

ENERGIC Plus

BATTERY CHARGER RX



USER'S MANUAL

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GENERAL

1. Introduction

This manual contains instructions and suggestions for the users of *Energic plus RX* battery chargers. Before to install, use or repair the charger, it's necessary to read and understand this manual completely.

It's recommended to keep the manual in good condition for all the lifetime of the charger. It should be kept in a dry and clean place, always available to the users.

Throughout this manual, the following special annotations have been used to indicate important information.



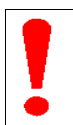
WARNING !

Gives important information regarding possible personal injury



CAUTION !

Gives important information regarding possible equipment damage



NOTE

Gives additional information and tips concerning important procedures and features of the charger

RESPONSIBILITY DISCLAIMER

The manufacturer of the *Energic plus RX* battery charger will not be responsible for damages and/or injuries caused by the charger in these situations:

- The charger is not installed properly by a qualified electrician;
- Maintenance operations are not done 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 data label on the box);
- The battery is damaged during the charge;
- The charger has been modified without the authorization of the manufacturer;
- Non-original spare parts are used in the charger;
- Wrong spare parts are used in the charger.

2. Safety instructions and warnings

GENERAL

Battery chargers can cause injury or death, or damage to other equipment or property, if the user does not strictly observe all safety rules and take precautionary actions.

Safe practices must be learned through study and training before using this equipment.

Only qualified personnel should install, use, or service this battery charger.

SHOCK PREVENTION

Bare conductors, or terminals in the output circuit, or ungrounded, electrically-live equipments can fatally shock a person. To protect against shock, have competent electrician verify that the equipment is adequately grounded and learn what terminals and parts are electrically HOT.

The body's electrical resistance is decreased when wet, permitting dangerous current to flow through the body. Do not work in damp area without being extremely careful. Stand on dry rubber mat or dry wood and use insulating gloves when dampness or sweat cannot be avoided. Keep clothing dry.

INSTALLATION AND GROUNDING – Electrical equipment must be installed and maintained in accordance with all the applicable national and local codes.

A power disconnect switch must be located at the equipment. Check the data label for voltage and phase requirements. If only 3-phase power is available, connect single-phase equipment to **ONLY TWO WIRES** of the 3-phase line.

DO NOT CONNECT the equipment grounding conductor to the third live wire of the 3-phase line as this makes the equipment frame electrically HOT, which can cause a fatal shock.

If a grounding conductor is part of the power supply cable, be sure to connect it to a properly grounded switch box or building ground. If not part of the supply cable, use a separate grounding conductor. Don't remove a ground prong from any plug. Use correct mating receptacles. Check ground for electrical continuity before using equipment.

The grounding conductor must be of a size equal to or larger than the size recommended by Code or this manual.

CHARGING LEADS – Inspect leads often for damage to the insulation. Replace or repair cracked or worn leads immediately. Use leads having sufficient capacity to carry the operating current without overheating.

Never extend the charging leads without prior approval of the manufacturer. Extending the charging leads without prior approval of the manufacturer may cause wrong operation of the charger and voids the warranty.

BATTERY TERMINALS – Do not touch battery terminals while equipment is operating.

SERVICE AND MAINTENANCE – Shut OFF all power at the disconnect switch or line breaker **BEFORE** inspecting, adjusting, or servicing the equipment. Lock switch OPEN (or remove line fuses) so that the power cannot be turned ON accidentally.

Disconnect power to equipment if it is to be left unattended or out of service.

Disconnect battery from charger.

Measure voltage on capacitors and, if there is any voltage reading, wait 5 minutes before to proceed.

Keep inside parts clean and dry. Dirt and/or moisture can cause insulation failure. This failure can result in high voltage at the charger output.

BURN AND BODILY INJURY PREVENTION

The battery produces very high currents when short circuited, and will burn the skin severely if in contact with any metal conductor that is carrying this current.

Do not permit rings on fingers to come in contact with battery terminals or the cell connectors on top of the battery.

Battery acid is very corrosive. Always wear correct eye and body protection when near batteries.

FIRE AND EXPLOSION PREVENTION

When batteries are being recharged, they generate hydrogen gas that is explosive in certain concentrations in air (the flammability or explosive limits are 4.1% to 72% hydrogen in air). The spark-retarding vents help slow the rate of release of hydrogen, but the escaping hydrogen may form an explosive atmosphere around the battery if ventilation is poor.

The ventilation system should be designed to provide an adequate amount of fresh air for the number of batteries being charged. This is essential to prevent an explosion.

Always keep sparks, flames, burning cigarettes, and other sources of ignition away from the battery recharging area. Do not break "live" circuits at the terminals of batteries. Do not lay tools or anything that is metallic on top of any battery.

To prevent arcing and burning of the connector contacts, be sure the charger is OFF before connecting or disconnecting the battery. The digital display must be completely OFF.

MEDICAL AND FIRST AID TREATMENT

First aid facilities and a qualified first aid person should be available for each shift for immediate treatment of electrical shock victims.

EMERGENCY FIRST AID: Call physician and ambulance immediately and use First Aid techniques recommended by the American Red Cross.

**DANGER: ELECTRICAL SHOCK CAN BE FATAL.**

If person is unconscious and electric shock is suspected, do not touch person if he or she is in contact with charging equipment, battery, charging leads, or other live electrical parts. Disconnect power at wall switch and then use First Aid.

Dry wood, wooden broom, and other insulating material can be used to move cables, if necessary, away from person.

IF BREATHING IS DIFFICULT, give oxygen.

IF NOT BREATHING, BEGIN ARTIFICIAL BREATHING, such as mouth-to-mouth.

IF PULSE IS ABSENT, BEGIN ARTIFICIAL CIRCULATION, such as external heart massage.

In case of acid in the eyes, flush very well with clean water and obtain professional medical attention immediately.

EQUIPMENT WARNING LABELS

Inspect all precautionary labels on the equipment.

Order and replace all labels that cannot be easily read.

