DIAP1−01

DTC	P0171	System Too Lean (Bank 1)

DTC	P0172	System Too Rich (Bank 1)

DTC	P0174	System Too Lean (Bank 2)

DTC	P0175	System Too Rich (Bank 2)

CIRCUIT DESCRIPTION

These DTCs indicate that the fuel is not enough (P0171, P0174) or too much (P0172, P0175). A DTC is set when the smoothed fuel trim (short FT + long FT) reaches the malfunction limit. This limit is basically +35% (too lean, adding fuel) or −35% (too rich, subtracting fuel). The values may vary with the emission limit for each vehicle.

Fuel trim is related to the feedback compensation value, not to the basic injection time. Fuel trim includes short term fuel trim and long−term fuel trim.

Short term fuel trim (short FT) is the short term fuel compensation used to maintain the air−fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air−fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air−fuel ratio is RICH and an increase in fuel volume if it is LEAN.

Long term fuel trim (long FT) is overall fuel compensation carried out in long term to compensate for continual deviation of the short term fuel trim from the central value, which is due to individual engine differences, wear overtime and changes in the using environment.

DTC No.	DTC Detecting Condition	Trouble Area
P0171 P0174	Sum of short FT and long FT is more than 40% when following conditions are met (2 trip detection logic): • Engine is warmed up. • Closed loop	• PCV valve and hose • Mass air flow meter • Injector blockage • Fuel pressure • Air induction system • Heated oxygen sensor (bank 1, 2 sensor 1) • Gas leakage in exhaust system • ECM
P0172 P0175	Sum of short FT and long FT is below −35% when following conditions are met (2 trip detection logic): • Engine is warmed up. • Closed loop	• Mass air flow meter • Injector leak or blockage • Ignition system • Heated oxygen sensor (bank 1, 2 sensor 1) • Gas leakage in exhaust system • ECM

INSPECTION PROCEDURE

1	**Confirm DTC.**

(a) Save the freeze frame data.
(b) Clear the DTCs.
(c) Warm up the engine.
(d) Drive the vehicle for about 10 minutes.
(e) Make sure that the DTC is present.

NO → **Go to step 10.**

YES

2	**Check for exhaust gas leakage.**

Check the leakage from the heated oxygen sensors.

NG → **Repair.**

OK

3	**Perform “A/F control” active test to check oxygen sensor operation.**

(a) Warm up the engine.
(b) On the hand−held tester, select “A/F CONTROL” from the active test menu.
(c) Switch the injection volume between +25% and −12.5%.
OK:

Injection Volume	O2S B1S1, O2S B2S1
+25%	> 0.5 V
−12.5%	<0.4 V

NG → **Replace heated oxygen sensor.**

OK

4	**Check PCV valve and piping leakage (see page EC−5).**

NG → **Repair.**

OK

5	**Check leakage between air cleaner and intake manifold.**

NG → **Repair.**

OK

6	**Visually check mass air flow meter.**

(a) Remove the mass air flow meter.
(b) Check if the foreign matter like lint sticks to the sensor element.

NG → **Clean sensor element. If necessary, replace mass air flow meter.**

OK

7	**Check for spark and ignition.**

NG → **Repair.**

OK

8	Check fuel pressure (see page SF−5).

NG → Check fuel pump, fuel line fuel filter and pressure regulator.

OK

9	Check injector for blockage or leakage (see page SF−23).

NG → Replace injector.

OK

Replace ECM (see page SF−86).

10	Check if vehicle has run out of fuel recently.

NO → Go to step 11

YES

DTC was set by running out of fuel.

11	**Perform driving pattern.**

(a) Turn the ignition switch OFF.
(b) Start the engine and warm up the engine until the coolant temp reaches 75˚C (167˚F).
(c) On the hand−held tester, select “CHECK MODE”.
(d) Drive the vehicle at 30 km/h (20 mph) or faster for at least 3 minutes.
(e) Stop the vehicle and allow the engine to idle for at least 2 minutes.
(f) Repeat (e) and (f) twice.
(g) Check DTCs.

Result:

Is DTC P0171, P0172, P0174 or P0175 present?

NO → **Perform test drive according to customer interview and freeze frame data til the DTC is set.**

YES

Go to step 2.