DTC	P0101	Mass Air Flow Circuit Range / Performance Problem
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DESCRIPTION

Refer to DTC P0100 (see page ES-86).

DTC No.	DTC Detection Conditions	Trouble Areas
P0101	Conditions (a), (b), (c), (d) and (e) continue for more than 10 seconds (2 trip detection logic): (a) Engine running (b) Engine coolant temperature 70°C (158°F) or higher (c) Throttle Position (TP) sensor voltage 0.24 V or more (d) Average engine load value ratio less than 0.85, or more than 1.15 (varies with estimated engine load) Average engine load value ratio = Average engine load based on MAF meter output / Average engine load estimated from driving conditions (e) Average air-fuel ratio less than -20 %, or more than 20 %	 Mass Air Flow (MAF) meter Air induction system PCV hose connections

MONITOR DESCRIPTION

The MAF meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and to provide an appropriate air-fuel ratio. Inside the MAF meter, there is a heated platinum wire which is exposed to the flow of intake air. By applying a specific electrical current to the wire, the ECM heats it to a specific temperature. The flow of incoming air cools both the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components of the MAF meter. The voltage level is proportional to the airflow through the sensor, and the ECM uses it to calculate the intake air volume. The ECM monitors the average engine load value ratio to check the MAF meter for malfunctions. The average engine load value ratio is obtained by comparing the average engine load calculated from the MAF meter output to the average engine load estimated from the driving conditions, such as the engine speed and the throttle opening angle. If the average engine load value ratio is below the threshold value, the ECM determines that the intake air volume is low, and if the average engine load value ratio is above the threshold value, the ECM determines that the intake air volume is high.

If this is detected in 2 consecutive driving cycles, the MIL is illuminated and a DTC is set.

MONITOR STRATEGY

Related DTCs	P0101: Mass air flow meter rationality
Required Sensors/Components (Main)	Mass air flow meter
Required Sensors/Components (Related)	Crankshaft Position (CKP) sensor, Engine Coolant Temperature (ECT) sensor and Throttle Position (TP) sensor
Frequency of Operation	Continuous
Duration	10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

	P0115 - P0118 (ECT sensor)
	P0120 - P0223, P2135 (TP sensor)
Monitor runs whenever following DTCs not present	P0125 (Insufficient ECT for closed loop)
	P0335 (CKP sensor)
	P0340 (CMP sensor)
Throttle position (TP sensor voltage)	0.24 V or more
Engine	Running
Battery voltage	10.5 V or more

Engine coolant temperature	70°C (158°F) or more
IAT sensor circuit	ОК
ECT sensor circuit	ОК
CKP sensor circuit	ОК
TP sensor circuit	ОК
Canister pressure sensor circuit	ОК
EVAP leak detection pump	OK
EVAP vent valve	ОК

TYPICAL MALFUNCTION THRESHOLDS

Both of following conditions 1 and 2 met	-	
1. Averaged engine load value ratio	Less than 0.85, or more than 1.15 (varies with estimated engine load)	
2. Averaged air-fuel ratio	Less than -20 %, or more than 20 %	

WIRING DIAGRAM

Refer to DTC P0100 (see page ES-88).

CONFIRMATION DRIVING PATTERN

HINT:

Performing this confirmation pattern will activate the mass air flow performance monitor.



- 1. Connect the intelligent tester to the DLC3.
- 2. Turn the ignition switch ON.
- 3. Turn the tester ON.
- 4. Clear DTCs (see page ES-35).
- 5. Start the engine, and warm it up until the engine coolant temperature reaches 70°C (158°F) or higher.
- 6. Drive the vehicle at approximately 100 km/h (62 mph) for 20 seconds or more.
- 7. On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES and check if any DTCs (any pending DTCs) are set.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, 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.

1 CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0101)

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the tester ON.
- (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (e) Read DTCs.

Result

Α

Display (DTC Output)	Proceed To
P0101	A
P0101 and other DTCs	В

HINT:

If any DTCs other than P0101 are output, troubleshoot those DTCs first.





REPLACE MASS AIR FLOW METER