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Service Category: Engine/Hybrid System		Section: Engine Control	
Model Year: 2008		Model: LX570	Doc ID: RM000000SWF03UX
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: DTC SUMMARY (2008 LX570)			

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow
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DTC SUMMARY

DTC CODE	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P0441	Purge VSV (Vacuum Switching Valve) stuck open	The leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. The reference pressure is measured at the start and at the end of the leak check. If the stabilized pressure is higher than [second reference pressure x 0.2], the ECM determines that the purge VSV is stuck open.	- Purge VSV - Connector/wire harness (Purge VSV - ECM) - ECM - Canister pump module - Leakage from EVAP system	While engine switch off	2 trip
	Purge VSV stuck closed	After the EVAP leak check is performed, the purge VSV is turned on (open), and atmospheric air is introduced into the EVAP system. The reference pressure is measured at the start and at the end of the check. If the pressure does not return to near atmospheric pressure, the ECM determines that the purge VSV is stuck closed.	- Purge VSV - Connector/wire harness (Purge VSV - ECM) - ECM - Canister pump module - Leakage from EVAP system	While engine switch off	2 trip
	Purge flow	While the engine is running, the following conditions are successively met: - Negative pressure is not created in the EVAP system when the purge VSV is turned on (open). - The EVAP system pressure change is below 0.4 kPa-g (3 mmHg-g) when the vent valve is turned on (closed). - The atmospheric pressure change before and after the purge flow monitor is below 0.1 kPa-g (0.75 mmHg-g).	- Purge VSV - Connector/wire harness (Purge VSV - ECM) - Leakage from EVAP line (Purge VSV - Intake manifold) - ECM	While engine running	2 trip

DESCRIPTION

The description can be found in the EVAP (Evaporative Emission) System [INFO](#) .

INSPECTION PROCEDURE

Refer to the EVAP System [INFO](#) .

MONITOR DESCRIPTION

The two monitors, Key-Off and Purge Flow, are used to detect malfunctions relating to DTC P0441. The Key-Off monitor is initiated by the ECM internal timer, known as the soak timer, 5 hours* after the engine switch is turned off. The purge flow monitor runs while the engine is running.

- KEY-OFF MONITOR

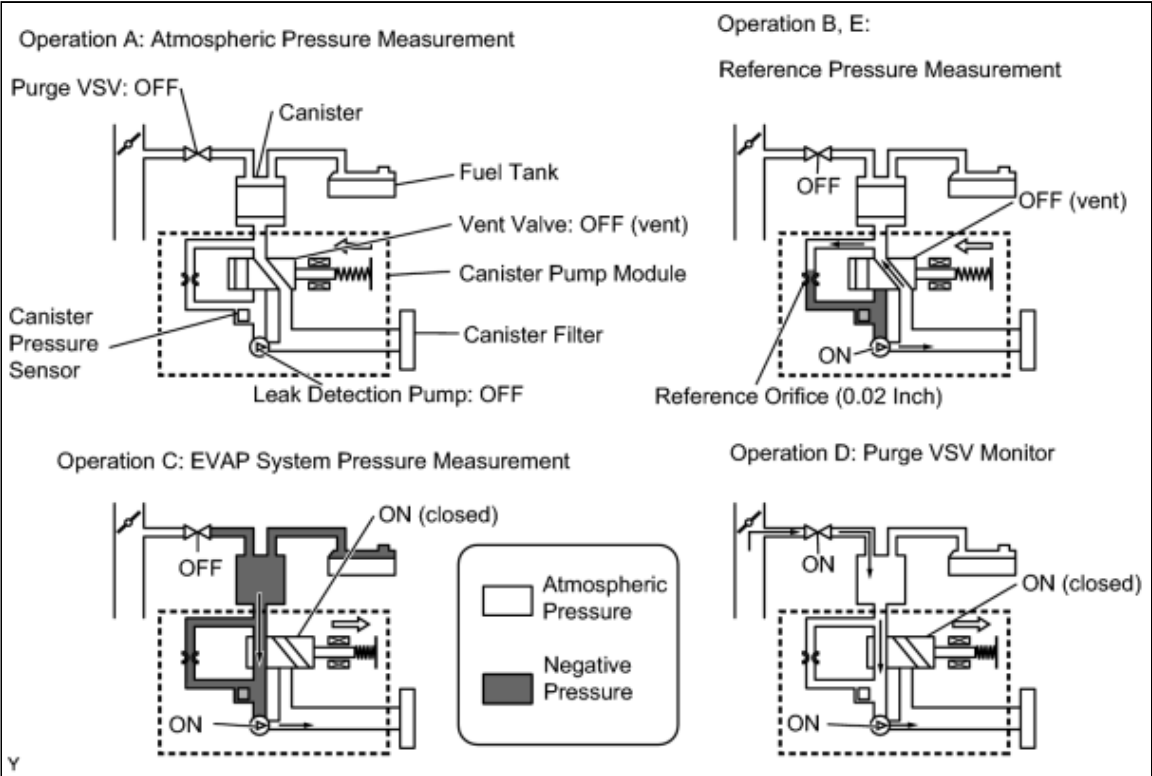
5 hours* after the engine switch is turned off, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

