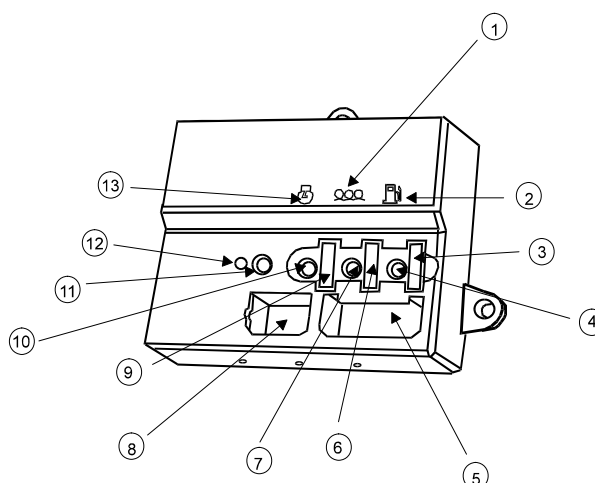


Engine Interface Module

The Engine Interface Module is a sealed, engine mounted module that provides switching relays for the Starter Motor Solenoid, Glow Plug and Fuel Solenoid. Each of these circuits is protected with individual automotive fuses mounted in the module. Individual LED's illuminate when each circuit is energized in addition these LED's greatly aid when fault finding.

This module is mounted on the engine with anti-vibration mounts and is easily connected to the engine via loom plugs. Use of the EIM means that heavy currents such as Fuel Solenoid power are isolated from the control panel thus enabling individual protection of each of the circuits.



Item Description

1. Glow Plug Symbol
2. Fuel Symbol
3. Fuel Solenoid Fuse
4. Fuel LED
5. Main Connector Socket
6. Glow Plug Fuse
7. Glow Plug LED

Item Description

8. Secondary Socket
9. Starter Solenoid Fuse
10. Starter LED
11. Overspeed Set-up LED
12. Overspeed Adjuster
13. Starter Symbol

Engine Interface Module

Functional Description

There are four versions of the Engine Interface Module available - the 12/24 volt EIM SR and the 12/24 volt EIM Plus.

The EIM SR is the basic level module that provides all the switching functionality; the EIM Plus provides the same functionality as the EIM SR plus the additional feature of Overspeed Sensing and an Overspeed Trip Adjuster. A magnetic pick-up on the engine flywheel housing provides the speed signal to the EIM Plus. When an overspeed situation is sensed, the EIM Plus signals the 2001, 4001 or 4001E generator set control panel to stop the engine. The Overspeed Trip Point can be easily set-up for 10% above the normal operating speed.

The overspeed feature on the EIM Plus, including the magnetic pickup is mandatory for all the Autostart control panels except the Access 4000 (2001, 4001 and 4001E).

Status Indication

LED's on the module correspond to the Starter Motor Solenoid supply, the Glow Plug supply (where used) and the Fuel Control Solenoid supply. Each illuminates to show that the indicated circuit is energized. A fourth LED (only operational on the EIM Plus) is used to set-up the Overspeed Trip Point.

Starter Motor Solenoid (EIM Plus)

During cranking the module receives a signal from the magnetic pick-up (MPU). When the signal from the MPU rises above 1090 Hz, the starter motor is disengaged by the EIM removing the supply to wire 51 (Starting Solenoid signal). At this time the EIM Plus also switches a zero volt signal to the generator set control panel to indicate that the engine is running, which in turn will remove the Starter Motor signal into the EIM. The zero volt signal is switched via wire 54.

Should the crank speed be less than 12 Hz, the module will only allow a crank of 0.6 seconds. This usually occurs due to one of the following:

- (i) The battery voltage is too low to enable the starter motor to crank the engine.
- (ii) The MPU is disconnected from the EIM (wires 5 & 57)
- (iii) The gap between the MPU and the flywheel of the engine is too great

If the engine speed falls below 350 Hz (i.e. the engine has stopped) the EIM Plus will allow cranking only after a 5 second delay (lockout) which compliments the generator set control panel's 3 attempt crank.

Starter Motor Solenoid (EIM SR, Access 4000 only)

When the three position (Run/Stop/Auto) switch is turned to Start, a relay in the EIM is energized after receiving a signal from the control panel, providing power to the Starter Motor Solenoid. The Starter Motor disengages when the Access 4000 removes its signal to the EIM i.e. Crank Cut Out setpoint has been reached. It is only the EIM Plus that will disengage the Starter Motor utilizing its own logic.

Glow Plug (pre-heat)

When the relay is energized power is provided to the Glow Plug (where fitted).

Fuel Control Solenoid

The generator set control panel energizes a relay in the module that provides power to the Fuel Control Solenoid allowing fuel flow to the engine.

Overspeed Signal (EIM Plus only)

The EIM Plus monitors the speed signal from the magnetic pick-up. If the engine speed rises above a certain pre-settable value, the module sends a zero volt signal to the generator set control panel to activate the Overspeed Fault circuitry.

