01–16  EMISSION SYSTEM

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Evaporative Emission (EVAP) Control System
Engine room side

1 Catch tank
(See 01–16–11 CATCH TANK INSPECTION)

2 Purge solenoid valve
(See 01–16–11 PURGE SOLENOID VALVE REMOVAL/INSTALLATION)
(See 01–16–12 PURGE SOLENOID VALVE INSPECTION)
EMISSION SYSTEM

Fuel tank

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1 | Rollover valve  
(See 01–14–13 FUEL TANK INSPECTION) |
| 2 | Fuel shut-off valve  
(See 01–14–13 FUEL TANK INSPECTION) |
| 3 | Fuel tank pressure sensor  
(See 01–40A–40 FUEL TANK PRESSURE SENSOR INSPECTION [ZM])  
(See 01–40B–40 FUEL TANK PRESSURE SENSOR INSPECTION [FS]) |
| 4 | Charcoal canister  
(See 01–16–9 CHARCOAL CANISTER INSPECTION) |
| 5 | Canister drain cut valve (CDCV)  
(See 01–16–10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION) |
| 6 | Air filter  
(See 01–16–9 AIR FILTER INSPECTION) |
EMISSION SYSTEM

| 7 | Evaporative gas check valve (two-way)  |
|   | (See 01–16–8 EVAPORATIVE GAS CHECK VALVE (TWO-WAY) INSPECTION) |

**EGR System**

| 1 | EGR boost sensor  |
|   | (See 01–40A–38 EGR BOOST SENSOR INSPECTION [ZM]) |
|   | (See 01–40B–39 EGR BOOST SENSOR INSPECTION [FS]) |

| 2 | EGR boost sensor solenoid valve  |
|   | (See 01–16–17 EGR BOOST SENSOR SOLENOID VALVE INSPECTION) |

| 3 | EGR valve  |
|   | (See 01–16–15 EGR VALVE REMOVAL/INSTALLATION)  |
|   | (See 01–16–15 EGR VALVE INSPECTION) |
Positive Crankcase Ventilation (PCV) System

4 EGR pipe

1 PCV valve
(See 01–16–18 POSITIVE CRANKCASE VENTILATION (PCV VALVE INSPECTION))

2 Ventilation hose

ZM

FS
EMISSION SYSTEM

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM DIAGRAM

- PURGE SOLENOID VALVE
- CHARCOAL CANISTER
- CATCH TANK
- CDCV
- AIR FILTER
- EVAPORATIVE GAS CHECK VALVE (TWO-WAY)
- ROLLOVER VALVE
- FUEL SHUT-OFF VALVE
- FUEL TANK PRESSURE SENSOR
- TO PCM
EMISSION SYSTEM

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION

1. Raise the rear of the vehicle and support it with safety stands.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

<table>
<thead>
<tr>
<th>1</th>
<th>Evaporative gas check valve (two-way)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Air filter</td>
</tr>
<tr>
<td>3</td>
<td>CDCV</td>
</tr>
<tr>
<td>4</td>
<td>Charcoal canister insulator</td>
</tr>
<tr>
<td>5</td>
<td>Charcoal canister</td>
</tr>
<tr>
<td>6</td>
<td>Evaporative hose</td>
</tr>
<tr>
<td>7</td>
<td>Fuel tank pressure sensor</td>
</tr>
</tbody>
</table>

A3J011601074W03

N.m (kgf cm, in-lbf)
EMISSION SYSTEM

1. Remove the check valve (two-way).
2. Attach an air hose to the SST.
3. Set the SST to port A as shown in the figure.
4. Verify that there is airflow from port B when pressure of \(+0.99 \text{ kPa} (+7.4 \text{ mmHg}, +0.29 \text{ inHg})\) is applied to port A.
   - If there is no airflow, replace the evaporative gas check valve (two-way).
5. Verify that there is airflow from port A when pressure of \(+0.99 \text{ kPa} (+7.4 \text{ mmHg}, +0.29 \text{ inHg})\) is applied to port C.
   - If there is no airflow, replace the evaporative gas check valve (two-way).

| 1 | Evaporative gas check valve (two-way) |
| 2 | Air filter |
| 3 | CDCV |
| 4 | Charcoal canister insulator |
| 5 | Charcoal canister |
| 6 | Evaporative hose |
| 7 | Fuel tank pressure sensor |

EVAPORATIVE GAS CHECK VALVE (TWO-WAY) INSPECTION
EMISSION SYSTEM

AIR FILTER INSPECTION

1. Remove the air filter.
2. Blow from port A and verify that there is airflow from port B.
   • If not as specified, replace the air filter.
3. Blow from port B and verify that there is airflow from port A.
   • If not as specified, replace the air filter.

