

## DIAGNOSTIC TROUBLE CODE (DTC) P1618

### ECM INTERNAL SPI COMMUNICATION

#### Circuit Description

The Serial Peripheral Interface (SPI) communication is used internally by the engine control module (ECM) to send messages between the engine processor and the automatic transaxle processor. Included in each message sent between the two processors is a checksum of the message. Both the engine processor and the automatic transaxle will compare this checksum value with the calculated value. If the checksums do not match, the processor will view the new data as being corrupted and ignore the values. The processor will then use the previous message. The receiving processor will then send a message to the sending processor informing it that its last message was corrupted.

#### Conditions for Setting the DTC

- Battery voltage is greater than 9 volts for more than 2 seconds.

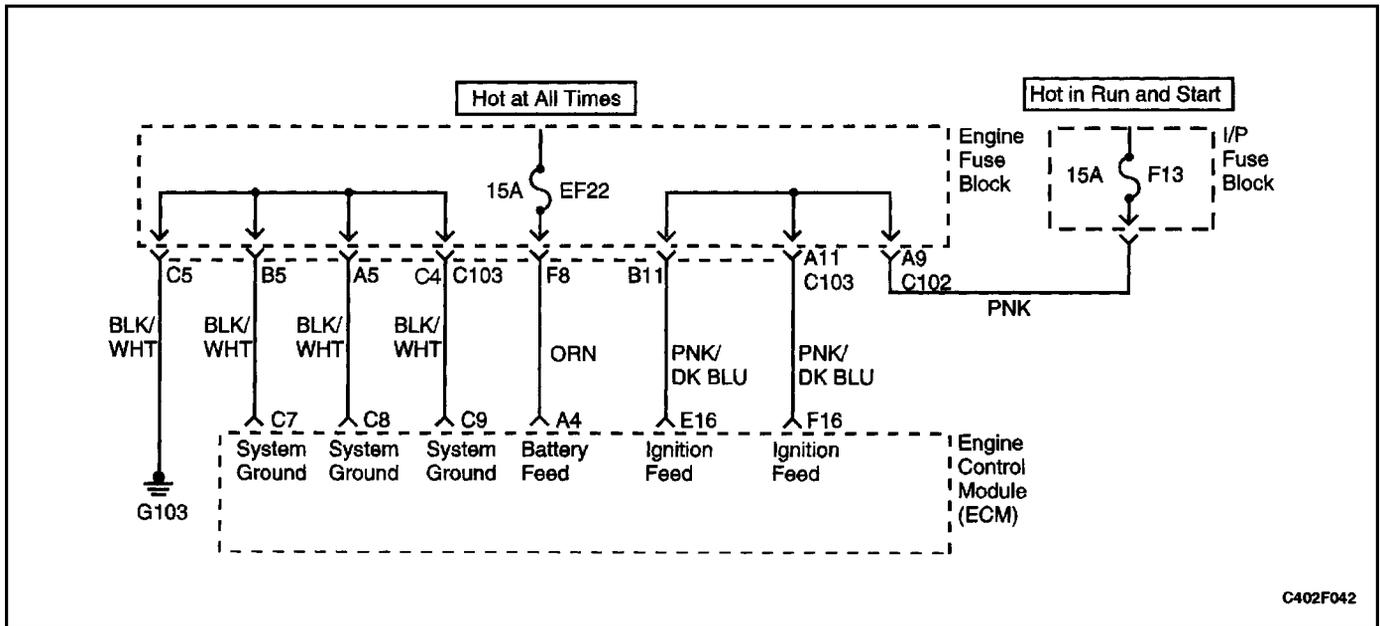
- Ignition ON.
- No ECM resets for more than 2 seconds.

#### Action Taken When the DTCs Sets

- The ECM will illuminate the Malfunction Indicator Lamp (MIL) the first time the fault is detected.
- The ECM will store conditions which were present when the DTC was set as Freeze Frame and in the Failure Records data.

#### Conditions for Clearing the MIL/DTC

- The ECM will turn the MIL OFF on the third consecutive trip cycle during which the diagnostic has been run and the fault is no longer present.
- A history DTC P1618 will clear after 40 consecutive warm-up cycles have occurred without a fault.
- Clear the DTC by using a scan tool or disconnecting the ECM battery feed.