The Overspeed Set Point is factory set for 10% above the rated speed of the engine i.e. 1980 for 1800rpm sets. This can be adjusted using the adjustment potentiometer accessed through the hole beside the Overspeed Set-Up LED. While the engine is running at the rated speed (1500 rpm for 50Hz or 1800 rpm for 60Hz) the adjustment screw should be adjusted until the Overspeed Set-Up LED just comes on. This sets the overspeed value at 10% above the speed at which the generator set is operating.

Safety “Relay” Feature

The EIM SR and EIM Plus provide a safety check for any damaged contacts (i.e. welded contacts) using a “safety” relay (SR).

When the emergency stop pushbutton on the generator set control panel is pushed the EIM module automatically checks Fuel Control Signal Out and Starter Motor Signal Out to see if the contacts of their switched relays are welded shut. A dimly lit LED on the module indicates the contacts are damaged and the module should be replaced. In the event that the contacts are welded shut, then the only way of stopping the Fuel or Starter Motor would be the Emergency Stop. The engaging of the Emergency Stop breaks the Negative to the coil of the Safety Relay therefore removing the signals to their respective Solenoids bypassing the faulty Fuel and Starter Motor Relays.

The Safety Relay is permanently energized when the battery is connected to the generating set and the Emergency Stop button(s) are not engaged.

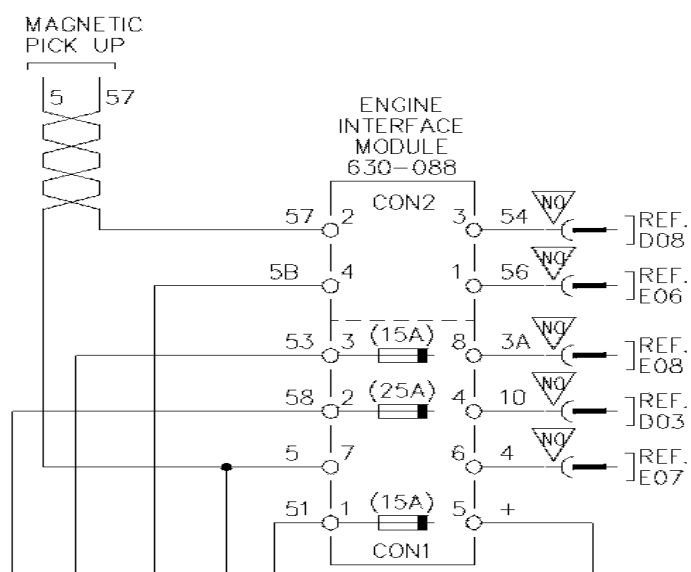
EIM Plus Operation

The EIM obtains its supply directly from the battery via wires + and 5, the Safety Relay is also powered from the battery using + but the negative to its coil is from the battery via normally closed contacts on the Emergency Stop(s). This means that if any of the Emergency Stop buttons are pushed then the Safety Relay will de-energize and the Fuel and Starting signals be removed from their respective solenoids. This means whilst the battery is connected and the generating set is stopped the EIM will be drawing current from the battery. It is for this reason that it is advisable to disconnect the battery whilst the generating set is in storage or fit a Battery Isolator Switch to prime power units.

When we intend to start the generating set we turn the three position switch to Run, or if in Auto and the ATS/Changeover has signaled the generating set to start, the control panel will switch a positive supply to the EIM via wires 3A and 4. These signals will then energize the Fuel and Starter Motor relays to allow a positive supply to be switched out of the EIM to the Fuel Control Solenoid (FCS) on wire 53 and the Starting Solenoid (SS) on 51.

The speed of the engine is monitored via the MPU (wire 57) to determine when the engine has fired and the Starter Motor (SM) can be disengaged. The SM will be disengaged when 1090 flywheel teeth pass the MPU in one second (1090Hz). The EIM will then remove the positive supply to the SS on wire 51 and also switch a negative signal to the control panel via wire 54 to indicate to the control panel that the engine has started and the signal to the EIM via wire 4 can be removed.

Schematic Representation



Connector	Pin	Wire	Function
Main	1	51	+ Output to Starter Motor Solenoid
Main	2	58	+ Output to Glow Plug
Main	3	53	+ Output to Fuel Control Solenoid
Main	4	10	Switched positive Glow Plug Input signal from control panel
Main	5	+	DC positive from battery
Main	6	4	Switched positive Starter Motor Input signal from control panel
Main	7	5	DC negative from battery
Main	8	3A	Switched positive Fuel Control Input signal from control panel
Secondary	1	56	Switched negative Overspeed Signal Output to control panel (N/A to EIM SR)
Secondary	2	57	MPU signal input (N/A to EIM SR)
Secondary	3	54	Switched negative Engine Run Signal Output to control panel (N/A to EIM SR)
Secondary	4	5B	Safety Relay DC negative from battery via N/C contacts on Emergency Stop(s)