

## DIAGNOSTIC TROUBLE CODE (DTC) P0502

### VEHICLE SPEED SENSOR (ENGINE SIDE) NO SIGNAL

#### Circuit Description

Vehicle speed information is provided to the engine control module (ECM) by the Vehicle Speed Sensor (VSS). The VSS is a permanent magnet generator that is mounted in the transaxle and produces a pulsing voltage whenever vehicle speed is over 3 mph (5 km/h). The alternating current (AC) voltage level and the number of pulses increases with vehicle speed. The ECM converts the pulsing voltage into mph (km/h) and then supplies the necessary signal to the instrument panel for speedometer/ odometer operation and to the cruise control module and multi-function alarm module operation. This Diagnostic Trouble Code (DTC) will detect if vehicle speed is reasonable according to engine rpm and load.

#### Conditions for Setting the DTC

- DTC(s) P0107, P0108, P0121, P0122, P0123, P1106, P1107, P1121 and P1122 will not set.
- Voltage is between 11–16 volts.
- Coolant temperature is greater than  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ).

#### Power Test

- Vehicle speed is less than 8 km/h (5 mph).
- Manifold Absolute Pressure (MAP) is greater than 60 kPa.
- Throttle Position (TP) sensor is between 25 and 60%.
- The rpm is between 2700 and 6000.

#### Deceleration Test

- Vehicle speed is less than 8 km/h (5 mph).
- MAP is less than 25 kPa.

- TP sensor is less than 1.0%.
- The rpm is between 1200 and 6000.
- The change in RPM is less than 90 RPM/cycle.
- P/N switch is off.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.
- Coolant fan turns on.

#### Conditions for Clearing the MIL/DTC

- The MIL will turn off after three consecutive ignition cycles in which the diagnostic runs without a fault.
- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

An intermittent problem may be caused by a poor connection, rubbed-through wire insulation, or a wire that is broken inside the insulation.

VSS signal circuit should be thoroughly checked for the following conditions:

- Backed-out terminals
- Improper mating
- Broken locks
- Improperly formed
- Damaged terminals
- Poor terminal-to-wire connection



- Physical damage to the wiring harness

Ensure the VSS is correctly torqued to the transmission housing.

Refer to "Intermittents" in this section.

### Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

- The On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
- The permanent magnet generator only produces a signal if the drive wheels are turning greater than 3 mph (5 km/h). This step determines if DTC P0502 is the result of a hard failure or an intermittent condition.
- Proper engine loads cannot be achieved in a shop environment to properly run the vehicle within the Freeze Frame Data conditions. It will be necessary to drive the vehicle on the road to obtain the proper engine loads.
- This step verifies that the ECM is receiving a signal from the vehicle speed sensor.
- Refer to service bulletin information for the latest calibration update.
- Refer to the latest Techline information for programming procedures.
- A resistance reading that is higher than the specified value indicates that the VSS circuitry is open.
- If the displayed resistance is less than the 1300 ohms, the VSS high and low circuits are shorted together.
- This checks the resistance of the VSS if no opens or shorts were found on the VSS high and low circuits.
- The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

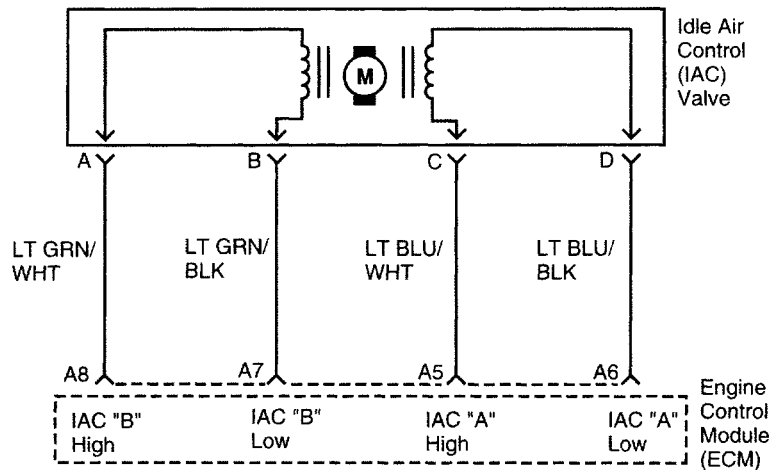
### DTC P0502 Vehicle Speed Sensor (Engine Side) No Signal

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to <i>Step 2</i>	Go to "On–Board Diagnostic System Check"
2	<b>Notice :</b> Running the vehicle in gear with the wheels hanging down at full travel will damage the drive axles. 1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Raise the drive wheels. 4. Support the lower control arms so that the drive axles are in a horizontal (straight) position. 5. Allow the engine to idle in gear. Does the scan tool display vehicle speed above the specified value?	0 mph	Go to <i>Step 3</i>	Go to <i>Step 4</i>
3	1. Turn the ignition switch ON, with the engine OFF. 2. Review the Freeze Frame data and note the parameters. 3. Operate the vehicle within the Freeze Frame conditions and Conditions for Setting this DTC. Does the scan tool display the vehicle speed above the specified value?	0 mph	Go to <i>Step 12</i>	Go to <i>Step 4</i>



