

GENERAL MOTORS (TRUCKS & VANS)

NOTE: Before performing Electronically Erasable Programmable Read Only Memory (EEPROM) programming procedure, check for any applicable Technical Service Bulletins (TSBs) that may apply to vehicle application. BCM/PCM/VCM must be programmed with proper Regular Production Option (RPO) configurations. Follow instructions on Techline(R) terminal and scan tool to program BCM/PCM/VCM.

CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE

Avalanche, Astro, Aztek, Blazer, Bravada, Cab & Chassis - 8.1L, Chevy Express - 4.3L, 5.0L, 5.7L & 8.1L, Cutaway - 5.7L & 8.1L, Envoy, Envoy XL, Escalade, Escalade EXT, Montana, Rendezvous, RV Cutaway - 5.7L & 8.1L, S10 Pickup, Safari, Savana - 4.3L, 5.0L, 5.7L & 8.1L, Savana Camper Special - 5.7L & 8.1L, Savana Special - 5.7L & 8.1L, Sierra - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Silhouette, Silverado - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Sonoma, Suburban, Tahoe, Trailblazer, Venture, Yukon & Yukon XL

CAUTION: Before performing Crankshaft Position Sensor (CKP) system variation learn procedure, always set parking brake and block drive wheels in order to prevent personal injury. Release throttle immediately when engine starts to decelerate in order to eliminate over revving engine. Once learn procedure has been completed, control module will return engine control to operator and engine will respond to throttle position.

NOTE: For additional diagnostic information, see appropriate SELF-DIAGNOSTICS article.

1. Install a scan tool.
2. With a scan tool, monitor the powertrain control module for DTCs. If other DTCs are set, except DTC P1336, see appropriate SELF-DIAGNOSTICS article.
3. With a scan tool, select the crankshaft position variation learn procedure.
4. Observe the fuel cut-off for the engine that you are performing the learn procedure on.
5. The scan tool instructs you to perform the following:
 - Block the drive wheels.
 - Apply the vehicles parking brake.
 - Cycle the ignition from OFF to ON.
 - Apply and hold the brake pedal.
 - Start and idle the engine.
 - Turn OFF the A/C.
 - Place the vehicle's transmission in Park (A/T) or Neutral (M/T).
 - The scan tool monitors certain component signals to determine if all the conditions are met to continue with the procedure. The scan tool only displays the condition that inhibits the procedure. The scan tool monitors the following components:

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

- A. Crankshaft Position (CKP) sensor activity. If there is a CKP sensor condition, refer to the applicable DTC that set. See appropriate SELF-DIAGNOSTICS article.
 - B. Camshaft Position (CMP) sensor activity. If there is a CMP sensor condition, refer to the applicable DTC that set. See appropriate SELF-DIAGNOSTICS article.
 - C. Engine Coolant Temperature (ECT). If the engine coolant temperature is not warm enough, idle the engine until the engine coolant temperature reaches the correct temperature.
6. With the scan tool, enable the crankshaft position system variation learn procedure.

NOTE: While the learn procedure is in progress, release the throttle immediately when the engine starts to decelerate. The engine control is returned to the operator and the engine responds to throttle position after the learn procedure is complete.

7. Slowly increase the engine speed to the RPM that you observed.
8. Immediately release the throttle when fuel cut-off is reached.
9. The scan tool displays Learn Status: Learned this ignition. If the scan tool does NOT display this message and no additional DTCs set, see appropriate SELF-DIAGNOSTICS article. If a DTC set, see appropriate SELF-DIAGNOSTICS article.
10. Turn OFF the ignition for 30 seconds after the learn procedure is completed successfully.

Vue - 2.2L

1. Start engine and allow ECT to reach more than 158°F (70°C).
2. Turn A/C off and place transaxle in Park or Neutral.
3. Using scan tool, perform CRANKSHAFT POS. VARIATION LEARN procedure.

Procedure requires accelerator to be depressed to wide open throttle and then released. ECM will cut fuel off at speeds more than 4000 RPM and will allow engine to decelerate. ECM will learn crankshaft as engine decelerates.

If ECM will not learn crankshaft, see **EXCESSIVE CRANKSHAFT VARIATION SYMPTOM** table for diagnostic aids.

EXCESSIVE CRANKSHAFT VARIATION SYMPTOM

Scan Tool Display	Possible Causes
Factors Out Of Range	Reluctor Wheel Machining Quality, Run Out, Incorrect Air Gap
Opposing Factors Out Of Range	Disturbance Or Noise In Crank Sensor Circuit
Sum Out Of Range	Engine Too Cold
Crank Pulse Count Error	Cam Or Crank Sensor DTC Set

ENGINE CONTROL MODULE PROGRAMMING

Remote Programming (Sierra & Silverado - 6.6L)

NOTE: **Programing Engine Control Module requires a compatible scan tool and a Techline(R) terminal. Procedure uses a Tech 2 scanner.**

NOTE: **DO NOT program a control module unless you are directed by a service procedure or you are directed by a technical service bulletin. Programming a control module at any other time will not permanently correct a customer's concern.**

Before Remote Programming a Control Module

1. Vehicle system voltage:
 - There is no charging system concern. All charging system concerns must be repaired before programming a control module.
 - Battery voltage is greater than 12 volts but less than 16 volts. The battery must be charged before programming the control module if the battery voltage is low.
 - A battery charger is NOT connected to the vehicle's battery. Incorrect system voltage or voltage fluctuations from a battery charger, may cause programming failure or control module damage.
 - Turn OFF or disable any system that may put a load on the vehicle's battery.
 - A. Twilight sentinel.
 - B. Interior lights.
 - C. Daytime Running Lights (DRL). Applying the parking brake, on most vehicles, disables the DRL system.
 - D. Heating, Ventilation, and Air Conditioning (HVAC) systems.
 - E. Engine cooling fans, etc.
2. The ignition switch is in the proper position. The scan tool 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.
3. All tool connections are secure.
 - RS-232.
 - The connection at the Data Link Connector (DLC) is secure.
 - Voltage supply circuits.
4. DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

Remote Programming Procedure

1. Turn OFF the ignition.
2. Install the Tech 2(tm) to the Data Link Connector (DLC).
3. Turn ON the ignition, with the engine OFF.
4. Turn OFF all vehicle accessories.
5. With the Tech 2(tm), select Service Programming.

