POWERTECH

12V 30A Battery Charger
For Lead Acid and Lithium Batteries
MB3621
User Manual

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the battery charger.

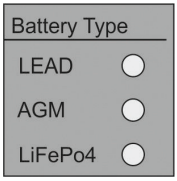
Read through the manual and pay special attention to the markings and labels of the charger, battery and equipment connected to the battery system.

Pay special attention to WARNING & PRECAUTIONS used in this manual.

Quick user guide:

1. Check the rating label for correct AC voltage.
2. Connect to AC socket, "Bulk" LED will flash then change to "Abs" LED.
3. The "LEAD" LED is the default battery type.
4. Select appropriate battery lead, B or C, below. (A comes pre-fitted to charger).
5. Disconnect AC, connect lead to battery, then reconnect AC.

USING THE SET BUTTON



a. Short press for battery type and DC source selection.
Short press on the "SET" button will cycle as follows:
LEAD • > AGM • > LiFePo4 • > 13.5V •••> LEAD • >AGM • >LiFePo4 • >etc Note:: "•••"
All 3 LEDs on means output is set at 13.5V with 20A Max.

b. Simply stop at your desired battery type, DC Source Mode, or charger.
Note: Unit will retain the selected setting even after has been disconnected from AC and battery.

c. Long press (5 sec) for LOW MODE, NIGHT MODE, EQ MODE & EXIT.

When battery type set at AGM or LiFePo4:
Long Press (5 sec)
for LOW > NIGHT > EXIT > LOW > NIGHT > EXIT > LOW > NIGHT > EXIT etc

If battery type is set to "LEAD":
Long Press (5 sec)
for LOW > NIGHT > EQ > EXIT > LOW > NIGHT > EQ > EXIT > etc

5. "LOW" = Low Power Mode: LED flickers, charger is set to Half Power Mode of 15Amp Maximum. Use for batteries under 100 Amp/hour.

6. NIGHT = Night Mode: LED steady
   8 hours @15Amp maximum output and no fan (for quiet night-time operation).
   Charger returns to normal max 30Amp with fan, at the end of 8 hours.

7. Exit from Night mode or Low Power Mode by 5 sec long press to unlock and further 5 sec press to exit.

Note:

Auto-Lock Up of charger:
The charger will be locked with the current selection 3 minutes after the last press of the SET button. If SET button is pressed before Lock starts, a new 3 minute count down starts.

To unlock the charger:
5 second long press on the SET button to unlock. All LEDs will flash to confirm that charger has been unlocked.

NOTE:
Failure to heed the following warnings may cause injury to persons and damage to Equipment.

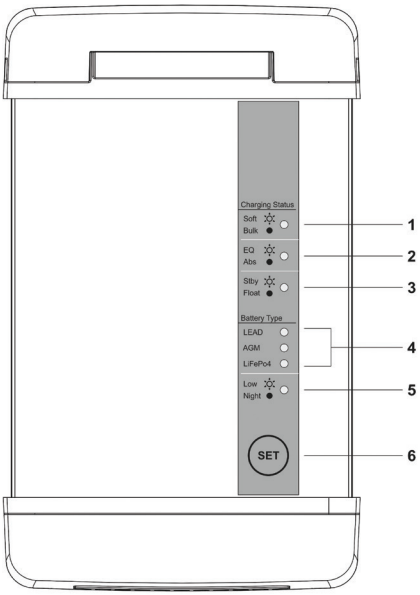
WARNING:
- The charger is not designed for any life support application.
- The charger is designed for indoor use. Protect the charger from moisture.
- This charger is made to charge only correctly-sized lead acid batteries and Lithium Fe PO4 (LFP).
- Do not attempt recharge non-rechargeable batteries.
- Charging other types of battery or under-sized lead acid batteries may cause fire or explosion.
- Do not use the charger if it has been dropped or damaged.
- Do not remove casing of the charger, there are no user -serviceable parts inside.
- Never attempt to charge a frozen battery.
- Never attempt to charge a damaged battery.
- Wear protective eye-wear and turn your face away when connecting or disconnecting the battery.
- Never place the charger on top of a battery.
- Never smoke, use an open flame, or create sparks near battery or charger during normal charging operation as batteries may give out explosive gas.
- Do not charge batteries in a sealed enclosure due to possible explosion of trapped explosive gas.
- Disconnect the AC mains supply before connecting or disconnecting the links to the battery.
- If the charger does not work properly or if it has been damaged, unplug all connections.

