DIDRP−01

DTC	P0450	Evaporative Emission Control System Pressure Sensor/Switch

DTC	P0451	Evaporative Emission Control System Pressure Sensor/Switch 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	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0450	Pressure sensor voltage abnormal fluctuation	Sensor output voltage rapidly fluctuates beyond upper and lower malfunction thresholds for 0.5 seconds.	• Pump module • Connector/Wire harness (Pump module − ECM) • 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

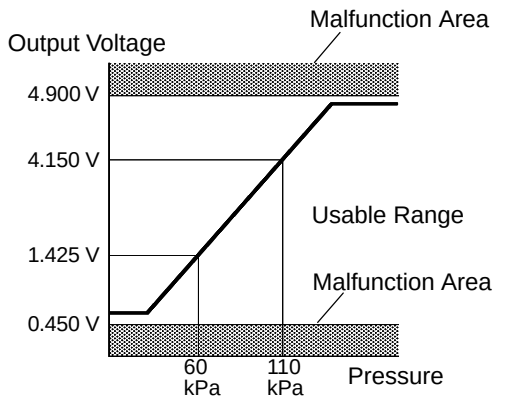
HINT:
The pressure sensor is built into the pump module.

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page DI−884).

MONITOR DESCRIPTION

Pressure Sensor Specification:



HINT:
Standard atmospheric pressure is 101.3 kPa

(a) DTC P0450: Pressure sensor voltage abnormal 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).

(b) 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)

(c) 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).

(d) 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
		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 per driving cycle	
Duration	0.5 sec.: P0450, P0452, P0453 15 sec.: P0451	
MIL operation	Immediate: P0450, P0452, P0453 2 driving cycles: P0451	
Sequence of operation	None	

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever these DTCs are not present	See page DI−437	
Pressure sensor noise:		
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)	
Battery voltage	10.5 V	−
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	−
IAT	4.4 to 35°C (40 to 95°F)	
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected	
Atmospheric pressure	Less than 70 kPa (525 mmHg), or 110 kPa (825 mmHg) or more	
Time after engine stopped	5 or 7 or 9.5 hours	
Pressure sensor chattering, low/high voltage:		
Battery voltage	8 V	−
Ignition switch	ON	
Starter	OFF	

TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Pressure sensor noise:	
Frequency that EVAP pressure change is 0.3 kPa or more	10 times or more for 10 sec.
Pressure sensor stuck:	
EVAP pressure change during reference pressure measurement	Less than 0.65 kPa (4.9 mmHg)
Pressure sensor chattering:	
EVAP pressure	Less than 42.11 kPa (315.90 mmHg), or more than 123.761 kPa (928.440 mmHg)
Pressure sensor low voltage:	
EVAP pressure	Less than 42.11 kPa (315.90 mmHg)
Pressure sensor high voltage:	
EVAP pressure	More than 123.761 kPa (928.440 mmHg)

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.**
- **A hand−held tester is required to conduct the following diagnostic troubleshooting procedure.**

1	**Confirm DTC and EVAP pressure.**

PREPARATION:

(a) Connect a hand−held tester to the DLC3.
(b) Turn the ignition switch to ON (do not start the engine).
(c) Turn the tester ON.

CHECK:

(a) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(b) Read DTCs.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / VAPOR PRESS.
(d) Read the EVAP (Evaporative Emission) pressure displayed on the tester.

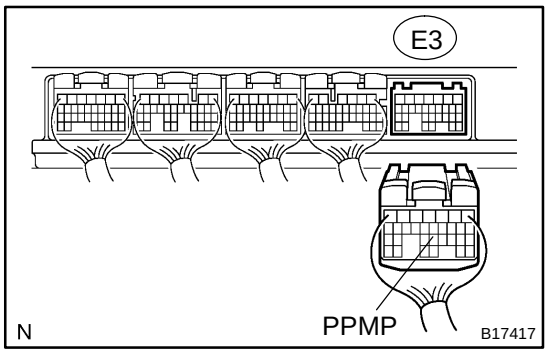
RESULT:

Display (DTC Output)	Test Results	Suspected Trouble Areas	Proceed To
P0451	—	• Pressure sensor	C
P0452	Less than 45 kpa (430 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 inspection procedure (See page DI−884).**

A

2	**Measure resistance between terminal PPMP of ECM and body ground.**



PREPARATION:

(a) Turn the ignition switch to OFF.

