



## Walker Products

### Camshaft & Crankshaft Position Sensors 2022

#### ***What is a Camshaft or Crankshaft Position Sensor? What do they do?***

Camshaft and Crankshaft (referred to as “Cam and Crank”) Position Sensors are some of the most crucial engine management devices on vehicles today. These sensors provide important engine timing signals to the vehicle on board computer to ensure proper fueling, ignition, and internal engine operations.

#### ***What happens when a Cam/Crank Sensor Fails?***

Vehicles with a malfunctioning Cam/Crank sensor may have these symptoms:

- Check Engine Light (*see our website for common Cam/Crank CEL Codes*)
- Misfiring
- Rough Idle
- Failure to Start – even with a warmed up engine
- Engine vibration
- Check engine light
  - Visit our website to learn more about OBDII codes related to Cam/Crank Sensors

Do not jump to conclusions too soon however, these common problems and CELs could be caused by other systems in the vehicle. In addition, the Cam/Crank sensors are often difficult to access and replace due to their typical location on the engine. There is value in doing some diagnostics on the sensor and system before replacing it.

#### ***How to diagnose the Cam/Crank Sensor:***

First, check the condition of the wiring harness for the sensor. Is it severed or damaged? Does the wiring harness or connector look to be contaminated by fluids or road grime? (*Bonus: if the wiring harness is damaged, check out Walker Products Full Service Kits® to complete the job right the first time!*). In addition, inspect for any exposed part of the sensor, does it look damaged or out of position? Lastly, with access to the sensor harness, you can probe the sensor output using a meter. Does the signal look like one of these four images?



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Figure 1 Normal Signal: Hall Effect Type Sensor

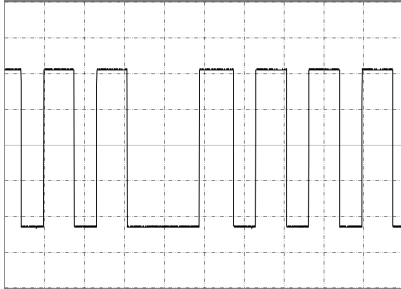


Figure 2 Normal Signal: Reluctance Type Sensor

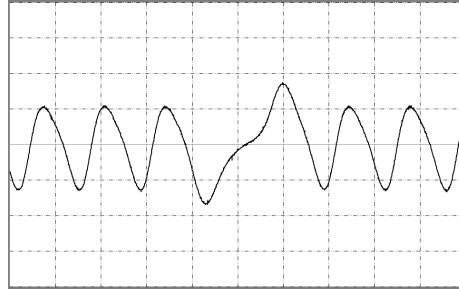


Figure 3 Faulty Signal: Hall Effect Type Sensor

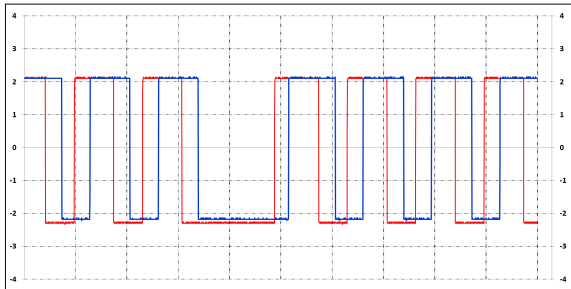
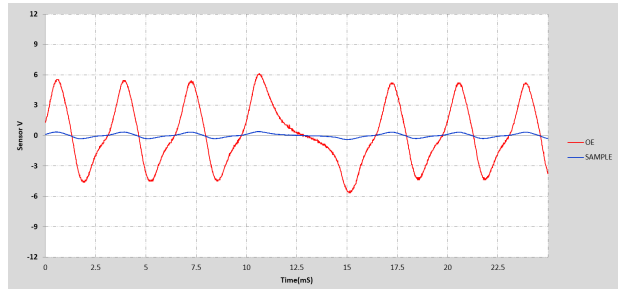


