USER AND MAINTENANCE MANUAL

Dear Customer,

Thank you for your trust and for buying this high-quality product. These instructions will help you to know the battery charger. A careful reading of these instructions will assure you to learn about the many features offered by this product.

Please, note the safety standards to ensure the safety of use of the product. A careful handling of the product will repay you with years of safe and reliable operation.

SAFETY RULES

	**CAUTION!** Indicates a possible dangerous situation that, if not avoided, can provoke mild injuries or material damage.
	**WARNING!** Indicates a dangerous situation that, if not avoided, can provoke serious injuries or death
	**DANGER!** Indicates a direct and imminent threat that, if not avoided, **will** provoke death or serious injuries.
	**IMPORTANT!** Indicate the correct use of the machine and other useful information. This sign does not stand for any dangerous nor threatening situation.

PROPER USE

The device is manufactured using recognized safety standards. Any incorrect use can cause:
- Injury or death to the operator or to a third party
- Damage to the device itself and to other material or assets belonging to the company or in the environment near the charger
- Inefficient operations

All personnel involved in commissioning, operating, maintenance service of this device must:
- have a qualification
- read and follow this operating manual carefully
- wait 24h after opening the package before using the device

All safety and danger warnings on the device must:
- be in a legible state
- Not to be damaged
- Not to be removed
- Not to be covered or painted.

The device must be exclusively used for its intended purpose. Any other use is deemed improper. The manufacturer is not responsible for any damage, unexpected or incorrect results caused by such misuse.

The use of the charger includes:
- reading and obeying all the operating instructions and safety / danger warnings
- perform inspection and maintenance work
- following the instructions of the battery and vehicle manufacturers.

MAINS LINE CONNECTION

Devices with a higher rating may affect the energy quality of the mains line, due to their voltage input.
This may affect the battery chargers and cause connection restrictions like:
- Insufficient network capacity
- Insufficient dimensioning of the electrical system

If one of this things occurs, the operator or the person using the device should check whether the device may be connected, asking for a confirmation to a qualified technician. Connect the battery charger to a power plug easily reachable in case of need.

NOTE! Make sure that the mains line connection is grounded properly.

RISKS CAUSED BY MAINS VOLTAGE AND CHARGING CURRENT

The user of the charger is exposed to many risks such as:
- Risk of electrocution from mains voltage and charging current
- Dangerous electromagnetic fields, which can risk the lives of those using cardiac pacemakers

An electric shock can be deadly. To avoid electric shocks while using the charger:
- do not touch any live parts inside or outside the charger
- never touch the battery poles
- do not short-circuit the charger lead or charging terminals.

All cables and leads must be secured, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or inadequately dimensioned cables and leads must be immediately repaired.

RISKS FROM ACID, GAS AND VAPOR

Batteries contain acid, which is harmful to the eyes and skin. Wear protective goggles and suitable protective clothing. In case of direct contact rinse any acid splashes and seek medical advice if necessary.

During the charge, gas and vapor are released, that can be harmful and could be highly explosive.
Only use the charger in well-ventilated areas to prevent the accumulation of explosive gases. Battery areas with less than 4% hydrogen are deemed not to be at risk of blast. A good ventilation provides a safe environment for the charging operation.
While charging, maintain a distance of at least 50 cm between battery and charger. Possible sources of ignition must be kept away from the battery.

The battery connection must not be disconnected while charging.
Do not inhale any of the gas and vapor released from the battery when charging.
Make sure that the charger and battery area is well ventilated.
To prevent short circuit, do not place any tools or conductive metals on the battery.

HOW TO HANDLE THE BATTERY

Protect the battery from dirt and mechanical damage.

Store charged battery in a cool place. Self-discharge is kept to a minimum at approx. 20°C
Every week, perform an inspection of the battery to ensure that the electrolyte level is correct.