RX SINGLEPHASE

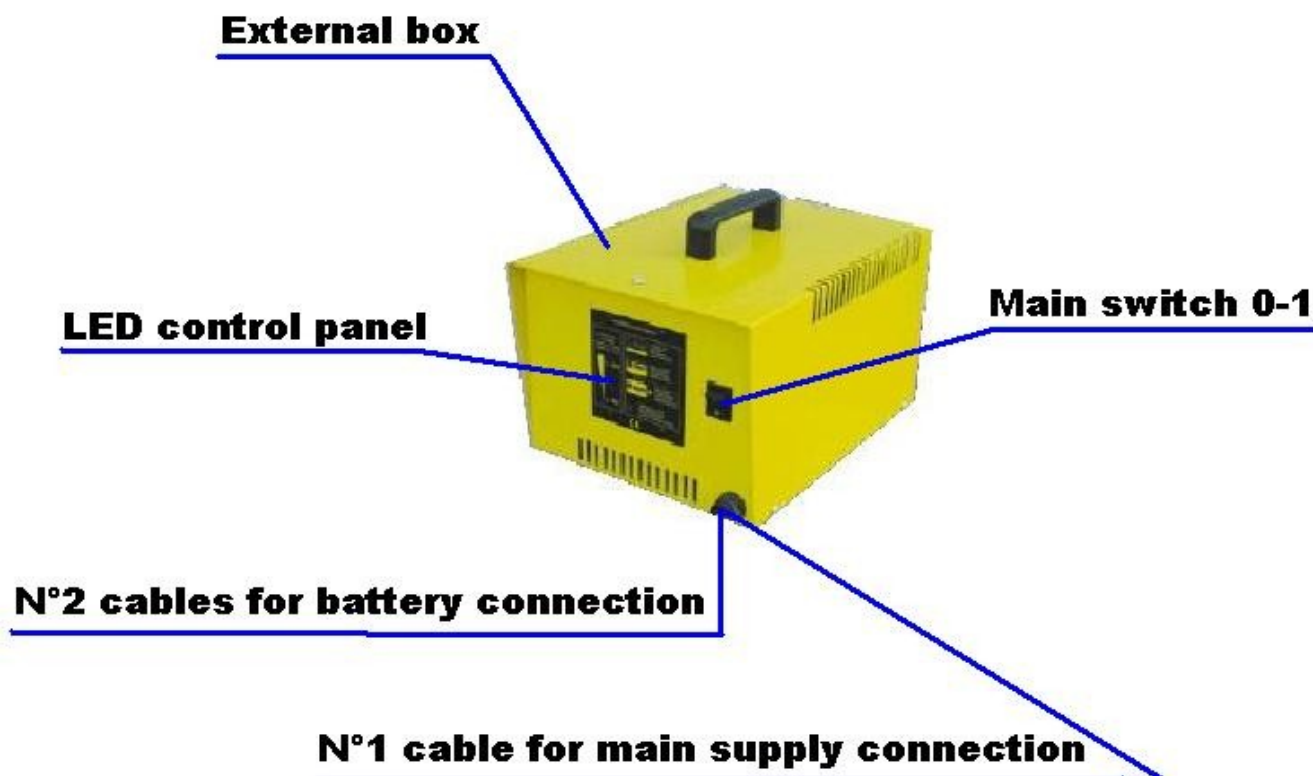
3. Description

Energic plus RX battery chargers have been designed to charge Pb batteries.

These units can convert the AC input voltage to a DC voltage at the correct level, in order to charge the battery cells.

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

- External box;
- Led control panel;
- Main switch (0-1);
- No.2 Cables for battery connection;
- No.1 Cable for main supply connection;



4. Installation of the charger

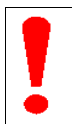
Conditions of use:

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



CAUTION !

The charger can be installed by qualified personnel only.



NOTE

This unit operates on 220-230-240 V AC, 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.



CAUTION !

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.



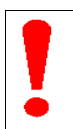
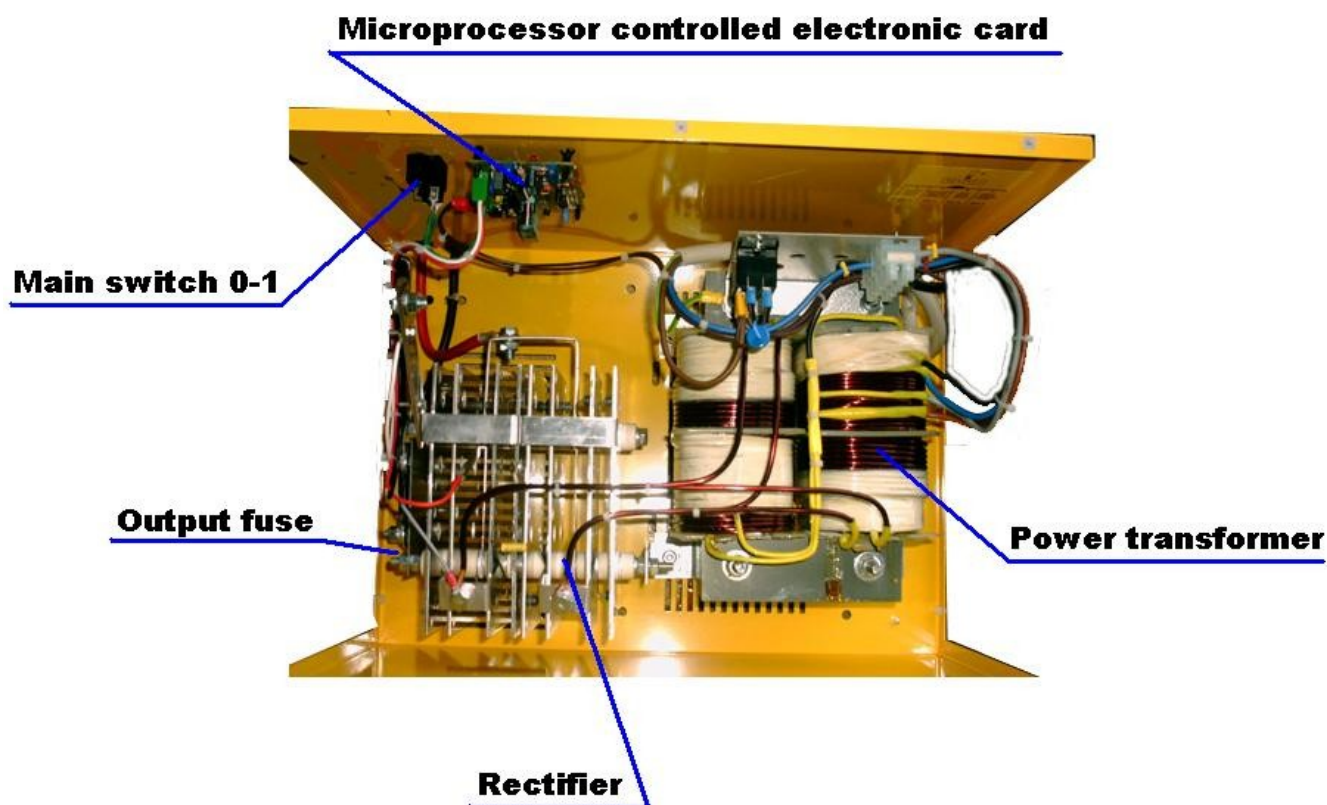
CAUTION !

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



CAUTION !

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.