Step	Action	Value(s)	Yes	No
4	1. Turn the ignition switch OFF. 2. Disconnect the engine control module (ECM) connector 2 (white). 3. Using a digital voltmeter (DVM) connected to ground, measure the voltage in the Vehicle Speed Sensor (VSS) signal circuit, at terminal D7 while rotating the wheels. Is the voltage near the specified value?	0.5 v	Go toStep 12	Go toStep 5
5	Measure the resistance in the VSS signal circuit while rotating the wheels. Is the resistance greater than the specified value?	1950 $\Omega$	Go toStep 6	Go toStep 7
6	Check the VSS signal circuit for an open and repair as necessary. Is a repair necessary?		Go toStep 12	Go toStep 9
7	Is the resistance value within or equal to the specified value?	1300–1950 $\Omega$	Go toStep 8	Go toStep 9
8	Check the VSS signal circuit for a short to ground or for being shorted together and repair as necessary. Is a repair necessary?		Go toStep 12	Go toStep 9
9	1. Remove the VSS. 2. Measure the resistance between terminals A and B. Is the resistance value within the specified value?	1300–1950 $\Omega$	Go toStep 11	Go toStep 10
10	Replace the VSS. Is the action complete?		Go toStep 12	
11	Replace the ECM. Is the action complete?		Go toStep 12	
12	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed.?		Go toStep 13	Go toStep 2
13	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





C402F023

## DIAGNOSTIC TROUBLE CODE (DTC) P0506

### IDLE SPEED RPM LOWER THAN DESIRED IDLE PEED

#### Circuit Description

The engine control module (ECM) controls the air entering into the engine with an Idle Air Control (IAC) Valve. To increase the idle rpm, the ECM commands the pintle inside the IAC valve away from the throttle body seat. This allows more air to bypass through the throttle blade. To decrease the rpm the ECM commands the pintle towards the throttle body seat. This reduces the amount of air bypassing the throttle blade. A scan tool will read the IAC valve pintle position in counts. The higher the counts, the more air that is allowed to bypass the throttle blade. This Diagnostic Trouble Code (DTC) determines if a low idle condition exists as defined as 100 rpm below the desired idle rpm.

#### Conditions for Setting the DTC

- DTC(s) P0106, P0107, P0108, P0112, P0113, P0117, P0118, P0121, P0122, P0123, P0125, P0131, P0132, P0133, P0134, P0135, P0137, P0138, P0140, P0141, P0171, P0172, P0201, P0202, P0203, P0204, P0300, P0336, P0337, P0341, P0342, P0351, P0352, P0402, P0404, P0405, P0406, P0502, P1130, P1133, P1134, P1404, P1441, P1627 not set.
- Engine Coolant Temperature (ECT) is greater than 59.75°C (140°F).
- Barometric Pressure (BARO) is greater than 72.67 kPa.
- Ignition voltage is between 9.5 and 16.7 volts.
- Engine has been running more than 125 seconds.
- The Intake Air Temperature is greater than -40°C (-40°F).
- All of the above must be met for greater than 5 seconds.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.
- Coolant fan turns on.

#### Conditions for Clearing the MIL/DTC

- The MIL will turn off after three consecutive ignition cycles in which the diagnostic runs without a fault.
- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

Inspect the IAC valve electrical connection for proper mating.

Inspect the wiring harness for damage.

Inspect the throttle stop screw for signs of tampering.

Inspect the throttle linkage for signs of binding or excessive wear.

A slow or unstable idle may be caused by one of the following conditions:

- Fuel system too rich or too lean.
- Foreign material in the throttle body bore or in the air induction system.
- A leaking or restricted intake manifold.
- Excessive engine overloading. Check for seized pulleys, pumps, or motors on the accessory drive.
- Overweight engine oil.



**Test Description**

Number(s) below refer to the step number(s) on the Diagnostic Table.

1. The On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. A normal operating IAC system will be able to be extended and retracted by a scan tool and change the engine idle rpm. Valve movement is verified by an engine rpm change.
3. If the scan tool was able to command the IAC valve smoothly, a malfunction may still exist internally within the IAC valve. This can be checked by checking the IAC valves internal resistance.
5. The IAC circuits always have ground or voltage signals on them in pairs. If the test light illuminates on more or less than 2 terminals, 1 of the circuits is shorted to voltage or open.
6. The IAC circuits always have ground or voltage signals on them in pairs. If the test light illuminates on more or less than 2 terminals, 1 of the circuits is shorted to ground or open.
8. The IAC circuits are constantly switched between ground and voltage so the test light should blink on all circuits when connected to ground.
10. Any circuitry, that is suspected as causing the intermittent complaint, should be thoroughly checked for backed–out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal–to–wiring connections or physical damage to the wiring harness.
12. A test light that remains ON constantly indicates that the circuit is shorted to voltage.
14. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.
16. If no malfunctions have been found at this point and no additional DTCs were set, refer to "Diagnostic Aids" in this section for additional checks and information.

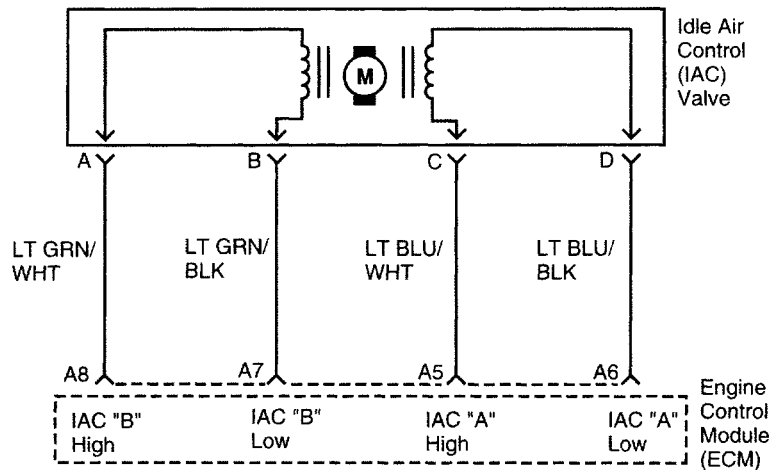
**DTC P0506 Idle Speed RPM Lower Than Desired Idle Speed**

