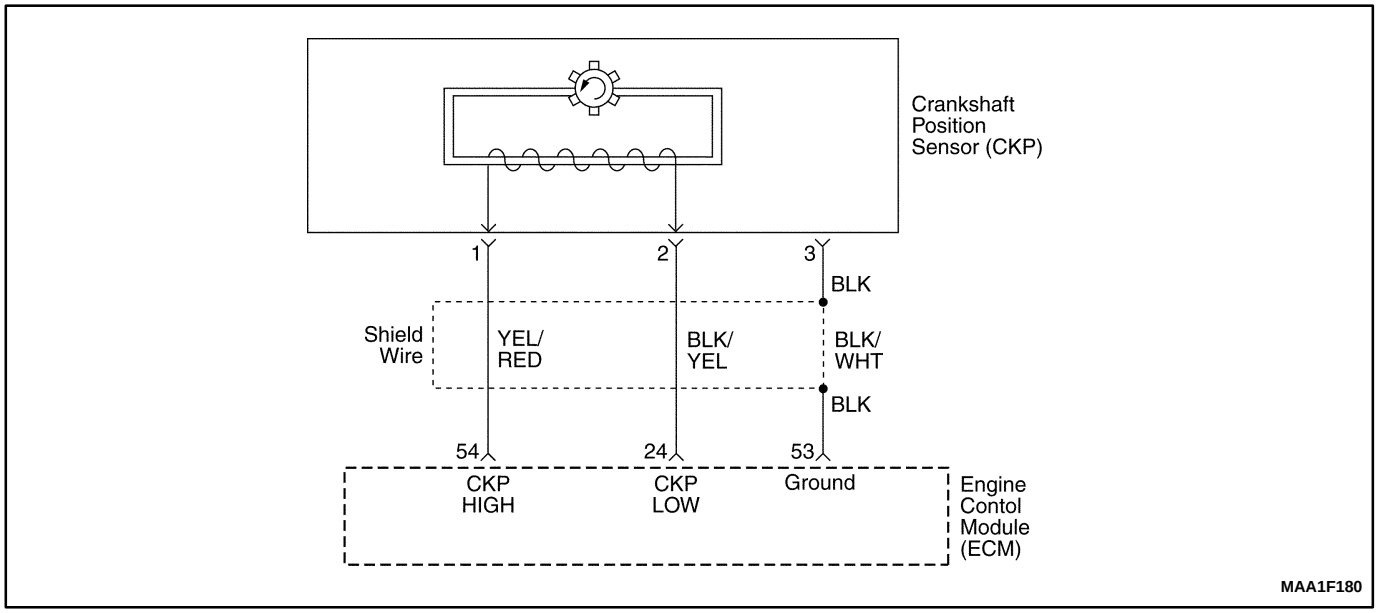


DIAGNOSTIC TROUBLE CODE (DTC) – P0336 58X CRANKSHAFT POSITION SENSOR NO PLAUSIBLE SIGNAL

Circuit Description

The 58X reference signal is produced by the crankshaft position (CKP) sensor. During one crankshaft revolution, 58 crankshaft pulses will be produced. The engine control module(ECM) uses the 58X reference signal to calculate engine rpm and CKP. The ECM constantly monitors the number of pulses on the 58X reference circuit and compares them to the number of camshaft position (CKP) signal pulses being received. If the ECM receive and incorrect number of pulses on the 58X reference circuit, DTC P0336 will set.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Detected number of teeth is differs by 3 or higher.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DIAGNOSTIC AIDS

An intermittent may be caused by a poor connection, rubbed-through wire insulation or a wire broken inside the insulation. Check for :

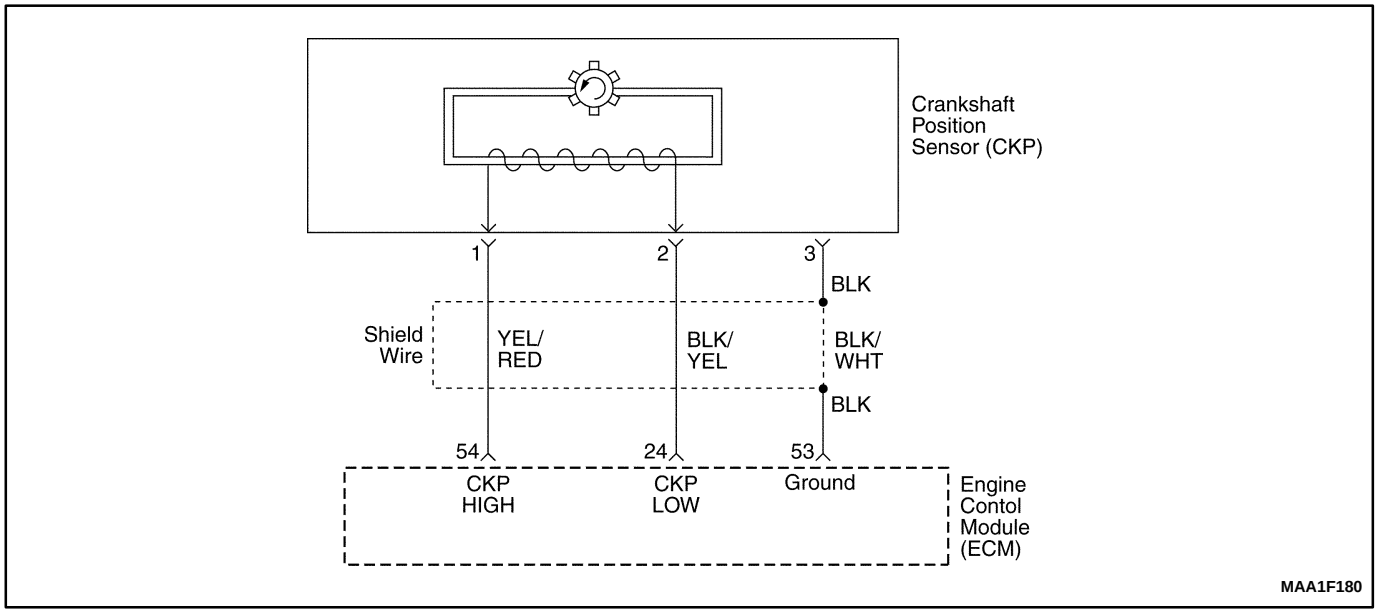
Poor connection – inspect the ECM harness and connectors for improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection.

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 58X reference circuit at the ECM harness connector while moving the connectors and the wiring harness related to the ECM. A change in voltage will indicate the location of the fault.

Review the failure records vehicle mileage since the diagnostic test failed may help determine how often the condition that caused the DTC to be set occurs. This may assist in diagnosing the condition.

DTC P0336 – 58X Crankshaft Position Sensor No Plausible Signal

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	Attempt to start the engine. Does the engine start?	–	Go to *Step 3*	Refer to "Engine Cranks But Will Not Run"
3	1. Review and record Failure Records information. 2. Clear the DTC P0336. 3. Start the engine and idle for 1 minute. 4. Observe the diagnostic trouble codes (DTCs). Is the DTC P0336 set?	–	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Disconnect the engine control module(ECM) and the crankshaft position (CKP) sensor. 2. Check for an open or a low voltage in the CKP sensor connector and the ECM harness connector. Is the problem found?	–	Go to *Step 5*	Go to *Step 6*
5	Repair the open or low voltage in the 58X reference circuit between the CKP sensor connector and the ECM harness connector. Is the repair complete?	–	Go to *Step 11*	–
6	1. Reconnect the ECM and CKP sensor. 2. Connect a digital voltmeter (DVM) to measure voltage on the 58X reference circuit, terminal 54 at the ECM connector. 3. Observe the voltage while cranking the engine. Is the voltage near the specified value?	2.5V	Go to *Step 9*	Go to *Step 7*
7	Check the connection at the CKP sensor and replace the terminals if necessary. Do any terminals require replacement?	–	Go to *Step 11*	Go to *Step 8*
8	Replace the CKP sensor. Is the replacement complete?	–	Go to *Step 11*	–
9	Check the connections at the ECM and replace the terminals if necessary. Do any terminal require replacement?	–	Go to *Step 11*	Go to *Step 10*
10	Replace the ECM. Is the replacement complete?	–	Go to *Step 11*	–
11	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 run and passed?	–	Go to *Step 12*	Go to *Step 2*
12	Check if any additional DTCs are set. Are any DTCs displaced that have not been diagnosed?	–	Go to Applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P0337 58X CRANKSHAFT POSITION SENSOR NO SIGNAL

Circuit Description

The 58X reference signal is produced by the crankshaft position (CKP) sensor. During one crankshaft revolution, 58 crankshaft pulses will be produced. The engine control module(ECM) uses the 58X reference signal to calculate engine rpm and CKP. The ECM constantly monitors the number of pulses on the 58X reference circuit and compares them to the number of camshaft position (CKP) signal pulses being received. If the ECM receive and incorrect number of pulses on the 58X reference circuit, DTC P0337 will set.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- No crankshaft teeth detected.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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 may be caused by a poor connection, rubbed-through wire insulation or a wire broken inside the insulation. Check for :

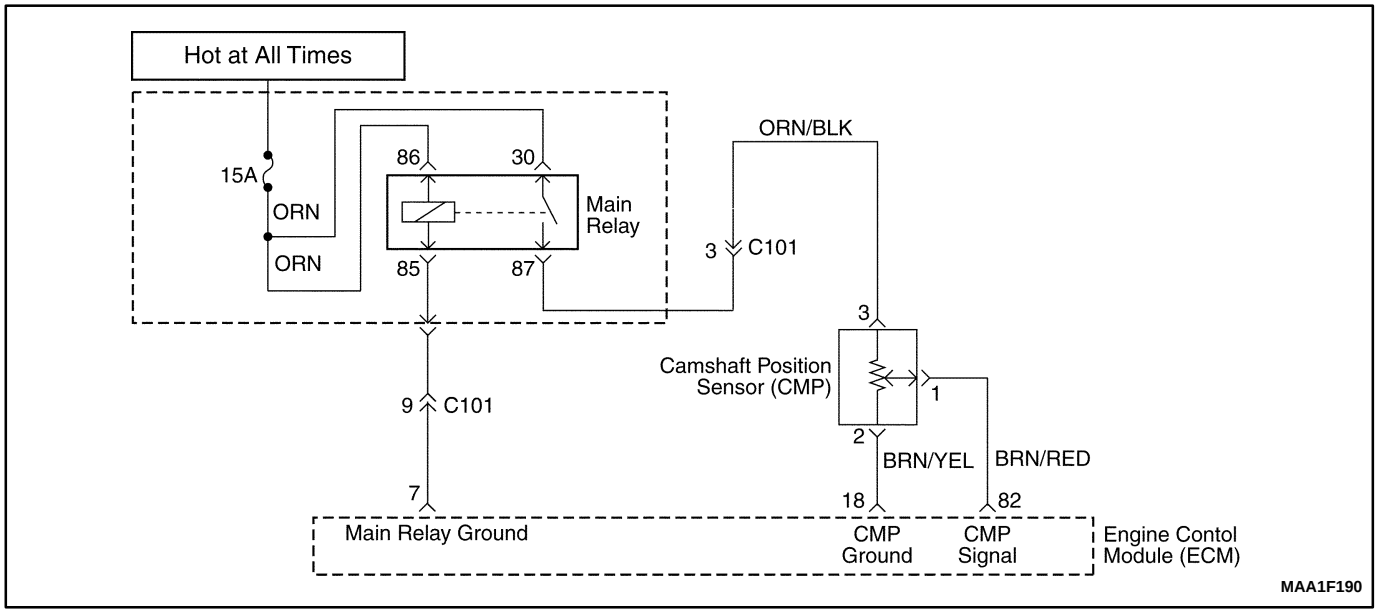
Poor connection – inspect the ECM harness and connectors for improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection.

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 58X reference circuit at the ECM harness connector while moving the connectors and the wiring harness related to the ECM. A change in voltage will indicate the location of the fault.

Review the failure records vehicle mileage since the diagnostic test failed may help determine how often the condition that caused the DTC to be set occurs. This may assist in diagnosing the condition.

DTC P0337 – 58X Crankshaft Position Sensor No Signal

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	Attempt to start the engine. Does the engine start?	–	Go to *Step 3*	Refer to "Engine Cranks But Will Not Run"
3	1. Review and record Failure Records information. 2. Clear the DTC P0337. 3. Start the engine and idle for 1 minute. 4. Observe the diagnostic trouble codes (DTCs). Is the DTC P0337 set?	–	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Disconnect the engine control module(ECM) and the crankshaft position (CKP) sensor. 2. Check for an open or a low voltage in the CKP sensor connector and the ECM harness connector. Is the problem found?	–	Go to *Step 5*	Go to *Step 6*
5	Repair the open or low voltage in the 58X reference circuit between the CKP sensor connector and the ECM harness connector. Is the repair complete?	–	Go to *Step 11*	–
6	1. Reconnect the ECM and CKP sensor. 2. Connect a digital voltmeter (DVM) to measure voltage on the 58X reference circuit, terminal 54 at the ECM connector. 3. Observe the voltage while cranking the engine. Is the voltage near the specified value?	2.5V	Go to *Step 9*	Go to *Step 7*
7	Check the connection at the CKP sensor and replace the terminals if necessary. Do any terminals require replacement?	–	Go to *Step 11*	Go to *Step 8*
8	Replace the CKP sensor. Is the replacement complete?	–	Go to *Step 11*	–
9	Check the connections at the ECM and replace the terminals if necessary. Do any terminal require replacement?	–	Go to *Step 11*	Go to *Step 10*
10	Replace the ECM. Is the replacement complete?	–	Go to *Step 11*	–
11	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 run and passed?	–	Go to *Step 12*	Go to *Step 2*
12	Check if any additional DTCs are set. Are any DTCs displaced that have not been diagnosed?	–	Go to Applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P0341 CAMSHAFT POSITION SENSOR RATIONALITY

Circuit Description

The Camshaft Position Sensor is used to detect Camshaft position and to have correlation with Crankshaft position so that the ECM can determine which cylinder is ready to be fueled by the injector. The polarity of camshaft sensor signal must be changed only once per crankshaft position.

Conditions for Setting the DTC

- Engine is running.
- No traction of CMP signal between teeth 18 and 82 but change in polarity.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

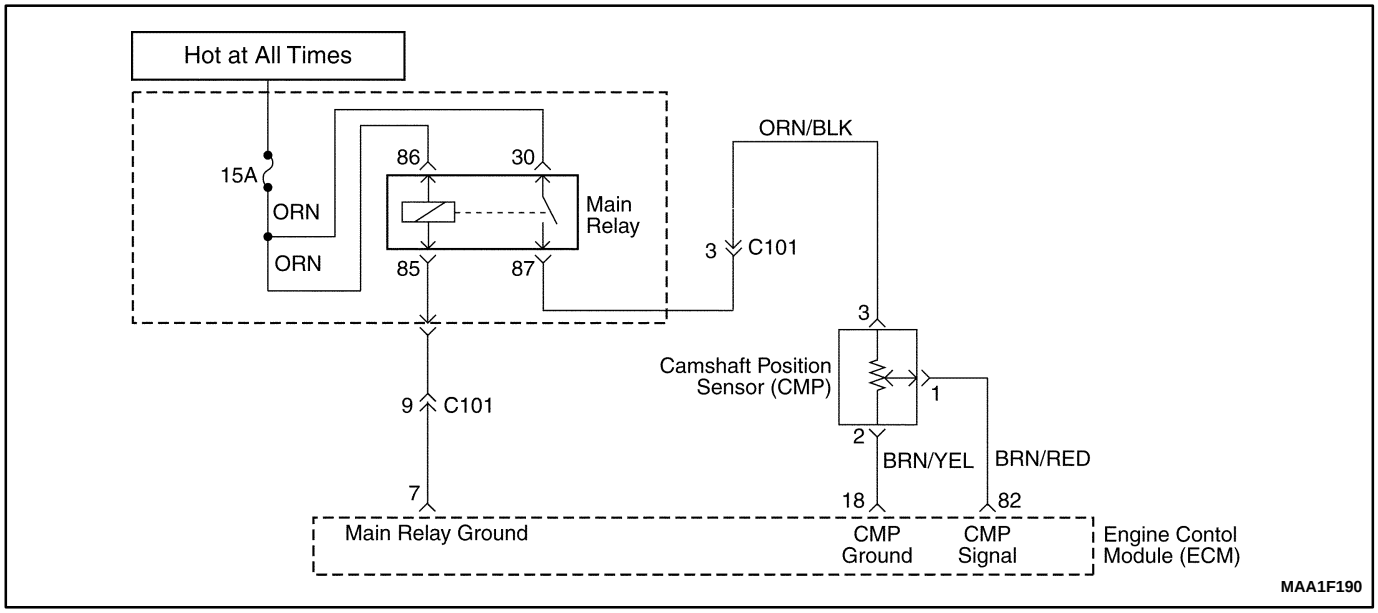
Check and correct any abnormal engine noise before using the diagnostic table.

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

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

DTC P0341 – Camshaft Position Sensor Rationality

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. Disconnect the CMP sensor connector. 3. Check for a faulty connector or terminals. Is the problem found?	–	Go to *Step 4*	Go to *Step 3*
3	1. Turn the ignition switch to ON. 2. Disconnect the ECM connector. 3. Inspect the ECM pins and connector for bent or damaged terminals. 4. Check the wire between the CMP sensor terminal 1 and ECM connector 82 for an open or short to ground or short to battery voltage while related connectors and wiring harness. 5. Check the wires between the CMP sensor terminal 2 and ECM connector 18 for an open while moving related connectors and wiring harness. Is the problem found?	–	Go to *Step 4*	Go to *Step 5*
4	1. Turn the ignition switch to LOCK. 2. Repair or replace the wire or the connector. 3. Clear any DTCs from the ECM. 4. Run the engine. 5. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
5	1. Turn the ignition switch to LOCK. 2. Replace the CMP sensor. 3. Clear any DTCs from the ECM. 4. Run the engine. 5. Perform the diagnostic system check. Does DTC P0341 reset?	–	System OK	Go to *Step 6*
6	1. Replace the ECM. 2. Run the engine. 3. Perform the Diagnostic system check. Is the replacement complete?	–	Go to *Step 7*	–
7	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 run and passed?	–	Go to *Step 8*	–
8	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) – P0342 CAMSHAFT POSITION SENSOR NO SIGNAL

Circuit Description

The Camshaft Position Sensor is used to detect Camshaft position and to have correlation with Crankshaft position so that the ECM can determine which cylinder is ready to be fueled by the injector. The polarity of camshaft sensor signal must be changed only once per crankshaft position.

Conditions for Setting the DTC

- Engine is running.
- No traction of CMP signal between teeth 18 and 82 but change in polarity.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

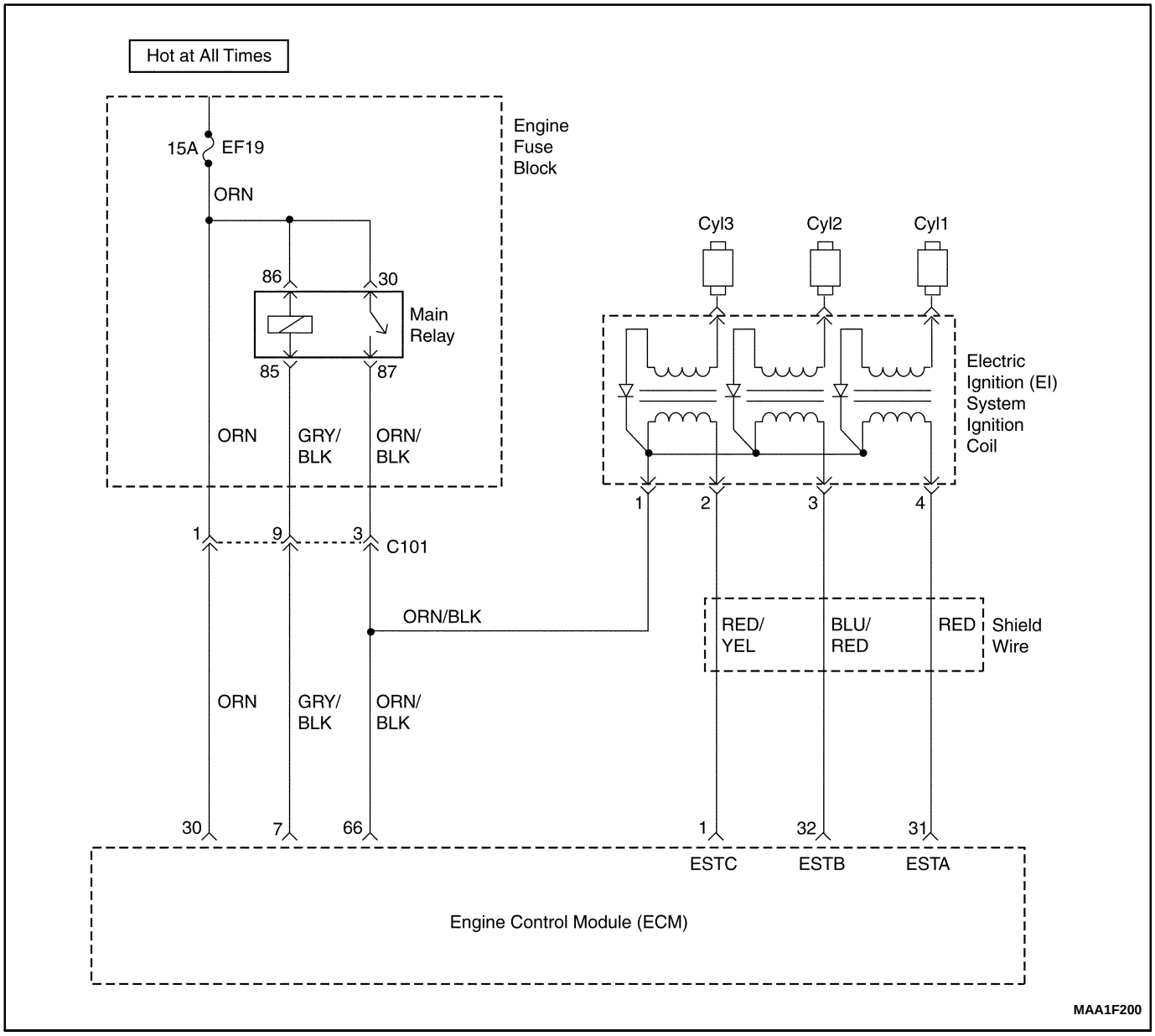
Check and correct any abnormal engine noise before using the diagnostic table.

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

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

DTC P0342 – Camshaft Position Sensor No Signal

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. Disconnect the CMP sensor connector. 3. Check for a faulty connector or termin1als. Is the problem found?	–	Go to *Step 4*	Go to *Step 3*
3	1. Turn the Turn the ignition switch to ON. 2. Disconnect the ECM connector. 3. Inspect the ECM pins and connector for bent or damaged terminals. 4. Check the wire between the CMP sensor terminal 1 and ECM connector 82 for an open or short to ground or short to battery voltage while related connectors and wiring harness. 5. Check the wires between the CMP sensor terminal 2 and ECM connector 18 for an open while moving related connectors and wiring harness. Is the problem found?	–	Go to *Step 4*	Go to *Step 5*
4	1. Turn the ignition switch to LOCK. 2. Repair or replace the wire or the connector. 3. Clear any DTCs from the ECM. 4. Run the engine. 5. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
5	1. Turn the ignition switch to LOCK. 2. Replace the CMP sensor. 3. Clear any DTCs from the ECM. 4. Run the engine. 5. Perform the diagnostic system check. Does DTC P0342 reset?	–	System OK	Go to *Step 6*
6	1. Replace the ECM. 2. Run the engine. 3. Perform the Diagnostic system check. Is the replacement complete?	–	Go to *Step 7*	–
7	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 run and passed?	–	Go to *Step 8*	–
8	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) – P0351 IGNITION SIGNAL COIL A FAULT

Circuit Description

The engine control module (ECM) provides a ground for the electronic spark timing 1 circuit. When the ECM removes the ground path of the ignition primary coil, the magnetic field produced by the coil collapses. The collapsing magnetic field produces a voltage in the secondary coil which fires the spark plug. The circuit between the ECM and the electronic ignition system is monitored for an open circuit, short to voltage, and low voltage. When the ECM detects a problem in the spark timing 1 circuit, it will set DTC P0351.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Time of fault fall occurrence is greater than time of the DIS fall occurrence.
- Must receive more than 40 failure within 80 test cycles.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DIAGNOSTIC AIDS

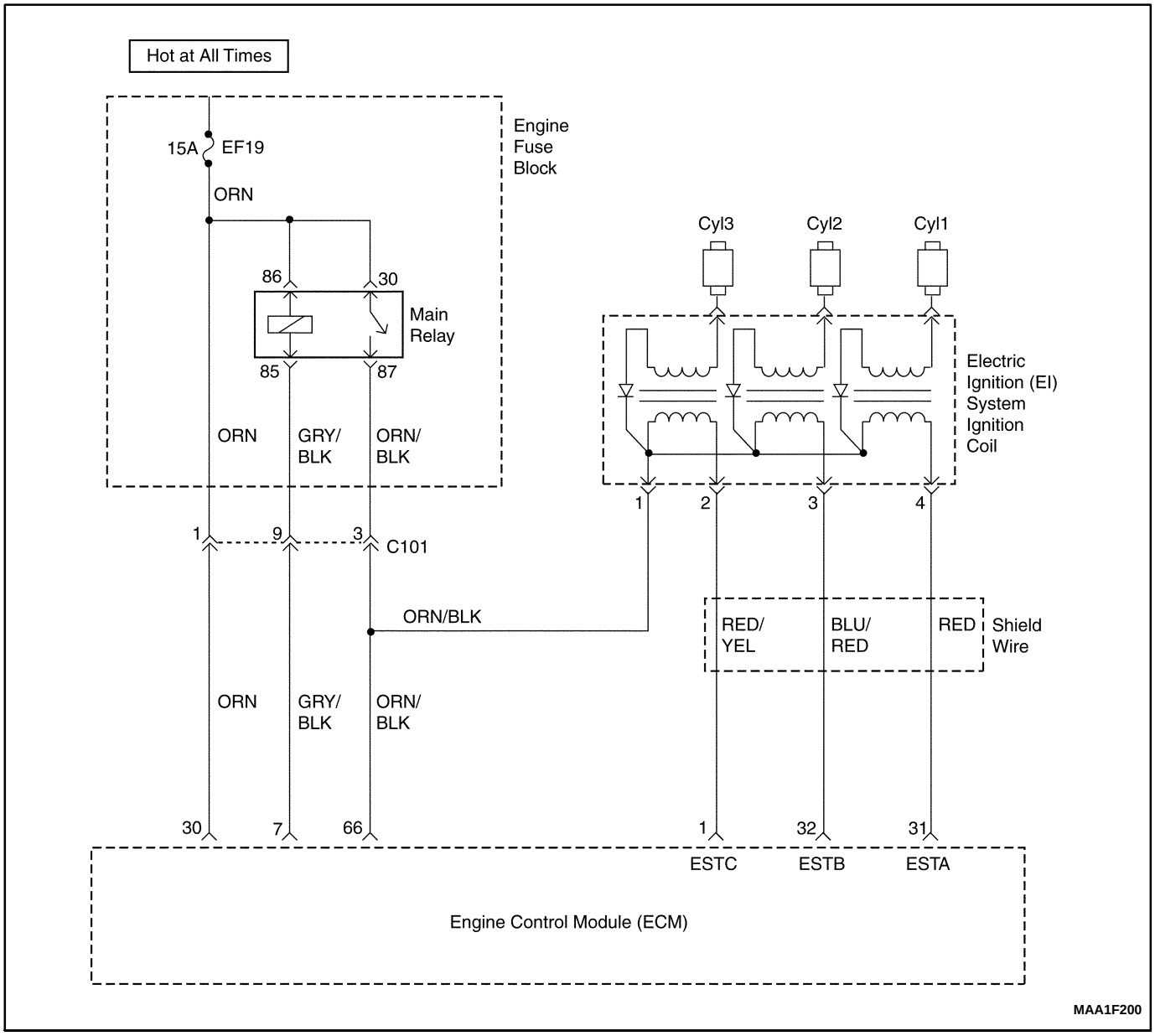
Check and correct any abnormal engine noise before using the diagnostic table.

