

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Reference Information

Special Tools

- *EL-49642* SPS Programming Support Tool
- *EL-46079* Tire Pressure Monitor Diagnostic Tool

For equivalent regional tools, refer to Special Tools.

Replace and Program Control Module

To program a replacement K9 Body Control Module (BCM), perform the following procedure:

1. Install *EL-49642* SPS programming support tool.

Note: Make sure the vehicle ignition switch state is in appropriate position for the following step.

- For Key Ignition System, begin with the ignition in the RUN position.
- For Push Button Start System, begin with the vehicle in vehicle OFF power mode. The Service Programming System will power mode the vehicle.

2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K9 Body Control Module - Programming and follow the on-screen instructions.
4. Perform the following for the appropriate ignition type prior to proceeding with the next step:

- Key Ignition System: Key in the ignition and any additional keys must be away from the vehicle at least 3 m.
- Push Button Start System: Keyless entry transmitter must be in the programming pocket. Refer to the owner manual for the exact pocket location. All additional transmitters must be away from the vehicle at least 3 m.

Note: The following programming step may take between 10–12 min and progress will appear to have stopped during this process. This is a normal security timer response and a restart should not be performed. If the DTC B389A set immediately after programming a replacement BCM, the Immobilizer Learn procedure was not properly completed. The Immobilizer Learn procedure needs to be performed again.

- On the SPS Supported Controllers screen, select IMMO Immobilizer Learn - Setup. On the next screen, select Body Control Module IMMO Learn with Existing Transponder or Remote Key and follow the on-screen instructions. When Immobilizer Learn is complete, press the Unlock button on the keyless entry transmitter to allow the keyless entry transmitter to exit the Immobilizer Learn mode.

Note: When performing the Tire Pressure Monitor Sensor Learn during BCM setup, the *EL-46079* tire pressure monitor diagnostic tool must be used to activate each tire pressure sensor for vehicles with UJM.

- For Key Ignition System, begin with the ignition in the RUN position.
- For Push Button Start System, begin with the vehicle in vehicle ON power mode.
- On the SPS Supported Controllers screen, select K9 Body Control Module - Setup (or K9 Body Control Module - Configuration & Setup) and follow the on-screen instructions.
- Check the driver information center display for additional messages regarding further calibration instructions. If there are no additional driver information center instructions present, programming is complete.
- At the end of programming, choose the "Clear DTCs" function on the SPS screen.
- If ABS, Traction Control and/or StabiliTrak indicators are ON and DTC C0161 is set in the K17 Electronic Brake Control Module after performing BCM programming and setup, do the following:

1. Disconnect the scan tool from the X84 Data Link Connector.
2. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from the vehicle. It may take up to 2 min to power down.
3. Ignition ON, verify DTC C0161 is in history. If not, repeat the above step to make sure the vehicle is in sleep mode.
4. Use the scan tool to clear the DTCs.

Reprogram Control Module

To program an existing K9 Body Control Module, perform the following procedure:

1. Install *EL-49642* SPS programming support tool.

Note: Make sure the vehicle ignition switch state is in appropriate position for the following step.

- For Key Ignition System, begin with the ignition in the RUN position.
- For Push Button Start System, begin with the vehicle in vehicle ON power mode.
- 2. Access the Service Programming System (SPS) and follow the on-screen instructions.
- 3. On the SPS Supported Controllers screen, select K9 Body Control Module - Programming and follow the on-screen instructions.

Note: When performing the Tire Pressure Monitor Sensor Learn during BCM setup, the *EL-46079* tire pressure monitor diagnostic tool must be used to activate each tire pressure sensor for vehicles with UJM.

- 4. On the SPS Supported Controllers screen, select K9 Body Control Module - Setup (or K9 Body Control Module - Configuration & Setup) and follow the on-screen instructions.
- 5. Check the driver information center display for additional messages regarding further calibration instructions. If there are no additional driver information center instructions present, programming is complete.
- 6. At the end of programming, choose the "Clear DTCs" function on the SPS screen.
- 7. If ABS, Traction Control and/or Stabilitrak indicators are ON and DTC C0161 is set in the K17 Electronic Brake Control Module after performing BCM programming and setup, do the following:
 - 1. Disconnect the scan tool from the X84 Data Link Connector.
 - 2. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from the vehicle. It may take up to 2 min to power down.
 - 3. Ignition ON, verify DTC C0161 is in history. If not, repeat the above step to make sure the vehicle is in sleep mode.
 - 4. Use the scan tool to clear the DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

- 1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
- 2. Verify the control module can be reprogrammed.
- *If the control module cannot be reprogrammed*
 - 1. Ignition OFF for one minute, ignition ON.
 - 2. Verify the control module can be reprogrammed.
- If the control module cannot be reprogrammed, replace the control module.
- If the control module can be reprogrammed.
- All OK.
- *If the control module can be reprogrammed*
- All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Control Module replacement, programming and setup

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Table 1: [Body Control Module Scan Tool Data Parameters](#)

Table 2: [Body Control Module Scan Tool Output Controls](#)

Body Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Definition
<i>Operating Conditions:</i> 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.
Accent Lighting 2 Command	—	Varies	This parameter displays the interior lighting ambient 2 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 Doors 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 Current Sensor	—	Varies	The scan tool displays the battery current in amperes.
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 Applied	—	Inactive	The scan tool displays Active or Inactive.

Parameter	System State	Expected Value	Definition
Brake Pedal Initial Travel Position Achieved	—	No	The scan tool displays No or Yes.
Brake Pedal Position Sensor	—	Varies	This displays Counts. This numeric value is the current brake pedal position.
Brake Pedal Position Sensor High Voltage During Learn	—	No	The scan tool displays No or Yes.
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 Learned Released Position	—	Yes	The scan tool displays No or Yes. This parameter displays Yes when the brake pedal position sensor has learned the released position.
Brake Pedal Position Sensor Learned Released Position	—	Varies	The scan tool displays volts.
Brake Pedal Position Sensor Learned Released Position	—	Varies	The scan tool displays percentage.
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 Pedal Pulled Up from Released 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.
Calculated Brake Pedal Position	—	Varies	The scan tool displays volts.
Calculated Brake Pedal Position	—	Varies	The scan tool displays percentage.
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.
Center Stop Lamp Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the center stop lamp status.
Central Door Lock Switch on Center Console/Passenger Door Lock Switch	—	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.
Child Security Lock Motors Command	—	Inactive	The scan tool displays Active or Inactive.
Child Security Lock/Window Lockout Switch	—	Inactive	The scan tool displays Active or Inactive.

Parameter	System State	Expected Value	Definition
Child Security Lock/Window Lockout Switch Indicator Command	—	Inactive	The scan tool displays Active or Inactive.
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.
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.
Door Lock Switch	—	Inactive	The scan tool displays Active or Inactive.
Driver Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver door Ajar switch status.
Driver Door Key Unlock Switch	—	Inactive	The scan tool displays Active or Inactive.
Driver Door Lock Switch	—	Inactive	The scan tool displays Active or Inactive.
Driver Door Unlatch Command	—	Inactive	The scan tool displays Active or Inactive.
Driver Door Unlock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the driver door unlock command status.
Driver Seat Heating Switch	—	Inactive	The scan tool displays Active or Inactive.
Driver Seat Heating/Venting /Cooling Mode	—	Off	The scan tool displays On or Off.
Driver Seat Ventilation Switch	—	Inactive	The scan tool displays Active or Inactive.
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.

Parameter	System State	Expected Value	Definition
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.
Driver Window Motor Reversing Status	—	No	The scan tool displays No or Yes.
Driver Window Motor Sensing System Fault Status	—	No	The scan tool displays No or Yes.
Driver Window Motor Undervoltage Status	—	No	The scan tool displays No or Yes.
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.
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.
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.
Glove Box Unlatch Switch	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the instrument panel compartment release switch status.
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.
Headlamp Washer Relay Command	—	Inactive	The scan tool displays Active or Inactive.
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.

Parameter	System State	Expected Value	Definition
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 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.
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.

Parameter	System State	Expected Value	Definition
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 Sensor 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.
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 Child Security Lock Switch	—	Inactive	This parameter displays Active or Inactive.
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 Sensor 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.

Parameter	System State	Expected Value	Definition
Left Rear Window Learned	—	Yes	The scan tool displays No or Yes.
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 Stop Lamp Command	—	Varies	The scan tool display percentage.
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.
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) Unlatch Command	—	Inactive	The scan tool displays Active or Inactive.
Passenger Door(s) Unlock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter displays the passenger door unlock status.
Passenger Seat Heating Switch	—	Inactive	The scan tool displays Active or Inactive.
Passenger Seat Heating/Venting/Cooling Mode	—	Off	The scan tool displays On or Off.
Passenger Seat Ventilation Switch	—	Inactive	The scan tool displays Active or Inactive.
Passenger Window Learned	—	Yes	The scan tool displays No or Yes. This parameter displays the passenger window learned status.

Parameter	System State	Expected Value	Definition
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.
Pickup Bed Cargo Lamp Command	—	Varies	The scan tool displays percentage. This parameter displays pickup bed cargo lamp command 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.
Rain Sensor	—	Inactive	The scan tool displays Active or Inactive.
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 Ignition Switch Start or Remote Vehicle 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.
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 Sensor 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.

Parameter	System State	Expected Value	Definition
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 Child Security Lock Switch	—	Inactive	The scan tool displays Active or Inactive.
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 Sensor 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 Stop Lamp Command	—	Varies	The scan tool displays percentage.
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.
Run/Crank Relay Command	—	Active	The scan tool displays Active or Inactive.
Run/Crank 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.

Parameter	System State	Expected Value	Definition
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 Tilt 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.
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.

Parameter	System State	Expected Value	Definition
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	The BCM activates the accent lighting when you select On. The value should be 100%. All accent lighting should illuminate until commanded Off.
Accent Lighting 2	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	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 Power Relay	The BCM actuates the accessory power relay when you select On. The accessory power relay should turn on allowing specific vehicle functions to operate.
Accessory/Retained Accessory Power Relay	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	The BCM activates all doors lock when you select Lock. All doors should lock.
All Doors Lock/Unlock	The BCM activates all doors lock/unlock when you select Lock/Unlock.
Auxiliary Ignition Run Relay	The BCM controls the Ignition Run Coil Control circuit to turn it On and Off.
Backup Lamps	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.
Brake Transmission Shift Interlock Solenoid	The BCM activates the transmission shift interlock solenoid actuator when you select On.

Scan Tool Output Control	Description
Actuator	
Brake Transmission Shift Interlock Indicator	The BCM activates the transmission range indicator when you select On. The transmission range indicator at the shifter should illuminate until commanded Off.
Center Brake Lamp	The BCM activates the center brake lamp when you select On. The center brake lamp should illuminate until commanded Off.
Center Stop Lamp	The BCM activates the center stop lamp when you select On. The center stop lamp should illuminate until commanded Off.
Child Security Lock Indicator	The BCM activates the child security lock indicator when you select On. The child security lock indicator should illuminate until commanded Off.
Child Security Lock Motors	The BCM actuates the child security door motor when you select Lock. The child security doors should lock.
Child Security Lock/Window Lockout Switch Indicator	The BCM activates the child security lock/window lockout switch indicator when you select On. The child security lock/window lockout switch indicator should illuminate until commanded Off.
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	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	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	The BCM pulses the driver door unlock motor when you select Unlock. The driver door should unlock.
Driver Window Motor	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.
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	The BCM actuates the front fog lamps relay when you select On. The front fog lamps relay should turn on.
Generator Regulator Setpoint	The BCM changes the output of the generator.
Hazard Lamps Switch Backlight	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	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.)
Incandescent Dimming	The BCM activates the incandescent light dimming when you select On. The values should be 100%. The incandescent light dimming should illuminate until commanded Off.
Indicator Dimming	The BCM activates the indicator dimming when you select On. The values should be 100%. The indicator should illuminate until commanded Off.
LED Backlight Dimming	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	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	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 Park Lamp	The BCM activates the left front park lamp when you select ON with a value of 100%. The left front park lamp should illuminate.
Left Front Park Lamp/Daytime Running Lamp	The BCM activates the left front park lamp/daytime running lamp when you select ON with a value of 100%. The left front park lamp/daytime running lamp should illuminate.

Scan Tool Output Control	Description
Left Front Turn Signal Lamp	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 Headlamp Lamp Low Beam	The BCM activates the left headlamp low beam when you select On. The values should be 100%. The left headlamp low beam should illuminate until commanded Off.
Left Park Lamps	The BCM activates the left park lamps when you select ON with a value of 100%. The left park lamps should illuminate.
Left Rear Park Lamp	The BCM activates the left rear park lamp when you select ON with a value of 100%. The left rear park lamp should illuminate.
Left Rear Stop/Park Lamp	The BCM activates the left rear stop/park lamp when you select ON with a value of 100%. The left rear stop/park lamp should illuminate.
Left Rear Turn Signal Lamp	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 Turn Signal/Stop Lamp	The BCM activates the left rear turn signal/stop lamp when you select On. The left rear turn signal/stop 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.
Left Stop Lamp	The BCM activates the left stop lamp when you select ON with a value of 100%. The left stop lamp should illuminate.
Left Trailer Turn Signal Lamp	The BCM activates the left trailer turn signal lamp when you select ON with a value of 100%. The left trailer turn signal lamp should illuminate.
License Plate Lamps	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 Lamps	The BCM activates the low beam lamps when you select On. The low beam lamps should turn on.
Low Beam Relay	The BCM activates the low beams when you select On. The low beam lights should turn on.
Outside Rear View Mirror Courtesy Lamp	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	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	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.
Pickup Bed Cargo Lamp	The BCM activates the pickup bed cargo lamp when you select On. The values should be 100%. The pickup bed cargo lamp should illuminate until commanded Off.
Rear Fog Lamp(s) Relay	The BCM activates the rear fog lamps when you select On. The rear fog lamps should turn on.
Right Brake Lamp	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	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 Park Lamp	The BCM activates the right front park lamp when you select ON with a value of 100%. The right front park lamp should illuminate.
Right Front Park Lamp/Daytime Running Lamp	The BCM activates the right front park lamp/daytime running lamp when you select ON with a value of 100%. The right front park lamp/daytime running lamp should illuminate.
Right Front Turn Signal Lamp	The BCM activates the right front turn signal lamp when you select On. The right front turn signal/hazard lamp should illuminate.
Right Headlamp Low Beam	The BCM activates the right headlamp low beam when you select On. The right headlamp low beam should illuminate.
Right Park Lamps	The BCM activates the right park lamps when you select ON with a value of 100%. The right park lamps should illuminate.

Scan Tool Output Control	Description
Right Rear Park Lamp	The BCM activates the right rear park lamp when you select ON with a value of 100%. The right rear park lamp should illuminate.
Right Rear Stop/Park Lamp	The BCM activates the right rear stop/park lamp when you select ON with a value of 100%. The right rear stop/park lamp should illuminate.
Right Rear Turn Signal Lamp	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 Turn Signal/Stop Lamp	The BCM activates the right rear turn signal/stop lamp when you select On. The right rear turn signal/stop 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.
Right Stop Lamp	The BCM activates the right stop lamp when you select ON with a value of 100%. The right stop lamp should illuminate.
Right Trailer Turn Signal Lamp	The BCM activates the right trailer turn signal lamp when you select ON with a value of 100%. The right trailer turn signal lamp should illuminate.
Run Relay	The BCM actuates the run relay when you select On. The run relay should turn on.
Run/Crank Relay	The BCM actuates the run/crank relay when you select On. The run/crank relay should turn on.
Run/Start Power Mode Indicator	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	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.
Stop Lamps	The BCM activates the stop lamps when you select ON with a value of 100%. The stop lamps should illuminate.
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.
Trailer Backup Lamps	The BCM activates the trailer backup lamps when you select ON with a value of 100%. The trailer backup lamps should illuminate.
Trailer Park Lamps	The BCM activates the trailer park lamps when you select ON with a value of 100%. The trailer park lamps should illuminate.
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	The BCM activates the trunk lamp when you select On. The value should be 100%. The trunk lamp should illuminate until commanded Off.
Trunk Lid Unlatch	The BCM activates the trunk lid unlatch when you select On. The trunk lid should unlatch.
Window Lockout Switch Indicator	The BCM activates the window lockout switch indicator when you select On. The window lockout switch indicator should illuminate until commanded Off.
Windshield Washer Relay	The BCM actuates the windshield washer relay when you select On. The windshield washer relay should turn on.
Windshield Wiper High Speed Relay	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	The BCM actuates the windshield wiper motor relay when you select On. The windshield wiper motor relay should turn on.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Reference Information

- Data Link References
- Diagnostic System Check - Vehicle
- Diagnostic Trouble Code (DTC) List - Vehicle
- Symptoms - Vehicle

Control Module References

Code	Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
K9	Body Control Module Scan Tool Information	Body Control System Schematics	Body Control Module Replacement	Body Control Module Programming and Setup
K17	Electronic Brake Control Module Scan Tool Information	Antilock Brake System Schematics	Electronic Brake Control Module with Brake Pressure Modulator Valve Replacement	Electronic Brake Control Module Programming and Setup
K20	K20 Engine Control Module: Scan Tool Information	• Engine Controls Schematics – 2.0L (L34) or 2.4L (LE6 LP8) engine • Engine Controls Schematics – 2.5L (LVN) or 2.8L (LWH) Diesel engine • Engine Controls Schematics – 2.8L, 3.0L, 3.2L or 3.6L engine	• Engine Control Module Replacement – 2.0L (L34) or 2.4L (LE6 LP8) engine • Engine Control Module Replacement – 2.5L (LVN) or 2.8L (LWH) Diesel engine • Engine Control Module Replacement – 2.8L, 3.0L, 3.2L or 3.6L engine	K20 Engine Control Module: Programming and Setup
K33	HVAC Control Module	HVAC Schematics – Automatic or HVAC Schematics – Manual	–	HVAC System Control Module Programming and Setup
K36	Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information	SIR Schematics	Airbag Sensing and Diagnostic Module Replacement	Inflatable Restraint Sensing and Diagnostic Module Programming and Setup
K41	Object Alarm Module	Object Detection Schematics	Rear Object Alarm Control Module Replacement	Object Alarm Module Programming and Setup
K64	Theft Deterrent Module	Theft Deterrent System Schematics	Theft Deterrent Module Replacement	Theft Deterrent Module Programming and Setup
K68	Trailer Lamp Control Module Scan Tool Information	Exterior Lights Schematics or Trailer Connector/Provision Schematics	–	Trailer Lamp Control Module Programming and Setup
K69	Transfer Case Shift Control Module Scan Tool Information	Automatic Transmission Controls Schematics or Transfer Case Control Schematics	Transfer Case Shift Control Module Replacement	Transfer Case Shift Control Module Programming and Setup

Control Module References

Code	Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
K71	Control Solenoid Valve and Transmission Control Module Assembly	Automatic Transmission Controls Schematics	Control Solenoid Valve and Transmission Control Module Assembly Replacement	Control Solenoid Valve and Transmission Control Module Assembly Programming and Setup
	Transmission Control Module Scan Tool Information	or Transfer Case Control Schematics		
K77	Remote Control Door Lock Receiver	Door Lock/Indicator Schematics	Remote Control Door Lock Receiver Replacement	Remote Control Door Lock Receiver Programming and Setup
P16	Instrument Cluster Scan Tool Information	Instrument Cluster Schematics	Instrument Cluster Replacement	Instrument Cluster Programming and Setup

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

The following service procedures require either a programming or a setup event be performed for a complete repair. The transmission control module (TCM) is part of the control solenoid (w/body and TCM) valve assembly, and is not serviced separately.

[Transmission Control Module \(TCM\) Replacement](#)

If the TCM is replaced, the following procedures must be performed:

1. TCM Reprogramming
2. The Reset Transmission Adapts — Refer to Reset Transmission Adapts

[TCM Reprogramming](#)

1. If the TCM needs to be reprogrammed, refer to Service Programming System (SPS).
2. Perform the Reset Transmission Adapts — Refer to Reset Transmission Adapts.

Note: After programming, perform the following to avoid future misdiagnosis:

1. Turn the ignition OFF for 30 seconds.
2. Turn the ignition ON with the engine OFF.
3. Use the scan tool in order to retrieve history DTCs from all modules.
4. Clear all history DTCs.

[Setup for Component Replacement](#)

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the Reset Transmission Adapts procedure must be performed:

- Transmission replacement
- Any internal transmission repair
- Any speed sensor

Refer to Reset Transmission Adapts.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

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 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 is provided here. This provides an overview on how a technician should diagnose a vehicle.

A link to the Diagnostic Procedure Instructions 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
<i>Operating Conditions:</i> Engine Running			
<i>Parameter Normal Range:</i> –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 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 or Circuit Testing 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. 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.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

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 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 and perform the appropriate symptom diagnostic.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

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

Diagnostic Trouble Code (DTC) List - Vehicle

DTC	Diagnostic Procedure
2	HVAC - Automatic - DTC 2
4	HVAC - Automatic - DTC 4
5	HVAC - Automatic - DTC 5
6	HVAC - Automatic - DTC 6
B0012	Supplemental Inflatable Restraints - DTC B0012 or B0013
B0015	Supplemental Inflatable Restraints - DTC B0015, B001A, B001B, or B0022
B0016	Supplemental Inflatable Restraints - DTC B0016, B0018, B0023, or B0025
B0019	Supplemental Inflatable Restraints - DTC B0019 or B0020
B0022	Supplemental Inflatable Restraints - DTC B0015, B001A, B001B, or B0022
B0023	Supplemental Inflatable Restraints - DTC B0016, B0018, B0023, or B0025
B0052	Supplemental Inflatable Restraints - DTC B0052
B0083	Supplemental Inflatable Restraints - DTC B0083-B0088
B0084	Supplemental Inflatable Restraints - DTC B0083-B0088
B0085	Supplemental Inflatable Restraints - DTC B0083-B0088
B0086	Supplemental Inflatable Restraints - DTC B0083-B0088
B0087	Supplemental Inflatable Restraints - DTC B0083-B0088
B0088	Supplemental Inflatable Restraints - DTC B0083-B0088
B0098	Supplemental Inflatable Restraints - DTC B0098
B0158	Displays and Gauges - Outside Air Temperature Display Malfunction - DTC B0158
B0283	Fixed and Moveable Windows - DTC B0283
B0550	Displays and Gauges - DTC B0550
B067F	Supplemental Inflatable Restraints - DTC B067F or B0680
B0680	Supplemental Inflatable Restraints - DTC B067F or B0680
B0775	Transfer Case - AAM (NQV) - DTC B0775
B0780	Transfer Case - AAM (NQV) - DTC B0780
B0785	Transfer Case - AAM (NQV) - DTC B0785
B0790	Transfer Case - AAM (NQV) - DTC B0790
B0958	Object Detection - DTC B0958, B0959, B0960, or B0961
B0959	Object Detection - DTC B0958, B0959, B0960, or B0961
B0960	Object Detection - DTC B0958, B0959, B0960, or B0961
B0961	Object Detection - DTC B0958, B0959, B0960, or B0961
B0967	Object Detection - DTC B0967 or B0968
B0968	Object Detection - DTC B0967 or B0968

DTC	Diagnostic Procedure
B0969	Fixed and Moveable Windows - DTC B0969
B1000	Data Communications - DTC B1000
B1001	Data Communications - DTC B1001
B1001	Supplemental Inflatable Restraints - DTC B1001
B1015	Object Detection - DTC B1015
B1019	Supplemental Inflatable Restraints - DTC B1019
B101D	Data Communications - DTC B101D
B101E	Data Communications - DTC B101E
B1021	Immobilizer - DTC B1021
B1325	Engine Electrical - DTC B1325
B1370	Wiring Systems and Power Management - DTC B1370-B1379, B1380-B1389, or B1440-B1443
B1380	Wiring Systems and Power Management - DTC B1370-B1379, B1380-B1389, or B1440-B1443
B1405	Secondary and Configurable Customer Controls - DTC B1405
B1405	Object Detection - DTC B1405
B1441	Wiring Systems and Power Management - DTC B1370-B1379, B1380-B1389, or B1440-B1443
B1445	Wiring Systems and Power Management - DTC B1445
B1446	Immobilizer - DTC B1446 or B1447
B1447	Immobilizer - DTC B1446 or B1447
B1448	Wiring Systems and Power Management - DTC B1448
B144A	Wiring Systems and Power Management - DTC B144A
B144B	Wiring Systems and Power Management - DTC B144B
B1480	Lighting - DTC B1480
B1517	Engine Electrical - DTC B1517
B151A	Engine Electrical - DTC B151A
B1527	Engine Electrical - DTC B1527
B1543	Vehicle Access - DTC B1543
B2462	Immobilizer - DTC B2462
B2470	Immobilizer - DTC B2470
B2530	Lighting - DTC B2530
B2540	Lighting - DTC B2540
B2545	Lighting - DTC B2545
B2575	Lighting - DTC B2575 or B2699
B257A	Lighting - DTC B257A
B257B	Lighting - DTC B257B
B2580	Lighting - DTC B2580
B2585	Lighting - DTC B2585 or B3867
B2610	Lighting - DTC B2610
B2615	Lighting - DTC B2615
B2625	Lighting - DTC B2625
B2652	Lighting - DTC B2652

DTC	Diagnostic Procedure
B2699	Lighting - DTC B2575 or B2699
B270A	Shift Lock Control - DTC B270A
B2725	Transfer Case - AAM (NQV) - DTC B2725
B273A	Antilock Brake System - DTC B273A
B2745	Antilock Brake System - DTC B2745
B2750	Horns - DTC B2750
B2955	Immobilizer - DTC B2955
B3031	Immobilizer - DTC B3031
B3055	Immobilizer - DTC B3055
B305C	Immobilizer - DTC B305C
B3060	Immobilizer - DTC B3060
B3101	Remote Functions - DTC B3101
B3105	Remote Functions - DTC B3105
B3106	Remote Functions - DTC B3106
B3109	Remote Functions - DTC B3109-B3113
B310D	Remote Functions - DTC B310D-B310F
B310E	Remote Functions - DTC B310D-B310F
B310F	Remote Functions - DTC B310D-B310F
B3110	Remote Functions - DTC B3109-B3113
B3111	Remote Functions - DTC B3109-B3113
B3112	Remote Functions - DTC B3109-B3113
B3113	Remote Functions - DTC B3109-B3113
B3125	Vehicle Access - DTC B3125, B3130, or B3135
B3130	Vehicle Access - DTC B3125, B3130, or B3135
B3135	Vehicle Access - DTC B3125, B3130, or B3135
B3140	Vehicle Access - DTC B3140, B3145, B3150, or B3155
B3140	Vehicle Access - Power Door Lock Switch Malfunction - DTC B3140, B3145, B3150, or B3155
B3145	Vehicle Access - DTC B3140, B3145, B3150, or B3155
B3145	Vehicle Access - Power Door Lock Switch Malfunction - DTC B3140, B3145, B3150, or B3155
B3150	Vehicle Access - DTC B3140, B3145, B3150, or B3155
B3150	Vehicle Access - Power Door Lock Switch Malfunction - DTC B3140, B3145, B3150, or B3155
B3155	Vehicle Access - DTC B3140, B3145, B3150, or B3155
B3155	Vehicle Access - Power Door Lock Switch Malfunction - DTC B3140, B3145, B3150, or B3155
B3265	Vehicle Access - DTC B3265
B3567	Displays and Gauges - Driver Information Center Switch Malfunction - DTC B3567
B3596	Lighting - DTC B3596
B3650	Lighting - DTC B3650
B370B	Wipers and Washers - DTC B370B
B3715	Wipers and Washers - DTC B3715 or B3875
B3794	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C

DTC	Diagnostic Procedure
B3806	Lighting - DTC B3806
B3811	Wipers and Washers - DTC B3811
B3867	Lighting - DTC B2585 or B3867
B3873	Wipers and Washers - DTC B3873
B3875	Wipers and Washers - DTC B3715 or B3875
B3881	Lighting - DTC B3881 or B3882
B3882	Lighting - DTC B3881 or B3882
B3883	Lighting - DTC B3883
B3884	Lighting - DTC B3884
B389A	Immobilizer - DTC B389A
B3902	Immobilizer - DTC B3902
B3935	Immobilizer - DTC B3935
B393D	HVAC - Manual - DTC B393D
B3948	Lighting - DTC B3948 or B3949
B3949	Lighting - DTC B3948 or B3949
B3950	Lighting - DTC B3950 or B3951
B3951	Lighting - DTC B3950 or B3951
B3976	Immobilizer - DTC B3976
B3984	Immobilizer - DTC B3984
C0035	Antilock Brake System - DTC C0035, C0040, C0045, or C0050
C0040	Antilock Brake System - DTC C0035, C0040, C0045, or C0050
C0045	Antilock Brake System - DTC C0035, C0040, C0045, or C0050
C0050	Antilock Brake System - DTC C0035, C0040, C0045, or C0050
C0110	Antilock Brake System - DTC C0110
C0131	Antilock Brake System - DTC C0131
C0161	Antilock Brake System - DTC C0161
C0186	Antilock Brake System - DTC C0186, C018B, C0196, C019B, or C0287
C018B	Antilock Brake System - DTC C0186, C018B, C0196, C019B, or C0287
C0196	Antilock Brake System - DTC C0186, C018B, C0196, C019B, or C0287
C019B	Antilock Brake System - DTC C0186, C018B, C0196, C019B, or C0287
C0201	Antilock Brake System - DTC C0201
C0242	Antilock Brake System - DTC C0242
C0245	Antilock Brake System - DTC C0245
C0277	Lighting - DTC C0277 or C0890
C0287	Antilock Brake System - DTC C0186, C018B, C0196, C019B, or C0287
C0297	Lighting - DTC C0297
C0306	Transfer Case - AAM (NQV) - DTC C0306
C0364	Transfer Case - AAM (NQV) - DTC C0364 or C0379
C0379	Transfer Case - AAM (NQV) - DTC C0364 or C0379
C0381	Transfer Case - AAM (NQV) - DTC C0381

