

# Dichiarazione di conformità / Declaration of conformity

Il sottoscritto / The undersigned **Valentino Mattiazzo**

In qualità di legale rappresentante della ditta / As legal representative of the company **TCE Group S.r.l.**

con sede in Sede / located in: Via G. Di Vittorio 5/9 - 35046 - Borgo Veneto (PD)

Partita IVA / VAT Nr.: 04458670280

*Dichiara che il prodotto **Caricabatterie** con le seguenti specifiche  
Declares that the product **Battery Charger** with the following specifics*



**Etichetta prodotto**  
**Product label**

È stato costruito rispettando le seguenti direttive e norme:

It was built in compliance with the following directives and standards:

- Direttiva 2014/35/UE nota come "Direttiva bassa tensione" (per gli aspetti di sicurezza) / Directive 2014/35/UE known as "Low voltage directive" (for safety aspects)
- Direttiva 2014/30/UE nota come "Direttiva compatibilità elettromagnetica" / Directive 2014/30/UE known as "Electro-Magnetic compatibility"
- Direttiva 2011/65/CE nota come "RoHS" / Directive 2011/65/CE known as "RoHS"
- Direttiva 2009/125/CE relativa all'istituzione di un quadro per l'elaborazione di specifiche per la progettazione ecocompatibile dei prodotti connessi all'energia / Directive 2009/125/CE regarding the establishment of a framework to elaborate specifics for the eco-compatible development of products related to energy
- Direttiva delegata (UE) 2015/863 della commissione del 31 marzo 2015 recante modifica dell'allegato II della direttiva 2011/65/UE / Delegated Directive (EU) 2015/863 to the commission of 31 March 2015 amending Annex II of Directive 2011/65 / EU
- Direttiva 2012/19/UE nota come "RAEE" / Directive 2012/19/UE known as "RAEE"
- Direttiva 2001/95/CE nota "Sicurezza generale dei prodotti" / Directive 2001/95/CE known as "General safety of the products"
- Norma IEC 61882:2016 metodo di analisi dei rischi secondo il metodo HAZOP / Standard IEC 61882:2016 risk analysis method according to the HAZOP method
- Norma IEC 61511-1:2016 Sicurezza funzionale - - Sistemi di sicurezza strumentati per il settore dell'industria di processo - Parte 1: Quadri, definizioni, requisiti di sistema, hardware e di programmazione dell'applicazione / Standard IEC 61511-1:2016 Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements
- UNI EN ISO 7010:2017 Titolo: Segni grafici - Colori e segnali di sicurezza - Segnali di sicurezza registrati / UNI EN ISO 7010:2017 Title: Graphic signs - Colors and safety signs - Registered safety signs
- EN 60 60335-2-29: 2016 - Sicurezza degli apparecchi elettrici domestici e simili Parte 2: Requisiti particolari per caricabatterie / EN 60 60335-2-29:2016 - Safety of household and similar electrical appliances Part 2: Particular requirements for battery chargers

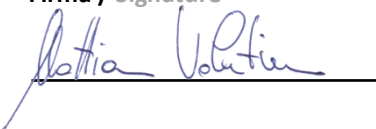
Ed è quindi conforme alle direttive e normative vigenti / And therefore it complies with the directives and regulations in force.

La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante / This declaration of conformity is issued under the sole responsibility of the manufacturer.

**Luogo e data / Place and date**

Borgo Veneto, 28/10/2020

**Firma / Signature**







# INSTALLATION, USE AND MAINTENANCE MANUAL

## KRONOS Series Battery Charger



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## Section 1

**Declaration of conformity**

**Producer information**

**Documentation information**

**Attached documentation**

## DECLARATION OF CONFORMITY

The KRONOS Series described in this documentation is sold together with the declaration of conformity, drawn up in compliance with the laws in force on the European territory.

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### NOTE

*BEFORE USING THE DEVICE IN ANY FORM, CHECK THE PRESENCE OF THE DECLARATION OF CONFORMITY.*

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### NOTE

*IF THE DEVICE IS GIVEN TO A THIRD PARTY, ALL THE DOCUMENTATION MUST BE GIVEN TOGETHER WITH IT.*

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## PRODUCER INFORMATION

<b>Company Name</b>	TCE Group S.r.l.
<b>Head Office</b>	Via G. di Vittorio 5/9 – 35046 Borgo Veneto PD
<b>VAT Nr.</b>	04458670280
<b>Office Telephone</b>	+39 0429/89290

## SERVICE CENTER

The authorized assistance on the KRONOS Series is performed directly by TCE Group S.r.l. or by a qualified technician appointed by the same.