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

6. Identify vehicle information as requested by the Tech 2(tm).
7. Select the type of module you are programming.
8. Select the type of programming to be performed.
9. Verify the displayed VIN with the vehicle VIN. If the displayed VIN does not match the actual VIN, write down the actual VIN and correct the VIN at the Techline(tm) terminal.
10. When complete, exit Service Programming.
11. Turn OFF the Tech 2(tm) and disconnect the Tech 2(tm) from the vehicle.
12. Turn OFF the ignition.
13. Connect the Tech 2(tm) to the Techline(tm) terminal.
14. Select Service Programming.
15. Select Tech 2(tm) as the tool you are using.
16. Select the type of programming to be performed.
17. Verify the displayed VIN with the vehicle VIN. Correct the VIN as necessary.
18. Select the type of module you are programming.
19. Identify what type of programming that you are performing.
 - Normal. This type of programming is for updating an existing calibration or programming a new controller.
 - Vehicle Configuration Index (VCI). This selection is used if the vehicle VIN is unavailable or not recognized by the Techline(tm) terminal. You will need to contact the Techline(tm) Customer Support center to use this option.
 - Reconfigure. This is to reconfigure a vehicle, such as tire size and axle ratio changes.
20. Select the appropriate calibration file.
21. Ensure all connections are secure.
22. Select Reprog to initiate the download of the new calibration to the Tech 2(tm).
23. After the download is complete, turn OFF the Tech 2(tm).
24. Disconnect the Tech 2(tm) from the Techline(tm) terminal.
25. Install the Tech 2(tm) to the Data Link Connector (DLC).
26. Turn ON the Tech 2(tm).
27. Turn ON the ignition, with the engine OFF.
28. Select Service Programming.

NOTE: **DO NOT turn OFF the ignition if the programming procedure is interrupted or unsuccessful. Ensure that all the ECM and DLC connections are secure and the Techline(tm) operating software is up to date. Attempt to reprogram the control module. If the control module cannot be programmed, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article.**

29. Select Program.
30. After the download is complete, exit Service Programming.

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

31. Turn OFF the ignition for 30 seconds.
32. Turn OFF the Tech 2(tm).
33. If a control module is replaced the following service procedures must be performed: ENGINE OIL LIFE RESET, INSPECTION/MAINTENANCE COMPLETE SYSTEM SET PROCEDURE under INSPECTION/MAINTENANCE PROCEDURES, and THEFT DETERRENT PASSWORD LEARN PROCEDURE.

Remote Programming Verification

1. With a scan tool, clear the DTCs.
2. Attempt to start the engine.
3. Repeat the Service Programming procedure if the engine does not start or operates poorly. Perform the following procedures before programming the ECM:
 - Ensure the control module and DLC connections are okay.
 - Ensure the Techline(tm) operating software is up to date.
 - Ensure the calibration part number is correct for the vehicle.
4. Attempt to program the control module. If the control module still cannot be programmed properly, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article. You must program the replacement control module.

Off-Board Programming (Sierra & Silverado - 6.6L)

NOTE: DO NOT program a control module unless you are directed by a service procedure or you are directed by a technical service bulletin. Programming a control module at any other time will not permanently correct a customer's concern.

NOTE: DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

Before Off-Board Programming a Control Module

Ensure that all connections are secure at the following locations:

- A. The Off-Board Programming Adapter.
- B. The Tech 2(tm).
- C. The control module.
- D. The Techline(tm) terminal.

The Off-Board Programming is used in situations where a control module must be programmed without having the vehicle present. The Off-Board Programming Adapter must be used to perform the Off-Board Programming procedure. The adapter allows the control module to power up and allows the Tech 2(tm) to communicate with the control module.

Off-Board Programming Procedure

1. Obtain the VIN of the vehicle for which the control module is being programmed.
2. With the Techline(tm) terminal, select Service Programming.
3. Select Tech 2(tm), Reprogram ECU, and Off-Board Programming Adapter as the ECU location.
4. Connect the control module, Off-Board Programming Adapter, and the Tech 2(tm) as described on the Techline(tm) terminal. Ensure you use the correct harness connector from the Off-Board Programming Adapter kit.
5. With the Tech 2(tm), select Service Programming Request Information function. The Tech 2(tm) communicates with the control module and receives the access code.
6. With the Tech 2(tm), exit the Service Programming Request Information.
7. Disconnect the Tech 2(tm) from the Off-Board Programming Adapter.
8. Connect the Tech 2(tm) to the Techline(tm) terminal.
9. Turn ON the Tech 2(tm).
10. With the Techline(tm) terminal, enter the VIN of the vehicle that will be receiving the control module.
11. The Techline(tm) terminal will display the message, attaching to database.
12. Identify what type of programming that you are performing.
13. Select the appropriate calibration file.
14. Ensure all connections are secure.
15. The Techline(tm) terminal displays a summary screen that summarizes your selections. After confirming you choices, the Techline(tm) terminal automatically loads the calibration files to the Tech 2(tm).
16. After the download is complete, turn OFF the Tech 2(tm).
17. Disconnect the Tech 2(tm) from the Techline(tm) terminal.
18. Connect the Tech 2(tm) to the Off-Board Programming Adapter.
19. With the Tech 2(tm), select Service Programming.