DTC	Diagnostic Procedure
C0387	Transfer Case - AAM (NQV) - DTC C0387
C0396	Transfer Case - AAM (NQV) - DTC C0396
C039A	Transfer Case - AAM (NQV) - DTC C039A
C0550	Antilock Brake System - DTC C0550
C0569	Antilock Brake System - DTC C0569
C056D	Data Communications - DTC C056D
C056D	Transfer Case - AAM (NQV) - DTC C056D
C056E	Data Communications - DTC C056E
C0710	Antilock Brake System - DTC C0710
C0800	Engine Electrical - DTC C0800
C0890	Lighting - DTC C0277 or C0890
P0010	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P0011	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0011, P0014, P0021, or P0024
P0013	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P0014	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0011, P0014, P0021, or P0024
P0016	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0016
P0016	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0016
P0016	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0016, P0017, P0018, or P0019
P0017	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0016, P0017, P0018, or P0019
P0018	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0016, P0017, P0018, or P0019
P0019	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0016, P0017, P0018, or P0019
P0020	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P0021	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0011, P0014, P0021, or P0024
P0023	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P0024	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0011, P0014, P0021, or P0024
P0030	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0030	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0031	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0031	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0032	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0032	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0036	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0036	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0037	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0037	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0038	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141

DTC	Diagnostic Procedure
P0038	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0045	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0045
P0046	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0046
P0050	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0051	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0052	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0053	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0053	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0054	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0054	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0056	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0057	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0058	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0059	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0060	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0068	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0068 or P1101
P0068	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0068 or P1101
P0069	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0069
P0089	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0089
P0090	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0090
P0095	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0095
P0100	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0100 or P0101
P0101	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0101
P0101	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0101
P0101	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0100 or P0101
P0102	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0102 or P0103
P0102	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0102 or P0103
P0103	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0102 or P0103
P0103	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0102 or P0103
P0105	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0105
P0106	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0106
P0106	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0106
P0107	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0107 or P0108
P0107	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0107 or P0108
P0108	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0107 or P0108

DTC	Diagnostic Procedure
P0108	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0107 or P0108
P0110	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0110
P0111	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0111
P0112	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0112, P0113, or P0114
P0112	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0112, P0113, or P0114
P0113	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0112, P0113, or P0114
P0113	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0112, P0113, or P0114
P0114	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0112, P0113, or P0114
P0114	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0112, P0113, or P0114
P0115	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0115
P0116	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0116
P0117	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0117 or P0118
P0117	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0117, P0118, or P0119
P0118	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0117 or P0118
P0118	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0117, P0118, or P0119
P0119	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0117, P0118, or P0119
P0121	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P0121	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P0122	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P0122	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P0123	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P0123	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P0128	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0128
P0131	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0131	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0132	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0132	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0133	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0133 or P1133
P0133	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P0134	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0134	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0135	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0135	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0137	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0137	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0138	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0138	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160

DTC	Diagnostic Procedure
P013A	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P013B	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P013C	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P013D	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P013E	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P013F	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P0140	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0131, P0132, P0134, P0137, P0138, or P0140
P0140	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0141	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0030-P0032, P0036-P0038, P0053, P0054, P0135, or P0141
P0141	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P014A	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P014B	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P0151	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0152	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0153	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P0154	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0155	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0157	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0158	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P015A	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P015B	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P015C	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P015D	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P0160	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0131, P0132, P0134, P0137, P0138, P0140, P0151, P0152, P0154, P0157, P0158, or P0160
P0161	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161
P0171	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0171, P0172, P0174, or P0175
P0172	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0171, P0172, P0174, or P0175
P0174	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0171, P0172, P0174, or P0175
P0175	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0171, P0172, P0174, or P0175

DTC	Diagnostic Procedure
P0180	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0180
P0190	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0190
P0191	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0191
P0201	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0201-P0204
P0201	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0201-P0204
P0201	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0202	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0201-P0204
P0202	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0201-P0204
P0202	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0203	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0201-P0204
P0203	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0201-P0204
P0203	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0204	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0201-P0204
P0204	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0201-P0204
P0204	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0205	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0206	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0213	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0213 or P120B
P0219	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0219
P0222	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P0222	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P0223	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P0223	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P0234	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0234 or P0299
P0261	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0262	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0263	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0263, P0266, P0269, or P0272
P0264	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0265	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0266	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0263, P0266, P0269, or P0272
P0267	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0268	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0269	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0263, P0266, P0269, or P0272
P0270	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277

DTC	Diagnostic Procedure
P0271	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0272	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0263, P0266, P0269, or P0272
P0273	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0274	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0276	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0277	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, or P0277
P0299	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0234 or P0299
P02E0	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P02E0
P0300	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0300-P0304
P0300	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0301	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0300-P0304
P0301	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0302	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0300-P0304
P0302	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0303	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0300-P0304
P0303	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0304	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0300-P0304
P0304	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0305	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0306	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0300-P0306
P0315	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0315
P0315	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0315
P0324	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0324, P0326, P0331, P06B6, or P06B7
P0325	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0325-P0328 or P06B6
P0325	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0326	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0325-P0328 or P06B6
P0326	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0324, P0326, P0331, P06B6, or P06B7
P0327	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0325-P0328 or P06B6
P0327	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0328	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0325-P0328 or P06B6
P0328	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0330	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0331	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0324, P0326, P0331, P06B6, or P06B7
P0332	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0333	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0325, P0327, P0328, P0330, P0332, or P0333
P0335	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0335 or P0336
P0335	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0335
P0335	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0335 or P0336

DTC	Diagnostic Procedure
P0336	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0335 or P0336
P0336	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0335 or P0336
P0340	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0340 or P0341
P0340	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0340
P0340	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0341	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0340 or P0341
P0341	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0345	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0346	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0351	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0351	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0351 or P0352
P0352	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0352	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0351 or P0352
P0353	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0354	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0355	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0356	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0351-P0356
P0365	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0366	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0390	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0391	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0340, P0341, P0345, P0346, P0365, P0366, P0390, or P0391
P0401	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0401 or P0402
P0402	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0401 or P0402
P0403	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0403
P0420	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0420
P0420	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0420 or P0430
P0430	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0420 or P0430
P0443	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0443
P0443	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0443
P0460	Displays and Gauges - DTC P0460
P0461	Displays and Gauges - Fuel Gauge Malfunction - DTC P0461-P0464
P0462	Displays and Gauges - Fuel Gauge Malfunction - DTC P0461-P0464
P0463	Displays and Gauges - Fuel Gauge Malfunction - DTC P0461-P0464
P0464	Displays and Gauges - Fuel Gauge Malfunction - DTC P0461-P0464
P0480	Engine Cooling - LE6 or LP8 - DTC P0480 or P0481
P0480	Engine Cooling - LY7 - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0481	Engine Cooling - LE6 or LP8 - DTC P0480 or P0481
P0481	Engine Cooling - LY7 - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0500	Manual Transmission - Eaton 5-Speed - DTC P0500, P0502, or P0503
P0502	Manual Transmission - Eaton 5-Speed - with RPO NQV - DTC P0502 or P0503

DTC	Diagnostic Procedure
P0502	Manual Transmission - Eaton 5-Speed - DTC P0500, P0502, or P0503
P0503	Manual Transmission - Eaton 5-Speed - with RPO NQV - DTC P0502 or P0503
P0503	Manual Transmission - Eaton 5-Speed - DTC P0500, P0502, or P0503
P0506	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0506 or P0507
P0507	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0506 or P0507
P0513	Immobilizer - DTC P0513
P0520	Displays and Gauges - Engine Oil Pressure Indicator Malfunction - DTC P0520
P0530	HVAC - Automatic - DTC P0530, P0532, or P0533
P0530	HVAC - Manual - DTC P0530, P0532, or P0533
P0532	HVAC - Automatic - DTC P0530, P0532, or P0533
P0532	HVAC - Manual - DTC P0530, P0532, or P0533
P0533	HVAC - Automatic - DTC P0530, P0532, or P0533
P0533	HVAC - Manual - DTC P0530, P0532, or P0533
P0560	Engine Electrical - DTC P0560
P0562	Engine Electrical - DTC P0562 or P0563
P0563	Engine Electrical - DTC P0562 or P0563
P0564	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0565	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0567	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0568	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P056C	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0572	Cruise Control - DTC P0572 or P0573
P0573	Cruise Control - DTC P0572 or P0573
P0575	Cruise Control - DTC P0575
P057B	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P057B-P057D
P057C	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P057B-P057D
P057D	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P057B-P057D
P0580	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0581	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P0601	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0601	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0601	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0601	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0601, P0603, P0604, or P062F
P0602	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0602	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610

DTC	Diagnostic Procedure
P0602	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0602	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0603	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0603	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0603	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0603	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0603	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0601, P0603, P0604, or P062F
P0604	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0604	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0604	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0604	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0604	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0601, P0603, P0604, or P062F
P0605	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0605	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0606	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0606	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P0606	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0606	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0607	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0607	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0607	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P060A	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P060A	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P060B	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P060C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0610	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0610	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0615	Engine Electrical - DTC P0615
P0616	Engine Electrical - DTC P0616 or P0617
P0617	Engine Electrical - DTC P0616 or P0617
P061C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0621	Engine Electrical - DTC P0621
P0622	Engine Electrical - DTC P0622

DTC	Diagnostic Procedure
P0627	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0627
P0628	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0628 or P0629
P0628	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0628
P0629	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0628 or P0629
P062B	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P062B	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P062B	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P062C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P062D	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P062E	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P062F	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P062F	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P062F	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0601, P0603, P0604, or P062F
P062F	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P062F	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0630	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P0630	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0630	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P0633	Immobilizer - DTC P0633
P0634	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0634
P0641	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0641, P0651, P0697, or P06A3
P0641	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0641, P0651, or P0697
P0641	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0641, P0651, P0697, or P06A3
P0645	HVAC - Automatic - DTC P0645
P0645	HVAC - Manual - DTC P0645
P064C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P064C
P0651	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0641, P0651, P0697, or P06A3
P0651	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0641, P0651, or P0697
P0651	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0641, P0651, P0697, or P06A3
P0658	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0658 or P0659
P0659	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0658 or P0659
P0667	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0667, P0668, or P0669
P0668	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0667, P0668, or P0669
P0669	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0667, P0668, or P0669
P0670	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0670
P0671	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0671-P0674

DTC	Diagnostic Procedure
P0672	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0671-P0674
P0673	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0671-P0674
P0674	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0671-P0674
P0683	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0683
P0685	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P0685	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0685, P0689, P0690, or P1682
P0686	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P0687	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P0689	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0685, P0689, P0690, or P1682
P0689	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P0690	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0685, P0689, P0690, or P1682
P0690	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P0691	Engine Cooling - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0692	Engine Cooling - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0693	Engine Cooling - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0694	Engine Cooling - DTC P0480, P0481, P0691, P0692, P0693, or P0694
P0697	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0641, P0651, P0697, or P06A3
P0697	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0641, P0651, or P0697
P0697	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0641, P0651, P0697, or P06A3
P06A3	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0641, P0651, P0697, or P06A3
P06A3	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0641, P0651, P0697, or P06A3
P06AC	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P06AC, P06AD, or P06AE
P06AD	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P06AC, P06AD, or P06AE
P06AE	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P06AC, P06AD, or P06AE
P06B6	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0325-P0328 or P06B6
P06B6	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0324, P0326, P0331, P06B6, or P06B7
P06B7	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0324, P0326, P0331, P06B6, or P06B7
P0700	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0700
P0700	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0700
P0703	Cruise Control - DTC P0703
P0711	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0711-P0713
P0712	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0711-P0713
P0713	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0711-P0713
P0716	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0716 or P0717
P0717	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0716 or P0717
P0722	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0722 or P0723
P0723	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0722 or P0723
P0741	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0741 or P0742
P0742	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0741 or P0742
P0751	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0751 or P0752

DTC	Diagnostic Procedure
P0752	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0751 or P0752
P0756	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0756
P0776	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0776 or P0777
P0777	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0776 or P0777
P0796	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0796 or P0797
P0797	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0796 or P0797
P0815	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0815, P0816, P0826, or P1876
P0816	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0815, P0816, P0826, or P1876
P0826	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0815, P0816, P0826, or P1876
P0830	Manual Transmission - Eaton 5-Speed - DTC P0830, P0831, or P0833
P0831	Manual Transmission - Eaton 5-Speed - DTC P0830, P0831, or P0833
P0833	Manual Transmission - Eaton 5-Speed - DTC P0830, P0831, or P0833
P0842	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0842 or P0843
P0843	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0842 or P0843
P0850	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0850-P0852
P0851	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0850-P0852
P0852	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0850-P0852
P0856	Antilock Brake System - DTC P0856
P0872	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0872 or P0873
P0873	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0872 or P0873
P0877	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0877 or P0878
P0878	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0877 or P0878
P0961	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0961-P0963
P0962	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0961-P0963
P0963	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0961-P0963
P0965	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0965-P0967
P0966	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0965-P0967
P0967	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0965-P0967
P0969	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0969-P0971
P0970	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0969-P0971
P0971	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0969-P0971
P0973	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0973 or P0974
P0974	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0973 or P0974
P0976	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0976 or P0977
P0977	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0976 or P0977
P0989	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0989 or P0990
P0990	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0989 or P0990
P1101	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0068 or P1101
P1101	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0068 or P1101
P1104	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1104

DTC	Diagnostic Procedure
P1133	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0133 or P1133
P120B	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0213 or P120B
P120C	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P120C or P120E
P120E	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P120C or P120E
P1224	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P1224, P1227, P122A, or P1233
P1227	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P1224, P1227, P122A, or P1233
P122A	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P1224, P1227, P122A, or P1233
P1233	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P1224, P1227, P122A, or P1233
P1258	Engine Cooling - DTC P1258
P150C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P150C
P150C	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P150C
P1516	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P1516	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P1516, P2101, P2119, or P2176
P155A	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P155B	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P155C	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P161C	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P161E	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P161E
P161F	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P0602-P0607, P060A-P060C, P061C, P062B-P062F, P0630, P161C, or P161F
P1629	Immobilizer - DTC P1629
P162C	Cruise Control - Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C
P1631	Immobilizer - DTC P1631
P1649	Immobilizer - DTC P1649
P1677	Immobilizer - DTC P1677
P1682	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0685, P0689, P0690, or P1682
P1682	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0685-P0687, P0689, P0690, or P1682
P16A0	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P16A1	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P16A2	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P16F3	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P16F3	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P1761	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P1761
P1762	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P1762
P1793	Antilock Brake System - DTC P1793
P182E	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P182E or P1915
P1875	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P1875
P1875	Manual Transmission - Eaton 5-Speed - DTC P1875

DTC	Diagnostic Procedure
P1876	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P0815, P0816, P0826, or P1876
P1915	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P182E or P1915
P2088	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2089	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2090	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2091	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2092	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2093	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2094	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2095	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0010, P0013, P0020, P0023, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095
P2100	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2101	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2101	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P1516, P2101, P2119, or P2176
P2102	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2103	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2119	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2119	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P1516, P2101, P2119, or P2176
P2120	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2120, P2125, or P2138
P2122	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P2122, P2123, P2127, P2128, or P2138
P2122	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2122, P2123, P2127, P2128, or P2138
P2123	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P2122, P2123, P2127, P2128, or P2138
P2123	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2122, P2123, P2127, P2128, or P2138
P2125	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2120, P2125, or P2138
P2127	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P2122, P2123, P2127, P2128, or P2138
P2127	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2122, P2123, P2127, P2128, or P2138
P2128	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P2122, P2123, P2127, P2128, or P2138
P2128	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2122, P2123, P2127, P2128, or P2138
P2135	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0121-P0123, P0222, P0223, or P2135
P2135	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135
P2138	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2120, P2125, or P2138
P2138	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P2122, P2123, P2127, P2128, or P2138
P2138	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2122, P2123, P2127, P2128, or P2138
P2146	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2146 or P2149
P2149	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2146 or P2149
P2160	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2160 or P2161
P2161	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2160 or P2161

DTC	Diagnostic Procedure
P2176	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P1516, P2100-P2103, P2119, or P2176
P2176	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P1516, P2101, P2119, or P2176
P2226	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2226
P2227	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2227-P2230
P2228	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2227-P2230
P2229	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2227-P2230
P2230	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2227-P2230
P2264	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2264
P2270	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P2271	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P2272	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P2273	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273
P245A	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P245A
P2510	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2510
P2534	Wiring Systems and Power Management - DTC P2534 or P2535
P2535	Wiring Systems and Power Management - DTC P2534 or P2535
P2537	Wiring Systems and Power Management - DTC P2537
P2544	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2544
P2544	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P2544
P2544	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2544
P2610	Engine Controls/Fuel - 2.4L (LE6 LP8) - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P2610	Engine Controls/Fuel - 2.8L, 3.0L, 3.2L, or 3.6L - DTC P0601-P0604, P0606, P0607, P0610, P062B, P062F, P0630, P16F3, or P2610
P262B	Data Communications - DTC P0601-P0606, P060A, P062F, or P262B
P2687	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P2687
P268A	Engine Controls/Fuel - 2.5L (LVN) or 2.8L (LWH) Diesel - DTC P268A
P2714	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2714 or P2715
P2715	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2714 or P2715
P2719	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2719-P2721
P2720	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2719-P2721
P2721	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2719-P2721
P2723	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2723 or P2724
P2724	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2723 or P2724
P2728	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2728-P2730
P2729	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2728-P2730
P2730	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2728-P2730
P2762	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2762, P2763, or P2764
P2763	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2762, P2763, or P2764
P2764	Automatic Transmission - 6L45/6L50/6L80/6L90 - DTC P2762, P2763, or P2764

Diagnostic Trouble Code (DTC) List - Vehicle

DTC	Diagnostic Procedure
U0020	Data Communications - DTC U0020
U0073	Data Communications - DTC U0073 or U2100
U0074	Data Communications - DTC U0074
U0078	Data Communications - DTC U0078
U0100-U02FF	Data Communications - DTC U0100-U02FF
U0300-U0336	Data Communications - DTC U0300-U0336
U0400-U05FF	Data Communications - DTC U0400-U05FF
U1500-U15FF	Data Communications - DTC U1500-U15FF
U1814	Data Communications - DTC U1814
U1826	Data Communications - DTC U1826
U18B9-U18BF	Data Communications - DTC U18B9-U18BF
U2099	Data Communications - DTC U2099
U2100	Data Communications - DTC U0073 or U2100
U2101	Data Communications - DTC U2101

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

The following service procedures require either a programming or a setup event performed for a complete repair.

[Electronic Brake Control Module Replacement](#)

If the electronic brake control module (EBCM) needs to be replaced, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to Service Programming System (SPS).
2. Perform the SPS function Electronic Brake Control Module – Programming and follow the on-screen instructions.
3. Perform the SPS function Electronic Brake Control Module – Configuration & Setup and follow the on-screen instructions. On the screen Control Module – Configuration and Setup Function(s), select both control module Configuration/Reconfiguration and control module Setup.
4. Clear DTCs after completing the programming procedure.

[Electronic Brake Control Module Reprogramming](#)

If the EBCM needs to be reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to Service Programming System (SPS).
2. Perform the SPS function Electronic Brake Control Module – Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

[Setup for Component Replacement](#)

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the corresponding procedure must be performed.

Steering Angle Sensor

Calibrate the steering angle sensor. Refer to Steering Angle Sensor Centering.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Electronic Brake Control Module Scan Tool Data Parameter](#)

Table 2: [Electronic Brake Control Module Scan Tool Output Controls](#)

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	—	0–14 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 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.
Front Isolation Solenoid Valve	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the front isolation solenoid valve is commanded ON.
Lateral Acceleration Signal	—	Varies	The scan tool displays the current lateral acceleration in m/s^2 .
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.
Longitudinal Acceleration	—	Varies	The scan tool displays the current longitudinal acceleration in m/s^2 .
Pump Motor Relay Feedback	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the pump motor is commanded ON.
Rear Isolation Solenoid Valve	—	Inactive	The scan tool displays Inactive or Active. Active is displayed when the rear isolation 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.

Parameter	System State	Expected Value	Description
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.
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.
Steering Wheel Angle	—	Varies	The scan tool displays the steering wheel angle position.
Steering Wheel Angle Sensor	—	OK	The scan tool displays OK or Malfunction. Malfunction is displayed when the system is defective.
Steering Wheel Angle Sensor Centering	—	OK	The scan tool displays OK or Not OK. The Scan tool displays the steering angle sensor centered status.
System Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Vehicle Stability Control Left Front/Right Rear Solenoid Valves	—	Inactive	The scan tool displays Active or Inactive. The scan tool displays the commanded state of the vehicle stability control solenoid valve.
Vehicle Stability Control Right Front/Left Rear Solenoid Valves	—	Inactive	The scan tool displays Active or Inactive. The scan tool displays the commanded state of the vehicle stability control solenoid valve.
Yaw Rate Signal	—	Varies	The scan tool displays the current yaw rate in °/s.

Electronic Brake Control Module Scan Tool Output Controls

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

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Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

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

- Engine Cranks But Does Not Run – 2.0L (L34) or 2.4L (LE6 LP8) engine
- Engine Cranks But Does Not Run – 2.5L (LKH LVN) or 2.8L (LVC LWH) Diesel engine
- Engine Cranks But Does Not Run – 2.8L, 3.0L, 3.2L, or 3.6L engine

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Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

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

- Starter Solenoid Does Not Click
- Starter Solenoid Clicks, Engine Does Not Crank
- Engine Cranks Slowly

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Submodel: | **Engine Type:** | **Liters:**

Fuel Delivery: | **Fuel:**

The inflatable restraint sensing and diagnostic module (SDM) must be programmed with the proper calibration software. The module stores and utilizes this information however if it is not properly configured with the correct calibration software, the SDM will not control all of the vehicle features properly.

Ensure that the following conditions exist in order to prepare for SDM programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the SDM unless directed by a service procedure or a service bulletin.

Note:

- The air bag indicator light may remain ON after the body control module (BCM), or SDM is replaced, and during the programming procedure for the BCM until after the procedure is completed. When installing a new SDM, there may be several DTCs set prior to programming. Once programmed, these DTCs should be in history and can be cleared.
- Failure to complete the following Setup procedure may cause DTC B1001 to be set in the SDM.

The following service procedures require either a programming or a setup event performed for a complete repair:

[Sensing and Diagnostic Module Replacement and/or Programming](#)

If the inflatable restraint sensing and diagnostic module needs to be replaced and/or reprogrammed, the following procedures must be performed:

1. Access SPS. Refer to Service Programming System (SPS).
2. Perform the SPS function Inflatable Restraint Sensing and Diagnostic Module Programming and follow the on-screen instructions.
3. Perform the SPS function Inflatable Restraint Sensing and Diagnostic Module Setup and follow the on-screen instructions.
4. Clear DTCs after completing the programming procedure.

If the control module fails to program, proceed as follows:

1. Ensure the DLC and Accessory Power Module connections are good.
2. Inspect the Techline equipment for the latest software version.
3. Attempt to program the SDM. If the SDM still cannot be programmed properly, replace the SDM.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Supplemental Inflatable Restraint Scan Tool Data Parameters](#)

Table 2: [Supplemental Inflatable Restraint Scan Tool Output Controls](#)

Supplemental Inflatable Restraint Scan Tool Data Parameters

Parameter	Expected Value	Definition
<i>Operating Conditions:</i> Ignition ON		
Active Switch	Enabled	The scan tool displays Enabled or Disabled. This is the state of the SIR active switch.
Active Switch	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR learned the active switch.
Battery Voltage Signal	Varies	This displays volts. This is the voltage input supplied to the SDM.
Driver Seat Belt Switch	Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the driver seat belt.
Driver Seat Belt Type	Varies	The scan tool displays Switch or Sensor. This is the type of driver seat belt.
Driver Seat Position Sensor	Enabled	The scan tool displays Enabled or Disabled. This is the state of the driver seat position sensor.
Driver Seat Position Sensor	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR learned the driver seat position sensor.
Driver Seat Position Sensor	Varies	The scan tool displays Rearward or Forward. This is the positional state of the drive seat.
Loop 1–12	Enabled	The scan tool displays Enabled or Disabled. This is the state of the SIR loop.
Loop 1–12	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR has that number loop learned.
Loop 1–12 Type	Varies	The scan tool displays Not Used, LF Stage 1, RF Stage 1, LF Stage 2, RF Stage 2, LF Preten., RF Preten., LF Side Bag, RF Side Bag, Lt. Roof Stage1, Rt. Roof Stage1, Lt. Roof Stage2, Rt. Roof Stage2, Lt. Roof Stage3 or Rt. Roof Stage3. This is the type of loop.
Passenger Seat Belt Switch	Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the passenger seat belt.
PPS Options	Varies	The scan tool displays Not Present, Manual, Auto or Auto. + Man. This is the current enabled option of the passenger presence system.
PPS Status	Enabled	The scan tool displays Enabled or Disabled. This is the state of the passenger presence system.
PPS Status	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR has learned the passenger presence system.
Primary Key Status	Valid	The scan tool displays Unknown, Valid or Invalid. This is the state of the primary key of the SDM.
Psgr. Seat Belt Sensor	Enabled	The scan tool displays Enabled or Disabled. This is the state of the passenger seat belt sensor.
Psgr. Seat Belt Sensor	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR learned the passenger seat belt sensor.
Psgr. Seat Belt Sensor	Varies	This displays mA. This is the amount of current supplied to the passenger seat belt sensor.
Psgr. Seat Belt Type	Varies	The scan tool displays Switch or Sensor. This is the type of passenger seat belt.
Psgr. Seat Position Sensor	Enabled	The scan tool displays Enabled or Disabled. This is the state of the passenger seat position sensor.
Psgr. Seat Position Sensor	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR learned the passenger seat position sensor.

Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information

Parameter	Expected Value	Definition
Psg. Seat Position Sensor	Inactive	The scan tool displays Rearward or Forward. This is the positional state of the passenger seat.
Received Primary Key	Valid	The scan tool displays Unknown, Valid or Invalid. Valid is shown if the primary key received from the BCM matches the SDM primary key.
Received VIN Digits 2–5	Varies	The scan tool displays the Secondary Key which includes digits 2 though 5 of the VIN that the BCM sends to the SDM.
Received VIN Digits 6–7	Varies	The scan tool displays the Secondary Key which includes digits 6 and 7 of the VIN that the BCM sends to the SDM.
Rollover Sensor	Enabled	The scan tool displays Enabled or Disabled. This is the state of the rollover sensor.
Rollover Sensor	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR learned the rollover sensor.
Run/Crank	Active	This displays volts. This is the current power mode of the SDM.
Sensor 1–6	Enabled	The scan tool displays Enabled or Disabled. This is the state of the sensor.
Sensor 1–6	Learned	The scan tool displays Learned or Unlearned. Learned is displayed if the SIR has that sensor learned.
Sensor 1–6 Type	Learned	The scan tool displays Not Used, EFS LF, EFS Center, EFS RF, SIS Left Row 1, SIS Right Row 1, SIS Left Row 2 or SIS Right Row 2. This is the type of SIR sensor.
SDM Primary Key	Varies	The scan tool displays the primary key that the SDM has stored to memory.
SIR Warning Indicator	Inactive	The scan tool displays On or Off. This is the status of the SIR warning indicator.

Supplemental Inflatable Restraint Scan Tool Output Controls

Scan Tool Output Control	Description
Setup New SDM	This output control is used to set up a new SDM.
Setup SDM Primary Key in BCM	This output control is used to set up a new SDM primary key in the BCM.

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Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

Special Tools

EL 49642 SPS Programming Support Tool

For equivalent regional tools, refer to Special Tools.

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the ECU is not properly configured with the correct calibration software, the ECU will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or ECU damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Replace and Program ECU or Reprogram ECU

To program a replacement or an existing ECU, perform the following procedure:

1. Install *EL-49642* SPS programming support tool
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select Instrument Cluster – Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select Instrument Cluster – Setup and follow the on-screen instructions.
5. On the SPS Supported Controllers screen, select Instrument Cluster – Configuration and follow the on-screen instructions.
6. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all ECU, DLC and programming tool connections are secure and the TIS terminal operating software is up to date.
 2. Attempt to reprogram the ECU.
 3. If the ECU can still not be programmed, turn the ignition OFF for at least one minute.
 4. Turn the ignition ON and attempt to reprogram the ECU. The ECU should program.
- If the ECU still cannot be programmed, replace the ECU.