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to Step 2	Go to "On–Board Diagnostic System Check"
2	1. Turn the ignition switch ON with the engine OFF. 2. Engine at normal operating temperature. 3. Transmission in park or neutral and the parking brake set. 4. A/C is Off. 5. Install a scan tool and command the Idle Air Control (IAC) valve up and down between the specified values.  Does the engine rpm change smoothly when commanded by the scan tool?	900–2000 rpm	Go to Step 3	Go to Step 5
3	1. Turn the ignition switch OFF. 2. Disconnect the IAC valve electrical connector. 3. Measure the resistance across the IAC valve terminals A and B. 4. Measure the resistance across the IAC terminals C and D.  Is the resistance across terminals A and B and terminals C and D within the specified value?	40–80 $\Omega$	Go to Step 4	Go to Step 13
4	1. Measure the resistance across the IAC valve terminals B and C. 2. Measure the resistance across the IAC terminals A and D.  Is the resistance across terminals B and C and terminals A and D infinite?		Go to Step 15	Go to Step 13



Step	Action	Value(s)	Yes	No
5	1. Turn the Ignition switch ON with the engine OFF. 2. Disconnect the IAC valve electrical connector. 3. With a test light connected to ground, probe the IAC electrical connector terminals. Does the test light illuminate on 2 terminals.		Go toStep 6	Go toStep7
6	With a test light connected to B+, probe the IAC electrical connector terminals. Does the test light illuminate on 2 terminals?		Go toStep 8	Go toStep 9
7	Check for an open or short to ground in the IAC valve high and low circuits and repair as necessary. Is a repair necessary?		Go toStep 15	Go toStep 10
8	1. Idle the engine. 2. Connect a test light to ground, probe the IAC electrical connector terminals. Does the test light flash ON and OFF for all terminals?		Go toStep 11	Go toStep 12
9	Check for an open or a short to voltage in the IAC valve high and low circuits and repair as necessary. Is a repair necessary?		Go toStep 15	Go toStep 10
10	Check the engine control module (ECM) electrical connector for poor connections and repair as necessary. Is a repair necessary?		Go toStep 15	Go toStep 14
11	Inspect the IAC valve passages. Is a problem found?		Go toStep 15	Go toStep 13
12	Check the test light. Does the test light remain ON constantly for the terminals that did not blink?		Go toStep 9	Go toStep 7
13	Replace the IAC valve. Is the action complete?		Go toStep 15	
14	Replace the ECM. Is the action complete?		Go toStep 15	
15	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?		Go toStep 16	Go toStep 2
16	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





C402F023

## DIAGNOSTIC TROUBLE CODE (DTC) P0507

### IDLE SPEED RPM HIGHER THAN DESIRED IDLE SPEED

#### Circuit Description

The engine control module (ECM) controls the air entering into the engine with an Idle Air Control (IAC) Valve. To increase the idle rpm, the ECM commands the pintle inside the IAC valve away from the throttle body seat. This allows more air to bypass through the throttle blade. To decrease the rpm the ECM commands the pintle towards the throttle body seat. This reduces the amount of air bypassing the throttle blade. A scan tool will read the IAC valve pintle position in counts. The higher the counts, the more air that is allowed to bypass the throttle blade. This Diagnostic Trouble Code (DTC) determines if a high idle condition exists as defined as 200 rpm above the desired idle rpm.

#### Conditions for Setting the DTC

- DTC(s) P0106, P0107, P0108, P0112, P0113, P0117, P0118, P0121, P0122, P0123, P0131, P0132, P0133, P0134, P0135, P0137, P0138, P0140, P0141, P0171, P0172, P0201, P0202, P0203, P0204, P0300, P0336, P0337, P0341, P0342, P0351, P0352, P0402, P0404, P0405, P0406, P0443, P0502, P1130, P1133, P1134, P1171, P1404, P1441, P1627 not set.
- Engine Coolant Temperature (ECT) is greater than 59.75°C (140°F).
- Barometric Pressure (BARO) is greater than 72.67 kPa.
- Ignition voltage is between 9.5 and 16.7 volts.
- Engine has been running more than 125 seconds.
- The Idle Air Temperature is greater than -40°C (-40°F).
- All of the above must be met for greater than 5 seconds.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.
- Coolant fan turns on.

#### Conditions for Clearing the MIL/DTC

- The MIL will turn off after three consecutive ignition cycles in which the diagnostic runs without a fault.
- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

Inspect the IAC valve electrical connection for proper mating.

Inspect the wiring harness for damage.

Inspect throttle stop screw for signs of tampering.

Inspect throttle linkage for signs of binding or excessive wear.

#### Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

- The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.



2. A normally operating IAC system will be able to be extended and retracted by a scan tool and change the engine idle rpm. Valve movement is verified by an engine rpm change.
3. If the scan tool was able to command the IAC valve smoothly, a malfunction may still exist internally within the IAC valve. This can be checked by checking the IAC valves internal resistance.
5. The IAC circuits always have ground or voltage signals on them in pairs. If the test light illuminates on more or less than 2 terminals, 1 of the circuits is shorted to voltage or open.
6. The IAC circuits always have ground or voltage signals on them in pairs. If the test light illuminates on more or less than 2 terminals, 1 of the circuits is shorted to ground or open
8. The IAC circuits are constantly switched between ground and voltage so the test light should blink on all circuits when connected to ground.
10. Any circuitry, that is suspected as causing the intermittent complaint, should be thoroughly checked for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wiring connections or physical damage to the wiring harness.
12. A test light that remains ON constantly indicates that the circuit is shorted to voltage.
14. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.
16. If no malfunctions have been found at this point and no additional DTCs were set, refer to "Diagnostic Aids" in this section for additional checks and information.

