

PE-ECU-1 System Overview and Requirements

The PE-ECU-1 can be installed on virtually any 1,2,4,6 or 8 cylinder even-firing engine that requires fuel injection and/or ignition control. All of the functions of the ECU can be adjusted by using a laptop or PC running Windows®.

The following describes the basic requirements for using the system. Please refer to the User's Manual for a more in-depth description.

Crank Position Sensing

The PE-ECU-1 system requires the use of a special series of signals from the crank position sensor in order to determine the position of the crankshaft and speed of the engine. The required signal is a 12-1 pulse train. This means that the Electronic Control Unit (ECU) is expecting to see 10 short pulses followed by a long pulse every time that the crank makes one revolution (Figure 1).

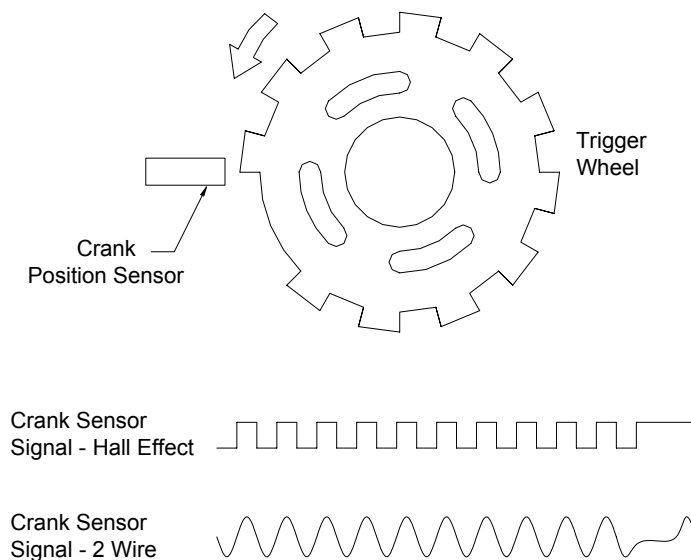


Figure 1

Because the controller requires the 12-1 pulse train, a special trigger wheel must be attached to the crankshaft of the engine. Each PE-ECU-1 kit contains a steel wheel for

this purpose. Several sizes are available. See our website (www.pe-ltd.com) for details on the available sizes.

The PE-ECU-1 system can use some factory crank position sensors. Crank sensors fall into one of two categories: variable reluctance (2-wire) or Hall effect sensors. Please advise which type of sensor you will be using when ordering a system. If you do not have a sensor, Performance Electronics, Ltd carries Hall effect units for the system.

Ignition Control

For 2 or 4 cylinder engines the ignition can be configured for either wasted spark or distributor firing. For 6 and 8 cylinder engines a distributor is required. The PE-ECU-1 unit **does not** require any external igniters to drive the ignition coil(s). As long as the total resistance per ignition driver is greater than 2.0 ohms, the coil(s) can be wired directly to the ECU. See the PE-ECU-1 manual for more information regarding the setup of the ignition system.

Fuel Control

The PE-ECU-1 system controls fuel injectors in “semi-sequential” mode. This means that all of the injectors are fired once per crankshaft revolution in pairs at different crank degrees. This provides slightly better fuel distribution than batch firing without requiring a cam sensor like a full sequential firing scheme.

The PE-ECU-1 system can be used with saturated style injectors and requires a minimum resistance of 10 ohms per injector.

Input Sensors

Generally, the ECU uses standard GM input sensors. The inputs that are supported by the ECU include the following:

- Crank Position
- Throttle Position (TPS)
- Manifold Absolute Pressure (MAP)
- Coolant Temperature
- Air Temperature
- 3 Generic Analog Inputs
- Battery Voltage (Measured from inside the ECU, no sensor required)

Any resistive throttle position sensor can be used with the system. The coolant temperature, air temperature and manifold pressure sensors must be GM style units. These are available through Performance Electronics, Ltd as well as any parts house.

User Controlled Outputs and Tachometer Output

The PE-ECU-1 is equipped with 4 user-controlled outputs. These outputs can be used to switch on relays for controlling anything that turns on and off based on RPM, MAP, TPS, Air Temperature or Coolant Temperature. Examples of such devices include: shift light, NOS enable, cooling fan and warning lights.

The system is also capable of driving some stock and most aftermarket tachometers. The output from the drive circuit is a 12v rectangle wave with a 30% "on" (12v) and 70% "off" (0v) duty cycle. The number of pulses per crank revolution is based on the number of cylinders selected in the Monitor software as described below.

- 1, 2 or 4 Cylinders = 2 Pulses per Crank Revolution
- 6 Cylinders = 3 Pulses per Crank Revolution
- 8 Cylinders = 4 Pulses per Crank Revolution

User Controlled Inputs

In addition to the outputs mentioned above, the PE-ECU-1 system also has 2 digital user inputs. These inputs will cut the fuel, cut the ignition or cut both the fuel and ignition when turned "on". These can be used for ignition or fuel cuts during shifting.