Operating Instructions

Part No.: 315 062 002 006
Date: 03 / 2023

Charger/Trickle-Charger

EL11

DC 24V 5A/ DC 24V 1A // AC 230 V 50-60Hz
DC 24V 10A / DC 24V 5A

Part No.: EL11.142 100

NATO Stock No: 6130-12-356-2760

Nortec Electronics GmbH & Co. KG
An der Strusbek 32 B
D – 22926 Ahrensburg
Tel.: 0049 / 4102 / 42002
Fax: 0049 / 4102 / 42840
Email: info@nortec-electronics.de
Web: www.nortec-electronics.de

Directory

1 Device Description

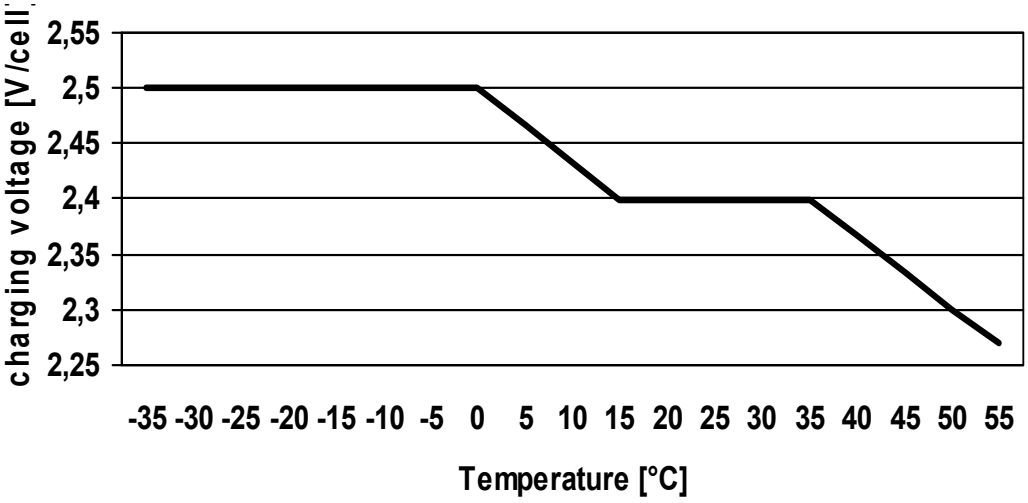
1.1 Area of application

The battery-charger and trickle-charger EL11 serves for the charging and trickle-charging of discharged partly-discharged and deep-discharged batteries from closed (open) or sealed Lead-Acid-batteries with 24V nominal voltage and nominal capacities between 45Ah and 500Ah. Lead-Acid-batteries with liquid electrolyte as well as sealed batteries in GEL- or AGM-technology can be charged. Alternatively the 5A-area or the 10A-area can be used. The device additionally can be used as constant voltage power supply with up to 10A. Based on the protection level (IP65) the charger can be used in closed shops as well as under shelters or in open air.

Picture 1:
EL11on transportation rack

NOTICE

The implemented version works - differently from the German VG requirements - with a temperature compensation performing the voltage correction parameters advised by the battery producers. This means even under extreme climatically circumstances optimum charging results are performed. Battery damages are reliably avoided. The following values of charging voltages are referred to an ambient temperature of 20°C.



