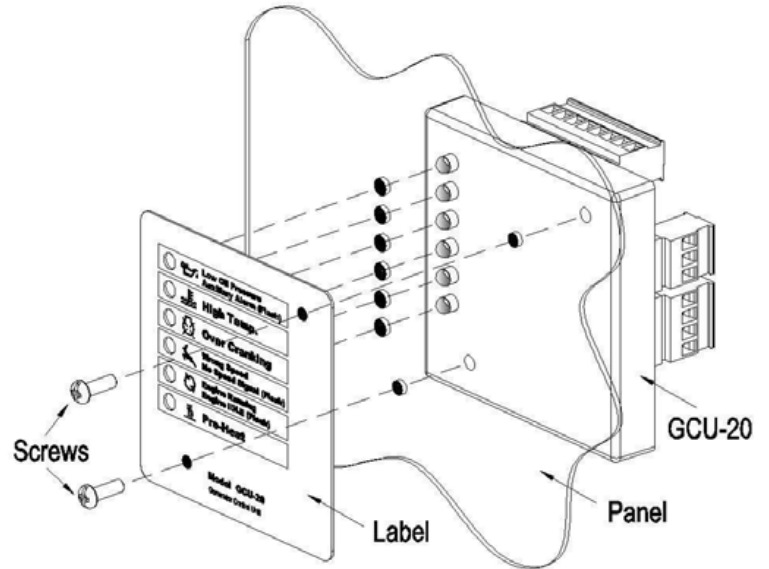


# GCU-20

## Automatic Engine Control Unit



### Installing Panel



### 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

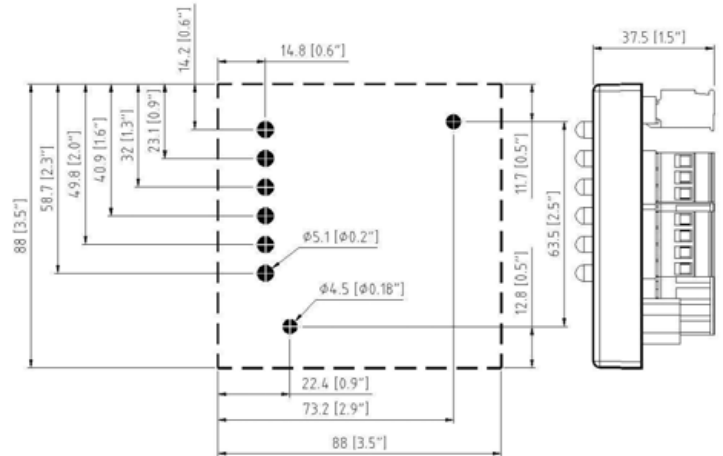
#### Engine Under-Speed Protection

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)

