

Using the PE-ECU-1 System with a 4-Cylinder Suzuki Motorcycle Engine

This document covers the required steps necessary to use the PE-ECU-1 engine management system with a 4-cylinder Suzuki motorcycle engine. Although the specific examples presented here refer to the GSXR600, the process would be similar for other Suzuki engines.

Crank Position Sensor

Many of the stock Suzuki crank position sensors can be used with the PE-ECU-1 engine management system, provided the ECU is specified for a 2-wire variable reluctance sensor when ordered. Sensors like the one shown in Figure 1 have been successfully tested with the system. Please contact Performance Electronics (PE) if you have a sensor different from the one shown in the Figure.

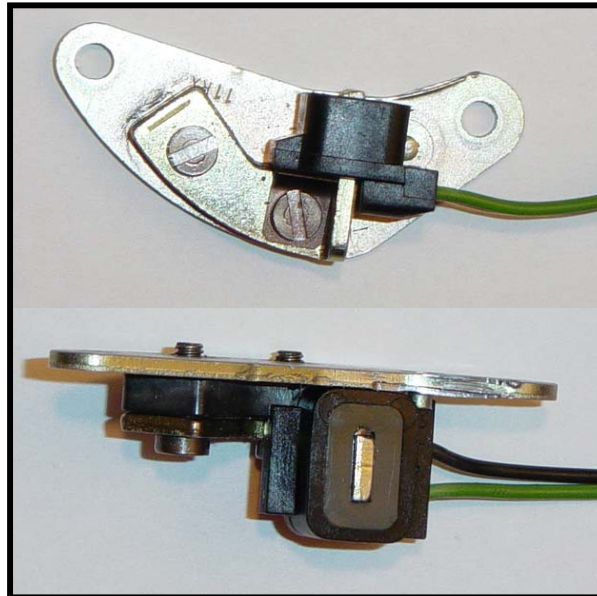


Figure 1 – Approved Suzuki Sensor

The sensor should be wired to the PE-ECU-1 system according to the following:

- Black Wire – Pin 34 on ECU
- Green Wire (GND) – Pin 25 on ECU

Failure to wire the sensor in this way may result in an engine that misfires and/or has incorrect ignition timing.

Crank Trigger Wheel

The stock Suzuki trigger wheel cannot be used with the PE-ECU-1 system due to the differences in the number and spacing of the teeth. The PE controller must be provided with a 12-1 pulse-train, correctly phased with TDC #1 according to Figure 2. **Note: The rotation of your crank trigger wheel may not match the rotation shown in the Figure. What's important is that the first tooth after the long space be positioned directly in front of the sensor when cylinder #1 is at TDC.**

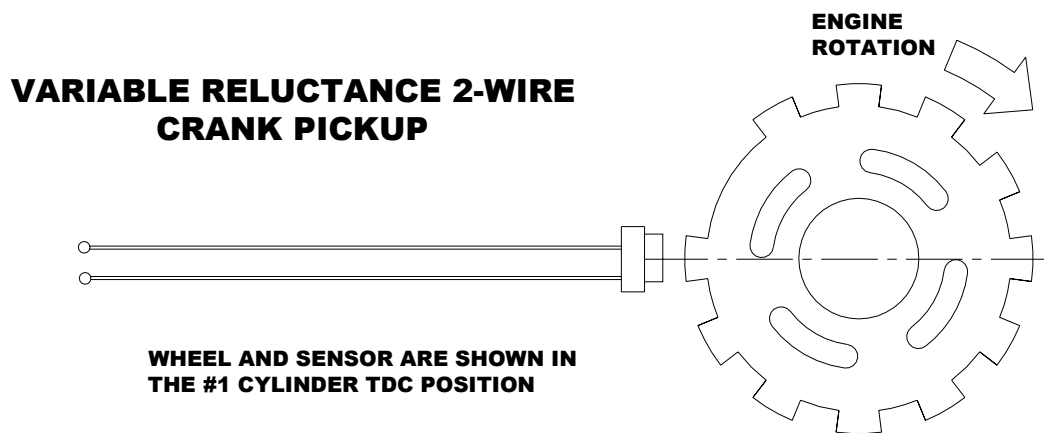


Figure 2 – Correct Trigger Wheel/Sensor Orientation

PE can supply one of several trigger wheels for different applications. For most motorcycle engines, the 2.4" diameter wheel fits nicely under the side cover in place of the stock trigger wheel. Drawings for the trigger wheels can be downloaded from the web site at www.pe-ltd.com/support.htm.