## DIAGNOSTIC TROUBLE CODE (DTC) P1625

### ECM INTERNAL SYSTEM RESET

#### Circuit Description

The engine control module (ECM) has a memory area where it stores certain data it needs to save when the ignition is OFF. This diagnostic test monitors this memory for a loss or unintended change of data. If such a condition occurs, Diagnostic Trouble Code (DTC) P1625 will set.

#### Conditions for Setting the DTC

- Clock reset or COP reset.
- Ignition ON.

#### Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- No message will be displayed.
- Clear keep alive memory locations.

#### Conditions for Clearing the 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.
- ECM battery voltage is interrupted.

#### Diagnostic Aids

If the battery has been disconnected for any reason DTC P1625 will set. The ECM keeps a running check on the memory. If the memory changes, it will reset. An intermittent loss of power or ground to the ECM will cause a reset.

#### 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.

**DTC P1625 ECM Internal System Reset**

<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 check complete?		Go to <i>Step 2</i>	Go to "On–Board Diagnostic System Check"
2	Check the scan tool. Are any other Diagnostic Trouble Codes (DTCs) set?		Go to "Applicable DTC table"	Go to <i>Step 3</i>
3	1. Start the engine and idle at normal operating temperature. 2. Operate the vehicle within the Conditions for Setting this DTC as specified in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?		System OK	Go to <i>Step 4</i>
4	Repair the open or shorts in the battery feed, ignition feed or ground circuits. Is the repair complete?		System OK	

**DIAGNOSTIC TROUBLE CODE (DTC) P1627****ECM A/D CONVERSION ERROR****System Description**

Some of the components, such as the vehicle speed sensor, send the information along to the engine control module (ECM) in the form of analog data. The ECM must then convert the analog data to serial data in order to analyze it. The ECM continuously monitors this activity every 125 milliseconds and checks for active malfunction codes on inputs to the A/D multiplex (MUX) that are shorted high. This Diagnostic Trouble Code (DTC) will set when an active malfunction is present that affects the A/D MUX diagnostic.

**Conditions for setting the DTC**

- Ignition ON.
- Active malfunction present that affect A/D MUX diagnostic.