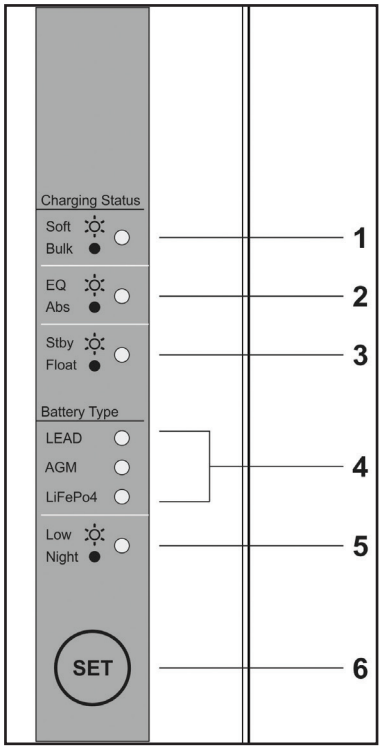
Introduction

This charger is designed for applications that demand adaptive charging for Lead Acid based and LiFePO4 (LFP) batteries. Most sealed batteries with or without load can be connected to the charger indefinitely* and the charger will keep on monitoring the battery. It has temperature compensated charging when connected the supplied battery temperature sensor. The Sleep Mode is to ensure a silent 8 hour charging period free of cooling fan noise.

**This is not recommended for "open" lead-acid batteries, ie, ones with removable filler caps.*

Control & Indicators





1. Bulk and soft start charger indicator.

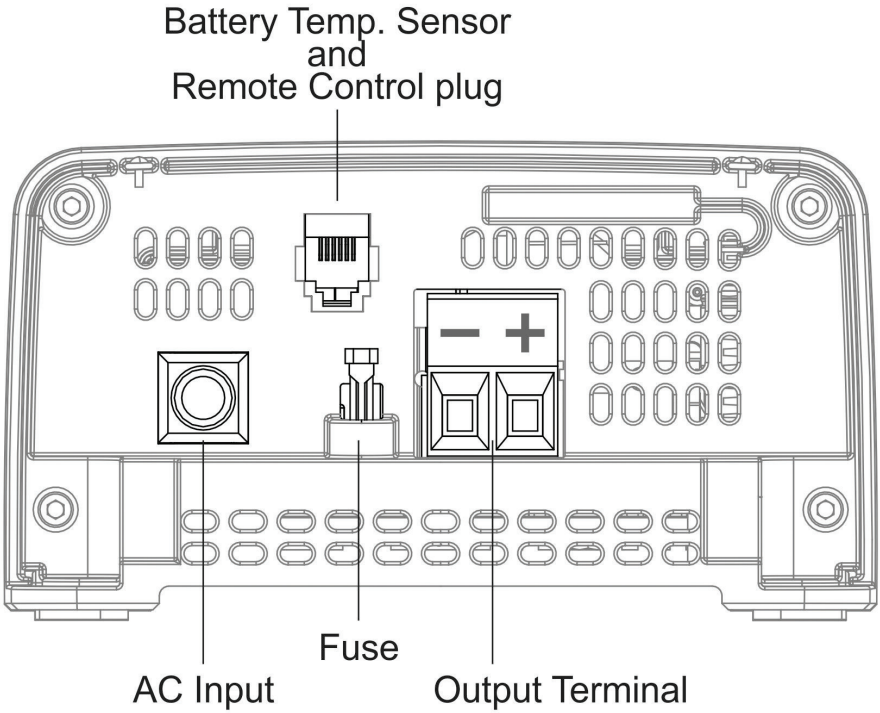
2. Absorption and Equalization charge indicator.

3. Float charge and Standby indicator.

4. Battery Type & 13.5V DC Source indicator.

5. Low mode and Night mode indicator.

6. Set Button for selection of battery type & operation mode.



NOTE:
MB3621 has Anderson-Type plug pre-fitted.

Using the Charger

After connection to the AC supply, the “Bulk” LED will light up first, then quickly switch to “Abs” (Absorb) LED. The default battery type “LEAD” LED should also be on showing charger is working correctly.

Battery Type and DC source Selection Procedure

You can select your desired mode by short presses on the SET button, in this sequence:
LEAD > AGM > LiFePo4 > 13.5V DC (3 battery type LEDS ON) >
LEAD > AGM > LiFePo4 > 13.5V DC (3 battery type LEDS ON) ... etc

Simply stop at your desired battery type or 13.5V DC Source. The charger remembers the setting even after AC & Battery are disconnected.

