

DTC	P0451	Evaporative Emission Control System Pressure Sensor/Switch Range/Performance
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DTC	P0452	Evaporative Emission Control System Pressure Sensor/Switch Low Input
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DTC	P0453	Evaporative Emission Control System Pressure Sensor/Switch High Input
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MONITOR DESCRIPTION

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

P0451

The ECM sensor 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 a "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 (2-trip detection logic) and a DTC is set.

The ECM checks for a "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 sensor 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.

If the output voltage of the vapor pressure sensor is out of 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, -1.18 in.Hg) or above 1.999 kPa (15 mmHg, 0.59 in.Hg), 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.

DIAGNOSTICS – ENGINE

DTC No.	DTC Detecting Condition	Trouble Area
P0451	Vapor pressure sensor output extremely changes under conditions of (a) and (b): (2 trip detection logic) (a) Vehicle speed: 0 km/h (0mph), Engine speed: Idling and pressure switching valve is OFF (b) Vapor pressure sensor value $\geq$ opening pressure valve of charcoal canister	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0452	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or less: (2 trip detection logic)	
P0453	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or more: (2 trip detection logic)	

MONITOR STRATEGY

P0451

Related DTCs	P0451	Evaporative emission control system pressure sensor range/performance
Required sensors/components	Main sensors/components	Vapor pressure sensor
	Related sensors/components	Mass air flow meter, Engine coolant temperature sensor
Frequency of operation	Once per driving cycle	
Duration	Signal fluctuation (noise) monitoring: 10 sec. No signal change (stuck) monitoring: 20 min.	
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/components	Vapor pressure sensor
	Related sensors/components	Mass air flow meter, Engine coolant temperature sensor
Frequency of operation	Once per driving cycle	
Duration	7 sec.	
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 DI-3)	
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 (–12.6°F)	11.1°C (20°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 sec.	15 sec.
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 (–12.6°F)	11.1°C (20°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	5 sec.	–
ø0.040 inch	Not detected	
ø0.020 inch	Not detected	
CCV malfunction, bypass VSV malfunction	Not detected	

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 DI-3)	
Difference between intake air temperature and engine coolant temperature at engine start	–	12°C (21.6°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, ± 0.02 in.Hg) or more during 5 to 15 sec. after idling and vehicle stop	5 times or more
No signal change (stuck) monitoring:	
Fuel tank pressure "no change" time (less than 0.018 kPa (0.135 mmHg, 0.005 in.Hg) change since engine start)	10 min. or more

P0452 and P0453

Detection Criteria	Threshold
P0452:	
Fuel tank pressure	Less than -3.999 kPa (-30 mmHg, -1.18 in.Hg) / when engine running
P0453:	
Fuel tank pressure	1.999 kPa (15 mmHg, 0.59 in.Hg) or more / when engine running

WIRING DIAGRAM

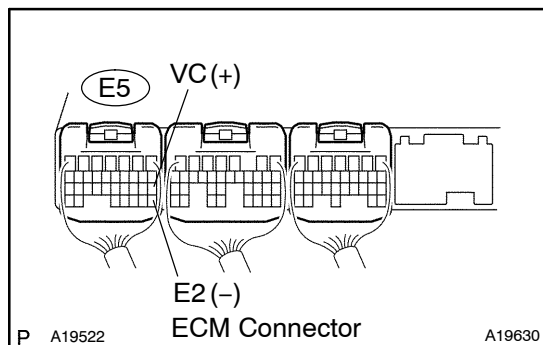
Refer to DTC P0441, P0446 and P2418 on page [DI-228](#).

INSPECTION PROCEDURE

HINT:

- If different DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- 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 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 voltage between terminals VC and E2 of ECM connector.



CHECK:

Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals of the E5 ECM connector.

OK:

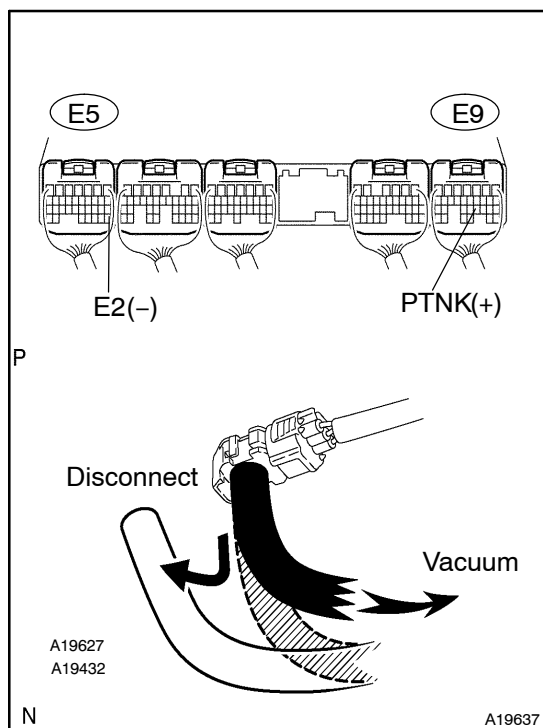
Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

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Replace ECM (See page [SF-60](#)).

OK

2 Check voltage between terminals PTNK and E2 of ECM connectors.



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors.

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (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.
- (3) Check the vapor pressure sensor output waveform using a hand-held tester.

NOTICE:

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

OK:

- (1) Voltage: 2.9 to 3.7 V
- (2) Voltage: 0.5 V or less
- (3) A consecutive waveform presents.

OK

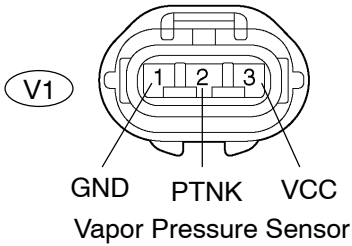
Check for intermittent problems (See page [DI-3](#)).

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Check for open and short in harness and connector between vapor pressure sensor and ECM.

Wire Harness Side:



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PREPARATION:

(a) Disconnect the V1 vapor pressure sensor connector.

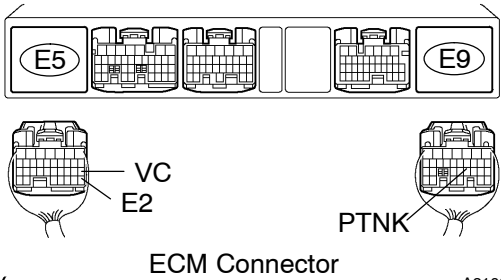
(b) Disconnect the E5 and E9 ECM connector.

CHECK:

Measure the resistance between the wire harness side connectors.

OK:

Tester Connection	Specified Condition
PTNK (V1-2) - PTKN (E9-21)	Below 1 Ω
GND (V1-1) - E2 (E5-28)	Below 1 Ω
VCC (V1-3) - VC (E5-18)	Below 1 Ω
PTNK (V1-2) or PTKN (E9-21) - Body ground	10 k Ω or higher
VCC (V1-3) or VC (E5-18) - Body ground	10 k Ω or higher



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Repair or replace harness or connector.

OK

Replace vapor pressure sensor.