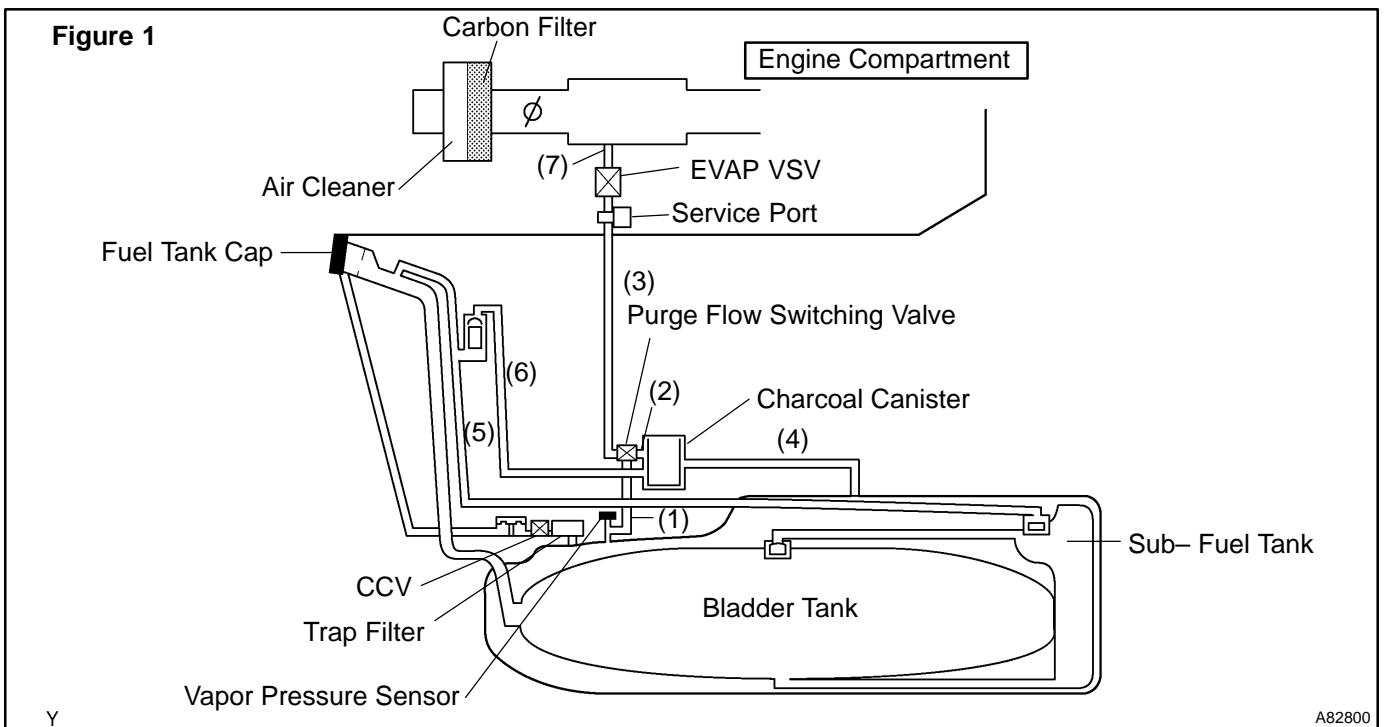


DTC	P0451	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH RANGE/PERFORMANCE
DTC	P0452	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH LOW INPUT
DTC	P0453	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH HIGH INPUT

CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for canister closed valve (CCV) and VSV for purge flow switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.



DTC No.	DTC Detection Condition	Trouble Area
P0451	Either condition (a) or (b) is met (2 trip detection logic): (a) Output of vapor pressure sensor frequently changes when vehicle speed is 0 mph and engine speed is idling (b) Output of vapor pressure sensor remains stuck for 5 minutes or more	<ul style="list-style-type: none"> • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0452	Output of vapor pressure sensor remains below threshold: (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0453	Output of vapor pressure sensor remains above threshold: (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM

MONITOR DESCRIPTION

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

P0451

The ECM senses pressure in the fuel tank using the vapor pressure sensor. The ECM supplies the sensor with a regulated 5 V reference-voltage and the sensor returns a signal voltage between 0.5 V and 4.5 V according to the pressure level in the fuel tank.

When the pressure in the fuel tank is low, the output voltage of the vapor pressure sensor is low. When it is high, the output voltage is high.

For this DTC P0451, the ECM checks for a "noisy" sensor or a "stuck" sensor.

The ECM checks for the "noisy" sensor by monitoring the fuel tank pressures when the vehicle is stationary and there should be little variation in the tank pressure. If the indicated pressure exceeds specified limits, the ECM will illuminate the MIL and a DTC is set.

The ECM checks for the "stuck" sensor by monitoring the fuel tank pressure for an extended time period. If the indicated pressure does not change over this period, the ECM will conclude that the fuel tank pressure sensor is malfunctioning. The ECM will illuminate the MIL and a DTC is set.

