

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)
DTC	P0332	Knock Sensor 2 Circuit Low Input (Bank 2)
DTC	P0333	Knock Sensor 2 Circuit High Input (Bank 2)

ES 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.

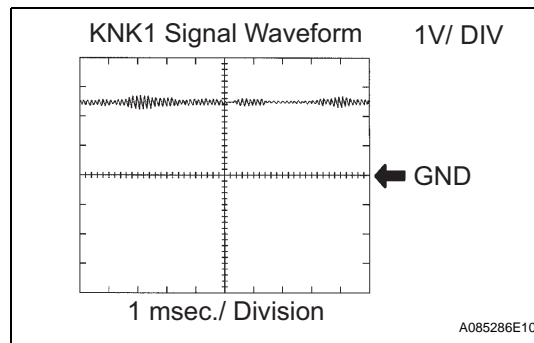
The knock sensor contains a piezoelectric element which generates a voltage when it becomes deformed.

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
P0327 P0332	Output voltage of knock sensor 1 or 2 is 0.5 V or less (1 trip detection logic)	<ul style="list-style-type: none"> • Short in knock sensor 1 or 2 circuit • Knock sensor 1 or 2 • ECM
P0328 P0333	Output voltage of knock sensor 1 or 2 is 4.5 V or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open in knock sensor 1 or 2 circuit • Knock sensor 1 or 2 • ECM

HINT:

When any of DTCs P0327, P0328, P0332 and P0333 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 or KNK2 - EKN2
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 P0327 and P0328 begins to run when 5 seconds have elapsed since the engine was started.

If the malfunction is not repaired successfully, any of DTC P0327, P0328, P0332 or P0333 is set 5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0327: Knock sensor (Bank 1) open/short (Low voltage) P0328: Knock sensor (Bank 1) open/short (High voltage) P0332: Knock sensor (Bank 2) open/short (Low voltage) P0333: Knock sensor (Bank 2) open/short (High voltage)
Required Sensors/Components (Main)	Knock sensor (Bank 1 and 2)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

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TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
Battery voltage	10.5 V or more
Time after engine start	5 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

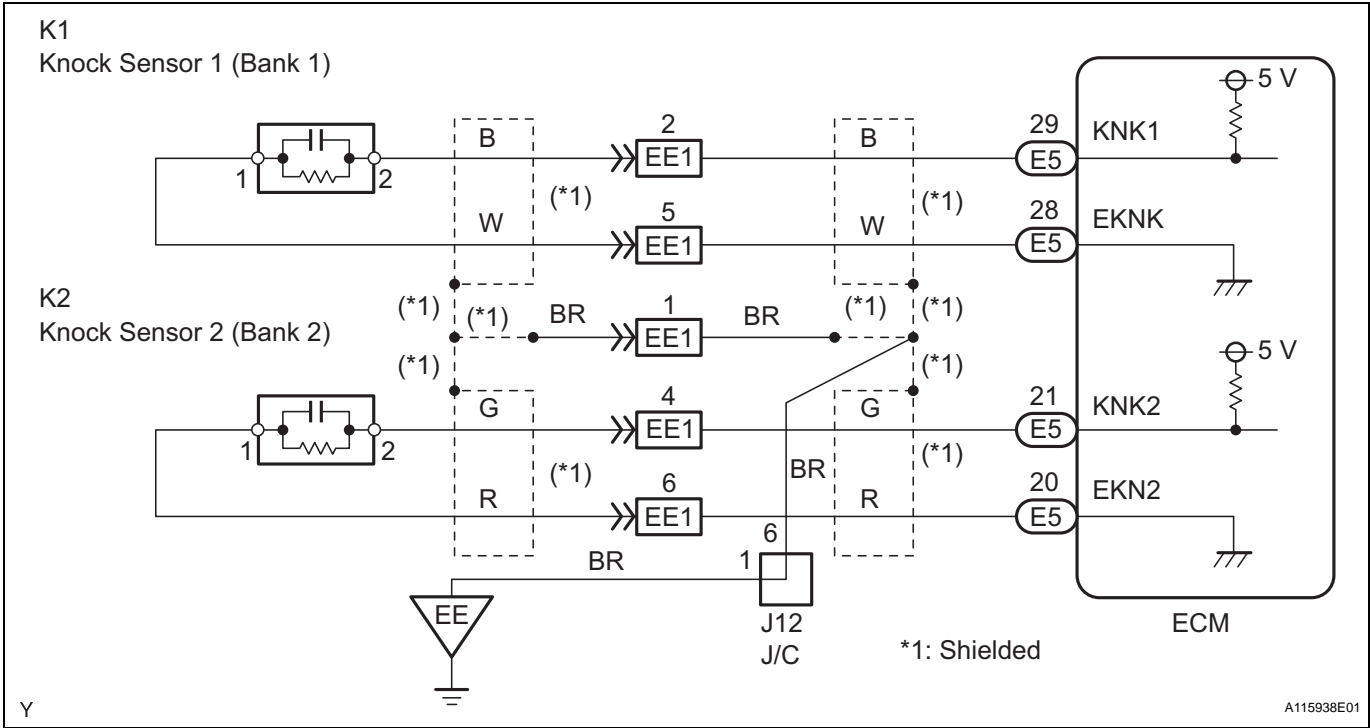
Knock Sensor Range Check (Low voltage) P0327 and P0332:

Knock sensor voltage	Less than 0.5 V
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Knock Sensor Range Check (High voltage) P0328 and P0333:

Knock sensor voltage	More than 4.5 V
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WIRING DIAGRAM

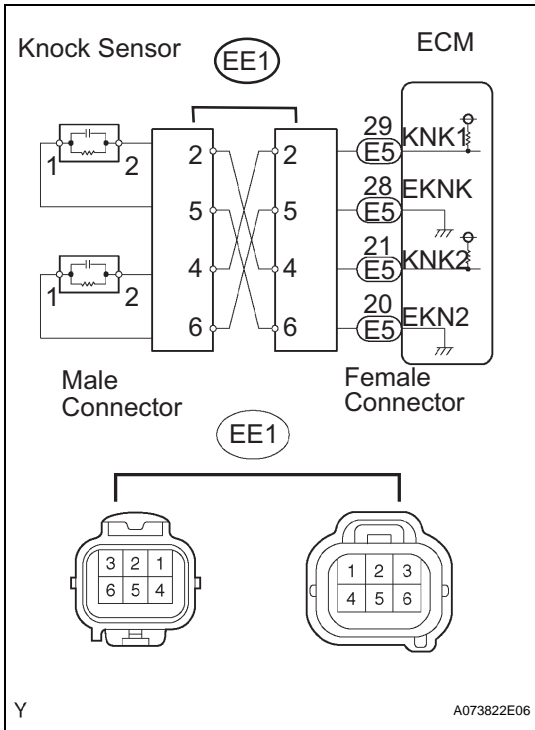


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HINT:

- DTCs P0327 and P0328 are for the bank 1 knock sensor circuit.
- DTCs P0332 and P0333 are for the bank 2 knock sensor circuit.
- Read freeze frame data using an intelligent tester. 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 (CHECK KNOCK SENSOR CIRCUIT)



- (a) Disconnect the EE1 connector.
- (b) Using lead wires, connect the connectors as follows.

Male Connector - Female Connector
Terminal 2 - Terminal 4
Terminal 5 - Terminal 6
Terminal 4 - Terminal 2
Terminal 6 - Terminal 5

- (c) Warm up the engine.
- (d) Run the engine at 3,000 rpm for 10 seconds or more.
- (e) Connect an intelligent tester to the DLC3.
- (f) Turn the ignition switch ON and turn the tester ON.
- (g) Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (h) Read DTCs.

Result

Display	Proceed to
DTCs same as when vehicle brought in P0327, P0328 → P0327, P0328 or P0332, P0333 → P0332, P0333	A
DTCs different from when vehicle brought in P0327, P0328 → P0332, P0333 or P0332, P0333 → P0327, P0328	B

- (i) Reconnect the EE1 connector.

B Go to step 4

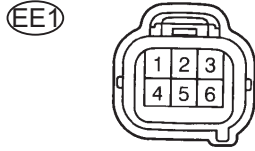
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2 CHECK HARNESS AND CONNECTOR (CONNECTOR - ECM)

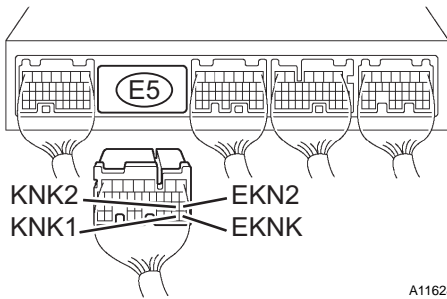
Wire Harness Side:

Female Connector



Front View

ECM Connector



Y

A116288E02

- (a) Disconnect the EE1 connector.
- (b) Disconnect the E5 ECM connector.
- (c) Check the resistance.

