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

ES

MONITOR DESCRIPTION

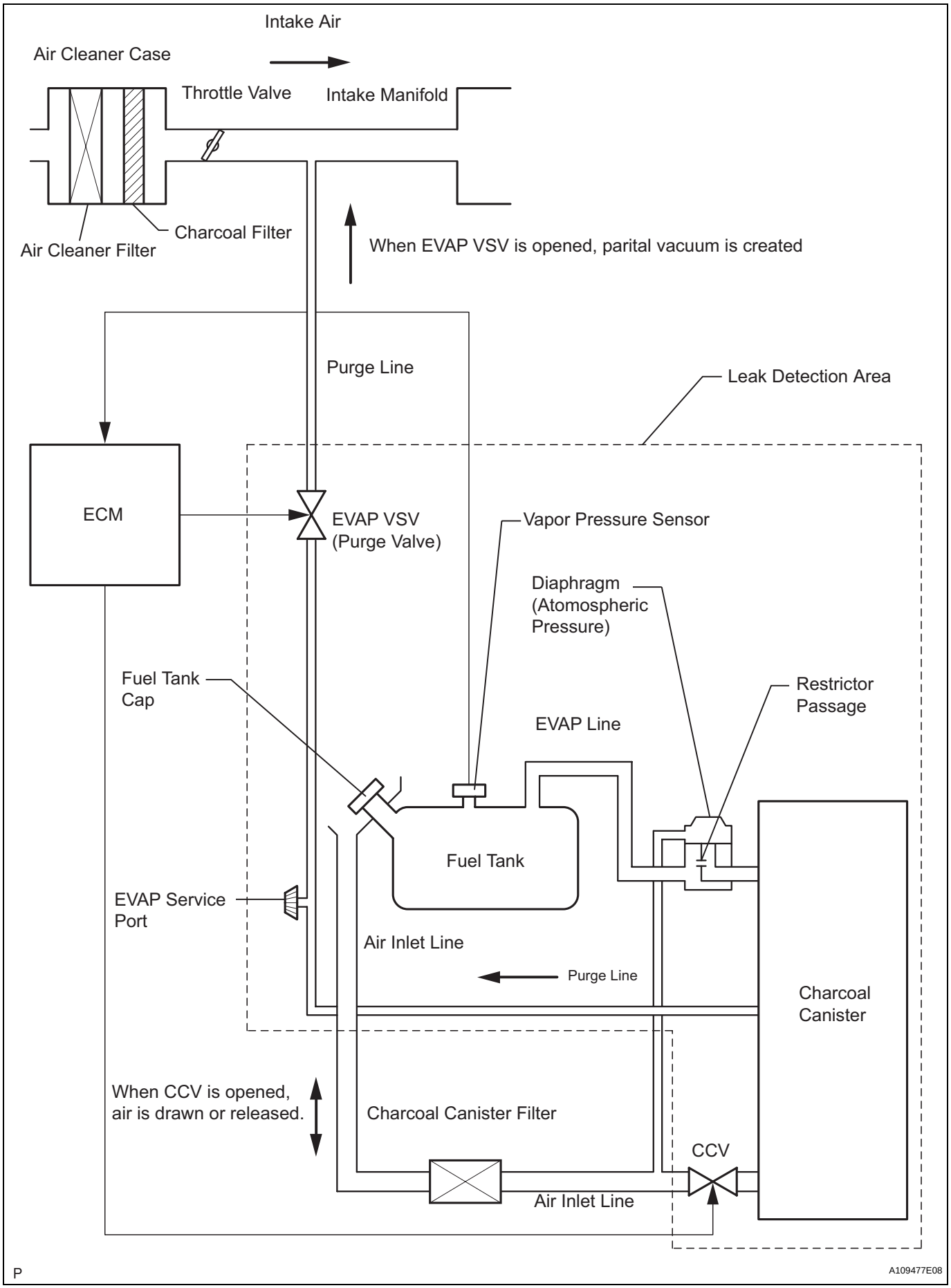
DTC "P0451, P0452 or P0453" is recorded by the ECM when the vapor pressure sensor malfunctions.