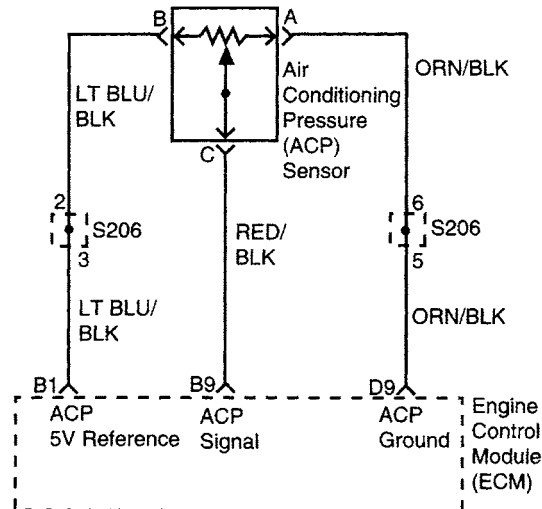
### DTC P0507 Idle Speed RPM Higher Than Desired Idle Speed

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (OBD II) System Check. Is the system check complete?		Go toStep 2	Go to"On-Board Diagnos- tic System Check"
2	1. Turn the ignition switch ON, with the engine OFF. 2. Engine at normal operating temperature. 3. Transmission in park or neutral and the parking brake set. 4. A/C is Off. 5. Install a scan tool and command the Idle air control (IAC) valve up and down between the specified values.  Does the engine rpm change smoothly when commanded by the scan tool?	900–2000 rpm	Go toStep 3	Go toStep 5
3	1. Turn the ignition switch OFF. 2. Disconnect the IAC valve electrical connector. 3. Measure the resistance across the IAC valve terminals A and B. 4. Measure the resistance across the IAC terminals C and D.  Are the resistance across terminals A and B and terminals C and D within the specified value?	40–80 $\Omega$	Go toStep 4	Go toStep 13
4	1. Measure the resistance across the IAC valve terminals B and C. 2. Measure the resistance across the IAC terminals A and D.  Is the resistance across terminals B and C and terminals A and D infinite?		Go toStep 15	Go toStep 13
5	1. Turn the Ignition switch ON with the engine OFF. 2. Disconnect the IAC valve electrical connector. 3. With a test light connected to ground, probe the IAC electrical connector terminals.  Does the test light illuminate on 2 terminals.		Go toStep 6	Go toStep 7



Step	Action	Value(s)	Yes	No
6	With a test light connected to B+, probe the IAC electrical connector terminals. Does the test light illuminate on 2 terminals?		Go to <i>Step 8</i>	Go to <i>Step 9</i>
7	Check for an open or short to ground in the IAC valve high and low circuits and repair as necessary. Is a repair necessary?		Go to <i>Step 15</i>	Go to <i>Step 10</i>
8	1. Idle the engine. 2. Connect a test light to ground, probe the IAC electrical connector terminals. Does the test light flash ON and OFF for all terminals?		Go to <i>Step 11</i>	Go to <i>Step 12</i>
9	Check for an open or a short to voltage in the IAC valve high and low circuits and repair as necessary. Is a repair necessary?		Go to <i>Step 15</i>	Go to <i>Step 10</i>
10	Check the engine control module (ECM) electrical connector for poor connections and repair as necessary. Is a repair necessary?		Go to <i>Step 15</i>	Go to <i>Step 14</i>
11	Inspect the IAC valve passages. Is a problem found?		Go to <i>Step 15</i>	Go to <i>Step 13</i>
12	Check the test light. Does the test light remain ON constantly for the terminals that did not blink?		Go to <i>Step 9</i>	Go to <i>Step 7</i>
13	Replace the IAC valve. Is the action complete?		Go to <i>Step 15</i>	
14	Replace the ECM. Is the action complete?		Go to <i>Step 15</i>	
15	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?		Go to <i>Step 16</i>	Go to <i>Step 2</i>
16	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





C402F041

## DIAGNOSTIC TROUBLE CODE (DTC) P0532

### A/C PRESSURE SENSOR LOW

#### Circuit Description

The A/C system uses an A/C refrigerant pressure sensor mounted in the high pressure side of the A/C refrigerant system to monitor A/C refrigerant pressure. The engine control module (ECM) uses this information to turn ON the engine coolant fans when the A/C refrigerant pressure is high and to keep the compressor disengaged when A/C refrigerant pressure is excessively high or low.

The Air Conditioning Pressure (ACP) sensor operates like other 3-wire sensors. The ECM applies a 5.0 volt reference and a sensor ground to the sensor. Changes in the A/C refrigerant pressure will cause the ACP sensor input to the ECM to vary. The ECM monitors the ACP sensor signal circuit and can determine when the signal is outside of the possible range of the sensor. When the signal is out of range for a prolonged period of time, the ECM will not allow the A/C compressor clutch to engage. This is done to protect the compressor.

#### Conditions for Setting the DTC

- A/D A/C pressure signal is less than 5 counts.
- A/C detected (Equipped).

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- The A/C compressor operation will be disabled while the low voltage indication exists.

#### Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

Inspect the wiring harness for damage. If the harness appears to be OK, observe the A/C pressure display on the scan tool while moving the connectors and wiring harnesses related to the ACP sensor. A change in the A/C pressure display will indicate the location of the fault.

