be performed first when there are testing dependencies.

Component Testing can offer static and/or dynamic component tests. These tests can be used to verify if a component is operating correctly to avoid unnecessary replacement.

Testing modules in this category will not be offered. In most cases, the module is used to verify the harness circuits in the Circuit/System Testing category and a retest of the module should always be performed before replacement.

Repair Instructions

Repair Instructions provides a link to *Diagnostic Repair Verification on page 6-92*. This link describes how to verify the vehicle is repaired.

All links to Repair or Replacement procedures are located here.

Repair Verification

Repair Verification describes how to verify the vehicle is repaired when additional instructions are needed beyond what is in Diagnostic Repair Verification.

Diagnostic System Check Instructions

The following is an overview of instructions for the general information and 13 step System Verification included in the Diagnostic System Check - Vehicle procedure.

Diagnostic Instructions

A link to *Strategy Based Diagnosis on page 6-58* is provided as an overview on how a technician should diagnose a vehicle.

A link to the Diagnostic System Check Instructions is provided. This provides an overview of instructions and examples for the general information and 13 step System Verification included in the Diagnostic System Check - Vehicle procedure. The examples in this document are intended to give the technician a general idea of what the test step is referring to. They are not intended to list every possible condition or situation.

Diagnostic Systems Check steps are listed by priority to guide the technician to the appropriate diagnostic procedure to correct the customer concern. There are many ways to determine the priority of diagnosing a vehicle concern. Some faults can cause customer perceived symptoms in areas unrelated to the fault. Using an example from the System Check, after reading DTCs, the technician is asked to verify there are no Electronic Control Unit Internal Performance Faults present. It is important that any internal performance issues are addressed prior to continuing through the System Check. There is no benefit addressing other DTCs that could be set due to an internal fault to a control module. If the fault is present, performing the diagnostic procedure for that fault will likely correct the customer perceived concern and possibly eliminate other DTCs that may be set.

Not all steps of the Diagnostic System Check have to be performed. The Diagnostic System Check tries to prioritize the test steps with the highest priority faults first. The technician is then lead to another document to do the actual diagnosis or repair. The strategy is to repair higher level faults that may be the cause of other system or component level symptoms. Additionally, the Diagnostic System Check can only be used for a single fault at a time. If additional faults are present, the technician must perform the diagnostic system check for each concern until all customer concerns are corrected.

Once a repair has been completed, General Motors diagnostic strategy is to always have the technician verify that the customer concern has been corrected. This is to prevent comebacks and to ensure customer satisfaction with their dealership experience. Therefore a link has been provided to *Diagnostic Repair Verification on page 6-92* procedure for the technician to verify the customer concern has been corrected.

There are some assumptions made when General Motors prepares service information. They include the following areas which are presumed to function as designed:

- The 12-volt battery is fully charged. General Motors assumes the majority of vehicles brought in for repair will be able to start and be driven into the service stall. If the vehicle has a dead battery, it is slow cranking or for any other reason the technician feels the customer concern may be battery related, a link is provided to *Battery Inspection/Test on page 9-702*. This procedure will guide the technician through inspecting and verifying the battery functions properly.
- Fuses should not be open. General Motors does not call out in diagnostic procedures to verify a fuse. The technician is expected to find an open fuse when the diagnostic test step states to check for an open circuit condition. Therefore a link has been provided to *Power Distribution Schematics on page 11-128* and *Electrical Center Identification Views on page 11-240* for technicians to reference power sources and fuse locations if they feel there may be loss of power due to an open fuse condition.
- Ground circuits are clean, tight, and in the correct location. General Motors assumes that the original ground circuits have not been compromised. The technician is expected to find a poor ground connection when the diagnostic test step states to test the ground circuit for an open/high resistance. Therefore a link has been provided to *Ground Distribution Schematics on page 11-152* and *Harness Routing Views on page 11-79* for technicians to reference ground locations and which ground circuits may be related to the customer concern.
- All connections/connectors are fully seated. General Motors assumes that all connections are properly installed. The technician is expected to find an open or poor connection when the diagnostic test step asks to test the circuit for an open/high resistance. Therefore a link has been provided to *Component Connector End Views on page 11-269* for technicians to reference which connections may be related to the customer concern.
- There are no aftermarket devices that affect the operation of the system. General Motors can only author diagnostic and repair information for vehicle systems and components that are original equipment or genuine GM Accessories. Aftermarket equipment can negatively affect original equipment operation and lead a technician's diagnosis of a concern in the wrong direction. Therefore a link has been provided to *Checking Aftermarket Accessories on page 11-525* that guides a technician through the possible causes of vehicle problems related to aftermarket accessories.

- The scan tool powers up. General Motors assumes that power is available at the Data Link Connector and the scan tool will power on. Therefore a link has been provided to *Scan Tool Does Not Power Up on page 11-52* if the technician finds that the scan tool does not power on.

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN—This step is to obtain as much information as possible from the customer. Are there aftermarket accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? Review the service history of the vehicle for previous repairs that could help diagnose the current concern.

   Now that the technician understands the customer concern, they should validate the concern on the vehicle. In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed. Inspect the visible system components for obvious damage or conditions that could cause the concern. Conduct a thorough visual inspection. Detect unusual sounds or odors.

   The condition described by the customer may be normal. If the technician finds the vehicle to operate normally, compare with another like vehicle that is operating normally, under the same conditions described by the customer. If this is the case, explain your findings and the operation of the system to the customer. If the customer is dissatisfied, submit a Field Product Report.
2. BULLETIN SEARCH—By searching for related bulletins, recall/field actions and preliminary information documents, a procedure for a known field issue may resolve the customer concern with little or no diagnosis necessary saving the technician diagnostic time.
3. MECHANICAL CONCERNS—This step is designed to take the technician directly to a list of symptom diagnostic procedures. The technician is asked to verify the symptoms exhibited by the system are mechanical in nature and not related to an electrical system, see some examples below. If the technician feels the concern could be related to an electrical system, they should continue through the Diagnostic System Check to verify the electrical functionality of vehicle. If the technician feels the concern is exclusively related to a mechanical system, a link to *Symptoms - Vehicle on page 6-90* is provided to select the appropriate symptom diagnostic procedure for the customer concern.

   Examples:
   - Brake noise or diagnosing irregular pad wear
   - Water leak diagnosis
   - Engine or transmission fluid leak diagnosis
   - Manual window or door lock diagnosis
   - Vehicle vibration diagnosis
   - Exhaust noise or leak diagnosis
4. VEHICLE POWER UP VERIFICATION—The technician is asked in this step to turn the ignition key ON and verify that the vehicle powers up. The technician should look for clues that multiple vehicle systems are receiving vehicle powermode messages, such as the cluster waking up, the radio powers on, the HVAC blower is operational, windshield wipers turn on, etc, with the key ON. This would be a rare condition as both the powermode master and back-up powermode master would have to be inoperable, however, if the vehicle does not power up, a link to *Power Mode Mismatch on page 11-515* is provided.
5. CONTROL MODULE COMMUNICATION and DTC CHECK—The technician is asked in this step to record the following three pieces of data on the Repair Order; any control module that the scan tool determined is not communicating, any DTC and symptom byte set current or history, and the control module that has set the DTC.

   This is considered a setup step for the rest of the Diagnostic System Check. The technician is not expected to do anything other than record the three pieces of data provided by the scan tool on the Repair Order. This provides the information needed to complete the rest of the diagnostic system check.

   To complete this step, the technician is asked to utilize the scan tool Vehicle DTC Information function. This function will query every possible control module on the vehicle requesting all DTCs. During the DTC query, the scan tool will try to establish communication with each control module. If the scan tool can communicate with the control module during the DTC request, it will display PRESENT and provide the number of DTCs set in the control module. If the scan tool cannot communicate with a control module, it will only display NOT COMMUNICATING. Since the scan tool cannot determine if a given control module should be present or not, the technician is asked in a future step to verify that the vehicle was not built with control modules listed as NOT COMMUNICATING.

   If the scan tool cannot establish communications with ALL of the vehicles control modules, a link to *Data Link References on page 11-66* is provided. A faulty control module or fault with the serial data circuit can cause no communication with all of the control modules on the vehicle. If any control module communicates on the serial data circuit, continue through the Diagnostic System check, as a future step will address any specific non communicating or group of non communicating control modules.

Once the scan tool has completed the routine, the technician should review each control module that has set a DTC and document them on the Repair Order. When reviewing the DTCs, the technician should take notice if any DTCs are powertrain related, and if so, navigate in the scan tool to the Powertrain area and utilize the Capture Info function. This will upload any Freeze Frame/ Failure Records stored in the control module to the scan tool in case the data is lost from the control module. As an example, if the technician commands a Clear DTCs function on a powertrain controller, all diagnostic information stored in the controller is erased. This includes Freeze Frame/ Failure Records and Inspection/Maintenance System Status indicators, if required for your region.