## PRESENTATION

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### NOTE

*UPON DEVICE RECEIVAL, BEFORE PERFORMING ANY OPERATION, READ THIS MANUAL CAREFULLY.*

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This manual contains instructions for the installation, configuration, use and maintenance of the KRONOS Series. The manual is made up of various sections, each of which deals with a series of topics, divided into chapters and paragraphs.

The summary lists all the topics covered in the entire manual. The numbering of the pages is progressive and each page shows the number of the same. This manual is intended for the user responsible for the configuration, use and maintenance of the KRONOS Series and relates to its technical life after its production and sale.

In the event that it is transferred to third parties for any reason (sale, loan for use, or any other reason), the device must be delivered complete with all its documentation.

**Before starting any operation it is necessary to have at least read the entire manual and then studied the topic relating to the operations to be carried out in depth.**

This manual contains proprietary information and cannot be partially supplied to third parties for any use and in any form, without the prior written consent of the company TCE Group S.r.l ..

TCE Group S.r.l. declares that the information contained in this manual is congruent with the technical and safety specifications of the KRONOS Series to which the manual refers.

Certified copy of this manual is filed in the technical file of the device, kept at TCE Group S.r.l ..

TCE Group S.r.l. does not recognize any documentation that has not been produced, issued or distributed by itself or by its authorized representative.

This manual, same as the technical file, will be kept by the manufacturer for the period required by law (10 years).

During this period, a copy of the documentation accompanying the product may be requested when purchased.

The entire technical file remains available for this period exclusively for the control authorities, who may request a copy.

After this period, it will be an obligation and care of whoever manages the product to make sure that both the product and the documentation comply with the laws in force at the time of the inspection.

## Graphic Conventions

In order to obtain a more immediate understanding of the topics, the graphic and typographic symbols and conventions described below have been adopted in the manual.

### Warning graphic conventions



#### NOTE

*NOTES CONTAIN IMPORTANT INFORMATION, HIGHLIGHTED OUTSIDE THE TEXT TO WHICH THEY REFER*



#### WARNING

*WARNING INDICATIONS INDICATE THOSE PROCEDURES WHICH TOTAL OR PARTIAL NON-COMPLIANCE MAY CAUSE DAMAGE TO THE DEVICE, ITS COMPONENTS AND MAY EXPOSE PEOPLE TO DANGER.*



#### DANGER

*THE DANGER INDICATIONS INDICATE THOSE PROCEDURES WHICH A TOTAL OR PARTIAL NON-COMPLIANCE MAY CAUSE DAMAGE OR INJURY TO THE HEALTH OF PEOPLE. SERIOUS DAMAGE TO THE DEVICE.*

### Pictograms

Nel dispositivo sono presenti i seguenti pittogrammi:



Electrocution Danger



Generic Danger



Obligation to read the manual



#### WARNING!

Pictograms that perform a safety function **must not** be removed, covered or damaged.



**ATTACHED DOCUMENTATION**

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**NOTE**

*BEFORE USING THE DEVICE, CHECK THE PRESENCE OF ALL THE ATTACHED DOCUMENTATIONS.*

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**NOTE**

*IF IT IS GIVEN TO A THIRD PARTY, ALL THE DOCUMENTATION OF THE DEVICE MUST BE DELIVERED WITH IT.*

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## Section 2

**Warranty**

**General safety rules**

**Technical specifics**

**Intended and unintended use**

**Residual risks**

## WARRANTY

The warranty rules, listed in full in the purchase contract, are valid only if the device is used in the conditions of intended use.

With the exception of the interventions described in **section MAINTENANCE** and performed with the procedures indicated, any repair or modification made to the KRONOS device by the user or by unauthorized companies will invalidate the warranty.

The warranty does not extend to damage caused by inexperience or negligence in the use of the device, or by bad or omitted maintenance.