(b) Disconnect the E3 ECM connector.

CHECK:

Measure the resistance between PPMP terminal of the ECM connector and the body ground.

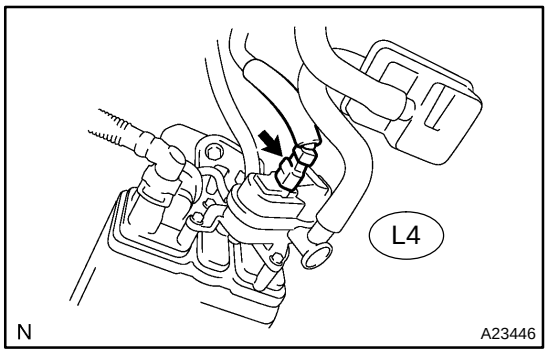
RESULT:

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

B → **Go to step 7.**

A

3	**Measure resistance between terminal PPMP of ECM and body ground.**



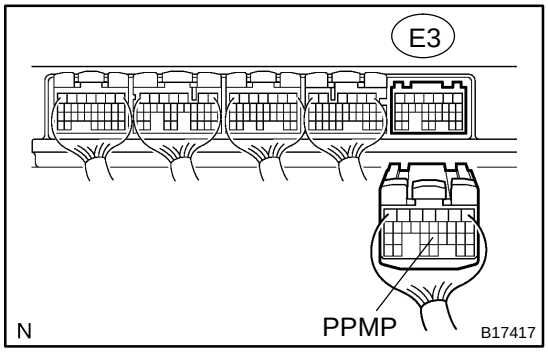
PREPARATION:

(a) Disconnect the L4 canister connector.

(b) Disconnect the E3 ECM connector.

CHECK:

Check the resistance between PPMP terminal of the ECM connector and the body ground.

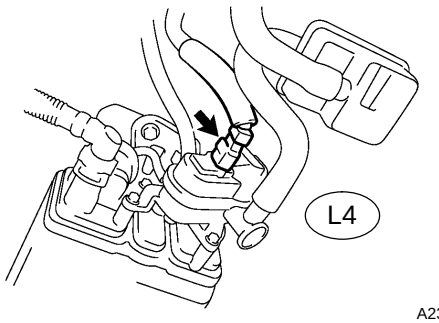


Result:

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

A	**Go to step 5.**
B	**Go to step 6.**

4	Measure voltage and resistance of pump module connector.



PREPARATION:

(a) Disconnect the L4 canister connector.

(b) Turn the ignition switch to ON.

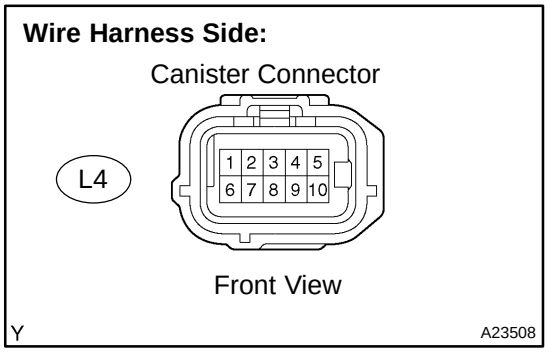
CHECK:

Measure the voltage and resistance of the L4 connector.

OK:

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 within standard ranges	• Open in pressure sensor circuit	A
Voltage and resistance outside standard ranges	• Open in wire harness/connector (ECM − pressure sensor)	B

B → **Go to step 6.**

A

5	Replace charcoal canister assembly.

NEXT → **Go to step 8.**

6	Repair or replace wire harness and connectors.

HINT:

If the exhaust tail pipe has been removed, go to the next step before reinstalling it.

NEXT → **Go to step 8.**

7	**Replace ECM (See page SF−82).**

NEXT

8	**Check whether DTC output recurs.**

PREPARATION:

(a) Connect the hand−held tester to the DLC3.
(b) Turn the ignition switch to ON and turn the tester ON.
(c) Wait for at least 60 seconds.

CHECK:

(a) On the tester, select the following menu items: 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