If DTC P0532 cannot be duplicated, reviewing the Fail Records vehicle mileage since the diagnostic test last failed may help determine how often the condition that caused the DTC to set occurs. This may assist in diagnosing the condition.

#### Test Description

Numbers below refer to the step numbers on the Diagnostic Table.

1. The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. Normal ACP sensor signal voltage is between 0.1 and 4.9 volts. If A/C voltage is within range, review the Fail Records data to determine the conditions that were present when DTC P0532 set.



6. The scan tool may not display 5 volts. The important thing is that the ECM recognizes the voltage as more than 4 volts, indicating that the ECM and the signal circuit are OK. A test light that illuminates indicates a short to ground in the signal circuit.
7. A short to ground in the 5 volt reference circuit may set additional DTCs.
11. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

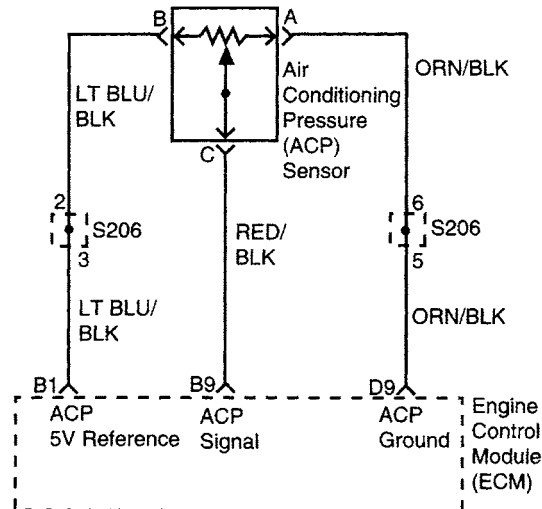
**DTC P0532 A/C Pressure Sensor Low**

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to Step 2	Go to "On-Board Diagnostic System Check"
2	With engine idling, install a scan tool. Does the scan tool display Air Conditioning (A/C) Pressure voltage below the specified value?	0.06 v	Go to Step 3	Go to Step 4
3	1. Turn the ignition switch OFF. 2. Disconnect the Manifold Absolute Pressure (MAP) sensor electrical connector. 3. Jumper the ACP signal circuit, terminal C to the 5 volt reference circuit, terminal B. 4. Turn the ignition switch on. Does the ACP voltage read more than the specified value?	4.9 v	Go to Step 5	Go to Step 6
4	1. Turn the ignition switch ON, with the engine OFF, review the Freeze Frame data and note the parameters. 2. Operate the vehicle within the freeze frame conditions and Conditions For Setting the DTC as noted. Does the scan tool display MAP voltage below the specified value?	0.06 v	Go to Step 3	Go to "Diagnostic Aids"
5	Inspect the A/C Pressure sensor harness electrical connector terminals for the following conditions: <ul style="list-style-type: none"> <li>Poor connections</li> <li>Poor contact tension.</li> <li>Poor terminal-to-wire connection</li> </ul> Is a problem found?		Go to Step 8	Go to Step 9
6	1. Turn the ignition switch OFF. 2. Remove the jumper wire. 3. Probe the ACP sensor signal circuit terminal C with a test light to B+. 4. Turn the ignition switch ON. Does the scan tool read over the specified value?	4.0 v	Go to Step 7	Go to Step 12
7	Check the ACP sensor 5 volt reference circuit for an open or short to ground. Is a problem found?		Go to Step 10	Go to Step 11
8	Repair the connection terminals as necessary. Is the action complete?		Go to Step 14	
9	Replace the ACP sensor. Is the action complete?		Go to Step 14	
10	Repair the ACP sensor 5 volt reference circuit. Is the action complete?		Go to Step 14	



Step	Action	Value(s)	Yes	No
11	Replace the engine control module (ECM). Is the action complete?		Go to <i>Step 14</i>	
12	Check the ACP sensor signal circuit for the following conditions: <ul style="list-style-type: none"> <li>• Open</li> <li>• Short to ground</li> <li>• Short to sensor ground</li> </ul> Is a problem found?		Go to <i>Step 13</i>	Go to <i>Step 11</i>
13	Repair the ACP sensor signal circuit. Is the action complete?		Go to <i>Step 14</i>	
14	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the Conditions for setting this DTC as specified in the supporting text.  Does the scan tool indicate that this diagnostic has run and passed?		Go to <i>Step 15</i>	Go to <i>Step 2</i>
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





C402F041

## DIAGNOSTIC TROUBLE CODE (DTC) P0533

### A/C PRESSURE SENSOR HIGH

#### Circuit Description

The A/C system uses an A/C refrigerant pressure sensor mounted in the high pressure side of the A/C refrigerant system to monitor A/C refrigerant pressure. The engine control module (ECM) uses this information to turn ON the engine coolant fans when the A/C refrigerant pressure is high and to keep the compressor disengaged when A/C refrigerant pressure is excessively high or low.

The Air Conditioning Pressure (ACP) sensor operates like other 3-wire sensors. The ECM applies a 5.0 volt reference and a sensor ground to the sensor. Changes in the A/C refrigerant pressure will cause the ACP sensor input to the ECM to vary. The ECM monitors the ACP sensor signal circuit and can determine when the signal is outside of the possible range of the sensor. When the signal is out of range for a prolonged period of time, the ECM will not allow the A/C compressor clutch to engage. This is done to protect the compressor.

#### Conditions for Setting the DTC

- A/D A/C pressure signal is more than 250 counts.
- A/C detected (Equipped).

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- The A/C compressor operation will be disabled while the low voltage indication exists.

#### Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

Inspect the wiring harness for damage. If the harness appears to be OK, observe the A/C pressure display on the scan tool while moving the connectors and wiring harnesses related to the ACP sensor. A change in the A/C pressure display will indicate the location of the fault.

If DTC P0533 cannot be duplicated, reviewing the Fail Records vehicle mileage since the diagnostic test last failed may help determine how often the condition that caused the DTC to set occurs. This may assist in diagnosing the condition.

#### Test Description

Numbers below refer to the step numbers on the Diagnostic Table.

1. The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. Normal ACP sensor signal voltage is between 0.1 and 4.9 volts. If A/C voltage is within range, review Fail Records data to determine the conditions that were present when DTC P0533 set.



6. The scan tool may not display 5 volts. The important thing is that the ECM recognizes the voltage as more than 4 volts, indicating that the ECM and the signal circuit are OK. A test light that illuminates indicates a short to ground in the signal circuit.
7. A short to ground in the 5 volt reference circuit could also set additional DTCs.
11. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

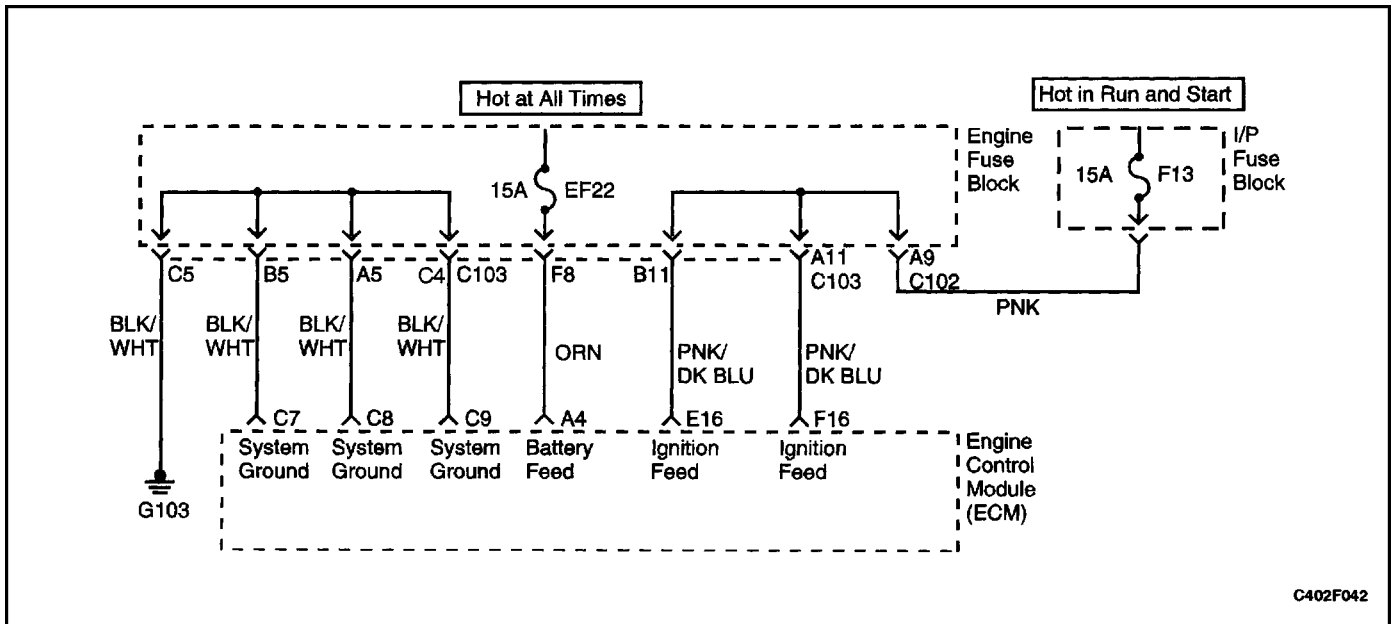
### DTC P0533 A/C Pressure Sensor High

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to Step 2	Go to "On-Board Diagnostic System Check"
2	With engine idling, install a scan tool. Does the scan tool display Air Conditioning Pressure (ACP) voltage below the specified value?	0.06 v	Go to Step 3	Go to Step 4
3	1. Turn the ignition switch OFF. 2. Disconnect the MAP sensor electrical connector. 3. Jumper the ACP signal circuit, terminal C to the 5 volt reference circuit, terminal B. 4. Turn the ignition switch ON. Does the ACP voltage read more than the specified value?	4.9 v	Go to Step 5	Go to Step 6
4	1. Turn the ignition switch ON, with the engine OFF, review the Freeze Frame data, and note the parameters. 2. Operate the vehicle within the freeze frame conditions and Conditions For Setting the DTC as noted. Does the scan tool display Manifold Absolute Pressure (MAP) voltage below the specified value?	0.06 v	Go to Step 3	Go to "Diagnostic Aids"
5	Inspect the A/C Pressure sensor harness electrical connector terminals for the following conditions: <ul style="list-style-type: none"> <li>• Poor connections</li> <li>• Proper contact tension</li> <li>• Poor terminal-to-wire connection</li> </ul> Is a problem found?		Go to Step 8	Go to Step 9
6	1. Turn the ignition switch OFF. 2. Remove the jumper wire. 3. Probe the ACP sensor signal circuit terminal C with a test light to B+. 4. Turn the ignition switch ON. Does the scan tool read over the specified value?	4.0 v	Go to Step 7	Go to Step 12
7	Check the ACP sensor 5 volt reference circuit for an open or short to ground. Is a problem found?		Go to Step 10	Go to Step 11
8	Repair the connection terminals as necessary. Is the action complete?		Go to Step 14	
9	Replace the ACP sensor. Is the action complete?		Go to Step 14	
10	Repair the ACP sensor 5 volt reference circuit. Is the action complete?		Go to Step 14	