Standard Resistance (Check for open)

Tester Connections	Specified Conditions
EE1 female connector 2 - KNK1 (E5-29)	Below 1 Ω
EE1 female connector 5 - EKNK (E5-28)	
EE1 female connector 4 - KNK2 (E5-21)	
EE1 female connector 6 - EKN2 (E5-20)	

Standard Resistance (Check for short)

Tester Connections	Specified Conditions
EE1 female connector 2 or KNK1 (E5-29) - Body ground	10 kΩ or higher
EE1 female connector 5 or EKNK (E5-28) - Body ground	
EE1 female connector 4 or KNK2 (E5-21) - Body ground	
EE1 female connector 6 or EKN2 (E5-20) - Body ground	

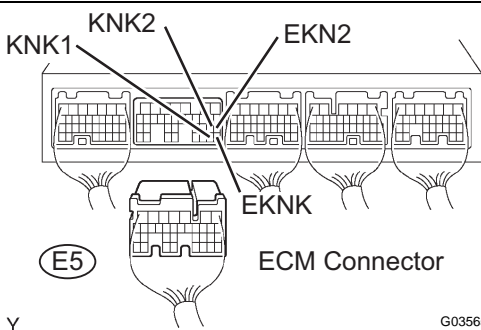
- (d) Reconnect the EE1 connector.
- (e) Reconnect the ECM connector.

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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT ECM



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G035655E02

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

Standard Voltage

Tester Connections	Specified Conditions
KNK1 (E5-29) - EKNK (E5-28)	4.5 to 5.5 V
KNK2 (E5-21) - EKN2 (E5-20)	

- (d) Reconnect the ECM connector.

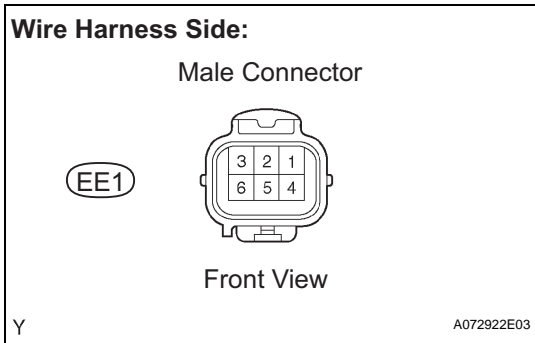
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REPLACE ECM

OK

CHECK FOR INTERMITTENT PROBLEMS

4 INSPECT KNOCK SENSOR



- (a) Disconnect the EE1 connector.
- (b) Check the resistance between the terminals of the EE1 male connector.

Standard Resistance

Tester Connections	Specified Conditions
EE1 male connector 2 - 5	120 to 280 kΩ
EE1 male connector 4 - 6	

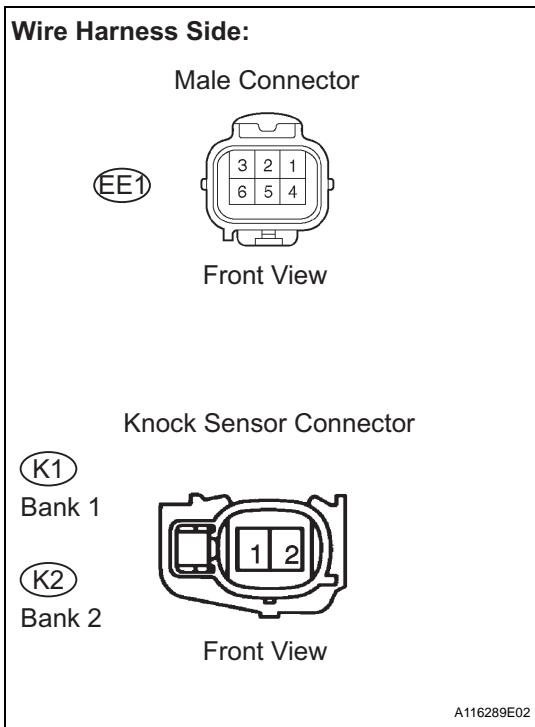
- (c) Reconnect the EE1 connector.

OK → **CHECK FOR INTERMITTENT PROBLEMS**

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5 CHECK HARNESS AND CONNECTOR (CONNECTOR - KNOCK SENSOR)



HINT:

- If DTC P0327 or P0328 has changed to P0332 or P0333, check the knock sensor circuit on the right bank side.
- If DTC P0332 or P0333 has changed to P0327 or P0328, check the knock sensor circuit on the left bank side.

- (a) Disconnect the EE1 connector.
- (b) Disconnect the K1 and K2 knock sensor connectors.
- (c) Check the resistance.

Standard Resistance (Check for open)

Tester Connections	Specified Conditions
EE1 male connector 2 - K1-2	Below 1 Ω
EE1 male connector 5 - K1-1	
EE1 male connector 4 - K2-2	
EE1 male connector 6 - K2-1	

Standard Resistance (Check for short)

Tester Connections	Specified Conditions
EE1 male connector 2 or K1-2 - Body ground	10 kΩ or higher
EE1 male connector 5 or K1-1 - Body ground	
EE1 male connector 4 or K2-2 - Body ground	
EE1 male connector 6 or K2-1 - Body ground	

- (d) Reconnect the EE1 connector.
- (e) Reconnect the knock sensor connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE KNOCK SENSOR