CHARCOAL CANISTER INSPECTION

Caution
• Do not apply the pressure more than 20 kPa (0.2 kgf/cm², 2.8 psi) to the charcoal canister, or the charcoal canister will be damaged.

1. Remove the charcoal canister. (See 01–16–7 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)
2. Plug ports A and C, then blow air into port B.
3. Verify that there is no air leakage from the case.
   • If not as specified, replace the charcoal canister.

CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Raise the rear of the vehicle and support it with safety stands.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

Evaporative Hose Installation Note
1. Install the evaporative hose until it contacts the stopper.
EMISSION SYSTEM

CANISTER DRAIN CUT VALVE (CDCV) INSPECTION

Simulation Test
1. Carry out the “Evaporative Emission Control System Inspection” (See 01–03A–56 Evaporative System Leak Inspection Using Vacuum Pump.) (See 01–03B–55 Evaporative System Leak Inspection Using Vacuum Pump.)
   • If not as specified, perform the following inspection for the CDCV.

Airflow Inspection

Note
• Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the CDCV. (See 01–16–9 CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION.)
3. Inspect airflow between the ports under the following conditions.
   • If not as specified, replace the CDCV.
   • If as specified but the “Simulation Test” is failed, inspect evaporative hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.

<table>
<thead>
<tr>
<th>Step</th>
<th>Terminal</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>B+</td>
<td>GND</td>
</tr>
</tbody>
</table>

Circuit Open/Short Inspection
1. Remove the PCM.
2. Connect the SST (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

Tightening torque
7.9—10.7 N·m (80—110 kgf·cm, 69.5—95.4 in·lbf)
4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and SST (104 Pin Breakout Box) terminals with ohmmeter leads.

Open circuit
• GND circuit (CDCV connector terminal B and PCM connector terminal 18 through common connector)
• Power circuit (CDCV connector terminal A and main relay connector terminal D)

Short circuit
• GND circuit (CDCV connector terminal B and PCM connector terminal 18 through common connector to GND)
• Power circuit (CDCV connector terminal A and main relay connector terminal D to GND)

5. Install the CDCV.
6. Connect the negative battery cable.

CATCH TANK INSPECTION
1. Remove the catch tank.
2. Plug the purge solenoid valve side port of the catch tank.
3. Blow from the charcoal canister side port and verify that there is no air leakage from the case.
   • If not as specified, replace the catch tank.

PURGE SOLENOID VALVE REMOVAL/INSTALLATION
1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

    1 Evaporative hose
       (See 01–16–11 Evaporative Hose Installation Note)
    2 Vacuum hose
       (See 01–16–11 Vacuum Hose Installation Note)
    3 Purge solenoid valve

Vacuum Hose Installation Note
1. Install the vacuum hose until it contacts the stopper.

Evaporative Hose Installation Note
1. Attach the evaporative hose until it contacts the stopper.
EMISSION SYSTEM

PURGE SOLENOID VALVE INSPECTION
Airflow Inspection

Note

• Perform the following test only when directed.

1. Remove the purge solenoid valve. (See 01–16–11 PURGE SOLENOID VALVE REMOVAL/INSTALLATION.)
2. Inspect airflow between the ports under the following conditions.
   • If not as specified, replace the purge solenoid valve.
   • If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.

<table>
<thead>
<tr>
<th>Step</th>
<th>Terminal</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>○</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>○</td>
</tr>
</tbody>
</table>

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the SST (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.