Picture 2:
Temperature compensated charging voltage

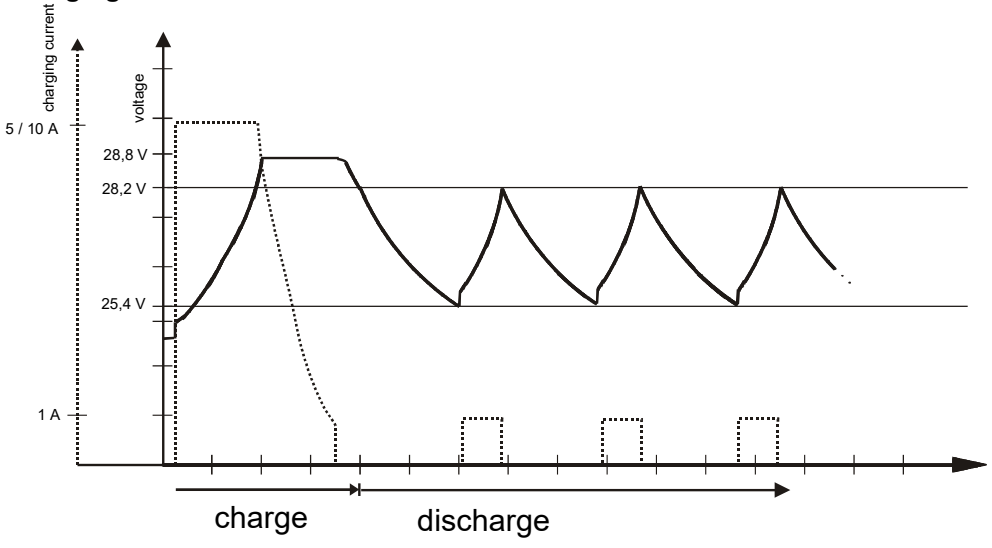
1.2 Functional sector 5A/10A

Charging area
- Pre-charge as a constant voltage charge with 28,8V until performing a charge current of 5A or 10A.
- Main charge section I as constant current charge with 5A or 10A until reaching a battery voltage of 28,8V
- main charge section U as constant voltage charge with 28,8V until charging current has decreased to 1A

1.3 Trickle-charging area 1A

The trickle-charging process starts per definition immediately after finishing the charging. The device supervises the battery until the voltage has decreased to 25,4V. This point is called lower threshold. At this point the trickle-charge current of 1A (constant) is switched on until the battery has reached the upper threshold of 28,2V. The device now waits for the off-load voltage to decline to 25,4V and the process starts again.

Charging curve functional sector 5A/10A



Picture 3:
Typical charging curve (partly discharged, closed lead acid batteries)

