DTC	P0441	EVAPORATIVE EMISSION CONTROL SYSTEM INCORRECT PURGE FLOW

DTC	P0442	EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK)

DTC	P0446	EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT

DTC	P0456	EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)

MONITOR DESCRIPTION

The ECM tests the evaporative emissions (EVAP) system using the fuel tank pressure sensor, the canister close valve (CCV), and the EVAP VSV. The ECM closes the EVAP system and introduces a negative pressure (vacuum) into it. The ECM then monitors the internal pressure using the fuel tank pressure sensor. (refer to graphic)

P0441

The EVAP VSV is used to purge the evaporative emissions from the fuel tank into the intake manifold. Also, it creates a negative pressure (vacuum) inside the fuel tank in unison with the operation of the CCV (canister closed valve) and leak tests are performed using this vacuum.

Opening or closing malfunctions in the EVAP VSV prompt the ECM to set DTC P0441.

The ECM checks for a EVAP VSV ”stuck closed” fault by commanding the EVAP VSV open with the CCV (vent) closed. The fuel tank should develop a high negative pressure (vacuum). If it does not, the ECM determines that the despite an OPEN command, the EVAP VSV remained closed. The ECM turns on the MIL and a DTC is set.

The ECM checks for a EVAP VSV ”stuck open” fault by commanding both valves (EVAP VSV and CCV) closed at a time when the fuel tank is at atmospheric pressure. If the fuel tank develops a high negative pressure (vacuum) at this early stage of the test, the ECM determines that the EVAP VSV is stuck OPEN. The ECM will turn on the MIL and DTC is set.

P0446

The CCV is open under normal operating conditions. When the EVAP VSV is used to purge the evaporative emissions from the fuel tank into the intake manifold, fumes are drawn from the fuel tank into the charcoal canister. The CCV has an additional function that relieves the pressure when the pressure inside the fuel tank has rapidly increased. Finally, the CCV is used in unison with the EVAP VSV to create a vacuum inside the fuel tank and leak tests are performed using this vacuum.

The ECM checks for a CCV ”stuck closed” malfunction by commanding both valves (EVAP VSV and CCV) open at a time when the fuel tank is at atmospheric pressure. If the fuel tank develops a high negative pressure (vacuum) and it remains in that state for more than 4 seconds, the ECM determines that the CCV (vent) is stuck CLOSED. The ECM will turn on the MIL and a DTC is set. This malfunction is detected regardless of the engine coolant temperature.

The ECM checks for a CCV ”stuck open” malfunction by commanding both valves closed at a time when the fuel tank should have developed a high negative pressure (vacuum). If the fuel tank did not develop the

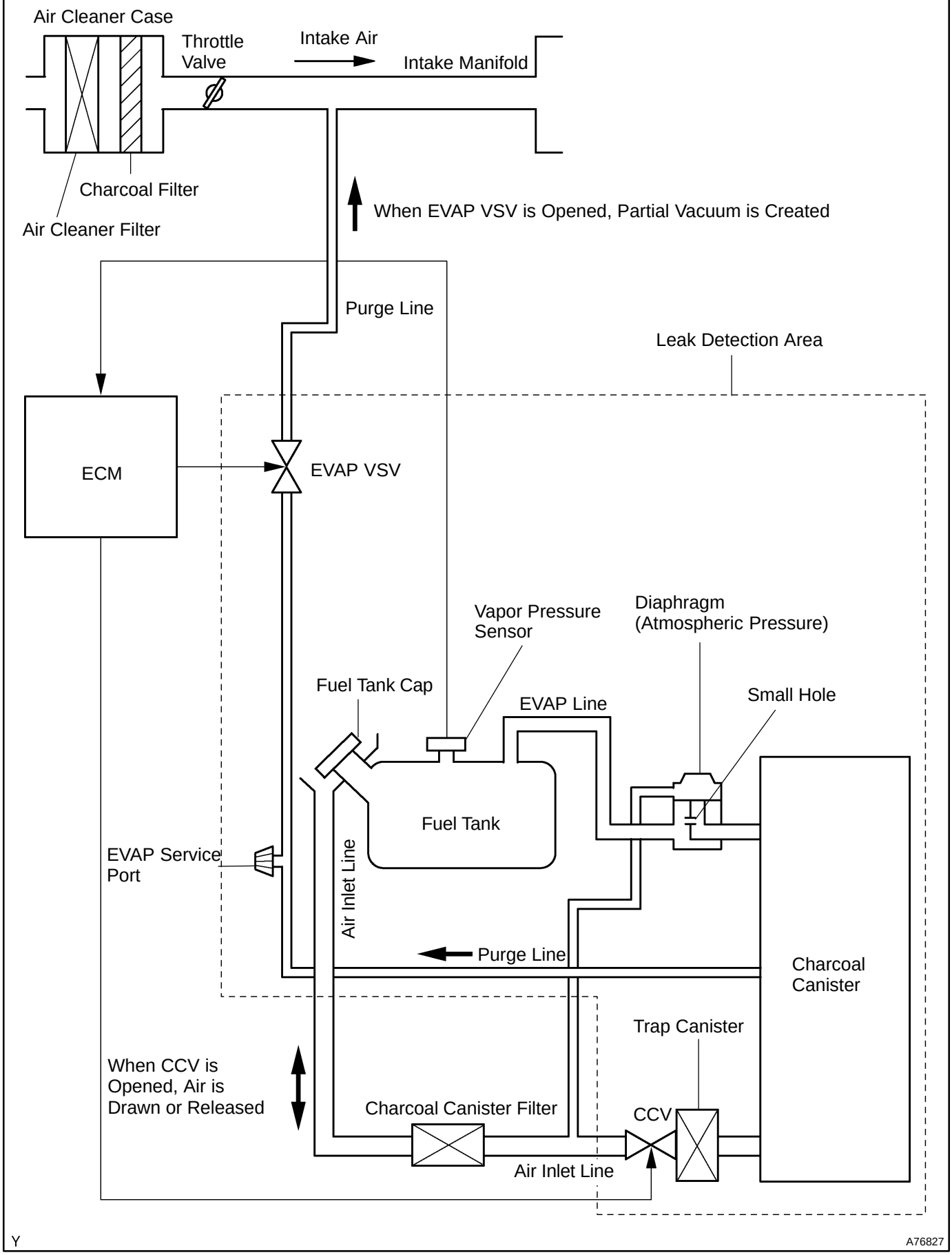
proper high negative pressure (vacuum), the ECM concludes that the CCV must have been ”stuck open”. The ECM will turn on the MIL and a DTC is set.

P0442, P0456

A leak in the evaporative emission system prompts the ECM to set DTC P0442, P0456.
The ECM tests the evaporative emissions (EVAP) system using the fuel tank pressure sensor, the canister close valve (CCV), and the EVAP VSV. The ECM closes the EVAP system and introduces a negative pressure (vacuum) into it. The ECM then monitors the internal pressure using the fuel tank pressure sensor. (Refer to graphic)
The ECM checks for leaks in the system by introducing a high negative pressure (vacuum) from the intake manifold by commanding the EVAP VSV open while the CCV (vent) is closed. After sufficient time has elapsed the fuel tank should have developed a high negative pressure (vacuum) and the EVAP VSV is closed. The ECM then monitors the pressure−rise (loss of vacuum) in the fuel tank. If the pressure rises too rapidly, the ECM concludes that there is a leak in the system. The ECM will turn on the MIL and a DTC is set. The ECM has separate DTCs for small and large leaks.
(a) Large increase of the internal pressure
(b) Slight increase of the internal pressure
Condition (a) represents leakage somewhere in the evaporative emission system and DTC P0442 is set, and condition (b) indicates a very small leak and DTC P0456 is set.

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 incoming in the charcoal canister and fuel tank will not stop (2 trip detection logic)	• Vacuum hose has cracks, holes, or is blocked, damaged or disconnected • Fuel tank cap 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 • Trap canister assy • Fuel tank has cracks, holes, or is damaged • Charcoal canister has cracks, holes, or is damaged • Fuel tank over fill check valve cracks, or is damaged • ECM
P0446	When CCV is ON, pressure in charcoal canister and fuel tank is maintained at atmospheric pressure (2 trip detection logic)	• Same as DTC No. P0441
P0442 P0456	After cold engine start After EVAP VSV operation, EVAP VSV is turned off sealing vacuum in system and ECM begins to monitor pressure increase Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0442 This monitoring method is also able to distinguish what is called the small or very small leak detection (DTC P0456) A pressure rise just above normal indicates a very small hole (2 trip detection logic)	• Same as DTC No. P0441