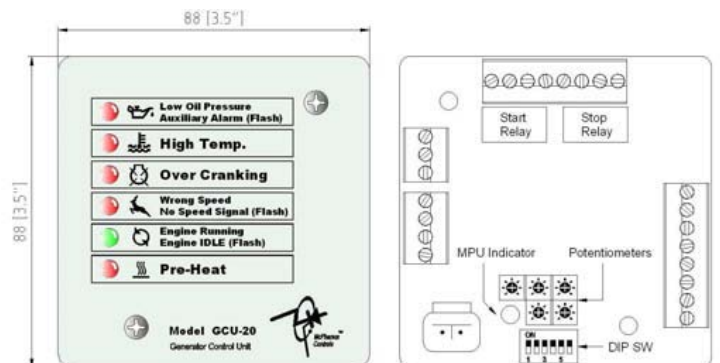
### Mounting Pattern



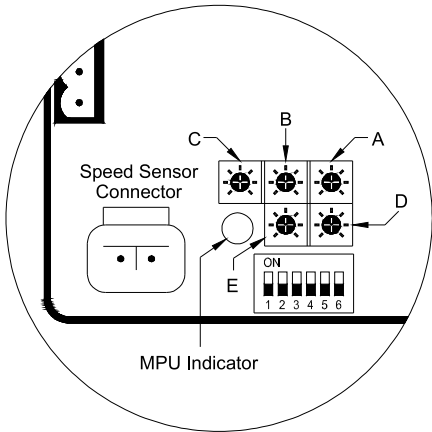
### Icon Reference Table

ICON	DESCRIPTION	COLOR
	Low Oil Pressure Alarm Auxiliary Alarm (Flashing)	Red
	High Water Temperature Alarm	Red
	Over Crank Alarm	Red
	Wrong speed Alarm No Speed Signal Alarm (Flashing)	Red
	Engine Running Indicator Engine IDLE (Flashing)	Green
	Engine Pre-Heat Indicator	Red

### Physical Dimensions



## Potentiometers & Dip Switches Detail



### 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 dip/switches 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

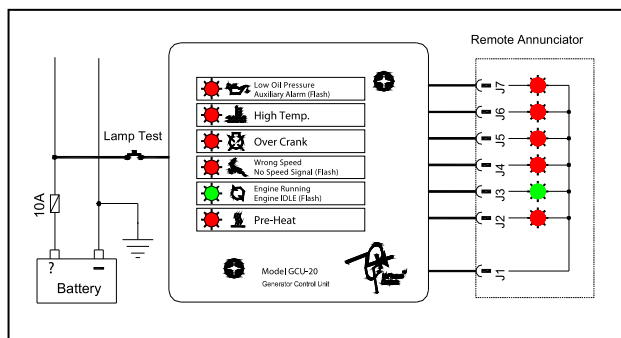
**SW 4: Generator Frequency (Ignore if it is a Water Pump)**  
 ON - 50Hz      OFF – 60Hz

**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.

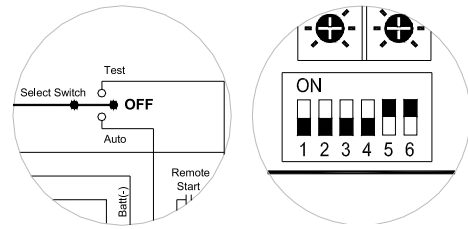


## Using with MPU

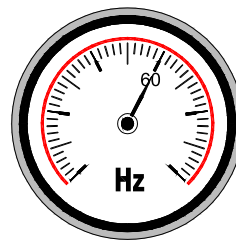
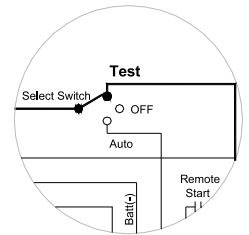
If you use the MPU for speed sensing instead of the generator frequency you must set (Switch 6 to ON), and depending on flywheel size (different generators has a different MPU frequencies). This nominal frequency MUST be set FIRST.

It is easy, if you follow the procedure below

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

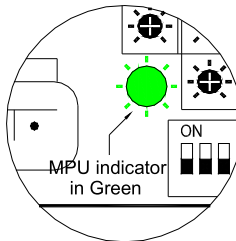
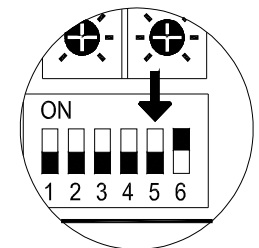


**Step 2 :** Start engine, by moving panel switch to “TEST” (Manual Start)



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

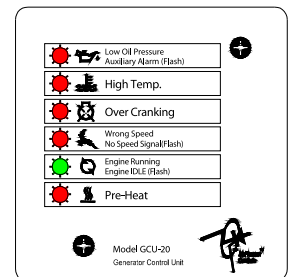
**Step 4 :** Now quickly move Switch 5 to “OFF”