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

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

DTC P0351 – Ignition Signal Coil A Fault

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	Check for a faulty connection or a damaged terminal 1 at the ignition coil. Is a problem found?	–	Go to *Step 8*	Go to *Step 3*
3	Check for a faulty connection or a damaged terminal 31 at the engine control module(ECM) connector. Is the problem found?	–	Go to *Step 8*	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. Check the ignition control circuit for a short to ground. Is the problem found?	–	Go to *Step 8*	Go to *Step 5*
5	Check the ignition control circuit for a short to battery voltage. Is the problem found?	–	Go to *Step 8*	Go to *Step 6*
6	Check for an open in the ignition control. Is the problem found?	–	Go to *Step 8*	Go to *Step 7*
7	Replace the ECM. Is the replacement complete?	–	Go to *Step 8*	–
8	1. Using the scan tool, clear the Diagnostic Trouble Codes(DTCs). ● Start the engine and Idle at normal operating temperature. ● 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 *Step 9*	–
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) – P0352 IGNITION SIGNAL COIL B FAULT

Circuit Description

The engine control module (ECM) provides a ground for the electronic spark timing 3 circuit. When the ECM removes the ground path of the ignition primary coil, the magnetic field produced by the coil collapses. The collapsing magnetic field produces a voltage in the secondary coil, which fires the spark plug. The circuit between the ECM and the electronic ignition system is monitored for an open circuit, short to voltage, and low voltage. When the ECM detects a problem in the spark timing 3 circuit, it will set DTC P0352.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Time of fault fall occurrence is greater than time of the DIS fall occurrence.
- Must receive more than 40 failure within 80 test cycles.

Action Taken When The DTCs 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.
- The ECM will default to 6 degree timing.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Using the scan tool can clear DTC(s).
- Disconnecting the ECM battery feed for 10 seconds.

DIAGNOSTIC AIDS

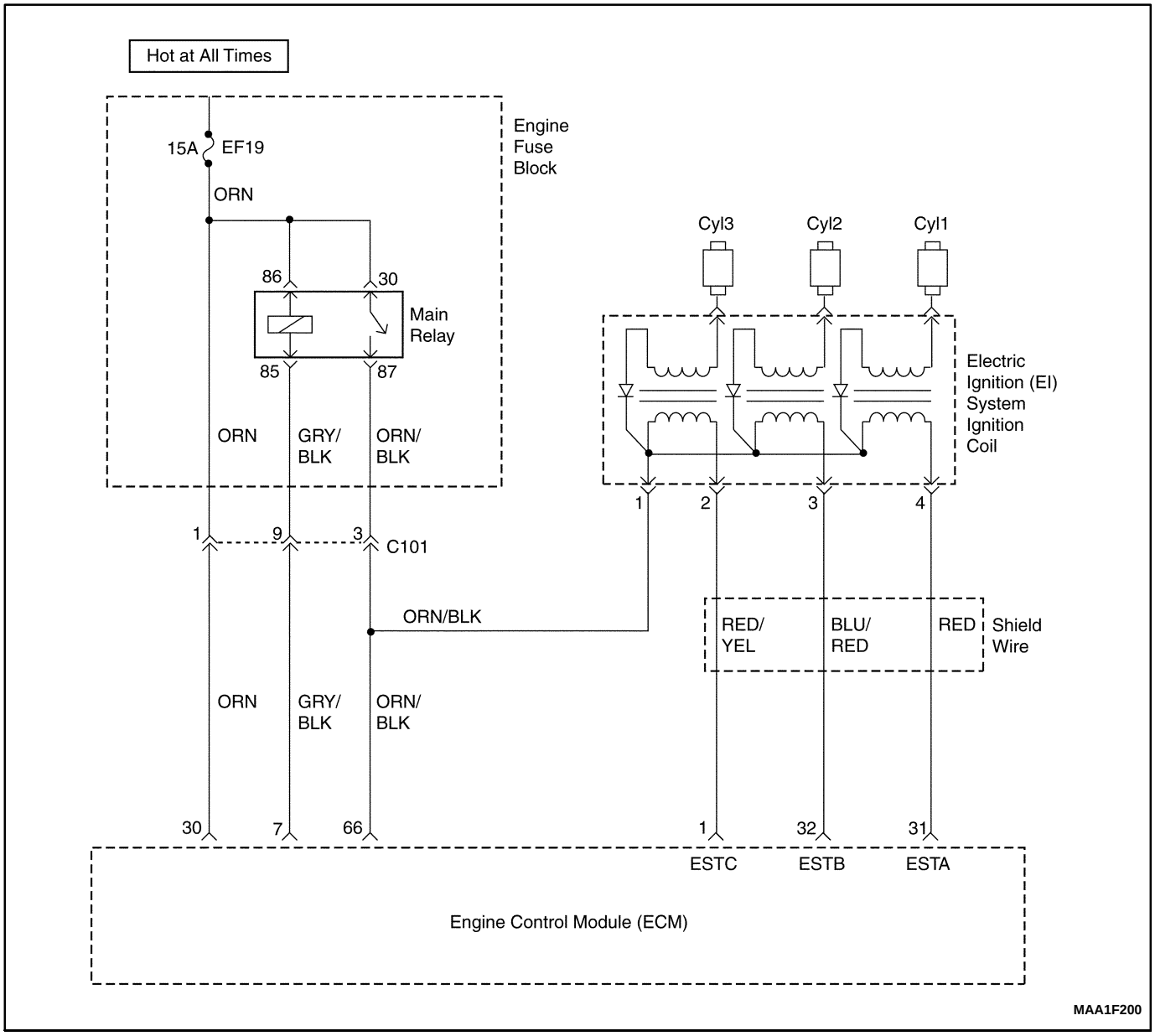
Check and correct any abnormal engine noise before using the diagnostic table.

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

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

DTC P0352 – Ignition Signal Coil B Fault

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	Check for a faulty connection or a damaged terminal 3 at the ignition coil. Is a problem found?	–	Go to *Step 8*	Go to *Step 3*
3	Check for a faulty connection or a damaged terminal 32 at the engine control module(ECM) connector. Is the problem found?	–	Go to *Step 8*	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. Check the ignition control circuit for a short to ground Is the problem found?	–	Go to *Step 8*	Go to *Step 5*
5	Check the ignition control circuit for a short to battery voltage. Is the problem found?	–	Go to *Step 8*	Go to *Step 6*
6	Check for an open in the ignition control. Is the problem found?	–	Go to *Step 8*	Go to *Step 7*
7	Replace the ECM. Is the replacement complete?	–	Go to *Step 8*	–
8	1. Using the scan tool, clear the Diagnostic Trouble Codes(DTCs). ● Start the engine and Idle at normal operating temperature. ● 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 *Step 9*	–
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) – P0353 IGNITION SIGNAL COIL C FAULT

Circuit Description

The engine control module (ECM) provides a ground for the electronic spark timing 3 circuit. When the ECM removes the ground path of the ignition primary coil, the magnetic field produced by the coil collapses. The collapsing magnetic field produces a voltage in the secondary coil, which fires the spark plug. The circuit between the ECM and the electronic ignition system is monitored for an open circuit, short to voltage, and low voltage. When the ECM detects a problem in the spark timing 3 circuit, it will set DTC P0352.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Time of fault fall occurrence is greater than time of the DIS fall occurrence.
- Must receive more than 40 failure within 80 test cycles.

Action Taken When The DTCs 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.
- The ECM will default to 6 degree timing.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Using the scan tool can clear DTC(s).
- Disconnecting the ECM battery feed for 10 seconds.

DIAGNOSTIC AIDS

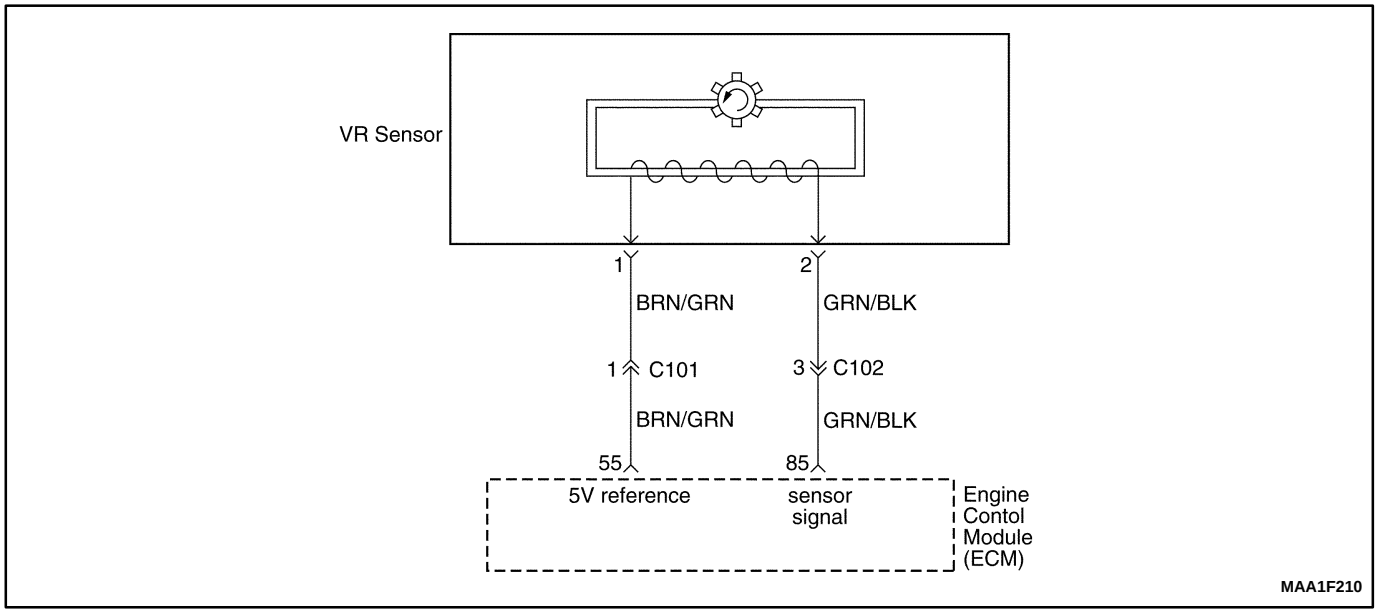
Check and correct any abnormal engine noise before using the diagnostic table.

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

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

DTC P0353 – Ignition Signal Coil C Fault

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	Check for a faulty connection or a damaged terminal 3 at the ignition coil. Is a problem found?	–	Go to *Step 8*	Go to *Step 3*
3	Check for a faulty connection or a damaged terminal 32 at the engine control module(ECM) connector. Is the problem found?	–	Go to *Step 8*	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. Check the ignition control circuit for a short to ground Is the problem found?	–	Go to *Step 8*	Go to *Step 5*
5	Check the ignition control circuit for a short to battery voltage. Is the problem found?	–	Go to *Step 8*	Go to *Step 6*
6	Check for an open in the ignition control. Is the problem found?	–	Go to *Step 8*	Go to *Step 7*
7	Replace the ECM. Is the replacement complete?	–	Go to *Step 8*	–
8	1. Using the scan tool, clear the Diagnostic Trouble Codes(DTCs). ● Start the engine and Idle at normal operating temperature. ● 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 *Step 9*	–
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) – P1382 ROUGH ROAD DATA INVALID (NON ABS)

Circuit Description

The VR sensor is used to detecting the road situation.

By sensing difference of wheel rotation duration caused by bumps or potholes in the road, the Engine Control Module (ECM) can determine if the changes in crankshaft speed are due to engine misfire or are driveline induced. If the VR sensor detects a rough road condition, the ECM misfire detection diagnostic will be de-activated.

The VR sensor is located in front–right wheel.

Conditions for Setting the DTC

- Vehicle speed is higher than 10km/h(6.21mph).
- No Vehicle Speed Sensor error not set.
- VR sensor output signal is higher than 0.26.
- VR sensor output signal is not change for 30seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DTC P1382 – Rough Road Data Invalid (NON ABS)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition ON, with engine OFF. 2. Install a scan tool to the Data Link Connector (DLC). 3. Review and record the scan tool Failure Records data. 4. Operate the vehicle within Failure Records conditions as noted. 5. Using the scan tool, monitor specific Diagnostic Trouble Code (DTC) info for DTC P1382. Does the scan tool indicate that DTC P1382 failed?	–	Go to *Step 4*	Go to *Step 3*
3	1. Check for the following conditions and repair as needed: 2. VR sensor seal missing or damaged. 3. VR sensor mounting flanges cracked, missing, or incorrectly installed. Is the repair complete?	–	Go to *Step 14*	Go to "Diagnostic Aids"
4	1. Turn the ignition OFF. 2. Disconnect the VR sensor electrical connector. 3. Turn the ignition ON, with the engine OFF. 4. Observe the VR sensor value displayed on the scan tool. Is the VR sensor value near the specified value?	0V	Go to *Step 5*	Go to *Step 12*
5	1. Jumper the 5 volt reference circuit, terminal 1 and the VR sensor signal circuit, terminal 2 together at the VR sensor harness connector. 2. Observe the VR sensor value displayed on the scan tool. Is the VR sensor value near the specified value?	4.95V	Go to *Step 6*	Go to *Step 7*
6	1. Turn the ignition OFF. 2. Disconnect the Engine Control Module (ECM) and check the sensor ground circuit for high resistance, an open between the ECM and the wheel speed sensor, or for a poor connection at the terminal 85 of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 10*
7	Check the 5 volt reference circuit for high resistance, an open between the ECM and the VR sensor, or a poor connection at the terminal 55 of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 8*
8	1 Turn the ignition OFF. 2. Disconnect the ECM and check the VR sensor signal circuit for high resistance, an open, a low voltage, or a short to the sensor ground circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 9*

DTC P1382 – Rough Road Data Invalid (NON ABS) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the VR sensor signal circuit for a poor connection at the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
10	Check for a poor connection at terminal 2 of the VR sensor and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 11*
11	Replace the VR sensor. Is the repair complete?	–	Go to *Step 14*	–
12	1. Turn the ignition OFF. 2. Disconnect the ECM. 3. Turn the ignition ON. 4. Check the VR sensor signal circuit for a short to battery voltage or a short to the 5 volt reference circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
13	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 14*	–
14	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 *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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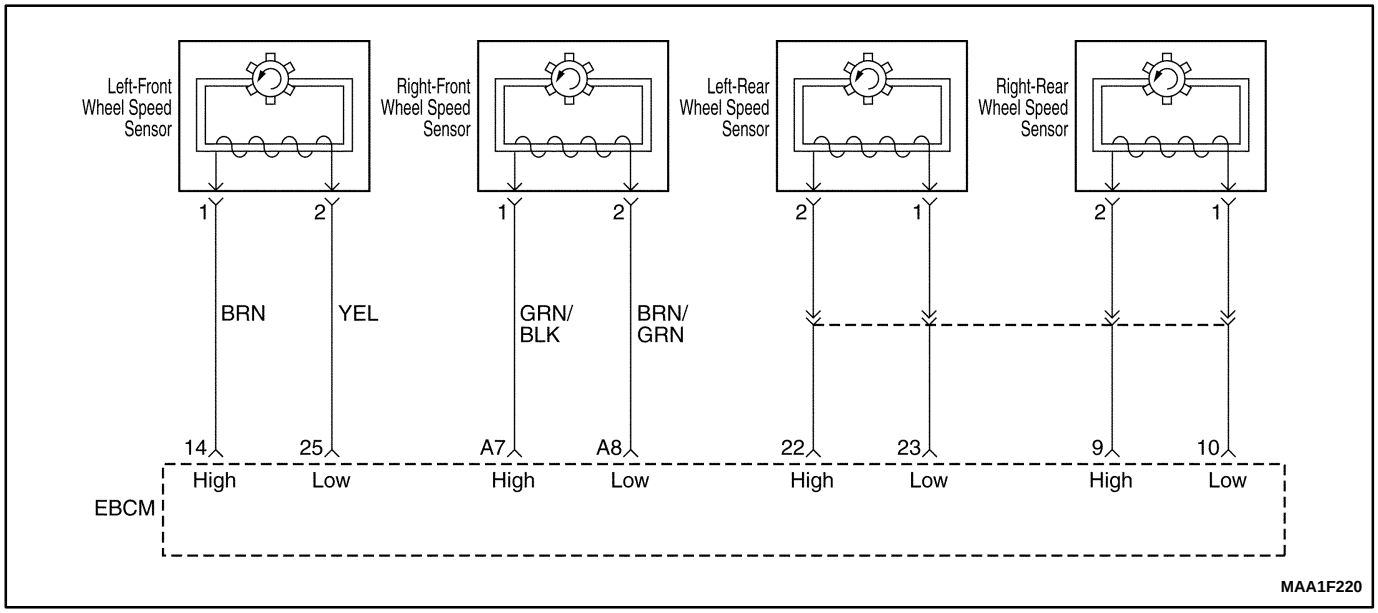

DIAGNOSTIC TROUBLE CODE (DTC) – P1382 ROUGH ROAD DATA INVALID (ABS)

Circuit Description

The wheel speed sensor is used to detecting the road situation.

As the wheel is rotated, the wheel speed sensor produces an AC voltage that increase with wheel speed. The EBCM uses the frequency of the AC signal to calculate wheel speed. The wheel speed sensor is connected to EBCM by a “twisted pair” of wires. Twisting reduces noise susceptibility than may cause a DTC to se.If the wheel speed sensor detects a rough road condition, the ECM misfire detection diagnostic will be de-activated.

Conditions for Setting the DTC

- Vehicle speed is higher than 10km/h(6.21mph).
- No Vehicle Speed Sensor error not set.
- VR sensor output signal is higher than 0.26.
- VR sensor output signal is not change for 30seconds.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DTC P1382 – Rough Road Data Invalid (ABS)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition On, with engine OFF. 2. Install a scan tool to the Data Link Connector (DLC). 3. Review and record the scan tool Failure Records data. 4. Operate the vehicle within Failure Records conditions as noted. 5. Using the scan tool, monitor specific Diagnostic Trouble Code (DTC) info for DTC P1382. Does the scan tool indicate that DTC P1382 failed?	–	Go to *Step 4*	Go to *Step 3*
3	1. Check for the following conditions and repair as needed: 2. Wheel speed sensor seal missing or damaged. 3. Wheel speed sensor mounting flanges cracked, missing, or incorrectly installed. Is the repair complete?	–	Go to *Step 14*	Go to "Diagnostic Aids"
4	1. Turn the ignition OFF. 2. Disconnect the defected Wheel speed sensor electrical connector. 3. Turn the ignition ON, with the engine OFF. 4. Observe the wheel speed sensor value displayed on the scan tool. Is the Wheel speed sensor value near the specified value?	0V	Go to *Step 5*	Go to *Step 12*
5	1. Jumper the 5 volt reference circuit, the Wheel speed sensor signal circuit, together at the defected wheel speed sensor harness connector. 2. Observe the defected Wheel speed sensor value displayed on the scan tool. Is the wheel speed sensor value near the specified value?	4.95V	Go to *Step 6*	Go to *Step 7*
6	1. Turn the ignition OFF. 2. Disconnect the Engine Control Module (ECM) and check the sensor ground circuit for high resistance, an open between the ECM and the Wheel speed sensor, or for a poor connection of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 10*
7	Check the 5 volt reference circuit for high resistance, an open between the ECM and the wheel speed sensor, or a poor connection of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 8*
8	1. Turn the ignition OFF. 2. Disconnect the ECM and check the wheel speed sensor signal circuit for high resistance, an open, a low voltage, or a short to the sensor ground circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 9*

DTC P1382 – Rough Road Data Invalid (ABS) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the wheel speed sensor signal circuit for a poor connection at the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
10	Check for a poor connection at terminal 3 of the wheel speed sensor and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 11*
11	Replace the wheel speed sensor. Is the repair complete?	–	Go to *Step 14*	–
12	1. Turn the ignition OFF. 2. Disconnect the ECM. 3. Turn the ignition ON. 4. Check the wheel speed sensor signal circuit for a short to voltage or a short to the 5 volt reference circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
13	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 14*	–
14	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 *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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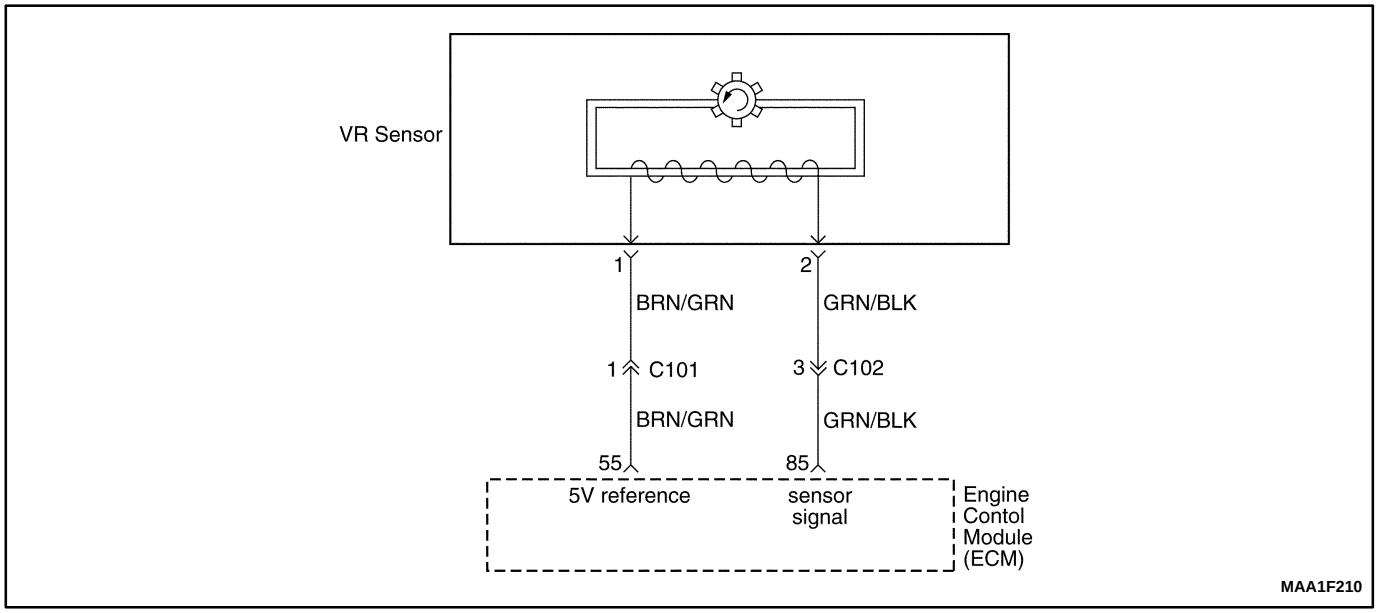

DIAGNOSTIC TROUBLE CODE (DTC) – P1385 ROUGH ROAD SENSOR CIRCUIT FAULT (NON ABS)

Circuit Description

The VR sensor is used to detecting the road situation.

By sensing difference of wheel rotation duration caused by bumps or potholes in the road, the Engine Control Module (ECM) can determine if the changes in crankshaft speed are due to engine misfire or are driveline induced. If the VR sensor detects a rough road condition, the ECM misfire detection diagnostic will be de-activated.

Conditions for Setting the DTC

- Vehicle speed is higher than 10km/h(6.21mph).
- No Vehicle Speed Sensor error not set.
- VR sensor output signal is higher than 0.26.
- VR sensor output signal is not change for 30 seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DTC P1385 – Rough Road Sensor Circuit Fault (NON ABS)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition ON, with engine OFF. 2. Install a scan tool to the Data Link Connector (DLC). 3. Review and record the scan tool Failure Records data. 4. Operate the vehicle within Failure Records conditions as noted. 5. Using the scan tool, monitor specific Diagnostic Trouble Code (DTC) info for DTC P1382. Does the scan tool indicate that DTC P1382 failed?	–	Go to *Step 4*	Go to *Step 3*
3	1. Check for the following conditions and repair as needed: 2. VR sensor seal missing or damaged. 3. VR sensor mounting flanges cracked, missing, or incorrectly installed. Is the repair complete?	–	Go to *Step 14*	Go to "Diagnostic Aids"
4	1. Turn the ignition OFF. 2. Disconnect the VR sensor electrical connector. 3. Turn the ignition ON, with the engine OFF. 4. Observe the VR sensor value displayed on the scan tool. Is the VR sensor value near the specified value?	0V	Go to *Step 5*	Go to *Step 12*
5	1. Jumper the 5 volt reference circuit, terminal 1 and the VR sensor signal circuit, terminal 2 together at the VR sensor harness connector. 2. Observe the VR sensor value displayed on the scan tool. Is the VR sensor value near the specified value?	4.95V	Go to *Step 6*	Go to *Step 7*
6	1. Turn the ignition OFF. 2. Disconnect the Engine Control Module (ECM) and check the sensor ground circuit for high resistance, an open between the ECM and the VR sensor, or for a poor connection at the terminal 85 of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 10*
7	Check the 5 volt reference circuit for high resistance, an open between the ECM and the VR sensor, or a poor connection at the terminal 85 of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 8*
8	1 Turn the ignition OFF. 2. Disconnect the ECM and check the VR sensor signal circuit for high resistance, an open, a low voltage, or a short to the sensor ground circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 9*

DTC P1385 – Rough Road Sensor Circuit Fault (NON ABS) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the VR sensor signal circuit for a poor connection at the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
10	Check for a poor connection at terminal 2 of the VR sensor and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 11*
11	Replace the VR sensor. Is the repair complete?	–	Go to *Step 14*	–
12	1. Turn the ignition OFF. 2. Disconnect the ECM. 3. Turn the ignition ON. 4. Check the VR sensor signal circuit for a short to battery voltage or a short to the 5 volt reference circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
13	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 14*	–
14	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 *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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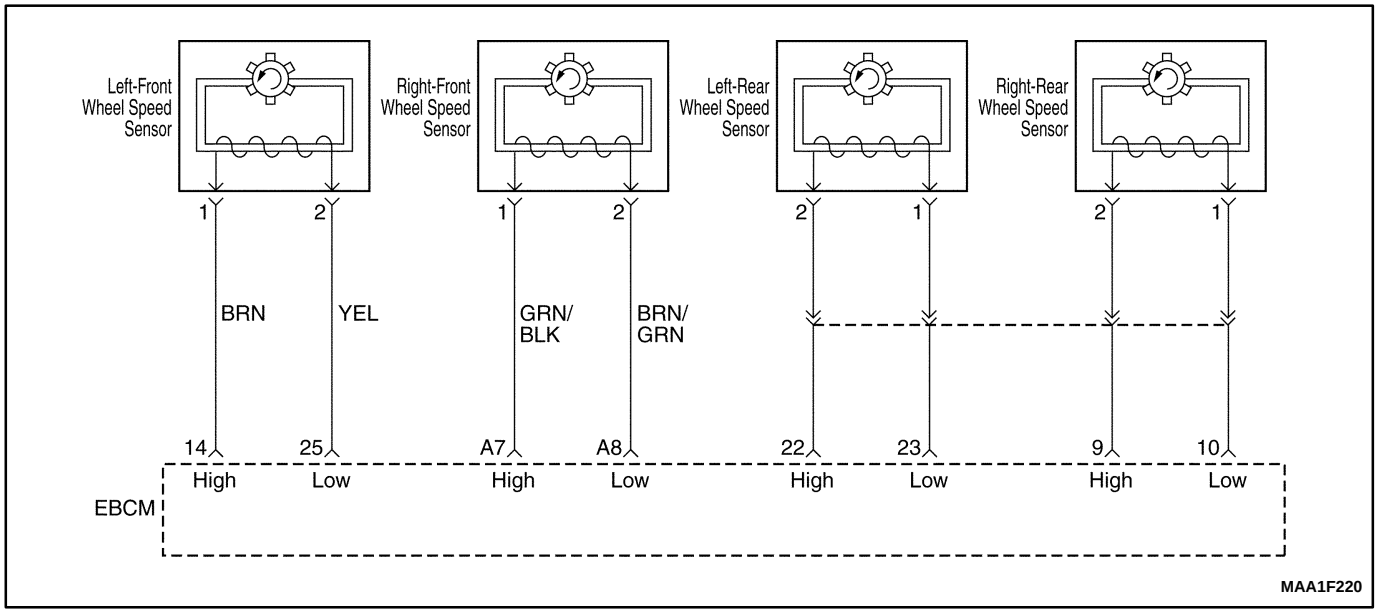

DIAGNOSTIC TROUBLE CODE (DTC) – P1385 ROUGH ROAD SENSOR CIRCUIT FAULT (ABS)

Circuit Description

The wheel speed sensor is used to detecting the road situation.

As the wheel is rotated, the wheel speed sensor produces an AC voltage that increase with wheel speed. The EBCM uses the frequency of the AC signal to calculate wheel speed. The wheel speed sensor is connected to EBCM by a “twisted pair” of wires. Twisting reduces noise susceptibility than may cause a DTC to se.If the wheel speed sensor detects a rough road condition, the ECM misfire detection diagnostic will be de-activated.