6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS—The technician is asked to review the DTCs recorded in step 5 and verify there are no control module internal performance faults set current. This type of fault may be the cause of other symptoms or DTCs displayed by the vehicle. By addressing this fault first, the technician may find the other concerns are resolved. The technician should always follow the diagnostic procedure for these types of faults prior to replacing any control module. If the technician finds a control module has an internal performance fault, a link is provided to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69* to select the appropriate DTC diagnostic procedure.

   Examples:

   - B1000 Electronic Control Unit Performance
   - B101D ECU Hardware Performance
   - C0550 Electronic Control Unit Performance
   - C056D ECU Hardware Performance
   - C0570 Auxiliary Electronic Control Unit Performance
   - P0606 Control Module Internal Performance
   - P0607 Control Module Performance

7. CONTROL MODULE COMMUNICATION VERIFICATION—This step is used to ensure the control modules that are NOT COMMUNICATING were not built on the vehicle. To understand if the vehicle was built with that option, we provide a link to the *Data Link References on page 11-66* document where Regular Production Options (RPOs) are listed next to the names of optional ECU's and can be compared to those the vehicle was built with. If the technician determines that a control that is NOT COMMUNICATING should be present, the technician is asked to follow the appropriate diagnostic procedure listed in the *Data Link References on page 11-66* document.

8. COMMUNICATION and POWERMODE FAULTS—This step is asking the technician to look for communication DTCs or DTCs related to control modules powering up based on power mode, communication enable or wake-up circuits. See in the below table some examples of the DTCs the technician should diagnose prior to continuing through the Diagnostic System Check. The technician should review the list of DTCs recorded in step 4 and verify that none of these type of DTCs are present. If so, the technician is referred to the *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69* to select the appropriate DTC diagnostic procedure.

   Examples:

   - U0140 Lost Communication With Body Control Module
   - U0164 Lost Communication With HVAC Control Module
   - U0170 Lost Communication With Passenger Presence Detection Module
   - U0402 Invalid Data Received From Transmission Control Module
   - U0452 Invalid Data Received From Inflatable Restraint Sensing and Diagnostic Module
   - U1814 Powertrain High Speed Communication Enable Circuit
   - B1428 Ignition Switched Power Run/Crank Relay Circuit
   - B137B Accessory Power Module Wake Up Circuit
   - C0897 Control Module Power Moding
   - P2536 Ignition Accessory Switch Circuit

9. POWER MODE VERIFICATION—This step verifies the Power Mode Master is receiving the proper output state of the ignition switch. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician is asked to perform the test with the driver door open. This ensures the retained accessory power mode is inactive during this test which could result in different scan tool readings. The technician is only asked to verify the current Power Mode parameter in the power mode data display list. If the parameter does not match the actual ignition switch position, a link is provided to perform the *Power Mode Mismatch on page 11-515* diagnostic procedure.

10. ENGINE CRANK and RUN VERIFICATION—Here the technician is asked to verify that the engine cranks and runs. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch, to complete this step. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician should know at this point whether the engine cranks and runs without having to actually performing this test step. One of the follow has probably already occurred and this step can be skipped: The technician drove the vehicle into the stall or verified when checking the Crank and Run parameter in step 8. If the technician has not already somehow verified the engine cranks in previous steps, the technician should perform this test step. Regardless of how this step was performed, if the engine does not crank, a link is provided to *Engine Does Not Crank on page 6-91* or if the engine cranks but does not run, a link is provided to *Engine Cranks But Does Not Run on page 6-91* for the technician to choose the correct diagnostic procedure for the actual engine application being used.
11. REMAINING DTC REVIEW—Here the technician is asked to review any remaining DTCs that were not addressed in previous steps. The technician is asked first to verify there are no control module supply voltage, system voltage or 5V circuit DTCs present. Control modules, systems or components with insufficient or zero voltage can cause one or multiple symptoms to exist on the vehicle. Control module voltage issues could also be the cause of failures during a programming event. The technician should correct voltage issues prior to addressing any programming or configuration DTCs. The technician should then check for any ECU programming, setup or configuration DTCs. By programming software or configuring a control module, the technician could correct the customer concern unobtrusively. The remaining DTCs, which are usually specific system or component faults, are diagnosed last. They can include ECU input and output circuit DTCs or individual circuit faults that usually cause single symptoms or failure modes on the vehicle and can be fixed following the proper DTC diagnostic procedure. In general, the technician should think about what DTCs or faults could be caused by another DTC or fault. A failed sensor may set a component DTC and then the system may set a DTC indicating the system cannot operate properly. By correcting the sensor fault, the system may now operate properly and the system level DTC will transition to history.

    Refer to the examples within each category below to understand the differences between these DTCs. If DTCs of these type are current, the technician is referred to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69* to choose the correct DTC diagnostic procedure.

    11.1. Voltage DTCs
    - B1325 Device Power 1 Circuit
    - C0875 Device Voltage Reference Input 2 Circuit
    - C1001 Adaptive Cruise Control Indicators Supply Voltage Circuit
    - P0641 5-Volt Reference Circuit
    - P0787 Downshift Timing Solenoid Control Circuit Low Voltage

    11.2. Programming, Setup, Configuration or Software Performance DTCs
    - B3943 Steering Column Lock has Not Learned Column Integration Module
    - B101E ECU Software Performance
    - B1019 System Configuration Error
    - C0558 Calibration Data Not Programmed
    - P0630 VIN Not Programmed or Mismatched - Powertrain Control Module (PCM)

    11.3. Component related DTCs
    - B0013 Driver Frontal Deployment Loop Stage 2
    - B0163 Passenger Compartment Temp Sensor Circuit
    - C0045 Left Rear Wheel Speed Sensor Circuit
    - P0565 Cruise Control Switch Circuit
    - P0751 1-2 Shift Solenoid (SS) Valve Performance

    11.4. System related DTCs
    - B1010 System Sensors Data Mismatch
    - C0176 System Thermal Error
    - C0561 System Disabled Information Stored
    - P1564 Vehicle Acceleration Too High – Cruise Control Disabled
    - P1625 Transmission Control Module (TCM) System Reset

    11.5. Any other remaining DTCs—The technician should diagnose and correct any other DTCs that are left that were not from the categories above.

12. EMISSION RELATED INSPECTION/ MAINTENANCE TESTING CONCERNS—Several regions require that a vehicle pass on-board diagnostic system tests and the inspection/ maintenance emission tests in order to renew license plates or vehicle registration. This is accomplished by viewing the Inspection/ Maintenance System Status display on a scan tool. Using a scan tool, the technician can observe the Inspection/Maintenance System Status in order to verify that the vehicle meets the criteria that comply with the local area requirements. If inspection and maintenance checks are required in your region, and the customer concern is related to not passing an Inspection/Maintenance test, a link is provided to *Inspection/Maintenance System Check on page 6-91* where the technician can choose the appropriate Inspection/Maintenance System Check for the actual engine application being used.
13. SYMPTOM DIAGNOSIS—At this step, the diagnostics are assuming that the only information the technician has available to diagnose the customer concern are symptoms of a problem. There are no DTCs set current or history. There may be a Driver Information Center display message or a system indicator to aid in identifying the root cause. The technician should evaluate the symptoms and conditions described by the customer and perform the symptoms diagnostics for the area of customer concern. A link is provided to *Symptoms - Vehicle on page 6-90* which contains a list of all symptoms related to this service manual publication.

Diagnostic Starting Point - Vehicle

Begin the system diagnosis with *Diagnostic System Check - Vehicle on page 6-66*. The Diagnostic System Check - Vehicle will provide a complete strategy to locate and repair a mechanical or electrical vehicle fault. Not following this strategy may cause additional diagnostic time and/or misdiagnosis.

The Diagnostic System Check - Vehicle will provide the following strategy:

- When to verify the customer concern and identify related bulletins, recalls and preliminary information
- When to identify a control module that is not communicating, a control module that has set a DTC, and the DTC diagnostic priority
- When to address power mode concerns
- When to verify the engine cranks and runs
- When to diagnose symptom related concerns

Diagnostic System Check - Vehicle

Diagnostic Instructions

- Review *Strategy Based Diagnosis on page 6-58* for an overview of the diagnostic approach.
- *Diagnostic System Check Instructions on page 6-62* provides an overview of each diagnostic step.
- Continue through the Diagnostic System Check until you are directed to follow a particular diagnostic or repair procedure. Once a repair has been completed, perform the *Diagnostic Repair Verification on page 6-92* and verify the customer concern has been corrected.

The diagnostic procedures within this manual are developed on the assumption that the following areas function as designed:

- The 12 V battery is fully charged and cables are clean and tight. Refer to *Battery Inspection/Test on page 9-702*.
- Fuses are not open. Refer to *Power Distribution Schematics on page 11-128* and *Electrical Center Identification Views on page 11-240*.
- Ground circuits for the area of customer concern are clean, tight, and in the correct location. Refer to *Ground Distribution Schematics on page 11-152* and *Harness Routing Views on page 11-79*.
- All connections/connectors for the area of concern are fully seated. Refer to *Component Connector End Views on page 11-269*.
- There are no aftermarket devices that affect the operation of the system. Refer to *Checking Aftermarket Accessories on page 11-525*.
- The scan tool powers up. Refer to *Scan Tool Does Not Power Up on page 11-52*.