**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

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

## Terminals Detail

Pin NO.	Current Max.	DESCRIPTION
1	10mA	Lamp test input
2	10mA	Oil switch input
3	10mA	Temperature switch input
4	10A	Auxiliary switch input
5	10A	Start signal output
6	10A	Battery negative input
7	10mA	AUTO switch input
8~9	10mA	Remote start signal input
10	10mA	Test switch input
11	10A	Fuel/Stop signal output
12	300mA	Pre-heat signal output
13~18	300mA	Annunciator signal output
19	300mA	Warm-up signal output
20	1A	Annunciator common used only <b>Don't use as main ground connection</b>
21	1A	Accessory ON signal output
22	1A	IDLE control output
23	10A	Battery positive input

## 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, simply do not use this terminal.

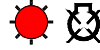
**Second**, the Engine Fuel Solenoid energizes terminal 11, and idle terminals 22.

**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.



**If the generator fail to start, move the select switch to the OFF (Reset) position, Find out why the engine failed to start before making any more start attempts.**

**Seven**, after the generator starts, the module allows Oil Pressure, Engine Temperature and engine speed to stabilize without triggering any faults for 20 seconds.

Moving the toggle switch to the OFF position, Stops the engine immediately

## AUTO (Remote Start) Operation

In the "AUTO" mode, the GCU-20 control module monitors input terminals 8 & 9 for a "REMOTE START" signal. Should a "REMOTE START" signal be detected a start sequence similar to previous manual start cycle is initiated.

Removing the Remote Start signal automatic activates the Cool Down Timer and after the Cool Down ends, the Fuel Solenoid is (de-energized or energized as the case may be) bringing the generator or engine to a complete stop.

