

<b>DTC</b>	<b>P0171</b>	<b>SYSTEM TOO LEAN (BANK 1)</b>
<b>DTC</b>	<b>P0172</b>	<b>SYSTEM TOO RICH (BANK 1)</b>
<b>DTC</b>	<b>P0174</b>	<b>SYSTEM TOO LEAN (BANK 2)</b>
<b>DTC</b>	<b>P0175</b>	<b>SYSTEM TOO RICH (BANK 2)</b>

## 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 Detection Condition	Trouble Area
P0171 P0174	Sum of short FT and long FT is more than 35% when following conditions are met (2 trip detection logic): • Engine is warmed up • Closed loop	<ul style="list-style-type: none"> <li>• PCV valve and hose</li> <li>• Mass air flow meter</li> <li>• Injector blockage</li> <li>• Air induction system</li> <li>• Fuel pressure</li> <li>• Gas leakage in exhaust system</li> <li>• A/F sensor (bank 1)</li> <li>• A/F sensor (bank 2)</li> <li>• ECM</li> </ul>
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	<ul style="list-style-type: none"> <li>• Mass air flow meter</li> <li>• Injector leak, blockage</li> <li>• Ignition system</li> <li>• Fuel pressure</li> <li>• Gas leakage in exhaust system</li> <li>• A/F sensor (bank 1)</li> <li>• A/F sensor (bank 2)</li> <li>• ECM</li> </ul>

## MONITOR STRATEGY

Required components/sensors	Fuel system, PCV system
Related components/sensors	A/F sensor, MAF sensor
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	2 driving cycles
Sequence operation	None

## TYPICAL ENABLING CONDITIONS

Monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 V or more
Fuel system status	Closed loop
EVAP purge cut	ON

One of the following conditions is met:

Engine rpm	Less than 1100 rpm
MAF per revolution	0.26 g/rev or more

## TYPICAL MALFUNCTION THRESHOLDS

Smoothed fuel trim learning value (too lean)	35 % or more
Smoothed fuel trim learning value (too rich)	-35 % or less

## 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

**OK**

### 2 CHECK FOR EXHAUST GAS LEAKAGE

Check the leakage from the A/F sensor.

**NG** → REPAIR

**OK**

### 3 CHECK AIR FUEL RATIO SENSOR

- (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	AFS B1S1, AFS B2S1
+25%	< 3.0 V
-12.5%	> 3.35 V

**NG** → REPLACE AIR FUEL RATIO SENSOR

**OK**

**4 CHECK PCV VALVE AND HOSE FOR LEAKAGE**

NG REPAIR

OK

**5 CHECK LEAKAGE BETWEEN AIR CLEANER AND INTAKE MANIFOLD**

NG REPAIR

OK

**6 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. REPLACE MASS AIR FLOW METER IF NECESSARY

OK

**7 CHECK FOR SPARK AND IGNITION**

NG REPAIR OR REPLACE

OK

**8 CHECK FUEL PRESSURE (See Page 11-6)**

NG CHECK FUEL PUMP, FUEL LINE AND FUEL PRESSURE REGULATOR

OK

**9 CHECK FUEL INJECTOR (See page 11-8)**

NG REPLACE INJECTOR

OK

**REPLACE ECM (See Page 10-16)**

**10 CHECK IF VEHICLE HAS RUN OUT OF FUEL RECENTLY****NO** → **Go to step 11****YES****DTC WAS SET WHEN VEHICLE RAN 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 60 – 120 km/h (35 – 75 mph) for 5 minutes.
- (e) Check DTCs.

**Result:****Is DTC P0171, P0172, P0174 or P0175 present?****NO** → **PERFORM TEST DRIVE ACCORDING TO CUSTOMER INTERVIEW AND FREEZE FRAME DATA UNTIL DTC IS SET****YES****Go to step 2**

-MEMO-

-MEMO-

-MEMO-

-MEMO-



-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-