DTC	P0451	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE

DTC	P0452	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH LOW INPUT

DTC	P0453	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH HIGH INPUT

MONITOR DESCRIPTION

DTC ”P0451, P0452 or P0453” is recorded by the ECM when the vapor pressure sensor malfunctions.

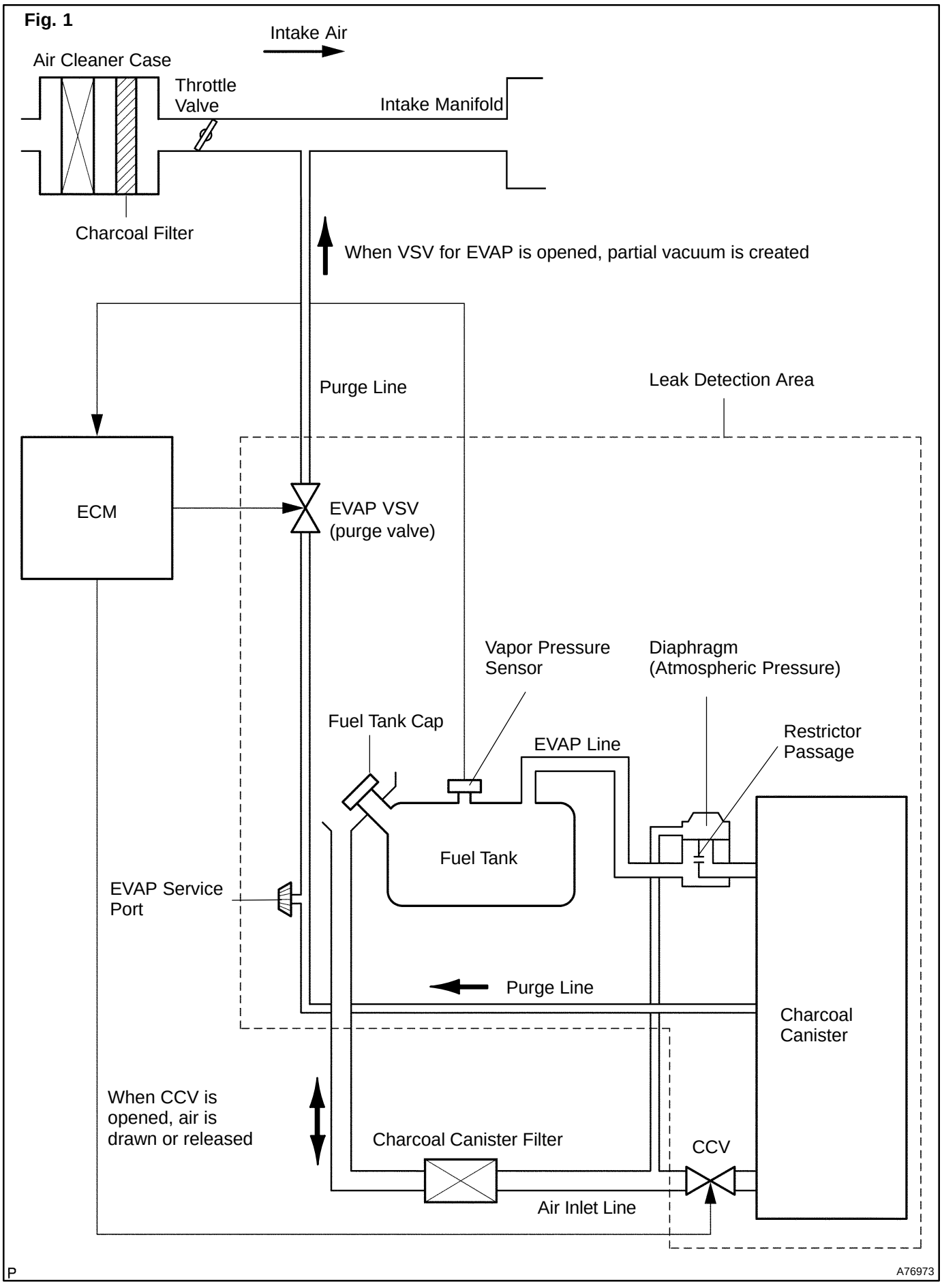
P0451

The ECM monitors the vapor pressure sensor in 2 ways. One method examines the fluctuation of the electrical signal while the engine is idling. If the pressure signal varies beyond the specified range more than 7 times, the ECM interprets this as a fault in the vapor pressure sensor. The ECM also verifies that the pressure signal changes within the specified range. If the output of the sensor does not vary for 5 minutes while the intake air amount has been changing, the ECM interprets this as a fault in the vapor pressure sensor. Either fault will set DTC P0451 and the ECM will turn on the MIL.

