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|---|---|---|
| **Last Modified:** 7-13-2007 | | 1.6 C |
| **Service Category:** Engine/Hybrid System | **Section:** Engine Control | |
| **Model Year:** 2008 | **Model:** ES350 | **Doc ID:** RM000000SWG010X |
| **Title:** 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0451: Evaporative Emission Control System Pressure Sensor Range / Performance (2008 ES350) | | |

| | | |
|---|---|---|
| **DTC** | **P0451** | **Evaporative Emission Control System Pressure Sensor Range / Performance** |

| | | |
|---|---|---|
| **DTC** | **P0452** | **Evaporative Emission Control System Pressure Sensor / Switch Low Input** |

| | | |
|---|---|---|
| **DTC** | **P0453** | **Evaporative Emission Control System Pressure Sensor / Switch High Input** |

## DTC SUMMARY

| DTC NO. | MONITORING ITEM | MALFUNCTION DETECTION CONDITION | TROUBLE AREA | DETECTION TIMING | DETECTION LOGIC |
|---|---|---|---|---|---|
| P0451 | Pressure sensor noising | Sensor output voltage fluctuates frequently in a certain time period. | • Pump module<br>• Connector/wire harness (Pump module - ECM)<br>• ECM | • EVAP monitoring (engine switch off)<br>• Engine running | 2 trip |
| P0451 | Pressure sensor stuck | Sensor output voltage does not vary in a certain time period. | • Pump module<br>• Connector/wire harness (Pump module - ECM)<br>• ECM | • EVAP monitoring (engine switch off) | 2 trip |
| P0452 | Pressure sensor voltage low | Sensor output voltage is less than 0.45 V for 0.5 seconds. | • Pump module<br>• Connector/wire harness (Pump module - ECM)<br>• ECM | • EVAP monitoring (engine switch off)<br>• Engine switch on | 1 trip |
| P0453 | Pressure sensor voltage high | Sensor output voltage is more than 4.9 V for 0.5 seconds. | • Pump module<br>• Connector/wire harness (Pump module - ECM)<br>• ECM | • EVAP monitoring (engine switch off)<br>• Engine switch on | 1 trip |

**HINT:**

**The pressure sensor is built into the pump module.**

## DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) system INFO .

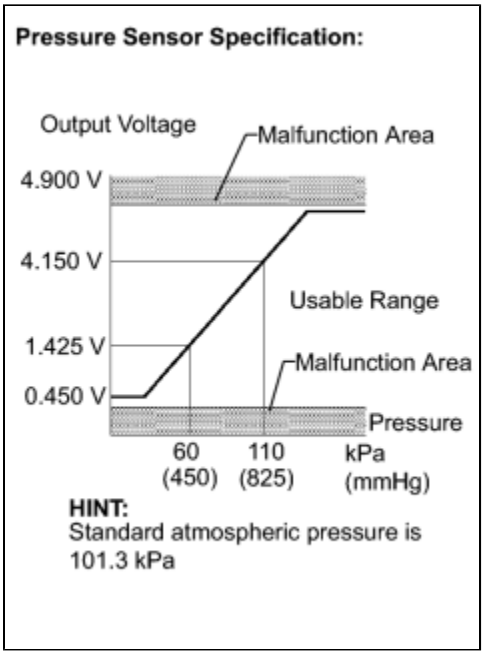
## MONITOR DESCRIPTION

- DTC P0451: Pressure sensor noising or stuck

  If the pressure sensor output voltage fluctuates rapidly for 10 seconds, the ECM stops the EVAP system monitor. The ECM interprets this as noise from the pressure sensor, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC.

  Alternatively, if the sensor output voltage does not change for 10 seconds, the ECM interprets this as the sensor being stuck, and stops the monitor. The ECM then illuminates the MIL and sets the DTC.

  (Both the malfunctions are detected by 2 trip detection logic).




- DTC P0452: Pressure sensor voltage low

  If the pressure sensor output voltage is below 0.45 V, the ECM interprets this as an open or short circuit in the pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).

