

# Automatic Battery Charger Manual

## ( MODEL : SMS TYPE )

### ● WARNING :

**To prevent personal injury or equipment damage, only qualified technicians /operators should install, operate or service this device.**

### ● CAUTION :

**Megger and high potential test equipment should not be used.**

**Incorrect use of such equipment could damage components contained in the unit.**

1. APPLICATION : This automatic battery charger has been designed to continuously charge a Lead-Acid Battery to start engine generator set by the switching mode power supply (SMPS), which is most essential to give emergency power to the equipment in the event of main power failure.

### 2. FEATURES :

- 2.1. Charges batteries with constant voltage and current.
- 2.2. Protection against the reverse property of battery.
- 2.3. Current limited automatically (does not require disconnect on engine crank).
- 2.4. Low ripple voltage (below  $\pm 1\%$ ).
- 2.5. Durable for continual use at maximum capacity by wide heat radiation area.
- 2.6. Durable under a damp and vibrating environment by silicon coating.
- 2.7. Useable for 50Hz & 60Hz.
- 2.8. Equalizing and floating charging.
- 2.9. High efficiency (over 80%).
- 2.10. Battery discharge protection at AC input power off (Patented).
- 2.11. Adopted Switching Mode Control method (SMPS).
- 2.12. Easily field adjustable without battery connection.

### 3. SPECIFICATION :

- 3.1. Control panel mounted type.
- 3.2. Input voltage : 220 Vac  $\pm 10\%$  (110Vac : **optional**)
- 3.3. Frequency : 60Hz or 50 Hz
- 3.4. Phase : a single phase
- 3.5. Output voltage : 24Vdc or 12 Vdc
- 3.6. Output current : 5A dc , 10A dc
- 3.7. Output control mode : Switching Mode by use of F.E.T
- 3.8. Output control method : constant voltage and current.
- 3.9. Efficiency : over 80%
- 3.10. Setting voltage for float charging 

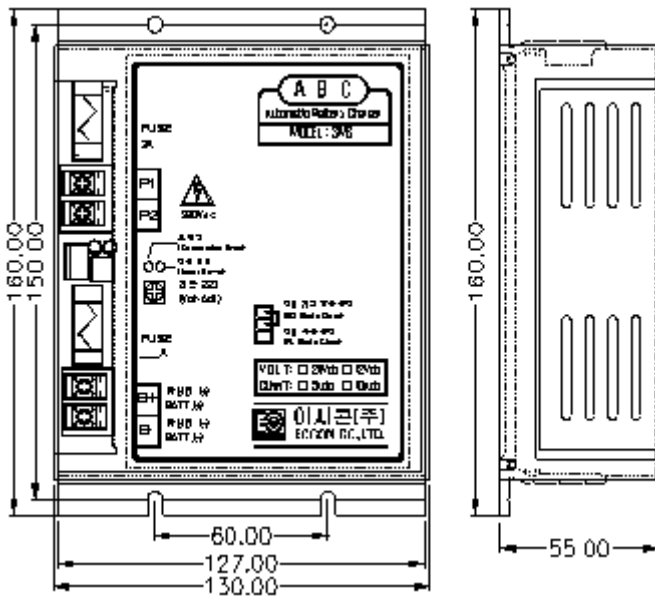
	24V Battery - 26.4Vdc
	12V Battery - 13.2Vdc
- 3.11. Setting voltage for equalize charging 

	24V Battery - 28.8Vdc
	12V Battery - 14.4Vdc
- 3.12. Charging current adjustable range : less  $\pm 20\%$  of nominal current value
- 3.13. Durable time at over load : 2 hours at 120% of nominal current value
- 3.14. Voltage adjustable range for float charging and equalize changing :

METHOD	24V battery system	12V battery system
Float charging	26.4V dc $\pm 5\%$ (=24 ~ 28Vdc)	13.2Vdc $\pm 5\%$ (=12 ~ 14Vdc)
Equalize charging	28.8V dc $\pm 5\%$ (=26 ~ 30Vdc)	14.4Vdc $\pm 5\%$ (=13 ~ 15Vdc)

#### 4. STRUCTURE

- ▶ Size (W \* D \* H) : 130 \* 55 \* 160(mm)
  - └ 12Vdc-5A,10A Charger.
  - └ 24Vdc-5A,10A Charger.
- ▶ Color : Bottom- dark gray , Cover- ivory
- ▶ Weight : about 1.2kg