### The warranty covers the products sold by us only and exclusively under the following conditions:

- 1) The warranty is valid for a period of 12/24 months depending on the legal nature of the customer.
- 2) The manufacturing company decides to replace, at its own discretion, the malfunctioning or incorrectly manufactured parts, only after a careful control and verification of incorrect assembly.
- 3) The transport and/or shipping costs for the repair or replacement of the product are always charged to the buyer.
- 4) During the warranty period, the replaced products become the property of the manufacturer.
- 5) Only the original purchaser who has complied with the ordinary maintenance instructions contained in the manual can benefit from this guarantee. Our warranty liability expires when the original owner relinquishes ownership of the product, or changes have been made to the product.
- 6) The warranty does not include damage resulting from excessive stress such as the use of the product after finding an anomaly, the use of improper operating methods as well as the failure to observe the instructions for use and maintenance.
- 7) The manufacturer assumes no responsibility for any difficulties that may arise in resale or use abroad due to the laws enforced in the country in which the product was sold.
- 8) The defective product or part of the product will not be replaced without proof of purchase (invoice, copy of payment); otherwise the replaced part will be charged to the buyer.
- 9) The warranty does not respond if there is tampering with the power plug (if it is already present in the device)

**Notice:** if it is deemed necessary to use the warranty, please indicate the following information:

- Type / Version
- Purchase date (presentation of the purchase document)
- Detailed description of the issue



### NOTE

*FAILURE TO COMPLY WITH THE METHODS OF INTERVENTION AND USE OF THE DEVICE DESCRIBED IN THIS DOCUMENTATION WILL LEAD TO THE FOREIGNMENT OF THE WARRANTY TERMS.*

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## GENERAL SAFETY RULES

### Warning

On our site you can find all the documentation required by law for the sale of this product, if you wish to receive it in printed format, you can request it to our customer service.

If part of the documentation is partially missing or even illegible, consult TCE Group S.r.l. before performing any further operation on the device. On the TCE Group S.r.l. website you can find and download a copy of the installation/use and maintenance manual of our products.

This chapter describes the general safety rules to be observed during any operation performed with the device. The intervention procedures, described in the following chapters, must be carried out in compliance with both the methods of execution indicated and the general safety rules of this chapter.

**The safety rules and the configuration, use and maintenance procedures indicated in this document are also a complement to the general workplace safety rules that must be respected.**

Different nations may have different safety regulations. It is therefore specified that in all cases in which the documentation standards are in conflict or reductive with respect to the standards of the country in which the KRONOS Series is used, the standards of the country will in any case have priority over those in the documentation.



### NOTE

*THE MANUFACTURER CANNOT BE HELD IN ANY CASE LIABLE FOR ACCIDENTS OR DAMAGES RESULTING FROM THE INAPPROPRIATE USE OF THE DEVICE, AS WELL AS EVEN PARTIAL NON-COMPLIANCE WITH THE SAFETY RULES AND INTERVENTION PROCEDURES DESCRIBED IN THE DOCUMENTATION.*

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Failure to comply with the rules of use and the methods of intervention, configuration, use and maintenance of the KRONOS Series contained in the manual also results in the cancellation of the warranty terms.

### Safety Rules

During the configuration and subsequent use of the KRONOS series, incorrect operating situations may occur that are not foreseen by the documentation. These completely anomalous situations can sometimes be caused by environmental factors or by fortuitous failures not foreseeable by the manufacturer.

The manual must be kept by the user and/or by the personnel responsible for handling, maintaining and using the device.

In the event of deterioration or loss, a certified copy may be requested by the customer to the manufacturer. We suggest that you keep a security copy in a place where it cannot be damaged or lost.



### WARNING

*BECAUSE IT WOULD BE IMPOSSIBLE TO DESCRIBE ALL THE OPERATIONS THAT SHOULD NOT OR CANNOT BE PERFORMED, IT IS DEEMED THAT ALL THE OPERATIONS (OTHER THAN NORMAL USE) THAT ARE NOT EXPLICITLY DESCRIBED IN THE MANUAL PROVIDED WITH THE DEVICE, ARE NOT TO BE PERFORMED.*

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## DESCRIPTION and INTENDED USE

The KRONOS series identifies a series of battery chargers produced by TCE Group S.r.l. in collaboration with POLAR S.r.l. whose main feature is the Touch display. The device allows viewing through the display. In some models a LED has been installed that allows you to understand the state of the charge based on the color. Each device allows the selection between two battery voltages and cannot be adapted to any voltage that does not correspond to the plate data. The intended use is industrial, particularly in the material handling sector.

## TECHNICAL DATA

Mechanic data	
Dimensions (mm)	Ref. Pag. 14
Weight (kg)	Ref. Pag. 14
Grado di protezione	IP21
Electrical data	
Power Supply (V)	Ref. device serial number label
Frequency (Hz)	50/60
Absorbed current (A)	Ref. device serial number label
Power (W)	Ref. device serial number label
Electrical safety class	Class I – grounded
Cable	Ref. Pag. 14
Connectors	DC Not included

The charger is equipped with several safety devices to ensure reliable and safe use.

