

DTC	P2401	EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW
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DTC	P2402	EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH
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CIRCUIT DESCRIPTION

Refer to EVAP Inspection Procedure (see page 05-317).

DTCs	Monitoring Item	Detection Condition	Trouble Area	Detection Timing	Detection Period
P2401	Vacuum pump stuck OFF (built-in pump module)	To determine leak criterion (Reference pressure), vacuum pump creates negative pressure in canister pump module through 0.02 inch orifice and pressure is measured. If one of following conditions is met, ECM sets pump module related DTCs: P043E, P043F, P2401, P2402 and P2419: •Reference pressure is -1 kPa or higher •Reference pressure is -4.85 kPa or lower •Reference pressure is not saturated within 60 seconds	<ul style="list-style-type: none"> • Pump module • Connector / wire harness (Pump module - ECM) • ECM 	Ignition OFF	2 trips
P2402	Vacuum pump stuck ON (built-in pump module)				

WIRING DIAGRAM

Refer to EVAP Inspection Procedure (see page 05-317).

INSPECTION PROCEDURE

Refer to EVAP Inspection Procedure (see page 05-317).

MONITOR DESCRIPTION

5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

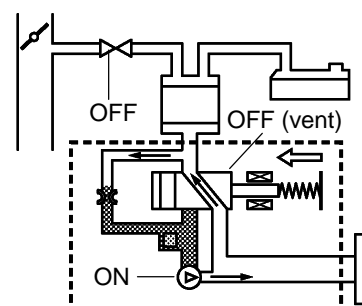
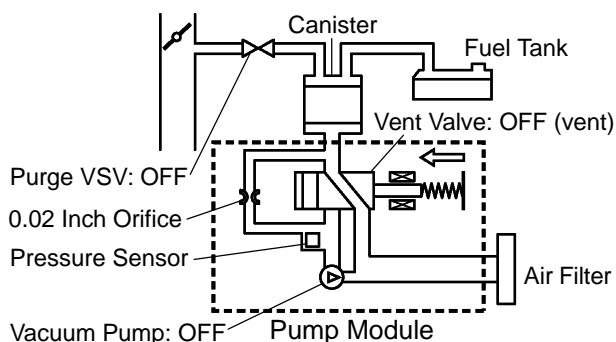
HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

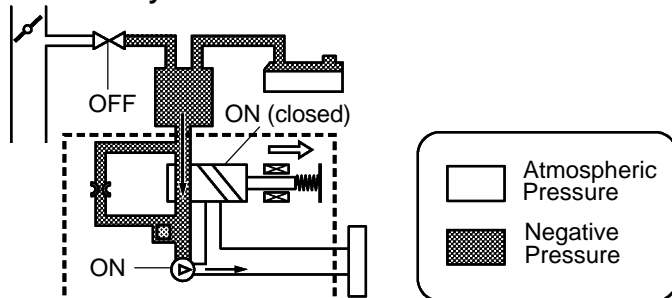
Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.

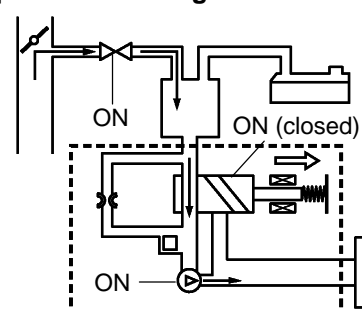
Operation A: Atmospheric Pressure Measurement Operation B, E: 0.02 Inch Leak Pressure Measurement