#### APPERANCE

#### 5. CONDITION FOR USE :

- 5.1. Ambient Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$   
(storage temperature :  $-25 \sim 60^{\circ}\text{C}$ )
- 5.2. Relative Humidity : 85 %

#### NOTE 1

**Be sure area around battery is well ventilated and away from a damp, vibrating environment and contaminated substance.**

#### 6. INDICATIONS AND ADJUSTER :

- 6.1. Input power [yellow] : indicates when AC input power turns on.
- 6.2. Connection error [red] : indicates B+ and B- line reverse connection to the battery.
- 6.3. Charging select Connector
  - floating charge: Charge indicator lamp next to the connector link
  - Equal Charge: Charge indicator lamp next to remove the connector

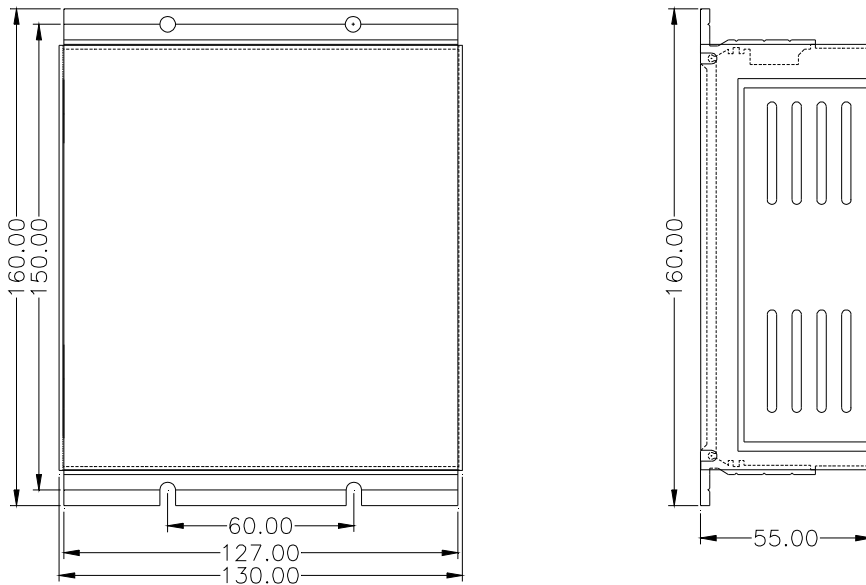
#### 7. INPUT & OUTPUT TERMINALS :

- 7.1. P1,P2 ; AC power input terminals to 220Vac power
- 7.2. B+,B- ; DC power output terminals, B+ should be connected to the positive terminal of the battery and B- to the negative.

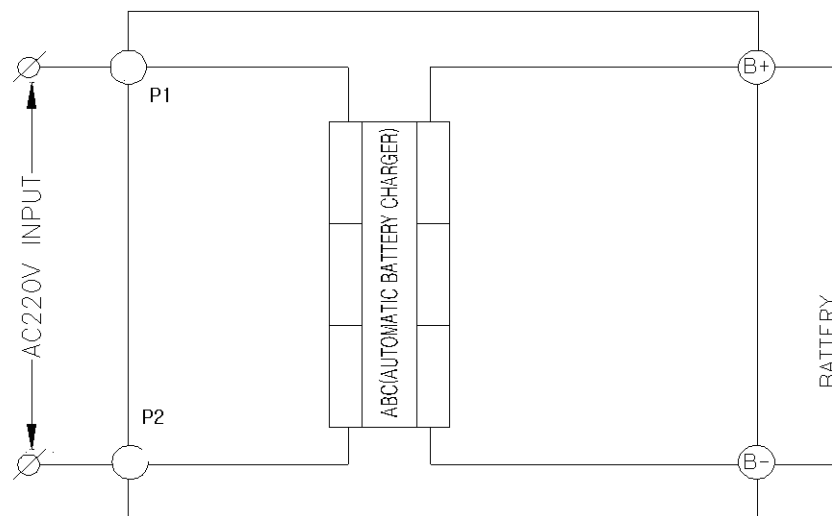
8. INSTALLATION AND CONNECTION

8.1. Installation

The charger shall be installed well ventilated away from a damp, vibrating, environment and without substance to obstruct maintenance and access.