The safety devices are used to protect the battery, the charger and the surrounding environment.

The control board offers safety on the charging cycle, as it monitors the various charging phases making sure that the recorded and read values are always within an optimal range for the connected battery.

The fuse installed inside the device offers protection against short circuit and reverse polarity.

All TCE Group S.r.l. devices are equipped with different timers to provide reliability during nighttime charges or during weekends.

## UNINTENDED USE

No use other than those described in the **DESCRIPTION** and **INTENDED USE** paragraph is allowed.

It is also absolutely forbidden:

- The use of the device with power supply networks other than those supported (*see Technical data*).
- The use of the device for applications that differ from those indicated.
- Tampering with the components of the device (hardware).
- Use the device with incompatible accessories.
- Use the device to recharge batteries other than lead-acid ones for traction and semi-traction.
- Use the device without installing the DC plug

The reuse of any unit after decommissioning the device relieves the manufacturer of any liability arising from the use of the same.



## NOTE

*THE MANUFACTURER CANNOT BE HELD IN ANY CASE LIABLE FOR ACCIDENTS OR DAMAGES RESULTING FROM UNINTENDED USE OF THE DEVICE. ANY UNINTENDED USE ALSO LEADS TO THE TERMINATION OF THE WARRANTY TERMS COVERAGE.*

## DATA SHEET

Modulo	Disegno	Dimensions L x P x H	Peso KG	Watt	Assorb. Max	Sezione Cavo DC
K1		225 x 125 x 155	3,67	750W	3,3A	K10 - 6mmq
K3		301 x 118 x 175	K20 - 5,0 K50 - 5,3	2200W	9,5A	K20 - 10mmq K50 - 10mmq K70 - 10mmq
K3/M		301 x 119 x 175	4,2	1000W	4,3A	K77 - 10mmq
K5		432 x 138 x 322	12,0	4200W	18,2	K60 - 25mmq K80 - 16mmq
K6		470 x 200 x 350	23,3	9000W	13,1	K900 - 35mmq K950 - 35mmq K980 - 25mmq
K7		537 x 155 x 325	18,0	6000W	10,2	K930 - 25mmq K1280 - 25mmq

## Residual risks

In the development phase TCE Group S.r.l. carried out a deep risk analysis on the system in question.

From this analysis, risks that cannot be eliminated due to their nature emerged. These risks have therefore been examined individually and in this manual the guidelines on how to avoid them have been emphasized. It is therefore important that any user responsible for configuring, using and maintaining the KRONOS Series, has previously read the manual.



### NOTE

*THE MANUFACTURER CANNOT BE HELD IN ANY CASE LIABLE FOR ACCIDENTS OR DAMAGES RESULTING FROM UNINTENDED USE OF THE DEVICE, AS A RESULT OF USER NEGLIGENCE*

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In particular:

- It is absolutely forbidden to make any modifications to the KRONOS Series. Any damage to people, animals or things resulting from the use of the device improperly modified by an unauthorized operator relieves the manufacturer from any responsibility.
- Keep this manual carefully, as it is necessary for a correct and safe use of the KRONOS Series. Periodically check the status of the label applied to the product and restore it if it is damaged. (in case contact the service center)
- If the external structure of one of the components of the KRONOS Series has sharp corners or edges following an accidental impact, such as to make it dangerous, or to doubt the degree of the IP protection, it is necessary to contact the service center and follow their instructions.
- Use only products with compatible devices as indicated in this document.

### Important:

- Do not wet the electrical connections of the device with water or other liquids.
- Proceed with caution during the installation phases to avoid damaging the device.
- The installation must be optimally performed by specialized personnel.
- The electrical connection to the existing system must be performed by qualified personnel in accordance with the laws and regulations in force.
- The power supply line must have cables with an adequate section evaluated on the basis of the serial number label plate, and in any case not less than 1.5mm<sup>2</sup>.
- Do not power at a voltage different from that indicated on the serial number label plate.
- The device must be separated from any heat source (such as lighting appliances and fireplaces) or other types of chargers or any other object that may emit harmful substances.
- Make sure that the DC cables are complete with plug and always raised from the floor even when the device is NOT operating
- Make sure the DC cables do not tangle causing damage to their own integrity.

### OPERATIONS INVOLVING RISKS FOR THE OPERATOR:

During the configuration and commissioning operations, comply with the general accident prevention regulations.