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

### NOTE

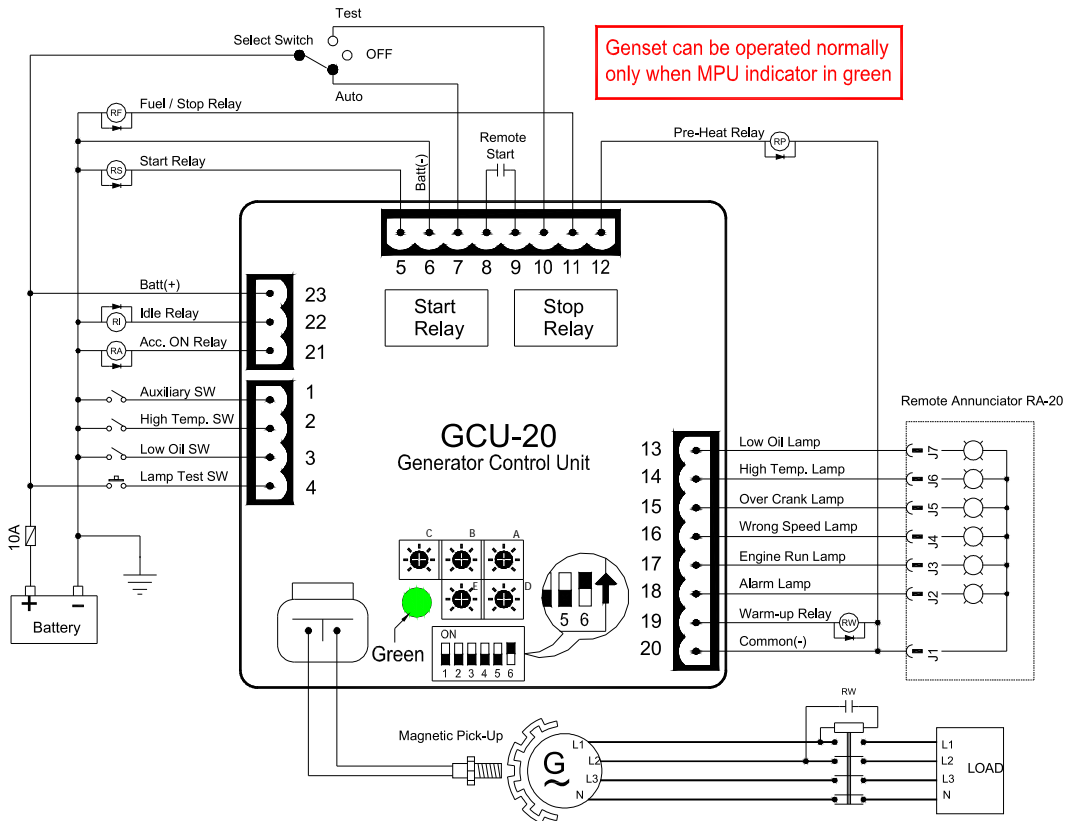
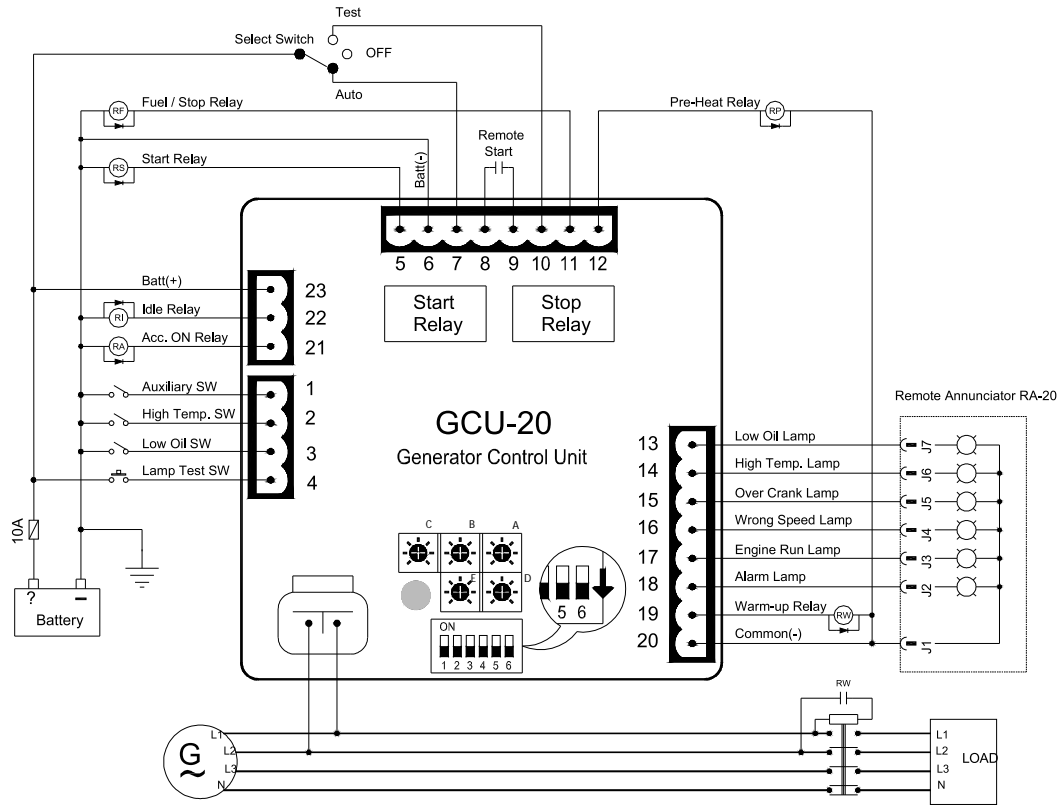
**Even if the generator is un Engine Cool down, The Module protection system remains active and if any failure occurs, the module bypasses the Engine Cooling Timer shutting down the generator/engine immediately.**