1.4 Technical data

1.4.1 Technical data EL 11

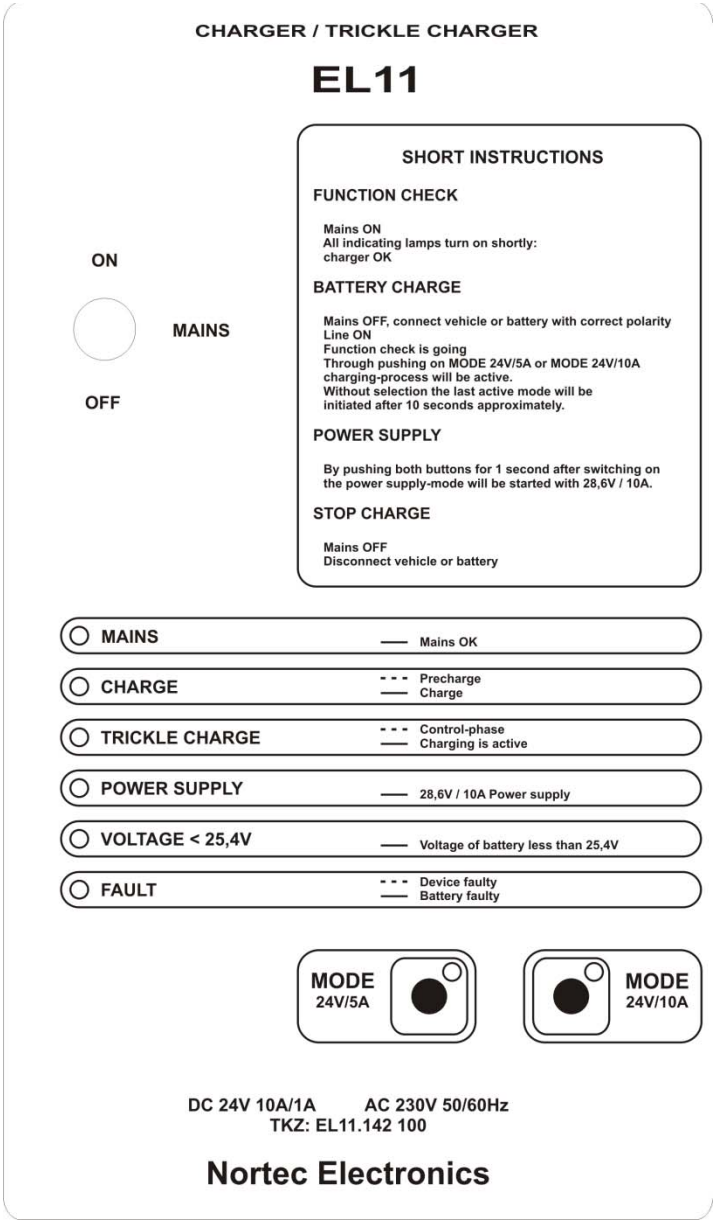
Type:	EL11
Part no.:	EL11.142 100.UK
Military requirement:	VG 96960 Part A and B
AC - voltage:	230 V ±10% / 50-60 Hz
Inrush power:	< 400VA (max.)
Output voltage:	max. 33VDC ±1% (device limit)
Output voltage pre-charge:	28.8V DC ±1% (constant voltage)
Output current main charge:	5A ±5% (constant current) / 10A±5% (constant current)
Output voltage main charge:	28,8V DC ±1% (constant voltage) because of temperature compensation variable from 26.5V to 31V
Output voltage for Constant voltage supply:	28.6 V
Output current trickle-charging:	1A ±5% (constant current)
Output voltage trickle-charging:	25.4 < U < 28.2V
Indicating LEDs:	1 LED, green 3 LED, yellow 2 LED, red
EMC:	according to VG 95 373-1, class 3 EN50081-1, EN 55022, EN 61000-3-2, EN 61000-3-3, EN 50082-2 EN 61000-4-2, -3, -4, -5, -6, -11, EN 50204, EN 61131-2
Protection:	IP65
Ambient temperature:	-30 to +55 ºC
Storage temperature:	-40 to +85 ºC
Humidity:	< 95 % T = 55ºC
Dimensions (H x W x D in mm):	350 x 180 x 170
Weight:	4.4 kg (without battery connection cable)
Conformity declaration:	CE conformity

Voltage values are valid at 20°C ambient temperature.

1.4.2 Technical data transportation rack

Type:	transportation rack with two UK-sockets power line 10m
Part No.:	EL11.9440 000 267.UK
Maximum permitted voltage:	260 V
Maximum permitted current:	16 A
Dimension (H x W x D in mm):	370 x 350 x 700 mm
Color:	RAL 6031 olive
Weight:	10.4 kg