INTERNAL VIEW OF THE CHARGER**NOTE**

Check the efficiency of earth circuitry (yellow/green cable);
Connect the charger to the mains using an adequate plug, with pushbutton and fuses;
Use an adequate plug to connect the charger to the battery.

ELECTRICAL INSTALLATION OF THE CHARGER

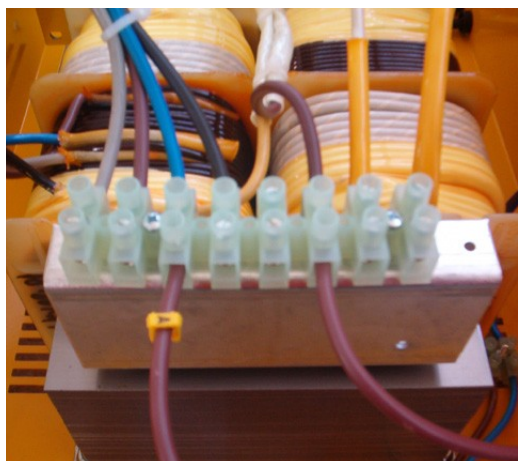
- Check the efficiency of earth circuitry (yellow/green wire);
- Connect the charger to the mains using an adequate plugs, with pushbutton and fuses;
- Use an adequate plug to connect the charger to the battery;



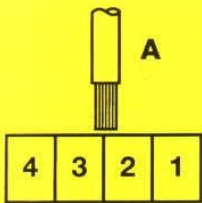
CAUTION !

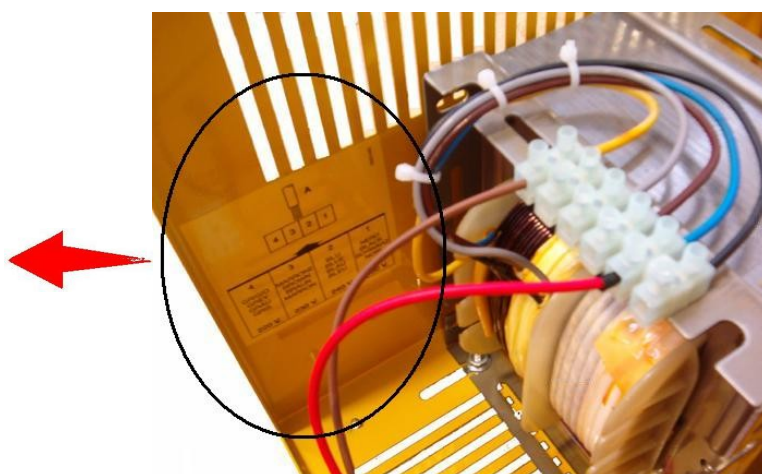
These settings can be done by qualified personnel only.
For more information please contact the manufacturer.

AC INPUT VOLTAGE ADJUSTMENT



- Disconnect the charger from main supply and battery;
- Open the cabinet;
- Locate the plugs (transformer taps) for AC input voltage adjustment;
- Disconnect the wire A from the original (default 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.

			
4	3	2	1
GRIGIO GREY GRAU GRIS	MARRONE BROWN BRAUN MARRON	BLU BLUE BLAU BLEU	NERO BLACK SCHWARZ NOIR
220 V.	230 V.	240 V.	250 V.



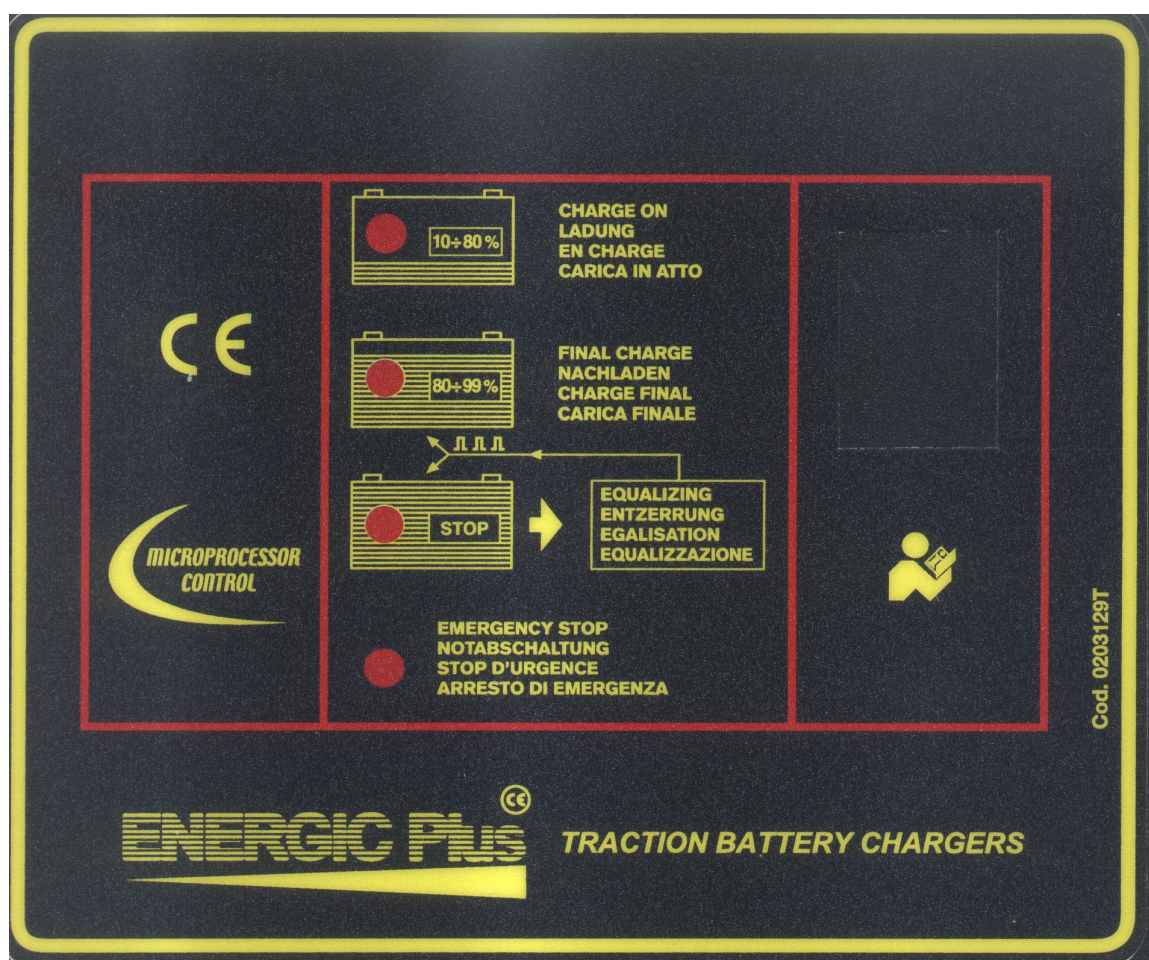
5. Operation

PRELIMINARY CONTROLS

- Inspect the charger completely for loose screws, electrical connections or other damages;
- Check that all the ventilation slots are not obstructed to assure proper air flow;
- Make sure that the charger is installed as instructed in this manual and in accordance with any applicable national or local norm.
- Set the main switch ☐ to position "0";
- Connect the charger to the battery;

When the battery is correctly connected, the LEDs on the control panel start to flash alternately.