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN—Understand and validate the customer concern. Inspect the visible system components for obvious damage or conditions that may cause the concern.
2. BULLETIN SEARCH—Check for related bulletins, recall/field actions and preliminary information.
3. MECHANICAL CONCERNS—Verify the symptom is not exclusively a mechanical concern.

⇒ **If the symptom is exclusively a mechanical concern**

Refer to *Symptoms - Vehicle on page 6-90*.

⇓ **If the symptom is not a mechanical concern**

Note: Do not clear any DTCs unless instructed to do so by a diagnostic procedure. If any DTC is Powertrain related, select Capture Info to store DTC and Freeze Frame/Failure Records to the scan tool.

4. VEHICLE POWER UP VERIFICATION—Ignition ON, verify the vehicle powers up.

⇒ **If the vehicle does not power up**

Refer to *Power Mode Mismatch on page 11-515*.

⇓ **If the vehicle powers up**

5. CONTROL MODULE COMMUNICATION and DTC CHECK—Using a scan tool, perform the Vehicle DTC Information function and verify at least one control module communicates with the scan tool. Record on the Repair Order the following information:
   - Any control module that is not communicating.
   - Any DTC, including symptom byte, and the control module that has set the DTC.

⇒ **If the scan tool does not communicate with any control module on the vehicle**

Refer to *Data Link References on page 11-66*.

⇓ **If the scan tool communicates with any control module**

6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS—Verify there are no current control module Internal Hardware Performance DTCs set.

⇒ **If any DTC of this type is set**

Refer to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69*.

⇓ **If no DTC of this type is set**

7. CONTROL MODULE COMMUNICATION VERIFICATION—Verify the vehicle is not built with any control module listed as not communicating with the scan tool, refer to *Data Link References on page 11-66*.

⇒ **If the vehicle is built with a control module that is not communicating**

Refer to *Data Link References on page 11-66*.

⇓ **If all control modules the vehicle is built with are communicating**

8. COMMUNICATION and POWERMODE FAULTS—Verify there are no current control module Power Mode or Communication DTCs set.

⇒ **If any DTC of this type is set**

Refer to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69*.

⇓ **If no DTC of this type is set**

Note: The engine may start during this test. Ensure the vehicle is out of gear and the parking brake is applied. Turn the engine OFF as soon as the crank power mode parameter has been observed.

9. POWER MODE VERIFICATION—Driver door open, observe the scan tool Power Mode parameter while cycling the ignition switch through all the power modes. Verify the current Power Mode parameter matches the actual ignition switch positions.

⇒ **If the Power Mode parameter does not match the actual ignition switch positions**

Refer to *Power Mode Mismatch on page 11-515*.

⇓ **If the Power Mode parameter matches the actual ignition switch positions**

10. ENGINE CRANK and RUN VERIFICATION—Verify that the engine cranks and runs.

⇒ **If the engine does not crank**

Refer to *Engine Does Not Crank on page 6-91*.

⇒ **If the engine does not run**

Refer to *Engine Cranks But Does Not Run on page 6-91*.

⇓ **If the engine cranks and runs**

11. REMAINING DTC REVIEW—Verify there are no other DTCs set.

⇒ **If other DTCs are set**

Diagnose them in the order listed below. Refer to *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69*.

11.1. Voltage DTCs

11.2. Programming, Setup, Configuration or Software Performance DTCs

11.3. Component related DTCs

11.4. System related DTCs

11.5. Any remaining DTCs

⇓ **If no other DTCs are set**

12. EMISSION RELATED INSPECTION/ MAINTENANCE TESTING CONCERNS—If inspection and maintenance checks are required in your region, verify the customer concern is not related to inspection/maintenance testing.

⇒ **If the customer concern is related to inspection/maintenance testing**

Refer to *Inspection/Maintenance System Check on page 6-91*.

⇓ **If the customer concern is not related to inspection/maintenance testing**

13. SYMPTOM DIAGNOSIS—Diagnose any remaining customer concern. Refer to *Symptoms - Vehicle on page 6-90*.

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Emissions Related DTCs

Action Taken When the DTC Sets – Type A

- The control module illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Freeze Frame/Failure Records.

Action Taken When the DTC Sets – Type B

- The control module illuminates the MIL on the second consecutive ignition cycle that the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The first time the diagnostic fails, the control module stores this information in the Failure Records. If the diagnostic reports a malfunction on the second consecutive ignition cycle, the control module records the operating conditions at the time of the malfunction. The control module writes the operating conditions to the Freeze Frame and updates the Failure Records.
- The following applies to misfire DTCs:
  - If the control module detects a low level or an emission level misfire condition during 2 consecutive trips, the control module illuminates the MIL.
  - If the control module detects a high level or catalyst damaging misfire, the control module flashes the MIL at a rate of once per second.
  - If the control module detects a misfire during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
    - The engine load is within 20% of the previous test that failed.
    - The engine speed is within 375 RPM of the previous test that failed.
    - The engine coolant temperature is in the same range of the previous test that failed.
- The following applies to fuel trim DTCs:
  - If the control module detects a fuel trim condition during 2 consecutive trips, the control module illuminates the MIL.
  - If the control module detects a fuel trim condition during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
    - The engine load is within 20% of the previous test that failed.
    - The engine speed is within 375 RPM of the previous test that failed.
    - The engine coolant temperature is in the same range of the previous test that failed.

Conditions for Clearing the MIL/DTC – Type A or Type B

- The control module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- A current DTC, Last Test Failed, clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warmup cycles, if no malfunctions are reported by this or any other emission related diagnostic.
- Clear the MIL and the DTC with a scan tool.

Non Emissions Related DTCs

Action Taken When the DTC Sets – Type C

- The control module stores the DTC information into memory when the diagnostic runs and fails.
- The MIL will not illuminate.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Failure Records.
- The driver information center, if equipped, may display a message.

Conditions for Clearing the DTC – Type C

- A current DTC Last Test Failed clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warmup cycles, if no malfunctions are reported by this or any other non emission related diagnostic.
- Clear the DTC with a scan tool.

Action Taken When the DTC Sets – Type D

- The control module will take default actions but no DTC will be stored in Failure Records.
- The MIL or SVS will not illuminate.

Conditions for Clearing the DTC – Type D

Clear the DTC with a scan tool.

Diagnostic Trouble Code (DTC) List - Vehicle

This master DTC list includes all applicable DTCs in alphanumeric order.

