

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 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 varies beyond 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.

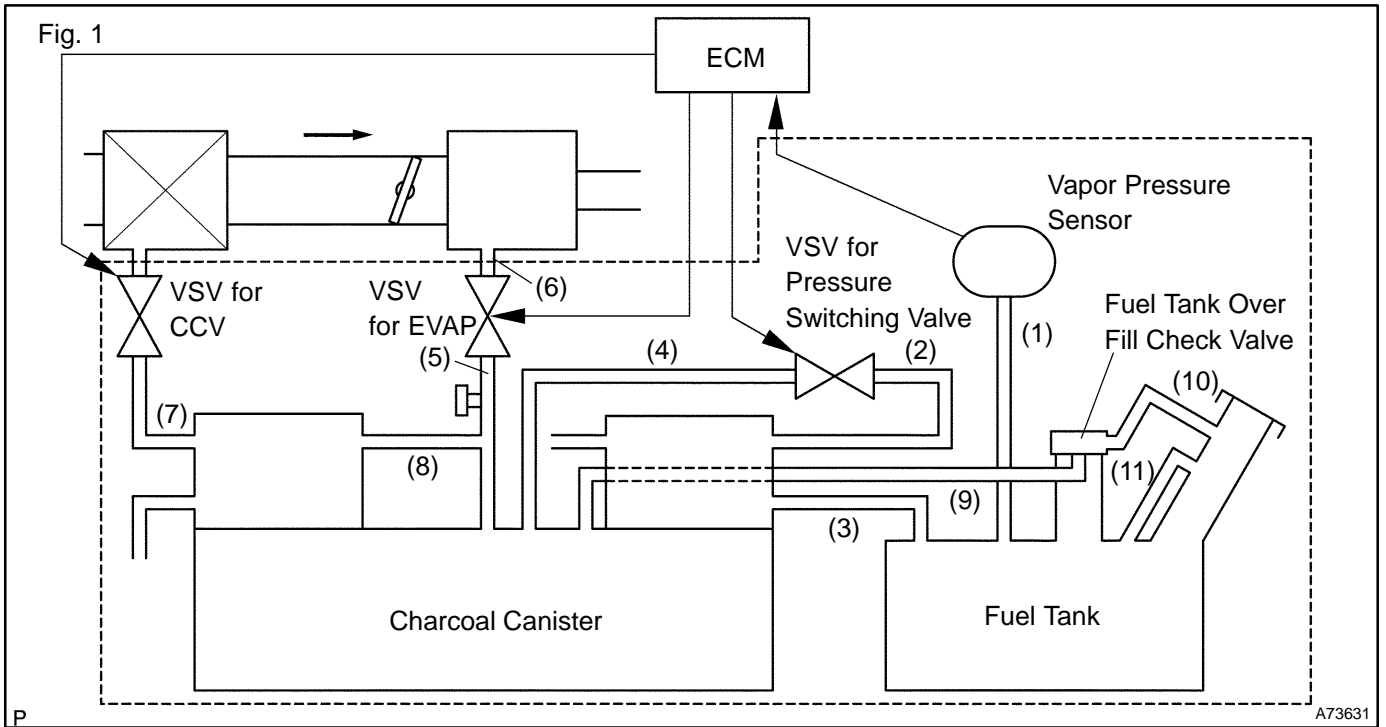
P0452 and P0453

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 a malfunction in the sensor or sensor circuit.

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.



