P033E: KNOCK SENSOR 4 CIRCUIT INTERMITTENT (BANK 2)

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$150-$500**
Can I Still Drive?	:	No

What Does The P033E Code Mean?

In the times that I have been faced with the diagnosis of a stored code P033E, it has been indicative of the powertrain control module (PCM) detecting an intermittent knock sensor signal for engine bank two. The designation of knock sensor 4 can denote a particular sensor (in a multiple sensor configuration) or it can point to a specific cylinder. Bank 2 refers to the bank of the engine which does not contain the number one cylinder. Consult a reliable vehicle information source for the configuration of the knock sensor system for the vehicle in question.

Typically threaded directly into the engine block, the knock sensoris a piezoelectric sensor. The location of the sensors in a multi-sensor system may vary between manufacturers but most are in the sides of the block (between water jacket freeze plugs).

Knock sensors that are in the sides of the engine block are often threaded directly into engine coolant passages. When the engine is warm and the engine cooling system is under pressure, removal of these sensors could result in severe burns from hot coolant.

Before removing any knock sensor/s, allow the engine to cool and always dispose of coolant properly.

A piezoelectric sensing crystal is at the heart of the knock sensor. When shaken or vibrated, the piezoelectric crystal produces a small amount of voltage. Since the knock sensor control circuit is

normally a one-wire ground circuit, the voltage generated by the vibration is recognized by the PCM as engine noise or vibration.

The severity of the vibration encountered by the piezoelectric crystal (inside the knock sensor) determines the level of voltage produced in the circuit.

If the PCM detects a degree of knock sensor voltage indicative of a spark detonation; it may retard ignition timing and no knock sensor control code may be stored.

If the PCM detects a level of knock sensor voltage that indicates a more severe engine noise (such as a connecting rod contacting the inside of the engine block), it may discontinue fuel delivery and ignition spark to the affected cylinder and a knock sensor code will be stored.

A very small amount of voltage is always produced by the knock sensor when the engine is running. This is because a slight amount of vibration is inevitable, no matter how smoothly an engine runs.

If the PCM detects an unexpected signal from knock sensor 4, like battery voltage, complete battery ground, or pulsing voltage, a code P033E will be stored and a MIL may be illuminated.

Related knock sensor / circuit trouble codes include P0324, P0325, P0326, P0327, P0328, P0329, P0330, P0331, P0332, P0333, and P0334.

What Are The Symptoms Of The P033E Code?

Symptoms of this code may include:

- Diminished engine performance
- Hesitation upon acceleration
- Loud noises from the engine area
- Decreased fuel efficiency

What Are The Potential Causes Of The P033E Code?

Potential causes for this code to set are:

- Defective knock sensor/s
- Internal engine malfunction
- Ignition misfire/s
- Contaminated or substandard fuel
- Defective knock sensor control wiring and/or connectors
- Bad PCM or a PCM programing error

How Can You Fix The P033E Code?

To diagnose a code P033E, a diagnostic scanner, a digital volt/ohmmeter, and a reliable vehicle information source will be necessary. If the engine sounds like it is knocking, or excessively noisy, address that issue before attempting a diagnosis for any knock sensor codes.

Consult your vehicle information source for technical service bulletins (TSB) which coincide with the symptom/s exhibited and the code/s stored in the vehicle in question. If the problem which you are having is a common one; the correct TSB may help form a successful diagnosis. Follow the diagnostic steps found in the TSB and you will likely arrive at the correct solution.

I like to start with a visual inspection of all system related wiring harnesses and connectors. I am searching for burnt, corroded, or otherwise broken wiring and connectors that may create an open or shorted circuit.

Knock sensors are often in the lower part of the engine block. This makes them susceptible to damage when heavy parts (like starters and engine mounts) are replaced. System connectors, wiring, and fragile knock sensors are frequently broken during repairs in the vicinity.

Connect the scanner to the vehicle diagnostic connector and retrieve all stored codes and freeze frame data. Write this information down for use in the diagnostic process. Clear the codes and test drive the vehicle to see if any are reset.

If the P033E is reset, start the engine and use the scanner to observe knock sensor data. If the scanner indicates that knock sensor voltage is not within manufacturer's specifications, use the DVOM to test live data at the knock sensor connector. If the signal at the connector is within specs, suspect a wiring issue between the sensor and the PCM. If voltage at the knock sensor connector is not within specifications, suspect a defective knock sensor.

Additional diagnostic notes:

- Systems with multiple knock sensors are arranged differently from one vehicle to another. Be careful to address the correct knock sensor for the code exhibited
- Beware of hot, pressurized coolant when removing knock sensors that are threaded into engine coolant passages

Severity Description

A stored code P033E could be a sign of severe internal engine failure. For this cause, it must be addressed with some degree of urgency.

Reference Sources

P033E: Knock Sensor 4 Circuit Intermittent (Bank 2), OBD-Codes.