Figure 3 shows a stock crank trigger wheel for a GSXR600 engine. Some fabrication is required in order to remove the tooth pattern from the stock wheel and to attach the PE trigger wheel to the assembly. It is important that the teeth on the trigger wheel pass directly under the metal portion of the stock sensor when installed.

Once the PE trigger wheel is in place, the radial gap between the teeth and the sensor must be set to 0.022" – 0.030". Also, maintain a minimum amount of run-out on the tips of the teeth in order to ensure trouble free starting. Run-out in excess of 0.003" in either the radial or axial direction can cause inconsistencies in the trigger wheel signal.

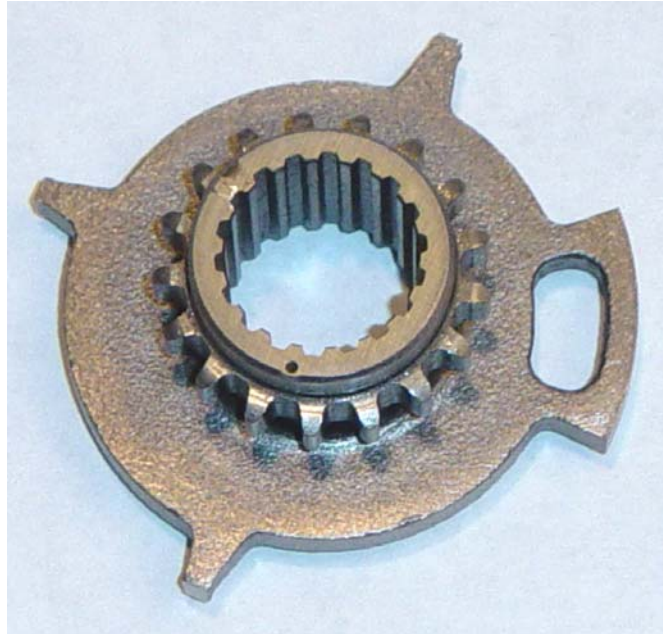


Figure 3 – Stock GSXR600 Crank Position Wheel

Ignition Coils and Coil Charge Time

Many stock ignition coils are compatible with the PE-ECU-1 system. In order for the coils to work correctly without damaging the hardware, several criteria have to met:

1. The coils must have the minimum amount of required primary resistance. Minimum values depend on the types of coils used.
 - “Wasted-Spark” Coils – The term “wasted-spark” refers to ignition coils that provide spark for two cylinders at a time. These kinds of coils each have two terminals for plug wires. Wasted spark coils must have at least 2.0 ohms of primary resistance.
 - “Coil-On-Plug” Coils – “Coil-On-Plug” ignition coils mount directly to the spark plug without the use of plug wires. On a four-cylinder engine, four coil-on-plug coils are required. These types of coils must have at least 1.0 ohm of primary resistance to use directly with the PE-ECU-1 system.
2. In addition to meeting the resistance requirement, ignition coils must also be inductive. The term inductive refers to the manner in which the coil is charged.

Inductive coils generate large secondary voltage as a result of collapsing 12v on the primary side. The other type of ignition system is termed CDI (Capacitive Discharge Ignition). In this system, the primary side of the coil expects a larger voltage than 12v. Because of this, the coil is constructed differently. A motorcycle shop manual usually contains the specifications concerning the ignition system. If you are having trouble determining what kind of system that you have, contact PE.

See the “User and Installation Manual” for specific wiring diagrams and recommendations for aftermarket coils.

The amount of time that the coils charge each revolution can be configured in the “Setup” menu under the “Engine” tab in the Monitor Program. Always start out with the lowest possible charge time and evaluate the engine’s performance. In most cases this will be 3.0 ms. Using excessive charge time can unnecessarily heat the ECU electronics and the coils themselves. Generally, coils with a low primary resistance require shorter charge times.