1.5 Short instructions

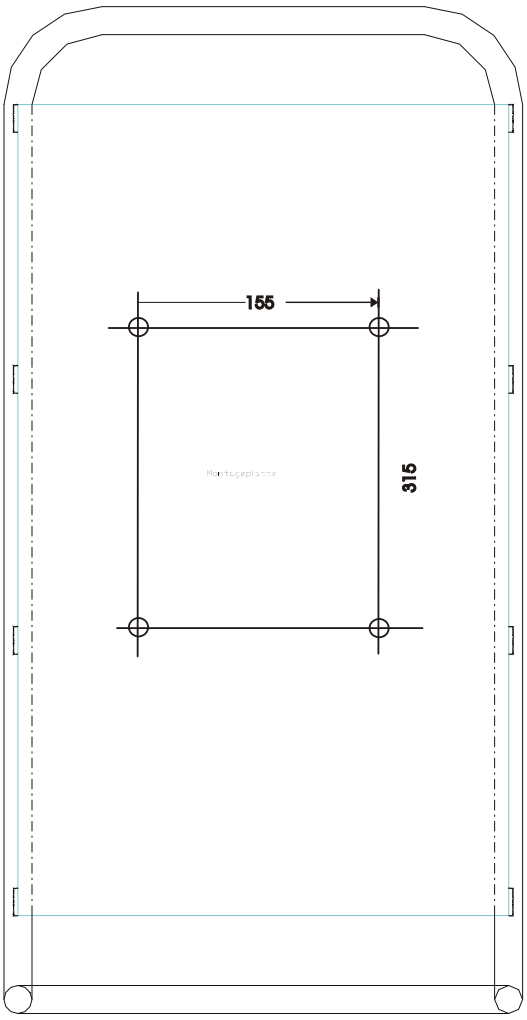


Picture 4:
Front foil EL11

2 Handling

2.1 Wall-mounting

The 4 holes for mounting EL 11 are to be marked on the wall according to Picture 5 to be attached in the grid 155mm x 315mm at the intended location and to be equipped with the appropriate dowels. When measuring the fixation points please keep in mind that there has to be a distance of minimum 10cm below the rack and at least 5cm each side.



Picture 5:
Drilling on transportation rack

2.2 Indication and operation elements

The Charger / Trickle charger EL11
(Part No.: EL11.142 100.UK) contains the following handling and indication elements (see chapter 1.5):

- Power supply cable (top of device)

- DC output connector (bottom of device)

- Mains switch (front panel of device)

- Green LED „NETZ“= MAINS

- Yellow LED “LADUNG” = CHARGING

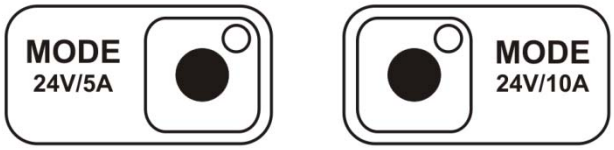
- Yellow LED “ERHALTUNGSLADUNG” = TRICKLE-CHARGE

- Yellow LED “SPANNUNGSVERSORGUNG” = POWER SUPPLY

- Red LED “SPANNUNG < 25.4V” = LOW BATTERY VOLTAGE

- Red LED “FEHLER” = ERROR

- FOLIENDRUCKTASTER = FOIL SELECTION SWITCH illuminated



Picture 6:
Foil selection switch, functional sector 5A and 10A

2.3 Battery charging

2.3.1 Rechargeable batteries

The PB-charger / Trickle charger EL11 has been devised for charging and maintaining open and sealed lead-acid batteries or battery sets of a nominal voltage of 24VDC and a nominal capacity between 45Ah and 500Ah. The charging process is optimized for batteries and battery sets of sealed lead-acid batteries in GEL-technology according to VG 96 924. The following types are treated:

- NBB 249 12 V 45 Ah VG 96 924 T 10
  12 V 50 Ah VG 96 924 T 03
- NBB 248 12 V 100 Ah VG 96 924 T 09

All other lead-acid batteries of the same voltage and capacity may be connected. Section VG 96 960-A (5A) is valid for capacities from 12Ah to 200Ah. For higher capacities choose section VG96 960-B (10A) valid for capacities between 25Ah to 500Ah.

2.3.2 Charging methods / charging curves

The Charger / Trickle-charger EL11 is equipped with IUa-charging-programs (for deep-discharged batteries UIUa-charge) with the following charging steps:

- Main charge consisting of pre-charge-U, main charge-I and main charge- U
- Trickle-charge-I

NOTICE:

The charging functions cannot be chosen individually. The process starts with the switching on the device und the selection of a functional area.

Charging (section 24V / 5A or 24V / 10A)

- Pre-charge-U
The pre-charging process has been devised for activating and recharging deep-discharged battery sets with an off-load voltage of more than 0.5VDC. The battery set is charged with a constant voltage of 28.8V until the charging current has increased to 5A respectively 10A. Maximum pre-charging time 12 hours otherwise the charger indicates an error. Starting from an off-load voltage of 25V the pre-charging step will be skipped.