- 8.2. Connect the specified AC input power with P1, P2 terminal of battery charger.
- 8.3. Connect the positive line of battery to B+ and the negative line to B-, respectively.
- 8.4. Check if connection error lamp indicates in above 8.3, and correct the properties of the lines (B+, B-) to the battery.



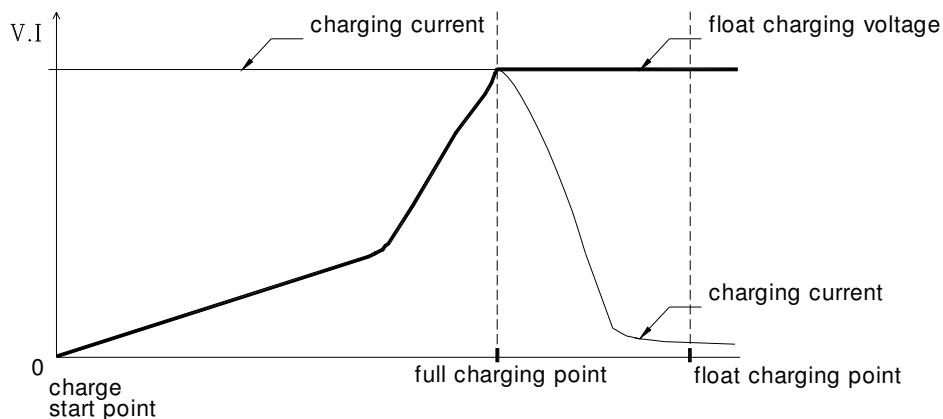
WIRING CONNECTION

## 9. TEST AND OPERATION

- 9.1. Turn on AC input breaker, then input power indicator lights.
- 9.2. If the connection error indicator lights, check the properties of battery.
- 9.3. Charging method selection

### ► Float charging

This charging is normal operation mode to charge the battery for starting the engine genset, which stands by main power cut off. When all connection have been completed as per above wiring connection drawing, then make two breakers (AC input, DC output) “ON”, charger starts charging action at float charging.



FLOAT CHARGING CURVE

As the battery is installed from storage condition and the charger start charging battery charger operates along with above float charging curve. In other words, when two breakers turn on, the charger supply the nominal current to the battery at low voltage until it reaches full charge point, from this point the current decrease slowly to keep on a little current at constant voltage (= float charging voltage),

### ● NOTE 2

**Generally, on float charging mode not to need a rush current like engine starting, the battery charger must keep output voltage to be a constant float charging voltage at the full charged condition of the battery and output current below 1.5 ~ 2A<sub>dc</sub>, which is the current to supply the consumption quantity for the electrical loads connected to the battery. But when engine starting occurs with the battery under-charged below float charging voltage, the charger will supply all of theses current to the load and it may cause battery damage.**

### ► Equalize charging

The purpose of the periodic equalize charging is to ensure that all of the battery cell are at full charge. but, equalizing voltage charge should be done until the equalize charging time expires one time every 3 months.

This charging starts by pushing equalize charging start push button [red color], equalize charging voltage is set at the factory before it ex-work.

- 9.4. Adjusting floating and equalizing voltage are set by VR2 on the PCB inside of battery charger.
- 9.5. Limit current adjustment.  
 Turing potentiometer VR1 on the PCB of battery charger cause to change DC output current limit up to  $\pm 20\%$  of nominal current. This current limit values is set at the factory prior to ex-work.

**NOTE 3**

**When charging mode select switch is in equalize position, be careful not to be over-charged into the battery, to avoid battery's overcharge, Equalize charging time is recommended below 6hrs.**

10. TROUBLE SHOOTING

SECTION	SYMPTOMS	PROBABLE CAUSE	ACTION
No output	No DC output and AC failure lamp lights.	1.AC input power is cut off. 2.AC input breaker open 3.DC output breaker open	1.Check the AC input lines and fuse inside of the charger. 2.Turn on the breaker. 3.Turn on the breaker.
Fault	Connection Error Lamp lights.	Two lines(B+,B-) to the battery has wrong connection.	Check the property of the battery and correct the lines.  Fused to exchange
Battery's Problem	1.The charger doesn't work.  2.Charger's input breaker off immediately.	1-1.Battery's remaining voltage is below 7Vdc. 1-2.The poor battery charger  2.Leads(wires) short circuit.	1-2.Replace with new one.  2.Open the cover and check leads inside of the charger.