Diagnostic Trouble Code (DTC) List - Vehicle

DTC	Diagnostic Procedure
B0012 B0013	*DTC B0012 or B0013 on page 13-74*
B0014	*DTC B0014, B0021, B0031, or B0038 on page 13-78*
B0015	*DTC B0015, B001A, B001B, or B0022 on page 13-81*
B0016	*DTC B0016, B0018, B0023, or B0025 on page 13-85*
B0017	*DTC B0017 or B0024 on page 13-88*
B0018	*DTC B0016, B0018, B0023, or B0025 on page 13-85*
B0019	*DTC B0019 or B0020 on page 13-91*
B001A B001B	*DTC B0015, B001A, B001B, or B0022 on page 13-81*
B0020	*DTC B0019 or B0020 on page 13-91*
B0021	*DTC B0014, B0021, B0031, or B0038 on page 13-78*
B0022	*DTC B0015, B001A, B001B, or B0022 on page 13-81*
B0023	*DTC B0016, B0018, B0023, or B0025 on page 13-85*
B0024	*DTC B0017 or B0024 on page 13-88*
B0025	*DTC B0016, B0018, B0023, or B0025 on page 13-85*
B0031 B0038	*DTC B0014, B0021, B0031, or B0038 on page 13-78*
B0052	*DTC B0052 on page 13-95*
B0072 B0073	*DTC B0072 or B0073 on page 13-51*
B0074	*DTC B0074 on page 13-96*
B0081	*DTC B0081 (Inflatable Restraint Sensing and Diagnostic Module) on page 13-98* or *DTC B0081 (Passenger Presence Module) on page 13-100*
B0083 B0084 B0085 B0086 B0087 B0088	*DTC B0083-B0088 on page 13-102*
B0223	*DTC B0223 on page 10-67*
B0283	*DTC B0283 on page 4-9*
B0550	*DTC B0550 on page 8-82*
B0969 P0970 P0971	*DTC P0969-P0971 on page 17-125*
B1000	*DTC B1000 on page 11-21*
B1001	SDM – *DTC B1001 on page 11-22* or All Modules – Data Communications – *DTC B1001 on page 13-106*
B1019	*DTC B1019 on page 13-107*
B101D	*DTC B101D on page 11-23*
B101E	*DTC B101E on page 11-24*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
B1025 B1035 B1045 B1055	*DTC B1025, B1035, B1045, or B1055 on page 8-8*
B125A	*DTC B125A on page 8-10*
B125C	*DTC B125C on page 8-12*
B1271	*DTC B1271 on page 8-14*
B1325 B1330	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
B1370	Displays and Gages – *DTC B1370 on page 8-83* or Wiring Systems and Power Management – *DTC B1370-B1379, B1380-B1389, or B1440-B1443 on page 11-502*
B1380	*DTC B1370-B1379, B1380-B1389, or B1440-B1443 on page 11-502*
B1405	*DTC B1405 on page 8-112*
B1441	*DTC B1370-B1379, B1380-B1389, or B1440-B1443 on page 11-502*
B1445	*DTC B1445 on page 11-506*
B1446 B1447	*DTC B1446 or B1447 on page 8-15*
B144A	*DTC B144A on page 11-508*
B144B	*DTC B144B on page 11-510*
B1480	*DTC B1480 on page 4-93*
B1516	*DTC B1516 on page 9-687*
B1517	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
B151A	*DTC B151A on page 9-689*
B1527	*DTC B1527 on page 9-690*
B1529	*DTC B1529 on page 8-114*
B1925 B2170	*DTC B1925 or B2170 on page 14-36*
B2345	*DTC B2345 on page 14-38*
B2425	*DTC B2425 or B2430 on page 14-40*
B242A	*DTC B242A on page 14-43*
B2430	*DTC B2425 or B2430 on page 14-40*
B2455	*DTC B2455 (OnStar) on page 8-17* or *DTC B2455 (Radio) on page 8-19*
B2470	*DTC B2470 on page 8-21*
B2476 B2482	*DTC B2476 or B2482 on page 8-23*
B2485	*DTC B2485 on page 8-25*
B2494	*DTC B2494 on page 4-243*
B252C	*DTC B252C on page 4-245*
B252E	*DTC B252E on page 4-247*
B2530	*DTC B2530 on page 4-95*
B2545	*DTC B2545 on page 4-97*
B256A	*DTC B256A on page 4-99*
B2570	*DTC B2570 on page 4-101*
B2575	*DTC B2575 or B2699 on page 4-103*
B257A	*DTC B257A on page 4-105*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
B257B	*DTC B257B on page 4-108*
B2580	*DTC B2580 on page 4-110*
B2585	*DTC B2585 or B3867 on page 4-112*
B2610	*DTC B2610 on page 4-115*
B2615	*DTC B2615 on page 4-117*
B2625	*DTC B2625 on page 4-119*
B2645	*DTC B2645 on page 4-121*
B2652	*DTC B2652 on page 4-123*
B2699	*DTC B2575 or B2699 on page 4-103*
B270A	*DTC B270A on page 17-596*
B2745	*DTC B2745 on page 5-9*
B2750	*DTC B2750 on page 4-73*
B2955	*DTC B2955 on page 13-5*
B3006	*DTC B3006 on page 3-4*
B302A	*DTC B302A on page 13-7*
B3031	*DTC B3031 on page 13-9*
B3055	*DTC B3055 on page 13-10*
B305C	*DTC B305C on page 13-12*
B3060	*DTC B3060 on page 13-13*
B3101	*DTC B3101 on page 13-35*
B3105	*DTC B3105 on page 13-37*
B3106	*DTC B3106 on page 13-38*
B3109	*DTC B3109-B3113 on page 13-39*
B310D B310E B310F	*DTC B310D-B310F on page 13-40*
B3110 B3111 B3112 B3113	*DTC B3109-B3113 on page 13-39*
B3125 B3130 B3135	*DTC B3125, B3130, or B3135 on page 4-249*
B3140 B3150	*DTC B3140 or B3150 on page 4-253*
B316B	*DTC B316B on page 4-11*
B3205	*DTC B3205 on page 4-14*
B3245 B324A	*DTC B324A or B3245 on page 4-256*
B3265	*DTC B3265 on page 4-258*
B3596	*DTC B3596 on page 4-125*
B3618	*DTC B3618 on page 4-260*
B3622	*DTC B3622 on page 8-116*
B3650	*DTC B3650 on page 4-127*
B370B	*DTC B370B on page 4-328*
B3715	*DTC B3715 or B3875 on page 4-332*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
B3794	*Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C on page 9-18*
B3806	*DTC B3806 on page 4-129*
B3811	*DTC B3811 on page 4-338*
B3867	*DTC B2585 or B3867 on page 4-112*
B3873	*DTC B3873 (without C25) on page 4-341* or *DTC B3873 (with C25) on page 4-344*
B3875	*DTC B3715 or B3875 on page 4-332*
B3881 B3882	*DTC B3881 or B3882 on page 4-131*
B3883	*DTC B3883 on page 4-134*
B3884	*DTC B3884 on page 4-137*
B389A	*DTC B389A on page 13-14*
B3902	*DTC B3902 on page 13-16*
B3930	*DTC B3930 on page 4-262*
B3933	*DTC B3933 on page 10-69*
B3935	*DTC B3935 on page 13-17*
B3948 B3949	*DTC B3948 or B3949 on page 4-139*
B3950 B3951	*DTC B3950 or B3951 on page 4-142*
B3976	*DTC B3976 on page 13-18*
B3984	*DTC B3984 on page 13-19*
C0035 C0040 C0045 C0050	*DTC C0035, C0040, C0045, or C0050 on page 5-11*
C0110	*DTC C0110 on page 5-14*
C0131	*DTC C0131 on page 5-16*
C0161	*DTC C0161 on page 5-18*
C0176	*DTC C0176 on page 15-5*
C0186 C0196	*DTC C0186, C0196, or C0287 on page 5-19*
C0201	*DTC C0201 on page 5-21*
C0242	*DTC C0242 or P0856 on page 5-23*
C0267	*DTC C0267 on page 5-110*
C0277	EBCM – *DTC C0277 on page 5-24* or Lighting – *DTC C0277 or C0890 on page 4-145*
C0287	*DTC C0186, C0196, or C0287 on page 5-19*
C027C	*DTC C027C on page 5-26*
C0292	*DTC C0292 on page 5-27*
C0297	*DTC C0297 on page 4-148*
C0475	*DTC C0475 on page 15-7*
C0545	*DTC C0545 on page 15-9*
C0561	*DTC C0561 on page 5-29*
C0569	*DTC C0569 on page 16-45*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
C056D	• EBCM – *DTC C056D on page 5-31* • Power Steering Control Module – *DTC C056D on page 15-10* • All Modules – Data Communications – *DTC C056D on page 11-25*
C056E	EBCM – *DTC C056E on page 5-32* or All Modules – Data Communications – *DTC C056E on page 11-26*
C0710	*DTC C0710 on page 5-33*
C0750 C0755 C0760 C0765	*DTC C0750, C0755, C0760, or C0765 on page 16-46*
C0775	*DTC C0775 on page 16-48*
C0800	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
C0890	*DTC C0277 or C0890 on page 4-145*
C0895	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
P0010	ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-40* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-327*
P0011	ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0011 or P0014 on page 9-43* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0011 or P0014 on page 9-330*
P0013	ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-40* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-327*
P0014	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0011 or P0014 on page 9-43* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0011 or P0014 on page 9-330*
P0016 P0017	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0016 or P0017 on page 9-46* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0016 or P0017 on page 9-333*
P0030 P0031 P0032	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-48* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-335*
P0033 P0034 P0035	*DTC P0033-P0035 on page 9-51*
P0036 P0037 P0038	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-48* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-335*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0053 P0054	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-48* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-335*
P0068	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0068 or P1101 on page 9-54* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0068 or P1101 on page 9-338*
P0096	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0096 or P0111 on page 9-56* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0096 or P0111 on page 9-340*
P0097 P0098	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0097 or P0098 on page 9-62* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0097, P0098, or P0099 on page 9-345*
P0099	*DTC P0097, P0098, or P0099 on page 9-345*
P00B3 P00B4	*DTC P00B3 or P00B4 on page 9-600*
P00B6	ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P00B6 on page 9-66* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P00B6 on page 9-603*
P00B7	*DTC P00B7 on page 9-605*
P00C7	*DTC P00C7 on page 9-68*
P00E9	*DTC P00E9 on page 9-72*
P00EA P00EB	*DTC P00EA or P00EB on page 9-69*
P0101	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0101 on page 9-77* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0101 on page 9-349*
P0102 P0103	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0102 or P0103 on page 9-81* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0102 or P0103 on page 9-353*
P0106	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0106 on page 9-84* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0106 on page 9-356*
P0107 P0108	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0107 or P0108 on page 9-89* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0107 or P0108 on page 9-360*
P0111	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0096 or P0111 on page 9-56* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0096 or P0111 on page 9-340*
P0112 P0113 P0114	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0112, P0113, or P0114 on page 9-93* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0112, P0113, or P0114 on page 9-364*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0116	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0116 on page 9-96* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0116 (LUW) on page 9-367*
P0117 P0118 P0119	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0117, P0118, or P0119 on page 9-99* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0117, P0118, or P0119 on page 9-369*
P0121 P0122 P0123	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0121-P0123, P0222, P0223, or P2135 (LUV) on page 9-102* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0121-P0123, P0222, P0223, or P2135 on page 9-372*
P0128	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0128 (LUJ) on page 9-107* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0128 (LUW) on page 9-376*
P0131 P0132	*DTC P0131, P0132, P0134, P0137, P0138, or P0140 on page 9-378*
P0133	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-112* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-381*
P0134	*DTC P0131, P0132, P0134, P0137, P0138, or P0140 on page 9-378*
P0135	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-48* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-335*
P0137 P0138	*DTC P0131, P0132, P0134, P0137, P0138, or P0140 on page 9-378*
P013A P013B P013E P013F	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-112* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-381*
P0140	*DTC P0131, P0132, P0134, P0137, P0138, or P0140 on page 9-378*
P0141	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-48* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141 on page 9-335*
P015A P015B	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-112* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-381*
P0171 P0172	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0171 or P0172 on page 9-116* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0171 or P0172 on page 9-385*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P018B P018C P018D	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P018B-P018D on page 9-118* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P018B-P018D on page 9-388*
P0201 P0202 P0203 P0204	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0201, P0202, P0203, P0204, P0261, P0262, P0264, P0265, P0267, P0268, P0270, or P0271 on page 9-120* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0201, P0202, P0203, P0204, P0261, P0262, P0264, P0265, P0267, P0268, P0270, or P0271 on page 9-390*
P0222 P0223	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0121-P0123, P0222, P0223, or P2135 (LUV) on page 9-102* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0121-P0123, P0222, P0223, or P2135 on page 9-372*
P0231 P0232	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0231, P0232, or P023F on page 9-123* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0231, P0232, or P023F on page 9-393*
P0234	*DTC P0234 or P0299 on page 9-125*
P0236	*DTC P0236 on page 9-128*
P0237 P0238	*DTC P0237 or P0238 on page 9-131*
P023F	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0231, P0232, or P023F on page 9-123* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0231, P0232, or P023F on page 9-393*
P0243 P0245 P0246	*DTC P0243, P0245, or P0246 on page 9-134*
P025A	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P025A on page 9-137* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P025A on page 9-395*
P0261 P0262 P0264 P0265 P0267 P0268 P0270 P0271	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0201, P0202, P0203, P0204, P0261, P0262, P0264, P0265, P0267, P0268, P0270, or P0271 on page 9-120* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0201, P0202, P0203, P0204, P0261, P0262, P0264, P0265, P0267, P0268, P0270, or P0271 on page 9-390*
P0299	*DTC P0234 or P0299 on page 9-125*
P0300 P0301 P0302 P0303 P0304	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0300-P0304 on page 9-139* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0300-P0304 (LUW) on page 9-397*
P0315	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0315 on page 9-142* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0315 (LUW) on page 9-400*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0324	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0324, P0326, or P06B6 on page 9-143* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0324, P0326, or P06B6 on page 9-402*
P0325	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0325, P0327, or P0328 on page 9-145* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0325, P0327, or P0328 (LUW) on page 9-404*
P0326	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0324, P0326, or P06B6 on page 9-143* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0324, P0326, or P06B6 on page 9-402*
P0327 P0328	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0325, P0327, or P0328 on page 9-145* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0325, P0327, or P0328 (LUW) on page 9-404*