- Main charge-I
The battery set is charged with a constant current of 5A respectively 10A until the voltage of the battery set has reached 28.8V.

- Main charge-U
The battery set is charged with a constant voltage of 28.8V until the charging current has decreased to 1A. The main charging process must have finished latest after 34h (functional sector 5A) respectively 22h (functional sector 10A).

Trickle-charging (section 24 V 1 A)

The trickle-charging is identical for both sectors. The trickle-charging process starts directly after finishing the main charge process.

The device waits until the off-load voltage has declined to the lower threshold of 25.4V. This phase is called supervision. The yellow LED "ERHALTUNGSLADUNG" = TRICKLECHARGE is blinking. The battery set will be charged with a constant current of 1A until the upper threshold 28.2V has been reached. This phase is called trickle-charge. The yellow LED "ERHALTUNGSLADUNG" = TRICKLE-CHARGE is illuminated until this value is reached.

Again, the device waits until the lower threshold of 25.4V is reached, after that the trickle charge current of 1A is started.

This process repeats again and again and guarantees an average status of charge of minimum 50%.

The whole charging process consisting of charge and trickle-charge starts automatically:

- After starting the charging section after pressing the push-button with connected batteries
- After mains failure and return of power
- In the trickle-charge phase if the battery voltage is beneath the lower threshold of 25.4V for more than 60 seconds

2.3.3 Constant-voltage power supply

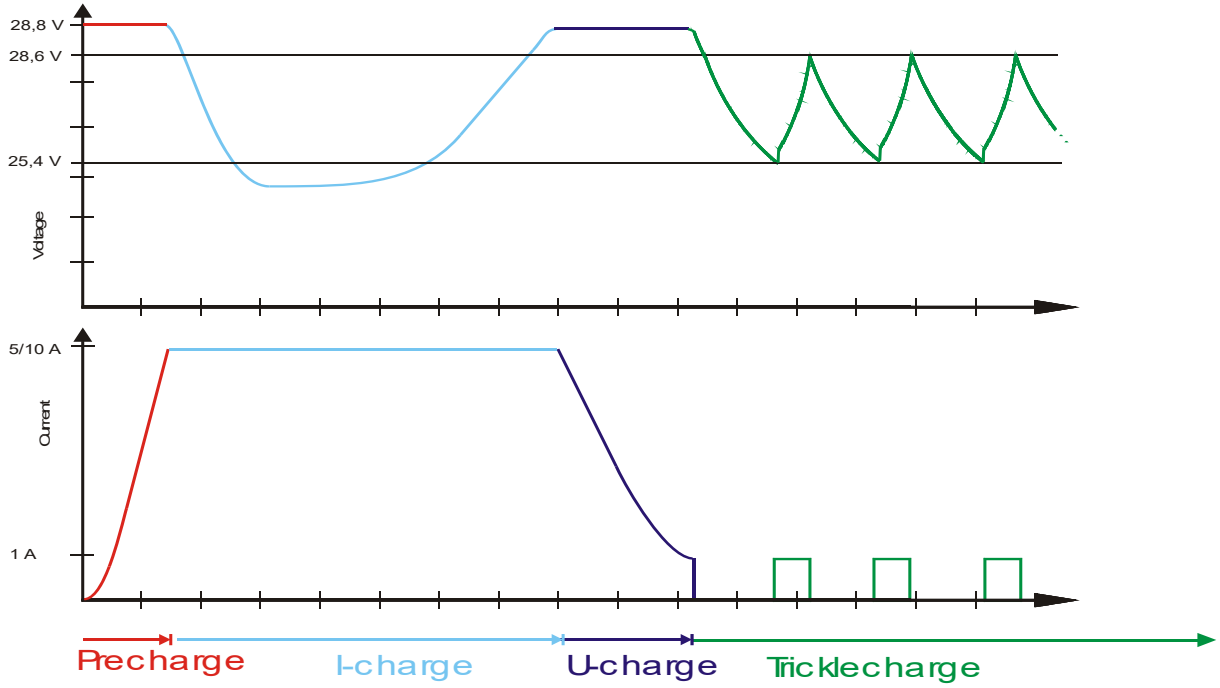
The charger EL11 is equipped with a constant voltage power supply function. All electrical consumers of the nominal voltage of 24V can be supplied with 28.6VDC and maximum 10A. The electrical functions of a vehicle can be tested even with dismounted batteries. Deep-discharged battery sets of a voltage lower than 0.5V can be revitalized. This function can be used as well for battery sets with permanent consumers (UPS-function).