- DTC P0453: Pressure sensor voltage high

  If the pressure sensor voltage output is 4.9 V or more, the ECM interprets this as an open or short circuit in the pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).

## MONITOR STRATEGY

| | |
|---|---|
| Related DTCs | P0451: Pressure sensor noise<br>P0451: Pressure sensor stuck<br>P0452: Pressure sensor low voltage<br>P0453: Pressure sensor high voltage |
| Required Sensors/Components | Pump module |
| Frequency of Operation | Once per driving cycle: P0451 sensor stuck<br>Continuous: P0451 sensor noising, P0452 and P0453 |
| Duration | 0.5 seconds: P0452, P0453<br>Within 15 seconds: P0451 |
| MIL Operation | Immediate: P0452, P0453<br>2 driving cycles: P0451 |

| | |
|---|---|
| Sequence of Operation | None |

## TYPICAL ENABLING CONDITIONS

**P0452 and P0453 (Pressure sensor chattering, low voltage, high voltage):**

| | |
|---|---|
| Monitor runs whenever following DTCs are not present: | None |
| Battery voltage | 8 V or more |
| Starter | OFF |
| Engine switch | ON |

**P0451 (Pressure sensor noise):**

| | |
|---|---|
| Atmospheric pressure | 70 kPa (525 mmHg) to 110 kPa (825 mmHg) |
| Battery voltage | 10.5 V or more |
| Intake air temperature | 4.4 to 35°C (40 to 95°F) |
| EVAP pressure sensor malfunction (P0452, P0453) | Not detected |
| Either of following conditions is met: | 1 or 2 |
| 1. Engine | Running |
| 2. Time after key off | 5, 7 or 9.5 hours |

**P0451 (Pressure sensor stuck):**

| | |
|---|---|
| Atmospheric pressure | Less than 70 kPa (525 mmHg), or 110 kPa (825 mmHg) or more |
| Battery voltage | 10.5 V or more |
| Intake air temperature | 4.4 to 35°C (40 to 95°F) |
| EVAP pressure sensor malfunction (P0452, P0453) | Not detected |
| Time after key off | 5, 7 or 9.5 hours |

## TYPICAL MALFUNCTION THRESHOLDS

**P0451: Pressure sensor noise**

| | |
|---|---|
| Frequency that EVAP pressure change is 0.3 kPa or more | 10 times or more in 10 seconds |

**P0451: Pressure sensor stuck**

| | |
|---|---|
| EVAP pressure change during reference pressure | Less than 1 kPa (0.75 mmHg) |

