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	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak criterion measured at start and at end of leak check. If stabilized pressure higher than [second 0.02 inch leak criterion x 0.2], ECM determines that EVAP system has large leakage.	• Fuel cap (loose) • Leakage from EVAP line (Canister - Fuel tank) • Leakage from EVAP line (Purge VSV - Canister) • Canister pump module • Leakage from fuel tank • Leakage from canister	While ignition switch OFF	2 trip
P0456	EVAP small leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak criterion measured at start and at end of leak check. If stabilized pressure higher than second 0.02 inch leak criterion, ECM determines that EVAP system has small leakage.	Same above	While ignition switch OFF	2 trip

DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) System (see page ES-392).

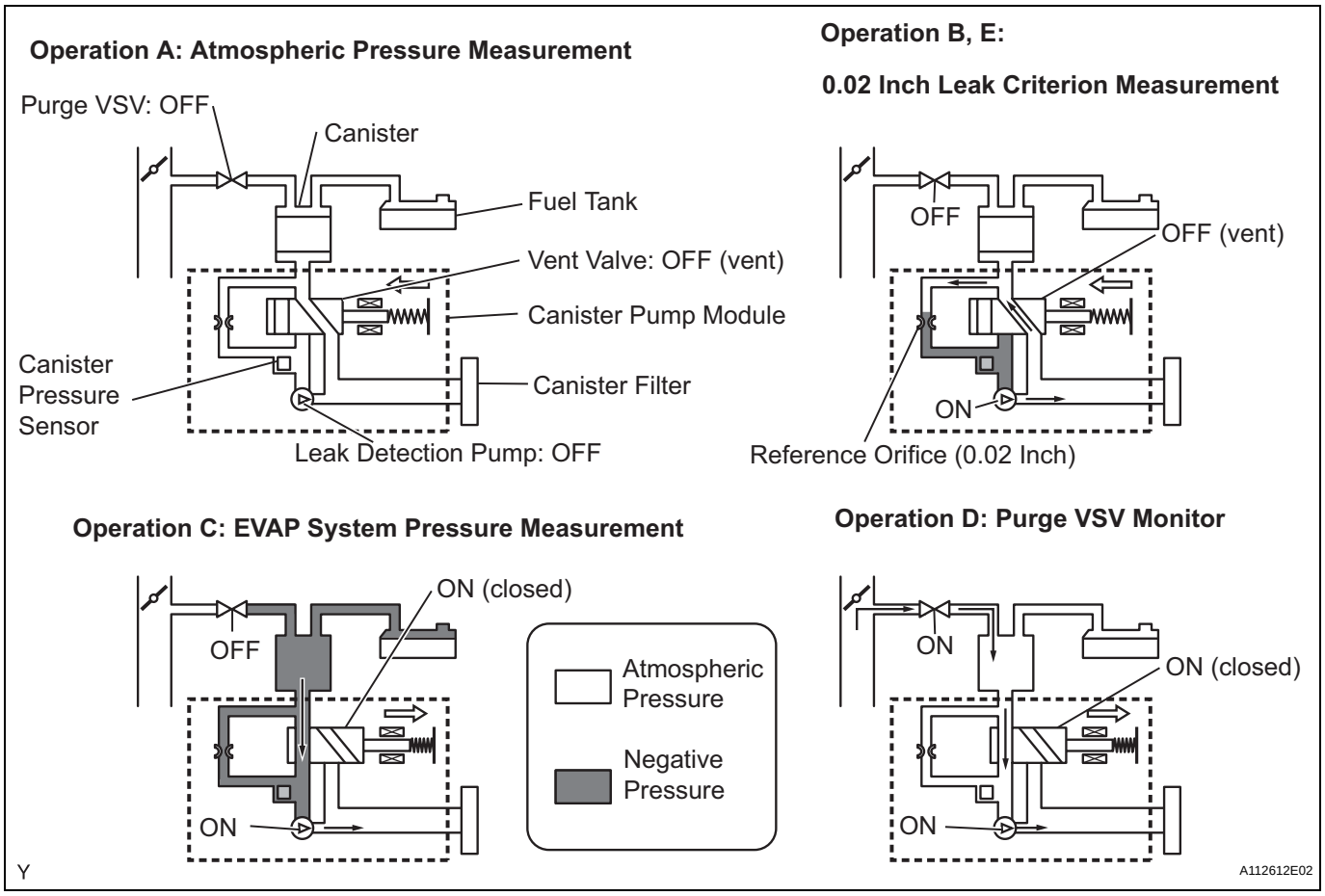
Refer to the EVAP System (see page ES-397).

