DTC	P0327/52	KNOCK SENSOR 1 CIRCUIT LOW INPUT (BANK 1 OR SINGLE SENSOR)

DTC	P0328/52	KNOCK SENSOR 1 CIRCUIT HIGH INPUT (BANK 1 OR SINGLE SENSOR)

CIRCUIT DESCRIPTION

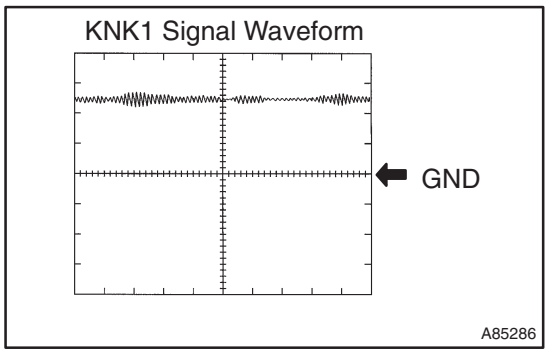
The flat type knock sensor (non–resonant type) has a structure that can detect vibration in a wider band of frequency, from approximately 6 to 15 kHz, and has the following features:

- The knock sensor is fitted on the cylinder block to detect engine knocking.
- The sensor contains a piezoelectric element which generates voltage when it becomes deformed. This occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, the ignition timing is retarded to suppress it.

DTC No.	DTC Detection Condition	Trouble Area
P0327/52	Output voltage of knock sensor is 0.5 V or less	• Short in knock sensor circuit • Knock sensor • ECM
P0328/52	Output voltage of knock sensor is 4.5 V or more	• Open in knock sensor circuit • Knock sensor • ECM

HINT:

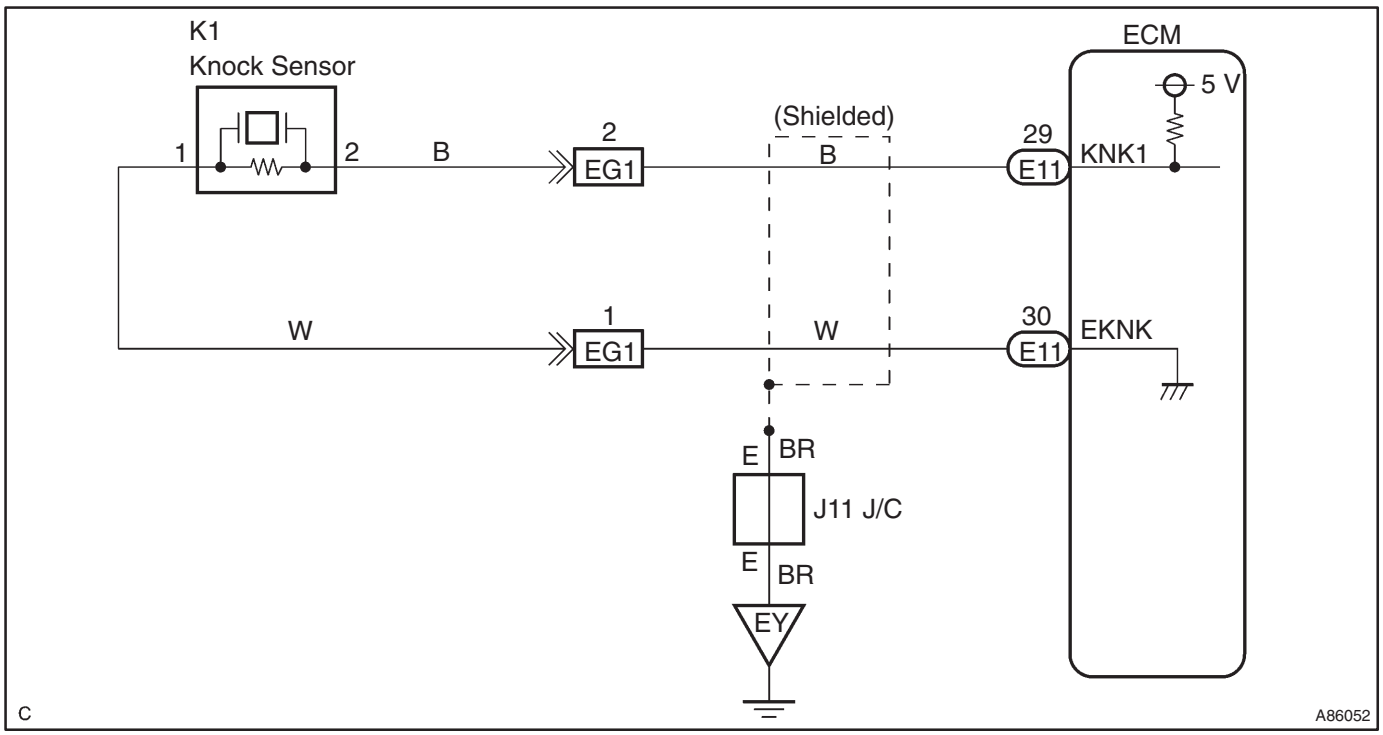
If the ECM detects DTC P0325, P0327 and/or P0328, it enters fail–safe mode in which the corrective retarded angle value is set to the maximum value.



