

# DIGITAL SMART 6/12/24V, 15A DC AUTO-DETECTION BATTERY CHARGER

## MB-3623

Suitable for Regular (Wet/ Flooded/ Sealed/ Maintenance Free) Lead Acid, Gel / SLA and Deep Cycle Batteries between 20-200Ah



**Please carefully read and follow the following safety and operating instructions.**

## **IMPORTANT SAFETY INSTRUCTIONS**

### **Gases**

When the battery is being charged you may notice bubbling in the fluid caused by the release of gas. As the gas is flammable no naked flames should be used around the battery, and the area should be kept well ventilated.

Because of this risk of explosive gas, only connect and disconnect the battery leads when the mains supply is disconnected.

### **Type of batteries**

This charger is only suitable for normal lead acid, sealed, leisure, gel or deep-cycle batteries and should not be used to recharge any other type of battery.

### **Points of note**

- When not in use, store the charger in a dry area to avoid moisture.
- Your Battery Charger is for *INDOOR USE ONLY*. Keep away from liquids, rain or snow.
- This battery charger is NOT designed as power supply.
- Do NOT recharge non-rechargeable batteries
- During charging, the battery must be placed in a well ventilated area.
- 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 charger from the supply mains. Then remove the chassis connection and then the battery connection.

### **Repair**

- The Battery Charger should not be opened. Any attempt at modification or repair by the user will entail the loss of your guarantee.
- 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.

### **Danger / Precautions When Working with Batteries**

- 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.
- Children should be supervised to ensure that they do not play with the appliance.
- Avoid getting battery fluid on your skin or clothes. It is acidic and can cause burns. If this occurs, you should rinse the affected area with soap and water immediately. Seek medical attention.
- If acid enters eye, immediately flood eye with running cold water for at least 20 minutes and get medical attention immediately.
- Never charge a frozen battery. If battery fluid (electrolyte) becomes frozen, bring battery into a warm area to allow battery to thaw before you begin charging.
- Never place a battery on top of charger or vice versa.
- Do not touch the battery clamps together when the charger is on.
- Never operate charger if it has received a hard blow, been dropped, or otherwise damaged. Take it to a qualified professional for inspection and repair.
- Be sure to position the charger power cord to prevent it from being stepped on, tripped over, or damaged.
- Never pull out the plug by the cord when unplugging the charger. Pulling on the cord may cause damage to the cord or the plug.
- Never smoke or allow a spark or flame in vicinity of battery or Engine.
- Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery or other electrical part may cause an explosion.
- Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery.
- A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing severe burns.

## FEATURES

### Automatic and Intelligent 5-Stage Charging Curve

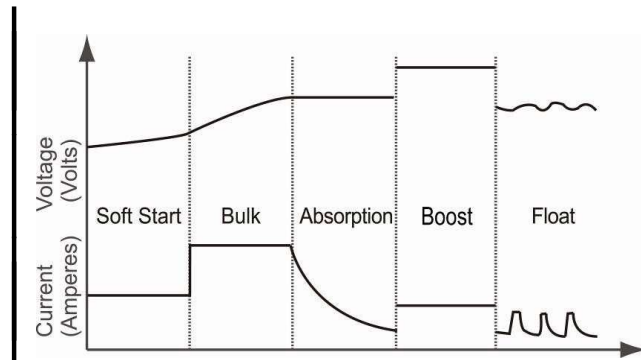
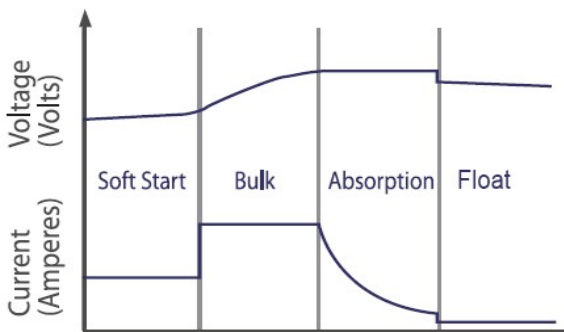
MB-3623 is controlled by a 12-bit AD microprocessor with 4/5-stage charging characteristic for charging batteries lawnmower, automobiles, motorcycles, snow mobiles, tractors, personal watercraft, boats, minibus, coach, truck, etc.

A microprocessor senses the condition of the battery and controls the regulator to provide the right current and voltage to the battery (charging characteristic). This will give the best effect on charging and give the longest life to battery.

Charging characteristic:

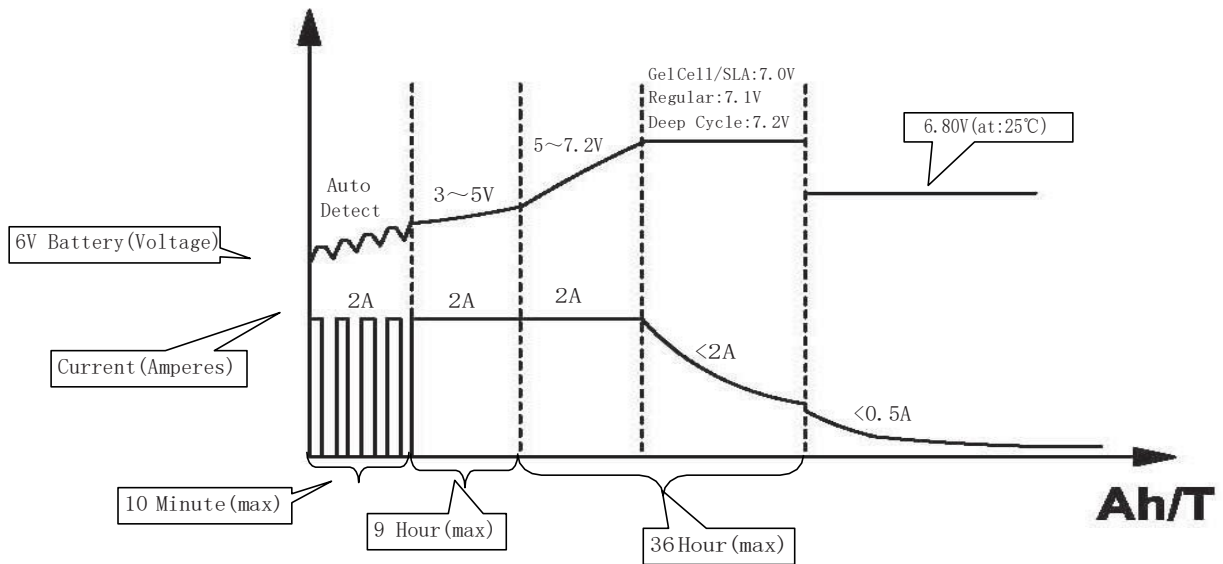
Gel Cell/SLA/Regular (4-Stage)

Deep Cycle (5-Stage)

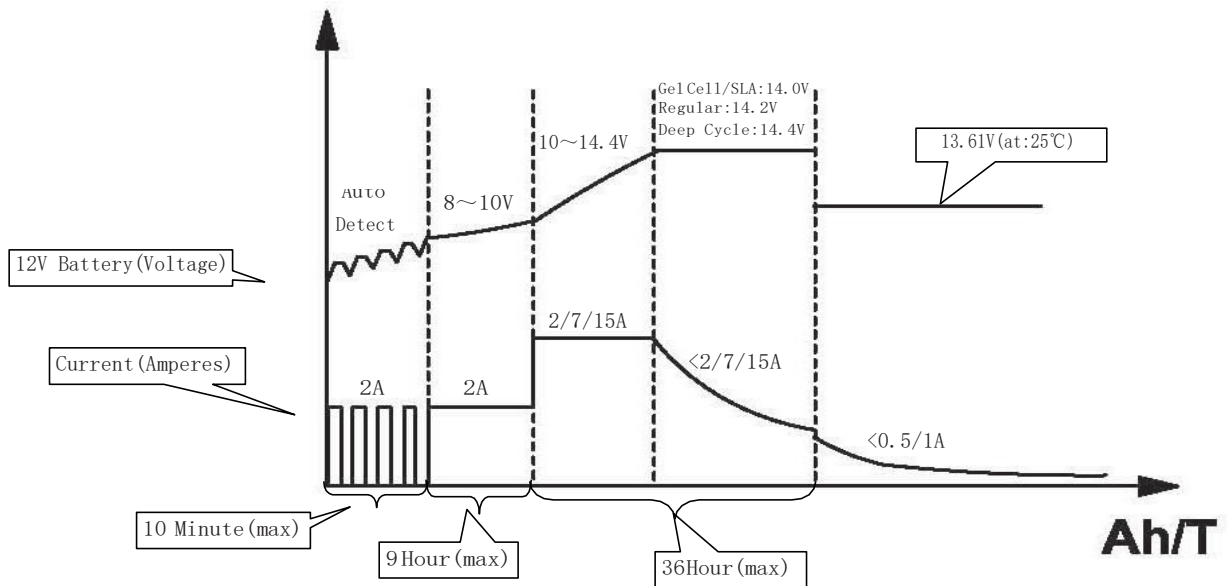


- **Soft Start:** Initial battery test to determine battery condition. If the battery is severely discharged, charger will begin the Soft Start stage. Charging starts with reduced current until battery voltage reaches a voltage suitable for bulk charging.
- **Bulk:** Major charging stage where the battery receives the majority of its charge. During this stage the battery brought to 60 - 80% of its charge. MB-3623 charger delivers maximum current until the terminal voltage has risen to the set level of:
  - 7.1V (6V Battery); 14,2V (12V Battery); 28.4V (24V Battery) for Wet/ Flooded Lead Acid, MF battery selection
  - 7V (6V Battery); 14,0V (12V Battery); 28V (24V Battery) for Gel/ SLA battery selection
  - 7.2V (6V Battery); 14,4V (12V Battery); 28.8V (24V Battery) for Deep Cycle selection.
- **Absorption:** Completes the charge up to virtually 100% at a constant voltage. The current tapers off after the current reached the minimum level.
- **Boost:** (Only for Deep cycle battery) the battery is charged deeply at a constant current and increased voltage to boost the charge capacity of the battery.
- **Float (Maintenance):**
  - **For "STD" selection:** The maintenance mode is charging at **constant voltage**, keeping the batteries at 100% charge. Normal charging mode is time-limited (max 10 days) while Float mode charges indefinitely without damaging the battery.
  - **For "DEEP" selection:** The maintenance mode is using **pulse charge**. When the battery voltage reaches upper limit (varied according to temperature), the charger will stop supplying power and until the battery drops to 13,0V, it will supply constant current again until the battery reaches upper limit. This will go in cycle until the charging process has been stopped manually. This keeps the battery in perfect condition when it is not in use. The charger can be connected for months keeping the batteries fresh.

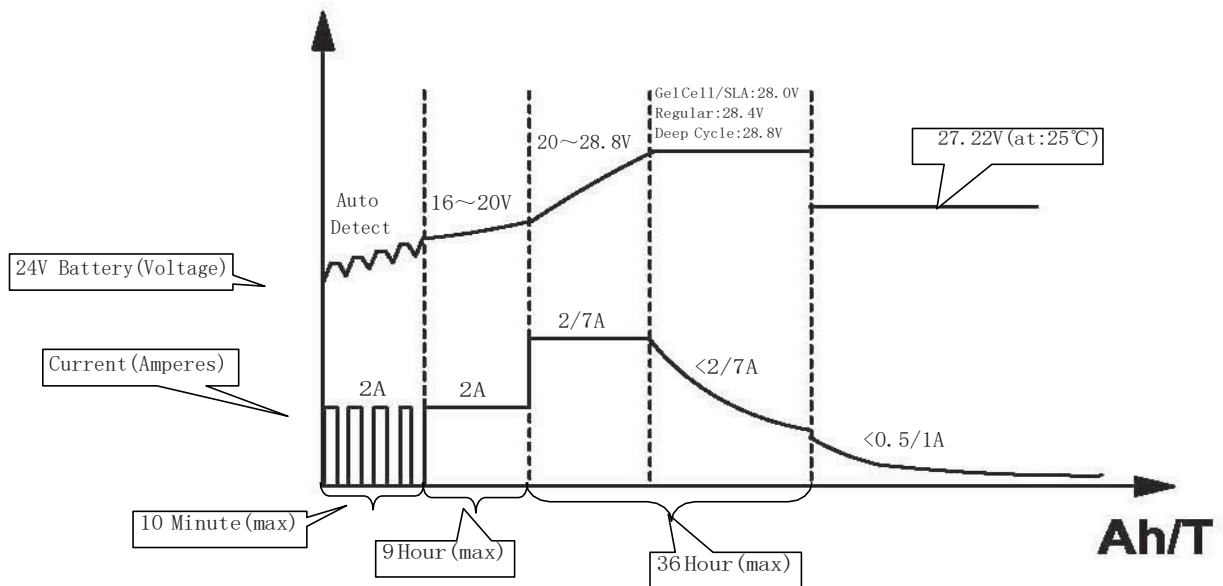
**Charging characteristic at 6V:**



**Charging characteristic at 12V:**



**Charging characteristic at 24V:**

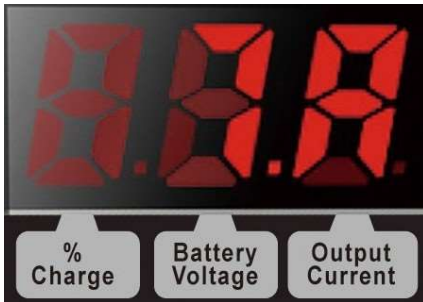


## LED display

The unit is built with LED display for showing charger status:



- **REVERSE** – RED LED – alligator clamps are connected in reverse polarity.
- **FAULT** - RED LED – Battery Fault.
- **CHARGING** – AMBER LED – The charger is charging to the battery.
- **FULL** - GREEN LED – The battery is fully charged and the charger is in maintenance mode.



- **3 x 7 Segment LED Main display** – Indicating charging current, battery voltage and charging %

## FUNCTIONAL ADVANTAGES

### Memory Function

If black out or the AC plug is disconnected from the mains supply, the battery charger will turn to memory mode and “- - -” illuminates on LED display. The charging mode and status will be recorded in the charger’s memory. Once power is resumed, MB-3623 will resume the charging process at the previous mode.

Remark:

- Memory function works on the condition that unit is connected with a battery which is at or over 6V.
- If prolonged black out is expected, please disconnect the unit from both mains and battery to reset the memory function.

**NOTE:** The memory function consumes power from battery and may run it flat.

### Temperature Compensation

A sensor will automatically adjust the charging voltage if the temperature deviates between – 20°C to +50°C. At a high temperature environment, MB-3623 lowers the output voltage and at a freezing condition, the unit will adjust a higher output voltage.

### Voltage compensation

Because of some voltage drop in the cables, the actual voltage at the alligator clamps of the unit can be lower than the charger output voltage. A special circuitry inside will monitor the true input voltage to the battery and adjust the output voltage accordingly. This will maximize the charging efficiency.

### Reverse-polarity protection

This unit offers reverse-polarity protection, the RED “REVERSE” LED will illuminate, the buzzer will warn the user and the charging process will not start. If this happens, unplug immediately from mains, connect the red alligator clip to positive (+) battery post, and black alligator clip to negative (-) post, then plug into the mains power and the charging process will start.

### **Short-circuit protection**

Should you accidentally touch the alligator clamp together whilst the mains power is on, the unit will not perform charging. Unplug from AC power mains, disconnect and start the process again being careful not to cross the alligator clamps together.

### **Temperature Control Fan**

To protect the charger from overheating, a fan is built-in for heat dispensation. Also to increase the life span of the fan, a sensor will control the on-off of the fan, where the fan will not be in use when the unit is not in a hot condition.

### **Buzzer Warning**

A built-in buzzer will help to warn you when connect the alligator clamps to the battery wrongly.

### **Cable Management**

MB-3623 casing is designed with AC and DC cables storage compartment. This will help to avoid cable damage and subsequently any possible danger to user.

### **Cut-Off Protection**

If the DC clamps are pulled off from the battery while the AC plug is still connected to the mains supply, the charger will automatically switch back to the standby mode and "2A" illuminates on LED main display. All charging function is cut-off. You can move the unit to recharge another battery; or, if you need to recharge the same battery, setting is needed to be done again.

### **Other features**

Anti-Spark Protection

## **OPERATION**

### **PLEASE READ CAREFULLY BEFORE USING**

**Suitable for 6/12/24V Wet/Flooded Lead Acid, Maintenance Free (MF), Gel/ SLA and Deep-cycle Batteries between 20-200Ah.**

#### **1. Charging your battery**

It is essential to disconnect the battery from the car. This will avoid possible damage to the alternator. To avoid damage to the bodywork from possible spillage, remove the battery completely from the vehicle. It is advisable to use gloves when handling the battery, as there is a high possibility of corrosive acid being on the outside of the battery.

#### **2. Preparing the battery**

Firstly, remove the caps from each cell and check that the level of the liquid is sufficient in each cell. If it is below the recommended level, top up with de-ionized or distilled water.

**Note:** *Under no circumstances should tap water be used.*

*The battery caps should not be replaced until charging is complete. This allows any gases formed during charging to escape. It is inevitable that some minor escape of acid will occur during charging.*

**NOTE:** *For permanently sealed/MF battery, it is not necessary to carry out the above checks.*

#### **3. Connection**

Connect the alligator clamps to the battery poles in the following order:

- Connect the positive charging lead (RED) to the positive terminal pole of the battery (marked P or +).
- Connect the negative charging lead (BLACK) to the negative pole of the battery (marked N or -).
- It is important to ensure that both alligator clamps are making good contact with their respective terminals.

#### 4. Control Panel

The Control Panel has several buttons and indicators.



**Charge Rate Button** sets the charge rate to one of the following:

**2A DC Slow** – Applicable on 6V/12V/24V battery, at a 2Amp DC Slow Rate Charging. The 2A rate is not intended to be used as a trickle charger for larger batteries.



**7A DC Normal** – Applicable on 12V/24V Battery, at a 7Amp DC normal rate.



**15A DC Fast** – Applicable on 12V Battery only, at 15Amp DC fast rate.



**Battery Selection Button** sets the type of battery to be charged to one of the following:



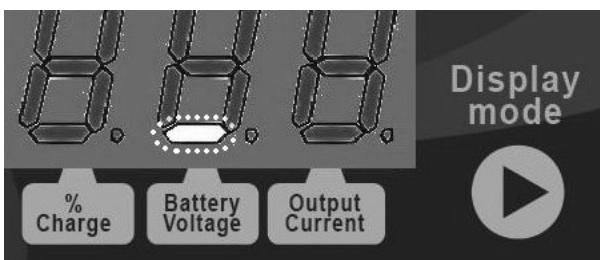
**Gel Cell / SLA** – Select for charging all type of "Gel Cell" & "SLA" batteries.

**Regular** – Select for charging all types of "lead acid" batteries (SEALED/MF or WET/ FLOODED TYPE).

**Deep** – Select for charging Deep cycle type batteries.

Batteries should be marked with their type. If charging a battery that is not marked, check the manual of the item that uses the battery. If the battery type is unknown, use the "Gel Cell / SLA" setting.

**Display mode button** sets and shows one of the following readings:



**Output current** – This shows the selected/ programmed charging current.

**Battery voltage** – This shows the voltage of the battery in DC, or Charging Voltage.

**Charging %** – This shows an estimate percent of charge.

## LED Indicators

On the front panel there are also 4 LED indicators for the following function:



**REVERSE** – Reverse Polarity. The alligator clamps have been connected at the wrong pole on the battery. When this occurs, simply disconnect and reconnect the alligator clamps at the correct pole, restart the charging process.

**FAULT** – Battery Fault. When this illuminates, this means the battery is broken/defective. If the battery fault display persists after resetting the charger, the battery may be faulty and unable to charge.

**CHARGING** – This shows the battery is in charging process.

**FULL**– This shows the battery is fully charged and the battery charger is in maintenance mode.

## 5. Charging Operation

### A) Auto- Detection

Insert the AC plug into the AC mains supply (220-240 Volts AC only).

When beep sound is heard and "2A" illuminates on LED main display, press "Start" button and start Auto-Detection function. "6A" "12A" "24A" is rotating on LED main display. After about **10 minutes**, when detection process is completed, beep sound is heard. "b6" or "b12" or "b24" illuminates on LED main display, indicating the type of detected battery- 6V, 12V or 24V. Simultaneously, LED of relevant LED indicator (voltage) of 6V or 12V or 24V, and "Gel Cell/SLA" illuminates on LED main display. Then, starts charging at pre-set charging rate at 2Amp.

*Remark: 1) MB-3623 is programmed and pre-set the standard settings at:*

- Charging Rate: 2Amp DC
  - Battery Type: Gel Cell/SLA
- 2) Auto-Detection function is for detecting the type (voltage) of battery.*
- 3) During auto-detection process (around 10minutes), unit does not response to any command even pressing any button.*

If you want to change the pre-set setting as above remark 1), press "Pause" button.

Then, press "Charge Rate" button for selecting the charging voltage you want.

Remark: For 6V Battery, only "2A" shows up on LED main display and this indicates only 2Amp is available.

For 12V Battery, "2A", "7A", "15A" shows up in each press and this indicates 2Amp, 7Amp, 15Amp DC charging rate are available for your selection. Leave at your designated charging rate.

For 24V Battery, only "2A", "7A" shows up in each press and this indicates only 2Amp, 7Amp DC charging rate are available for your selection (15A is not available). Leave at your designated charging rate.

If you want to change the Battery Type from the pre-set Gel Cell/SLA to Regular (Lead-Acid) or Deep Cycle, press "Battery Type" button and press again for selection from the list. Leave at your designated battery type.

After above manual selection, press "Start" button and charging will start at the programmed parameters as your designated selection.

### B) Basic Operation - Manual Pre-set before Auto-Detection

*Remark: Advantage of this operation is you can achieve quicker set-up of charging parameters. But, please keep in mind:*

*For 6V battery, only 2A charge rate is applicable; for 12V battery, 2A, 7A, 15A charge rates are applicable; for 24V, only 2A, 7A charge rates are applicable.*



*If you select non-applicable charging rate, after Auto-Detection process, charging will start at factory pre-set charging rate at 2Amp and 2A illuminates on LED main display.*

Insert the AC plug into the mains supply (220-240 Volts AC only).

When beep sound is heard and "2A" lights up on LED main Display, follow the below steps:

**Step 1** – Press the Charge Rate button to select the charging power (current)

Remark: If you know it's 6V battery, please don't select "7A/ 15A" as they are not applicable.

If you know it's 24V battery, please don't select "15A" as this is not applicable.

**Step 2** – Press the "Battery Type" Button to select the battery type for charging.

**Step 3** – Press the "Start" Button to start the Auto-Detection Process.

After about 10 minutes, when detection process is completed, beep sound is heard. "b6" or "b12" or "b24" lights up on LED display, indicating the type of detected battery- 6V, 12V or 24V. Simultaneously, LED of relevant LED indicator (voltage) of 6V or 12V or 24V, and "Gel Cell/SLA" illuminate.

When your manually pre-set charge rate is applicable on detected type (voltage) of battery, charging starts.

*Remark:*

*If you select a non-applicable charging rate, charge will start at factory pre-set charging rate at 2Amp and "2A" illuminates on LED main display. If you want to change the setting, please press "Pause" button. Then, press "Charge Rate" button for selecting the charging voltage you want.*

*Remark: For 6V Battery, only "2A" shows up on LED main display and this indicates only 2Amp is available.*

*For 12V Battery, "2A", "7A", "15A" illuminates in each press and this indicates 2Amp, 7Amp, 15Amp DC charging rate are available for your selection. Leave at your designated charging rate.*

*For 24V Battery, only "2A", "7A" illuminates in each press and this indicates only 2Amp, 7Amp DC charging rate are available for your selection (15A is not available). Leave at your designated charging rate.*

*After above manual selection, press "Start" button and charging will start at the programmed parameters as your designated selection.*

**NOTE:**

**Battery Fault** – A few seconds after switching on to the operating mode, the LED indicator "FAULT" will illuminate if the following occurs:

- A. Low battery voltage - < 3 V
- B. High battery voltage - > 28V
- C. Battery short circuit or battery cell short circuit

Under these conditions, the battery charger will stop functioning. In the event of A, B or C, the battery may be defective.

When the LED "FULL" illuminates, the battery is completely charged. The battery charger will now go into maintenance mode. No attention is required until the battery is required for use again.

### **When charging is complete**

Switch off the mains supply, unplug the charger, and disconnect the alligator clamps from the battery posts. Inspect the liquid levels in each cell and top up. If necessary, using the correct fluid. Replace the caps. Any surplus fluid around the cell tops should be wiped off (this should be done with extreme care as it may be acidic/corrosive).

Where appropriate, if the battery has been removed for charging, replace it and reconnect the cables.

## Protection

### a) Reverse Polarity

If the alligator clamps are connected improperly to the battery terminals, the reverse polarity LED will indicate the reversed polarity; warning buzzer will also sound and "E1" illuminates on LED main display. When this occurs simply disconnect the battery charger from the AC power and connect the alligator clamps correctly to the battery terminals. Reconnect the charger to the AC power.

### b) Over-Heat

If internal temperature of the unit is too high, warning buzzer will sound and "E3" illuminates on LED main display. When this occurs simply disconnect from AC power mains and battery. Let the unit cool down before charging again.

### c) Over-Current

If output current is too high, warning buzzer will sound and "E4" illuminates on LED main display. When this occurs, please disconnect the unit from AC power mains and battery. Try to re-set and recharge. Or set to lower output.

### d) Short-Circuited

If "+" and "-" alligator clamps are shorted or voltage of battery is below 3V, warning buzzer will sound and "E5" illuminates on LED main display. When this occurs, please disconnect from AC power mains and check the polarity connection. If polarity connection is correct, please check the battery.

### e) Voltage of battery >28V

If voltage of battery is over 28V, warning buzzer will sound and "E6" illuminates on LED main display. When this occurs, please disconnect from AC power mains and battery. Don't try to recharge that battery.

### f) Detection Failure

If type (voltage) of battery is failed to be detected or the type of battery is not suitable to be recharged by MB-3623, warning buzzer will sound and "E2" illuminates on LED main display. When this occurs, please check the type of battery. For example, if the battery is lithium or for electric car, do not charge with MB-3623. If type of battery is applicable for MB-3623, please try to re-set and recharge. If situation persists, battery may be faulty.

## MAINTENANCE AND CARE

It is essential to keep your battery regularly charged throughout the year, especially during the winter months. In the winter the effectiveness of your car battery is reduced by the cold. Oil is thick. Engines are difficult to start as the heater, windscreen wipers and lights are all draining power. It is at this time that batteries have to be at peak power. If your battery is not regularly maintained and kept fully charged, it can cause problems and a possible breakdown.

Listed are some helpful hints on how to keep your battery healthy in conjunction with your Battery Charger.

### Faulty Cells

Batteries are usually made with six cells. One of these cells can deteriorate or get damaged. If, after several hours charging your battery is still flat, you should test the battery. Take hydrometer readings from each cell in the battery. If one reading is lower than the others, this could indicate a faulty cell.

## Care

Sometimes the battery may appear flat, but this could simply be dirty or loose connections on your battery terminals. It is important to maintain the leads on a regular basis. Do this by removing the leads from the battery, clean the inside of each connector and terminal posts on the battery, smear the terminal posts and connectors with Vaseline, refit in their correct positions and tighten firmly.

It is essential to keep the electrolyte level above the plates.

Note, however, that you should not overfill it, as the electrolyte is strongly acidic. When topping up do not use tap water. Always use distilled or de-ionized water. It is important to keep the acid level up. If necessary, have it checked by a battery specialist.

## Checking the condition of your battery

Using a hydrometer, which can be purchased, from most motor accessory stores, you can check the specific gravity of the electrolyte in each cell. The hydrometer is used to suck up a quantity of fluid from the cell. The weighted float inside the hydrometer will register the condition of that cell. Put the fluid back into the cell after testing, taking care not to splash the fluid about.

## TROUBLE SHOOTING

Trouble often can be corrected by the user. Please read this chart for possible solutions to common problems.

PROBLEM	POSSIBLE CAUSE	SOLUTION
The battery is connected and the charger is on, but it isn't charging.	The charger is not in charging mode.	Press Mode Display button until Battery % or Voltage reading comes on.
Indicator lights are lit in an erratic manner not explained in the manual.	A button may have been pressed when the charger was plugged in. The charger may be defective.	Make sure nothing is touching the control panel, then unplug the unit and plug it in again. Consult place of purchase in this case for assistance.
The green "FULL" LED turns on a few minutes after connecting to the battery.	The battery may be fully charged or recently charged, leaving the battery voltage high enough to appear to be fully charged.	If the battery is in a vehicle, turn the headlights on for a few minutes to reduce the battery voltage and try charging again. Also try a lower Charge Rate selection.
The charger was unplugged from the wall but the display is still on.	The battery is supplying the power to the display.	Disconnect the battery.

## TECHNICAL SPECIFICATIONS

For 12V Normal Lead Acid, Sealed, Leisure, Gel or Deep Cycle Batteries

Input: 220V – 240V ~ 50Hz, 2.5A (Max.)  
Output: 2A DC for 6/12/24V battery; 7A DC for 12/24V battery;  
15A DC for 12V battery



## ENVIRONMENTAL PROTECTION



Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your local authority or retailer for recycling advice.

### Error Codes & Solutions:

Problem	Error Codes	Solutions
Battery is in reverse polarity	Er1	Check charge clamp, connect the red clamp to positive (+) battery post, and black clamp to negative (-) post.
Battery problem	Er2	Battery has problem. Replace with a new battery and try again.
Overcurrent protection	Er3	PCBA damaged, Replace if under warranty else dispose.
Over Temperature protection	Er4	Check working temperature environment, with work from 0-40 C .
Battery voltage < 3V	[3.0	Low voltage. Replace with a new battery and try again.
Battery voltage > 28V	]28	Check the battery voltage is for 12V system.

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