The Model GCU-10 is an Automatic Engine Control Module, designed to meet the demand of the generator industry. The module starts and stops the generator, and at the same time indicates the operation status and fault conditions, if it senses a fault it will automatically shuts down the engine and indicates the engine failure by means of eight LED’s. The technician can program the module according to different generator requirements complying with different conditions and protections.

**Protection Setting**

**Engine fail to start reattempt**
- Engine tries 3 times to start

**Engine High Water temperature Protection**
- Shutdown activated after 3 sec delay by NO Contacts

**Engine Low Oil Pressure Protection**
- Shutdown activated after 3 seconds
- Oil Pressure Switch Type: NO or NC Contacts

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

**Engine Underspeed Protection**
- Shutdown activated after 5 seconds
- At 50Hz activation at 55 Hz - 60Hz activation at 66 Hz

**Emergency Shutdown**
- Shutdown activated by NO Contacts

**Spare / User define Shutdown**
- Shutdown activated after 5 sec delay by NO Contacts

**Low Battery Voltage Warning**
- Activated after 5 seconds delay
- For 12VDC activated at 10VDC - 24VDC activated at 20DCV

**Icon Reference Table**

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Power Source" /></td>
<td>Power Source</td>
<td><img src="image" alt="Over-speed" /></td>
<td>Over-speed</td>
</tr>
<tr>
<td><img src="image" alt="Engine Running" /></td>
<td>Engine Running</td>
<td><img src="image" alt="Under-speed" /></td>
<td>Under-speed</td>
</tr>
<tr>
<td><img src="image" alt="Start Failure" /></td>
<td>Start Failure</td>
<td><img src="image" alt="Emergency Stop" /></td>
<td>Emergency Stop</td>
</tr>
<tr>
<td><img src="image" alt="High Water Temperature" /></td>
<td>High Water Temperature</td>
<td><img src="image" alt="Spare Shutdown" /></td>
<td>Spare Shutdown</td>
</tr>
<tr>
<td><img src="image" alt="Low Engine Oil Pressure" /></td>
<td>Low Engine Oil Pressure</td>
<td><img src="image" alt="Low Battery Voltage" /></td>
<td>Low Battery Voltage</td>
</tr>
</tbody>
</table>

**Adjustment**

In the back, the GCU-10 has five adjustment pots that changes five common time delay functions.

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

**Function Setting**

On the back of the control we have five pins dipswitches that set the specification of the genset.

- **SW 1: Generator Frequency**
  - ON-50Hz - OFF-60Hz
- **SW 2: Battery Voltage**
  - ON-12V - OFF-24V
- **SW 3: Fuel Solenoide**
  - ON: Energize to Start - OFF: Energize to Stop
- **SW 4: Oil Pressure Switch Type**
  - ON - Normal Open Sensor - OFF - Normal Close Sensor
- **SW 5: Oil Pressure Switch (Used For Crank Disconnect)**
  - ON - Disabled, not used for crank disconnect
  - OFF - Enable, used for crank disconnect

**Specification**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Supply</td>
<td>9.0 to 36 VDC</td>
</tr>
<tr>
<td>Alternator Input Range</td>
<td>5 ~ 300 VAC</td>
</tr>
<tr>
<td>Alternator Input Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Fuel Solenoid Signal Output</td>
<td>5 Amp @ 12/24 VDC</td>
</tr>
<tr>
<td>Start Signal Output</td>
<td>5 Amp @ 12/24 VDC</td>
</tr>
<tr>
<td>Warm up Signal Output</td>
<td>5 Amp @ 12/24 VDC</td>
</tr>
<tr>
<td>Alarm Signal Output</td>
<td>5 Amp @ 12/24 VDC</td>
</tr>
<tr>
<td>Idle Control Conductor Capacity</td>
<td>5 Amp @ 12/24 VDC</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>100 gram</td>
</tr>
</tbody>
</table>

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Manual Operation

To initiate a start sequence moves the front control knob to MANUAL.

- The LED above the knob illuminates indicating the generator is in MANUAL.

First, the Pre-Heat timer begins by energizing terminal 4. When Pre-Heat is not used set adjustment “A” full counterclockwise.

Second, the engine Fuel Solenoid is energizes by terminal 10, together with governor idle terminals 14 & 15.

Third, After a 1 sec. delay, the starter motor engages, and the engine cranks for the duration of the crank timer.

Fourth, after the engine fires, the starter motor is disengaged and locked out with the 18-Hertz signal from the generator output. Alternatively, the oil pressure switch can serve as an additional back up crank release.

Fifth, after the engine fires and if the Engine Idle option is activated, the ENGINE RUNNING LED will, continuous flash during the idle period indicating the status is IDLE. (If engine idle is not used set adjustment “D” full counterclockwise.

Sixth, should the engine not fire on the first attempt and the crank timer expires the module will once again attempt to start the engine until the engine fires or after the third attempt is completed.

Should the generator fail to start, place the front knob in the OFF (Reset) mode. Establish why the engine failed to fire before making any more start attempts.

After the generator starts, the module allows Oil Pressure, High Engine Temperature, Underspeed, and the Auxiliary fault input to stabilize without triggering any faults for 20 seconds. After 20 sec. full fault protection is available.

By moving the knob to the OFF position, the genset will STOP immediately.

Automatic (Remote Mode) Operation

By moving the knob to the “AUTO” mode, the POWER SOURCE LED will start flashing indicating the module is in AUTO and the genset can start at any time.

In the “AUTO” position, the module monitors input terminal 9 for a “REMOTE START” signal. Should a “REMOTE START” signal be detected a start sequence similar to previous manual start sequence is initiated.

When removing the Remote Start signal the Automatic Cool Down delay times out, the Fuel Solenoid is (de-energized or energized as the case may be) bringing the generator to a stop and the POWER SOURCE LED will start flashing, indicating the genset is on standby and ready to start.

Should the Remote start signal be re-activated during the cooling down period, the set will immediately return to load.

NOTE

Even if the generator is executing Engine Cool down Timer, The Module protection system remain in operation and if any failure occurs, the module bypasses the Engine Cooling Timer shutting down the generator immediately.

OFF Operation

The OFF position places the module into STOP or RESET mode.

In RESET mode the operator must clear any fault conditions.

Selecting OFF when the engine is running automatically STOPS the generator. The fuel supply will be removed and engine will be brought to a standstill. Should a remote start signal be present while operating in this mode, a remote start will not occur.

Standard Wiring Diagram

Please link to http://www.mtspowerproducts.com for detailed manual
Function Setting
In the back, the GCU-10 has five pins dip switch that set the specification of the genset.
SW 1: Generator Frequency
ON-50Hz OFF-60Hz
SW 2: Battery Voltage
ON-12V OFF-24V
SW 3: Stop Solenoid
ON - Energize to Start OFF - Energize to Stop
SW 4: Oil Pressure Switch Type
ON-Normal Open NO OFF/Normal Close NC
SW 5: Oil Pressure Switch (Crank Disconnect)
ON - not used for crank disconnect
OFF - used for crank disconnect

Adjustment
In the back, the GCU-10 has five adjustment pots that change the time delay functions.
A: Engine Pre-Heat—Adjustable from 2 to 30sec
B: Starter Cranking time—Adjustable from 1 to 15sec
C: Energize to STOP—Adjustable from 1 to 15sec
D: Engine Idle (Governor)—Adjustable from 0 to 300sec
E: Engine Cool-down—Adjustable from 0 to 300sec