

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) and the fuel is too much (P0172, P0175). A DTC is set when the smoothed fuel trim (short FT + long FT) reaches the emission limit. This limit is basically +35% (too lean, adding fuel) or -35% (too rich, subtracting fuel). This value may vary with the engine and vehicle.

Fuel trim refers to the feedback compensation value compared against the basic injection time.

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 lean or rich 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 long-term to compensate for continual deviation of the short term fuel trim from the central value due to individual engine differences, wear over time and changes in the usage environment.

DTC No.	DTC Detection Condition	Trouble Area
P0171 P0174	Sum of long FT and short FT exceeds +40% when following conditions are met (2 trip detection logic): <ul style="list-style-type: none"> • Engine is warmed up • Closed loop 	<ul style="list-style-type: none"> • PCV valve and hose • Mass air flow sensor • Air induction system • Injector blockage • Fuel pressure • Exhaust gas leakage system • Front heated oxygen sensor (bank 1 sensor 1) • Front heated oxygen sensor (bank 2 sensor 1) • ECM
P0172 P0175	Sum of long FT and short FT is below -35% when following conditions are met (2 trip detection logic): <ul style="list-style-type: none"> • Engine is warmed up • Closed loop 	<ul style="list-style-type: none"> • Mass air flow sensor • Injector leak or blockage • Ignition system • Front heated oxygen sensor (bank 1 sensor 1) • Front heated oxygen sensor (bank 2 sensor 1) • ECM

MONITOR STRATEGY

Required components/sensors	Fuel system, PCV system
Related components/sensors	Front heated oxygen sensor, MAF meter
Frequency of operation	Continuous
Duration	10 sec
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

These DTCs are not present	See page 05-19
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 1000 rpm
MAF per revolution	0.28 g/rev or more

TYPICAL MALFUNCTION THRESHOLDS

Smoothed fuel trim learning value (too lean)	40 % or more (Varies with ECT)
Smoothed fuel trim learning value (too rich)	-35 % or less (Varies with ECT)

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.

OK: P0171, P0172, P0174 or P0175 is present.

NO → Go to step 10

OK

2 CHECK FOR EXHAUST GAS LEAK

Check the leakage from the front heated oxygen sensors.

NG → REPAIR

OK

3 PERFORM ACTIVE TEST (A/F CONTROL)

- (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 LEAKAGE FROM PCV HOSE
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NG	REPAIR
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OK

5	CHECK LEAKAGE BETWEEN AIR CLEANER AND INTAKE MANIFOLD
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NG	REPAIR
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OK

6	CHECK MASS AIR FLOW METER
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- (a) Turn the air conditioning off.
- (b) Warm up the engine.
- (c) On the hand held tester, select "MAF" from the data list.
- (d) Check the MAF value at idling and 3000 rpm.
OK: 3 – 6 g/s at idle, 11 – 23 g/s at 3000 rpm
- (e) Remove the mass air flow meter.
- (f) Check if the foreign matter like lint sticks to the sensor element.
OK: No foreign matter at the sensor element

NG	CLEAN SENSOR ELEMENT. IF NECESSARY, REPLACE MASS AIR FLOW METER
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OK

7	CHECK FOR SPARK AND IGNITION
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NG	REPAIR
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OK

8	CHECK FUEL PRESSURE (See page 11-8)
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NG	REPAIR FUEL SYSTEM
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OK

9	CHECK FUEL INJECTOR (See page 11-10)
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NG	REPLACE FUEL INJECTOR
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OK

REPLACE ECM (See page 10-19)

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 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****YES****Go to step 2**

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-