   Tightening torque
   7.9—10.7 N·m (80—110 kgf·cm, 69.5—95.4 in·lbf)

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and SST (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   • Power circuit (purge solenoid valve connector terminal A and main relay connector terminal D through common connector)
   • Control circuit (purge solenoid valve connector terminal B and PCM connector terminal 67 through common connector)
EMISSION SYSTEM

Short circuit
- Power circuit (purge solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
- Control circuit (purge solenoid valve connector terminal B and PCM connector terminal 67 through common connector to GND)
5. Install the purge solenoid valve.
6. Connect the negative battery cable.

FUEL-FILLER CAP INSPECTION

leakage inspection
1. Perform the following SST (Evaporative Emission System Tester MZ254AT3641) self-test.

   Note
   - If the tester does not work correctly during self-test, see the tester operators manual for more detailed procedures.

   (1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester display should be off at this time.
   (2) Connect the long hose (part of SST) to the tester.
   (3) Connect the manifold assembly (part of SST) to the long hose as shown.
   (4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads 10 to 12 psi (preset at factory).
      - If not, see the tester operators manual to contact tester manufacturer.
   (5) Press the ON/OFF switch to turn on the SST and make sure the left display reads 0.0.
   (6) Turn the control valve on the tester to the FILL position.
   (7) Verify the left display reading is within 13.9 to 14.0 inches of water.
      - If not, adjust the pressure using the regulator knob located on the right side of the tester.
   (8) Turn the control valve to TEST position and press the START switch.
   (9) After the 2-minute countdown (left display) is completed, the right display shows the total pressure loss for that period. A 0.5 inch of water loss is acceptable on the self-test.
      - If the loss is more than 0.5 inch of water, perform one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of SST).
2. Press the RESET switch to set the left display reading to 0.0.
3. Connect the fuel cap receiver assembly (part of SST) to the manifold assembly and fuel-filler cap from the vehicle.
   - If the fuel-filler cap is not a genuine part, replace it.
4. Turn the control valve to the FILL position.
5. Wait (maximum 20 s) until the left display reads 13.9 to 14 inches of water.
   - If the reading is slightly below, adjust it using the regulator knob.
   - If the reading is far below, the fuel-filler cap has leak. Replace it.
6. Turn the control valve to the TEST position and press the START switch.
7. After the 2-minute countdown (left display) is completed, check the test result (the failed/ passed light on the tester).
   - If the green light turns on, the fuel-filler cap is OK.
   - If the red light turns on, the fuel-filler cap has leakage. Replace it.
8. Close the gas cylinder valve.
9. Turn the control valve to the FILL position.
10. Press the ON/OFF switch to turn off the tester.
EMISSION SYSTEM

EGR VALVE REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EGR valve connector</td>
</tr>
<tr>
<td>2</td>
<td>EGR valve</td>
</tr>
</tbody>
</table>

4. Connect the negative battery cable.

EGR VALVE INSPECTION

Resistance Inspection

Note
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Inspect resistance of the EGR valve coils.
   - If not as specified, replace the EGR valve.
   - If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Resistance (ohm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C—E</td>
<td>20—24</td>
</tr>
<tr>
<td>C—A</td>
<td></td>
</tr>
<tr>
<td>D—B</td>
<td></td>
</tr>
<tr>
<td>D—F</td>
<td></td>
</tr>
</tbody>
</table>

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EMISSION SYSTEM

Circuit Open/Short Inspection
1. Remove the PCM.
2. Connect the SST (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.
   Tightening torque
   7.9—10.7 N·m (80—110 kgf·cm, 69.5—95.4 in·lbf)

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and SST (104 Pin Breakout Box) terminals with ohmmeter leads.
   Open circuit
   • Control circuit (EGR valve connector terminal E and PCM connector terminal 68)
   • Control circuit (EGR valve connector terminal A and PCM connector terminal 72)
   • Control circuit (EGR valve connector terminal B and PCM connector terminal 46)
   • Control circuit (EGR valve connector terminal F and PCM connector terminal 56)
   • Power circuit (EGR valve connector terminal C or D and main relay connector terminal D through common connector)
   Short circuit
   • Control circuit (EGR valve connector terminal E and PCM connector terminal 68 to GND)
   • Control circuit (EGR valve connector terminal A and PCM connector terminal 72 to GND)
   • Control circuit (EGR valve connector terminal B and PCM connector terminal 46 to GND)
   • Control circuit (EGR valve connector terminal F and PCM connector terminal 56 to GND)
   • Power circuit (EGR valve connector terminal C or D and main relay connector terminal D through common connector to GND)
5. Remove the EGR valve, and inspect for any damage or clogging. Replace the EGR valve if not as specified.
6. Connect the negative battery cable.
Airflow Inspection

