DTC	P0171/25	SYSTEM TOO LEAN (FUEL TRIM) (BANK 1)

DTC	P0172/26	SYSTEM TOO RICH (FUEL TRIM) (BANK 1)

CIRCUIT DESCRIPTION

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 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 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.

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 MIL lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25	When air–fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on RICH side (2 trip detection logic)	• Air induction system • Injector blockage • Intake air flow meter • E.F.I. engine coolant temp. sensor • Fuel pressure • Gas leak on exhaust system • Open or short in heated oxygen sensor circuit • A/F sensor
P0172/26	When air–fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Injector leak, blockage • Intake air flow meter • E.F.I. engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leak on exhaust system • Open or short in heated oxygen sensor circuit • A/F sensor

WIRING DIAGRAM

Refer to DTC P0125/91 on page 05–173.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand–held tester, as freeze frame data 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 10–7)

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

2	CHECK FUEL INJECTOR ASSY (See page 11–29)

NG → REPLACE FUEL INJECTOR ASSY

OK

3	INSPECT INTAKE AIR FLOW METER SUB–ASSY (See page 10–8)

NG → REPLACE INTAKE AIR FLOW METER SUB–ASSY

OK

4	INSPECT E.F.I. ENGINE COOLANT TEMPERATURE SENSOR (See page 10–8)

NG → REPLACE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

OK

5	CHECK FOR SPARK AND IGNITION (See page 18–3)

NG → REPAIR OR REPLACE GO TO IGNITION SYSTEM

OK

6	CHECK FUEL PRESSURE (See page 11–29)

NG → REPAIR OR REPLACE GO TO FUEL SYSTEM

OK

7	CHECK EXHAUST GAS LEAK

NG → REPAIR EXHAUST GAS LEAKAGE POINT

OK

8 READ VALUE OF HAND–HELD TESTER(VOLTAGE OF AIR FUEL RATIO SENSOR)

(a) Connect the hand–held tester to the DLC3.
(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.
(c) Use the hand–held tester to read the output voltage of the A/F sensor during idling.
Voltage:

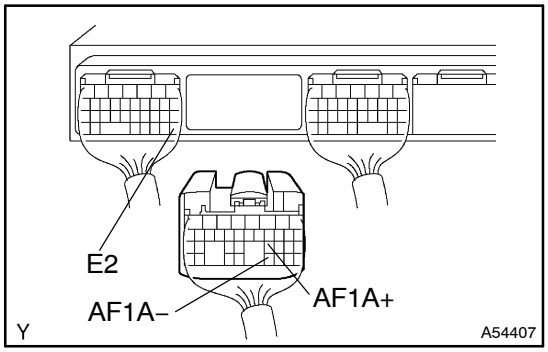
Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V • Not remains at 3.8 V or more • Not remains at 2.8 V or less
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

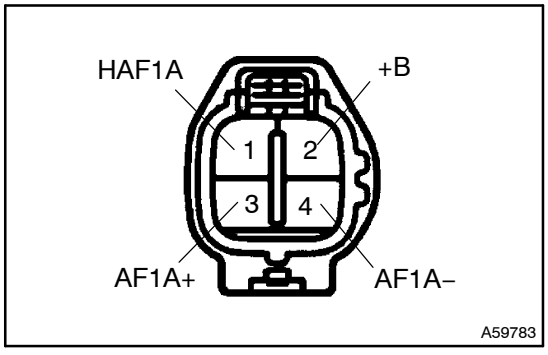
HINT:
- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

OK → **Go to step 10**

NG

9 CHECK WIRE HARNESS OR CONNECTOR(ECM–A/F SENSOR)





(a) Disconnect the A/F sensor connector.
(b) Disconnect the ECM E9 connector.
(c) Check continuity between the terminals AF1A+ of the ECM connector and AF1A+ of the A/F sensor connector.
Resistance: 1 Ω or less
(d) Check for short between the terminals AF1A+ and E2 of the ECM connector.
Resistance: 1 MΩ or more
(e) Check continuity between the terminals AF1A– of the ECM connector and AF1A– of the A/F sensor connector.
Resistance: 1 Ω or less
(f) Check for short between the terminals AF1A– and E2 of the ECM connector.
Resistance: 1 MΩ or more

NG → **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

OK

REPLACE AIR FUEL RATIO SENSOR

10 PERFORM CONFIRMATION DRIVING PATTERN

GO

11 READ OUTPUT DTC

Result:

	A	B
RESULT	P0171/25 is not output.	P0171/25 is output again.

B → **CHECK AND REPLACE ECM**

A

12 CONFIRM VEHICLE RUNS OUT OF FUEL IN PAST

NO → **CHECK AND REPLACE ECM**

YES

CHECK FOR INTERMITTENT PROBLEMS