NOTE: **DO NOT turn OFF the Off-Board Programming Adapter if the programming procedure is interrupted or unsuccessful. Ensure the control module and the Off-Board Programming Adapter connections are secure and the Techline(tm) operating software is up to date. Attempt to reprogram the control module. If the control module cannot be programmed, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article.**

20. With the Tech 2(tm), select Program.
21. After the download is complete, exit Service Programming.
22. Turn OFF the Off-Board Programming Adapter.

Vue - 2.2L

After replacing ECM or if program needs to be updated, refer to latest Techline information on ECM reprogramming. After reprogramming, perform CRANKSHAFT POSITION VARIATION LEARN

PROCEDURE and PROGRAMMING THEFT DETERRENT SYSTEM COMPONENTS.**Vue - 3.0L**

1. Turn ignition off if the ECM is going to be replaced.
2. Turn ignition on.
3. Use the Service Stall System (SSS) to reprogram the new/old ECM. Refer to the SSS User Guide for procedure or follow the on-screen instructions.
4. After the ECM has been reprogrammed, use the SSS to perform the ECM passlock relearn procedure. Refer to the SSS User Guide for procedure or follow the on-screen instructions.
5. The ECM will automatically go through a throttle body relearn procedure once the reprogram is complete. The ECM normally will go through a throttle body relearn procedure anytime the ignition is left on with the engine off for longer than 29 seconds (if the enable conditions have been met. For enable conditions, see appropriate SELF-DIAGNOSTICS article). The ECM will take about 2-3 seconds to perform the relearn. To ensure that the procedure has been completed, the ignition should be turned off for 10 seconds, then turned on, with the engine off for 1 minute.
6. Clear DTCs in all controllers if any exist. It may be normal for U-type or passlock DTCs to set in other controllers or for the ECM to set U-type, passlock or P0600 DTCs after a reprogram has been performed. Clear DTCs if any are present, then turn the ignition off for 10 seconds. Turn the ignition on and recheck for DTCs. As long as the LAST TEST for a DTC indicates PASSED on scan tool, the DTC is not currently failing and most likely will not cause a problem. Reclear DTCs if any exist.
7. The ECM will continuously and automatically relearn the crankshaft notch variation necessary for correct misfire diagnostics. No manual procedure is required.

After replacing ECM or if program needs to be updated, refer to latest Techline information on ECM reprogramming. After reprogramming, perform PROGRAMMING THEFT DETERRENT SYSTEM COMPONENTS.

FUEL INJECTION PUMP TOP DEAD CENTER OFFSET ADJUSTMENT

Learning A TDC Offset (Cab & Chassis, Chevy Express, Cutaway, RV Cutaway, Savana, Savana Camper Special & Savana Special - 6.5L)

NOTE: Do not perform this procedure when only an injection pump has been replaced.

This procedure should only be used when a Diagnostic Trouble Code (DTC) has directed you to do so, or one of the following repairs has been performed:

- A DTC P1214 is set.
- The engine has been replaced.
- The front engine cover has been replaced.
- The Powertrain Control Module (PCM) and the injection pump have been replaced at the same time.
- The crankshaft position sensor has been replaced.

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

The PCM has the ability to perform a Top Dead Center (TDC) Offset Learn when one is not present or has been cleared. This procedure allows the PCM to be updated with the correct TDC offset for the vehicle.

The TDC Offset specification is only to be used after the Learn procedure has been performed. See **TDC OFFSET SPECIFICATION** table.

TDC OFFSET SPECIFICATION

Application	TDC Offset
All	-.25 to -.75

1. One of the above repairs must have been performed. If not, do not continue.
2. Install the scan tool.
3. Start the engine.
4. Operate the vehicle until the Engine Coolant Temperature (ECT) is more than 170°F (77°C).
5. Clear all DTCs and turn the engine OFF.
6. Turn the ignition ON with the engine OFF.
7. Hold the accelerator pedal in the Wide Open Throttle (WOT) position for a minimum of 45 seconds (this step prepares the PCM to activate the offset learn (internal to PCM) and then release pedal.
8. Turn the ignition OFF for 30 seconds. In this step, the PCM powers down (to verify the PCM has powered down, a No Communication With Vehicle screen will display when trying to access a data list).

NOTE: A new TDC Offset will over write the previous one.

9. After the PCM has completed the power down, start the engine. Verify in the scan tool that the ECT is more than 170°F (77°C). If not, operate vehicle until desired ECT is achieved (vehicle can be driven or throttle can be depressed until correct coolant temperature is achieved). As soon as the ECT is more than 170°F (77°C) and the engine speed is below 1500 RPM, the PCM automatically learns a new offset (a momentary stumble in engine RPM will indicate that the TDC Offset has been activated).
10. Check the TDC Offset in the scan tool. The TDC Offset should be between -0.25 and -0.75. If the TDC Offset is within the specified value, the procedure is complete. If not, continue to the next step (adjusting the injection pump).
11. Turn the engine OFF.
12. Loosen injection pump flange nuts using the Injection Pump Wrench (J 41089).

NOTE: In order to achieve a negative (-) TDC Offset number, rotate the pump toward the drivers side of the vehicle. In order to achieve a positive (+) TDC Offset number, rotate the pump towards the passenger side of the vehicle.

13. Slightly (1 mm equals 2 degrees) rotate the injection pump in the desired direction (use the J 29872-A to rotate the injection pump) and then retighten the injection pump flange nuts (a scribe line across the pump flange and cover can be used as a reference (1 mm equals 2 degrees) which is the approximate width of a scribe line).

14. Repeat steps 3 -13 until the correct TDC Offset has been achieved. It is possible that the injection pump may require multiple adjustments to achieve the specified value. If you are unable to set the correct TDC Offset or the TDC Offset will not learn, check for the following:
- The coolant temperature is more than 170°F (77°C).
 - Proper time intervals are observed for wide open throttle and PCM power down.
 - All PCM and injection timing stepper motor connections and for DTCs.
 - The Techline terminal/equipment for the latest software version.
 - For proper base installation of the injection pump (engine shut-down ESO solenoid should be approximately straight up and down).
 - If the TDC Offset is stuck on a high + (plus) value, check for a damaged camshaft driven gear key.
 - If the TDC Offset is stuck on a high - (negative) value, check for a damaged or improperly installed crankshaft position sensor.
 - If all checks have been performed, the injection pump may be malfunctioning, however, this is an extremely unlikely failure.