DTC No.	DTC Detection Condition	Trouble Area
P0451	<ul style="list-style-type: none"> Vapor pressure sensor's voltage output extremely changes under the following conditions: (a) and (b) (2 trip detection logic): (a) Vehicle speed: 0 km/h (0mph), Engine speed: Idling, and VSV for pressure switching valve: OFF (b) Vapor pressure sensor value greater than opening pressure value of charcoal canister Vapor pressure sensor's voltage output remains at fixed value 	<ul style="list-style-type: none"> Open or short in vapor pressure sensor circuit Vapor pressure sensor ECM
P0452	Open in vapor pressure sensor circuit	
P0453	Short in vapor pressure sensor circuit	

MONITOR STRATEGY

P0451

Related DTCs	P0451	Evaporative emission control system pressure sensor range/performance
Required sensors/components	Main sensors	Vapor pressure sensor
	Related sensors	Mass air flow sensor, engine coolant temperature sensor
Frequency of operation	Once per driving cycle	
Duration	Signal fluctuation (noise) monitoring: 10 seconds No signal change (stuck) monitoring: 20 minutes	
MIL operation	2 driving cycles	
Sequence of operation	None	

P0452 and P0453

Related DTCs	P0452	Evaporative emission control system pressure sensor/switch low input
	P0453	Evaporative emission control system pressure sensor/switch high input
Required sensors/components	Main sensors	Vapor pressure sensor
	Related sensors	Mass air flow sensor, 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**P0451**

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05-25)	
Signal fluctuation (noise) monitoring:		
Altitude	–	2,400 m (7,872 ft)
Difference between intake air temperature and engine coolant temperature at engine start	–7°C (–19.4°F)	11.1°C (52°F)
Engine coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Intake coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Vehicle stop and idling	5 seconds	15 seconds
Stuck monitoring:		
Altitude	–	2,400 m (7,872 ft)
Vapor pressure sensor	No malfunction	
Difference between intake air temperature and engine coolant temperature at engine start	–7°C (–19.4°F)	11.1°C (52°F)
Engine coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Intake air coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Time after engine start	6 seconds	–

P0452 and P0453

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05-25)	
Difference between intake air temperature and engine coolant temperature at engine start	–	12°C (22°F)
Engine coolant temperature at engine start	10°C (50°F)	35°C (95°F)
Intake air temperature at engine start	10°C (50°F)	35°C (95°F)
Engine	Running	

TYPICAL MALFUNCTION THRESHOLDS

P0451

Detection Criteria	Threshold
Signal fluctuation (noise) monitoring:	
The number of times the output changed ± 0.667 kPa (5 mmHg) or more during 5 to 15 seconds after idling and vehicle stop	7 times or more
No signal change (stuck) monitoring:	
Fuel tank pressure "no change" time (less than 0.18 kPa (1.35 mmHg) after engine start)	20 minutes or more

P0452 and P0453

Detection Criteria	Threshold
P0452:	
Fuel tank pressure	Less than -3.999 kPa (-30 mmHg)
P0453:	
Fuel tank pressure	1.999 kPa (15 mmHg) or more

WIRING DIAGRAM

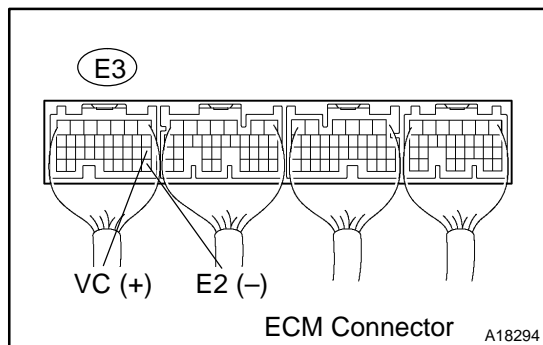
Refer to DTC No. P0441 on page 05-193.

INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- If DTC P0441 (Purge Flow), P0446 (VSV for 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 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.
- If the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1 INSPECT ECM(VC VOLTAGE)



- Turn the ignition switch ON.
- Measure the voltage between the terminals of the E3 ECM connector.

