DTC	P0441	**Evaporative Emission Control System Incorrect Purge Flow**

DESCRIPTION

The circuit description can be found in the EVAP System (See page).

Refer to the EVAP System (See page).

MONITOR DESCRIPTION

The ECM tests the Evaporative Emissions (EVAP) system using the fuel tank pressure sensor, Canister Close Valve (CCV), and EVAP VSV. The ECM closes the EVAP system and creates negative pressure (vacuum) into it. The ECM then monitors the internal pressure using the fuel tank pressure sensor (refer to the Leak Check graphic).
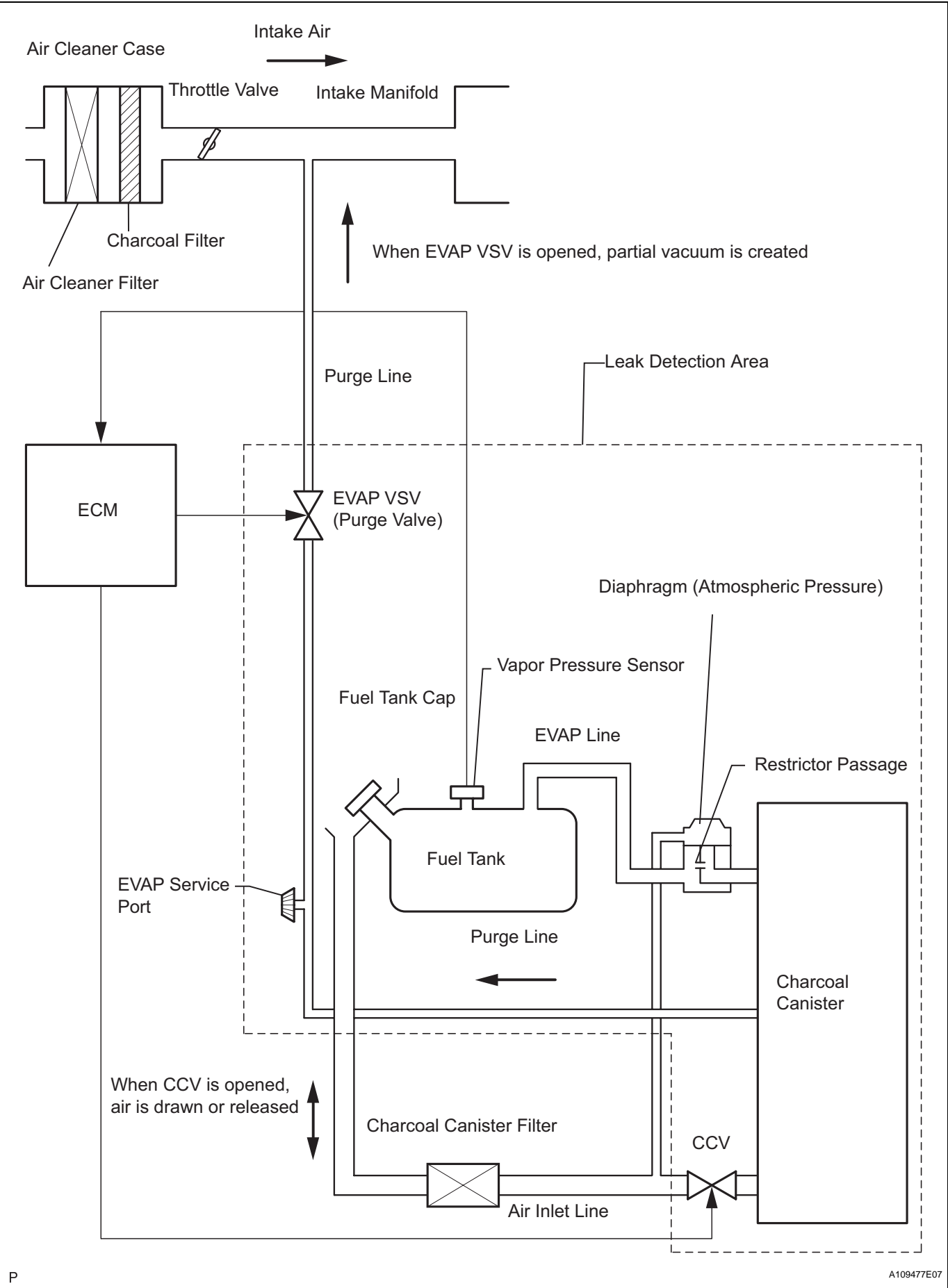
P0441

The EVAP VSV has the following features:

1. Purges the evaporative emissions from the fuel tank to the intake manifold.
2. Works with the CCV to create negative pressure (vacuum) inside the fuel tank and performs leak tests.