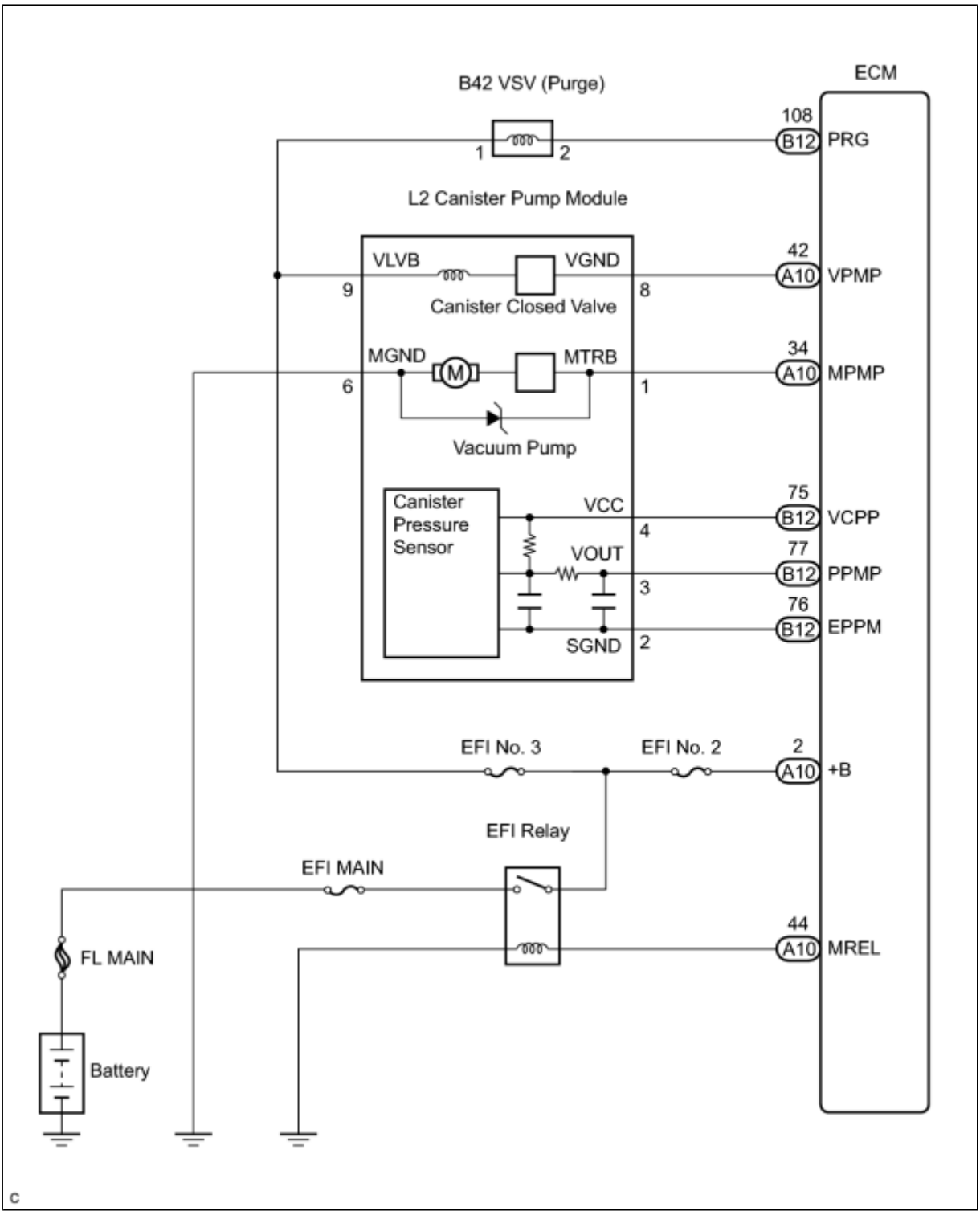
**P0452: Pressure sensor low voltage**

| | |
|---|---|
| EVAP pressure | Less than 42.11 kPa (315.82 mmHg) |

**P0453: Pressure sensor high voltage**

| | |
|---|---|
| EVAP pressure | More than 123.761 kPa (928.207 mmHg) |

## WIRING DIAGRAM



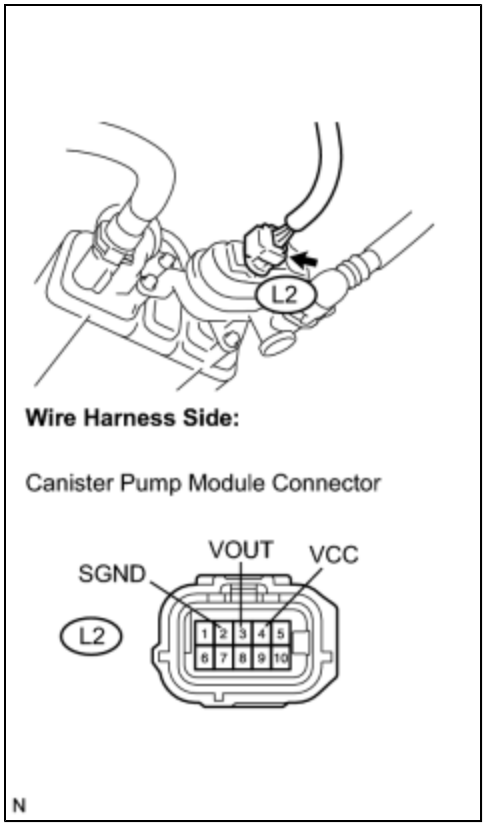

## INSPECTION PROCEDURE

**NOTICE:**

- When a vehicle is brought into a workshop, leave it as it is. Do not change the vehicle condition. For example, do not tighten the fuel tank cap.
- Do not disassemble the pump module.
- Techstream is required to conduct the following diagnostic troubleshooting procedure.