GLOW PLUG SYSTEM RELEARN PROCEDURE

Cab & Chassis, Chevy Express, Cutaway, RV Cutaway, Savana, Savana Camper Special & Savana Special - 6.5L

NOTE: The vehicle must be in operating condition before performing this procedure.

The glow plug system type learn is used to identify the correct system type (Federal or California). The scan tool will display Federal, California or Not Learned (Engine Data List). The glow plug system type needs to be relearned when a new calibration has been flash programmed in to the PCM. The relearn procedure does not need to be done to a glow plug system type after a PCM has been replaced. The new PCM has the ability to perform an auto learn when system is not present. The Not Learned message will display on scan tool. If a system type has not been relearned after the PCM has been flashed, a DTC P0380 will set.

1. Turn ON the ignition, with the engine OFF.
2. Use the scan tool in order to select Special Functions, Engine Output Functions and Glow Plug System Learn.
3. Activate the Glow Plug System Learn by selecting ON. After the learn function has been preformed, Not Learned will display on the scan tool. In this step the scan tool is clearing the system type.
4. Use the scan tool in order to select the Special Functions menu, and select Glow Plug.
5. Activate the Glow Plug system by selecting ON. In this step the glow plug relay is now sending the identifying (signature) voltage to the PCM.
6. The PCM will now be able to identify the correct glow plug system type. For visual verification of the glow plug system, see COMPONENT LOCATIONS in appropriate SELF-DIAGNOSTICS article.
7. Clear the DTC P0380.
8. Allow the PCM to power down for at least 45 seconds.
9. Turn ON the ignition leaving the engine OFF. Use the scan tool in order to verify that DTC P0380 has not reset.

10. If DTC P0380 reset, perform the following procedure:

- Check the connections at the glow plug relay.
- Try again to relearn the glow plug system. If the relearn fails again, see appropriate SELF-DIAGNOSTICS article.

POWERTRAIN CONTROL MODULE

Remote Programming (Avalanche, Astro, Aztek, Blazer, Bravada, Cab & Chassis - 8.1L, Chevy Express - 5.0L, 5.7L & 8.1L, Cutaway - 5.7L & 8.1L, Envoy, Envoy XL, Escalade, Escalade EXT, Montana, Rendezvous, RV Cutaway - 5.7L & 8.1L, S10 Pickup - 4.3L, Safari, Savana - 5.0L, 5.7L & 8.1L, Savana Camper Special - 5.7L & 8.1L, Savana Special - 5.7L & 8.1L, Sierra - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Silhouette, Silverado - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Sonoma - 4.3L, Suburban, Tahoe, Trailblazer, Venture, Yukon & Yukon XL)

NOTE: **Programing Powertrain Control Module requires a compatible scan tool and a Techline(R) terminal. Procedure uses a Tech 2 scanner.**

NOTE: **DO NOT program a control module unless you are directed by a service procedure or you are directed by a technical service bulletin. Programming a control module at any other time will not permanently correct a customer's concern.**

Before Remote Programming a Control Module

1. Vehicle system voltage:

- There is no charging system concern. All charging system concerns must be repaired before programming a control module.
- Battery voltage is greater than 12 volts but less than 16 volts. The battery must be charged before programming the control module if the battery voltage is low.
- A battery charger is NOT connected to the vehicle's battery. Incorrect system voltage or voltage fluctuations from a battery charger, may cause programming failure or control module damage.
- Turn OFF or disable any system that may put a load on the vehicle's battery.
 - A. Twilight sentinel and Interior lights.
 - B. Daytime Running Lights (DRL). Applying the parking brake, on most vehicles, disables the DRL system.
 - C. Heating, Ventilation, and Air Conditioning (HVAC) systems.
 - D. Engine cooling fans, etc.

2. The ignition switch is in the proper position. The scan tool 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.

3. All tool connections are secure.

- RS-232.
- The connection at the Data Link Connector (DLC) is secure.
- Voltage supply circuits.

4. DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

Remote Programming Procedure

1. Turn OFF the ignition.
2. Install the Tech 2(tm) to the Data Link Connector (DLC).
3. Turn ON the ignition, with the engine OFF.
4. Turn OFF all vehicle accessories.
5. With the Tech 2(tm), select Service Programming.
6. Identify vehicle information as requested by the Tech 2(tm).
7. Select the type of module you are programming.
8. Select the type of programming to be performed.
9. Verify the displayed VIN with the vehicle VIN. If the displayed VIN does not match the actual VIN, write down the actual VIN and correct the VIN at the Techline(tm) terminal.
10. When complete, Exit Service Programming.
11. Turn OFF the Tech 2(tm) and disconnect the Tech 2(tm) from the vehicle.
12. Turn OFF the ignition.
13. Connect the Tech 2(tm) to the Techline(tm) terminal.
14. Select Service Programming.
15. Select Tech 2(tm) as the tool you are using.
16. Select the type of programming to be performed.
17. Verify the displayed VIN with the vehicle VIN. Correct the VIN as necessary.
18. Select the type of module you are programming.
19. Identify what type of programming that you are performing.
 - Normal. This type of programming is for updating an existing calibration or programming a new controller.
 - Vehicle Configuration Index (VCI). This selection is used if the vehicle VIN is unavailable or not recognized by the Techline(tm) terminal. You will need to contact the Techline(tm) Customer Support center to use this option.
 - Reconfigure. This is to reconfigure a vehicle, such as tire size and axle ratio changes.
20. Select the appropriate calibration file.
21. Ensure all connections are secure.
22. Select Reprog to initiate the download of the new calibration to the Tech 2(tm).
23. After the download is complete, turn OFF the Tech 2(tm).
24. Disconnect the Tech 2(tm) from the Techline(tm) terminal.
25. Install the Tech 2(tm) to the Data Link Connector (DLC).
26. Turn ON the Tech 2(tm).
27. Turn ON the ignition, with the engine OFF.