When the EVAP VSV remains open or closed, the ECM sets DTC P0441.

The ECM checks if the EVAP VSV is "stuck closed". The ECM commands the EVAP VSV to open while the CCV is closed. Under these circumstances, a high negative pressure (vacuum) should develop in the fuel tank. If no negative pressure develops, the ECM determines that the EVAP VSV remains closed despite the open command. The ECM will turn on the MIL and set a DTC.

The ECM also checks if the EVAP VSV is "stuck open". The ECM commands the EVAP VSV to close while the CCV is closed and the pressure in the fuel tank is the same as ambient pressure. Under these circumstances, the pressure in the fuel tank should remain at ambient pressure. If negative pressure develops in the fuel tank, the ECM determines that the EVAP VSV remains open despite the close command. The ECM will turn on the MIL and set a DTC.
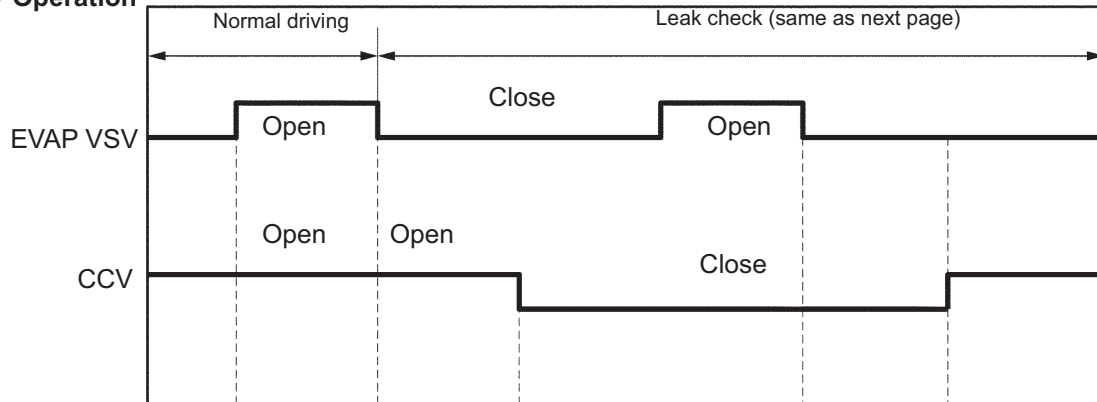
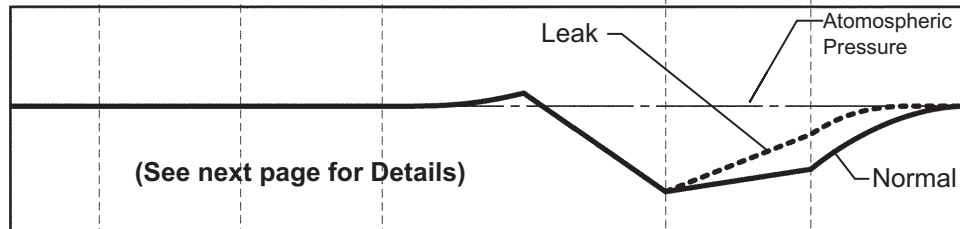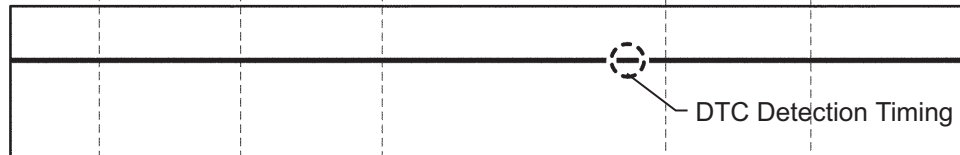| DTC No.	DTC Detection Condition	Trouble Area
P0441	• Pressure in charcoal canister and fuel tank does not drop during purge control (2 trip detection logic) • During purge cut-off, negative pressure enters charcoal canister and fuel tank (2 trip detection logic)	• Vacuum hose has cracks, holes, or is blocked, damaged or disconnected • Fuel tank cap is incorrectly installed • Fuel tank cap has cracks or is damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in EVAP VSV circuit • EVAP VSV • Open or short in CCV circuit • CCV • Fuel tank has cracks, holes, or is damaged • Charcoal canister has cracks, holes, or is damaged • Fuel tank over fill check valve has cracks, or is damaged • ECM