P0335 P0336	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0335 or P0336 on page 9-147* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0335 or P0336 on page 9-406*
P0340 P0341	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0340, P0341, P0365, or P0366 on page 9-150* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0340, P0341, P0365, or P0366 on page 9-409*
P0351 P0352 P0353 P0354	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0351-P0354 on page 9-153* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0351-P0354 on page 9-412*
P0365 P0366	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0340, P0341, P0365, or P0366 on page 9-150* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0340, P0341, P0365, or P0366 on page 9-409*
P0411	*DTC P0411 on page 9-414*
P0412 P0418	*DTC P0412 or P0418 on page 9-419*
P0420	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0420 on page 9-155* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0420 on page 9-422*
P0442	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0442 on page 9-157* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0442 on page 9-425*
P0443	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0443 on page 9-159* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0443 on page 9-427*
P0446	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0446 on page 9-161* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0446 on page 9-429*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0449	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0449 on page 9-163* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0449 on page 9-431*
P0451 P0452 P0453 P0454	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0451-P0454 on page 9-165* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0451-P0454 on page 9-433*
P0455	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0455 on page 9-168* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0455 on page 9-436*
P0461 P0462 P0463 P0464	*Fuel Gauge Malfunction - DTC P0461-P0464 on page 8-96*
P0496	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0496 on page 9-170* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0496 on page 9-438*
P0502 P0503	TCM - F13–5/F15–5/F17–5 manual transmission – *DTC P0502 or P0503 on page 17-438* or TCM - M20/M32 manual transmission – *DTC P0502 or P0503 on page 17-555*
P0506 P0507	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0506 or P0507 (LUV) on page 9-172* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0506 or P0507 (LUW, LWE) on page 9-440*
P0513	*DTC P0513 on page 13-20*
P0520	*DTC P0520 on page 8-86*
P0521	*DTC P0521 on page 8-88*
P0532 P0533	*DTC P0532 or P0533 on page 10-71*
P0560	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
P0562 P0563	*DTC B1325, B1330, B1517, C0800, C0895, P0560, P0562, or P0563 on page 9-685*
P0564 P0565 P0567 P0568 P056C	*Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C on page 9-18*
P0572 P0573	*DTC P0572 or P0573 on page 9-14*
P057B P057C P057D	*DTC P057B-P057D on page 17-67*
P0580 P0581	*Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C on page 9-18*
P0597 P0598 P0599	*DTC P0597-P0599 on page 9-614*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0601	• TCM - 6T30/6T40/6T45/6T50 transmission – *DTC P0601, P0603, P0604, or P062F on page 17-70* • All Modules – Data Communications – *DTC P0601-P0604, P0606, or P062F on page 11-27* • ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-174* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine (LUW) – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-442*
P0602	• All Modules – Data Communications – *DTC P0601-P0604, P0606, or P062F on page 11-27* • ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-174* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine (LUW) – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-442*
P0603 P0604	• TCM - 6T30/6T40/6T45/6T50 transmission – *DTC P0601, P0603, P0604, or P062F on page 17-70* • All Modules – Data Communications – *DTC P0601-P0604, P0606, or P062F on page 11-27* • ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-174* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine (LUW) – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-442*
P0606	• All Modules – Data Communications – *DTC P0601-P0604, P0606, or P062F on page 11-27* • ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-174* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine (LUW) – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-442*
P0615 P0616 P0617	*DTC P0615, P0616, or P0617 on page 9-691*
P0621	*DTC P0621 on page 9-694*
P0622	*DTC P0622 on page 9-696* or *DTC P0622 on page 9-696*
P0627 P0628 P0629	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0627-P0629 on page 9-177* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0627-P0629 on page 9-445*
P062F	• TCM - 6T30/6T40/6T45/6T50 transmission – *DTC P0601, P0603, P0604, or P062F on page 17-70* • All Modules – Data Communications – *DTC P0601-P0604, P0606, or P062F on page 11-27* • ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-174* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine (LUW) – *DTC P0601-P0604, P0606, or P062F (Fuel Pump Control Module) on page 9-442*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0630	• ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0630 on page 9-179* • ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443*
P0633	*DTC P0633 on page 13-21*
P0634	*DTC P0634 on page 17-72*
P0641	• ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-182* • Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641 or P06A6 (Fuel Pump Control Module) on page 9-180* • ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-449* • Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0641 or P06A6 (Fuel Pump Control Module) on page 9-447*
P0645 P0646 P0647	*DTC P0645, P0646, or P0647 on page 10-73*
P064A	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1255 or P064A on page 9-194* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1255 or P064A on page 9-466*
P0650	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0650 on page 9-184* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0650, P263A, or P263B on page 9-451*
P0651	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-182* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-449*
P0658 P0659	*DTC P0658 or P0659 on page 17-74*
P0660 P0661 P0662	*DTC P0660, P0661, or P0662 on page 9-453*
P0667 P0668 P0669	*DTC P0667, P0668, or P0669 on page 17-76*
P0685 P0686 P0687 P0689 P0690	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0685, P0686, P0687, P0689, P0690, or P1682 on page 9-186* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0685-P0687, P0689, P0690, or P1682 on page 9-456*
P0697	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-182* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-449*
P069E	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P069E on page 9-190* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P069E on page 9-460*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P06A3	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-182* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0641, P0651, P0697, or P06A3 (ECM) on page 9-449*
P06A6	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0641 or P06A6 (Fuel Pump Control Module) on page 9-180* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine– *DTC P0641 or P06A6 (Fuel Pump Control Module) on page 9-447*
P06AC P06AD P06AE	*DTC P06AC, P06AD, or P06AE on page 17-78*
P06B6	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0324, P0326, or P06B6 on page 9-143* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0324, P0326, or P06B6 on page 9-402*
P0700	*DTC P0700 (LUW) on page 9-461*
P0703	*DTC P0703 on page 9-17*
P0711 P0712 P0713	*DTC P0711-P0713 on page 17-80*
P0716 P0717	*DTC P0716, P0717, P07BF, or P07C0 on page 17-82*
P071D	*DTC P071D on page 17-85*
P0722 P0723	*DTC P0722, P0723, P077C, or P077D on page 17-88*
P0741 P0742	*DTC P0741 or P0742 on page 17-91*
P0751 P0752	*DTC P0751 or P0752 on page 17-94*
P0776 P0777	*DTC P0776 or P0777 (Gen 1) on page 17-97* or *DTC P0776 or P0777 (Gen 2) on page 17-100*
P077C P077D	*DTC P0722, P0723, P077C, or P077D on page 17-88*
P0796 P0797	*DTC P0796 or P0797 (Gen 1) on page 17-103* or *DTC P0796 or P0797 (Gen 2) on page 17-106*
P07BF P07C0	*DTC P0716, P0717, P07BF, or P07C0 on page 17-82*
P0806 P0807 P0808	TCM - F13–5/F15–5/F17–5 manual transmission – *DTC P0806-P0808 on page 17-440* or TCM - M20/M32 manual transmission – *DTC P0806-P0808 on page 17-557*
P080A	TCM - F13–5/F15–5/F17–5 manual transmission – *DTC P080A on page 17-443* or TCM - M20/M32 manual transmission – *DTC P080A on page 17-560*
P0812	TCM - F13–5/F15–5/F17–5 manual transmission – *DTC P0812 on page 17-444* or TCM - M20/M32 manual transmission – *DTC P0812 on page 17-561*
P0815 P0816 P0826	*DTC P0815, P0816, or P0826 on page 17-109*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P0842 P0843	*DTC P0842 or P0843 on page 17-111*
P0850 P0851 P0852	*DTC P0850-P0852 on page 17-114*
P0856	*DTC C0242 or P0856 on page 5-23*
P0872 P0873	*DTC P0872 or P0873 on page 17-117*
P0877 P0878	*DTC P0877 or P0878 on page 17-119*
P0961 P0962 P0963	*DTC P0961-P0963 on page 17-121*
P0965 P0966 P0967	*DTC P0965-P0967 on page 17-123*
P0969 P0970 P0971	*DTC P0969-P0971 on page 17-125*
P0973 P0974	*DTC P0973 or P0974 on page 17-127*
P0989 P0990	*DTC P0989 or P0990 on page 17-129*
P1101	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0068 or P1101 on page 9-54* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0068 or P1101 on page 9-338*
P11C2 P11C3	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P11C2 or P11C3 on page 9-191* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P11C2-P11C4 on page 9-462*
P11C4	*DTC P11C2-P11C4 on page 9-462*
P1255	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1255 or P064A on page 9-194* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1255 or P064A on page 9-466*
P1400	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1400 on page 9-195* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1400 on page 9-467*
P150C	*DTC P150C on page 9-469*
P1516	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1516, P2101, P2119, or P2176 (LUV) on page 9-197* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1516, P2101, P2119, or P2176 (LUW, LWE) on page 9-470*
P155A P155B P155C	*Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C on page 9-18*
P162B	*DTC P162B on page 13-23*
P162C	*Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C on page 9-18*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P1630	*DTC P1630 on page 13-24*
P1631	*DTC P1631 on page 13-25*
P1649	*DTC P1649 on page 13-26*
P1682	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0685, P0686, P0687, P0689, P0690, or P1682 on page 9-186* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0685-P0687, P0689, P0690, or P1682 on page 9-456*
P16F3	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443*
P1761	*DTC P1761 on page 17-132*
P182E	*DTC P182E or P1915 on page 17-134*
P1876	*DTC P1876 on page 17-137*
P1915	*DTC P182E or P1915 on page 17-134*
P2070 P2071	*DTC P2070 or P2071 on page 9-473*
P2076	*DTC P2076 on page 9-475*
P2077 P2078	*DTC P2077 or P2078 on page 9-477*
P2088 P2089 P2090 P2091	ECM – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-40* or ECM – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0010, P0013, or P2088-P2091 on page 9-327*
P2096	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2096 on page 9-200* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2096 on page 9-480*
P2097	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2097 on page 9-202* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2097 on page 9-482*
P2101 P2119	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1516, P2101, P2119, or P2176 (LUV) on page 9-197* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1516, P2101, P2119, or P2176 (LUW, LWE) on page 9-470*
P2122 P2123 P2127 P2128	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2122, P2123, P2127, P2128, or P2138 on page 9-204* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2122, P2123, P2127, P2128, or P2138 on page 9-484*
P2135	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0121-P0123, P0222, P0223, or P2135 (LUV) on page 9-102* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0121-P0123, P0222, P0223, or P2135 on page 9-372*
P2138	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2122, P2123, P2127, P2128, or P2138 on page 9-204* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2122, P2123, P2127, P2128, or P2138 on page 9-484*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P2176	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P1516, P2101, P2119, or P2176 (LUV) on page 9-197* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P1516, P2101, P2119, or P2176 (LUW, LWE) on page 9-470*
P2181	*DTC P2181 on page 9-616*
P2199	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2199 on page 9-207* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2199 on page 9-487*
P2227 P2228 P2229 P2230	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2227-P2230 on page 9-214* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2227-P2230 on page 9-494*
P2261	*DTC P2261 on page 9-217*
P2270 P2271	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-112* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0133, P013A, P013B, P013E, P013F, P015A, P015B, P2270, or P2271 on page 9-381*
P2430 P2431	*DTC P2430 or P2431 on page 9-497*
P2432 P2433	*DTC P2432 or P2433 on page 9-501*
P2440	*DTC P2440 on page 9-504*
P2444	*DTC P2444 on page 9-507*
P2534	Fuel Pump Control Module – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2534 (Fuel Pump Control Module) on page 9-219* or Fuel Pump Control Module – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2534 (Fuel Pump Control Module) on page 9-509*
P2544	*DTC P2544 on page 9-220*
P262B	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-175* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM) on page 9-443*
P2635	ECM - 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine – *DTC P2635 (Fuel Pump Control Module) on page 9-221* or ECM - 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine – *DTC P2635 (Fuel Pump Control Module) on page 9-510*
P263A P263B	*DTC P0650, P263A, or P263B on page 9-451*
P2714 P2715	*DTC P2714 or P2715 (Gen 1) on page 17-139* or *DTC P2714 or P2715 (Gen 2) on page 17-142*
P2719 P2720 P2721	*DTC P2719-P2721 on page 17-145*
P2723 P2724	*DTC P2723 or P2724 (Gen 1) on page 17-147* or *DTC P2723 or P2724 (Gen 2) on page 17-150*
P2728 P2729 P2730	*DTC P2728-P2730 on page 17-153*