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Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Instrument Cluster Scan Tool Data Parameters](#)

Table 2: [Instrument Cluster Scan Tool Output Controls](#)

Instrument Cluster Scan Tool Data Parameters		
Parameter	Expected Value	Description
<i>Operating Conditions: Ignition ON</i>		
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.
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.

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Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

Special Tools

EL-49642 SPS Programming Support Tool

For equivalent regional tools, refer to Special Tools.

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the EL-49642 SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.
- Note the engine oil life remaining percentage.

Replace and Program Control Module

To program a replacement K20 Engine Control Module (ECM), perform the following procedure:

1. Install EL-49642 SPS programming support tool.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Before removing the old control module, perform the SPS function Prepare Control Module for Removal, if available.
Note: The Prepare Control Module for Removal function can only be performed when communication with the old control module is still possible.
4. Replace the ECM.
5. Perform the SPS function K20 Engine Control Module - Programming and follow the on-screen instructions.
6. Clear the DTCs after completing the Programming procedure.
7. Perform the SPS function Immobilizer Learn and follow the on-screen instructions. Refer to Immobilizer System Component Programming.
8. Perform the SPS function K20 Engine Control Module - Configuration & Setup and follow the on-screen instructions.
9. Clear DTCs after completing the Configuration & Setup procedure.

Reprogram Control Module

To reprogram an existing K20 Engine Control Module, perform the following procedure:

1. Install EL-49642 SPS programming support tool.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Clear DTCs after completing the Programming procedure.
4. Perform the SPS Function Immobilizer Learn and follow the on-screen instructions. Refer to Immobilizer System Component Programming.
5. Perform the SPS function Engine Control Module - Configuration & Setup and follow the on-screen instructions, if available.
6. Clear DTCs after completing the Configuration & Setup procedure.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following:

1. Ignition ON. Ensure the control module, DLC, and programming tool connections are secure and the SPS software is up to date.
 2. Verify the control module can be reprogrammed.
- *If the control module cannot be reprogrammed*
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the control module can be reprogrammed.
 - If the control module cannot be reprogrammed, replace the K20 Engine Control Module.
 - *If the control module can be reprogrammed*
 - All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for ECM replacement, programming and setup.

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Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Engine Control Module Scan Tool Data Parameters](#)

Table 2: [Engine Control Module \(ECM\) Scan Tool Output Controls](#)

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 is completed.
- No diagnostic trouble codes (DTCs)
- 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 for engine diagnosis.

Engine Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
<i>Operating Conditions:</i> Engine Idling/Radiator Hose Hot/Closed Throttle/Park or Neutral/Closed Loop/Accessories Off/Brake Pedal Released			
5 V Reference 1, 2, 3, or 4	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 V Reference 1, 2, 3, or 4 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 Disengage 1–8 History	A/C ON	Reason for A/C Disengagement	The parameter indicates the reason the air conditioning (A/C) compressor was disengaged. The scan tool displays None, A/C Pressure, Engine Speed, Battery Voltage, Anti Stall, RPM Unstable, wide open throttle (WOT), Launch Performance, Coolant Hot, Accelerator Pedal Position (APP), Air Bag Deploy, or A/C Relay DTC.
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.
	A/C ON	1.3–2.5 V*	*Varies with temperature and relative humidity.
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.
	Engine Speed at 2,000 RPM	1.117–2.350 kPa* (162–341 PSI)*	*Varies with temperature and relative humidity.
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 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.
A/C Compressor Clutch Relay Control Circuit Open Test Status	A/C ON or Off	OK/Not Run	This parameter displays the state of the air conditioning (A/C) clutch relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
A/C Compressor Clutch Relay Control Circuit Low Voltage Test Status	A/C ON or Off	OK/Not Run	This parameter displays the state of the air conditioning (A/C) clutch relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit

Parameter	System State	Expected Value	Description
			faults are detected during the current test.
A/C Compressor Clutch Relay Control Circuit High Voltage Test Status	A/C ON or Off	OK/Not Run	This parameter displays the state of the air conditioning (A/C) clutch relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
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 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.
Ambient Air Temperature	—	°C (°F) Varies	This parameter displays the surrounding air temperature, at any given altitude.
Ambient Air Temperature When Recommended Maximum Fuel Alcohol Content Exceeded	Ignition ON	0°C (32°F) or less	This parameter displays Ambient Air temperature when recommended Ethanol concentration exceeded.
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 1 Circuit Status	Ignition ON	OK Fault	APP Sensor 1 Out of Range indicates that the sensed accelerator pedal position 1 sensor value is currently out of range or that a Malfunction has been detected based upon the sensed accelerator pedal position 1 sensor value being out of range.
APP Sensor 1 Learned Released Position	Ignition ON	Varies	This Parameter indicates the accelerator pedal sensor 1 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the calibration.)
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	
APP Sensor 2 Circuit Status	Ignition ON	OK Fault	APP Sensor 2 Out of Range indicates that the sensed accelerator pedal position 2 sensor value is currently out of range or that a Malfunction has been detected based upon the sensed accelerator pedal position 1 sensor value being out of range.
APP Sensor 2 Learned Released Position	Ignition ON	Varies	This Parameter indicates the accelerator pedal sensor 2 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the calibration.)
APP Sensor 1 and 2	—	Agree	This parameter displays the results of a control module test that compares the signals from the APP sensors 1 and 2. The scan tool will display Agree or Disagree. Agree indicates that APP sensor 1 and APP sensor 2

Parameter	System State	Expected Value	Description
			voltages correspond to the same accelerator pedal position. Disagree indicates that APP sensor 1 and APP sensor 2 voltages correspond to different accelerator pedal positions.
APP Sensors	—	0%	This parameter displays the average of the APP sensors as calculated by the throttle actuator control (TAC) module. The APP average is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
APP Sensor 1 Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the APP sensor 1 as calculated by the control module using the signal from the APP sensor 1. APP sensor 1 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
APP Sensor 2 Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the APP sensor 2 as calculated by the control module using the signal from the APP sensor 2. APP sensor 2 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
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.
Brake Pedal Position	The brake pedal is applied	Applied	This parameter displays the status of the brake pedal switch.
	The brake pedal is released	Released	
Calculated Air Flow	—	g/s Varies	This parameter displays the air flow of the engine as calculated by the control module.
Calculated Catalyst Temperature	—	°C (°F) Varies	This parameter displays the catalyst temperature as calculated by the control module.
Calculated Engine Oil Temperature	—	°C (°F) Varies	This parameter displays the temperature of the engine oil as calculated by the control module using various sensor inputs. The engine oil temperature calculated has a range of values indicating a low value when the oil temperature is low to a high value when the oil temperature is high.
Camshaft Position Active Counter	—	0–255 Counts	This parameter displays an incrementing counter when the control module receives a signal from the camshaft position sensors.
Camshaft Position Sensor	—	Engine Speed	This parameter displays the speed of the engine as calculated by the signal from the camshaft position sensor, shown in RPM.
Catalyst Monitor Complete	—	Yes or No	This parameter displays the monitor completion status.
Catalyst Monitor Complete This Ignition Cycle	—	Yes or No	This parameter displays the monitor completion status during the current driving/monitoring cycle.
Catalyst Monitor Enabled	—	Yes or No	This parameter displays the monitor enable status.
Catalyst Monitor Enabled This Ignition Cycle	—	Yes or No	This parameter displays the monitor enable status during the current driving/monitoring cycle.
Catalyst Monitor Not At Idle Test Conditions Met	—	Yes or No	This parameter displays the status of the catalyst monitor diagnostic. Off Idle Conditions Met indicates if the off idle conditions for the catalyst monitor diagnostic have been met. Once the Off Idle Conditions are met the vehicle can return to idle and allow the catalyst monitor diagnostic test to run.
Catalyst Monitor Test Counter	—	Counts	This parameter displays the number of catalyst monitor diagnostics that have passed.

Parameter	System State	Expected Value	Description
Catalyst Monitor Test Result	—	Varies	This parameter displays the status of the catalyst monitor diagnostic.
Catalyst Monitor Test State	—	Varies	This parameter displays when the catalyst monitor diagnostic is actively running a test. This condition will only be true when the vehicle is at idle.
Change Engine Oil Indicator Command	—	On/Off	This parameter displays the state of the change engine oil lamp commanded by the engine control module.
Cold Start Fuel Injector Command	Engine Cranking	%	This Parameter displays the commanded duty cycle for the cold start fuel injector.
Cold Start Fuel Injector Control Circuit High Voltage Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel injector control circuit. The parameter displays Malfunction if the cold start fuel injector control circuit is shorted to voltage.
Cold Start Fuel Injector Control Circuit Low Voltage Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel injector control circuit. The parameter displays Malfunction if the cold start fuel injector control circuit is shorted to ground.
Cold Start Fuel Injector Control Circuit Open Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel injector control circuit. The parameter displays Malfunction if the cold start fuel injector control circuit is open.
Cold Start Fuel Pump Relay Command	Engine Cranking	ON	This parameter displays the engine control modules commanded state of the cold start fuel pump relay command control circuit.
Cold Start Fuel Pump Relay Control Circuit High Voltage Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel relay control circuit. The parameter displays Malfunction if the cold start fuel relay control circuit is shorted to voltage.
Cold Start Fuel Pump Relay Control Circuit Low Voltage Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel relay control circuit. The parameter displays Malfunction if the cold start fuel relay control circuit is shorted to ground.
Cold Start Fuel Pump Relay Control Circuit Open Test Status	Engine Cranking	OK/Malfunction/Not Run	This parameter displays the state of the cold start fuel relay control circuit. The parameter displays Malfunction if the cold start fuel relay control circuit is open.
Cold Start Up	—	Varies	This parameter displays whether the engine meets the conditions for a cold startup during the present ignition cycle. The scan tool displays Yes when the conditions for a cold startup are met during this ignition cycle. The scan tool displays No when the conditions for a cold startup are not met during the present ignition cycle. Conditions for a cold startup require the coolant temperature and the intake air temperature to be below a predetermined temperature and within a certain range of each other. These conditions must occur after the engine was warmed up to a specific temperature during the previous ignition cycle.
Component Monitor Complete	—	Yes/No	This parameter displays the component monitor completion status during the current driving/monitoring cycle.
Component Monitor Enabled	—	Yes/No	This parameter displays the component monitor enable status during the current driving/monitoring cycle.
Cooling Fan Relay 1 Control Circuit Open Test Status	—	OK or Not Run	This parameter displays the status of the fan relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cooling Fan Relay 1 Control Circuit Low Voltage Test Status	—	OK or Not Run	This parameter displays the status of the fan relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cooling Fan Relay 1 Control Circuit High Voltage Test Status	—	OK or Not Run	This parameter displays the status of the fan relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.

Parameter	System State	Expected Value	Description
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 Control Circuit Open Test Status	—	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Fault if the fan relay control circuit is open.
Cooling Fan Relay 2 Control Circuit Low Voltage Test Status	—	OK or Not Run	This parameter displays the status of the fan relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cooling Fan Relay 2 Control Circuit High Voltage Test Status	—	OK or Not Run	This parameter displays the status of the fan relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
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.
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	—	Varies	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is released.
CPP Sensor	—	%	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.
Crankshaft Position Active Counter	—	0–255 Counts	This parameter displays an incrementing counter when the control module receives a signal from the crankshaft position sensor.
Crankshaft Position Resynchronization Counter	—	0 Counts	This parameter displays the number of counts the control module resynchronizes with the crankshaft position sensor.
Crankshaft Position Sensor	—	Engine Speed	This parameter displays the engine speed as calculated by the control module using the signal from the crankshaft position sensor.
Crank Request Signal	Ignition switch not in the crank position	No	This parameter displays whether the ignition switch has been cycled to the crank position requesting the control module to activate the starter relay.
	Ignition switch in the crank position	Yes	
Cruise Control	Cruise Control ON	Active/Inactive	This parameter displays the status of the cruise control system as determined by the control module.
Cruise Control Accelerate Switch	Cruise Control ON	Active/Inactive /Invalid	The scan tool displays ON, when the cruise ON/OFF switch is ON and the accelerate switch is pressed, the ECM detects a predetermined voltage value for this switch.
Cruise Control Cancel Switch	Cruise Control ON	Active/Inactive /Invalid	This parameter displays the status of the cruise control cancel switch.
Cruise Control Coast Switch	Cruise Control ON	Active/Inactive /Invalid	The scan tool displays ON, when the cruise ON/OFF switch is ON and the ECM detects a predetermined

Parameter	System State	Expected Value	Description
			voltage value for the coast switch.
Cruise Control Disengage History 1–8	Cruise Control ON	Reason for Cruise Disengagement	The parameter displays the last 8 cruise control disengages in order from 1–8, with 8 being the most recent. There are approximately 40 possible causes for the cruise control to disengage.
Cruise Control Inhibit Reason	Cruise Control ON	Varies	The parameter displays the reason why the cruise control system is inhibited. There are approximately 40 possible causes for the cruise control to be inhibited.
Cruise Control On/Off Switch	Cruise Control ON	ON/OFF	The engine control module (ECM) monitors the signal circuit of the cruise control switch. A closed switch is displayed as ON.
Cruise Control Resume Switch	Cruise Control ON	Active/Inactive /Invalid	The scan tool displays ON, when the cruise ON/OFF switch is ON and the resume switch is pressed, the ECM detects a predetermined voltage value for the resume switch.
Cruise Control Set Switch	Cruise Control ON	Active/Inactive /Invalid	The scan tool displays ON, when the cruise ON/OFF switch is ON and the ECM detects a predetermined voltage value for the set switch.
Current Gear	Transmission in Park/Neutral	P/N	This parameter displays the transmission gear commanded by the transmission control module.
	Transmission not in Park/Neutral	Reverse/1st–5th	
Cycles of Misfire Data	—	Incrementing 0–100 Counts	This parameter displays the number of cylinder firing events recorded by the control module.
Cylinder 1–4 Current Misfire Counter	—	0 Counts	The scan tool displays 0–255 counts. This parameter displays the number of misfires that have been detected during the last 200 cylinder firing events. The counters may normally display some activity, but the activity should be nearly equal for all of the cylinders, and in low numbers.
Cylinder 1–4 History Misfire Counter	—	0 Counts	The scan tool displays 0–255 counts. The misfire history counters display the total level of misfire that has been detected on each cylinder. The misfire history counters will not update or show any activity until a misfire DTC P0300 has become active. The misfire history counters will update every 200 cylinder firing events.
Cylinder 1–4 Injector Control Circuit Open Test Status	—	OK	This parameter displays the state of the injector control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cylinder 1–4 Injector Disabled – Misfire Detected	—	No	This parameter displays the status of the fuel injector driver by the control module. The scan tool will display YES if the fuel injector is being disabled due to a misfire detection. The scan tool will display NO if the fuel injector is not being disabled by the control module due to a misfire.
Cylinder 1–4 Injector Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the injector control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cylinder 1–4 Injector Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the injector control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Cylinder 1–4 Knock Detected	—	NO	This parameter displays the status of each cylinder for knock detection by the control module. The scan tool will display YES if a knock condition has been detected related to that cylinder combustion event. The scan tool will display NO if there is no knock condition detected related to that cylinder combustion event.
Deceleration Fuel Cut-Off	—	Inactive	This parameter displays the status of the operating mode used to turn off the fuel injectors during certain deceleration conditions. When the scan tool displays Active, the control module has turned off the fuel injectors. When the scan tool displays Inactive, the fuel

Parameter	System State	Expected Value	Description
			system is operating normally.
Desired ECT	—	°C (°F) Varies	This parameter displays the desired engine coolant temperature (ECT) in °C (°F) .
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 First Malfunction	Ignition ON	0 km/h (0 MPH)	This parameter displays in kilometers or miles the distance traveled since a Malfunction occurred.
Distance Since Last Malfunction	—	Varies	This parameter displays the distance accumulated when the emission diagnostic trouble code last failed.
Distance Since Last Oil Pressure Warning	Ignition ON	0 km/h (0 MPH)	This parameter displays in kilometers or miles the distance traveled since the last oil pressure warning Malfunction occurred.
Distance Since Recommended Maximum Fuel Alcohol Content Exceeded	Ignition ON	0 km/h (0 MPH)	This parameter displays in kilometers or miles the distance driven since the most recent time that the Recommended Ethanol Concentration Exceeded occurred.
Distance This Driving Cycle	Ignition ON	0 km/h (0 MPH)	This parameter displays in kilometers or miles the distance driven during this ignition cycle.
Driver Requested Axle Torque	—	Y	This parameter displays the driver intended axle torque.
ECM Authentication Status	Ignition ON	Unknown/Incorrect /Negative Response/Valid	ECM Authentication Status indicates the result of the comparison between the last received immobilizer response and the expected response calculated into the ECM.
ECM Challenge Status	Ignition ON	Valid/Invalid	ECM Challenge Status indicates the challenge between ECM and the immobilizer.
ECM Response Source	Ignition ON	Ignition Switch Start/Remote Vehicle Start/Exterior PTO Vehicle Start	ECM Response Source indicates the source used to calculate the ECM response.
ECT Sensor	—	–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.
Electric Power Management Inhibit Reason	—	Varies	The scan tool displays the reason why the regulated voltage control is inhibit.
Engine Calibration Monitoring	—	Present/Not Present	This parameter indicates if the Engine Upgrade Protection are supported by ECM.
Engine Calibration Monitoring Identifier	v	Programmed/Not Programmed	This parameter indicates the status if the Engine Performance Identifier has been programmed
Engine Controls Ignition Relay Control Circuit Open Test Status	—	Not Run	This parameter displays the state of the engine control ignition relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Engine Controls Ignition Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the engine control ignition relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Engine Controls Ignition Relay Control Circuit High Voltage Test Status	—	Not Run	This parameter displays the state of the engine control ignition relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Engine Controls Ignition Relay Command	—	ON	This parameter displays the commanded state of the engine control ignition relay control circuit. The scan tool will display ON or OFF. ON indicates the engine control ignition relay control circuit is being grounded by

Parameter	System State	Expected Value	Description
Engine Controls Ignition Relay Feedback Signal	—	B+	the control module, allowing voltage to other control module circuits and systems. OFF indicates the engine control ignition relay is not being commanded ON by the control module.
Engine Load	Engine Idling	11–30%	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	Varies	
Engine Off Time	Engine speed at 2,500 RPM	25–40%	This parameter displays the amount of time that has elapsed since the engine was last cycled OFF. The scan tool displays the time in hours, minutes, and seconds. The engine OFF time will reset to zero when the engine starts.
	Ignition Switch in the OFF Position	Varies	
Engine Oil Life Remaining	Ignition ON	0–100%	This parameter displays the percent of engine oil life remaining. The controller calculates the engine oil life by monitoring engine load, coolant temperature, and engine speed.
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 Oil Temperature When Engine Overspeed Is Detected	—	Varies	This parameter displays the temperature of the engine oil if overspeed detected.
Engine Overspeed	—	Not Present	This parameter displays the status if overspeed detected.
Engine Overspeed Counter	—	Varies	This parameter displays the status if overspeed detected.
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	
Engine Speed When Engine Overspeed Detected	—	Varies	This parameter displays the speed of the engine crankshaft rotation stored if an engine overspeed is detected.
Engine Torque Command	—	Y	This parameter displays the estimated amount of torque that is delivered from the engine. The scan tool displays engine torque in Y (lb ft).
EVAP Purge Solenoid Valve Control Circuit Open Test Status	—	OK	This parameter displays the status of the evaporative emission (EVAP) purge solenoid control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
EVAP Purge Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the evaporative emission (EVAP) purge solenoid control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
EVAP Purge Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the evaporative emission (EVAP) purge solenoid control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
EVAP Purge Solenoid Valve Command	—	10–20%	This parameter displays the on-time or duty cycle of the EVAP canister purge solenoid commanded by the control module. Zero percent indicates no purge. One hundred percent indicates full purge.

Parameter	System State	Expected Value	Description
Fuel Control Loop Status	—	Closed Loop	This parameter displays the state of the fuel control system as commanded by the control module. Closed loop operation indicates that the control module is controlling the fuel delivery based off the oxygen sensors input signal. In open loop operation the control module ignores the oxygen sensor input signal and bases the amount of fuel to be delivered on other sensor inputs.
Fuel Economy	Engine Idling	Liters per Hour	This Parameter displays the instant fuel consumption rate of the engine in liters per hour.
Fuel Enrichment – Hot Catalyst	—	No	This parameter displays if the control module is commanding catalyst protection.
Fuel Enrichment – Hot Coolant	—	Inactive	This parameter displays the status of the fuel delivery system. The scan tool will display Active if the fuel system is running in open loop due to a temperature condition. The scan tool will display Inactive if the fuel system is operating normally.
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 Level Sensor Reference Command	—	Varies	This parameter displays the approximate fuel level in the fuel tank as a percentage.
Fuel Pump Relay Control Circuit Open Test Status	—	Not Run	This parameter displays the status of the fuel pump relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Fuel Pump Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the fuel pump relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Fuel Pump Relay Control Circuit High Voltage Test Status	—	Not Run	This parameter displays the status of the fuel pump relay control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
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 System Monitor Complete	—	Yes/No	This parameter indicates the status of the fuel system monitoring.
Fuel System Monitor Enabled	—	Yes/No	
Fuel Tank Rated Capacity	—	70 L (18.4 Gal)	This parameter displays the rated maximum quantity of fuel the fuel tank will hold. This is calibrated in the control module to match the vehicle.
Fuel Trim Memory Cell	—	Varies	This parameter displays the fuel trim cell number as calculated by the control module based on engine speed and load inputs. The scan tool will display a lower number as conditions are closer to idle, and a higher number as conditions approach maximum engine speed and maximum load.
Fuel Trim Learn	—	Enabled	This parameter displays Enabled when conditions are appropriate for enabling long term fuel trim corrections. This indicates that the long term fuel trim is adapting continuing amounts of short term fuel trim. If the scan tool displays Disabled, then long term fuel trim will not respond to changes in short term fuel trim.
Fuel Trim System Test State	—	Monitoring	This parameter indicates the status of the Fuel Trim System Test. The scan tool will display Disabled, Enabled, Monitoring, or Run Purge Test.
Generator F-Terminal Signal	—	Varies	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.

Parameter	System State	Expected Value	Description
Generator L-Terminal Circuit Open Test Status	—	Not Run	This parameter displays the status of the generator L-terminal circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Generator L-Terminal Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the generator L-terminal circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Generator L-Terminal Circuit High Voltage Test Status	—	OK	This parameter displays the status of the generator L-terminal circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Generator L-Terminal Signal Command	—	ON	This parameter displays the commanded state of the generator L-terminal output.
HO2S 1 or HO2S 2	Ignition ON, Engine OFF	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 1 or HO2S 2 Heater	—	A	This parameter displays the amperage of the HO2S heater commanded by the control module.
HO2S 1 or HO2S 2 Heater Command	—	ON	This parameter displays the commanded state of the HO2S 1 or HO2S 2 heater circuit by the control module. The scan tool will display ON when the heater is commanded ON. The scan tool will display OFF when the heater is commanded OFF.
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.
HO2S 1 or HO2S 2 Heater Control Circuit Open Test Status	—	OK	This parameter displays the status of the control circuit for the HO2S 1 or HO2S 2. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
HO2S 1 or HO2S 2 Heater Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the control circuit for the HO2S 1 or HO2S 2. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
HO2S 1 or HO2S 2 Heater Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the control circuit for the HO2S 1 or HO2S 2. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
HO2S Heater Monitor Complete	Engine Idling	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/monitoring cycle.
HO2S Heater Monitor Complete This Ignition Cycle	—	Yes or No	This parameter displays the diagnostic monitor completion status during the current driving/monitoring cycle.
HO2S Heater Monitor Enabled	Engine Idling	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/monitoring cycle.
HO2S Heater Monitor Enabled This Ignition Cycle	—	Yes or No	This parameter displays the diagnostic monitor enable status during the current driving/monitoring cycle.
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.
Idle Speed Correction	—	Varies	This parameter indicates the idle speed correction.
Ignition 1 Signal	—	B+	This parameter displays B+ when the control module detects a voltage at the ignition 1 input terminal.
Ignition Accessory Signal	—	ON	This parameter displays the state of the ignition accessory position input to the control module from the ignition switch.

Parameter	System State	Expected Value	Description
Ignition Timing	—	-4 to +15°	This parameter displays the amount of spark advance the control module is commanding. The control module determines the desired advance.
Ignition Coil 1 and 4 Control Circuit Open Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Coil 1 and 4 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Coil 1 and 4 Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Coil 2 and 3 Control Circuit Open Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Coil 2 and 3 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Coil 2 and 3 Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Ignition control circuit. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Ignition Cycles with Malfunction Since 1st Malfunction	Ignition ON	Counts	This Parameter contains the number of ignition cycles with a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles without Completed Test Since 1st Malfunction	Ignition ON	Counts	This Parameter contains the number of ignition cycles without a completed test since the first ignition cycle with a failure reported.
Ignition Cycles without Malfunction Since Last Malfunction	Ignition ON	Counts	This Parameter contains the number of ignition cycles with a pass reported and no failures reported since the first ignition cycle with a failure reported.
Immobilizer Auto Learn Counter	Ignition ON	Counts	This Parameter displays the number of times the immobilizer auto learn function was activated.
Immobilizer Automatic Learn Timer	Ignition ON	hh:mm:ss	The scan tool displays the automatic learn timer.
Immobilizer ECM Identifier	—	OK/Incorrect	This parameter displays the state of the immobilizer ECM identifier.
Immobilizer Environment Device 1-4	—	OK/Unknown	The scan tool displays Incorrect, Correct, Not Received, Not Programmed or Unknown. This parameter displays the immobilizer source status.
Immobilizer Fuel Disable	—	Active/Inactive	This parameter displays the state of the immobilizer fuel disabling.
Immobilizer Module Environment Identification	—	Active/Inactive	This parameter displays the state of the environment identification.
Immobilizer Module Fuel Disable	—	Active/Inactive	This parameter displays the immobilizer module state of the immobilizer fuel disabling.
Immobilizer Module Identification	—	Complete/Incomplete	This parameter displays the activation state of the immobilizer module.
Immobilizer Security Code Programmed	—	Yes/No	This parameter displays the programmed state of the security code.
Immobilizer Password Learn	Ignition ON	Enabled/Disabled	Learning Enabled indicates that learning of immobilizer code information is enabled.
Immobilizer Password Learn Scan Tool Delay	—	Active/Inactive	This parameter displays the auto learn timer status.
Immobilizer Password Programmed	—	Yes/No	The parameter displays No or Yes.

Parameter	System State	Expected Value	Description
Immobilizer Post-Release Passive State	—	Active/Inactive	The parameter displays active or inactive.
Immobilizer Post-Release State	—	Active/Inactive	The parameter displays active or inactive.
Immobilizer Pre-Release State	—	Active/Inactive	The parameter displays active or inactive.
Immobilizer Release State	—	Active/Inactive	The parameter displays active or inactive.
Immobilizer Security Code Accepted	—	Yes/No	The parameter displays Yes or No.
Immobilizer Security Code Function	—	Present/Not Present	This parameter displays the presence of the security code information.
Immobilizer Security Code Lockout	—	Active/Inactive	The parameter displays active or inactive.
Immobilizer Security Code Programmed	—	Yes/No	The parameter displays Yes or No.
Immobilizer Security Code Programming Counter	—	Counts	This parameter displays the counts of the security code programming.
Immobilizer Security Code Reset Counter	—	Counts	This parameter displays the counts of the security code resets.
Immobilizer Security Code Lockout Active Timer	Ignition ON	ms	This Parameter displays the time elapsed since the immobilizer security code lockout has been activated either due to a battery disconnect or an incorrect immobilizer security code being entered.
Immobilizer Security Code Programming Counter	Ignition ON	Counts	This Parameter displays the number of times a new immobilizer security code has been programmed through secure access. This counter can only be incremented.
Immobilizer Security Code Reset Counter	Ignition ON	Counts	This Parameter displays the number of times the immobilizer security code has been reset to the default value through secure access. This counter can only be incremented.
Immobilizer Security Information Programmed	Ignition ON	Yes/No	This Parameter displays the status of the immobilizer system.
Immobilizer System Status	Ignition ON	Standby / Immobilized at Startup / Immobilized No Response / Immobilized Negative Response / Immobilized Incorrect Response / Post-Release State / Pre-Release State / Release State	This Parameter displays the status of the immobilizer system.
Immobilizer Transponder Identification	—	Active/Inactive	This parameter displays the state of the transponder identification
Immobilizer Transponder Key	—	OK/Incorrect	This parameter displays when the transponder is incorrect.
Immobilizer Transponder Key Identification	—	OK/Unknown	This parameter displays when the transponder is unknown.
Immobilizer Transponder Valid Response Received Time	—	ms	This parameter displays the time elapsed until the transponder valid response is received.
Injector Duty Cycle	—	2–3 ms	This parameter displays the average pulse width of the fuel injectors as determined by the control module.
Intake Manifold Pressure	—	32–53 kPa (4.6–7.6 PSI)	This parameter displays the pressure difference between the MAP and the barometric pressure (BARO) as calculated by the control module.
Knock Retard	—	0°	This parameter displays the amount of spark advance the control module removes from the ignition control spark advance in response to the signal from the knock sensors.