Conditions for Setting the DTC

- Vehicle speed is higher than 10km/h(6.21mph).
- No Vehicle Speed Sensor error not set.
- VR sensor output signal is higher than 0.26.
- VR sensor output signal is not change for 30seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

DTC P1385 – Rough Road Sensor Circuit Fault (ABS)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition ON, with engine OFF. 2. Install a scan tool to the Data Link Connector (DLC). 3. Review and record the scan tool Failure Records data. 4. Operate the vehicle within Failure Records conditions as noted. 5. Using the scan tool, monitor specific Diagnostic Trouble Code (DTC) info for DTC P1385. Does the scan tool indicate that DTC P1385 failed?	–	Go to *Step 4*	Go to *Step 3*
3	1. Check for the following conditions and repair as needed: 2. Wheel speed sensor seal missing or damaged. 3. Wheel speed sensor mounting flanges cracked, missing, or incorrectly installed. Is the repair complete?	–	Go to *Step 14*	Go to "Diagnostic Aids"
4	1. Turn the ignition OFF. 2. Disconnect the defected Wheel speed sensor electrical connector. 3. Turn the ignition ON, with the engine OFF. 4. Observe the Wheel speed sensor value displayed on the scan tool. Is the Wheel speed sensor value near the specified value?	0V	Go to *Step 5*	Go to *Step 12*
5	1. Jumper the 5 volt reference circuit, the Wheel speed sensor signal circuit, together at the defected Wheel speed sensor harness connector. 2. Observe the defected Wheel speed sensor value displayed on the scan tool. Is the VR sensor value near the specified value?	4.95V	Go to *Step 6*	Go to *Step 7*
6	1. Turn the ignition OFF. 2. Disconnect the Engine Control Module (ECM) and check the sensor ground circuit for high resistance, an open between the ECM and the Wheel speed sensor, or for a poor connection of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 10*
7	Check the 5 volt reference circuit for high resistance, an open between the ECM and the Wheel speed sensor, or a poor connection of the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 8*
8	1. Turn the ignition OFF. 2. Disconnect the ECM and check the Wheel speed sensor signal circuit for high resistance, an open, a low voltage, or a short to the sensor ground circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 9*

DTC P1385 – Rough Road Sensor Circuit Fault (ABS) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the Wheel speed sensor signal circuit for a poor connection at the ECM and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
10	Check for a poor connection at terminal 3 of the Wheel speed sensor and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 11*
11	Replace the Wheel speed sensor. Is the repair complete?	–	Go to *Step 14*	–
12	1. Turn the ignition OFF. 2. Disconnect the ECM. 3. Turn the ignition ON. 4. Check the Wheel speed sensor signal circuit for a short to voltage or a short to the 5 volt reference circuit and repair as needed. Is the repair complete?	–	Go to *Step 14*	Go to *Step 13*
13	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 14*	–
14	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 *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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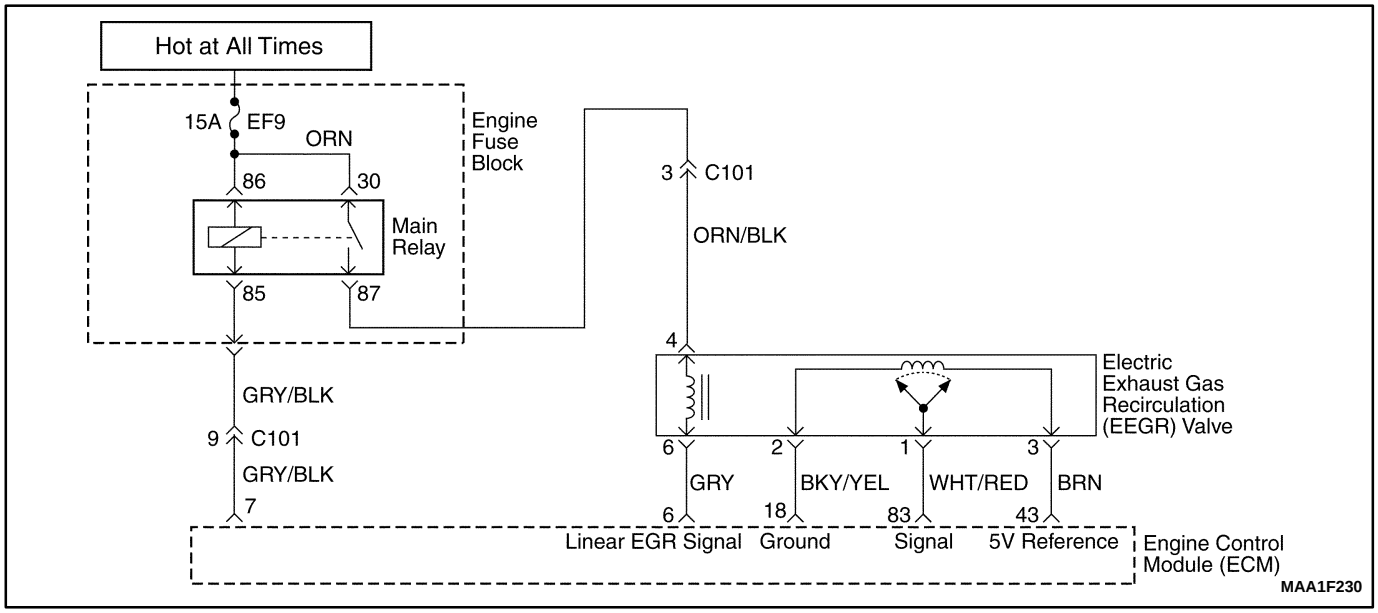

DIAGNOSTIC TROUBLE CODE (DTC) – P0400 ELECTRIC EXHAUST GAS RECIRCULATION OUT OF LIMIT

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It a accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting the DTC

- Engine Coolant Temperature(ECT) is higher than 80°C(176°F).
- Intake Air Temperature(IAT) is higher than 15°C (59°F).
- Manifold Absolute Pressure is greater than 75kPA.
- The EEGR is higher than 3%.
- Mass Air Flow is between 92 ~157mg/tdc.
- Engine Speed Is Between 2,500~2,900rpm.
- DTCs P0107, P0108, P0112, P0113, P0117, P0118, P0122, P0123, P0131, P0300, P0335, P0336, P0341, P0342, P1671, P1672, P1673 are NOT SET.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.

DTC P0400 – Electric Exhaust Gas Recirculation Out of Limit

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON. 2. Disconnect the EEGR valve electrical connector. 3. With a test light connected to B+, probe the ground circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	1. Connect the test light to ground. 2. Probe the EEGR control circuit at terminal 1 to the EEGR valve. 3. Command the EEGR valve to the specified values using a scan tool. After the command is raised, does the test light glow brighter, flash or maintain a steady glow?	25%, 50%, 75%, 100%	Go to *Step 6*	Go to *Step 7*
5	Repair the open or poor connection in the EEGR ground circuit. Is the repair complete?	–	Go to *Step 19*	–
6	With a test light still connected to ground, probe the signal circuit at terminal 1. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
7	With a test light still connected to ground, again probe the signal circuit without commanding the EEGR valve with the scan tool. Does the test light illuminate?	–	Go to *Step 10*	Go to *Step 11*
8	Check the signal circuit for a short to voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
9	With a digital voltmeter (DVM) connected to ground, probe the 5V reference circuit at terminal 3. Is the voltage measured near the specified value?	5V	Go to *Step 13*	Go to *Step 14*
10	Check the control circuit for a short to battery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
11	Connect the test light to B+ and again probe the control circuit at terminal 4. Does the test light illuminate?	–	Go to *Step 15*	Go to *Step 16*
12	Replace the engine control module (ECM). Is the replacement complete?	–	Go to *Step 19*	–
13	Check the EEGR ground circuit for a poor connection or proper terminal tension at the ECM and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 17*

DTC P0400 – Electric Exhaust Gas Recirculation Out of Limit (Cont'd)

Step	Action	Value(s)	Yes	No
14	Check the 5V reference circuit for a shortage to vattery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
15	Check the control circuit for a shortage to ground and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
16	Check the control circuit for an open or poor connection at the EEGR valve electrical connector and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 18*
17	Replace the EEGR valve. Is the replacement complete?	–	Go to *Step 19*	–
18	Check the ECM electrical connector for a poor connection and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
19	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 20*	Go to *Step 2*
20	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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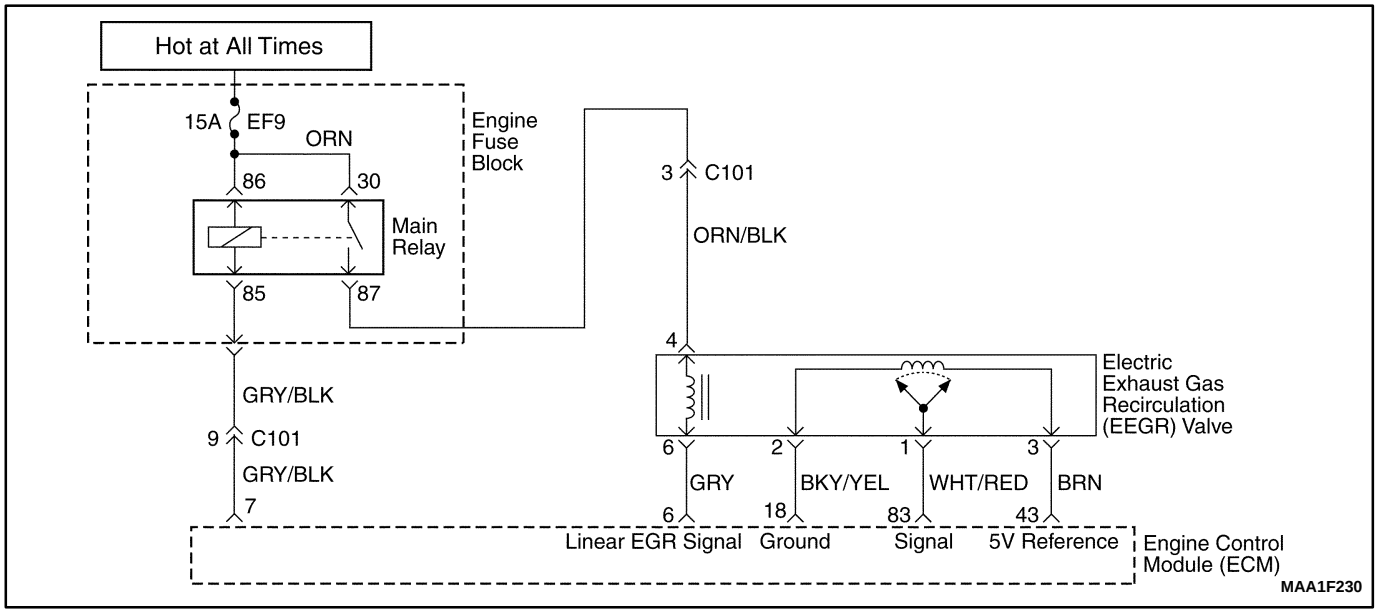


DIAGNOSTIC TROUBLE CODE (DTC) – P1402 ELECTRIC EXHAUST GAS RECIRCULATION BLOCKED

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It a accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting the DTC

- Engine Coolant Temperature(ECT) is greater than 80°C(176°F).
- Intake Air Temperature(IAT) is greater than 15°C (59°F).
- Manifold Absolute Pressure is greater than 75kPA.
- The EEGR differential rate is less than 3%.
- Mass Air Flow is between 92 ~157mg/tdc.
- Engine Speed Is Between 2,500~2,900rpm.
- DTCs P0107, P0108, P0112, P0113, P0117, P0118, P0122, P0123, P0131, P0300, P0335, P0336, P0341, P0342, P1671, P1672, P1673 are NOT SET.
- EEGR is disabled.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.

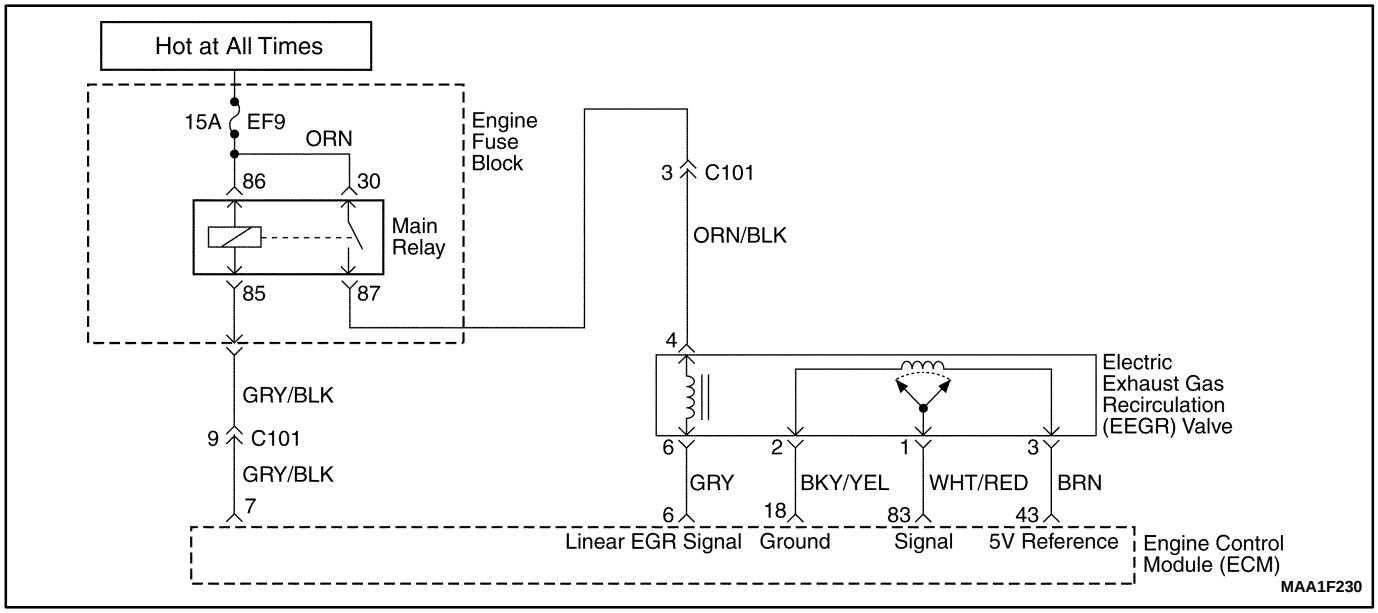
Diagnostic Aids

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be

easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P1402 – Electric Exhaust Gas Recirculation Blocked

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Start the engine and allow the engine to idle. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the engine stall or attempt to stall?	50%	Go to *Step 5*	Go to *Step 3*
3	1. Turn the ignition switch to LOCK. 2. Remove the EEGR valve assembly. 3. Inspect the EEGR valve, passages and pipe for a restriction or damage and repair as necessary. Is a repair necessary?	–	Go to *Step 5*	Go to *Step 4*
4	Replace the EEGR valve. Is the replacement complete?	–	Go to *Step 5*	–
5	1. Start the engine. 2. Disconnect the battery for the specified time. 3. Drive the vehicle to the specified value. 4. Release the throttle and allow the vehicle to decelerate to the specified value. Is the EEGR Decel Filter Values less than the specified value?	10 secnds 60mph (97km/h) 20mph (32km/h) 0mph	Go to *Step 3*	Go to *Step 6*
6	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 7*	Go to *Step 2*



DIAGNOSTIC TROUBLE CODE (DTC) – P1403 ELECTRIC EXHAUST GAS RECIRCULATION VALVE FAILURE

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It a accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A linear EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting THE DTC

- Engine Coolant Temperature(ECT) is greater than 80°C(176°F).
- Intake Air Temperature(IAT) is greater than 15°C (59°F).
- Manifold Absolute Pressure is greater than 75kPA.
- The open EEGR value is higher than 3%.
- Mass Air Flow is between 92 ~157mg/tdc.
- Engine Speed Is Between 2,500~2,900rpm.
- EEGR potentiometer voltage is less than 0.4V.
- EEGR potentiometer voltage is higher than 1.75V or integral term of EEGR controller blocked in high or low limit.
- DTCs P0107, P0108, P0112, P0113, P0117, P0118, P0122, P0123, P0131, P0300, P0335, P0336, P0341, P0342, P1671, P1672, P1673 are NOT SET.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for

repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P1403 – Electric Exhaust Gas Recirculation Valve Failure

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON. 2. Disconnect the EEGR valve electrical connector. 3. With a test light connected to B+, probe the ground circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	1. Connect the test light to ground. 2. Probe the EEGR control circuit at terminal 1 to the EEGR valve. 3. Command the EEGR valve to the specified values using a scan tool. After the command is raised, does the test light glow brighter, flash or maintain a steady glow?	25%, 50%, 75%, 100%	Go to *Step 6*	Go to *Step 7*
5	Repair the open or poor connection in the EEGR ground circuit. Is the repair complete?	–	Go to *Step 19*	–
6	With a test light still connected to ground, probe the signal circuit at terminal 1. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
7	With a test light still connected to ground, again probe the signal circuit without commanding the EEGR valve with the scan tool. Does the test light illuminate?	–	Go to *Step 10*	Go to *Step 11*
8	Check the signal circuit for a short to voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
9	With a digital voltmeter (DVM) connected to ground, probe the 5V reference circuit at terminal 3. Is the voltage measured near the specified value?	5V	Go to *Step 13*	Go to *Step 14*
10	Check the control circuit for a short to battery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
11	Connect the test light to B+ and again probe the control circuit at terminal 4. Does the test light illuminate?	–	Go to *Step 15*	Go to *Step 16*
12	Replace the engine control module (ECM). Is the replacement complete?	–	Go to *Step 19*	–

DTC P1403 – Electric Exhaust Gas Recirculation Valve Failure (Cont'd)

Step	Action	Value(s)	Yes	No
13	Check the EEGR ground circuit for a poor connection or proper terminal tension at the ECM and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 17*
14	Check the 5V reference circuit for a shortage to battery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
15	Check the control circuit for a shortage to ground and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
16	Check the control circuit for an open or poor connection at the EEGR valve electrical connector and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 18*
17	Replace the EEGR valve. Is the replacement complete?	–	Go to *Step 19*	–
18	Check the ECM electrical connector for a poor connection and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
19	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 20*	Go to *Step 2*
20	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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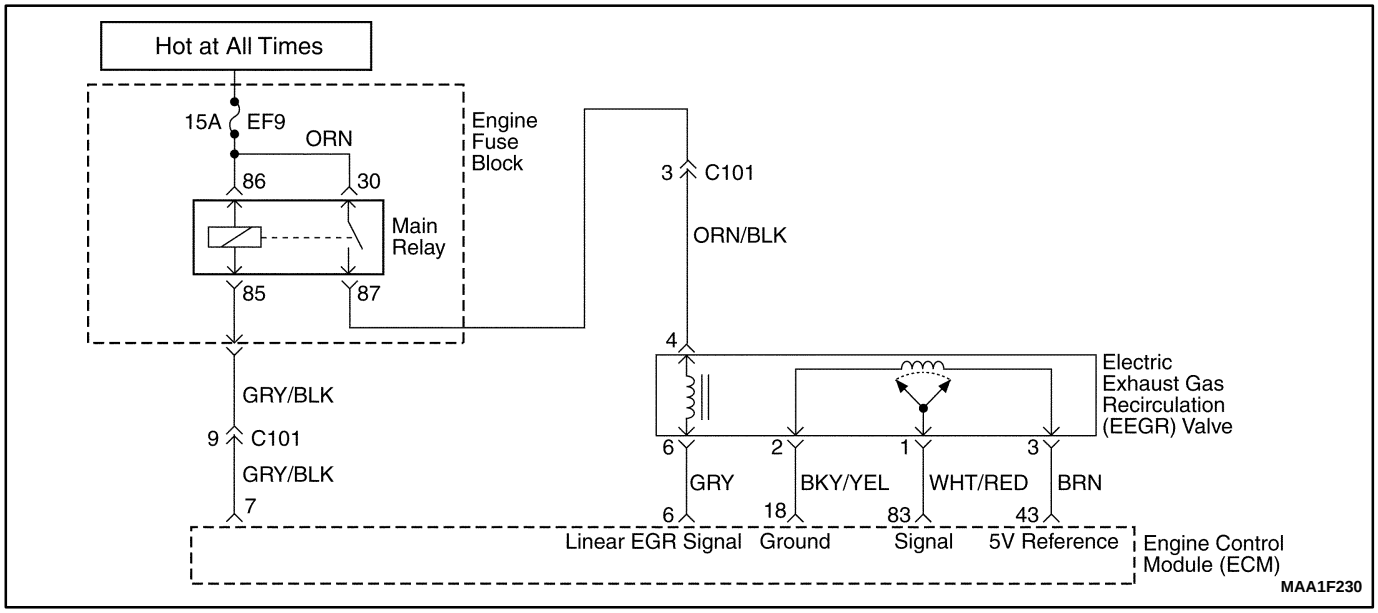

DIAGNOSTIC TROUBLE CODE (DTC) – P0404 ELECTRIC EXHAUST GAS RECIRCULATION OPENED

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A linear EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting THE DTC

- EEGR circuit low voltage.

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.
- EEGR is disabled.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P0404 – Electric Exhaust Gas Recirculation Opened

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON. 2. Disconnect the EEGR valve electrical connector. 3. With a test light connected to B+, probe the ground circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	1. Connect the test light to ground. 2. Probe the EEGR control circuit at terminal 1 to the EEGR valve. 3. Command the EEGR valve to the specified values using a scan tool. After the command is raised, does the test light glow brighter, flash or maintain a steady glow?	25%, 50%, 75%, 100%	Go to *Step 6*	Go to *Step 7*
5	Repair the open or poor connection in the EEGR ground circuit. Is the repair complete?	–	Go to *Step 19*	–
6	With a test light still connected to ground, probe the signal circuit at terminal 1. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
7	With a test light still connected to ground, again probe the signal circuit without commanding the EEGR valve with the scan tool. Does the test light illuminate?	–	Go to *Step 10*	Go to *Step 11*
8	Check the signal circuit for a short to voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
9	With a digital voltmeter (DVM) connected to ground, probe the 5V reference circuit at terminal 3. Is the voltage measured near the specified value?	5V	Go to *Step 13*	Go to *Step 14*
10	Check the control circuit for a short to battery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
11	Connect the test light to B+ and again probe the control circuit at terminal 4. Does the test light illuminate?	–	Go to *Step 15*	Go to *Step 16*
12	Replace the engine control module (ECM). Is the replacement complete?	–	Go to *Step 19*	–
13	Check the EEGR ground circuit for a poor connection or proper terminal tension at the ECM and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 17*

DTC P0404 – Electric Exhaust Gas Recirculation Opened (Cont'd)

Step	Action	Value(s)	Yes	No
14	Check the 5V reference circuit for a shortage to battery voltage and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
15	Check the control circuit for a shortage to ground and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
16	Check the control circuit for an open or poor connection at the EEGR valve electrical connector and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 18*
17	Replace the EEGR valve. Is the replacement complete?	–	Go to *Step 19*	–
18	Check the ECM electrical connector for a poor connection and repair as necessary. Is a repair necessary?	–	Go to *Step 19*	Go to *Step 12*
19	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 20*	Go to *Step 2*
20	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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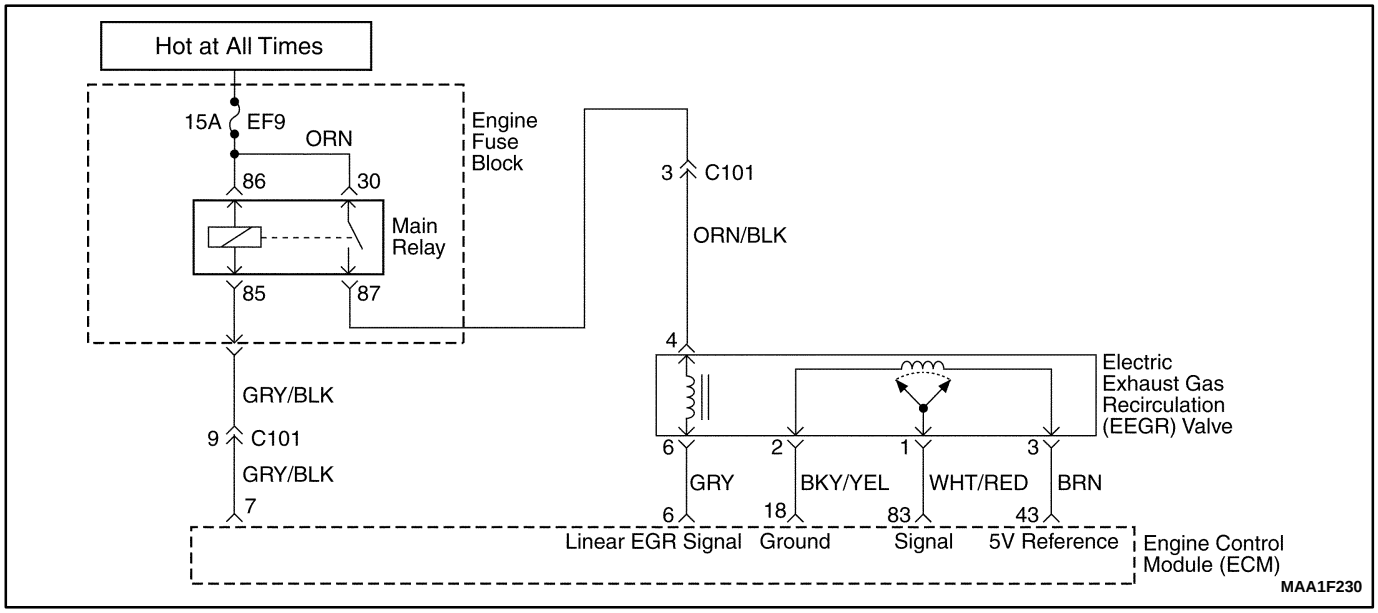

DIAGNOSTIC TROUBLE CODE (DTC) – P1404 ELECTRIC EXHAUST GAS RECIRCULATION CLOSED

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A linear EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting THE DTC

- EEGR circuit high voltage.

Action Taken When The DTCs 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.
- EEGR is disabled.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

Diagnostic Aids

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P1404 – Electric Exhaust Gas Recirculation Opend

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON with the engine OFF. 2. Disconnect the EEGR valve electrical connector. 3. With a digital voltmeter (DVM) connected to ground, probe the 5volt reference circuit at terminal 2 to the EEGR valve. Does the DVM read near the specified value?	5V	Go to *Step 4*	Go to *Step 5*
4	Jumper the 5 volt reference circuit to the signal circuit at terminals 2 and 3. Does the actual EEGR position display the specified value ?	100%	Go to *Step 6*	Go to *Step 7*
5	1. Connect the test light to B+. 2. Probe the 5 volt reference circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 6*	Go to *Step 7*
6	Check the 5 volt reference and signal circuit for a poor connection or proper terminal tension and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 7*
7	1. Connect the test light to B+. 2. Probe the signal circuit at terminal 1 to the EEGR valve. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
8	Check for a high voltage in the EEGR valve 5 volt reference circuit and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 9*
9	Replace the EEGR valve. Is a replacement complete?	–	Go to *Step 12*	–
10	Check for a high voltage in the EEGR valve signal circuit and repair as necessary Is a repair necessary?	–	Go to *Step 12*	Go to *Step 11*
11	Replace the engine control module(ECM). Is a replacement complete?	–	Go to *Step 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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 13*	Go to *Step 2*

DTC P1404 – Electric Exhaust Gas Recirculation Opend (Cont'd)

Step	Action	Value(s)	Yes	No
13	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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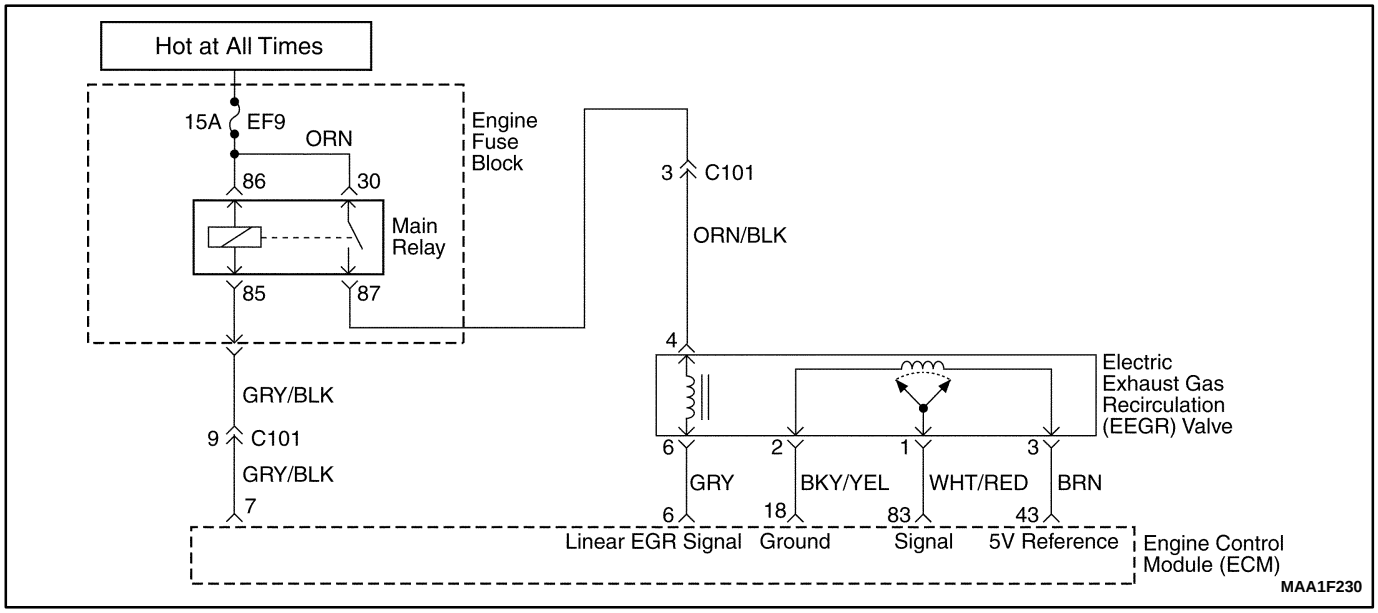

DIAGNOSTIC TROUBLE CODE (DTC) – P0405 EEGR PINTLE POSITION SENSOR LOW VOLTAGE

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A linear EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

ThisDiagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting THE DTC

- EEGR voltage is less than 0.01V.
- EEGR potentiometer circuit low voltage.