Diagnostic Trouble Code (DTC) List - Vehicle (cont'd)

DTC	Diagnostic Procedure
P2762 P2763 P2764	*DTC P2762, P2763, or P2764 on page 17-155*
U0001	*DTC U0001 on page 11-28*
U0020	*DTC U0020 on page 11-29*
U0073	*DTC U0073 or U2100 on page 11-30*
U0074	*DTC U0074 on page 11-31*
U0078	*DTC U0078 on page 11-36*
U0100–U02FF	*DTC U0100-U02FF on page 11-37*
U0301 U0302 U0315	*DTC U0300-U0336 on page 11-41*
U0400–U05FF	*DTC U0400-U05FF on page 11-42*
U1500–U15BF	*DTC U1500-U15FF on page 11-43*
U1814	*DTC U1814 on page 11-46*
U18B9 U18BF	*DTC U18B9-U18BF on page 11-48*
U2099	*DTC U2099 on page 11-49*
U2100	*DTC U0073 or U2100 on page 11-30*
U2101	*DTC U2101 on page 11-51*

Symptom Byte List

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
(00–0F) General Electrical Failures This category includes standard wiring failure modes (for example, shorts and opens), direct current (DC) quantities related by Ohm's Law and quantities related to amplitude, frequency or rate of change, and wave shape.		
00	—	This sub type is used for failures that cannot be assigned to a specific sub type. No additional information is available.
01	Short to Battery	This sub type is used for failures where the Electronic Control Unit measures vehicle system (battery positive) potential for greater than a specified time period or when some other value is expected.
02	Short to Ground	This sub type is used for failures where the Electronic Control Unit measures ground (battery negative) potential for greater than a specified time period or when some other value is expected.
03	Low Voltage	This sub type is used for failures where the Electronic Control Unit measures a voltage below a specified range but not necessarily a short to ground.
04	Open	This sub type is used for failures where the Electronic Control Unit determines an open circuit via lack of bias voltage, low current flow, no change in state of an input in response to an output, etc.
05	High Voltage/Open	This sub type is used for failures where the condition detected by the Electronic Control Unit is the same for either indicated failure mode.
06	Low Voltage/Open	This sub type is used for failures where the condition detected by the Electronic Control Unit is the same for either indicated failure mode.