Fig. 1


Air Cleaner Case
Throttle Valve
Intake Air
Intake Manifold
Charcoal Filter
Air Cleaner Filter
When EVAP VSV is Opened, Partial Vacuum is Created
Purge Line
Leak Detection Area
ECM
EVAP VSV
Vapor Pressure Sensor
Diaphragm (Atmospheric Pressure)
Fuel Tank Cap
EVAP Line
Small Hole
Fuel Tank
EVAP Service Port
Air Inlet Line
Purge Line
Charcoal Canister
Trap Canister
When CCV is Opened, Air is Drawn or Released
Charcoal Canister Filter
CCV
Air Inlet Line
Y
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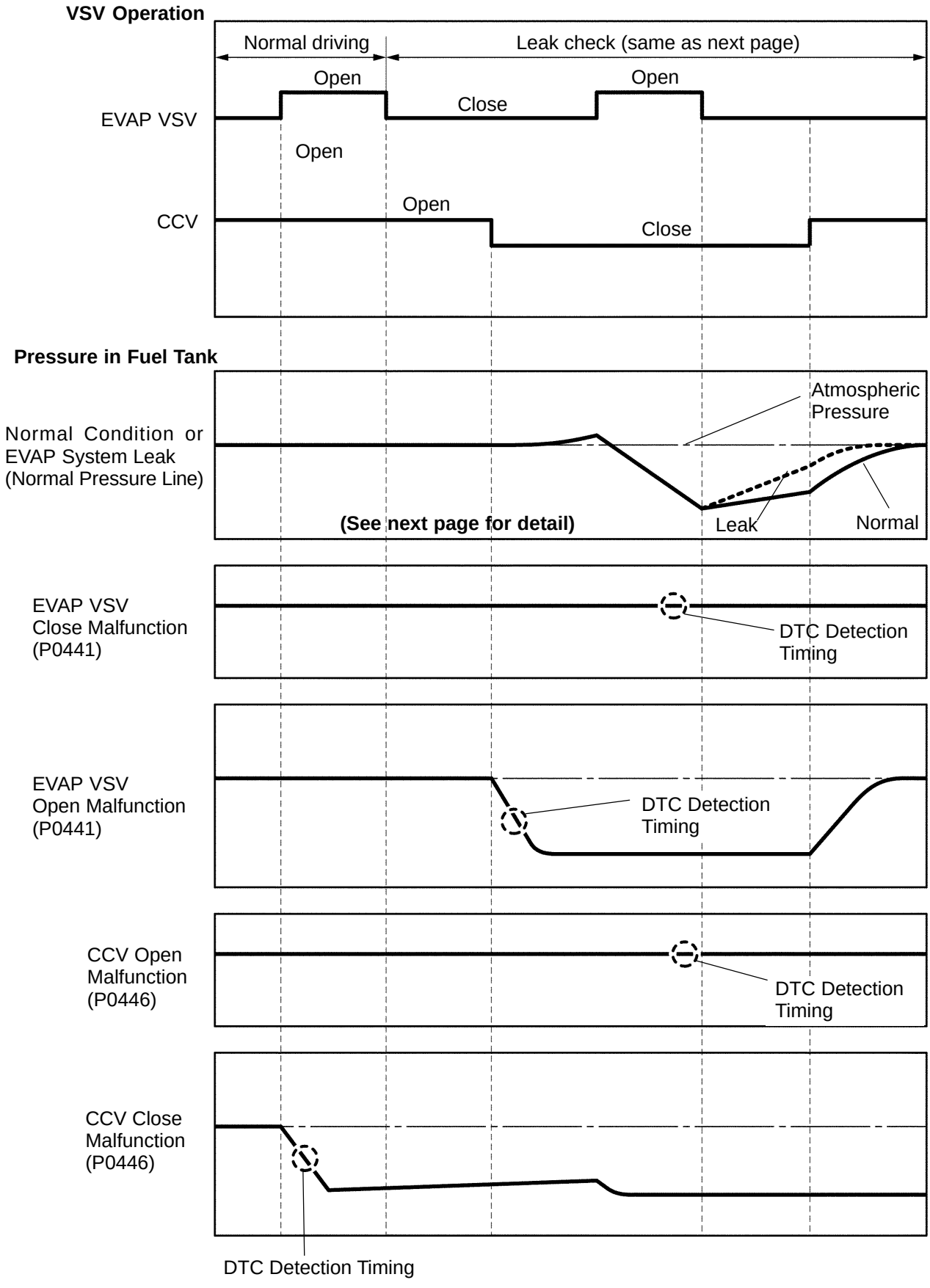
VSV Malfunction Condition and Leak Check

EVAP VSV is Open: ON
CCV is Open: OFF



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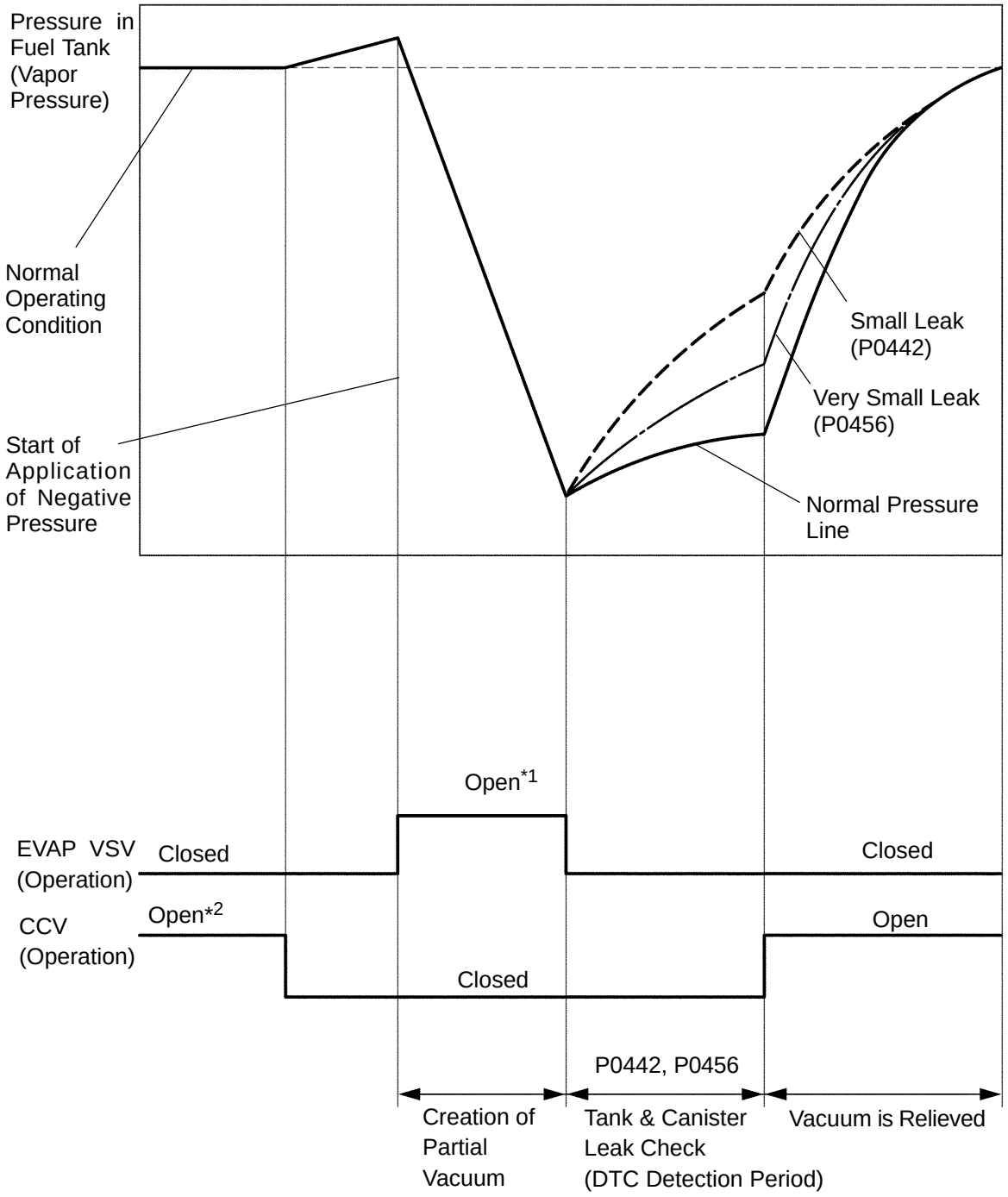
Leak Check

Initial Condition
- Cold Start
- Engine Coolant Temperature/Intake Air Temperature nearly Same



*1: EVAP VSV is Open: ON

*2: CCV is Open: OFF

P

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EVAP LEAK TEST

(a) Connect the hand−held tester to the DLC3.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK (or EVAP LEAK TEST) mode on the hand−held tester.
(c) If any changes do not occur within 1 minute after pressing ”EVAP LEAK TEST”, remove the fuel tank cap, then set the fuel tank cap again. Perform ”EVAP SYS CHECK (or EVAP LEAK TEST)”.

Display on the Hand−held tester	Scan tool detect a leak on the EVAP system
	Scan tool does not detect a leak on the EVAP system

HINT:
If a leak is detected during this leak test, or if DTCs P0441, P0442 and P0446 were output simultaneously, conduct a leak test again after repair. If no leak is found at this time, the EVAP system is recovered to normal.

MONITOR STRATEGY

Related DTCs	P0441: Purge VSV stuck open P0441: Purge VSV stuck close P0442: EVAP 0.04 inch leak P0446: CCV stuck open P0446: CCV stuck close P0455: EVAP gross leak P0456: EVAP 0.02 inch leak
Required sensors/ components (Main)	CCV, EVAP canister, EVAP hose, Fuel cap, Fuel tank and Purge VSV
Required sensors / components (Related)	ECT, FTP, IAT, MAF and VSS (Vehicle Speed Sensor)
Frequency of operation	Once per driving cycles
Duration	Within 90 seconds
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05−360
Battery voltage	11 V or more
Altitude	7,874 ft. (2,400 m) or less
FTP sensor malfunction	Not detected
Throttle position learning	Completed
IAT	4.4°C (39.9°F) or more
IAT at engine start	• 4.4 to 35°C (39.9 to 95°F) • 4.4 to 32°C (39.9 to 89.6°F) (Only EVAP 0.02 inch leak)
ECT at engine start	• 4.4 to 35°C (39.9 to 95°F) • 4.4 to 32°C (39.9 to 89.6°F) (Only EVAP 0.02 inch leak)
IAT at engine start − ECT at engine start	−7 to 11.1°C (19.4 to 52°F)
EVAP VSV, CCV	Not operated test by scan tool
Time after engine start	With in 50 minutes
FTP change before vacuum introduction	Minimal change (driving on fairly smooth road)
Fuel level	Less than 90 %
Purge duty cycle	10 % or more
Refuel	No refuel during EVAP monitor
EVAP pressure	−1.7 kPa (−12.75 mmHg) or more
Vehicle speed	Steady speed

EVAP 0.02 inch leak P0456:

0.04 inch leak	Not detected
CCV malfunction	Not detected
Purge VSV malfunction	Not detected
Vehicle speed	Less than 81.25 mph (130 km/h)

TYPICAL MALFUNCTION THRESHOLDS

Purge VSV stuck close P0441:

FTP change during vacuum introduction	Less than 0.7 kPa (5 mmHg)

Purge VSV stuck open P0441:

Duration that following condition is met	4 seconds or more
FTP before vacuum introduction	Less than −1.333 kPa (−10 mmHg)