Standard:

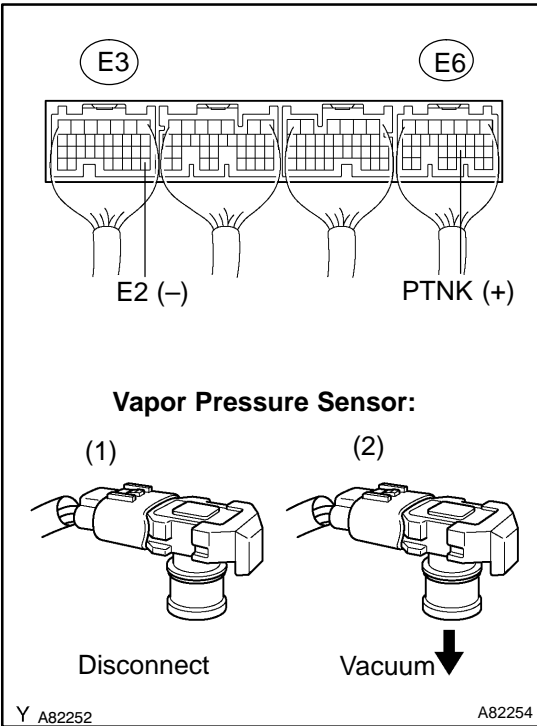
Tester Connection	Specified Condition
VC (E3-18) – E2 (E3-28)	4.5 to 5.5 V

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REPLACE ECM (See page 10-11)

OK

2 INSPECT ECM(PTNK VOLTAGE)



- (a) Turn the ignition switch ON.
- (b) Measure the voltage between the terminals of the E3 and E6 ECM connectors.
 - (1) Disconnect the vacuum hose from the vapor pressure sensor.

Standard (1):

Tester Connection	Specified Condition
PTNK (E6-21) - E2 (E3-28)	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):

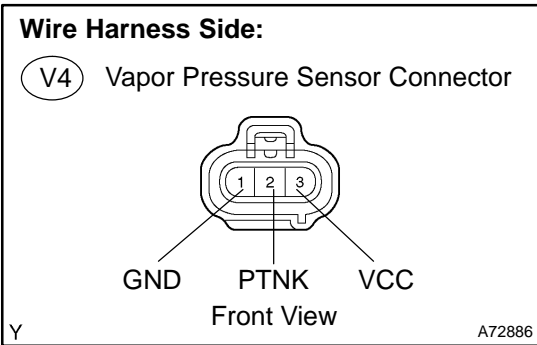
Tester Connection	Specified Condition
PTNK (E6-21) - E2 (E3-28)	0.5 V or less

- (3) Reconnect the vacuum hose.

OK → **REPLACE ECM (See page 10-11)**

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



- (a) Disconnect the V4 vapor pressure sensor connector.
- (b) Disconnect the E3 and E6 ECM connectors.
- (c) Check the resistance between the wire harness side connectors.

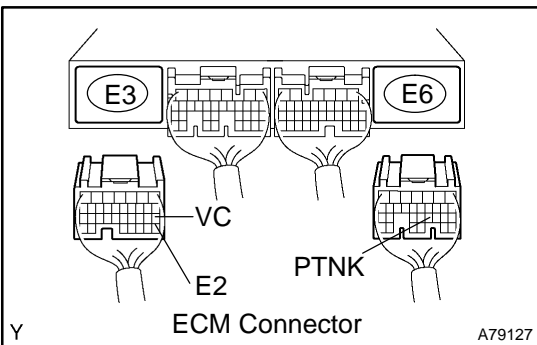
Standard (Check for open):

Tester Connection	Specified Condition
PTNK (V4-2) - PTNK (E6-21)	Below 1 Ω
GND (V4-1) - E2 (E3-28)	
VCC (V4-3) - VC (E3-18)	

Standard (Check for short):

Tester Connection	Specified Condition
PTNK (V4-2) or PTNK (E6-21) - Body ground	10 kΩ or higher
VCC (V4-3) or VC (E3-18) - Body ground	

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



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

OK

REPLACE VAPOR PRESSURE SENSOR ASSY