In particular:

- if you work on electrical parts, make sure they are not live.

Already in the development phase, solutions have been adopted to ensure safe use of the device at all stages of use: transport, assembly, adjustment, use and maintenance. However, not all possible risks for operators and the environment have been eliminated, both for technological reasons (reliability of the devices) and for management (excessive difficulties in elimination), consequently the residual risks present are reported.

Any improper use of the device can cause:



- Injury or death to the user or to third party persons
- Damage to the device and/or to other material or assets belonging to the company where the device is located
- Damage to the environment surrounding the device
- Inefficient and non-compliant operations with the normal operating status of the device

The personnel involved in the use of the device must:



- Have a qualification in the use of electrical/electronic equipment
- Read the manual carefully to understand the correct operation of the device
- Comply with the safety regulations listed below
- Use the correct tools when repairing faults or during simple device maintenance

In case of further signs or notifications applied on the device for safety reasons, they must be:

- In a readable and understandable state for all
- Do not be damaged
- Not to be removed
- Do not cover existing writings or signs
- Do not be covered by other signs / stickers or colored with paint or color of any kind



## Section 3

**Installation location**

**Handling**

**Installation and connection**

**Use**

## WARNINGS

When handling and installing the product, it is necessary to provide for the use of personal protective equipment (PPE) such as:

### - Clothing:

Complies with the essential safety requirements in force to protect against minor mechanical damage.

### - Gloves:

Operating in areas with voltage and live parts, it is necessary to use CE-marked gloves as PPE that protect against all the risks just analyzed.

### - Safety shoes with non-slip sole:

They are necessary in all works where there is a risk of a potentially dangerous piece falling.

### - Safety goggles:

They are necessary in all works where there is a danger that an object and/or material could be thrown into the eyes of an operator.



## UNPACKING INSTRUCTIONS

The device is delivered in a cardboard box. Inside the box you will find:

- Device complete with power cord and DC cable
- Instruction manual
- Any compliant accessories if requested by the customer when ordered
- Wall mounting brackets and fischer screws

## INSTALLATION LOCATION

It is good to keep in mind some aspects before proceeding with the handling, installation and subsequent use of the device. In particular, it is necessary to check some factors:

- The product storage area must be chosen so that it cannot be hit by water, steam jets and corrosive acids. It must never be subjected to atmospheric agents before installation.
- It must be fixed on a linear surface.
- Temperature range of use -30 ° C to +65 ° C
- Storage temperature range -40 ° C to + 95 ° C
- Maximum relative humidity conditions of the air:
  - Up to 80% non-condensing during storage;
  - Up to 95% in use;
- The device can be installed both indoors, provided they are well ventilated, and outdoors.
- Altitude up to 2000mt

## HANDLING

It must be kept in mind that, even if carefully protected and packaged, the device must be considered and handled with care and attention.

Before moving the device, check the integrity of the device and its parts. If you find any damage, lack, deformation or traces of collisions, notify the authorized assistance service before proceeding with the following operations.

### Manual handling

The weight of the assembled device is indicated in this manual.

The assembled device, given its weight and dimensions, can be moved manually.

## INSTALLATION AND CONNECTION

The product has been developed, manufactured and tested to meet all specific standards (see the declaration of conformity), if installed and connected in a proper manner.

All the products are tested and configured by the manufacturer before shipping and delivery to the customer.

If the installation, use and/or maintenance of the device are not carried out in a proper manner, anomalies may occur during operational use, and safety problems may also occur. Inappropriate installation and maintenance will void the warranty terms.



### WARNING

*THE DEVICE CAN ONLY BE OPERATED AFTER IT HAS BEEN INSTALLED CORRECTLY.*

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Before installing, connecting and operating the device, completely remove any protection from dust or humidity and any packaging material.

#### Preliminary checks

##### Check for any damage

Check that the various parts of the device do not show physical damage due to shocks, tears or abrasions.

Check in particular:

- That the cables are not damaged/ruined/cut
- That the device is not damaged/ruined/cut.
- That the power plug (if present) is not damaged or ruined

##### Damage Reporting Procedure

If any damage is found, interrupt the procedure in progress and report the nature of the damage to the manufacturer's customer support office.

