USER GUIDE

Battery Charger

modernum Smart 75

with built-in flashlight and power supply

for 1 - 150Ah lead-acid batteries

Please read this user guide carefully before using the charger

Use protective eyewear when handling batteries

INTRODUCTION

Thank you for choosing a professional quality product from MODERNUM! This advanced and user-friendly battery charger will optimize performance and lifetime of your battery.

This intelligent and fully automatic charger can be used to charge any type of lead-acid batteries, including AGM and GEL types from 1 to 150Ah.
It can also act as a power supply in the 13.7V mode. It has a flashlight that automatically turns on while not connected to the battery.

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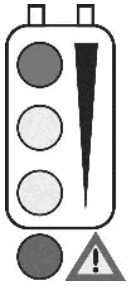
GETTING STARTED

1. Connecting the charger: Connect the charger to the supply mains. The flashlight in front of the charger will automatically turn on to assist you in dark situations. 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 red clamp should connect to the positive (+) pole of the battery and the black clamp to the negative (-) pole.
   For stand-alone batteries: Connect the charger to the supply mains. Connect the red clamp to the battery's positive (+) pole, and then the black clamp to the battery's negative (-) pole.
2. Select a charge mode, or 13.7V supply, by pressing the selection button.
3. A green light next to "full battery" symbol means the battery is fully charged and has entered maintenance mode (not applicable for 13.7V mode).
4. After charging is complete, the charger will switch to a maintenance mode to keep the battery fully charged as long as charger is plugged in to the mains.

INSTRUCTIONS

1. Connect the charger as explained in GETTING STARTED, point 1, above.

2. Select the most suitable mode for your battery (refer to battery manual if in doubt) by pressing the selection button. There are 4 modes to choose from in the left column. A yellow light indicates the currently selected charge mode (for the 13.7V mode the light is green). If the red light turns on it means “FAULT” and indicates wrong connection to battery (reversed polarity). Disconnect mains, then clamps and reconnect as said above.
3. Approximately 3 seconds after the battery is connected, the flashlight will turn off and one LED light (in the right column) will show the battery level:



GREEN – fully charged

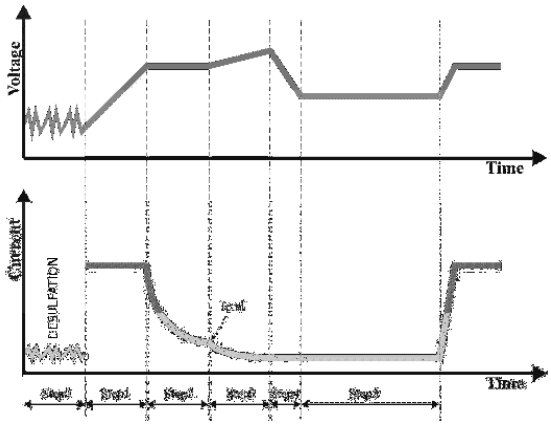
YELLOW – charging
Yellow flashing – time limit fault

YELLOW – charging (Empty/Low)

RED – FAULT
Red flashing – over-temp (over ≈50°C)

4. After charging, disconnect the battery charger from the supply mains. Then remove the chassis connection and then the battery connection.
   For stand-alone batteries: After charging, disconnect the charger from the supply mains. Then remove the black clamp and then the red clamp.
   It is recommended to store the charger in its original bag when not in use.
5. By leaving the clamps on the battery after charging, and mains plugged in, the charger will automatically switch to 13.7V maintenance mode as long as it is connected to the mains.
6. To stop or interrupt charging, unplug the supply mains, at any time, and then remove clamps.

CHARGING CURVE



Reference charging time (hours) to 85 % capacity.
Time varies with different batteries and conditions.
25Ah: 5h 75Ah: 9h 100Ah: 16h 150Ah: 24h

Note: If left connected after step 5, it is programmed to restart from Step0 after 7 days, to refresh the battery.

SAFETY

- This charger is made for charging 12V lead-acid batteries or to act as a 13.7V power supply. Do not use it for other purposes or with other battery types.
- Do not try to recharge non-rechargeable batteries.
- Do not use the charger if its casing, terminals, clamps or cables are damaged.
- **The supply cord cannot be replaced. If the cord is damaged the appliance should be scrapped.**
- Use protective eyewear when handling batteries, and connecting or disconnecting it.
- Battery acid is corrosive. If it comes in contact with skin or eyes – rinse with plenty of water and contact a doctor immediately.
- During charge, a battery can emit explosive gases. Make sure there are not sparks or flames close to it, and ensure good ventilation.
- Never charge a battery that is frozen.
- Do not place the charger on top of the battery.
- Do not cover the charger.
- In the 13.7V supply mode the charger provides a constant output voltage of 13.7V that in certain circumstances may cause sparking. Be very careful with polarity when using the unit as a power supply. Connect the clamps to the battery poles before plugging the unit into the mains supply. Also remember when using the power supply function, you must unplug the unit from the mains before removing the clamps from the battery.

- The charger is protected against overheating. If the ambient temperature is too high, the charging current is reduced.
- During the charge, the charger may intermittently provide a 15.5V charge voltage. Ensure that no equipment that may be damaged by this voltage level is connected to the battery during charging.
- 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.
- Make sure that the charger switched to maintenance mode after normal charging is completed, if you want to leave it unattended and connected for a long time. If it does not leave charge mode after maximum time, disconnect charger from the battery. See technical specifications below for info about time limit.
- All batteries will eventually fail. If that happens during charging, the charger will detect it, but there may be some rare faults in the battery, so do not leave it charging unattended for longer periods of time.
- Do not allow children to play with any part of this product.
- You need to have read and understood the full context of this user guide before you start using the battery charger.

SPECIAL FEATURES

Flashlight: There is a built-in flashlight in the front of the charger. It will automatically turn on when the charger is plugged in. It will switch off if connected to a battery.

13.7V mode: This mode provides a constant 13.7V supply, with current up to 7A. This is useful for maintenance charging 12V batteries. And also to restore heavily discharged (or sulfated) batteries: Try to run in this mode for a little while (max 10 min) to increase the voltage on battery so that the charger can detect it, and change to a charging mode.

Temperature sensor and cut-off: The temperature affects the batteries ability to receive charge. This product has a sensor in the black clamp, which compensates for temperature variations to give optimal charge in cold as well as warm conditions, avoiding the common problem of insufficient charging in cold weather and over-charging at high temperatures. Batteries can be damaged by being charged at high temperatures, so the charger has a temperature cut-off set to approximately +50°C.

Storage and travel: To make it easy to bring the charger with you, and for compact storage, you can wind the cables around the charger's holders in the back and front, and then lock

them together with the included strap. Use the cloth bag to protect it while not in use.

FAULTS INDICATIONS & TROUBLE-SHOOTING

1. **Fault**: Red light (constant), Clamps connected to the battery.
   Probable cause: Reversed polarity protection activated due to clamps connected to wrong battery poles.
   Action: disconnect the charger from the mains, re-connect the clamps correctly and connect mains again.

2. **Fault**: Charging does not start and flashlight does not turn off. None of the battery level lights are lit (in the right LED column).
   Probable cause 1: Clamps do not have good connection to battery.
   Action: Check that clamps are connected well to metal on both battery poles. Check that connector on the clamp cable is pushed all the way into connector on charger's connector.
   Probable cause 2: The battery voltage is too low for the charger to detect it, and it will not start. This may be because the battery is worn or faulty or has been overly discharged.
   Action: Try to connect using the "13.7V Supply" mode for a little while (max. 10 min). Then restart charging. This normally works for a heavily discharged, but otherwise healthy battery.

3. **Fault**: Charging started normally, but did not complete, and stopped. The "half full" battery flashes yellow.
   Probable cause 1: The battery has a fault that does not permit it to be charged, e.g. a short circuit.
   Action: Replace the battery (with lead-acid type).
   Probable cause 2: Parallel load. If there is an equipment using current from the battery while charging, the charger may not be able to charge the battery within the safety time limit set for safety reasons.
   Action: Disconnect the parallel load and repeat charging, or purchase a more powerful charger that can handle the extra load.
   Probable cause 3: Battery is too large and could not be charged within the set safety time limit.
   Action: Repeat charging.

4. **Fault**: Red light (flashing)
   Probable cause: The high temperature cut-off has been triggered. This can mean that battery is faulty, or that the ambient temperature is high.
   Action: If charging is done at room temperature, the high temperature is probably caused by a

battery fault or wear, in which case the battery should be replaced. If charging is taking place at a high ambient temperature, you can restart the charging after the battery has been allowed to cool down.

5. **Fault**: The flashlight does not come on when the charger´s power cable is plugged into the mains socket.
   Probable cause: No power in mains socket. Or the flashlight LED is broken. (You can still use the charger but it will be without flashlight function).

MAINTENANCE

The charger is entirely maintenance-free. It has no user-serviceable parts. Opening the charger will void the warranty. The case may be cleaned using a soft, damp cloth. The charger must be disconnected from the mains when being cleaned.

ACCESSORIES

The charger comes with clamp cables and a set of ring terminal cables, which can be used for fixed installations. To change cables, press the unlock flange on the connector and pull it out. Connect the desired new cable. Push it all the way. The flange should lock it.

TECHNICAL SPECIFICATIONS

Model:	Smart 75
Type:	switch mode charger, microprocessor controlled
For battery types (12V)	lead-acid (incl. AGM, GEL)
For battery capacity	1 – 150Ah (Max 180Ah)
Input voltage	220-240 VAC +/-10%
Input current	0.9A
Back current	≤1mA
Charging Voltage	13.7 – 15.5VDC
Charging Voltage Supply	13.7VDC (up to 7A load)
Charging current	Max 7A
Ripple voltage	Max 70mV
Ambient temperature	- 40 – +50°C
Cooling	Convection
Spark protection	Yes (except in 13.7V mode)
Temperature sensor	Yes (≈0.3V/10°C)
Temperature cut-off	Yes, approx. +50°C
Timeout error (bad or too big batt.)	24 hours (approximately)
Max charging time	45 hours (approximately)
Charging type	5 step; IUIU + pulse, or 13.7V maintenance/float
Battery DC cable length	1500 mm
Power cable 2x0.75 mm^2	1400 mm
Dimensions (LxWxH)	225x50x50 mm
International Protection class	IP54
Weight	0.5 kg (net)

CE MANUFACTURER DECLARATION

Made by SM Power Innovations AB (SMPower)
Product: Battery charger Smart 75
The manufacturer guarantees that the unit complies with the relevant standards. Tested and approved by Intertek.

LIMITED WARRANTY

We guarantee the quality of this product. It is made to meet high industrial production standards for electronics. This limited warranty is made to the original purchaser of this product, and is valid from the date of purchase, meeting the mandatory warranty rights for the country of purchase. If the product has workmanship defects or damages relating to manufacturing or distribution, contact the store where you purchased the charger for warranty claims. The warranty is void if the unit has been damaged due to careless handling, abuse or unauthorized repair, or has been opened, or screws and/or labels have been removed. We are not responsible for any consequential costs, or shipping- or handling costs for the return to the place of purchase. Nor are we liable under any other warranty than this one. This warranty is not transferrable.

Note: Measurements such as time, %, lengths etc are approximates.

