

MACHIN® PROGRAMMING **BATTERY CHARGER**



TK-60

USER GUIDE



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

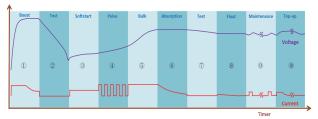
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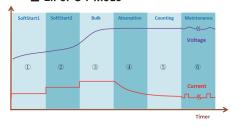
8 Stages Charging Mode

Normal Mode Voltage 1 (5) (7) (8)

■ Boost Mode



■ LiFePO4 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.

Absorption:

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

Timer

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.

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.

1 Pre-Charge 1

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

2 Pre-Charge 2

Soft start, moderately charging in the begining 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

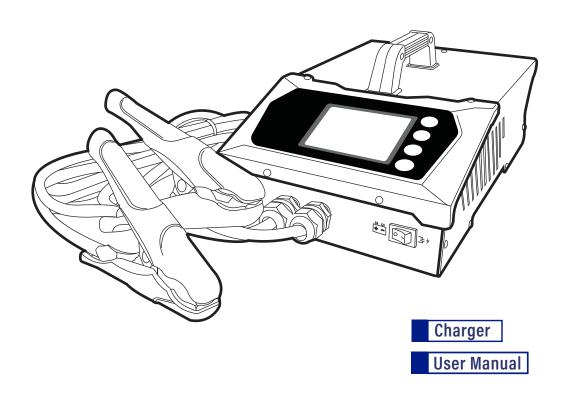
- This charger is designed for charging lead-acid battery of vehicles, do not charge the battery of home appliances.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge. Unless they have been 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.

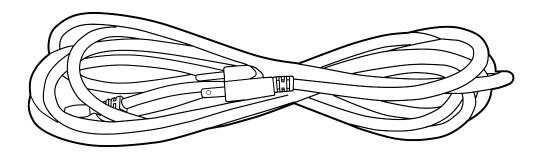
It is the operator's responsibility to comply with the following:

- 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.

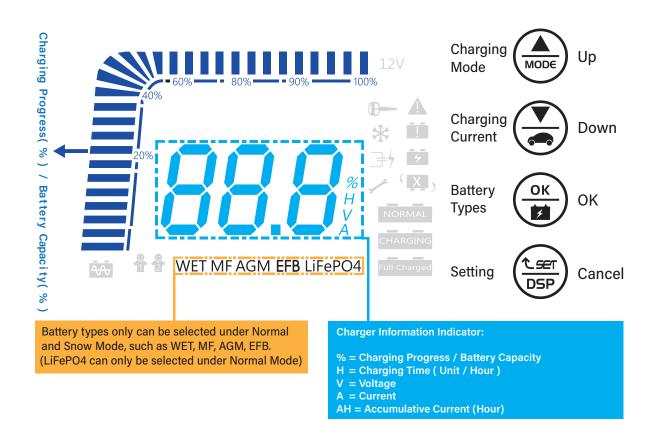
- · Disconnect equipment from power supply before cleaning. Do not use any liquid or aerosol cleaner. Use only moisture cloth.
- · If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.





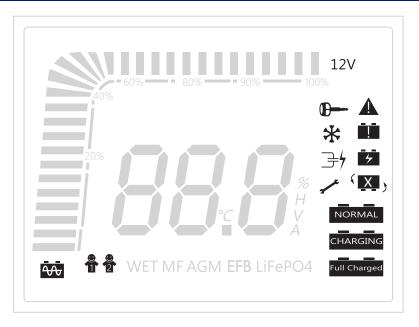
AC Cable

LCD Display Panel and Function



Icon Indicator

D	ISS Mode
*	Snow Mode
글 +	DC Supply
1	Advanced Setting
A	Charger Error
	Battery Error
4	Boost Mode
(X)	Reverse Polarity
NORMAL	Normal Mode
CHARGING	Charging
Full Charged	Charging Completed
₩.	Battery Check
# #	Advanced Mode
12V	Battery Voltage