#### Installation

To install the product, proceed as follows:

1. Remove it from the packaging, making sure to remove all protections (inserted in order to protect the device from dust and humidity and/or anything else that may occur during transport)
2. Proceed to a visual check of the integrity of the charger and all its connected parts
3. Proceed with the installation of the DC connector (ensuring compatibility with the battery)

#### Preparation

- Make sure the power and charging plugs are installed. If not, contact a specialized technician to install the properly sized connectors for the device and the power supply network
- Make sure that the DC and AC charging cables are in perfect condition before proceeding with the installation
- Make sure that the mains socket into which the device will be connected is properly grounded and protected by adequate safety measures
- Make sure that the device is suitable for the connected battery (check serial label)
- Make sure that the device is positioned in a place suitable for its purpose that does not lead to accidental fall and possible damage.
- Avoid placing the device in areas with sparks and/or flames as the battery generates explosive gases during the charging process
- Make sure the battery cells are in good condition and that there are no short circuits
- Make sure there are no objects on top of the battery cells before starting the charging cycle
- Make sure that ordinary maintenance of fan and filters cleaning (every 6 months) has been carried out. Otherwise, proceed with cleaning the fan and filters (with the charger not powered) to ensure optimal ventilation and heat dissipation
- It is recommended not to use and unplug the device during heavy thunderstorms

## Electric Connection

- Connect the charger to the battery before connecting it to the power outlet
- Make sure the AC plug is properly connected to the AC outlet
- Check that the cables are properly connected to the contacts of the DC connector
- It is recommended to use bi-polar connectors suitable for the charging purpose to avoid the possibility of reverse polarity on the battery.

## USE

### Problems

If any unexpected and dangerous anomaly occurs during a start-up and use phase of the KRONOS Series, it is recommended to follow the procedure below:

- Switch off the device
- Wait 5/10 minutes for complete cooling
- Try the device again
- If the problem persists, switch off the device and contact the service center.

In the event that unforeseen electromagnetic anomalies occur after powering or turning on the KRONOS device, such as the inability to communicate via phones or smartphones, it is recommended to follow the following procedure:

- Check the proper installation and configuration of the device
- if the malfunction persists, disconnect the power supply and immediately contact service center.



Before starting a normal charge cycle, also check the condition of the battery:

- Make sure there is no dirt or tools resting on the cells
- Make sure it is in good condition
- Make sure there are no short circuits or bad/broken cells
- Check the fluid level (in the case battery type requires it) before each charge
- Check the status of the connection plug with the battery charger (make sure that the contacts inside the plug are in optimal conditions)



An electric shock can be fatal, to avoid electric shocks while using the device:

- Do not touch any exposed cables inside the device or connected directly to it
- NEVER touch the poles of the battery connected to the device
- Do not short-circuit the device cables or the charging plug

The batteries charged by our device contain acid which is very harmful to health and can cause eye or skin problems in case of direct contact.

In case of direct contact with acid, rinse immediately with water and seek medical advice.

TCE Group S.r.l. always recommends wearing personal protective equipment when carrying out maintenance operations on both the battery and the battery charger.

During normal operation of the device, gases and vapors are released from the battery and can cause health problems. These gases and vapors are also highly explosive.

For proper use of the device, a well-ventilated environment is required to prevent the accumulation of these gases and avoid the danger of explosion.



Charging stations with less than 4% of hydrogen in the air are considered safe against explosions caused by this gas. Good ventilation ensures a safe and reliable working environment for charging operations.



During charging, TCE Group S.r.l. recommends keeping a distance of AT LEAST 120cm between the battery charger and the battery and keeping at a safe distance any object that could cause or be a source of sparks or flame.

To avoid problems or damage caused by gas, steam or acid, TCE Group S.r.l. recommends:

- Do not disconnect the charging plug while charging
- Do not breathe the gas or vapor released by the battery during charging
- Make sure that the battery is in a well-ventilated area when charging
- Avoid and prevent short circuit in battery
- Do not place any tools on top of the battery while charging

While the device is in operation, it is recommended that all unauthorized personnel is kept away from the charger. In case of people near the device during a charging cycle, TCE Group S.r.l. recommends:

- Warn them about the various dangers caused by the device in operation (gas, dangers of electrocution and charging currents, electromagnetic fields, etc. etc.)
- Provide immediately personal protective equipment (ex. Gloves, protective helmets, etc. etc.)
- Try to avoid direct contact between the device and unauthorized personnel

## Use procedures

- Once the battery is connected to the charger, if the battery voltage is within a predetermined range, charging will start automatically
- The front LED light will flash RED to indicate that the battery is connected and the battery charge status is below 80%. Above 80% the YELLOW light will start flashing. Upon reaching 100% the GREEN light will start flashing and it will be possible to disconnect the device from the battery
- When the battery is fully charged, the charging process will be automatically interrupted
- In case of values outside the preset range or if the device reaches the completion of the safety timer, the charge will be automatically interrupted
- In the event of a blackout during the charging phase, the charger will automatically resume the cycle when the blackout is over