Action Taken When The DTCs 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.
- EEGR is disabled.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

Diagnostic Aids

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P0405 – EEGR Pintle Position Sensor Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON with the engine OFF. 2. Disconnect the EEGR valve electrical connector. 3. With a digital voltmeter (DVM) connected to ground, probe the 5volt reference circuit at terminal 3 to the EEGR valve. Does the DVM read near the specified value?	–0.01V	Go to *Step 4*	Go to *Step 5*
4	Jumper the 5 volt reference circuit to the signal circuit at terminals 2 and 3. Does the actual EEGR position display the specified value ?	100%	Go to *Step 6*	Go to *Step 7*
5	1. Connect the test light to B+. 2. Probe the 5 volt reference circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 6*	Go to *Step 7*
6	Check the 5 volt reference and signal circuit for a poor connection or proper terminal tension and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 7*
7	1. Connect the test light to B+. 2. Probe the signal circuit at terminal 2 to the EEGR valve. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
8	Check for a low voltage in the EEGR valve 5 volt reference circuit and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 9*
9	Replace the EEGR valve Is a replacement complete?	–	Go to *Step 12*	–
10	Check for a low voltage in the EEGR valve signal circuit and repair as necessary Is a repair necessary?	–	Go to *Step 12*	Go to *Step 11*
11	Replace the engine control module(ECM). Is a replacement complete?	–	Go to *Step 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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 13*	Go to *Step 2*

DTC P0405 – EEGR Pintle Position Sensor Low Voltage (Cont'd)

Step	Action	Value(s)	Yes	No
13	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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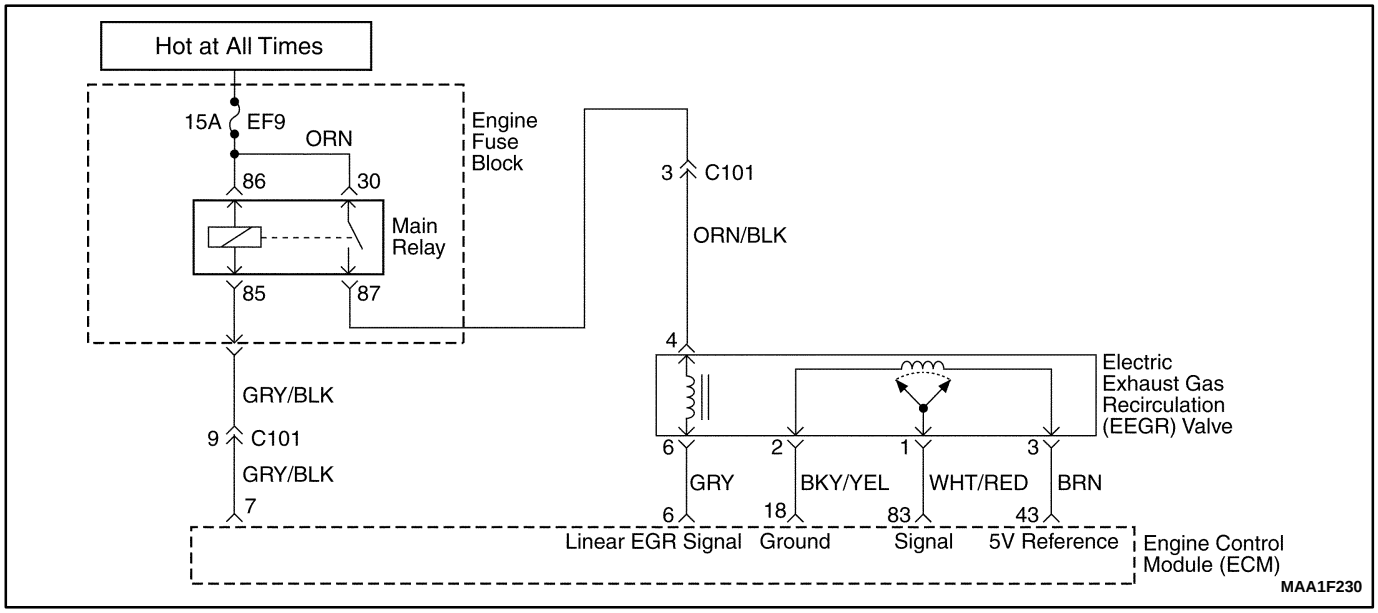

DIAGNOSTIC TROUBLE CODE (DTC) – P0406 EEGR PINTLE POSITION SENSOR HIGH VOLTAGE

Circuit Description

An Electric Exhaust Gas Re-circulation (EEGR) system is used to lower oxides of nitrogen (NOX) emission levels caused by high combustion temperatures. It accomplishes this by feeding small amounts of exhaust gases back into the combustion chamber. When the air/fuel mixture is diluted with the exhaust gases, combustion temperatures are reduced.

A linear EEGR valve is used on this system. The linear EEGR valve is designed to accurately supply exhaust gases to the engine without the use of intake manifold vacuum. The valve controls exhaust flow going into the intake manifold from the exhaust manifold fhrough an orifice with a engine control module(ECM) controlled pintle. The ECM controls the pintle position using inputs from the Throttle Position (TP) and the Manifold Absolute Pressure (MAP) sensor. The ECM then commands the EEGR valve to operate when necessary by controlling an ignition signal through the ECM. This can be monitored on a scan tool as the Desired EEGR position.

The ECM monitors the results of its command through a feedback signal. By sending a 5 volt reference and a ground to the EEGR valve, a voltage signal representing the EEGR valve pintle position is sent to the ECM. This feedback signal can also be monitored on a scan tool and is the actual position of the EEGR pintle. The actual EEGR position should always be near the commanded or Desired EEGR position.

This Diagnostic Trouble Code(DTC) will detect an open or short circuit.

Conditions for Setting THE DTC

- EEGR voltage is higher than 4.99V.
- EEGR potentiometer circuit high voltage.

Action Taken When The DTCs 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.
- EEGR is disabled.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

Due to moisture associated with exhaust systems, the EEGR valve may freeze and stick in cold weather at times. After the vehicle is brought into a warm shop for repairs, the valve warms and the problem disappears. By watching the Actual EEGR and desired EEGR positions on a cold vehicle with a scan tool, the fault can be easily verified. Check the Freeze Frame data to determine if the DTC set when the vehicle was cold by viewing the Engine Coolant Temperature (ECT).

DTC P0406 – EEGR Pintle Position Sensor High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to with the engine OFF. 2. Install the scan tool. 3. Command the electric exhaust gas recirculation (EEGR) valve to the specified values. Does the Actual EEGR Position follow the desired EEGR position?	25%, 50%, 75%, 100%	Go to *Step 19*	Go to *Step 3*
3	1. Turn the ignition switch to ON with the engine OFF. 2. Disconnect the EEGR valve electrical connector. 3. With a digital voltmeter (DVM) connected to ground, probe the 5volt reference circuit at terminal 3 to the EEGR valve. Does the DVM read near the specified value?	More than 5V	Go to *Step 4*	Go to *Step 5*
4	Jumper the 5 volt reference circuit to the signal circuit at terminals 2 and 3. Does the actual EEGR position display the specified value ?	100%	Go to *Step 6*	Go to *Step 7*
5	1. Connect the test light to B+. 2. Probe the 5 volt reference circuit to the EEGR valve. Does the test light illuminate?	–	Go to *Step 6*	Go to *Step 7*
6	Check the 5 volt reference and signal circuit for a poor connection or proper terminal tension and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 7*
7	1. Connect the test light to B+. 2. Probe the signal circuit at terminal 2 to the EEGR valve. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 9*
8	Check for a high voltage in the EEGR valve 5 volt reference circuit and repair as necessary. Is a repair necessary?	–	Go to *Step 12*	Go to *Step 9*
9	Replace the EEGR valve Is a replacement complete?	–	Go to *Step 12*	–
10	Check for a high voltage in the EEGR valve signal circuit and repair as necessary Is a repair necessary?	–	Go to *Step 12*	Go to *Step 11*
11	Replace the engine control module(ECM). Is a replacement complete?	–	Go to *Step 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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 13*	Go to *Step 2*

DTC P0406 – EEGR Pintle Position Sensor High Voltage (Cont'd)

Step	Action	Value(s)	Yes	No
13	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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DIAGNOSTIC TROUBLE CODE (DTC) – P0420 CATALYST LOW EFFICIENCY

Circuit Description

In order to control exhaust emissions of Hydrocarbons (HC), Carbon Monoxide (CO) and Nitrogen Oxide (NOx), a Three-Way Catalytic Converter (TWC) is used. The catalyst within the converter promotes a chemical reaction which oxidizes the HC and CO present in the exhaust gas, converting them into harmless water vapor and carbon dioxide, it also reduces NOx, converting it into nitrogen. The catalytic converter also has the ability to store oxygen. The Engine Control Module (ECM) has the capability to monitor this process using a Heated

Oxygen Sensor (HO2S) located in the exhaust stream past the TWC. The HO2S produces an output signal which indicates the oxygen storage capacity of the catalyst; this in turn indicates the catalyst's ability to convert exhaust emissions effectively. The ECM monitors the catalyst efficiency by first allowing the catalyst to heat up, waiting for a stabilization period while the engine is idling, and then adding and removing fuel while monitoring the reaction of the HO2S. When the catalyst is functioning properly, the HO2S response to the extra fuel is slow compared to the Oxygen Sensor (O2S). When the HO2S response is close to that of the O2S, the Oxygen storage capability or efficiency of the catalyst is considered to be bad, and the Malfunction Indicator Lamp (MIL) will illuminate.

Conditions for Setting the DTC

- Oxygen Sensor Capacity test condition:
- Closed loop stoichiometry.
- Engine is running more than 300 seconds.
- Airflow is between 25~50kg/h.
- Engine Coolant Temperature (ECT) is more than 70°C(176°F) .
- Engine speed between 2,400rpm and 3,000rpm.
- Vehicle speed is between 64km/h(28.6mph) and 80km/h(49.7mph).

Note: Test is aborted for this idle if:

- Change in engine speed is greater than 80 rpm.
- A/C status changed.
- Cooling fan status changed.
- Insufficient air/fuel shift.
- DTC(s) P0106, P0107, P0108, P0117, P0118, P0122, P0123, P0125, P0131, P0132, P0133, P1133, P0134, P1134, P0137, P0138, P0140, P0141, P1167, P1171, P0171, P0172, P0201, P0202, P0203, P0204, P0300, P0336, P0337, P0341, P0342, P0351, P0352, P0402, P0404, P0405, P0406, P0506, P0507, and P0562 are NOT SET.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

The catalyst test may abort due to a change in the engine load. Do not change the engine load (i.e. A/C, coolant fan, heater motor) while a catalyst test is in progress.

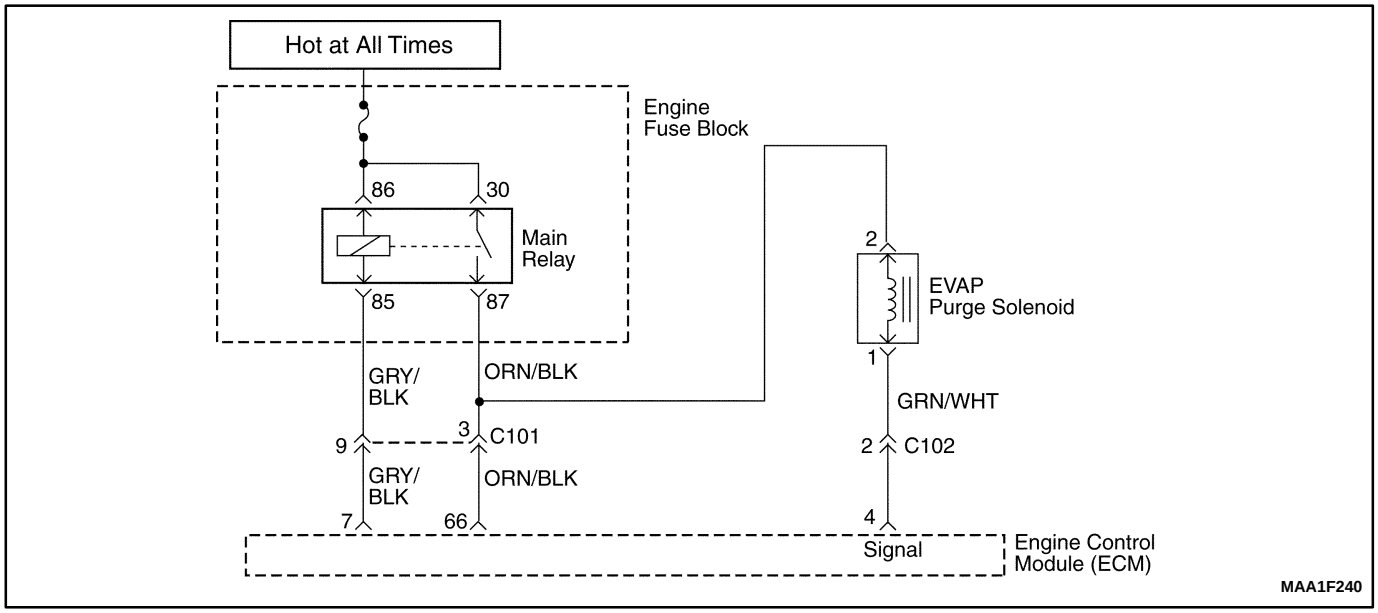
An intermittent problem may be caused by a poor connection, rubbed-through wire insulation, or a wire that is broken inside the insulation.

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-wire connection.

DTC P0420 – Catalyst Low Efficiency

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Install a scan tool to the Data link Connector (DLC). 2. Turn the ignition ON. Are any component Diagnostic Trouble Codes (DTCs) set?	–	Go to Applicable DTC table	Go to *Step 3*
3	1. Visually/physically check the following: 2. Exhaust system for a leak. 3. Heated Oxygen Sensor (HO2S). Is a problem found?	–	Go to *Step 4*	Go to *Step 5*
4	Repair the exhaust system as needed. Is the repair complete?	–	Go to *Step 6*	–
5	Replace the Three Way Catalytic Converter (TWC). Is the repair complete?	–	Go to *Step 6*	–
6	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 7*	Go to *Step 2*
7	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) – P0444 EVAP PURGE CONTROL CIRCUIT NO SIGNAL

Circuit Description

The evaporative emission (EVAP) system includes the following components :

- Fuel tank.
- EVAP vent solenoid.
- Fuel pipes and hoses.
- Fuel vapor lines.
- Fuel cap.
- EVAP canister.
- Purge lines.
- EVAP canister purge valve.
- EVAP service port.

The evaporative emission system is checked by applying vacuum to the EVAP system and monitoring for a vacuum decay. The engine control module(ECM) monitors the vacuum level through the fuel tank pressure sensor signal. At the appropriate time, the EVAP canister purge valve and the EVAP vent solenoid are turned on, allowing the engine to draw a small vacuum on the entire EVAP system. After the desired vacuum level has been achieved, the EVAP canister purge valve is turned OFF, sealing the system. If a sufficient vacuum level cannot be achieved, a large leak is indicated. This can be caused by the following conditions :

Missing or faulty fuel cap.

Disconnected or faulty fuel tank pressure sensor.

Disconnected, damaged, pinched, or blocked EVAP purge line.

Disconnected or faulty EVAP canister purge valve.

Disconnected or faulty EVAP vent solenoid.

Open ignition feed circuit to the EVAP vent or purge solenoid.

Damaged EVAP canister.

Leaking fuel sensor assembly O-ring.

Leaking fuel tank or fuel filler beck.

Any of the above conditions can set DTC P0444.

The test is failed if the tank vacuum is less than 10 in H20 for 15 seconds and the manifold vacuum integral is greater than 49512 (proportional to purge mass from the tank).

Conditions for Setting the DTC

- Intake Air Temperature(IAT) is between 4°C and 34°C(39°F and 93°F).at engine start up.
- Engine Coolant Temperature(ECT) is between 4°C and 34°C(39°F and 93°F).at engine start up.
- Barometric pressure (BARO) is greater than 68kPA.
- IAT is not more than 8°C(46°F) greater than the ECT at start up.
- Fuel level is between 10% and 90%.
- The throttle position (TP) sensor is less than or equal to 100%.
- No fuel slosh, and the change in fuel level percent is 21 counts on 0.125 sec.
- Manifold vacuum is greater than or equal to 10kPA.
- Fuel level or change in tank pressure is less than or equal to 24.9 in H2O.
- System voltage is between 11V and 16V.

- The EVAP system in unable to achieve or maintain vacuum during the diagnostic test. The amount of decay will vary within the fuel level.

Action Taken When The DTCs 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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

Although this DTC is considered a type. A diagnostic, it acts like a type B diagnostic under certain conditions. Whenever this diagnostic reports the system has passed, or if the battery is disconnected, the diagnostic must fail twice before setting a DTC. The initial failure is not reported to the diagnostic executive or displayed on a scan tool. A passing system always reports to the diagnostic executive immediately.

Check for the following conditions :

- Missing or damaged fuel cap.
- Missing or damaged O-rings at fuel vapor and EVAP purge line canister fittings.
- Cracked or punctured EVAP canister.
- Damaged source vacuum line, EVAP purge line, EVAP vent hose or fuel tank vapor line.
- Poor connection at the ECM. Inspect the harness connectors for the following conditions.
- Backed-out terminals.
- Improper mating.
- Broken locks.
- Improperly formed.
- Damaged terminals.
- Poor terminal-to-wire connection.
- Damaged harness. Inspect the wiring harness to the EVAP vent solenoid, EVAP canister purge valve, and the fuel tank pressure sensor for an intermittent open or short circuit.
- Kinked, pinched or plugged vacuum source, EVAP purge, or fuel tank vapor line. Verify that the lines are not restricted.

DTC P0444 – EVAP Purge Control Circuit No Signal

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Disconnect the evaporative emission (EVAP) canister purge valve connector. 2. Connect a test light between the EVAP canister purge valve connector terminal 2 and battery positive. Is the test light ON?	–	Go to *Step 3*	Go to *Step 5*
3	1. Disconnect the ECM connector. 2. Connect a test light between the ECM connector terminal 66 and ground. Is the test light ON?	–	Go to *Step 4*	Go to *Step 6*
4	1. Repair the line break in the wire between the EVAP canister purge valve connector 1 and the ECM connector terminal 66. 2. Clear any Diagnostic Trouble Codes (DTCs) from the ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
5	1. Repair the line break in the wire between the EVAP canister purge valve connector 2 and the main relay connector terminal 87. 2. Clear any Diagnostic Trouble Codes (DTCs) from the ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
6	1. Replace the ECM. 2. Perform the diagnostic system check. Is the repair complete?	–	Go to *Step 7*	–
7	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 7*	Go to *Step 2*
8	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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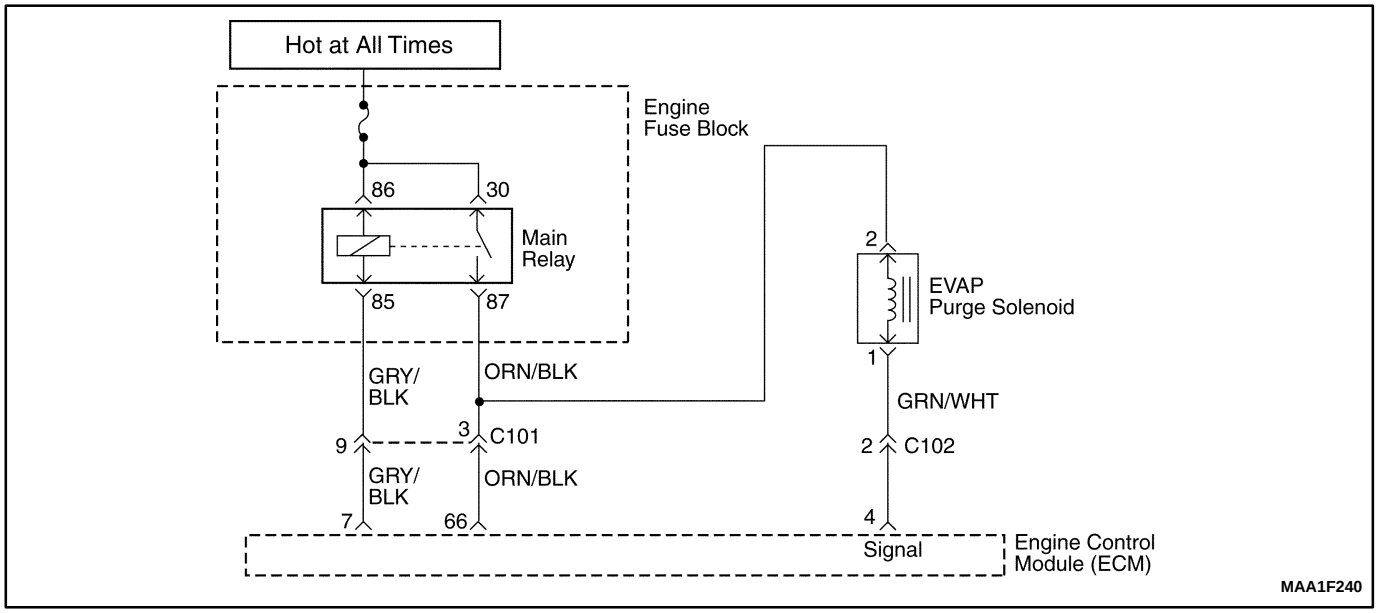

DIAGNOSTIC TROUBLE CODE (DTC) – P0445 EVAP PURGE CONTROL CIRCUIT FAULT

Circuit Description

The evaporative emission (EVAP) system includes the following components :

- Fuel tank.
- EVAP vent solenoid.
- Fuel tank pressure sensor.
- Fuel pipes and hoses.
- Fuel vapor lines.
- Fuel cap.
- EVAP canister.
- Purge lines.
- EVAP canister purge valve.
- EVAP service port.

The evaporative emission system is checked by applying vacuum to the EVAP system and monitoring for a vacuum decay. The engine control module(ECM) monitors the vacuum level through the fuel tank pressure sensor signal. At the appropriate time, the EVAP canister purge valve and the EVAP vent solenoid are turned on, allowing the engine to draw a small vacuum on the entire EVAP system. After the desired vacuum level has been achieved, the EVAP canister purge valve is turned OFF, sealing the system. If a sufficient vacuum level cannot be achieved, a large leak is indicated. This can be caused by the following conditions :

Missing or faulty fuel cap.

Disconnected or faulty fuel tank pressure sensor.

Disconnected, damaged, pinched, or blocked EVAP purge line.

Disconnected or faulty EVAP canister purge valve.

Disconnected or faulty EVAP vent solenoid.

Open ignition feed circuit to the EVAP vent or purge solenoid.

Damaged EVAP canister.

Leaking fuel sensor assembly O-ring.

Leaking fuel tank or fuel filler beck.

Any of the above conditions can set DTC P0445.

The test is failed if the tank vacuum is less than 10 in H20 for 15 seconds and the manifold vacuum integral is greater than 49512 (proportional to purge mass from the tank).

Conditions for Setting the DTC

- Intake Air Temperature(IAT) is between 4°C and 34°C(39°F and 93°F).at engine start up.
- Engine Coolant Temperature(ECT) is between 4°C and 34°C(39°F and 93°F).at engine start up.
- Barometric pressure (BARO) is greater than 68kPA.
- IAT is not more than 8°C(46°F) greater than the ECT at start up.
- Fuel level is between 10% and 90%.
- The throttle position (TP) sensor is less than or equal to 100%.
- No fuel slosh, and the change in fuel level percent is 21 counts on 0.125 sec.
- Manifold vacuum is greater than or equal to 10kPA.
- Fuel level or change in tank pressure is less than or equal to 24.9 in H2O.
- System voltage is between 11V and 16V.

- The EVAP system in unable to achieve or maintain vacuum during the diagnostic test. The amount of decay will vary within the fuel level.

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 four 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

Although this DTC is considered a type. A diagnostic, it acts like a type B diagnostic under certain conditions. Whenever this diagnostic reports the system has passed, or if the battery is disconnected, the diagnostic must fail twice before setting a DTC. The initial failure is not reported to the diagnostic executive or displayed on a scan tool. A passing system always reports to the diagnostic executive immediately.

Check for the following conditions :

Missing or damaged fuel cap.

Missing or damaged O-rings at fuel vapor and EVAP purge line canister fittings.

Cracked or punctured EVAP canister.

Damaged source vacuum line, EVAP purge line, EVAP vent hose or fuel tank vapor line.

Poor connection at the ECM. Inspect the harness connectors for the following conditions.

- Backed-out terminals.
- Improper mating.
- Broken locks.
- Improperly formed.
- Damaged terminals.
- Poor terminal-to-wire connection.
- Damaged harness. Inspect the wiring harness to the EVAP vent solenoid, EVAP canister purge valve, and the fuel tank pressure sensor for an intermittent open or short circuit.
- Kinked, pinched or plugged vacuum source, EVAP purge, or fuel tank vapor line. Verify that the lines are not restricted.