28. Select Service Programming.

NOTE: **DO NOT turn OFF the ignition if the programming procedure is interrupted or unsuccessful. Ensure that all the PCM and DLC connections are secure and the Techline(tm) operating software is up to date. Attempt to reprogram the control module. If the control module cannot be programmed, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article.**

29. Select Program.

30. After the download is complete, EXIT Service Programming.

31. Turn OFF the ignition for 30 seconds.

32. Turn OFF the Tech 2(tm).

33. If a control module is replaced the following service procedures must be performed: CRANKSHAFT POSITION SENSOR, ENGINE OIL LIFE RESET, INSPECTION/MAINTENANCE COMPLETE SYSTEM SET PROCEDURE under INSPECTION/MAINTENANCE PROCEDURES, and THEFT DETERRENT PASSWORD LEARN PROCEDURE.

Remote Programming Verification

1. With a scan tool, clear the DTCs.
2. Attempt to start the engine.
3. Repeat the Service Programming procedure if the engine does not start or operates poorly. Perform the following procedures before programming the PCM:
 - Ensure the control module and DLC connections are okay.
 - Ensure the Techline(tm) operating software is up to date.
 - Ensure the calibration part number is correct for the vehicle.
4. Attempt to program the control module. If the control module still cannot be programmed properly, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article. You must program the replacement control module.

Off-Board Programming (Avalanche, Astro, Aztek, Blazer, Bravada, Cab & Chassis - 8.1L, Chevy Express - 5.0L, 5.7L & 8.1L, Cutaway - 5.7L & 8.1L, Envoy, Envoy XL, Escalade, Escalade EXT, Montana, Rendezvous, RV Cutaway - 5.7L & 8.1L, S10 Pickup - 4.3L, Safari, Savana - 5.0L, 5.7L & 8.1L, Savana Camper Special - 5.7L & 8.1L, Savana Special - 5.7L & 8.1L, Sierra - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Silhouette, Silverado - 4.3L, 4.8L, 5.3L, 6.0L & 8.1L, Sonoma - 4.3L, Suburban, Tahoe, Trailblazer, Venture, Yukon & Yukon XL)

NOTE: **DO NOT program a control module unless you are directed by a service procedure or you are directed by a technical service bulletin. Programming a control module at any other time will not permanently correct a customer's concern.**

NOTE: **DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control**

module damage may occur.

Before Off-Board Programming a Control Module

Ensure that all connections are secure at the following locations:

- A. The Off-Board Programming Adapter.
- B. The Tech 2(tm).
- C. The control module.
- D. The Techline(tm) terminal.

The Off-Board Programming is used in situations where a control module must be programmed without having the vehicle present. The Off-Board Programming Adapter must be used to perform the Off-Board Programming procedure. The adapter allows the control module to power up and allows the Tech 2(tm) to communicate with the control module.

Off-Board Programming Procedure

1. Obtain the VIN of the vehicle for which the control module is being programmed.
2. With the Techline(tm) terminal, select Service Programming.
3. Select Tech 2(tm), Reprogram ECU, and Off-Board Programming Adapter as the ECU location.
4. Connect the control module, Off-Board Programming Adapter, and the Tech 2(tm) as described on the Techline(tm) terminal. Ensure you use the correct harness connector from the Off-Board Programming Adapter kit.
5. With the Tech 2(tm), select Service Programming Request Information function. The Tech 2(tm) communicates with the control module and receives the access code.
6. With the Tech 2(tm), exit the Service Programming Request Information.
7. Disconnect the Tech 2(tm) from the Off-Board Programming Adapter.
8. Connect the Tech 2(tm) to the Techline(tm) terminal.
9. Turn ON the Tech 2(tm).
10. With the Techline(tm) terminal, enter the VIN of the vehicle that will be receiving the control module.
11. The Techline(tm) terminal will display the message, attaching to database.
12. Identify what type of programming that you are performing.
13. Select the appropriate calibration file.
14. Ensure all connections are secure.
15. The Techline(tm) terminal displays a summary screen that summarizes your selections. After confirming you choices, the Techline(tm) terminal automatically loads the calibration files to the Tech 2(tm).
16. After the download is complete, turn OFF the Tech 2(tm).
17. Disconnect the Tech 2(tm) from the Techline(tm) terminal.
18. Connect the Tech 2(tm) to the Off-Board Programming Adapter.
19. With the Tech 2(tm), select Service Programming.

NOTE: **DO NOT turn OFF the Off-Board Programming Adapter if the programming procedure is interrupted or unsuccessful. Ensure the control module and the Off-Board Programming Adapter connections are secure and the Techline(tm) operating software is up to date. Attempt to reprogram the control module. If the control module cannot be programmed, replace the control module. See appropriate REMOVAL, OVERHAUL & INSTALLATION article.**

20. With the Tech 2(tm), select Program.
21. After the download is complete, exit Service Programming.
22. Turn OFF the Off-Board Programming Adapter.