Figure 4 Faulty Signal: Reluctance Type Sensor

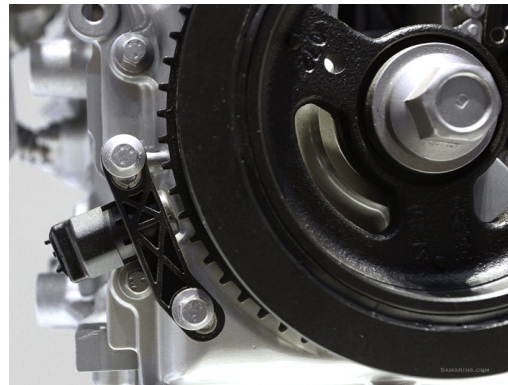


### What are some tips on installing Cam/Crank Sensors?

Figure 5 Crank Sensor with Harness & Cam Sensor



Figure 6 Crank Sensor Installed



The Cam/Crank sensors have a limited range where they can detect the presence/absence of the gear teeth. Any obstruction will cause the sensor to fall outside the normal operating range.



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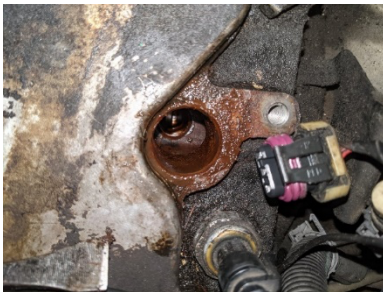
*Figure 7 Sensor Spacers*

In addition, some sensors require spacers to ensure proper distance between the sensor and reluctor wheel. Walker Products Cam/Crank sensors come with a guide to help set the proper spacing on these applications.

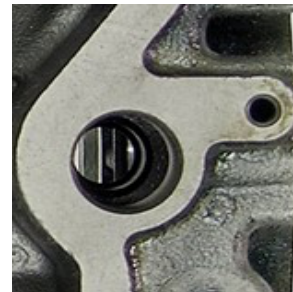
All sensors need clean surfaces to allow proper seating and positioning – be sure to clean the area thoroughly.

Many Cam/Crank sensors have O-rings to help with sealing – be sure the old O-ring did not remain stuck on the engine during removal (*just like you would check an oil filter replacement*).

*Figure 8 Unclean Mounting Surface*



*Figure 9 Clean Mounting Surface*



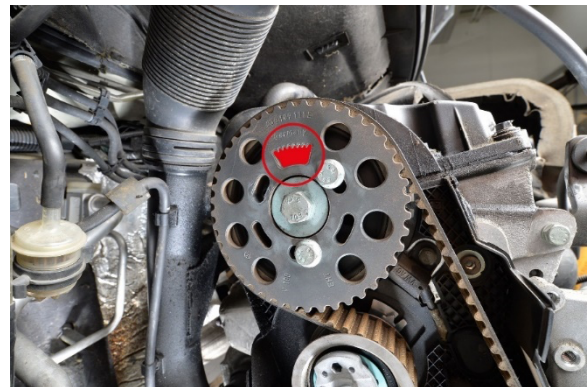
Lastly, and most importantly, make sure to research and follow any specific relearn/reset procedures needed (*varies, depending on vehicle*).

#### **Additional Cam/Crank Sensor Technical Notes:**

The vehicle computer (ECM) needs the angular position of the Camshaft and Crankshaft to synchronize the operation of the fuel injectors, spark plugs, etc. Typically, a steel timing gear is oriented on the shaft. The engine block has mounting positions for the Cam or Crank sensor. The sensors change their output when they detect the presence and absence of the metal teeth on the spinning gear.

