

ENERGIC Plus

**SMC BATTERY CHARGER
USER'S MANUAL**



SMC

USER'S MANUAL

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2 INTRODUCTION

2.1 INTRODUCTION AND REFERENCES

This manual includes instructions and suggestions for the users of *ENERGIC Plus SMC* battery chargers.

The code and the version of this manual are written on the bottom of each page. If you need more copies please specify Code and Version.

Before starting to use your *ENERGIC Plus SMC* battery charger please read these instructions carefully.

2.2 GLOSSARY



Attention:

Read this section before proceeding!

Here you'll find an explanation of the technical terms used in the manual.

WUla curve =

CHARGE CURVE - Described in the DIN 41774 norm;

2.3 DATA LABEL

A data label is located on the back side of the cabinet. It contains the following data:

- CE make;
- Model;
- Serial number;
- Weight;
- Input voltage;
- Maximum input current (A);
- Maximum power consumption (KVA);
- Input frequency;
- Voltage of the battery (output voltage);
- Maximum output current (output current).

2.4 HOW TO USE THE USER'S MANUAL

This manual includes all the information for the final user of *ENERGIC Plus SMC* battery chargers.

Installation and maintenance operations can be done by qualified personnel only.

The user's manual is an important part of the charger, therefore it must be kept in good condition for the lifetime of the charger. It should be kept in a dry and clean place, always available to the users.

To indicate important instructions, in this manual the following pictures are used:



“Caution: ”

This operation can be dangerous for the user.



“Attention: ”

This operation is important for the good working of the charger.



During this operation there is a risk of an electrical shock.

2.5 RESPONSIBILITY DISCLAIMER

The manufacturer of *ENERGIC Plus* SMC battery chargers will not be responsible for damages caused by the chargers in these situations:

- The charger is not installed properly by a qualified electrician;
- The charger is not used according to the instructions included in this manual;
- The charger is not connected to the correct input supply (see technical label on the box);
- The charger has been modified without the authorization of the manufacturer;
- Non-original or wrong spare parts are used in the charger;

3 SMC BATTERY CHARGER – DESCRIPTION

3.1 SMC BATTERY CHARGER – INTRODUCTION

ENERGIC Plus SMC battery chargers have been designed to charge Pb batteries.

These units can convert the AC main supply in a DC output at the correct voltage, in order to charge the battery cells.

These chargers have been designed and optimized to be used with electric vehicles and to be mounted on board.

3.2 TECHNICAL DATA

3.2.1 PHYSICAL FEATURES

Mass:	5 - 40 Kg depending on the model (see data label on box);
Main supply cable:	Grey multiple cable;
Battery connection cables:	Red cable / marked with symbol +; Black cable / marked with symbol - ;
Motor blocking signal:	Grey bipolar cable.

3.2.2 TECHNICAL DESCRIPTION

These are the principal devices included in the charger, available to the user:

- External box;
- Control electronic board;
- Main switch 0-1;
- No.2 Cables for battery connection;
- No.1 Cable for main supply connection;
- No.1 Cable for vehicle block during the charge.

Inside the charger there are the following devices, not available to the user:

- Power transformer;
- Rectifier;
- Microprocessor controlled electronic card with power relays;
- Output fuse;
- Plugs for voltage setting;
- Motor blocking relay.

4 INSTALLATION OF THE CHARGER

Conditions of use:

- Operating temperature: 5°C to 45°C;
- Storage temperature: -20°C to 60°C;
- Relative humidity: less than 75%;



Attention: The charger can be installed by qualified personnel only.



Attention: This unit operates on 230 V AC +/- 10%, 50Hz.
Check that the unit's operating voltage is identical to your local power supply.
Check that the unit's maximum input power is available from your power supply.



Attention: To prevent fire or shock hazard, do not expose the unit to rain or moisture.
Do not use the unit in presence of flammable gas, because it can generate sparks.



Attention: To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.



Attention: Allow adequate air circulation to prevent internal heat buildup.
Do not place the unit near materials that may block the ventilation slots.
Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
Please take care about positioning and fixing of the charger inside the vehicle; these must assure a correct air flow and a protection against every kind of physical or electrical damage.

4.1 ELECTRICAL INSTALLATION OF THE CHARGER

- Check the efficiency of earth circuitry (yellow/green wire);
- Connect the charger to the battery using an adequate connector;
- Check the condition of the main supply plug;

4.1.1 MOTOR BLOCKING FUNCTION



Attention: **These settings can be done by qualified personnel only.**
For more information please contact the manufacturer.

ENERGIC Plus SMC battery chargers are equipped with a relay that can be used to block the vehicle motor when the charger is connect to the main supply and the main switch is ON.
This safety function will prevent the user to start the vehicle while it's being charged.
In order to ensure a safe operation, it's mandatory to implement this function. This can be accomplished by connecting the two control wires (grey bipolar cable) in series with the control circuitry of the vehicle.

4.2 MAIN SUPPLY VOLTAGE PRESET



Attention: These settings can be done by qualified personnel only. For more information please contact the manufacturer.

- Disconnect the charger from main supply and battery;
- Open the cabinet;
- Find the plugs for tension setting;
- Disconnect the wire A from the original plug (position 2);
- Connect the wire A to the desired position. Check the table to find the correct position;
- Close the cabinet;
- Connect the charger to main supply.

POSITION	4	3	2	1
VOLTAGE	250	240	230	220

5 OPERATION

5.1 HOW TO CONNECT THE CHARGER

- Set the main switch to position "0";
- Connect the charger to the main supply.

5.2 START OF THE CHARGE

The charger can be turned on only when the battery and the main supply are correctly connected. Set the main switch to position "1"; the light inside the switch and the led "CHARGE ON" will lights on. After 5 seconds the charge start and the first green LED (which corresponds to the first charge phase) lights on (see chapter 5.3.1).



Attention: *ENERGIC Plus* SMC chargers are programmed to do a complete cycle of charge, however it's recommended to survey the operations when the battery must remain connected to the charger for more than 12 hours (example: week-ends)