Parameter	System State	Expected Value	Description
Long Term Fuel Trim	—	-10 to +10%	The scan tool range is -99 to +99%. This parameter indicates the Long Term fuel trim correction as commanded by the ECM. A change made to the fuel delivery will be indicated by the Long and Short Term values. The Short Term values change rapidly in response to the HO2S signal voltages. These changes fine tune the engine fueling. The Long Term values change in response to the changes in the Short Term. The Long Term makes coarse adjustments to the fueling in order to recenter and restore control to the Short Term. The Short Term and the Long Term can be monitored with a scan tool. A positive fuel trim value indicates that the ECM is adding fuel in order to compensate for a lean condition. A negative fuel trim value indicates that the ECM is reducing the amount of fuel in order to compensate for a rich condition.
Long Term Fuel Trim Test Average	—	0.98% Varies	This parameter is the average long term fuel trim for this bank as calculated by the control module. The scan tool will display a value more than 0% indicating that time is being added to the injector pulse width, increasing the amount of fuel to this bank of the engine. The scan tool will display a value of less than 0, indicating time is being subtracted from the injector pulse width, reducing the amount of fuel to this bank of the engine. A value of 0% indicates no compensation is required to operate the engine at the desired air/fuel ratio.
Long Term Fuel Trim Test Average without Purge	—	1.02% Varies	This parameter is calculated by the control module based on the Short Term Fuel Trim value. The Long Term Fuel Trim is used for the long term correction of the fuel delivery. The scan tool will display a high value for a large amount of long term fuel correction, and 0% for no long term fuel trim correction. The scan tool will display a negative value when fuel system is running too rich and fuel is being removed from the combustion event. The scan tool will display a positive value if the fuel system is running lean and fuel is being added to the combustion event.
Low Engine Oil Pressure Indicator Command	Ignition ON	On/Off	This parameter displays the output state.
MAF Performance Test	—	OK	This parameter displays the status of the mass air flow (MAF) performance test by the control module. The scan tool will display OK if no condition is detected. The scan tool will display Fault if the control module detects a condition during the test.
MAF Sensor	Engine Idling	1.7–3.7 g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
	Engine speed at 2,500 RPM	5.5–7.5 g/s	
MAF Sensor	—	1.700–2.100 Hz	This parameter indicates the frequency signal received from the MAF sensor by the control module. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
MAF When Engine Overspeed Detected	—	g/s	This parameter displays the intake mass air flow at overspeed condition detection.
MAP Performance Test 1	—	OK	This parameter displays the status of the MAP performance test 1 by the control module. The scan tool will display OK if no fault is found. The scan tool will display Fault if the control module detects a fault during the test.
MAP Performance Test 2	—	OK	This parameter displays the status of the MAP performance test 2 by the control module. The scan tool will display OK if no fault is found. The scan tool will display Fault if the control module detects a fault during the test.
MAP Sensor	—	26–52 kPa (3.7–7.6 PSI)	This parameter displays the pressure from the 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.
Maximum Engine Speed When Engine Overspeed Detected	—	RPM	This parameter displays the engine speed peak value at overspeed condition.

Parameter	System State	Expected Value	Description
MIL Command	Ignition ON	ON/OFF	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the engine control module (ECM).
MIL Control Circuit Open Test Status	—	OK	This parameter displays the status of the control circuit for the malfunction indicator lamp control (MIL). The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
MIL Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the control circuit for the malfunction indicator lamp control (MIL). The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
MIL Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the control circuit for the malfunction indicator lamp control (MIL). The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
MIL Requested by DTC	—	Yes/No	This parameter indicates the reason the control module illuminated the MIL. The scan tool will display YES when the MIL is requested as a result of an A or B type DTC. The scan tool will display NO if the MIL is illuminated for another reason, such as transmission DTCs.
MIL Requested	Ignition ON	Yes/No	This parameter displays the state of the MIL request.
Misfire Diagnostic Engine Load	—	%	This parameter displays the misfire diagnostic engine load.
Misfire Diagnostic Engine Speed	—	RPM	This parameter displays the misfire diagnostic engine speed.
Misfire Monitor Complete	—	Yes/No	This parameter displays the misfire monitor status.
Misfire Monitor Enabled	—	Yes/No	This parameter displays the misfire monitor enabling state.
Number of DTC(s)	—	0	This parameter indicates the number of diagnostic trouble codes (DTCs).
O2S/HO2S Monitor Complete	Engine Idling	Yes/No	This Parameter displays the enable and completion status during the current driving/monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/monitoring cycle.
O2S/HO2S Monitor Enabled	Engine Idling	Yes/No	This Parameter displays the enable and completion status during the current driving/monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/monitoring cycle.
Output Shaft Speed Sensor	Vehicle needs to be moving	RPM	This Parameter displays the transmission output speed (the speed at the output of the gear box) determined from the speed measured by the transmission output speed sensor.
Odometer When Engine Overspeed Detected	—	km/miles	This parameter displays the absolute vehicle odometer reading at overspeed condition detection.
Power Enrichment	—	Inactive	This parameter displays the status of the operating mode of the control module used to increase fuel delivery during certain acceleration conditions.
Power Mode	Ignition ON	OFF / Accessory / Run / Crank Request	This Parameter displays the state of the System Power Mode. This signal is based upon the state of the system power mode received over serial communication from the vehicle electronics. If the serial data signal not received, the Parameter will display OFF.

Parameter	System State	Expected Value	Description
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 a Throttle Actuator Control (TAC) system condition.
Reduced Engine Power History	—	OK	This parameter displays the last reason that ECM has Commanded Reduced Engine Power. The scan tool displays one of the following when Reduced Engine Power is commanded: • TAC DTC • Fan Control DTC • ECT Overtemperature • Engine Oil Overtemperature
Remaining Fuel in Tank	—	Liters (Gallons) Varies	This parameter displays the amount of fuel remaining in the fuel tank as measured in liters (gallons). The control module determines the amount of fuel remaining in the tank by using information from the fuel level sensor. The scan tool will display a higher value with a full fuel tank, and a lower value with an empty fuel tank.
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	—	On/Off	This parameter displays the reverse gear switch state.
Short Term Fuel Trim	—	–10 to +10%	The Short Term values change rapidly in response to the HO2S signal voltages. These changes fine tune the engine fueling. The Long Term values change in response to the changes in the Short Term. The Long Term makes coarse adjustments to the fueling in order to recenter and restore control to the Short Term. The Short Term and the Long Term can be monitored with a scan tool. A positive fuel trim value indicates that the ECM is adding fuel in order to compensate for a lean condition. A negative fuel trim value indicates that the ECM is reducing the amount of fuel in order to compensate for a rich condition.
Short Term Fuel Trim Test Average	—	–3 to +99% Varies	This parameter displays the short term closed loop fuel correction. This value is compared to predetermined thresholds to determine if the fuel trim diagnostic is passing or failing.
Start Up ECT	—	–39 to +140°C (–38 to +284°F)	This parameter displays the temperature of the engine coolant on start up based on input to the control module from the ECT sensor 1.
Start Up IAT	—	–39 to +140°C (–38 to +284°F)	This parameter displays the temperature of the intake air at start in the air induction system based on input to the control module from the IAT sensor.
Starter Relay Control Circuit Open Test Status	—	OK	This parameter displays the status of the control circuit for the starter relay. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Starter Relay Control Circuit Low Voltage Test Status	—	Not Run	This parameter displays the status of the control circuit for the starter relay. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
Starter Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the control circuit for the starter relay. The scan tool displays OK, Fault, or Not Run. OK indicates that no circuit faults are detected during the current test.
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.
SVS Indicator Command	—	On/Off	This parameter displays the service engine non emission related indication state.
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

Parameter	System State	Expected Value	Description
			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	—	Disabled	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 Body Idle Air Flow Compensation	—	0–100% Varies	This parameter displays the amount of airflow compensation in response to engine intake air flow restrictions. For example, throttle plate coking.
Throttle Position	—	2–6%	This parameter displays the actual throttle position angle indicated by the control module using information from the two Throttle Body sensors.
Throttle Position Performance Test	—	OK	This parameter displays the status of the throttle position performance test by the control module. The scan tool will display OK if no fault is found. The scan tool will display Fault if the control module detects a fault during the test.
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 1 Position	—	2–6%	This parameter displays the angle of the throttle position sensor 1 as calculated by the control module using the signal from the throttle position sensor 1. The throttle position sensor 1 is a range of values indicating a low percentage when the throttle is closed to a high percentage when the throttle is fully open.
Throttle Position Sensor 1 Learned Minimum	—	0.5–0.71 V	This parameter displays the learned minimum voltage for throttle position sensor 1 as determined by the control module this ignition cycle.
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	
Throttle Position Sensor 2 Position	—	2–6%	This parameter displays the angle of the throttle position sensor 2 as calculated by the control module using the signal from the throttle position sensor 2. The throttle position sensor 2 is a range of values indicating a low percentage when the throttle is closed to a high percentage when the throttle is fully open.
Throttle Position Sensor 2 Learned Minimum	—	0.55–0.75 V	This parameter displays the learned minimum voltage for throttle position sensor 2 as determined by the control module this ignition cycle.
Throttle Position Sensors 1 and 2	—	Agree	This parameter displays the results of a control module test that compares the signals from the Throttle Body sensors 1 and 2. The scan tool will display Agree or Disagree. Agree indicates that throttle position sensor 1 and throttle position sensor 2 voltages correspond to the same throttle position. Disagree indicates that throttle position sensor 1 and throttle position sensor 2 voltages correspond to different throttle positions.
Torque Delivered Signal	—	Y	This parameter displays the torque delivered from the engine to the transmission.
Torque Management Ignition Timing Retard	—	15–25°	This parameter displays how much the ignition spark timing is being retarded to control torque by the control module. The scan tool will display a higher value under extreme torque control conditions such as spinning wheels. The scan tool will display a lower value under low torque control conditions such as light driving.

Parameter	System State	Expected Value	Description
Torque Request Inhibit – Fuel	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – Ignition Timing	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – Ignition Timing Advance	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – Minimum Idle	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – Minimum Torque	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – TAC	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit – TAC Limit	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Total Knock Retard	—	0°	This parameter displays 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 value during extreme conditions such as high temperatures and antilock braking. The scan tool will display a lower value during lighter driving conditions.
Total Misfire	—	0 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.
Vehicle Speed When Engine Overspeed Detected	—	0 km/h (0 MPH)	This parameter displays the vehicle speed at overspeed condition detection.
VIN Programming Counter	Ignition ON	Counts	This Parameter displays the number of times the VIN has been programmed. This counter can only be incremented.
Warm-ups Since DTC Cleared	—	Varies	This parameter displays the number of warm-ups since the DTC was cleared in counts.
Warm-Ups without Emission Malfunctions	—	Varies	This parameter displays the number of warm up cycles that have occurred without an emission fault present. The scan tool will display a 0 if a fault has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without an emission fault.
Warm-Ups without Non Emission Malfunctions	—	Varies	This parameter displays the number of warm up cycles that have occurred without a non emission fault present. The scan tool will display a 0 if a fault has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without a non emission fault.
Wide Open Throttle	—	Yes/No	This parameter displays the throttle status commanded by the control module. The scan tool will display YES if the vehicle throttle is commanded to wide open. The scan tool will display NO if the vehicle throttle is commanded to an amount less than 100%.

Engine Control Module (ECM) Scan Tool Output Controls

Output Control	Description
A/C Compressor 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

Output Control	Description
	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.
Brake Pedal Position Sensor Learned	This device control is used to reset the brake pedal fully released learned position to its initialized value after a brake system repair.
Compression Test	This device control is used to set up the internal combustion engine for a compression test. The fuel pump, fuel injectors, and spark are all disabled. The throttle is opened to a WOT position. For conventional engine vehicles, the extended crank feature is not active. Engine cranking is completely controlled by the technician either through the ignition key or through a remote starter switch as applicable. The device control limits and rejects will apply normally upon entry to the device control. Once the device control is active, the limits will be monitored (to prevent unwanted starter operation, for example), but in the case of a limit exceeded or a tester disconnect, device control of the fuel and spark will not be released until the Power Mode switches to Accessory or OFF. This will prevent unexpected fuel and spark operation in the case of a device control abort. 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:
Cooling Fan Relay 1	• Engine coolant temperature is not out of range • In the correct power mode
Cooling Fan Relay 2	This function controls the cooling fan relay 2. The normal commanded state of the fan relay is OFF. 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
Crankshaft Position Variation Learn	This device control is used to activate the crankshaft position variation learn algorithm which calculates the reference pulse correction factors for the misfire diagnostic. This function disables the selected fuel injector. The normal commanded state is None. The scan tool initiates the test when the following conditions are met:
Cylinder Power Balance	• The engine is operating and the engine idle is stable. • The vehicle speed is 0 km/h (0 MPH). • There are no vehicle speed sensor DTCs set. If the fuel injector is disabled after 30 s, fuel injector control is not allowed again on the same fuel injector for 60 s. This function controls the engine control ignition relay or main relay. The normal commanded state is None. When commanded ON or OFF, the engine control module (ECM) turns the relay 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:
Engine Controls Ignition Relay	• The ignition is ON with the engine OFF. • There are no crankshaft position or VSS sensor DTCs set. • The vehicle speed is 0 km/h (0 MPH). • 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. This function controls the idle speed override in 25 RPM, 100 RPM, and 500 RPM increments, from the base idle speed to 1.950 RPM. The scan tool initiates the test when the following conditions are met:
Engine Speed	• The vehicle speed is 0 km/h (0 MPH). • There are no VSS sensor DTCs set.
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.

Output Control	Description
	In the correct power mode
Fuel Control Loop Status	This device control is used to enable or disable closed loop fuel control. This function enables the fuel injector in order to verify proper fuel injector flow. The ECM will pulse the selected injector when the following conditions are met:
Fuel Injector Balance	- All instruction on the scan tool completed. - Fuel injector selected. - Key ON, engine OFF. The selected fuel injector can only be flowed or pulsed once per ignition cycle. 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:
Fuel Pump Relay	- 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 Enable	This function enables or disables the ECM fuel trim learning. The normal commanded state is None.
Fuel Trim Reset	This function is used to reset the learned fuel trim values to their initial values. 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:
Generator L-Terminal	- 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 Learn	This function is used to trigger the reset of the learned resistances for the oxygen sensor heaters following a replacement. The learned resistances are reset to a calibration used to prevent overheating of the sensors until more accurate resistances may be learned following an extended engine OFF time. 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:
HO2S Heater Sensor 1 or 2	- 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.
Idle Ignition Timing	Disables and enables idle spark advance with the engine running. This function is used to reset the learned airflow adaptive values to the initial values. The scan tool initiates the test when the following conditions are met:
Idle Learn	- The vehicle speed is 0 km/h (0 MPH). - In the correct power mode - There are no throttle actuator control system DTCs set.
Idle Speed Adjustment	This device control allows a service technician to add an offset to the engine idle speed within a restricted range to address customer complaints for vehicle vibration.
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.
Misfire Graphic	This function is used to graph the accumulated misfires occurring in each cylinder. The scan tool allows for a reset of the misfire graph.
Programming History	This function displays the history buffer entries for the primary calibration part in the engine controller.
Starter Relay	This function is used to override the state of the Starter Relay output. Fuel and spark are disabled to prevent the engine from starting if the starter relay output is commanded ON. The scan tool initiates the test when the following conditions are met:

Output Control	Description
	- The engine speed is 0 RPM. - There are no crankshaft position sensor DTCs set. - The vehicle speed is 0 km/h (0 MPH) - There are no VSS sensor DTCs set. - There are no theft deterrent DTCs set. - There are no TAC system DTCs set. - The ignition voltage is within range. - In the correct power mode. - Not enough time has elapsed since the last time the starter has been enabled with a scan tool. This function controls the throttle valve in 10% increments. The scan tool initiates the test when the following conditions are met:
Throttle Position	- 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.
Throttle Sweep	This device control is used to automatically command the throttle blade from 0% to 100% and then back to 0%.
Tire Size	This function is used for correcting vehicle speed and odometer calculations when tire size is changed.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Engine Control Module Scan Tool Data](#)

Table 2: [Engine Control Module \(ECM\) Scan Tool Output Controls](#)

The Engine Control Module Scan Tool Data List contains all engine-related parameters that are available on the scan tool. This is a master list arranged in alphabetical order and not all the parameters listed are in every engine platform.

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

- The Diagnostic System Check - Vehicle is completed.
- No diagnostic trouble codes (DTCs)
- 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 would 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.

Engine Control Module Scan Tool Data

Parameter	System State	Expected Value	Description
<i>Base Operating Conditions:</i> Engine Idling/Radiator Hose Hot/Park or Neutral/Closed Loop			
A/C Disengage Reason	A/C OFF	Invalid	This parameter displays the A/C compressor disengage reason. There are 8 different possible faults for the A/C compressor to disengage.
A/C High Side Pressure Sensor	A/C OFF	0–5 Volts	This parameter displays the voltage from the A/C high side pressure sensor signal circuit to the control module.
	A/C ON	0–5 Volts	
A/C High Side Pressure Sensor	A/C OFF	700–900 kPa (101–130 psi)	This parameter displays the pressure from the A/C high side pressure sensor signal circuit to the control module.
	A/C ON	900–1300 kPa (130–174 psi)	
APP Sensor 1	—	0%	This parameter displays the angle of accelerator pedal position as calculated by the control module using the signals from the APP sensors.
APP Sensor 1	—	Volts	This parameter displays the voltage signal sent to the control module from APP sensor 1 of the APP sensor assembly. APP sensor 1 is a range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
			This parameter displays the angle of the APP sensor 2 as calculated by the control module using the signal from the APP sensor 2. APP sensor 2 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
APP Sensor 2	—	0%	This parameter displays the voltage signal sent to the control module from APP sensor 2 of the APP sensor assembly. APP sensor 2 is a range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
APP Sensor 2	—	Volts	
APP Sensors	—	0%	This Parameter contains the accelerator pedal position resulting directly from the settling of differences of the accelerator pedal position sensors (prior to any compensation to determine driver intent).

Parameter	System State	Expected Value	Description
Balancing Rate Cyl. 1–4	—	mm3	These parameters display the adjustment in fuel volume for each cylinder as calculated by the control module. The scan tool will display a negative balancing rate if the fuel volume is lowered. The scan tool will display a positive balancing rate if the fuel volume is increased.
BARO Sensor	—	kPa	This parameter displays the barometric pressure as calculated by the control module using the signal from the MAP sensor measured when the ignition is turned on with the engine not running. The control module will update the barometric pressure during wide-open throttle (WOT) conditions.
Boost Pressure Sensor	—	kPa	This parameter shows the turbocharger boost pressure in kPa.
BPP Circuit Signal	—	Released	This parameter displays the status of the brake pedal as determined by the stop lamp pedal switch.
Cruise Control ON/OFF Switch	Cruise Control ON	Yes	This parameter displays the state of the cruise ON/OFF switch input to the control module.
Cruise Resume Switch	Cruise Resume Switch ON	Active	This parameter displays the state of the cruise Resume switch input to the control module from the cruise control system.
Cruise Set Switch	Cruise Set Switch ON	Active	This parameter displays the state of the cruise Set/Coast switch input to the control module from the cruise control system.
Desired Air Mass Per Cylinder	—	mg/stroke	The parameter displays the amount of air (on a per cylinder event) that is being requested.
Desired EGR Position	—	%	This parameter displays the EGR commanded percentage from the engine control module.
Desired Fuel Rail Pressure	—	42500.0–44500.0 kPa 6215.0–6265.0 psi	This parameter displays the desired fuel rail pressure as calculated by the control module. This value is calculated based on engine speed, engine load, and sensor inputs.
Desired PressureBoost	—	98 kPa	This parameter displays the desired turbocharger boost pressure inside the engine as calculated by the control module based on the signal from the Boost pressure sensor.
Distance Since DTC Cleared	—	km/miles	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.
Desired Idle Speed	—	700–800 RPM	This parameter displays the desired engine idle speed as commanded by the control module.
ECT Sensor	—	–39 to +140°C (–38 to +284°F)	This parameter displays the temperature of the engine coolant based on input to the control module from the engine coolant temperature (ECT) sensor.
EGR Command	—	%	This parameter displays the duty cycle commanded by the control module for the EGR valve. The scan tool will display a high percentage when the EGR valve is commanded open. The scan tool will display a low percentage when the EGR valve is commanded closed.
Engine Load	Engine Idling	20–35%	This parameter displays the percent of the calculated engine load based on inputs to the control module from various engine sensors.
	Engine speed at 2,500 RPM	15–25%	
Engine Oil Pressure Switch	—	OK	This parameter displays the pressure of the engine oil calculated by the control module using a signal from the engine oil pressure (EOP) sensor.
Engine Run Time	Engine Operating	0:00:00 Increments when the engine is operating	This parameter displays the time elapsed since the engine was started.

Parameter	System State	Expected Value	Description
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 (CKP) sensor. If there is a CKP sensor DTC, the ECM calculates the engine speed from one of the camshaft position (CMP) sensors.
	Engine Idling	Approximately 750–850 RPM	
Fuel Heater Command	—	OFF	This parameter displays the control module commanded state of the fuel heater control circuit.
Fuel Level Sensor	—	Volts	This parameter displays the voltage of fuel in the fuel tank calculated by the engine control module.
Fuel Level Sensor	—	0–100%	This parameter displays the percent of fuel in the fuel tank calculated by the engine control module.
Fuel Pressure Regulator 1	—	1300–1400 mA	This parameter displays the engine control modules commanded state of the fuel rail pressure regulator 1.
Fuel Pump Relay Command	Ignition ON, engine OFF	Fuel pump on for 2 seconds	This parameter displays the control modules commanded state of the fuel pump relay control circuit.
	Engine idling	On	
Fuel Rail Pressure Sensor	—	42.8–43.8 MPa (6207–6352 psi)	This parameter displays the fuel rail pressure calculated by the control module using the signal from the fuel rail pressure (FRP) sensor.
Fuel Rail Pressure Sensor	—	1.40–1.50 Volts	This parameter displays the voltage of the fuel rail pressure calculated by the control module using the signal from the fuel rail pressure (FRP) sensor.
Fuel Tank Level Remaining	—	Varies	This parameter displays the amount of fuel remaining in the fuel tank as measured in a percentage. The control module determines the amount of fuel remaining in the tank by using information from the fuel level sensor(s). The scan tool will display a higher value with a full fuel tank, and a lower value with an empty fuel tank.
Fuel Temperature Sensor	—	25 to 40°C (77 to 104°F)	This parameter displays the fuel temperature calculated by the control module based on input from the fuel temperature sensor.
Fuel Temperature Sensor	—	2.80 Volts	This parameter displays the voltage calculated by the control module based on input from the fuel temperature sensor.
Generator F Terminal Signal	—	25–35%	This parameter displays the commanded state of the generator by the control module.
Glow Plug Command	—	OFF	This parameter displays the control module commanded state of the glow plug.
Glow Plug Feedback Signal	—	OK	This parameter displays the state of the Glow Plug Feedback Signal circuit.
Intake Air Flow Valve Motor Command	—	55–65%	This parameter displays the percent of the control modules commanded state of the intake air flow valve.
IAT Sensor 2	—	–39 to +140°C (–38 to +284°F)	This parameter displays the temperature of the air entering the engine air duct calculated by the control module based on the input from the intake air temperature sensors.
Ignition 1 Signal	Ignition ON	ON	This parameter displays the voltage measured at the ignition 1 circuit of the control module. Voltage is applied to the control module when the ignition switch is in the Ignition 1 position.
MAF Sensor	—	g/s	This parameter indicates the quantity calculated by the control module based on a signal from the mass air flow (MAF) Sensor.
MAP Sensor	—	95–104 kPa	This parameter indicates the manifold absolute pressure inside the engine as calculated by the control module based on the signal from the manifold absolute pressure (MAP) sensor.
MAP Sensor	—	0.95–1.06 Volts	This parameter indicates the voltage signal received by the control module from the MAP sensor. The scan tool displays a low voltage at

Parameter	System State	Expected Value	Description
			idle, and a high voltage at wide open throttle. Barometric pressure and altitude can effect these values.
MIL Command	—	OFF	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the control module.
Starter Relay Command	—	OFF	This parameter displays the commanded state of the starter relay.
TAC Motor Command	—	%	This parameter displays the percentage of the throttle plate opening.
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 indicates the number of warm up cycles that have occurred Since DTCs were cleared. The scan tool will display a higher counts as more warm up cycles have occurred since the DTCs were cleared.

Engine Control Module (ECM) Scan Tool Output Controls

Output Control	Description
Compression Test	This function activates the starter motor but without starting the engine. All Fuel Injectors are shut off in order to allow the compression test.
Coolant Temperature Gauge	This function sweeps the coolant temperature gauge from 0% to 100%.
EGR Solenoid	This function opens or closes the exhaust gas recirculation (EGR) solenoid. The EGR solenoid increases or decreases in 10 percent increments. The device control will not change unless changed or cancelled by the scan tool.
Engine High Temp. Lamp	This function activates On or Off the high coolant temp lamp.
Engine Speed Control	This function is used to override the Idle engine speed.
Fuel Filter Heater	This function activates the fuel heater relay ON or OFF. The Device Control will not change unless changed or cancelled by the scan tool.
Fuel Pump Relay	Note: This function is only allowed with the ignition ON, engine OFF. This function activates the fuel transfer pump or prime pump (depending on application) ON or OFF. The Device Control will not change unless changed or cancelled by the scan tool.
Generator L-Terminal	Note: This function is only allowed with the engine idling. This function controls the system voltage. When commanded ON, normal system voltage output is present. When commanded OFF, system voltage output is no longer present, Ignition 1 signal continues to drop, Gen L-Terminal goes to OFF and Gen F-Terminal continues to drop.
Glow Plugs	This function activates the Glow Plug Controller ON or OFF. The Device Control will be aborted after 12 seconds for the first activation, and after 5 seconds for every other activation. The Device Control is inhibited if the engine is running.
Glow Plug Lamp	This function activates the glow plug indicator lamp. The glow plug indicator lamp will remain illuminated until cancelled by the scan tool.
IAF Valve Motor	This function controls the opening and closing of the Intake Air Flow valve.
IMT Valve	This function controls the opening or closing of the Intake Manifold Tuning Valve
Injector Flow Rate Programming	This function will essentially erase the stored Zero Fuel Control (ZFC) for a given injector(s). The ECM will relearn these values over time in situations where the pulse width is very small (i.e., over run mode - going down a hill where very little fuel is injected).
Intake Manifold Runner Control	This function activates the Intake manifold runner control output by opening or closing the valve.
Malfunction Indicator Lamp (MIL)	This function activates the malfunction indicator lamp (MIL). The MIL will remain illuminated until cancelled by the scan tool.
Oil Life Reset	This device control displays the engine oil life remaining determined by the engine control module (ECM). Also this device control can be used to reset engine oil remaining life to 100% after an oil change.
TC Vane Position Ctrl Solenoid	Note: This function is only allowed with the engine idling. Cycles the turbocharger vane position solenoid to 95 percent boost and back to 0 percent boost. The device control is limited to engine speeds less than 2,000 RPM .

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Engine Control Module Scan Tool Data](#)

Table 2: [Engine Control Module \(ECM\) Scan Tool Output Controls](#)

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 is completed.
- No diagnostic trouble codes (DTCs)
- 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 would 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.

Engine Control Module Scan Tool Data

Parameter	System State	Expected Value	Description
<i>Base Operating Conditions: Engine Idling/Radiator Hose Hot/Park or Neutral/Closed Loop</i>			
5 V Reference 1, 2, 3 or 4 Circuit Status	Engine Idling	OK-Malfunction	This parameter will display OK if the circuit is good or Malfunction if a short to ground, short to B+ is present.
5 V Reference 1, 2, 3 or 4	Engine Idling	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.
A/C Compressor Operation	A/C ON	Allowed/Not Allowed	This parameter displays if the A/C compressor is allowed or not allowed to operate.
A/C Disengage 1–8 History	A/C ON	Reason for A/C Disengagement	The parameter displays reason for the last 8 air conditioning (A/C) compressor disengagements in order from 1 to 8 with 8 being the most recent. There are 8 possible causes for the A/C compressor to disengage.
A/C High Side Pressure Sensor	A/C OFF	0.75–1.5 V*	This parameter displays the voltage signal from the A/C high side pressure sensor input to the control module.
	A/C ON	1.3–2.5 V*	* Varies with temperature, humidity, and altitude.
A/C High Side Pressure Sensor	A/C OFF	450–827 kPa (65–120 psi)*	This parameter displays the pressure from the A/C high side pressure sensor signal circuit to the control module.
	A/C ON	827–2,350 kPa (120–341 psi)*	* Varies with temperature, humidity, and altitude.
A/C OFF for WOT	A/C ON	Yes-No	This parameter displays whether the control module is commanding the A/C compressor clutch relay OFF for wide open throttle (WOT).
A/C Pressure Out of Range	A/C ON	Yes-No	This parameter displays whether the A/C pressure is out of range for normal operation as determined by the control module.
A/C Request Signal	A/C ON	Yes-No	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	Engine Idling	0–100 %	This parameter displays the angle of the accelerator pedal position (APP) as calculated by the control module using the signals from the APP sensors.