If any of the following occurs, do not start the battery charger and have the battery checked:
- Uneven electrolyte levels or high water consumption in individual cells means a possible fault
- Battery is overheating (temperature over 55°C)

PROTECTING OTHERS

While the charger is in function, keep all non-authorized personnel out of the working area.

If there are people near the charging area:
- Warn them about all the dangers (hazardous acids and gas, danger from mains voltage and charging current, etc.)
- Provide suitable protective equipment

Before leaving the work area, make sure it is safe even if the operator is absent.

SAFETY MEASURES IN NORMAL OPERATION

The charger must only be operated on a mains supplied with a ground conductor and a socket with a ground conductor contact. The manufacturer will not be held responsible for any damage caused by misusage

Only operate the device in accordance with the degree of protection **IP21** instructions.
Never operate the charger if there is any evidence of damage

Any safety devices or parts that are not functioning properly, in a condition that will not assure its proper functioning must be repaired before using the charger.
Never bypass or disable protection or safety devices.

INSTALLATION

Install the charger in a dry place with a good airflow, far from warm sources and corrosive environments (alkaline/acid,...). Leave an empty space of 20 cm on the sides and 1 m in height.

You cannot reach more than 40° C in your working location.
Wait at least 24H after opening the charger's package before putting it in operation.

Avoid pouring water on/in the battery charger. It has an **IP21** protection level.

Make sure the charger fits the battery (check the info plate on the battery charger before use)
Protect the network with a delayed switch or a charging fuse larger than the greater absorption of the battery charger.

Respect the battery connector polarity (black cables mark negative (-) polarity and red cables mark positive (+) polarity).

PROTECTION DEVICE

A fuse protects c.c. circuit in case of extended overvoltage or polarity inversion.

If there is no network, charging process will TEMPORARILY interrupt.

Charge will reactivate AUTOMATICALLY when the electricity network will come back on.

SECURITY CERTIFICATION

CE Devices with the CE mark satisfy the essential requirements of the low-voltage and electromagnetic compatibility standards.

NETWORK LINKING

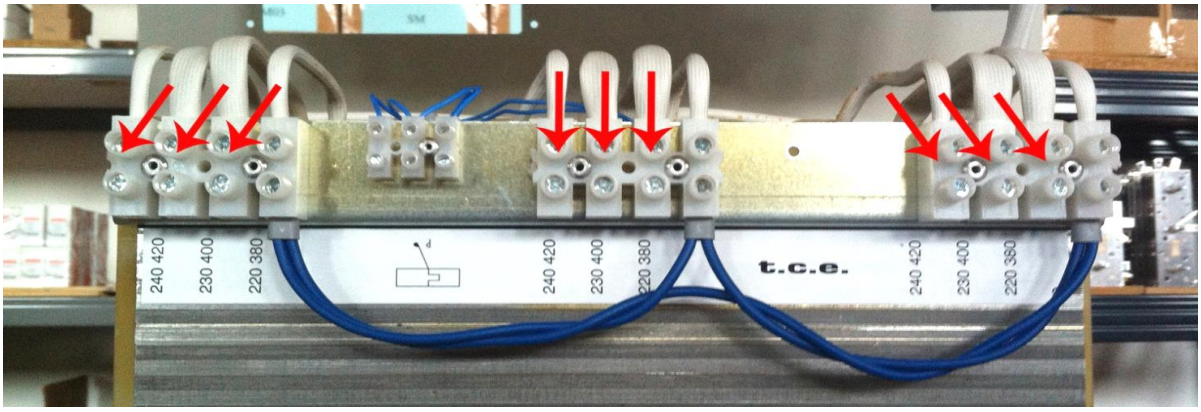
Our rectifier works with a three-phase 380-440 Vac and single-phase 220-255 Vac network operation.

Before connecting, make sure the network voltage is close to its normal value. If the charging values are not correct (in case of anomalies in the supply line or because it is being used in a different time band when the voltage is higher, ex. Night band), it is possible to correct the power of the transformer up to the Measured voltage value.

Three-Phase connection

To correct the network voltage you have to act on the terminal block inside the rectifier. It is important to check out these values:
+10% +5% Rated -5%
Use a socket that corresponds to the parameter between measured and rated voltage.

Example:
Rated voltage 400 Vac
Line voltage 420 Vac
Ratio % +5%
Terminal block position 420
Rated voltage 400 Vac
Line voltage 380 Vac
Ratio -5%
Terminal block position 380

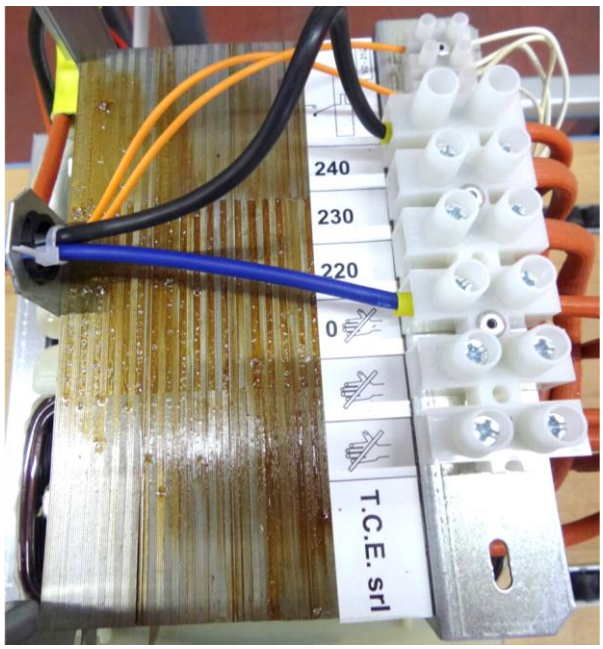


Warning! Voltage inside the charger may cause injuries. Only the personnel qualified can manage this device.

Single-Phase connection

To correct the network voltage you have to act on the terminal block inside the rectifier. It is important to check out these values:
+10% +5% Rated -5%
Use a socket that corresponds to the parameter between measured and rated voltage.

Example:
Rated voltage 230 Vac
Line voltage 240 Vac
Ratio % +5%
Terminal block position 240
Rated voltage 230 Vac
Line voltage 220 Vac
Ratio -5%
Terminal block position 220



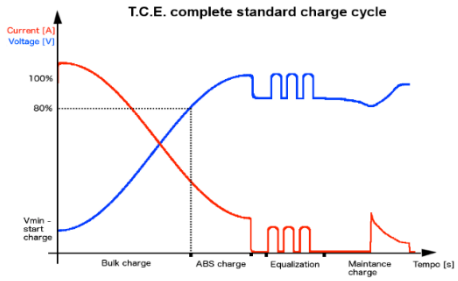
Warning! Voltage inside the charger may cause injuries. Only the personnel qualified can manage this device.

CHARGING CURVES

Charging curve installed is Wa, with decreasing current, according to DIN41774 standard.
To obtain the right charge for the battery, the battery charger must be able to supply a charge as exact as possible to that of the standard: indeed, it allows a starting charging current equal to 16% of the battery capacity and a decreasing trend.
To choose the right battery charger, you have to define the charging current you would need, calculating the 16% of the capacity of the battery in Ampere-hour (Ah). (Ex: for a 600Ah battery, you have to use a 100A battery charger)

WA CURVE

The Wa curve, displayed in the diagram, is characterized by a decreasing trend of the charging voltage to the increasing of the battery tension. The charger executed with Wa curve has a duration which changes from 10 to 12 hours. At the end of the charge, the equalization cycle takes place (usually during weekends): it allows the charger to eliminate little voltage differences between the battery elements that, through time, would considerably reduce its performances.
It takes place through extra charging cycles with a default duration and it starts 10 hours after the end of the charge.



MAINTENANCE

If the battery will not be used for long periods, for example during holidays, it would have to be maintained charged, to not compromise its performances.
It is better to charge the battery before left unused for long periods. To protect it from the auto-discharge, it is possible to complete the program with the maintenance function. It maintains the battery at 100% charge, even if it won't be used for months; this function goes through the microprocessor, which is able to autonomously put to use extra charging cycles, that maintain the battery current in predefined charging values and always full.

BEFORE CALLING THE TECHNICIAN

Before calling the technician, make sure to:

- Read carefully the "Mains line connection" section
- Verify that the battery charger is correctly supplied (in case of three-phase devices, check the presence of the three phases)
- Verify on the display if the battery is connected
- Check the battery current
- Verify that the available network power is larger than the maximum absorption of the battery charger (see data plate)
- Check the integrity of connectors.

If the problem continues, call an authorized technician.

Error code: T+	Error code: V+	Error code: Time exceeded
Power transformer overheated **Thermal probe opened due to an over temperature of the power transformer.** **Solution:** - **Wait until the transformer cools off.** - **Check if the 2 orange wires are properly connected behind the control card**	*Over Voltage* **Solutions:** - Check if the battery is correct for the charger - Check if the battery is too charged - Check if the control card is set on the correct V (behind the control card)	*Charging Time Exceeded* If the charging cycle cannot reach the final phase, the safety timer will exceed the 12h limit and this error will appear on the main visualization. **Solutions:** - Make sure that the input wires on the power transformer match the network voltage - Check the condition of the battery

PROBLEM SOLVING

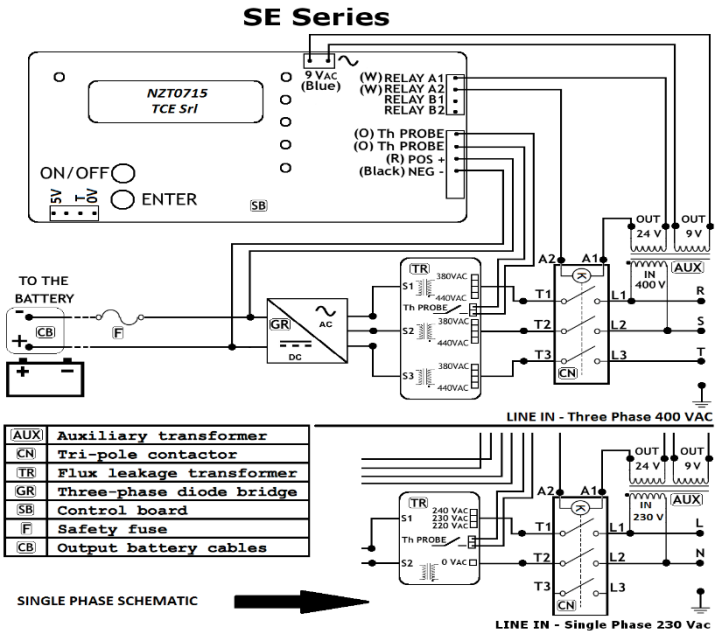
Section reserved for the technician

The battery charger does not light on

- Check the presence of the correct network voltage on the direct plug and the efficiency of the fuse
- Check that the network voltage is the same as the input of the transformer (380V, 400V, 420V, 440V three-phase or 220V, 230V, 240V, 250V single-phase)
- Verify the efficiency of the fuse in the battery charger
- Check the good connection between connectors and control card
- Check the continuity of the thermal probes of the transformer (orange conductor)
- Verify the correct lock of screws that tie the cables to the rectifier connection
- Check the operation of the remote control switch and the auxiliary wiring
- Verify the output tensions of the auxiliary transformer
- Check if the voltage arrives to the power transformer

The connection-to-the-battery cable does not exit (only for Easy Wire)

- Check if it is not gone out from its slot.
- Verify if something does not block the unwinding of the cable.



CONTROL CARD VISUALS AND OPERATIONS (Box C – S)

When the battery charger is powered. The first visualization shows the unit model. At the same time all the LEDs on the card turns on for a second to test their functionality.
The charger while turning on, is already testing the connection (if present) with the battery and in case the result is positive and the battery is correct for the charger, it will automatically start charging.

In case there is no battery connected to the charger, on the display the **NO BATTERY visualization** will appear, notifying the user of this situation.

The **CHARGING visualization** appears after the automatic start of the charge of after the customers manually starts the charge by pressing the button On/Off. It shows the battery Voltage and the total length of the charge. In addition, a small battery figure shows the level of the charge of the battery in real time. In case of interruption between the battery and the charger (unplug of connectors), the charge automatically stops.

The ABS CHARGE visualization appears when the charge is at 80%.

Push the ENTER button to access the **ERROR Visualization**, it shows the error codes in case of anomalies or malfunctions. The error codes descriptions can be seen in the "Before calling the Technician" section of this manual.

Push the ENTER button to check the **pre-set length of the ABS charge** and the total length of the charge. To change the ABS Charging time, check the below instructions

IMPORTANT: DO NOT DO THE FOLLOW OPERATION WHILE CHARGING OR IF A BATTERY IS CONNECTED TO THE CHARGER!!!

The control card allows, based on the battery status (old/reconditioned or new), to increase the ABS time. The older the battery the more hours it requires to charge. Default setting is **AUTO**, it selects the ABS time automatically.

If the 2 buttons on the card are pushed at the same time for a few seconds, the Set ABS time visual will appear.

Standard is AUTO (the control card calculates the best ABS charge time), to increase or fix the ABS time press the **ENTER** button until the desired charge time is reached (1-10 hours) then press **ON/OFF** for a few seconds to set it.

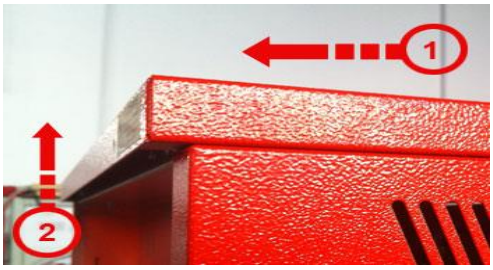
After the ABS visual, the language visual will appear. It is possible to change the language here by pushing **ENTER** to go through the languages available and then **ON/OFF** for a few seconds.

HOW TO OPEN THE BATTERY CHARGER (Box C - S)

NOTE! The incorrect execution of the instructions or the drop of the devices could cause serious personal injuries and material damage. Only skilled technicians must execute the opening of this device. Follow the safety standards for safety reported in the user instruction of the battery charger.

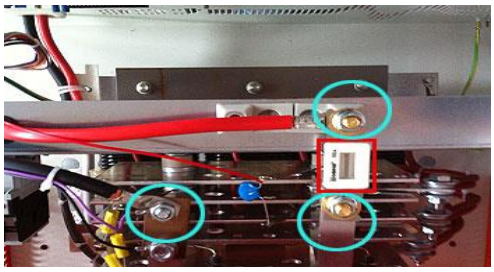
PHASE 1: **Make sure that the supply cable and battery cables are disconnected.**

Remove the two Phillips screw on the back top part of the battery charger.



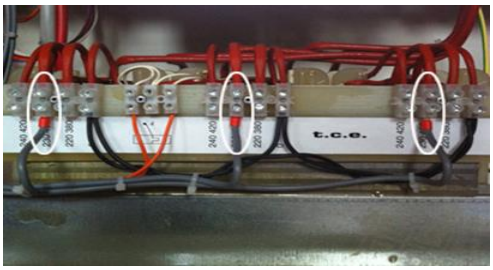
PHASE 2: Let the top scroll backward for 15 mm to release it from the tracks and lift it upwards to remove it.

Remove the white front panel by lifting it upwards to have full access to the charger's power transformer.

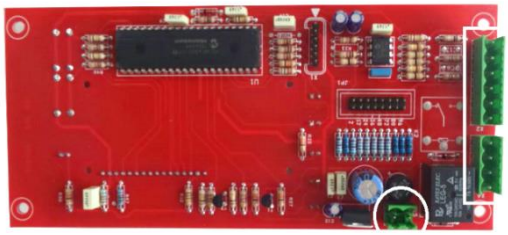


PHASE 4: As soon as you take off the top, it is possible to test the good condition of the power fuse, verify the lock of the bolts on the diode bridge and check the wiring of the power transformer.

It is also possible to check the conditions of the Auxiliary transformer and contactor and make sure the connection are properly fastened.

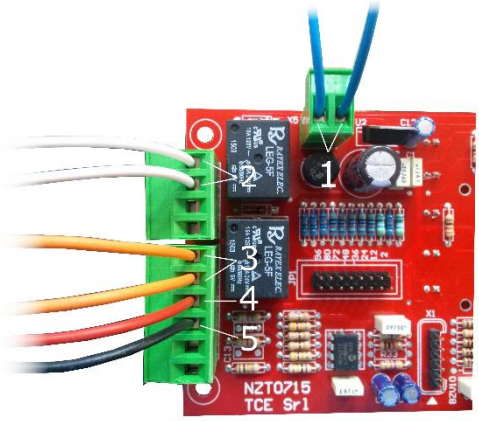


PHASE 5: When the charger is completely open, it is possible to test the operational status of the power transformer and adapt the input voltage to the network voltage (check the Network Linking section of this manual)



PHASE 6: It is possible to check the integrity of the motherboard and the proper insertion of its connectors.

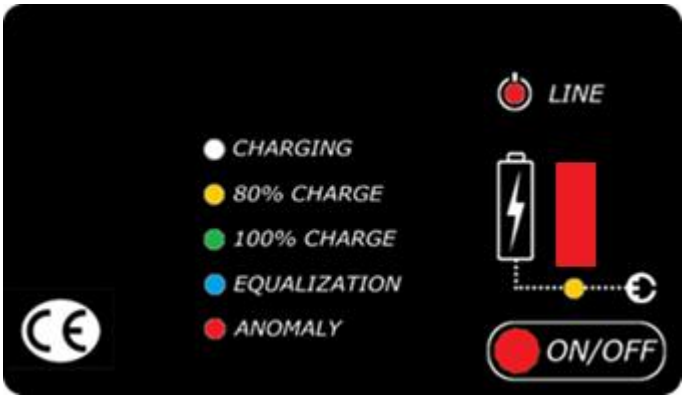
N.B.: When reassembling the Metal Panel, make sure that the connectors are properly fastened in their slots.



Control Card Wiring schematic

1) Blue cables x 2
2) White cables x 2
3) Orange cables x 2
4) Red cable
5) Black cable

FRONT PANEL OPERATIOANAL GUIDE (Box M)



When the battery charger is powered, the charger will run a quick test to check the integrity of the LEDs and the LED bar.

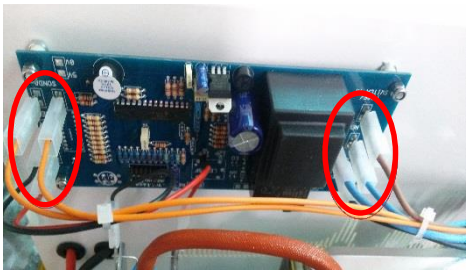
When the battery is connected, the yellow LED on top of the On/Off button will flash for a few seconds, the control card checks the battery conditions and then automatically starts the charge.
In case of interruption between the charger and the battery (unplug of connectors), the charger automatically stops.
To manually start or stop the charge, press the On/Off button.

All the LEDs are high intensity to offer a simple visualization of the charging status even from a certain distance.

HOW TO OPEN THE BATTERY CHARGER (Box M)

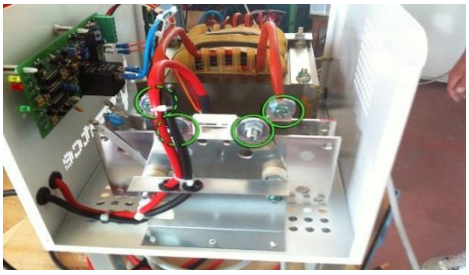
NOTE! The incorrect execution of the instructions or the fall of the devices could cause serious personal injuries and material damage. The opening is to be executed only by skilled technicians. Follow safety standards for security, reported in the user instruction of the battery charger.

PHASE 1: **Make sure that the supply cable and battery cables are not connected.**
Remove the 4 Phillips screws on the left and right side of the battery charger, as shown in the image. To optimize the operation, lay down the charger on a 6,5cm high stand, which will hold the bottom in its position as soon as the top part is lifted.

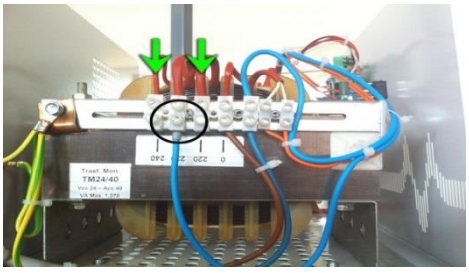


PHASE 2: It is possible to check the integrity of the motherboard and if the supply connectors are properly plugged in, as shown in the image it is possible to check if the “ON/OFF” button connectors are properly plugged.

N.B.: During the reassembling of the bottom make sure the connectors are reinserted properly in their slots.



PHASE 3: Once the top is lifted is possible to: test the quality condition of the power fuse and verify if the bolts on the diode bridge are tight or loose. In case of loose screws tight them.



PHASE 4: It is also possible to check the current of the power transformer (220V, 230V, 240V) and to adapt the input voltage to the output one. As shown in the example in the “Network linking” section.

WARRANTY TERMS

This battery charger is manufactured according to basic standards that assure its good quality. Our skilled technicians check every assembling phase.

The warranty is recognized only in case of anomalies caused by bad manufacturing or components. Complaints recognized under warranty terms cause the restoration or the replacement with an identical product, without expense, provided that the device is brought to the supplier's site.

Anything else that is not mentioned above won't be considered (ex. material or moral damages, stop of devices, ...)

Warranty duration is 24 months after the first use of the product or after 24 months of the date of the Commercial invoice. The warranty duration can be extended up to 60 months under request.

Warranty duration is calculated according to a standard 12 hours/day job; if the battery charger is exposed to a double turn shift, the duration is proportionally reduced.

Warranty is immediately revoked in these cases: modification without permission, illegible serial number, and malfunctions caused by natural events, corrosive or damaging environment for electric circuits, unusual impact, delivery damage and misuse.Shipment cost is not refunded unless the anomaly or malfunction of the device is caused by bad manufacture or problem related to the components.

The manufacturer can modify and update its devices, without noticing to the customers, but guaranteeing replacement parts for the older models.

Restorations or replaced parts are guaranteed for 6 (six) months.

The buyer agrees with the terms of warranty.

Relating to the manufacturer's responsibility, it would be subjected to obligations on its products only if the technician would correctly execute user instructions and if the user would observe with scrupulousness the instructions found in the technical manual enclosed to the battery charger.

DICHIARA sotto la propria responsabilità che il prodotto : DECLARES under his own responsibility that the product:	Caricabatterie 50Hz 50 Hz Battery Charger
Realizzato per la ricarica di : Realized to charge:	Batterie trazione Traction Batteries
Per uso in ambiente : To be used in environment:	Industriale Industrial
Completo di : Including:	Controllo elettronico Electronic control

MODEL_____/_____/_____SERIAL NR._____YEAR_____

DICHIARA in oltre che questo prodotto è conforme ai requisiti essenziali di sicurezza delle seguenti ulteriori direttive CEE

Also **DECLARES** that this product complies with basic safety requirements of the following CE directives

CEE 73/23 – 93/68 – 89/336
CEI EN 50065-1 CEI EN 50081-2 CEI 70-1 CEI 14-4