DI3P5–02

DTC	P0325/52	Knock Sensor 1 Circuit Malfunction

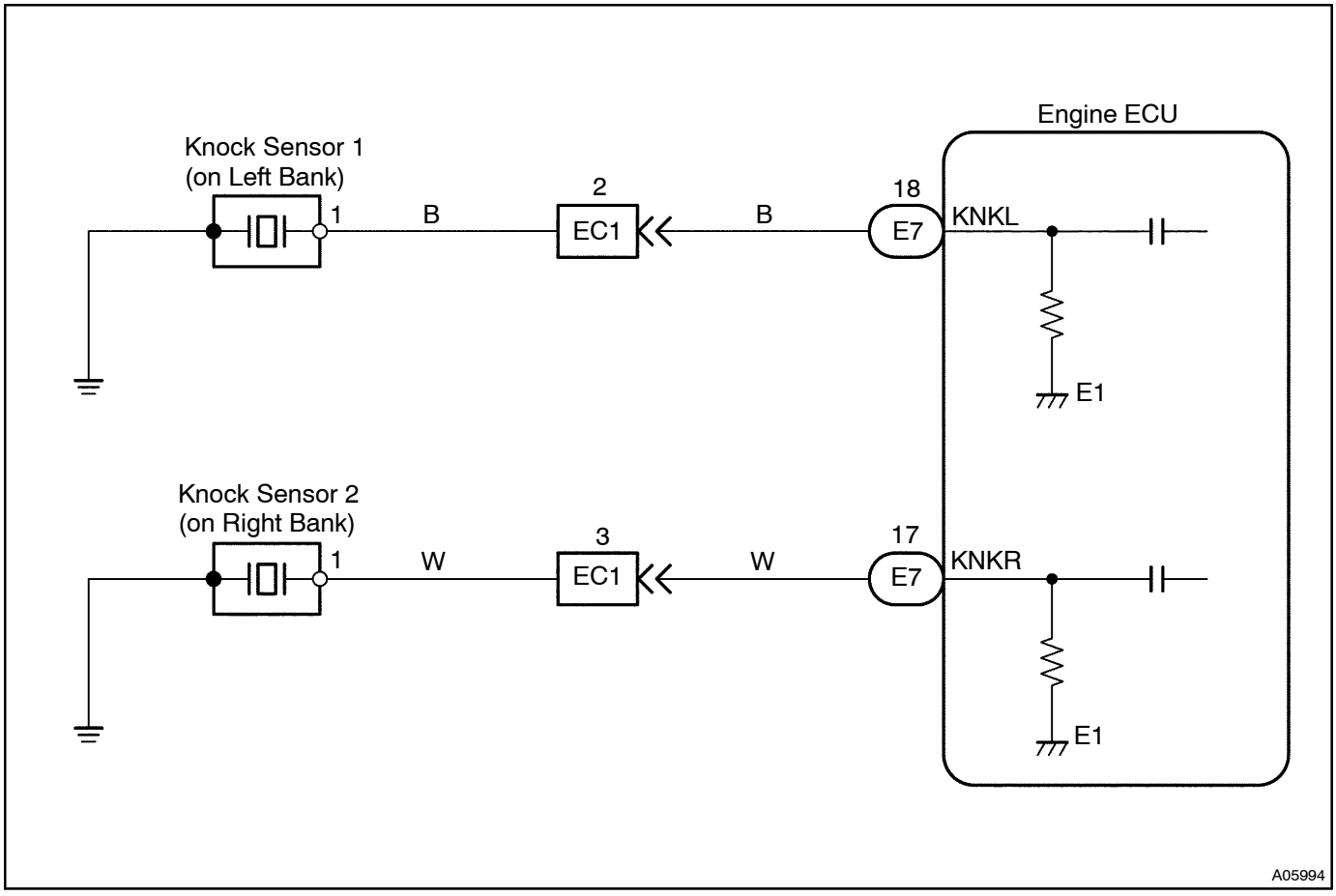
DTC	P0330/55	Knock Sensor 2 Circuit Malfunction

CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325/52	No knock sensor 1 signal to engine ECU with engine speed between 1,700 rpm and 5,400 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU
P0330/55	No knock sensor 2 signal to engine ECU with engine speed between 1,700 rpm and 5,400 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU

WIRING DIAGRAM



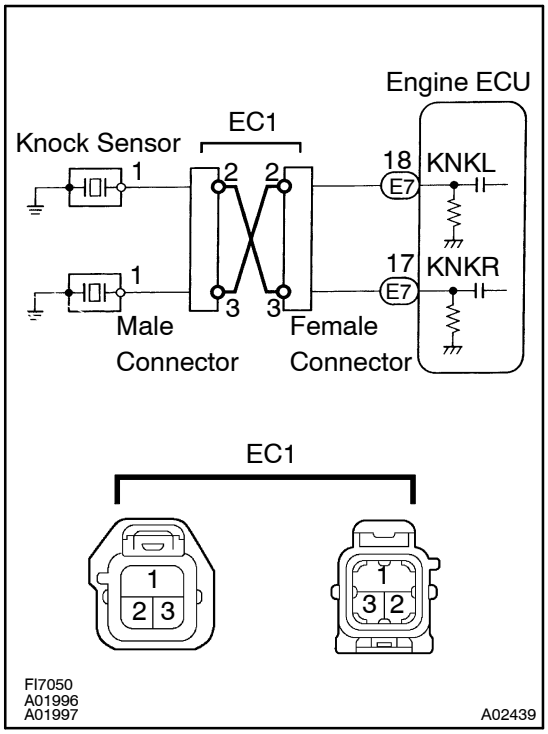
INSPECTION PROCEDURE

HINT:

- DTC P0325/52 is for the left bank knock sensor circuit.
- DTC P0330/55 is for the right bank knock sensor circuit.
- 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Connect hand–held tester and check knock sensor circuit.**



PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Disconnect the wire to wire connector EC1.
(c) Connect the terminals of the disconnected EC1 male connector and EC1 female as follows.

