DTC	P0325/52	KNOCK SENSOR1 CIRCUIT MALFANCTION (BANK1)

DTC	P0330/55	KNOCK SENSOR2 CIRCUIT MALFANCTION (BANK2)

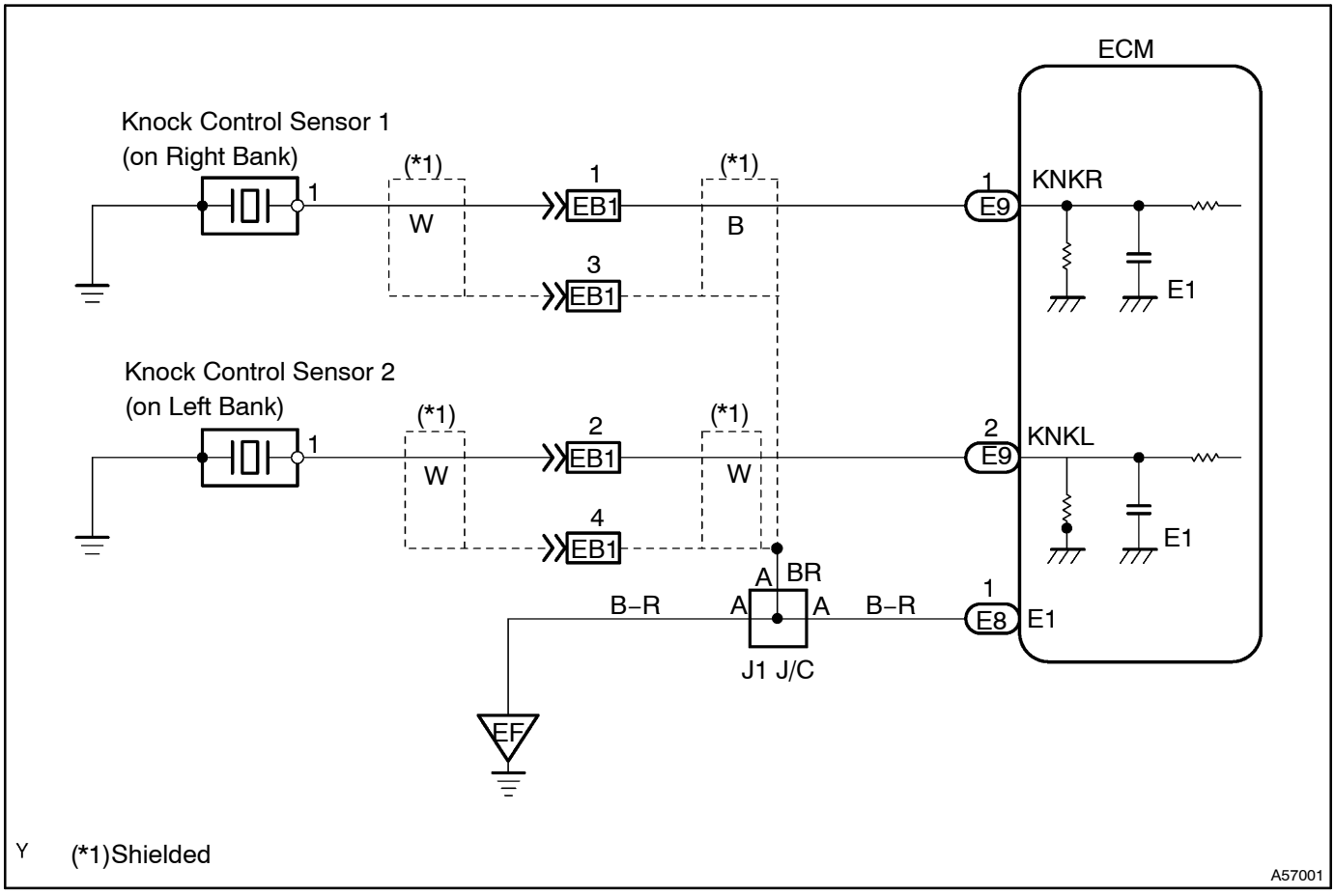
CIRCUIT DESCRIPTION

Each of knock sensor is fitted 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 ECM with engine speed between 2,000 rpm and 5,600 rpm	• Open or short in knock sensor 1 circuit • Knock control sensor 1 (looseness) • ECM
P0330/55	No knock sensor 1 signal to ECM with engine speed between 2,000 rpm and 5,600 rpm	• Open or short in knock sensor 2 circuit • Knock control sensor 2 (looseness) • ECM

If the ECM detects the above diagnosis conditions, it operates the fail–safe function in which the corrective retard angle value is set to the maximum value.

