

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

This document covers the required steps necessary to use the PE-ECU-1 engine management system with a 4-cylinder Yamaha motorcycle engine. Although the specific examples presented here refer to the R6, the process would be similar for other Yamaha engines.

### Crank Position Sensor

Many of the stock Yamaha 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 Yamaha Sensor and '99 – '02 R6 Trigger Wheel**

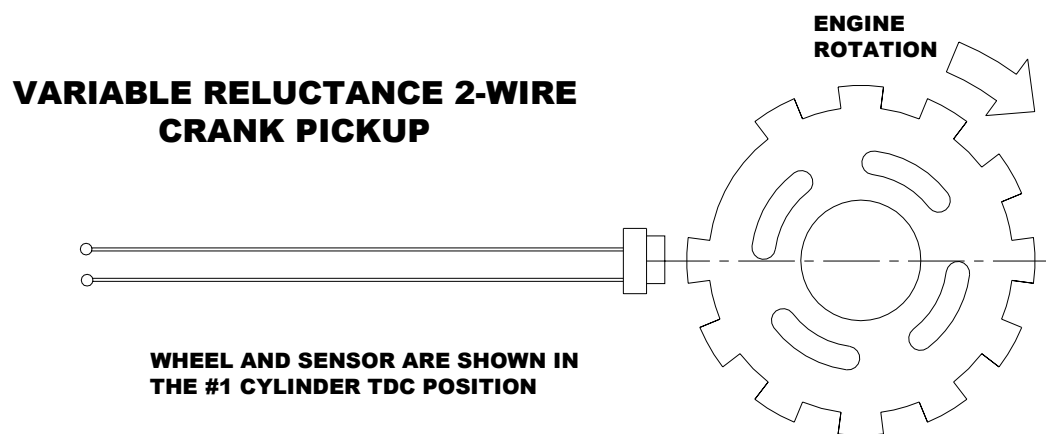
The crank position sensor should be wired to the PE-ECU-1 system according to the following convention:

- Black Wire – Pin 25 on ECU
- Grey Wire – Pin 34 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 and Sensor**

The stock Yamaha 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](http://www.pe-ltd.com/support.htm).

Figure 1 shows a stock crank trigger wheel for many of the Yamaha R6 engines. The inside diameter of this wheel is slightly smaller than the PE wheel; therefore, a small adapter must be manufactured for the conversion. In addition, the PE wheel has a slightly smaller O.D. This requires that the stock sensor be moved about 0.040" toward the crank centerline to achieve the desired gap.

With the PE trigger wheel in place, the radial gap between the O.D. of the teeth and the crank pickup sensor must be set to 0.030” – 0.040”. Also, a minimum amount of run-out on the tips of the teeth must be maintained in order to ensure trouble free starting. Run-out in excess of 0.005” in either the radial or axial direction can cause inconsistencies in the trigger wheel signal.

## **Ignition Coils**

The stock coils for the Yamaha R6 engine, up to and including the 2003 model, are not directly compatible with the PE-ECU-1 system. These coils are the capacitive discharge variety and the ECU requires inductive ignition coils. Options for ignition coils include using inductive units from other manufacturers or using aftermarket coils like the ones manufactured by Accel (P/N: 140403). Ignition coils from the Honda F2, F3, F4 and F4I engines are all directly compatible with the PE-ECU-1 system. For specific questions concerning ignition coil compatibility, contact PE directly.