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 is changing, the ECM interprets this as a fault in the vapor pressure sensor. DTC P0451 will be set when either of the faults occurs 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.


Intake Air
Air Cleaner Case
Throttle Valve
Intake Manifold
Charcoal Filter
Air Cleaner Filter
When EVAP VSV is opened, parital vacuum is created
Purge Line
Leak Detection Area
ECM
EVAP VSV
(Purge Valve)
Vapor Pressure Sensor
Diaphragm
(Atomospheric
Pressure)
Fuel Tank
Cap
Restrictor
Passage
EVAP Line
Fuel Tank
EVAP Service
Port
Air Inlet Line
Purge Line
Charcoal
Canister
When CCV is opened,
air is drawn or released.
Charcoal Canister Filter
CCV
Air Inlet Line
P
A109477E08

DTC No.	DTC Detection Condition	Trouble Area
P0451	Vapor pressure sensor output changes extremely under the following conditions: • Vapor pressure sensor output changes often while vehicle speed is 0 mph (0 km/h) 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

ES

MONITOR STRATEGY

Related DTCs	P0451: EVAP pressure Sensor Noise P0451: EVAP pressure Sensor Stuck P0452: EVAP pressure Sensor Range Check (Low voltage) P0453: EVAP pressure Sensor Range Check (High voltage)
Required sensors / components (Main)	EVAP pressure sensor
Required sensors / components (Related)	ECT sensor, IAT sensor
Frequency of operation	Once per driving cycle
Duration	7 seconds: EVAP pressure Sensor Range Check 45 seconds: EVAP pressure Sensor Noise 5 minutes: EVAP pressure Sensor Stuck
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	None

EVAP pressure Sensor Noise P0451:

Altitude	Less than 7,870 ft. (2,400 m)
Battery voltage	11 V or more
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected
IAT at engine start - ECT at engine start	-7 to 11.1°C (-12.6 to 20°F)
EVAP VSV, 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)

EVAP pressure Sensor Stuck P0451:

Altitude	Less than 7,870 ft. (2,400 m)
Battery voltage	11 V or more
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected
IAT at engine start - ECT at engine start	-7 to 11.1°C (-12.6 to 20°F)
EVAP VSV, 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

EVAP pressure Sensor Range Check P0452, 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	Less than 12°C (21.6°F)
Engine condition	Running

TYPICAL MALFUNCTION THRESHOLDS

EVAP pressure Sensor Noise P0451:

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

EVAP pressure Sensor Stuck P0451:

EVAP pressure change	No change for 5 minutes

EVAP pressure Sensor Range Check (Low voltage) P0452:

EVAP pressure	Less than -30 mmHg (-3.999 kPa)

EVAP pressure Sensor Range Check (High voltage) P0453:

EVAP pressure	15 mmHg (1.999 kPa) or more

COMPONENT OPERATING RANGE

EVAP pressure	-26 to 11 mmHg (-3.5 to 1.5 kPa) or more [734 to 771 mmHg]

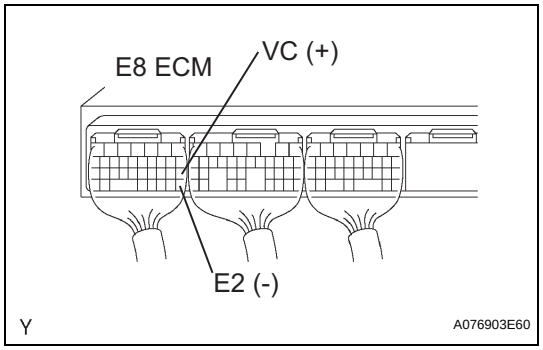
WIRING DIAGRAM

Refer to the EVAP System (See page ES-312).

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.
- 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 intelligent tester or the OBD II scan tool. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. 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.

