DI5YC–01

DTC	P0171/25	System too Lean (Fuel Trim)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared against 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 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 from the central value due to individual engine differences, wear over time and changes in the usage environment.
If both the short–term fuel trim and long–term fuel trim are LEAN beyond a certain value, it is detected as a malfunction and the MIL lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25	When the air–fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the RICH side (2 trip detection logic)	• Air intake (hose loose) • Fuel line pressure • Injector blockage • Oxygen sensor • Manifold absolute pressure sensor • Engine coolant temp. sensor

HINT:

- When the DTC P0171/25 is recorded, the actual air–fuel ratio is on the LEAN side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171/25 is recorded. The 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.

INSPECTION PROCEDURE

HINT:

- LH and RH bank engine ECU detect this DTC code respectively. The inspection procedures are same for both LH and RH bank engine ECU and described in this manual. Even though terminal name and part name on the side of RH bank are described in parenthesis, perform the inspection for only ECU that has detected DTC.
- Read freeze frame data using hand–held tester or scan tool. 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

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

NG → Repair or replace.

OK

2	Check injector injection (See page FI–18).

NG → Replace injector.

OK

3	Check engine coolant temp. sensor (See page FI–56).

NG → Repair or replace.

OK

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

NG → Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

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

OK

6	Check gas leakade on exhaust system.

NG → Repair or replace.

OK

7	Check the output voltage of oxygen sensor during idling.

PREPARATION:

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

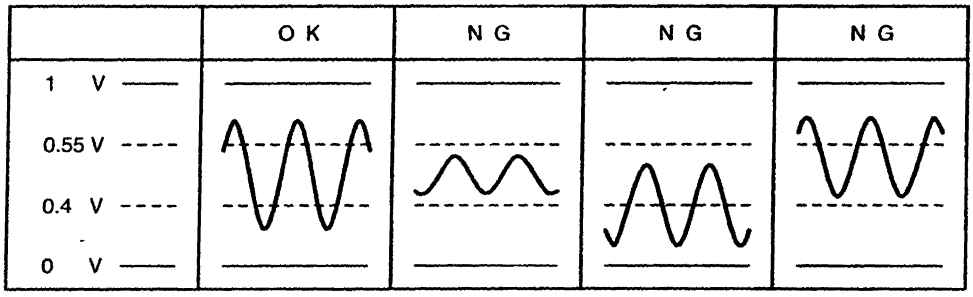
CHECK:

Use the hand–held tester 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).



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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-10).

NG → Repair or replace harness or connector.

OK

Replace oxygen sensor.

9	Perform confirmation driving pattern (See page DI-56).

GO

10	Is there DTC P0171/25 being output again?

YES → Check and replace engine ECU.

NO

11	Did vehicle runs out of fuel in the past?

NO → Check for intermittent problems.

YES

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