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Air Cleaner Case

Intake Air →

Throttle Valve   Intake Manifold

Charcoal Filter

Air Cleaner Filter

When EVAP VSV is opened, partial vacuum is created

Purge Line

Leak Detection Area

ECM

EVAP VSV
(Purge Valve)

Diaphragm (Atmospheric Pressure)

Vapor Pressure Sensor

Fuel Tank Cap

EVAP Line

Restrictor Passage

EVAP Service
Port

Fuel Tank

Purge Line

Charcoal
Canister

When CCV is opened,
air is drawn or released

Charcoal Canister Filter

CCV

Air Inlet Line

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VSV Malfunction Condition and Leak Check

EVAP VSV is Open: ON
CCV is Open: OFF

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A085438E02

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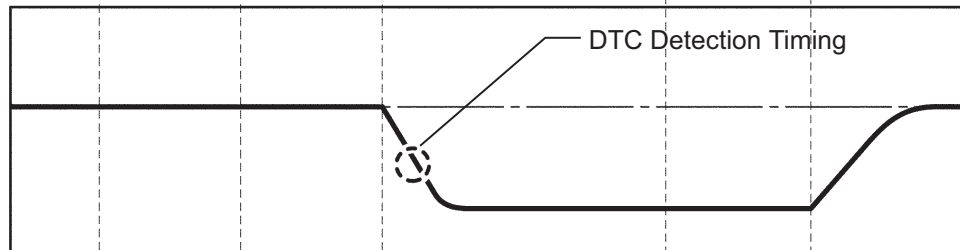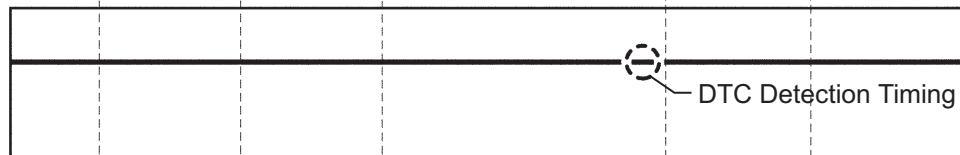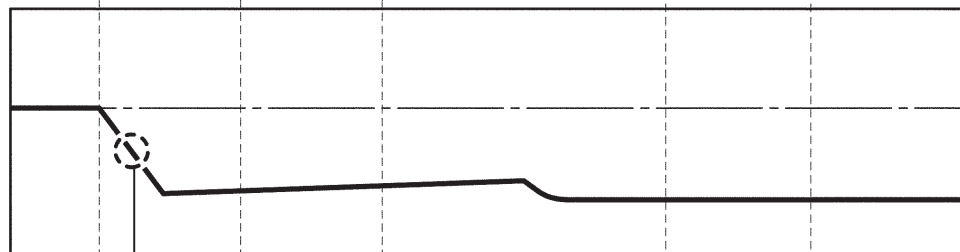
Leak check

Initial Condition:

● Cold Start

● Engine coolant temperature/intake air temperature are nearly same

FTP: Pressure in Fuel Tank (Vapor Pressure)

Ambient Pressure

Gross Leak (P0455)

for ex., Fuel Tank Cap loose)

