

<b>DTC</b>	<b>P0455</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (GROSS LEAK)</b>
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<b>DTC</b>	<b>P0456</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)</b>
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## DTC SUMMARY

DTC	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0455	EVAP gross leak	Vacuum pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If stabilized pressure higher than [second 0.02 inch leak pressure standard x 0.2], ECM determines that EVAP system has large leakage.	<ul style="list-style-type: none"> <li>• Fuel tank cap (loose)</li> <li>• Leakage from EVAP line (Canister - Fuel tank)</li> <li>• Leakage from EVAP line (Purge VSV - Canister)</li> <li>• Pump module</li> <li>• Leakage from fuel tank</li> <li>• Leakage from canister</li> </ul>	While ignition switch OFF	2 trip
P0456	EVAP small leak	Vacuum pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If stabilized pressure larger than second 0.02 inch leak pressure, ECM determines that EVAP system has small leakage.	Same above	While ignition switch OFF	2 trip

## CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page [05-317](#) ).

## INSPECTION PROCEDURE

Refer to the 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.

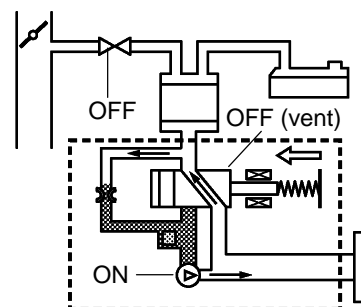
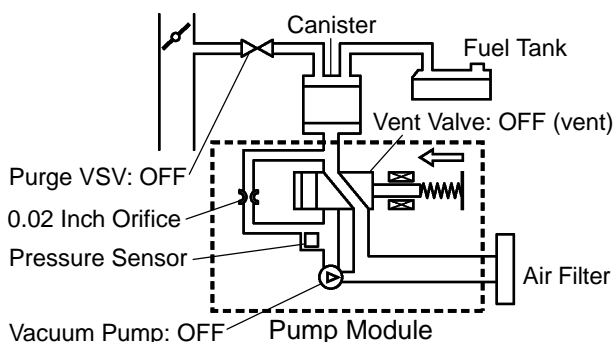
HINT:

\*: 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.

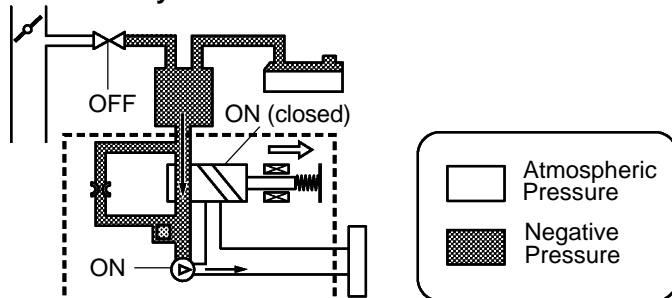
Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP 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.

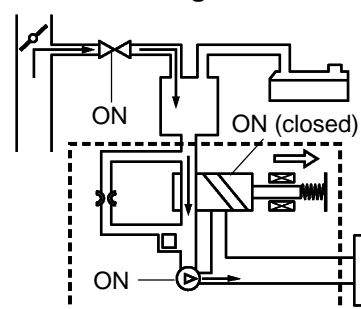
### Operation A: Atmospheric Pressure Measurement    Operation B, E: 0.02 Inch Leak Pressure Measurement



### Operation C: EVAP System Pressure Measurement



### Operation D: Purge VSV monitor

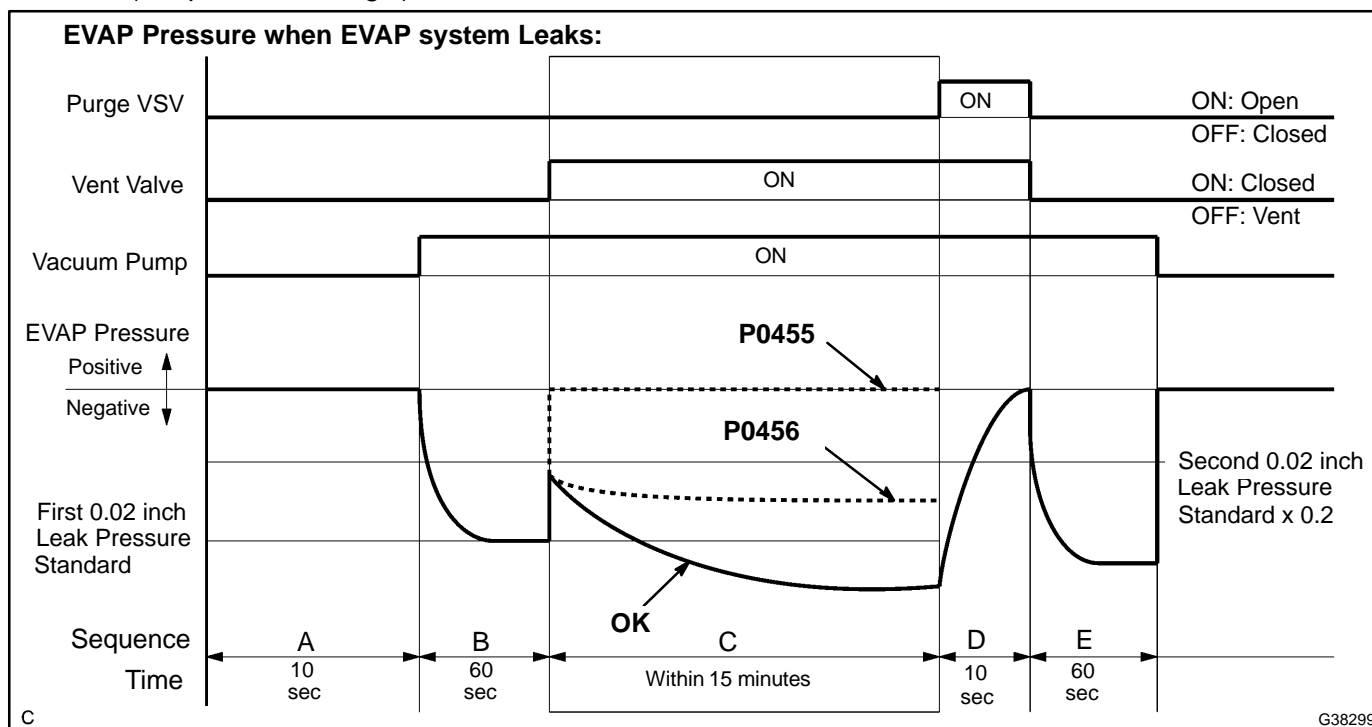


## (a) P0455: EVAP (Evaporative Emission) gross leak

In operation C, the vacuum pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than [second 0.02 inch leak pressure standard x 0.2] (near atmospheric pressure), the ECM determines that the EVAP system has a large leakage, illuminates the MIL and sets the DTC (2 trip detection logic).

## (b) P0456: EVAP very small leak

In operation C, the vacuum pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than second 0.02 inch leak pressure standard, the ECM determines that the EVAP system has a small leakage, illuminates the MIL and sets the DTC (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 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 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****P0455: EVAP gross leak**

FTP when vacuum introduction was complete	Higher than reference pressure x 0.2
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**P0456: EVAP small leak**

FTP when vacuum introduction was complete	Between 1 and 2
Condition 1	Higher than second reference pressure
Condition 2	Lower than reference pressure x 0.2

**MONITOR RESULT (MODE 06)**

Refer to page [05-317](#) for detailed information on Monitor Result.