



Lifting module Range

Max. lifting force 2000 N, stroke from 440 to 940 mm, electro-mechanical telescopic version



1 Description of the product

The drive of the telescopic lifting module Range consists of a 230 V A.C. motor and a spindle drive with trapezoidal spindle. A motor brake in combination with the trapezoidal spindle guarantees safe holding of the driven position.

The telescopic guide unit consists of a precise aluminium profile section with a pre-stressed plain bearing with low friction and without clearance for exact positioning. The compact construction with low height and small width guarantees an unhindered accessibility to the workpiece from all sides. Mechanical and electric interfaces can be easily integrated in the process of automation.

Operation

The operation is made by hand panel or foot switch or alternatively by a primary electric control. Lifting and lowering is triggered by push-buttons with touch control contact. After release of the push-button, the motion will be immediately stopped.

2 Validity of the documentation

These operating instructions are available for lifting modules Range of the following types:

8924-02-XX-E, in the following named product.

3 Target group of this document

- Experts for installation and maintenance with electro-mechanical know-how.

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.

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4 Safety instructions

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.



Mandatory sign!

The symbol stands for important information, necessary protection equipment, etc.

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 For your safety

4.2 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 Safety instructions

The product was manufactured in accordance with the generally accepted rules of the technology.

Observe the safety instructions and the operating instructions given in this manual, in order to avoid personal damage or material damage.

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep these operating instructions so that they are 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.

- You only may start up the product, when it has been found that the incomplete machine or machine, in which the product shall be mounted, corresponds to the country-specific provisions, safety regulations and standards.
- Perform a risk analysis for the incomplete machine, or the machine.

Due to the interactions between the product and the machine/fixture or the environment, risks may arise that only can be determined and minimized by the user, e.g. :

- generated forces,
- generated movements,
- Influence of hydraulic and electrical control,
- etc.

Note

Repair of e.g. Electrical and hydraulic components

- Repair works, as e.g. the change of electrical or hydraulic components may only be effected by the service technicians of the company Römheld.

5.1 Product-specific safety instructions

5.1.1 Safety hazards

When reaching into the lifting area of the lifting module with the fixed connecting construction during the lifting or lowering motion, very serious cutting and bruising injuries can be caused to the leg, the foot, the hand or the arm. Therefore:

- Each person in the user's factory involved in installation, start up, operation, cleaning, maintenance and repair of the product, has to read and to understand the operating instructions and especially the chapter "Safety instructions".
- The operating company has to ensure that only authorised persons, who are instructed with reference to possible dangers and introduced on the basis of the operating instructions, work on the product.
- Do not reach into the working area during the lifting and lowering movement.

When cleaning the lifting module components of the customer's workpiece can fall down or thrown out and this can lead to injuries to the eye or other parts of the body. Therefore:

- For transport, installation, start up, operation, cleaning and maintenance always wear safety goggles and protective shoes. For cleaning and maintenance always wear safety gloves in addition to safety goggles and protective shoes.
- Clean the product only with cleaning clothes.

The lifting module is equipped with an electrical control. In case of unexpected procedure live parts can be touched. Death or very serious injuries can be the consequences. Therefore:

- For works at the electric system the mains cable must be disconnected from the mains.

- Works at the electric system may only be effected by qualified personnel.

To lubricate the interior spindle lifting unit lubricating grease is used. Improper handling and use not in accordance with the regulations lead to health hazards. Therefore:

For cleaning and maintenance always wear safety gloves in addition to safety goggles and protective shoes. Avoid skin contact with lubricating grease.

5.1.2 Emissions

The A valued continuous sound level is less than 75 dB(A) in operation. Sound ranging has been effected as per DIN 45635 part 1.

5.2 Warning

WARNING

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!

5.3 Personal protective equipment



For works at and with the product, wear safety goggles!



For works at and with the product, wear protective gloves!



For works at and with the product, wear safety shoes!

5.4 Safety devices

The below safety devices are for the safety of the operators. As a matter of principle no safety devices may be detached, put out of action or modified.