CCV stuck close P0446:

Duration that the following conditions 1 and 2 are met:	4 seconds or more
1. Accumulated purge volume	0.5 g or more
2. FTP	Less than −1.7 kPa (−12.75 mmHg)

CCV stuck open P0446:

Purge VSV stuck close	Detected

EVAP 0.04 inch leak P0442:

Both of the following conditions are met:	Condition 1 and 2
1. FTP change for 5 seconds from −2.67 kPa (−20 mmHg)	More than 0.19 kPa (1.4 mmHg)
2. FTP change for 5 seconds from −2.27 kPa (−17 mmHg)	More than 0.19 kPa (1.4 mmHg)

EVAP 0.02 inch leak P0456:

Both of the following conditions are met:	Condition 1 and 2
1. FTP change for 5 seconds when FTP is −2.27 kPa (−17 mmHg)	0.08 kPa (0.6 mmHg) or more
2. FTP change for 5 seconds when FTP is −2.67 kPa (−20 mmHg)	0.08 kPa (0.6 mmHg) or more

EVAP gross leak P0455:

FTP when vacuum introduction completed	−0.93 kPa (−7 mmHg) or more

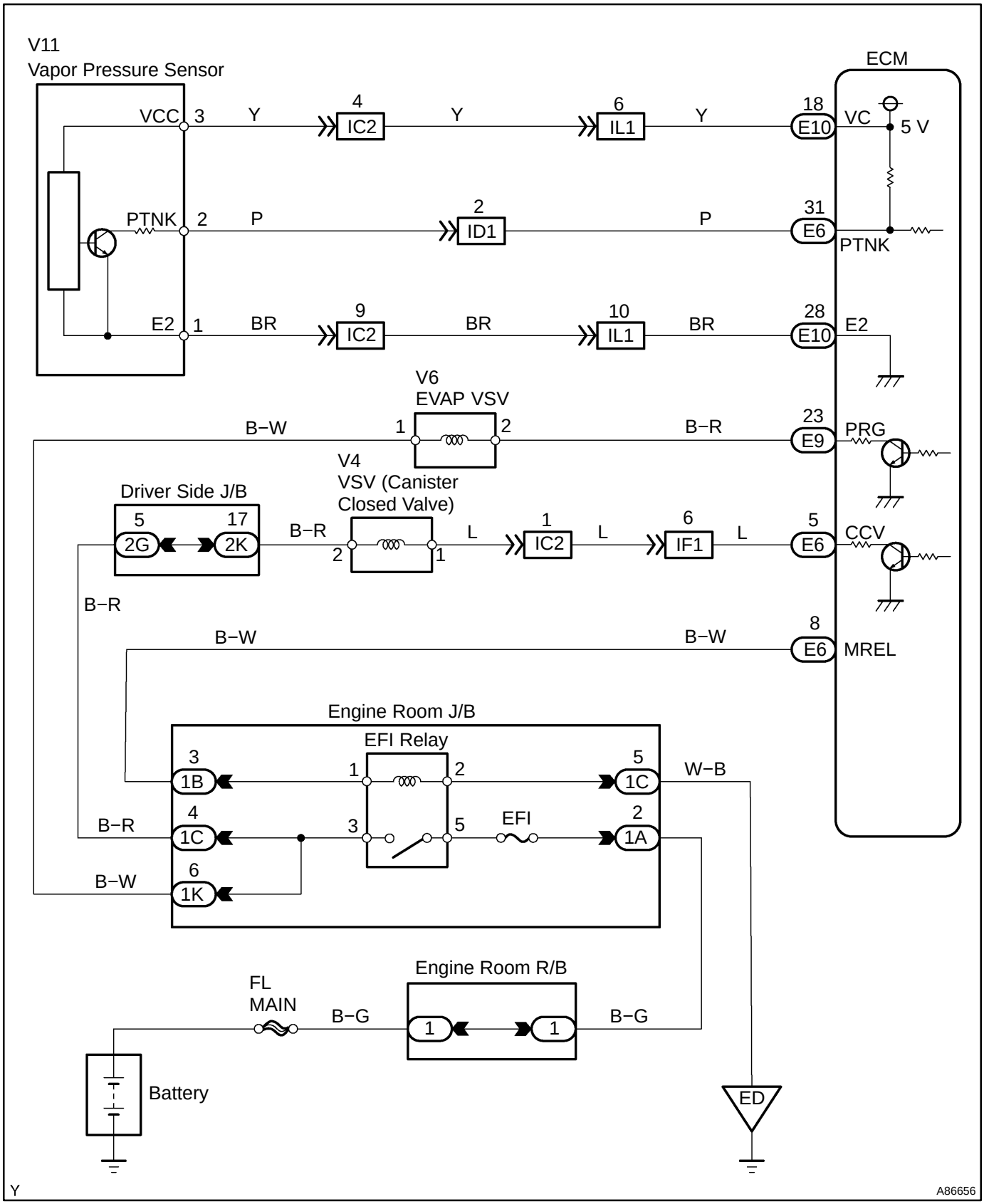
MONITOR RESULT (MODE 06)

Refer to page 05−369 for detailed information.

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)	Fuel tank pressure change during vacuum introduction	Malfunction criteria for EVAP VSV stuck closed
0	$02	Multiply by 65.536 (msec.)	Duration that fuel tank pressure is lower than specified value before vacuum introduction	Malfunction criteria for EVAP VSV stuck open
0	$03	Multiply by 65.536 (msec.)	Duration that fuel tank pressure is lower than specified value during purge flow	Malfunction criteria for Canister Closed Valve (CCV)
0	$04	Multiply by 0.0458 (mmHg)	Fuel tank pressure change monitored by vapor pressure sensor	Malfunction criteria for 0.04 inch leak
0	$05	Multiply by 0.0458 (mmHg)	Fuel tank pressure change monitored by vapor pressure sensor	Malfunction criteria for 0.02 inch leak

WIRING DIAGRAM

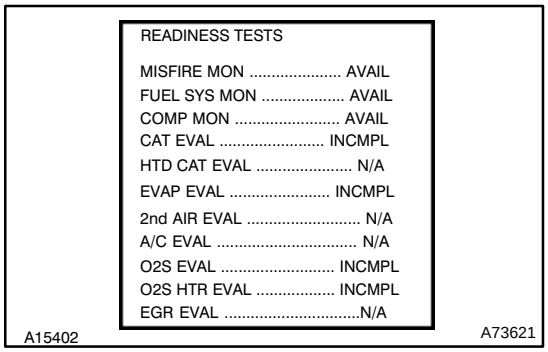


CONFIRMATION READINESS TEST

First Trip Procedure

(a) The vehicle must be cold and the ambient temperature must be approximately between 50 to 95°F.

(b) The Intake Air Temperature (IAT) and the Engine Coolant Temperature (ECT) sensors indicate almost the same value.

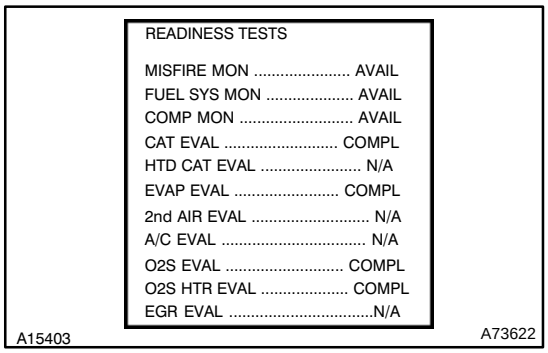


(c) Clear the DTCs.
- Disconnect the battery cable or remove the EFI and ETCS fuses more than 60 seconds.
- READINESS TESTS will show INCMPL (incomplete).

(d) Drive the vehicle on a freeway. Write down the initial status of the READINESS TESTS. As each Readiness Test passes EVAP evaluation monitors, its status will change to COMPL (complete). This procedure may take approximately 20 minutes or more.

NOTICE:

Do not shut off the engine − the results will be invalid.

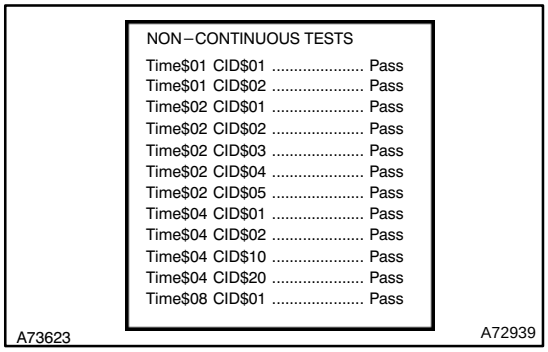


Pass Condition − No Problem Found by the ECM

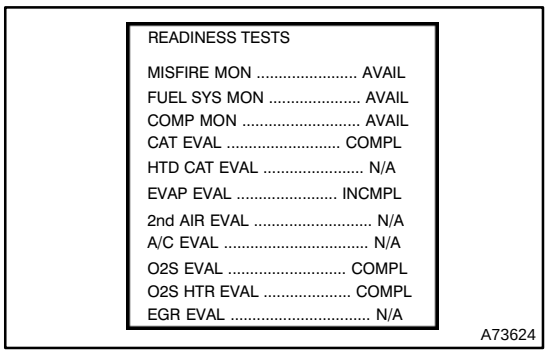
If the EVAP evaluation monitor shows COMPL, go to the NON−CONTINUOUS TESTS screen.
- Enter the following menus: ADVANCED OBD II / ONBOARD TESTS / NON−CONTINUOUS TESTS.

NOTICE:

Do not shut off the engine − the results will be invalid.

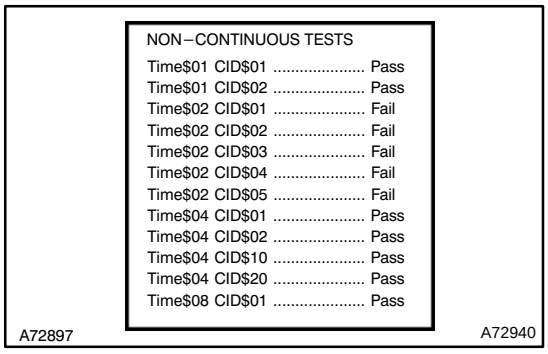


- To get there, go to Advanced OBD II, Onboard Tests, Non−continuous Tests.
- If all of the tests in the ”Time $02” category show ”Pass”, the EVAP evaluation monitor detected no problems.



