DTC	P0450	Evaporative Emission Control System Pressure Sensor / Switch

DTC	P0451	Evaporative Emission Control System Pressure Sensor Range / Performance

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

ES

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

DTC SUMMARY

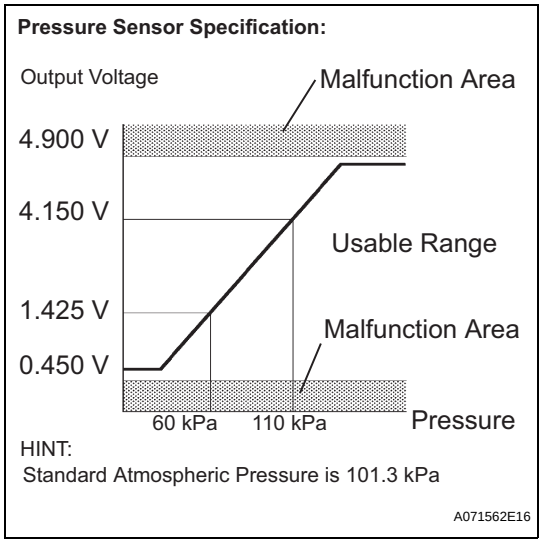
DTCs	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0450	Pressure sensor abnormal voltage fluctuation	Sensor output voltage rapidly fluctuates beyond upper and lower malfunction thresholds for 0.5 seconds.	• Pump module • ECM	• EVAP monitoring (ignition OFF) • Ignition ON	1 trip
P0451	Pressure sensor noising	Sensor output voltage fluctuates frequently in certain time period.	• Pump module • Connector/wire harness (Pump module - ECM) • ECM	• EVAP monitoring (ignition OFF) • Engine running	2 trip
P0451	Pressure sensor stuck	Sensor output voltage does vary in certain time period.	• Pump module • Connector/wire harness (Pump module - ECM) • ECM	EVAP monitoring (ignition OFF)	2 trip
P0452	Pressure sensor voltage low	Sensor output voltage is less than 0.45 V for 0.5 seconds.	• Pump module • Connector/wire harness (Pump module - ECM) • ECM	• Ignition ON • EVAP monitoring (ignition OFF)	1 trip
P0453	Pressure sensor voltage high	Sensor output voltage is more than 4.9 V for 0.5 seconds.	• Pump module • Connector/wire harness (Pump module - ECM) • ECM	• Ignition ON • EVAP monitoring (ignition OFF)	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 (See page ES-346).

MONITOR DESCRIPTION



1. DTC P0450: Pressure sensor abnormal voltage fluctuation
   If the pressure sensor voltage output rapidly fluctuates between less than 0.45 V and more than 4.9 V, the ECM interprets this as an open or short circuit malfunction in the pressure sensor or its circuit, and stops the EVAP (Evaporative Emission) system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).
2. DTC P0451: Pressure sensor noising or stuck
   If the pressure sensor voltage output 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 voltage output 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)
3. DTC P0452: Pressure sensor voltage low
   If the pressure sensor voltage output is below 0.45 V, the ECM interprets this as an open or short circuit malfunction 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).
4. 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 malfunction 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	P0450: Evaporative emission control system pressure sensor/switch chattering P0451: Evaporative emission control system pressure sensor noise P0451: Evaporative emission control system pressure sensor stuck P0452: Evaporative emission control system pressure sensor/switch low input P0453: Evaporative emission control system pressure sensor/switch high input
Required Sensors / Components	Pump module
Frequency of Operation	Once pre driving cycle
Duration	0.5 seconds: P0450, P0452, P0453 Within 15 seconds: P0451
MIL Operation	Immediate: P0450, P0452, P0453 2 driving cycles: P0451
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	None

Pressure sensor noise:

Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
IAT	4.4 to 35°C (40 to 95°F)
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Either of the following conditions is met	Condition 1 or 2
1. Time after key off	5 or 7 or 9.5 hours
2. Engine condition	Running