Symptom Byte List (cont'd)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
07	High Voltage	This sub type is used for failures where the Electronic Control Unit measures a voltage above a specified range but not necessarily a short to battery.
08	Performance – Signal Invalid	This sub type is used for failures where the value of the signal is not plausible given the operating conditions.
09	Too Fast Transitions	This sub type is used for failures where the signal transitions more quickly than is reasonably allowed.
0A	Too Slow Transitions	This sub type is used for failures where the signal transitions more slowly than is reasonably allowed.
0B	High Current	This sub type is used for failures where the Electronic Control Unit measures current flow above a specified range.
0C	Low Current	This sub type is used for failures where the Electronic Control Unit measures current flow below a specified range.
0D	High Resistance	This sub type is used for failures where the Electronic Control Unit infers a circuit resistance above a specified range.
0E	Low Resistance	This sub type is used for failures where the Electronic Control Unit infers a circuit resistance below a specified range.
0F	Signal Erratic	This sub type is used for failures where the signal is momentarily implausible (not long enough for Signal Invalid) or discontinuous.
(10–1F) Additional General Electrical Failures This category includes the overflow from category 0.		
10	—	Currently not used.
11	High Input	This sub type is used for failures where some circuit quantity is above a specified range.
12	Low Input	This sub type is used for failures where some circuit quantity is below a specified range.
13	Low Voltage/High Temperature	This sub type is used for failures where a temperature sensor with a negative temperature coefficient detects a voltage below a specified range.
14	High Voltage/Low Temperature	This sub type is used for failures where a temperature sensor with a negative temperature coefficient detects a voltage above a specified range.
15	Performance – Signal Rising Time Failure	This sub type is used for failures where the signal rise time is outside a specified range.
16	Performance – Signal Falling Time Failure	This sub type is used for failures where the signal fall time is outside a specified range.
17	Performance – Signal Shape/ Waveform Failure	This sub type is used for failures where the shape of the signal (plot of the amplitude with respect to time) is not correct (for example, improper circuit impedance.)
18	Low Signal Amplitude	This sub type is used for failures where the Electronic Control Unit measures a signal voltage below a specified range but not necessarily a short to ground (for example, gain too low).
19	High Signal Amplitude	This sub type is used for failures where the Electronic Control Unit measures a signal voltage above a specified range but not necessarily a short to battery (for example, gain too high).
1A	Performance – Bias Level Out of Range	This sub type is used for failures where the Electronic Control Unit applies a bias voltage to a circuit upon which is superimposed a signal voltage (for example, Oxygen Sensor Circuit.)
1B	Signal Cross Coupled	This sub type is used for failures where the Electronic Control Unit detects a circuit shorted to another circuit when both circuits are controlled by the Electronic Control Unit.
1C	—	Currently not used.
1D	—	Currently not used.
1E	—	Currently not used.

Symptom Byte List (cont'd)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
1F	Erratic	This sub type is used for failures where the Electronic Control Unit momentarily detects one of the conditions defined above but not long enough to set a specific sub type.
(20–2F) FM / PWM Failures This category includes faults related to Frequency Modulated (FM) and Pulse Width Modulated (PWM) inputs and outputs of the Electronic Control Unit and faults where position is determined by counts.		
20	—	Currently not used.
21	Incorrect Period	This sub type is used for failures where the Electronic Control Unit measures an incorrect duration for one cycle of the output.
22	Too Short Low-Time	This sub type is used for failures where the Electronic Control Unit detects the low pulse is too narrow with respect to time.
23	Too Long Low-Time	This sub type is used for failures where the Electronic Control Unit detects the low pulse is too wide with respect to time.
24	Too Short High-Time	This sub type is used for failures where the Electronic Control Unit detects the high pulse is too narrow with respect to time.
25	Too Long High-Time	This sub type is used for failures where the Electronic Control Unit detects the high pulse is too wide with respect to time.
26	Low Frequency	This sub type is used for failures where the Electronic Control Unit detects too few cycles in a given time period.
27	High Frequency	This sub type is used for failures where the Electronic Control Unit detects too many cycles in a given time period.
28	Incorrect Frequency	This sub type is used for failures where the Electronic Control Unit measures an incorrect number of cycles in a given time period.
29	Too Few Pulses	This sub type is used for failures where the Electronic Control Unit measures too few pulses (for example, position is calibrated in counts from one extreme to the other).
2A	Too Many Pulses	This sub type is used for failures where the Electronic Control Unit measures too many pulses (for example, position is calibrated in counts from one extreme to the other).
2B	Missing Reference	This sub type is used for failures where the Electronic Control Unit does not detect a reference for a signal circuit or a group of signal circuits.
2C	—	Currently not used.
2D	—	Currently not used.
2E	—	Currently not used.
2F	—	Currently not used.
(30–3F) Electronic Control Unit Internal Failures This category includes faults related to memory, software, and internal electrical circuitry; requiring component replacement.		
30	—	Currently not used.
31	Internal Checksum Error	This sub type is used by the Electronic Control Unit to indicate an incorrect checksum calculation where memory type is not specified.
32	General Memory Malfunction	This sub type is used by the Electronic Control Unit to indicate a memory failure where memory type is not specified.
33	Special Memory Malfunction	This sub type is used by the Electronic Control Unit to indicate a memory failure where the specific memory type is not defined in this category.
34	RAM Malfunction	This sub type is used by the Electronic Control Unit to indicate a Random Access Memory (RAM) failure.
35	ROM Malfunction	This sub type is used by the Electronic Control Unit to indicate a Read Only Memory (ROM) failure.
36	EEPROM Performance/ Malfunction	This sub type is used by the Electronic Control Unit to indicate an Electrically Erasable Programmable Read Only Memory (EEPROM) failure.

Symptom Byte List (cont'd)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
37	Software Malfunction	This sub type is used by the Electronic Control Unit to indicate a failure in the execution of operational software
38	Supervision Software Malfunction	This sub type is used by the Electronic Control Unit to indicate a loop time error in the execution of the operational software.
39	Internal Malfunction	This sub type is used by the Electronic Control Unit to indicate the detection of an internal circuit failure.
3A	Incorrect Component Installed	This sub type is used by the Electronic Control Unit to indicate a mismatch between the hardware connected to the Electronic Control Unit and the hardware expected by the Electronic Control Unit.
3B	Self-Test Malfunction	This sub type is used by the Electronic Control Unit to indicate a sensor self-test failure launched by an Electronic Control Unit command.
3C	Internal Communication Malfunction	This sub type is used by the Electronic Control Unit to indicate loss of an internal communication line, for example, between microprocessors in a dual microprocessor configuration.
3D	—	Currently not used.
3E	—	Currently not used.
3F	—	Currently not used.
(40–4F) Electronic Control Unit Programming Failures This category includes faults related to operational software, calibrations, and options; remedied by programming the Electronic Control Unit.		
40	—	Currently not used.
41	Not Programmed	This sub type is used to indicate that only boot software is present in the Electronic Control Unit.
42	Calibration Not Programmed	This sub type is used to indicate that operational software is present but calibration data is not.
43	EEPROM Incorrect Programming	This sub type is used to indicate an EEPROM error that may be remedied by reprogramming the module.
44	Security Access Not Activated	This sub type is used to indicate that programming was attempted without unlocking the Electronic Control Unit.
45	Variant Not Programmed	This sub type is used to indicate the need to enter (program) the sub system option content.
46	Configuration Not Programmed	This sub type is used to indicate the need to enter (program) the vehicle option content.
47	VIN Not Programmed	This sub type is used to indicate the need to enter (program) the vehicle identification number (VIN).
48	Security Code Not Programmed	This sub type is used to indicate the need to enter (program) the theft / security code.
49	RAM Incorrect Programming	This sub type is used by the Electronic Control Unit to indicate a Random Access Memory (RAM) error remedied by reprogramming.
4A	Programming Checksum Error	This sub type is used by the Electronic Control Unit to indicate an incorrect checksum calculation where memory type is not specified.
4B	Calibration Not Learned	This sub type is used by the Electronic Control Unit to indicate that a password, operational range, etc. for a sensor or actuator must be learned by the Electronic Control Unit.
4C	DTC Memory Full	This sub type is used by the Electronic Control Unit to indicate that more DTCs have been detected than can be accommodated by the memory allocated for DTC storage.
4D	Stack Overflow	This subtype is used by the Electronic Control Unit to indicate that more memory has been used in a stack than is allocated to a program.
4E	—	Currently not used.
4F	—	Currently not used.