Used safety devices

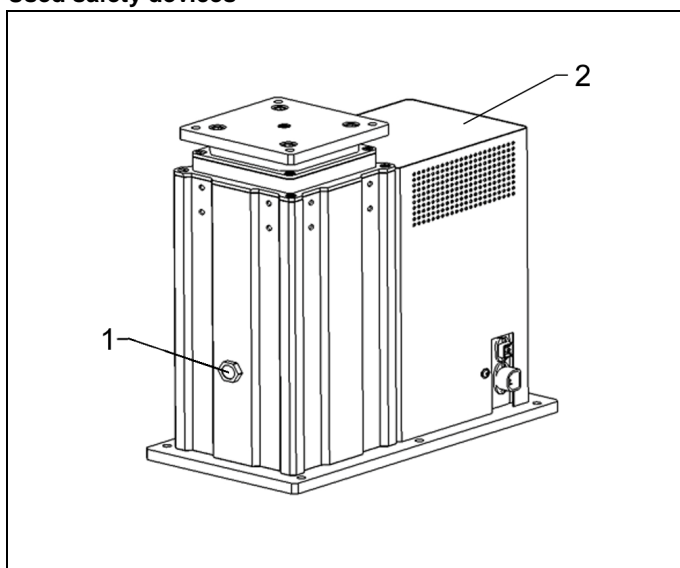


Figure 1: Positions of the safety devices

1 Plug	2 Motor cover
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5.5 Check the safety devices

Note

Use the regulations

- To check the safety device use the check lists "General examination" and / or "Functional testing". Eliminate immediately recognised defects at the safety devices.

Testing intervals

- at the beginning of every shift
- once a week in case of continuous shift
- after each maintenance or repair

Testing content

- Function
- State and position
- Safe fixing

General examination

Covers	Number, available and undamaged	
Screw plugs	Number, available and undamaged	
Name plates with specifications	Number, available, readable and undamaged	
Danger signs	Number, available and undamaged	
Mandatory signs	Number, available and undamaged	
Further safety devices available	available, undamaged and ready for operation	
Testing date:	Tester (signature):	

(Number see "Position of safety devices")

6 Application

6.1 Intended use

The products are used in industrial applications to effect occasional lifting and lowering movements with an electric motor. Furthermore the following belongs to possible uses:

- Max. pressure load only within the lifting force indicated below technical characteristics.
- Position of the gravity centre of the load within the top plate.
- Use only within closed, low-dust rooms
- Use within the capacity indicated in the technical characteristics, pay special attention to the torque load.
- 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.

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 vibrations or other physical / chemical effects 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.
- For applications other than vertical lifting of loads. Hanging operation (e. g. from the ceiling) is inadmissible.
- Not suitable for applications with strong impact loads or strong vibration.

Special solutions are available on request!

7 Installation

7.1 Design

⚠ WARNING

Injury by falling parts!

- Keep hands and other parts of the body out of the working area.
- Wear personal protection equipment!

⚠ CAUTION

Great weight may fall

Some product types have a considerable weight. These have to be secured against working free during transport. Weight specifications see chapter "Technical characteristics".

Transverse forces and forced conditions!

Side loads and forced conditions on the product lead to the premature failure.

- Avoid forced conditions (overdetermination) of the product.
- Max. forces and torques see technical characteristics.



Figure 2: Components

1 Base plate	3 Top plate
2 Guide unit	4 Electric control with connecting inserts for mains cable and push-buttons

8 Transport

⚠ WARNING

Injury due to overturning product!

- Overturning product due to inappropriate means of transportation.
- Do not stand below the load during lifting and lowering, stay outside the danger zone.
- Use suitable means of transportation.
- Pay attention to the weight of the equipment.
- Pay attention that the product is safely located (centre of gravity see instruction sign).

The product is delivered secured on a pallet for transport. The product fixed on the pallet for transport may only be transported to the place of installation by means of a corresponding hand-lift truck or fork lift truck (min. lifting force see technical characteristics).

Pay attention that the pallet for transport with fixed product is safely located on the hand-lift truck or fork lift truck.

8.1 Fixing of the product

⚠ WARNING

Injury due to overturning product!

- Overturning product due to missing or incorrect fixing!
- Fasten bottom plate on the floor.
- When introducing torques within the load limit (see technical characteristics) we recommend to use an additional base plate (accessory) and to secure this plate correctly.

1. Install the product so that for the required cleaning and maintenance works there is all around a clearance zone of at least 700 mm.