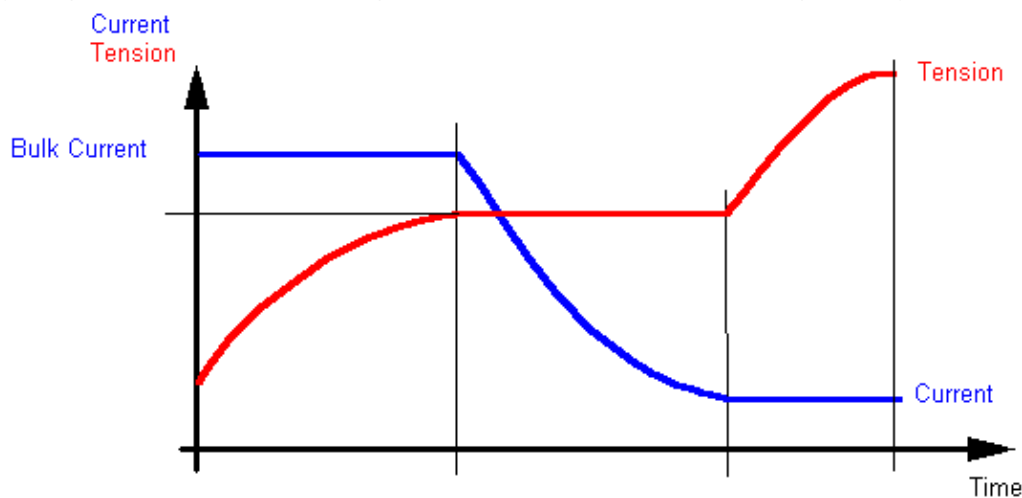
Charging curves

The standard curve installed inside the NEOS Series battery chargers is divided into different stages.

In each stage the charging current is subject to a predefined variation based on the type of battery (Lead, AGM, GEL, etc). Any special curves are agreed in advance with the technical department.

The stages of the standard charging curve are:

- S1 - The current rises slowly (soft start) until the maximum nominal current is reached
- S2 - The maximum nominal current is kept constant until the voltage required by the type of battery is reached (ex. 2.4V/Cell in case of lead acid batteries)
- S3 - Upon reaching the predetermined threshold, the current drops to 2/3 of the maximum nominal current until the second predetermined threshold is reached (ex. 2.55V/cell in the case of lead acid batteries)
- S4 - Upon reaching the second pre-set threshold, the current drops to 1/3 of the maximum nominal current until reaching the final voltage based on the type of battery (ex. 2.68V/Cell in the case of lead batteries)
- S5- The battery charger maintains constant voltage and varies the current until the charge is completed



Final charging voltages

<b>Battery Type</b>	<b>Final charging voltage</b>
Lead Acid "heavy duty"	2,68 V/cell
Lead Acid "light duty"	2,4 V/cell
GEL	2,35 V/cell
AGM1	2,38 V/cell
AGM2	2,45 V/cell

LED Visualizations

<b>LED Color</b>	<b>Color pattern</b>	<b>Status</b>
	LED is off	The charger is off
	Breathing blue	Waiting for battery connection
	Red still	Charging cycle in Bulk phase (0-80%)
	Yellow still	Charging cycle in ABS phase (80-100%)
	Green still	Charging cycle in floating (Equalization not active)
	Blue still	Equalization

	Purple still	Desolfatazione
	Flashing Red	Anomaly (check display for error code)

### Troubleshooting

Given the complexity of the machine, it is advisable in case of problems, to contact an authorized dealer or directly TCE Group Srl.

Below is a data sheet of the main error codes that may occur.

<b>Display</b>	<b>Description</b>	<b>Cause</b>
T sens 1	Primary temperature probe anomaly	Possible breaking of the probe / Disconnection of the FLAT cable of the control card
T sens 2	Secondary temperature probe anomaly	Possible breaking of the probe
Tfr Sens	Transformer temperature probe anomaly	Possible breaking of the probe
Time out	Timeout during the Bulk phase (0-80%)	Battery could be damaged or wrong voltage
Warning Memory	Error during writing/reading of the memory in the microprocessor	Anomaly in the microprocessor

# Section 4

## Maintenance

### Disposal



## MAINTENANCE

### Safety

In system maintenance operations it is necessary to provide for the use of personal protective equipment (PPE) such as:

**- Clothing:**

In compliance with the essential safety requirements in force in the workplace in which it will be used.

**- Gloves:**

Operating in areas with loads, moving mechanical parts, live parts and parts that can reach high temperatures, it is necessary to use CE marked gloves as PPE that protect against all the risks just analyzed.

**- Safety shoes with non-slip sole:**

They are necessary in all works where there is a risk of a piece falling.

**- Safety goggles:**

They are necessary in all works where there is a danger that an object, material, liquids, can be thrown into the eyes of an operator.



Maintenance operations must be carried out by personnel who have previously read the manual.

Any type of cleaning or physical maintenance must always be carried out with the device switched off and disconnected from the power supply. When carrying out these operations, strictly follow the instructions given in this manual.



## DANGER

*DISCONNECT THE DEVICE FROM THE POWER SOURCE BEFORE PERFORMING ANY CLEANING OR PHYSICAL MAINTENANCE.*

The lighting system (natural and/or artificial) of the area where maintenance operations are carried out must ensure the following minimum illuminance values: 200 lux. For any maintenance and cleaning operations, in addition to the instructions contained in this manual, the general safety standards and, if necessary, the general safety standards at work in force in the place where these operations are carried out must be observed.

### Periodic maintenance

It is necessary to periodically clean the device, in particular to check that the fan blades and the cooling fins, from any accumulation of dust and dirt, which may have formed on the external surface (operation that involves removing the fan cover). If necessary, use a compressor to blow the dust, in particular on the filter if installed on the device. You can also use a non-abrasive damp cloth that is free of alcohol or aggressive solvents. Do not use abrasive sponges, chemical solvents or detergents. During cleaning, avoid water touching internal electrical parts of the device.

### Extraordinary Maintenance

Extraordinary maintenance is required in case of failures or breakages, unforeseeable accidents or inappropriate use of the device. The situations that can arise from time to time are completely unpredictable and therefore it is not possible to describe appropriate intervention procedures.

If necessary, consult the manufacturer's service center to receive the appropriate instructions for the situation.

**All interventions, mechanical, electrical and electronic, ordinary or extraordinary, must in any case be carried out by specialized and authorized personnel or by our service center personnel**

## DECOMMISSIONING

### Device deactivation

The device is manufactured and built according to criteria of robustness, durability and flexibility that allow it to be used for many years. Once it has reached the end of its technical and operational life, it must be put out of service in conditions where it can no longer be used for the purposes for which it was designed and built at the time, making it possible to reuse the raw materials that constitute it.

The same deactivation procedures must be observed in all the following cases:

- Decommissioning of the device and storage in warehouse.
- Final disposal.

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### NOTE



*THE MANUFACTURING COMPANY DOES NOT ASSUME ANY LIABILITY FOR DAMAGES TO PERSONS OR THINGS RESULTING FROM THE REUSE OF SINGLE PARTS OF THE DEVICE FOR FUNCTIONS OR IN ASSEMBLY CONFIGURATIONS DIFFERENT FROM THE ORIGINAL ONES.  
THE MANUFACTURING COMPANY REJECTS ANY ACKNOWLEDGMENT, IMPLIED OR EXPRESS, OF ELIGIBILITY FOR A SPECIFIC PURPOSE OF PARTS OF THE DEVICE REUSED AFTER THE DEFINITIVE DEACTIVATION FOR ITS DISPOSAL.*

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### Disposal

The possibility of reusing some parts of the device is subject to the total responsibility of the user.

The label shows the symbol indicated in Legislative Decree no.49 of 14 March 2014 which transposes Directive 2012/19 / EU, which indicates the need to dispose of the product in differentiated waste, specifically in waste of electric and electronic type. Refer to the waste collection center located in your area. Specific symbol:



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### NOTE



*THE MANUFACTURER IS NOT RESPONSIBLE IN ANY WAY FOR DAMAGES CAUSED BY THE DEVICE IF NOT USED IN THE INTEGRAL VERSION AND FOR THE USES AND METHODS OF USE SPECIFIED IN THIS MANUAL.  
THE MANUFACTURER IS NOT RESPONSIBLE IN ANY WAY FOR ANY DAMAGE TO PERSONS OR THINGS RESULTING FROM THE RECOVERY OF PARTS OF THE DEVICE USED AFTER ITS DISPOSAL.*

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