Symptom Byte List (cont'd)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
(50–5F) Algorithm Based Failures This category includes faults based on comparing two or more input parameters for plausibility or comparing a single parameter to itself with respect to time.		
50	—	Currently not used.
51	—	Currently not used.
52	—	Currently not used.
53	Low Temperature	This sub type is used for failures where the Electronic Control Unit calculates a low temperature condition based upon the duration of certain operating parameters.
54	High Temperature	This sub type is used for failures where the Electronic Control Unit calculates a high temperature condition based upon the duration of certain operating parameters.
55	Too Few Transitions	This sub type is used for failures where the Electronic Control Unit monitors a parameter over time within specified limits and detects fewer than the expected number of transitions.
56	Too Many Transitions	This sub type is used for failures where the Electronic Control Unit monitors a parameter over time within specified limits and detects more than the expected number of transitions.
57	—	Currently not used.
58	Performance	This sub type is used for failures where the Electronic Control Unit does not see the expected change to a parameter or group of parameters in response to a particular event.
59	Protection Time-Out	This sub type is used for failures where the Electronic Control Unit detects a function is active for greater than a specified time period.
5A	Not Plausible	This sub type is used for failures where the Electronic Control Unit compares two or more input parameters for plausibility.
5B	—	Currently not used.
5C	—	Currently not used.
5D	—	Currently not used.
5E	—	Currently not used.
5F	—	Currently not used.
(60–6F) Mechanical Failures This category includes faults detected by inappropriate motion in response to an Electronic Control Unit controlled output.		
60	—	Currently not used.
61	Stuck	This sub type is used for failures where the Electronic Control Unit does not detect any motion in response to energizing a motor, solenoid, relay, etc.
62	Stuck Open	This sub type is used for failures where the Electronic Control Unit does not detect any motion upon commanding the operation of a motor, solenoid, relay, etc., to close some piece of equipment.
63	Stuck Closed	This sub type is used for failures where the Electronic Control Unit does not detect any motion upon commanding the operation of a motor, solenoid, relay, etc., to open some piece of equipment.
64	Slip Detected	This sub type is used for failures where the Electronic Control Unit detects excessive duration to command a motor, solenoid, relay, etc., to move a piece of equipment to a desired position.
65	Emergency Position Not Achievable	This sub type is used for failures where the Electronic Control Unit is unable to command a motor, solenoid, relay, etc., to move a piece of equipment to the emergency position.
66	Incorrect Mounting	This sub type is used for failures where the server detects incorrectly mounted components, for example, acceleration sensor showing a position error of 90°.

Symptom Byte List (cont'd)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
67	Incorrect Assembly	This sub type is used for failures where the control module has detected that the component has been incorrectly installed (for example, hydraulic pipes crossed over, circuits cross wired) or polarity errors.
68	—	Currently not used.
69	—	Currently not used.
6A	—	Currently not used.
6B	—	Currently not used.
6C	—	Currently not used.
6D	—	Currently not used.
6E	—	Currently not used.
6F	—	Currently not used.
(70–7F) Bus Signal / Message Failures This category includes faults related to bus hardware and signal integrity. This category is also used when the physical input for a signal is located in one Electronic Control Unit and another Electronic Control Unit diagnoses the circuit.		
70	—	Currently not used.
71	Invalid Data	This sub type is used by the Electronic Control Unit to indicate a signal was received with the corresponding validity bit equal to Invalid or post processing of the signal determines it is invalid.
72	Message Counter Incorrect	This sub type is used by the Electronic Control Unit to indicate a signal was received without the corresponding rolling count value being properly updated.
73	Parity Error	This sub type is used by the Electronic Control Unit to indicate a message was processed with an incorrect parity calculation.
74	Bus Signal Checksum Error	This sub type is used by the Electronic Control Unit to indicate a message was processed with an incorrect protection (checksum) calculation.
75	Serial Data Link High Input	This sub type is used for failures where some circuit quantity, reported via serial data, is above a specified range.
76	Serial Data Link Low Input	This sub type is used for failures where some circuit quantity, reported via serial data, is below a specified range.
77	—	Currently not used.
78	—	Currently not used.
79	—	Currently not used.
7A	—	Currently not used.
7B	—	Currently not used.
7C	—	Currently not used.
7D	—	Currently not used.
7E	—	Currently not used.
7F	Bus Signal Erratic	This sub type is used for failures where the signal, reported via serial data, is momentarily implausible or discontinuous.
(80–FF) Reserved Unique System Specific – See specific diagnostic procedures for symptom byte information if these symptom bytes are used.		

Symptoms - Vehicle

Body Repair

Symptoms - Bolted Exterior Body Panels and Closures on page 3-5

Body Systems

- *Symptoms - Fixed and Moveable Windows on page 4-15*
- *Symptoms - Horns on page 4-74*
- *Symptoms - Lighting on page 4-149*
- *Symptoms - Mirrors on page 4-223*

- *Symptoms - Vehicle Access on page 4-264*
- *Symptoms - Wiper/Washer Systems on page 4-347*

Brakes

- *Symptoms - Antilock Brake System on page 5-36*
- *Symptoms - Hydraulic Brakes on page 5-111*
- *Symptoms - Park Brake on page 5-182*

Driveline/Axle

Symptoms - Wheel Drive Shafts on page 7-3

Driver Information and Entertainment

- *Symptoms - Cellular Communication on page 8-26*
- *Symptoms - Entertainment on page 8-26*
- *Symptoms - Displays and Gauges on page 8-89*
- *Symptoms - Secondary and Configurable Customer Controls on page 8-117*

Engine

- *Symptoms - Cruise Control on page 9-17*
- *Symptoms - Engine Controls on page 9-222* – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine
- *Symptoms - Engine Controls on page 9-511* – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine
- *Symptoms - Engine Electrical on page 9-701*
- *Symptoms - Engine Exhaust on page 9-734*
- *Symptoms - Engine Mechanical on page 9-770* – 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine
- *Symptoms - Engine Mechanical on page 9-953* – 1.6L (LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine

General Information

Symptoms - Vibration Diagnosis and Correction on page 1-62

HVAC

Symptoms - HVAC Systems - Manual on page 10-75

Power and Signal Distribution

- *Symptoms - Data Communications on page 11-51*
- *Symptoms - Power Outlets on page 11-74*
- *Symptoms - Wiring Systems on page 11-513*

Roof

Symptoms - Roof on page 12-5

Safety and Security

- *Symptoms - Immobilizer on page 13-26*
- *Symptoms - Remote Functions on page 13-40*
- *Symptoms - Seat Belts on page 13-53*
- *Symptoms - SIR on page 13-109*
- *Symptoms - Theft Deterrent on page 13-150*

Seats

Symptoms - Seat Heating and Cooling on page 14-44

Steering

- *Symptoms - Power Steering System on page 15-11*
- *Symptoms - Steering Wheel and Column on page 15-25*

Suspension

- *Symptoms - Suspension General Diagnosis on page 16-35*
- *Symptoms - Tire Pressure Monitoring on page 16-48*

Transmission

- *Symptoms - Automatic Transmission on page 17-157*
- *Symptoms - Clutch on page 17-401*
- *Symptoms - Manual Transmission on page 17-445* – F13–5/F15–5/F17–5 manual transmission
- *Symptoms - Manual Transmission on page 17-562* – M20/M32 manual transmission
- *Symptoms - Automatic Transmission Shift Lock Control on page 17-598*

Engine Does Not Crank

Refer to the appropriate diagnostic procedure below for the symptom observed.

- *Starter Solenoid Does Not Click on page 9-709*
- *Starter Solenoid Clicks, Engine Does Not Crank on page 9-711*
- *Engine Cranks Slowly on page 9-711*

Engine Cranks But Does Not Run

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- *Engine Cranks But Does Not Run on page 9-228* for the 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine
- *Engine Cranks But Does Not Run on page 9-516* for the 1.6L(LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine

Inspection/Maintenance System Check

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- *Inspection/Maintenance System Check on page 9-239* for the 1.2L (L2Q LDC LWD) or 1.4L (L2I L2N LDD LUH LUJ LUV) engine
- *Inspection/Maintenance System Check on page 9-528* for the 1.6L(LDE LED LFJ LGE LLU LXV) or 1.8L (2H0 LFH LUW LWE) engine

Diagnostic Repair Verification

Note: After a repair has been made, some DTCs require the ignition to be turned OFF then back ON before the scan tool function will clear the DTC.

1. Ignition OFF.
2. Install any components or connectors that have been removed or replaced during diagnosis.
3. Perform any adjustment, programming or setup procedures that are required when a component or module is removed or replaced.
4. Ignition ON.
5. Clear the DTCs.
6. Turn the ignition OFF for 60 seconds.
7. If the repair was related to a DTC, duplicate the Conditions for Running the DTC and use the Freeze Frame/Failure Records, if applicable, in order to verify the DTC does not set. If the DTC sets or another DTC is present, refer to the *Diagnostic Trouble Code (DTC) List - Vehicle on page 6-69* and perform the appropriate diagnostic procedure.

   Or

   If the repair was symptom related, duplicate the conditions under which the customer concern occurred to verify the repair. If the customer concern reoccurs or another symptom is present, return to *Symptoms - Vehicle on page 6-90* and perform the appropriate symptom diagnostic.