PCM Programming (Cab & Chassis, Chevy Express, Cutaway, RV Cutaway, Savana, Savana Camper Special & Savana Special - 6.5L)

1. Verify the following for the setup:
 - The battery is charged.
 - The ignition is ON.
 - The battery/cigarette lighter connection is secure.
 - The Data Link Connector (DLC) is attached.
2. Perform the programming. See the up to date Techline terminal/equipment for user instructions.
3. Perform the Passlock(tm) Learn Procedure. See **THEFT DETERRENT SYSTEM COMPONENTS** .
4. After the vehicle has been programed, operate the vehicle until the coolant temperature is more than 170°F (77°C). This will allow the Top Dead Center (TDC) offset to be programed. See **FUEL INJECTION PUMP TOP DEAD CENTER OFFSET ADJUSTMENT** .
5. Check the Data list for a TDC offset.
6. If the PCM fails to reprogram, do the following:
 - Check all the Powertrain Control Module (PCM) connections.
 - Check the Techline terminal/equipment for the latest software version.
 - Try again to reprogram the PCM. If the PCM fails again, replace the PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article.

Programming TDC Offset (Cab & Chassis, Chevy Express, Cutaway, RV Cutaway, Savana, Savana Camper Special & Savana Special - 6.5L)

The PCM will automatically activate the TDC offset program when the engine coolant is more than 170°F (77°C). If the PCM is not programmed with a TDC offset, a DTC P1214 will set.

PCM Programming (S10 Pickup - 2.2L, Sonoma - 2.2L & Tracker)

After replacing Powertrain Control Module (PCM) or if program needs to be updated, refer to latest Techline information on PCM reprogramming. PCM can only be programmed using Tech 2 and Techline terminal, or by using a personal computer equipped with the current service programming system software installed.

THEFT DETERRENT SYSTEM COMPONENTS

10-Minute Learn Procedure (Avalanche, Astro, Blazer, Cab & Chassis, Chevy Express, Cutaway, Escalade, Escalade EXT, RV Cutaway, S10 Pickup, Safari, Savana, Savana Camper Special & Savana Special, Sierra, Silverado, Sonoma, Suburban, Tahoe, Yukon & Yukon XL)

NOTE: If replacing the Passlock(tm) module with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the Passlock(tm) module is replaced.

If replacing a PCM/ECM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
- Passlock(tm) Module.
- PCM

NOTE: Ensure current Techline(R) Service Programming System (SPS) software is used.

1. Connect Tech 2 scan tool to DLC.
2. Select "Request Information" under Service Programming.
3. Disconnect scan tool from vehicle and connect it to a Techline(R) terminal.
4. Using Techline(R) terminal, select "Theft Module Re-Learn" under Service Programming.
5. Disconnect scan tool 2 from Techline(R) terminal and connect scan tool to vehicle.
6. Turn ignition on, with engine off.
7. Select "VTD Re-Learn" under Service Programming on scan tool.
8. Attempt to start engine, then release the key to ON position. Vehicle should not start.
9. Observe SECURITY indicator light for about 10 minutes. Indicator light will turn off and vehicle is now ready to relearn Passlock(tm) sensor data code and/or password on the next ignition switch transition from OFF to CRANK position.
10. Turn ignition off and wait 5 seconds.
11. Start engine. If engine starts, vehicle has now learned the password.
12. Using Tech 2 scan tool, clear any DTCs.

30-Minute Learn Procedure (Avalanche, Astro, Blazer, Cab & Chassis, Chevy Express, Cutaway, Escalade, Escalade EXT, RV Cutaway, S10 Pickup, Safari, Savana, Savana Camper Special & Savana Special, Sierra, Silverado, Sonoma,

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

Suburban, Tahoe, Yukon & Yukon XL)

NOTE: If replacing the Passlock(tm) module with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the Passlock(tm) module is replaced.

If replacing a PCM/ECM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
- Passlock(tm) Module.
- PCM

NOTE: Ensure current Techline(R) Service Programming System (SPS) software is used.

1. Turn ignition on, with engine off.
2. Attempt to start engine, then release key to ON position. Vehicle should not start.
3. Observe SECURITY indicator light for about 10 minutes. Indicator light should turn off.
4. Turn ignition off and wait 5 seconds.
5. Repeat steps 1 -4 two more times for a total of 3 cycles/30 minutes. Vehicle is now ready to relearn the Passlock(tm) sensor data code and/or passwords on the next ignition switch transition from OFF to CRANK position.

NOTE: Vehicle learns Passlock(tm) sensor data code and/or password on the next ignition switch transition from OFF to CRANK position. Ignition must be turned off before attempting to start vehicle.

6. Start engine. Vehicle has now learned the Passlock(tm) sensor data code and/or password.
7. Using scan tool, clear any DTCs. History DTCs will self clear after 100 ignition cycles.

Set Up a New Theft Deterrent Control Module (Aztek, Montana, Rendezvous, Silhouette & Venture)

NOTE: When replacing a theft deterrent control module with an GM Service Parts Operation (SPO) Replacement Part, set up the control module prior to the 10-minute relearn procedure or the 30-minute relearn procedure.

Use this procedure only if replacing the theft deterrent control module with an GM SPO Replacement Part.

1. Connect a scan tool to the vehicle.
2. Turn ON the ignition, with the engine OFF.
3. With a scan tool, select Setup New VTD Module in the Vehicle Theft Deterrent, Special Functions data list.
4. Follow the scan tool on-screen instructions.

NOTE: When replacing a theft deterrent control module with an GM SPO Replacement Part, the module will learn the keys immediately. The existing Powertrain Control Module (PCM) must learn the new fuel continue password when you replace the theft deterrent control module.

When replacing a PCM with a GM SPO Replacement Part, the new PCM will learn the incoming fuel continue password immediately after programming and upon receipt of a password message. Once a password message is received and a password is learned, perform the learn procedure to change this password again. A PCM which had been installed in another vehicle will have learned the fuel continue password of the other vehicle's theft deterrent control module. Perform either the 10-minute relearn procedure or the 30-minute relearn procedure after programming to learn the fuel continue password of the current vehicle's theft deterrent control modules.

When performing either relearn procedure, all previously learned keys will be erased from the theft deterrent control module's memory.

Additional keys may be learned immediately after the first relearn procedure by inserting the additional key and turning the ignition switch to RUN position within 10 seconds of removing the previously learned key.