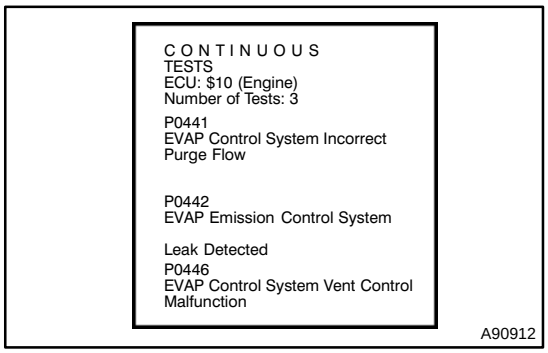
Fail Condition − Problem Detected by the ECM

If the EVAP evaluation monitor shows INCMPL, go to the NON−CONTINUOUS TESTS screen.



(1) If all tests show ”Pass”, one of the following may have occurred:
- The EVAP evaluation monitor did not operate.
- The EVAP evaluation monitor did not finish its tests.
- The ECM has withheld judgement.

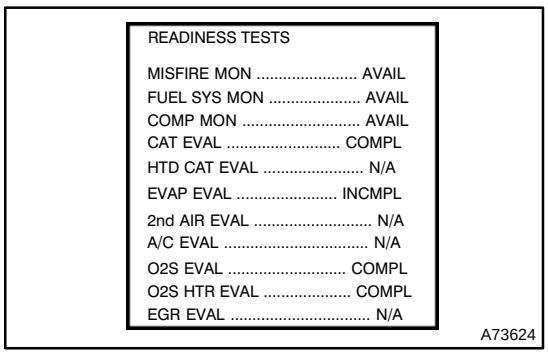
(2) If one or more of the tests in the time $02 category show ”Fail”, the EVAP evaluation monitor did operate and the ECM detected a problem.



(3) Go to the CONTINUOUS TESTS screen. This is the only place DTC’s are listed for the first trip.

NOTICE:

The DTCs listed may not be valid. A second trip is needed to confirm listed DTCs.



Second Trip Procedure

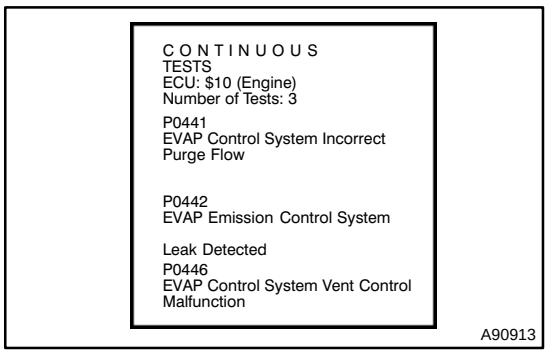
(e) The vehicle must be cold, and the ambient temperature must be approximately between 50 to 95°F.

(f) Go to the READINESS TESTS screen.

(g) Drive the vehicle on a freeway. Write down the initial status of the READINESS TESTS. This procedure may take approximately 20 minutes or more.

NOTICE:

Do not shut off the engine − the results will be invalid.



(h) If the READNESS TESTS change to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTCs.
- If a DTC was stored, the problem has been detected and confirmed by the ECM.
- If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

HINT:
- If DTC P0441 (Purge Flow), P0446 (CCV), P0451, P0452 or P0453 (Evaporative Pressure Sensor) is output with DTC P0442 or P0456, first troubleshoot DTC P0441, P0446, P0451, P0452 or P0453. If no malfunction is detected, troubleshoot DTC P0442 or P0456 next.
- Ask the customer if the following situations occurred.
  (1) When the MIL illuminated, if the fuel tank cap was loose and if it was then tightened.
  (2) When refueling, if the fuel tank cap was loose.
  If the fuel tank cap was loose, that is why the DTC was stored.
  If the fuel tank cap was loose or if the customer cannot remember, troubleshoot according to the procedures on the following pages.
- Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air−fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

HINT:
Use the chart above to check the malfunction for each DTC output.
Then perform the necessary repairs listed under ”Trouble Chart”.

DTC output	Malfunction indicated	Trouble chart	
P0441 only	Open Malfunction of EVAP VSV	Execute step from 7 to 10	Check and replace of EVAP VSV
P0446 only	Open Malfunction of CCV	Execute step from 11 to 15	Check and replace of CCV
P0442 and/or P0456	Very small or small or medium leak	Execute step from 2	
P0441 and P0442 and P0446	Large leak (for example fuel tank cap loose) or VSV malfunction (open malfunction of CCV or close malfunction of EVAP VSV)	Execute step from 3*	

*: In most cases, troubleshooting can be completed by checking if the fuel tank cap was loose or repairing the CCV or the EVAP VSV.

Hand−held tester:

1	READ OUTPUT DTC

(a) Read the output DTC.
(b) Troubleshoot each of the problems according to the procedure for each DTC.
HINT:
Based on the output DTC, proceed to A, B C or D.

DTC output	Troubleshoot	Proceed to
• P0442 (small leak) • P0456 (very small leak) • P0442 and P0456 • Other DTC combination	Go to step 2	A
P0441 only (EVAP VSV malfunction)	Execute step from 7 to 10	B
P0446 only (CCV malfunction)	Execute step from 11 to 15	C
P0441 and P0442 and P0446	Go to step 3	D

B → **Go to step 7**

C → **Go to step 11**

D → **Go to step 3**

A

2	PERFORM SYSTEM CHECK MODE (EVAP LEAK TEST)

GO

3	CHECK THAT FUEL TANK CAP MEETS OEM SPECIFICATIONS

OK: Tank cap meets specification in OEM (original equipment manufacturing).

NG → **REPLACE WITH A CAP THAT MEETS OEM SPECIFICATIONS**

OK

4	CHECK THAT FUEL TANK CAP IS CORRECTLY INSTALLED

OK: Tank cap is correctly installed.

NG → **CORRECTLY INSTALL FUEL TANK CAP**

OK

5	INSPECT FUEL TANK CAP ASSY (See page 12−7)

OK: Tank cap is not deformed or loose.

NG → **REPLACE FUEL TANK CAP ASSY**

OK

6	CHECK FILLER NECK FOR DAMAGE

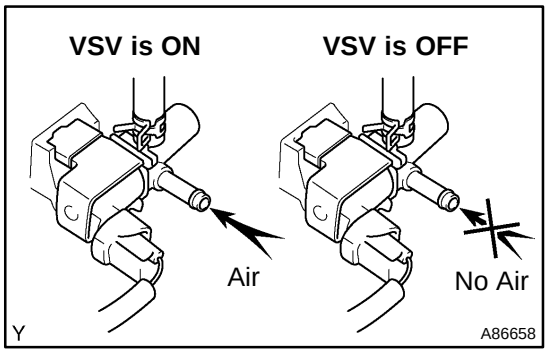
(a) Remove the fuel tank cap.
(b) Visually check the filler neck for damage.

OK: Filler neck has no damage.

NG → **REPLACE FUEL TANK INLET PIPE SUB−ASSY (FILLER NECK)**

OK

7	PERFORM ACTIVE TEST BY HAND−HELD TESTER (EVAP VSV)



(a) Disconnect the vacuum hose of the EVAP VSV from the charcoal canister.
(b) Start the engine.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / EVAP VSV. Press the right or left button.
(d) When the EVAP VSV is operated by the hand−held tester, check whether the disconnected hose applies suction to your finger.

Standard:

Tester operation	Specified condition
VSV is ON	Disconnected hose applies suction to your finger
VSV is OFF	Disconnected hose applies no suction to your finger

OK → **Go to step 11**

NG

8	CHECK HOSES AND TUBES (INTAKE MANIFOLD − EVAP VSV, EVAP VSV − CHARCOAL CANISTER)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.

NG → **REPAIR OR REPLACE DEFECTIVE OR DAMAGED HOSE OR TUBE**

OK

9	CHECK OPERATION OF EVAP VSV (See page 12−7)

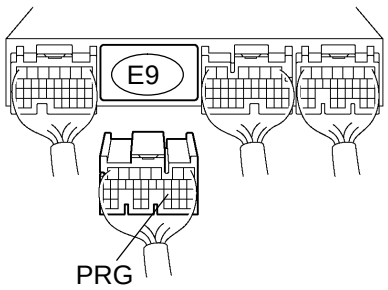
OK: When battery voltage is applied to the EVAP VSV, air flows freely.

NG → **REPLACE EVAP VSV**

OK

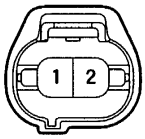
10 CHECK WIRE HARNESS (EVAP VSV − ECM, EVAP VSV − EFI RELAY)

Wire Harness Side



Y

V6
EVAP VSV



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(a) Check the wire harness between the EVAP VSV and ECM.
(1) Disconnect the V6 EVAP VSV connector.
(2) Disconnect the E9 ECM connector.
(3) Check the voltage of the wire harness side connectors.

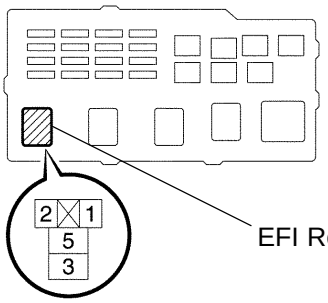
Standard:

Tester Connection	Specified Condition
V6−2 − E9−23 (PRG)	Below 1 Ω
V6−2 or E9−23 (PRG) − Body ground	10 kΩ or higher

Wire Harness Side

V6
EVAP VSV

Engine room J/B



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A91834

A91838

(b) Check the wire harness between the EVAP VSV connector and EFI relay.
(1) Disconnect the V6 EVAP VSV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Check the resistance of the wire harness side connectors.