Parameter	System State	Expected Value	Description
Accelerator Pedal Position When Engine Overspeed Detected	Engine Idling	%	This parameter displays the accelerator pedal position (APP) observed upon initial detection of an overspeed condition. This value will be updated upon each overspeed condition.
Ambient Air Temperature	Engine Idling	Varies	This parameter displays temperature from the input of the Intake Air Temperature Sensor.
APP Sensor 1 Circuit Status	Engine Idling	OK/Malfunction	APP Sensor 1 Out of Range indicates that the sensed accelerator pedal position 1 sensor value is currently out of range or that a Malfunction has been detected based upon the sensed accelerator pedal position 1 sensor value being out of range
APP Sensor 1 Learned Applied Position	Ignition ON	78 %	This parameter contains the learned maximum (fully applied) accelerator pedal position relating to absolute accelerator pedal position (no correction or normalization based upon learned minimum or maximum positions) from accelerator pedal position sensor 1.
APP Sensor 1 Learned Released Position	Ignition ON	0.98 V	This Parameter indicates the accelerator pedal sensor 1 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the calibration.
APP Sensor 1 Position	Pedal Released	0 %	This Parameter contains the displacement determined from accelerator pedal position sensor 1 (corrected and normalized based upon its learned minimum and maximum positions).
	Pedal Fully Applied	99 %	
APP Sensor 2	Ignition ON	V	This Parameter contains the accelerator pedal position sensor 2 analog input as a percentage of its reference voltage
APP Sensor 2 Circuit Status	Ignition ON	OK/Malfunction	APP Sensor 2 Out of Range indicates that the sensed accelerator pedal position 2 sensor value is currently out of range or that a malfunction has been detected (and latched) based upon the sensed accelerator pedal position 2 sensor value being out of range
APP Sensor 2 Learned Applied Position	Ignition ON	78 %	This Parameter contains the learned maximum (fully applied) accelerator pedal position relating to absolute accelerator pedal position (no correction or normalization based upon learned minimum or maximum positions) from accelerator pedal position sensor 2.
APP Sensor 2 Learned Released Position	Ignition ON	0.49 V	This Parameter indicates the accelerator pedal sensor 2 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by an algorithm.
APP Sensor 2 Position	Pedal Released	0 %	This Parameter contains the displacement determined from accelerator pedal position sensor 2 (corrected and normalized based upon its learned minimum and maximum positions).
	Pedal Fully Applied	100 %	
APP Sensors	Pedal Released	0 %	This Parameter contains the accelerator pedal position resulting directly from the settling of differences of the accelerator pedal position sensors (prior to any compensation to determine driver intent).
	Pedal Fully Applied	99 %	
Ambient Air Temperature	Ignition ON	°C °F Varies	This parameter displays the outside air temperature as calculated by the control module.
APP Sensor 1	Accelerator pedal not actuated	0.98 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	4.25 V	
APP Sensor 2	Accelerator pedal not actuated	0.49 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	2.14 V	

Parameter	System State	Expected Value	Description
APP Sensor 1 and 2	Ignition ON	Agree/Disagree	This parameter displays Disagree if the control module detects the signal voltage from APP sensor 1 is not in correct relationship to APP sensor 2. The scan tool displays Agree under the normal operating conditions.
BARO	Engine Idling	65–104 kPa (8–16 psi)	This parameter displays the barometric pressure. The control module uses the barometric pressure sensor input for fuel control to compensate for altitude differences.
BARO Sensor	Engine Idling	2.5–4.0 V	This parameter displays the barometric pressure sensor voltage.
Brake Pedal Position Circuit Signal	Ignition ON	Open/Closed	This parameter displays the serial data message of the brake signal from the electronic brake and traction control module (EBTCM).
Brake Pedal Position Sensor Signal	Ignition ON	Applied/Released/Invalid	This parameter displays the serial data message of the brake position sensor signal from the electronic brake and traction control module (EBTCM).
Calculated Air Flow	Engine Idling	G/S	This Parameter contains the mass airflow determined from the speed density (MAP based) calculation of air mass per cylinder.
Calculated Catalyst Temperature Bank 1 or Bank 2	Engine Idling	Approximately 552°C (1026°F)	This Parameter contains the estimated catalyst temperature for bank 1 sensor 1 (as a function of engine speed, engine airflow, and fuel ethanol percentage) for use in the oxygen sensor and catalyst monitor diagnostic algorithms.
Calculated Engine Oil Temperature	Engine Idling	105°C (221°F)	This Parameter displays the estimated engine oil temperature (as a function of engine coolant temperature and other parameters).
Camshaft Position Sensor	Engine Idling	0 RPM	This parameter displays the speed of the engine as calculated by the signal from a camshaft position (CMP) sensor. This parameter will always display 0 unless a condition with the CKP sensor or CKP reluctor exists. If a CKP condition exists the control module will use a valid CMP sensor signal to determine engine speed and crank/camshaft position.
Camshaft Position Signal Output Circuit High Voltage Test Status	Engine Idling	OK	This Parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to voltage.
Camshaft Position Signal Output Circuit Low Voltage Test Status	Engine Idling	OK	This Parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to ground.
Camshaft Position Signal Output Circuit Open Test Status	Engine Idling	OK	This Parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is open.
Catalyst Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This Parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates yes or no when the catalyst monitor diagnostic is actively running a test
Catalyst Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This Parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates yes or no when the catalyst monitor diagnostic is actively running a test
Catalyst Monitor Not At Idle Test Conditions Met	Engine Idling	Yes/No	This Parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates yes or no when the catalyst monitor diagnostic is actively running a test
Catalyst Monitor Test Counter Bank 1 or 2	Engine Idling	Counts	This Parameter contains the number of repeated results of the catalyst monitor diagnostic test that have been performed since a code clear for bank 1 or bank 2 (used to determine if a sufficient number of tests have run to report a passing condition).

Parameter	System State	Expected Value	Description
Catalyst Monitor Test Result Bank 1 or 2	Engine Idling	No Decision/Failed /Passed	This Parameter indicates the status of the catalyst monitor diagnostic for bank 1 or bank 2. Multiple tests may run before the diagnostic reports a "Pass" or "Fail" and will be tracked by Catalyst Monitor Diagnostic Test Counter Bank 1 or bank 2. When this Parameter reports a "Pass" or "Fail", the diagnostic is complete for the current trip and will not attempt any further tests on bank 1 or bank 2.
Catalyst Monitor Test State	Engine Idling	Active/Inactive	This Parameter indicates the status of the catalyst monitor diagnostic by displaying active or inactive. This test will only run with the engine at idle.
Change Engine Oil Indicator Command	Ignition ON	ON/OFF	This Parameter sends a signal through the serial communication to inform the driver to change the engine oil. It is based on a calibrated amount of time.
Catalyst Monitor Enabled this Ignition Cycle	Engine Idling	Yes-No	This parameter displays the monitor enable status during the current driving/monitoring cycle.
Crankshaft Position Active Counter	Engine Idling	0–255 Counts	This parameter displays an incrementing counter when the control module receives a signal from the crankshaft position sensor (CKP).
Crankshaft Position Resync Counter	Engine Idling	0 Counts	This parameter displays the number of times the control module has to resynchronize with the CKP sensor. The parameter will begin to increment if the control module does not detect a CKP reference pulse. The parameter will reset to 0 after the Ignition is switched OFF.
Cold Startup	Ignition ON	Yes/No	This parameter displays whether the engine meets the conditions for a cold startup during the present ignition cycle. The scan tool displays Yes when the conditions for a cold startup are met during the ignition cycle. The scan tool displays No when the conditions for a cold startup are not met during the present ignition cycle. Conditions for a cold startup require the coolant temperature and the intake air temperature to be below a predetermined temperature and within a certain range of each other. These conditions must occur after the engine was warmed up to a specific temperature during the previous ignition cycle.
Cooling Fan Relay 1 Command	Ignition ON	ON/OFF	This parameter displays the commanded state of the fan relay 1 control circuit. The cooling fan relay 1 should be ON when the scan tool indicates the FC Relay 1 Command is ON. The cooling fan relay 1 should be OFF when the scan tool indicates the FC Relay 1' Command is OFF.
Cooling Fan Relay 1 Control Circuit High Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is shorted to voltage.
Cooling Fan Relay 1 Control Circuit Low Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is shorted to ground.
Cooling Fan Relay 1 Control Circuit Open Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is open.
Cooling Fan Relays 2 Command	Ignition ON	ON/OFF	This Parameter displays the commanded state of the fan relay 2 output. .
Cooling Fan Relays 2 Control Circuit High Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is shorted to voltage.
Cooling Fan Relays 2 Control Circuit Low Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is shorted to ground.
Cooling Fan Relays 2 Control Circuit Open Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the fan relay control circuit. The parameter displays Malfunction if the fan relay control circuit is open.
Crankshaft Position Sensor	Engine Idling	RPM	This Parameter displays engine speed.

Parameter	System State	Expected Value	Description
Crank Request Signal	Ignition switch not in the crank position	No	This parameter displays whether the ignition switch has been cycled to the crank position requesting the control module to activate the starter relay.
	Ignition switch in the crank position	Yes	
Cruise Control	Cruise ON	Active/Inactive	This parameter displays the status of the cruise control system as determined by the control module.
Cruise Control Cancel Switch	Cruise ON	Active/Inactive/Invalid	This parameter displays the status of the cruise control cancel switch
Cruise Control Disengage 1-8 History	Cruise ON	Reason for Cruise Disengagement	The parameter displays the last 8 cruise control disengages in order from 1 to 8, with 8 being the most recent. There are approximately 30 possible causes for the cruise control to disengage
Cruise Control Inhibit Reason	Cruise OFF	OFF	The parameter displays the reason the cruise control system cannot engage.
	Cruise ON	Park/Neutral	
Cruise Control ON/OFF Switch	Cruise ON	ON/OFF	The engine control module (ECM) monitors the signal circuit of the cruise control switch. A closed switch is displayed as ON.
Cruise Control Resume/Accelerator Switch	Cruise ON	ON/OFF	The scan tool displays ON, when the cruise ON/OFF switch is ON and the resume/accel (+) button is pressed, the ECM detects a predetermined voltage value for the resume/accel. switch.
Cruise Control Set/Coast Switch	Cruise ON	ON/OFF	The scan tool displays ON, when the cruise ON/OFF switch is ON and the ECM detects a predetermined voltage value for the set/coast (-) switch.
Current Gear	Transmission in Park/Neutral	P/N	This parameter displays the transmission gear commanded by the transmission control module.
	Transmission not in Park/Neutral	Reverse/1st-5th	
Current Gear When Engine Overspeed Detected	Engine Idling	Varies	This parameter displays the transmission actual gear observed upon initial detection of an overspeed condition.
Cylinder 1-6 Current Misfire Counter	Engine Idling	Counts	The scan tool displays a range of 0-255 counts. This parameter displays the number of misfires that have been detected during the last 255 cylinder firing events. The counters may normally display some activity, but the activity should be nearly equal for all of the cylinders, and in low numbers.
Cylinder 1-6 History Misfire Counter	Engine Running	Counts	The scan tool displays a range of 0-65,535 counts. The misfire history counters display the total level of misfire that has been detected on each cylinder. The misfire history counters will not update or show any activity until a misfire DTC P0300 has become active. The misfire history counters will update every 255 cylinder firing events.
Cycles of Misfire Data	Engine Running	0-3,000 counts	This parameter displays the number of cylinder firing events recorded by the control module.
Ignition Coil 1-6 Control Circuit High Voltage Test Status	Engine Running	OK or Not Run	This parameter displays the state of the Ignition control circuit. The parameter displays Malfunction if the Ignition control circuit is shorted to voltage.
Ignition Coil 1-6 Control Circuit Low Voltage Test Status	Engine Idling	OK or Not Run	This parameter displays the state of the Ignition control circuit. The parameter display Malfunctions if the Ignition control circuit is shorted to ground.
Ignition Coil 1-6 Control Circuit Open Test Status	Engine Idling	OK or Not Run	This parameter displays the state of the Ignition control circuit. The parameter displays if Malfunction the Ignition control circuit is open.
Ignition Coil Supply Voltage Bank 1 or 2	Engine Idling	ON/OFF	This parameter displays ON when voltage is supplied to the Ignition coil bank 1 or bank 2.

Parameter	System State	Expected Value	Description
Ignition Cycles Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	Counts	This Parameter displays the number of Ignition Cycles since Recommended Maximum Fuel Alcohol Content Exceeded.
Ignition Cycles Without Malfunction Since Last Malfunction	Engine Idling	Counts	This Parameter displays the number of ignition cycles with a pass reported and no malfunctions reported since the first ignition cycle with a malfunction reported.
Inspection/Maintenance Drive Cycle Complete	Engine Idling	Yes/No	Inspection/Maintenance Drive Cycle Complete means that all required components of the standard drive cycle have completed.
Inspection/Maintenance Drive Cycle Idle Time Complete	Engine Idling	Yes/No	Inspection/Maintenance Drive Cycle Idle Time Complete indicates that the engine idle time requirement is complete.
Inspection/Maintenance Drive Cycle Idle Timer	Engine Idling	hh:mm:ss	This parameter displays the Inspection/Maintenance Drive Cycle Idle Timer.
Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete	Engine Idling	No	This parameter displays the Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete. The parameter displays Yes when the Inspection/Maintenance Drive Cycle Propulsion System Active Time is Complete.
Inspection/Maintenance Drive Cycle Propulsion System Active Timer	Engine Idling	hh:mm:ss	This parameter displays the total accumulated time in which the propulsion system has been active after the 1st time the engine is started.
Inspection/Maintenance Drive Cycle Vehicle Speed Time Complete	Engine Idling	No	This parameter displays Yes when the Vehicle Speed Time Complete indicates that the vehicle has been above 25 mph for five minutes.
Inspection/Maintenance Drive Cycle Vehicle Speed Timer	Engine Idling	hh:mm:ss	This parameter displays the total accumulated time in which the vehicle speed has been greater than 25 mph after the 1st time the engine is started.
Intake Air Humidity Sensor	Engine Idling	%	This Parameter displays the signal from the Intake Air Humidity sensor, which represents the relative humidity of the intake air.
Cylinder 1-6 Injector Control Circuit Status	Engine Idling	OK or Not Run	This parameter displays the state of the fuel injector control circuit.
Cylinder 1-6 Injector Disabled Misfire Detected	Engine Idling	Yes/No	This parameter displays the injector that has been disabled by the misfire catalyst converter protection calibration.
Cylinder 1-6 Knock Detected	Engine Idling	Yes/No	This parameter displays yes if a knock has been detected in an individual cylinder.
Decel. Fuel Cutoff	Engine Idling	Active/Inactive	This parameter displays the status of the operating mode of the control module used to turn OFF the fuel injectors and the EVAP canister purge valve during certain deceleration conditions.
Desired Exhaust Camshaft Position (If Equipped)	Engine Idling	0 Degrees	This parameter displays the desired exhaust camshaft angle as commanded by the control module.
Desired Exhaust Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the desired exhaust camshaft angle as commanded by the control module.
	Engine speed at 2000 RPM	10 Degrees	
Desired Idle Speed	Engine Idling	Approximately 650 RPM	This parameter displays the desired engine idle speed as commanded by the control module. The desired idle speed varies depending on engine load.
Desired Intake Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the desired intake camshaft angle as commanded by the control module.
	Engine speed at 2000 RPM	10 Degrees	
Desired Throttle Position	Engine Idling	%	Commanded Throttle Actuator Control
Distance Since DTC Cleared	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since a DTC was cleared.

Parameter	System State	Expected Value	Description
Distance Since First Malfunction	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since a Malfunction occurred.
Distance Since Last Malfunction	Engine Idling	0 Km/mi	This parameter displays the distance accumulated since last malfunction was captured. This parameter is only meaningful within the context of a failure record or freeze frame.
Distance Since Last Oil Level Warning	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since the last oil level warning Malfunction occurred.
Distance Since Last Oil Pressure Warning	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since the last oil pressure warning Malfunction occurred.
Distance Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	0 Km/mi	This Parameter displays in kilometers or miles the distance Since Recommended Maximum Fuel Alcohol Content Exceeded.
Drag Control Status	Engine Idling	Inactive	EDC Active (Drag Active) control mode is indicated when the requested torque signal is above the driver requested value while the traction control system signal input is active.
Engine Drag Control Status	Vehicle Moving	Active/Inactive	EDC Active (Drag Active) control mode is indicated when the requested torque signal is above the driver requested value while the traction control system signal input is active.
ECM Authentication Status	Ignition ON	Unknown/Incorrect /Negative Response/Valid	ECM Authentication Status indicates the result of the comparison between the last received immobilizer response and the expected response calculated into the ECM.
ECM Response Source	Ignition ON	Ignition Switch Start/Remote Vehicle Start/Exterior PTO Vehicle Start	ECM Response Source indicates the source used to calculate the ECM response
Engine Controls Ignition Relay Command	Ignition ON	ON/OFF	This parameter displays the state of the control circuit for control module power relay as commanded by the control module.
Engine Controls Ignition Relay Control Circuit High Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to voltage.
Engine Controls Ignition Relay Controls Circuit Low Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to ground.
Engine Controls Ignition Relay Controls Circuit Open Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is open.
Engine Controls Ignition Relay Feedback Signal	Ignition ON	12.0–14.9 V	This parameter displays the voltage available at the EC ignition relay pin of the control module.
ECT Sensor	Ignition ON	88 to 105°C (190 to 221°F)	This parameter displays the temperature of the engine coolant based on input to the control module from the engine coolant temperature (ECT) sensor.
EGR/Camshaft Position Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This Parameter displays Yes or No of the completion status during the current driving / monitoring cycle of emission related monitors.
EGR/Camshaft Position Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This Parameter displays Yes or No of the completion status during the current driving / monitoring cycle of emission related monitors.
Electric Power Management Inhibit Reason	Engine Idling	None	This Parameter displays the reason for the source of the Regulated Voltage Control (RVC) override command. RVC lowers system operating voltage to reduce system electrical load and improve fuel economy performance. The following is a list of possible reasons. None, Control Function,

Parameter	System State	Expected Value	Description
Engine Load	Engine Idling	25–45 %	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	40–60 %	
Engine OFF Time	Engine Idling	0:00:00 Seconds - Varies	This parameter displays the amount of time that has elapsed since the engine was last cycled OFF.
Engine Oil Life Remaining	Engine Idling	0–100 %	This parameter displays the percent of engine oil life remaining. The controller calculates the engine oil life by monitoring engine load, coolant temperature, and engine speed.
Engine Oil Pressure Switch	Engine Idling	OK	This parameter displays the status of the engine oil level switch as determined by the control module. The control module uses this information to turn on the low engine oil lamp if the engine oil level remains approximately 1 quart low for a sufficient amount of time. The scan tool will display Low when the engine oil level is low. The scan tool will display OK when the engine oil level is correct.
Engine Oil Temperature When Engine Overspeed Detected	Engine Idling	Temperature	This parameter displays the temperature of the engine oil as determined by the control module.
Engine Overspeed	Engine Idling	Not Present	This Parameter displays if an Engine Overspeed is Present or Not Present.
Engine Run Time	Engine Idling	0:00:00 Increments when the engine is operating	This parameter displays the time elapsed since the engine was started.
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 (CKP) sensor. If there is a CKP sensor DTC, the ECM calculates the engine speed from one of the camshaft position (CMP) sensors.
	Engine Idling	550–700 RPM	
Engine Speed When Engine Overspeed Detected	Engine Idling	RPM	This parameter displays the engine speed observed upon initial detection of an overspeed condition. This value will be updated after each overspeed condition.
EVAP Malfunction History	Engine Running	None	This parameter displays the result of the evaporative emission (EVAP) system as determined by the control module. The scan tool will display the following: • None • Excess Vacuum • Purge Valve Leak • Small Leak • Weak Vacuum • No Test Result
EVAP Monitor Complete This Ignition Cycle	Engine Running	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/monitoring cycle.
EVAP Monitor Enabled This Ignition Cycle	Engine Running	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/monitoring cycle.
EVAP Purge Solenoid Valve Command	Engine Idling	%	This Parameter displays the commanded duty cycle for the canister purge output.
EVAP Purge Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
EVAP Purge Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is open.
EVAP Purge Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is shorted to voltage.
EVAP Vent Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is shorted to ground. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
EVAP Vent Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is open. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
EVAP Vent Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is shorted to voltage. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
EVAP Vent Solenoid Command	Engine Idling	Venting/Not Venting	This parameter displays the state of the control circuit for evaporative emission (EVAP) vent solenoid as commanded by the control module.
Exhaust Camshaft position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the actual exhaust camshaft position in degrees.
	Engine speed at 2000 RPM	10 Degrees	
Exhaust Camshaft Position Variance	Engine Idling	0 Degrees	This parameter displays in degrees, the difference between the desired exhaust camshaft position and the actual exhaust camshaft position.
Exhaust Camshaft Position Variance Bank 1 or 2.	Engine Idling	0 Degrees	This parameter displays in degrees, the difference between the desired exhaust camshaft position and the actual exhaust camshaft position.
	Engine speed at 2000 RPM	0 Degrees	
Exhaust Camshaft Position Active Counter (If Equipped)	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 Active Counter Bank 1 or 2	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	Engine Idling	0 %	This parameter displays the on-time or duty cycle of the exhaust camshaft position (CMP) actuator solenoid valve as commanded by the control module.
Exhaust Camshaft Position Command Bank 1 or 2.	Engine Idling	20 %	This parameter displays the on-time or duty cycle of the exhaust camshaft position (CMP) actuator solenoid valve as commanded by the control module.
	Engine speed at 2000 RPM	50 %	
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status Bank 1 or 2.	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to ground.
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status Bank 1 or 2.	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is open.
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to

Parameter	System State	Expected Value	Description
Status Bank 1 or 2.			voltage.
Extended Travel Brake Pedal Position Signal	Engine Idling	Released	This parameter displays the status of the Extended Travel Brake Pedal Position sensor.
Fuel Level Sensor Reference Command	Engine Idling	%	This Parameter displays the percentage of time that the power supply for the fuel level sensor is on. This percentage is minimized when the fuel has high ethanol content and is maximized when the fuel has low ethanol content.
Fuel Control Loop Status	Engine Idling	Open/Closed	Fuel Closed Loop Active indicates that oxygen sensor 1 of each bank is being used as feedback to adjust the amount of fuel delivered to the engine.
Fuel Economy	Engine Idling	Liters per Hour	This Parameter displays the instant fuel consumption rate of the engine in liters per hour.
Fuel Enrichment-Hot Catalyst	Engine Running	Active/Inactive	Fuel Enrichment Catalyst Protection Active indicates fuel is being added to cool the catalytic converter.
Fuel Enrichment-Hot Coolant	Engine Running	Active/Inactive	Hot Coolant Enrichment Active indicates that the conditions to enable hot coolant enrichment are active and that a richer than stoichiometric air/fuel ratio is being commanded in order to help cool the engine when a system malfunction is causing the engine to run at extreme temperatures.
Fuel Level Sensor	Ignition ON	0-5 V	This parameter displays the voltage signal received by the control module from the fuel level sensor.
Fuel Pump Relay Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to voltage in the circuit.
Fuel Pump Relay Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to ground in the circuit.
Fuel Pump Relay Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an open in the circuit.
Fuel Pump Enable Command	Ignition ON	ON/OFF	This Parameter displays the commanded state of the fuel pump output (the output is considered to be commanded ON if its duty cycle is not zero)
Fuel Tank Rated Capacity	Ignition ON	Varies	This parameter displays the capacity of the fuel tank in liters or gallons. The rated capacity displayed by the scan tool will varies with vehicle type.
Fuel Trim Learn	Engine Idling	Enabled/Disabled	This parameter displays Enabled when conditions are appropriate for enabling long term fuel trim corrections. This indicates that the long term fuel trim is adapting continuing amounts of short term fuel trim. If the scan tool displays Disabled, then long term fuel trim will not respond to changes in short term fuel trim.
Fuel Trim Memory Cell	Engine Idling	Counts 0 250	This Parameter displays long term fuel corrections that is active based upon the current operating conditions (MAP, engine speed, purge duty cycle, A/C compressor state, and transmission range).
Fuel Trim System Test State	Engine Idling	Disabled/Running/EVAP Purge Test Running/Complete	This Parameter displays the current state of the fuel adjustment system diagnostic.
Fuel Volatility	Engine Idling	Varies	This parameter indicates the rate the fuel can be vaporized in the cylinder as calculated by the control module. The scan tool will display HIGH when the fuel volatility is high. The scan tool will

Parameter	System State	Expected Value	Description
			display LOW when the fuel volatility is low.
Generator F Terminal Signal	Engine Idling	0–100 %	This parameter displays the amount of generator ON-time as commanded by the control module. The higher the percentage the greater the generator output.
Generator Indicator Command	Engine Idling	ON/OFF	This Parameter displays ON or OFF associated with the status of the generator
Generator L Terminal Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is shorted to voltage.
Generator L Terminal Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is shorted to ground.
Generator L Terminal Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is open.
Generator L-Terminal Command	Engine Idling	0–100 %	This parameter displays the control modules commanded state of the voltage regulator on the generator.
HO2S Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	0.00–1.00 V - Varies	This parameter displays the voltage output from the HO2S to the control module. A lower voltage indicates a lean exhaust, while a higher voltage indicates a rich exhaust.
HO2S Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	0.00–1.00 V - Varies	This parameter displays the voltage output from the HO2S to the control module. A lower voltage indicates a lean exhaust, while a higher voltage indicates a rich exhaust.
HO2S Heater Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	mA	This Parameter display the current feedback for the oxygen sensor heater output for bank 1 sensor 1 or bank 2 sensor 1.
HO2S Heater Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	mA	This Parameter display the current feedback for the oxygen sensor heater output for bank 1 sensor 2 or bank 2 sensor 2.
HO2S Heater Control Circuit High Voltage Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to voltage.
HO2S Heater Control Circuit High Voltage Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to voltage.
HO2S Heater Control Circuit Low Voltage Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to ground.
HO2S Heater Control Circuit Low Voltage Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to ground.
HO2S Heater Control Circuit Open Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is open.
HO2S Heater Control Circuit Open Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is open.
HO2S Heater Command Bank 1 or 2 Sensor 1 or 2 Heater Command	Engine Idling	0–100 %	This parameter displays the HO2S heater ON time in percentage, as commanded by the control module.
HO2S Heater Command Bank 1 or 2 Sensor 1 or 2	Engine Idling	ON/OFF	This parameter display the state of the HO2S heater control circuit as commanded by the control module.