2. The product has to be mounted horizontally on a plane and solid concrete floor (concrete strength grade B 25) or a rigid connecting construction of the customer (flatness 0.20 mm).
3. Fasten the base plate of the product with four hexagon socket head cap screws ISO 4762 - M10 onto the concrete floor or the connecting construction of the customer.
4. For this purpose professionally insert into the concrete floor four heavy-duty dowels (e.g. Fischer part-no.: SL M-10 N).

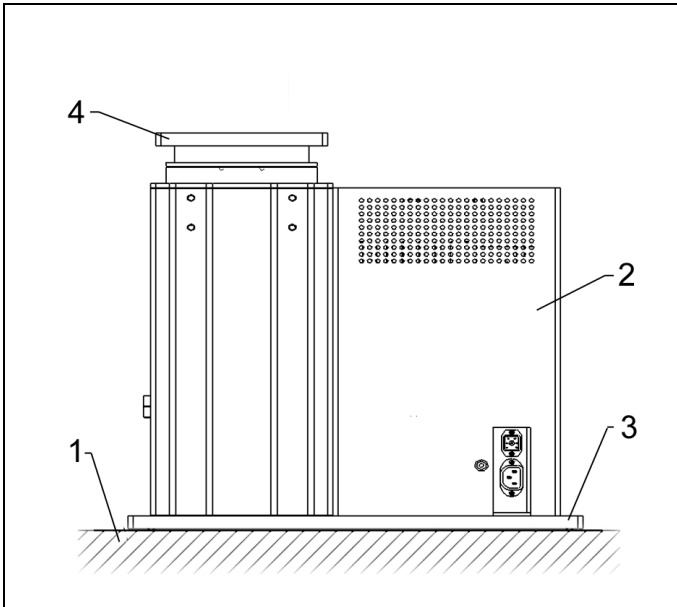


Figure 3: Principle of fixing

1 Concrete floor or connecting construction	3 Base plate
2 Motor cover	4 Top plate

8.2 Mounting of the customer's connecting construction

⚠ WARNING

Injury due to overturning product!

- Overturning product due to eccentric load provided by the user!
- The centre of gravity of the user's load must be within the 4 fixing screws of the bottom plate.
- When introducing torques within the load limit (see technical characteristics) we recommend to use an additional base plate (accessory) and to secure this plate correctly.

1. For fixing of the customer's connecting construction there are 4 bore holes (for M10 - Ø 10.5 mm) at the top plate. All provided bore holes have to be used!
2. Fasten the connecting construction at the top plate.

i 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.

9 Start up

⚠ 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.

Check tight seat (check seating torque of the fixing screws).

For operation one push-button for the function triggering as well as a mains cable 3829-202 (accessories) are required.

i HINWEIS

- The lifting modules must only be used in conjunction with the components which belong to the system. Components, which do not belong to the system or not permitted devices must under no circumstances be connected.

Accessories:

Foot switch:

- 3823-029

Hand panel:

- 3823-025

Mains cable:

- 3829-202

- 1 Connection of the push-button for function triggering to the lifting module: The plug must be inserted into the upper plug connection of the electric control. Then the screw of the cable bushing has to be tightened with a torque of 0.4 Nm.
- 2 Supply voltage: Insert the mains cable into the lower plug connection of the electric control and into a 230V plug with earthing contact.

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.

Injury by crushing!

Components of the product make a movement while they are in operation.

- This can cause injuries.
- Keep parts of the body and items out of the working area!

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!

The operator is obliged to report immediately any changes at the product that may affect the safety to the safety expert or to the person who is responsible for safety and to stop operating the product.

Refrain from any operating method that could affect the safety of the lifting module. The operator is obliged to operate the lifting module only in perfect condition.

10.1 Working place

The working place is planned on the opposite side to the motor cover.

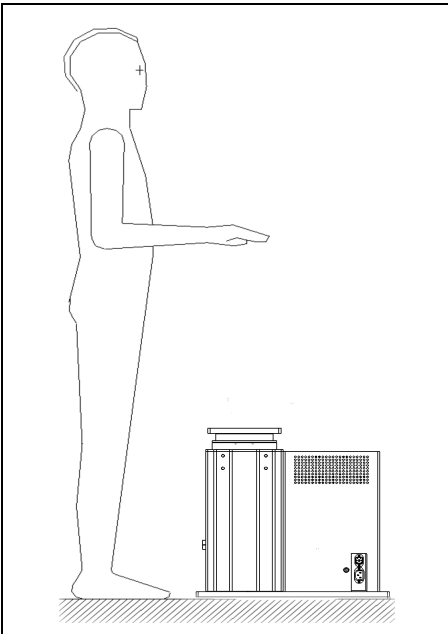


Figure 4: Working place

10.2 Behaviour in an emergency

In emergencies the product may not be operated.