P0452 and P0453

The ECM senses pressure in the fuel tank using the vapor pressure sensor. The ECM supplies the sensor with a regulated 5 V reference-voltage and the sensor returns a signal voltage between 0.5 V and 4.5 V according to the pressure level in the fuel tank.

When the pressure in the fuel tank is low, the output voltage of the vapor pressure sensor is low. When it is high, the output voltage is high.

If the output voltage of the vapor pressure sensor is out of the normal range, the ECM will determine that there is malfunction in the sensor or sensor circuit.

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

MONITOR STRATEGY

Case 1

Related DTCs	P0451: Evaporative emission control system pressure sensor range/performance (Signal fluctuation monitoring)
Required sensors/components	Main: Vapor pressure sensor Related: Mass air flow meter, engine coolant temperature sensor
Frequency of operation	Once per driving cycle
Duration	10 seconds
MIL operation	2 driving cycles
Sequence of operation	None

Case 2

Related DTCs	P0451: Evaporative emission control system pressure sensor range/performance (No signal change monitoring)
Required sensors/components	Main: Vapor pressure sensor Related: Mass air flow meter, engine coolant temperature sensor
Frequency of operation	Once per driving cycle
Duration	20 minutes
MIL operation	2 driving cycles
Sequence of operation	None

Case 3

Related DTCs	P0452: Evaporative emission control system pressure sensor low input P0453: Evaporative emission control system pressure sensor high input
Required sensors/components	Main: Vapor pressure sensor Related: Mass air flow meter, engine coolant temperature sensor
Frequency of operation	Once per driving cycle
Duration	7 seconds
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS**Case 1**

P0451: Evaporative emission control system pressure sensor range/performance (Signal fluctuation monitoring)

The monitor will run whenever the following DTCs are not present	See page 05-20
Intake air temperature at engine start compared with engine coolant temperature	Maximum of 7°C (19.4°F) lower or 11.1°C (19.9°F) higher
Engine coolant temperature at engine start	4.4°C (40°F) or more, and 35°C (95°F)
Intake air temperature at engine start	4.4°C (40°F) or more, and 35°C (95°F)

Case 2

P0451: Evaporative emission control system pressure sensor range/performance (Stuck monitoring)

The monitor will run whenever the following DTCs are not present	See page 05-20
Intake air temperature at engine start compared with engine coolant temperature	Maximum of 7°C (19.4°F) lower or 11.1°C (19.9°F) higher
Engine coolant temperature at engine start	4.4°C (40°F) or more, and 35°C (95°F)
Intake air temperature at engine start	4.4°C (40°F) or more, and 35°C (95°F)

Case 3

(a) P0452: Evaporative emission control system pressure sensor low input

(b) P0453: Evaporative emission control system pressure sensor high input

The monitor will run whenever the following DTCs are not present	See page 05-20
Engine coolant temperature at engine start compared with intake air temperature	Less than 12°C (21.6°F)
Engine coolant temperature at engine start	10°C (50°F) or more, and 35°C (95°F) or less
Intake air temperature at engine start	10°C (50°F) or more, and 35°C (95°F) or less
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

Case 1:

P0451: Evaporative emission control system pressure sensor range/performance (Signal fluctuation monitoring)

The number of times the sensor output changed ± 0.7 kPa (5 mmHg) or more for 5 to 15 seconds after vehicle stop	7 times or more
---	-----------------

Case 2

P0451: Evaporative emission control system pressure sensor range/performance (Stuck monitoring)

Fuel tank pressure "no change" time (variation is less than 0.138 kPa (0.02 mmHg) after engine start)	20 minutes or more
---	--------------------

Case 3

(a) P0452: Evaporative emission control system pressure sensor low input

Fuel tank pressure	Less than -3.999 kPa (-30 mmHg) / when engine running
--------------------	--

(b) P0453: Evaporative emission control system pressure sensor high input

Fuel tank pressure	1.999 kPa (15 mmHg) or more / when engine running
--------------------	---

WIRING DIAGRAM

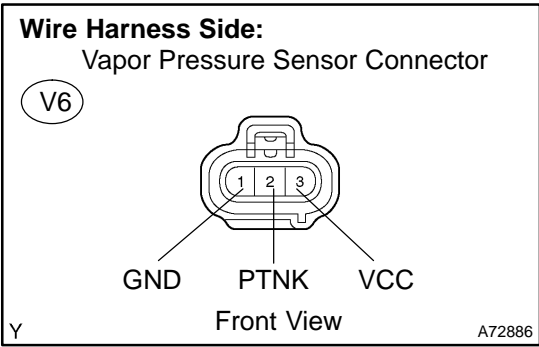
Refer to DTCs P0441 and P0446 on page [05–202](#).