Low / Night / EQ Selection Procedure

Long Presses for LOW MODE, NIGHT MODE, EQ MODE & EXIT.

When battery type set at AGM or LiFePo4.

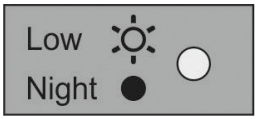
Long Press (4 second) for
LOW > NIGHT > EXIT > LOW > NIGHT > EXIT > LOW > NIGHT > EXIT

When battery type set at LEAD

Long Press for
LOW > NIGHT > EQ > EXIT > LOW > NIGHT > EQ > EXIT >

Low Mode & Night Mode

Flickering LED is Low Mode @
Solid LED is Night Mode @



In “Night” mode, maximum current is reduced to15 Amps in all modes. This allows the MB3621 to run with the cooling fan disabled, so that the charger is virtually noiseless. The Night Mode also has an 8-hour timer which automatically resets it back to normal mode (with the maximum 30 Amp charging current). Low mode is more suitable for batteries less than 100Ah. Both modes are ideal for use in caravans or campers where the Night mode is good for situations requiring a high day time load and low operating noise when people are sleeping.

Equalization Mode (Recondition Mode)

This charging profile is only applicable to Lead Acid batteries, in particular the flooded cell type. It reconditions incorrectly discharged batteries, reducing stratification and sulphation. It also gives the individual battery cells a better-balanced charge. Once set, the charging algorithm is automatic. The charger will go through Soft Bulk (for deeply discharged battery) > Bulk > Absorption > Equalization > Float charge stages.

WiFi default setting (WiFi version only)

The default WiFi setting for charger is set to direct connection mode (Ad-hoc). The default SSID started with m_link and NO password is needed. To reset WiFi to default setting, first make sure the charger is unlocked. Then long press for around 15s until ALL LEDs flash to reset WiFi setting.

* Recommend to set password after first connected to prevent unauthorized access.

Caution:

- Always check with battery manufacturer for the conditions & suitability for Equalization Charge.
- Disconnect any load connected to the battery.
- Only apply Equalization charge occasionally to Flat plate or Cylindrical cell lead acid sealed type VRLA batteries.
- Gassing in Wet type unsealed batteries is common so make sure electrolyte level is maintained. Top up with distilled water as necessary.
- Disconnect any load connected to the battery.
- Never leave the charger unattended during Equalization Charge.

Procedure for Equalization Charge

1. Disconnect any load to the battery.
2. Top up the electrolyte of the battery if necessary.
3. Set Battery Type to “LEAD”.
4. Give Set Button 3 Long Presses (5 second each)
LOW > NIGHT > EQ
The “EQ” LED will flicker to indicate charger has been set for EQ Charge.
5. The charger will go through Soft Bulk (for deeply discharged battery) then Bulk > Absorption > Equalization.
EQ charge finishes automatically either when battery rises to 16.2V or after one hour. It then switches to Float charge stage.
6. Exit any time by a long press on the SET button to unlock and a further long press until the flashing “EQ” LED goes off followed by “Float” LED On.

Recommended Battery Capacity

	Charging Mode	Battery Capacity
30A	NORMAL	100Ah to 300Ah
15A	LOW or NIGHT MODE	60Ah to 150Ah

Battery Charger installation and Connection

Observe the warnings & safety precautions before installing and operating the charger. Check battery condition, top up cells for wet batteries, clean battery terminals. Secure the battery charger in a well ventilated place, make sure the mounting surface is flat and without soft covering material or loose paper sheet. The air intake is at the bottom and air outlet at the Front Exhaust Hood. It is recommended you install the charger in a vertical position for optimum cooling and water avoidance.

- Before connecting or disconnecting the charging cable, unplug AC cord from the mains.
- With the battery cable disconnected from the Anderson socket, first connect the Red cable to the battery Positive (+) Pole.
- Then connect the Black cable to Negative (–) Pole of the battery. Make sure all the connections are secured and tight, double check on the correct polarity.
- Then plug the battery into the Anderson socket and switch on the AC power. After AC is on, check that the charger has correctly identified correct battery type. If not, you can always change to the correct battery type by quick short presses without disconnection of the AC mains or battery.