Standard:

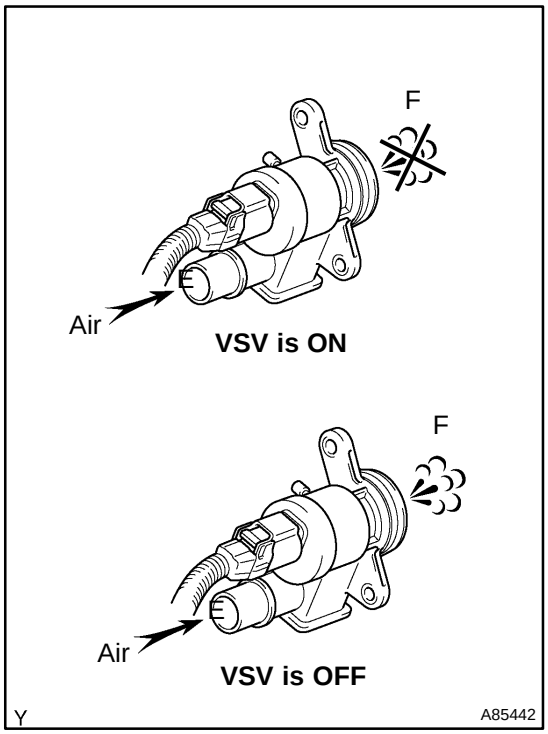
Tester Connection	Specified Condition
V6−1 − J/B EFI relay terminal 3	Below 1 Ω
V6−1 or J/B EFI relay terminal 3 − Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE ECM (See page 10−9)

11 PERFORM ACTIVE TEST BY HAND−HELD TESTER (CCV)



(a) Remove the CCV.
(b) Turn the ignition switch ON.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / CAN CTRL VSV. Press the right or left button.
(d) Check the CCV operation while operating it with the hand−held tester.

Standard:

Tester operation	Specified condition
VSV is ON	Air does not flow from ports E to F
VSV is OFF	Air from port E flows out through port F

Result:

VSV operation	Output DTC	Proceed to
NG	—	A
OK	P0446 output	B
OK	P0446 does not output	C

B → **Go to step 14**

C → **Go to step 17**

A

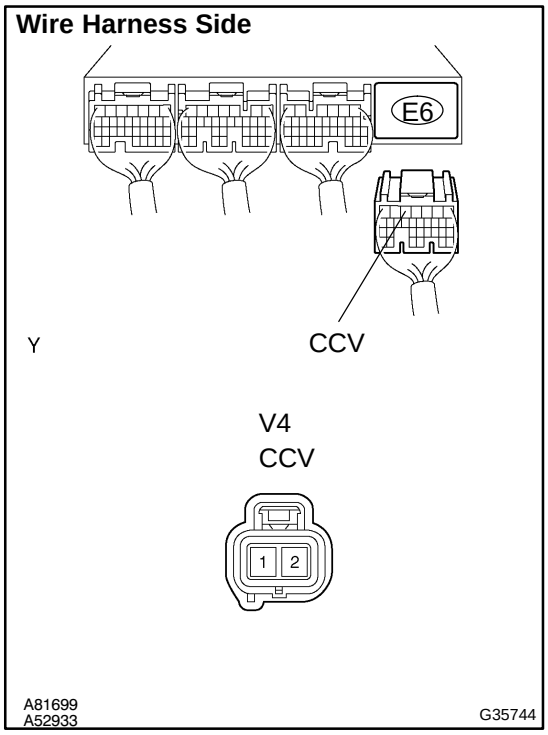
12 CHECK OPERATION OF CCV (See page 12−7)

OK: When battery voltage is applied to the CCV, air cannot flow freely.

NG → **REPLACE CCV**

OK

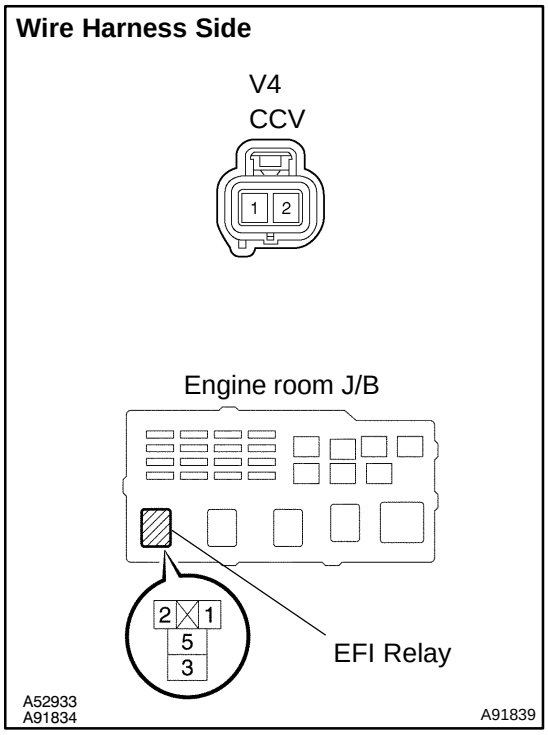
13 CHECK WIRE HARNESS (CCV − ECM, CCV − EFI RELAY)



(a) Check the wire harness between the CCV and ECM.
(1) Disconnect the V4 CCV connector.
(2) Disconnect the E6 ECM connector.
(3) Check the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
V4−1 − E6−5 (CCV)	Below 1 Ω
V4−1 or E6−5 (CCV) − Body ground	10 kΩ or higher



(b) Check the wire harness between the CCV and EFI relay.
(1) Disconnect the V4 CCV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Check the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
V4−2 − J/B EFI relay terminal 3	Below 1 Ω
V4−2 or J/B EFI relay terminal 3 − Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

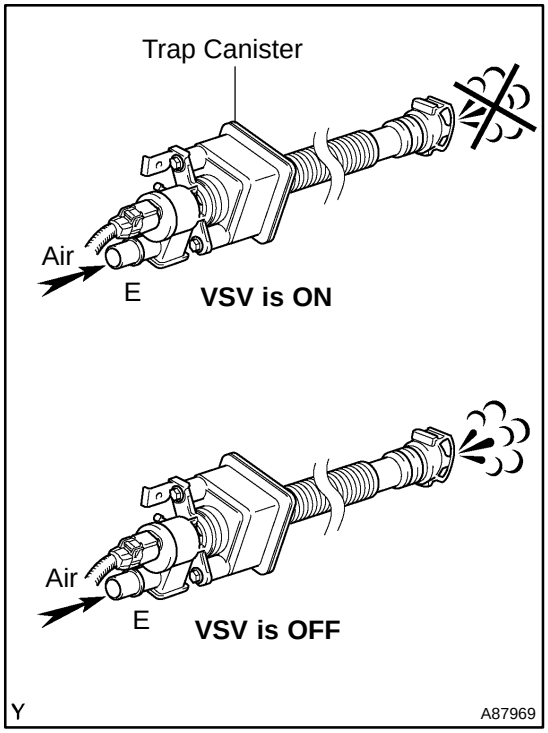
14	CHECK CCV (CHECK FOR LEAKAGE BETWEEN CCV, CHARCOAL CANISTER)

(a) Check that the hose between trap canister and charcoal canister is connected correctly.
(b) Check the hose between trap canister and charcoal canister for looseness or disconnection.
(c) Check the hose between trap canister and charcoal canister for cracks, holes, damage or blockage.
(d) Check that the CCV is correctly installed.
(e) Check the O−ring of the CCV.

NG → **REPAIR OR REPLACE**

OK

15	PERFORM ACTIVE TEST BY HAND−HELD TESTER (CCV)



(a) Disconnect the air inlet hose from the charcoal canister.
(b) Disconnect the air inlet hose from the CCV.
(c) Turn the ignition switch ON.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / CAN CTRL VSV. Press the right or left button.
(e) Check the CCV operation while operating it with the hand−held tester.

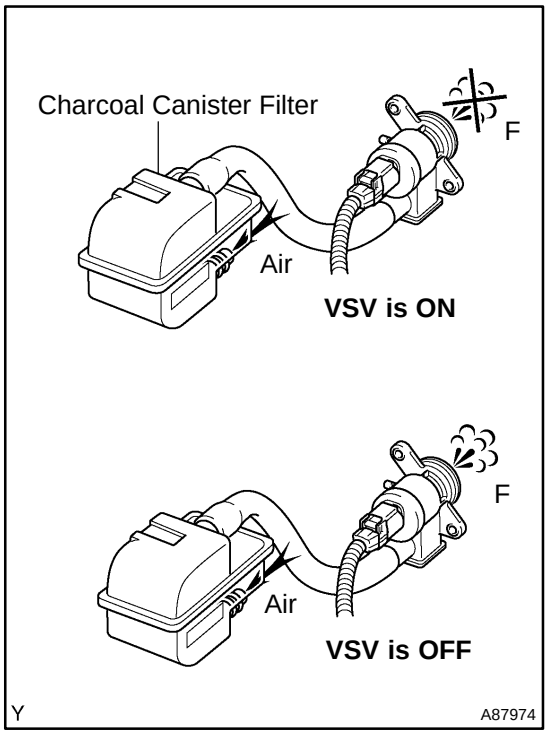
Standard:

Tester operation	Specified condition
VSV is ON	Air does not flow from port E to air inlet hose
VSV is OFF	Air from port E flows out through air inlet hose

NG → **REPLACE TRAP CANISTER**

OK

16	PERFORM ACTIVE TEST BY HAND−HELD TESTER (CCV)



(a) Remove the CCV from the trap canister.
(b) Disconnect the air inlet hose from the charcoal canister filter.
(c) Turn the ignition switch ON.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / CAN CTRL VSV. Press the right or left button.
(e) Check the CCV operation while operating it with the hand−held tester.

