GCU-20
Automatic Engine Control Unit

WARNING
Disconnect all electric power to the machine before installation

Protection Functions

Engine fail to start
Engine tries 3 times to start

Engine Low Oil Pressure Protection
Shutdown activated after 3 seconds
Oil Pressure Switch Type NO or NC

Auxiliary Shutdown
Shutdown activated after 3 seconds delay by NO contact

Engine High Water temperature Protection
Shutdown activated after 3 seconds delay by NO contact

Engine Over-speed Protection
Shutdown activated after 3 seconds
50Hz activated at 55 Hz - 60Hz activated at 66 Hz

Engine Under-Speed Protection
Shutdown activated after 5 seconds
50Hz activated at 45 Hz - 60Hz activated at 54 Hz

No Speed Signal Present Protection
Shutdown activated after 5 seconds (MPU use only)

Icon Reference Table

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨</td>
<td>Low Oil Pressure Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>🚨</td>
<td>Auxiliary Alarm (Flashing)</td>
<td>Red</td>
</tr>
<tr>
<td>🚬</td>
<td>High Water Temperature Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>⚠️</td>
<td>Over Crank Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>🚨</td>
<td>Wrong speed Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>🚨</td>
<td>No Speed Signal Alarm (Flashing)</td>
<td>Red</td>
</tr>
<tr>
<td>🔥</td>
<td>Engine Running Indicator</td>
<td>Green</td>
</tr>
<tr>
<td>🔥</td>
<td>Engine IDLE (Flashing)</td>
<td>Green</td>
</tr>
<tr>
<td>🔥</td>
<td>Engine Pre-Heat Indicator</td>
<td>Red</td>
</tr>
</tbody>
</table>

Mounting Pattern

Physical Dimensions
Potentiometers & Dip Switches Detail

![Potentiometers & Dip Switches Diagram]

**Adjustments**
On the back of the GCU-20 we have five adjustment pots that modify time delay functions.

- **A**: Engine Pre-Heat Timer (Adjustable from 2 to 30sec)
- **B**: Energized to STOP Timer (Adjustable from 1 to 15sec)
- **C**: Engine Cool-down Timer (Adjustable from 0 to 300sec)
- **D**: Starter Cranking time Timer (Adjustable from 1 to 15sec)
- **E**: Engine Idle (Governor) Timer (Adjustable from 0 to 300sec)

**Function Setting**
Also in the back, the GCU-20 we have six dipswitches that set specific working parameters.

- **SW 1**: Oil Pressure Switch Used for Crank Disconnect
  - ON - Disable
  - OFF - Enable

- **SW 2**: Oil Pressure Switch Type
  - ON - Normal Open
  - OFF - Normally Close

- **SW 3**: Engine Stop Setting
  - ON - Energize to Start
  - OFF - Energize to STOP

- **SW 4**: Generator Frequency (Ignore if it is a Water Pump)
  - ON - 50Hz
  - OFF - 60Hz

- **SW 5**: MPU Setting
  - ON - Enable (used to Program Speed)
  - OFF - Disable

- **SW 6**: Speed Signal Type
  - ON - Use MPU for speed sensing
  - OFF - Use AC generator frequency for speed sensing

**Lamp Test Function**
Applying battery (+) signal to terminal 1 (Lamp Test Terminal) the GCU-20 turns on all the front panel LEDs and annunciator lamps.

**Using with MPU**
If you use the MPU for speed sensing instead of the generator frequency you must set (Switch 6 to ON), and depending on flywheel size (different generators have a different MPU frequencies). This nominal frequency MUST be set FIRST.

It is easy, if you follow the procedure below

**Step 1**: Move Switches 5 & 6 to "ON" before starting engine.

![Switch Settings Diagram]

**Step 2**: Start engine, by moving panel switch to "TEST" (Manual Start)

**Step 3**: Run the engine normally at its rated speed. (60 or 50 Hz) or pump rated RPM

**Step 4**: Now quickly move Switch 5 to "OFF"

**Step 5**: When MPU LED turns GREEN setup is complete.

**MPU Setup failure**
If setup fails, the control module shuts down the engine and immediately flashes ON all the LEDs on the front panel. Check MPU and wiring before repeating this setup again.