Pressure sensor stuck

Battery voltage	10.5 V or more
IAT	4.4 to 35°C (40 to 95°F)
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Time after key off	5 or 7 or 9.5 hours

Pressure sensor chattering, low/high voltage

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Pressure sensor noise:

Frequency that EVAP pressure change is 0.3 kPa (2.25 mmHg) or more	10 times or more in 10 seconds

Pressure sensor stuck:

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

Pressure sensor chattering:

EVAP pressure	Less than 42.11 kPa (315.82mmHg), or more than 123.761 kPa (928.207 mmHg)

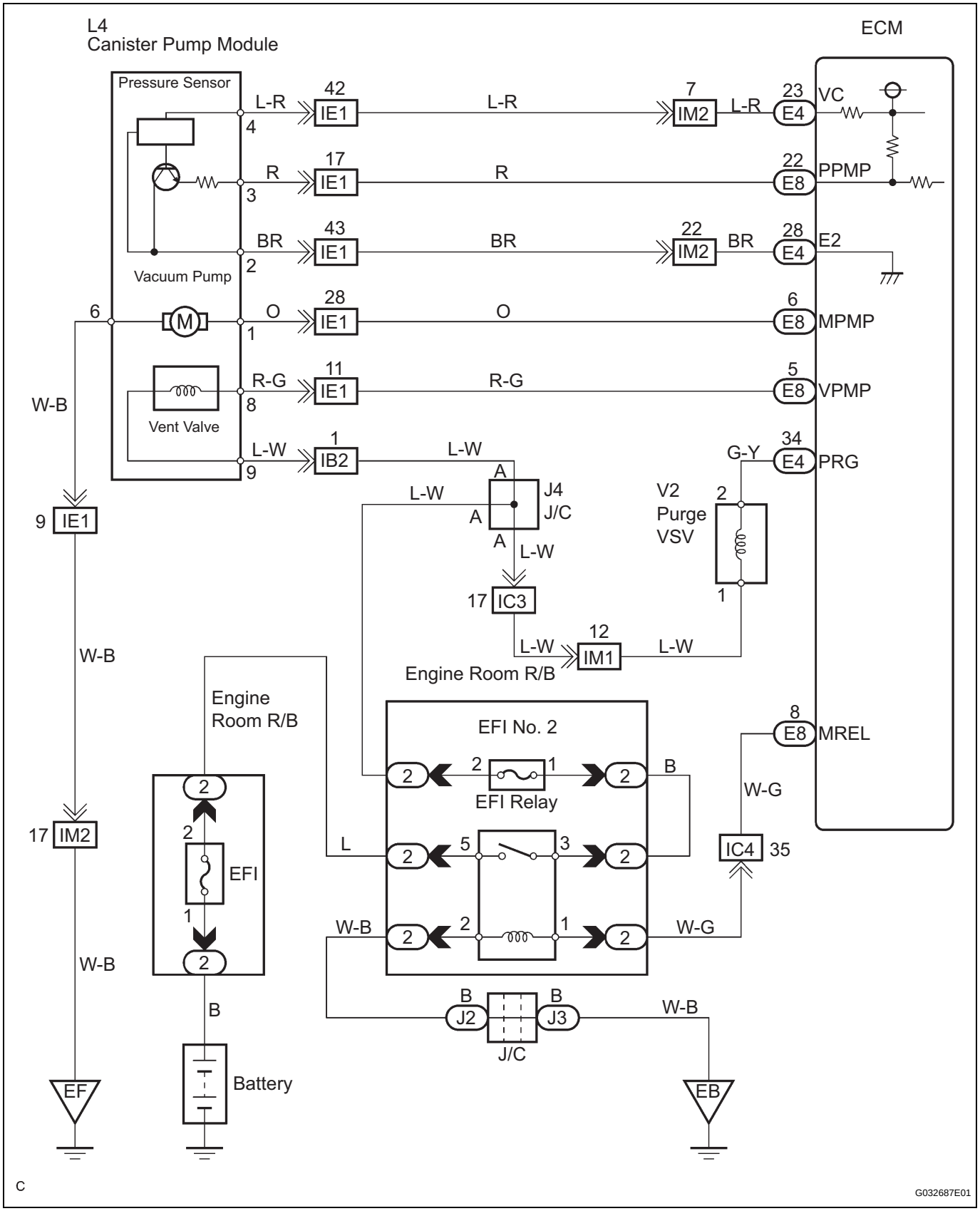
Pressure sensor low pressure:

EVAP pressure	Less than 42.11 kPa (315.82 mmHg)

Pressure sensor high pressure:

EVAP pressure	More than 123.761 kPa (928.207 mmHg)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When a vehicle is brought into the 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.**
- **The intelligent tester is required to conduct the following diagnostic troubleshooting procedure.**

ES

1 CONFIRM DTC AND EVAP PRESSURE

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (do not start the engine).
(c) Turn the tester on.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read DTCs.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / PRIMARY / VAPOR PRESS.
(g) Read the EVAP (Evaporative Emission) pressure displayed on the tester.

Result

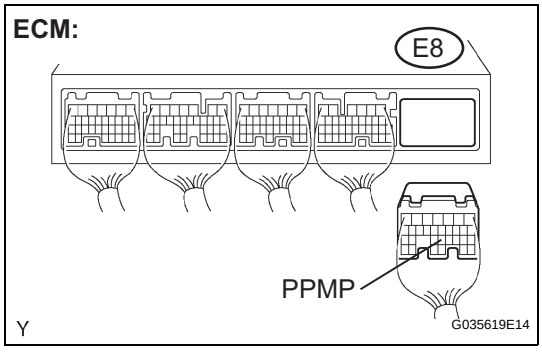
Display (DTC Output)	Test Results	Suspected Trouble Areas	Proceed to
P0451	-	Pressure sensor	C
P0452	Less than 45 kpa (338 mmHg)	• Wire harness/connector (ECM - pressure sensor) • Pressure sensor • Short in ECM circuit	A
P0453	More than 120 kPa (900 mmHg)	• Wire harness/connector (ECM - pressure sensor) • Pressure sensor • Open in ECM circuit	B

B → Go to step 4

C → GO TO EVAP SYSTEM

A

2 CHECK HARNESS AND CONNECTOR (PUMP MODULE - ECM)



(a) Turn the ignition switch off.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance between PPMP terminal of the ECM connector and the body ground.

Result

Test Results	Suspected Trouble Areas	Proceed to
10 Ω or less	• Wire harness/connector (ECM - pressure sensor) • Short in pressure sensor circuit	A
10 Ω or more	• Wire harness/connector (ECM - pressure sensor) • Short in ECM circuit	B

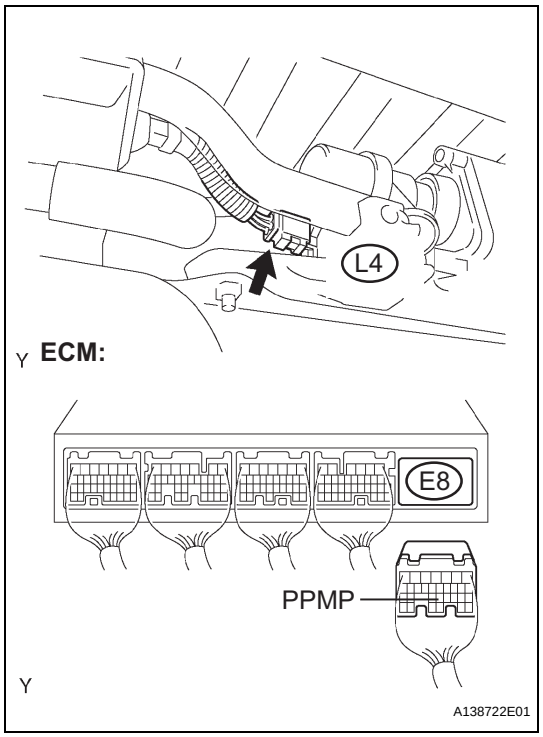
(d) Reconnect the ECM connector.