Standard:

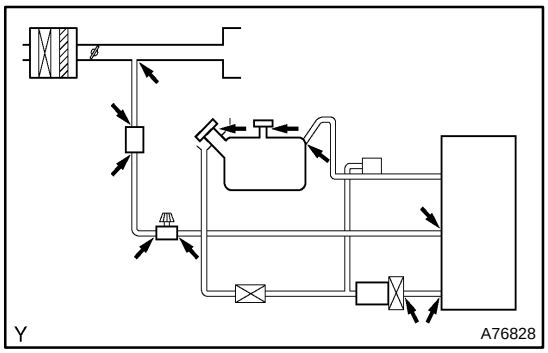
Tester operation	Specified condition
VSV is ON	Air does not flow from charcoal canister filter port to port F
VSV is OFF	Air from charcoal canister filter port flows out through port F

NG → **REPLACE CHARCOAL CANISTER FILTER NO. 2**

OK

REPLACE ECM (See page 10−9)

17	CHECK FOR EVAPORATIVE EMISSIONS LEAK



(a) Check if any hoses close to the fuel tank have been modified, and check whether there are signs of any damage near fuel tank or charcoal canister.
  (1) Check for cracks, deformation or loose connections of the following parts:
  - Fuel tank
  - Charcoal canister
  - Fuel tank filler pipe
  - Hoses and tubes around fuel tank and charcoal canister

OK: There is no leak.

NG → **REPAIR OR REPLACE DEFECTIVE OR DAMAGED COMPONENT**

OK

18	CHECK HOSES AND TUBES (INTAKE MANIFOLD − EVAP VSV, EVAP VSV − CHACOAL CANISTER)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.

NG → REPAIR OR REPLACE DEFECTIVE OR DAMAGED HOSE OR TUBE

OK

19	CHECK HOSES AND TUBES (FUEL TANK − CHARCOAL CANISTER)

(a) Check the following for proper connections:
- The fuel tank and the fuel EVAP pipe (see page 12−7).
- The fuel EVAP pipe and the fuel tube under the floor.
- The fuel tube and the charcoal canister.

(b) Check the hose and the tube for cracks, hole and damage.

NG → REPAIR OR REPLACE DEFECTIVE OR DAMAGED HOSE OR TUBE

OK

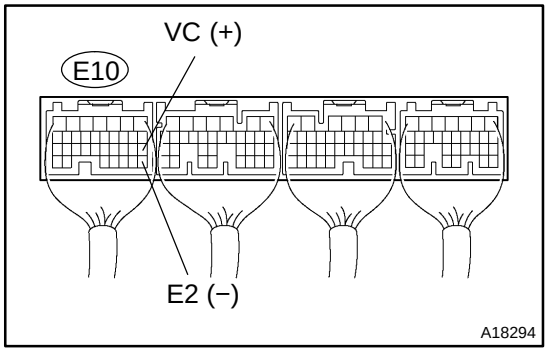
20	INSPECT CHARCOAL CANISTER ASSY (CRACKS, HOLES, OR DAMAGE) (See page 12−7)

OK: Canister has no crack or holes.

NG → REPLACE CHARCOAL CANISTER ASSY

OK

21	INSPECT ECM (VC VOLTAGE)



(a) Turn the ignition switch ON.
(b) Check the voltage of the E10 ECM connector.

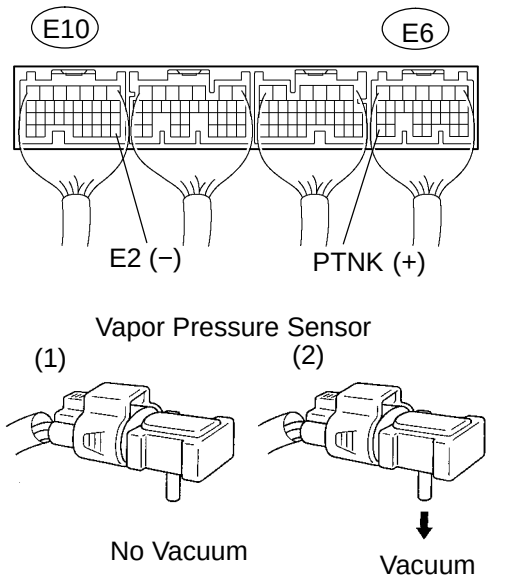
Standard:

Tester Connection	Specified Condition
E10−18 (VC) − E10−28 (E2)	4.5 to 5.5 V

NG → REPLACE ECM (See page 10−9)

OK

22 INSPECT ECM (PTNK VOLTAGE)



(a) Turn the ignition switch ON.
(b) Check the voltage of the E10 and E6 ECM connectors.
(1) Disconnect the vacuum hose from the vapor pressure sensor.

Standard (1):

Tester Connection	Specified Condition
E6−31 (PTNK) − E10−28 (E2)	2.9 to 3.7 V

(2) Using a MITYVAC (Hand−held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

NOTICE:
The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

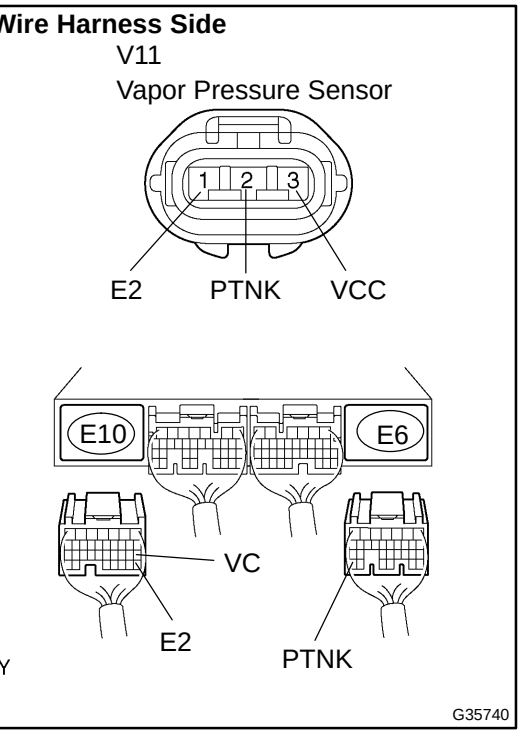
Standard (2):

Tester Connection	Specified Condition
E6−31 (PTNK) − E10−28 (E2)	0.5 V or less

OK → **Go to step 24**

NG

23 CHECK WIRE HARNESS (VAPOR PRESSURE SENSOR − ECM)



(a) Disconnect the V11 vapor pressure sensor connector.
(b) Disconnect the E10 and E6 ECM connectors.
(c) Check the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
V11−2 (PTNK) − E6−31 (PTNK) V11−1 (E2) − E10−28 (E2) V11−3 (VCC) − E10−18 (VC)	Below 1 Ω
V11−2 (PTNK) or E6−31 (PTNK) − Body ground V11−3 (VCC) or E10−18 (VC) − Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE VAPOR PRESSURE SENSOR ASSY

24	INSPECT FUEL TANK ASSY (CRACKS AND DAMAGE)

OK: There is no crack or hole or damage in fuel tank.

NG → REPLACE FUEL TANK ASSY

OK

IT IS LIKELY THAT VEHICLE USER DID NOT PROPERLY CLOSE FUEL TANK CAP

OBD II scan tool (excluding hand−held tester):

1	CHECK THAT FUEL TANK CAP MEETS OEM SPECIFICATIONS

OK: Tank cap meets specification in OEM (original equipment manufacturing).

NG → REPLACE WITH A CAP THAT MEETS OEM SPECIFICATIONS

OK

2	CHECK THAT FUEL TANK CAP IS CORRECTLY INSTALLED

OK: Tank cap is correctly installed.

NG → CORRECTLY INSTALL FUEL TANK CAP

OK

3	INSPECT FUEL TANK CAP ASSY (See page 12−7)

OK: Tank cap is not deformed or loose.

NG → REPLACE FUEL TANK CAP ASSY

OK

4	CHECK FILLER NECK FOR DAMAGE

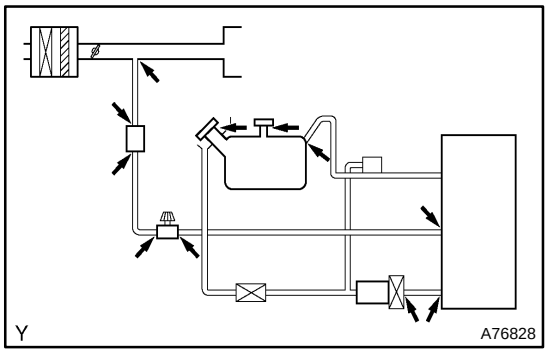
(a) Remove the fuel tank cap.
(b) Visually check the filler neck for damage.

OK: Filler neck has no damage.

NG → REPLACE FUEL TANK INLET PIPE SUB−ASSY (FILLER NECK)

OK

5	CHECK FOR EVAPORATIVE EMISSIONS LEAK



(a) Check if the hoses close to the fuel tank have been modified, and check whether there are signs of any accident damage near fuel tank or charcoal canister.
  (1) Check for cracks, deformation or loose connections of the following parts:
  - Fuel tank
  - Charcoal canister
  - Fuel tank filler pipe
  - Hoses and tubes around fuel tank and charcoal canister

OK: There is no leak.

NG	REPAIR OR REPLACE DEFECTIVE OR DAMAGED COMPONENT

OK

6	CHECK HOSES AND TUBES (FUEL TANK − CHARCOAL CANISTER)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.

NG	REPAIR OR REPLACE DEFECTIVE OR DAMAGED HOSE OR TUBE

OK

7	CHECK EACH VSV CONNECTOR FOR LOOSENESS OR DISCONNECTION (EVAP VSV, CCV AND VAPOR PRESSURE SENSOR)

NG	REPAIR OR CONNECT VSV AND SENSOR CONNECTORS

OK

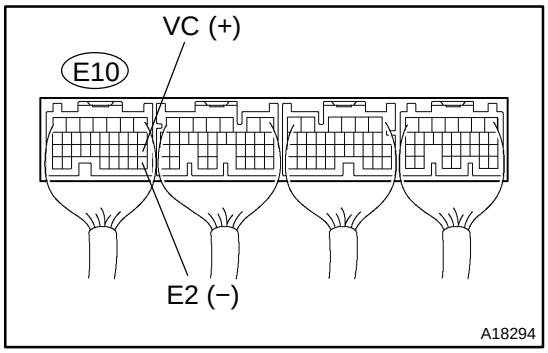
8	CHECK HOSES AND TUBES (INTAKE MANIFOLD − EVAP VSV, EVAP VSV − CHARCOAL CANISTER)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.