10.3 Lifting and lowering

By operating the directional push-buttons lift (↑) or lower (↓) 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 electro-mechanical over-current release in the electric control protects the lifting module against overload.



Figure 5: Hand panel and foot switch

11 Maintenance

11.1 Plan for maintenance

Maintenance works	Interval	by...
Cleaning	daily	Operator
Check fittings, damages, guiding clearance and protection devices	daily	Operator
Regrease lifting module	After 2000 cycles (lifting and lowering), however at least quarterly	Fitters or industrial mechanics with experiences in dealing with spindle lifting elements.
Wear test of the spindles and nuts	every six months	Fitters or industrial mechanics with experiences in dealing with spindle lifting elements.
Checking of electric system and components	yearly	Expert
Remove the lubricating grease leaking from internal spindle drive	After 50,000 cycles (lifting and lowering), however at least after 5 years	ROEMHELD service personnel
Revision by the manufacturer (recommendation)	After 50,000 cycles (lifting and lowering), however at least after 5 years	ROEMHELD service personnel
Repair	in case of damages	ROEMHELD service staff

i HINWEIS

Pay attention to the qualification of the personnel.

11.2 Cleaning

⚠ WARNING

Injury due to a lifting or lowering movement!

- Before cleaning switch off power supply.

Injury by flying out components or oil!

- For cleaning works always wear safety goggles, protective shoes and safety gloves.

The following cleaning works have to be effected daily at the mechanical components.

1. Clean with cleaning clothes or cleaning rags.
2. Slightly lubricate the metallic components (plates, guides, etc.).

11.3 Checks

To maintain the lifting module in a safe condition and ready for operation the following checks have to be effected:

⚠ WARNING

Injury due to a lifting or lowering movement!

- Before cleaning switch off power supply.

11.3.1 Daily checks

- Visual inspection of the lifting module
- Check the guide unit for damages and possible running marks, repair if required.
- Check safety devices (see chapter "Safety devices").

11.3.2 Half-yearly checks

⚠ WARNING

Injury due to a lifting or lowering movement!

- Before cleaning switch off power supply.
- Check all fixing screws of the lifting module, retighten if required.
- Check all cable fixings and fittings, retighten if required.
- Check the wear of the guide unit based on the guiding clearance. If the backlash is larger than 0.5 mm, the guiding elements have to be exchanged. (see chapter Repair)
- Wear at the threaded spindles and nuts of the internal spindle lifting unit by means of the axial thread backlash (Δs).

For this purpose

- dismantle customer's fixture.
- extend the lifting module stroke/2.
- determine dimension S1 as reference height.
- pull with max. 500 N at the top plate to overcome the axial thread backlash.
- determine dimension S2.

The axial thread backlash (Δs) of the lifting module results as follows: Axial thread backlash $\Delta s1 = s2 - s1$

If the axial thread backlash ($\Delta s1$) of the lifting module is higher than **1.,25 mm** the complete internal spindle lifting unit must be exchanged.