P0452 and P0453

When pressure indicated by the vapor pressure sensor deviates below −3.999 kPa (−30 mmHg) or above 1.999 kPa (15 mmHg), the ECM interprets this as a malfunction in the vapor pressure sensor. The ECM will turn on the MIL and a DTC will be set.

Fig. 1


Intake Air
Air Cleaner Case
Throttle Valve
Intake Manifold
Charcoal Filter
When VSV for EVAP is opened, partial vacuum is created
Purge Line
Leak Detection Area
ECM
EVAP VSV (purge valve)
Vapor Pressure Sensor
Diaphragm (Atmospheric Pressure)
Fuel Tank Cap
EVAP Line
Restrictor Passage
Fuel Tank
EVAP Service Port
Purge Line
Charcoal Canister
When CCV is opened, air is drawn or released
Charcoal Canister Filter
CCV
Air Inlet Line
P
A76973

DTC No.	DTC Detection Condition	Trouble Area
P0451	Vapor pressure sensor output changes extremely under these conditions: • Vapor pressure sensor output changes often while vehicle speed is 0 km/h (0 mph) and the engine is idling 5 sec to 10 sec (2 trip detection logic) • Vapor pressure sensor output is stuck 5 minutes (2 trip detection logic)	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0452	Vapor pressure sensor output remains less than −30 mmHg: (2 trip detection logic)	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0453	Vapor pressure sensor output remains more than 15 mmHg: (2 trip detection logic)	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM

MONITOR STRATEGY

Related DTCs	P0451: FTP Sensor Noise P0451: FTP Sensor Stuck P0452: FTP Sensor Range Check (Low voltage) P0453: FTP Sensor Range Check (High voltage)
Required sensors / components (Main)	FTP sensor
Required sensors / components (Related)	ECT sensor, IAT sensor
Frequency of operation	Once per driving cycle
Duration	7 seconds: FTP Sensor Range Check 45 seconds: FTP Sensor Noise 20 minutes: FTP Sensor Stuck
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not present	None

P0451 (FTP sensor noise):

Altitude	Below 8,000 ft (2,400 m)
Battery voltage	11 V or more
EVAP pressure sensor malfunction (P0452 and P0453)	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
ECT at engine start	4.4 to 35°C (40 to 95°F)
IAT at engine start	4.4 to 35°C (40 to 95°F)

P0451 (FTP sensor stuck):

Altitude	Below 8,000 ft (2,400 m)
Battery voltage	11 V or more
EVAP pressure sensor malfunction (P0452 and P0453)	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
ECT at engine start	4.4 to 35°C (40 to 95°F)
IAT at engine start	4.4 to 35°C (40 to 95°F)
Time after engine start	5 seconds or more
0.04 inch leak	Not detected
0.02 inch leak	Not detected
CCV malfunction	Not detected

FTP Sensor Range Check P0452 and P0453:

ECT at engine start	10 to 35°C (50 to 95°F)
IAT at engine start	10 to 35°C (50 to 95°F)
Difference between engine start ECT and engine start IAT	12°C (21.6°F) or less
Engine condition	Running

TYPICAL MALFUNCTION THRESHOLDS

P0451 (FTP sensor Noise):

EVAP pressure change after the vehicle stop	A lot of change for a short time

P0451 (sensor stuck):

EVAP pressure change	No change for 5 minutes

FTP Sensor Range Check (Low voltage) P0452:

FTP	Less than −30 mmHg (−4 kPa)

FTP Sensor Range Check (High voltage) P0453:

FTP	15 mmHg (2 kPa) or more

COMPONENT OPERATING RANGE

FTP	−26 to 11 mmHg (−3.5 to 1.5 kPa) or more [734 to 771 mmHg]

WIRING DIAGRAM

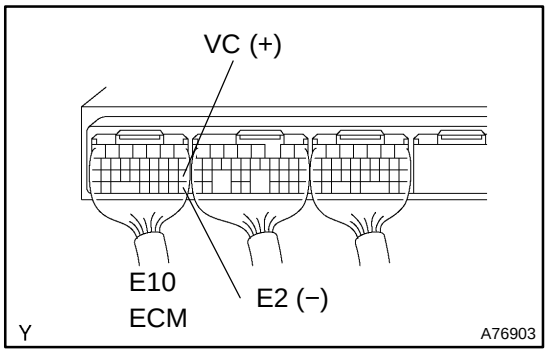
Refer to DTC P0441 on page 05−697.