DTC P0445 – EVAP Purge Control Circuit Fault

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to “On-Board Diagnostic System Check”
2	1. Disconnect the evaporative emission (EVAP) canister purge valve connector. 2. Measure the resistance of the EVAP canister purge valve connector. Does the resistance measure near within the value specified?	30Ω	Go to *Step 3*	Go to *Step 9*
3	Connect a test light between EVAP canister purge valve connector terminal 2 and ground. Is the test light ON?	–	Go to *Step 4*	Go to *Step 6*
4	1. Disconnect the ECM connector. 2. Connect a test light between the ECM connector terminal 66 and ground. Is the test light ON?	–	Go to *Step 5*	Go to *Step 7*

DTC P0445 – EVAP Purge Control Circuit Fault (Cont'd)

Step	Action	Value(s)	Yes	No
5	1. Repair the high voltage or ground in the wire between the EVAP canister purge valve connector terminal 1 and the ECM connector terminal 66. 2. Clear any Diagnostic Trouble Codes (DTCs) from the ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
6	1. Disconnect the EVAP canister purge valve connector. 2. Connect a test light between the EVAP canister purge valve connector terminal 2 and battery. Is the test light ON?	–	Go to *Step 7*	Go to *Step 9*
7	1. Disconnect the ECM connector. 2. Connect a test light between the ECM connector terminal 65 and ground. Is the test light ON?	–	Go to *Step 8*	Go to *Step 10*
8	1. Repair the low voltage in the wire between the EVAP canister purge valve connector terminal 1 and the ECM connector terminal 66. 2. Clear any Diagnostic Trouble Codes (DTCs) from the ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
9	1. Replace the EVAP canister purge valve. 2. Clear any Diagnostic Trouble Codes (DTCs) from the ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	Go to *Step 10*	–
10	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 11*	Go to *Step 2*
11	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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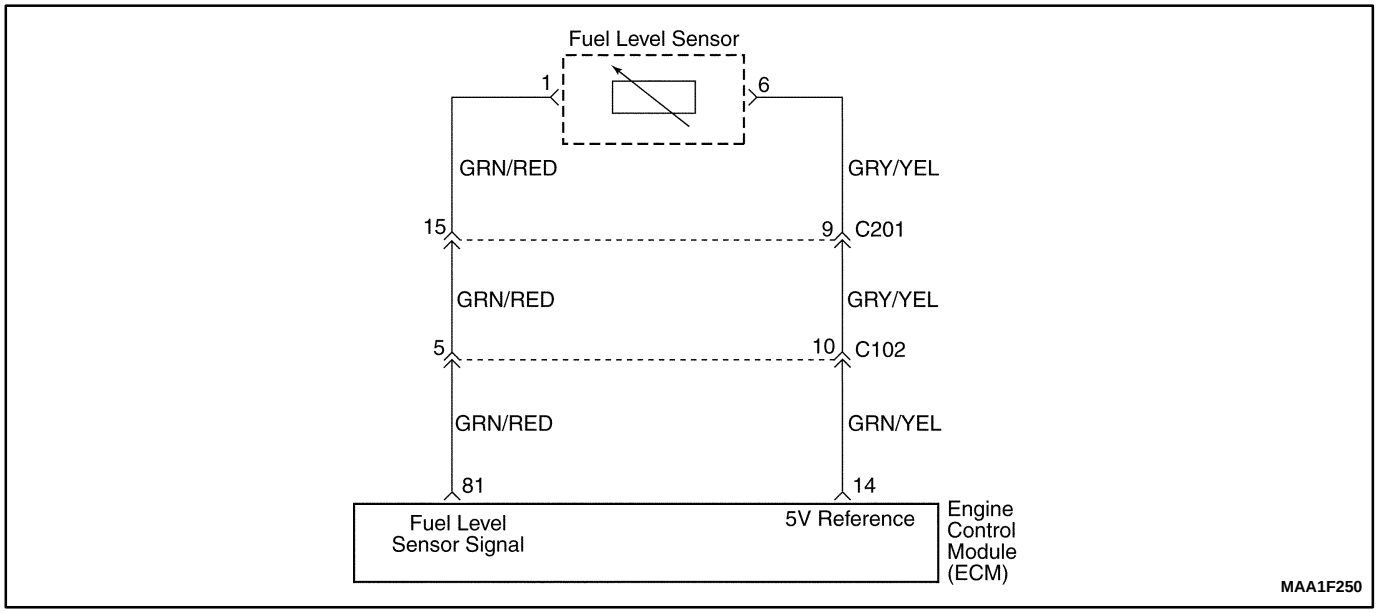

DIAGNOSTIC TROUBLE CODE (DTC) – P0462 FUEL LEVEL SENSOR LOW VOLTAGE

Circuit Description

The engine control module(ECM) uses the fuel level input from the Fuel Level Sensor to calculate expected vapor pressures within the fuel system. Vapor pressure vary as the fuel level changes. Vapor pressure is critical in determining if the evaporative emission (EVAP) system is operating properly. Fuel Level is also used to determine if the Fuel level is too high or too low to be able to accurately detect EVAP system faults. This Diagnostic Trouble Code(DTC) detects a stuck fuel level sender.

Conditions for Setting the DTC

- Fuel Level Sensor voltage is less than 0.05V.
- Fuel Level Sensor circuit low voltage.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

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

Inspect the wiring harness for damage.

A stuck Fuel Level Sensor may cause the DTC to set. If DTC P0463 cannot be duplicated, the information included in the Freeze Frame data can be useful in determining vehicle operating conditions when the DTC was first set.

Resistance check for the Fuel Level Sensor.

Empty = 100 ohms or over.

Half full = about 32.5 ohms.

Full = 10 ohms or less.

DTC P0462 – Fuel Level Sensor Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON. 2. Install a scan tool. 3. Operate the vehicle within Freeze Frame conditions as noted. Is the Diagnostic Trouble Code (DTC) P0462 set?	–	Go to *Step 3*	Go to "Diagnostic Aids"
3	1. Disconnect the fuel sender electircal connector from the fuel pump. 2. Using a digital voltmeter (DVM), measure the voltage in the signal circuit at terminal 1. Is the voltage within the specified value?	0.2–4.8V	Go to *Step 4*	Go to *Step 6*
4	Check for a proper ground connection at the fuel tank and repair as necessary. Is a repair necessary?	–	Go to *Step 11*	Go to *Step 5*
5	1. Remove the fuel sender from the fuel tank. 2. Reconnect the fuel sender electrical connector. 3. Monitor the Fuel Level Sensor parameter on the scan tool while moving the Fuel Level Sensor float from the empty position to the full position. 4. Repeat the procedure several times. Does the Fuel Level Sensor value on the scan tool increase and then decrease steadily when the float is moved?	–	Go to "Diagnostic Aids"	Go to *Step 8*
6	Check for an open or short to ground in the Fuel Level Sensor circuit and repair as necessary. Is the repair necessary?	–	Go to *Step 11*	Go to *Step 9*
7	Repair the open or short to ground in the Fuel Level Sensor circuit between the Fuel Level Sensor harness connector and the Fuel Level Sensor. Is the repair complete?	–	Go to *Step 11*	–
8	Replace the fuel sender assembly. Is the replacement complete?	–	Go to *Step 11*	–
9	1. Connect the fuel sender electrical connector. 2. Disconnect the engine control module(ECM) connector. 3. Using a digital voltmeter (DVM) measure the voltage in the signal circuit, at terminal 81. Does the DVM read within the specified value?	0.2–4.8V	Go to *Step 10*	Go to section *9E, Instrumentation/Driver Information*
10	Replace the ECM. Is the repair complete?	–	Go to *Step 11*	–
11	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 12*	Go to *Step 2*

DTC P0462 – Fuel Level Sensor Low Voltage (Cont'd)

Step	Action	Value(s)	Yes	No
12	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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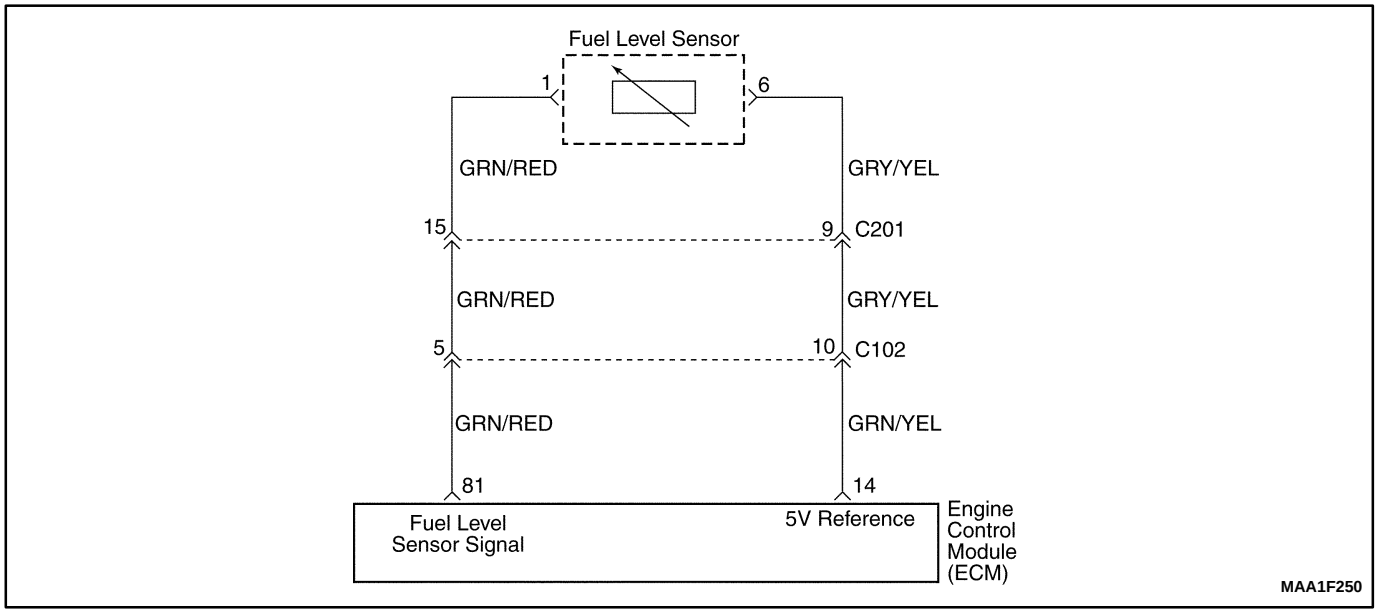

DIAGNOSTIC TROUBLE CODE (DTC) – P0463 FUEL LEVEL SENSOR HIGH VOLTAGE

Circuit Description

The engine control module(ECM) uses the fuel level input from the Fuel Level Sensor to calculate expected vapor pressures within the fuel system. Vapor pressure vary as the fuel level changes. Vapor pressure is critical in determining if the evaporative emission (EVAP) system is operating properly. Fuel Level is also used to determine if the Fuel level is too high or too low to be able to accurately detect EVAP system faults. This Diagnostic Trouble Code(DTC) detects a stuck fuel level sender.

Conditions for Setting the DTC

- Fuel Level Sensor voltage is higher than 4.9V.
- Fuel Level Sensor circuit high voltage.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

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

Inspect the wiring harness for damage.

A stuck Fuel Level Sensor may cause the DTC to set. If DTC P0463 cannot be duplicated, the information included in the Freeze Frame data can be useful in determining vehicle operating conditions when the DTC was first set.

Resistance check for the Fuel Level Sensor.

Empty = 100 ohms or over.

Half full = about 32.5 ohms.

Full = 10 ohms or less.

DTC P0463 – Fuel Level Sensor High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON. 2. Install a scan tool. 3. Operate the vehicle within Freeze Frame conditions as noted. Is the Diagnostic Trouble Code (DTC) P0463 set?	–	Go to *Step 3*	Go to "Diagnostic Aids"
3	1. Disconnect the fuel sender electrical connector from the fuel pump. 2. Using a digital voltmeter (DVM), measure the voltage in the signal circuit at terminal 1. Is the voltage within the specified value?	0.2–4.9V	Go to *Step 4*	Go to *Step 6*
4	Check for a proper ground connection at the fuel tank and repair as necessary. Is a repair necessary?	–	Go to *Step 11*	Go to *Step 5*
5	1. Remove the fuel sender from the fuel tank. 2. Reconnect the fuel pump electrical connector. 3. Monitor the Fuel Level Sensor parameter on the scan tool while moving the Fuel Level Sensor float from the empty position to the full position. 4. Repeat the procedure several times. Does the Fuel Level Sensor value on the scan tool increase and then decrease steadily when the float is moved?	–	Go to "Diagnostic Aids"	Go to *Step 8*
6	Check for an open or short to battery voltage in the Fuel Level Sensor circuit and repair as necessary. Is the repair necessary?	–	Go to *Step 11*	Go to *Step 9*
7	Repair the open or short to battery voltage in the Fuel Level Sensor circuit between the Fuel Level Sensor harness connector and the Fuel Level Sensor. Is the repair complete?	–	Go to *Step 11*	–
8	Replace the fuel sender assembly. Is the replacement complete?	–	Go to *Step 11*	–
9	1. Connect the fuel pump electrical connector. 2. Disconnect the engine control module(ECM) connector. 3. Using a digital voltmeter (DVM) measure the voltage in the signal circuit, at terminal 81. Does the DVM read within the specified value?	0.2–4.9V	Go to *Step 10*	Go to section *9E, Instrumentation/Driver Information*
10	Replace the ECM. Is the repair complete?	–	Go to *Step 11*	–
11	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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 12*	Go to *Step 2*

DTC P0463 – Fuel Level Sensor High Voltage (Cont'd)

Step	Action	Value(s)	Yes	No
12	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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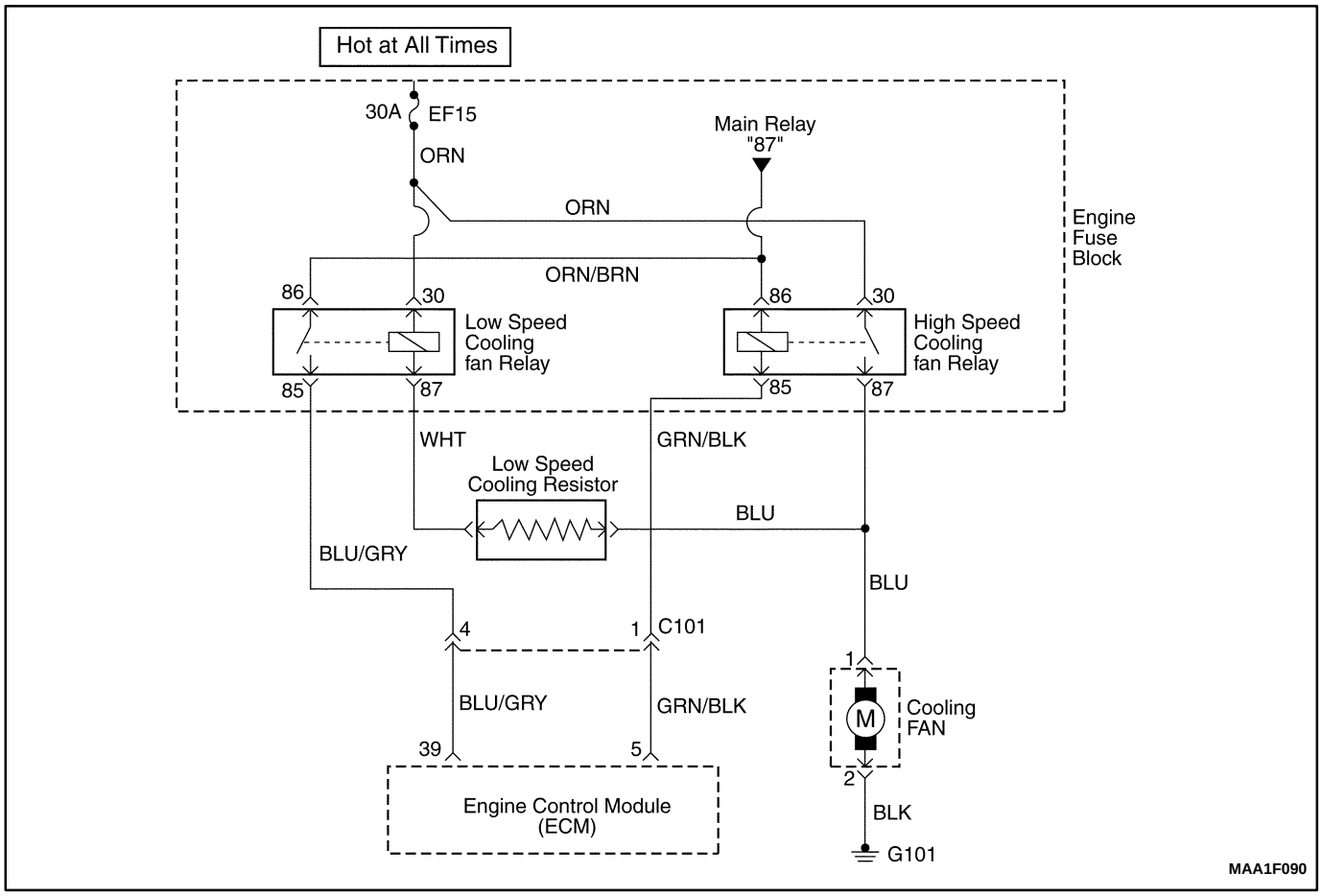

DIAGNOSTIC TROUBLE CODE (DTC) – P0480 LOW SPEED COOLING FAN RELAY CIRCUIT FAULT (WITHOUT A/C)

Circuit Description

Ignition voltage is supplied directly to the cooling fan relay coil. The engine control module(ECM) controls the relay by grounding the control circuit via an internal switch called a driver. The primary function of the driver is supply the ground for the component being controlled. Each driver has a fault line which is monitored by the ECM. When the ECM is commanding a component ON, the voltage of the control circuit should be low (near 0volts). When the ECM is commanding the control circuit to a component OFF, the voltage potential of the circuit should be high(near battery voltage). If the fault detection circuit senses a voltage other than what is expected, the fault line status will change causing the DTC to set.

The relay is used to control the high current flow to the cooling fan motors. This allows the ECM driver to only have to handle the relatively low current used by the relay.

Conditions for Setting the DTC

- Diagnostic Trouble Codes (DTCs) P0117, P0118 not set.
- Ignition ON.
- Ignition voltage is greater than 10 volts.
- Engine run time is greater than 5 seconds.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

Using Freeze Frame and/or failure records data may aid in locating an intermittent condition. If the DTC cannot be duplicated, the information included in the Freeze Frame and/or failure records data can be useful in determining how many miles since the DTC set. The fail counter and Pass Counter can also be used to determine how many ignition cycles the diagnostics reported

a Freeze Frame conditions (rpm, load, vehicle speed, temperature, etc.) that .are noted. This will isolate when the DTC failed.

DTC P0480 – Low Speed Cooling Fan Relay Circuit Fault (WITHOUT A/C)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON with the engine OFF. 2. Install a scan tool. 3. Command the relay ON and OFF. Does the relay turn ON and OFF when commanded?	–	Go to *Step 3*	Go to *Step 5*
3	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module (ECM) connector. 3. Turn the ignition switch to ON. 4. Using a digital voltmeter(DVM), measure the current in low speed relay control circuit, at terminal 39 to ground for 2 minutes. Does the amperage measure less than the specified value?	0.75 amps	Go to "Diagnostic Aids"	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Using a DVM, measure the resistance between terminals 87 and 39 in the relay control circuit in the ECM harness connector to ground. Does the DVM display infinite resistance?	–	Go to *Step 12*	Go to *Step 10*
5	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Connect a test light between the relay coil terminals 30 and 87 in the relay harness connector. 4. Turn the Turn the ignition switch to ON. 5. Using the scan tool, command the relay ON and OFF. Does the test light turn ON and OFF with each commanded?	–	Go to *Step 8*	Go to *Step 6*
6	With the test light connected to ground, probe the ignition feed circuit in the relay harness connector. Does the test light illuminate?	–	Go to *Step 7*	Go to *Step 11*
7	1. Turn the ignition switch to LOCK. 2. Reconnect the relay. 3. Disconnect the ECM connector containing the relay control circuit. 4. Turn the Turn the ignition switch to ON. 5. With a fused jumper wire connected to ground, probe the relay control circuit at terminal 39 in the ECM harness connector. Does the relay operate?	–	Go to *Step 9*	Go to *Step 10*
8	Check the connections at the relay. Is a problem found and corrected?	–	Go to *Step 14*	Go to *Step 12*

DTC P0480 – Low Speed Cooling Fan Relay Circuit Fault (WITHOUT A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the connection at the ECM. Is a problem found and corrected?	–	Go to *Step 11*	Go to *Step 13*
10	Repair the faulty relay control circuit. Is the repair complete?	–	Go to *Step 14*	–
11	Repair the faulty relay ignition feed circuit. Is the repair complete?	–	Go to *Step 14*	–
12	Replace the relay. Is the replacement complete?	–	Go to *Step 14*	–
13	Replace the ECM. Is the replacement complete?	–	Go to *Step 14*	–
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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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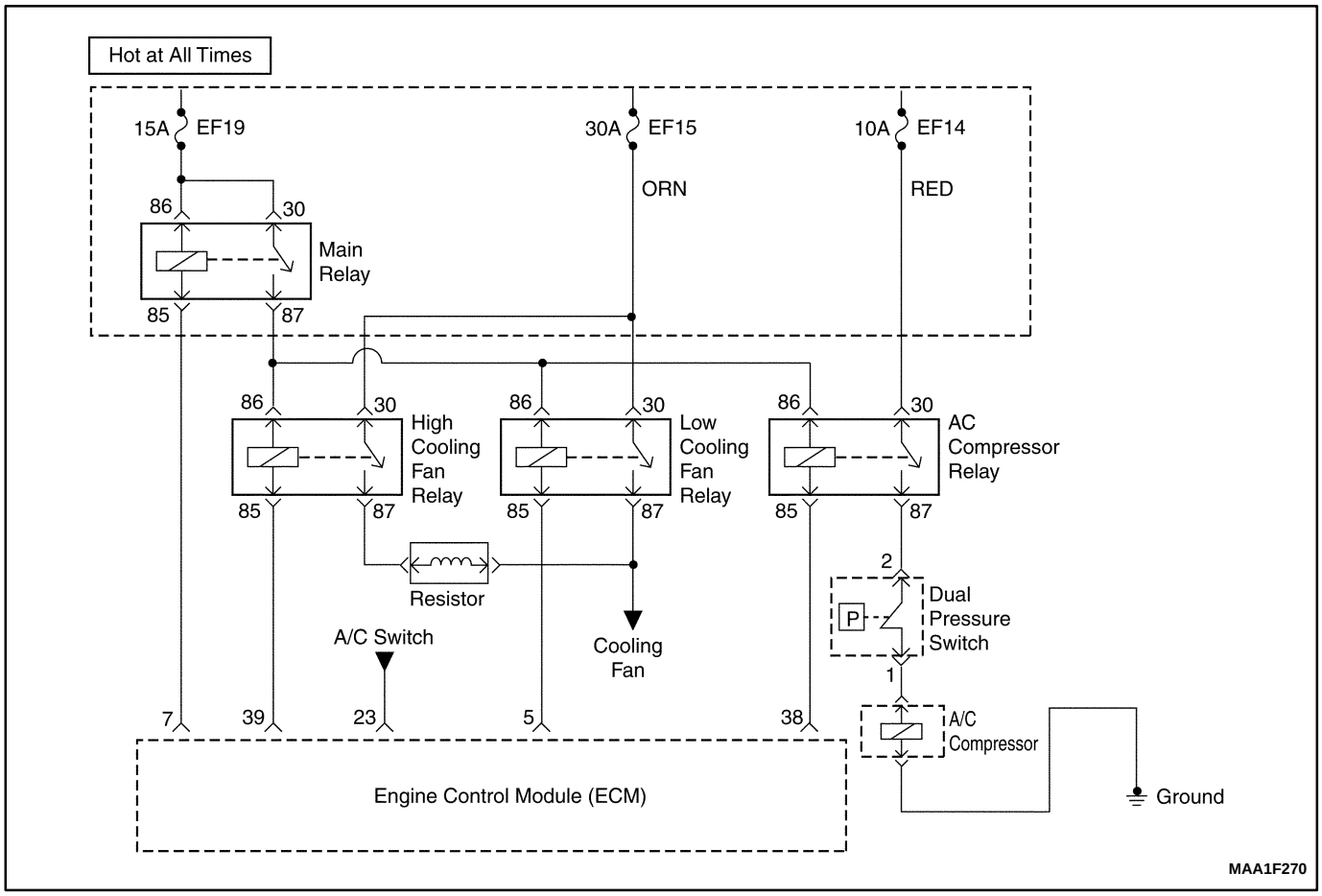

DIAGNOSTIC TROUBLE CODE (DTC) – P0480 LOW SPEED COOLING FAN RELAY CIRCUIT FAULT (WITH A/C)

Circuit Description

Ignition voltage is supplied directly to the cooling fan relay coil. The engine control module(ECM) controls the relay by grounding the control circuit via an internal switch called a driver. The primary function of the driver is supply the ground for the component being controlled. Each driver has a fault line which is monitored by the ECM. When the ECM is commanding a component ON, the voltage of the control circuit should be low (near 0volts). When the ECM is commanding the control circuit to a component OFF, the voltage potential of the circuit should be high(near battery voltage). If the fault detection circuit senses a voltage other than what is expected, the fault line status will change causing the DTC to set.

The relay is used to control the high current flow to the cooling fan motors. This allows the ECM driver to only have to handle the relatively low current used by the relay.

Conditions for Setting the DTC

- Diagnostic Trouble Codes (DTCs) P0117, P0118 not set.
- Ignition ON.
- Ignition voltage is greater than 10 volts.
- Engine run time is greater than 5 seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

Using Freeze Frame and/or failure records data may aid in locating an intermittent condition. If the DTC cannot be duplicated, the information included in the Freeze Frame and/or failure records data can be useful in determining how many miles since the DTC set. The fail counter and Pass Counter can also be used to determine how many ignition cycles the diagnostics reported

a Freeze Frame conditions (rpm, load, vehicle speed, temperature, etc.) that .are noted. This will isolate when the DTC failed.

DTC P0480 – Low Speed Cooling Fan Relay Circuit Fault (with A/C)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON with the engine OFF. 2. Install a scan tool. 3. Command the relay ON and OFF. Does the relay turn ON and OFF when commanded?	–	Go to *Step 3*	Go to *Step 5*
3	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module (ECM) connector. 3. Turn the ignition switch to ON. 4. Using a digital voltmeter(DVM), measure the current in low speed relay control circuit, at terminal 10 to ground for 2 minutes. Does the amperage measure less than the specified value?	0.75 amps	Go to "Diagnostic Aids"	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Using a DVM, measure the resistance between terminals 85 and 5 in the relay control circuit in the ECM harness connector to ground. Does the DVM display infinite resistance?	–	Go to *Step 12*	Go to *Step 10*
5	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Connect a test light between the relay coil terminals 86 and 85 in the relay harness connector. 4. Turn the Turn the ignition switch to ON. 5. Using the scan tool, command the relay ON and OFF. Does the test light turn ON and OFF with each commanded?	–	Go to *Step 8*	Go to *Step 6*
6	With the test light connected to ground, probe the ignition feed circuit in the relay harness connector. Does the test light illuminate?	–	Go to *Step 7*	Go to *Step 11*
7	1. Turn the ignition switch to LOCK. 2. Reconnect the relay. 3. Disconnect the ECM connector containing the relay control circuit. 4. Turn the Turn the ignition switch to ON. 5. With a fused jumper wire connected to ground, probe the relay control circuit at terminal 5 in the ECM harness connector. Does the relay operate?	–	Go to *Step 9*	Go to *Step 10*
8	Check the connections at the relay. Is a problem found and corrected?	–	Go to *Step 14*	Go to *Step 12*

DTC P0480 – Low Speed Cooling Fan Relay Circuit Fault (with A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the connection at the ECM. Is a problem found and corrected?	–	Go to *Step 11*	Go to *Step 13*
10	Repair the faulty relay control circuit. Is the repair complete?	–	Go to *Step 14*	–
11	Repair the faulty relay ignition feed circuit. Is the repair complete?	–	Go to *Step 14*	–
12	Replace the relay. Is the replacement complete?	–	Go to *Step 14*	–
13	Replace the ECM. Is the replacement complete?	–	Go to *Step 14*	–
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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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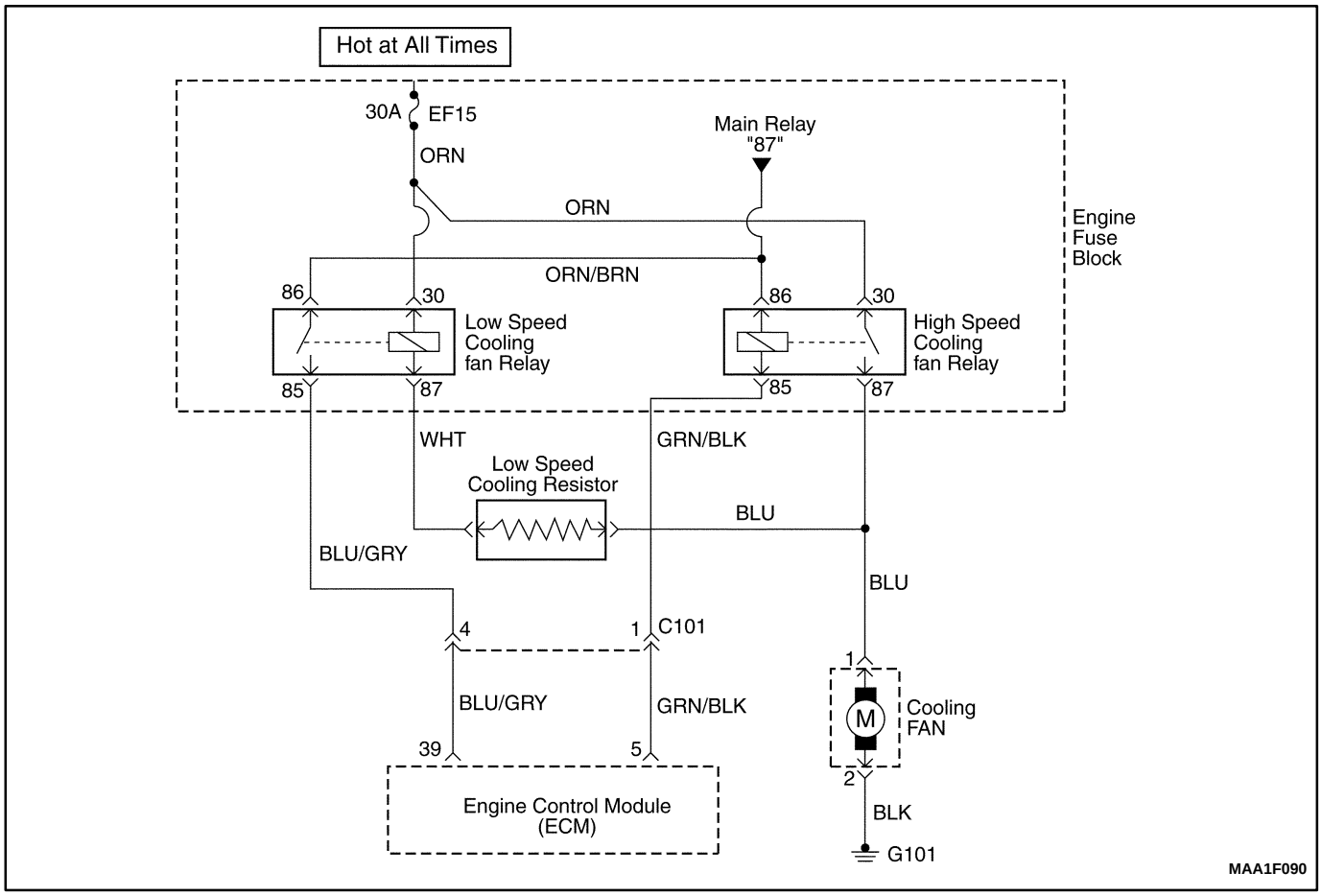

DIAGNOSTIC TROUBLE CODE (DTC) – P0481 HIGH SPEED COOLING FAN RELAY CIRCUIT FAULT (WITHOUT A/C)

Circuit Description

Ignition voltage is supplied directly to the cooling fan relay coil. The engine control module(ECM) controls the relay by grounding the control circuit via an internal switch called a driver. The primary function of the driver is supply the ground for the component being controlled. Each driver has a fault line which is monitored by the ECM. When the ECM is commanding a component ON, the voltage of the control circuit should be low (near 0volts). When the ECM is commanding the control circuit to a component OFF, the voltage potential of the circuit should be high(near battery voltage). If the fault detection circuit senses a voltage other than what is expected, the fault line status will change causing the DTC to set.