Use only a master key when performing the first relearn procedure. If you use a valet key first, the theft deterrent control module will not allow additional keys to be learned.

10-Minute Learn Procedure (Aztek, Montana, Rendezvous, Silhouette & Venture)

NOTE: Use this procedure after replacing the following components:

- The Passkey(R) III (PK3) keys.
- The theft deterrent control module.
- The PCM.

If replacing a theft deterrent control module with a GM SPO Replacement Part, perform the procedure to setup a new theft deterrent control module prior to the 10-minute relearn procedure.

1. Connect a scan tool to the vehicle.
2. Turn ON the ignition, with the engine OFF.
3. Insure that all power consuming devices are turned OFF on the vehicle.

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

4. With a scan tool, select Request Info. under Service Programming System and follow the scan tool on-screen instructions.
5. Disconnect the scan tool from the vehicle and connect the scan tool to a Techline Terminal with the current Service Programming System (SPS) software.
6. On the Techline Terminal, select Service Programming System and follow the Techline Terminal on-screen instructions.
7. Disconnect the scan tool from the Techline Terminal and reconnect the scan tool to the vehicle.
8. With a master Passkey(R) III key, turn ON the ignition with the engine OFF.
9. With a scan tool, select Program ECU under Service Programming System.
10. At this point the scan tool must remain connected for the duration of the 10-minute relearn procedure.

NOTE: On some vehicles the **SECURITY** telltale maybe illuminated on steady for the duration of the 10-minute relearn procedure.

11. Observe the scan tool, after approximately 10 minutes the scan tool will display "Programming Successful, Turn OFF Ignition". The vehicle is now ready to relearn the key information and/or the passwords on the next ignition switch transition from OFF to ON.
12. Turn OFF the ignition and wait 5 seconds.
13. With a master Passkey(R) III key, start the vehicle. The theft deterrent control module has now learned the key transponder information and the PCM has now learned the fuel continue password.

NOTE: Perform this step **ONLY** on vehicles with **EXPORT** configured theft deterrent control modules.

14. Turn OFF the ignition and wait 15 seconds minimum.

NOTE: Perform this step **ONLY** on vehicles with **EXPORT** configured theft deterrent control modules.

15. With a second master Passkey(R) III key, start the vehicle. The theft deterrent control module has now learned the second master Passkey(R) III key transponder information.
16. With a scan tool, clear any DTCs.

30-Minute Learn Procedure (Aztek, Montana, Rendezvous, Silhouette & Venture)

NOTE: Use this procedure after replacing the following components:

- The Passkey(R) III (PK3) keys.
- The theft deterrent control module.
- The PCM.

This procedure is not available on vehicles equipped with option code

(Z49 or BAE).

If replacing a theft deterrent control module with an GM SPO Replacement Part, perform the procedure to setup a new theft deterrent control module prior to the 30-minute relearn procedure.

1. With a master Passkey(R) III key (Black), turn ON the ignition, with the engine OFF.
2. Observe the Security telltale, after approximately 10 minutes the telltale will turn off.
3. Turn OFF the ignition, and wait 5 seconds.
4. Repeat steps 1 -3 two more times for a total of 3 cycles or 30 minutes.

NOTE: The vehicle learns the key transponder information and/or passwords on the ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start the vehicle.

5. With a master Passkey(R) III key, start the vehicle. The vehicle has now learned the key transponder information and the PCM has now learned the fuel continue password.
6. With a scan tool, clear any DTCs.

10 Minute Learn Procedure With Standard Key (Bravada, Envoy, Envoy XL & Trailblazer)

NOTE: The Body Control Module (BCM) must be programmed with the proper RPO configurations before performing learn procedures. See PROGRAMMING in appropriate BODY CONTROL MODULES article in ACCESSORIES & EQUIPMENT.

NOTE: This procedure requires a Tech 2 scan tool and a Techline terminal with current SPS (Service Programming System) software.

If replacing the BCM with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the BCM is replaced.

If replacing a PCM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
- BCM

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

- PCM

1. Connect the Tech 2 to the vehicle.
2. Select "Request Information" under "Service Programming".
3. Disconnect the Tech 2 from the vehicle and connect it to a techline terminal.
4. On the techline terminal, select "Theft Module Re-Learn" under "Service Programming".
5. Disconnect the Tech 2 from the techline terminal and connect it to the vehicle.
6. Turn ON the ignition, with the engine OFF.
7. Select "VTD Re-Learn" under "Service Programming".
8. Attempt to start the engine, then release the key to ON (vehicle will not start).
9. Observe the SECURITY telltale, after approximately 10 minutes the telltale will turn OFF (the vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK).
10. Turn OFF the ignition, and wait 5 seconds.
11. Start the engine (the vehicle has now learned the password).
12. With the Tech 2 (scan tool), clear any DTCs.

30 Minute Learn Procedure With Standard Key (Bravada, Envoy, Envoy XL & Trailblazer)

1. Turn ON the ignition, with the engine OFF.
2. Attempt to start the engine, then release the key to ON (vehicle will not start).
3. Observe the SECURITY telltale, after approximately 10 minutes the telltale will turn OFF.
4. Turn OFF the ignition, and wait 5 seconds.
5. Repeat steps 1 -4 two more times for a total of 3 cycles/30 minutes (the vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or passwords on the next ignition switch transition from OFF to CRANK).

NOTE: The vehicle learns the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start the vehicle.

6. Start the engine (the vehicle has now learned the Passlock(tm) Sensor Data Code and/or password).
7. With a scan tool, clear any DTCs if needed (history DTCs will self clear after 100 ignition cycles).

Procedure To Set Up New Theft Deterrent Control Module With Transponder Key (Bravada, Envoy, Envoy XL & Trailblazer)

NOTE: When replacing a theft deterrent control module with a GM Service Parts Operation (SPO) Replacement Part, the module will learn keys immediately. The existing PCM however, must learn the new fuel continue password when the theft deterrent control module is replaced.

