Power supply for mobile systems

Control module with battery holder for modulog modules

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1 Description of the product

1.1 Description

A system with different individual components allows a network-independent power supply for electrical lifting modules. A rechargeable battery supplies the drive unit with energy. The battery can be recharged by an external quick battery charger. In order to guarantee working without downtime, it is recommended to have a second rechargeable battery. The control modules with battery holder are used to control the lifting modules.

Various operating elements allow an efficient functionality.

1.2 Description of the battery

The rechargeable battery is a Li-Ion battery for ROEMHELD products as an energy source. The high capacity in a compact housing allows an efficient and flexible use. For charging of the batteries exclusively the quick battery charger from ROEMHELD may be used.

1.3 Description - Quick battery charger 3822 177 + 3822 182

The quick battery charger is used to recharge the rechargeable battery part no. 3822 -175. In addition, Ni-MH batteries can be charged with the quick battery charger, that correspond to the technical data of the battery charger.

The quick battery charger is equipped with the following functions:

- Microprocessor-controlled charging
- Automatic voltage detection
- Protection against reverse battery
- Battery defect detection
- Battery pressure increase protection
- Charging current 1.8-3.0 A
- Pulse trickle charge Ni-MH batteries

1.4 Description - Control module for 1 modulog lifting module with incremental stroke measuring system 3821 270; 3821 270M

The control module with battery holder is the key element of the system to which all further components are connected. It is suitable for a lifting module with different force levels / stroke lengths and incremental stroke measuring system. The holder for the rechargeable battery is already integrated in the control module and forms a compact unit for supply and control of the drive module. The control unit in the control module has connections for the lifting module, for one operating element and control signals for optional functions.

Optional functions, suitable for lifting modules with incremental measuring system.

The memory function allows to store up to five height positions. These can be recalled again and again or newly stored. Thus, ergonomically reasonable working heights can be obtained for different persons or different working heights within one assembly process can be determined. Operation is made via an operating panel that allows to store the height positions as well as

to call them. Due to safety reasons, a movement is always made by touch control.
A control plug has additional signal lines. Thanks to this feature and the free programmability, customised special functions can be realised, such as the approach to a transfer position or the response to a collision switch. Also, specific stroke end positions can be stored, in which the control stops the lifting module with high repetitive accuracy.

2 Validity of the documentation

This document applies to the following products:

Battery, quick battery charger and holder for battery of the data sheet M.8201. The following types or part numbers are concerned:

Battery
- 3822 175

Quick battery charger
- 3822 177
- 3822 182

Control module with battery holder
- **3821 270**

Control module with battery holder with memory function
- **3821 270M**

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with expert knowledge in electrical engineering.

Qualification of the personnel
Expert knowledge means that the personnel must
- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he
- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

4 Symbols and signal words

⚠ DANGER

Danger of life / heavy health damages
Stands for an imminent danger.
If it is not avoided, death or very severe injuries will result.

⚠ WARNING

Person damage
Stands for a possibly dangerous situation.
If it is not avoided, death or very severe injuries will result.

⚠ CAUTION

Easy injuries / property damage
Stands for a possibly dangerous situation.
If it is not avoided, minor injuries or material damages will result.

Hazardous to the environment
The symbol stands for important information for the proper handling with materials that are hazardous to the environment.
Ignoring these notes can lead to heavy damages to the environment.

NOTE

This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

4.1 Symbols on the name plate

This symbol indicates that the product should only be operated when the associated operating instructions have been read and understood.

This symbol indicates that the product must not be thrown into the fire. There is a risk of explosion.

This symbol indicates that the product must only be used within the indicated range of temperature. Temperatures outside the admissible temperature range are to be avoided.

This symbol indicates that the product must only be used in dry places. The product must not be exposed to humidity and moisture.

This symbol indicates that the product must not be disposed of in normal household waste.
For more information, see chapter "Disposal".

This symbol indicates that the product must only be used in dry rooms.

This symbol indicates that the product has to disposed in the European area in accordance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) .
Outside of Europe, the country-specific standards and guidelines for recycling are to be considered.

This symbol indicates that the product is equipped with a protective insulation II (safe electrical isolation).

This symbol indicates that the product is equipped with a safe extra low voltage (SELV). This SELV ensures that the circuit with the lower voltage is separated from the circuit with the higher voltage by double or reinforced insulation.

5 For your safety

5.1 Basic information

The operating instructions serve for information and avoidance of dangers when installing the products into the machine as well as information and references for transport, storage and maintenance.

Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the products can be guaranteed.

Furthermore, the consideration of the operating instructions will:

- avoid injuries
- reduce down times and repair costs,
- increase the service life of the products.

5.2 Safety instructions

The rechargeable battery is a Li-Ion battery, which is developed and manufactured according to the state of the art. Relevant safety standards are met or even exceeded. When charged, these Li-Ion batteries have a high energy content. The ingredients of Li-Ion battery cells are basically flammable under certain conditions. Therefore, familiarize yourself with the intended use in the operating manual.

- Read this operating manual thoroughly and completely, before you work with the product.
- Keep this operating manual so that it is accessible to all users at any time.
- Pay attention to the current safety regulations, regulations for accident prevention and environmental protection of the country in which the product will be used.
- Use the ROEMHELD product only in perfect technical condition.
- Observe all notes on the product.
- Use only accessories and spare parts approved by the manufacturer in order to exclude danger to persons because of not suited spare parts.
- Respect the intended use.

5.3 Product-specific safety instructions

5.3.1 Use the quick battery charger correctly

- Only use the quick battery charger after you have checked the quick battery charger, mains cable and mains plug for damage and have found no damage.
- Only use the quick battery charger in dry, ventilated indoor areas so that the battery charger does not come into contact with any liquids.
- Do not make any modifications or repairs to the battery charger.
- Charge the ROEMHELD rechargeable battery with the battery charger.
- Disconnect the mains plug from the socket after using the quick battery charger.