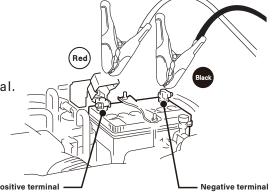
Operating Instruction

Before Connecting

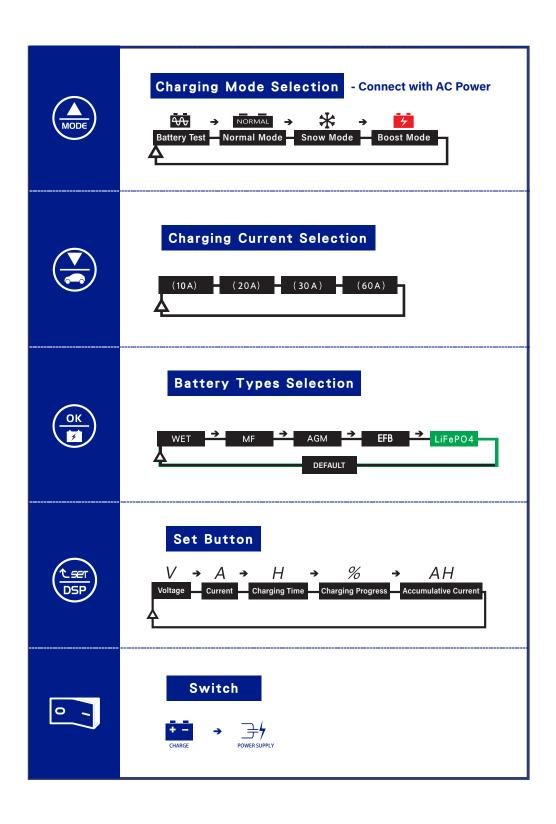
- Please make sure battery types and capacity of your vehicles before selecting charging current and mode.
- · Please clean the battery vent tube before using.
- If acids enter an eye, flushing eyes immediately with plenty of cold, clean water and get medical attention.
- · Make sure working area is 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 dirts 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

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

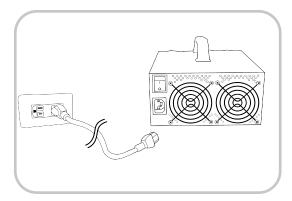


※ Please make sure clamps and battery are well-connected.

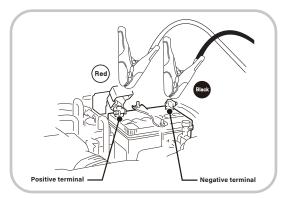


Easy Operation

1 Connect with AC power.



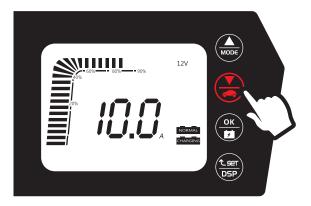
② Connect clamps with car battery positive and negative terminals.



③ Press button 🎰 to the Normal Mode NORMAL .



4 Press button to select your charging current 10A/20A/30A/60A. If there is no action for 3 seconds. it will back to last display.



- (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.

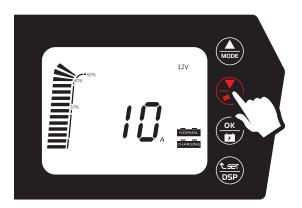
Charging Function - Normal Mode

Normal Mode Charging

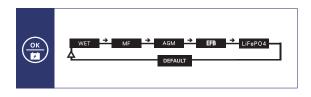
1 Press button to the Normal Mode NORMAL, then charging will begin automatically.



② Press button to select your charging current 10A/20A/30A/60A. If there is no action for 3 seconds, it will back to last display.



* This charger will save your last charging procedure automatically.



- ③ Press button to select your battery types, WET, MF, AGM, EFB or LiFePO4 to go into charging.
- ※ If unsure on what types of battery you have , please leave it without choosing.



4 Press button (DSP) to check the following information.

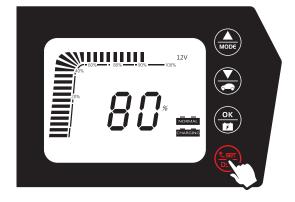
V : Voltage

A : Current

H: Charging Time

% : Charging Progress

AH: Accumulative Current



Charging Function - Snow Mode

Snow Mode Charging * Snow Mode is recommended to charge in low temperature.

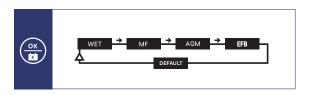
1 Press button to the Snow Mode **, then charging will begin automatically.



2 Press button (to select your charging current 10A/20A/30A/60A. If thereis no action for 3 seconds, it will back to last display.



 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 b to check the following information.

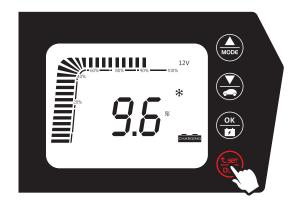
V : Voltage

A : Current

H: Charging Time

%: Charging Progress

AH: Accumulative Current



Charging Function - Boost Mode

Boost Mode Charging

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

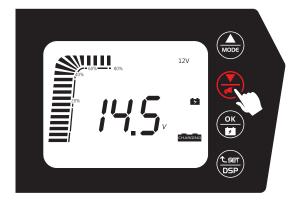
① Boost Mode is used when battery can not work in a normal charging condition. Boost charging involves a high voltage for short period of time to charge the battery. It is generally if the battery has been discharged heavily. It enables the quick charging of depleted batteries.

Press the button 🌦 , to go into Boost Mode 💆 .



- Only available for lead-acid battery.
 Cannot assure the battery will back
- **※** Battery types are unselectable.
- X 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.

Press Button to select your charging current 8A/16A/24A/48A. If there is no action for 3 seconds, it will back to last display.



③ 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 .

