

### 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.



#### TECHNICAL FEATURES

1. CPU controller board
2. Automatic start settable by dip-switch
3. Automatic turn-off after disconnecting the battery connector, settable by dip-switch
4. Post charge time settable by dip-switch
5. Voltage threshold for the post-charge start settable by dip-switch
6. Automatically equalization
7. Visual and acoustic signal
8. It is possible to choose the voltage from the board, for a fixed voltage
9. Charge curve "WA"
10. Power supply 400Vac
11. Available on request ,and according to the technical possibilities, single-phase versions at 230V

### **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.
- 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.

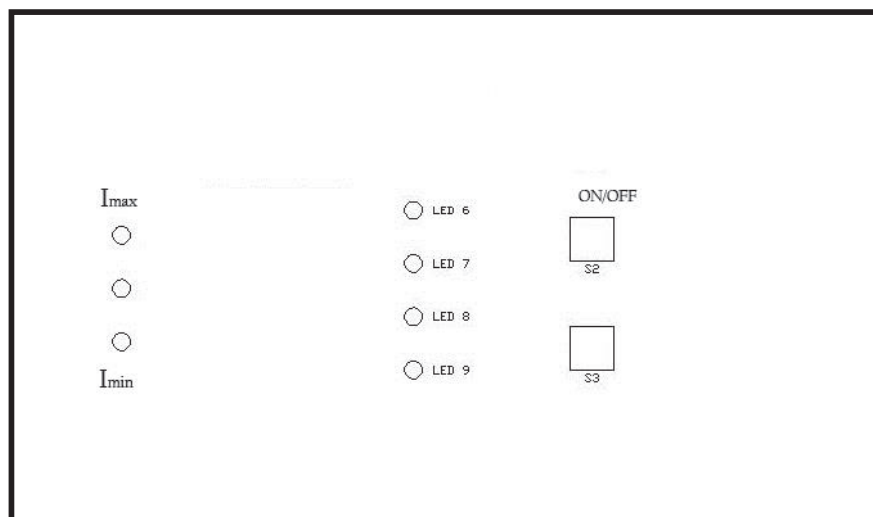
**TABLE 1**  
ELEMENTS NUMBER AND BATTERY CAPACITY

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	1750	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

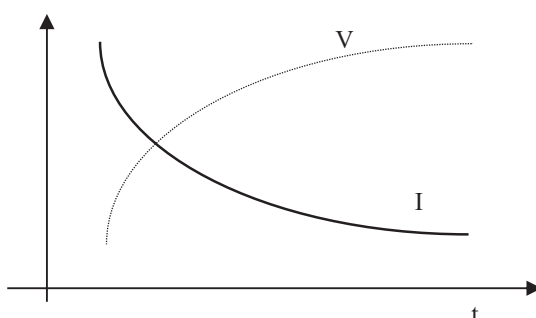
### BUTTONS AND INDICATION POSITIONS



- 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 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
- S2** ON/OFF 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 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.

### EQUALIZATION CHARGE DESCRIPTION

Equalization charge is automatically.

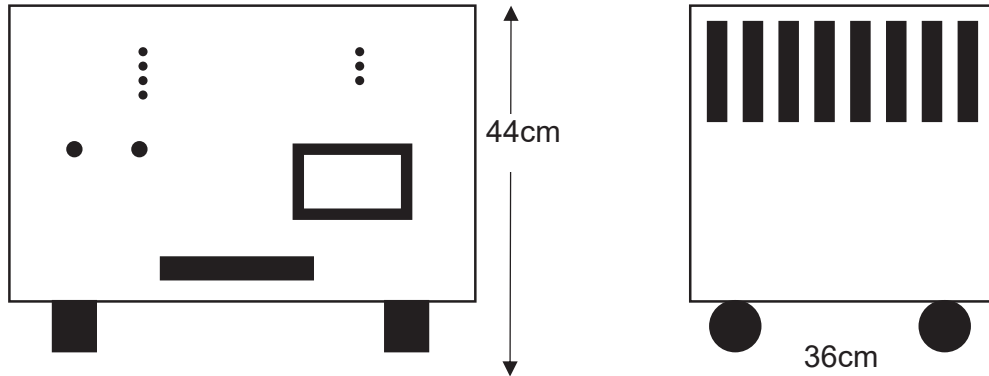
This procedure means to activate the charge phase for 5 minutes and keep it turned off for the 55 minutes after, cyclically until the 48 hours expire.

### 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.

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.