HINT:

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

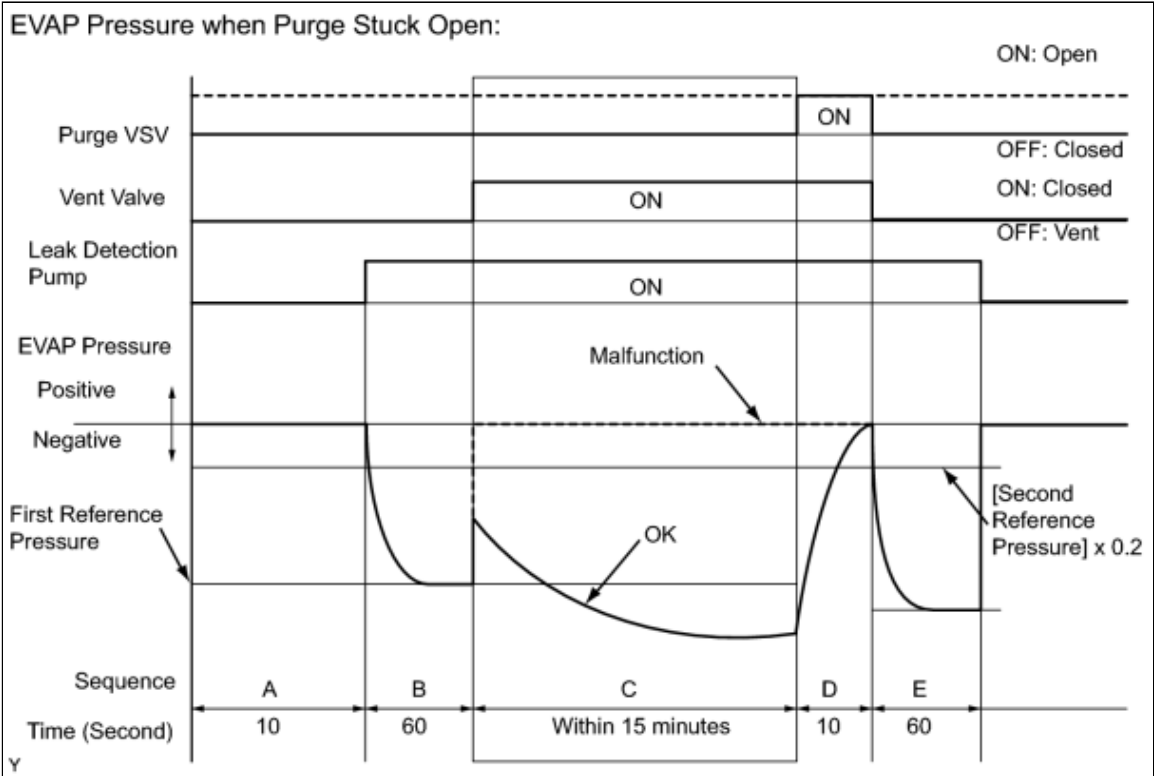
SEQUENCE	OPERATION	DESCRIPTION	DURATION
-	ECM activation	Activated by soak timer 5, 7 or 9.5 hours after engine switch turned off.	-
A	Atmospheric pressure measurement	Vent valve turned off (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If pressure in EVAP system not between 70 kPa-a and 110 kPa-a (525 mmHg-a and 825 mmHg-a), ECM cancels EVAP system monitor.	10 seconds
B	First reference pressure measurement	In order to determine reference pressure, 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 it 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 normality.	10 seconds
E	Second reference pressure measurement	After second reference pressure measurement, leak check performed by comparing first and second reference pressure. If stabilized system pressure higher than second reference pressure, ECM determines that EVAP system leaking.	60 seconds
-	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.