Note

• Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the EGR boost sensor solenoid valve.
3. Inspect airflow between each port under the following conditions.
   • If not as specified, replace the EGR boost sensor solenoid valve.
   • If as specified, inspect the vacuum hoses for improper routing, kinks or leakage, and carry out the “Circuit Open/Short Inspection” and repair or replace the parts if necessary.

4. Connect the negative battery cable.

Circuit Open/Short Inspection

1. Remove the PCM.
2. Connect the SST (104 Pin Breakout Box) to the PCM as shown.
3. Tighten the connector attaching screw.
   
   **Tightening torque**
   
   7.9—10.7 N·m (80—110 kgf·cm, 69.5—95.4 in·lbf)

4. Inspect for an open or short circuit in the following wiring harnesses by probing the applicable sensor and SST (104 Pin Breakout Box) terminals with ohmmeter leads.

   **Open circuit**
   
   • Power circuit (EGR boost sensor solenoid valve connector terminal A and main relay connector terminal D through common connector)
   • Control circuit (EGR boost sensor solenoid valve connector terminal B and PCM connector terminal 98)

   **Short circuit**
   
   • Power circuit (EGR boost sensor solenoid valve connector terminal A and main relay connector terminal D through common connector to GND)
   • Control circuit (EGR boost sensor solenoid valve connector terminal B and PCM connector terminal 98 to GND)

5. Install the EGR boost sensor solenoid valve.
6. Connect the negative battery cable.
POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION

1. Remove the PCV valve.
2. Blow through the valve and verify that air flows as specified.
   • If not as specified, replace the PCV valve.

**Specification**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Airflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air applied from port A</td>
<td>Yes</td>
</tr>
<tr>
<td>Air applied from port B</td>
<td>No</td>
</tr>
</tbody>
</table>
WARM UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION

Note
• Make sure that no HO2S DTC has been detected. If detected, this inspection cannot be used for WU-TWC inspection.

1. Connect the WDS or equivalent and monitor PIDs as following.
   • Monitor the WU-TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.
2. Begin to monitor the appropriate PIDs.
3. Drive the vehicle for 10 min at 65—96 km/h [40—60 mph] to ensure the WU-TWC reaches operating temperature.
4. Stop the vehicle and leave in a safe place.
5. Let the engine at idle.
6. Record PIDs for 1 min.
7. Select the appropriate PIDs and read the graph.
8. Count the number of times (inversions) that the upstream HO2S graph line actually crosses the 0.5 V line.
9. Count the number of times (inversions) that the downstream HO2S graph line actually crosses the 0.5 V line.

Note
• Do not count the number of peaks. Refer to the illustration.

10. Using the following equation, calculate the value of ratio.

Equation
\[ \text{RATIO} = \frac{\text{Upstream HO2S inversion}}{\text{downstream HO2S inversion}} \]

• If the ratio is 2 or more or no downstream HO2S inversion, the WU-TWC is functioning properly.
• If the ratio is less than 2, the WU-TWC is not functioning properly. Replace the WU-TWC.

Upstream HO2S graphline example

![Upstream HO2S graphline example](image1)

![26 inversions](image2)
**EMISSION SYSTEM**

**Downstream HO2S graphline example 1**

Equation:
RATIO = 26 inversions (upstream HO2S inversions) ÷ 7 inversions (downstream HO2S inversions) = 3.7 (good WU-TWC)

**Downstream HO2S graphline example 2**

**Downstream HO2S graphline example 3**

Equation:
RATIO = 26 inversions (upper stream HO2S inversions) ÷ 19 inversions (downstream HO2S inversions) = 1.4 (deteriorated WU-TWC)