ECU® Design Guide for Engine Controls

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Which Series to Select

60 Series… 60,63,67

If you have a small generator without a magnetic pickup or your engine has a non ferrous (aluminum) flywheel a unit like the 60 Series unit can work since it can operate from the generator voltage output. If you don't have much space and only can have a single switch and a lamp for the operators station the 60 Series works well also. Cost is lower on this unit normally since it has the no LED option.

90 Series… 9988N,9988L,9910,9915

If you have a small generator with a magnetic pickup the 90 series works well if its not an electronic engine or you can not get the information needed to use an ECM. You can use simple safety switches for Low Oil Pressure and High Engine Temperature. These units are used to large extent on new low quantity runs and retrofits due to their adaptability. They are also used in volume on what is now called a "mechanical" (non ECM) engine. Many use basic adjustments.

70 Series… 70B,76O,76GM,77

These units are for ECM equipped engines. They are the simplest to apply as long as the engine CAN PGN codes and SPN.FMI codes are in line with the proper engine. They are simple to apply to the engine and since all adjustments are done at the factory there is no set up. They must be confirmed that the engine is a match for the controller you pick by engine manufacturer.

700 Series… 750

These units are the maximum ease of use and highest density on your control panel. Both the standard 5 gauges, Oil Pressure, Engine Temperature, Battery Voltage, RPM and Fuel level are incorporated and a full 5 light engine control with cycle crank and all safeties. They direct read the ECM codes for speed data and all status and fault data. They are the simplest way to achieve a fast panel in a hurry. They also utilize a plug system that makes installation on a large production scale fast and easy. They are easy to do fast field change outs for upgrades. They also have full firmware upgradability using a programmer in field. The 750 is very popular among engine manufacturers due to its affordability, style and ruggedness.

800 Series… 830,835,840

Available in many versions from just a panel monitor to an engine control with Panel Monitor or even a full generator based AC analysis capability with Voltage, Current, Power Factor, KW, KVA, KVar, Frequency and more. There is no need for a CAN viewer with this unit since it has a full diagnostics system on board with a data log leading up to a engine shutdown showing the fault progression time stamped by the engine hours. Some versions have built in logic, input, output systems and even some with Load Bank Controllers for keeping 4I and 4F engines properly loaded to engine specifications. Many have escape mode and soft stops for DPF and SCR systems. They have been designed in conjunction with the Engine Manufacturers requirements to protect and maintain the engines using the new EPA 4I and 4F designations. They also support direct Satellite communications via interface modules and modems including Cellular modems. They can communicate with expansion modules and annunciators as well. They can also read back DM2 engine ECM records for fault history. 30 second CAN message recording is supported via our data service in every unit not to mention that they can be field upgraded with just an emailed file and a flash drive plugging directly to the unit.

What does an *ECU*® engine control do for me?

The engine control depending on the model and systems design can...

Watch for a start events such as
　　　Rental User request (turn generator on)
　　　Low Battery
　　　Loss of Commercial Power
　　　Drainage canal high
　　　Cell tower power on request
　　　Low air pressure in tank

After the start request the control can then
　　　Wait for a period of time
　　　Pre-heat the engine
　　　Pre-lube the engine
　　　Open engine package enclosure louvers
　　　Crank the engine
　　　Disconnect the starter at the proper speed
　　　Allow engine to warm up and go to full throttle
　　　Monitor the engine for various fault conditions
　　　In the event of certain conditions perform shutdown
　　　Indicate error condition
　　　Cool the engine down on normal shutdown

What does it sense and control?

The engine control depending on the model and systems design can...

Sense …
CAN Bus signals
Low oil pressure safety switch
Oil pressure sensor
High coolant temperature safety switch
Coolant temperature sensor
Battery Voltage
Emergency stop switches
Magnetic pickup (for speed sensing)
Start switch
Remote start contacts
Other types also

Control...
Starting pilot relay (energizes starting solenoid)
Fuel solenoid valve
Full throttle solenoid
Glow Plug relay
Other valves and relays

What kind of sensors are used on the engine?

The engine sensors fall into many categories

Safety Switches
These types of switches are used on most engines. They are simply an open or closed switch that changes from off to on OR on to off depending on a parameter it is monitoring. These switches simply state that some thing is in limits or not. No level information of how wrong or right a parameter (like oil pressure) is, just that it is adequate or not.

Senders
Unlike safety switches Senders indicate actual levels of how much of something there is. A good example of sender data is fuel level. In an engine system the sender allows some systems to watch for say a pre-low fuel level thus allowing a warning to occur to alert an operator that the unit will run out of fuel if no action to refill is taken. Senders used by engine controls are electronic in nature. Many senders change their resistance based on the parameter they are monitoring. Some senders output voltages or alter currents based on the parameter they are measuring.
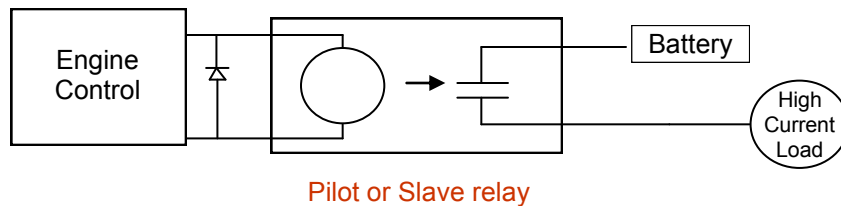
Magnetic pickups
This is a special type of sensor that when installed can measure proximity to a flywheel tooth. As the flywheel rotates the magnetic pickup generates a voltage that is proportional in frequency to the actual engine speed. This allows the engine control to monitor engine speed.

What are pilot or slave relays?

Pilot or Slave relays

Many of the valves and solenoids engine controls operate have high currents and it may become necessary to "buffer" the control against harmful currents.

Pilot or Slave relay

The Pilot or Slave relay simply "relays" the signal to the high current load. The input to the Slave relay can be small but it can control currents up to 100's of amps. A diode is shown in the above illustration. This is a low cost preventative that adds years of useful life. The diode channels the surges of the slave relay into a harmless dissipation as opposed to causing arcing in the control contacts of the engine control.

By placing the pilot relays close to the loads other electrical benefits occur when the system is in an environment where electrical interference should be minimized.

Are there any application drawings available?

Many of the different flyers available on the website have various drawings showing the use of the engine controls with timers and fault expanders. Look at the various drawings for ideas.

ECU® can be reached for special applications that we may already have drawings for.