**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.

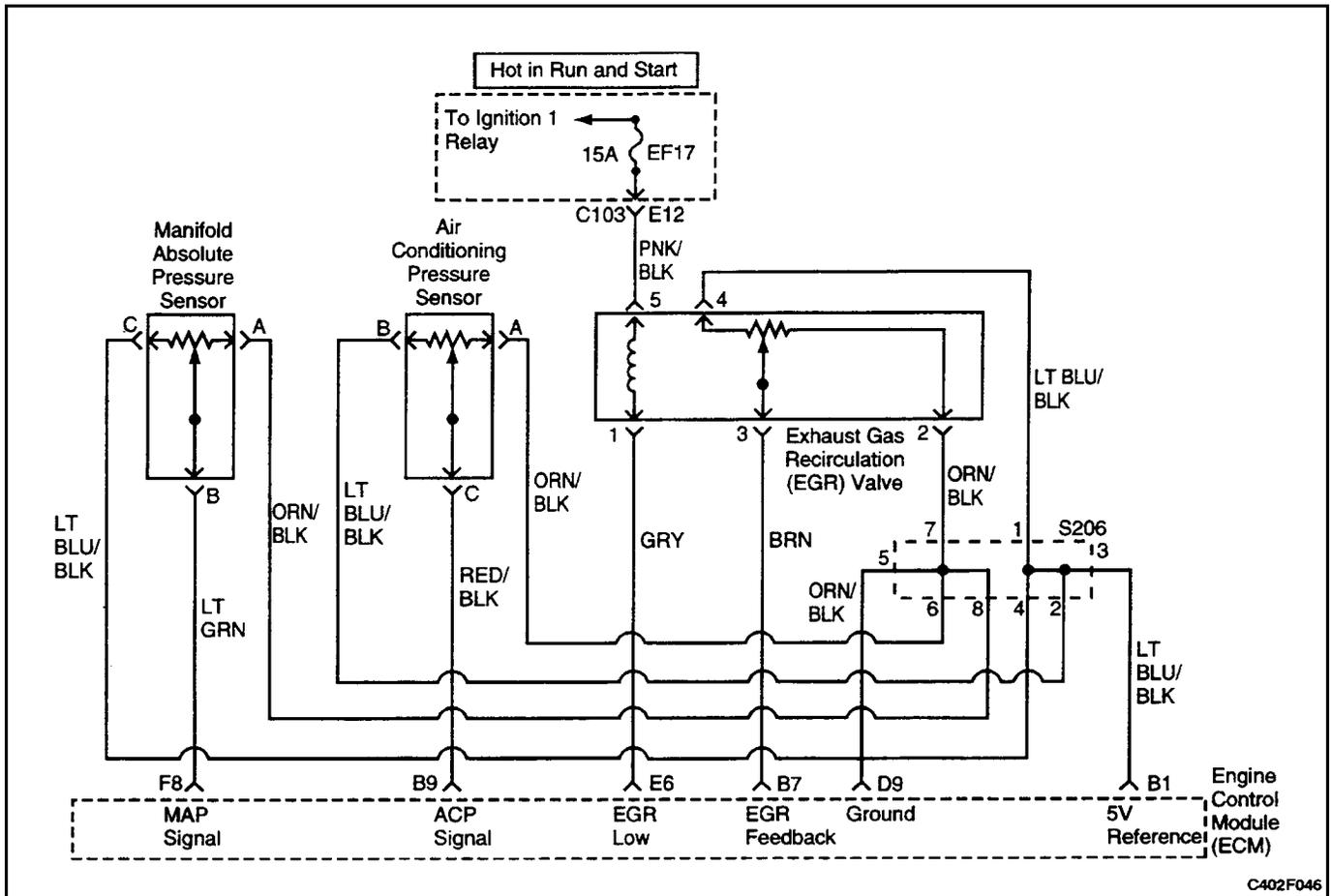
**Test Description**

The number(s) below refer to step(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.
4. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

**DTC P1627 ECM A/D Conversion Error**

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	Check the scan tool. Are any other Diagnostic Trouble Codes (DTCs) set?		Go to "Applicable DTC table"	Go to <i>Step 3</i>
3	1. Start the engine and idle at normal operating temperature. 2. Operate the vehicle within the Conditions for Setting this DTC. Does the scan tool indicate that this diagnostic ran and passed?		System OK	Go to <i>Step 4</i>
4	Replace the engine control module (ECM). Is the repair complete?		System OK	



## DIAGNOSTIC TROUBLE CODE (DTC) P1635 ECM 5 VOLT REFERENCE LINE LOW

### Circuit Description

The engine control module (ECM) uses the 5 volt reference circuit as a sensor feed to the Manifold Absolute Pressure (MAP) sensor, the Air Conditioning Pressure (ACP) sensor and the Exhaust Gas Recirculation (EGR) valve. The ECM monitors the voltage on the 5 volt reference. If the voltage is out of tolerance, the ECM will set Diagnostic Trouble Code (DTC) P1635.

### Conditions for Setting the DTC

- The ECM detects a voltage out of tolerance condition on the 5 volt reference circuit.
- Every 125 milliseconds there are greater than or equal to 10 failures within 20 samplings.
- Voltage reading is less than 4.8v or greater than 5.2v.
- Ignition voltage is greater than 6.2 v.

### Action Taken When the DTC Sets

- The ECM will not illuminate the Malfunction Indicator Lamp (MIL).
- The ECM will store the conditions which were present when the DTC set as Freeze Frame and Fail Records data.

### 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

Check for the following conditions:

- Poor connection at the ECM. Inspect the harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection.
- Damaged harness. Inspect the wiring harness for damage. If the harness appears to be OK, observe the MAP display on the scan tool with the ignition ON and the engine OFF while moving connectors and wiring harnesses related to the following sensors:

- MAP
- ACP
- EGR valve

A change in the MAP display will indicate the location of the fault.

Reviewing the Fail Records vehicle mileage since the diagnostic test last failed may help determine how often the condition that caused the DTC to be set occurs. This may assist in diagnosing the condition.

Inspect the ECM and engine grounds for being secure and clean.

### Test Description

The number(s) below refer to step(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.