5.3.2 Use the rechargeable battery correctly

- Disconnect the rechargeable battery from the mobile system before any modification, repair or work to exclude unforeseen motor activity.
- Only use the rechargeable battery after you have checked the battery for damage and have found no damage.
- Only touch a damaged battery with protective gloves.
- Only charge the battery with an original ROEMHELD quick battery charger.

If a battery burns or explodes

- Remove yourself and other living creatures away from the battery.
- Call the fire brigade.
- Keep a safe distance from the battery.

5.3.3 Other hazards

Even if all safety instructions are followed, the use of the battery can lead to a dangerous situation e.g.,
if the battery is damaged or has a malfunction:

- Do not use the battery.
- Store the battery in a fire-resistant container.
- Remove combustible material from the storage location.
- Only touch the battery with protective gloves.
- Move far enough away from the battery to avoid inhaling escaping vapours and gases and to avoid skin contact with escaping liquid.

If the battery heats up strongly or becomes hot:

- Have the battery checked by ROEMHELD.
- Store the battery in a fire-resistant container.
- Secure the storage location over a large area.

If deformation, odour or leaking liquid occurs on the battery:

- Store the battery in a fire- and acid-resistant container.
- Secure the storage location over a large area.
- Remove combustible material from the storage location.
- If possible, have the battery disposed of immediately by a specialist dealer.

5.3.4 Misuse

To use the power supply for the mobile system safely, exclude the following misuses:

- improper repairs and maintenance,
- improper use of the battery,
- breakage of an electrical conductor due to improper use,
- structural changes to the delivery condition of the mobile system, in particular modifying, and any other manipulation of the control module and other system-relevant components.
- opening and modifying all components of the control module,
- charging processes outside the temperature range of +10 to +40°C,
- discharging processes outside the temperature range of 0 to +50°C.

6 Application

6.1 Intended use

The products are used in industrial use to charge the Li-Ion batteries with the part number 3822 175.

Also Ni-MH batteries can be charged that correspond to the technical data of the battery charger.

Furthermore the following are intended uses:

- Use within the capacity indicated in the technical data sheets.
- Use as per operating instructions.
- Compliance with service intervals.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.
- Use only within closed, low-dust and dry rooms
- Use in locations without direct sunlight or interference from other heat sources.

6.2 Misapplication

⚠ WARNING

Injuries, material damages or malfunctions!

- Do not modify the product!

The use of these products is not admitted:

- For the domestic use.
- On pallets or machine tool tables in primary shaping and metal forming machine tools.
- If due to physical / chemical effects (vibrations, welding currents or others) damages of the products or seals can be caused.
- On pallets or machine tool tables that are used to change the characteristics of the material (magnetise, radiation, photochemical procedures, etc.).
- In areas for which special guidelines apply, especially installations and machines:
  - For the use at fun fairs and in leisure parks.
  - In food processing or special hygiene regulations.
  - For military purposes.
  - In mines.
  - In explosive and aggressive environments (e.g. ATEX).
  - In medical engineering.
  - In the aerospace industry.
  - For passenger transport.

7 Transport

⚠ CAUTION

Short circuit and fire risk!

The lithium-ion battery is considered a hazardous good and can be damaged by shocks and impacts without external damage being detected.

- If you are transporting the product with a built-in battery, remove the battery and store it separately.
- Transport the battery with special care.

Lithium-ion batteries are subject to the requirements of the legal system for dangerous goods

- When transporting, note the special requirements for packaging and labelling, for example, for air transport or shipping orders.
- Inform yourself about the transport of the battery and about suitable transport packaging, e.g. directly from the transport company.
- Only send undamaged batteries and insulate the electrical contact points with an adhesive strip.

8 Installation

8.1 Design

8.1.1 Overview quick battery charger

Figure 1: Components of the quick battery charger

1	Ventilation slots	6	Mains cable and plug
2	Contacts	7	Name plate
3	Battery holder	8	Rubber feet
4	Sticker	9	Insertion direction of the battery
5	Status display		

8.2 Overview of status display

The status display indicates the different status of the battery, the charging process and the quick battery charger by means of two LEDs. One of the LEDs is a multi-coloured LED that changes the colour between red and green depending on the status changes.
Depending on the status, the corresponding LED flashes or stays lit.
Above the LEDs is a sticker that describes the significance of the light signals with symbols, so that the light signals can be assigned to the status.

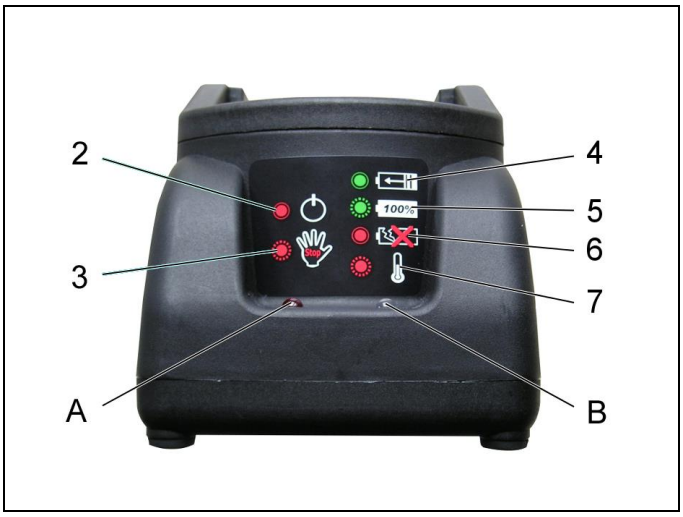

Figure 2: Status display

A red LED on the left B multi-colour LED on the right	2 to 7 symbols for status, see explanation

Status quick battery charger, red LED (A)

The status of the quick battery charger is displayed by the red LED.

Status	Symbol	Description
Device OK (2)		The red LED stays lit. The quick battery charger can be used.
Device defective (3)		The red LED flashes. The quick battery charger is defective. Disconnect the quick battery charger immediately from the mains and remove the battery.

Status charging process and battery, multi-coloured LED (B)

The status of the charging process is displayed by the multi-coloured LED.

Status	Symbol	Description
Charging process (4)		The multi-coloured LED stays lit green. The inserted battery is being charged.
Battery is fully charged (5)		The multi-coloured LED flashes green. The inserted battery is fully charged.
Battery check (6)		The multi-coloured LED stays lit red. The battery is defective.
Battery temperature error (7)		The multi-coloured LED flashes red. The battery is too cold or too hot. The battery can remain in the quick battery charger. The device automatically starts the charging process when the battery has reached the right temperature.

8.2.1.1 Symbols on the name plate

This symbol indicates that the product should only be operated when the associated operating instructions have been read and understood.

This symbol indicates that the product must only be used in dry rooms.

This symbol indicates that the product is equipped with a protective insulation II (safe electrical isolation).

This symbol indicates that the product must not be disposed of in normal household waste.
For more information, see chapter "Disposal".

This symbol indicates that the product is equipped with a safe extra low voltage (SELV). This SELV ensures that the circuit with the lower voltage is separated from the circuit with the higher voltage by double or reinforced insulation.

8.2.2 Overview of the battery 3822 175

Figure 3: Components of the battery

1 Housing	5 Guide

2	Name plate	6	Danger sign (safety device)
3	Locking (safety device)		
4	Contacts		

8.2.2.1 Symbols on the name plate

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8.2.3 Overview of the control unit 3821 270(M)

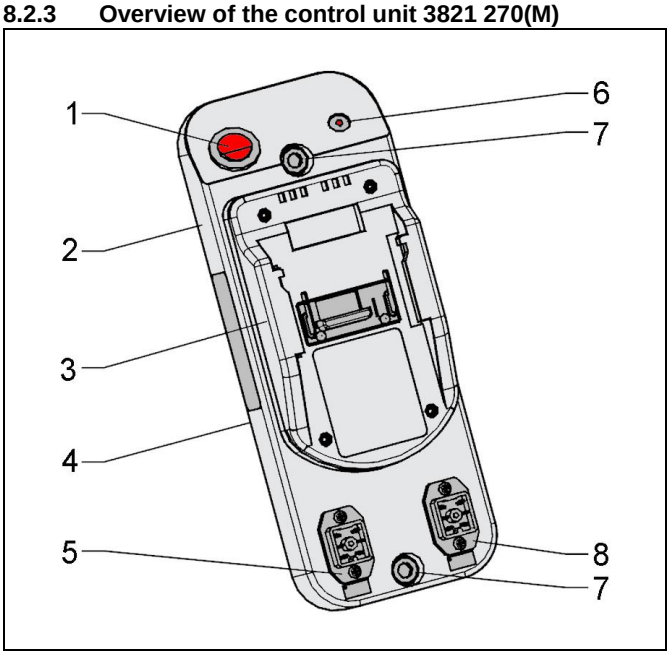

Figure 4: Design

1	On/Off switch	5	Plug-in connector for lifting module
2	Control module		
3	Battery holder		
4	Flat sealing (back)		

		6	LED for error code output and state of charge display
		7	Socket head cap screw M8
		8	Plug-in connector for control panel

8.2.3.1 Fixing of the product

Fixation of the control unit is made with the two socket head cap screws M8 directly at the lifting module or the customer's connecting construction.
The attached flat sealing must be inserted between the control unit and the connecting construction.

NOTE

Dangers due to the connecting construction of the customer

Dangers due to the connecting construction of the customer, as e.g. squeezing points have to be excluded by the customer's design.

⚠ CAUTION

Fixing the connecting cable

- The cables must be fixed by the user so that no bending and tensile stress will act and the cable cannot be damaged in any way.

9 Start up

⚠ DANGER

Danger due to defective components!

If the quick battery charger is connected with a worn mains cable, defective plug or housing to the mains, there is the risk of electric shock.

- Before using, check all components of the quick battery charger by visual inspection for damage.
- Replace defective quick battery charger.

⚠ CAUTION

Pay attention to the admissible environmental conditions!

If the product is not operated in the prescribed environmental conditions, then the product may not work properly or can be damaged.

- Pay attention to the admissible environmental conditions (see chapter "Technical characteristics").

Clogged ventilation slots of the quick battery charger

If the ventilation slots of the quick battery charger are clogged by dirt or covered by objects, the device may overheat. Damage is the result.

- Keep ventilation slots always free from objects.
- Clean clogged ventilation slots in the de-energized state with a brush.
- Make sure that no objects can enter in the housing of the quick battery charger through the ventilation slots.

9.1 Check quick battery charger

1 Check quick battery charger as per the indicated daily checks (see chapter "Maintenance").

9.1.1 Connect quick battery charger

1 Put the quick battery charger on a flat surface.
2 Connect the plug of the quick battery charger to the mains.

9.1.2 Check the operational readiness of the quick battery charger

The operational readiness can be read at the status display.

1 After switching on, check the LEDs at the status display.
If the **red LED** stays lit, the quick battery charger can be used.
If the **red LED** flashes, there is a defect. Immediately disconnect the quick battery charger from the mains and replace it.

9.2 Connect the control module with battery holder

The control module with battery holder must be firmly screwed on the lifting module or the connecting construction and the devices must be connected to the ports.

The flat sealing must be inserted between the control module and the connecting construction.

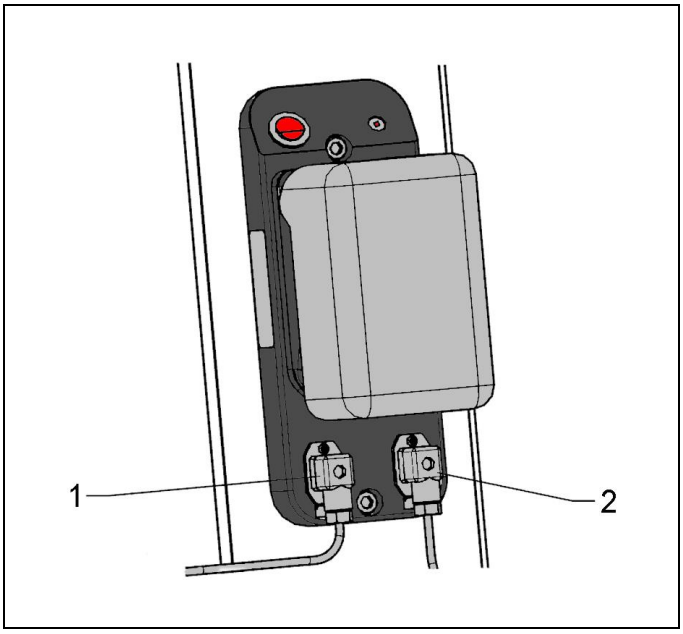

Figure 5: Connection of the control module

1 Connection for lifting module	2 Connection for hand panel or foot switch

- Insert the connector of the lifting module into the provided socket (1) of the control module.
- Insert the connector of the hand panel or foot switch into the provided socket (2) of the control module.
- Tighten the screws of the cable bushing with a screw torque of 0.4 Nm.

9.2.1 Connect the control module with two lifting modules

The control module is the key element of the system to which all further components are connected. The battery holder must be firmly screwed on the lifting module and the devices must be connected to the ports.

The flat sealing must be inserted between the control module and the connecting construction.

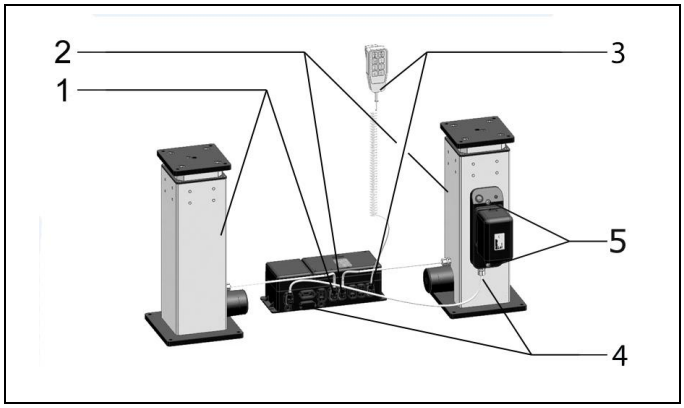

Figure 6: Connection of the control module

1 Connection for lifting module 1 2 Connection for lifting module 2	3 Connection for hand panel or foot switch 4 Connection for power supply 5 Fixing thread at the lifting module

- Insert the connector of the lifting module into the provided sockets (1 and 2) of the control module.
- Insert the connector of the hand panel or foot switch into the provided socket (3) of the control module.
- Insert the connector for the power supply into the provided socket (4) of the control module.
- Tighten the screws of the cable bushing with a screw torque of 0.4 Nm.

9.3 Connect the power supply

For the operation, a ROEMHELD battery is required. Before using, the battery must be charged in the ROEMHELD quick battery charger.

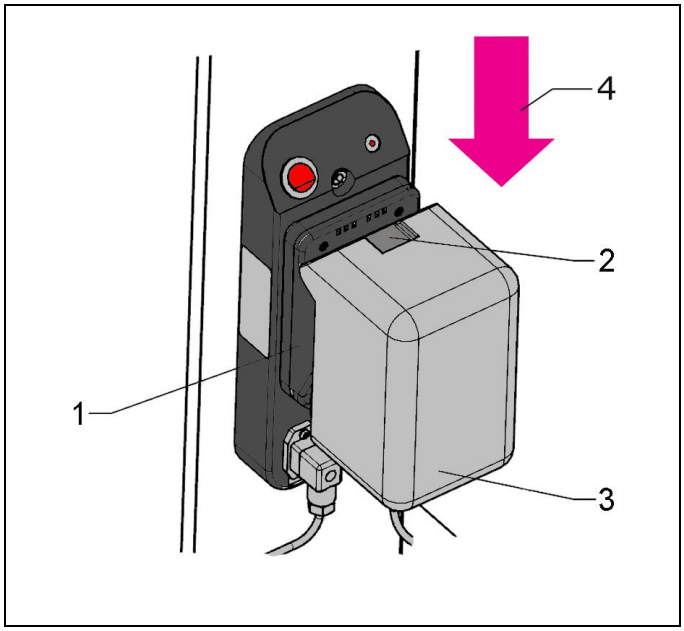

Figure 7: Insert the battery

1 Holder 2 Locking	3 Battery 4 Insertion direction of the battery

- Charge the battery in the quick battery charger.
- Insert the charged battery into the holder until it snaps in.

9.3.1 Setting mode

The control module is suitable to operate lifting modules of different stroke lengths and force ranges. Therefore the control module must be adapted to the connected lifting module during the first start-up. For this purpose, an automatic teaching process is integrated, that must be started by the user.
For the setting mode, all components have to be connected according to the chapter setting mode. The lifting module should be operated in idle running, that means that no load should be on the lifting module.

⚠ CAUTION

Injury or material damage due to moving components!

- In the setting mode the lifting module makes a motion.
  Protect the working area against third parties. Sufficiently fix setups, etc.
- When releasing the push-buttons Up(↑) and Down (↓) of the operating panel, the motion will be stopped.

- For setting the push-buttons Up (↑) and Down (↓) of the operating panel have to be activated until the setting mode has been completed.
  - The movement is stopped by release of the push-buttons. Then the setting process must be started again.
  - After approx. 5 seconds the lifting module start to retract until the integrated limit switch is reached.
    Thus the zero position of the lifting module is determined.
  - After another 5 seconds, the lifting module starts to extend. This serves to determine the stroke length.
  - As soon as the lifting module reaches its mechanical end position, the switch-off position is determined and permanently stored.
  - By operating the push-buttons, the operation can be cancelled.
- By retracting (↓) and extending (↑) it has to be checked, if the final positions are correctly reached.
  If malfunctions occur, the setting process has to be repeated.
- In the case of troubles, an initialization of the lifting module can be made in setting mode. For this purpose the process can be interrupted, when the lifting module has reached the retracted end position.

ⓘ NOTE

Limited examination of failures in setting mode

- It has to be considered that only limited examination of failures is made in setting mode.

Setting mode in case of upcoming failures

- In principle, the setting mode is also possible in case of potential problems. It is not required to re-initialize the control after a voltage drop in setting mode as. The control is initialized every time the lifting modules move to their lowest position.

10 Operation

⚠ WARNING

Injuries due to non-compliance of the operating instructions!

- The product may only be operated, if the operating instructions - especially the chapter "Safety instructions" have been read and understood.

Injuries due to misuse, incorrect operation or abuse!

Injuries can occur if the product is not used within the intended use and the technical performance data.

- Before start up, read the operating instructions!

Fire due to wrong or defective battery!

Fire can be caused when charging not admissible or defective ROEMHELD products.

- Charge only ROEMHELD batteries that are admitted for the product.
- Before inserting the batteries check for integrity. In case of doubt, do not insert the batteries.
- Pay attention to the operating instructions of the batteries.

⚠ CAUTION

Deep discharge of the battery

When the product is switched on and is not in use, the battery can be damaged by deep discharge.

- If the product will not be used for a longer time, switch off the switch.

1 Check the battery for damage, e. g. cracks.
Replace the damaged battery by an intact one.

10.1 Insert and charge the battery

This procedure describes how the battery is correctly inserted into the quick battery charger and charged, the charge status can be read and the battery is removed from the quick battery charger.

ⓘ NOTE

Pay attention to the temperature of the battery!

The battery can only be charged if its temperature is between 5 °C and 40 °C . If the temperature is outside this area, the quick battery charger will not charge the battery.
If the battery is too cold or too hot:

- Wait until the battery has adjusted to the room temperature of the installation location.

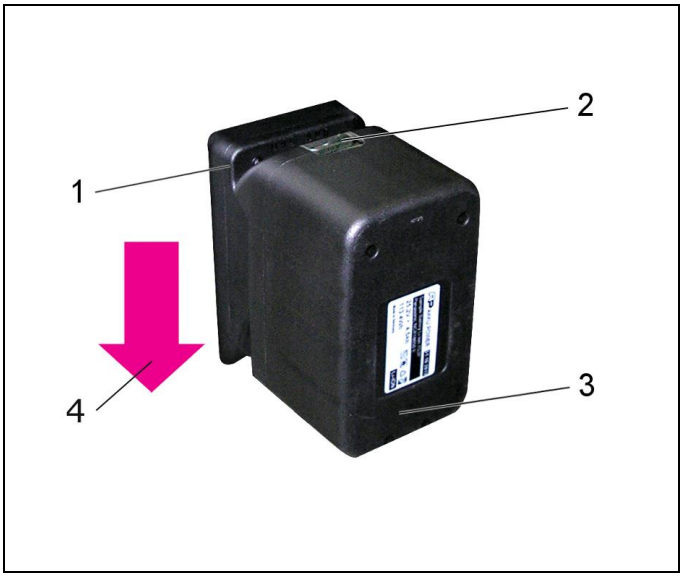

Figure 8: Insert the battery

1 Holder	3 Battery
2 Locking	4 Insertion direction of the battery

1. Check the battery for damage, e. g. cracks.
   Replace the damaged battery with an intact one.
2. Insert the battery into the holder until it snaps in.
3. The inserted battery will be checked by the quick battery charger. For this time period (about 4 s), the multi-coloured LED flashes red.
4. If the multi-coloured LED stays green after checking, the battery is charging.
5. If the multi-coloured LED stays red after checking, the battery must immediately be removed from the quick battery charger. The battery is defective and must be replaced with a new one.
6. If the multi-coloured LED flashes red after checking, the battery is too cold or too hot. • Wait until the battery has adjusted to the admissible temperature. The device will automatically start up the charging process.

NOTE

Required charging time

The quick battery charger requires for charging of the admissible battery approx. 120 minutes.

Charging times are temperature-dependent

If the temperature at the place of installation of the quick battery charger rises above 35 °C, the charging times can be longer.

Nominal capacity of the battery is not reached

Nominal capacities cannot be reached, if batteries were not used for a longer period. Also, new batteries do not reach the full nominal capacity at the first charging cycles.

The total nominal capacity of the batteries is reached after approximately 5 charging/discharging cycles.

Ni-MH batteries get hot during charging

With Ni-MH batteries, there is higher warming of the cells as with Li-Ion batteries.

Battery may be deeply discharged

The battery must be removed from the holder when the quick battery charger is not connected to the mains.

