



INSTRUCTION MANUAL

-- 24V17A Trident-500 --

Waterproof Lead Acid Battery Charger (IP67)



Dear Customer!

Thank you very much for your trust in us and our product.
Please read these operating instructions carefully **before** start of operation.

Mainland Energy Conversion LTD

1. Safety Rules and General Warnings

- **ATTENTION:** Avoid explosive gases, open flames and sparks – look for enough air ventilation while charging!
EXPLOSION RISK!!
- **ATTENTION:** The charger is exclusively designed for 24V rechargeable lead /acid batteries and must not be used for other purposes. Please consider the charging instructions from the battery manufacturer before charging!
- **DO NOT OPEN!** Repair work must only be accomplished by authorized companies or specialized technical staff.
- Persons, which are not able to use the device in a safe way, because of their physical, sensory or mental competence, or because of their inexperience, should not use the charger without control or instruction of a skilled person. Look that the children don't play with the charger.
- If the mains connection of the device is damaged, you have to change it, with an original connection which is available at the manufacturer.
- Never place the device on top of the battery while charging!
- Protect against direct solar radiation.
- In case of obvious damage or malfunction immediately disconnect the device from mains supply and protect against unintended reconnection.
- The DC cable cannot be cut or shortened.

2. General Information

This waterproof Lead Acid Battery Charger was especially developed for the use in abominable environment, and in situations where water may be present. It is able to charge any lead-acid battery, including standard-, AGM-, GEL- and Wet- battery types, to utilize a 4-step charging program and safely function in a fully automatic mode. The output of the charger is electronically protected against short circuit, reverse polarity connection and deeply discharged batteries. Three coloured LEDs on the top panel are used as a charging and state of charge indicator.

3. Special Features

- Battery type (Standard-, GEL-, WET-, AGM-Battery) selectable;
- Distinctive warning of battery being in a state of deep discharge;
- Signalling of possible connection problems with battery terminals;
- Indicating a non-chargeable ('dead battery') condition;
- Remote battery temperature sensing / charge voltage compensation;
- LEDs to indicate operation and charging status;
- 4-step charging technology with automatically restart charging;
- Short circuit and reverse polarity protection;
- Automatic Shut-off at too high temperature;
- Convection cooled;

4. Product Figure

1. Red Power-LED
2. Green Full-LED
3. Yellow Charging-LED
4. Red Error-LED

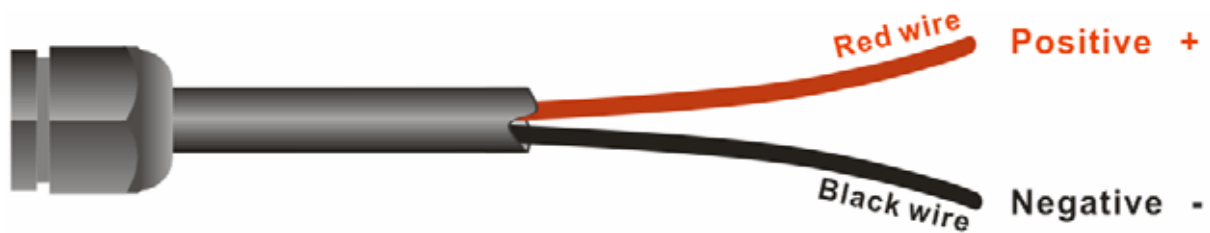
5. Yellow standby-LED
6. Yellow Gel-LED
7. Selection battery type Button
8. Yellow Agm-LED

9. Yellow Wet-LED
- 10 AC-input cable
- 11 External programming socket
- 12 DC-output cable



5. How to connect the battery

DC cable connective method:



6. How to select battery type

Connect to the 24V battery, the LED of battery type will light on which has been selected last time, press the select button(7) and do not release it until the blinking slowly of battery type LED, at this moment, you can press the select button(7), other battery type will be selected, when you finish to select battery type, please also press the button and do not release it until the selected LED constant lighting (if you do not do this step, the battery type will return to last time status).

Remark: the charger can remember which battery type has been selected when you switch on the charger next time.

7. Operation

ATTENTION:

- Before operation please make sure that neither the power cable nor the charger including the charging cable show any damage and make sure that the mains supply complies with the specification.
- Please consider the charging instructions from the battery manufacturer before charging.

I. Connect the charger to the battery and start charging:

- a) Make sure that the charger is disconnected from the mains supply.
- b) Connect the charging cable with the plug of the battery.
- c) Select the battery type.
- d) Connect the power cable of the charger with the mains supply.

The charging process starts automatically and runs through the following four charging phases:

1. charging phase: soft start

When the battery voltage between 16.6V and 20V, the Standby LED(5), Wet LED(9) will constant lighting, and the Gel LED(6), Agm LED(8) will blinking alternately, after the battery voltage is reached 20V, the battery type LED and Charging LED(3) will constant lighting.

(Explanation for this function: It uses small current to charge battery in order to extend battery lifetime.)

2. charging phase: constant current

This charging step is indicated by **blinking slowly of the Charging LED (3)**.

(Explanation for this function: During the constant current phase, the battery is being charged to 80% of its capacity.)

3. charging phase: constant voltage

This charging step is indicated by **blinking quickly of the Charging LED (3)**.

(Explanation for this function: During the constant voltage phase the battery is being charged to its maximum capacity.)

4. maintain phase: float charging

This charging step is indicated by **constant lighting of the Charging LED (3)**.

(Explanation for this function: the battery has reached its full capacity. The charger can now be disconnected from the battery (see pt. II disconnection the charger) or remain at the battery in float-charge mode.

5. stop charging phase

This stop charging phase is indicated by **constant lighting of the Full LED (2)**.

(Explanation for this function: the charger stops charging. But when the battery voltage is lower than 25V, the charger will automatically restart charging.)

II. Disconnect the charger from the battery:

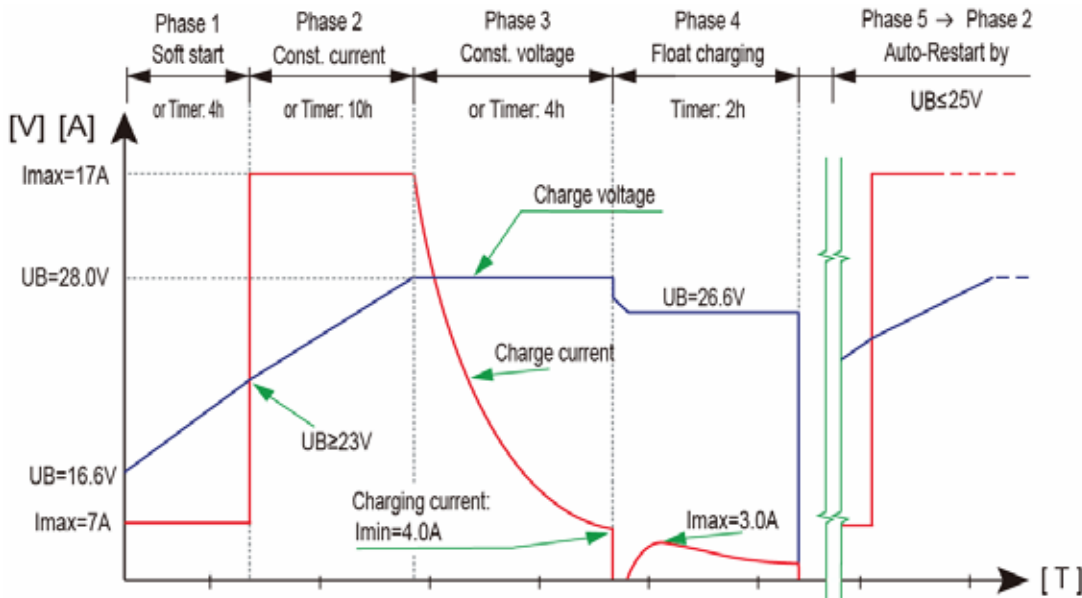
- a) Disconnect the charger from the mains supply;
- b) Disconnect the charger from the battery;

Charging advice:

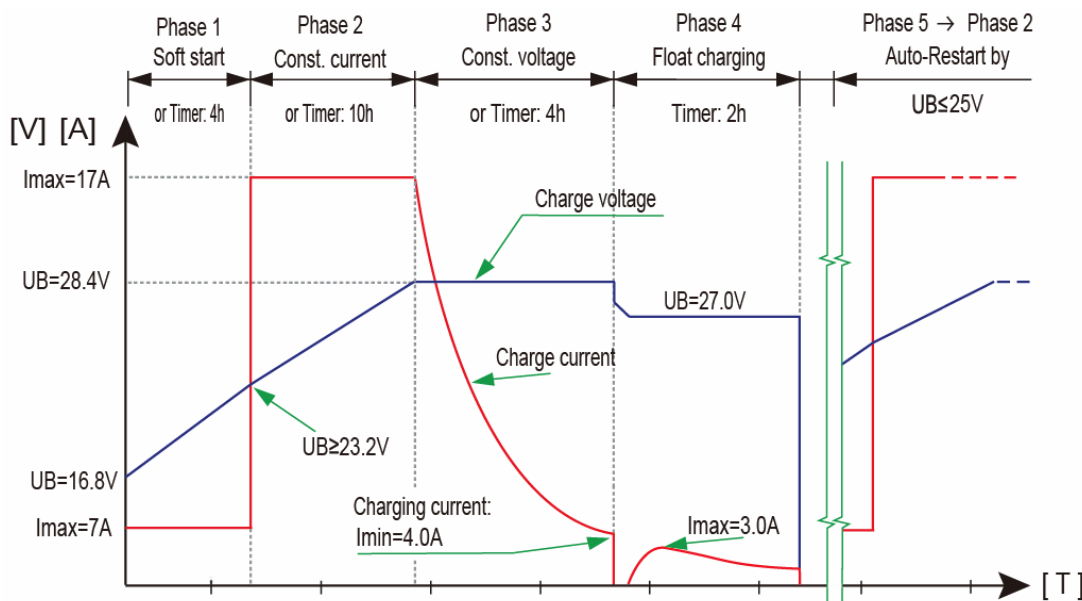
- If the charger will be disconnected from the battery during the charging process, the charge current will be interrupted immediately. In that case please disconnect the charger from the mains supply. For starting a new charging process please comply with the relevant points (see pt.I)
- For increasing the lifetime of a battery please do not stop a charging process before the battery charge full.

8. Charging curve

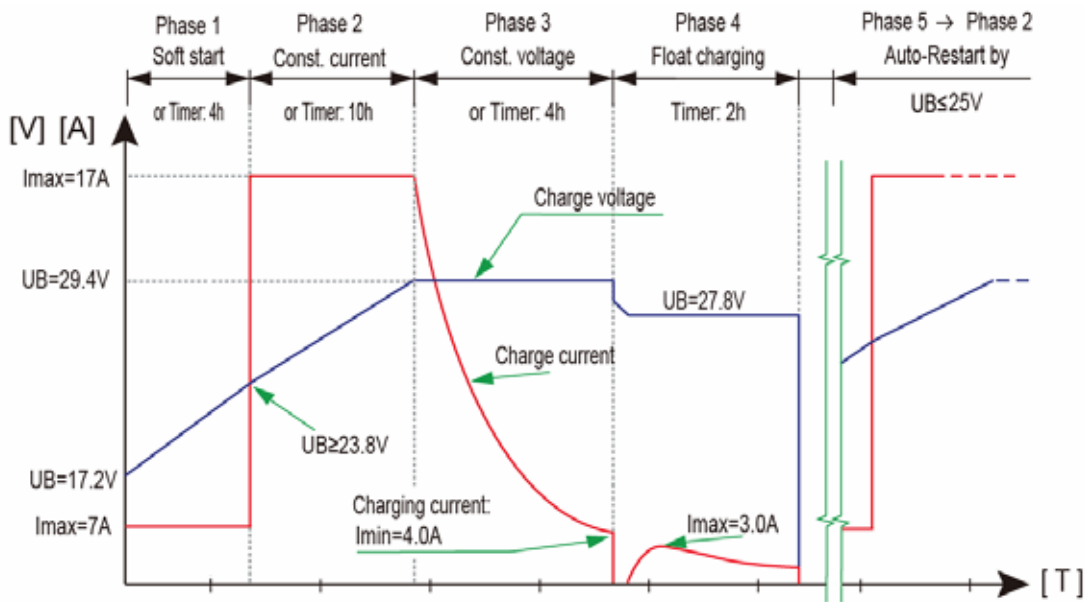
A. Standby battery type:



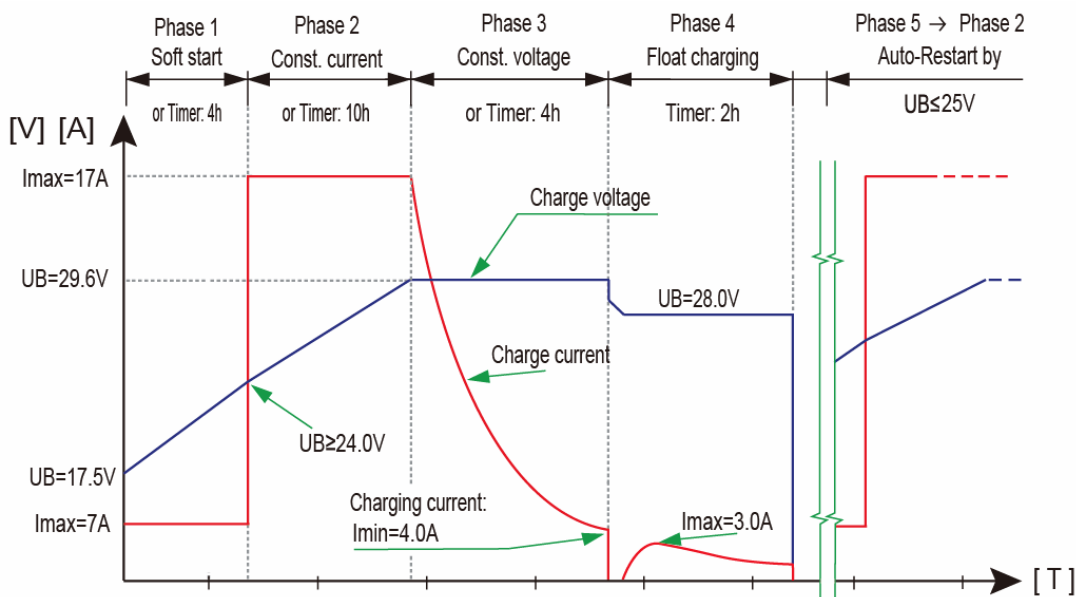
B. Gel battery type:



C. Agm battery type:



D. Wet battery type:



9. Errors and Troubleshooting

No have LED lights after connected the mains:

- Check if connected the battery;
- Check if the mains plug is correctly plugged in;
- Check if mains cable is defective;

All Yellow LED of Battery type blinking alternately:

- The battery has been deeply discharged, at the moment, the battery voltage is lower than 17 ± 1V. For safety reason, the charger does not work for this battery.

Red Error-LED(3) blinking:

Error LED blinking times	Error message
1	Temperature sensor failed.

2	Rated charging time exceed, caused by battery short circuit or "old" battery.
3	Temperature sensor cable is not connected well or damaged.
4	The temperature of heat sink is too high or the fan was covered.
5	Battery voltage is too high, or wrong battery is connected.
6	Battery temperature is too low as charging.
7	Battery temperature is too high as charging.
8	Battery disconnected from the charger as charging.
9	Wrong parameter.
10	Current tolerance is too high or too low.
11	Controlled IC was damaged.
12	Current can not be monitored.
13	Charging current is too high (Current limit problem).
14	Charging current is too high (Current control problem).

10. Technical Specifications

AC Input:	230 VAC 50Hz
Power max.:	590 W
Charging technology:	4-Step charging
Output nominal:	24V 17A
Charging phase 1:	7.0A (soft start)
Charging phase 2:	17A (constant current)
Charging phase 3:	Min. 4.0A (constant voltage)
Charging phase 4:	Max. 3.0A (float charging)
Start charging voltage	Min. 17 ± 1V
Restart charging voltage	<25.0V
Efficiency:	> 85%
Cooling:	Convection
Temperature sensor:	intern
Temperature range:	0°C – 40°C
Dimensions:	340 x 250 x 118 mm / 7.8 kg
Scope of delivery:	Charger, Interface cable, operation manual

11. Advice for Disposal



It is prohibited to dispose the charger into the house- and residual waste removal (WEEE-Richtlinie 2002/96/EG und EAG-VO) , it must be disposed at the according collection points. For the protection of our environment please inform yourself at your communal administrative agency about your nearest disposal point.



The charger equates to the RoHS-directive 2002/95/EG, for the restriction of the use of certain hazardous substances in electrical and electronic equipment.



12. Disclaimer of Warranty

- Mainland Energy Conversion LTD guarantees replacement or repair of chargers that are recognized as defective within 2 years under common environmental conditions. The validation of the warranty time starts with the delivery date from the manufacturer. Mainland Energy Conversion LTD is limiting the free guaranteeing to working hours and spare parts only.
- For damages caused by non-observance of the operating instructions, inappropriate start up or handling as well as reconstructions and modifications of the device, the warranty claim expires and Mainland Energy Conversion LTD assumes no liability for consequential damage to property or persons!
- Repair work must only be accomplished by authorized companies or professional staff!

Subject to technical modifications. We assume no liability for misprints.

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