## PROCEDURE

| 1. | CHECK HARNESS AND CONNECTOR (PUMP MODULE - ECM) |
|---|---|




(a) Disconnect the L2 canister pump module connector.

(b) Turn the engine switch on (IG).

(c) Measure the voltage and resistance according to the value(s) in the table below.

Standard:

| TESTER CONNECTION | SPECIFIED CONDITION |
|---|---|
| L2-4 - Body ground | 4.5 to 5.0 V |
| L2-3 - Body ground | 4.5 to 5.0 V |
| L2-2 - Body ground | 100 Ω or less |

Result:

| TEST RESULT | SUSPECTED TROUBLE AREA | PROCEED TO |
|---|---|---|
| Voltage and resistance within standard ranges | Open in pressure sensor circuit | A |
| Voltage and resistance outside standard ranges | Open in wire harness/connector (ECM - pressure sensor) | B |

(d) Reconnect the canister pump module connector.

B ▶ CHECK HARNESS AND CONNECTOR

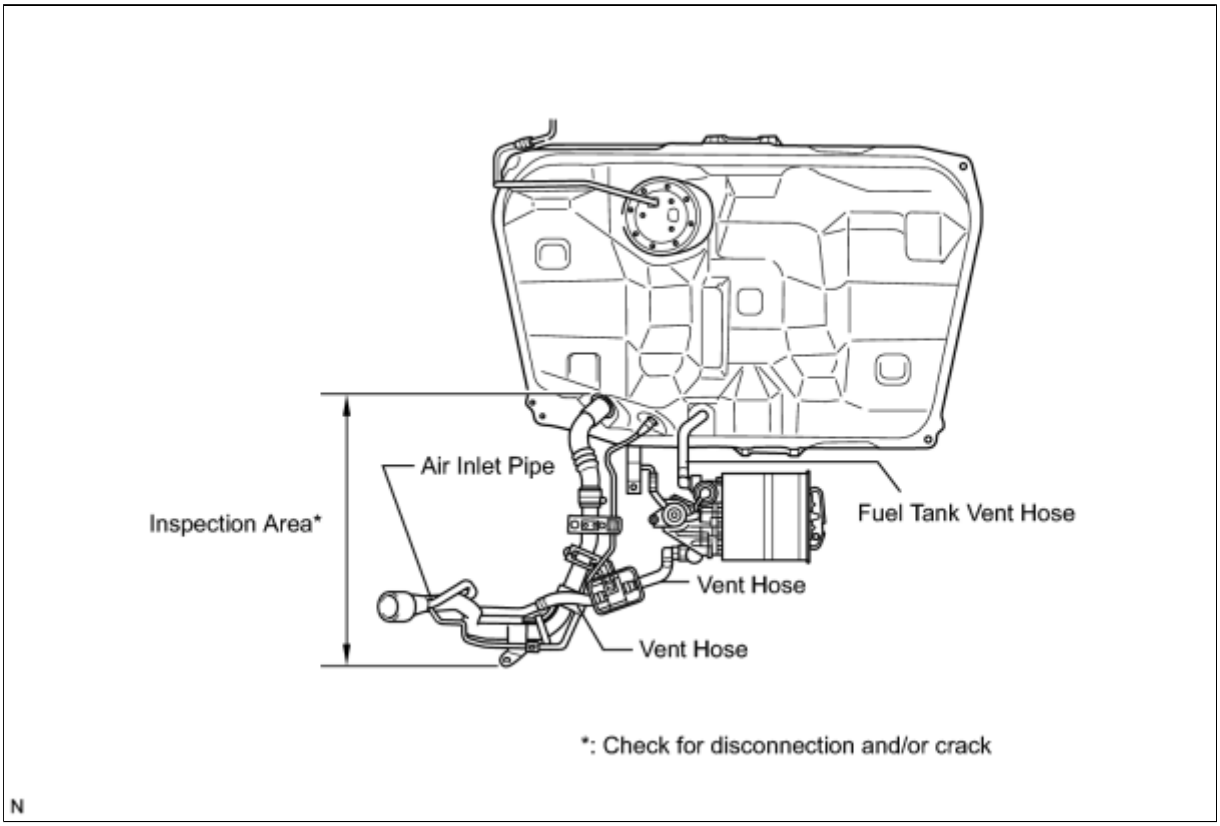
A

| 2. | REPLACE CHARCOAL CANISTER ASSEMBLY |
|---|---|

(a) Replace the canister assembly INFO .

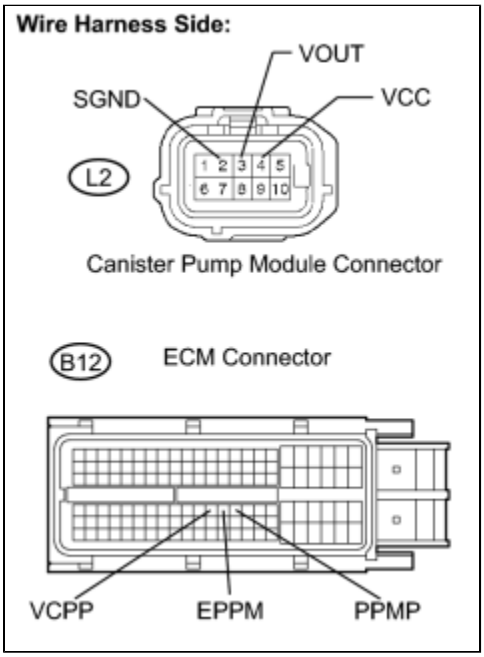
**NOTICE:**

**When replacing the canister, check the canister pump module interior and related pipes for water, fuel and other liquids. If liquids are present, check for disconnections and/or cracks in the following: 1) the pipe from the air inlet pipe to the canister pump module; 2) the canister filter; and 3) the fuel tank vent hose.**




| 3. | CHECK HARNESS AND CONNECTOR |