The 6 Stage Charging Algorithms for Lead Acid Battery

There are two separate charging algorithms:
One for lead acid based and one for Lithium FePo4.
Lead acid based batteries: wet, sealed, AGM

6 Stages:
Soft Start > Bulk > Absorption > Float > Standby > Refresh Cycle

This 6-Stage charger will give a fast and safe charge according to the state of your battery, saves energy, and automatically refreshes your battery.

Soft Start:
When battery voltage is less than 12V, charger will lower the initial charging current to 15 Amp to avoid heating up and stress on the battery until battery voltage rises to 12.4V then switches to normal Bulk Charge.

Bulk Charge:
This stage will give about 80% of the total charge to the battery. Charger delivers a constant charging current of 30Amp to the battery.

Absorption Charge:
This will give the remaining 20% charge to the battery. When the battery voltage rises to the appropriate voltage level for the selected battery type, the charging switches to Constant Voltage charging. The absorption time is dependent on both the time spent in bulk charge and the battery type.
The absorption time is also restricted to pre-set of upper and lower time limits.

Float Charge:
A low constant voltage charge to top up the battery for slight self-discharge or light occasional loading in order to keep the battery in a fully charged condition at all times.

Standby Charge:
After 8 or more hours of inactivity, the charger will enter an energy conservation (Standby) mode with lower Float Voltage. This Standby stage also helps to reduce grid corrosion and decreases gassing and corrosion of the positive terminal.

Refresh Charge:
After 7 days of inactivity, the charger will automatically enter a refresh cycle charge (fast bulk & absorption, float) This is to keep the electrolyte and the cells in good working condition.

Equalization Charge:
(Only applicable to Lead Acid based batteries, particularly flooded-cell type).
This reconditions discharged batteries and reduces stratification and sulphation found in deeply discharged and infrequent used batteries. It also balances the charges in the individual cells.
Once set, the charging algorithm is automatic. The charger will go through Soft Bulk (for deeply discharged battery) -> Bulk -> Absorption -> Equalization -> Float charge stages.
You can exit from Equalization charge to Float anytime by long press at the SET button.

Sleep Mode & Half Power Mode:
Both charge modes have 15Amp maximum charging current instead of the usual 30Amp.

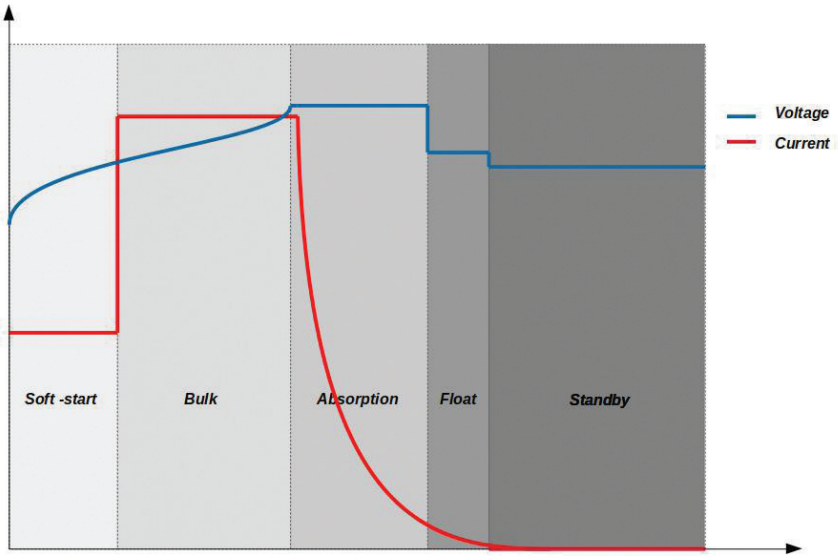
The cooling fan will be off at all times to ensure a quiet charging operation.

Half Power mode is more suitable for batteries with less than 100Ah capacity.

