

DTC	P0325/52	KNOCK SENSOR 1 CIRCUIT (BANK 1 OR SINGLE SENSOR)
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

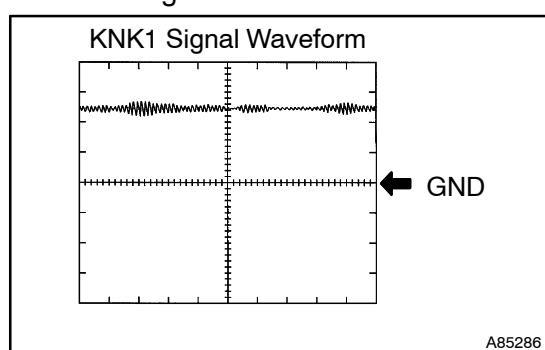
The flat type knock sensor (non-resonant type) has a structure that can detect vibration in a wider band of frequency from about 6 to 15 kHz and has the following features:

- 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
P0325/52	Knock sensor signal level remains at low for more than 10 seconds	<ul style="list-style-type: none"> • Open or short in knock sensor circuit • Knock sensor (under-torqued or looseness) • ECM
P0327/52	Output voltage of the knock sensor is 0.5 V or less	<ul style="list-style-type: none"> • Short in knock sensor circuit • Knock sensor • ECM
P0328/52	Output voltage of the knock sensor is 4.5 V or more	<ul style="list-style-type: none"> • Open in knock sensor circuit • Knock sensor • ECM

HINT:

If the ECM detects DTC P0325/52, P0327/52 and P0328/52, it enters fail-safe mode in which the corrective retarded angle value is set to the maximum value.



Reference: Inspection by using the oscilloscope.

The correct waveform is as shown.

Item	Contents
Terminal	KNK1 - EKNK or KNK2 - EKN2
Equipment Setting	0.01 to 10 V/Division, 0.01 to 10 msec./Division
Condition	After warming up the engine, keep the engine speed at 4,000 rpm

The diagram illustrates the electrical connections for the ECM. A Knock Sensor (K1) is connected to terminal E10 (pin 1) of the ECM. A shielded cable (B) connects the sensor to the ECM. A J19 J/C connector is connected to terminal E9 (pin 1) of the ECM. The ECM also has a 5V supply and a ground connection. The diagram includes terminals E10, E9, and E1 on the ECM, a 5V supply, and a ground connection.

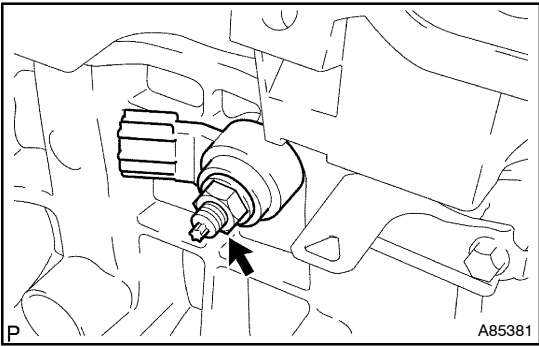
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean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

- (a) Clear the DTC(s) (see page 05-268).
- (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.

Display (DTC Output)	Proceed To
P0325/52	A
P0325/52, and P0327/52 and/or P0328/52	B
No output	C

A

2 INSPECT KNOCK SENSOR



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

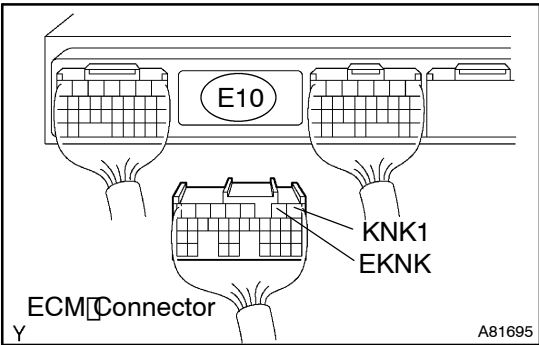
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SECURELY REINSTALL SENSOR

OK

REPLACE KNOCK SENSOR

3 CHECK HARNESS AND CONNECTOR (ECM - KNOCK SENSOR)



- (a) Disconnect the E10 ECM connector.
(b) Measure the resistance between the terminals of the E10 ECM connector.
Standard:

Tester Connection	Specified Condition
KNK1 (E10-1) - EKNK (E10-2)	120 to 280 Ω at 20°C (68°F)

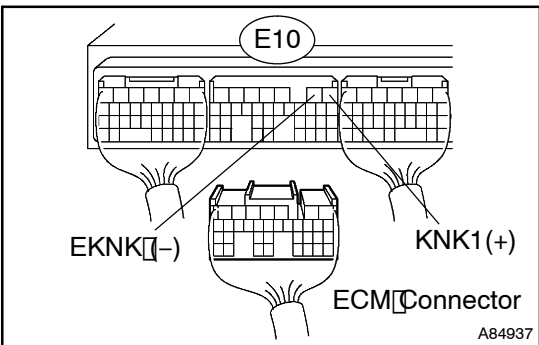
- (c) Reconnect the ECM connector.

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Go to step 5

OK

4 INSPECT ECM (KNK1 VOLTAGE)



- (a) Disconnect the E10 ECM connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminals of the E10 ECM terminal.

Standard:

Tester Connection	Specified Condition
KNK1 (E10-1) - EKNK (E10-2)	4.5 to 5.5 V

- (d) Reconnect the ECM connector.

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REPLACE ECM (See page 10-30)

OK

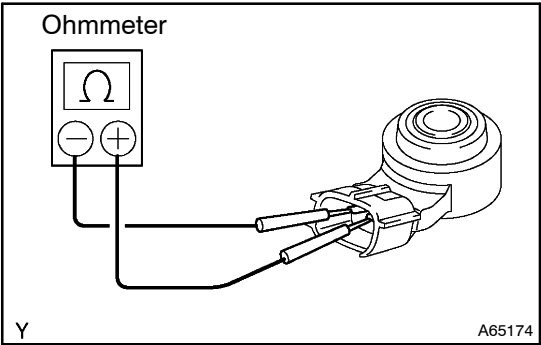
CHECK FOR INTERMITTENT PROBLEMS (See page 05-259)

NOTICE:

Fault may be intermittent. Check the wire harness and connectors carefully.

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INSPECT KNOCK SENSOR



- (a) Remove the knock sensor.
- (b) Measure the resistance between the terminals.

Standard:

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

- (c) Reinstall the knock sensor.

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REPLACE KNOCK SENSOR

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR