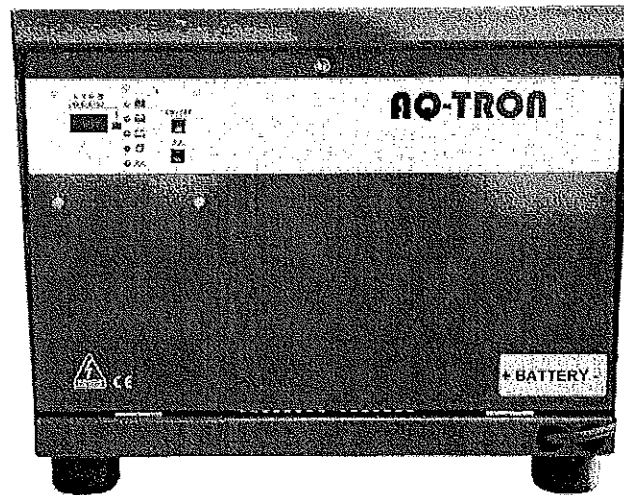


COMPACT BATTERY PLUS-2

GENERALITIES

This device is a traditional three-phases battery charger, power supplied 230Vac or 400Vac, with WA charge cycle type, so with decreasing current and increasing voltage. Its reduced sizes make easier the utilization in case of lack of space, in reduced spaces. The charge process is completely automated, since that the device has an electronic controller board that controls the whole charge cycle, showing various phases or anomalies by LED and DISPLAY.



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 display the Ah and the charge time of the last 5 charges
- It is possible to set the equalization and the buffer charge
- Visual and acoustic signal
- Missing power supply or phase indicator
- 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
- Improved accuracy of the current measurement

TECHNICAL DATA SHEET

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IMPORTANT:

If the charge stops after few seconds from the beginning, disconnect the battery connector, connect it again and press the ON button. This operation must be done until the battery charger works normally, going on with the charge.

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

USER WARNINGS

- The battery charger's 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 for do repeated charge cycles, even if they are short, that maintain a constant current consumptin equal to the maximum value.
- If the power supply wire is damaged, DO NOT repair it with improvised riparations, DO NOT use the battery charger and don't leave it connected to the power supply. It is necessary to replace the wire, and this must be done only from the battery charger producer or from expert technical support

INSTALLATION

- Place the charger on a flat horizontal surface, so that it is stable and on all the four feet. The surface must be able to bear the charger's wight, indicated on the table 2 on page 3.
- It must be placed so that it has at least 20cm on the sides and 1m above it
- Room temperature must not exceed 40°C.
- DO NOT place the battery charger in a place subject of acid vapors
- It's been built to work indoor, not exposed to the rain and in a well-ventilated place
- It must not be soaked with water ot other liquids, since that it has a protection grade IP20

POWER SUPPLY CONNECTION

- The charger must be connect only to plugs with ground tap.
- The charger is meant to work with 3 phase 400Vac supply.
- Before connecting it, check the correct voltage on net supply. 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 force 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 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 to charge not rechargeable batteries.

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- During the charging cycle, the battery must be placed in a well ventilated place and caps must be opened

ATTENTION: if the charger is a model with automatic start, the charging cycle begins automatically connecting the batteries.

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

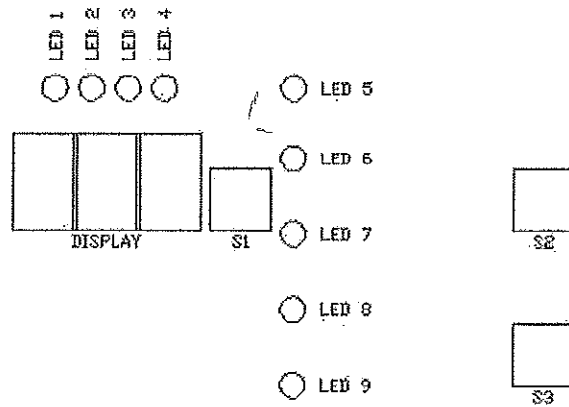
TABLE 2
ABSORPTIONS AND WEIGHT OF THE BATTERY CHARGER

MODEL	POWER [W]	CURRENT (A) @ 400Vac	WEIGHT [Kg]
24V 80A 3F	2300	3,8	39
24V 100V 3F	2880	6,3	41
24V 120A 3F	3500	7,5	44
24V 140A 3F	4200	9,2	49
36V 80A 3F	3500	7,5	40
36V 100A 3F	4350	9,4	42
36V 120A 3F	5200	11,3	42
40V 60A 3F			45
40V 80A 3F			52
40V 100A 3F			50
40V 120A 3F			55
48V 60A 3F	3500	7,5	40
48V 80A 3F	4600	10	45
48V 100A 3F	5800	12,5	50
48V 120A 3F	6950	15	55

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BUTTONS AND INDICATION POSITIONS



- LED 1 (V)** When lit indicates that the display shows the charging current
- LED 2 (V)** When lit indicates that the display shows the battery voltage
- LED 3 (V)** When lit indicates that the display shows the amount of charged Ah
- LED 4 (V)** When lit indicates that the display shows the time elapsed from start
- LED 5 (V)** When lit indicates that the charged has terminated
- LED 6 (V)** Blinking during charge
- LED 7 (G)** Lit when post-charge phase is acting
- LED 8 (R)** When blinking means that the charging cycle has lasted more than the maximum 12 hours (anomaly).
When steady lit shows anomaly in feeding or activation of thermal protection
- LED 9 (V)** When ON means that the equalisation charging is allowed
When FLASHING means that equalisation charging is taking place

- S1** Button for selecting the display data
- 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

When turning on the electronic board, on the display appears for 2 second, the word "nor", it means that the charge cycle is the normal WA.

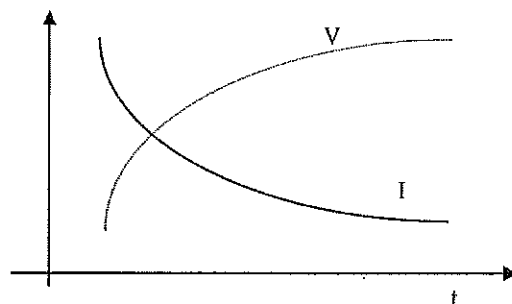
After this, on the display appear for few seconds the nominal value of the battery voltage, it must always be equals to the nominal voltage of the battery charger

Battery charger CBC PLUS-2- allows to view the parameters (Ah – charge time) of the last 5 charges. To visualize these parameters keep pressed for few seconds the FUNZ button, that allows also to select in sequence the saved values of the last charges. Before to keep pressed S1 to enter on memory data, must be selected the parameter to view, (move the led lit on LED 3 or LED 4 and then keep button pressed)

WA CHARGE

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

CARATTERISTICA WA



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 the taking place of the charging cycle by flashing LED 6; at the same time it controls 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 the counting of the post charging time, the charging cycle can be considered regularly finished.

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

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

BUTTONS FUNCTION

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

The S3 button allows the taking place of equalisation function at the end of the charging cycle. This phase can be activated simply by pushing the S3 button and is shown by LED 9. When LED 9 is ON it means that the function is allowed (button S3 pushed); when LED 9 flashes it means that the equalisation process is taking place.

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VISUALIZATION OF SAVED PARAMETERS OF THE LAST CHARGES (Ah and Time)

The board allows to see the parameters Ah and charge time of the last 5 charges, made in chronological order.

To access to this parameters battery charger must not be charging, and follow this procedure:

Supply the board(connecting the batteries), select the parameter that is desired (LED above the display will turn on one by one, stop when it is turned on the one indicating the wanted parameter Ah or t) by pressing the button S1, and when the parameter is selected DO NOT release the button for at least 5 seconds. When released the button the board indicates alternatively C 1 and a number, that indicates the value of the parameter saved during the last charge. Pressing again the button S1 the board indicates C 2 and the value of the parameter regarding the charge before the last one, this happen every time pressing S 1 until C 5, the last saved charge.

To go out from this mode, it is necessary to disconnect the batteries.

EQUALIZATION CHARGE DESCRIPTION

Equalization charge can be enabled by pressing S3 button during the charge or post charge phase.

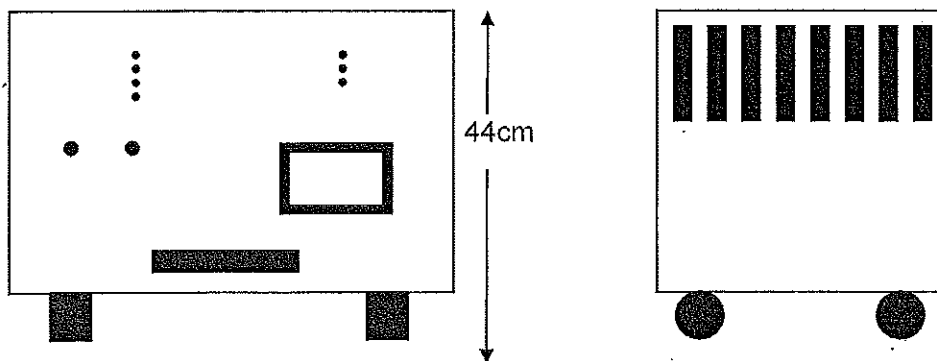
When enabled, the equalization starts after the normal charge finished and it last for 48 hours. This procedure means to activate the charge phase for 5 minutes and keep it turned off for the 55 minutes after, cyclically until the 48 hours expire.

PROTECTIONS

On the battery charger are implemented the following protection:

- The electronic board automatically stops the charge if it lasts more than 12 hours
- An output fuse is implemented to protect against accidental inversion of 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 on the 2 external pins of the 3-ways connector (on the right side of the board) if there is the power supply from the batteries. If there is not any supply control every connection that goes from those 2 pins until the batteries. Control also that the fuse is not faulty.

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

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

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

If the power supply arrives to the diode bridge, control if the fuse is whole. 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 control the power supply wire, the plug and the power panel

-In the case that there is the power supply on the three COM terminals, with board indicating the working charge (green led flashing) verify also that on the NA relay's terminals there is power supply – if NOT the board must be replaced.

-in the case that also on 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 usually the charge cycle begins normally.

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WARNING:

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

If it is necessary to contact our customer service, it's recommended that every useful information has been taken, in order to minimize the assistance time.

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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, get sure that the net supply voltage is correct. 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.

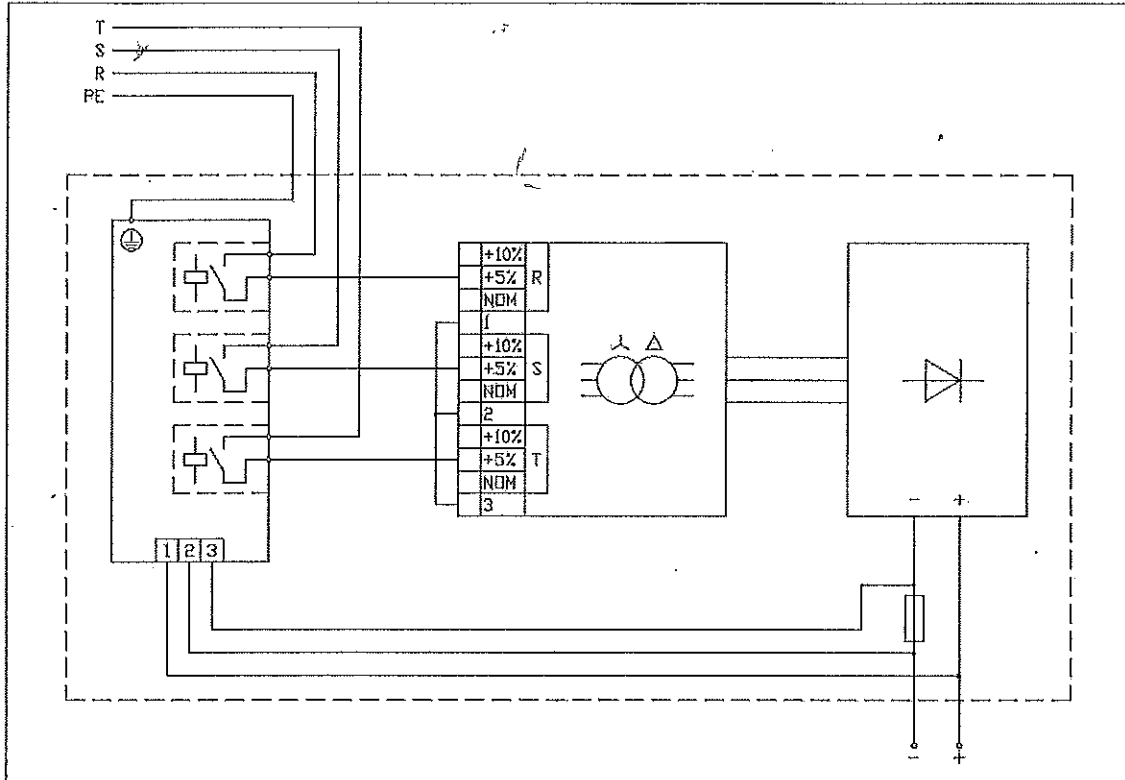
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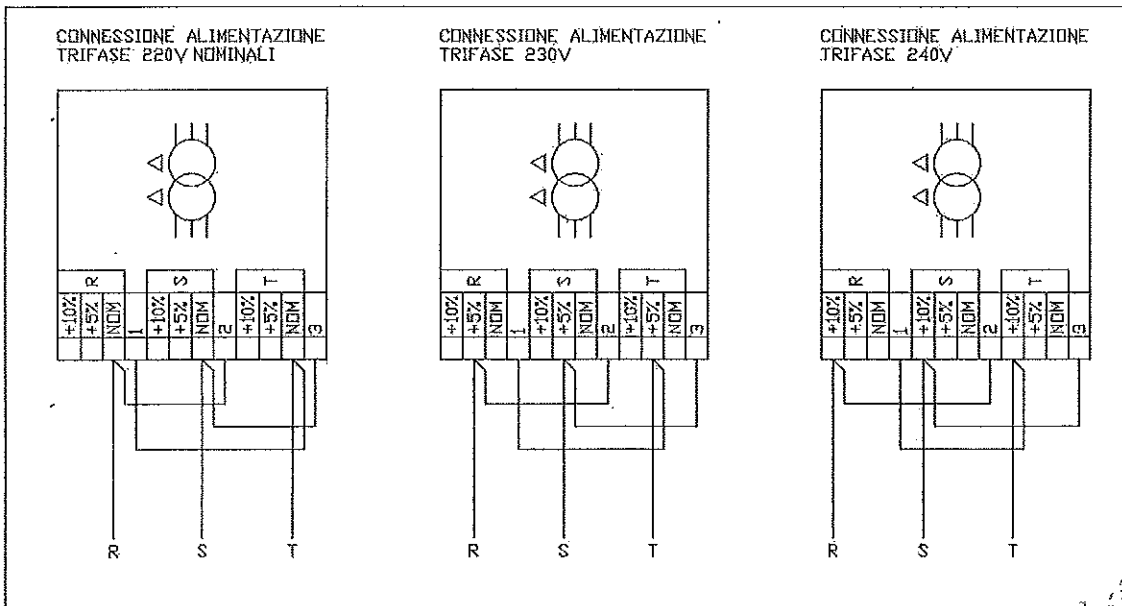
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WIRING DIAGRAM



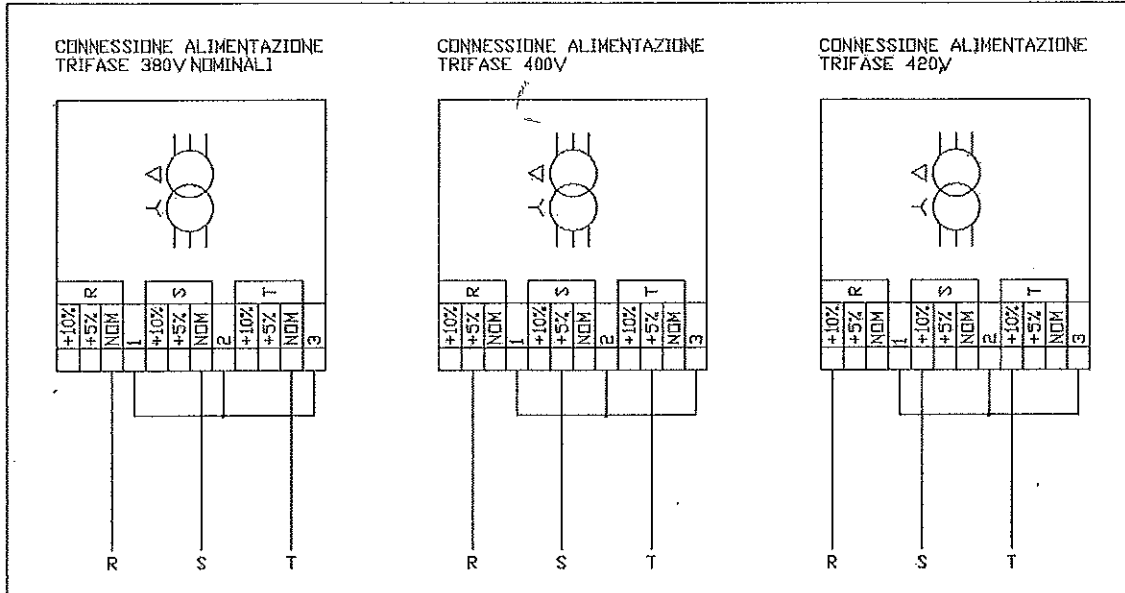
WIRING DIAGRAM 220V 3 PHASE



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WIRING DIAGRAM 400V 3 PHASE



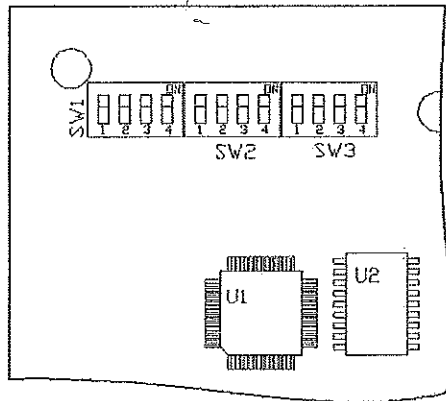
TECHNICAL DATA SHEET

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PCB SETTINGS

On the board there are three dip-switches called SW1 SW2 and SW3, and following here it's described their functioning:

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. See table below for 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

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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 set the charge interruption in case of the current goes below a certain threshold. If "ON" the function is disabled. If OFF it is enabled

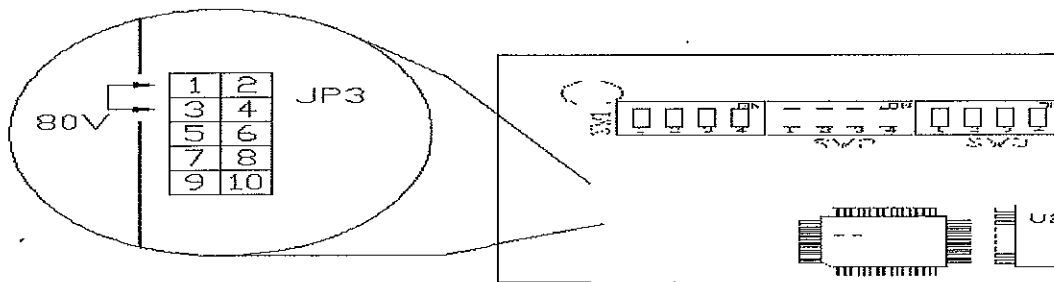
SW3 Dip-switched 1 and 2 set the post-charge lasting time and it is indicated as HOUR:MINUTES. If they're set all "OFF" a time equal to 3:00 hours is selected and it is the default set.

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 finish of the charge.

Board settings for 80V battery

The board can be set for be used ONLY with 80V batteries – bridging pins number 1 and 3 of JP3 connector by a jumper



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1. **IF THE DISPLAY FLASHES IT MEANS THAT ONE OR ALL THE PHASES ARE MISSING OR THAT THE POWER SUPPLY IS MISSING**
2. Anomaly is shown both from a display and from an acoustic buzzer.
3. By pressing the buttons "Funz." and "equalization" for 10 seconds it is possible to set a fixed voltage. By pressing again both buttons it is possible to take it off.

Starting the battery charger it is shown:

1. Charge cycle type: Wa;WoWA;Pul;
2. Battery charger voltage with before the letter A if the Automatic start is selected or the letter F if there is a fixed voltage selected.
3. It appears the maximum current of the battery charger

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