## OFF Operation

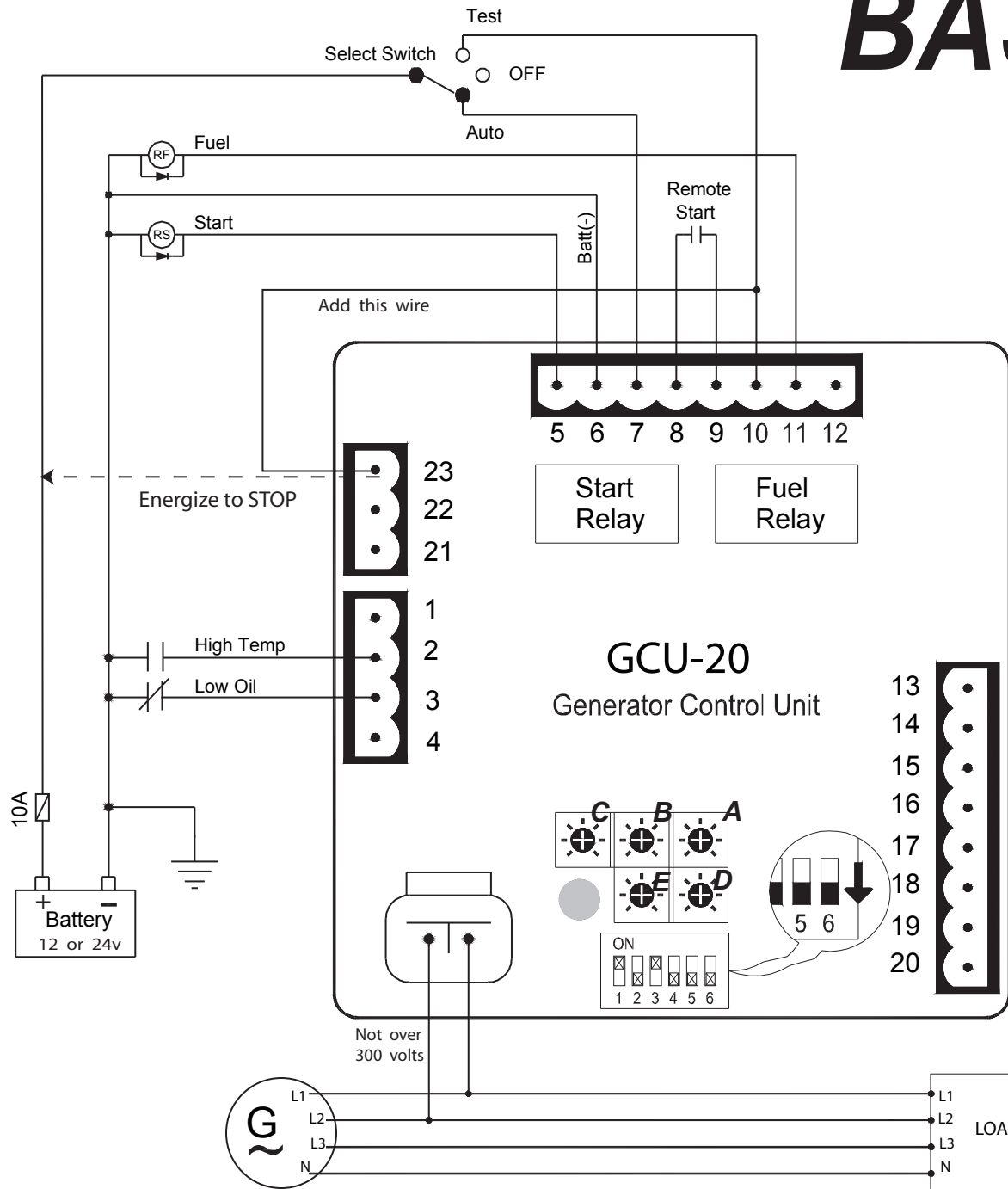
The OFF position places the module into Stop or Reset mode.

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.



# BASIC SET-UP



## Adjustments

- A : Engine Pre-Heat Timer
- B : Energized to STOP Timer
- C : Engine Cool-down Timer (Adj 0 to 300sec)
- D : Starter Crank time Timer (Adj 1 to 15sec)
- E : Engine Idle (Governor) Timer

## Setting DIP/switches

- 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