Recognize completed charging

When the charging process is completed, the multi-coloured LED flashes green. The battery can be removed from the quick battery charger or remain there for an indefinite period if it is connected to the mains. The battery will not be damaged.

10.2 Remove the battery

The battery is secured by a latch in the holder. To remove the battery, the locking of the battery must be operated.

1 Pull the latch on the battery and hold it in this position to release the battery.
2 Pull the battery out of the holder.

10.3 Lifting and lowering

NOTE

If the battery is empty, the lifting module remains in the current position. Without energy supply the lifting module does not lower.

• If the empty battery is replaced by a charged battery, the lifting module can be operated again.

Before the operation the control module must be switched on with the on/off switch.

The control module detects the discharged state of the battery. This is signalized by means of a cyclic flashing signal on the LED for error code output and state of charge display. The flashing signal consists of a short flashing (30 ms) of the LED. Followed by a pause of 1 s. Due to the flat discharge curve of the battery, the state of charge display is relatively imprecise. The battery is provided with a deep discharge protection.

10.4 Operation of hand panel and foot switch

By operating the directional key lift (↑) or lower(↓) at the hand panel or foot switch, the lifting module is extended or retracted. Due to the touch control the respective direction key must remain operated during lifting and/or lowering.

An electronic current limitation in the supply unit protects the lifting module against overload. If the lifting module works longer than 1 second in the range of the current limitation, for example due to overload, the stroke module is switched off. The function is restored after release of the push-button operation.

Figure 9: Hand panel and foot switch

10.5 Electrical operating panel for the operation of electrical modules with memory function

Figure 10: Operating panel

The operating panel has eight push-buttons:

- Two directional keys Up(↑) or Down (↓) to adjust the position of the lifting modules.,
- the memory key - memory function (M) and
- position push-buttons (1), (2), (3), (4) and (5).

By pressing the directional key Up (↑) or Down (↓) the lifting modules are moved to the desired position.
In order to store the position, proceed as follows:

- Press push-button (M) simultaneously with one of the position push-buttons (1), (2), (3), (4) or (5) or
- push-button (M) and then on of the position push-buttons, where the position shall be stored.

Then the stored positions can be approached by pressing the position push-buttons (1), (2), (3), (4) or (5) in push-button mode.
The stored positions are durably kept until they are overwritten by a new storage process.
The electronic current limitation integrated in the control protects the lifting modules and the power supply against overload.

11 Maintenance

11.1 Maintenance plan 3822 177

Maintenance works	Interval	by...
Clean the housing and the ventilation slots	daily	Operator
Control of the housing, mains cable and plug	daily	Operator
Visual control of the safety devices	daily	Operator
Visual control of the sticker of the status display	daily	Operator
Replacement	in case of damages	Operator

NOTE

Qualification of the personnel
Pay attention to the qualification of the personnel.

11.2 Cleaning

⚠ CAUTION

Improper cleaning agents
If the product will be cleaned with chemical solvents and cleaners, the product can be damaged.

- Use only the indicated aids for cleaning.

In order to avoid damage of the device due to cleaning, it may only be cleaned as described below.

1 Disconnect the device from the power supply.
2 Remove the battery from the device.
3 Clean the device with a dry and soft cloth.
4 Clean the ventilation slots with a dry brush.

11.2.1 Daily checks

1. Disconnect the device from the power supply.
2. Check if the mains cable is damaged, e. g. damage of the insulation or the plug.
3. Check the housing of the quick battery charger for damage, e. g. cracks.
4. Check ventilation slots so that they are free of contaminations or impurities.
5. Remove contaminations and impurities from the housing and the ventilation slots with a brush.
6. Check if the mandatory sign and name plate are undamaged and available, replace with a new one, if required.
7. Check if the sticker at the status display is undamaged and available, replace with a new one, if required.

Replace the quick charging battery when damaged!

11.3 Repair

NOTE

The product cannot be repaired. In the event of an error it must be replaced.

11.4 As required

NOTE

The control module 3821 270(M) and the battery 3821 175 are maintenance-free.

If the times between the charging cycles are always shorter at the same useful life, the capacity of the battery is no longer sufficient.
In this case:

- Replace battery with an original battery

12 Trouble shooting

12.1 Quick battery charger

Trouble	Cause	Remedy
After the insertion of the battery, no status will be displayed at the status display.	The plug is not correctly connected to the mains.	Check correct position of the plug and adjust, if required.
	The mains cable is defective.	Disconnect the quick battery charger from the mains and replace it.
	Battery inserted incorrectly	Observe insertion direction
LED "device defective" is flashing	The device is defective.	Disconnect the quick battery charger from the mains and replace it.
LED "Battery check" stays lit.	The battery is defective.	Immediately remove the battery from the quick battery charger. Dispose the battery. Use a new battery.
LED "Battery temperature error" flashes	The battery is too cold or too hot.	Wait until the battery has adjusted to the admissible temperature. The quick battery charger will automatically start up the charging process.

12.2 Control module 3821 270(M)

⚠ WARNING

Injury / burning due to contact with energized parts!

- Before working on electric equipment, the energized parts must be de-energized and secured.
- Do not open protection covers at electric parts.
- All electrical works must only be realised by electricians.

⚠ CAUTION

All work by service personnel only!

- All works only to be effected by ROEMHELD service staff.

The control module carries out a series of checks during the operation and reports faults with flash code. This can be visually recognized via a red LED on the housing of the control module. The error code consists of a series of flash pulses followed by a pause. The error code can be determined by counting the flashing pulses between the pauses.

As long as an error is present, the lifting module is out of operation.

Current error messages can be reset by switching off and on the switch of the control module. The lifting module is functional again provided that no further error conditions are existent.