Parameter	System State	Expected Value	Description
HO2S/Heater Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/monitoring cycle.
HO2S/Heater Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/monitoring cycle.
IAT Sensor	Ignition ON	-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.
Ignition Accessory Signal	Ignition ON	ON/OFF	This parameter displays ON when the control module detects a voltage at the ignition accessory input terminal.
Ignition 1 Signal	Ignition ON	B+	This parameter displays B+ when the control module detects a voltage at the ignition 1 input terminal.
Injector Duty Cycle Bank 1 or 2	Engine idling	0.82–1.50 ms	This parameter displays the amount of fuel injector ON time or pulse width as commanded by the control module.
Ignition Cycles with Malfunction Since 1st Malfunction	Ignition ON	Counts	This Parameter contains the number of ignition cycles with a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles without Malfunction Since Last Malfunction	Ignition ON	Counts	This Parameter contains the number of ignition cycles with a pass reported and no failures reported since the first ignition cycle with a failure reported.
Ignition Timing	Engine Idling	Degrees	This Parameter displays the final spark advance in terms of a crankshaft angle
Immobilizer Auto Learn Counter	Ignition ON	Counts	This Parameter displays the number of auto-learn cycles that have been successfully completed within the immobilizer system.
Immobilizer Automatic Learn Timer	Ignition ON	h/m/s	This Parameter displays the time elapsed within the current auto-learn cycle within the immobilizer system.
Immobilizer Password Learn	Ignition ON	Active/Inactive	Learning Enabled indicates that learning of immobilizer code information is enabled.
Immobilizer Password Learn Scan Tool Delay	Engine Idling	Active/Inactive	Scan tool Learn Delay Active indicates that the security code has been accepted but the scan tool learn delay is active and will not allow learning enabled, programming security code, or resetting security code.
Immobilizer Security Code Accepted	Engine Idling	Yes/No	Security Code Accepted displaying Yes indicates that the received security code is correct
Immobilizer Security Code Lockout	Engine Idling	Yes/No	Security Code Lockout Active indicates that the security code has not passed and lockout is active.
Immobilizer Security Code Lockout Active Timer	Engine Idling	ms	This Parameter displays the time elapsed since the immobilizer security code lockout has been activated either due to a battery disconnect or an incorrect immobilizer security code being entered
Immobilizer Security Code Programmed	Ignition ON	Yes/No	Security Code Programmed indicates that the security code has been programmed.
Immobilizer Security Code Programming Counter	Ignition ON	Counts	This Parameter displays the number of times a new immobilizer security code has been programmed through secure access. This counter can only be incremented.
Immobilizer Security Code Reset Counter	Ignition ON	Counts	This Parameter displays the number of times the immobilizer security code has been reset to the default value through secure access. This counter can only be incremented.
Immobilizer Security Information Programmed	Ignition ON	Yes/No	This Parameter displays the status of the immobilizer system

Parameter	System State	Expected Value	Description
Immobilizer System Status	Ignition ON	Varies	This Parameter displays the status of the immobilizer system, the following maybe displayed. Standby, Immobilized at Startup, Immobilized, No Response, Immobilized Negative Response, Immobilized, Incorrect Response, Post-Release State, Pre-Release State, Release State
Immobilizer Valid Response Received Time	Ignition ON	ms	This Parameter displays the actual time observed for a valid immobilizer response.
Intake Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the actual intake camshaft position in degrees.
	Engine speed at 2000 RPM	10 Degrees	
Intake Camshaft position Variance Bank 1 or 2.	Engine Idling	0 Degrees	This parameter displays in degrees, the difference between the desired intake camshaft position and the actual intake camshaft position.
	Engine speed at 2000 RPM	0 Degrees	
Intake Camshaft Position Active Counter Bank 1 or 2	Engine Idling	0–255	This parameter displays an incrementing counter when the control module receives a signal from the intake camshaft position (CMP) sensor.
Intake Camshaft Position Commanded Bank 1 or 2	Engine Idling	20 %	This parameter displays the ON-time or duty cycle of the intake camshaft position (CMP) actuator solenoid valve as commanded by the control module.
	Engine speed at 2000 RPM	50 %	
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status Bank 1 or 2.	Engine Idling	OK or Not Run	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to ground.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status Bank 1 or 2.	Engine Idling	OK or Not Run	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is open.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status Bank 1 or 2.	Engine Idling	OK or Not Run	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to voltage.
Intake Manifold Pressure	Engine Idling	kPa/psi	This Parameter displays the engine intake manifold vacuum pressure calculated as the difference between ambient air pressure (barometric pressure) and intake manifold absolute pressure (MAP).
Knock Retard	Engine Idling	0 Degrees	This parameter indicates the amount of spark advance the control module removes from the ignition control (IC) spark advance in response to the signal from the knock sensors.
Long Term Fuel Trim Bank 1 or 2	Engine Idling	0 %	This parameter displays the commanded Long Term Fuel Trim correction by the control module for bank 1 or bank 2 for cruise and acceleration conditions.
Long Term Fuel Trim Test Average Bank 1 or 2	Engine Idling	0 %	This Parameter displays the filtered long term closed loop fuel correction for bank 1 or 2. This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.
Long Term Fuel Trim Test Average without Purge	Engine Idling	0 %	This Parameter displays the filtered non purge long term closed loop fuel correction for bank 1 or 2. This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing, failing, or indeterminate during normal purge-OFF operation as well as during the intrusive excess purge vapor test.
Long Term Fuel Trim Test Average without Purge Bank 1 or 2	Engine Idling	0 %	This Parameter displays the filtered non purge long term closed loop fuel correction for bank 1 or 2. This value is compared to thresholds to determine if the fuel adjustment system diagnostic

Parameter	System State	Expected Value	Description
			is passing, failing, or indeterminate during normal purge-OFF operation as well as during the intrusive excess purge vapor test.
Low Engine Oil Level Indicator Command	Engine Idling	OFF	The scan tool displays ON or OFF. This is the state of the low engine oil level indicator as monitored by the ECM.
Low Engine Oil Pressure Indicator Command	Engine Idling	ON/OFF	This parameter displays the commanded state of the low EOP lamp control circuit by the control module.
MAP Performance Test 1	Engine Idling	OK	MAP Test 1 Residual Out of Tolerance indicates that the filtered MAP Test 1 residual (the difference between the measured intake manifold pressure and the intake manifold pressure predicted from the intake manifold model using the mass airflow predicted from the throttle model) exceeds a failure threshold.
MAP Performance Test 2	Engine Idling	OK	MAP Test 2 Residual Out of Tolerance indicates that the filtered MAP Test 2 residual (the difference between the measured intake manifold pressure and the intake manifold pressure predicted from the intake manifold model using the measured mass airflow) exceeds a failure threshold.
MAP Sensor	Engine Idling	kPa/psi	This Parameter displays the actual engine intake manifold absolute pressure (MAP).
MAP Sensor	Engine Idling	0.4–2.0V	The Parameter displays The MAP sensor voltage as it measures the change in the intake manifold pressure which results from engine load and speed changes. As the intake manifold pressure increases, the air density in the intake also increases and additional fuel is required.
Maximum Engine Speed When Engine Overspeed Detected	Engine Idling	RPM	This Parameter displays the Maximum Engine Speed When Engine Overspeed Detected
MAF Sensor	Engine Idling	3.0–8.3 g/s	This parameter displays in grams per second, the measured quantity of air flowing into the engine during all operating conditions.
	Engine speed at 2,500 RPM	11.88 g/s	
MAF Sensor	Engine Idling	2,000–2,500 Hz	The scan tool displays a range of 0-65,555 hertz. This parameter displays the frequency signal input to the control module, and represents measured quantity of air flowing into the engine during all operating conditions.
MIL Control Circuit Low Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to ground.
MIL Control Circuit Open Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is open.
MIL Control Circuit High Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to voltage.
MIL Command	Engine Idling	ON/OFF	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the control module.
Mil Requested by DTC	Engine Idling	Yes/No	This parameter indicates the reason the control module illuminated the MIL. The scan tool will display YES when the MIL is requested as a result of an A or B type DTC. The scan tool will display NO if the MIL is illuminated for another reason, such as transmission DTCs.
Misfire Diagnostic Engine Load	Engine Idling	%	This Parameter displays the engine load used within the misfire diagnostic (calculated as the ratio of the mass of air predicted to be in the cylinder two firing events into the future to the maximum possible mass of air in the cylinder based on the current ambient air pressure and charge temperature).

Parameter	System State	Expected Value	Description
O2S/HO2S Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This Parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This Parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
Odometer When Engine Overspeed Detected	Engine Idling	km/miles	This Parameter displays the kilometers or miles of the Odometer When Engine Overspeed Detected.
Park/Neutral Position Switch (If Equipped)	Engine Idling	Park/Neutral	This parameter indicates the range selection of the automatic transmission as calculated by the control module based on input from the PNP switch. The scan tool will display, In Gear, Park, or Neutral depending on the PNP switch position.
Power Enrichment	Engine Idling	Inactive	This parameter indicates if the control module has detected conditions appropriate to operate in Power Enrichment mode. The scan tool will display Active if the mode is in operation, and Inactive if the mode is not in operation. The control module enters Open Loop operation and increases injector pulse width when in power enrichment mode.
Power Mode	Engine Idling	OFF/Accessory /Run/Crank Request	This Parameter displays the state of the System Power Mode. This signal is based upon the state of the system power mode received over serial communication from the vehicle electronics. If the serial data signal not received, the Parameter will display OFF.
Reduced Engine Power	Engine Idling	Active/Inactive	This parameter displays Active if the control module is commanding reduced engine power due to a throttle actuator control (TAC) system condition.
Remote Vehicle Start Disable History 1–8	Engine Cranking	Reason for RVS Disable	These parameters displays the last eight reasons the control module disabled remote vehicle start (RVS).
Reduced Engine Power History	Engine Idling	Throttle Malfunction, Cooling Fan Malfunction, Engine Over-temperature Protection Active, Engine Oil Temperature Too High, Remote Vehicle Speed Limiting, Engine Calibration Malfunction, Engine Oil Life, High Pressure Fuel System Malfunction	This Parameter Displays the last reason that Powertrain Module has illuminated the Reduced Engine Power (REP) indication.
Redundant Odometer Memory	Engine Idling	Present/Not Present	ECU Odometer Programmed indicates if the ECU odometer value has been programmed
Remaining Fuel in Tank	Engine Idling	%	This Parameter displays the total fuel level as a percentage of the rated capacity of the fuel tank.
Remaining Fuel in Tank	Engine Idling	Liters/Gallons	This Parameter displays the actual total fuel volume contained in the fuel tank.
Remote Vehicle Start Request Signal	Ignition OFF	ON/OFF	Remote Vehicle Start Request indicates the state of the request received over serial communication from the remote vehicle start (RVS) system to start the vehicle in remote mode.
Short Term Fuel Trim Bank 1 or Bank 2	Engine Idling	-5 % to +5 %	This parameter displays the short-term correction to the fuel delivery by the control module in response to oxygen sensor 1 or 2. 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.
Short Term Fuel Trim Test Average Bank 1 or Bank 2	Engine Idling	%	This Parameter display's the filtered short term closed loop fuel correction for bank 1 or 2. This value is compared to thresholds to determine if

Parameter	System State	Expected Value	Description
			the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.
Starter Relay Control Circuit Low Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to ground. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Relay Control Circuit Open Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is open. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Relay Control Circuit High Voltage Test Status	Ignition ON	OK or Not Run	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to voltage. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Relay Command	Ignition switch not in the crank position	ON/OFF	This parameter indicates whether the control module is commanding the starter relay to go ON or OFF.
	Ignition switch in the crank position	ON	
Start Up ECT	Ignition ON	-39° to +140°C (-38° to +284°F)	This parameter displays the temperature of the engine coolant on start-up based on input to the control module from the ECT sensor.
Start Up IAT	Ignition ON	-39° to +140°C (-38° to +284°F)	This parameter displays the temperature of the intake air at start in the air induction system based on input to the control module from the IAT sensor.
SVS Indicator Command	—	Off	This parameter displays ON when a Service Engine System Non Emission Related Indication is detected.
TAC Forced Engine Shutdown	Ignition ON	Yes/No	This parameter indicates the status of the TAC motor by the control module. The scan tool will display Yes if the engine has been shut down due to a throttle control fault.
TAC Motor	Ignition ON	Enabled/Disabled	This parameter indicates the status of the throttle actuator control (TAC) motor driver in the control module. The scan tool will display Enabled if TAC motor operation is allowed. The scan tool will display Disabled if the control module detects a condition that affects TAC motor operation.
TAC Motor Command	Ignition ON	%	This Parameter displays the commanded duty cycle for the throttle actuator output.
Throttle Position Performance Test	Engine Idling	OK/Malfunction	Throttle Position Residual Out of Tolerance indicates that the filtered throttle position residual (the product of the MAF residual and the MAP Test 1 residual) exceeds a failure threshold.
Total Knock Retard	Engine Idling	0°	This parameter displays how much ignition spark timing is being retarded due to all control systems monitored by the control module.
Total Misfire	Engine Idling	0	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.
Throttle Position	Ignition ON	0–100 %	This parameter displays the desired TP angle commanded by the control module.
Throttle Position Sensor 1	Ignition ON	3.7–4.3 V	This parameter displays the actual voltage on the TP sensor 1 signal circuit as measured by the control module.
Throttle Position Sensor 1 Learned Minimum	Ignition ON	4.1–4.7 V	This parameter displays the learned minimum value of throttle position (TP) sensor 1 as recorded by the control module during the last

Parameter	System State	Expected Value	Description
			learn procedure.
Throttle Position Sensor 1 or 2 Position	Ignition ON	%	This parameter displays the actual voltage on the TP sensor 2 signal circuit as measured by the control module.
Throttle Position Sensor 2 Learned Minimum	Ignition ON	0.5–0.9 V	This parameter displays the learned minimum value of TP sensor 2 as recorded by the control module during the last learn procedure.
Throttle Position Sensors 1 and 2	Ignition ON	Agree/Disagree	This parameter displays Disagree when the control module detects that TP sensor 1 voltage signal is not within the correct relationship to TP sensor 2. The scan tool displays Agree under the normal operating conditions.
Traction Control Status	Ignition ON	Active/Inactive	This parameter displays Active if the electronic brake and traction control module (EBTCM) is commanding traction control.
Torque Delivered Signal	Vehicle Moving	Y/Lb Ft	This Parameter displays the engine torque based upon the airflow through the engine and the torque losses due to spark retard and fuel shutoff. Since this is a steady state engine torque, it does not include the inertial component of engine torque.
Torque Management Ignition Timing Retard	Engine Idling	Degrees	This Parameter displays the total spark retard (in terms of a crankshaft angle).
Torque Request Inhibit-Fuel	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-Ignition Timing	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-Ignition Timing Advance	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-Minimum Idle	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-Minimum Torque	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-TAC	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Torque Request Inhibit-TAC Limit	Engine Idling	Yes/No	This Parameter displays the existing condition in the ECM causing the transmission torque request to be limited.
Total Engine Overspeed Time	Engine Idling	ms	This Parameter displays the Total Engine Overspeed Time.
VIN Programming Counter	Ignition ON	Counts	This Parameter displays the number of times the VIN has been programmed. This counter can only be incremented.
Vehicle Speed Sensor	Vehicle Moving	Km/h 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).
Vehicle Speed When Engine Overspeed Detected	Engine Idling	Km/h mph	This Parameter displays the Vehicle Speed When Engine Overspeed Detected.
Warm Ups Since DTC Cleared	Engine Idling	Counts	This parameter indicates the number of warm up cycles that have occurred Since DTCs were cleared. The scan tool will display a higher counts as more warm up cycles have occurred since the DTCs were cleared.
Warm Ups without Emission Malfunctions	Engine Idling	Counts	This Parameter displays the number of OBD defined warm up cycles since the last emissions related (fault type A or B) fail report or MIL request. Emissions related DTCs are cleared from

Parameter	System State	Expected Value	Description
Warm Ups without Non Emission Malfunctions	Engine Idling	Counts	memory when this counter reaches 40. This Parameter displays the number of OBD defined warm up cycles since the last non emissions related (fault type C) fail report. Non emissions related DTCs are cleared from memory when this counter reaches 40.
Wide Open Throttle	Engine Idling	Yes/NO	This parameter displays the throttle status commanded by the control module. The scan tool will display YES if the vehicle throttle is commanded to 100 percent.
Engine Control Module (ECM) Scan Tool Output Controls			
Output Control	Description		
Compression Test	This device control is used to set up the internal combustion engine for a compression test. The fuel pump, fuel injectors, and spark are all disabled. The throttle is opened to a Wide Open Throttle (WOT) position. For conventional engine vehicles, the extended crank feature is not active, and for strong hybrid vehicles, the Hybrid Powertrain Control Module is configured to crank at the speed specified in the device control command. Engine cranking is completely controlled by the technician either through the ignition key or through a remote starter switch as applicable. The device control limits and rejects will apply normally upon entry to the device control. Once the device control is active, the limits will be monitored (to prevent unwanted starter operation, for example), but in the case of a limit exceeded or a tester disconnect, device control of the fuel and spark will not be released until the Power Mode switches to Accessory or OFF. This will prevent unexpected fuel and spark operation in the case of a device control abort.		
Cooling Fan Relay 1	This function activates the cooling fan relay 1. The normal commanded state of the fan relay is NONE. The relay command status can also be monitored on the scan tool data parameter Cooling Fan Relay 1 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F)		
Cooling Fan Relay 1,2 and 3	This function activates the cooling fan relay 1, 2 and 3. The normal commanded state of the fan relays is NONE. The relay command status can also be monitored on the scan tool data parameters Cooling Fan Relay 1 Command and Cooling Fan Relays 2 and 3 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F)		
Cooling Fan 2	This function activates the cooling fan relay 2. The normal commanded state of the fan relays is NONE. The relay command status can also be monitored on the scan tool data parameter 2 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F)		
Crankshaft Position Variation Learn	This device control is used to activate the crankshaft position variation learn algorithm which calculates the reference pulse correction factors for the misfire diagnostic.		
Engine Controls Ignition Relay	This device control is used to override the state of the Powertrain Relay.		
Engine Oil Life Reset	This device control contains the engine oil remaining life determined from a calculation based upon the effective engine revolutions and the distance driven since the last oil change. This device control may be used to reset the engine oil remaining life to 100 % after an oil change or to any other value when replacing a control module Note: The Misfire Current and Misfire History parameters may not increment when using this function. This function disables the selected fuel injector. The normal commanded state is None. The scan tool initiates the test when the following conditions are met:		
Cylinder Power Balance	• The engine is operating and the engine idle is stable. • The vehicle speed is 0 km/h (0 mph). • There are no DTCs set for the vehicle speed sensor. If the fuel injector was disabled for 30 seconds, fuel injector control is not allowed again on the same fuel injector for 60 seconds.		
Engine Speed	This function controls the idle speed override in 25 RPM, 100 RPM, and 500 RPM increments, from the base idle speed to 1,400 RPM. The scan tool initiates the test when the following conditions are met:		

Output Control	Description
	- The transmission is in park or neutral. - The engine speed is less than 1,000 RPM. The engine speed will remain in the commanded state until cancelled by the scan tool.
EVAP Test	This device control is used to activate the evaporative emissions service bay test. Note: The EVAP Purge Solenoid Command parameter may not change states when using this output control.
EVAP Purge Solenoid Valve	This function controls the evaporative emission (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 percent increments within a range of 0–100 percent. The system remains in the commanded state until cancelled by the scan tool or the fuel tank pressure (FTP) sensor exceeds –24 mm Hg (–12 inch H2O). Note: The EVAP Purge and Vent Solenoid Command parameters may not change states when using this output control.
EVAP Purge/Seal	This function activates both the EVAP purge solenoid valve and EVAP vent solenoid to seal the EVAP system. When activated, the purge valve is commanded to 0 percent and the vent valve is commanded ON, Not-venting. The normal commanded state for both solenoids is None. Both of the solenoids remain in the commanded state until cancelled by the scan tool or the FTP sensor exceeds –24 mm Hg (–12 inch H2O). Note: The EVAP Vent Solenoid Command parameter may not change states when using this output control.
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. The system remains in the commanded state unless one of the following conditions occur: - Cancelled by the scan tool - The EVAP canister purge solenoid is more than 0 percent, and the FTP sensor exceeds –24 mm Hg (–12 inch H2O).
Exhaust Camshaft Position Actuator Bank 1	This device control is used to override the state of the exhaust cam phase output for bank 1. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (retard for exhaust camshaft) from the park position (a camshaft position of zero represents the park position).
Exhaust Camshaft Position Actuator Bank 2	This device control is used to override the state of the exhaust cam phase output for bank 2. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (retard for exhaust camshaft) from the park position (a camshaft position of zero represents the park position).
Exhaust Camshaft Position Actuator Solenoid Valve Bank 1	This device control is used to override the state of the exhaust cam phase solenoid output for bank 1.
Exhaust Camshaft Position Actuator Solenoid Valve Bank 2	This device control is used to override the state of the exhaust cam phase solenoid output for bank 2.
Fuel Control Loop Status	This function controls the heated oxygen sensor (HO2S) loop status. The commanded states include NONE, OPEN, and CLOSED. The normal commanded state is NONE. The loop status changes as commanded, OPEN or CLOSED. The system remains in the commanded state until cancelled by the scan tool. This function enables the fuel injector in order to verify the correct fuel injector flow. The ECM will pulse the selected fuel injector when the following conditions are met:
Fuel Injector Balance (If Available)	- All instruction on the scan tool is complete. - A fuel injector is selected. - The ignition is ON with the engine OFF. The selected fuel injector can only be flowed/pulsed once per ignition cycle. This function controls the fuel pump. The normal commanded state is NONE. The scan tool initiates the test when the following conditions are met:
Fuel Pump Relay	- There are no vehicle speed sensor DTCs set. - The vehicle speed is 0 km/h (0 mph). When commanded ON/OFF, the engine control module (ECM) turns the fuel pump ON/OFF. If the engine is running and the fuel pump is commanded OFF, the engine will stall. The system remains in the commanded state for about 2 seconds or until cancelled by the scan tool or the ECM detects a vehicle speed.
Fuel Trim Enable	This function disables the control modules ability to learn new fuel trim parameters. The commanded states are NONE, ENABLED, DISABLED. The normal commanded state is NONE. The system remains in the commanded state until cancelled by the scan tool.
Fuel Trim Reset	This function is used to reset the learned fuel trim values to their initial values.

Output Control	Description
Generator L-Terminal	Commands the generator L terminal ON and OFF.
HO2S Heater Bank 1 Sensor 1	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Bank 1 Sensor 2	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Bank 2 Sensor 1	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Bank 2 Sensor 2	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Learn	This device control is used to trigger the reset of the learned resistances for the oxygen sensor heaters following a replacement in service. The learned resistances are reset to a calibration used to prevent overheating of the sensors until more accurate resistances may be learned following an extended engine OFF time (typically 12 or more hours).
Idle Learn	This function allows the throttle position and the idle speed to be relearned by the ECM, once the following conditions have been met. • The ignition is ON with the engine OFF. • The ECT is between 5–85°C (41–185°F). • No throttle actuator control (TAC) system DTCs are set.
Idle Ignition Timing	Disables and enables idle spark advance with the engine running.
Ignition Timing Retard	This device control is used to retard the spark angle from the software calculated spark angle. For example, if the software calculated spark angle was 15 degrees advanced and this device control requested a 3 degree retard, the commanded spark angle that would be delivered would be 12 degrees advanced.
Intake Camshaft Position Actuator Bank 1	This device control is used to override the state of the intake cam phase output for bank 1. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (advance for intake camshafts) from the park position (a camshaft position of zero represents the park position).
Intake Camshaft Position Actuator Bank 2	This device control is used to override the state of the intake cam phase output for bank 2. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (advance for intake camshafts) from the park position (a camshaft position of zero represents the park position).
Intake Camshaft Position Actuator Solenoid Valve Bank 1	This device control is used to override the state of the intake cam phase solenoid output for bank 1.
Intake Camshaft Position Actuator Solenoid Valve Bank 2	This device control is used to override the state of the intake cam phase solenoid output for bank 2.
Malfunction Indicator Lamp (MIL)	This function controls the malfunction indicator lamp (MIL). The normal commanded state is NONE. When commanded ON/OFF, the ECM turns the MIL ON/OFF. The system remains in the commanded state until cancelled by the scan tool.
Misfire Graphic	This function clears the misfire graphics from the scan tool.
Remote Vehicle Start Disable History Reset	This function clears the remote vehicle start (RVS) disable history. When RESET is selected the reason the control module did not allow RVS in the last 8 attempts is cleared.
Starter Relay (If Available)	Commands the starter relay ON and OFF.
Throttle Position	This device control is used to override the commanded throttle position.
Throttle Sweep	This function moves the Throttle plate slowly from a closed position to wide open position, aiding diagnosis of TAC motor.

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Fuel Delivery: | **Fuel:**

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the EL-49642 SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select Parking Assist Control Module - Programming and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select Parking Assist Control Module - Setup and follow the on-screen instructions.
4. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

Reprogram Control Module

Do not reprogram the parking assist control module, unless directed by a service procedure, or a service bulletin.

To reprogram an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select Parking Assist Control Module - Programming and follow the on-screen instructions.
3. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the parking assist control module, DLC and programming tool connections are secure and the SPS software is up to date.
 2. Verify the parking assist control module can be reprogrammed.
- *If the parking assist control module cannot be reprogrammed*
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the parking assist control module can be reprogrammed.
 - If the parking assist control module cannot be reprogrammed, replace the parking assist control module.
 - If the parking assist control module can be reprogrammed.
 - All OK.
 - *If the parking assist control module can be reprogrammed*
 - All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for parking assist control module replacement, programming and setup

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Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Parking Assist Control Module Scan Tool Data Parameters](#)

Table 2: [Parking Assist Control Module Scan Tool Output Controls](#)

Parking Assist Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
<i>Operating Conditions:</i> Ignition ON/Engine OFF/Parking Assist ON			
Battery Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Calculated Transmission Range	Transmission in reverse	Reverse	The scan tool displays Park, Reverse, Neutral, Drive or Unknown depending on the state of the commanded gear.
Obstacle Detected	—	No	The scan tool displays Yes or No. Yes is displayed if there is an object within the measuring range of the object sensors.
Park Assist Chime	—	Varies	The scan tool displays On or Off. On is displayed if there is an object within the measuring range of the object sensors.
Park Assist Disable History 1	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 2	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 3	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 4	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 5	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 6	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Disable History 7	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Park Assist Sensor	—	On	The scan tool displays On or Off.
Park Assist Sensor Reference Voltage	—	7.3–9.1 V	The scan tool displays V. This is the amount of voltage being sent to the object sensors.
Park Assist System Status	—	Enable	The scan tool displays Disable, Enable, Inhibited or Failed. This is the state of the parking assist system.
Power Mode	—	Run	The scan tool displays Off, Accessory, Run or Crank. This is the state of the ignition switch.

Parameter	System State	Expected Value	Description
Rear Red LED	Parking assist Active, No object behind the vehicle	Off	The scan tool displays On and Off.
	Parking assist Active, Object between 0.3–0.6 m (1–1.9 ft) behind the vehicle	On	
Rear Yellow 1 LED	Parking assist Active, No object behind the vehicle	Off	The scan tool displays On and Off.
	Parking assist Active, Object between 1–2.5 m (3.3–8.2 ft) behind the vehicle	On	
Rear Yellow 2 LED	Parking assist Active, No object behind the vehicle	Off	The scan tool displays On and Off.
	Parking assist Active, Object between 0.6–1 m (1.9–3.3 ft) behind the vehicle	On	

Parking Assist Control Module Scan Tool Output Controls

Output Control	Description
Rear Red LED	The parking assist control module illuminates the red LED of the parking assist indicator when commanded from the scan tool.
Rear Yellow 1 LED	The parking assist control module illuminates the 1st yellow LED of the parking assist indicator when commanded from the scan tool.
Rear Yellow 2 LED	The parking assist control module illuminates the 2nd yellow LED of the parking assist indicator when commanded from the scan tool.

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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 failure on the second consecutive ignition cycle, the control module records the operating conditions at the time of the failure. 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 percent 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 percent 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 warm-up cycles, if no failures 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 warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Clear the DTC with a scan tool.

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Diagnostic Aids

The remote control door lock receiver only functions as an antenna, receiving the signals sent by the keyless entry transmitter and forwarding them to the body control module (BCM). The keyless entry software is contained wholly within the BCM.

Replace and Program ECU or Reprogram ECU

This ECU does not require SPS programming or any setup procedures.

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Caution: Before programming a control module, the following must be observed, or control module damage may occur:

- The TIS terminal, MDI, and/or scan tool must have the latest software.
- The vehicle battery must be fully charged. The battery voltage should be between 12–14 volts.
- The TIS terminal, MDI, and/or scan tool connections must be secure.
- A battery charger must NOT be connected to the battery when programming a control module.

Special Tools

EL 49642 SPS Programming Support Tool

For equivalent regional tools, refer to Special Tools.

For step-by-step control module programming instructions, please refer to the techline information system (TIS) terminal.

Review the information below to ensure proper programming protocol.

Note:

- DO NOT program a control module unless you are directed by a service procedure or you are directed by a General Motors service bulletin. Programming a control module at any other time will not permanently correct a customers concern.
- It is essential that the TIS terminal, MDI, and/or Scan Tool, is equipped with the latest software before performing service programming.
- Due to the time requirements of programming a controller, install *EL 49642* SPS programming support tool to maintain system voltage. Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. If the above tool is not available, DO NOT connect a battery charger, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Some modules will require additional programming/setup events to be performed before or after programming.
- Some vehicles may require the use of a CANDi or MDI module for programming.
- Review the appropriate service information for these procedures.
- DTCs may set during programming. Clear DTCs after programming is complete.
- Clearing powertrain DTCs will set the Inspection/Maintenance system status indicators to NO.

Ensure the following conditions are met before programming a control module:

- Vehicle system voltage:
 - There is not a charging system concern. All charging system concerns must be repaired before programming a control module.
 - Turn OFF or disable any system that may put a load on the vehicles battery, such as the following components:
 - Interior lights
 - Exterior lights including daytime running lamps (DRL)—Applying the parking brake, on most vehicles, disables the DRL system.
 - Heating, ventilation, and air conditioning (HVAC) systems
 - Engine cooling fans
 - Radio, etc.
 - The ignition switch must be in the proper position. SPS prompts you to turn ON the ignition, with the engine OFF. DO NOT change the position of the ignition switch during the programming procedure, unless instructed to do so.
- Make certain all tool connections are secure, including the following components and circuits:
 - Scan Tool
 - The RS 232 communication cable port
 - The connection at the data link connector (DLC)
 - The voltage supply circuits
 - MDI
 - The USB, Ethernet or Wireless communication port
 - The connection at the data link connector (DLC)

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all control module and DLC connections are secure and the TIS terminal operating software is up to date.
 2. Attempt to reprogram the control module.
 3. If the control module can still not be programmed, turn the ignition OFF for at least one minute.
 4. Turn the ignition ON and attempt to reprogram the control module. The control module should program.
- If the control module still cannot be programmed, replace the control module.

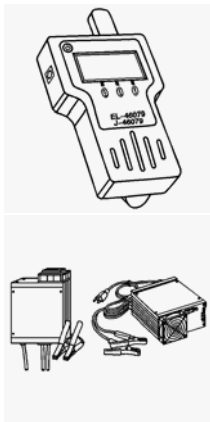
After successfully programming the control module, ensure that all post programming procedures are performed. Refer to Control Module References for the appropriate control module programming and setup document for any required procedures.

