

DTC P0450-P0453

DIAGNOSTIC INSTRUCTIONS

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC DESCRIPTORS

DTC P0450

Fuel Tank Pressure (FTP) Sensor Circuit

DTC P0451

Fuel Tank Pressure (FTP) Sensor Performance

DTC P0452

Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage

DTC P0453

Fuel Tank Pressure (FTP) Sensor Circuit High Voltage

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
FTP Sensor 5-Volt Reference	P0452, P0642	P0450, P0451	P0446, P0452	P0453, P0643	-
FTP Sensor Signal	P0452	P0450, P0451	P0452	P0453	P0450, P0451
FTP Sensor Low Reference	-	P0446, P0450, P0451	P0446	-	P0450, P0451

TYPICAL SCAN TOOL DATA

FTP Sensor Voltage

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: With EVAP system vented to atmosphere			
Parameter Normal Range: 1.3-1.7 V			
FTP Sensor Low Reference	1.5 V	4.6 V	-

FTP Sensor Signal	0 V	0 V	5 V
FTP Sensor 5-Volt Reference	0 V	0 V	5 V

CIRCUIT/SYSTEM DESCRIPTION

The fuel tank pressure (FTP) sensor measures air pressure or vacuum in the evaporative emission (EVAP) system. The engine control module (ECM) supplies a 5-volt reference and a low reference circuit to the FTP sensor. The FTP sensor signal voltage varies depending on EVAP system pressure or vacuum. The ECM also uses this FTP signal to determine atmospheric pressure for use in the engine-off small leak test, DTC P0442. Before using this signal as an atmospheric reference it must first be re-zeroed. The sensor performance test includes checks for sudden changes in pressure or signal oscillation and a pressure range check.

This turbocharged engine is equipped with a one way flow check valve that prevents boost pressure from entering the purge line and EVAP system.

CONDITIONS FOR RUNNING THE DTC

P0450

- The engine is running.
- The estimated ambient air temperature is warmer than -7°C ($+19.4^{\circ}\text{F}$).
- The EVAP canister vent valve has been open for more than 3 seconds.
- The vehicle speed is less than 29 km/h (18 mph).
- DTC P0450 runs continuously when the above conditions have been met.

P0451 - Part 1

- The engine is running.
- The vehicle speed is greater than 0 km/h (0 mph).
- The ambient pressure is greater than 68 kPa.
- The estimated ambient air temperature is warmer than -7°C ($+19.4^{\circ}\text{F}$).
- The fuel level is between 12-88 percent.
- DTC P0451 runs continuously when the above conditions have been met.

P0451 - Part 2

- The EVAP canister purge solenoid valve is closed and the EVAP canister vent solenoid valve is open.
- The vehicle speed is between 10-75 km/h (6-46 mph).
- The time since engine start is greater than 450 seconds.
- DTC P0451 runs whenever the above conditions have been met.

P0452 and P0453

- The engine is running.

- DTCs P0452 and P0453 run continuously when the above condition has been met.

CONDITIONS FOR SETTING THE DTC

P0450

There are sudden changes in fuel tank pressure greater than a calibrated amount for up to 30 seconds.

P0451 - Part 1

The FTP is greater than 7 in H₂O or less than -16 in H₂O for more than 4 seconds.

P0451 - Part 2

The fuel tank pressure changed 0.68 kPa compared to a reference value stored at the last cold start.

P0452

The FTP sensor voltage is less than 0.1 volt for more than 4 seconds continuously or 50 seconds cumulative.

P0453

The FTP sensor voltage is more than 4.85 volts for more than 4 seconds continuously or 50 seconds cumulative.

ACTION TAKEN WHEN THE DTC SETS

DTCs P0450, P0451, P0452 and P0453 are Type B DTCs.

CONDITIONS FOR CLEARING THE MIL/DTC

DTCs P0450, P0451, P0452 and P0453 are Type B DTCs.

DIAGNOSTIC AIDS

P0450 and P0451

- A restriction in the EVAP canister or vent lines could prevent fuel vapor pressure from bleeding off fast enough. If the vent system cannot bleed off pressure fast enough, the re-zero procedure may not complete successfully, which could cause this code to set.
- Ensure that the reference port on the FTP sensor is unobstructed.
- An FTP sensor that is skewed or does not have a linear transition from low to high may cause this code to set. Scan tool output controls, snapshot, and plot functions can help detect erratic sensor response. To test the sensor signal under vacuum conditions, use the Quick Snapshot and the Purge/Seal functions to capture data while commanding purge to 20 percent, then plot the data to look for erratic sensor operation. A similar test can be done for the pressure side of the sensor operation by applying pressure with the **J 41413-200** while taking a snapshot. See **Special Tools** .

REFERENCE INFORMATION**Schematic Reference****Engine Controls Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Evaporative Emission Control System Description****Electrical Information Reference**

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference**Powertrain Diagnostic Trouble Code (DTC) Type Definitions****Scan Tool Reference****Control Module References** for scan tool information**Special Tools**

J 41413-200 Evaporative Emission System Tester (EEST). See **Special Tools** .

CIRCUIT/SYSTEM VERIFICATION

Ignition ON, observe the scan tool fuel tank pressure (FTP) sensor parameter. The reading should be between 1.3-1.7 volts with the fuel cap removed, and change with fuel tank pressure. Increasing pressure causes decreasing voltage, decreasing pressure causes increasing voltage.

CIRCUIT/SYSTEM TESTING

1. Ignition OFF, disconnect the harness connector at the FTP sensor.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal 2 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the control module.
3. Ignition ON, test for 4.8-5.2 volts between the 5-volt reference circuit terminal 3 and ground.

- If less than the specified range, test the 5-volt reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the control module.
 - If greater than the specified range, test the 5-volt reference circuit for a short to voltage. If the circuit tests normal, replace the control module.
4. Verify the scan tool FTP sensor parameter is less than 0.2 volt.
 - If greater than the specified range, test the signal circuit terminal 1 for a short to voltage. If the circuit tests normal, replace the control module.
 5. Install a 3A fused jumper wire between the signal circuit terminal 1 and the 5-volt reference circuit terminal 3. Verify the scan tool FTP sensor parameter is greater than 4.8 volts.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the control module.
 6. If all circuits test normal, test or replace the FTP sensor.

REPAIR PROCEDURES

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuel Tank Pressure Sensor Replacement**
- **Control Module References** for engine control module (ECM) replacement, setup, and programming