Step	Action	Value(s)	Yes	No
11	Replace the engine control module (ECM). Is the action complete?		Go to <i>Step 14</i>	
12	Check the A/C Pressure sensor signal circuit for the following conditions: <ul style="list-style-type: none"><li>• Open</li><li>• Short to ground</li><li>• Short to sensor ground</li></ul> Is a problem found?		Go to <i>Step 13</i>	Go to <i>Step 11</i>
13	Repair the A/C Pressure sensor signal circuit. Is the action complete?		Go to <i>Step 14</i>	
14	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the Conditions for setting this DTC as specified in the supporting text..  Does the scan tool indicate that this diagnostic has run and passed?		Go to <i>Step 15</i>	Go to <i>Step 2</i>
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





## DIAGNOSTIC TROUBLE CODE (DTC) P0562

### SYSTEM VOLTAGE (ENGINE SIDE) TOO LOW

#### Circuit Description

The engine control module (ECM) monitors the ignition voltage on the ignition feed circuit to terminal F16 at the ECM. A system voltage Diagnostic Trouble Code (DTC) will set whenever the voltage is below a calibrated value.

#### Conditions for Setting the DTC

- Ignition ON.
- The system voltage is less than 11 volts.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.

#### Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

If the DTC sets when an accessory is operated, check for a poor connection or excessive current draw.

Any circuitry that is suspected as causing the intermittent complaint should be thoroughly checked for the following conditions:

- Backed-out terminals
- Improper mating
- Broken locks
- Improperly formed
- Damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness

#### Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

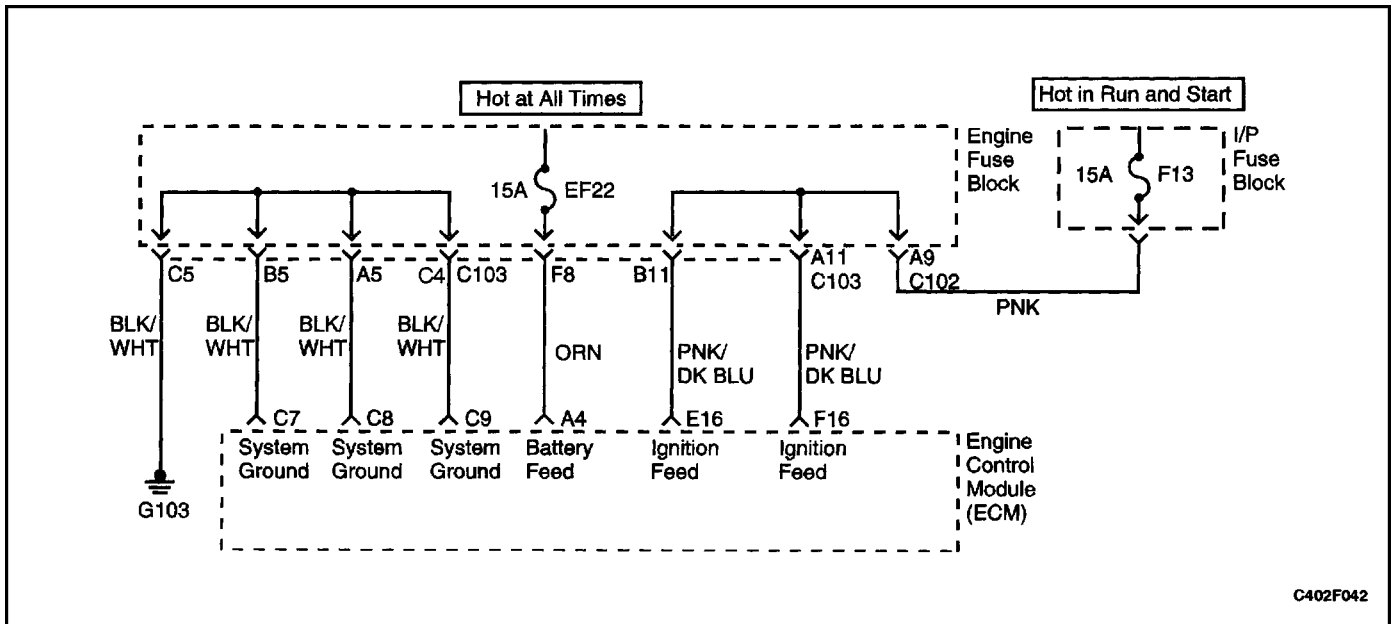
1. The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. This checks if the generator is malfunctioning under load conditions.
4. Checks the ignition feed circuit for excessive resistance. An open circuit will cause a no-start condition.
7. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.
9. If no malfunctions have been found at this point and no additional DTCs were set, refer to "Diagnostic Aids" in this section for additional checks and information.