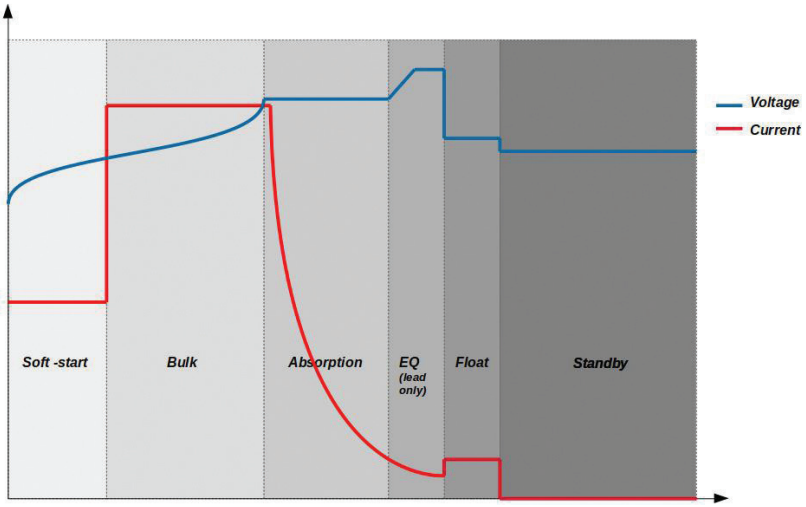
The sleep Mode has an 8 hour timer, charger will go back to normal maximum output of 30Amp

Battery with Loads connected such as in caravan, campers & etc.
The charger can be used as a stand alone automotive charger or continuously connected to battery with or without load as long as the load is not more than 25 Amp in normal mode or 10 Amp in half power / sleep mode.

Lead Acid Batteries: LEAD / AGM



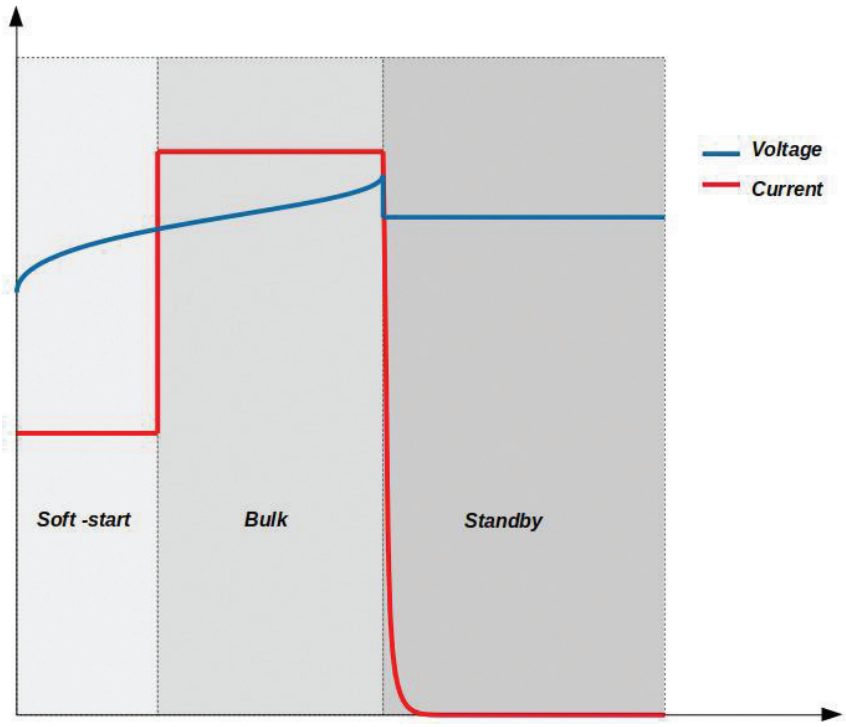
Charging Profile with Equalization charge set for Lead Acid based batteries.



LiFePO4 (LFP) battery

Caution:
Never charge LFP battery when its temperature is below 0°C.

There is a special charge algorithm and treatment for Lithium FePO4 (LFP) batteries to ensure safe and optimal charging adaptive to the special chemistry of the battery which is quite different to Lead Acid battery. There are only two active charging stages namely Bulk and inactive (no charging current) Standby Stage. There is no Float and no automatic refreshing cycle charge and no Equalization Charge for LFP.



DC Source 13.5V
All 3 battery type LEDs are on at the same time in DC source mode.
Charger can be used as a constant 13.5 Volt DC power source with continuous 20Amp capacity.

Battery with load
A load can be connected to the battery during charging as long as the load is not larger than the rated output of the charger. The maximum continuous load should be less than 20Amp.

Supplied Accessories
Battery temperature sensor (only for lead acid based battery)
When connected to the battery temperature sensor, the charging voltages changes inversely with the battery temperature such that charging voltage decreases with rise of temperature and increases with drop of battery temperature.

Optional Accessory - Remote control Module
It is an extension of the front panel of the charger with full sets of LED indicators & the SET button. You can monitor the charging status and do all sorts of setting on the charger without getting to the charger which is most likely installed at hard to access spot. This optional Remote Control Module comes with a 10-meter connection cable.

Cable size recommendation for 30A

AWG	Maximum Length
12	2m
10	3.5m
8	5.5m

Protection:

Over Temperature Protection of battery:

When this sensor detects the temperature of battery over 60ºC, the charger will decrease the charging current to 1Amp. When the battery temperature reduces back to 60°C.

Over Temperature Protection of charger:

At high operating temperature charger will gradually decreases the output power to protect the electronic components from further thermal stress and at the same time keeps a safe and continuous charging. The charger will decrease output current in 3 levels, while the charger temperature keeps on increasing, it will decrease output current to 20Amp first, then 10Amp and finally 1Amp.
Short circuit protection by constant current method and auto reset when fault is clear.
Reversed polarity protection with 40Amp (CBC-9130)/ 20Amp (CBC-9215) thermal fuse.

Specifications:

Input voltage:	190-260VAC
No load current:	≤120mA
Output Voltage*:	
Lead:	14.4V (Absorption), 13.6V (Float)
AGM:	14.7V (Absorption), 13.6V (Float)
LiFePO4:	14.4V (Absorption), N/A (Float)

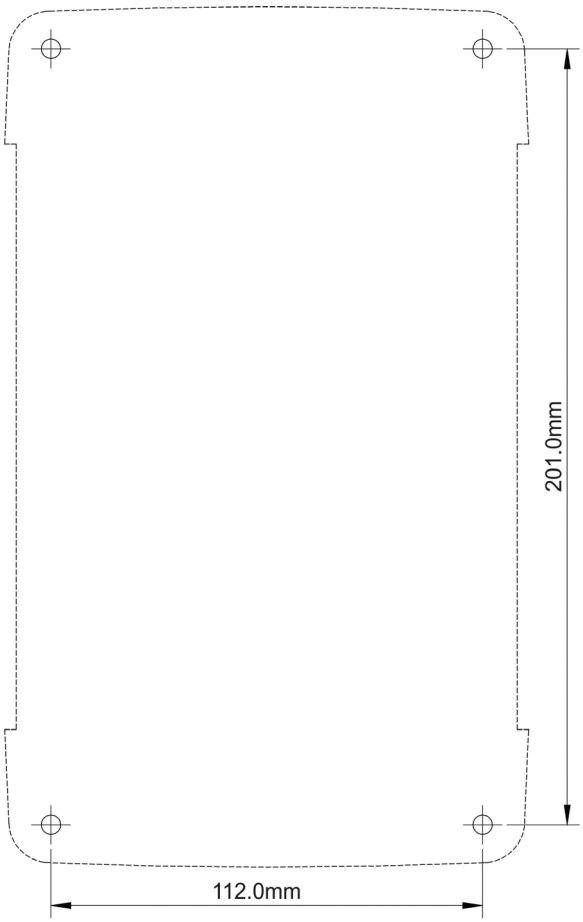
*24V batteries – multiply parameters by 2

Recycle Day:	7 days
Efficiency:	91%
Max Output Charge current:	30A
Recommended Battery capacity:	100-300Ah @ 30A, 50-150Ah @ 15A
Operating Temperature:	-10°C to 50°C
Weight:	1.8kg
Dimensions:	223(L) x 135(W) x 73(H)mm

Troubleshooting:

Problem	Possible Cause	Fix
All LED on Panel is OFF	Charger damaged	Inspect case of charger. If damaged, do not use it
	No AC Input	1. Check AC source. 2. Check cable connection is correctly connected.
	Charger Failed	Contact supplier repairing service
No Output and LED on Panel is ON	Output fuse is blown	Check output fuse
	Charger failed	Contact supplier for repairing service
LED Consecutive Rotations	Charger over temperature	1. Check cooling fan is working. 2. Disconnect any load to battery. 3. Disconnect AC source. 4. Let charger cool down. 5. Double-check on correct size of battery.
	Battery over temperature	1. Switch AC and dicsonnect battery from charger and load, let cool down. 2. Make sure load connected to battery is less than 20Amp. 3. Make sure temperature sensor is connected correctly and fix on battery. 4. Check temperature of battery near temperature sensor point. If 55°C - 60°C, the charger will protect. 5. Make sure batter and the sensor wire are away from any heat source.

Mounting Plate Diagram:



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