Diagram of the signal curve:

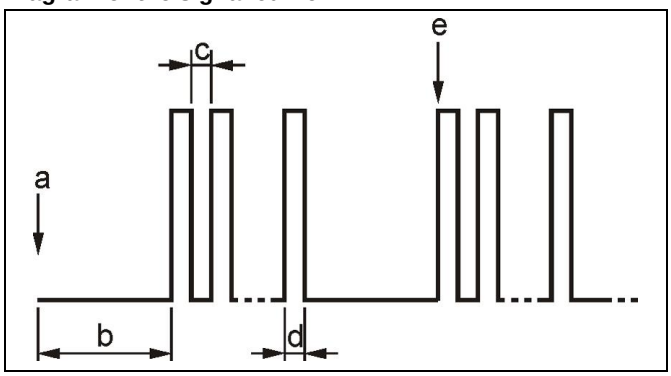

Figure 11: Flow chart of fault signals

a	Trouble
b	0.75 sec
c	0.25 sec
d	0.25 sec
e	n pulses

The currently evaluated errors are listed in the following table.

Number of flashing pulses	Description
2 or 5 or 6 or 7	Reset of the processor during motion command. The microcontroller of the control unit makes a reset while the endurance test is active. This error is used to assist in the development phase and should not occur in customer operations.
3	Undervoltage of the supply of the control. The supply voltage of the control (battery) falls for a period of 50 ms below a value of approx. 20V.
4	Overvoltage of the supply of the control. The supply voltage of the control (battery) exceeds for a period of 50 ms a value of approx. 34V.
8	The lifting module has been overloaded or blocked.
9	Missing stroke information of the lifting module. If there is no change of the stroke signal within the programmed time, this will be interpreted by the control as a fault.
10	Faulty data connection to the keyboard. This error can only occur for keyboards with memory function.
13	High overcurrent by defective component (cross fault) Probably a defective power transistor of the motor control.
14	When controlling, there is no motor current flow. Interruption in motor winding or control.
15	Relative duty cycle exceeded. The admissible relationship between operating and pause time has been exceeded. This can lead to inadmissible heating.

12.3 Control module for 2 lifting modules

⚠ WARNING

Injury / burning due to contact with energized parts!

- Before working on electric equipment, the energized parts must be de-energized and secured.
- Do not open protection covers at electric parts.
- All electrical works must only be realised by electricians.

⚠ CAUTION

All work by service personnel only!

- All works only to be effected by ROEMHELD service staff.

Trouble	Cause	Remedy
Top plate of the operated lifting module does not lift or lower after the operation of the button	No power supply	Check power supply
Top plate of the operated lifting module does not lift or lower after the operation of the button	Plug connection between two modules is loose	Check all plug connections of the system

12.4 Failure handling (only for synchronization controls)

At the control module, there is a luminous diode. This luminous diode signals if the system is ready for work or gives information in case of a fault.

If the control module is ready for work, the luminous diode is constantly lit. If there is a fault, the luminous diode goes out for one second. Then there is a certain number of flashing impulses. The number of impulses is identical with the fault number listed in the following table. After the sequence of impulses there is again a break of 1 second and then again a number of impulses. This procedure is continuously repeated until the remedy of the fault. By counting the impulses, it is easy to determine the fault number.

In case of faults the lifting modules can only be moved in setting mode thereby the trouble is normally reset. Generally faults are reset by switching off and on the control module by means of the mains plug.

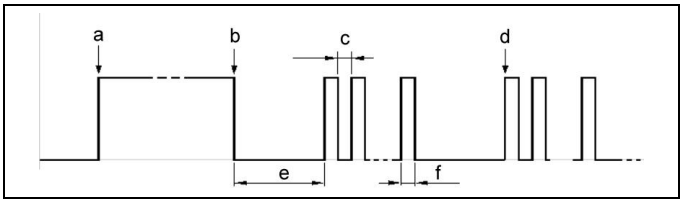

Figure 12: Flow chart of fault signals

a	mains on	d	n impulses
b	fault	e	1.0 sec
c	0.2 sec	f	0.2 sec

Fault number	Fault description
1	Internal fault of the control module. Different faults are summed up below this fault number.
2	Control fault lifting module 1: The motor of the lifting module cannot be controlled. The reason is probably a faulty plug connection to the lifting module. Also a defect motor or a defect control element in the control module could be the reason for this.
3	Control fault liting module 2: The motor of the lifting module cannot be controlled. The reason is probably a faulty plug connection to the lifting module. Also a defect motor or a defect control element in the control module could be the reason for this.
4	Missing stroke information of the lifting module 1. If there is no change of the stroke signal within the programmed time, this will be interpreted by the control as fault. A possible reason can be a failure of the measuring system or the lifting module. Also an overload, where the actuator is in excess current release, can cause such a fault.
5	Missing stroke information of the lifting module 2. If there is no change of the stroke signal within the programmed time, this will be interpreted by the control as a fault. A possible reason can be a failure of the measuring system or the lifting module. Also an overload, where the actuator is in excess current release, can cause such a fault.
6	Too large deviation of the internal stroke information. This fault can occur, if a limit switch gives a faulty signal. The position of the corresponding lifting module would be replaced, while the remaining lifting modules remain on their position value. This fault occurs typically if the plug-type connector to a lifting module will be disconnected during voltage supply of the control. In principle, interruption of the limit switch signal leads to this fault (The limit switch is a break contact).
7	Excess-current release. One or more actuators are overloaded. Too much mechanical load, internal or external blockade or jamming may be the cause. Perform a reference run and check the system.

12.5 Error messages (only for synchronization control)

The synchronization control is equipped with a diagnostic, which executes after connection to the supply power and during operation self-tests of all components which are relevant for the safety and signalizes a recognized fault by a visual and acoustic signal.

