DIDRQ−01

DTC	P0455	Evaporative Emission Control System Leak Detected (Gross Leak)

DTC	P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)

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.	• Fuel tank cap (loose) • Leakage from EVAP line (Canister − Fuel tank) • Leakage from EVAP line (Purge VSV − Canister) • Pump module • Leakage from fuel tank • Leakage from canister	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 DI−884).

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.

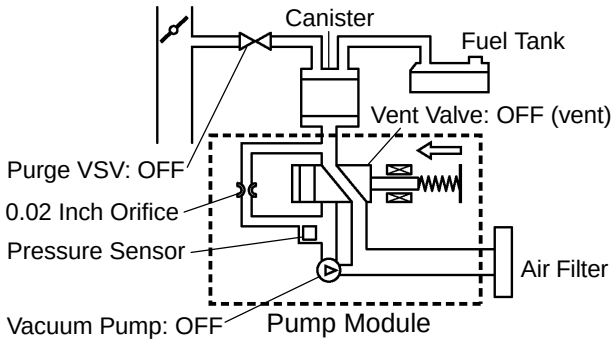
HINT:

*: 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.

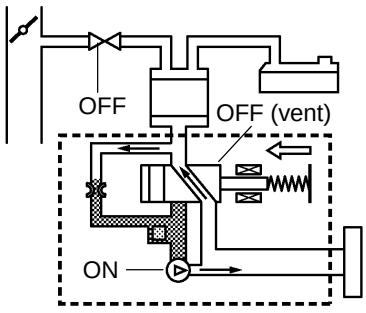
Sequence	Operations	Descriptions	Duration
−	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	−
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP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

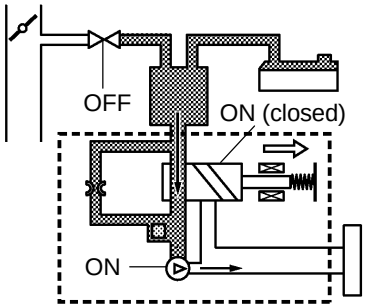
Operation A: Atmospheric Pressure Measurement

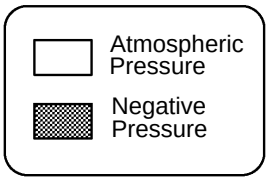


Operation B: 0.02 Inch Leak Pressure Measurement

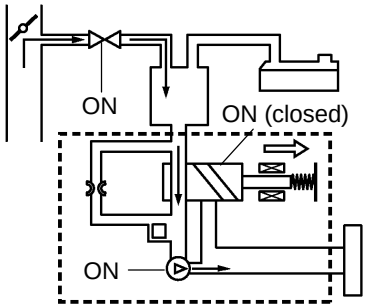


Operation C: EVAP Leak Check





Operation D: Purge VSV monitor



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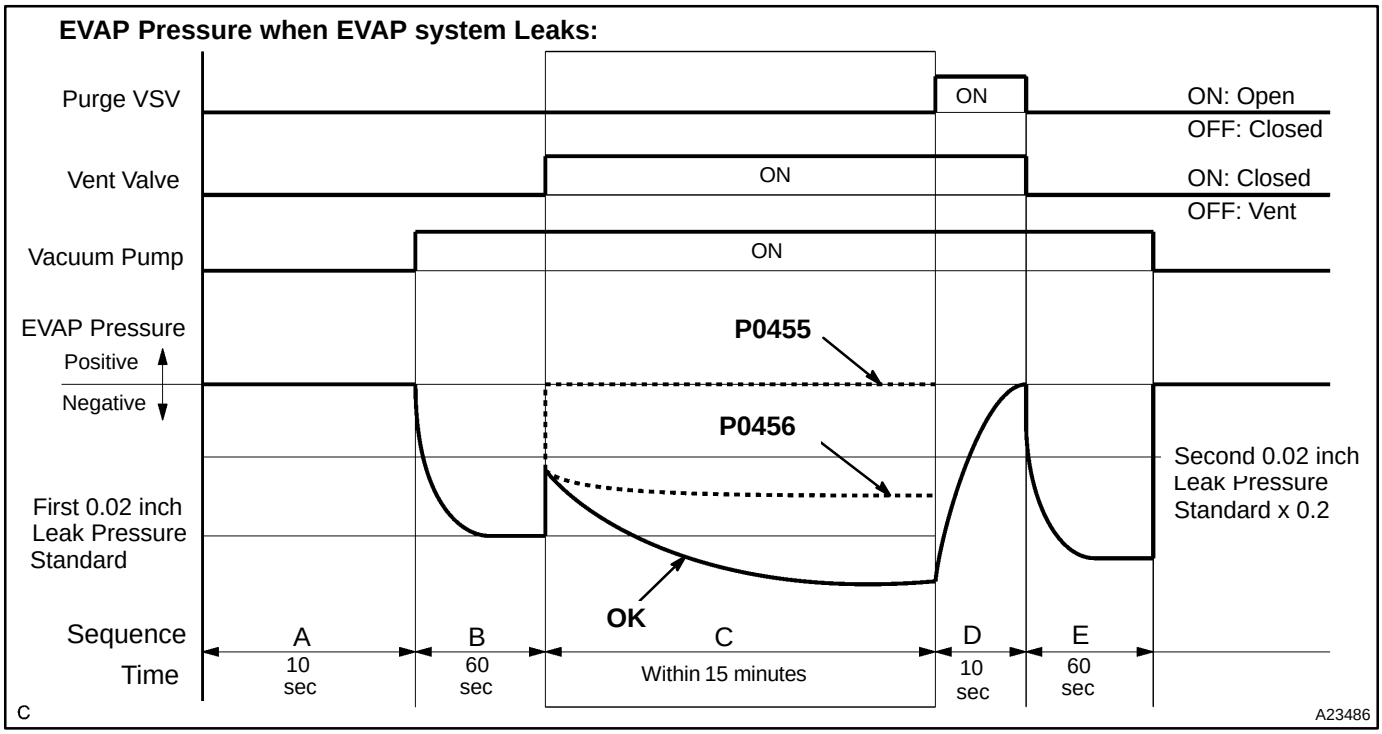
(a) P0455: EVAP (Evaporative Emission) gross leak