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

NOTE: When replacing a Powertrain Control Module (PCM) with a GM Service Parts Operation (SPO) Replacement Part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a relearn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the fuel continue password of the other vehicles theft deterrent control module and will require performing the 10 Minute Re-Learn Procedure to learn the fuel continue password of the current vehicles theft deterrent control modules.

NOTE: When replacing a theft deterrent control module with a GM Service Parts Operation (SPO) Replacement Part, the procedure to setup a new theft deterrent control module must be performed prior to the 10 Minute Re-Learn Procedure.

NOTE: Use this procedure only if replacing the theft deterrent control module with a GM Service Parts Operation (SPO) Replacement Part.

1. Connect the Tech 2 diagnostic scan tool to the vehicle.
2. Turn ON the ignition, with the engine OFF.
3. With the scan tool, select Setup New VTD Module in the Vehicle Theft Deterrent, Special Functions data list.
4. Follow the scan tool on-screen instructions.

10 Minute Re-Learn Procedure (Bravada, Envoy, Envoy XL & Trailblazer)

NOTE: When performing the 10 Minute Re-Learn Procedure, 2 master Passkey(R) III+ (PK3+) keys are required. If a Gray valet key is learned first, the theft deterrent control module will not allow additional keys to be learned.

NOTE: When performing the 10 Minute Re-Learn Procedure, all previously learned keys will be erased from the theft deterrent control module's memory.

NOTE: Additional keys may be learned immediately after the 10 Minute Re-Learn Procedure.

Use this procedure after replacing any of the following components:

- The Passkey(R) III+ (PK3+) keys.
- The theft deterrent control module.
- The PCM.

NOTE: This procedure requires a Tech 2 scan tool and a Techline Terminal with current

Service Programing System (SPS) software.

1. Connect the Tech 2 diagnostic scan tool to the vehicle.
2. With the scan tool, select Request Info. under Service Programing System and follow the scan tool on screen instructions.
3. Disconnect the scan tool from the vehicle and connect it to a Techline Terminal with current Service Programing System (SPS) software.
4. On the Techline Terminal, select Service Programming Systems and follow the Techline Terminal on screen instructions.
5. Disconnect the scan tool from the Techline Terminal and reconnect it to the vehicle.
6. With a master Passkey(R) III+ (PK3+) key, turn ON the ignition, with the engine OFF.
7. With the scan tool, select Program ECU under Service Programing System.
8. At this point the scan tool must remain connected for the duration of the 10 Minute Re-Learn Procedure.
9. Observe the SECURITY telltale or the scan tool on screen timer, after approximately 10 minutes the scan tool timer will expire and/or the telltale will turn off. The vehicle is now ready to relearn the key information and/or passwords on the next ignition switch transition from OFF to CRANK.
10. Turn OFF the ignition and wait 5 seconds.
11. With a master Passkey(R) III+ (PK3+) key, start the vehicle, the theft deterrent control module has now learned the key transponder information and the PCM has now learned the fuel continue password.
12. Turn OFF the ignition and wait 15 seconds minimum.
13. With a second master Passkey(R) III+ (PK3+) key, start the vehicle, the theft deterrent control module has now learned the second master Passkey(R) III+ (PK3+) key transponder information.
14. Learning Additional keys, if required.
15. With the scan tool, clear any DTCs.

Auto Learn Method (Vue)

CAUTION: DO NOT use a BCM from another vehicle to aid in diagnosis. BCM's are not interchangeable after they have been installed.

NOTE: Passlock(R) learn procedure must be performed when Passlock(R) sensor, BCM or ECM are replaced. If only Passlock(R) sensor was replaced, auto learn method may be used. BCM or ECM replacement requires Saturn service stall method. Saturn service stall method requires use of Tech 2 scan tool.

NOTE: If ignition is turned off before SECURITY indicator light changes state, relearn procedure must be restarted.

1. Check BCM and ECM for existing DTCs. If DTCs exist, repair as necessary and go to next step. If no DTCs exist, go to next step.
2. Turn ignition switch to RUN position. Momentarily turn ignition switch to START position. DO NOT

2002 Cadillac Escalade

2002 GENERAL INFORMATION Computer Relearn Procedures - Domestic

start vehicle. Wait 10 minutes. When SECURITY indicator light changes from flashing to off, or from on to off, turn ignition switch to OFF position. Perform this process 3 times. After third time, vehicle should start on next ignition cycle.

Saturn Service Stall Method (Vue)

NOTE: If ignition is turned off before SECURITY indicator light changes state, relearn procedure must be restarted.

1. Check BCM and ECM/ECM for existing DTCs. If DTCs exist, repair as necessary and go to next step. If no DTCs exist, go to next step.
2. Install scan tool. Turn ignition switch to RUN position. Using scan tool, select Passlock(R) relearn procedure. Wait 10 minutes. When SECURITY indicator light changes from flashing to off, or from on to off, turn ignition switch to OFF position. Vehicle should start on next ignition cycle.

THROTTLE BODY RELEARN PROCEDURE

Vue - 3.0L

1. Turn ignition off for 10 seconds.
2. Turn ignition on, engine off.
3. Ensure these engine operating parameters are met before proceeding:
 - ECT is 41-212°F (5-100°C).
 - IAT is more than 41°F (5°C).
 - Battery voltage is more than 10 volts.
 - Accelerator pedal angle is less than 14 degrees.
4. Leave ignition on for one minute with engine off.

The ECM will start at 29 seconds to cycle the throttle plate from rest position to full closed, then from the full closed position to around 14 percent. This will take about 3 seconds. The ECM will then return the throttle to the rest position. During this throttle plate cycle, the ECM will have learned the lower and rest position TP sensor values, actuator motor torque to overcome spring pressure as well as both spring return rates.