a. Purge VSV stuck open

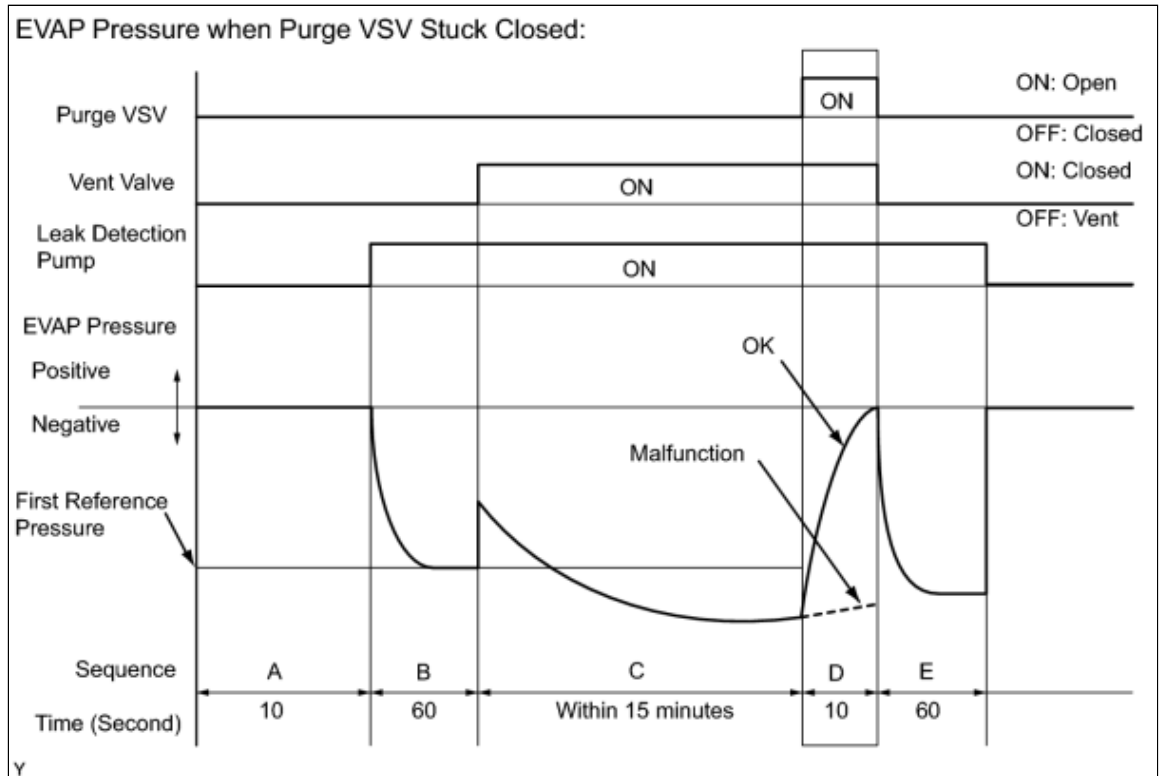
In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The EVAP system pressure is then measured by the ECM using the canister pressure sensor. If the stabilized system pressure is higher than [second reference pressure x 0.2], the ECM interprets this as the purge VSV (Vacuum Switching Valve) being stuck open. The ECM illuminates the MIL and stores the DTC (2 trip detection logic).