LED CONTROL PANEL



START OF THE CHARGE

The charger can be turned on only when the battery is correctly connected.
The charge can start in two ways, depending by the position of the main switch .

(When the charge is complete, the user may disconnect the battery from the charger to start working, without turning the main switch  to position "0". This is not a problem, because the charger, when the battery is re-connected, will start the charge after a few seconds, to avoid sparks between contactors).

If the main switch  is set on "0", when the battery is connected the LEDs on the control panel flash alternately.

Now, to start the charge, it's necessary to set the main switch  to position "1".

If the main switch  is already in position "1", the charge starts after about 5 seconds of delay.

When the charge is started, the second LED "**CHARGE ON**" will flash at frequency of about 1 second.



WARNING !

When the charge is started, check that the LED "CHARGE ON" is flashing at frequency of about 1 second. This control is useful to be sure that the electronic control is working correctly.



WARNING !

ENERGIC Plus RX 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)

CHARGE OPERATIONS

NOTE

**The operations described in this chapter are done by
ENERGIC Plus RX chargers automatically.**

CHARGE CYCLE

The current of charge follows the Wa curve, as described in the DIN 41774 norm, while the LED **"CHARGE ON"** continuously flashes.

After some hours, depending by the conditions of the battery, when the battery's voltage reaches the value of "gassing" (2,4 Volt per cell), the LED **"FINAL CHARGE"** starts to flash and the charge continues.

After three hours the charge is completed, and the LED **"STOP"** is turned on. At this point the equalization cycle starts.

If the charge is not normally completed within 12 hours, the electronic control stops the charger, the LED **"EMERGENCY STOP"** is turned on and the equalization cycle is excluded. **If this happens it's necessary to check the conditions of charger and battery before starting another charge cycle.**

EQUALIZATION

When a battery is new, all the cells are virtually in the same condition. After the first cycle of charge-discharge, it's possible to measure small differences of voltage between the cells. These little differences between cells, in the next charge-discharge cycles, are more and more emphasized. This process reduces the performance of the battery and its life.

The EQUALIZATION function, performed by *ENERGIC Plus* RX chargers, has been developed to keep all the cells of the battery at the same level, even after years of continuous work.

Equalization is performed by giving extra charge cycles of 30 minutes every 15,5 hours. During extra charge cycles the LEDs **"FINAL CHARGE"** and **"STOP"** flash alternately.

The equalization function starts with a pause of 15,5 hours, it is then performed when the battery remains connected to the charger for more than about 24 hours (example: week-ends).

The electronic control of the charger measures only the time of effective charge so, even after one or more main supply black-outs, the charge cycle re-starts from the point of interruption.

The electronic control is reset only when the battery is disconnected.

END OF CHARGE

When the battery is completely charged the charger is turned off and the LED **"STOP"** is turned on.



WARNING !

Before disconnecting the battery, check it is not being charged. If it is charging turn off the charger using the main switch, to avoid sparks between connectors.

RX THREEPHASE

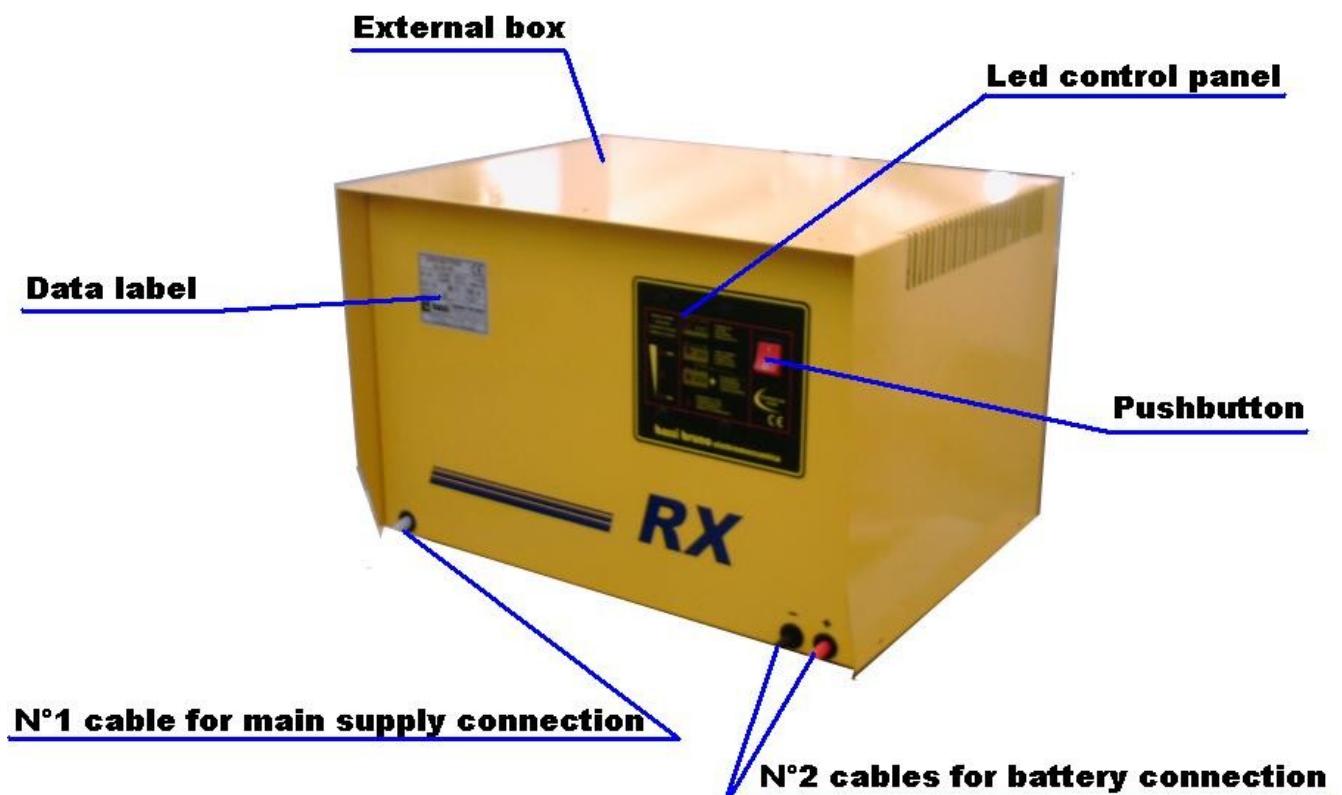
6. Description

Energic plus RX battery chargers have been designed to charge Pb batteries.

These units can convert the AC input voltage to a DC voltage at the correct level, in order to charge the battery cells.

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

- External box;
- Led control panel;
- STOP pushbutton;
- No.2 Cables for battery connection;
- No.1 Cable for main supply connection;



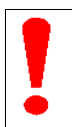
7. Installation

Conditions of use:

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

**CAUTION !**

The charger can be installed by qualified personnel only.

**NOTE**

This unit operates on threephase AC input, 380 Vac, 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.

**CAUTION !**

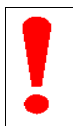
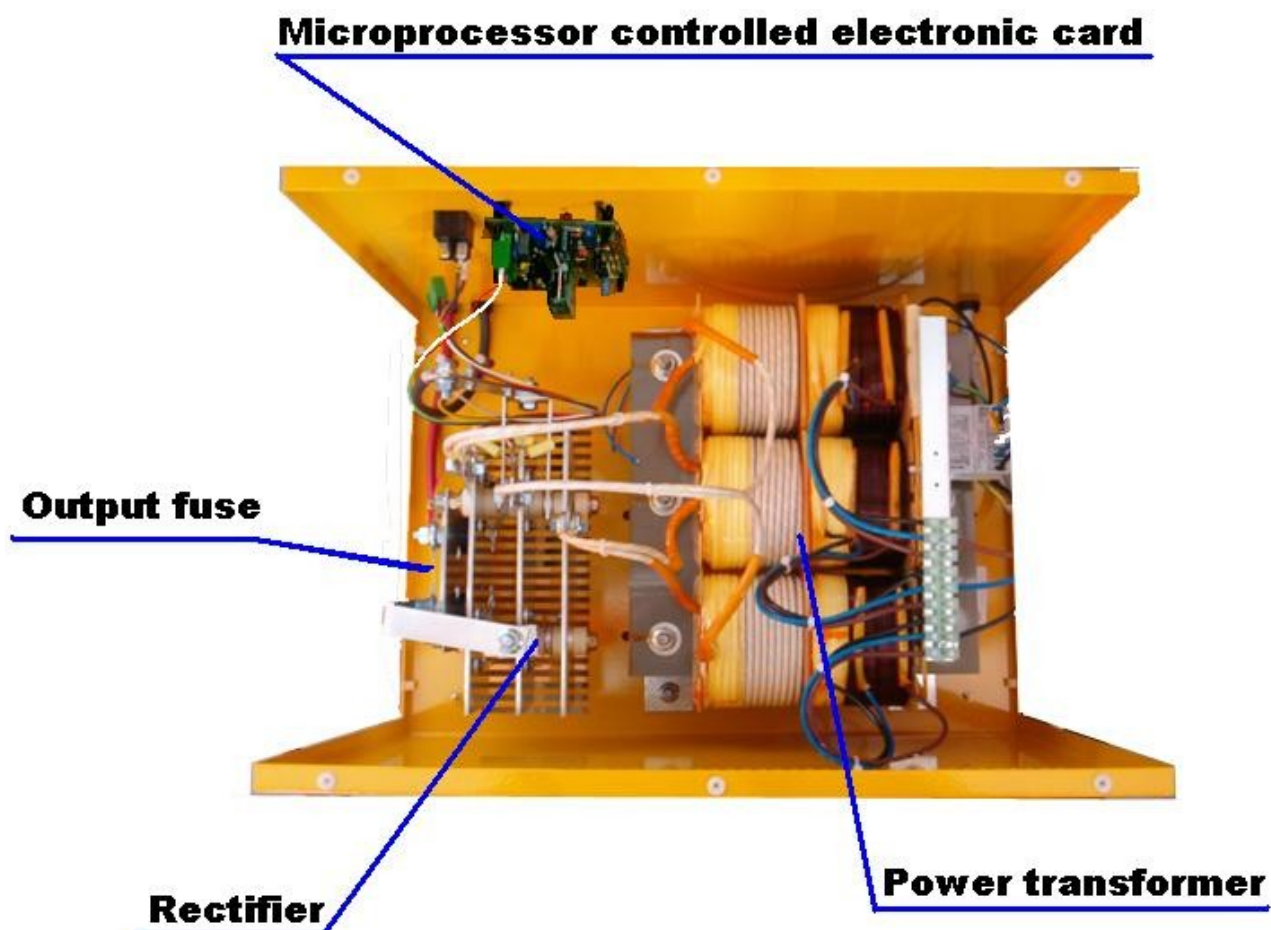
To prevent fire or shock hazard, do not expose the unit to rain or moisture.
Do not use the unit in presence of flammable gas, because it can be generate sparks.

**CAUTION !**

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

**CAUTION !**

Allow adequate air circolation 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.

INTERNAL VIEW OF THE CHARGER**NOTE**

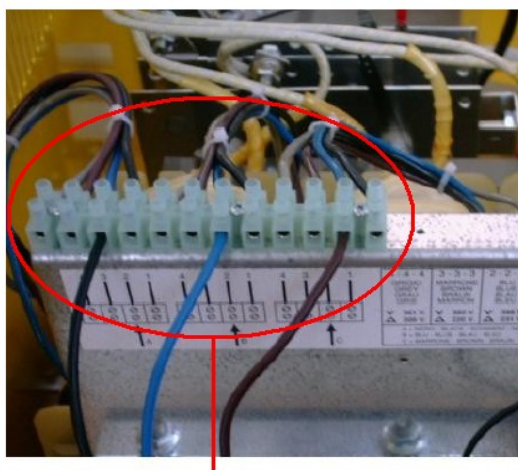
Check the efficiency of earth circuitry (yellow/green cable);
Connect the charger to the mains using an adequate plug, with pushbutton and fuses;
Use an adequate plug to connect the charger to the battery.

ELECTRICAL INSTALLATION OF THE CHARGER

- Check the efficiency of earth circuitry (yellow/green wire);
- Connect the charger to the mains using an adequate plugs, with pushbutton and fuses;
- Use an adequate plug to connect the charger to the battery.

**CAUTION !**

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

AC INPUT VOLTAGE ADJUSTMENT

**Transformer TAPS for AC
input voltage adjustment
(-5%, Nominal, +5%, +10%)**

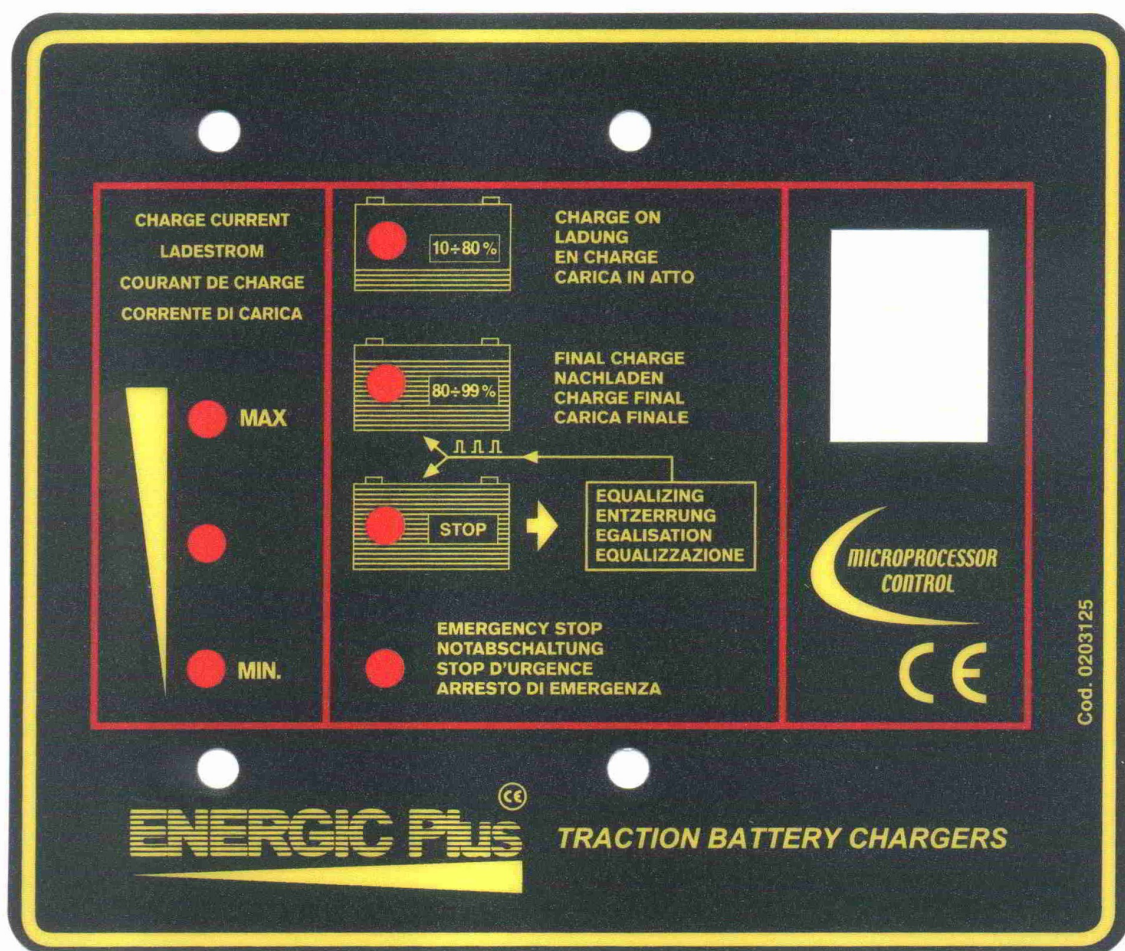
- Disconnect the charger from main supply and battery;
- Open the cabinet;
- Find the plugs for tension setting;
- Disconnect the wire A from the original plug (position 2);
- Connect the wire A to the desired position. Check the table to find the correct position;
- Close the cabinet;
- Connect the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

8. Operation

PRELIMINARY CONTROLS

- Inspect the charger completely for loose screws, electrical connections or other damages;
- Check that all the ventilation slots are not obstructed to assure proper air flow;
- Make sure that the charger is installed as instructed in this manual and in accordance with any applicable national or local norm.

LED CONTROL PANEL



START OF THE CHARGE

The charger can be turned on only when the battery is correctly connected.



WARNING !

When the charge is started, check that the LED “CHARGE ON” is flashing at frequency of about 1 second. This control is useful to be sure that the electronic control is working correctly.

CHARGE OPERATIONS

When the battery is connected, the charger turns on automatically in 5 seconds and the LED “CHARGE ON” starts to flash.

If the main supply is not present, all the control LEDs (except the “BATTERY CONNECTION” LED) starts to flash alternately.

START OF THE CHARGE

When the charge is started, check that the LED “CHARGE ON” is flashing at frequency of about 1 second. This control is useful to be sure that the electronic control is working correctly.

Energic Plus RX 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)

CHARGE OPERATIONS

- The maximum time allowed to reach the gassing voltage is 12 hours. If the battery doesn't reach the gassing voltage within 12 hours the charger stops and the LED "EMERGENCY STOP" lights on and the EQUALIZATION is excluded.
- When the battery reaches the gassing voltage, the LED "FINAL CHARGE" starts to flash, together with the LED "CHARGE ON", and the charge continues for 3 hours.
- If the battery is disconnected, the charger turns off in 3 seconds and the charge process is completely reset.
- When a battery is re-connected, the charger turns on automatically and the charge starts from the beginning.
- If, during the charge or equalization, there are one or more black-outs of the mains, the microprocessor keeps in memory the state of the charge and, when the power supply is available again, the charge re-starts from the exact point of interruption.
- When the charge is complete, the charger goes in stand-by mode for 15hours 30minutes, before to proceed with the equalization, therefore the equalization will be executed only when the charger remains connected for more than 24hours (normally in the weekend).
- The equalization consists in 4 small charge cycles (30 minutes long), with 15hours and 30 minutes of interval between each cycle. During extra charge cycles the LEDs " FINAL CHARGE" and "STOP-100%" flash alternately.

NOTE

The operations described in this chapter are done by *ENERGIC Plus RX* chargers automatically.

END OF CHARGE

When the battery is completely charged the charger is turned off and the LED "STOP – 100%" continues to flash.