Charging Function - LiFePO4 MODE

LiFePO4 Mode

This is designed for charging LifePO4 battery.

X Only can be used at Normal Mode.

1 Press button under Normal Mode normal and select LiFePO4 to go into charging.



② Press button to select your charging current 10A/20A/30A/60A. If thereis no action for 3 seconds, it will back to last display.



3 Press button to check the following information.

V : Voltage A : Current

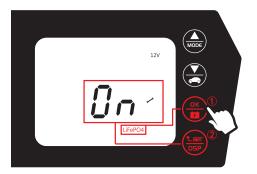
H: Charging Time %: Charging Progress

AH: Accumulative Current



Forced On Charging

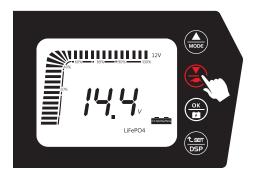
- ** The BMS of LiFePO4 battery will cut off the output automatically when it is over discharged. To solve this situation, you could use the forced on charging. Must not reverse polarity when using this mode or it might cause damage for battery or charger.
- 1 Press button under Normal Mode and select LiFePO4.
- ② Long press button 🖨 at least 3 seconds, two icons and 🗓 n will display on the screen.



3 Press button to go into charging, it will do a forced on charging by 14.4V for only 60 seconds. After then, it will back to LiFePO4 normal charging.

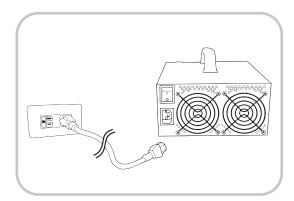


4) Press button to select charging current.

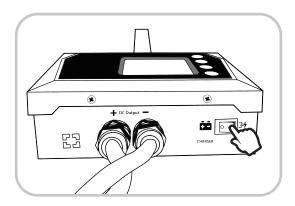


Power Supply Mode

1) Connect with AC Power.



2 Turn the switch to POWER SUPPLY.



③ Long press button for 3 seconds, you will hear a "Bi" sound.



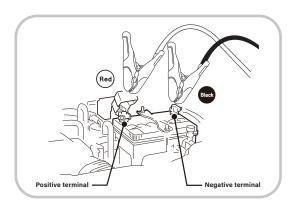
④ Press button ♠ To adjust voltage 13.5V~14.8V



After adjusting, press button , it will supply power by selecting voltage.

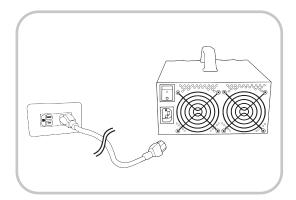


6 Connect the clamps with car positive and negative terminals. (Please connect correctly)



Testing Function - Battery Test

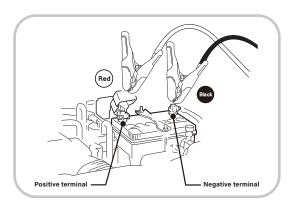
1) Connect with AC Power.



② Please check if there is tion on it. Otherwise, press button to select.



③ Connect the clamps with car positive and negative terminals. (Please connect correctly)



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



§ Press button (see) to check the following information.

V : Voltage

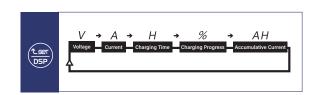
A : Current

H: Charging Time

% : Charging Progress

AH: Accumulative Current





Specification

Spec. Chart

TK-60					
	Input Power	AC100V ~ AC 240V 50/60HZ			
	Normal Voltage	DC12V			
Output (Charging Mode) Charging Voltage		Normal Mode = max.DC14V~15.5V Snow Mode = max.DC14.6V~15.7V Boost Mode = max.DC16.5V LiFePO4 Mode = max. DC14.4V			
	Charging Current (Current Selection)	10 A/20A/30A/60A			
Output Voltage		DC13.5V~14.8V			
(Supply Mode)	Output Current	60A			
	Max.Power	900W			
	Protection	 Short Circuit Protection Over-temperature Protection Spark Protection Over-charge Protection 	 Over-voltage Protection Reverse Polarity Protection Disconnecting Protection Over-current Protection 		
	Efficiency	>85%			
_	Battery Types	WET/MF/AGM/EFB/LiFePO4			
	Operating Temperature	-20~40°C, Humidity 90%			
	Dimensions (L* W * H)	330 x 206 x 153 mm			
	Weight	5.5 kgs			

Compatible Battery

- Battery Voltage DC12V
- Battery Types
 - Lead-acid battery for vehicles
 - EFB battery
 - VRLA battery
 - AGM battery
 - WET battery
 - MF battery
 - Others
 - LiFePO4 Battery
 - EFB (ISS) Battery
- Battery Charging Battery Capacity
 - 36Ah ~ 600Ah

Warning

Non starter lead-acid batteries,

please select NORMAL to charge your battery.

- 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.

- 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 classis, 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.

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M E M O

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