

DTC	P0171	System too Lean (Fuel Trim) (Bank 1)
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DTC	P0172	System too Rich (Fuel Trim) (Bank 1)
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DTC	P0174	System too Lean (Fuel Trim) (Bank 2)
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DTC	P0175	System too Rich (Fuel Trim) (Bank 2)
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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 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 from 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 MIL lights up.

DTC No.	DTC Detection Condition	Trouble Area
P0171 P0174	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on RICH side (2 trip detection logic)	<ul style="list-style-type: none"> • Air induction system • Injector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in heated oxygen sensor (bank 1, 2 sensor 1) circuit • Heated oxygen sensor (bank 1, 2 sensor 1)
P0172 P0175	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on LEAN side. (2 trip detection logic)	<ul style="list-style-type: none"> • 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 (bank 1, 2 sensor 1) circuit • Heated oxygen sensor (bank 1, 2 sensor 1)

HINT:

- When the DTC P0171 or P0174 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172 or P0175 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 the DTC P0171 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 $\pm 38\%$, the system is functioning normally.
- The heated oxygen sensor (Bank 1, 2 Sensor 1) output voltage and the short–term fuel trim value can be read using the OBD II scan tool or TOYOTA hand–held tester.

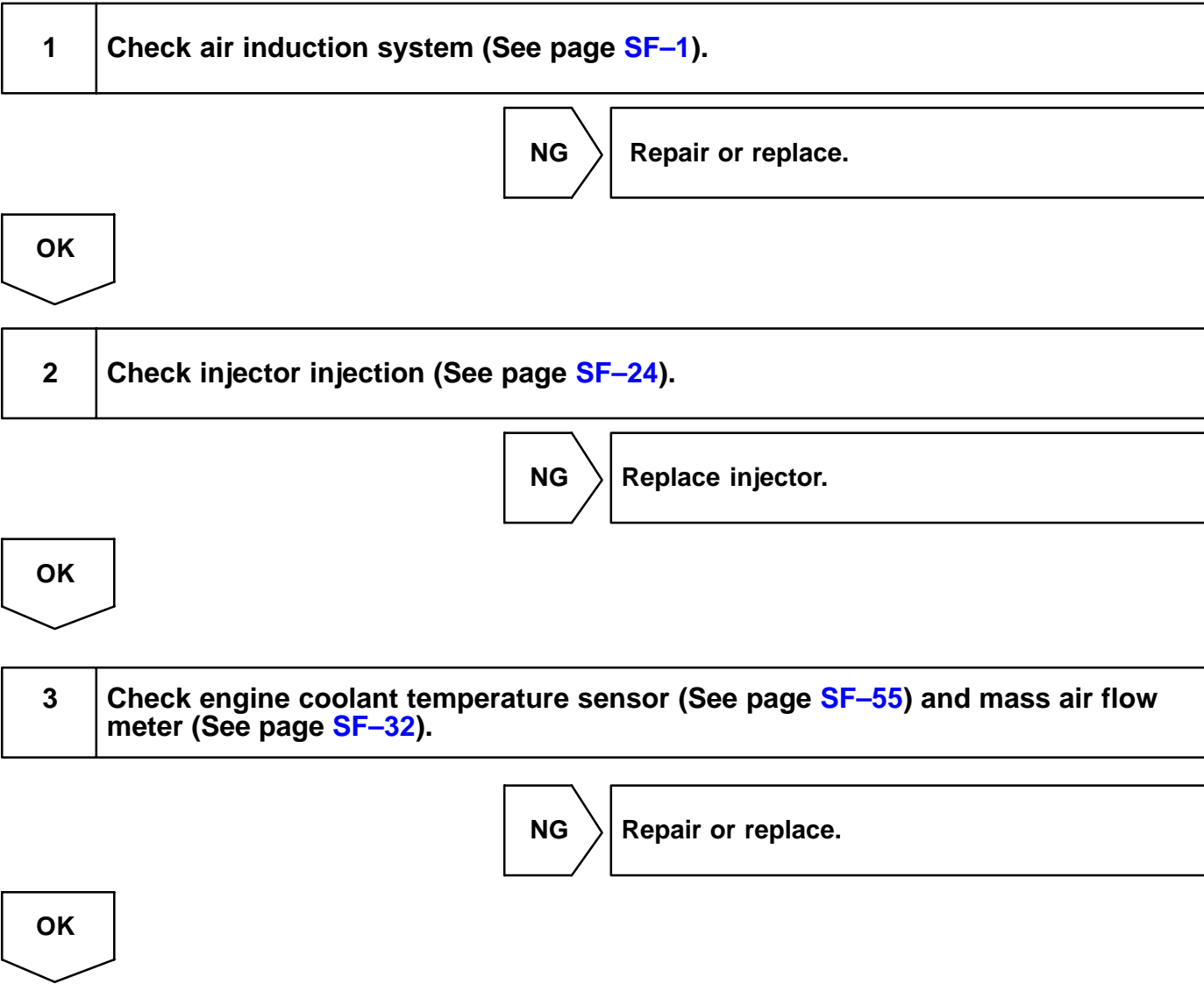
WIRING DIAGRAM

Refer to DTC P0125 on page [DI-42](#).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA 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 was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.



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

Repair or replace.

OK

5	Check fuel pressure (See page SF-7).
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NG

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

OK

6	Check gas leakage on exhaust system.
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NG

Repair or replace.

OK

7	Check output voltage of heated oxygen sensor (bank 1, 2 sensor 1) during idling.
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PREPARATION:

Keep the engine at 2,500 rpm for approx. 90 sec. to warm up the heated oxygen sensor.

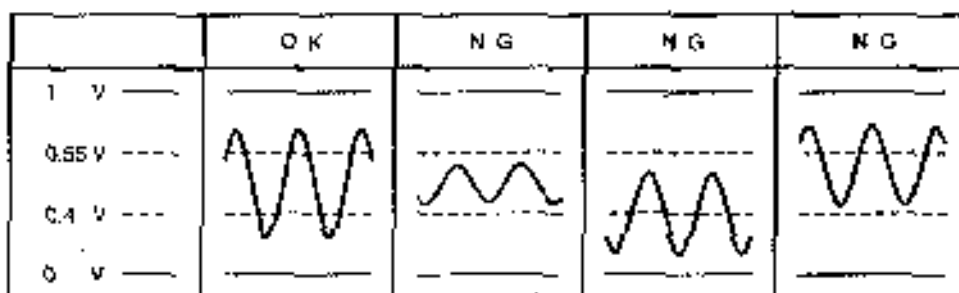
CHECK:

Use the OBD II scan tool or TOYOTA hand-held tester to read the output voltage of the heated oxygen sensor during idling.

OK:

Heated oxygen sensor output voltage:

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



OK**Perform confirmation driving pattern (See page [DI-47](#)).****NG****8****Check for open and short in harness and connector between ECM and heated oxygen sensor (bank 1, 2 sensor 1) (See page [IN-18](#)).****NG****Repair or replace harness or connector.****OK****Replace heated oxygen sensor.****9****Perform confirmation driving pattern (See page [DI-47](#)).****GO****10****Is there DTC P0171, P0172, P0174 or P0175 being output again?****YES****Check and replace ECM (See page [IN-28](#)).****NO****11****Did vehicle run out of fuel in past?****NO****Check for intermittent problems (See page [DI-3](#)).****YES**

DTC P0171, P0172, P0174 or P0175 is caused by shortage of fuel.