The relay is used to control the high current flow to the cooling fan motors. This allows the ECM driver to only have to handle the relatively low current used by the relay.

Conditions for Setting the DTC

- Diagnostic Trouble Codes (DTCs) P0117, P0118 not set.
- Ignition ON.
- Ignition voltage is greater than 10 volts.
- Engine run time is greater than 5 seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

Using Freeze Frame and/or failure records data may aid in locating an intermittent condition. If the DTC cannot be duplicated, the information included in the Freeze Frame and/or failure records data can be useful in determining how many miles since the DTC set. The fail counter and Pass Counter can also be used to determine how many ignition cycles the diagnostics reported

a Freeze Frame conditions (rpm, load, vehicle speed, temperature, etc.) that .are noted. This will isolate when the DTC failed.

DTC P0481 – High Speed Cooling Fan Relay Circuit Fault (without A/C)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON with the engine OFF. 2. Install a scan tool. 3. Command the relay ON and OFF. Does the relay turn ON and OFF when commanded?	–	Go to *Step 3*	Go to *Step 5*
3	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module (ECM) connector. 3. Turn the ignition switch to ON. 4. Using a digital voltmeter(DVM), measure the current in high speed relay control circuit, at terminal 5 to ground for 2 minutes. Does the amperage measure less than the specified value?	0.75 amps	Go to "Diagnostic Aids"	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Using a DVM, measure the resistance between terminals 85 and 5 in the relay control circuit in the ECM harness connector to ground. Does the DVM display infinite resistance?	–	Go to *Step 12*	Go to *Step 10*
5	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Connect a test light between the relay coil terminals 86 and 85 in the relay harness connector. 4. Turn the Turn the ignition switch to ON. 5. Using the scan tool, command the relay ON and OFF. Does the test light turn ON and OFF with each commanded?	–	Go to *Step 8*	Go to *Step 6*
6	With the test light connected to ground, probe the ignition feed circuit in the relay harness connector. Does the test light illuminate?	–	Go to *Step 7*	Go to *Step 11*
7	1. Turn the ignition switch to LOCK. 2. Reconnect the relay. 3. Disconnect the ECM connector containing the relay control circuit. 4. Turn the Turn the ignition switch to ON. 5. With a fused jumper wire connected to ground, probe the relay control circuit at terminal 5 in the ECM harness connector. Does the relay operate?	–	Go to *Step 9*	Go to *Step 10*
8	Check the connections at the relay. Is a problem found and corrected?	–	Go to *Step 14*	Go to *Step 12*

DTC P0481 – High Speed Cooling Fan Relay Circuit Fault (without A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
9	Check the connection at the ECM. Is a problem found and corrected?	–	Go to *Step 11*	Go to *Step 13*
10	Repair the faulty relay control circuit. Is the repair complete?	–	Go to *Step 14*	–
11	Repair the faulty relay ignition feed circuit. Is the repair complete?	–	Go to *Step 14*	–
12	Replace the relay. Is the replacement complete?	–	Go to *Step 14*	–
13	Replace the ECM. Is the replacement complete?	–	Go to *Step 14*	–
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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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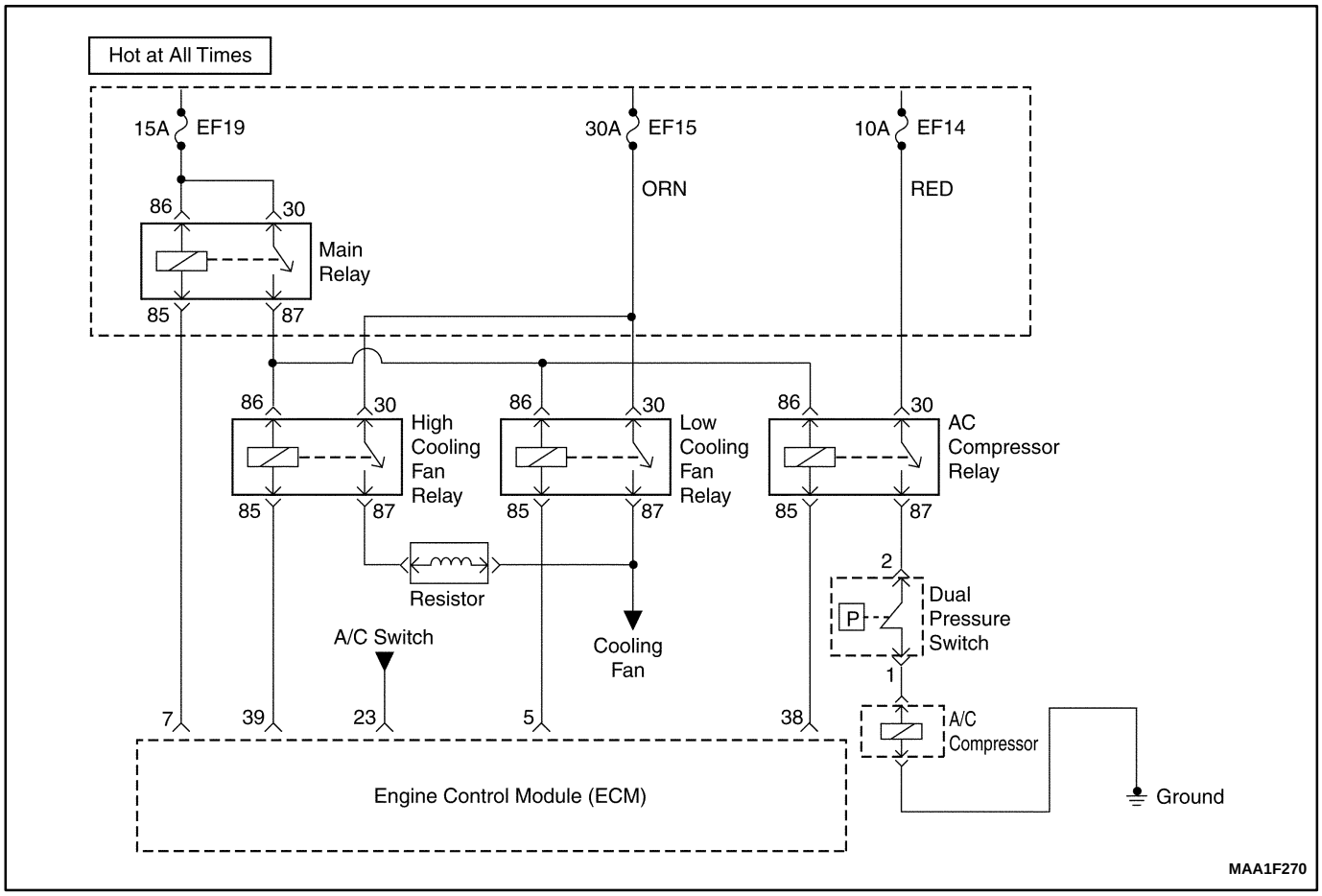

DIAGNOSTIC TROUBLE CODE (DTC) – P0481 HIGH SPEED COOLING FAN RELAY CIRCUIT FAULT (WITH A/C)

Circuit Description

Ignition voltage is supplied directly to the cooling fan relay coil. The engine control module(ECM) controls the relay by grounding the control circuit via an internal switch called a driver. The primary function of the driver is supply the ground for the component being controlled. Each driver has a fault line which is monitored by the ECM. When the ECM is commanding a component ON, the voltage of the control circuit should be low (near 0volts). When the ECM is commanding the control circuit to a component OFF, the voltage potential of the circuit should be high(near battery voltage). If the fault detection circuit senses a voltage other than what is expected, the fault line status will change causing the DTC to set.

The relay is used to control the high current flow to the cooling fan motors. This allows the ECM driver to only have to handle the relatively low current used by the relay.

Conditions for Setting the DTC

- Diagnostic Trouble Codes (DTCs) P0117, P0118 not set.
- Ignition ON.
- Ignition voltage is greater than 10 volts.
- Engine run time is greater than 5 seconds.

Action Taken When The DTCs Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

Using Freeze Frame and/or failure records data may aid in locating an intermittent condition. If the DTC cannot be duplicated, the information included in the Freeze Frame and/or failure records data can be useful in determining how many miles since the DTC set. The fail counter and Pass Counter can also be used to determine how many ignition cycles the diagnostics reported

a Freeze Frame conditions (rpm, load, vehicle speed, temperature, etc.) that .are noted. This will isolate when the DTC failed.

DTC P0481 – High Speed Cooling Fan Relay Circuit Fault (with A/C)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to ON with the engine OFF. 2. Install a scan tool. 3. Command the relay ON and OFF. Does the relay turn ON and OFF when commanded?	–	Go to *Step 3*	Go to *Step 5*
3	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module (ECM) connector. 3. Turn the ignition switch to ON. 4. Using a digital voltmeter(DVM), measure the current in high speed relay control circuit, at terminal 39 to ground for 2 minutes. Does the amperage measure less than the specified value?	0.75 amps	Go to "Diagnostic Aids"	Go to *Step 4*
4	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Using a DVM, measure the resistance between terminals 85 and 39 in the high speed cooling fan relay control circuit in the ECM harness connector to ground. Does the DVM display infinite resistance?	–	Go to *Step 12*	Go to *Step 10*
5	1. Turn the ignition switch to LOCK. 2. Disconnect the relay. 3. Connect a test light between the relay coil terminals 86 and 85 in the relay harness connector. 4. Turn the Turn the ignition switch to ON. 5. Using the scan tool, command the relay ON and OFF. Does the test light turn ON and OFF with each commanded?	–	Go to *Step 8*	Go to *Step 6*
6	With the test light connected to ground, probe the ignition feed circuit in the relay harness connector. Does the test light illuminate?	–	Go to *Step 7*	Go to *Step 11*
7	1. Turn the ignition switch to LOCK. 2. Reconnect the relay. 3. Disconnect the ECM connector containing the relay control circuit. 4. Turn the Turn the ignition switch to ON. 5. With a fused jumper wire connected to ground, probe the relay control circuit at terminal 10 in the ECM harness connector. Does the relay operate?	–	Go to *Step 9*	Go to *Step 10*

DTC P0481 – High Speed Cooling Fan Relay Circuit Fault (with A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
8	Check the connections at the relay. Is a problem found and corrected?	–	Go to *Step 14*	Go to *Step 12*
9	Check the connection at the ECM. Is a problem found and corrected?	–	Go to *Step 11*	Go to *Step 13*
10	Repair the faulty relay control circuit. Is the repair complete?	–	Go to *Step 14*	–
11	Repair the faulty relay ignition feed circuit. Is the repair complete?	–	Go to *Step 14*	–
12	Replace the relay. Is the replacement complete?	–	Go to *Step 14*	–
13	Replace the ECM. Is the replacement complete?	–	Go to *Step 14*	–
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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 15*	Go to *Step 2*
15	Check if any additional DTCs are set. Are any DTCs displayed that have not been diagnosed?	–	Go to Applicable DTC table	System OK

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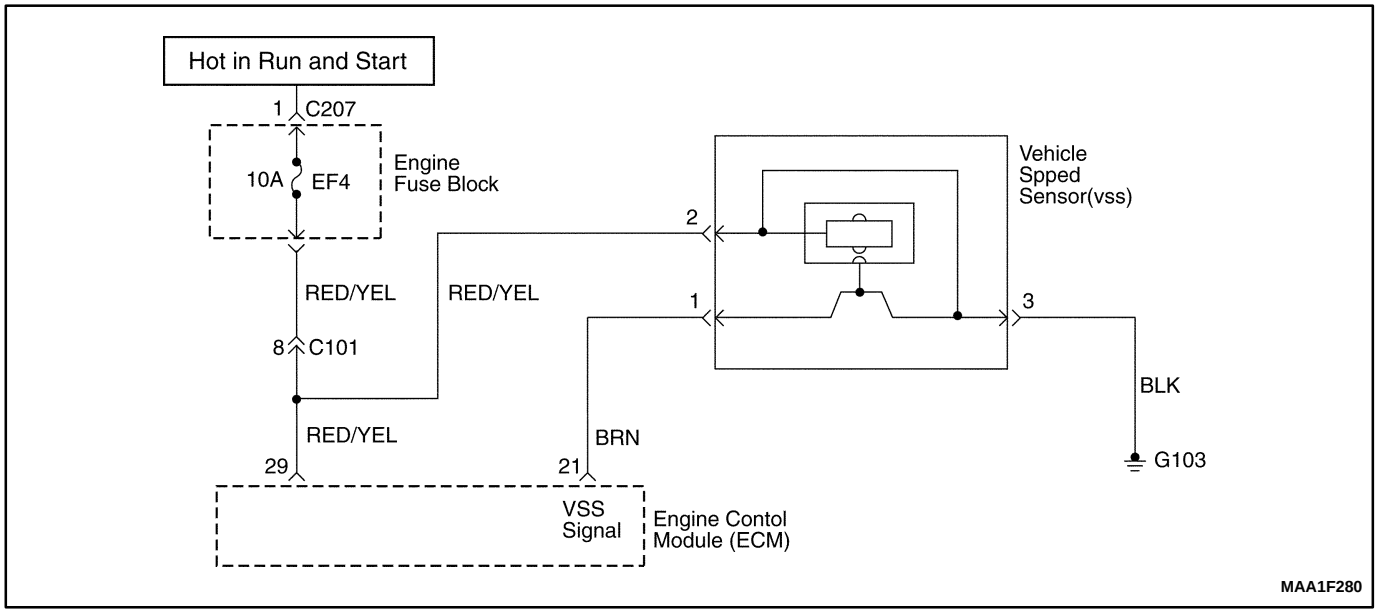

DIAGNOSTIC TROUBLE CODE (DTC) – P0501 VEHICLE SPEED NO SIGNAL (M/T ONLY)

Circuit Description

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

Conditions for Setting the DTC

- Vehicle speed is not change at least 10 seconds.
- Engine speed is greater than 2,100rpm.
- MAF is greater than 152mg/tdc.

Action taken when The DTCs 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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Using the scan tool can clear DTC(s).

Diagnostic Aids

An Intermittent problem may be caused by a poor connection, rubbed through wire insulation, or 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 terminals to wire connection
- Physical damage to the wiring harness

Ensure the VSS is correctly torqued to the trnasaxle housing.

Refer to *“intermittents”* in this Section.

DTC P0501 – Vehicle Speed No Signal(M/T Only)

Step	Action	Value(s)	Yes	No
1	Perform an Euro On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	**Notice:** 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 *Step 3*	Go to *Step 4*
3	1. Turn the ignition 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 *Step 12*	Go to *Step 4*
4	1. Turn the ignition OFF. 2. Disconnect the engine control module(ECM) connector. 4. using a digital voltmeter(DVM) connected to ground, measure the voltage in the Vehicle Speed Sensor (VSS) signal circuit, at terminal 1 while rotating the wheels. Is the voltage greater than or eqaul to specified value?	0.5 v	Go to *Step 12*	Go to *Step 5*
5	Measure the resistant in the VSS signal circuit while rotating the wheels. Is the resistance greater than the specified value?	1950 Ω	Go to *Step 6*	Go to *Step 7*
6	Check the VSS signal circuit for an open and repair as necessary. Is the repair complete?	–	Go to *Step 12*	Go to *Step 9*
7	Is the resistance value within or equal to the specified value?	1300–1950 Ω	Go to *Step 8*	Go to *Step 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 to *Step 12*	Go to *Step 12*
9	1. Remove the VSS. 2. Measure the resistance between terminals 2 and 3. Is the resistance value within the specified value?	1300–1950 Ω	Go to *Step 11*	Go to *Step 10*
10	Replace the VSS. Is the action complete?	–	Go to *Step 12*	–
11	Replace the ECM. Is the action complete?	–	Go to *Step 12*	–

DTC P0501 – Vehicle Speed No Signal(M/T Only) (Cont'd)

Step	Action	Value(s)	Yes	No
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 the DTC as specifiec in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?	–	Go to *Step 15*	Go to *Step 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

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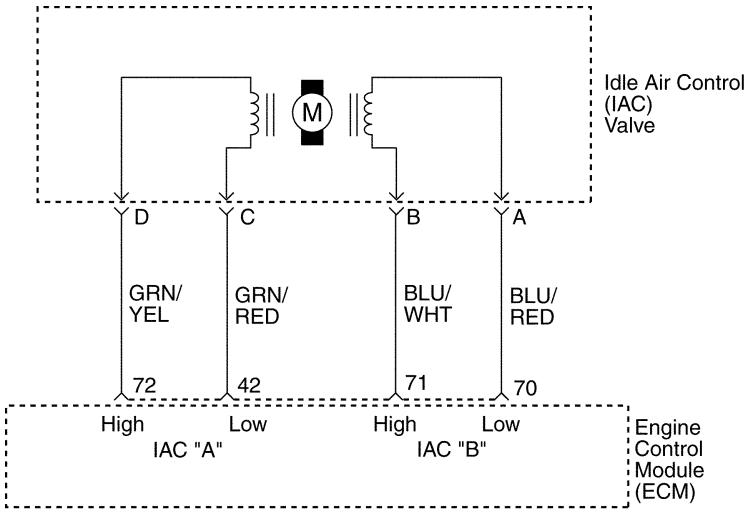

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DIAGNOSTIC TROUBLE CODE (DTC) 0505
IDLE AIR CONTROL VALVE (IACV) CIRCUIT FAULT

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

- No intrusive tests are active.
- DTC(s) P0106, P0107, P0108, P0112, P0113, P0117, P0118, P0122, P0123, P0131, P0132, P0133, P1133, P1134, P0171, P1171, P0172, P0201, P0202, P0203, P0204, P0300, P0336, P0337, P0341, P0342, P0351, P0352, P0402, P0404, P1404, P0405, P0406, P0443, and P0502 are not set.
- Engine is running more than 60 seconds.
- Barometric Pressure (BARO) is greater than 72 kPa (10.4 psi).
- Engine Coolant Temperature (ECT) is greater than 60°C (140°F).
- Ignition voltage is between 11 and 16 volts.
- The Intake Air Temperature (IAT) is greater than –20°C (–4°F).
- Manifold Absolute Pressure is less than 60 kPa (8.7 psi).
- IAC valve is controlled fully opened.
- 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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

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.

DTC P0505 Idle Air Control Valve (IACV) Circuit Fault

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Install a scan tool to the Data Link Connector (DLC). 2. Operate the engine to idle speed. 3. Transmission in park or neutral and the parking brake set. 4. A/C is off. 5. Using scan tool, command the Idle Air Control (IAC) valve up and down between the specified value. Does the rpm change smoothly when he commanded by the scan tool?	900–1200 rpm	Go to *Step 3*	Go to *Step 5*
3	1. Turn the ignition OFF. 2. Disconnect the IAC valve connector. 3. Measure the resistance between terminal C and D of the IAC valve. 4. Measure the resistance between terminal B and A of the IAC valve. Is the resistance within the specified value?	40–80 Ω	Go to *Step 4*	Go to *Step 13*
4	1. Measure the resistance between terminal D and B of the IAC valve. 2. Measure the resistance between terminal C and A of the IAC valve. Is the resistance equal to the specified value?	∞	Go to *Step 15*	Go to *Step 13*
5	1. Turn the ignition OFF. 2. Disconnect the IAC valve connector. 3. Turn the ignition ON. 4. With test light connected to ground, probe the IAC connector terminals. Does the test light illuminate on D terminals?	–	Go to *Step 6*	Go to *Step 7*
6	With test light connected to B+, probe the IAC connector terminals. Does the test light illuminate on D terminals?	–	Go to *Step 8*	Go to *Step 9*
7	Check for an open or short to ground in the IAC high and low circuits and repair as needed. Is the repair complete?	–	Go to *Step 15*	Go to *Step 10*
8	1. Idle the engine. 2. Connect a test light to ground, probe the IAC connector terminals. Does the test light flash On and OFF for all terminals?	–	Go to *Step 11*	Go to *Step 12*
9	Check for an open or a short to voltage in the IAC valve high and low circuits and repair as needed. Is the repair complete?	–	Go to *Step 15*	Go to *Step 10*
10	Check the Engine control Module (ECM) connector for poor connections and repair as needed. Is the repair complete?	–	Go to *Step 15*	Go to *Step 14*

DTC P0505 Idle Air Control Valve (IACV) Circuit Fault (Cont'd)

Step	Action	Value(s)	Yes	No
11	Inspect the IAC valve passages and repair as needed. Is the repair complete?	–	Go to *Step 15*	Go to *Step 13*
12	Check the test light. Does the test light remain on constantly for the terminals that did not blink?	–	Go to *Step 9*	Go to *Step 7*
13	1. Turn the ignition OFF. 2. Replace the IAC valve. Is the repair complete?	–	Go to *Step 15*	–
14	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 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 to *Step 16*	Go to *Step 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

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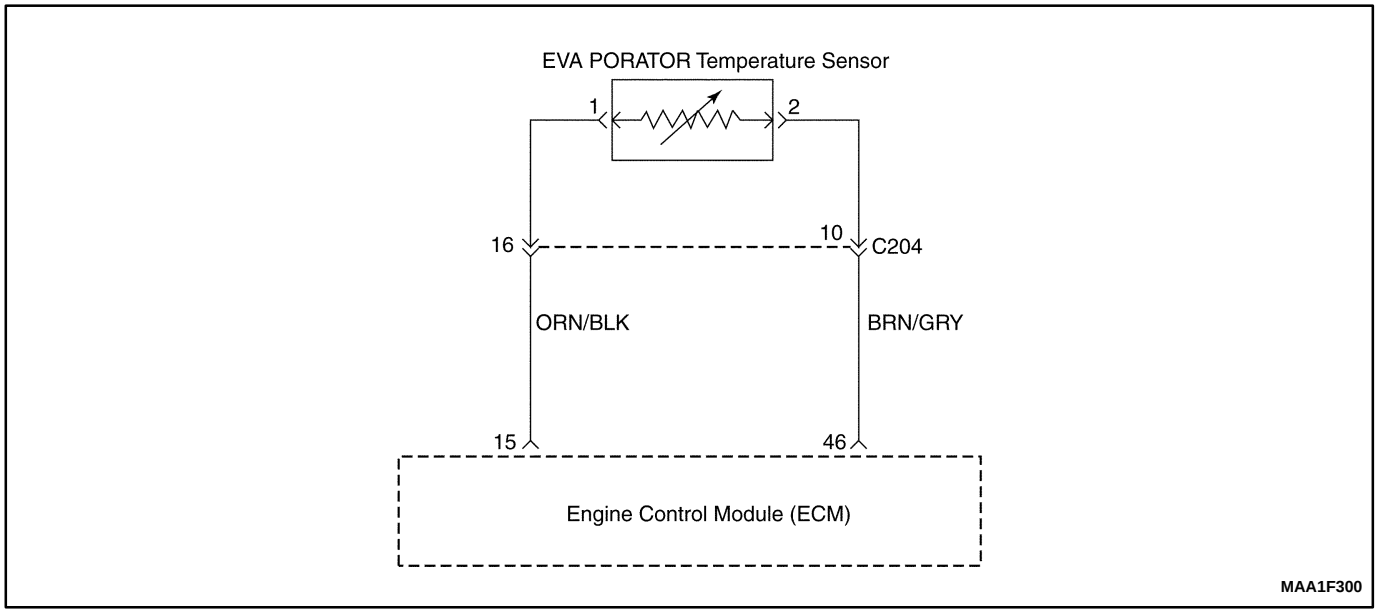


DIAGNOSTIC TROUBLE CODE (DTC) – P1535 EVAPORATOR TEMPERATURE SENSOR HIGH VOLTAGE

Circuit Description

A semiconductor which resistance is noticeably changed as the change of temperature. When the refrigerant temperature of the evaporator drops to 0°C (0°F) and below, the evaporator cores get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermistor is a sensor which is used to prevent from frosting or icing. The thermistor is installed on the evaporator.

Conditions for Setting the DTC

- A short to battery voltage condition exists and is present for more the 2 seconds.

Action Taken When the DTC Sets

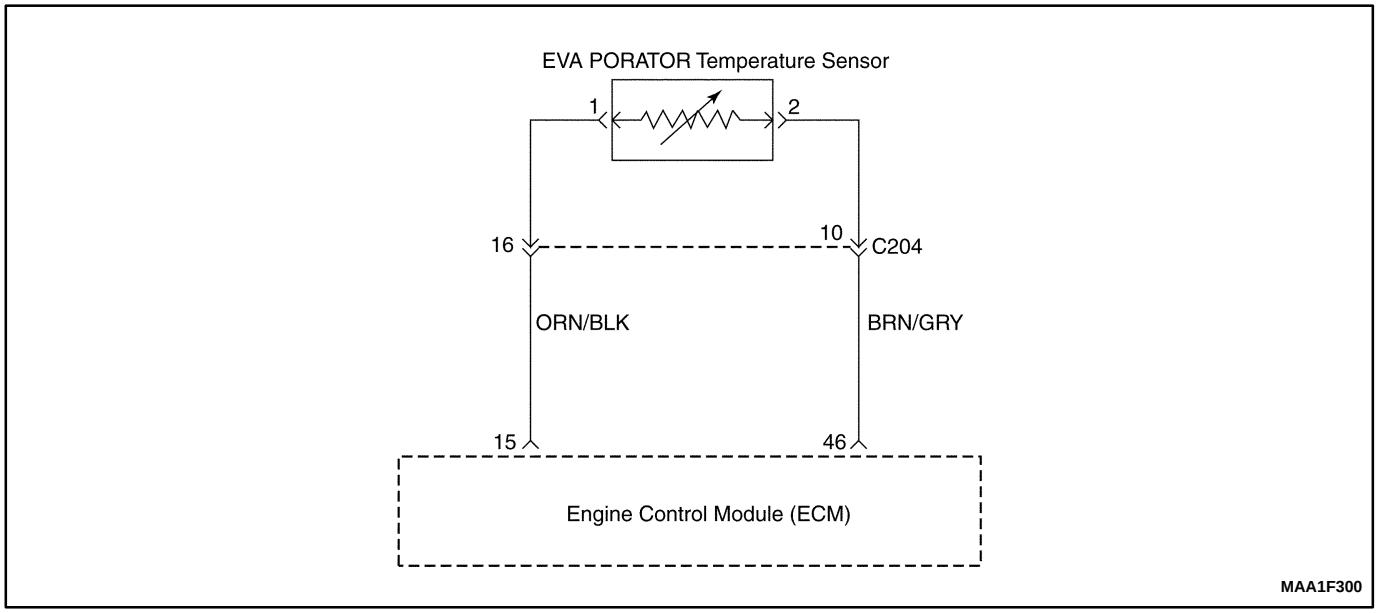
- The ECM will not illuminate the Malfunction Indicator Lamp (MIL).
- A history DTCs is stored.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored Failure Records buffers.
- The A/C compressor operation will be disabled while the low voltage indication exists.
- Update the fail record each time the diagnostic test fail.

Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- Usisng the scan tool can clear DTC(s).
- Disconnecting the ECM battery feed for 10 seconds.