In addition, there are four main types of Cam/Crank sensors, and each has a unique signal output as follows:

*Figure 10 Crankshaft with Timing Gear*

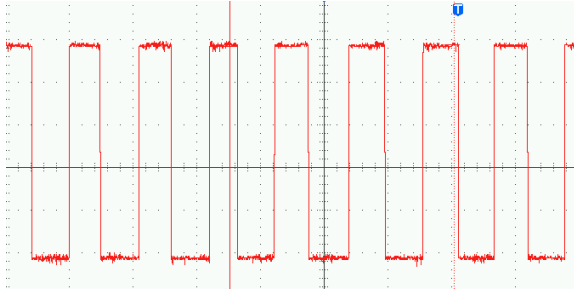




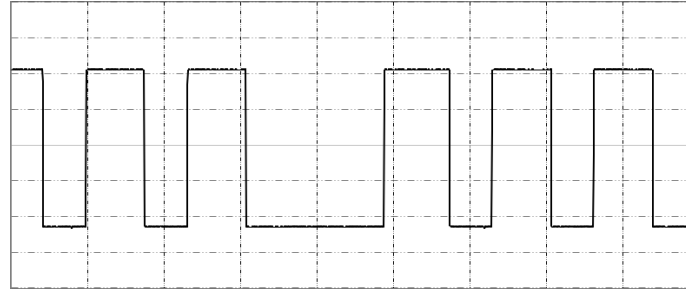
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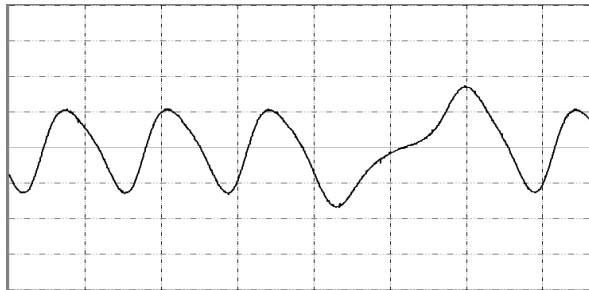
*Figure 11 Magnetic Type Sensor Output*



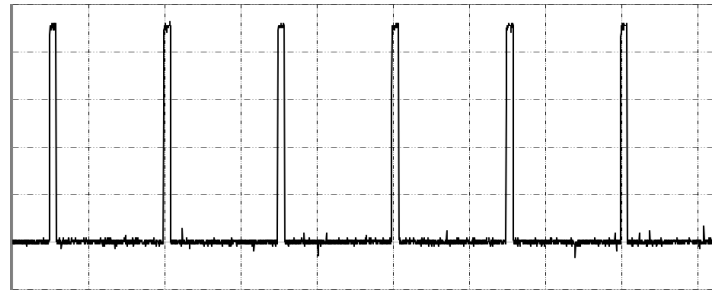
*Figure 12 Hall Effect Style Output*



*Figure 13 Reluctance Type Output*



*Figure 14 Optical Style Output*



There is typically a square wave output for the magnetic, Hall-effect, and optical sensors. For the magnetic and Hall-effect sensors, the signal is not square, but it is manipulated into a square wave output by electronics that sense whether the output is above or below a threshold level and flip an output according to those levels.





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#### ***Why Buy from Walker Products?***

Walker goes beyond testing parts to ensure function – Walker designs and manufactures proprietary testing equipment that gives us even more insight to Cam/Crank Sensors. With a machine that tests and analyzes against the OE signals, sensors are precisely measured to evaluate shift or lag versus the OE. This data is not available from the manufacturer.

When the vehicle-side connector is worn and unreliable, the sensor plus the vehicle-side pigtail is also available in Walker's exclusive Full Service Kits®. In addition to machine testing, Walker Cam/Crank Sensors are tested on-vehicle as part of a long term stress test to ensure durability under extreme

conditions. Whether you are performing a simple removal and replacement or an in-depth diagnostic project, always count on Walker Products Camshaft and Crankshaft Position Sensors to deliver superior Quality, Coverage, and Support.

## **QUALITY • COVERAGE • SUPPORT**

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