Start of Creation of Negative Pressure

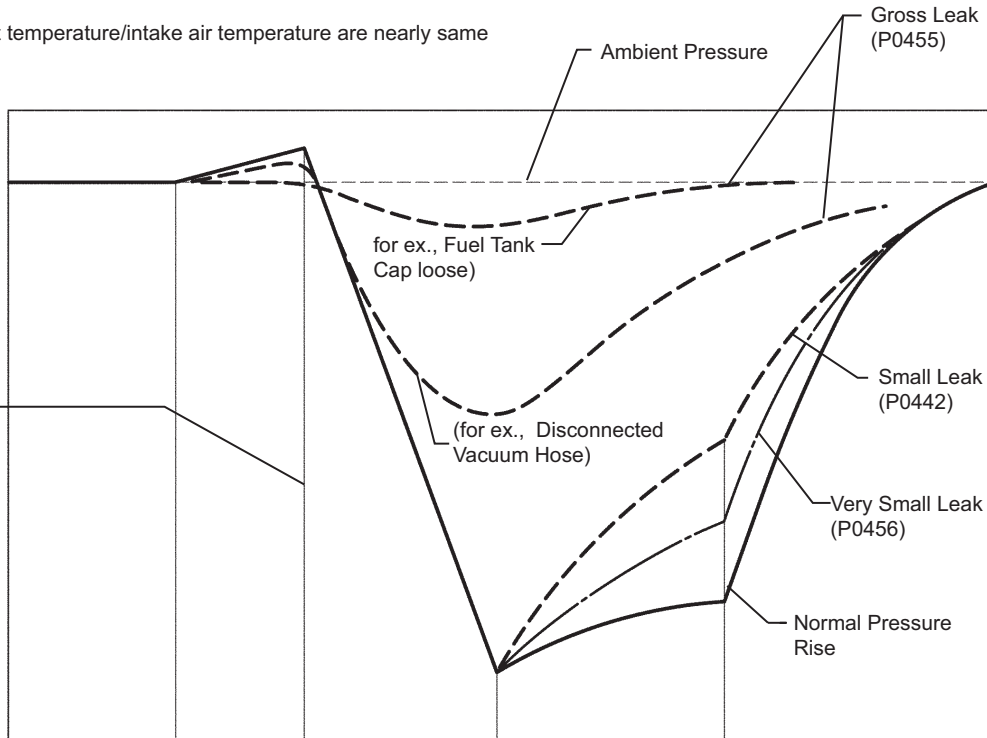(for ex., Disconnected Vacuum Hose)

Small Leak (P0442)

Very Small Leak (P0456)

Normal Pressure Rise

EVAP VSV (Operation)

Open[*1]

Closed   Closed

CCV (Operation) Open[*2]

Closed

Open

P0455   P0442, P0456

Creation of Partial Vacuum

Tank & Canister Leak Chek (DTC Detection Period)

Vacuum is Released
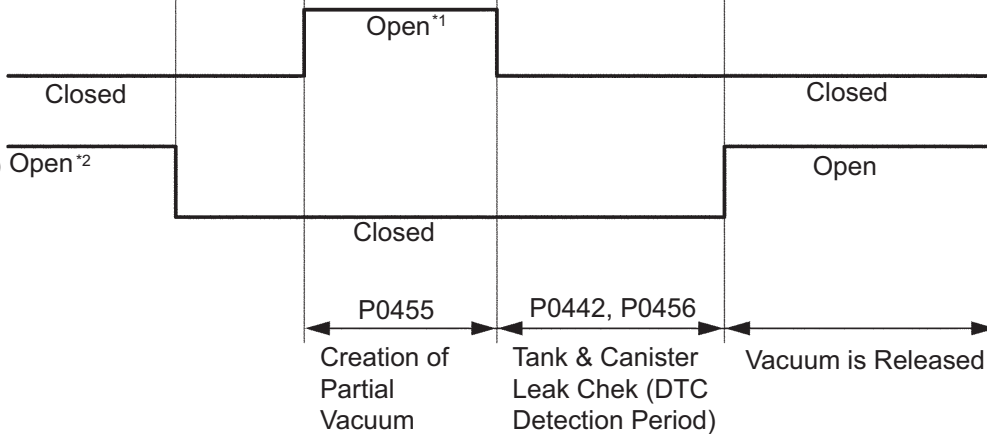
[*1] : EVAP VSV is Open: ON
[*2] : CCV is Open : OFF

