6 Optical indicators

- **red**: Battery voltage <6V or
  Battery does not absorb power.
- **red flashing**: Device defective
- **orange**: Device is charging battery
- **green**: Battery is charged, trickle charge is running
- **green flashing:** Battery is charged, monitoring phase

Operation manual

Battery charger and trickle charger 24V for wall mounting

EL24F

DC 24V 8A / DC 24V 1A // AC230V 50/60Hz
Version: 11.2019

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Inhalt

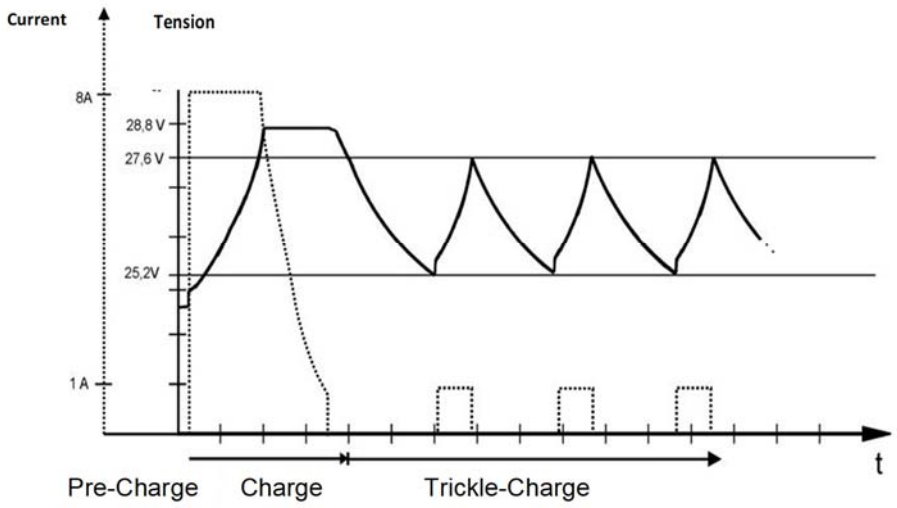
Notes

The charging functions cannot be selected separately but provide a closed functional sequence. This is started when the device is switched on.

The entire charging process starts automatically:

- after switching on the supply voltage with connected battery,
- after mains failure and return of the supply voltage,
- If the lower turn-on voltage of 25.4V during the trickle charge e.g. is exceeded by connecting consumers for more than 10 seconds.

Charging cables and batteries must be checked for contamination and perfect mechanical and electrical condition before connection.



Typical charging voltage curve (partially discharged, closed 24V lead-acid battery)

1 Technical data

Typ:	EL24F.1000
Manufacturer:	Nortec Electronics GmbH & Co. KG An der Strusbek 32 B D-22926 Ahrensburg Tel.: +49 / 4102 / 42002 Fax: +49 / 4102 / 42840 Email: info@nortec.de Web: www.nortec.de
Mains voltage:	230V ±10% / 45-65Hz
Input power:	< 500VA (max.)
Output voltage:	max. 35VDC ±1% (device limit)
Output voltage pre-charge:	28.8VDC ±1% (constant voltage)
Output current main charge:	8A ±5% (constant current)
Output voltage main charge:	28.8VDC ±1% (constant voltage)
Output current trickle charging:	1A ±5% (constant current)
Battery types:	All types of 24V lead acid batteries (wet, maintenance free, Ca / Ca, AGM and Gel)
Battery capacity:	from 40Ah to 160Ah
Indicator lights:	1 external two-color LED (red, green) via a 4-pin cable
Electrical safety:	according to EC Low Voltage Directive
Protection:	IP65

Protection class:	Protection class I
Operating temperatur:	-25 to + 40°C, (at higher operating temperature the output power is reduced)
Storage temperature:	-40 to +85C°
Humidity:	<(95-5)% at TU = 55°C
Dimensions (LxBxH):	240 x 160 x 108mm
Weight:	4.0kg
Declaration of conformity:	CE conformity
Mains connection:	Connection cable 5m long with earthing contact plug with double protection contact system (SCHUKO)
Charge cable:	2 × 1mm² 5m with open end
Warranty period:	24 months

The terms of VDE 0100 Part 717 are valid:
Requirements for special installations or locations – Mobile or transportable units.

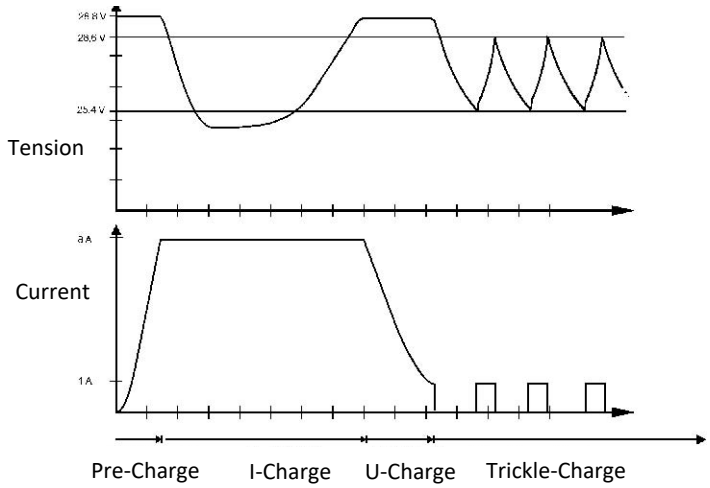
5.2 Chargeable batteries and charging characteristics

The EL24F battery charging and maintenance charger is designed for charging and subsequent trickle charging of closed (open) liquid electrolytes or sealed lead-acid batteries or battery packs with a rated voltage of 24V and a rated capacity between 45Ah and
500Ah designed.