NG	REPAIR OR REPLACE DEFECTIVE OR DAMAGED HOSE OR TUBE

OK

9 INSPECT ECM (VC VOLTAGE)



(a) Turn the ignition switch ON.
(b) Check the voltage of the E10 ECM connector.

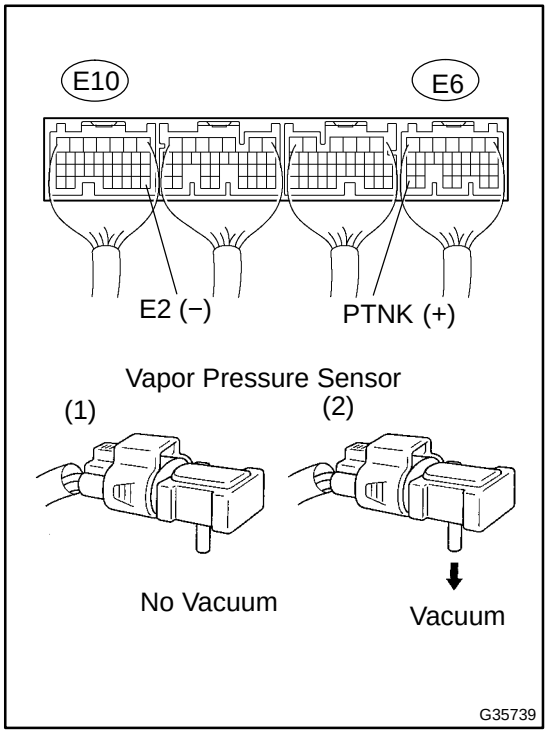
Standard:

Tester Connection	Specified Condition
E10−18 (VC) − E10−28 (E2)	4.5 to 5.5 V

NG → **REPLACE ECM (See page 10−9)**

OK

10 INSPECT ECM (PTNK VOLTAGE)



(a) Turn the ignition switch ON.
(b) Check the voltage of the E10 and E6 ECM connectors.
(1) Disconnect the vacuum hose from the vapor pressure sensor.

Standard (1):

Tester Connection	Specified Condition
E6−31 (PTNK) − E10−28 (E2)	2.9 to 3.7 V

(2) Using a MITYVAC (Hand−held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

NOTICE:
The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

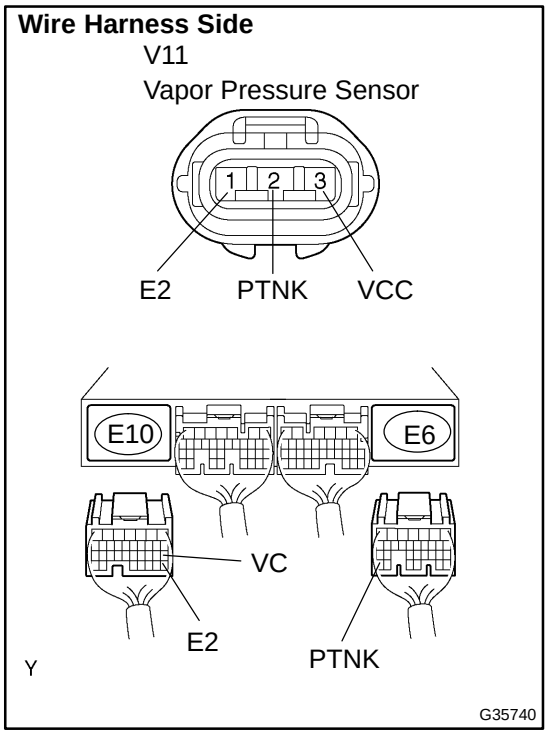
Standard (2):

Tester Connection	Specified Condition
E6−31 (PTNK) − E10−28 (E2)	0.5 V or less

OK → **Go to step 12**

NG

11 CHECK WIRE HARNESS (VAPOR PRESSURE SENSOR − ECM)



(a) Disconnect the V11 vapor pressure sensor connector.
(b) Disconnect the E6 and E10 ECM connectors.
(c) Check the resistance of the wire harness side connectors.

Standard:

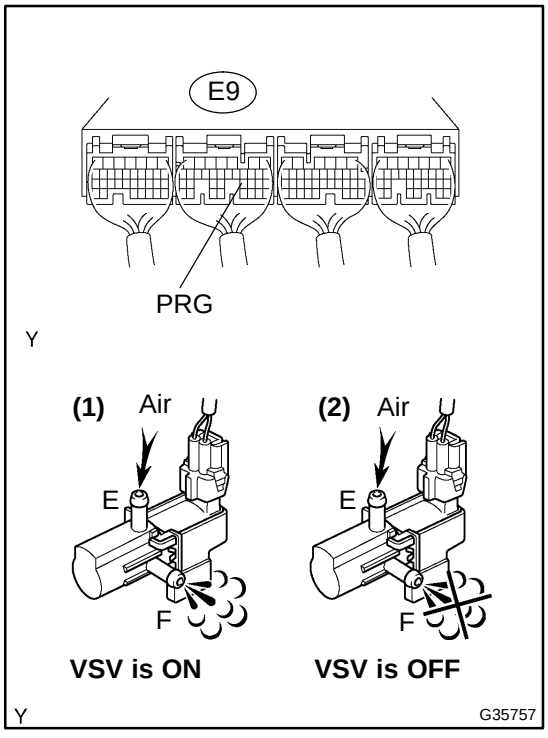
Tester Connection	Specified Condition
V11−2 (PTNK) − E6−31 (PTNK) V11−1 (E2) − E10−28 (E2) V11−3 (VCC) − E10−18 (VC)	Below 1 Ω
V11−2 (PTNK) or E6−31 (PTNK) − Body ground V11−3 (VCC) or E10−18 (VC) − Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE VAPOR PRESSURE SENSOR ASSY

12 CHECK FUNCTION OF EVAP VSV



(a) Remove the EVAP VSV.
(b) Disconnect the E9 ECM connector.
(c) Turn the ignition switch ON.
(d) Check the VSV function.
  (1) Connect the terminal E9−23 (PRG) of the ECM connector and body ground (EVAP VSV should be OPEN, i.e. ON).

  OK (1):

  Air from port E flows out through port F.

  (2) Disconnect terminal E9−23 (PRG) of the ECM connector from body ground (EVAP VSV should be CLOSED, i.e. OFF).

  OK (2):

  Air does not flow from port E to port F.

OK → **Go to step 15**

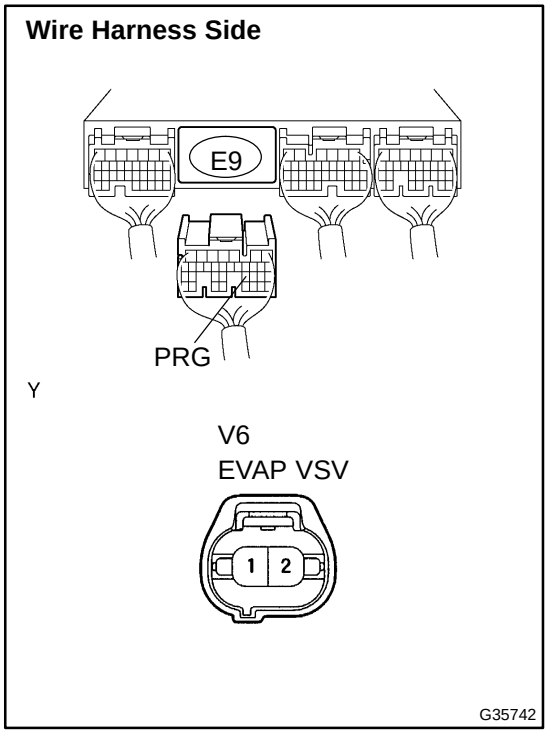
NG

13	CHECK OPERATION OF EVAP VSV (See page 12−7)

NG → REPLACE EVAP VSV AND CLEAN VACUUM HOSES, AND THEN CHECK CHARCOAL CANISTER

OK

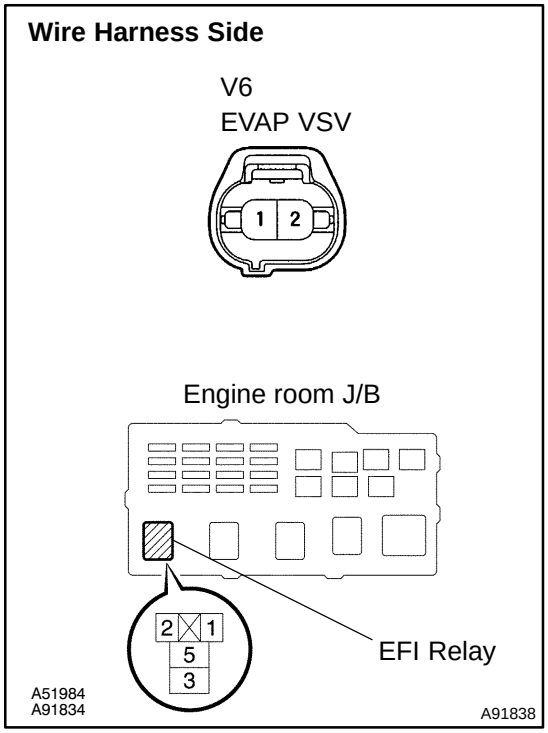
14	CHECK WIRE HARNESS (EVAP VSV − ECM, EVAP VSV − EFI RELAY)



(a) Check the wire harness between the EVAP VSV and the ECM.
(1) Disconnect the V6 EVAP VSV connector.
(2) Disconnect the E9 ECM connector.
(3) Check the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
V6−1 − E9−23 (PRG)	Below 1 Ω
V6−1 or E9−23 (PRG) − Body ground	10 kΩ or higher



(b) Check the wire harness between the EVAP VSV and EFI relay.
(1) Disconnect the V6 EVAP VSV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Check the resistance of the wire harness side connectors.