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MONITOR STRATEGY

Related DTCs	P0441: Purge VSV stuck open P0441: purge VSV stuck close
Required sensors / components (Main)	CCV, EVAP canister, EVAP hose, Fuel cap, Fuel tank and Purge VSV
Required sensors / components (Related)	ECT sensor, FTP sensor, IAT sensor, MAF meter, Vehicle speed sensor
Frequency of operation	Once per driving cycle
Duration	Within 60 seconds
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

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The monitor will run whenever these DTCs are not present	P0011, P0012, P0021, P0022 (VVT system-Advance, Retard), P0100, P0101, P0102, P0103 (MAF sensor), P0110, P0112, P0113 (IAT sensor), P0115, P0116, P0117, P0118 (ECT sensor), P0120, P0122, P0123, P0220, P0222, P0223, P2135,(TP sensor), P0125 (Insufficient ECT for closed loop), P0171, P0172, P0174, P0175 (Fuel system), P0300, P0301, P0302, P0303, P0304, P0305, P0306 (Misfire), P0335 (CKP sensor), P0340, P0341 (CMP sensor), P0351, P0352, P0353, P0354, P0355, P0356, (Igniter), P0500 (VSS), P0510 (Idle switch)
Battery voltage	11 V or more
Altitude	Less than 7,870 ft. (2,400 m)
EVAP pressure sensor malfunction	Not detected
IAT at engine start - ECT at engine start	-7 to 11.1°C (-12.6 to 20°F)
EVAP VSV and CCV	Not operated by scan tool
EVAP purge duty cycle	6 % or more (vary with MAF)
Refuel	No refuel during EVAP monitor
EVAP pressure	-12.75 mmHg (-1.7 kPa) or more
ECT at engine start	4.4 to 35°C (39.9 to 95°F)
IAT at engine start	4.4 to 35°C (39.9 to 95°F)
IAT	4.4°C (39.9°F) or more
Vehicle speed change	Steady speed
Time after engine start	Within 50 minutes
EVAP pressure change	Minimum change (driving on fairly smooth road)
Fuel level	Less than 90 %

TYPICAL MALFUNCTION THRESHOLDS

Purge VSV stuck close P0441:

FTP change during vacuum introduction	Less than 5.25 mmHg (0.7 kPa)

Purge VSV stuck open P0441:

Duration that the following condition is met:	4 seconds or more
EVAP pressure before vacuum introduction	Less than -10 mmHg (-1.333 kPa)

MONITOR RESULT

Refer to "CHECKING MONITOR STATUS" for detailed information (See page ES-14).
The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (See page ES-16).
- TID (Test Identification Data) is assigned to each emissions-related component.
- TLT (Test Limit Type):
  If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.
  If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.

- CID (Component Identification Data) is assigned to each test value.
- Unit Conversion is used to calculate the test value indicated on generic OBD ll scan tools.

TID $02: EVAP system - LEV II Vacuum monitor

TLT	CID	Unit Conversion	Description of Test Data	Description of Test Limit
1	$01	Multiply by 0.183 (mmHg)	Test value of EVAP VSV stuck close: Determined by fuel tank pressure change during vacuum introduction	Malfunction criteria for EVAP VSV stuck closed
0	$02	Multiply by 0.0655 (seconds)	Test value of EVAP VSV stuck open: Determined by duration that fuel tank pressure is higher than criteria	Malfunction criteria for EVAP VSV stuck open
0	$03	Multiply by 0.0655 (seconds)	Test value of canister closed valve (CCV): Determined by duration that fuel tank pressure is lower than criteria	Malfunction criteria for Canister Closed Valve (CCV)
0	$04	Multiply by 0.0458 (mmHg)	Test value 0.04 inch leak: Determined by fuel tank pressure change	Malfunction criteria for 0.04 inch leak
0	$05	Multiply by 0.0458 (mmHg)	Test value 0.02 inch leak: Determined by fuel tank pressure change	Malfunction criteria for 0.02 inch leak

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