B → Go to step 8

A

ES

3 CHECK HARNESS AND CONNECTOR (PUMP MODULE - ECM)



(a) Disconnect the L4 canister connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance between PPMP terminal of the ECM connector and the body ground.

Result

Test Results	Suspected Trouble Areas	Proceed to
10 kΩ or more	Short in pressure sensor circuit	A
10 kΩ or less	Short in wire harness/connector (ECM - pressure sensor)	B

(d) Reconnect the canister connector.
(e) Reconnect the ECM connector.

B → Go to step 6

A

4 REPLACE CHARCOAL CANISTER ASSEMBLY

(a) Replace charcoal canister assembly (See page EC-6).
(b) Connect the intelligent tester to the DLC3.

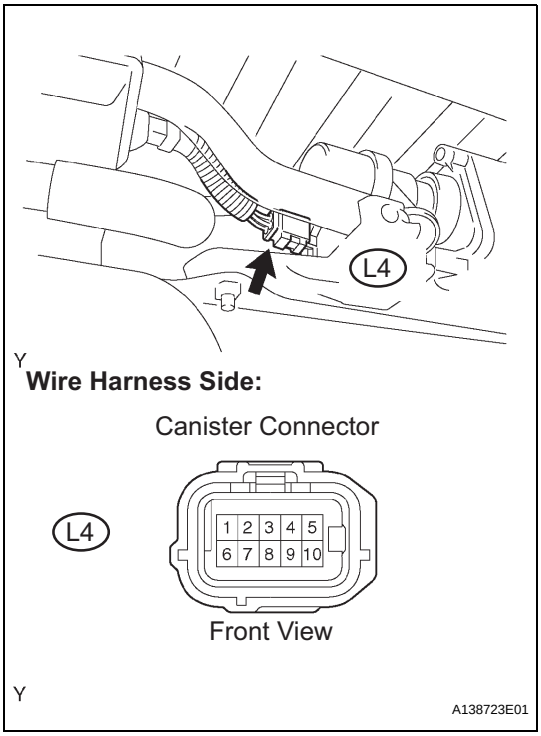
(c) Turn the ignition switch on and turn the tester on.
(d) Wait for at least 60 seconds.
(e) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTC is displayed on the tester, the repair has been successfully completed.

NEXT

COMPLETED

ES

5 CHECK HARNESS AND CONNECTOR (PUMP MODULE - ECM)



(a) Disconnect the L4 canister connector.
(b) Turn the ignition switch on.
(c) Measure the voltage and resistance of the L4 canister connector.
Standard

Tester Connections	Specified Conditions
L4-4 - Body ground	Between 4.5 V and 5.5 V
L4-3 - Body ground	Between 4.5 V and 5.5 V
L4-2 - Body ground	100 Ω or less

Result

Test Results	Suspected Trouble Areas	Proceed to
Voltage and resistance is within standard ranges	Open in pressure sensor circuit	A
Voltage and resistance is outside standard ranges	Open in wire harness/connector (ECM - pressure sensor)	B

(d) Reconnect the canister connector.

B → **Go to step 7**

A

6 REPLACE CHARCOAL CANISTER ASSEMBLY

(a) Replace charcoal canister assembly (See page EC-6).
(b) Connect the intelligent tester to the DLC3.

(c) Turn the ignition switch on and turn the tester on.
(d) Wait for at least 60 seconds.
(e) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTC is displayed on the tester, the repair has been successfully completed.

NEXT

COMPLETED

ES

7	REPAIR OR REPLACE WIRE HARNESS OR CONNECTORS

(a) Repair or replace wire harness or connectors.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch on and turn the tester on.
(d) Wait for at least 60 seconds.
(e) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTC is displayed on the tester, the repair has been successfully completed.

NEXT

COMPLETED

8	REPLACE ECM

(a) Replace the ECM (See page ES-434).
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch on and turn the tester on.
(d) Wait for at least 60 seconds.
(e) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTC is displayed on the tester, the repair has been successfully completed.

NEXT

COMPLETED