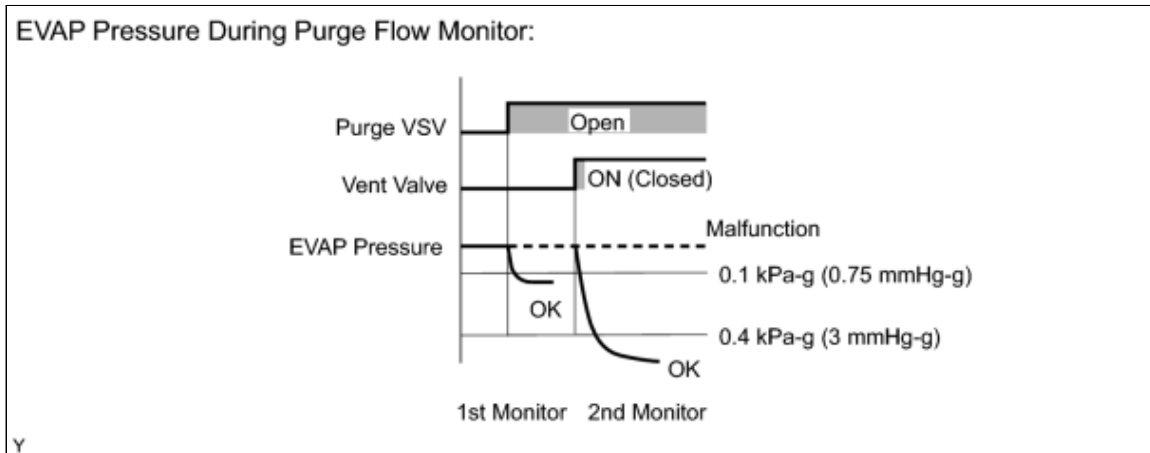
b. Purge VSV stuck closed

In operation D, the canister pressure sensor measures the EVAP system pressure. The pressure measurement for the purge VSV monitor is begun when the purge VSV is turned on (open) after the EVAP leak check. When the measured pressure indicates an increase of 0.3

kPa-g (2.25 mmHg-g) or higher, the purge VSV is functioning normally. If the pressure does not increase, the ECM interprets this as the purge VSV being stuck closed. The ECM illuminates the MIL and stores the DTC (2 trip detection logic).



- PURGE FLOW MONITOR**



The purge flow monitor consists of two monitors. The 1st monitor is conducted every time and the 2nd monitor is activated if necessary.

- The 1st monitor**

While the engine is running and the purge VSV is ON (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If negative pressure is not created, the ECM begins the 2nd monitor.

- The 2nd monitor**

The vent valve is turned on (closed) and the EVAP pressure is then measured. If the variation in the pressure is below 0.4 kPa-g (3 mmHg-g), the ECM interprets this as the purge VSV being stuck closed, illuminates the MIL and stores DTC P0441 (2 trip detection logic).

Atmospheric pressure check:

In order to ensure reliable malfunction detection, the variation between the atmospheric pressures, before and after conduction of the purge flow monitor, is measured by the ECM.

OBD II MONITOR SPECIFICATIONS

1. Key-off Monitor

Monitor Strategy

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

Typical Enabling Conditions

EVAP key-off monitor runs when all of following conditions met	-
Atmospheric pressure	70 to 110 kPa-a (525 to 825 mmHg-a)
Battery voltage	10.5 V or higher
Vehicle speed	Less than 4 km/h (2.5 mph)
Engine switch	Off
Time after key off	5 or 7 or 9.5 hours
Canister pressure sensor malfunction (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 key off	Conditions 1 and 2
1. Duration that vehicle driven	5 minutes or more
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)

Typical Malfunction Thresholds

Purge VSV stuck open:	-
EVAP pressure when vacuum introduction complete	Reference pressure x 0.2 or higher
Purge VSV stuck closed:	-
EVAP pressure change after purge VSV ON (open)	Below 0.3 kPa-g (2.25 mmHg-g)

OBD II MONITOR SPECIFICATIONS

1. Purge Flow Monitor

Monitor Strategy

Required Sensors/Components	Purge VSV and canister pump module
Frequency of Operation	Once per driving cycle
Duration	Within 10 minutes
MIL Operation	2 driving cycles

Sequence of Operation	None
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Typical Enabling Conditions

Monitor runs whenever following DTCs not stored	P0011 (VVT System 1 - Advance) P0012 (VVT System 1 - Retard) P0021 (VVT System 2 - Advance) P0022 (VVT System 2 - Retard) P0102 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0171, P0172 (Fuel system) P0300 - P0308 (Misfire) P0335 (CKP sensor) P0351 - P0358 (Igniter) P0451 - P0453 (EVAP press sensor) P0500 (VSS)
Engine	Running
ECT	4.4°C (40°F) or higher
IAT	4.4°C (40°F) or higher
Canister pressure sensor malfunction	Not detected
Purge VSV	Not operated by scan tool
EVAP system check	Not operated by scan tool
Battery voltage	10 V or higher
Purge duty cycle	8% or more

Typical Malfunction Thresholds

Both of following conditions met	Conditions 1 and 2
1. EVAP pressure change when purge operation started	Below 0.1 kPa-g (0.75 mmHg-g)
2. EVAP pressure change during purge operation when vent valve closed	Below 0.4 kPa-g (3 mmHg-g)

MONITOR RESULT

Refer to Checking Monitor Status INFO .

