

<b>Last Modified:</b> 6-2-2008	5.1 C	<b>From:</b> 200601
<b>Model Year:</b> 2007	<b>Model:</b> Camry	<b>Doc ID:</b> RM000000SVT00ZX
<b>Title:</b> 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0327: Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor) (2007 Camry)		

<b>DTC</b>	<b>P0327</b>	<b>Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)</b>
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<b>DTC</b>	<b>P0328</b>	<b>Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)</b>
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<b>DTC</b>	<b>P0332</b>	<b>Knock Sensor 2 Circuit Low Input (Bank 2)</b>
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<b>DTC</b>	<b>P0333</b>	<b>Knock Sensor 2 Circuit High Input (Bank 2)</b>
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## **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.

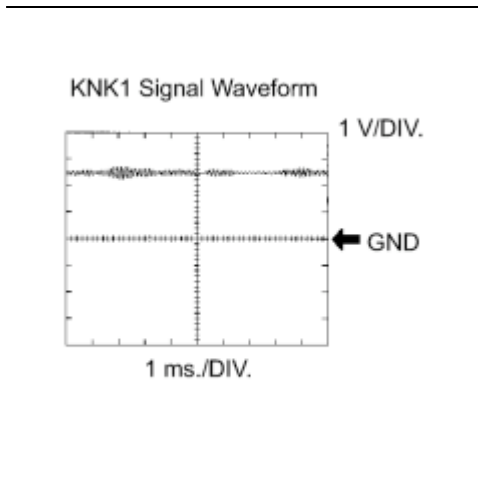
The voltage is generated when the engine block vibrates due to knocking. Any occurrence of engine knocking can be suppressed by delaying the ignition timing.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
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"> <li>● Short in knock sensor 1 or 2 circuit</li> <li>● Knock sensor 1 or 2</li> <li>● ECM</li> </ul>
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"> <li>● Open in knock sensor 1 or 2 circuit</li> <li>● Knock sensor 1 or 2</li> </ul>

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
		<ul style="list-style-type: none"> <li>ECM</li> </ul>

**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 engine switch is turned off.**

Reference: Inspection using an oscilloscope



The correct waveform is as shown.

ITEM	CONTENT
Terminals	KNK1 - EKNK or KNK2 - EKN2
Equipment Settings	0.01 to 10 V/DIV. 0.01 to 10 ms./DIV.
Conditions	Keep engine speed at 4,000 rpm with warm engine

## **MONITOR DESCRIPTION**

The knock sensor, located on the cylinder block, detects spark knock. When spark knock occurs, the piezoelectric element of the sensor vibrates. When the ECM detects a voltage in this frequency range, it retards the ignition timing to suppress 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, or if the knock sensor output voltage is outside the normal range, the ECM interprets this as a fault in the knock sensor and sets a DTC.

## 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

## TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None
Battery voltage	10.5 V or more
Time after engine start	5 seconds or more
Engine switch	ON
Starter	OFF

## TYPICAL MALFUNCTION THRESHOLDS

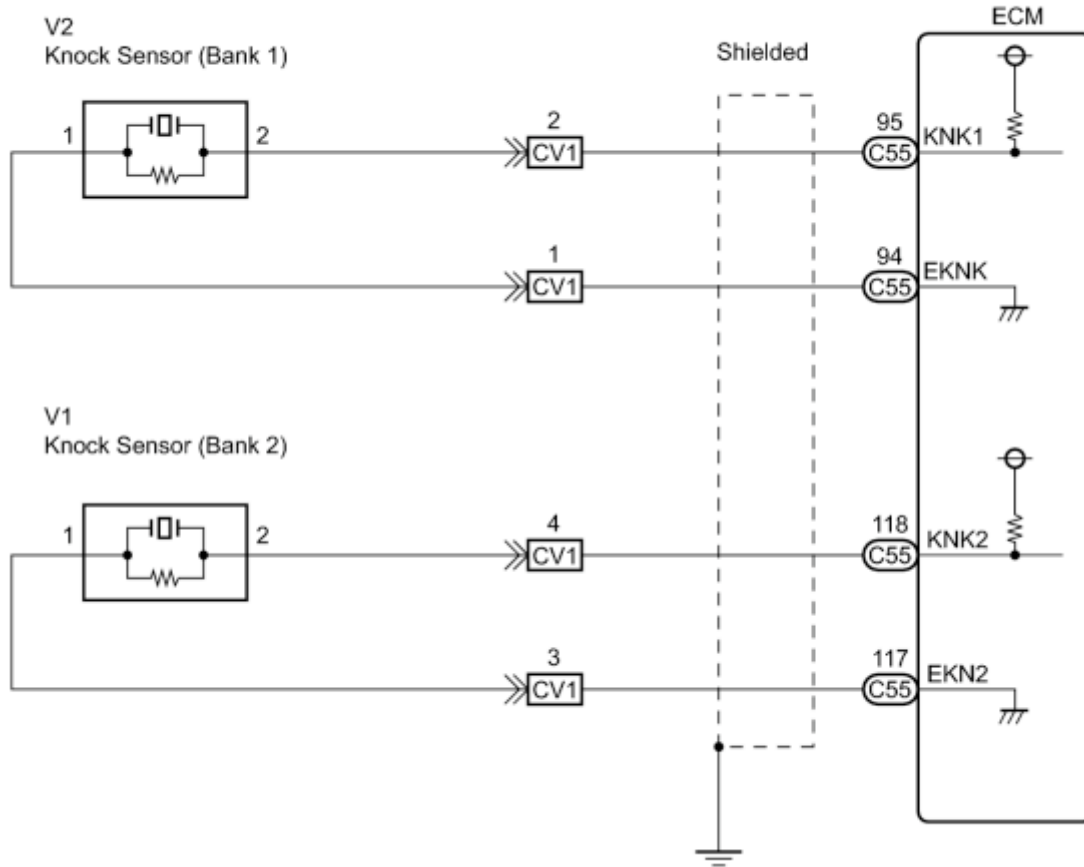
### **Knock Sensor Range Check (Low voltage) P0327 and P0332:**

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



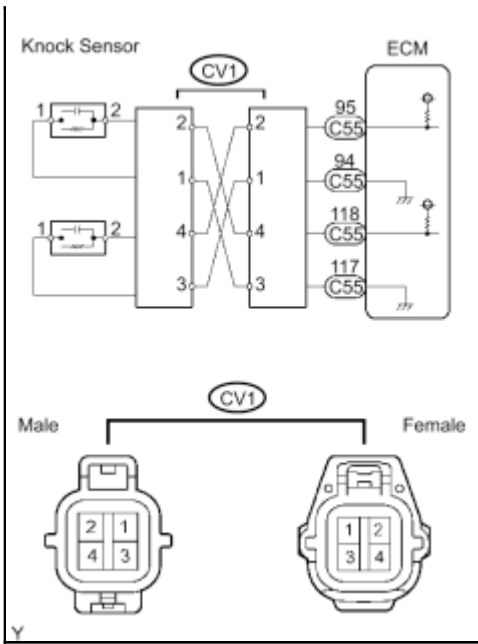
## INSPECTION PROCEDURE

### **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 the intelligent tester. 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 INFO.

## PROCEDURE

<b>1.</b>	<b>READ OUTPUT DTC (CHECK KNOCK SENSOR CIRCUIT)</b>
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(a) Disconnect the CV1 connector.