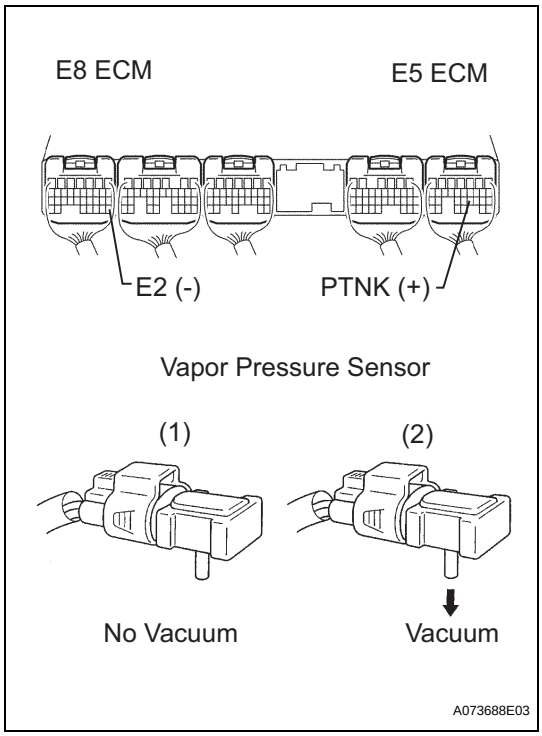
Standard voltage

Tester Connection	Specified Condition
E8-18 (VC) - E8-28 (E2)	4.5 to 5.5 V

NG → **REPLACE ECM**

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 voltage (1)

Tester Connection	Specified Condition
E5-21 (PTNK) - E8-28 (E2)	2.9 to 3.7 V

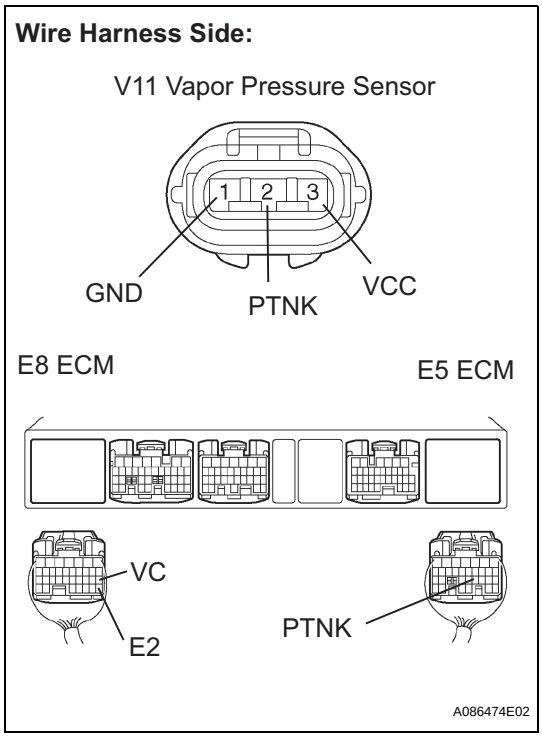
(2) Using a MITYVAC (Hand-held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.
NOTICE:
The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).
Standard voltage (2)

Tester Connection	Specified Condition
E5-21 (PTNK) - E8-28 (E2)	0.5 V or less

OK → REPLACE ECM

NG

3	CHECK WIRE HARNESS (VAPOR PRESSURE SENSOR ASSEMBLY - ECM)



(a) Disconnect the V11 vapor pressure sensor connector.
(b) Disconnect the E5 and E8 ECM connectors.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
V11-2 (PTNK) - E5-21 (PTNK) V11-1 (GND) - E8-28 (E2) V11-3 (VCC) - E8-18 (VC)	Below 1 Ω
V11-2 (PTNK) or E5-21 (PTNK) - Body ground V11-3 (VCC) or E8-18 (VC) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE VAPOR PRESSURE SENSOR ASSEMBLY