Error	Cause	Remedy
Control signals trouble. This is visible by blinking LEDs at the control.	Consider the notes in section fault diagnostic system.	Try first to move the lifting modules in (=>) setting mode to the lower final position. If further fault signals follow, there is a defect in the lifting modules or the control. If that is the case, please contact the after-sales service.

13 Accessory

NOTE

Accessories

- See data sheet.

14 Technical characteristics

Battery 3822 175	
Nominal voltage	25.2 V
Nominal capacity	4500 mAh
Charging current	max. 3A
Operating temperature for charging	10°C…+40°C
Operating temperature for discharge	0°C…+50°C
Storage temperature	-20°C…+35°C
Duty cycle	15% 1.5 min. ON
Dimensions (LxWxH)	135x85x91 mm
Weight	approx. 860g

Quick battery charger 3822 177; 3822 182	
Supply power 3822 182	100…120 V ± 10%
Supply power 3822 177	220…240 V ± 10%
Frequency of supply power	50…60 Hz
Output voltage	9.6…28.8 V
Charging current	2.9 A ± 10%
Power limitation	max. 55 … 70 W
Charging time for 4.5 Ah	approx. 2 h
Environmental temperature - operation	+5°C…+40°C
Environmental temperature - storage	-20°C…+60°C
Protection class	II ⧈
Code class	IP30
Dimensions (LxWxH)	152x86x76
Weight	approx. 550g

Control module for 1 module for modulog lifting modules 3821 270; 3821 270M	
Operating voltage (battery)	25.2 V
Electronic current limitation	8 A
Duty cycle	15%, 1.5 min ON
Protection class	III
Code class	IP 30
Standby current consumption	approx. 7 mA
Electrical connections	Plug connection secured by screw
Weight	approx. 700g

15 Disposal

Hazardous to the environment
Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions.
For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

16 EC-Declaration of conformity

16.1 EC-Declaration of conformity

CE

Manufacturer
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Responsible person for the documentation:
Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

This declaration of conformity applies to the following products:
Battery and holder for a battery of the data sheet M.8201. The following types or part numbers are concerned:

Battery
- 3822 185
- 3822 186

Control module Standard with memory function (for single module without synchronism)
- **3821 270**
- **3821 270M**

Control module Standard with memory function (with two lifting modules in synchronism)
- **3821 416B**
- **3821 416MB**

Battery holder with 1 m cable
- 3821 276 L1000

Battery holder with 3 m cable
- 3821 276 L3000

We hereby declare that the machine described in its design and construction as well as in the version we have placed on the market complies with the essential health and safety requirements according to the following EC directives.

The following additional EU directives were applied:
- **2011/65/EU,** RoHS
- **2013/56/EU** - Batty Directive

The listed products are designed and manufactured in line with the relevant versions of the EC directives **2014/30/EC - EMC directive** (Electromagnetic Compatibility Directive) and in compliance with the valid technical rules and standards.

The products may only be put into operation after it was assessed that the incomplete machine / machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The following harmonised standards have been applied:

DIN EN 62133; 2017-11, Accumulators and batteries with alkaline or other non-acid electrolytes

DIN EN 61326-1; 2013-07, Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1

DIN EN 50581:2013-02; VDE 0042-12:2013-02, Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The technical documents according to the specified guidelines were created for the products.
The manufacturer obligates to provide the special documentation of the products to national authorities on demand.

If the product is modified and not approved by us, this declaration will become invalid.

Laubach, 15.07.2021

i.V. Ralph Ludwig

Ralph Ludwig
Leiter Forschung und Entwicklung

Head of Research and Development

Römheld GmbH
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16.2 EC-Declaration of conformity

CE

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Responsible person for the documentation:
Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

This declaration of conformity applies to the following products:
Quick battery charger of data sheet M8201. The following types or part numbers are concerned:

Quick battery charger
- 3822 177
- 3822 182 Variant for 100…120 VAC

We hereby declare that the machine described in its design and construction as well as in the version we have placed on the market complies with the essential health and safety requirements according to the following EC directives.

The following additional EU directives were applied:
- **2014/35/EU,** Low volltage
- **2011/65/EU,** RoHS

The listed products are designed and manufactured in line with the relevant versions of the EC directives **2014/30/EC - EMC directive** (Electromagnetic Compatibility Directive) and in compliance with the valid technical rules and standards.

The products may only be put into operation after it was assessed that the incomplete machine / machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The following harmonised standards have been applied:
DIN EN 55014-1:2006 + A1:2009 + A2:2011
DIN EN 55014-2:1997 + A1:2001 + A2:2008
DIN EN 61000-3-2:2006 + A1:2009 + A2:2009
DIN EN 61000-3-3:2013
IEC 60355-1: 2010 (5th Edition)
IEC 60355-2-29:2002 (4th Edition) + A1:2004 + A2:2009

The technical documents according to the specified guidelines were created for the products.
The manufacturer obligates to provide the special documentation of the products to national authorities on demand.

If the product is modified and not approved by us, this declaration will become invalid.

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This declaration of conformity applies to the following products:
Holder for rechargeable battery and control module of data sheet M8201. The following types or part numbers are concerned:

Control module Standard with memory function (for single module without synchronism)
- **3821 270**
- **3821 270M**

Control module Standard with memory function (with two lifting modules in synchronism)
- **3821 416B**
- **3821 416MB**

Battery holder with 1 m cable
- 3821 276 L1000

Battery holder with 3 m cable
- 3821 276 L3000

We hereby declare that the machine described in its design and construction as well as in the version we have placed on the market complies with the essential health and safety requirements according to the following EC directives.

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The listed products are designed and manufactured in line with the relevant versions of the EC directives **2014/30/EC - EMC directive** (Electromagnetic Compatibility Directive) and in compliance with the valid technical rules and standards.

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