**DTC P0562 System Voltage (Engine Side) Too Low**

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to <i>Step 2</i>	Go to "On–Board Diagnostic System Check"
2	1. Install a scan tool and clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and raise the engine speed to the specified value. 3. Load the electrical system by turning on the headlights, high blower motor, etc. Is the ignition voltage less than the specified value?	1400 rpm 10 v	Go to <i>Step 3</i>	Go to <i>Step 8</i>
3	1. With the engine still running at the specified value. 2. Using a digital voltmeter (DVM), measure the battery voltage at the battery. Is the battery voltage greater than the specified value?	1400 rpm 12 v	Go to <i>Step 4</i>	Go to "Diagnostic Aids"
4	1. Turn the ignition switch OFF. 2. Disconnect the engine control module (ECM) connector at the ECM. 3. Turn the ignition switch ON with the engine OFF. 4. Using a DVM, measure the ignition voltage at the ignition feed circuit, terminal F16. Is the ignition voltage greater than the specified value?	10 v	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Check for a malfunctioning connection at the ECM harness terminals and repair as necessary. Is a repair necessary?		Go to <i>Step 8</i>	Go to <i>Step 7</i>
6	Repair the poor connection (high resistance) in the ignition feed circuit. Is the action complete?		Go to <i>Step 8</i>	
7	Replace the ECM. Is the action complete?		Go to <i>Step 8</i>	
8	1. Using the scan tool, clear the DTCs. 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?		Go to <i>Step 9</i>	Go to <i>Step 2</i>
9	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK





## DIAGNOSTIC TROUBLE CODE (DTC) P0563

### SYSTEM VOLTAGE (ENGINE SIDE) TOO HIGH

#### Circuit Description

The engine control module (ECM) monitors the ignition voltage on the ignition feed circuit to terminal F16 at the ECM. A system voltage Diagnostic Trouble Code (DTC) will set whenever the voltage is below a calibrated value..

#### Conditions for Setting the DTC

- Ignition ON.
- The system voltage is greater than 16 volts.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.

#### Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Diagnostic Aids

If the DTC sets when an accessory is operated, check for a poor connection or excessive current draw.

Any circuitry that is suspected as causing the intermittent complaint should be thoroughly checked for the following conditions:

- Backed-out terminals
- Improper mating
- Broken locks
- Improperly formed
- Damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness

#### Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

1. The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. This checks if the generator is malfunctioning under load conditions.
4. Checks the ignition feed circuit 140 for excessive resistance. An open circuit will cause a no start condition.
7. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.
9. If no malfunctions have been found at this point and no additional DTCs were set, refer to "Diagnostic Aids" in this section for additional checks and information.



**DTC P0563 System Voltage (Engine Side) Too High**

<b>Step</b>	<b>Action</b>	<b>Value(s)</b>	<b>Yes</b>	<b>No</b>
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to <i>Step 2</i>	Go to "On–Board Diagnostic System Check"
2	1. Install a scan tool and clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and raise the engine speed to the specified value. 3. Load the electrical system by turning on the headlights, high blower motor, etc. Is the ignition voltage greater than the specified value?	1400 rpm 10 v	Go to <i>Step 3</i>	Go to <i>Step 8</i>
3	1. With the engine still running at the specified value. 2. Using a digital voltmeter (DVM), measure the battery voltage at the battery. Is the battery voltage less than the specified value?	1400 rpm 12 v	Go to <i>Step 4</i>	Go to "Diagnostic Aids"
4	1. Turn the ignition switch OFF. 2. Disconnect the engine control module (ECM) connector at the ECM. 3. Turn the ignition switch ON, with the engine OFF. 4. Using a DVM, measure the ignition voltage at the ignition feed circuit, terminal F16. Is the ignition voltage greater than the specified value?	10 v	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Check for a malfunctioning connection at the ECM harness terminals and repair as necessary. Is a repair necessary?		Go to <i>Step 8</i>	Go to <i>Step 7</i>
6	Repair the poor connection (high resistance) in the ignition feed circuit. Is the action complete?		Go to <i>Step 8</i>	
7	Replace the ECM. Is the action complete?		Go to <i>Step 8</i>	
8	1. Using the scan tool, clear the DTCs. 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?		Go to <i>Step 9</i>	Go to <i>Step 2</i>
9	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK



## DIAGNOSTIC TROUBLE CODE (DTC) P0601

### ECM (ENGINE SIDE) CHECKSUM FAULT

#### Circuit Description

The engine control module (ECM) is the control center of the fuel injection system. It constantly looks at the information from various sensors, and controls the systems that affect vehicle performance. The ECM also performs the diagnostic function of the system. It can recognize operational problems, alert the driver through the Malfunction Indicator Lamp (MIL) (Check Engine), and store a Diagnostic Trouble Code (DTC) or DTCs which identify the problem areas to aid the technician in making repairs. An Electrically Erasable Programmable Read Only Memory (EEPROM) is used to house the program information and the calibrations required for engine, transmission, and powertrain diagnostics operation. The ECM uses a value called a checksum for error detection of the software. The checksum is a value that is equal to all the numbers in the software added together. The ECM adds all the values in the software, and if that value does not equal the checksum value, a checksum error is indicated.

#### Conditions for Setting the DTC

- The ECM detects more than 3 incorrect checksums.
- Ignition ON.
- Program ID not equal to value in S/W (\$A9).

#### Action Taken When the DTC Sets

- MIL will illuminate.

- The ECM will attempt to record operating conditions at the time the failure is detected. However, since this is an internal ECM failure, this information may or may not be reliable. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.

#### Conditions for Clearing the MIL/DTC

- The MIL will turn off after three consecutive ignition cycles in which the diagnostic runs without a fault.
- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- DTC(s) can be cleared by using the scan tool.

#### Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

1. The On-Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

### DTC P0601 ECM (Engine Side) Checksum Fault

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (OBD II) System Check. Is the system check complete?.		Go to Step 2	Go to "On-Board Diagnostic System Check"
2	Replace the engine control module (ECM). Is the action complete?		Go to Step 3	
3	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text.  Does the scan tool indicate that this diagnostic has run and passed?		Go to Step 4	Go to Step 2
4	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to "Applicable DTC table"	System OK