Male connector ↔ Female connector
Terminal 1 ↔ Terminal 2
Terminal 2 ↔ Terminal 1

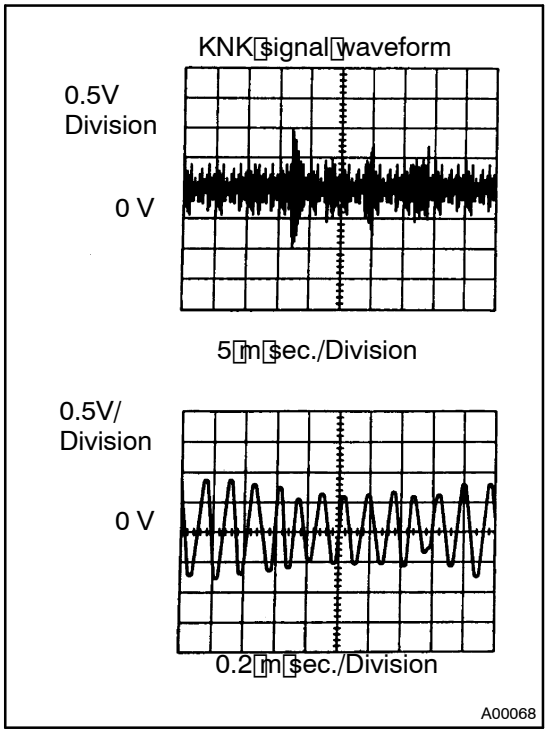
(d) Turn ignition switch ON and switch the hand–held tester main switch ON.
(e) After the engine is warmed up, perform quick racing to 4,000 rpm three times.

CHECK:

Check the DTC.

RESULT:

Type I	DTC same as when vehicle brought in. P0325/52 → P0325/52 or P0330/55 → P0330/55
Type II	DTC different to when vehicle brought in. P0325/52 → P0330/55 or P0330/55 → P0325/52



Reference: INSPECTION USING OSCILLOSCOPE

- With the engine racing (4,000 rpm), measure between terminal KNK1, KNK2 of the engine ECU connector and body ground.

HINT:
The correct waveforms are as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 0.13 m sec.
  (Normal mode vibration frequency of knock sensor: 8.1 kHz)

HINT:
If normal mode vibration frequency is not 8.1 kHz, the sensor is malfunctioning.

Type II	**Go to step 3.**

Type I

2	**Check for open and short in harness and connector between EC1 connector and engine ECU (See page IN–19).**

NG	**Repair or replace harness or connector.**

OK

Check and replace engine ECU (See page IN–19).

3	Check for open and short in harness and connector between EC1 connector and knock sensor (See page IN–19).

HINT:
- If DTC P0325/52 has changed to P0330/55, check the knock sensor circuit on the left bank side.
- If DTC P0330/55 has changed to P0325/52, check the knock sensor circuit on the right bank side.

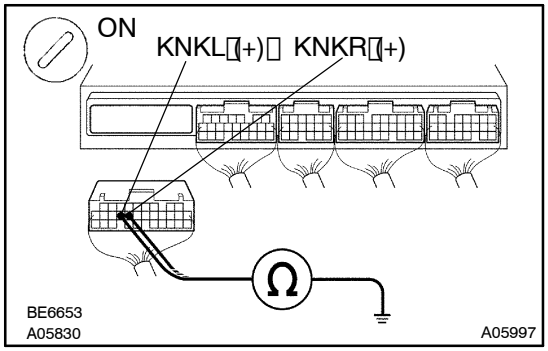
NG → Repair or replace harness or connector.

OK

Replace knock sensor.

When not using hand–held tester

1	Check continuity between terminal KNKR, KNKL of engine ECU connector and body ground.



PREPARATION:
(a) Remove the glove compartment door.
(b) Disconnect the E7 connector of engine ECU.

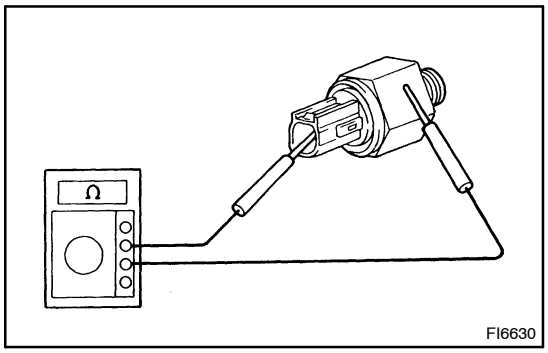
CHECK:
Measure resistance between terminal KNKR, KNKL of engine ECU connector and body ground.

OK:
Resistance: 1 MΩ or higher

OK → Go to step 3.

NG

2	Check knock sensor.



PREPARATION:
Disconnect knock sensor connector.
CHECK:
Measure resistance between the knock sensor terminal and body.
OK:
Resistance: 1 MΩ or higher

NG → **Replace knock sensor.**

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN-19).

NG → **Repair or replace harness or connector.**

OK

4	Does malfunction disappear when a good knock sensor is installed?

YES → **Replace knock sensor.**

NO

Check and replace engine ECU (See page IN-19).