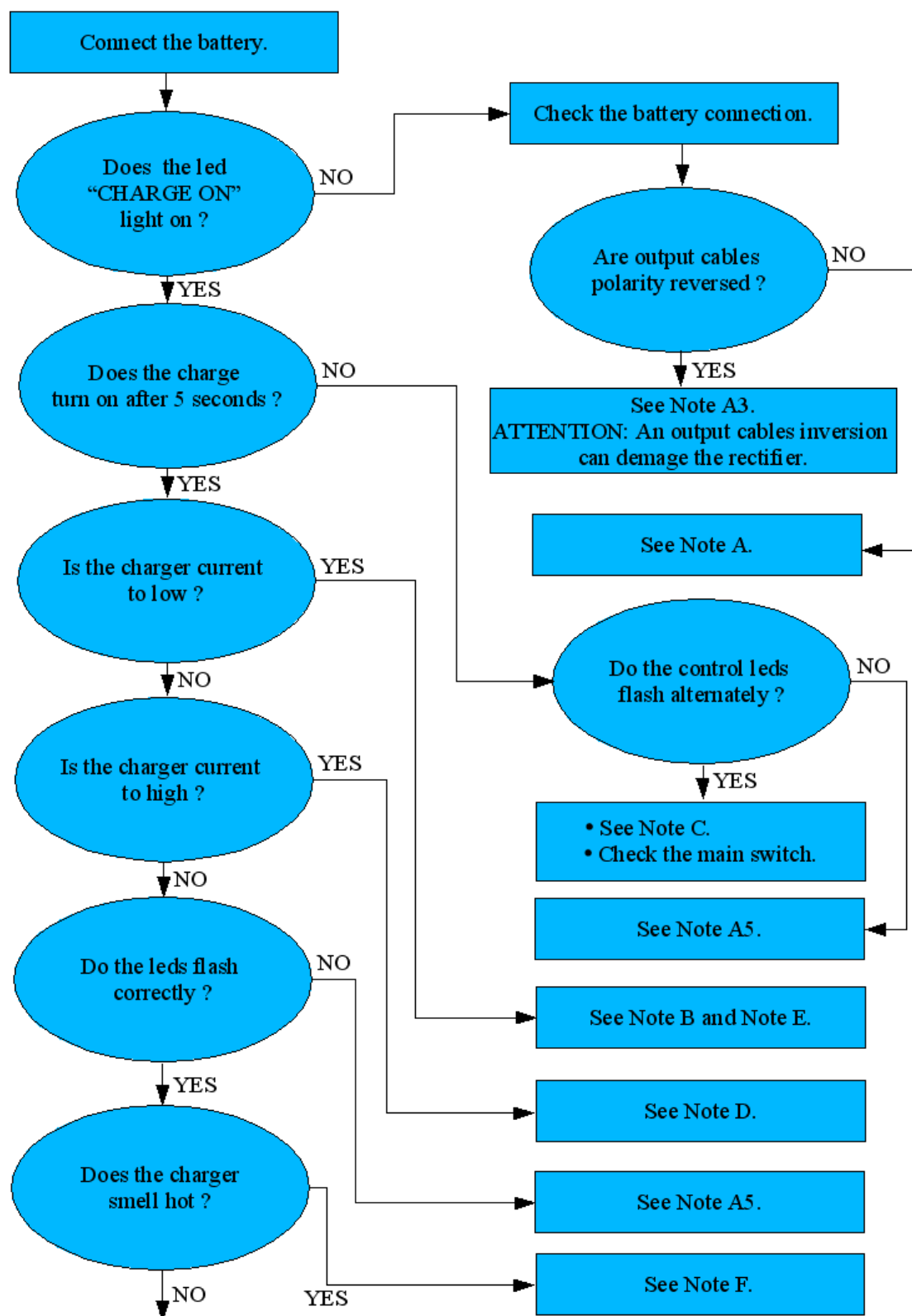
WARNING !

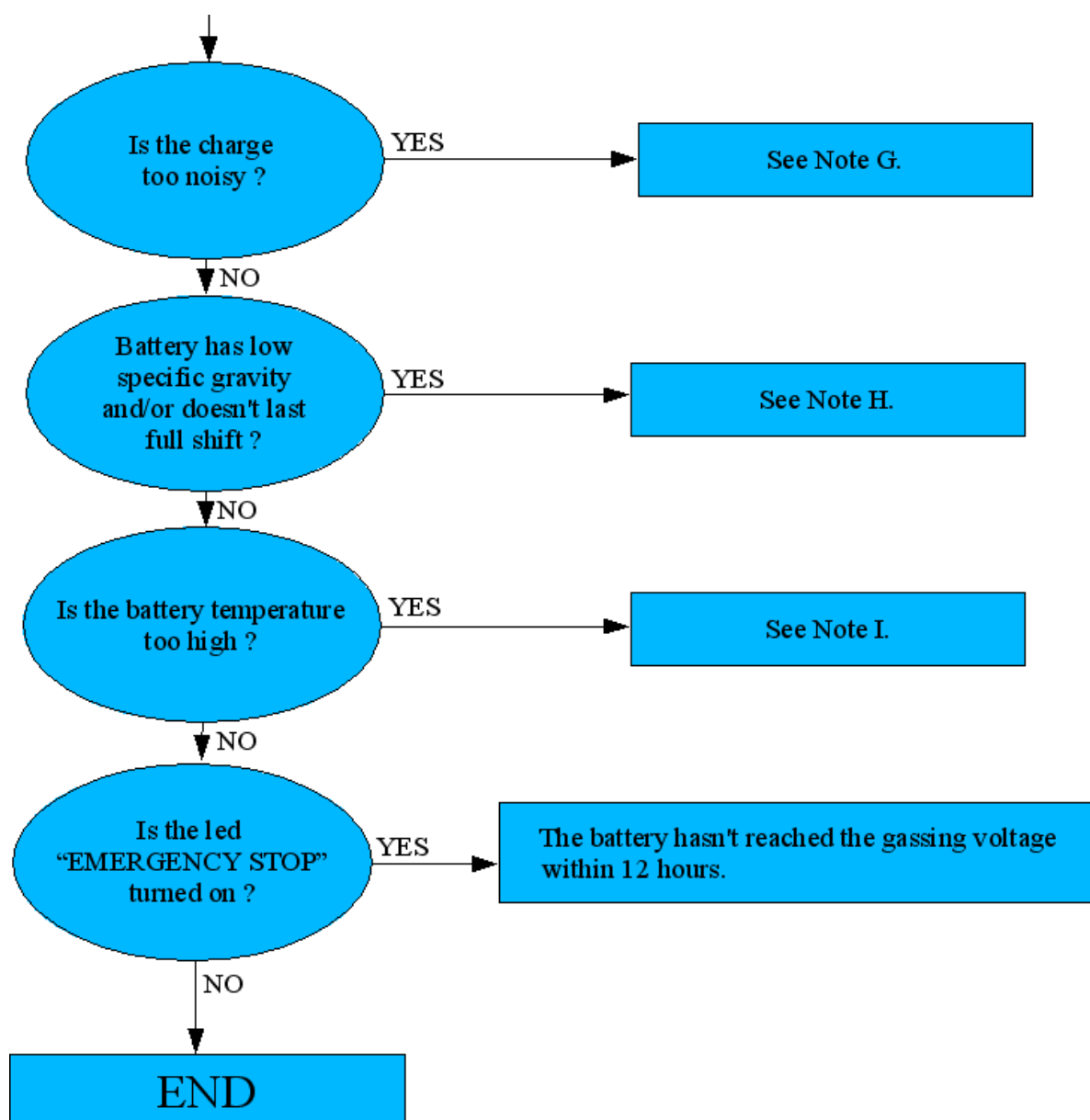
Before disconnecting the battery, make sure that it is not being charged. If it is being charged, turn off the charger using the STOP pushbutton, to avoid sparks between connectors.

TROUBLE SHOOTING GUIDE

<i>SYMPTOM</i>		<i>POSSIBLE CAUSES</i>	<i>ACTION</i>
Charger does not react to battery being connected, and LED control panel remains OFF.	A	1 Battery not connected properly.	Check battery connectors/harness.
		2 Charger has been connected to forklift motor connector.	Disconnect forklift motor and connect battery.
		3 Output cables reversed.	Check charger, connectors and battery polarities. Output fuse is probably blown.
		4 Bad control board connection.	Check board connectors (green).
		5 Bad control board.	Replace control board.
Output current is absent.	B	Output fuse blown.	Replace output fuse and adjust AC input setting.
All the control LEDs flash alternately.	C	1 AC input is absent.	Check AC input voltage on each phase. Check AC input connections. Check AC disconnect switch and fuses.
		2 Bad contactor.	Replace contactor.
Output current is too high.	D	1 Wrong AC input settings.	Adjust AC input settings to higher voltage.
		2 One or more cells are shorted.	Repair battery.
Output current is too low.	E	1 Wrong AC input settings.	Adjust AC input settings to lower voltage.
		2 One AC phase is absent.	Check AC input voltage on each phase.
		3 One or more diodes blown.	Replace rectifier.
		4 Bad contactor.	Replace contactor.
Charger smells hot.	F	1 Bad location.	Install the charger in proper location.
		2 Ventilation slots obstructed.	Remove objects which may obstruct slots.
		3 Wrong AC input settings.	Adjust AC input settings to higher voltage.
		4 Bad or loose power wirings.	Check and thighten all power wirings.
		5 Transformer burned.	Replace transformer.
Charger too noisy	G	1 Bad contactor.	Replace contactor and freewheeling diode.
		2 One or more diodes shorted.	Replace rectifier.
Battery has low S.G. and/or doesn't last full shift .	H	1 Wrong AC input settings.	Adjust AC input settings to lower voltage.
		2 Battery capacity too low.	Replace battery.
Battery temperature too high.	I	1 Wrong AC input settings.	Adjust AC input settings to higher voltage.
		2 Battery power demand too high.	Consider purchasing bigger Ah battery.
		3 Insufficient cool down time.	Increase cool down time before/after charging.
		4 Automatic stop doesn't work.	Check and replace board and/or contactor.

TROUBLE SHOOTING





SPARE PARTS LIST

COMMON PARTS – SINGLEPHASE CABINET S

POSITION	CODE	DESCRIPTION
1-S	0203340	Base RE box S
2-S	0203341	Cover RE box S
3-S	0203129T	Printcard external plate RX
4-S	RLCBSRE-06-01	Printcard support (x4)
5-S	0201321	Main switch 0-1
6-S	0201829	Cable strain relief
7-S	0201828	Cable strain relief
8-S	0100999	Hand grip
9-S	100001	Output fuse holder
10-S	1011CA01	Plastic feet RE (x4)

VARIABLE PARTS – SINGLEPHASE CABINET S

POS.	DESCR.	12-25	24-20	24-25	24-30
11-S	Rectifier	0201911	0201903	0202032	0202032
12-S	Printcard 567SCE	0302761	0302762	0302762	0302762
13-S	Output fuse	0201062	0201062	0201062	0201062

COMMON PARTS – SINGLEPHASE CABINET A

POSITION	CODE	DESCRIPTION
1-A	0203345	Base RE box A
2-A	0203346	Cover RE box A
3-A	0203129T	Printcard external plate RX
4-A	RLCBSRE-06-01	Printcard support (x4)
5-A	0201321	Main switch 0-1
6-A	100001	Output fuse holder
7-A	1011CA01	Plastic feet RE (x4)

VARIABLE PARTS – SINGLEPHASE CABINET A

POS.	DESCR.	24-40	24-50	24-60
8-A	Rectifier	0202033	0201914	0202016
9-A	Printcard 567SCE	0302762	0302762	0302762
10-A	Output fuse	0201063	0201064	0201065

COMMON PARTS – SINGLEPHASE CABINET B

POSITION	CODE	DESCRIPTION
1-B	0203370	Base RE box B
2-B	0203374	Cover RE box B
3-B	0203129T	Printcard external plate RX
4-B	RLCBSRE-06-01	Printcard support (x4)
5-B	0201321	Main switch 0-1
6-B	100001	Output fuse holder
7-B	1020CA01	Plastic feet RE (x4)

VARIABLE PARTS – SINGLEPHASE CABINET B

POS	DESCR.	48-60	48-80
8-B	Rectifier	0202016	0202017
9-B	Printcard 567SCE	0302764	0302764
10-B	Output fuse	0201065	0201066

COMMON PARTS – THREEPHASE

POSITION	CODE	DESCRIPTION
1	0203370	Base RE box B
2	0203374	Cover RE box B
3	0203125	Printcard external plate RE
4	RLCBSRE-06-01	Printcard support (x4)
5	203141	Pushbutton 0-1
6	0203999	Varistor 275V
7	100001	Output fuse holder
8	1020CA01	Plastic feet RE (x4)
9	0203262	Contacteur

VARIABLE PARTS – CABINET C

POS.	DESCR.	24-60	24-80	24-100	36-60	36-80	36-100	40-50
10	Rectifier	0202021	0202022	0202023	0202021	0202022	0202023	0202021
		40-60	40-80	48-50	48-60	48-80	48-100	72-60
		0202021	0202022	0202021	0202021	0202022	0202023	0202021
POS.	DESCR.	24-60	24-80	24-100	36-60	36-80	36-100	40-50
11	Printcard	0202752	0202752	0202752	0202753	0202753	0202753	02027535
		40-60	40-80	48-50	48-60	48-60	48-100	72-60
		02027535	02027535	0202754	0202754	0202754	0202754	0202755
POS.	DESCR.	24-60	24-80	24-100	36-60	36-80	36-100	40-50
12	Output fuse	0201065	0201066	0201067	0201065	0201066	0201067	0201064
		40-60	40-80	48-50	48-60	48-80	48-100	72-60
		0201065	0201066	0201064	0201065	0201066	0201067	0201065

CABINETS TABLE
Singlephase
Threephases

CABINET	Singlephase Units		
S	24/20	24/25	24/30
A	24/40	24/50	24/60
B	48/60	48/80	

CABINET	Threephase Units
B	ALL MODELS