NOTICE

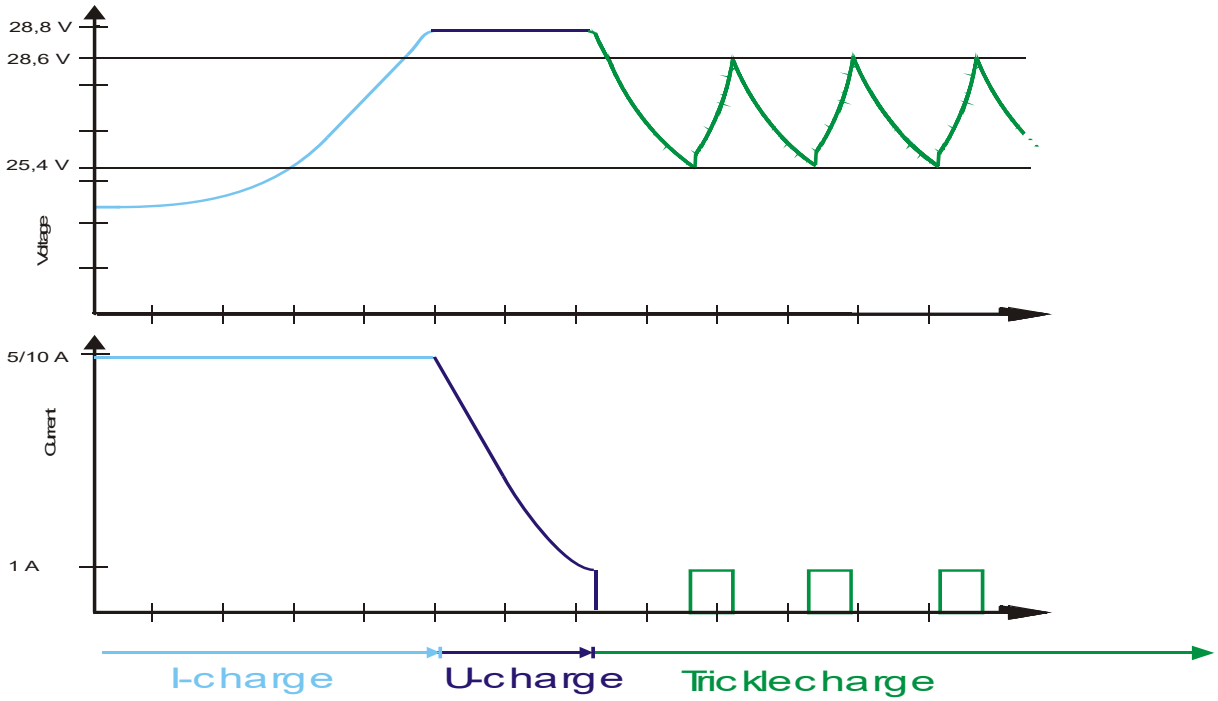
Electrical consumers with a load of more than 10A bring down the output voltage of the charger EL11. The device will not be damaged by this kind of operation. It is short circuit stable.