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).



MONITOR STRATEGY

Related DTCs	P0455	Gross leak detected
	P0456	Very small leak (0.020 inch hole) detected
Required sensors/components	Purge VSV, Pump module	
Frequency of operation	Once per driving cycles	
Duration	Within 15 min. (varies with amount of fuel in tank)	
MIL operation	2 driving cycles	
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	
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)	
Battery voltage	10.5 V	−
Vehicle speed	−	2.5 mph (4 km/h)
Ignition switch	OFF	

Time after key off	5 or 7 or 9.5 hours	
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected	
EVAP canister purge valve	Not operated by scan tool	
EVAP canister vent valve	Not operated by scan tool	
EVAP leak detection pump	Not operated by scan tool	
Both of the following conditions 1 and 2 set before key off	−	
1. Duration that vehicle has been driven	5 min.	−
2. EVAP purge operation	Performed	
ECT	4.4 to 35°C (40 to 95°F)	
IAT	4.4 to 35°C (40 to 95°F)	
Key−off monitor sequence	1 to 8	
1. Atmospheric pressure	−	
Next sequence is run if the following condition is set	−	
Atmospheric pressure change	−	0.3 kPa (2.25 mmHg)
2. First reference pressure measurement	−	
Next sequence is run if the following conditions are set	Condition 1, 2 and 3	
1. EVAP pressure just after reference pressure measurement start	−	−1 kPa (−7.5 mmHg)
2. Reference pressure	−4.85 to −1.057 kPa (−36.38 to −7.93 mmHg)	
3. Reference pressure	Saturated within 60 seconds	
3. EVAP canister vent valve close stuck check	−	
Next sequence is run if the following condition is set	−	
EVAP pressure change after vent valve is ON	0.3 kPa (2.25 mmHg)	−
4. Vacuum introduction	−	
Next sequence is run if the following condition is set	−	
EVAP pressure	Saturated within 15 minutes	
5. EVAP canister purge valve close stuck check	−	
Next sequence is run if the following condition is set	−	
EVAP pressure change after purge valve is open	0.3 kPa (2.25 mmHg)	−

6. Second reference pressure measurement	−	
Next sequence is run if the following conditions are set	Condition 1, 2, 3 and 4	
1. EVAP pressure just after reference pressure	−	−1 kPa (−7.5 mmHg)
2. Reference pressure	−4.85 to −1.057 kPa (−36.38 to −7.93 mmHg)	
3. Reference pressure	Saturated within 60 seconds	
4. Difference between first reference pressure and second reference pressure	−	0.7 kPa (5.25 mmHg)
7. Leak check	−	
Next sequence is run if the following condition is set	−	
EVAP pressure when vacuum introduction is complete	−	Second reference pressure
8. Atmospheric pressure measurement	−	
EVAP monitor is complete if the following condition is set	−	
Atmospheric pressure difference between sequence 1 and 8	−	0.3 kPa (2.25 mmHg)

TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Small leak (0.020 inch) malfunction detection:	
EVAP pressure when vacuum introduction is complete	Between reference pressure and reference pressure x 0.2
Gross leak detection:	
EVAP pressure when vacuum introduction is complete	Higher than reference pressure x 0.2

MONITOR RESULT (MODE 06 DATA)

Refer to page DI−445 for detailed information.

INSPECTION PROCEDURE

Refer to the EVAP Inspection Procedure (see page DI−884).