### 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**

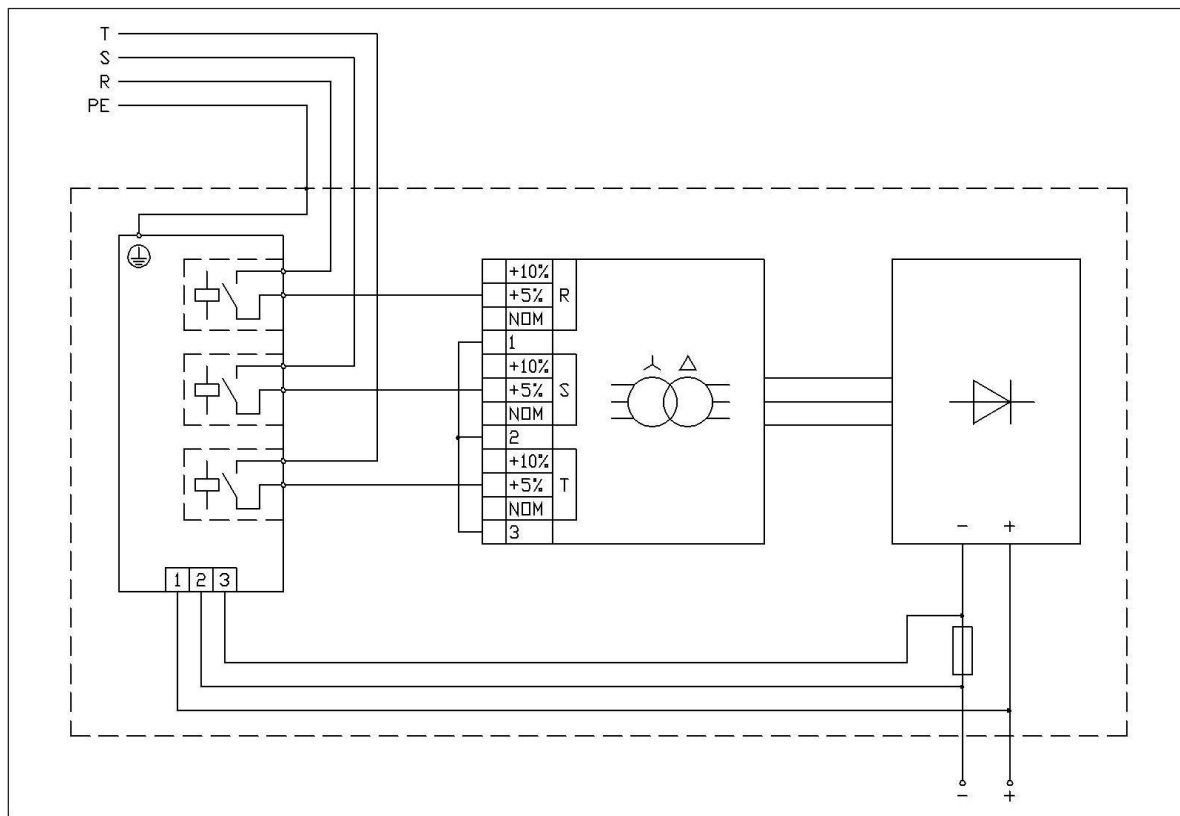
#### INSTRUCTIONS FOR SUPPLY VOLTAGE CHANGE

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.

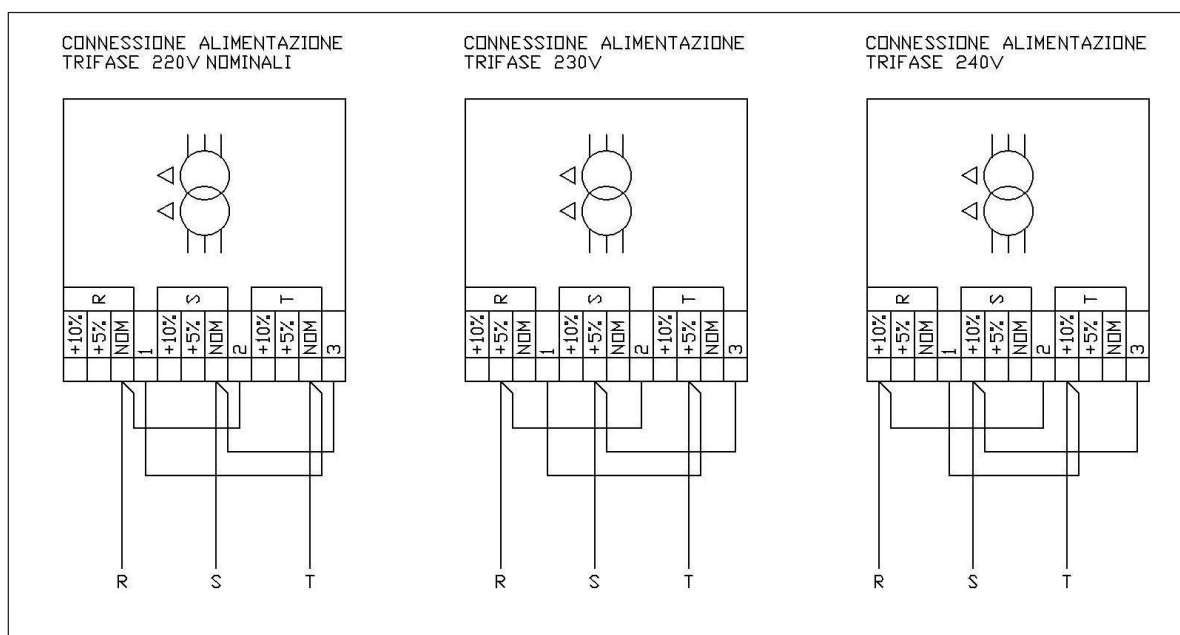
Use the outlet corresponding to the measured tension/nominal tension ratio; for example, if the net supplies 420Vac, connect the transformer feeding in the 10% position.



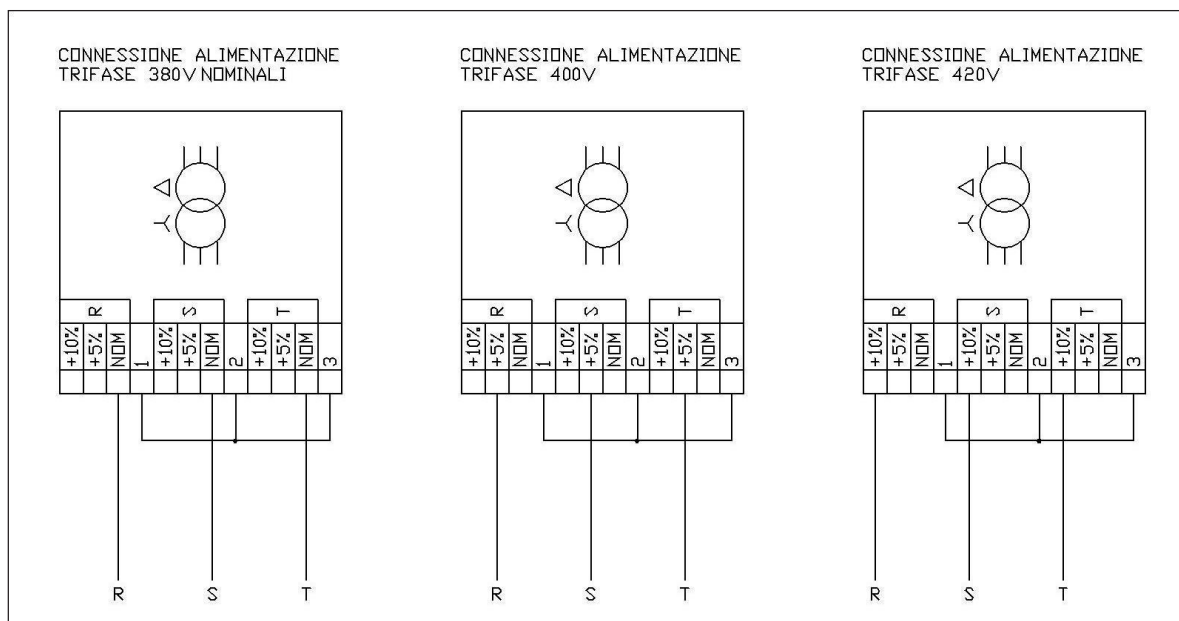
### WIRING DIAGRAM



### WIRING DIAGRAM 220V 3 PHASE



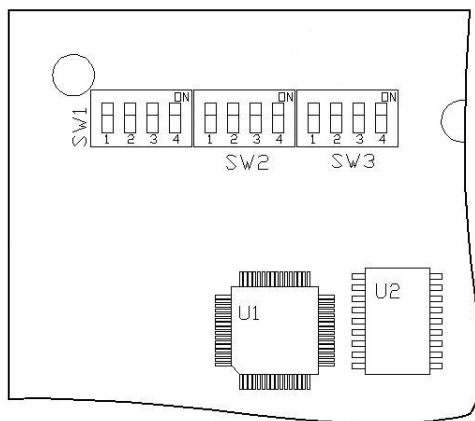
### WIRING DIAGRAM 400V 3 PHASE



### PCB SETTINGS

On the board there are three dip-switches called SW1 SW2 and SW3, 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

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