

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 between approximately 6 kHz and 15 kHz.

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

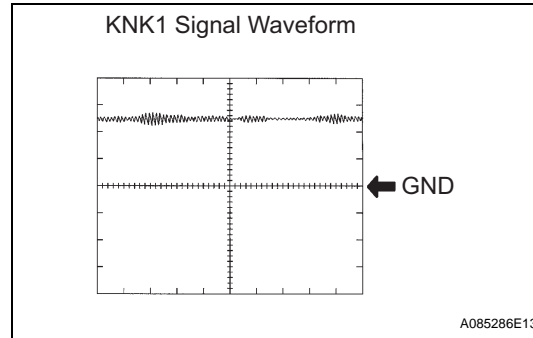
The knock sensor contains a piezoelectric element which generates a voltage when it becomes deformed.

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 Condition	Trouble Area
P0327	Output voltage of knock sensor 0.5 V or less (1 trip detection logic)	<ul style="list-style-type: none"> • Short in knock sensor circuit • Knock sensor • ECM
P0328	Output voltage of knock sensor 4.5 V or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open in knock sensor circuit • Knock sensor • ECM

HINT:

When any of DTCs 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/DIV., 0.01 to 10 msec./DIV.
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 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 P0327 or P0328 is set 5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	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

Monitor runs whenever following DTCs not present	None
Battery voltage	10.5 V or more
Starter	OFF
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

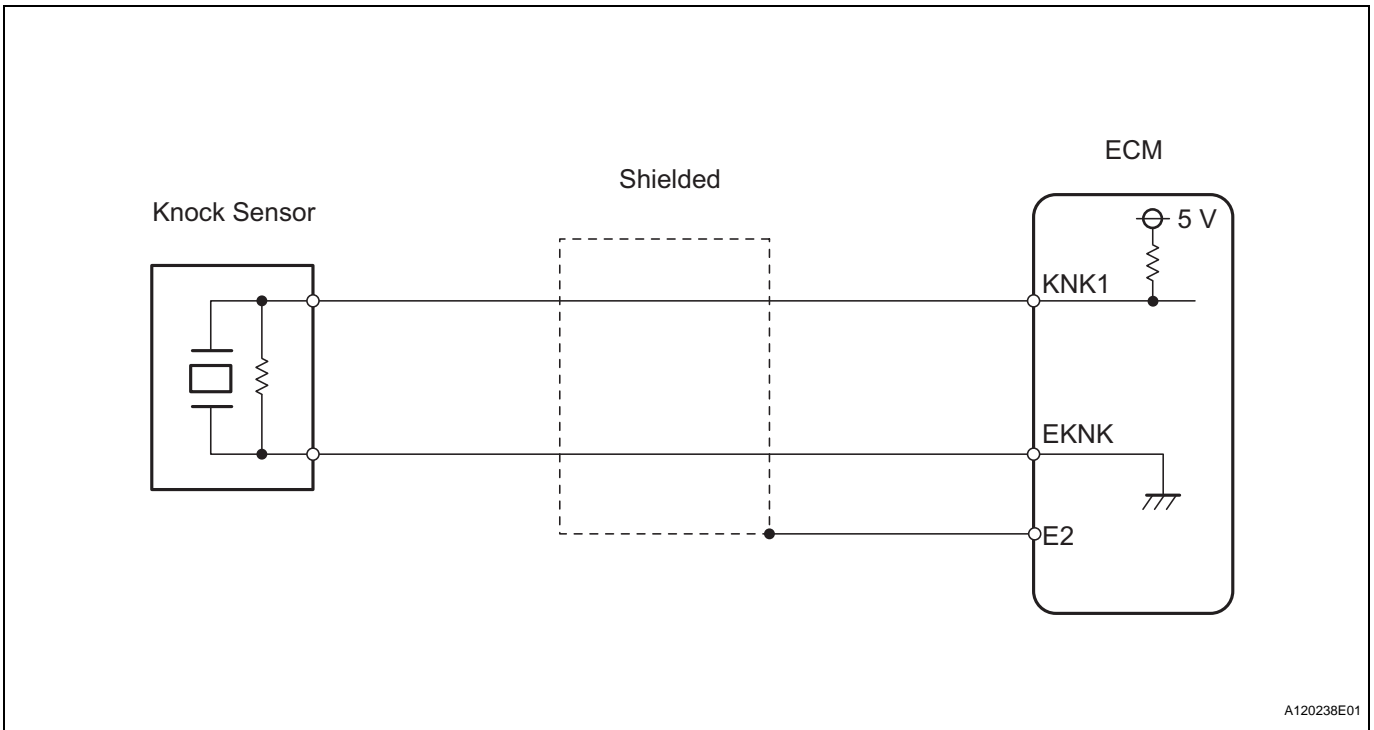
Knock Sensor Range Check (Low voltage) P0327:

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

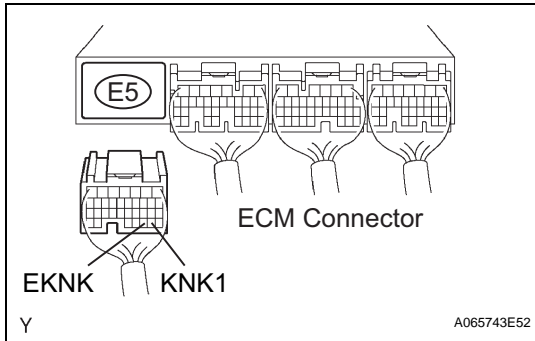


HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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.

ES

1 CHECK WIRE HARNESS (ECM - KNOCK SENSOR)



- (a) Disconnect the E5 ECM connector.
- (b) Measure the resistance of the ECM connector.

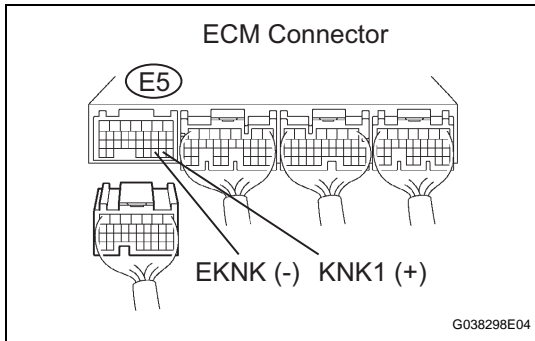
Standard resistance

Tester Connection	Specified Condition
KNK1 (E5-29) - EKNK (E5-30)	120 to 280 kΩat 20°C (68°F)

NG → **Go to step 3**

OK

2 INSPECT ECM (KNK1 VOLTAGE)



- (a) Disconnect the E5 ECM connector.
- (b) Turn the ignition switch ON.
- (c) Measure the voltage of the ECM connector.

Standard voltage

Tester Connection	Specified Condition
KNK1 (E5-29) - EKNK (E5-30)	4.5 to 5.5 V

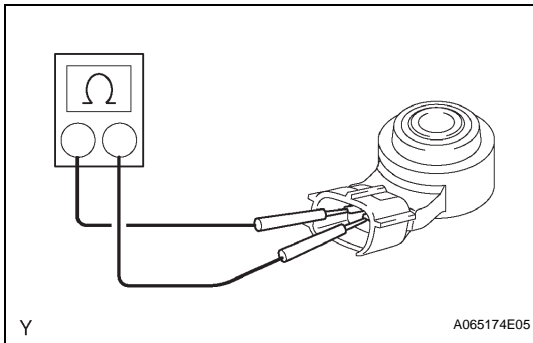
NOTICE:

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

NG → **REPLACE ECM**

OK

CHECK FOR INTERMITTENT PROBLEMS

3 INSPECT KNOCK SENSOR

- (a) Remove the knock sensor (see page [ES-357](#)).
 (b) Measure the resistance of the sensor.

Standard resistance

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

NG**REPLACE KNOCK SENSOR****OK****REPAIR OR REPLACE HARNESS OR CONNECTOR****ES**