|---|---|

(a) Disconnect the L2 canister pump module connector.




(b) Disconnect the B12 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

| TESTER CONNECTION | SPECIFIED CONDITION |
|---|---|
| L2-4 (VCC) - B12-75 (VCPP) | Below 1 Ω |
| L2-3 (VOUT) - B12-77 (PPMP) | Below 1 Ω |
| L2-2 (SGND) - B12-76 (EPPM) | Below 1 Ω |

Standard resistance (Check for short):

| TESTER CONNECTION | SPECIFIED CONDITION |
|---|---|
| L2-4 (VCC) or B12-75 (VCPP) - Body ground | 10 kΩ or higher |
| L2-3 (VOUT) or B12-77 (PPMP) - Body ground | 10 kΩ or higher |
| L2-2 (SGND) or B12-76 (EPPM) - Body ground | 10 kΩ or higher |

(d) Reconnect the canister pump module connector.

(e) Reconnect the ECM connector.

**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK** ▼

| | |
|---|---|
| **4.** | **REPLACE ECM** |

(a) Replace the ECM INFO .

**NEXT**

| 5. | CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR) |
|---|---|

(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG) (do not start the engine).

(c) Turn the tester on.

(d) Wait for at least 60 seconds.

(e) Enter the following menus: Powertrain / Engine / Trouble Code / Pending.

**HINT:**

**If no pending DTCs are displayed on the tester, the repair has been successfully completed.**

**NEXT** **COMPLETED**