

DTC	P0325	Knock Sensor 1 Circuit
DTC	P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)
DTC	P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)

DESCRIPTION

A flat type knock sensor (non-resonant type) has a structure that can detect vibrations over a wide band of frequencies: between approximately 6 kHz and 15 kHz.

Knock sensors are fitted onto the engine block to detect engine knocking.

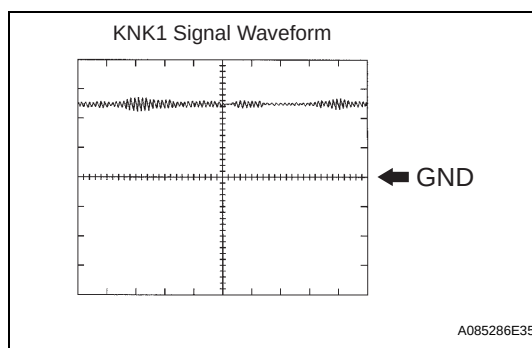
The knock sensor contains a piezoelectric element which generates a voltage when it becomes deformed. The voltage is generated when the engine block vibrates due to knocking. Any occurrence of engine knocking can be suppressed by delaying the ignition timing.

DTC No.	DTC Detection Conditions	Trouble Areas
P0325	Open or short in knock sensor circuit (1 trip detection logic)	- Open or short in knock sensor circuit - Knock sensor - ECM
P0327	Output voltage of knock sensor is 0.5 V or less (1 trip detection logic)	- Short in knock sensor circuit - Knock sensor - ECM
P0328	Output voltage of knock sensor is 4.5 V or more (1 trip detection logic)	- Open in knock sensor circuit - Knock sensor - ECM

HINT:

When any of DTCs P0325, P0327 and P0328 are set, the ECM enters fail-safe mode. During fail-safe mode, the ignition timing is delayed to its maximum retardation. Fail-safe mode continues until the ignition switch is turned OFF.

Reference: Inspection using an oscilloscope.



The correct waveform is as shown.

Items	Contents
Terminals	KNK1 - EKNK
Equipment Settings	0.01 to 10 V/Division, 0.01 to 10 msec./Division
Conditions	keep engine speed at 4,000 rpm with warm engine

MONITOR DESCRIPTION

If the output voltage transmitted by the knock sensor remains low or high for more than 1 second, the ECM interprets this as a malfunction in the sensor circuit, and sets a DTC.

The monitor for DTCs P0325, P0327 and P0328 begins to run when 5 seconds have elapsed since the engine was started.

If the malfunction is not repaired successfully, either DTC P0325, P0327 or P0328 is set 5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0325: Knock sensor range check (Fluctuating) P0327: Knock sensor range check (Low voltage) P0328: Knock sensor range check (High voltage)
Required Sensors/Components (Main)	Knock sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	None
Battery voltage	10.5 V or more
Time after engine start	5 seconds or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Knock Sensor Range Check (Chattering) P0325:

Knock sensor voltage	Less than 0.5 V, or more than 4.5 V
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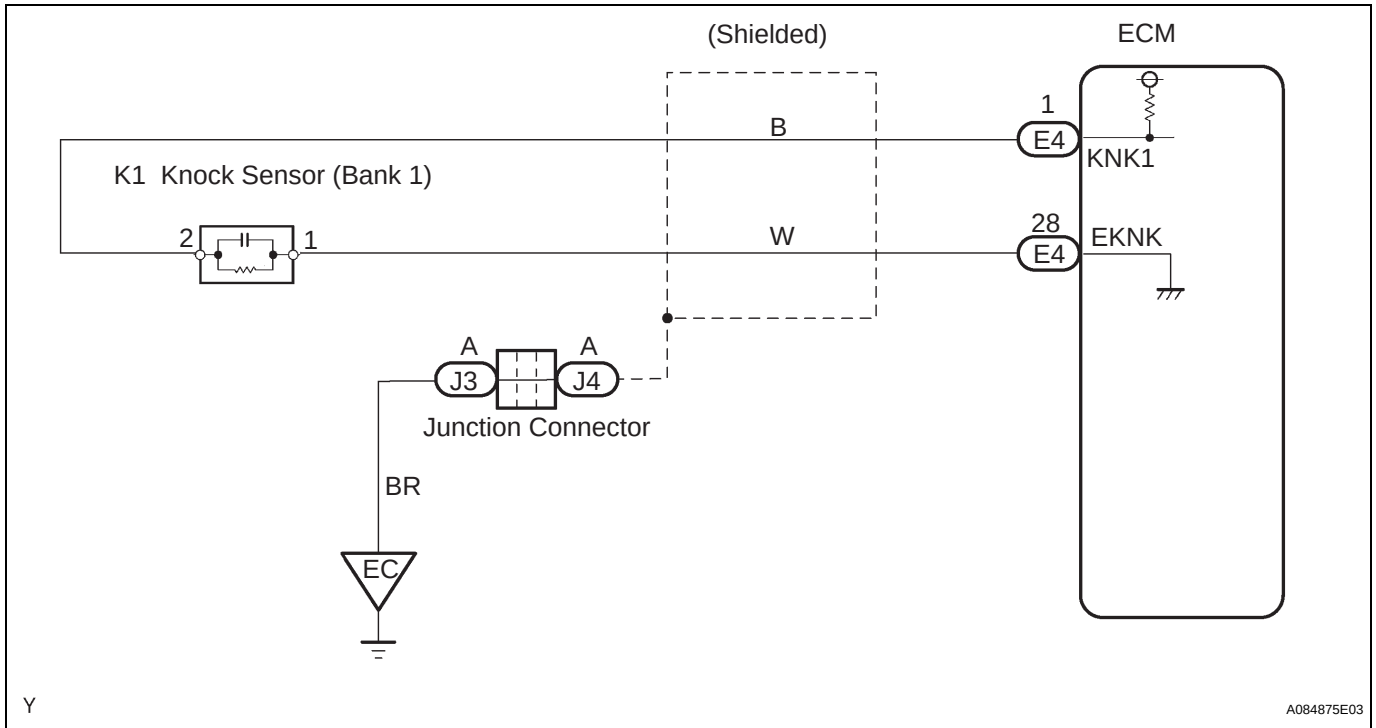
Knock Sensor Range Check (Low voltage) P0327:

Knock sensor voltage	Less than 0.5 V
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Knock Sensor Range Check (High voltage) P0328:

Knock sensor voltage	More than 4.5 V
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WIRING DIAGRAM



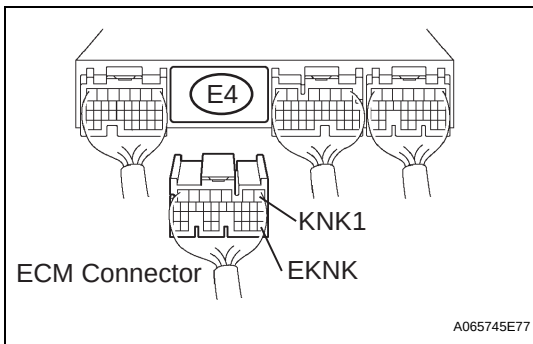
INSPECTION PROCEDURE

HINT:

Read freeze frame data using an intelligent tester or OBD II scan tool. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air/fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

1

CHECK HARNESS AND CONNECTOR (ECM - KNOCK SENSOR)



- Disconnect the E4 ECM connector.
- Measure the resistance between the terminals of the E4 ECM connector.

Standard resistance

Tester Connections	Specified Conditions
KNK1 (E4-1) - EKNK (E4-28)	Between 120 k Ω and 280 k Ω at 20°C (68°F)

- Reconnect the ECM connector.

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Go to step 3

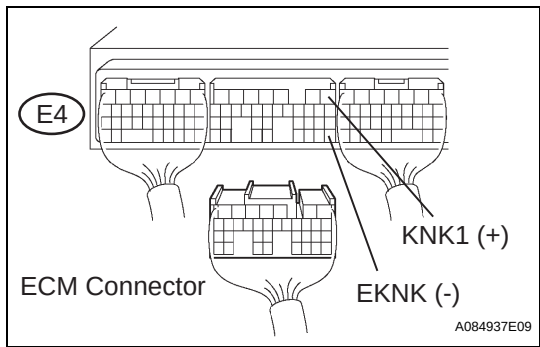
OK

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2

INSPECT ECM (KNK1 VOLTAGE)



- (a) Disconnect the E4 ECM connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminals of the E4 ECM terminals.

Standard voltage

Tester Connections	Specified Conditions
KNK1 (E4-1) - EKNK (E4-28)	Between 4.5 V and 5.5 V

- (d) Reconnect the ECM connector.

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

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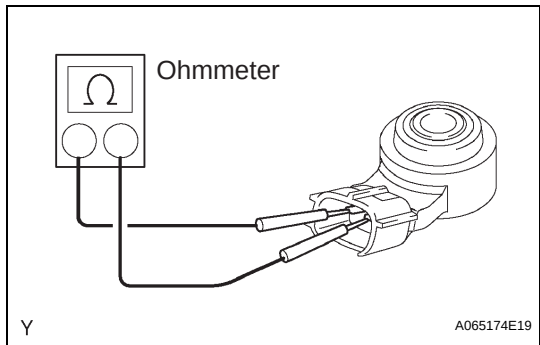
REPLACE ECM

OK

CHECK FOR INTERMITTENT PROBLEMS

3

INSPECT KNOCK SENSOR



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

Standard resistance

Tester Connections	Specified Conditions
KNK1 (K1-2) - EKNK (K1-1)	Between 120 kΩ and 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