WIRING DIAGRAM



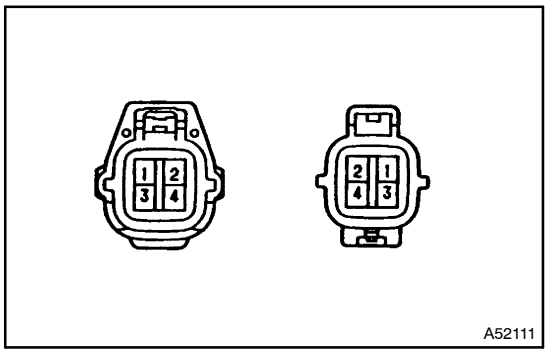
INSPECTION PROCEDURE

HINT:

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

when using Hand–held Tester:

1	CHECK KNOCK SENSOR CIRCUIT



(a) Disconnect the wire from wire connector .

(b) Connect the terminals of the disconnected EB1 male connector and EB1 female as follows.

Male connector ⇔ Female connector
Terminal 1 ⇔ Terminal 2
Terminal 2 ⇔ Terminal 1

(c) Turn the ignition switch ON and push the hand–held tester main switch ON.

(d) After the engine is warmed up, perform quick racing to 4,000 rpm 3 times.

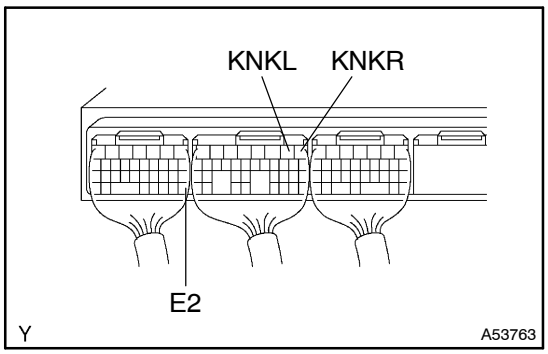
Result:

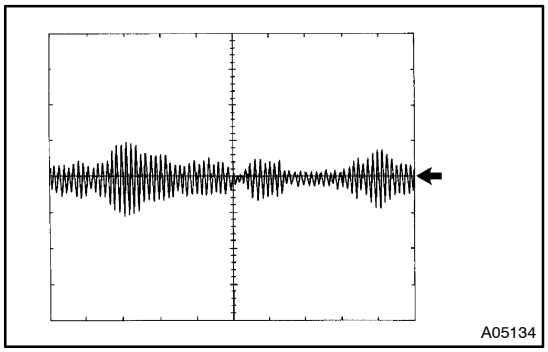
A	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
B	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325

(e) Check the output waveform.

HINT:

Item	Contents
Terminal	KNKL, KNKR ⇔ E2
Equipment Set	0.5V/DIV, 1ms/DIV
Condition	After warming up the engine, keep the engine speed 4,000 rpm.





B	Go to step 3

A

2	CHECK HARNESS AND CONNECTOR(EB1 CONNECTER – ECM)

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM

3	CHECK HARNESS AND CONNECTOR(EB1 CONNECTER – KNOCK SENSOR)

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

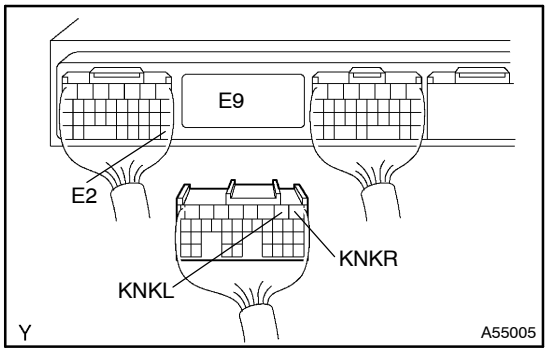
NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE KNOCK CONTROL SENSOR

When not using Hand–held Tester:

1	INSPECT ECM

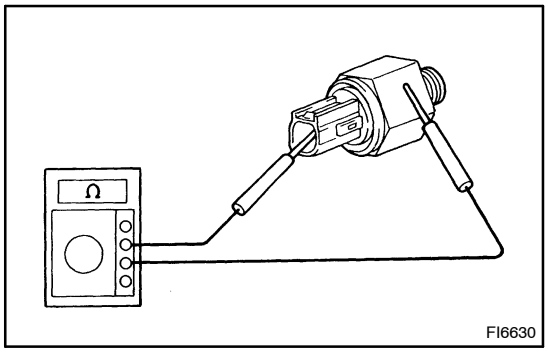


(a) Turn the ignition switch ON.
(b) Disconnect the ECM E9 connector.
(c) Measure resistance between terminal KNKR, KNKL and E2 of ECM connector.
Resistance: 1 MΩ or higher

OK → Go to step 3

NG

2	INSPECT KNOCK CONTROL SENSOR



(a) Disconnect knock sensor connector.
(b) Measure resistance between the knock sensor terminal and body.
Resistance: 1 MΩ or higher

NG → REPLACE KNOCK CONTROL SENSOR

OK

3	CHECK HARNESS AND CONNECTOR(ECM – KNOCK SENSOR)

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4	CONFIRM THE MALFUNCTION DISAPPEAR WHEN A GOOD KNOCK SENSOR IS INSTALLED

YES → REPLACE KNOCK CONTROL SENSOR

NO

CHECK AND REPLACE ECM