After switching on EL11 both push-buttons (5A and 10A) are blinking. By pressing both sections at least for 1 second the UPS-function will be started.
The yellow LED "SPANNUNGSVERSORGUNG" = POWER SUPPLY is illuminated.

2.4 Typical charging curves



Picture 7:
Charging curve of a deep-discharged battery



Picture 8:
Charging curve of partly-discharged battery

2.5 Indication of failures and error resolution

2.5.1 The red LED „VOLTAGE <25.4V“

The error indication is illuminated if the battery voltage decreases below 25.4V. This characterizes the edge of starting ability of the vehicle by all means. This error indication might shine together with the yellow LEDs “LADUNG” = CHARGE or “ERHALTUNGSLADUNG” = TRICKLE-CHARGE (permanent light).

2.5.2 The red LED „error“, battery defective (permanent light)

The permanent light is illuminated if the charging cable is not correctly connected or a battery failure emerged.

2.5.3 The red LED „error“, battery defective (LED flashing)

3. SAFETY INSTRUCTIONS

While charging the safety note for users (Picture 9) has to be positioned inside the vehicle in the focus of the driver.

3.1 Safety note for users

During the charge with EL11 normally the mains switch of the tank is switched off. In the cover of this manual you will find the warning sign for the tank driver.

ATTENTION

Before starting the vehicle please remove trickle-charge cables! Please install this sign visibly in the driver's cabin. After removal of cables replace safety note in Operating instructions!

Picture 9:
Safety note for users

The battery charger EL11 should only be operated in perfect condition while observing the operating instructions. The safety and operating instructions must be observed.

In the case of operator errors or misuse, there are risks for:
- body and life of the operator,
- the equipment and other property of the operator,
- the function of the device.

All persons involved in the installation, commissioning, operation, maintenance and upkeep of the device must:
- be appropriately qualified,
- pay close attention to these operating instructions and
- follow the applicable rules for occupational safety.

Unauthorized intervention or manipulation of the device is not permitted. Furthermore, the local safety regulations must be observed.

Nortec Electronics is not responsible for any damage caused by improper connection. Never connect 230V to the battery connection cables.

Charging non-rechargeable or mechanically damaged batteries may cause the battery to explode. Avoid any contact with battery acid. If you come into contact with battery acid, wash the affected area thoroughly. If eyes come into contact with battery acid, rinse them with running water or an eyewash device and consult a doctor.

Charging a battery can cause the release of gases. These gases are flammable and explosive! Do not get close to batteries with sparks, open flames or cigarettes. Always ensure adequate ventilation of the batteries during charging.

The battery charger may only be opened and repaired by the manufacturer, by authorized repairers or by individual agreement with Nortec Electronics.

	**Maintenance and safety regulations of the battery manufacturers**! - All maintenance work on batteries must only be carried out by suitably qualified personnel.
	**Wear eye protection and protective clothing when working on batteries!** - Observe the applicable accident prevention regulations.
	**Avoid contact of acids with eyes or skin!** - In case of emergency, rinse immediately with plenty of water. - Then consult a doctor immediately.
	**Dangerouselectricalvoltage!** - Do not lay any metal tools or objects on the battery. - Do not wear metal ornaments such as rings, watches, belts or jewelry. - Disconnect mains voltage before opening the device. - Do not manipulate the device.
	**Explosion and firehazard!** - When charging batteries, a highly explosive oxyhydrogen gas mixture can arise. - - Avoid sparking and short circuits: use only insulated tools, do not lay metallic objects on the battery or drop them.
	**No Smoking!**
	**Follow instructions for battery usage!** - Attach these visibly near the battery. - Pay attention to the dangers arising from batteries.
	**Batteries must not be disposed of with household waste!** - You are legally obliged to return old batteries, so that a proper disposal can be guaranteed.

Disposal

Do not throw the packaging and the product in the household waste! The product and packaging are made of reusable materials (plastics, metals, paper). Dis-pose of an unusable product in an environmentally friendly manner in accordance with local regulations.