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Fuel Delivery: | Fuel:

Illustration



Tool Number/ Description

EL 46079

J 46079

Tire Pressure Monitor Diagnostic Tool

EL 49642

EL 50113

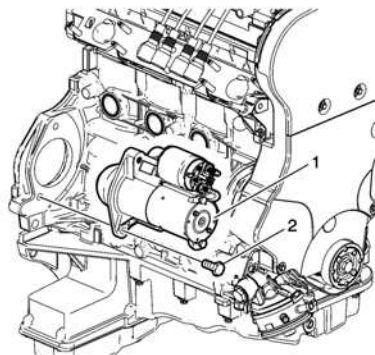
Europe– Use recommended equivalent workshop equipment

SPS Programming Support Tool

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Fuel Delivery: | Fuel:



1. Install the starter (1) and bolts (2).

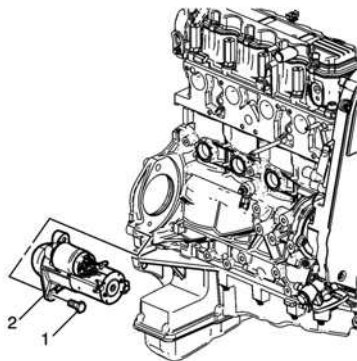
Caution: Refer to Fastener Caution.

2. Tighten the bolts (2) to **45Y(37 lb ft)**.

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Fuel Delivery: | Fuel:



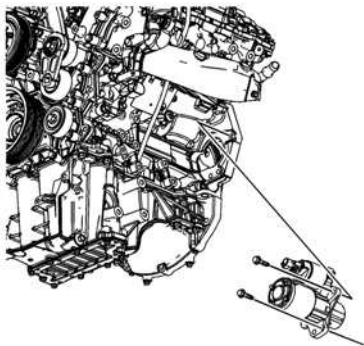
1. Install the starter (2) and bolts (1).

Caution: Refer to Fastener Caution.

2. Tighten the bolts (1) to **45Y(37 lb ft)**.

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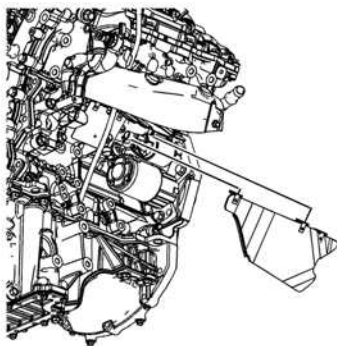
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:



1. Install the starter motor.

Caution: Refer to Fastener Caution.

2. Install the starter motor bolts and tighten to **50 Y (37 lb ft)**.

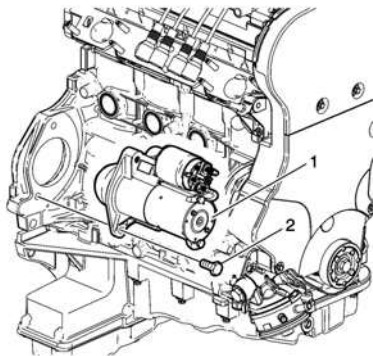


3. Install the starter heat shield.

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Fuel Delivery: | Fuel:

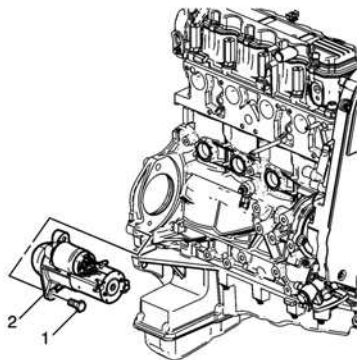


1. Remove the starter bolts (2)
2. Remove the starter (1).

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Submodel: | Engine Type: | Liters:

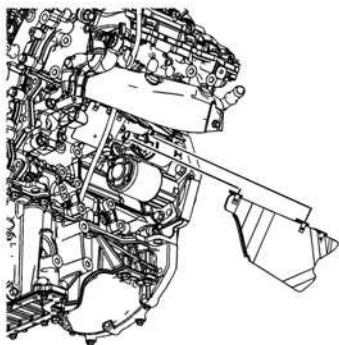
Fuel Delivery: | Fuel:



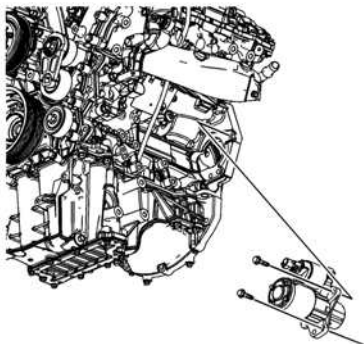
1. Remove the starter bolts (1)
2. Remove the starter (2).

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:



1. Remove the starter heat shield.



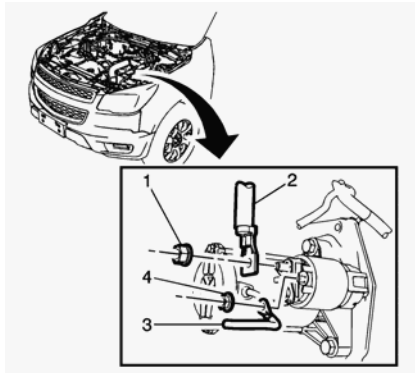
2. Remove the starter motor bolts.
3. Remove the starter motor.

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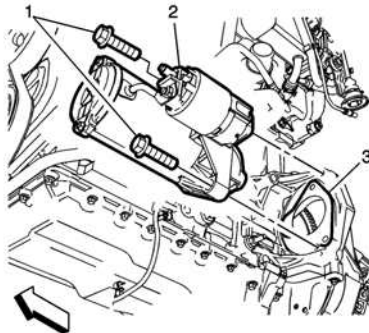
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

1. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Remove the engine lower front splash shield. Refer to Engine Lower Front Splash Shield Replacement.
3. Remove the left front wheel assembly. Refer to Tire and Wheel Removal and Installation.

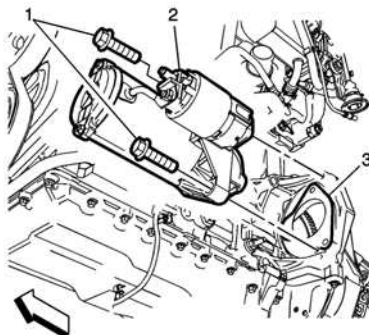


4. Remove the battery positive cable fastener (1) and remove the battery positive cable (2) from the starter solenoid.
5. Remove the engine harness fastener (4) and the engine harness terminal (3) from the starter solenoid.



6. Remove the starter mounting fasteners (1) and the gasket (3).
7. Remove the starter (2) from the engine compartment.

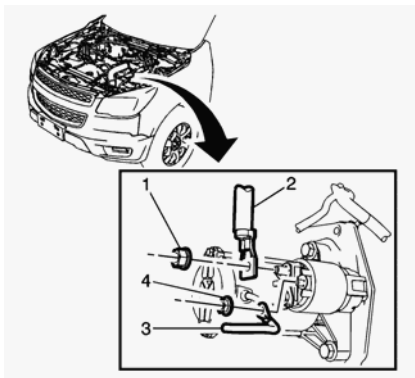
[Installation Procedure](#)



Caution: Refer to Fastener Caution.

1. Install the starter (2) and gasket (3) to the engine block. Tighten the fasteners (1) to **50 Y (37 lb ft)**.

Starter Replacement (Diesel)



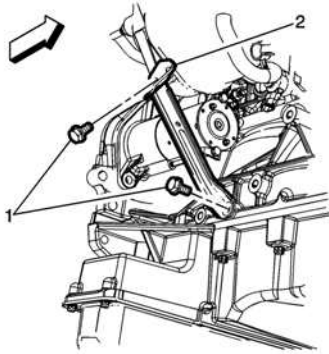
2. Install the battery positive cable (2) to the starter solenoid and tighten the fastener (1) to **10 Y (89 lb in)**.
3. Install the engine harness terminal (3) to the starter solenoid and tighten the fastener (4) to **4 Y (44 lb in)**.
4. Install the engine lower front splash shield. Refer to Engine Lower Front Splash Shield Replacement.
5. Install the left front wheel assembly. Refer to Tire and Wheel Removal and Installation.
6. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.

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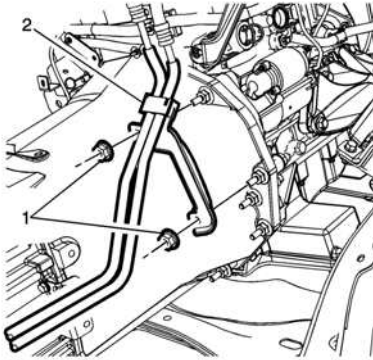
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

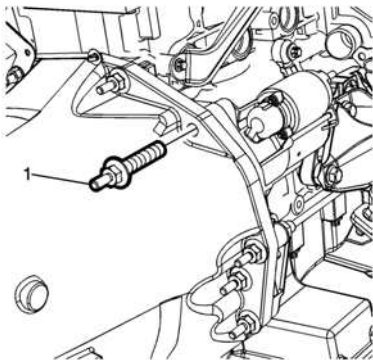
1. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Remove the battery positive cable. Refer to Battery Positive Cable Replacement.



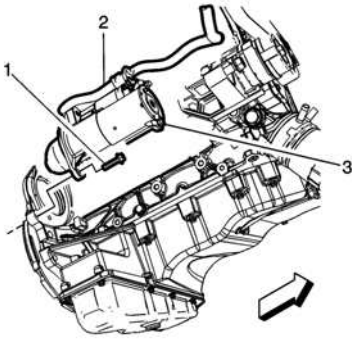
3. Remove the intake manifold brace fasteners (1) and remove the intake manifold brace (2).



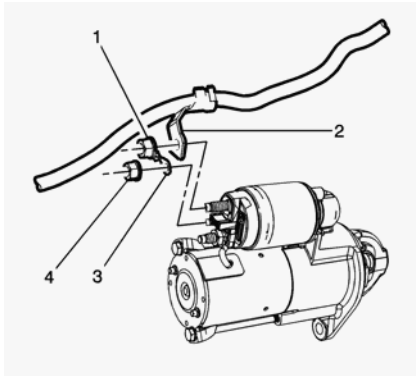
4. Remove the fuel feed and return bracket fasteners (1) and remove the fuel feed and return bracket (2).



5. Remove the starter mounting fastener (1) from the transmission .

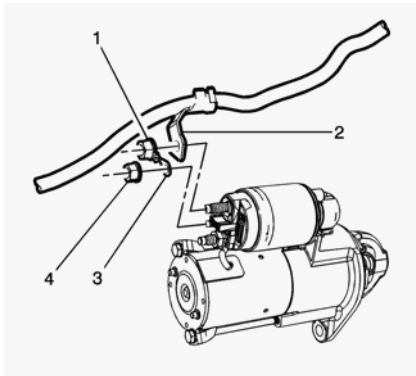


6. Remove the starter mounting fastener (1) and the battery positive cable (2) with the starter (3), from the engine compartment.



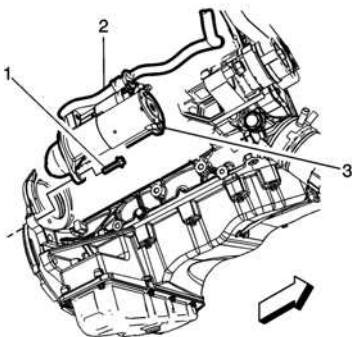
7. Place the starter in a suitable vice.
8. Remove the battery positive fastener (1) and the battery positive terminal (2), from the starter solenoid.
9. Remove the battery positive fastener (4) and the battery positive terminal (3), from the starter solenoid.

[Installation Procedure](#)

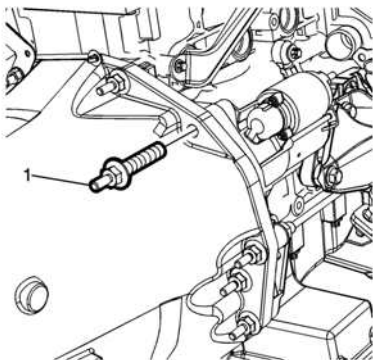


Caution: Refer to Fastener Caution.

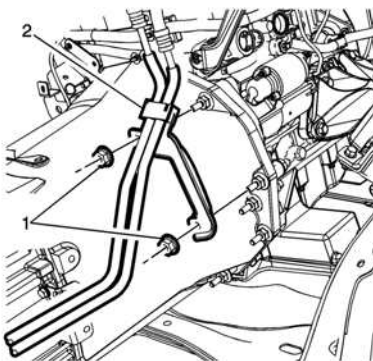
1. Place the starter in a suitable vice and install the battery positive terminal (3) to the starter solenoid. Tighten the fastener (4) to **9 Y (80 lb in)**.
2. Install the battery positive terminal (2) to the starter solenoid and tighten the fastener (1) to **9 Y (80 lb in)**.



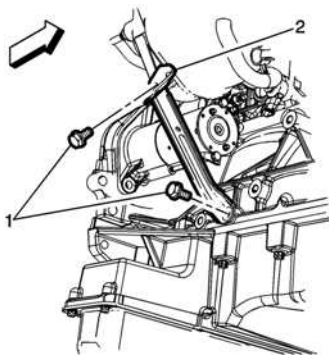
3. Install the starter (3) with the battery positive cable (2) and tighten the starter mounting fastener (1) to **45 Y (37 lb ft)**.



4. Install the starter mounting stud/fastener (1) from the transmission side and tighten to **50 Y (37 lb ft)**.



5. Install the fuel feed and return bracket (2) and tighten the fasteners (1) to **17 Y (12 lb ft)**.



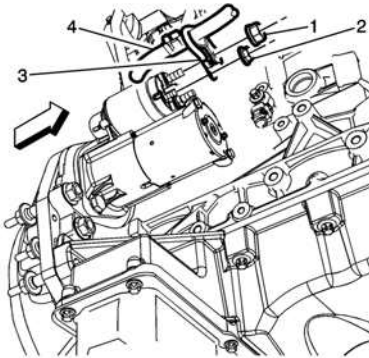
6. Install the intake manifold brace (2) and tighten the fasteners (1) to **22 Y (16 lb ft)**.
7. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.

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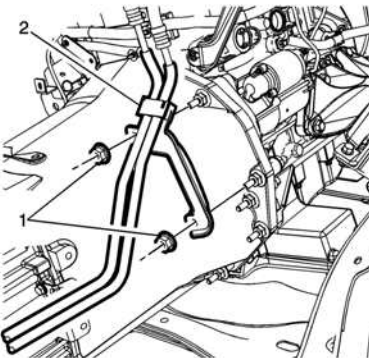
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

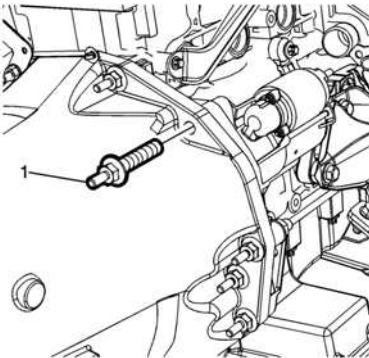
1. raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.



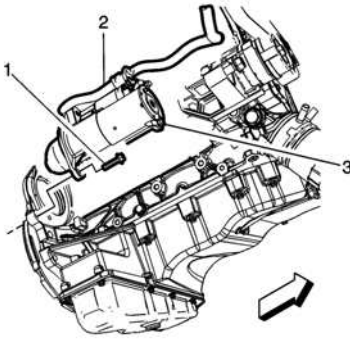
3. Remove the battery positive cable fastener (1) and terminal (4) from the starter solenoid.
4. Remove the engine harness fastener (2) and terminal (3) from the starter solenoid.



5. Remove the fuel feed and return bracket fasteners (1) and remove the fuel feed and return bracket (2).

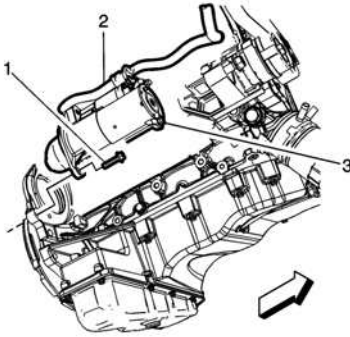


6. Remove the starter mounting fastener (1) from the transmission .



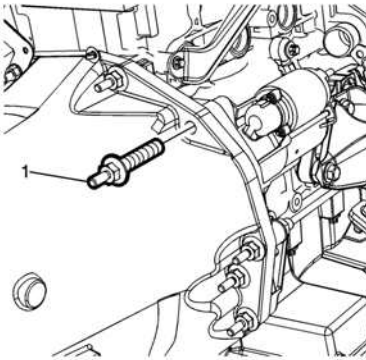
7. Remove the starter mounting fastener (1) and remove the starter (2) from the engine compartment.

[Installation Procedure](#)

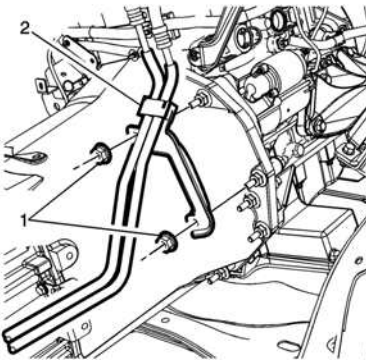


Caution: Refer to Fastener Caution.

1. Install the starter (2) and tighten the starter mounting fastener (1) to **45 Y (37 lb ft)**.

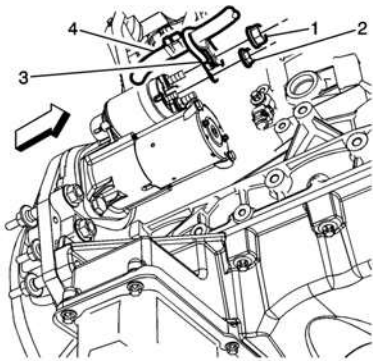


2. Install the starter mounting stud/fastener (1) on the transmission side and tighten to **50 Y (37 lb ft)**.



3. Install the fuel feed and return bracket (2) and tighten the fasteners (1) to **17 Y (12 lb ft)**.

Starter Replacement (LP8)



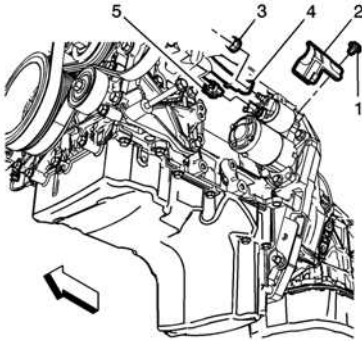
4. Install the engine harness terminal (3) and tighten the fastener (2) to **9 Y (80 lb in)**.
5. Install the battery positive cable terminal (4) and tighten the fastener (1) to **9 Y (80 lb in)**.
6. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.

2013 Chevrolet Colorado

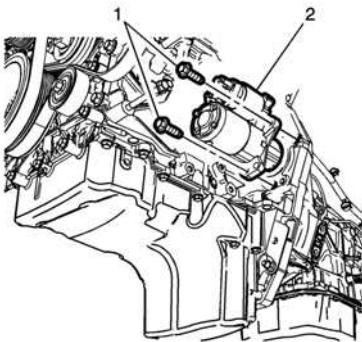
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

1. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Remove the left side engine mount. Refer to Engine Mount Replacement - Left Side.
3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
4. Remove the left front engine lower front splash shield. Refer to Engine Lower Front Splash Shield Replacement.

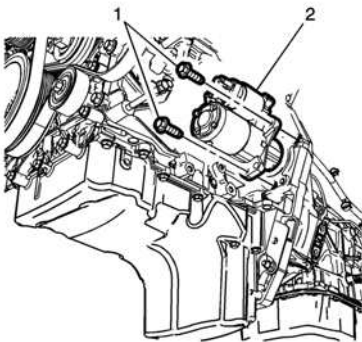


5. Remove the starter heat shield fastener (1) and the starter heat shield (2).
6. Remove the battery positive cable fastener (3) and remove the battery positive cable (4) from the starter solenoid.
7. Disconnect the engine harness connector (5) from the starter.



8. Remove the starter mounting fasteners (1) and the starter assembly (2), from the engine compartment.

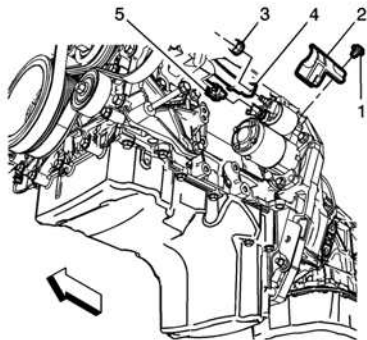
[Installation Procedure](#)



Caution: Refer to Fastener Caution.

1. Install the starter (2) and tighten the fasteners (1) to **58 Y (43 lb ft)**.

Starter Replacement (LY7)



2. Connect the engine harness connector (5) to the starter solenoid.
3. Install the battery positive cable terminal (4) to the starter solenoid and tighten the fastener (1) to **10 Y (89 lb in)**.
4. Install the starter heat shield (2) and tighten the fastener (1) to **5 Y (44 lb in)**.
5. Install the engine lower front splash shield. Refer to Engine Lower Front Splash Shield Replacement.
6. Install the left side engine mount. Refer to Engine Mount Replacement - Left Side.
7. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

The starter motors are non-repairable starter motors. They have pole pieces that are arranged around the armature. Both solenoid windings are energized. The pull-in winding circuit is completed to the ground through the starter motor. The windings work together magnetically to pull and hold in the plunger. The plunger moves the shift lever. This action causes the starter drive assembly to rotate on the armature shaft spline as it engages with the flywheel ring gear on the engine. Moving at the same time, the plunger also closes the solenoid switch contacts in the starter solenoid. Full battery voltage is applied directly to the starter motor and it cranks the engine.

As soon as the solenoid switch contacts close, current stops flowing through the pull-in winding because battery voltage is applied to both ends of the windings. The hold-in winding remains energized. Its magnetic field is strong enough to hold the plunger, shift lever, starter drive assembly, and solenoid switch contacts in place to continue cranking the engine. When the engine starts, pinion overrun protects the armature from excessive speed until the switch is opened.

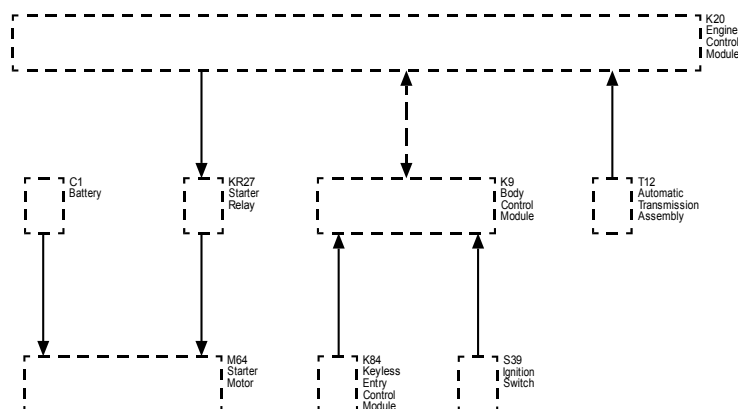
When the ignition switch is released from the START position, the START relay opens and battery voltage is removed from the starter solenoid S terminal. Current flows from the motor contacts through both windings to the ground at the end of the hold-in winding. However, the direction of the current flow through the pull-in winding is now opposite the direction of the current flow when the winding was first energized.

The magnetic fields of the pull-in and hold-in windings now oppose one another. This action of the windings, along with the help of the return spring, causes the starter drive assembly to disengage and the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

[Circuit Description \(Key Start\)](#)

When the ignition switch is placed in the Start position, a discrete signal is supplied to the body control module (BCM) notifying it that the ignition is in the Start position. The BCM then sends a message to the engine control module (ECM) notifying it that CRANK has been requested. The ECM verifies that the transmission is in Park or Neutral. If it is, the ECM then supplies 12 volts to the control circuit of the crank relay. When this occurs, battery positive voltage is supplied through the switch side of the crank relay to the S terminal of the starter solenoid.

[Starting System Block Diagram](#)



(HW)	Hard-Wired
(DD)	Serial Data - GMLAN High Speed
(HW)	Hard-Wired
(HW)	Hard-Wired
(HW)	Hard-Wired
(HW)	Hard-Wired
(HW)	Hard-Wired
(K20)	K20 Engine Control Module
(C1)	C1 Battery
(KR27)	KR27 Starter Relay
(K9)	K9 Body Control Module
(T12)	T12 Automatic Transmission Assembly
(M64)	M64 Starter Motor
(K84)	K84 Keyless Entry Control Module
(S39)	S39 Ignition Switch

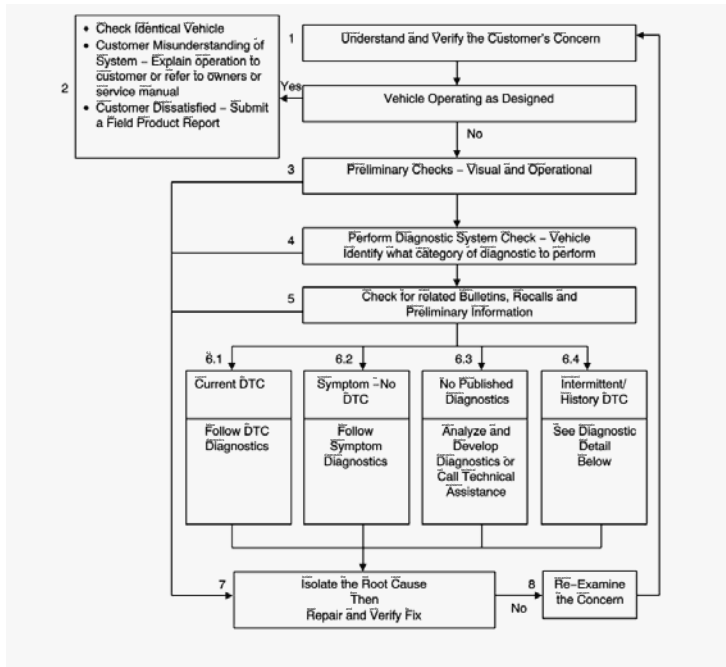
2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

J 42598 Vehicle Data Recorder

The goal of Strategy Based Diagnosis is to provide guidance in preparing a systematic 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. Refer to the following chart for the correct Strategy Based Diagnosis.



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 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.
6. Diagnostic categories:

1. Current DTC: Follow the designated DTC diagnostic in order to make an effective repair. Refer to Diagnostic Trouble Code (DTC) List - Vehicle.
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.
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.
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.
- Follow the suggestions on Testing for Intermittent Conditions and Poor Connections.
- Use the available scan tool, digital multimeter, or J 42598 vehicle data recorder with data capturing capabilities.
- Isolate the Root Cause, then Repair and Verify: After isolating the root cause, make the repairs and validate for the correct operation by performing the Diagnostic

Strategy Based Diagnosis

Repair Verification. Verifying that the DTC or symptom has been corrected may involve road testing the vehicle.

- Re-examine the concern. If a technician cannot successfully find or isolate the concern, a re-evaluation is necessary. Reverify the concern. The concern could be an intermittent malfunction or a normal operating condition.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Symptom Byte List

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
<i>(00–0F) General Electrical Failures</i>		
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.
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.
<i>(10–1F) Additional General Electrical Failures</i>		
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.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
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.
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).

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
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.
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.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
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.
(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.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
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°.
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.
<i>(70–7F) Bus Signal / Message Failures</i>		
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.

Symptom Byte List

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
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.
<i>(80–FF) Reserved</i>		
Unique System Specific – See specific diagnostic procedures for symptom byte information if these symptom bytes are used.		

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Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

Important: Use the symptom tables only if the following conditions are met:

- Refer to Diagnostic Starting Point - Vehicle.
- There are no DTCs set.
- The control modules can communicate via the serial data link.
- Review the system operation in order to familiarize yourself with the system functions. Refer to Transmission General Description and Transmission Component and System Description.

[Visual/Physical Inspection](#)

Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

[Intermittent](#)

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections.

[Symptom List](#)

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

- Fluid Diagnosis
 - Transmission Fluid Level and Condition Check
 - Fluid Pressure High or Low
 - Automatic Transmission Fluid Leaks
 - Fluid Leak Diagnosis
- Noise and Vibration Diagnosis
 - Whine/Growl Noise That Changes with Vehicle Speed
 - Noise in First or Reverse Gear
 - Noise in First, Second, Third, Fourth, Fifth, or Reverse Gear
 - Noise in First, Second, Sixth, or Reverse Gear
 - Noise in Second or Sixth Gear
 - Noise During 3-4 or 4-3 Shifts
 - Noise in Fourth, Fifth, or Sixth Gear
 - Vibration
 - Flex Plate/Torque Converter Vibration Test
 - Noise and Vibration Analysis
- Range Performance Diagnosis
 - No Park or Drive
 - No Drive in All Ranges
 - No Reverse Gear
- Shift Quality Feel Diagnosis
 - Harsh Garage Shift
 - Harsh, Soft, Delayed or Slipping First or Reverse Gear
 - Harsh, Soft, Delayed or Slipping 1-2-3-4 Shift
 - Harsh, Soft, Delayed or Slipping 4-5-6 Shift
 - Harsh, Soft, Delayed or Slipping Third, Fifth, or Reverse Gear
 - Harsh, Soft, Delayed or Slipping Second or Sixth Gear
- Shift Pattern
 - No First Gear
 - No First and Reverse Gears
 - No First, Second, Third, and Fourth Gear
 - No Second and Sixth Gear
 - No Fourth, Fifth, and Sixth Gear
 - No Third, Fifth, and Reverse Gear
- Torque Converter Diagnosis
 - Torque Converter Diagnosis
 - No Torque Converter Clutch Apply
 - No Torque Converter Clutch Release
- Symptom Not Found or No Symptom Detected

Symptoms - Automatic Transmission

- Transmission Fluid Level and Condition Check
- Road Test
- Line Pressure Check

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Fuel Delivery: | **Fuel:**

Note:

- Perform the Diagnostic System Check - Vehicle before using the symptom tables, in order to verify the following conditions are true:
 - There are no diagnostic trouble codes (DTCs) set.
 - The control modules can communicate via the serial data link.
- Review the system operation in order to familiarize yourself with the system functions. Refer to Transfer Case Description and Operation.

