

SMART BATTERY CHARGER

SC-600 USER GUIDE





MASHIN ELECTRIC CORP.

Established in 1996 in Madou District, Tainan City, Mashin Electric Corp. begins as a manufacturer of car chargers. Over the years, Mashin becomes a professional battery charger manufacturer for Automotive, Motorcycle, Industry, Jump Starter and functional battery chargers. Especially the car chargers stand the first selling position in domestic market. Recently, we have committed into more and more product lines for battery chargers.

We specialized in Battery Charger, Adaptor, Transformer, Switching Power, DC to AC Inverter, LiFePO4 Lithium Battery Pack, Battery Analyzer, Booster Cable, Jump Starter and related electronic products. With more than 20 years' factory experiences, we received customers' reliance for automotive market around the world. Mashin can do OEM services and also has the capability for ODM. Our products are followed by high SOP standards throughout the whole production process. Besides, we put into the newest equipment and focus on employees training in order to provide the best service and products to our customers.

Creativity and experiences are our advantages to receive customers' trust. Besides, our engineers have decades of experiences and contributed in developing our own battery chargers. Every year, we will have more than 5% R&D developing fees for our new products. What we want is to provide our customers a more convenient life. We take the four policies, "Total Quality Assurance, Quality First, Service First, Customer Satisfy" as our company goals. From R&D, purchasing, production to the sales and delivery, we all have completely Quality Management System. In addition, most of our products obtained UL, CE, CB, FCC, PSE, SAA, RoHs, and CEC certifications and safety regulations. Strict company policy and management obtain the certification of French (ANFOR) ISO-9001 and be the Japan PSE and U.S. UL certified factory.

Since the factory established, Mashin has actively built up our own brand and strives to develop the best products on a daily basis. It wasn't easy to keep the faith after several decades, but we did.

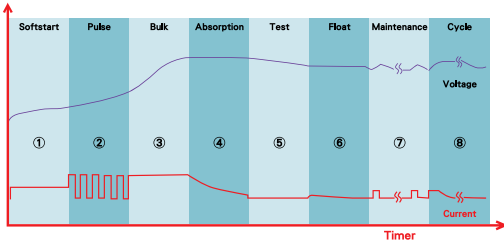
In the future, we will maintain our creativity, keep developing new types of chargers and extend the international market. It's our responsibility to feed back to the world.



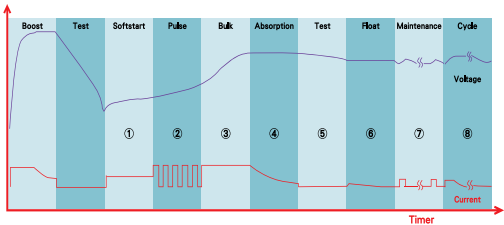
● Features	2.
■ 8 Stages Charging Mode	
■ Safety Instructions	
■ Safety Notes	
● Accessories	4.
● LED Display and Functions	6.
● How to Connect with SS01 Connector	7.
● Operating Instructions	9.
● Power Level Indicator	10.
● Charging Functions	11.
● LED Signal Indicator	13.
● General Information	14.
● Specification	15.
■ Spec. Chart	
■ Available Battery	
● Troubleshooting	16.
■ Warranty	

8 Stages Charging Mode

Normal Mode



Boost Mode



① Soft start:

Tests if the battery can accept charge, charging will commence if battery is okay.

* Boost Mode will charge by high voltage.

② Pulse:

Pulsing current removes sulphates from the battery plates and restores battery efficiency and capacity.

③ Bulk Charge:

Charging with maximum constant current until approximately 80% of capacity.

④ Absorption:

Charging with constant voltage and declining current to equalize and maximize up the battery capacity.

⑤ Test:

Tests if the battery can hold charge. If the battery voltage drops below 12.3V within 2 minutes, battery is faulty.

⑥ Float:

Keep the battery voltage at maximum level by providing a constant voltage charge.

⑦ Maintenance:

Battery maintenance mode active when the battery voltage is lower than 12.6V, the charger will begin maintenance charging automatically.

⑧ Cycle Recharge:

A continuation of the Maintenance mode that monitors battery voltage and will gently pulse current and increase voltage. It will charge automatically every 15 days.

Safety Instructions

- Before removing the battery from the vehicle, please check your codes for audio, security systems...etc.
- Before removing the battery from the vehicle, please make sure to disconnect the earth (ground) terminal first. All accessories in the vehicle must be turned off to avoid sparks.

Warning:

- It is dangerous to work near a lead-acid battery. A battery will generate explosive gases during normal operation and gases increase when charging.
- Make sure working area is well ventilated.
- Make sure there is no possibility to cause gases being ignited. Must be no naked flames, cigarettes, flame heaters, blowtorches...etc. near the battery or working area.
- The gases can be ignited by sparks, please disconnect the chargers from the mains before disconnecting the leads from the battery.
- Must wear approved safety eyewear when connecting or disconnecting battery / battery charger leads.
- Avoid touching eyes while working with batteries.
- Do not smoke near the battery or engine.

Safety Notes

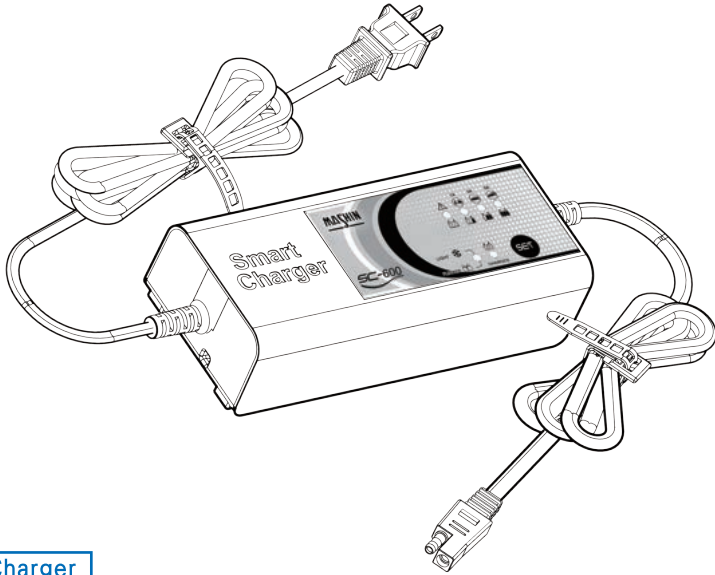
- This charger is designed for charging lead-acid battery of vehicles, do not charge the battery of home appliances.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge. Unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
(The EN variation to this instruction is not the same as it redefines the meaning of children).
- Place chargers as far away from the battery as the charger cables permit.
- When working with or near a lead-acid battery, make sure there is someone nearby to come to your aid if necessary.
- If battery acids contacts skin or clothing, wash immediately with soap and plenty of fresh water.
- If acids enter an eye, flushing eyes immediately with plenty of cold, clean water and get medical attention.
- When working with lead-acid battery, make sure to remove personal metal items, such as watch straps, rings, bracelets, necklaces...etc. A short circuit across from one of above will cause severe burns.
- Do not put the battery on top of the charger.
- Never touch the clamps when the charger is working.
- Never allow the clamps to touch each other or to contact a piece of metal that could bridge them.
- If you need to remove a battery, always remove the ground terminal from the battery first. Make sure all accessories are off to minimize the potential of a spark.

It is the operator's responsibility to comply with the following:

- Do not disassemble the charger without qualified professional when service or repair is required.
- Inspect all power supply leads, plugs and all electrical connections for wear and /or damage.
- Before use, inspect the insulation on the charger cable and check the charger and plug before connecting to the mains supply.
- Also regularly inspect power supply sockets, extension leads and connectors.
- Ensure that the mains voltage marked on the charger is the same as the electrical power supply to be used.
- Do not carry the charger by its power lead.
- Do not pull the power plug from the socket by the power lead.
- Extension lead reels: when a cable extension lead reel is used it should be fully unwound before connection. We recommend the cable reel has an RCD fitted. Be sure that the capacity of the cable reel is suitable for the product.

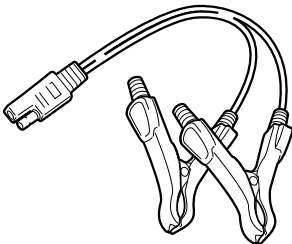
If in any doubt about electrical safety, consult a qualified electrician.

- Disconnect equipment from power supply before cleaning. Do not use any liquid or aerosol cleaner. Use only moisture cloth.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

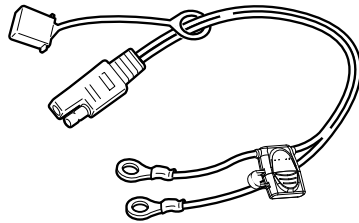


Charger

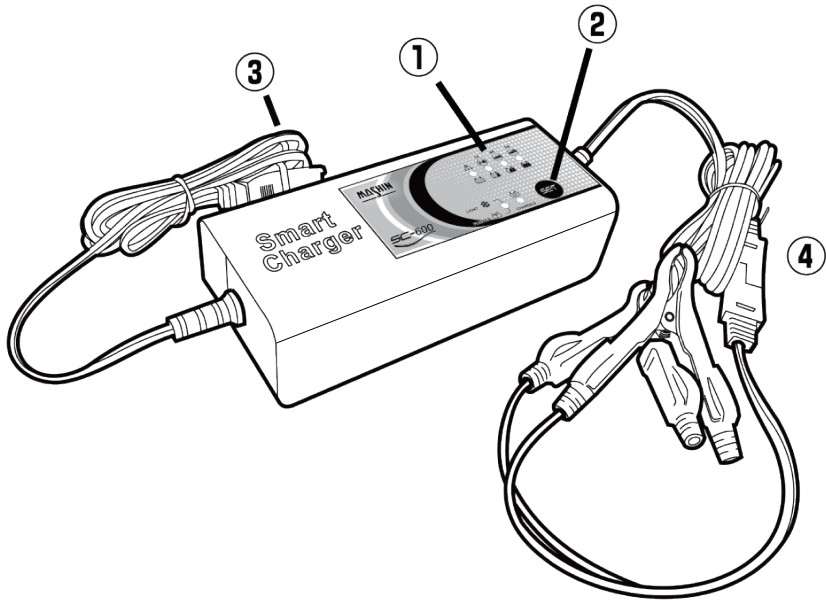
User Manual



Clamps



Eyelet M6 Connector



① LED Display

Display Battery Power Level, Charging Current and Error Status.

② SET Button

Select Charging Mode and Charging Current.

③ AC Power Cord

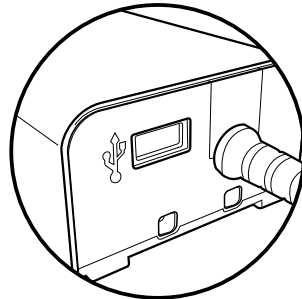
AC100V~240V Socket.

④ SS01 Connector

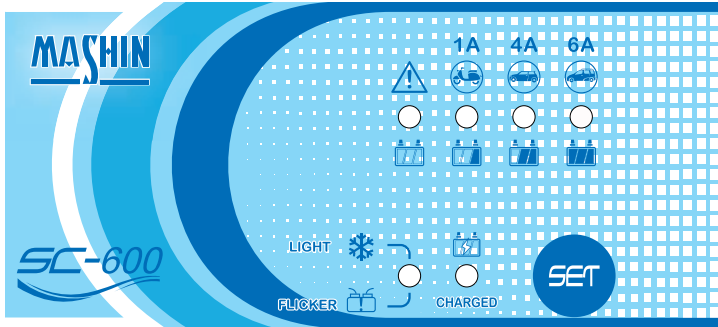
User can select to connect Eyelet M6 or Clamps.

⑤ USB Port

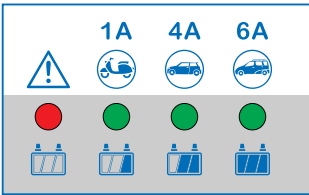
Charge your electronic devices.
(Such as mobiles, tablets...etc.)



LED Display and Functions

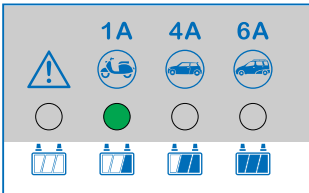


① Power Level Indicator



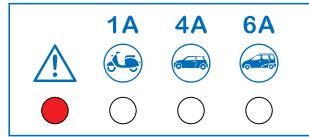
- 4 Lights On : Battery is fully charged.
- 3 Lights On : Battery is starting to drain.
- 2 Lights On : Battery is low.
- 1 Light On : Battery is very low.

② Charging Current Indicator



- 1 Amps Charging Current
- 4 Amps Charging Current
- 6 Amps Charging Current

③ Error Indicator



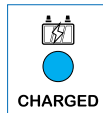
- When the Red LED on :
1. Charger is abnormal.
 2. Battery is abnormal.

④ Snow Mode / Boost Mode



- Snow Mode : Orange LED Lights .
- Boost Mode : Orange LED Flashes .

⑤ Charging Indicator



- Charging : Blue LED Flashes .
- Completed : Blue LED Lights .

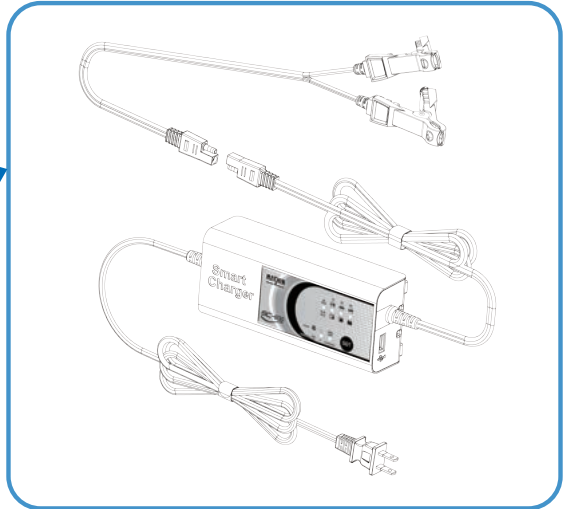
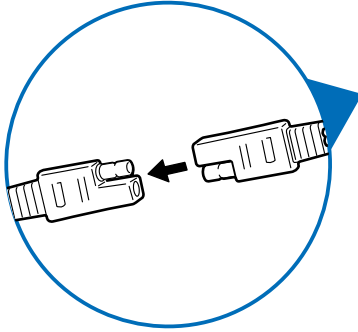
⑥ Set Button



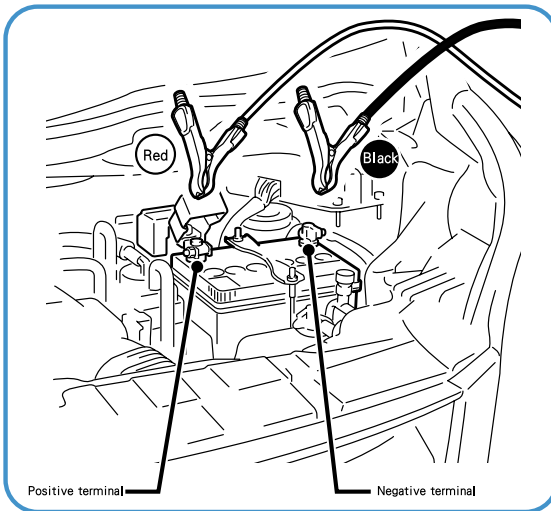
How to connect with SS01 Connector

Connect with Clamps

- ① Plug the SS01 Connector with clamps and plug it tightly.

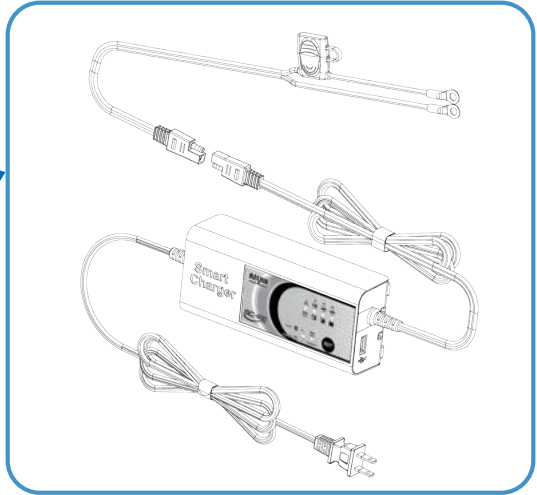
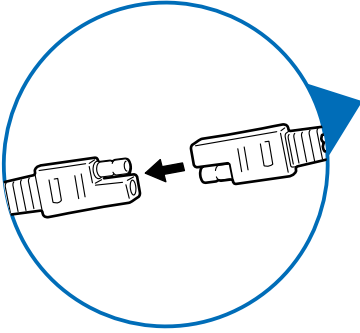


- ② Connect the clamps with battery positive and negative terminals.

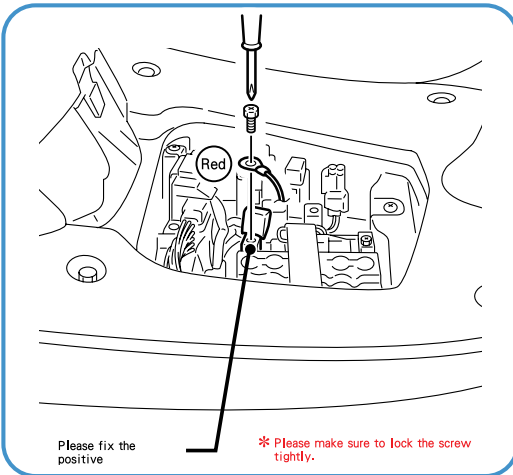


Connect with Eyelet M6 Connector

- ① Plug the SS01 Connector with Eyelet M6 Connector and plug it tightly.

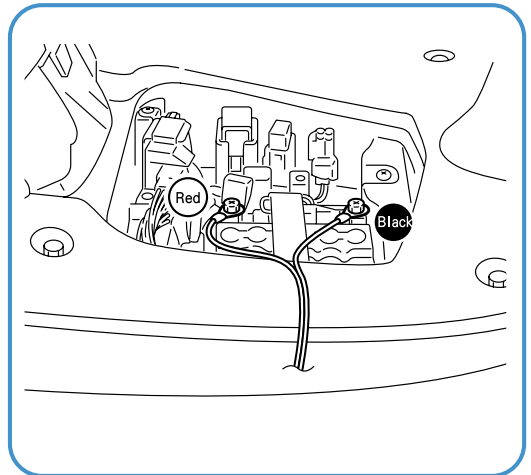


- ② Please take off the screw (or nut) from battery positive terminal then install the red ring terminal onto the positive terminal and lock with screw.



* Please make sure to lock the screw tightly.

- ③ Take off the screw (or nut) from battery negative terminal then install the black ring terminal onto the negative terminal and lock with screw.

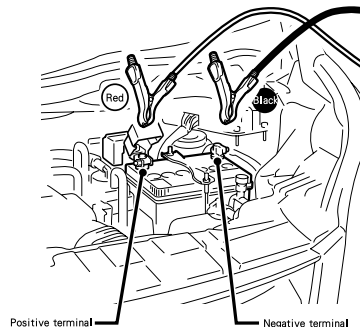


Before Connecting

- Please make sure battery types and capacity of your vehicles before selecting charging current and mode.
- Please clean the battery vent tube before using.
- If acids enter an eye, flushing eyes immediately with plenty of cold, clean water and get medical attention.
- Make sure working area is well ventilated.
- Please make sure the battery electrolyte is within the range.
- When removing the battery from the car, please disconnect the negative terminal first.
- Please make sure all the electronic devices are in OFF position.
- Do not bind the cable to use.
- Connect the red clamps with positive terminal first.
- Do not use the other cables instead of Mashin' s standard when connecting.
- Ensure there is no cracks or dirt on the clamps.
- The battery terminals might get rusty, please clean the terminals before charging.
- Never touch the cables and battery in wet hands.

Before Charging

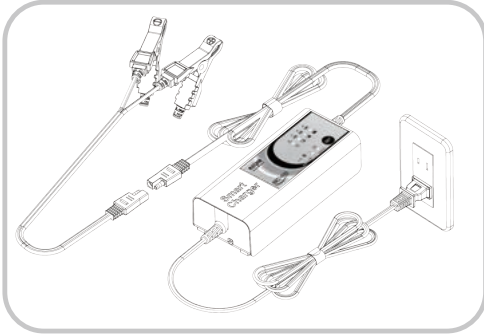
- ① Please identify the correct polarity of your battery.
- ② Connect the red clamp with positive terminal.
- ③ Connect the black clamp with negative terminal.



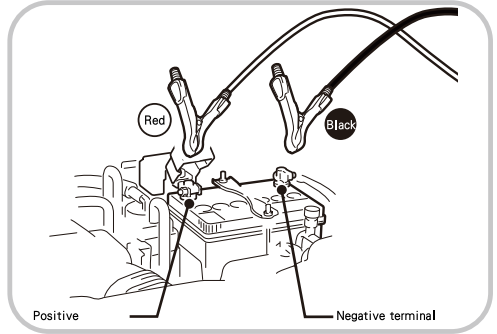
※ Please make sure clamps and battery are well-connected.

Power Level Indicator

① Connect with AC Power.



② Connect clamps with battery positive and negative terminals.



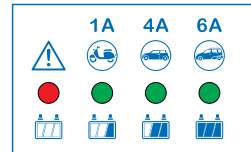
③ After connecting, the battery power level will be displayed.

100%	●	●	●	●
75%	●	●	●	○
50%	●	●	○	○
25%	●	○	○	○

○ Off ● On

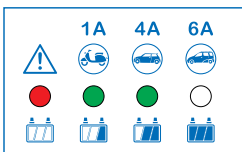
Battery Power Level 100%

Battery is good and fully charged.



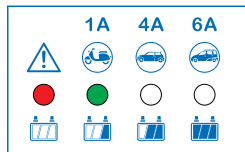
Battery Power Level 75%

Battery is starting to drain. It is recommended to charge. Please charge battery by Normal or Snow Mode.



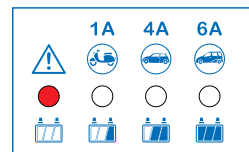
Battery Power Level 50%

Battery is low. Please charge battery by Normal or Snow Mode.



Battery Power Level 25%

Battery is very low. It might be over-discharged or aging. Please charge battery by Boost, Normal or Snow Mode.



Charging Functions

Charging Current

Current Selection	Vehicle	Battery Capacity	Charging Time
1 A	SCOOTER	3~12 Ah	4~15 Hrs
4 A	CAR	20~45 Ah	7~15 Hrs
6 A	SUV	30~75 Ah	7~17 Hrs

※ The charging time will be different according to different battery situations.

Normal Mode Charging

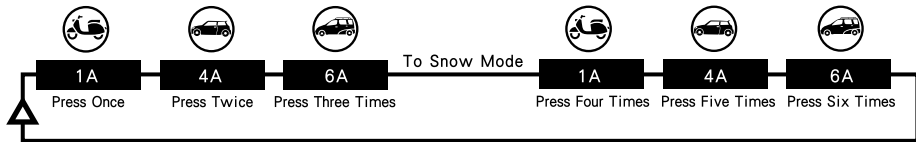
It is recommended to use in normal charging condition.

Snow Mode Charging

It is recommended to use in low temperature.

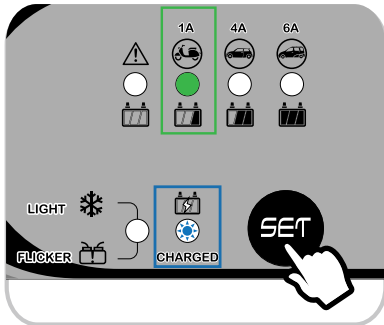
① Press button **SET** to select charging current.

① Press button **SET** to select charging current.

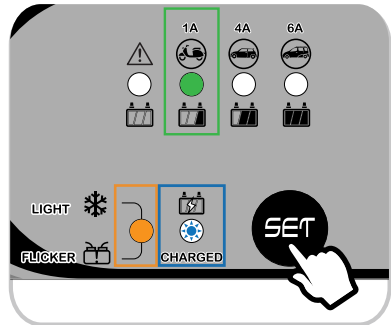


The Green LED will light on the selecting current.

The Green LED will light on the selecting current.



The Orange LED will light when getting into the Snow Mode.



② The Blue LED will flash when charging begins.

② The Blue LED will flash when charging begins.

③ The Blue LED lights when charging is completed.

③ The Blue LED lights when charging is completed.



Boost Mode Charging

※ Please remove the battery from the car before using Boost Mode Charging.

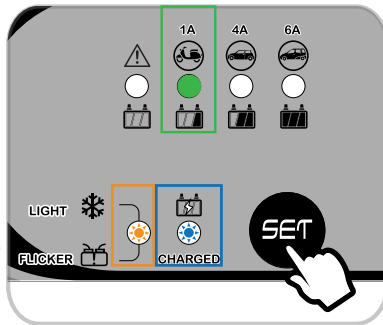
Boost Mode is used when battery can not work in a normal charging condition or the voltage is lower than 6V. Boost Charging involves a high current for short period of time to charge the battery. It is generally if the battery has been discharged heavily. It enables the quick charging of depleted batteries.

① Press button **SET** to select your charging current under Normal or Snow Mode.



② Long press button **SET** until the Orange LED flashes  .

The Green LED will light on the selecting current.





The Orange LED will flash when getting into the Boost Mode.

③ The Blue LED will flash when charging begins.

④ The Blue LED lights when charging is completed.

※ Cannot assure the battery will back to normal condition.

※ If the battery is over-discharged, aging or the battery plate is faulty, the Boost Mode might be difficult to recover.

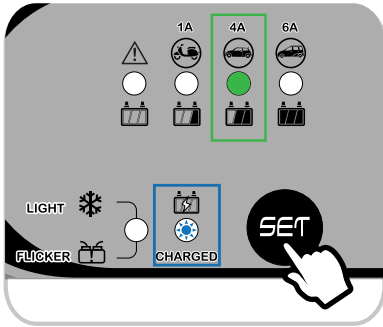
※ The Boost Mode will do four times boost charging, if the battery is recovered, the charger will back to Normal Mode Charging. Otherwise, the charger will stop charging and the Error LED flashes  .

LED Signal Indicator

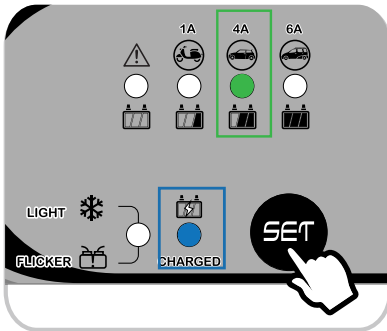
Charging Indicator

- ① The charging will begin after selecting the charging mode and charging current.

The Green LED will light on the selecting current.



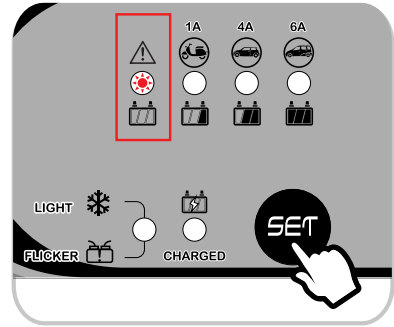
- ② The Blue LED will flash when charging begins.



- ③ The Blue LED lights when charging is completed. After full charging, it will get into the maintenance mode to maintain your battery.
- ④ When charging is completed, please disconnect the AC Plug then disconnect the clamps from the battery.

Error Indicator

When battery is over-discharged or faulty, the Red LED will light on.



- Red LED flashes : battery is abnormal.
- Red LED lights : charger is abnormal.

① Why battery needs to charge ?

Batteries will be affected by self-discharge even unused, therefore, it is necessary to use a charger to charge batteries. Proper charging can increase battery efficiency and extend its service life.

② What is the voltage for a fully charged battery ?

Normally the voltage should be over 12.6V for a 12V battery, if it is between 12.3~12.6V which means it is not fully charged, please charge it. If the voltage does not over 12.6V after charging, the battery capacity is reduced.

③ How to remove the battery terminal corrosion ?

Please disconnect the terminals from the battery first. Then wearing the gloves to wash terminals with 100°C hot water and clean it with a steel brush or a sandpaper. Finally, you can rub some rust preventive oil on the terminals.

④ Precaution for standard type batteries ?

Remember to check the electrolyte level as often as you can. When the level is lower, please refill the liquid (pure water or distilled water) .

⑤ Precaution for replacing a battery ?

To remove a battery, please disconnect the negative terminal first then disconnect the positive terminal. When installing, please connect with positive terminal then connect with negative terminal. Do not reverse polarity.

⑥ Precaution for charging a battery ?

- ⊙ Please make sure the battery electrolyte is within the range.
- ⊙ Make sure working area is well ventilated.
- ⊙ If you are charging a standard type battery, please open the vent plug to charge.
- ⊙ If the battery acid is leaking out when charging, please clean it.
- ⊙ Please identify the correct polarity of your battery.
- ⊙ If the battery temperature is over 45°C, please stop charging.
- ⊙ Make sure the clamps and battery are well-connected.

⑦ How to set up the charging current of a battery ?

Normally the charging current will be 1/10~1/6 of a battery capacity. (Eg. 60Ah battery can charge by 6A~10A) .

MODEL	SC-600								
Input Power	AC100V ~ AC240V 50 / 60HZ								
Normal Voltage	DC12V								
Charging Voltage	Normal Mode = max.DC14.4V Snow Mode = max.DC14.7V Boost Mode = max.DC16.5V								
USB Charging Current	DC 5V 1A (max 1.5A)								
Charging Current	1A / 4A / 6A (Current Selection)								
Protection	<table border="0"> <tr> <td>1. Short Circuit Protection</td> <td>5. Over-voltage Protection</td> </tr> <tr> <td>2. Over-temperature Protection</td> <td>6. Reverse Polarity Protection</td> </tr> <tr> <td>3. Spark Protection</td> <td>7. Disconnecting Protection</td> </tr> <tr> <td>4. Over-charge Protection</td> <td>8. Over-current Protection</td> </tr> </table>	1. Short Circuit Protection	5. Over-voltage Protection	2. Over-temperature Protection	6. Reverse Polarity Protection	3. Spark Protection	7. Disconnecting Protection	4. Over-charge Protection	8. Over-current Protection
1. Short Circuit Protection	5. Over-voltage Protection								
2. Over-temperature Protection	6. Reverse Polarity Protection								
3. Spark Protection	7. Disconnecting Protection								
4. Over-charge Protection	8. Over-current Protection								
Battery Types	WET / MF / EFB / AGM (for 6 cells)								
Operating Temperature	-20~40 °C, Humidity 90 %								
Dimension	176 x 77 x 46 mm ±2mm								
Weight	0.68 kgs								

Available Battery

- ◆ Battery Voltage DC12V
- ◆ Battery Types
 - Lead-acid battery for vehicles
 - GEL battery
 - Shield battery
 - VRLA battery
 - AGM battery
 - Others

Non starter lead-acid batteries,
please select **NORMAL** to charge your battery.

- ◆ Charging Battery Capacity
 - 3Ah ~ 75Ah
- ◆ Maintain Battery Capacity
 - 3Ah ~ 120Ah

Warning

- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance
- Cleaning and user maintenance shall not be made by children without supervision
- This appliance can not be used for non-rechargeable batteries
- Disconnect equipment from power supply before cleaning.
- Do not use any liquid or aerosol cleaner. Use only moisture cloth.
- If the supply cord is damaged, it must be replaced by the manufacturer.
- The battery terminal not connected to the chassis has to be connected first. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains.
- After charging, disconnect the battery from the supply mains. Then remove the chassis connection and then the battery connection.

Problem	Solution
Power Level Indicator does not work ?	Check if the charger is well-connected with the AC socket ?
Error Indicator lights on ?	Check if Eyelet M6 Connector or Clamps are wrongly connected with the battery ? Or installing other accessories that are not manufactured by Mashin Electric Corp. ?
Error Indicator flashes ?	Check if battery is defective or degraded ? Or connect with a battery which is not DC 12V ?
Press SET button but the LED does not work ?	Check if connect with a battery which is not DC 12V ?
Can not set up Boost Mode ?	Please set the charging current first then press the SET button.
Error Indicator lights on when charging ?	Check if the temperature of charger is too high. Disconnect the AC power and clamps to wait until the charger cools down and charge again.
The charger displays full charging after connecting for just half hours ?	The battery is fully-charged. Check if the battery is defective or degraded ? Check if setting up the charging current correctly ?
Error Indicator lights on when charging ?	Check if the temperature of charger is too high. Disconnect the AC power and clamps to wait until the charger cools down and charge again.

Warranty

The warranty is void if the product is misused, careless handling, or repaired by anyone other than Mashin Electric Corp. or its authorized representative.

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MEMO

A series of horizontal dotted lines for writing.

EG-600

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