MONITOR DESCRIPTION

5 hours* after the ignition switch is turned to OFF, the electric leak detection 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 pressure in EVAP system 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 criterion (reference pressure) measurement	In order to determine 0.02 inch leak criterion, leak detection pump creates negative pressure (vacuum) through reference orifice and then ECM checks if leak detection 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 measured value as they will be used in 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 criterion (reference pressure) measurement	After second 0.02 inch leak criterion measurement, leak check performed by comparing first and second 0.02 inch leak criterion. If stabilized system pressure higher than second 0.02 inch leak criterion, 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.



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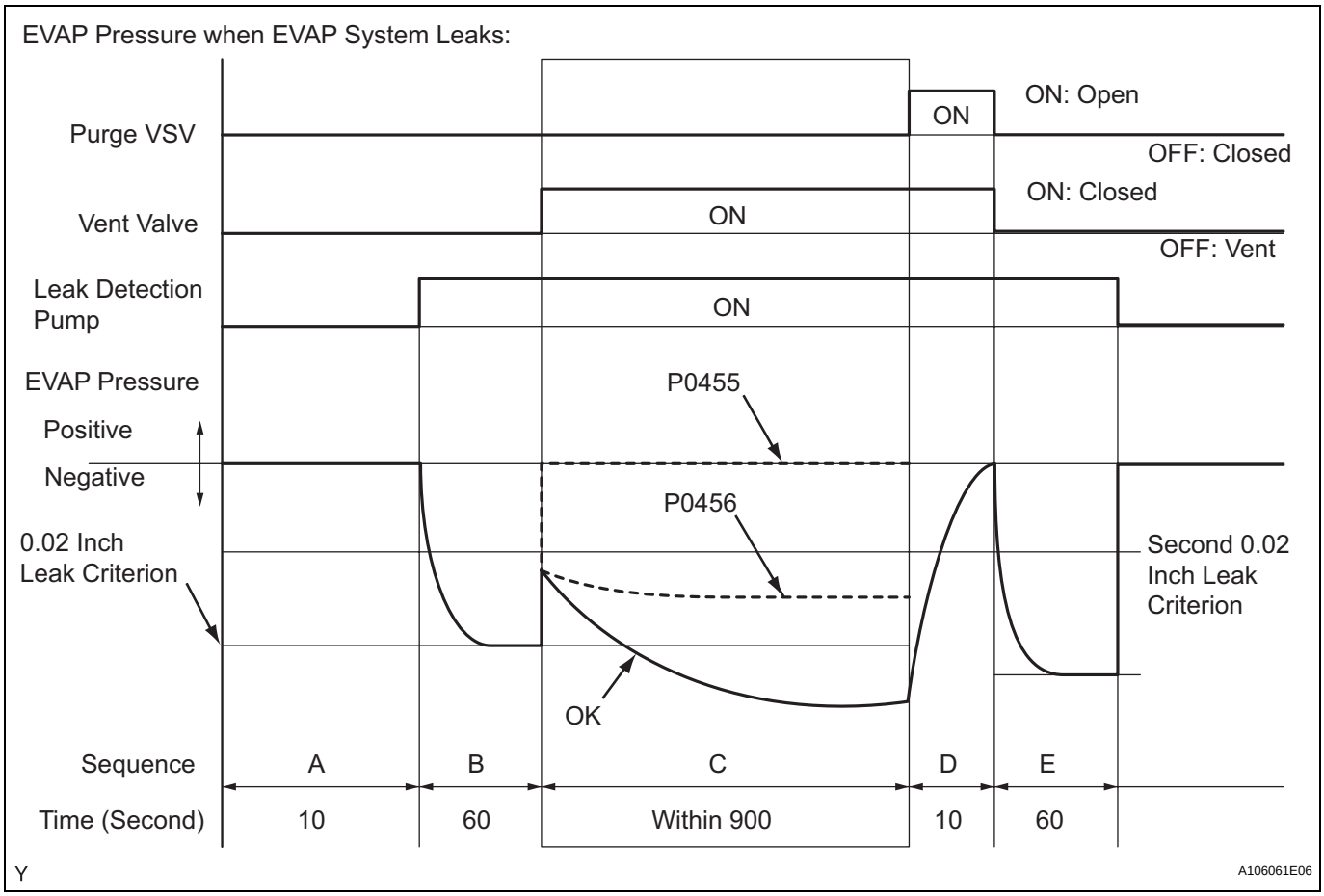
1. P0455: EVAP (Evaporative Emission) gross leak
   In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than [second 0.02 inch leak criterion x 0.2] (near atmospheric pressure), the ECM determines that the EVAP system has a large leakage, illuminates the MIL and sets the DTC (2 trip detection logic).

