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

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

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 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 long–term to compensate for continual deviation of the short–term fuel trim form 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 or RICH beyond a certain value, it is detected as a malfunction and the check engine warning (CHK ENG) lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171	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)	• PCV hose • Air induction system • Infector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in heated oxygen sensor circuit • Heated oxygen sensor • ECM
P0172	When the air–fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the LEAN side. (2 trip detection logic)	• Injector leak, blockage • Mass air flow meter • Engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in heated oxygen sensor circuit • Heated oxygen sensor • ECM

HINT:

If the total of the short–term fuel trim value and long–term fuel trim value is within ± 25 %, the system is functioning normally.

WIRING DIAGRAM

Refer to DTC P0125 on page .

INSPECTION PROCEDURE

HINT:

Read freed frame data using hand–held tester or OBD II 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 **12–1**)

> NG > REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

2	CHECK CONNECTION OF PCV HOSE

> NG > REPAIR OR REPLACE PCV HOSE

OK

3	CHECK FUEL INJECTOR ASSY (See page **11–7**)

> NG > REPLACE FUEL INJECTOR ASSY

OK

4	CHECK E.F.I. ENGINE COOLANT TEMPERATURE SENSOR (See page **10–2**)

> NG > REPAIR OR REPLACE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

OK

5	CHECK FOR SPARK AND IGNITION (See page **18–1**)

> NG > REPAIR OR REPLACE IGNITION SYSTEM

OK

6	CHECK FUEL PRESSURE (See page **11–5**)

> NG > REPAIR OR REPLACE FUEL SYSTEM

OK

7	CHECK EXHAUST GAS LEAKAGE POINT

> NG > REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT

OK

8	READ VALUE OF OBD II SCAN TOOL OR HAND–HELD TESTER(OUTPUT VOLTAGE OF OXYGEN SENSOR)

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

(b) Use the hand–held tester or OBD II scan tool to read the output voltage of the oxygen sensor during idling.
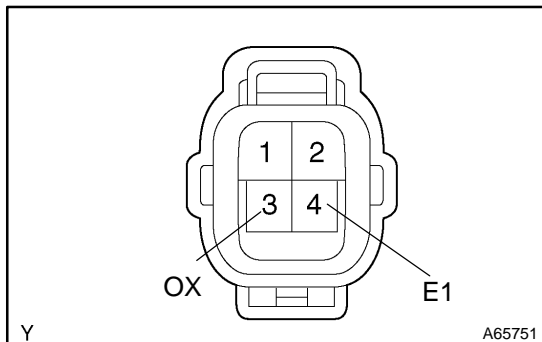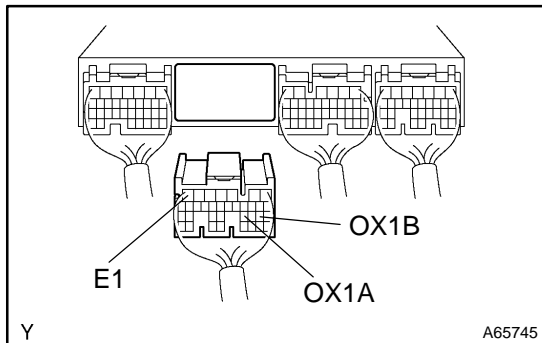
Oxgen sensor otput voltage:

Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table)

P18349
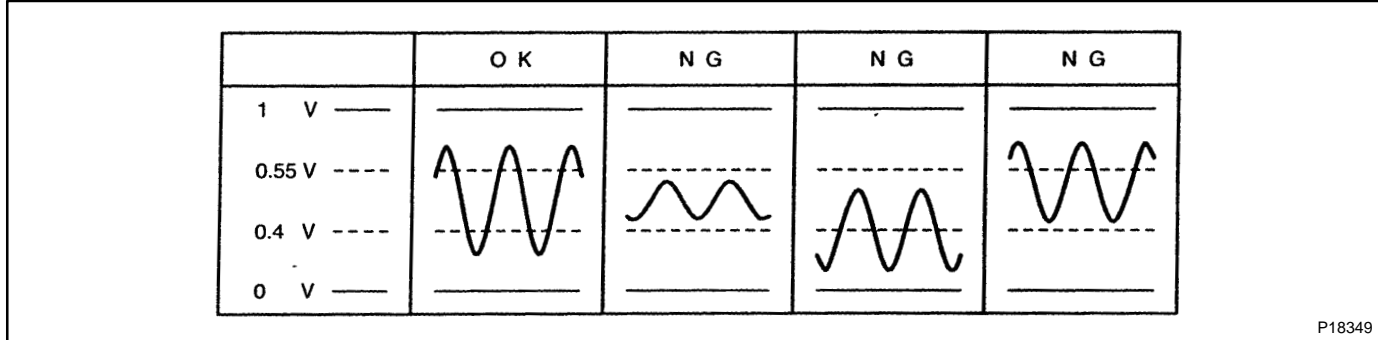
OK	Go to step 10

NG

9	CHECK HARNESS AND CONNECTOR(ECM–OXYGEN SENSOR)

A65745

A65751

(a) Disconnect the oxygen sensor connector.

(b) Disconnect the ECM E4 connector.

(c) Check continuity between the terminals OX1A of the ECM connector and OX of the oxygen sensor connector.
Resistance: 1 Ω or less

(d) Check continuity between the terminals E1 of the ECM connector and the E1 of the oxygen sensor connector.
Resistance: 1 Ω or less

(e) Check for short between the terminals OX1A and E1 of the ECM connector.
Resistance: 1 MΩ or more

(f) Check continuity between the terminals OX1B of the ECM connector and OX of the oxygen sensor connector.
Resistance: 1 Ω or less

(g) Check continuity between the terminals E1 of the ECM connector and the E1 of the oxygen sensor connector.
Resistance: 1 Ω or less

(h) Check for short between the terminals OX1B and E1 of the ECM connector.
Resistance: 1 MΩ or more

NG	REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

| REPLACE OXYGEN SENSOR |

| 10 | PERFORM CONFIRMATION DRIVING PATTERN |

GO

| 11 | READ OUTPUT DTC(BESIDES P0171 OR P0172) |

Result:

	A	B
RESULT	P0171 and P0172 are not output.	P0171 and P0172 are output again.

B | CHECK AND REPLACE ECM |

A

| 12 | CONFIRM VEHICLE RUNS OUT OF FUEL IN THE PAST |

NO | CHECK FOR INTERMITTENT PROBLEMS |

YES

| DTC P0171 IS CAUSED BY RUNNING OUT OF FUEL |