

DTC	P0325	KNOCK SENSOR 1 CIRCUIT (BANK 1 OR SINGLE SENSOR)
------------	--------------	---

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)
------------	--------------	--

CIRCUIT DESCRIPTION

A flat type knock sensor (non-resonant type) can detect vibrations in a wide band of frequency (about 6 kHz to 15 kHz) and has the following features:

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

DTC No.	DTC Detection Condition	Trouble Area
P0325	Open or short in knock sensor circuit (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in knock sensor circuit • Knock sensor • ECM
P0327	Output voltage of the knock sensor is 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 the knock sensor is 4.5 V or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open in knock sensor circuit • Knock sensor • ECM

HINT:

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

MONITOR DESCRIPTION

The knock sensor, located on the cylinder block, detects spark knock. When a spark knock occurs, the sensor vibrates in a specific frequency range. When the ECM detects the voltage in this frequency range, it retards the ignition timing to suppress the spark knock.

The ECM also senses background engine noise with the knock sensor and uses this noise to check for faults in the sensor. If the knock sensor signal level is too low for more than 10 seconds, and if the knock sensor output voltage is out of normal range, the ECM interprets this as a fault in the knock sensor and sets a DTC.

Related DTCs	P0325: Knock sensor range check (chattering) P0327: Knock sensor range check (low voltage) P0328: Knock sensor range check (high voltage)
Required sensors / components (Main)	Knock sensor
Required sensors / components (Related)	MAF meter, CKP sensor, ECT sensor
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

The monitor will run whenever these DTCs are not present	See page 05-16
Battery voltage	10.5 V or more
Time after engine start	5 sec. or more

Knock Sensor Range Check (Chattering) P0325:

Knock sensor voltage	Less than 0.5 V, or more than 4.5 V
----------------------	-------------------------------------

Knock sensor voltage	Less than 0.5 V
----------------------	-----------------

Knock sensor voltage	More than 4.5 V
----------------------	-----------------

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. 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.

1 READ OUTPUT DTC

- Clear the DTC (see page 05-38).
- Warm up the engine.
- Run the engine at 3,000 rpm for 10 seconds or more.
- Connect the hand-held tester or the OBD II scan tool to the DLC3.
- Turn ON the ignition switch. Push the hand-held tester or the OBD II scan tool main switch ON.
- Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read the DTC.

Result:

Display (DTC output)	Proceed to
Only P0325 is output again	A
P0325, P0327 and/or P0328 are output again	B
P0325, P0327 and/or P0328 are not output again	C

B

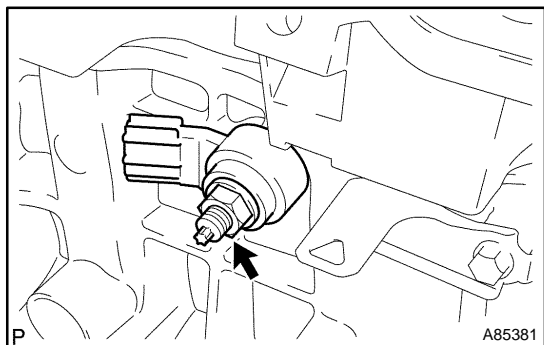
Go to step 3

C

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-9)

A

2 INSPECT KNOCK SENSOR



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

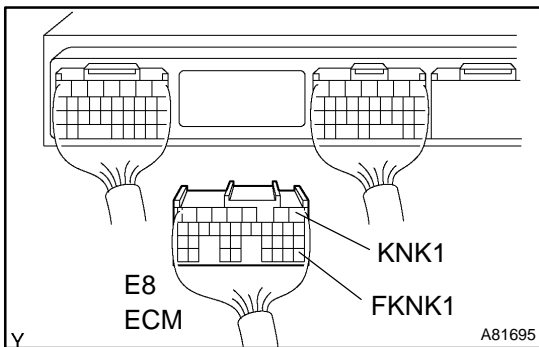
NG

TIGHTEN SENSOR

OK

REPLACE KNOCK SENSOR

3 CHECK WIRE HARNESS (ECM - KNOCK SENSOR)



- Disconnect the E8 ECM connector.
- Measure the resistance of the wire harness side connector.

Standard:

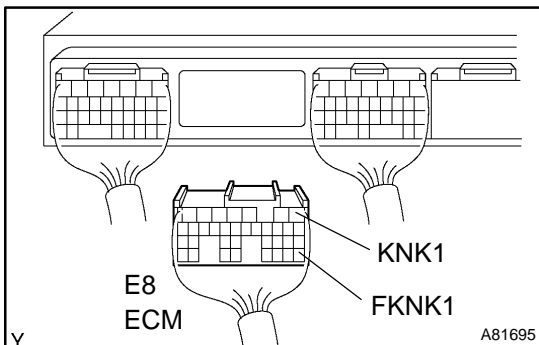
Tester Connection	Condition	Specified Condition
E8-1 (KNK1) - E8-28 (FKNK1)	20°C (68°F)	120 to 280 kΩ

NG

Go to step 5

OK

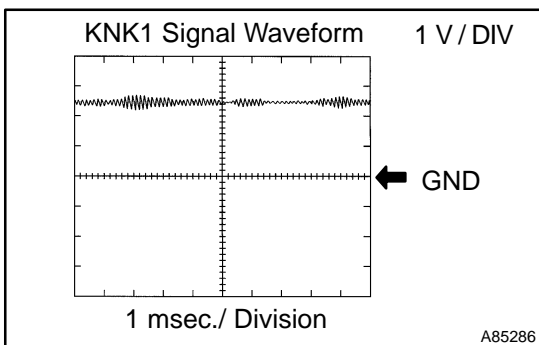
4 INSPECT ECM (KNK1 VOLTAGE)



- Disconnect the E8 ECM connector.
- Turn the ignition switch ON.
- Measure the voltage of the ECM terminals.

Voltage:

Tester Connection	Specified Condition
E8-1 (KNK1) - E8-28 (FKNK1)	4.5 to 5.5 V



HINT:

Reference: Inspection using an oscilloscope.

After warming up, run the engine at 4,000 rpm. Check the waveform between terminal KNK1 and FKNK1 of the ECM connector.

Standard:

Tester Connection	Specified Condition
E8-1 (KNK1) - E8-28 (FKNK1)	Correct waveform is as shown

NG

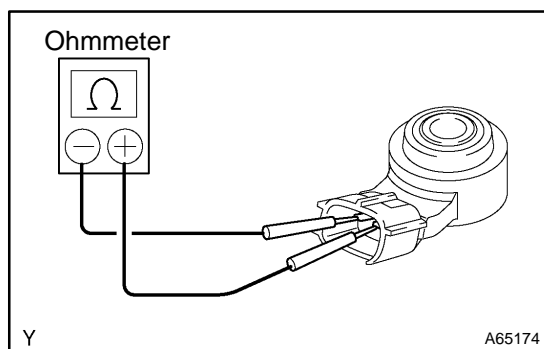
REPLACE ECM (See Page 10-9)

OK

CHECK FOR INTERMITTENT PROBLEMS

NOTICE:

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

5 INSPECT KNOCK SENSOR

- (a) Remove the knock sensor.
- (b) Measure the resistance between the terminals.
OK: Resistance is 120 to 280 kΩ at 20°C (68°F)

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