DTC P1535 – Evaporator Temperature Sensor High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD 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 to LOCK. 2. Disconnect the evaporator temperature sensor. 3. Measure the resistance between evaporator temperature sensor terminals 1 and 2. Does the resistance within the specified value?	0Ω	Go to *Step 7*	Go to *Step 3*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 2 in the sensor harness connector. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	Repair a short to battery between the terminal 46 of ECM and A/C compressor relay terminal 2. Is the repair complete?	–	Go to *Step 9*	–
5	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 2 in the sensor harness connector. Does the test light illuminate?	–	Go to *Step 6*	Go to *Step 8*
6	Repair a short to battery between the ECM wiring connector terminal 46 and evaporator temperature sensor terminal 2. Is the repair complete?	–	Go to *Step 9*	–
7	Replace the evaporator temperature sensor. Is the replacement complete?	–	Go to *Step 9*	–
8	1. Turn the ignition switch to LOCK. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 9*	–
9	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 10*	Go to *Step 2*
10	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1536 EVAPORATOR TEMPERATURE SENSOR LOW VOLTAGE

Circuit Description

A semiconductor which resistance is noticeably changed as the change of temperature. When the refrigerant temperature of the evaporator drops to 0°C (0°F) and below, the evaporator cores get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermistor is a sensor which is used to prevent from frosting or icing. The thermistor is installed on the evaporator.

Conditions for Setting the DTC

- A short to battery voltage condition exists and is present for more the 2 seconds.

Action Taken When the DTC Sets

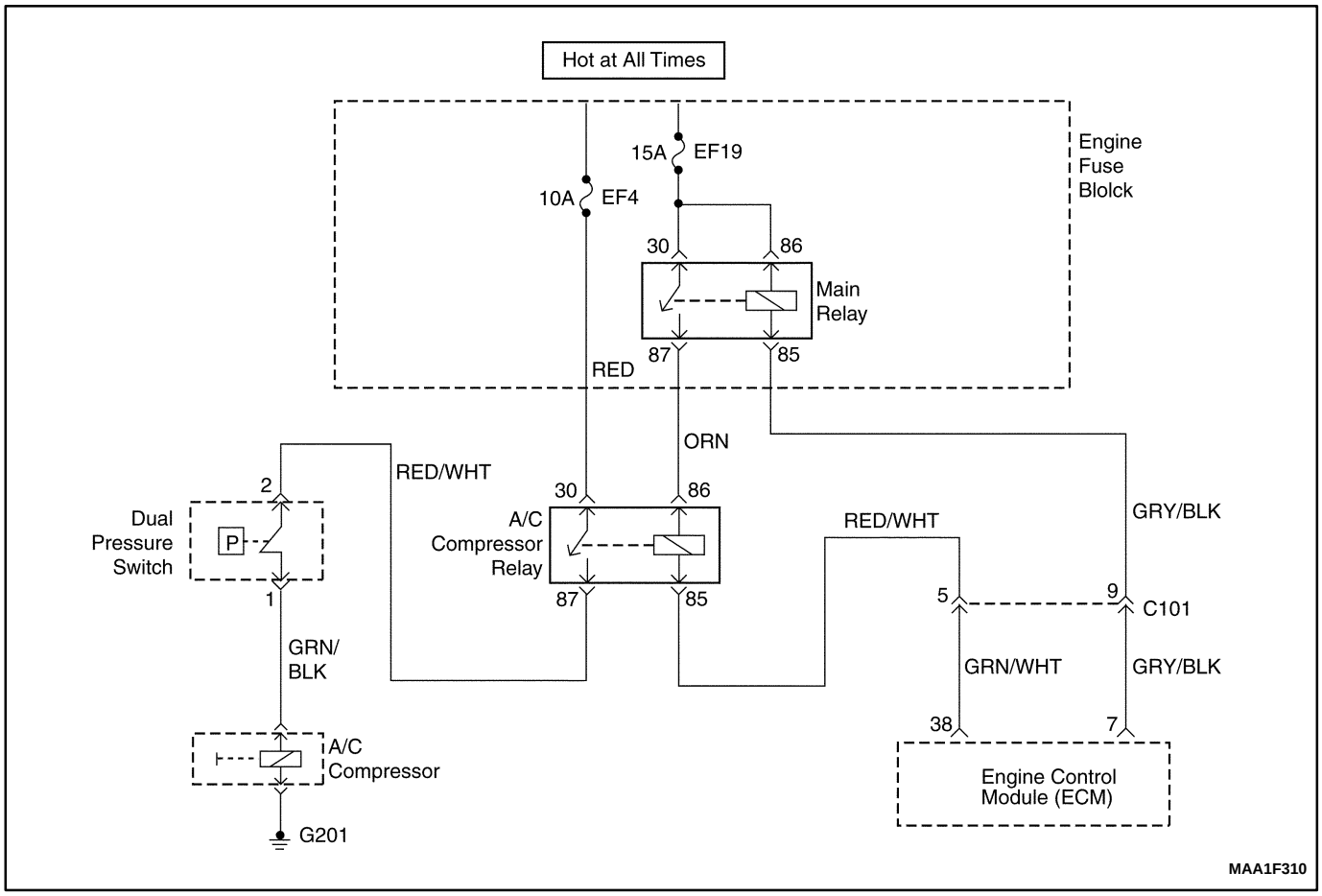
- The ECM will not illuminate the Malfunction Indicator Lamp (MIL).
- A history DTCs is stored.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored Failure Records buffers.
- The A/C compressor operation will be disabled while the low voltage indication exists.
- Update the fail record each time the diagnostic test fail.

Conditions for Clearing the MIL/DTC

- A history DTC will clear after 40 consecutive warm-up cycles without a fault.
- Usisng the scan tool can clear DTC(s).
- Disconnecting the ECM battery feed for 10 seconds.

DTC P1536 – Evaporator Temperature Sensor Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD II) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	2..Turn the ignition switch to LOCK. 2. Disconnect the evaporator temperature sensor. 3. Measure the resistance between evaporator temperature sensor terminals 1 and 2. Does the resistance within the specified value?	0Ω	Go to *Step 7*	Go to *Step 3*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 2 in the sensor harness connector. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	Repair a short to battery between the terminal 46 of ECM and A/C compressor relay terminal 2. Is the repair complete?	–	Go to *Step 9*	–
5	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 2 in the sensor harness connector. Does the test light illuminate?	–	Go to *Step 6*	Go to *Step 8*
6	Repair a short to battery between the ECM wiring connector terminal 46 and evaporator temperature sensor terminal 2. Is the repair complete?	–	Go to *Step 9*	–
7	Replace the evaporator temperature sensor. Is the replacement complete?	–	Go to *Step 9*	–
8	1. Turn the ignition switch to LOCK. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 9*	–
9	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 10*	Go to *Step 2*
10	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1537 A/C COMPRESSOR RELAY HIGH VOLTAGE

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.

Conditions for Setting the DTC

- A/C compressor relay circuit short to battery.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

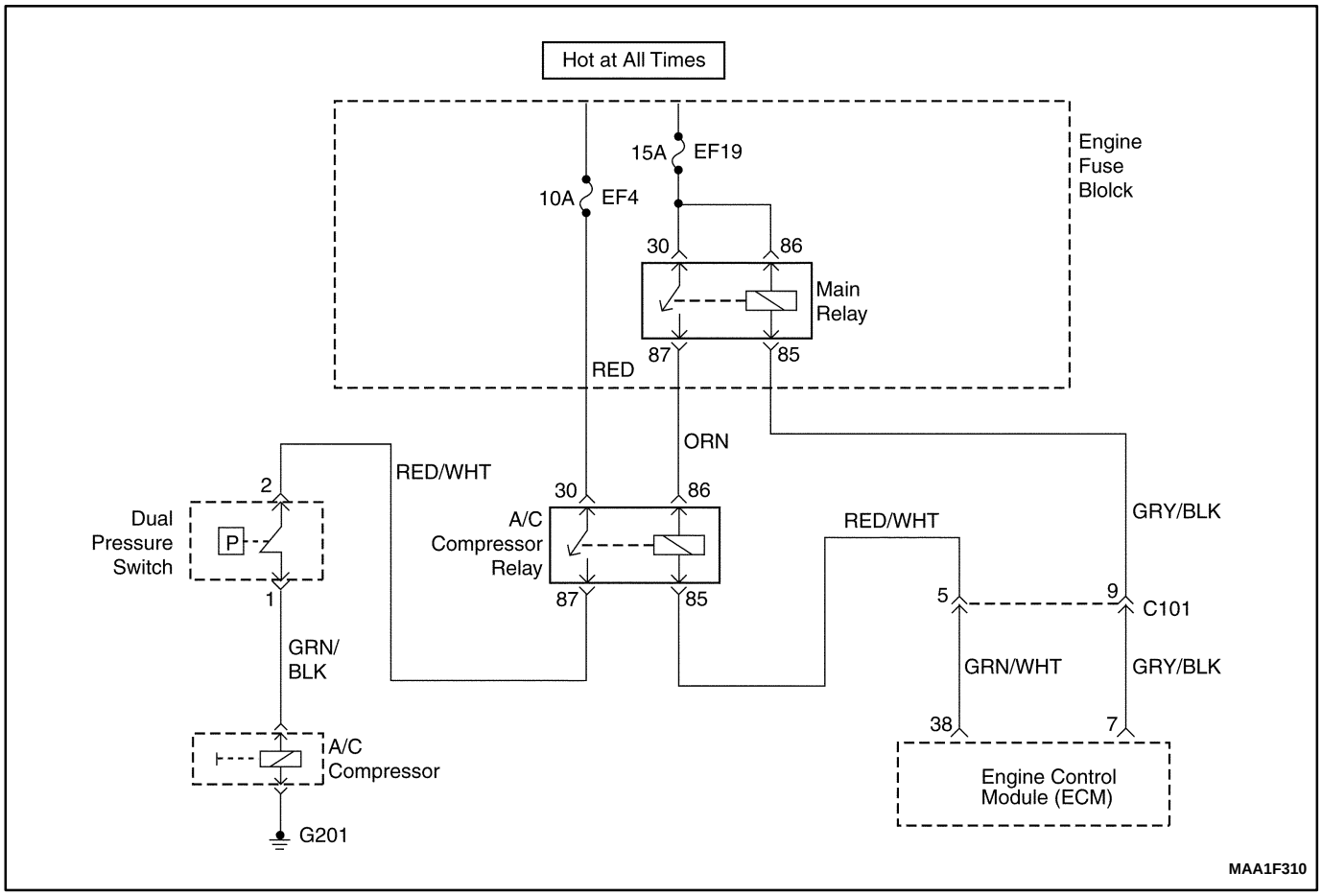
Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

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 P1537 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.

DTC P1537 – A/C Compressor Relay High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	3..Turn the ignition switch to LOCK. 2. Disconnect the A/C compressor relay. 3. Measure the resistance between A/C compressor relay terminals 85 and 86. Does the resistance within the specified value?	0Ω	Go to *Step 3*	Go to *Step 7*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 86 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 5*	Go to *Step 4*
4	Repair a short to battery voltage between the ignition switch terminal and A/C compressor relay terminal 86. Is the repair complete?	–	Go to *Step 9*	–
5	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 86 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 6*
6	Repair a short to battery voltage between the ECM wiring connector terminal 38 and A/C compressor relay terminal 85. Is the repair complete?	–	Go to *Step 9*	–
7	Replace the A/C compressor relay. Is the replacement complete?	–	Go to *Step 9*	–
8	1. Turn the ignition switch to LOCK. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 9*	–
9	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 10*	Go to *Step 2*
10	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1538 A/C COMPRESSOR RELAY LOW VOLTAGE

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.

Conditions for Setting the DTC

- A/C compressor relay circuit short to ground or open.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

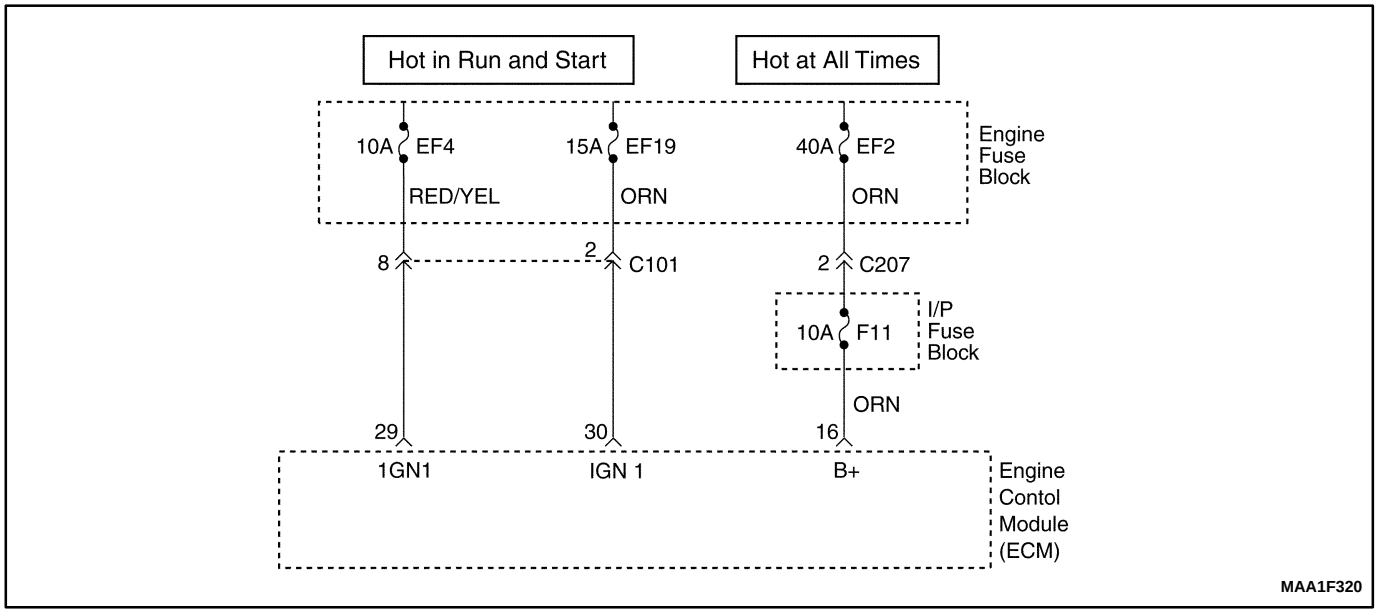
Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

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 P1538 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.

DTC P1538 – A/C Compressor Relay Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. Disconnect the A/C compressor relay. 3. Measure the resistance between A/C compressor relay terminals 85 and 86. Does the resistance within the specified value?	0Ω	Go to *Step 3*	Go to *Step 7*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 86 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 5*	Go to *Step 4*
4	Repair a short to ground between the ignition switch terminal 4 and A/C compressor relay terminal 86. Is the repair complete?	–	Go to *Step 9*	–
5	1. 1. Turn the ignition switch to LOCK. 2. Disconnect the ECM. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 86 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 8*	Go to *Step 6*
6	Repair a short to ground between the ECM wiring connector terminal 38 and A/C compressor relay terminal 85. Is the repair complete?	–	Go to *Step 9*	–
7	Replace the A/C compressor relay. Is the replacement complete?	–	Go to *Step 9*	–
8	1. Turn the ignition switch to LOCK. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 9*	–
9	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 10*	Go to *Step 2*
10	Check if any additional DTCs are set. Are any DTCs displayed that 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 7 at the ECM. A system voltage Diagnostic Trouble Code (DTC) sill set whenever the voltage is below a calibrated value.

Conditions for Setting the DTC

- Ignition ON.
- Main relay is ON.
- The ignition voltage is less than 11.5 volt.
- The main relay voltage is less than 5.0V or higher than 26V during 7.6 seconds.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

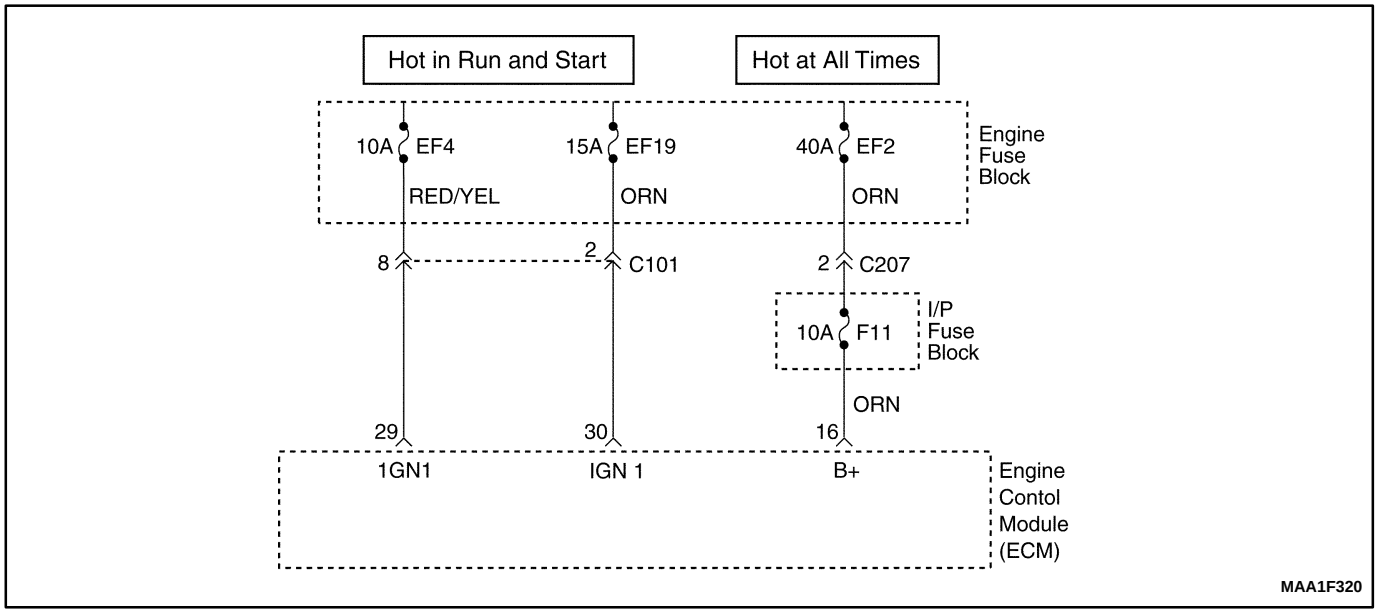
An Intermittent problem may be caused by a poor connection, rubbed through wire insulation, or wire that is broken inside the insulation.

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

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

DTC P0562 – System Voltage (Engine Side) Too Low

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	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?	1,400rpm 10V	Go to *Step 3*	Go to *Step 8*
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?	1,400rpm 12V	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module(ECM) connector at the ECM. 3. Turn the Turn the ignition switch to ON with the engine OFF. 4 Using a DVM, measure the ignition voltage at the ignition feed circuit, terminal 29. Is the ignition voltage greater than the specified value?	10V	Go to *Step 5*	Go to *Step 6*
5	Check for a malfunctioning connection at the ECM harness terminals and repair as necessary. Is a repair necessary?	–	Go to *Step 8*	Go to *Step 7*
6	Repair the poor connection (high resistance) in the ignition feed circuit. Is the repair complete?	–	Go to *Step 8*	–
7	Replace the ECM. Is the replacement complete?	–	Go to *Step 8*	–
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 ad specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?	–	Go to *Step 9*	Go to *Step 2*
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 7 at the ECM. A system voltage Diagnostic Trouble Code (DTC) sill set whenever the voltage is below a calibrated value.

Conditions for Setting the DTC

- Ignition ON.
- The ignition voltage is greater than 16 volt.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.
- Disconnecting the ECM battery feed for more than 10 seconds.

Diagnostic Aids

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

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

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

DTC P0563 – System Voltage (Engine Side) Too High

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	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?	1,400rpm 10V	Go to *Step 3*	Go to *Step 8*
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?	1,400rpm 12V	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Turn the ignition switch to LOCK. 2. Disconnect the engine control module(ECM) connector at the ECM. 3. Turn the Turn the ignition switch to ON with the engine OFF. 4. Using a DVM, measure the ignition voltage at the ignition feed circuit, terminal 29. Is the ignition voltage greater than the specified value?	10V	Go to *Step 5*	Go to *Step 6*
5	Check for a malfunctioning connection at the ECM harness terminals and repair as necessary. Is a repair necessary?	–	Go to *Step 8*	Go to *Step 7*
6	Repair the poor connection (high resistance) in the ignition feed circuit. Is the repair complete?	–	Go to *Step 8*	–
7	Replace the ECM. Is the replacement complete?	–	Go to *Step 8*	–
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 ad specified in the supporting text. Does the scan tool indicate that this diagnostic has run and passed?	–	Go to *Step 9*	Go to *Step 2*
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 ENGINE CONTROL MODULE CHECKSUM ERROR

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 after 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), 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, transaxle, transaxle 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 checksum.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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.

DTC P0601– Engine Control Module Checksum Error

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) 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 replacement complete?	–	Go to *Step 3*	–
3	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 ad 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

DIAGNOSTIC TROUBLE CODE (DTC) – P0604 ENGINE CONTROL MODULE INTERNAL/EXTERNAL RAM ERROR

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 after 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), 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, transaxle, transaxle 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 checksum.

Action taken when The DTCs 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 four 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.

DTC P0604 – Engine Control Module RAM Error

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) 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 replacement complete?	–	Go to *Step 3*	–
3	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 ad 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

DIAGNOSTIC TROUBLE CODE (DTC) – P0605 ENGINE CONTROL MODULE NMVY WRITE ERROR

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 after 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), 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, transaxle, transaxle 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 checksum.

Action taken when The DTCs 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 four 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.

DTC P0605 Engine Control Module NMVY Write Error

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) 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 replacement complete?	–	Go to *Step 3*	–
3	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 ad 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

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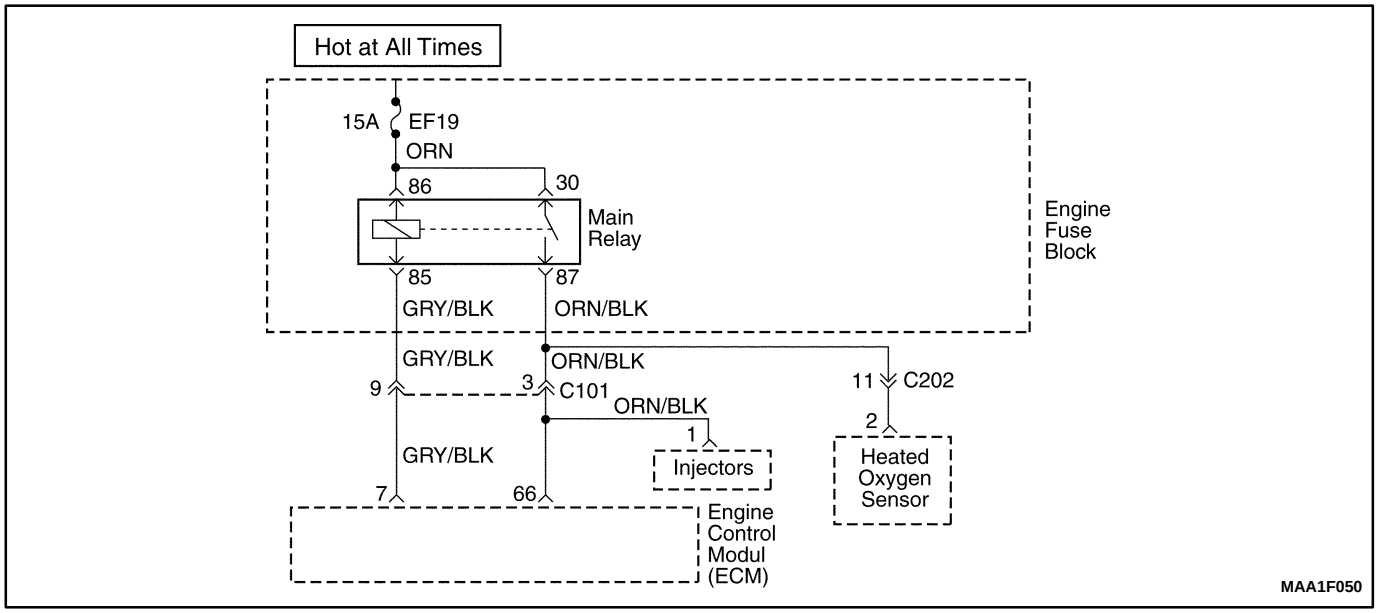


DIAGNOSTIC TROUBLE CODE (DTC) – P1610 MAIN RELAY HIGH VOLTAGE

Circuit Description

When the ignition switch to ON, main relay will grounded to ECM internal ground by ECM controlling.

A system voltage Diagnostic Trouble Code (DTC) will set whenever the voltage is below a calibrated value.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Main relay wiring harness high voltage.

Action Taken When The DTCs 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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Using the scan tool can clear DTC(s).

Diagnostic Aids

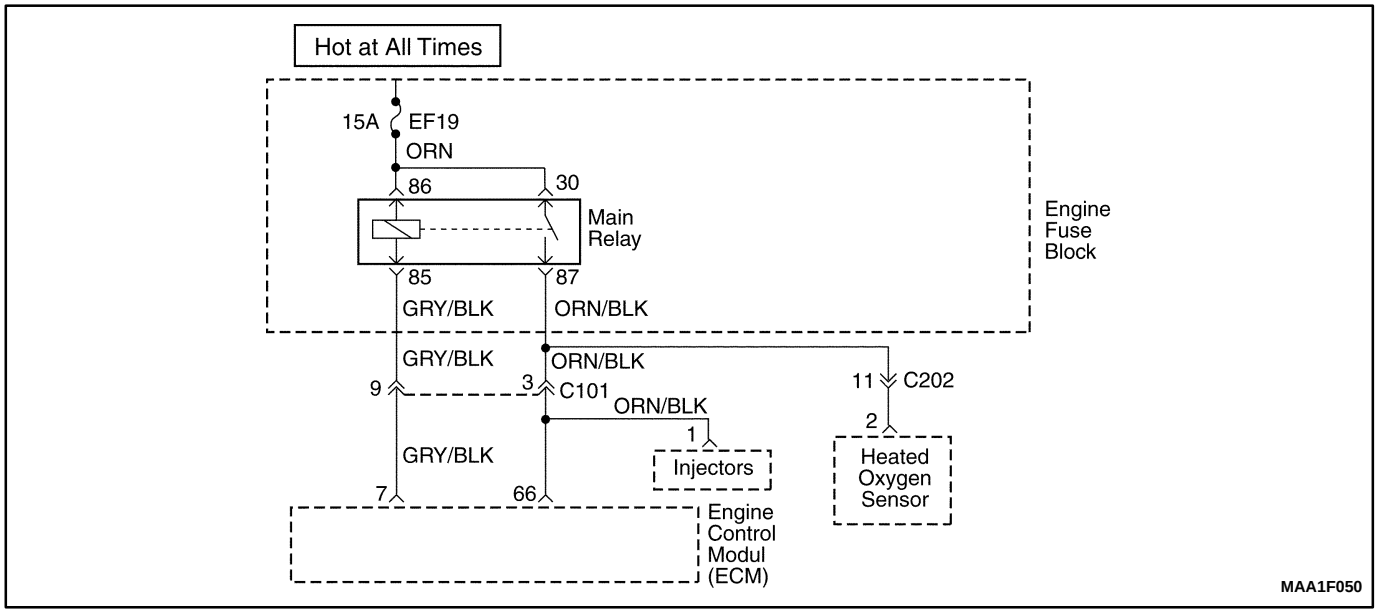
Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

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 P1610 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.

DTC P1610 – Main Relay High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Disconnect the main relay. 2. Measure the resistance between main relay terminals 85 and 86. Does the resistance within the specified value?	75~85Ω	Go to *Step 3*	Go to *Step 6*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 85 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM wiring harness connector. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 85 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 5*	Go to *Step 7*
5	Repair a high voltage between the ECM wiring connector terminal 7 and main relay terminal 85. Is the repair complete?	–	Go to *Step 7*	–
6	Replace the main relay. Is the replacement complete?	–	Go to *Step 7*	–
7	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 8*	Go to *Step 2*
8	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1611 MAIN RELAY LOW VOLTAGE

Circuit Description

When the ignition switch to ON, main relay will grounded to ECM internal ground by ECM controlling.

A system voltage Diagnostic Trouble Code (DTC) will set whenever the voltage is below a calibrated value.

Conditions for Setting the DTC

- This DTC can be stored in “key-on” status.
- Main relay wiring harness high voltage.

Action Taken When The DTCs Sets

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

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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.
- Using the scan tool can clear DTC(s).