Standard:

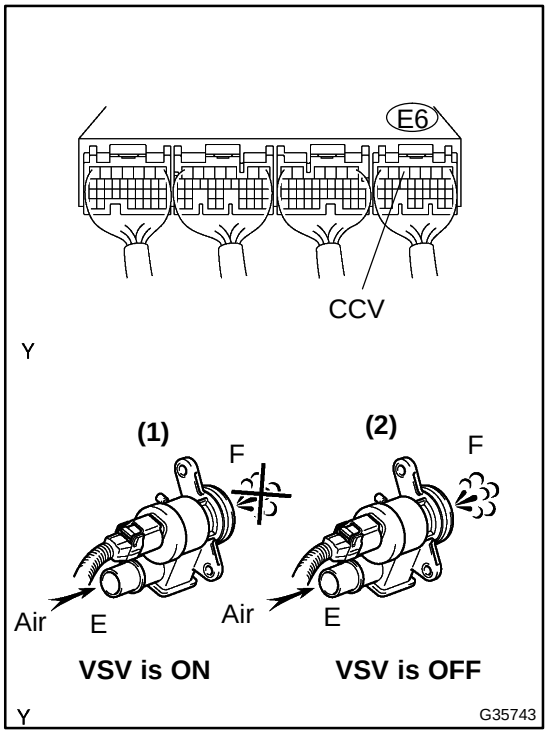
Tester Connection	Specified Condition
V6−1 − J/B EFI relay terminal 3	Below 1 Ω
V6−1 or J/B EFI relay terminal 3 − Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ECM (See page 10−9)

15	CHECK FUNCTION OF CCV



(a) Remove the CCV.
(b) Turn the ignition switch ON.
(c) Check the VSV function.
(1) Connect terminal E6−5 (CCV) of the ECM connector and body ground (CCV should be CLOSED, i.e. ON).

OK (1):
Air does not flow from port E to port F.

(2) Disconnect terminal CCV of the ECM connector from body ground (CCV should be OPEN, i.e. OFF).

OK (2):
Air from port E flows out through port F.

OK → **Go to step 18**

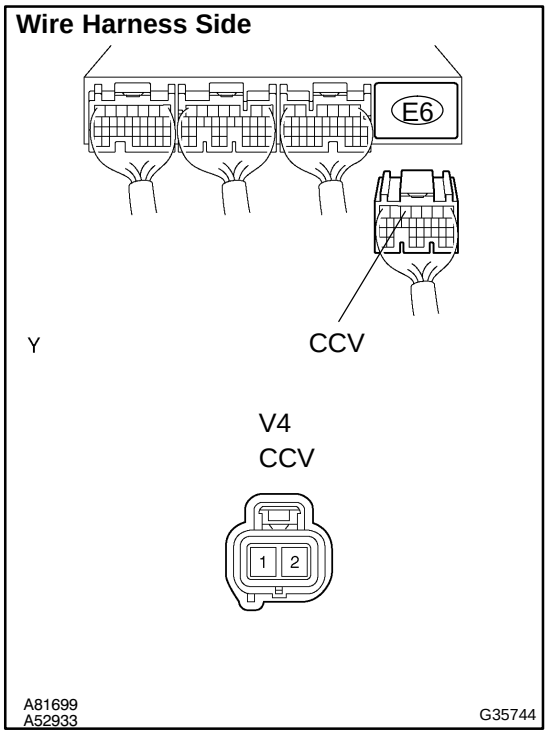
NG

16	CHECK OPERATION OF CCV (See page 12−7)

NG → **REPLACE CCV, AND THEN CHECK LEAKAGE**

OK

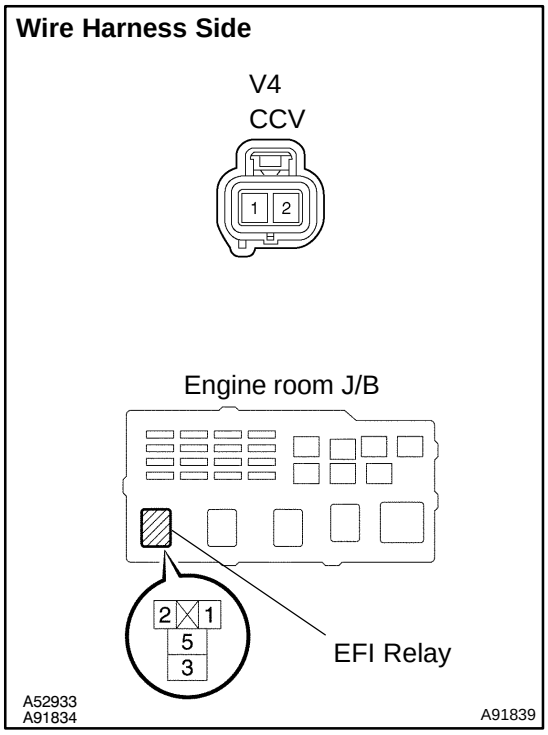
17 CHECK WIRE HARNESS (CCV − ECM, CCV − EFI RELAY)



(a) Check the wire harness the CCV and ECM.
(1) Disconnect the V4 CCV connector.
(2) Disconnect the E6 ECM connector.
(3) Check the resistance of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
V4−1 − E6−5 (CCV)	Below 1 Ω
V4−1 or E6−5 (CCV) − Body ground	10 kΩ or higher



(b) Check the wire harness between the CCV and EFI relay.
(1) Disconnect the V4 CCV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Check the resistance of the wire harness side connectors.

Standard:

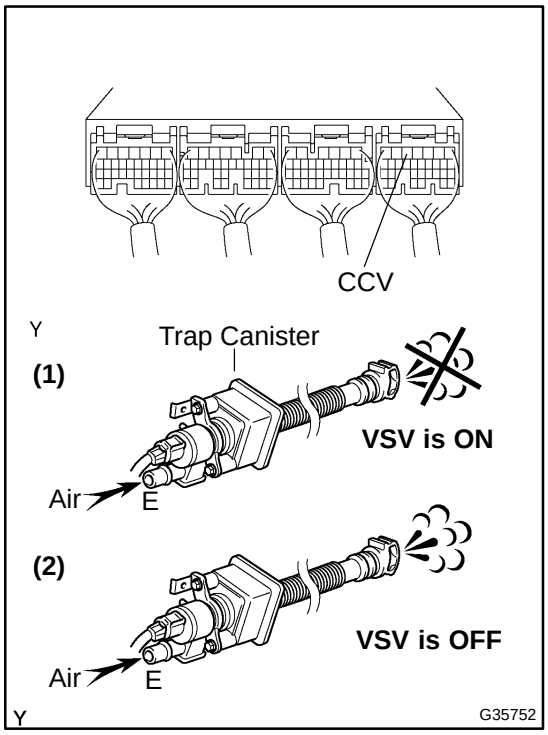
Tester Connection	Specified Condition
V4−2 − J/B EFI relay terminal 3	Below 1 Ω
V4−2 or J/B EFI relay terminal 3 − Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE ECM (See page 10−9)

18	CHECK THAT TRAP CANISTER IS NOT CLOGGED



(a) Disconnect the air inlet hose from the charcoal canister.
(b) Disconnect the air inlet hose from the CCV.
(c) Turn the ignition switch ON.
(d) Check the VSV function.
  (1) Connect terminal E6−5 (CCV) of the ECM connector and body ground (CCV should be CLOSED, i.e. ON).

OK (1):

Air does not flow from port E to air inlet hose.

  (2) Disconnect terminal CCV of the ECM connector from body ground (CCV should be OPEN, i.e. OFF).

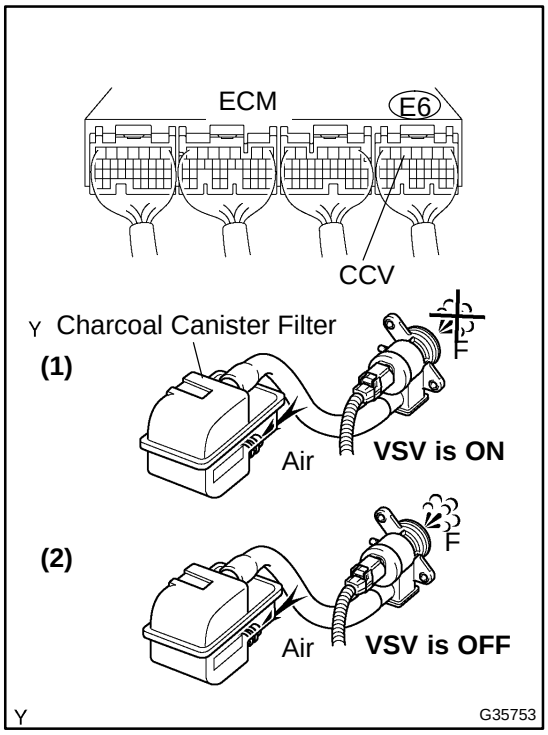
OK (2):

Air from port E flows out through air inlet hose.

NG → **REPLACE TRAP CANISTER**

OK

19	CHECK THAT CHARCOAL CANISTER FILTER IS NOT CLOGGED



(a) Remove the CCV from the trap canister.
(b) Disconnect the air inlet hose from the charcoal canister filter.
(c) Turn the ignition switch ON.
(d) Check the VSV function.
(1) Connect terminal E6−5 (CCV) of the ECM connector and body ground (CCV should be CLOSED, i.e. ON).

OK (1):

Air does not flow from charcoal canister filter port to port F.

(2) Disconnect terminal CCV of the ECM connector from body ground (CCV should be OPEN, i.e. OFF).

OK (2):

Air from charcoal canister filter port flows out through port F.

NG → **REPLACE CHARCOAL CANISTER FILTER NO.2**

OK

20	CHECK FUEL TANK OVER FILL CHECK VALVE (See page 12−1)

NG → **REPLACE FUEL TANK ASSY**

OK

CHECK AND REPLACE CHARCOAL CANISTER ASSY