[Visual/Physical Inspection](#)

- Inspect for aftermarket devices which could affect the operation of the automatic transfer case system. Refer to Checking Aftermarket Accessories.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the automatic transfer case for the proper fluid level.

[Intermittent](#)

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections.

[Symptom List](#)

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

- Transfer Case Popping Noise
- Transfer Case Banging Noise
- Transfer Case Whine or Rumble Noise
- Transfer Case Growl or Grinding Noise
- Transfer Case Clunk in 2HI Only
- Transfer Case Clunk in 4HI
- Transfer Case Clunk in 4LO
- Transfer Case Will Not Shift
- Transfer Case Jumps Out of Gear
- Transfer Case Leak Diagnosis

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[Body Repair](#)

Symptoms - Bolted Exterior Body Panels and Closures

[Body Systems](#)

- Symptoms - Fixed and Moveable Windows
- Symptoms - Horns
- Symptoms - Lighting
- Symptoms - Mirrors
- Symptoms - Vehicle Access
- Symptoms - Wiper/Washer Systems

[Brakes](#)

- Symptoms - Antilock Brake System
- Symptoms - Hydraulic Brakes
- Symptoms - Park Brake

[Driveline/Axle](#)

- Symptoms - Front Drive Axle
- Symptoms - Propeller Shaft
- Symptoms - Locking/Limited Slip Rear Axle
- Symptoms - Rear Differential Carrier
- Symptoms - Rear Drive Axle
- Symptoms - Wheel Drive Shafts

[Driver Information and Entertainment](#)

- Symptoms - Displays and Gauges
- Symptoms - Secondary and Configurable Customer Controls

[Engine](#)

- Symptoms - Cruise Control
- Symptoms - Engine Controls – 2.4L (LE6 or LP8) engine
- Symptoms - Engine Controls – 2.5L (LVN) or 2.8L (LWH) Diesel engine
- Symptoms - Engine Controls – 2.8L, 3.0L, 3.2L or 3.6L engine
- Symptoms - Engine Cooling
- Symptoms - Engine Electrical
- Symptoms - Engine Exhaust
- Symptoms - Engine Mechanical – 2.5L (LVN) or 2.8L (LWH) Diesel engine
- Symptoms - Engine Mechanical – 2.8L, 3.0L, 3.2L or 3.6L engine

[General Information](#)

Symptoms - Vibration Diagnosis and Correction

[HVAC](#)

- Symptoms - HVAC Systems - Automatic
- Symptoms - HVAC Systems - Manual

[Power and Signal Distribution](#)

- Symptoms - Data Communications
- Symptoms - Power Outlets
- Symptoms - Wiring Systems

[Safety and Security](#)

- Symptoms - Object Detection
- Symptoms - Remote Functions
- Symptoms - Seat Belts
- Symptoms - SIR
- Symptoms - Theft Deterrent

[Seats](#)

Symptoms - Power Seats

Symptoms - Vehicle

[Steering](#)

- Symptoms - Power Steering System
- Symptoms - Steering Wheel and Column

[Suspension](#)

Symptoms - Suspension General Diagnosis

[Transmission](#)

- Symptoms - Automatic Transmission
- Symptoms - Clutch
- Symptoms - Manual Transmission
- Symptoms - Automatic Transmission Shift Lock Control
- Symptoms - Transfer Case

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Fuel Delivery: | **Fuel:**

Ensure that the following conditions exist in order to prepare for trailer lighting control module programming or configuration:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

The following service instructions reflect either a re-programming or configuration event performed to complete a repair procedure.

Trailer Lighting Control Module Programming

Do not re-program the trailer lighting control module unless directed by a service procedure or a service bulletin.

1. Access the Service Programming System (SPS) and follow the on-screen instructions. Refer to Service Programming System (SPS).
2. On the SPS Supported Controllers screen, select Trailer Interface (Control) Module – Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

If the trailer lighting control module fails to accept the program, verify all scan tool and trailer lighting control module connections are secure.

Trailer Lighting Control Module Configuration/Reconfiguration and Setup

If the trailer lighting control module is replaced or installed as an after sales accessory, both the configuration/reconfiguration and setup procedures must be performed.

1. Access the Service Programming System (SPS) and follow the on-screen instructions. Refer to Service Programming System (SPS).
2. On the SPS Supported Controllers screen, select Trailer Interface (Control) Module – Configuration and Setup.
3. On the Control Module – Configuration and Setup Function(s) screen, select both ECU Configuration/Reconfiguration and ECU Setup menu options and follow the on-screen instructions.
4. Clear DTCs after completing the configuration/reconfiguration and setup procedures.

If the trailer lighting control module fails to accept the configuration/reconfiguration and setup procedures, verify all scan tool and trailer lighting control module connections are secure.

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Table 1: [Trailer Interface Control Module Scan Tool Data Parameters](#)
Table 2: [Trailer Interface Control Module Scan Tool Output Controls](#)

Trailer Interface Control Module Scan Tool Data Parameters			
Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Battery Voltage	—	Varies 12–14 V	The scan tool displays volts. This is the voltage of the trailer lighting converter.
Brake Pedal Switch Status	—	Inactive	The scan tool displays Active when the brake pedal is pressed. The scan tool displays Inactive when the brake pedal is released.
Rear Multifunction Carrier Connection Detected	—	No	The scan tool displays Yes if a multifunction carrier is connected to the vehicle.
Rear Multifunction Carrier Detection	—	Disabled	The scan tool displays Enabled if a multifunction carrier is connected to the vehicle.
Run/Crank Terminal Status	—	Inactive	The scan tool displays Active when the engine runs/cranks.
Trailer Connection Detected	—	No	The scan tool displays Yes if a trailer is connected to the vehicle.
Trailer Detection	—	Disabled	The scan tool displays Enabled if a trailer is connected to the vehicle.
Trailer Interface Control Module Scan Tool Output Controls			
Output Control	Description		
Left Trailer Tail Lamp	Commands the left trailer tail lamp ON and OFF		
Left Trailer Turn Signal Lamp	Commands the left trailer turn signal lamp ON and OFF		
Left Auxiliary Tail and Brake Lamp	Commands the left auxiliary tail and brake lamp ON and OFF		
Left Rear Auxiliary Turn Signal Lamp	Commands the left rear auxiliary turn signal lamp ON and OFF		
Left Tail Lamp	Commands the left tail lamp ON and OFF		
Right Trailer Tail Lamp	Commands the right trailer tail lamp ON and OFF		
Right Trailer Turn Signal Lamp	Commands the right trailer turn signal lamp ON and OFF		
Right Auxiliary Tail and Brake Lamp	Commands the right auxiliary tail and brake lamp ON and OFF		
Right Rear Auxiliary Turn Signal Lamp	Commands the right rear auxiliary turn signal lamp ON and OFF		
Right Tail Lamp	Commands the right tail lamp ON and OFF		
Trailer Brake Lamps	Commands the trailer brake lamps ON and OFF		
Trailer Backup Lamps	Commands the trailer backup lamps ON and OFF		
Trailer Fog Lamp(s)	Commands the trailer fog lamp(s) ON and OFF		

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The following service procedures require either a programming or a setup event performed for a complete repair.

[Transfer Case Shift Control Module Replacement](#)

If the transfer case shift control module is replaced, the transfer case shift control module reprogramming procedure and the Transfer Case High/Low Clutch Reset procedures must be performed. Refer to Service Programming System (SPS)

[Transfer Case Shift Control Module Reprogramming](#)

If the transfer case shift control module needs to be reprogrammed, refer to Service Programming System (SPS).

Ensure that the following conditions exist in order to prepare for transfer case shift control module programming or reprogramming:

- The battery is fully charged.
- The ignition switch is in the RUN position.
- The Techline equipment cable connection at the data link connector (DLC) is secure.

Program the transfer case shift control module using the latest software matching the vehicle. Refer to up-to-date Techline equipment user instructions.

If the transfer case shift control module fails to program, proceed as follows:

- Ensure that the transfer case shift control module connection is OK.
- Inspect the Techline equipment for the latest software version.
- Attempt to program the transfer case shift control module. If the transfer case shift control module still cannot be programmed properly, replace the transfer case shift control module.

[Transfer Case Shift Control Module Setup](#)

Perform the Transfer Case High/Low Clutch Retest (Motor Learn Procedure). Refer to Transfer Case High/Low Clutch Reset for NQV.

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Table 1: [Scan Tool Data Parameters](#)

Table 2: [Scan Tool Output Controls](#)

The Transmission Control Module Scan Tool Data List contains all transfer case 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.

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 value described below, refer to Symptoms - Transfer Case for diagnosis.

The scan tool values from a properly functioning transfer case may be used for comparison with the transfer case 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
<i>Operating Conditions:</i> Ignition ON, engine OFF, Park or Neutral and transfer case in 2WD, unless otherwise noted.			
2WD High Range Indicator Command	ON or OFF	ON	This parameter displays ON when the transfer case shift control module commands the 2WD High indicator light ON.
2WD/4WD Synchronizer Clutch Command	0 to 100%	0%	This parameter displays the pulse width modulated voltage signal being supplied by the transfer case shift control module to the 2WD/4WD synchronizer clutch on the low reference circuit. This parameter will display 0% after a range shift.
2WD/4WD Synchronizer Clutch Current	0.00 to 5.00 A	0.00 A	This parameter displays the current drawn by the 2WD/4WD synchronizer clutch from the transfer case shift control module. This parameter will display 0.00 A after shifting ranges.
2WD/4WD Synchronizer Clutch High Control Circuit High Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. A short to battery on the 2WD/4WD synchronizer clutch high control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch High Control Circuit High Voltage Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch Low Control Circuit High Voltage Test Status parameter.
2WD/4WD Synchronizer Clutch High Control Circuit Low Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. A short to ground on the 2WD/4WD synchronizer clutch high control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch High Control Circuit Low Voltage Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch Low Control Circuit Low Voltage Test Status parameter.
2WD/4WD Synchronizer Clutch Open Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch

Parameter	System State	Expected Value	Description
2WD/4WD Synchronizer Clutch Low Control Circuit High Voltage Test Status	Not Run, OK or Malfunction	OK	channel 2 encoder signal circuit and the low reference circuit. An open/high resistance condition on the 2WD/4WD synchronizer clutch high control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch High Control Circuit Open Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch Low Control Circuit Open Test Status parameter. This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. A short to battery on the 2WD/4WD synchronizer clutch low control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch Low Control Circuit High Voltage Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch High Control Circuit High Voltage Test Status parameter.
2WD/4WD Synchronizer Clutch Low Control Circuit Low Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. A short to ground on the 2WD/4WD synchronizer clutch low control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch Low Control Circuit Low Voltage Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch High Control Circuit Low Voltage Test Status parameter.
2WD/4WD Synchronizer Clutch Low Control Circuit Open Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the 2WD/4WD synchronizer clutch control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. An open/high resistance condition on the 2WD/4WD synchronizer clutch low control circuit will cause this parameter to display Malfunction. When Malfunction is set on the 2WD/4WD Synchronizer Clutch Low Control Circuit Open Test Status parameter it also sets on the 2WD/4WD Synchronizer Clutch High Control Circuit Open Test Status parameter.
2WD/4WD Synchronizer Clutch Low Control Command	ON or OFF	OFF	This parameter displays the status of the 2WD/4WD synchronizer clutch high control circuit. The 2WD/4WD synchronizer clutch control circuit is made up of the transfer case position switch channel 2 encoder signal circuit and the low reference circuit. This parameter displays OFF after a Range Shift.
4WD High Range Indicator Command	ON or OFF	OFF	This parameter displays ON when the transfer case shift control module commands the 4WD High indicator light ON.
4WD Low Range Indicator Command	ON or OFF	OFF	This parameter displays ON when the transfer case shift control module commands the 4WD Low indicator light ON.
Control Module Voltage Signal	0.0 to 25.5 V	Battery Voltage	This parameter displays the voltage measured by the transfer case shift control module at the battery positive voltage circuit.
Display Dimming	0 to 100%	Varies	This parameter displays the current being supplied by the transfer case shift control module to the transfer case 2WD/4WD indicator switch.

Parameter	System State	Expected Value	Description
Front Axle Engagement Actuator Command	Engaged or Disengaged	Disengaged	This parameter displays either Engaged or Disengaged. Engaged when the body control module is commanding Auto 4WD, 4WD, or 4WD Low ranges, and Disengaged when the body control module is commanding Neutral, or 2WD ranges.
Front Axle Engagement Actuator Control Circuit High Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the front axle engagement actuator control circuit. A short to battery on the front axle engagement actuator control circuit will cause this parameter to display Malfunction.
Front Axle Engagement Actuator Control Circuit Low Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the front axle engagement actuator control circuit. A short to ground on the front axle engagement actuator control circuit will cause this parameter to display Malfunction.
Front Axle Engagement Actuator Control Circuit Open Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the front axle engagement actuator control circuit. An open/high resistance condition on the front axle engagement actuator control circuit will cause this parameter to display Malfunction.
Front Axle Feedback Switch	Engaged or Disengaged	Disengaged	This parameter displays the actual status of the front axle.
Ignition 1 Signal	ON or OFF	ON	This parameter displays the status of the run/crank ignition 1 voltage circuit to the transfer case shift control module. The scan tool displays OFF at ignition OFF.
Ignition Accessory Signal	ON or OFF	ON	This parameter displays the status of the ignition accessory signal circuit to the transfer case shift control module. The scan tool displays OFF when interior lights turn OFF.
Non-Driven Wheel Speed	Varies	km/h/MPH	This parameter displays the non-drive wheel speed in kilometers or miles per hour.
Range Actuator Command	-100 to +100%	0%	This parameter displays the pulse width modulated voltage signal being supplied by the transfer case shift control module to the transfer case encoder motor on circuit A or circuit B. The scan tool displays negative values when turning counterclockwise or positive values when turning clockwise. This parameter will display 0% after a range shift.
Range Actuator Control Circuit A Command	OFF, High or Low	OFF	This parameter displays the direction of the voltage flow of the range actuator control circuit. The scan tool displays Low-High-Off when turning counterclockwise or High-Low-Off when turning clockwise while shifting. This parameter will display OFF after shifting ranges. Opposite of Range Actuator Control Circuit B.
Range Actuator Control Circuit B Command	OFF, High or Low	OFF	This parameter displays the direction of the voltage flow of the range actuator control circuit. The scan tool displays High-Low-Off when turning clockwise or Low-High-Off when turning counterclockwise while shifting ranges. This parameter will display OFF after shifting ranges. Opposite of Range Actuator Control Circuit A.
Range Actuator Control Circuit High Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the range actuator control circuit. The range actuator control circuit is made up of the range actuator control circuit A and the range actuator control circuit B. A short to battery on the range actuator control circuit A or the range actuator control circuit B will cause this parameter to display Malfunction.
Range Actuator Control Circuit Low Voltage Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the range actuator control circuit. The range actuator control circuit is made up of the range actuator control circuit A and the range actuator control circuit B.

Parameter	System State	Expected Value	Description
Range Actuator Control Circuit Open Test Status	Not Run, OK or Malfunction	OK	A short to ground on the range actuator control circuit A or the range actuator control circuit B will cause this parameter to display Malfunction. This parameter monitors the status of the range actuator control circuit. The range actuator control circuit is made up of the range actuator control circuit A and the range actuator control circuit B. An open on the range actuator control circuit A or the range actuator control circuit B will cause this parameter to display Malfunction.
Range Actuator Control Circuit Shorted Test Status	Not Run, OK or Malfunction	OK	This parameter monitors the status of the range actuator control circuit. The range actuator control circuit is made up of the range actuator control circuit A and the range actuator control circuit B. A short to ground, short to battery or short together on the range actuator control circuit A and/or the range actuator control circuit B will cause this parameter to display Malfunction.
Range Actuator Current	-15.0 to +36.0 A	0.0 A	This parameter displays the current drawn by the range actuator from the transfer case shift control module on either the range actuator control circuit A or the range actuator control circuit B. Typical values display 0.0 to 12.0 A. This parameter will display 0.0 A after shifting ranges.
Range Actuator Direction Command	Stationary, Clockwise or Counterclockwise	Stationary	This parameter displays what direction the transfer case shift control module is commanding the range actuator to turn. This parameter will display Stationary after a range change.
Range Actuator Position	2WD, 4WD High-2WD 4WD High/Locked, 4WD High-Neutral, Neutral, Neutral-4WD Low, or 4WD Low	2WD	This parameter displays the actual position of the transfer case according to the range actuator position sensor.
Range Actuator Position Sensor	0 to 360°	99°	This parameter displays the position of the range actuator position sensor in degrees. Typical scan tool displays: • 2WD = 85–115° • 4WD High/Locked = 5–35° • 4WD Low = 315–345° • Neutral = 190–200°
Range Actuator Position Sensor	190 to 210 Hz	199 Hz	This parameter displays the frequency of the current being supplied to the range actuator position sensor.
Range Actuator Position Sensor	0 to 100%	24% (±5%)	This parameter displays the position of the range actuator position sensor in percent. Typical scan tool values: • 2WD = 24% • 4WD High = 5% • 4WD Low = 95% • Neutral = 5%
Range Actuator Position Sensor Supply Voltage	4.8 to 5.2 V	5.0 V	This parameter displays the voltage being supplied by the transfer case shift control module to the range actuator position sensor.
Service 4WD Indicator Command	ON or OFF	OFF	This parameter displays ON anytime a DTC sets.
Transfer Case Commanded Position	2WD, 4WD High/Locked, 4WD Low, Neutral or None	2WD	This parameter displays the current range commanded by the driver.
Transfer Case Neutral Range Indicator Command	ON or OFF	OFF	This parameter displays ON when the transfer case shift control module commands the Neutral indicator light ON.

Parameter	System State	Expected Value	Description
Transfer Case Output Shafts Slip Speed	Varies	RPM	This parameter displays the difference between the rotational speeds of the transfer case output shafts.
Transfer Case Range Selection Switch	0.0 to 7.5 V	2.0 V (±0.2 V)	This parameter displays the voltage being returned from the transfer case range selection switch. Typical scan tool displays: • 2WD = 2.0 V • 4WD High/Locked = 3.0 V • 4WD Low = 1.5 V • Neutral = 2.5 V
Transfer Case Range Selection Switch Reference	0.0 to 7.5 V	5.0 V	This parameter displays the voltage being supplied by the transfer case shift control module to the transfer case range selection switch.
Transfer Case Range Selection Switch State	2WD, 4WD High/Locked, 4WD Low, Neutral or None	2WD	This parameter displays the current range commanded by the transfer case range selection switch.
Transmission Fluid Temperature	Varies	°C (°F)	This parameter displays the transmission fluid temperature in degrees Celsius or Fahrenheit.
Transmission Gear	Park, Reverse, Neutral, 1, 2, 3, 4, 5, and 6	Park or Neutral	This parameter displays the current gear the transmission is in. The scan tool displays Park, Reverse and Neutral when ignition ON and engine OFF. The scan tool displays Park, Reverse, Neutral, 1, 2, 3, 4, 5, and 6 when engine ON.
Transmission OSS	Varies	RPM	This parameter displays transmission output shaft speed in revolutions per minute.
Transmission Range	Park, Reverse, Neutral, 1, 2, 3, 4, 5, and 6	Park or Neutral	This parameter displays the current gear the transmission is in. The scan tool displays Park, Reverse and Neutral when ignition ON and engine OFF. The scan tool displays Park, Reverse, Neutral, 1, 2, 3, 4, 5, and 6 when engine ON.
Vehicle Speed	Varies	km/h/MPH	This parameter displays vehicle speed in kilometers or miles per hour.

Scan Tool Output Controls

Output Control	Description
Note: Refer to the scan tool manual for complete scan tool operating instructions.	
2WD High Range Indicator	This function allows the technician to command the 2WD High indicator light, within the transfer case shift control switch, ON or OFF.
2WD/4WD Synchronizer Clutch	This function allows the technician to increase the current supplied to the 2WD/4WD synchronizer clutch from 0% to 100% in 10% increments. Current will be held until released.
2WD/4WD Synchronizer Clutch Test	Note: Transmission must be in transmission Neutral for this output control to operate. This function allows the technician to command full current to the 2WD/4WD synchronizer clutch. Current will be held for 2–3 seconds.
4WD High Range Indicator	This function allows the technician to command the 4WD High indicator light, within the transfer case shift control switch, ON or OFF.
4WD Low Range Indicator	This function allows the technician to command the 4WD Low indicator light, within the transfer case shift control switch, ON or OFF.
Front Axle Engagement Actuator	Note: Transmission must be in transmission Neutral for this output control to operate. This function allows the technician to command the front axle to engage.
Range Actuator Learn	This function allows the technician to command the transfer case shift control module to relearn the range actuator position sensor after the encoder motor, module, or transfer case is replaced.
Transfer Case Neutral Range Indicator	This function allows the technician to command the Neutral indicator light, within the transfer case shift control switch, ON or OFF.

Transfer Case Shift Control Module Scan Tool Information

Output Control

Description

Transfer Case Range

Note: Transmission must be in transmission Neutral for this output control to operate.
This function allows the technician to command range changes.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Table 1: [Scan Tool Data Parameters](#)

Table 2: [Scan Tool Output Controls](#)

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.

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 value described below, refer to Symptoms - Automatic Transmission 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
<i>Operating Conditions:</i> Engine at idle with the upper radiator hose hot and in closed loop operation, closed throttle, transmission in Park, 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 based on the gear ratio change after the commanded 5-6 shift.
Brake 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.
Calc. 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 percent, where 0 percent represents an idle or coast request and 100 percent represents a request for wide open throttle (WOT).
Commanded Gear	1	1, 2, 3, 4 or 1, 2, 3, 4, 5 or Park/Neutral, Reverse, 1, 2, 3, 4, 5	This parameter displays the current commanded state of the shift solenoid valves. The scan tool displays 1, 2, 3, 4 or 5
Driver Shift Control	Inactive	Active/Inactive	This parameter displays Active or Inactive. The scan tool displays Active when the gear selector is in the sport (S) position, which enables TAP shift. The scan tool displays Inactive when the gear selector is not in the S 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

Parameter	System State	Expected Value	Description
			selector input and also will display none when there is no request.
ECT	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).
Engine Speed	Varies	RPM	This parameter displays the rotational speed of the engine expressed as revolutions per minute.
Engine Torque	Varies	Y (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 Y 15 lb ft of actual measured engine torque.
Gear Ratio	Varies	Ratio	This parameter displays the actual transmission gear ratio. The scan tool displays the gear ratio calculated from the automatic transmission input shaft speed sensor (AT ISS) and the automatic transmission output shaft speed sensor (AT OSS) inputs.
High Side Driver 1	Enabled	Enabled/Disabled	This parameter displays the High Side Driver 1 status on the scan tool. When the High Side Driver 1 is commanded OFF this displays Disabled, when the High Side Driver 1 is commanded ON this displays Enabled.
High Side Driver 1 CKT Status	OK or Indeterminate	OK, Open/Short to Volts, Short to GND, Indeterminate	This parameter displays the High Side Driver 1 circuit status on the scan tool. If the voltage is low when the solenoid is commanded OFF, the scan tool will display Open/Short to GND. If the voltage is high when the solenoid is commanded ON, the scan tool will display Short to Volts. If no circuit fault is present the scan tool will display OK.
Ignition Voltage	12 to 14 volts	Volts	This parameter displays the system voltage measured at the ignition feed.
IMS	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.
IMS A/B/C/P	LOW/HI/HI/LOW	HI or 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 HI/LOW, HI/LOW, HI/LOW, HI/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.
PC Sol. 2 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 2 Pressure Comm	No	Yes/No	This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 3 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 3 Pressure Comm	Yes	Yes/No	This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 4 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts.

Parameter	System State	Expected Value	Description
PC Sol. 4 Pressure Comm	No	Yes/No	This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 5 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 5 Pressure Comm	No	Yes/No	This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
Shift Sol. 1 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts, or Indeterminate.
Shift Solenoid 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 Sol. 2 CKT Status	OK or Indeterminate	OK, Open/Short to GND, Short to Volts, Indeterminate	This parameter displays OK, Open/Short to GND, Short to Volts, or Indeterminate.
Shift Solenoid 2	ON	On/Off	This parameter displays the commanded state of the 2–3, 3–4 shift solenoid valve (S2). The scan tool displays On/Off.
TCC PC Sol. Pressure Comm	No	Yes/No	This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
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.
TCM Temperature	Varies	°C (°F)	This parameter displays results in °C (°F).
TFP Switch 1	HI	HI/LOW	This parameter displays the state of the first clutch oil pressure switch. The scan tool displays HI/LOW.
TFP Switch 3	LOW	HI/LOW	This parameter displays state of the 3rd clutch oil pressure switch. The scan tool displays HI/LOW.
TFP Switch 4	LOW	HI/LOW	This parameter displays state of the 4th clutch oil pressure switch. The scan tool displays HI/LOW.
TFP Switch 5	LOW	HI/LOW	This parameter displays state of the fifth clutch oil pressure switch. The scan tool displays HI/LOW.
Tow/Haul Mode (If equipped)	Inactive	Active/Inactive	This parameter displays ACTIVE when the transmission is operating in the tow/haul mode. In this mode the transmission control module (TCM) extends the length of time between upshifts and elevates transmission line pressure. Shift quality and TCC scheduling are also affected during tow/haul mode operation. The scan tool displays ACTIVE or INACTIVE.
Trans. Fluid Temp.	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 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.
Transmission OSS	0	RPM	This parameter displays the rotational speed of the transmission output shaft expressed as revolutions per minute.

Scan Tool Output Controls

Output Control	Description
High Side Driver 1	- The TCM commands the driver for the solenoid voltage supply ON and OFF. - When the ignition is ON, and the engine is OFF, there are no limits to this control. - High side drivers may not be commanded ON and OFF with the scan tool if the engine is running.
Line PC Solenoid	- The scan tool is used to request pressure in increments of 200 kPa (30 psi) from 200–2000 kPa (30–290 psi). The TCM will then command the line PC solenoid to achieve the requested increment. - When the ignition is ON, and the engine is OFF, the pressure request may be controlled within calibrated limits. There is a limit to the output control of 200 kPa (290 psi) when the engine is OFF. If the request is above specified amount, the message "Request override current out of range" will display. - 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.
PC Solenoid 2 Command	- The TCM commands the pressure control solenoid in order to apply or 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.
PC Solenoid 3 Command	- 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.
PC Solenoid 4 Command	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.
PC Solenoid 5 Command	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.
Service Clean Procedure	- The scan tool is used to start and stop the transmission cleaning procedure algorithm. - The following control limits apply: - The engine must be running. The message "Engine not Running" will appear on the scan tool if this control is attempted without the engine running. - There cannot be active transmission DTCs. The message "Transmission Fault present" will appear on the scan tool if this control is attempted with transmission DTCs active. - The transmission range must be Park or Neutral. The message "Transmission not in PARK or NEUTRAL" will appear on the scan tool if this control is attempted with the transmission in any range other than Park or Neutral. - The vehicle speed cannot exceed 8 km/h (5 mph). The message "Vehicle Speed too high" will appear on the scan tool if this control is attempted with a vehicle speed greater than 8 km/h (5 mph). - The engine speed cannot exceed 2500 RPM. The message "Engine Speed too high" will appear on the scan tool if this control is attempted with an engine speed greater than 2500 RPM. - The transmission oil temperature must be at a normal operating temperature. The message "Transmission oil temperature out of range" will appear on the scan tool if this control is attempted without a transmission oil temperature between 70–110°C (158–230°F).
Reset Transmission Adapts	- The scan tool is used to start and stop the transmission Fast Learn Adapt algorithm. - The following control limits apply: - The engine must be running. The message "Engine not Running" will appear on the scan tool if this control is attempted without the engine running. - There cannot be active transmission DTCs. The message "Transmission Fault present" will appear on the scan tool if this control is attempted with transmission DTCs active.
Shift Solenoid 1	- The TCM commands Shift Solenoid 1 and Shift Solenoid 2 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

Transmission Control Module Scan Tool Information (6L45/6L50/6L80/6L90)

Output Control	Description
Shift Solenoid 2	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.
TCC PC Solenoid Command	• 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.