5. A faulty EGR valve can leak a small amount of current from the ignition feed circuit to the 5 volt reference. If the problem does not exist with the EGR valve disconnected, replace the EGR valve.
11. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

### DTC P1635 ECM 5 Volt Reference Line 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. Visually/physically check the engine control module (ECM) and engine grounds. 2. Ensure that the grounds are clean and secure. 3. If a problem is found, repair as necessary. Is a problem found?		Go to <i>Step 12</i>	Go to <i>Step 3</i>
3	1. Turn the ignition ON, engine OFF. 2. Install the scan tool. Is Diagnostic Trouble Code (DTC) P0106, P0107, P0108, P0401, P0402, P0404, P0405, P0406, P0532, P0533, P1106, P1107 or P1404 also set?		Go to "Multiple ECM Information Sensor DTCs Set"	Go to <i>Step 4</i>
4	1. Turn the ignition OFF and disconnect the ECM. 2. Turn the ignition ON. 3. Measure the voltage between the 5 volt reference circuit, terminal B1 and the ECM ground circuit, terminal D9 at the ECM harness connector. Is the voltage greater than the specified value?	5.5 volts	Go to <i>Step 5</i>	Go to <i>Step 9</i>
5	Disconnect the Exhaust Gas Recirculation (EGR) valve. Is the voltage greater than the specified value with the EGR valve disconnected?	5.5 volts	Go to <i>Step 6</i>	Go to <i>Step 8</i>
6	1. Disconnect the Manifold Absolute Pressure (MAP) sensor and the Air Conditioning Pressure (ACP) sensor one at a time. 2. If voltage changes when one of the above components is disconnected, locate and repair short to voltage in the affected sensor signal circuit. Is the problem found?		Go to <i>Step 12</i>	Go to <i>Step 7</i>

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Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> <li>1. Turn the ignition OFF.</li> <li>2. Disconnect the ECM.</li> <li>3. Turn the ignition ON.</li> <li>4. Check the 5 volt reference circuit, terminal B1 for a short to voltage.</li> <li>5. If a problem is found, repair as necessary.</li> </ol> Is a problem found?		Go to <i>Step 12</i>	Go to <i>Step 11</i>
8	Replace the EGR valve. Is the repair complete?		Go to <i>Step 12</i>	
9	Measure the voltage between the 5 volt reference circuit, terminal B1 and the ECM ground circuit, terminal D9 at the ECM harness connector. Is the voltage less than the specified value?	4.5 volts	Go to <i>Step 10</i>	Go to <i>Step 11</i>
10	<ol style="list-style-type: none"> <li>1. Turn the Ignition OFF.</li> <li>2. Disconnect the ECM.</li> <li>3. Check the 5 volt reference circuit, terminal B1 for a short to ground.</li> <li>4. If a problem is found, repair as necessary?</li> </ol> Is a problem found?		Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	Replace the ECM. Is the repair complete?		Go to <i>Step 12</i>	
12	<ol style="list-style-type: none"> <li>1. Using the scan tool, clear DTCs.</li> <li>2. Start the engine and idle at normal operating temperature.</li> <li>3. Operate the vehicle within the conditions for setting this DTC as specified in the supporting text.</li> </ol> Does the scan tool indicate that this diagnostic ran and passed?		Go to <i>Step 13</i>	Go to <i>Step 2</i>
13	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) P1640

### ODM INTERNAL SPI COMMUNICATION

#### Circuit Description

Output Driver Modules (ODMs) are used by the engine control module (ECM) to turn on the current driven devices that are needed to control various engine functions. The ODM is capable of controlling up to 7 separate outputs by applying ground to the device which the ECM is commanding on. ODMs are capable of diagnosing each output circuit individually. This Diagnostic Trouble Code (DTC) detects a short to ground or open circuit and short to battery for the 7 low-side output devices of the ODM.

Since A/C is an option, NO A/C will cause the A/C clutch relay output to always fault. If a fault is seen on the A/C clutch relay output, it will not be logged as a fault until the A/C request input interrupts a high voltage, indicating that A/C has been installed.

#### Conditions for Setting the DTC

- Ignition ON.
- Ignition voltage is greater than or equal to 10 volts.
- Engine run time is greater than or equal to 5 seconds.
- DTC P1618 not set.