2. P0456: EVAP very small leak
In operation C, the leak detection 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 criterion, the ECM determines that the EVAP system has a small leakage, illuminates the MIL and sets the DTC (2 trip detection logic).



MONITOR STRATEGY

Required Sensors/Components	Purge VSV and Canister 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

Monitor runs whenever following DTCs not present	None
EVAP key-off monitor runs when all of following conditions met	-
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
Vehicle speed	Below 2.5 mph (4 km/h)
Ignition switch	OFF
FTP sensor malfunction (P0450, P0451, P0452 and 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 following conditions met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle driven	5 minutes 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)
Time after engine stopped	5 hours

Example of restart time

First time	7 hours
Second time	9 hours and 30 minutes

1. Key-off monitor sequence 1 to 8

1. Atmospheric pressure

Next sequence is run if following condition set	-
Atmospheric pressure change for 10 second	Less than 0.3 kPa (2.25 mmHg) for 1 second

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2. First reference pressure

Next sequence is run if all of following conditions set	Condition 1, 2 and 3
1. FTP when 4 seconds after reference pressure measurement	-1 kPa (-7.5 mmHg) or less
2. Reference pressure	-4.85 to -1.057 kPa (-33.38 to -7.93 mmHg)
3. Reference pressure	Saturated within 60 seconds

3. Vent valve stuck closed check

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

4. Vacuum introduction and leak

Next sequence is run if both of following conditions set	Condition 1 and 2
1. Vacuum introduction time	12 minutes or less
2. FTP	Saturated within 12 minutes

5. Purge VSV stuck closed check

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

6. Second reference pressure measurement

Next sequence is run if all of following conditions set	Condition 1, 2, 3 and 4
1. FTP when 4 seconds after reference pressure measurement	-1 kPa (-7.5 mmHg) or less
2. Reference pressure	-4.85 to -1.057 kPa (-36.4 to -7.92 mmHg)
3. Reference pressure	Saturated within 60 seconds
4. Reference pressure difference between first and second	0.7 kPa (5.25 mmHg) or less

7. Leak check

Next sequence is run if following condition set	-
FTP when vacuum introduction was complete	Second reference pressure or less

8. Atmospheric pressure

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

2. Typical Malfunction Thresholds

"Saturated" indicates that the EVAP pressure change is less than 0.1 kPa (0.75 mmHg) in 30 seconds.

P0455: EVAP gross leak	-
FTP when vacuum introduction complete	Higher than reference pressure x 0.2

P0456: EVAP small leak	-
FTP when vacuum introduction complete	Between 1 and 2
Condition 1.	Higher than second reference pressure
Condition 2.	Lower than reference pressure x 0.2
Atmospheric pressure (absolute pressure)	70 kPa (525 mmHg) or more, and less than 110 kPa (825 mmHg)

MONITOR RESULT

Refer to Checking Monitor Status (See page ES-21) or (See page ES-422).