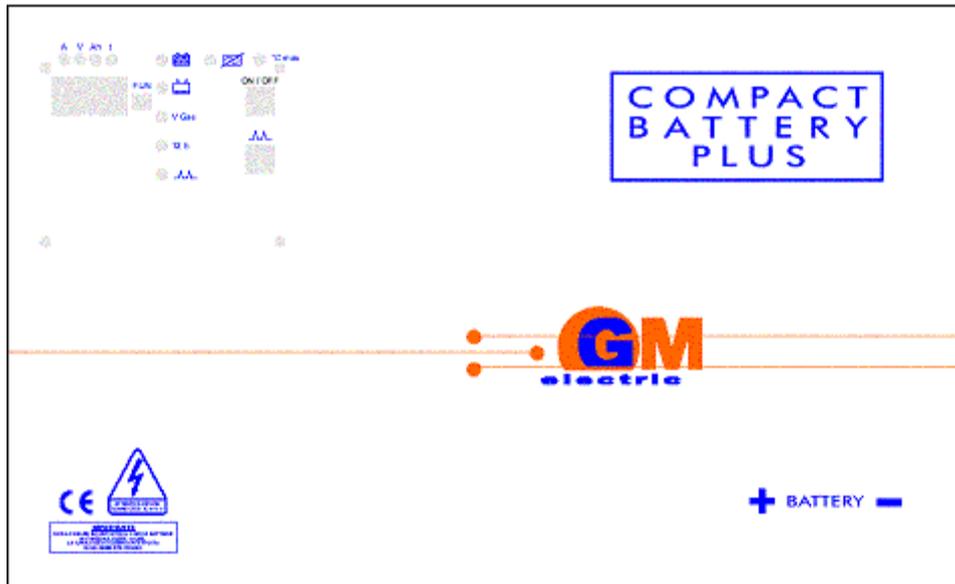


## GENERALITIES

This device is a traditional three-phases battery charger, with a power supply of 230Vac or 400Vac. The battery charger is a WA charge cycle type, which ensures a decrease of the current and an increase of the voltage.

Its reduced sizes makes the utilization easier in case there is a lack of space.

The charge process is completely automated, since the device has an electronic controller board that controls the whole charge cycle, showing various phases or anomalies by LED.



## TECHNICAL FEATURES

- CPU controller board.
- Automatic start settable by dip-switch.
- Automatic turn-off after disconnecting the battery connector, settable by dip-switch.
- Post charge time settable by dip-switch.
- Voltage threshold for the post-charge start settable by dip-switch.
- It is possible to set the equalization and the buffer charge.
- Intelligent post-charge.
- It is possible to choose the voltage from the board, for a fixed voltage.
- Charge status shown by LED.
- Charge curve "WA".
- Power supply 400Vac.
- Available on request ,and according to the technical possibilities, single-phase versions at 230V.
- Visual and acoustic anomalies signals.

## **IMPORTANT**

If the charging stops after a few seconds from the start, then disconnect the battery connector, connect it again and press the ON button. This operation must be done until the battery charger works normally and goes on with charging.

This operation is necessary when the battery is completely discharged or when it has been discharged over its normal limit.

## **USER WARNINGS**

- The battery chargers been built to work closed, DO NOT open it in any case.
- DO NOT introduce any kind of objects into the battery charger
- The battery charger is NOT created and sized to do repeated charge cycles. Even if the charge cycles are short and maintain a constant current consumption equal to the maximum value.
- If the power supply wire is damaged, DO NOT repair it with improvised reparations, DO NOT use the battery charger and don't leave it connected to the power supply. It is necessary to replace the wire; it should be only done by the battery charger producer or by an expert technical support.
- 

## **INSTALLATION**

- Place the charger on a flat horizontal surface, make sure it is stable and it stands on all its four feet. The surface must be able to bear the charger's weight, indicated on the table 2 on page 3.
- It must be placed in a way that it has at least 20cm of space on the sides and 1m above the case.
- The room temperature must not exceed 40°C.
- DO NOT place the battery charger in a place subject of acid vapours.
- It has been built to work indoor, do not expose the charger to the rain or in a well-ventilated place.
- It must not be soaked with water or other liquids, since that it has a protection grade IP20.

## **POWER SUPPLY CONNECTION**

- The charger must only be connected to plugs with ground tap.
- The charger is meant to work with 3 phase 400Vac supply.
- Before connecting it, the correct voltage on the net supply must be checked. In case the measured value is different from the nominal value, please contact your technical service.
- Check that the feeding line is correctly protected and compliance to the laws in order to grant protection against over feeding and short circuits (see table 2, page 3 for input current values).

## CONNECTION TO THE BATTERY

- Connect the charger to the battery, while paying attention to the correct wires polarisation:
  - battery positive = red (+)**
  - battery negative = black (-)**
- Use the charger only with lead batteries with number of elements and nominal capacity compliance to TABLE 1 pag 3.
- Avoid charging not rechargeable batteries.
- During the charging cycle, the battery must be placed in a well ventilated place and the caps must be opened.

**ATTENTION:** If the charger is a model with automatic start, the charging cycle begins automatically after the batteries have been connected.

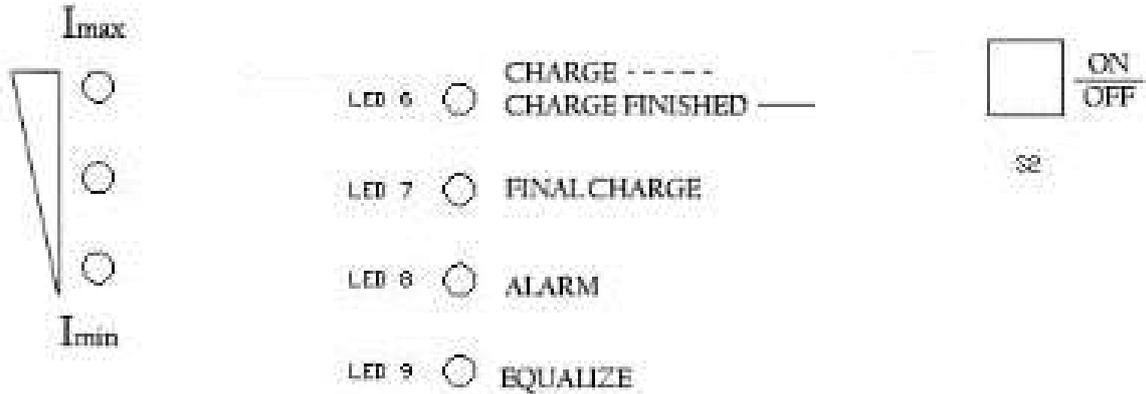
**TABLE 1**  
ELEMENTS NUMBER AND BATTERY CAPACITY

NOMINAL RECTIFIER VOLTAGE	BATTERY ELEMENTS
24 V	12
36 V	18
40 V	20
48 V	24
NOMINAL RECTIFIER CURRENT	BATTERY CAPACITY A/h 5 HOURS
40 A	195-250
50 A	255-315
60 A	320-375
80 A	380-500
100 A	505-625
120 A	630-750
140 A	755-875
160 A	880-1000

**TABLE 2**  
ABSORPTIONS AND WEIGHT OF THE BATTERY CHARGER

MODEL	POWER [kVA]	CURRENT (A) @ 400Vac	WEIGHT [Kg]
24V 80A 3F	2.4	3.6	39
24V 100V 3F	3	4.6	41
24V 120A 3F	3.6	5.5	44
24V 140A 3F	4.2	6.4	49
36V 80A 3F	3.6	5.5	40
36V 100A 3F	4.5	6.9	42
36V 120A 3F	5.4	8.3	42
40V 60A 3F	3	4.6	45
40V 80A 3F	4	6	52
40V 100A 3F	5	7.6	50
40V 120A 3F	6	9.2	55
48V 60A 3F	3.6	5.5	40
48V 80A 3F	4.8	7.4	45
48V 100A 3F	6	9.2	50
48V 120A 3F	7.2	11	55

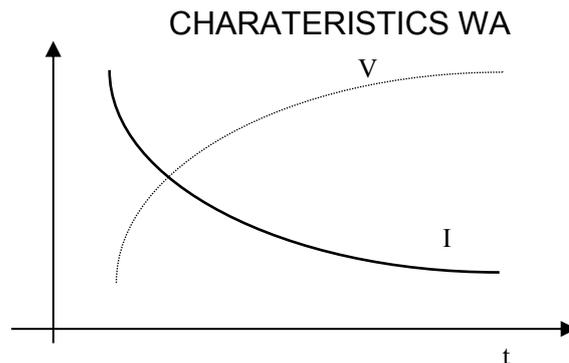
## BUTTONS AND INDICATION POSITIONS



- LED 6 (V)** Blinking during charge – Led ON end charge.
- LED 7 (Y)** Lit when post-charge phase is acting.
- LED 8 (R)** When blinking, it means that the charging cycle has lasted more than the maximum 12 hours (anomaly).  
When steady lit, it shows an anomaly in the feeding or activation of thermal protection.
- LED 9 (V)** When ON, it means that the equalisation charging is allowed.  
When FLASHING, it means that equalisation charging is taking place
- S2** ON/OFF button.
- S3** Equalisation button.
  
- (G)** The colour of the led is GREEN
- (Y)** The colour of the led is YELLOW
- (R)** The colour of the led is RED

## WA CHARGE

The charging current decreases automatically according to the peculiar working of the transformer (stray flux) with consequent voltage increase.



## **BATTERY CHARGER FUNCTIONING**

The battery charger mounts an electronic PCB with microprocessor control, double timing and equalisation charge.

When pushing the S2 button, the PBC begins feeding the battery and signals that the charging cycle is taking place. The charger signals this by flashing LED 6; at the same time it checks that the tension arrives at the post-charging level. When the post-charging level is exceeded, the PCB begins counting the post-charging time and signals the end of the process by LED 7.

After counting the post charging time, the charging cycle can be considered regularly as finished.

The charging cycle also ends when the battery tension exceeds a maximum value.

Should the whole cycle last more than 12 hours, the PCB interrupts the cycle and signals the anomaly by flashing LED 8.

## **BUTTON FUNCTIONS**

The S2 button allows to begin and stop the charging cycle. The start of the charging cycle is shown by the flashing of LED 6.

## **EQUALIZATION CHARGE DESCRIPTION**

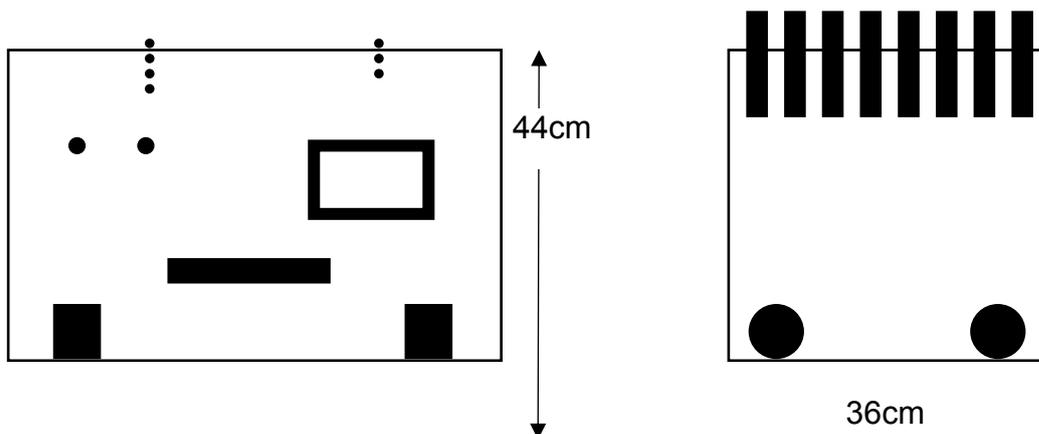
When enabled, the automatic equalization starts after the normal charge has finished, the equalization lasts 48 hours. This procedure is meant to activate the charge phase for 5 minutes and keep it turned off for the 55 minutes after, cyclically until the 48 hours expire.

## **PROTECTIONS**

The following protections are implemented on the battery charger:

- The electronic board automatically stops the charge if it lasts more than 12 hours.
- An output fuse is implemented to give protection against accidental inversion of the battery polarity or output protracted overload current.

## DIMENSIONS



## COMMON ANOMALIES AND SOLUTIONS

### THE BATTERY CHARGER DOESN'T CHARGE:

Control if the board turns on:

If the board does not turn on, control the 2 external pins of the 3-ways connector (on the right side of the board) if there is power supply from the batteries. If there is not any supply, control every connection that goes from those 2 pins to the batteries. Control also if the fuse is not faulty.

If there is a power supply on the board's connector, it means that the board is faulty and must be replaced.

If the board turns on, push the "ON" button and see if the green LED indicates the working charge and starts to flash.

After a control by a multi-meter to see if there is power supply on the three diode bridge's terminals (where the wires coming out from the transformer arrive). (PAY ATTENTION. DO NOT SHORT-CIRCUITING ANYTHING).

If the power supply arrives to the diode bridge, control if the fuse looks alright. If the fuse is not faulty, then the diode bridge must be replaced.

If the power supply doesn't arrive to the diode bridge control the following:

- Control if there is power supply on the three COM relays pins on the board, if it doesn't arrive, then control the power supply wire, the plug and the power panel.
- In the case that there is a power supply on the three COM terminals, and the board is indicating the working charge (green led flashing). Then verify also that there is power supply on the NA relay's terminals – if NOT, the board must be replaced.
- In the case that also on the NA relays terminals there is power supply – then control if the power supply arrives also to the transformer's terminal, both on the power supply wires input side (where the wires from the board arrive) and on the other side, where the primary transformer's wires arrive.

If the power supply doesn't arrive to those terminals control that the wires are well-connected to the terminals.

**THE BATTERY CHARGER TURNS ON, BUT AFTER FEW SECONDS IT TURNS OFF:**

**This problem is due to the fact that the batteries are too discharged. To solve this problem keep turning on the battery charger every time that it turns off. After some tries the charge cycle usually begins again, just like it normally does.**

**WARNING**

Before contacting our customer service, make sure that the problem is not among those listed above.

If it is necessary to contact our customer service, it is recommended that all useful information is given to our customer service, in order to minimize the assistance time.

## **ATTENTION!!**

**THE FOLLOWING PART OF THE MANUAL IS RESERVED TO QUALIFIED PERSONNEL ONLY.**

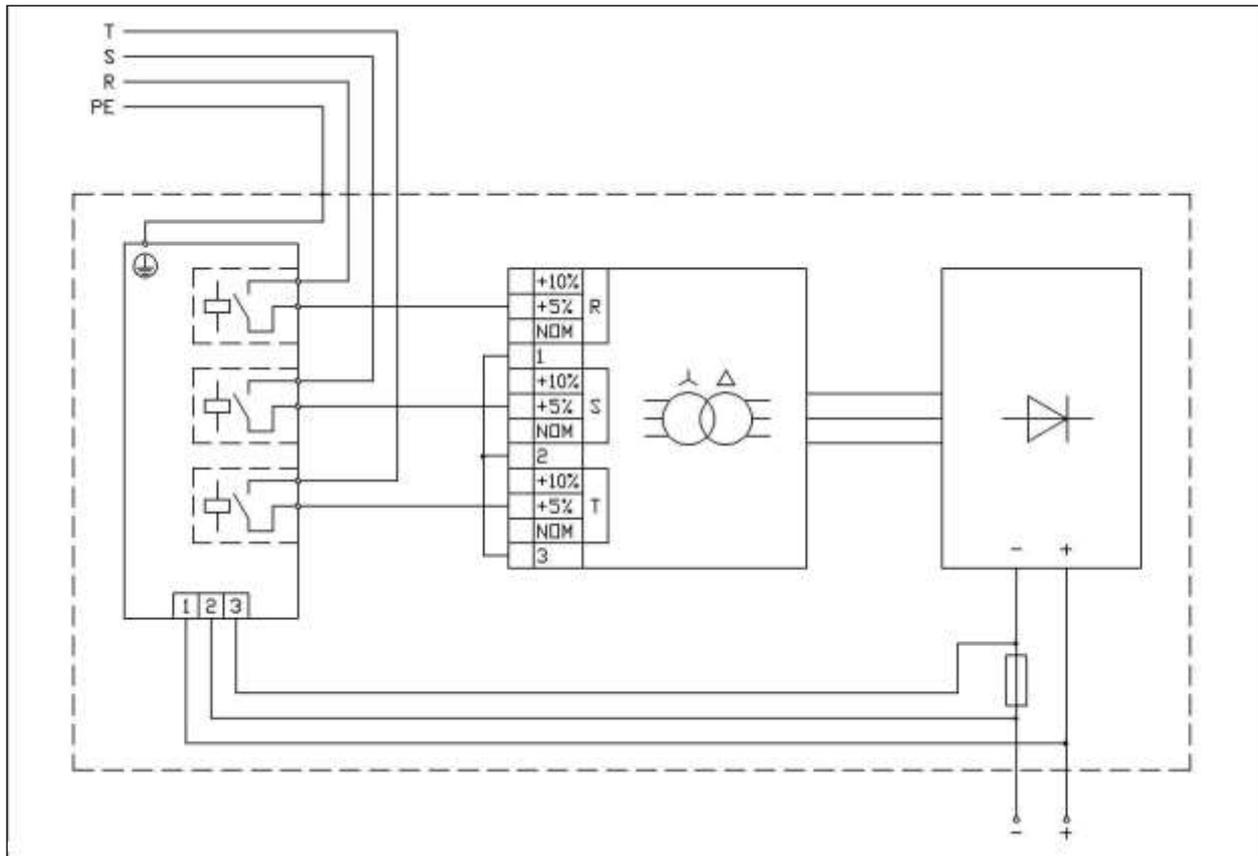
**DISCONNECT TENSION BEFORE OPENING THE CHARGER.  
DO NOT WORK ON THE OPENED CHARGER WITH TENSION STILL PRESENT.**

### INSTRUCTIONS FOR SUPPLY VOLTAGE CHANGE

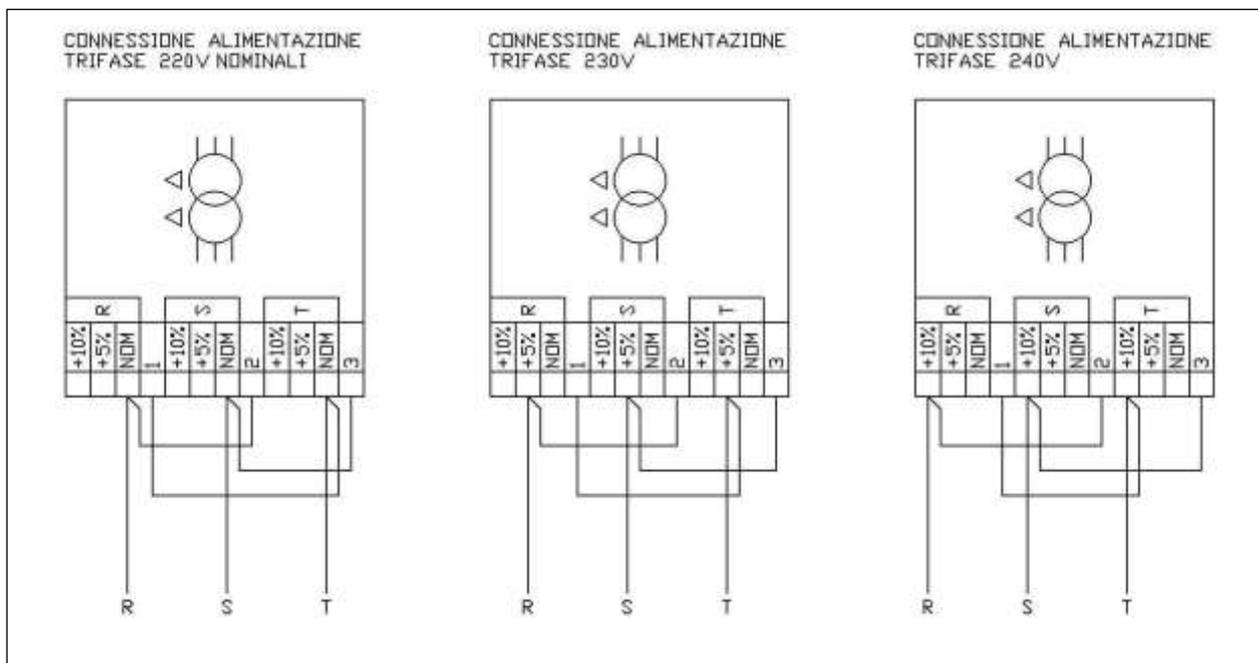
Before connecting the charger, make sure that the net supply voltage is alright. If the measured net value is different from the nominal one, it's possible to adapt the transformer supply to the measured tension. This is possible by connecting the supply conductors on the transformer terminal block according to the hereunder schematics.

Use the outlet corresponding to the measured tension/nominal tension ratio; for example, if the net supplies 420Vac, connect the transformer feeding in the 10% position.

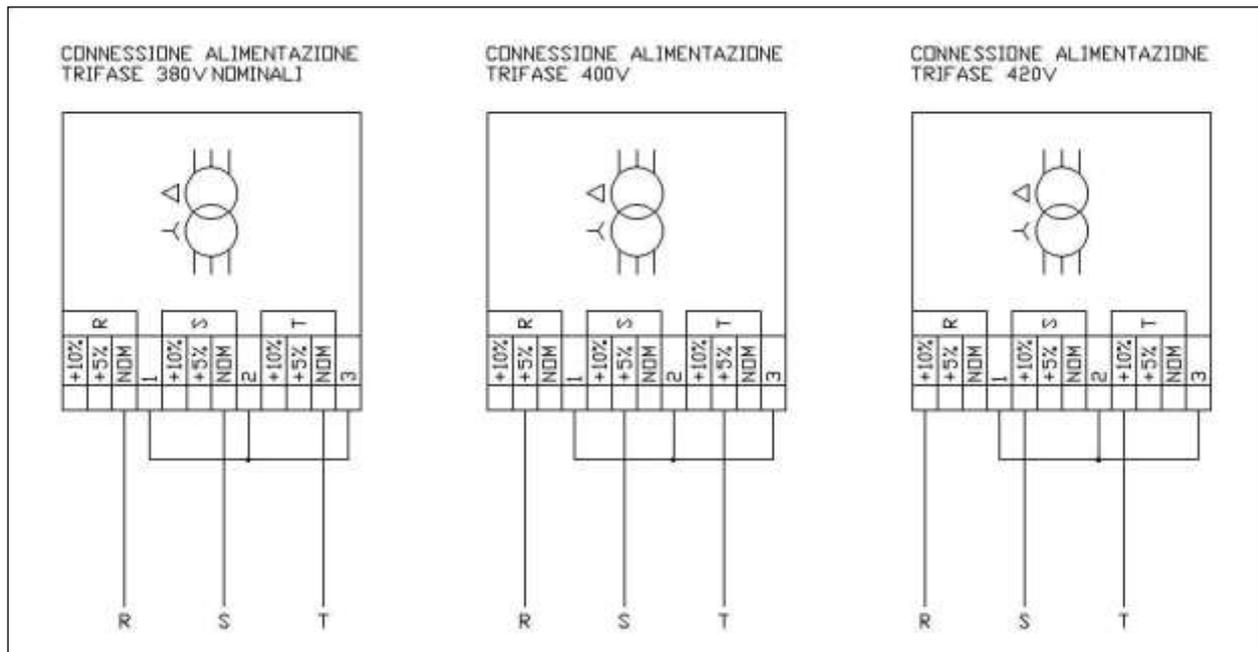
## WIRING DIAGRAM



## WIRING DIAGRAM 220V 3 PHASE



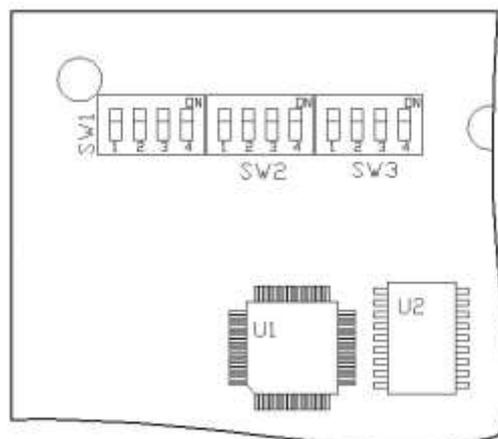
## WIRING DIAGRAM 400V 3 PHASE



## PCB SETTINGS

On the board there are three dip-switches called SW1, SW2 and SW3. Below, there is a description of their functions given:

**SW1** 1 – It sets the start mode: dip-switch n-1 in “OFF” the charger starts by pressing S2. If dip-switch n-1 is ON the start is in automatic mode.



**SW1** dip-switch 2, 3, 4 set the maximum current of the charger.

The table below shows the dip-switches settings

4	3	2	I max. Charger
ON	ON	ON	60 A
ON	ON	OFF	80 A
ON	OFF	ON	100 A
ON	OFF	OFF	120 A
OFF	ON	ON	140 A
OFF	ON	OFF	160 A
OFF	OFF	ON	180 A
OFF	OFF	OFF	200 A

**SW2**

In this case the dip-switches 3 and 4 are used to set the maximum protection voltage, indicated as Volt per Element. When they're both set "OFF" the default voltage is selected, and it is 2.70V per element.

4	3	V elem.
ON	ON	2.65
OFF	OFF	2.70
ON	OFF	2.75
OFF	ON	2.80

Dip-switches 1 and 2 set the post-charge threshold

1	2	Post-charge
ON	ON	2.30
OFF	ON	2.35
OFF	OFF	2.40
ON	OFF	2.45

**SW3** 1 – Dip-switch number 4 sets the charge interruption in case the current goes below a certain threshold. If "ON" the function is disabled. If OFF it is enabled.

**SW3** Dip-switched 1 and 2 set the post-charge lasting time. It is indicated as HOUR:MINUTES. If they're set all "OFF", a time equal to 3:00 hours is selected and it is the default set.

1	2	Tempo
ON	ON	Short time for testing
ON	OFF	240 min.
OFF	ON	180 min.
OFF	OFF	Automatic

**SW3** dip-switch 3 OFF: Equalization and ON: Buffer charge.  
The equalization and the buffer charge lasting time is 48 hours from the end of the charge.

## COMPLIANT STATEMENT

The device here described compliant to the following rules and European normative.

### EUROPEAN RULES:

Low voltage:  
European: 2006/95/CEE

ELECTROMAGNETIC COMPATIBILITY  
European: 2004/108/CEE

### REFERENCE EUROPEAN NORMATIVE:

LOW VOLTAGE:

EN50178  
EN60204  
EN60335-1  
EN60335-2-29

ELECTROMAGNETIC COMPATIBILITY:

EN55011  
EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-11

**It is hereby stated that this product is eligible for CE marking.**

General Administrator

## **WARRANTY**

Grants the product a warranty of 12 months after the shipping date. The warranty is only valid if all the rules described in this manual have been respected.

The warranty is limited to the duty of repairing or replacing (without costs) all the faulty parts found during the validity of the warranty period. All costs linked to travelling expenses to the customers are excluded.

Reparation/replacement of the faulty parts will be done in the shortest possible time in compliance with the engagements of the building firm and without any obligation to any kind of indemnity and/or compensation for direct or indirect damages.

Warranty will not be recognised on products showing any kind of tempering or external applications.

The beginning of the warranty period will start from the date of the shipping documents.