**WARNING**
If the MPU signal is used for speed sensing (Switch 6 ON), but MPU frequency set up has not yet been completed the MPU indicator will flash RED and the engine will not run under any condition.

However, if the user tries to start the engine a “No Speed Signal” warning LED will continue to flash indicating that the user should repeat the set up of the MPU frequency setting or switch to generator frequency sensing.
**Specification**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Supply</td>
<td>9.0 to 35 VDC</td>
</tr>
<tr>
<td>Alternator Input Range</td>
<td>5 ~ 300VAC</td>
</tr>
<tr>
<td>Alternator Input Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>MPU Signal Input Range</td>
<td>± 2V to 70V Peak</td>
</tr>
<tr>
<td>Rated MPU Frequency</td>
<td>100 Hz ~ 10,000 Hz</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 °C to +70 °C</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>90% or Below</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Under 3VA</td>
</tr>
<tr>
<td>Weight</td>
<td>200 gram</td>
</tr>
</tbody>
</table>

**TEST Operation**

To initiate a start sequence moves the external toggle switch to the on TEST (Manual Start) position.

- **First**, the pre-heat timer begins by energizing terminal 12. If Pre-Heat is not used, simple no use this terminal.
- **Second**, the Engine Fuel Solenoid energizes terminal 11, and idle terminals 22.
- **Third**, after a 1 sec. delay, the starter motor energizes, and the engine cranks for the duration of the crank timer.
- **Fourth**, after the engine (start/fires), the starter motor disengaged and locked out by using the 18-Hertz signal from the generator or the signal from the MPU. Alternatively, the oil pressure switch can serve as an additional back up crank disconnect.
- **Fifth**, after the engine fires and if the Engine Idle option is used, the ENGINE RUNNING LED will continuous flashing in idle indicating the status is IDLE. (If engine idle is not used -- set adjustment, “E” full counterclockwise)
- **Sixth**, if the engine does not start the first time the module will try again to start the engine 2 more times and stop after the third try.

**OFF Operation**

The OFF position places the module into Stop or Reset mode.

- In RESET, the operator should fix any problems that stopped the engine.
- Selecting OFF when the engine is running automatically STOPS the engine by removing its fuel supply. Should a remote start signal returns while operating in OFF a remote start cannot occur.
Genset can be operated normally only when MPU indicator in green.
**BASIC SET-UP**

### Adjustments

- **A**: Engine Pre-Heat Timer [Full CCW]
- **B**: Energized to STOP Timer [Full CCW]
- **C**: Engine Cool-down Timer (Adj 0 to 300sec) [Full CCW]
- **D**: Starter Crank Time Timer (Adj 1 to 15sec) [1/2 way]
- **E**: Engine Idle (Governor) Timer [Full CCW]

### Setting DIP/switches [Normal Settings]

- **SW 1**: Oil Pressure Switch Used for Crank Disconnect
  - **ON**: Disable
  - **OFF**: Enable
- **SW 2**: Oil Pressure Switch Type
  - **ON**: Normal Open
  - **OFF**: Normally Close
- **SW 3**: Engine Stop Setting
  - **ON**: Energize to Start
  - **OFF**: Energize to STOP
- **SW 4**: Generator Frequency (Ignore if it is a Water Pump)
  - **ON**: 50Hz
  - **OFF**: 60Hz
- **SW 5**: MPU Setting
  - **ON**: Enable (used to Program Speed)
  - **OFF**: Disable
- **SW 6**: Speed Signal Type
  - **ON**: Use MPU for speed sensing
  - **OFF**: Use AC generator frequency for speed sensing