The charging methods used are optimized for battery sets of 24V series or series parallel circuits of closed lead-acid batteries.

The battery charger and trickle charger EL24F is equipped with an IUa charging program (for deep-discharged batteries UIUa-charge) with the following charging areas:

- Charge divided into a pre-charge-U, a main charge-I and a main charge-U
- Trickle charge



Current and voltage curve when charging a deeply discharged 24V battery

Recommendation: Before removing the battery cable, interrupt active charging by unplugging the power plug. This has a positive effect on the life of the connector.

2 General information

We congratulate you on the acquisition of the EL24F

This robust housing combines two functions:

- **Battery charger**
- **Battery trickle charger**

State-of-the-art microprocessor technology ensures that your battery is optimally charged with the UIUa characteristic, which guarantees maximum battery life. The UIUa characteristic is recommended by leading battery manufacturers. The experience of many years of observations of battery charging and charging in large fleets (partly with stored vehicles) is consistently implemented in this device in modern charging technology. An intact deeply discharged battery is brought back to the best possible state of charge from a residual voltage of about 6 V and held there. It does not have to be opened or separated from the vehicle. Defective batteries are detected automatically.
Light emitting diodes keep you informed about the status of the battery and the device at all times.

3 Safety instructions

Attention: The EL24F complies with protection class 1. Installation, electrical connection and commissioning may only be carried out by a qualified electrician.

3.1 Intended use

The charger is designed to charge 24V lead-acid batteries in vehicles such as liquid electrolyte batteries, maintenance-free batteries, VRLA batteries and GEL batteries. The charger can be connected directly to the battery with clamps or via suitable plug connectors.
The EL24F is approved for private and commercial use.

Each device is tested for all functions before delivery and delivered in a safe and secure condition. When used as intended, the device is safe to operate.

3.2 Safety instructions

The battery charger EL24F 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.

5 Function battery LOAD

5.1 Preliminary note

Proper battery charging is the first requirement for a long battery life. The device present here treats any type of lead-acid batteries with a rated voltage of 24V in an optimal way. However, it is up to you to check the battery in time to avoid permanent damage due to deep discharges, which can lead to the battery becoming unusable.
Please remember that only a full battery can be stored. A deeply discharged lead-acid battery destroys itself within days.

A non-deeply discharged, intact battery (open circuit voltage> 24V) can be easily charged by applying a current (8A) to its final charging voltage of 28.8 V, which the device software specifies. After reaching the end-of-charge voltage, this is left by the device on the battery until the charging current drops to a predetermined value (here 1A) - the battery is optimally fully charged.
However, if the battery has been deeply discharged, some irreversible chemical processes have taken place inside, which have considerably reduced the power consumption of the battery. In this case, an attempt is made to reverse the chemical reactions by means of a summons.
The loader will first check if a summons is required. If this is the case, the battery must recover within a predetermined time. Then the device goes fully automatically into the main charge. If the pre-charge time of 12h is exceeded, the device goes to fault.

4 Connection and commissioning

Before connecting the device, check that the specified mains voltage on the type plate of the device is the same as that available to you. These are 230V/50Hz.
Due to the circuit design and the polarity reversal protection of the EL24F, no special sequence is required for operation and connection. We recommend the following procedure. It provides you with the most efficient information.

1. Connect the 230V input in the vehicle:
   green / yellow cable = earth = to green / yellow
   black cable 1 = L1 = on brown
   black cable 2 = N = on blue

2. Connect the signaling cable [1]
   Brown = LED green (green contact LED type Q14F1GZZRYG02E)
   Black = LED red (red contact LED type Q14F1GZZRYG02E)
   White = LED common pole
   (yellow contact LED type Q14F1GZZRYG02E)
   Blue = unused

3. Connect the battery.
   Blue resp. No. 2 = battery minus
   Brown or No. 1 = Battery Plus

[1] Multicolor LED type Q14F1GZZRYG02E is optional equipment and has to be ordered separately.

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.

	**Dangerous electrical voltage!** - Do not lay any metal tools or objects on the battery. - Do not wear metal ornaments such as rings, watches, belts or jewelery. - Disconnect mains voltage before opening the device. - Do not manipulate the device.
	**Explosion and fire hazard!** - 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.
	**Danger of acid burn!** - Battery acids and electrolytes are highly corrosive. - Wear protective gloves and eye protection. - Do not tilt the battery.
	**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.

3.3 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). Dispose of an unusable product in an environmentally friendly manner in accordance with local regulations.