INSPECTION PROCEDURE

HINT:

- If DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Always troubleshoot DTCs P0441 (purge flow), P0446 (VSV for CCV), P0451, P0452 and P0453 (evaporative pressure sensor) before troubleshooting DTCs P0442, P0455 and P0456.
- 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, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air−fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1 CHECK ECM (VC VOLTAGE)



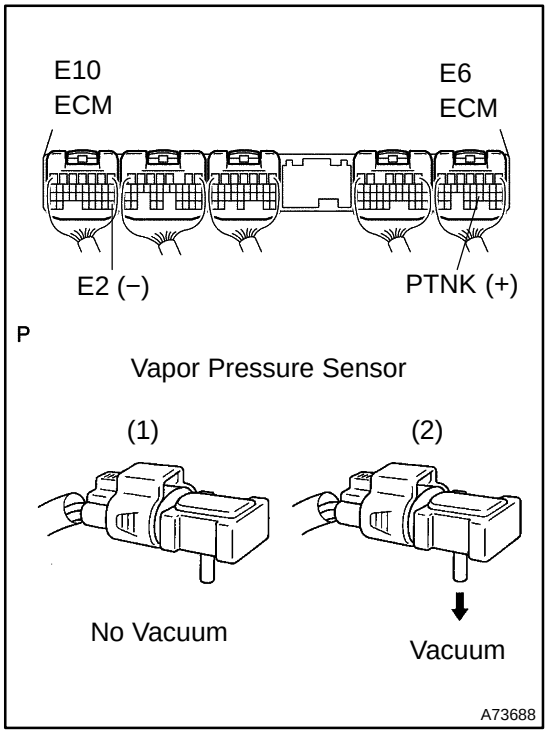
(a) Turn the ignition switch ON.
(b) Measure the voltage of the ECM connector.
Standard:

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

NG → **REPLACE ECM (See page 10−25)**

OK

2 CHECK ECM (PTNK VOLTAGE)



(a) Turn the ignition switch ON.
(b) Measure the voltage of the ECM connectors.
(1) Disconnect the vacuum hose from the vapor pressure sensor.
Standard (1):

Tester Connection	Specified Condition
E6−21 (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.

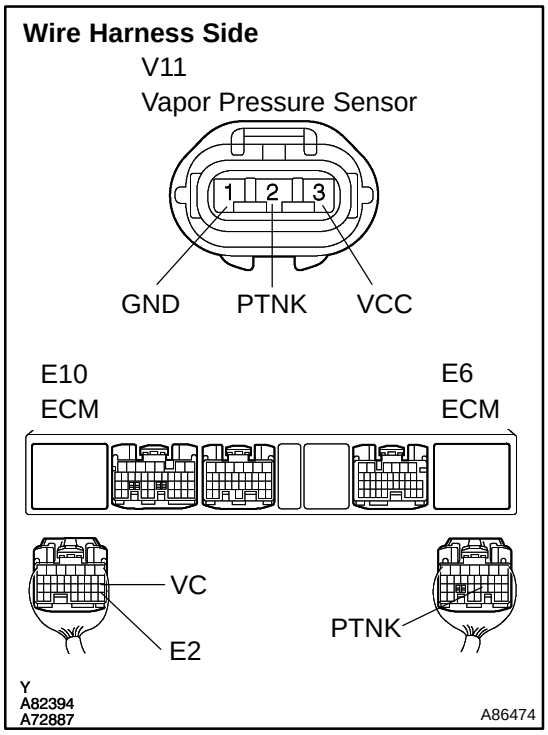
NOTICE:
The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).
Standard (2):

Tester Connection	Specified Condition
E6−21 (PTNK) − E10−28 (E2)	0.5 V or less

OK → **REPLACE ECM (See page 10−25)**

NG

3	CHECK WIRE HARNESS (VAPOR PRESSURE SENSOR − ECM)



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

Standard:

Tester Connection	Specified Condition
V11−2 (PTNK) − E6−21 (PTNK) V11−1 (GND) − E10−28 (E2) V11−3 (VCC) − E10−18 (VC)	Below 1 Ω
V11−2 (PTNK) or E6−21 (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