DI6TT–09

DTC	P0171/25	System too Lean (A/F Lean Malfunction)

DTC	P0172/26	System too Rich (A/F Rich Malfunction)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared to the basic injection time. Fuel trim includes short–term fuel trim and long–term fuel trim.

Short–term fuel trim is the short–term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the 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 is overall fuel compensation carried out long–term to compensate for continual deviation of the short–term fuel trim form the central value due to individual engine differences, wear overtime and changes in the usage environment.

If both the short–term fuel trim and long–term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the CHK ENG (MIL) on the multi information display.

DTC No.	DTC Detection Condition	Trouble Area
P0171/25	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Air induction system • Vacuum sensor • Injector blockage • Ignition system • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor circuit • Oxygen sensor • Engine ECU
P0172/26	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on RICH side (2 trip detection logic)	• Air induction system • Vacuum sensor • Injector blockage • Ignition system • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor circuit • Oxygen sensor • Engine ECU

HINT:

- When the DTC P0171/25 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172/26 is recorded, the actual air–fuel ratio is on the RICH side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171/25 is recorded. The CHK ENG (MIL) then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ±38 %, the system is functioning normally.
- The oxygen sensor output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0130/21 on page DI–44.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check air induction system (See page FU–1).**

NG → **Repair or replace.**

OK

2	**Check injector injection (See page FU–33).**

NG → **Replace injector.**

OK

3	**Check vacuum sensor (See page FU–46) and water temperature sensor (See page FU–44).**

NG → **Repair or replace.**

OK

4	**Check for spark and ignition (See page IG–1).**

NG → **Repair or replace.**

OK

5	**Check LPG regulator.**

NG → **Check and repair LPG regulator.**

OK

6	**Check gas leakage on exhaust system.**

NG → **Repair or replace.**

OK

7	**Check output voltage of oxygen sensor during idling.**

PREPARATION:

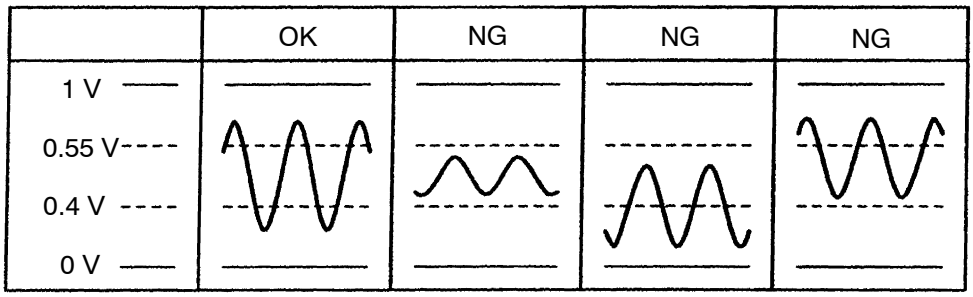
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Used the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



OK → **Go to step 9.**

NG

8	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–20).

NG → Repair or replace harness or connector.

OK →

Replace oxygen sensor.

9	Perform confirmation driving pattern (See page DI–44).

Go →

10	Is there DTC P0171/25 or P0172/26 being output again?

YES → Check and replace engine ECU (See page IN–20).

NO →

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI–18).

YES →

DTC P0171/25 or P0172/26 is caused by running out of fuel.

When not using hand–held tester:

1	Check air induction system (See page FU–1).

NG → Repair or replace.

OK

2	Check LPG regulator.

NG → Check and repair LPG regulator.

OK

3	Check injector injection (See page FU–33).

NG → Replace injector.

OK

4	Check vacuum sensor (See page FU–46) and water temperature sensor (See page FU–44).

NG → Repair or replace.

OK

5	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

6	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

7	Does malfunction disappear when a good oxygen sensor is installed?

YES → Repair oxygen sensor.

NO

Check and replace engine ECU (See page IN–20).