Diagnostic Aids

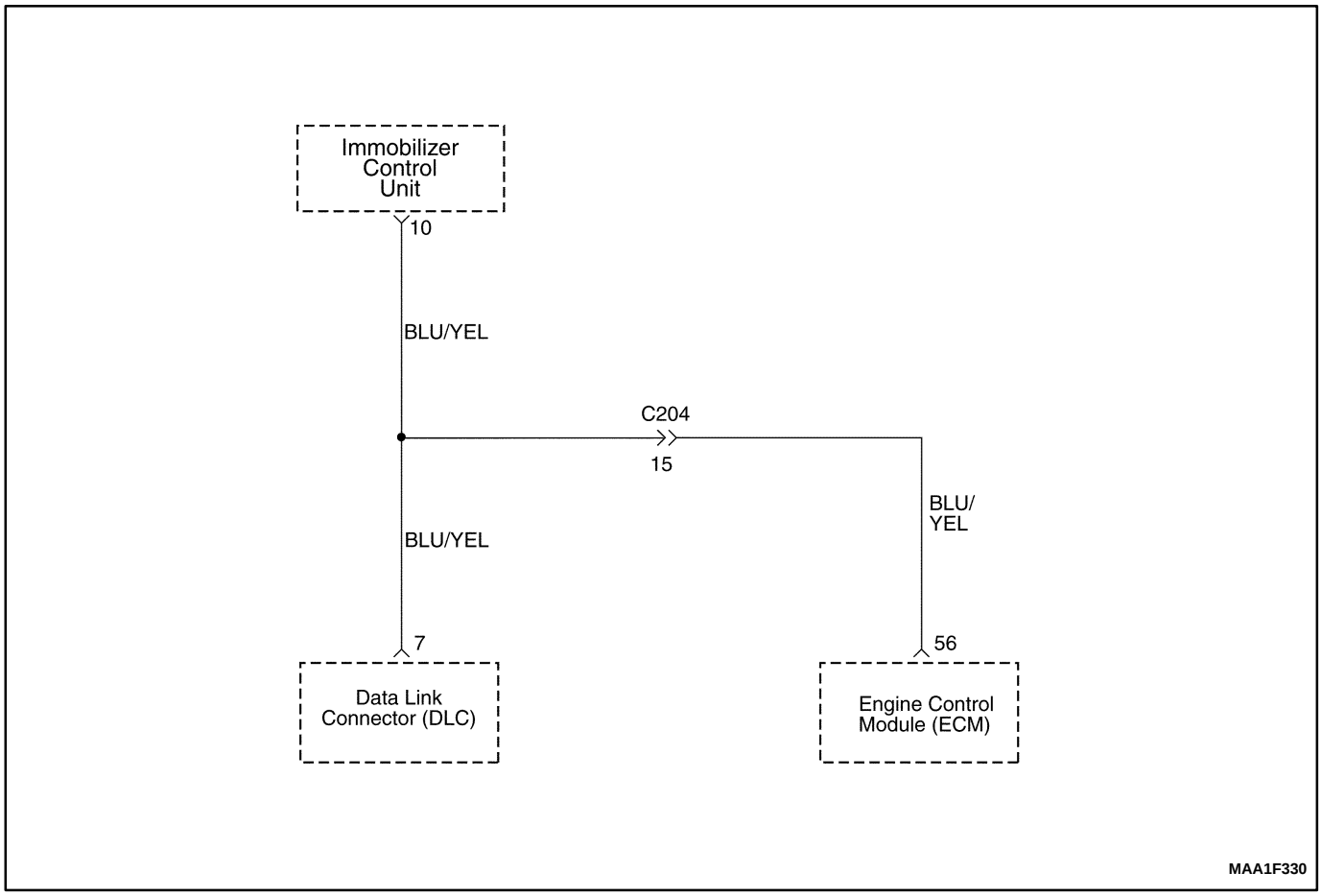
Inspect harness connectors for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal-to-wire connection at the ECM.

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 P1611 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.

DTC P1611 – Main Relay Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Disconnect the main relay. 2. Measure the resistance between main relay terminals 85 and 86. Does the resistance within the specified value?	75~85Ω	Go to *Step 3*	Go to *Step 6*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at terminal 85 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 4*	Go to "Diagnostic Aids"
4	1. Turn the ignition switch to LOCK. 2. Disconnect the ECM wiring harness connector. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal 85 in the relay harness connector. Does the test light illuminate?	–	Go to *Step 5*	Go to *Step 7*
5	Repair a high voltage between the ECM wiring connector terminal 7 and main relay terminal 85. Is the repair complete?	–	Go to *Step 7*	–
6	Replace the main relay. Is the replacement complete?	–	Go to *Step 7*	–
7	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 8*	Go to *Step 2*
8	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1628 IMMOBILIZER NO SUCCESSFUL COMMUNICATION

Circuit Description

When the ignition switch is turned to ON, the key tested by immobilizer anti-theft system. While the key code is being read by immobilizer control unit or integrated anti-theft control unit, the engine can start run with any key that will turn the lock cylinder. the key code is read and compared with key codes that have been stored in the memory of the immobilizer control unit. If a valid key is detected, the immobilizer control unit sends a serial data release message to the Engine Control Module (ECM). Included in the release message is an identification (ID) code which assures that neither the immobilizer control unit nor the ECM have been substituted to defeat the system. If the ECM receives an invalid release message, the ECM performs the following action:

- Disable the fuel injector circuit.
- Disable the fuel pump circuit.
- Disable the ignition coil.
- A Diagnostic Trouble Code (DTC) will stored if detect communication link failure between the ECM and immobilizer control unit.

Conditions for Setting the DTC

- Ignition switch is turned to ON.
- Immobilizer option auto detected.
- ECM release time window(1.5 or 2 seconds) expired.
- Vehicle Speed Sensor (VSS) signal is less than 512 km/h.

Action Taken When the DTC Sets

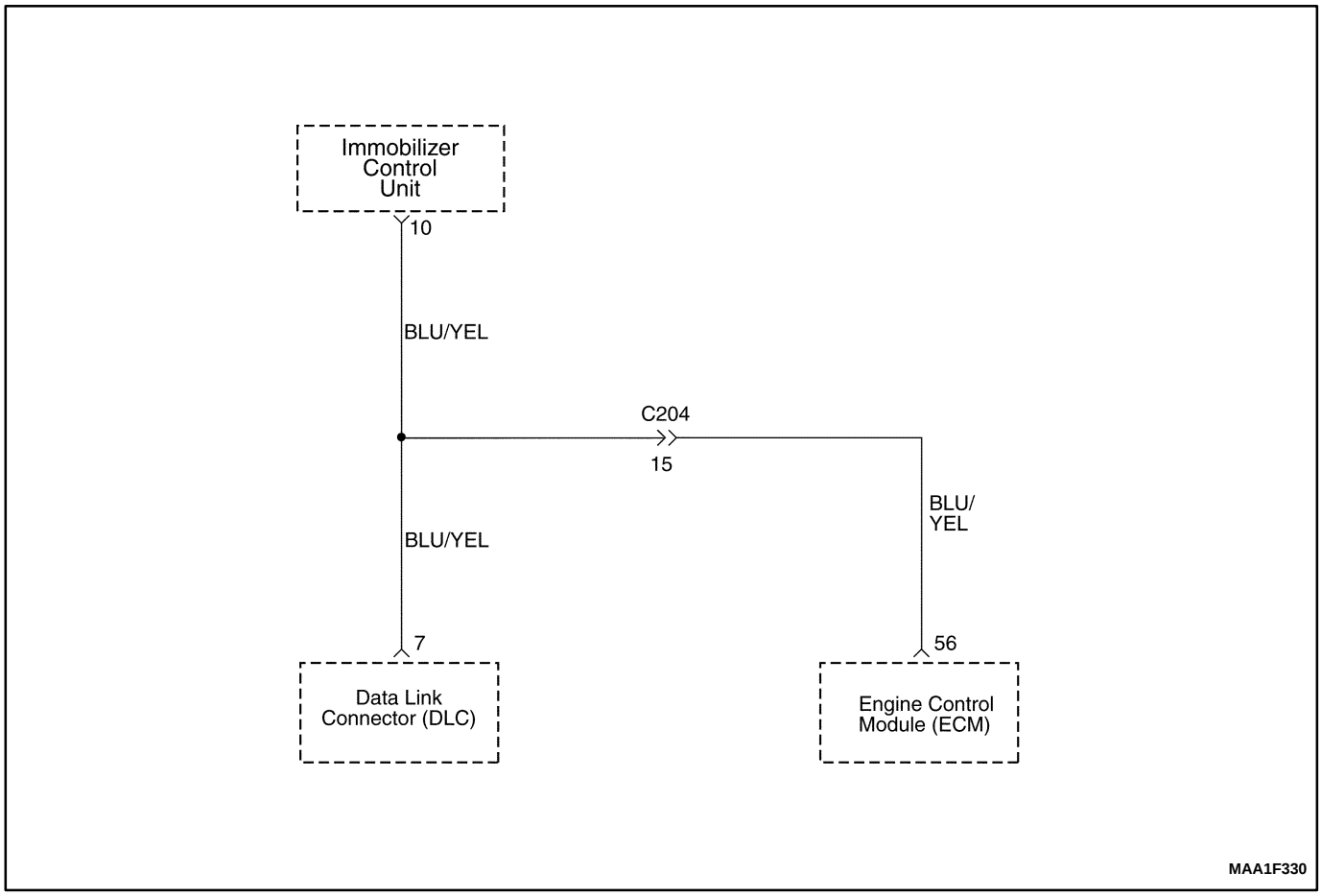
- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame data.

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.

DTC P1628 – Immobilizer No Successful Communication

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition OFF. 2. Install a scan too to the Data Link Connector (DLC). 3. Turn the ignition ON. 4. Select IMMOBILIZER DIAGNOSIS STATUS from the scan tool menu. Is the communication established between the scan tool and the immobilizer control unit?	–	Go to *Step 3*	Go to *Section 9T, Immobilizer Anti-Theft System*
3	1. Turn the ignition OFF. 2. Disconnect the Immobilizer Control Unit and Engine Control Module (ECM) connectors. 3. Measure the resistance between terminal 7 of immoblizer control unit and terminal 56 of the ECM. Is the resistance within the specified value?	0 Ω	Go to *Step 5*	Go to *Step 4*
4	Repair an open circuit between terminal 7 of immobilizer control unit and terminal 56 of the ECM. Is the repair complete?	–	Go to *Step 8*	–
5	Check the terminals in immobilizer control unit and the ECM for damages and repair as needed. Is the repair complete?	–	Go to *Step 8*	Go to *Step 6*
6	Replace the immobilizer control unit. Is the repair complete?	–	Go to *Step 8*	Go to *Step 7*
7	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 8*	–
8	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 9*	Go to *Step 2*
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) – P1629 IMMOBILIZER WRONG COMPUTATION

Circuit Description

When the ignition switch is turned to ON, the key tested by immobilizer anti-theft system. While the key code is being read by immobilizer control unit or integrated anti-theft control unit, the engine can start run with any key that will turn the lock cylinder. the key code is read and compared with key codes that have been stored in the memory of the immobilizer control unit. If a valid key is detected, the immobilizer control unit sends a serial data release message to the Engine Control Module (ECM). Included in the release message is an identification (ID) code which assures that neither the immobilizer control unit nor the ECM have been substituted to defeat the system. If the ECM receives an invalid release message, the ECM performs the following action:

- Disable the fuel injector circuit.
- Disable the fuel pump circuit.
- Disable the ignition coil.

A Diagnostic Trouble Code (DTC) will stored if detect communication link failure between the ECM and immobilizer control unit.

Conditions for Setting the DTC

- Ignition switch is turned to ON.
- Immobilizer option auto detected.
- ECM release time window(1.5 or 2 seconds) expired.
- Vehicle Speed Sensor (VSS) signal is less than 512 km/h.

Action Taken When the DTC Sets

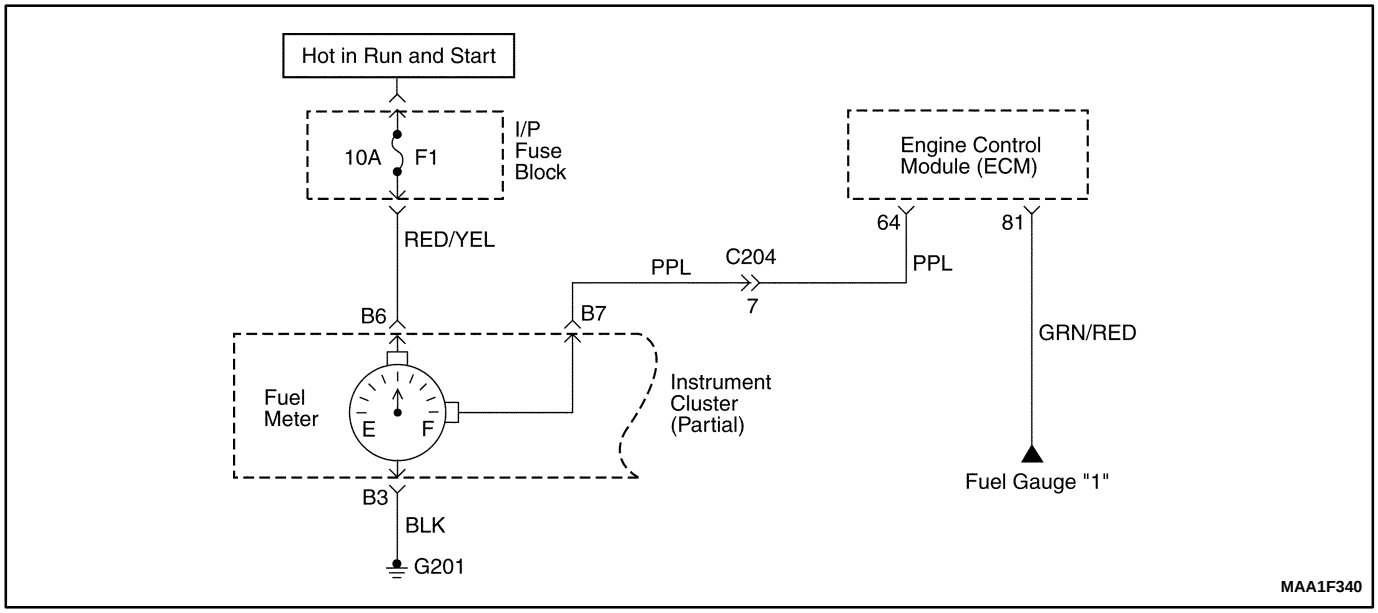
- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame data.

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.

DTC P1629 – Immobilizer Wrong Computation

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition OFF. 2. Install a scan too to the Data Link Connector (DLC). 3. Turn the ignition ON. 4. Select IMMOBILIZER DIAGNOSIS STATUS from the scan tool menu. Is the communication established between the scan tool and the immobilizer control unit?	–	Go to *Step 3*	Go to *Section 9T, Immobilizer Anti-Theft System*
3	1. Turn the ignition OFF. 2. Disconnect the Immobilizer Control Unit and Engine Control Module (ECM) connectors. 3. Measure the resistance between terminal 7 of immoblizer control unit and terminal 56 of the ECM. Is the resistance within the specified value?	0 Ω	Go to *Step 5*	Go to *Step 4*
4	Repair an open circuit between terminal 7 of immobilizer control unit and terminal 56 of the ECM. Is the repair complete?	–	Go to *Step 8*	–
5	Check the terminals in immobilizer control unit and the ECM for damages and repair as needed. Is the repair complete?	–	Go to *Step 8*	Go to *Step 6*
6	Replace the immobilizer control unit. Is the repair complete?	–	Go to *Step 8*	Go to *Step 7*
7	1. Turn the ignition OFF. 2. Replace the ECM. Is the repair complete?	–	Go to *Step 8*	–
8	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 9*	Go to *Step 2*
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) – P0656 FUEL LEVEL GAUGE CIRCUIT FAULT

Circuit Description

The engine control module(ECM) uses the fuel level input from the Fuel Level Sensor to calculate expected vapor pressures within the fuel system. Vapor pressure vary as the fuel level changes. Vapor pressure is critical in determining if the evaporative emission (EVAP) system is operating properly. Fuel Level is also used to determine if the Fuel level is too high or too low to be able to accurately detect EVAP system faults. This Diagnostic Trouble Code(DTC) detects a stuck fuel level sender.

Conditions for Setting the DTC

- Fuel Level Sensor voltage is higher than 4.8V.
- Fuel Level Sensor circuit high voltage.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will not illuminate.
- The ECM will store conditions which were present when the DTC was set as Failure Records data only.
- This information will not be stored in the Freeze Frame 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

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

Inspect the wiring harness for damage.

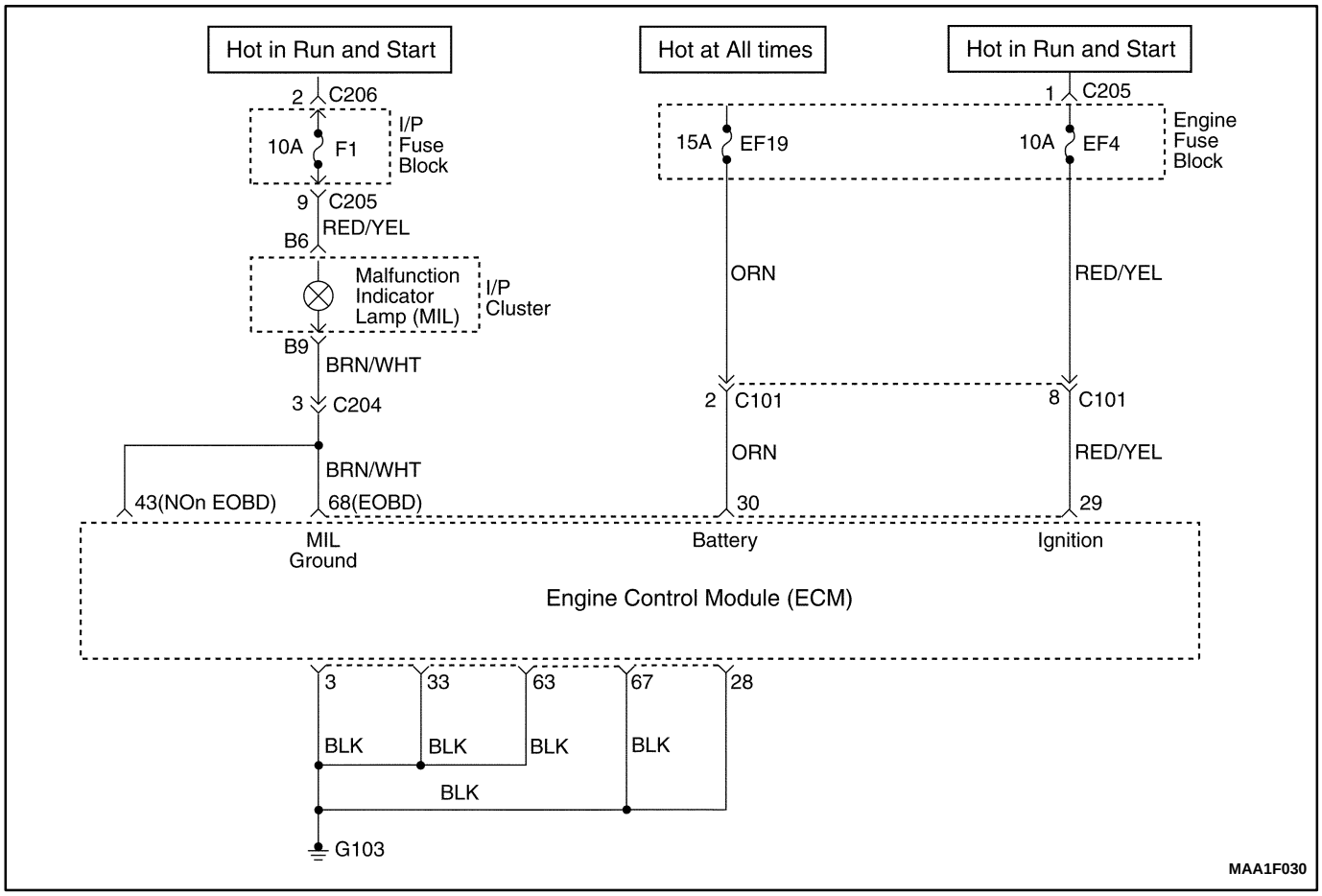
A stuck Fuel Level Sensor may cause the DTC to set. If DTC P0656 cannot be duplicated, the information included in the Freeze Frame data can be useful in determining vehicle operating conditions when the DTC was first set.

Resistance check for the Fuel Level Sensor.

- Empty = 100 ohms or over.
- Half full = about 32.5 ohms.
- Full = 10 ohms or less.

DTC P0656 – Fuel Level Gauge Circuit Fault

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. connect the scan tool to the DLC. 3. Turn the Turn the ignition switch to ON. Are any Diagnostic Trouble Codes (DTCs) displayed?	–	Go to *Step 3*	Try with another scan tool
3	Refer to the applicable DTC table. Start with the DTC with the lowest numerical value and move up. Is the DTC identified as valid trouble code P0656?	–	Go to *Step 4*	Go to applicable DTC table
4	1. Disconnect the cluster connector 2. Turn the ignition switch to LOCK. 3. Check for an open or short to ground in the wire between the cluster connector terminal C14 and ground. Is the problem found?	–	Go to *Step 6*	Go to *Step 5*
5	1. Turn the ignition switch to LOCK. 2. Check for short to battery in the wire between the the cluster connector terminal C14 and ground. Is the problem found?	–	Go to *Step 6*	Go to *Step 7*
6	1. Change the between cluster and ECM or repair the connector terminal as needed. 2. Clear any DTCs from ECM. 3. Perform the diagnostic system check. Is the repair complete?	–	System OK	–
7	1. Replace the cluster. 2. Clear any DTCs from ECM. 3. Perform the diagnostic system check. Are any Diagnostic Trouble Codes (DTCs) displayed?	–	Go to *Step 8*	System OK
8	Replace the ECM. Is the replcement complete?	–	Go to *Step 9*	–
9	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 10*	Go to *Step 2*
10	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1660 MALFUNCTION INDICATOR LAMP (MIL) HIGH VOLTAGE

Circuit Description

When the ignition switch to ON, the Malfunction Indicator Lamp (MIL) is ON steady.

When the engine cranking, the Malfunction Indicator Lamp (MIL) is OFF after one flashing time.

If a system have some difficulties, the Malfunction Indicator Lamp (MIL) is ON.

Conditions for Setting the DTC

- The Malfunction Indicator Lamp (MIL) wiring harness high voltage.

Action Taken When The DTCs 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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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

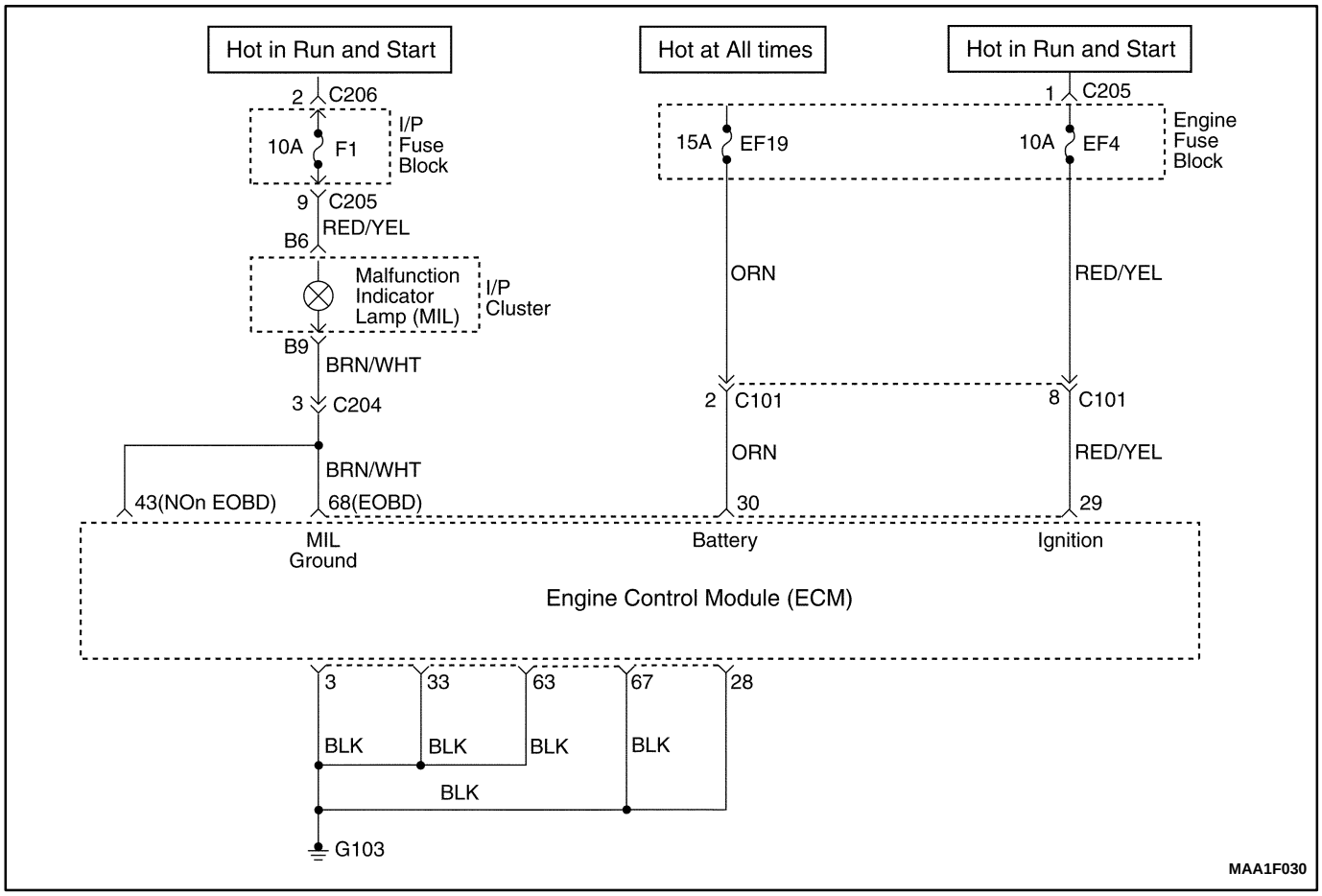
An Intermittent problem may be caused by a poor connection, rubbed through wire insulation, or wire that is broken inside the insulation.

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

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

DTC P1660 – Malfunction Indicator Lamp (MIL) High Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. Disconnect the cluster wiring connector. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal A7 in the harness connector. Does the resistance within the specified value?	0 Ω	Go to *Step 3*	Go to *Step 6*
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at ECM wiring connector terminal 68. Does the test light illuminate?	–	Go to *Step 4*	Go to Step 5
4	1. Turn the ignition switch to LOCK. 2. Replace the cluster. Is the replacement complete?	–	Go to *Step 6*	–
5	Repair a short to battery between the ECM wiring connector terminal 68 and cluster wiring connector terminal B9. Is the repair complete?	–	Go to *Step 6*	–
6	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 7*	Go to *Step 2*
7	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK



DIAGNOSTIC TROUBLE CODE (DTC) – P1661 MALFUNCTION INDICATOR LAMP (MIL) LOW VOLTAGE

Circuit Description

When the ignition switch to ON, the Malfunction Indicator Lamp (MIL) is ON steady.

When the engine cranking, the Malfunction Indicator Lamp (MIL) is OFF after one flashing time.

If a system have some difficulties, the Malfunction Indicator Lamp (MIL) is ON.

Conditions for Setting the DTC

- The Malfunction Indicator Lamp (MIL) wiring harness low voltage.

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.

Conditions for Clearing the MIL/DTC

- The MIL will turn off after four 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 wire that is broken inside the insulation.

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

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

DTC P1661 – Malfunction Indicator Lamp (MIL) Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On-Board Diagnostic (EOBD) System Check. Is the system check complete?	–	Go to *Step 2*	Go to "On-Board Diagnostic System Check"
2	1. Turn the ignition switch to LOCK. 2. Disconnect the cluster wiring connector. 3. With the test light, connected to ground, probe the ignition feed circuit, at terminal A7 in the harness connector. Does the resistance within the specified value?	–	Go to Step 3	Go to Step 6
3	1. Turn the ignition switch to LOCK. 2. With the test light, connected to ground, probe the ignition feed circuit, at ECM wiring connector terminal 39. Does the test light illuminate?	–	Go to *Step 4*	Go to *Step 5*
4	1. Turn the ignition switch to LOCK. 2. Replace the cluster. Is the replacement complete?	–	Go to *Step 6*	–
5	Repair a short to ground or open between the ECM wiring connector terminal 39 and cluster wiring connector terminal A7. Is the repair complete?	–	Go to *Step 6*	–
6	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 7*	Go to *Step 2*
7	Check if any additional DTCs are set. Are any DTCs displayed that that have not been diagnosed?	–	Go to applicable DTC table	System OK