Reference: Inspection using the oscilloscope.
The correct waveform is as shown on the left.

Item	Contents
Terminal	KNK1 – EKNK
EquipmentSetting	0.01 to 10 V/Division, 0.01 to 10 msec./Division
Condition	After warming up engine, keep engine speed at 4,000 rpm

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ OUTPUT DTC

(a) Clear DTCs (see page 05–18).
(b) Warm up the engine.
(c) Run the engine at 3,000 rpm for 10 seconds or more.
(d) Connect the intelligent tester II to the DLC3.
(e) Turn the ignition switch to ON and turn the intelligent tester II ON.
(f) Select the following menu items: Powertrain / Engine and ECT / DTC.
(g) Read DTCs.

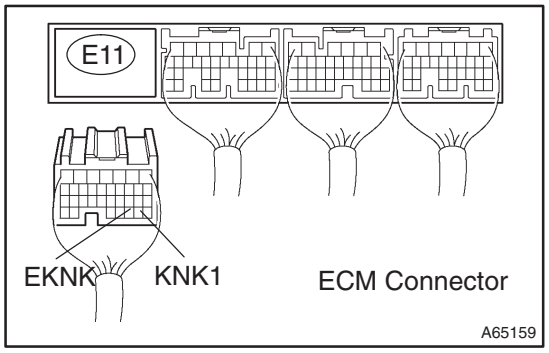
Result :

Display (DTC Output)	Proceed To
P0327 or P0328	A
No output	B

B → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–8)**

A

2 CHECK HARNESS AND CONNECTOR(ECM – KNOCK SENSOR)



(a) Disconnect the E11 ECM connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

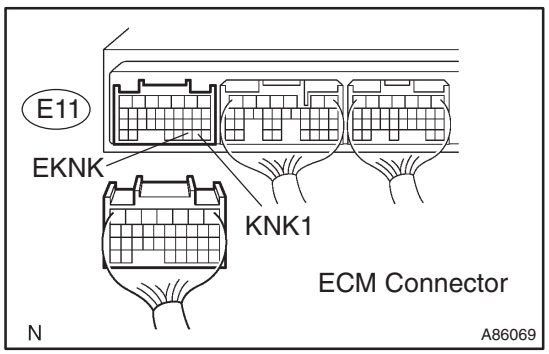
Tester Connection	Specified Condition
KNK1 (E11–29) – EKNK (E11–30)	120 to 280 kΩ at 20°C (68°F)

(c) Reconnect the ECM connector.

NG → **Go to step 4**

OK

3 INSPECT ECM(KNK1 VOLTAGE)



(a) Disconnect the E11 ECM connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
KNK1 (E11–29) – EKNK (E11–30)	4.5 to 5.5 V

(d) Reconnect the ECM connector.

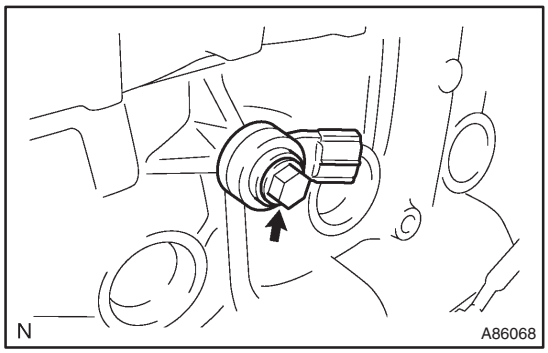
NG → **REPLACE ECM (See page 10–12)**

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05–8)

NOTICE:
The fault may be intermittent. Check the wire harness and connectors carefully.

4 INSPECT KNOCK SENSOR

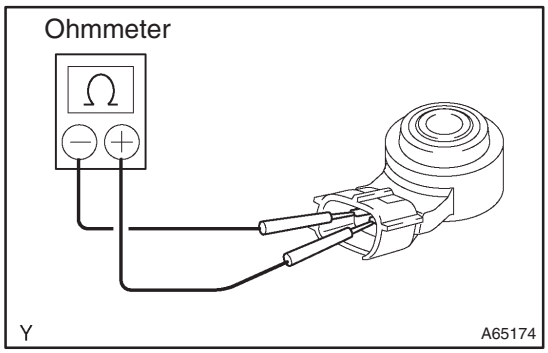


(a) Check the knock sensor installation.
Standard:
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

NG → **SECURELY REINSTALL SENSOR**

OK

5 INSPECT KNOCK SENSOR



(a) Remove the knock sensor.
(b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester Connection	Specified Condition
KNK1 (K1–2) – EKNK (K1–1)	120 to 280 kΩ at 20°C (68°F)

(c) Reinstall the knock sensor.

NG → **REPLACE KNOCK SENSOR (See page 10–10)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR