

SMART BATTERY CHARGER

SC-1000 1000+ 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.

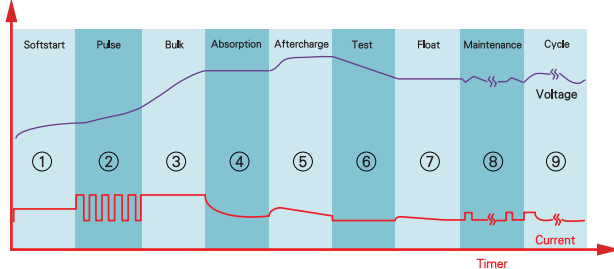


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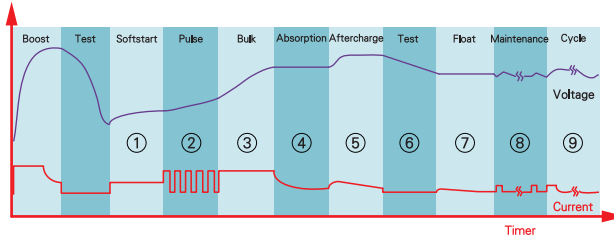
Features

9 Stages Charging Mode

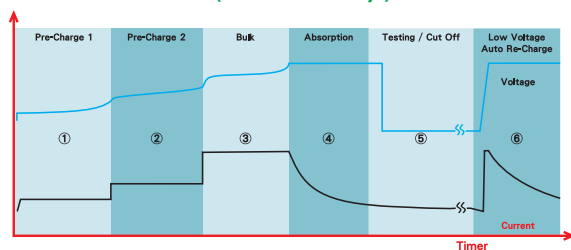
Normal Mode



Boost Mode



LiFePO4 Mode (SC-1000+ Only)



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 Aftercharge:

Charging by equalizing the battery plates in order to increase the battery efficiency and extend service life.

⑥ Test:

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

⑦ Float:

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

⑧ Maintenance:

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

⑨ 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.

① Pre-Charge 1

This stage activates only if the battery is severely discharged and help to protect and precondition the cells against the damage.

② Pre-Charge 2

Soft start, moderately charging in the beginning to avoid the peak current damages the cells.

③ Bulk

Charging with maximum current, the current is fixed according to the maximum capability of the charger.

④ Absorption

The current will decline to charge in order to maximize the battery capacity.

⑤ Testing / Cutoff

Test if the battery is in the normal condition.

⑥ Low Voltage Auto Re-Charge

Re-charge automatically if it detects the voltage is dropped off.

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.

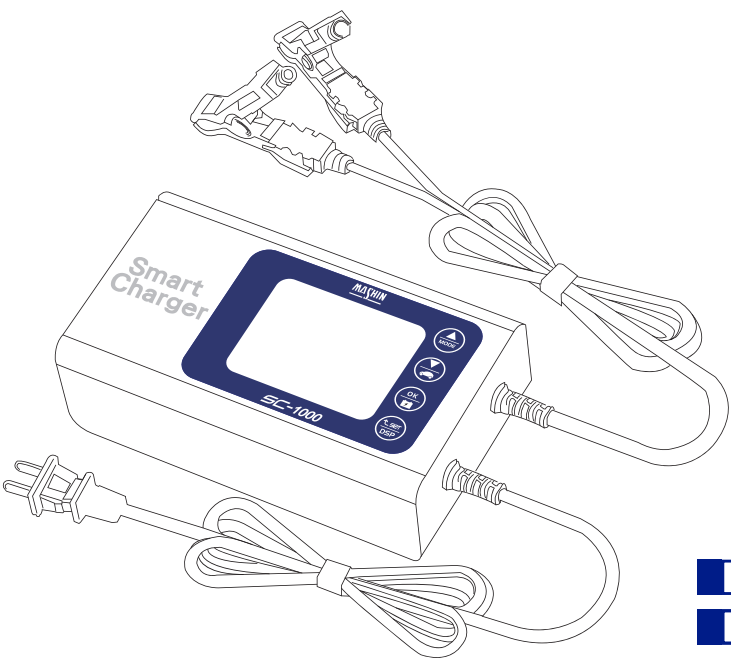
It is the operator's responsibility to comply with the following:

- 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.

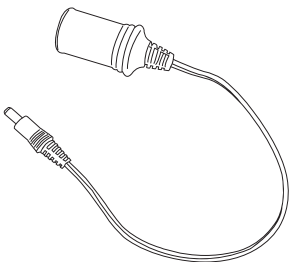
If in any doubt about electrical safety, consult a qualified electrician.

- 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.

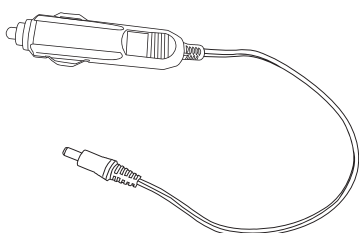
Accessory



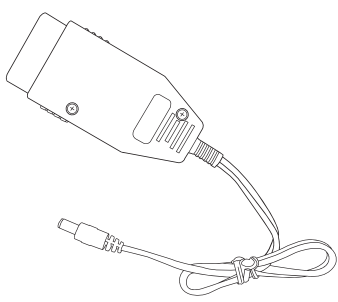
Charger
User Manual



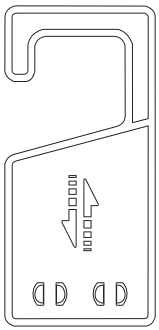
Cigarette Female Socket
→ Option / SC-1000+ Only



Cigarette Connector
→ Option / SC-1000+ Only

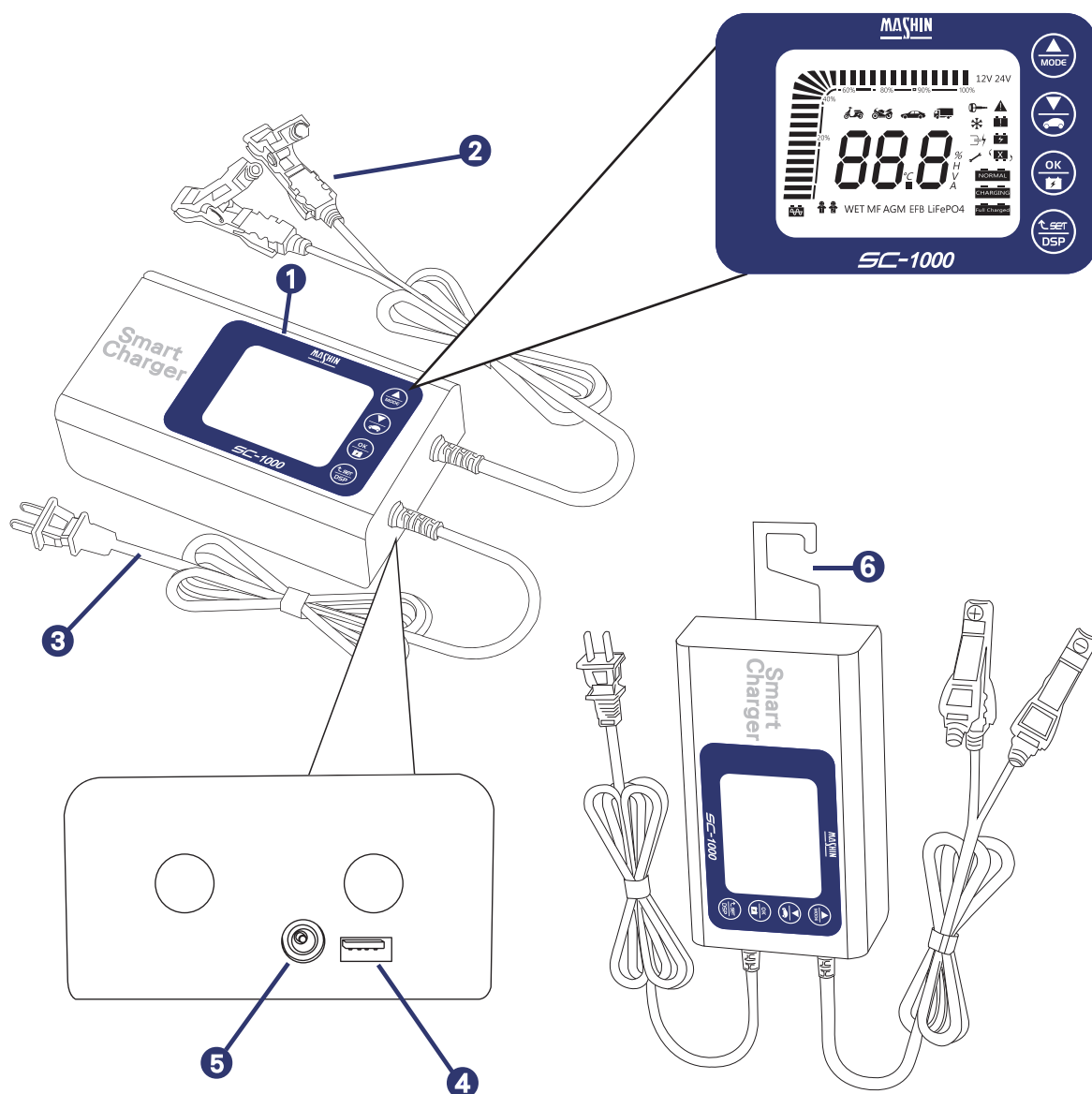


OBDII
→ Option / SC-1000+ Only



Hanging Hook

Parts Indicator



1. LCD Display Panel

* There is a protector on the panel, user can tear it off before using.

2. Clamps

Connect with battery positive and negative terminal (Do not reverse polarity) .

3. AC Power Cord

4. USB Port (SC-1000+ Only)

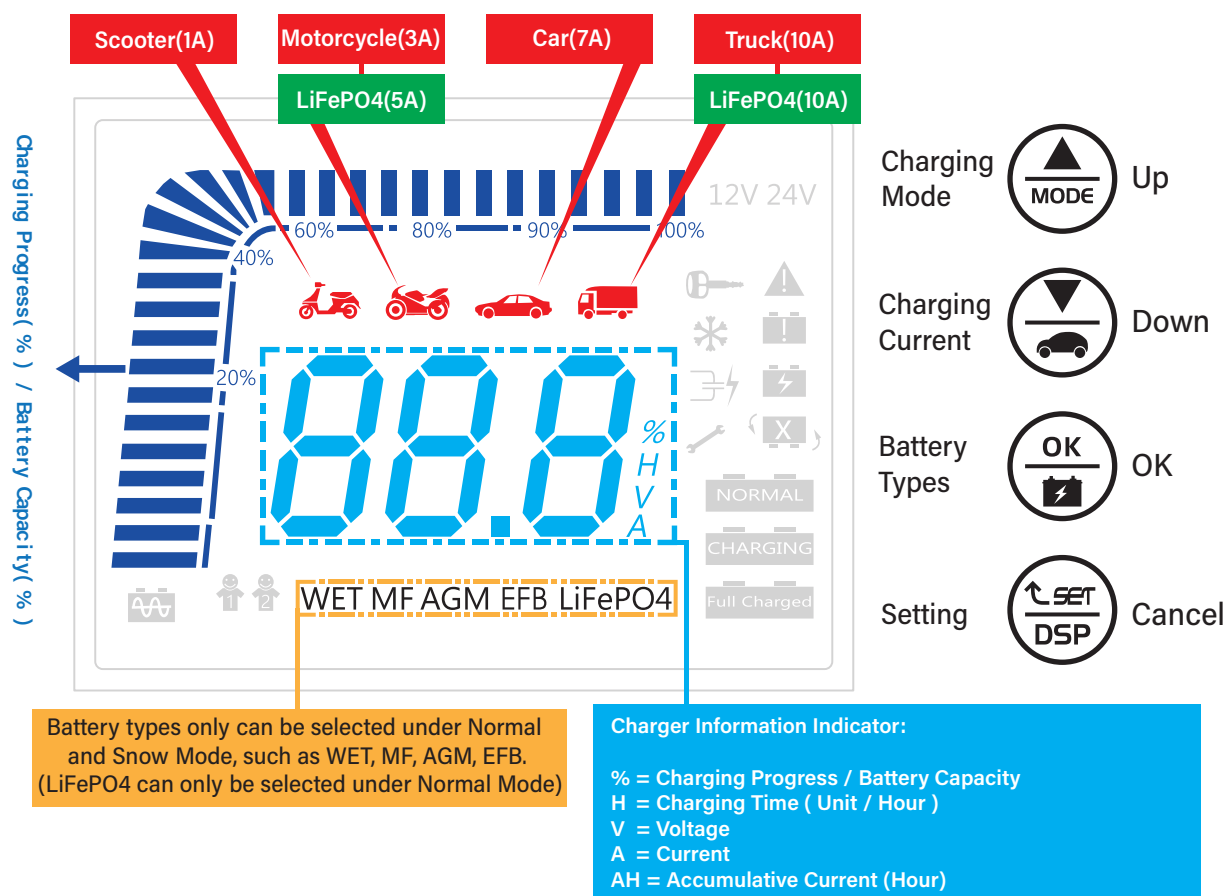
Charging your electronic devices (Mobile, Tablet...etc.) .

5. DC Port (SC-1000+ Only)

* Cigarette Female Socket (Option)
* Cigarette Connector (Option)
* OBD II (Option)

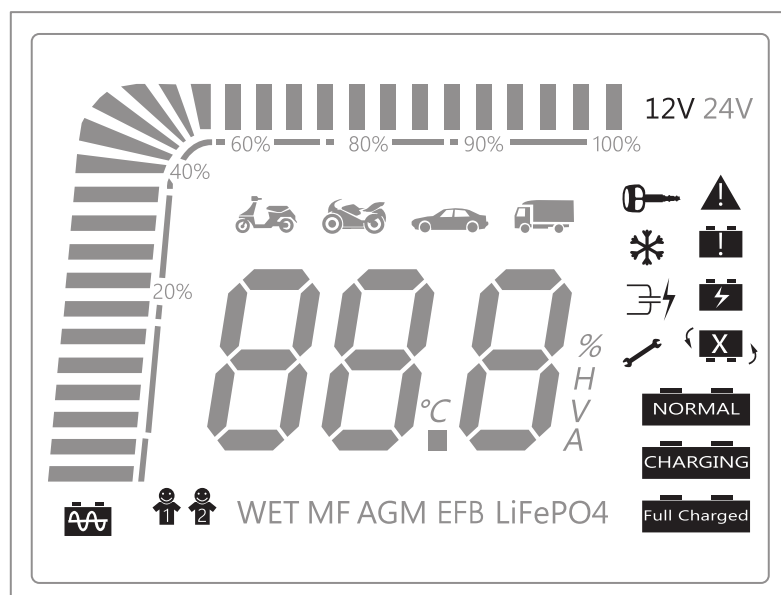
6. Hanging Hook

LCD Display Panel and Function



Icon Indicator

	Starter Motor
	Snow Mode
	DC Supply / Alternator Check
	Advanced Setting
	Charger Error
	Battery Error
	Boost Mode
	Reverse Polarity
	Normal Mode
	Charging
	Charging Completed
	Battery Check
	Advanced Mode
12V	Battery Voltage



Operating Instruction

Sleep Mode

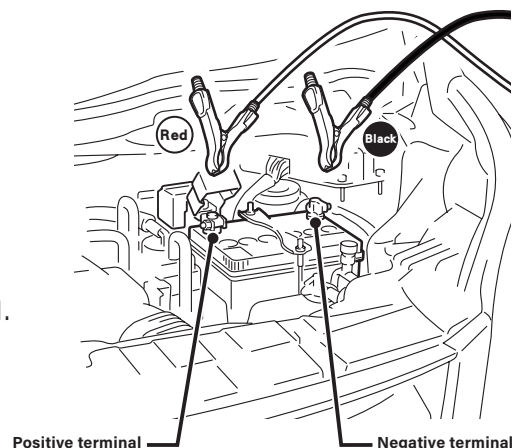
- If there is no action for 3 mins after connecting with AC power , the screen will off , please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

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.
- Please identify the correct polarity of your clamps before using LifePO4 forced on charging. Must not reverse polarity or it may cause the damage for battery or charger.
- 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.

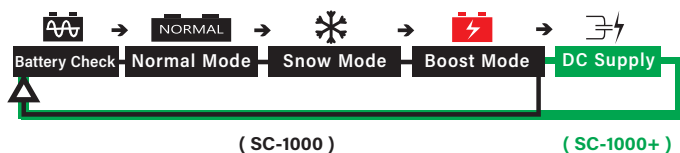


※ Please make sure clamps and battery are well-connected.

Button Indicator



Charging Mode Selection - Connect with AC Power



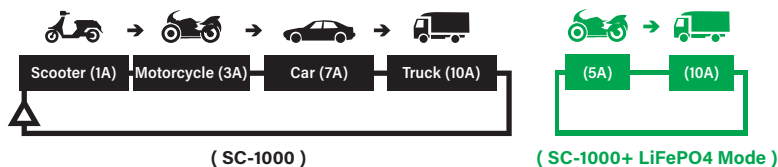
Testing Function - Without AC Power



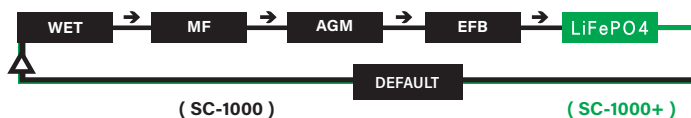
(* If you would like to do a second test, please disconnect battery with clamps then connect to test again).



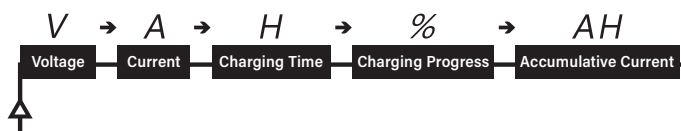
Charging Current Selection



Battery Types Selection

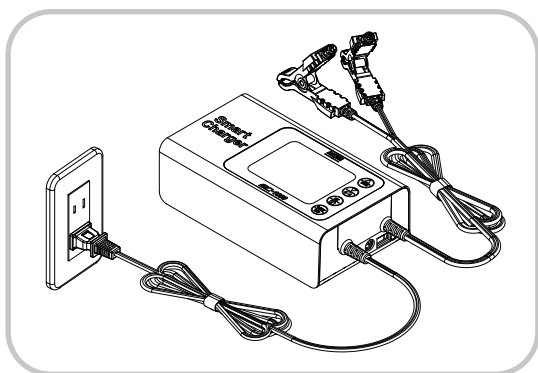


Set Button

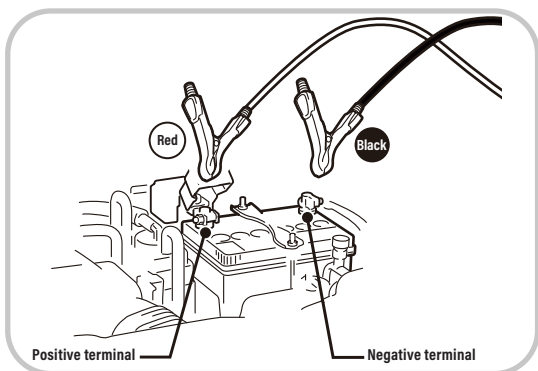



Easy Operation

- ① Connect with AC power.



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

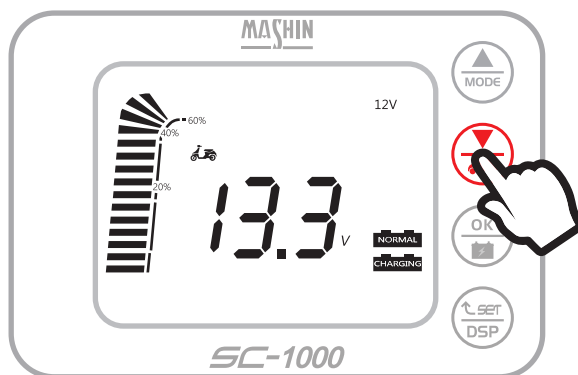


- ③ Press button  to the Normal Mode **NORMAL**.



- ④ Press button  to select your charging current.

 (1A)  (3A)  (7A)  (10A)



- ⑤ The icon **CHARGING** lights when charging begins and charging progress will display on the screen.

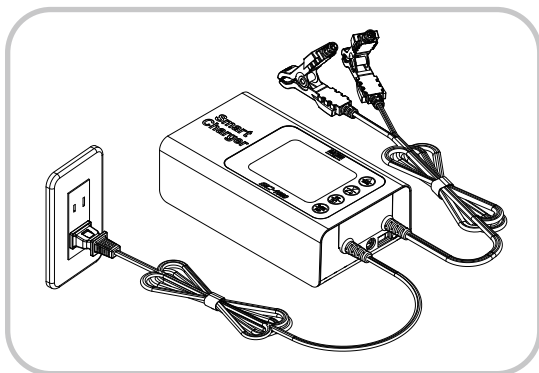
- ⑥ When charging is completed, the icon **Full Charged** will light on.

Sleep Mode

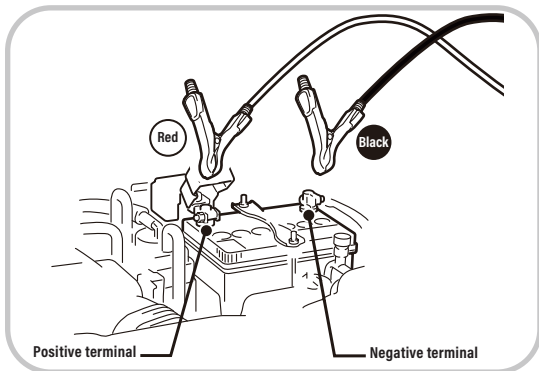
- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

Charging Functions - Battery Test

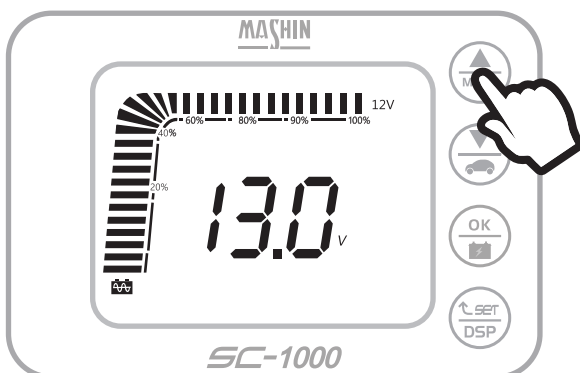
- ① Connect with AC power.



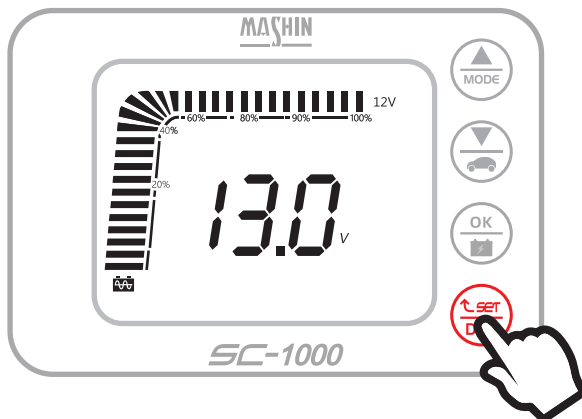
- ② Connect clamps with car battery positive and negative terminals.




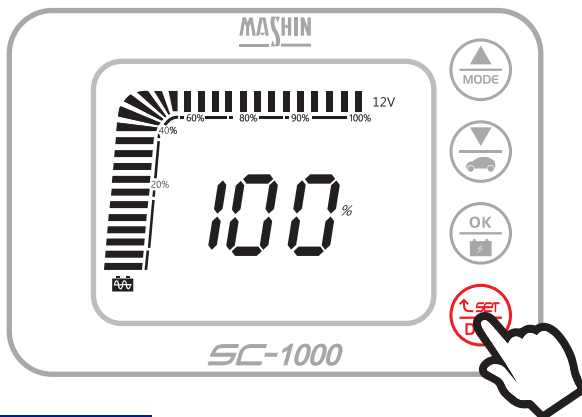
- ③ Press button  to Battery Test .



- ④ The battery voltage will display on the screen.
(Measuring range is from 6V to 16V)



- ⑤ Press button  and the battery capacity will display on the screen.




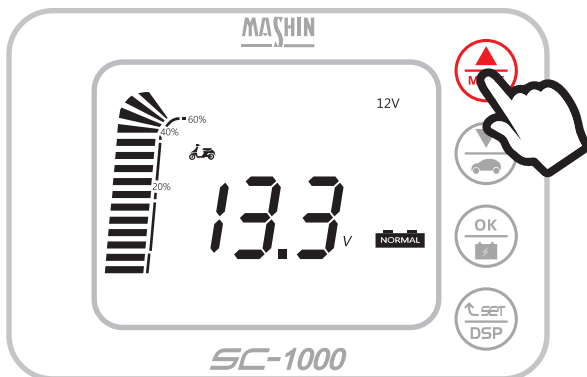
Sleep Mode






- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

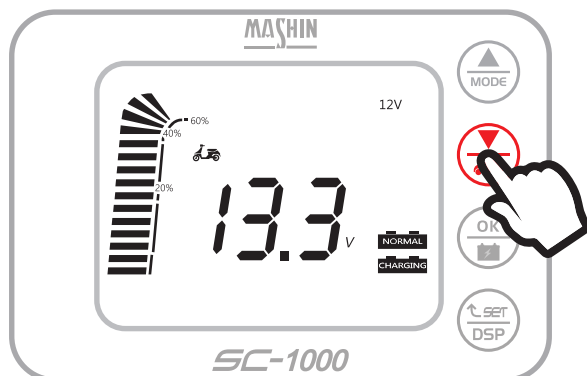
Normal Mode

Normal Mode Charging


- ① Press button  to the Normal Mode **NORMAL**, then charging will begin automatically.



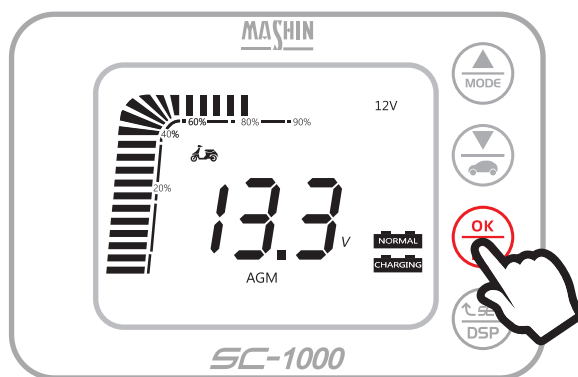
- ② Press button  to select your charging current.
 (1A)  (3A)  (7A)  (10A)



※ This charger will save your last charging procedure automatically.

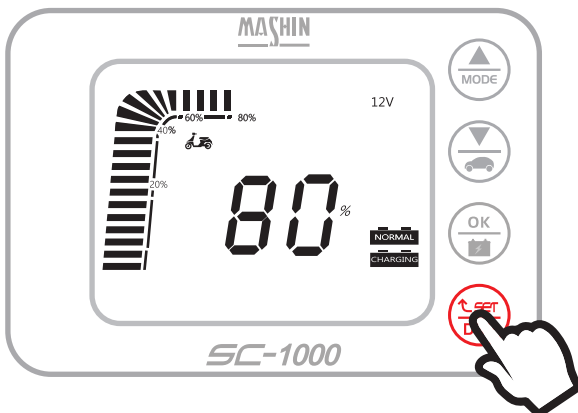
- ③ Press button  to select your battery types, WET, MF, AGM or EFB to go into charging.

※ If unsure on what types of battery you have, please leave it without choosing.



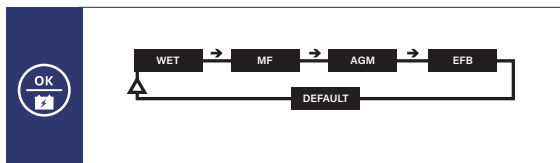
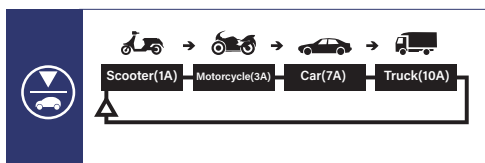
- ④ Press button  to check the following information.

V : Voltage A : Current
 H : Charging Time % : Charging Progress
 AH : Accumulative Current



Sleep Mode



- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

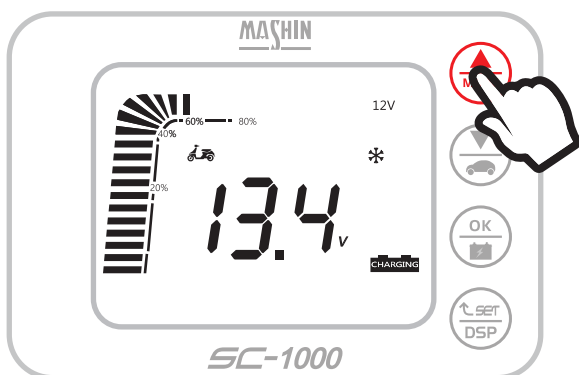







Snow Mode

Snow Mode Charging

※ Snow Mode is recommended to charge in low temperature.


- ① Press button  to the Snow Mode , then charging will begin automatically.

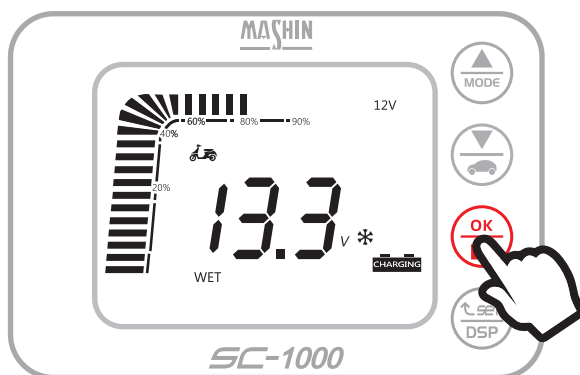


- ② Press button  to select your charging current.
 (1A)  (3A)  (7A)  (10A)



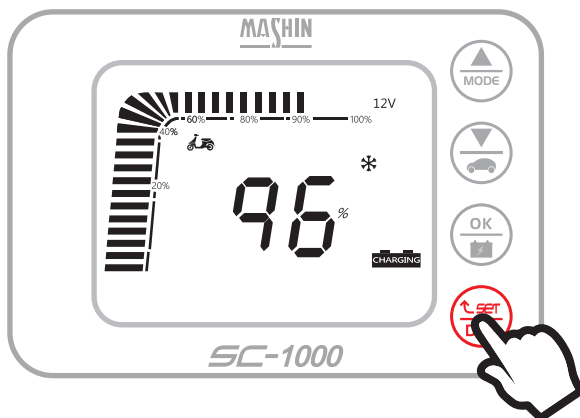
※ Snow Mode is only available for lead-acid battery, LiFePO4 battery cannot be selected in this mode.

- ③ Press button  to select your battery types, WET, MF, AGM or EFB to go into charging.



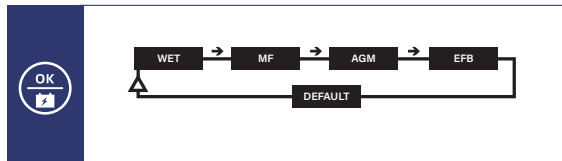
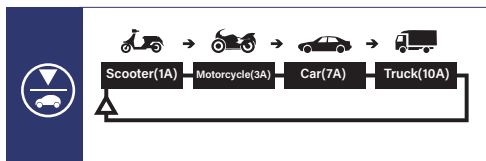
- ④ Press button  to check the following information.

V : Voltage A : Current
 H : Charging Time % : Charging Progress
 AH : Accumulative Current



Sleep Mode

- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.





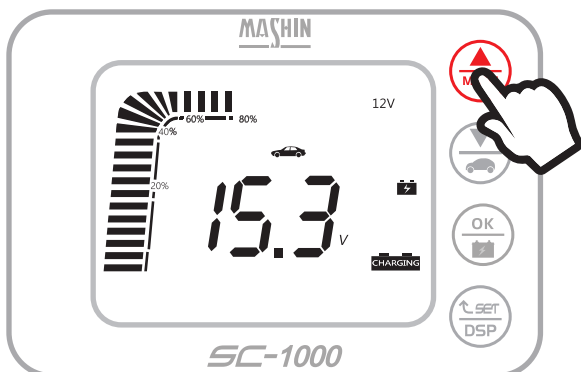
Boost Mode

Boost Mode Charging

❗ Please remove the battery from the car before using Boost Mode charging.

- ① Boost Mode is used when battery can not work in a normal charging condition or the voltage is lower than 2V. Boost charging involves a high voltage 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.

- ② Press the button  , to go into Boost Mode  .



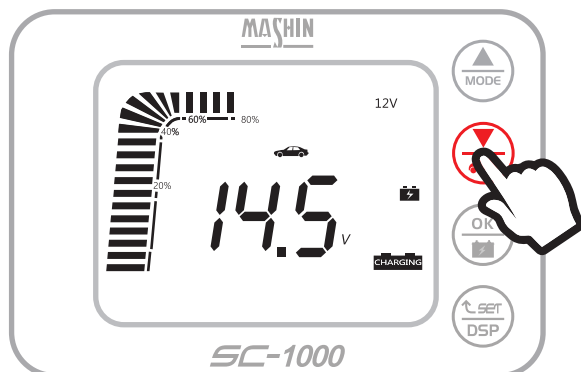
- ✗ Only available for lead-acid battery.
- ✗ Cannot assure the battery will back to normal condition.
- ✗ Battery types are unselectable.
- ✗ The percentage of charging process is unavailable.
- ✗ The Boost Mode will do four times boost charging, if the battery is recovered , the charger will back to Normal Mode Charging. Otherwise, the charger will stop charging and the Error icon lights.


⚠ Remove the car battery might cause the data loss of your car ECU and electronic devices.

It is recommended to use OBD II to supply power for your car.

- ③ Press button  to select your charging current.

 (1A)  (3A)  (7A)  (10A).

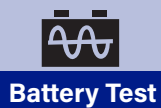


- ④ It will do the the boost charging by 16.5V at most for four times. If the battery is still not working after four times, the icon will light on  .

Sleep Mode

- If there is no action for 3 mins after connecting with AC power , the screen will off , please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

Testing Function



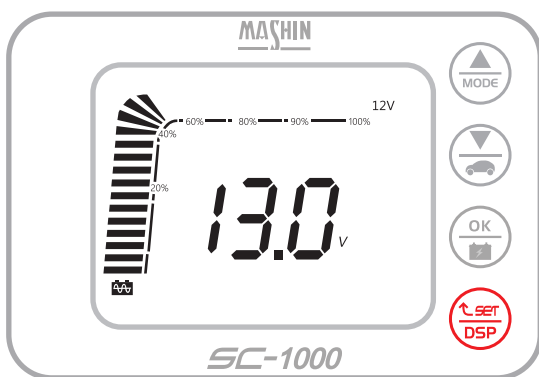
Battery Test




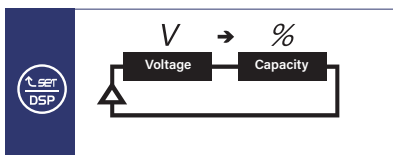
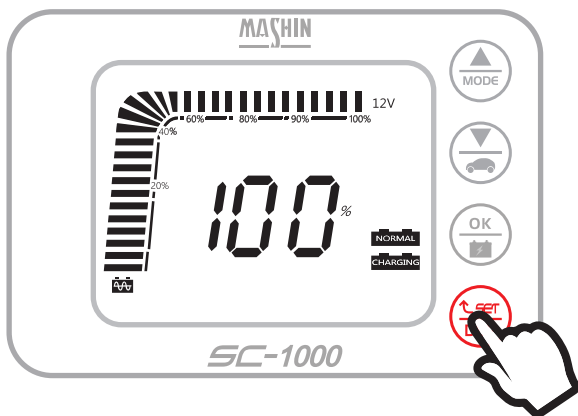
Starter Motor Test

① Connect clamps with car battery positive and negative terminals. No need to connect with AC power.



② The battery voltage will display on the screen.
(Measuring range is 6V-16V)

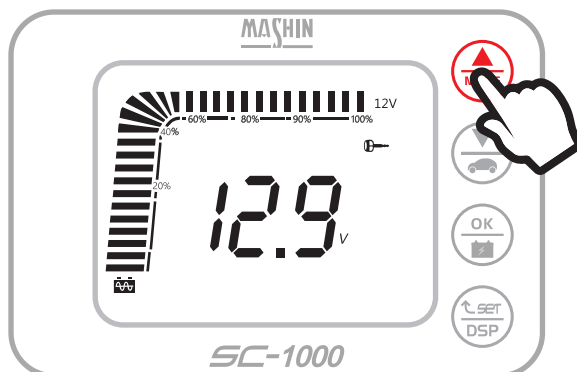


③ Press button , the battery capacity will display on the screen.

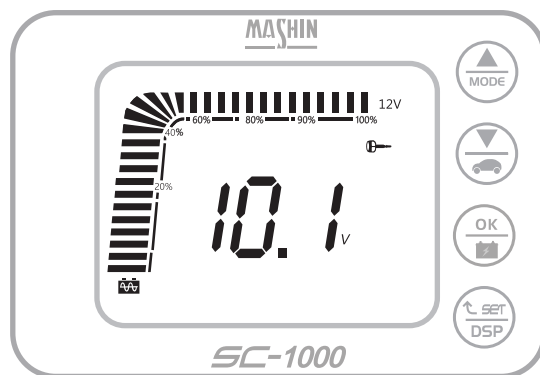


④ Please charge your battery when it is running low.

① After finishing Battery Test, press button  to Starter Motor Test and the signal  will flash.





② Then start the car engine, the lowest voltage of starter motor will display on the screen.

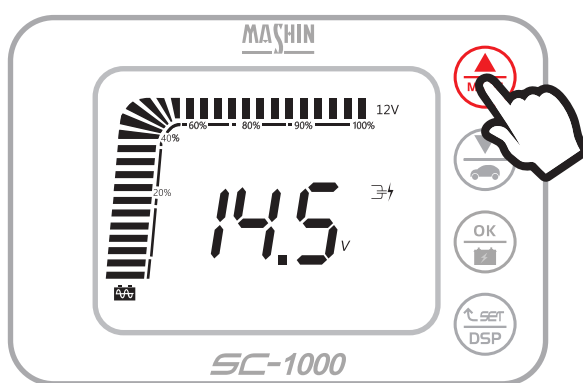


Sleep Mode

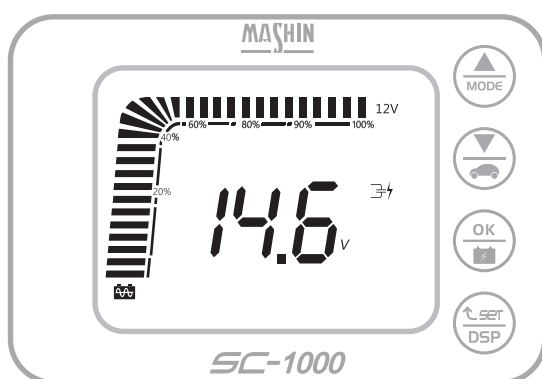
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.


Alternator Test

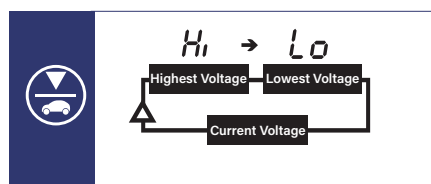
- ① After finish Starter Motor Test, press button  to the Alternator Test and the icon  will flash and begin measuring the alternator voltage.



- ② The current alternator voltage will display on the screen. Then running the engine at 2,000~3,000RPM to get a more accurate data.



- ③ Press button , the screen will display the highest, lowest and current voltage of the alternator.



Sleep Mode


- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

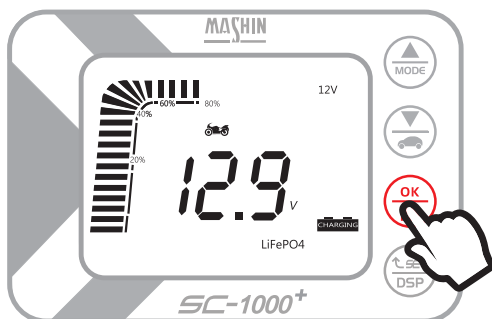
SC-1000+ Only

LiFePO4 Mode



This is designed for charging LifePO4 battery.

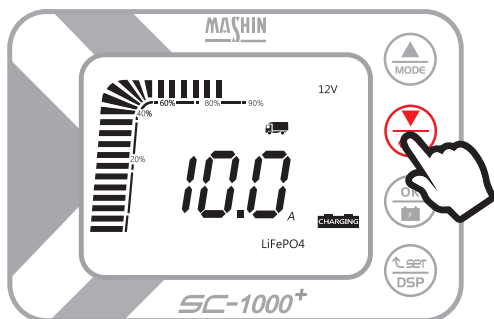
※ Only can be used under 12V Normal Mode.

- ① Press button  under Normal Mode **NORMAL** and select LiFePO4 to go into charging.



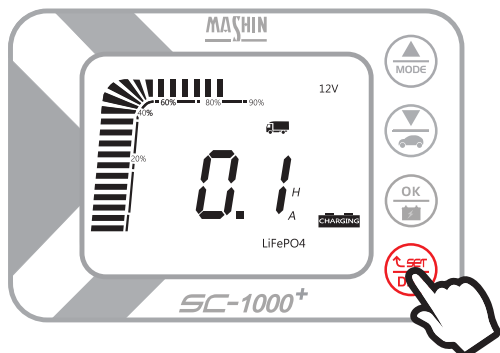
- ② Press button  to select your charging current.


 (5A)  (10A)



- ③ Press button  to check the following information.

V : Voltage A : Current
H : Charging Time % : Charging Progress
AH : Cumulative Current




※ To get out of LiFePO4 mode, please press .

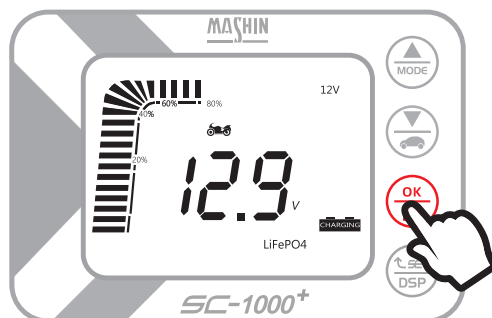
Sleep Mode



- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.
- If disconnecting the AC power without disconnecting the clamps, after 30 seconds, the beep sound appears for every 30 seconds and stops for 10 seconds until removing the clamps.

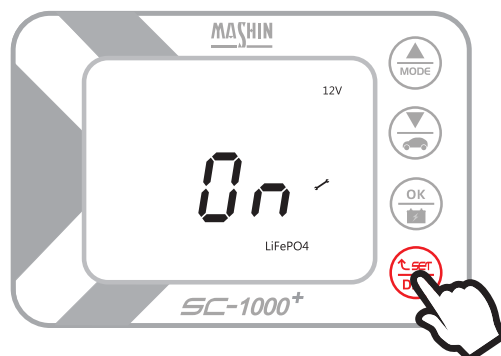
Forced On Charging


※ The BMS of LiFePO4 battery will cut off the output automatically when it is over discharged. To solve this situation, you could use the forced on charging. **Must not reverse polarity when using this mode or it might cause damage for battery or charger.**

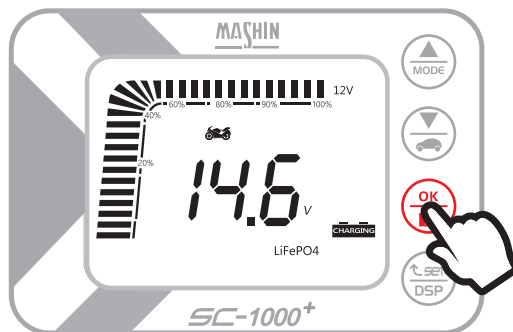
- ① Press button  under Normal Mode **NORMAL** and select LiFePO4 to go into charging.




- ② Long press button  at least 3 seconds, two icons  and  will display on the screen.

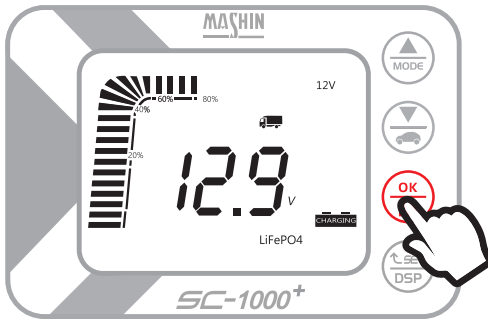




- ③ Press button  to go into charging, it will do a forced on charging by 14.6V for only 60 seconds. After then, it will back to LiFePO4 normal charging.



- ④ Then Press button  to select your charging current.

 (5A)  (10A)

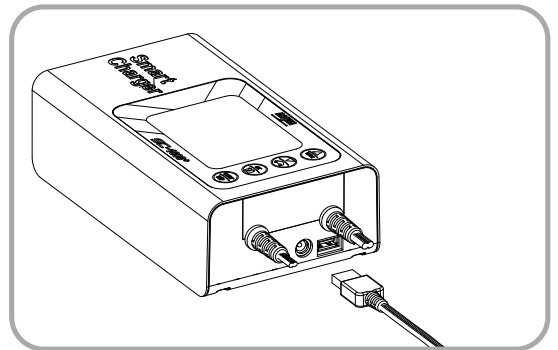


- ⑤ The icon  lights when charging begins and charging progress will display on the screen.
- ⑥ When charging is completed, the icon  will light on.

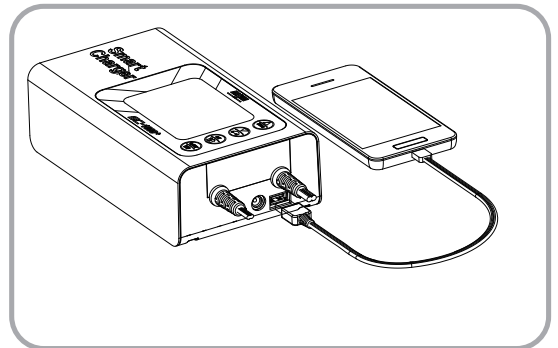
USB Charging

Charge Your Electronic Devices

- ① Connect with AC power.
- ② Connect the USB cable to the SC-1000+ USB port.



- ③ Start charging your electronic devices.



※ USB port is an individual device, it can supply power in any charging mode. The maximum current is 5V 2.1A.

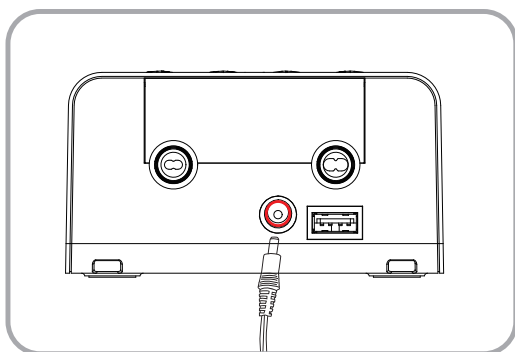
DC Supply

OBD II / Cigarette Connector (Option)

- ① Connect with AC power.
- ② Connect OBD II with OBD II port or Connect Cigarette Connector with cigarette lighter socket, and one signal will light.



- ③ Plug the OBD II DC connector or Cigarette DC connector into the DC port.






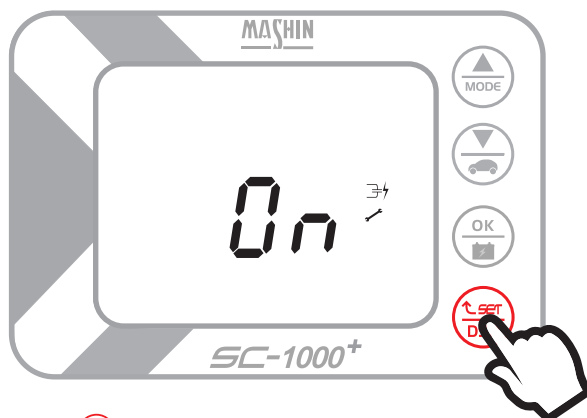
- ④ Press button  to DC Supply .




Sleep Mode

- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.

- ⑤ Long press button  at least 3 seconds, two signals  and  will display on the screen.



- ⑥ Press  to get into DC Supply.



- ⑦ When the other signal of OBD II lights on, connection is completed. You can change your battery now.

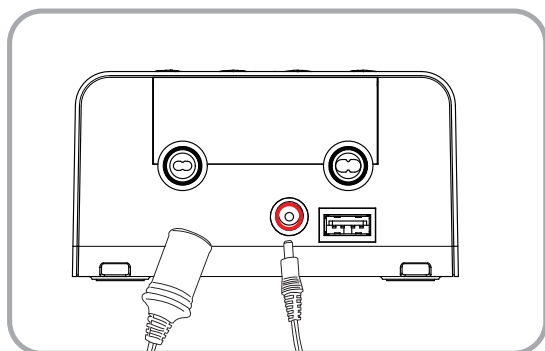


- ※ Maximum output is 5A.
- ※ This is used to change your battery, do not use to charge your battery.

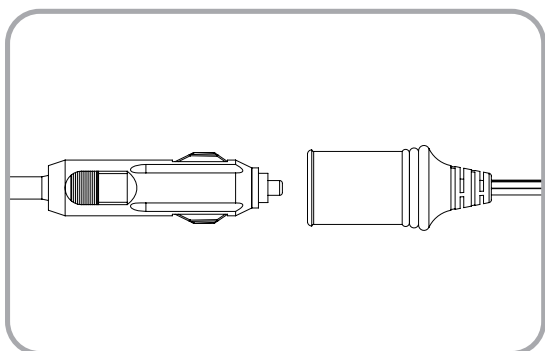
DC Supply

Cigarette Female Socket (Option)

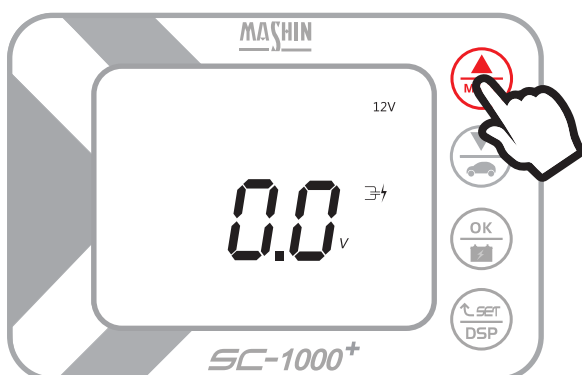
- ① Connect with AC power.
- ② Plug the DC connector of Cigarette Female Socket into the DC port.






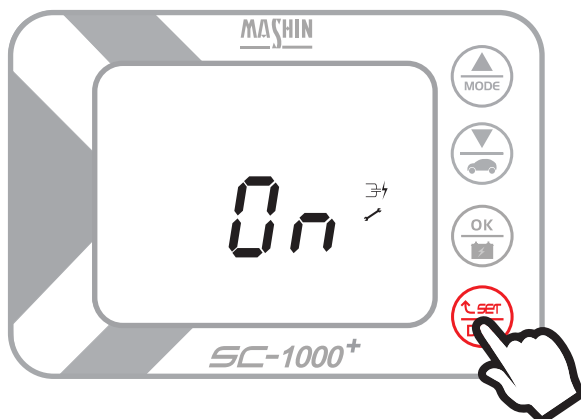
- ③ Connect the cigarette connector of electronic devices with female socket.



- ④ Press button  to DC Supply .



- ⑤ Long press  at least three seconds, two icons  and  will display on the screen.



- ⑥ Press button  to get into DC Supply.



- ⑦ Start to charge car electronic devices.

Sleep Mode

- If there is no action for 3 mins after connecting with AC power, the screen will off, please press any button to awake.

General Information

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℃ 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℃, 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) .

Specification

Spec. Chart

MODEL	SC-1000	SC-1000+
Input Power	AC100V ~ AC240V 50 / 60HZ	
Normal Voltage	DC12V	
Charging Voltage	Normal Mode = max.DC14V~15.5V Snow Mode = max.DC14.6V~15.7V Boost Mode = max.DC16.5V	Normal Mode = max.DC14V~15.5V Snow Mode = max.DC14.6V~15.7V Boost Mode = max.DC16.5V LiFePO4 Mode = max. DC14.6V
USB Charging Current	-	DC 5V 2.1A
DC Supply	-	DC 13.5V 5A
Charging Current (Current Selection)	1A / 3A / 7A / 10A	1A / 3A / 7A / 10A 5A / 10A (LiFePO4)
Protection	1. Short Circuit Protection 2. Over-temperature Protection 3. Spark Protection 4. Over-charge Protection	5. Over-voltage Protection 6. Reverse Polarity Protection 7. Disconnecting Protection 8. Over-current Protection
Battery Types	WET / MF / AGM / GEL / EFB	WET / MF / AGM / GEL / EFB LiFePO4
Operating Temperature	-20~40°C , Humidity 90 %	
Dimensions (L * W * H)	197 x 113 x 61 mm ±2mm	
Weight	0.95 kgs	

Compatible Battery

◆ Battery Voltage DC12V

◆ Battery Types

- Lead-acid battery for vehicles
- GEL battery
- VRLA battery
- AGM battery
- Others

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

● LiFePO4 Battery(SC-1000+ Only)

● EFB (ISS) Battery

◆ Battery Charging Battery Capacity

- 3Ah ~ 120Ah

◆ Maintain Battery Capacity

- 3Ah ~ 200Ah

■ 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.

Troubleshooting

Q : Connect with AC power but the charger does not turn on?

A : Check if connecting with AC power correctly.

Check if there is no electricity in AC outlet.

Q : Battery Error lights on?

A : Check if battery is defective or deteriorative.

Check if battery is DC12V.

Q : Reverse polarity lights on?

A : Check if connection is reversed.

Q : Battery gets hot or having smell when charging?

A : Check if battery is defective or deteriorative.

Q : Battery can not fully charging?

A : Check if settings are correct.

Check if battery is defective or deteriorative.

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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