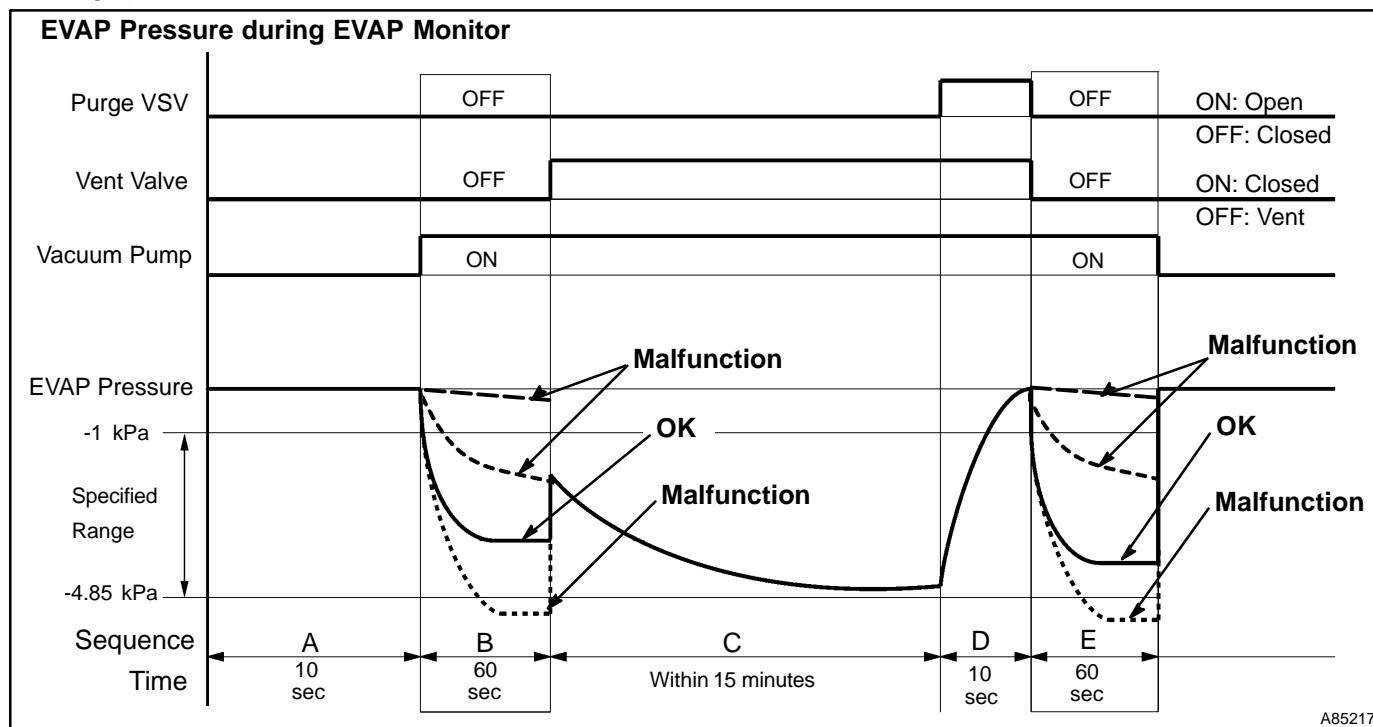
Operation C: EVAP System Pressure Measurement



Operation D: Purge VSV monitor



In sequence B and E, to determine the leak criterion, the vacuum pump creates negative pressure in the canister pump module through the 0.02 inch orifice. If the pressure is out of specified range or is not saturated, the ECM illuminates the MIL and sets DTCs P043E, P043F, P2401, P2402 and P2419 (2-trip detection logic).



OBD II MONITOR SPECIFICATIONS

Monitor Strategy

Required Sensors/Components	Purge VSV and pump module
Frequency of Operation	Once per driving cycle
Duration	Within 15 minutes (varies with amount of fuel in tank)
MIL Operation	2 driving cycles
Sequence of Operation	None

Typical Enabling Conditions

The monitor will run whenever these DTCs are not present	See page 05-16
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Below 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine is stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met before IG switch OFF:	Condition 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)

Example of re-start time

First time	7 hours
Second time	9 hours and 30 min.

Key-of f monitor sequence: 1 to 8

1. Atmospheric pressure

Next sequence is run if following condition met	-
Atmospheric pressure change for 10 sec.	Within 2.25 mmHg (0.3 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions met	Condition 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.47 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition met	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.3 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions met	Condition 1 and 2
1. Vacuum introduction time	Within 15 min.
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition met	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.3 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions met	Condition 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.47 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition met	-
FTP when vacuum introduction was complete	Lower than second reference pressure

8. Atmospheric pressure

Monitor is complete if following	-
Atmospheric pressure difference between sequence 1 and 8	Within 2.25 mmHg (0.3 kPa)

Typical Malfunction Thresholds

One of the following conditions is met:	Condition 1, 2, 3, 4 or 5
1. FTP when 4 seconds after reference pressure measurement began	More than -7.5 mmHg (-1 kPa)
2. Reference pressure	Less than -36.4 mmHg (-4.85 kPa)
3. Reference pressure	-7.9 mmHg (-1.057 kPa) or more
4. Reference pressure	Not saturated
5. Reference pressure difference between first and second	5.2 mmHg (0.7 kPa) or more

MONITOR RESULT (MODE 06)

Refer to page 05-317 for detailed information on Monitor Result.

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