INSPECTION PROCEDURE

HINT:

- If DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- If DTC P0441 (Purge Flow), P0446 (CCV), P0451, P0452 or P0453 (Evaporative Pressure Sensor) is output with DTC P0442 or P0456, troubleshoot DTC P0441, P0446, P0451, P0452 or P0453 first. If no malfunction is detected, troubleshoot DTC P0442 or P0456 next.
- Read freeze frame data using the hand–held tester or the OBD II scan tool. Freeze frame data records the engine condition when 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.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1 CHECK HARNESS AND CONNECTOR(VAPOR PRESSURE SENSOR - ECM)



- (a) Disconnect the V6 vapor pressure sensor connector.
- (b) Disconnect the E4 and E7 ECM connectors.
- (c) Check the resistance between the wire harness side connectors.

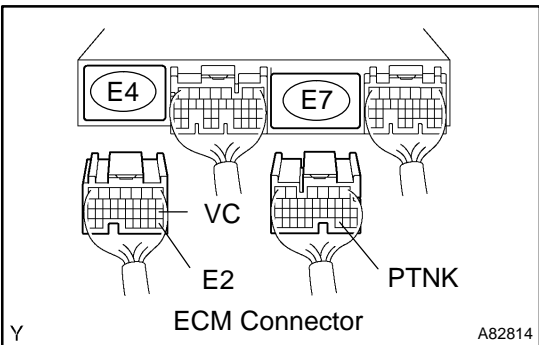
Standard (Check for open):

Tester Connection	Specified Condition
PTNK (V6-2) - PTNK (E7-30)	Below 1 Ω
GND (V6-1) - E2 (E4-28)	Below 1 Ω
VCC (V6-3) - VC (E4-18)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
PTNK (V6-2) or PTNK (E7-30) - Body ground	10 kΩ or higher
VCC (V6-3) or VC (E4-18) - Body ground	10 kΩ or higher

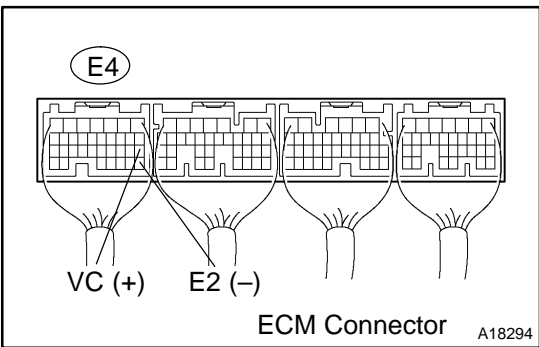
- (d) Reconnect the vapor pressure sensor connector.
- (e) Reconnect the ECM connector.



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

OK

2 INSPECT ECM(VC VOLTAGE)



- (a) Turn the power switch ON (IG).
- (b) Measure the voltage between the specified terminals of the E4 ECM connector.

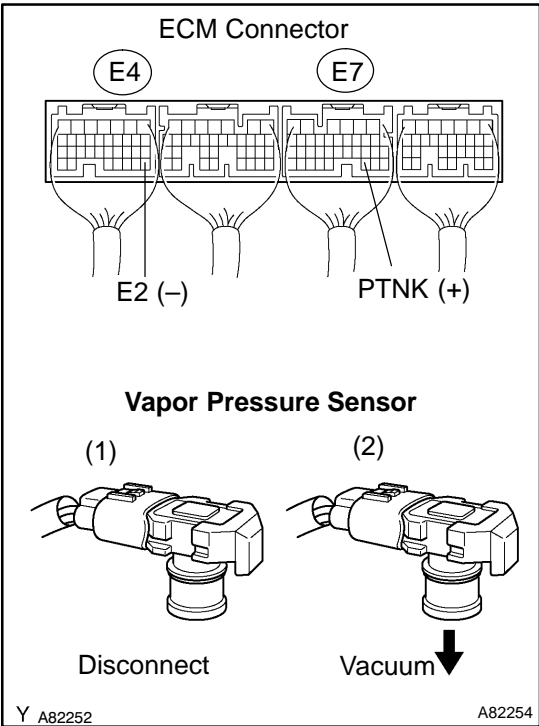
Standard:

Tester Connection	Specified Condition
VC (E4-18) - E2 (E4-28)	4.5 to 5.5 V

NG → **REPLACE ECM (See page 10-24)**

OK

3 INSPECT ECM(PTNK VOLTAGE)



- (a) Turn the power switch ON (IG).
- (b) Measure the voltage between the specified terminals of the E4 and E7 ECM connectors.
 - (1) Remove the vapor pressure sensor.

Standard (1):

Tester Connection	Specified Condition
PTNK (E7-30) - E2 (E4-28)	2.9 to 3.7 V

- (2) Using the 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
PTNK (E7-30) - E2 (E4-28)	0.5 V or less

- (3) Reinstall the vapor pressure sensor.

OK → **REPLACE ECM (See page 10-24)**

NG

REPLACE VAPOR PRESSURE SENSOR ASSY