#### Action Taken When the DTC Sets

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

#### Conditions for Clearing the MIL/DTC

- A history DTC P1640 will clear after 40 consecutive warm-up cycles occur without a fault.
- The DTC P1640 can be cleared with a scan tool or disconnecting the ECM.

#### Diagnostic Aids

Check for the following conditions:

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

- Damaged harness – Inspect the wiring harness for damage. If the harness appears to be OK, disconnect the ECM, turn the ignition ON and observe a voltmeter connected to the MIL driver circuit at the ECM harness connector while moving connectors and wiring harnesses related to the MIL. A change in voltage will indicate the location of the fault.
- Poor connection at component – Examine for damaged connectors, unplugged connectors or damaged terminals at the various ODM controlled components.

The following ECM terminals are controlled by the ODM:

- C4 – EST A
- D5 – EST B
- A15 – Evaporative Emission (EVAP) Canister Purge Control
- C13 – Cooling Fan Relay 1
- C12 – Cooling Fan Relay 2
- B14 – A/C Clutch Output

#### 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.
3. Normally, ignition feed voltage is present on the output driver circuit with the ECM disconnected and the ignition turned ON.
4. Checks for a shorted component or a short B+ on the output driver circuit. Either condition would result in a measured current of over 1.5 amps. Also checks for a component that is going open while being operated, resulting in a measured current of 0 amps.
5. Checks for a fault component.
14. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM reprogramming.

**DTC P1640 ODM Internal SPI Communication**

<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 the scan tool and clear the Diagnostic Trouble Code (DTC). 2. Review the Freeze Frame data with the ignition ON and the engine OFF and note the parameters. 3. Operate the vehicle within the Freeze Frame conditions as noted. Does DTC P1640 reset?		Go to <i>Step 3</i>	Go to "Diagnostic Aids"
3	1. Turn the ignition OFF 2. Disconnect the engine control module (ECM). 3. Turn the ignition ON. 4. Using a digital voltmeter (DVM), measure the voltage between one of the output driver circuits at the ECM harness connector and ground. Is the voltage near the specified value?	11–14 v	Go to <i>Step 4</i>	Go to <i>Step 7</i>
4	Measure the current between one of the output driver circuits and ground for at least 2 minutes. Does the current reading remain between the specified values?	0.05–1.5 amps	Go to "Diagnostic Aids"	Go to <i>Step 5</i>
5	1. Turn the ignition OFF and disconnect the ignition feed circuit. 2. Turn the ignition ON. 3. Using a DVM, measure the voltage between the output driver circuit and ground. Is the voltage at the specified value?	0 v	Go to <i>Step 11</i>	Go to <i>Step 6</i>
6	Locate and repair short to voltage in the component output driver circuit. Is the repair complete?		Go to <i>Step 15</i>	
7	Check the ignition feed fuse for the component. Does the fuse need to be replaced?		Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	1. Locate and repair the short to ground in the ignition feed circuit. 2. Replace the fuse. Is the repair complete?		Go to <i>Step 15</i>	
9	1. Disconnect the ignition feed circuit. 2. With the ignition ON, measure the voltage between the ignition feed circuit and ground. Is the voltage near the specified value?	11–14 v	Go to <i>Step 10</i>	Go to <i>Step 13</i>
10	1. Check the output driver circuit for an open or short to ground. 2. If a problem is found, repair the output driver circuit. Is a problem found?		Go to <i>Step 15</i>	Go to <i>Step 11</i>

Step	Action	Value(s)	Yes	No
11	1. Check the output driver circuit and the ignition feed circuit for a poor connection at the component and at the ECM. 2. If a problem is found, replace the faulty terminal(s). Is a problem found?		Go to <i>Step 15</i>	Go to "Diagnostic Aids"
12	1. Check the output driver circuit for a poor connection at the ECM 2. If a problem is found, replace the faulty terminal. Is a problem found?		Go to <i>Step 15</i>	Go to <i>Step 14</i>
13	Locate and repair open in the ignition feed circuit to the component. Is the repair complete?		Go to <i>Step 15</i>	
14	Replace the ECM. Is the repair complete?		Go to <i>Step 15</i>	Go to <i>Step 2</i>
15	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 ran and passed?		Go to <i>Step 16</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