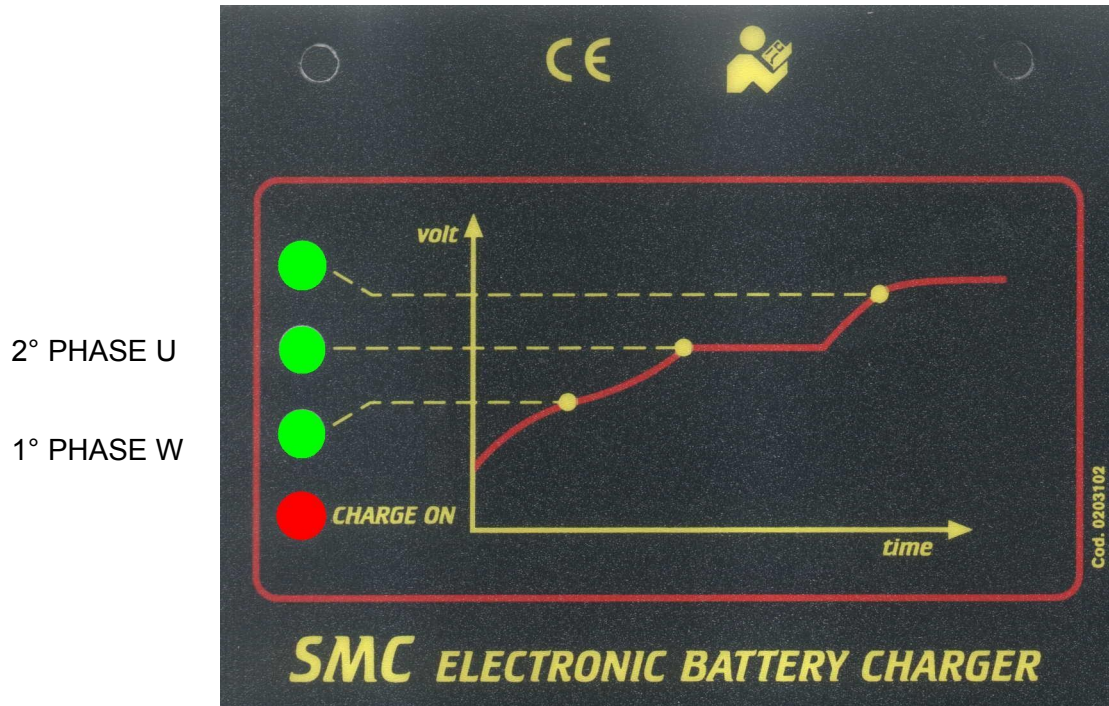
5.3 CHARGE OPERATIONS



Attention: The operations described in this chapter are done by *ENERGIC Plus SMC* chargers automaticly.

5.3.1 CHARGE CYCLE

The current of charge follows the WUa curve, as described in the DIN 41774 Norm, while the LED "CHARGE ON" remains on.



The charging cycle is divided in 2 phases (with reference to the front panel of the charger).

1° Phase: W [Constant Power]

When the charge starts, the battery voltage is around 2.00 V/cell and the current reaches the maximum value. During this phase the current decreases and the voltage increases, up to the threshold value (2,5 V/cell). At this point, the charge passes to the next phase.

This phase has a security timer of 8 hours. If the battery don't reaches the threshold value in 8 hours the charger pass automatically to the the next phase. This function prevent the risk of overheat of the battery.

2° Phase: U [Constant Voltage]

The charge continues at constant voltage, while the current decreases. This phase continue for 4 hours. At the end the cycle is complete.

The front panel show another phase, but this feature isn't implemented in this model.

5.4 END OF CHARGE

When the battery is completely charged the charger is turned off. The LED "CHARGE ON" turns off and the 3° phase led remains on.



Attention: Before disconnecting the battery, check it is not being charged. If it is charging (led "CHARGE ON" light on), turn off the charger using the main switch , to avoid sparks between connectors.

5.5 EMERGENCY STOP

If the charge is not normally completed within 20 hours, the electronic control stops the charger automatically.



In this case the led "CHARGE ON" is off and the 3° phase led is blinking.

This condition isn't normal and is strictly recommended to find the source of the problem. Please see to the following chapter or contact the manufacturer.

6 TROUBLE SHOOTING



Attention: The operations described in this chapter can be done by qualified personnel only.

- When the main supply is connected, nothing happens on the control panel:
 - The main switch  may be in position "0", or else the main supply is not present;
 - Check the connections between main supply and charger;
 - Verify that the power available on the main supply is sufficient for the charger;
 - Verify fuses of the main supply;
 - Check the connection between battery and charger;
 - Check the output fuse;
 - Contact the manufacturer;
- **Charge current is too high:**
 - Check the battery cells for short circuits;
 - The main supply voltage is too high, then it's necessary to reset the charger. See chapter 4.2;
 - If the battery is old, it's voltage increases slowly, and this can cause a high final charge current. Keep the battery under supervision against overheats during the charge;
 - Contact the manufacturer;
- **Charge current is too low:**
 - The main supply voltage is too low, then it's necessary to reset the charger. See chapter 4.2;
 - Contact the manufacturer;
 - Check the output fuse;
- **The lamp inside the main switch is always off:**
 - The main switch  may be in position "0", or else the main supply is not present;
 - Check the connections between main supply and charger;
 - Verify that the power available on the main supply is sufficient for the charger;

7 TECHNICAL DOCUMENTS

This manual includes the following technical documents:

ELECTRIC DIAGRAM