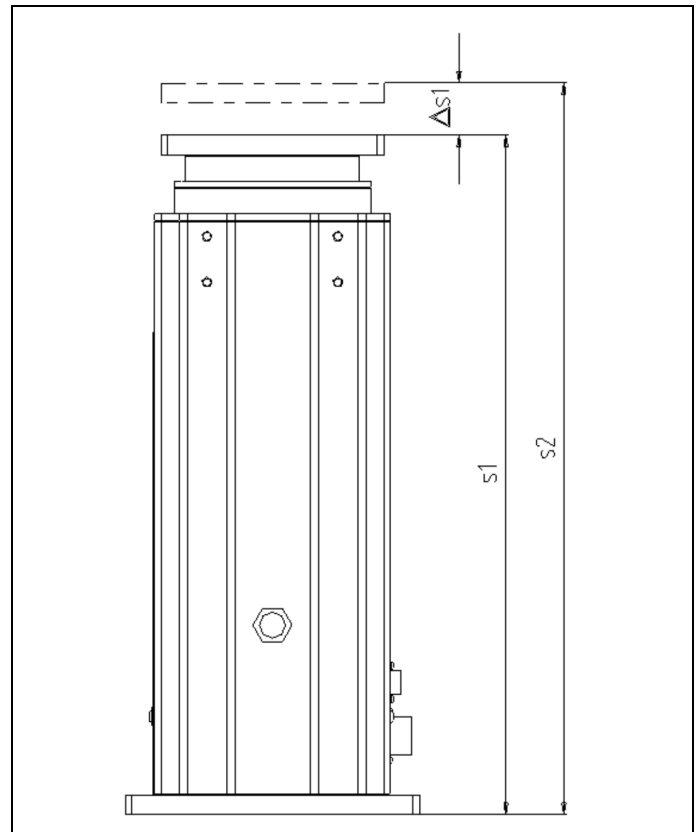


Figure 6: Determination of the axial thread backlash

11.3.3 Yearly checks

⚠ WARNING

Injury due to a lifting or lowering movement!

- Before cleaning switch off power supply.

The electrical components of the lifting module are to be checked by an expert at regular intervals, but at least once a year. The check includes:

- The perfect functioning
- The state of the component
- Check as per BGV A3

11.4 Regreasing

⚠ WARNING

Injury due to a lifting or lowering movement!

- Before cleaning switch off power supply.

Poisoning due to contact with lubricating grease!

For cleaning works and regreasing always wear safety goggles, protective shoes and safety gloves.

The internal spindle lifting unit used in the lifting module is supplied ready for work and is filled with long-lived and good-adhering high-performance lubricating grease.

The lubrication intervals for the spindle unit is fixed to max. 2000 cycles, but at least every three months.

As lubricant use exclusively **Multis Complex EP 2** of the company TOTAL.

For regreasing of the lifting module proceed as follows:

- Actuate the directional push-button lower (↓) of the push-button until the lifting module is completely retracted.
- Switch off supply voltage.
- Remove screw plug (1).

- Regreasing of the interior spindle lifting unit by means of a grease gun through the bore holes in the lifting unit. Per lubrication interval, max. 80 **grams** of lubricant Multis Complex EP 2 may be refilled, otherwise the lubricant can escape. An overfilling is to be avoided!
- Close the bore in the guiding tube by means of the screw plug. (1)
- Switch on supply voltage.
- Repeated retracting and extending of the lifting module by actuating the corresponding directional push-buttons of the button. If necessary, regrease once again.

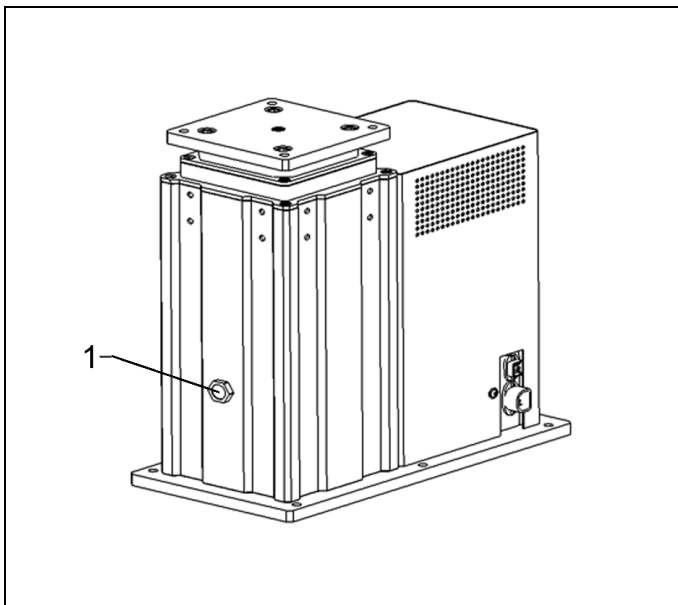


Figure 7: Regreasing

12 Trouble shooting

⚠ WARNING

Injuries, material damages or malfunctions!

- The product must never be opened. At the product no changes must be made, except the ones expressly mentioned in the operating instructions!

Poisoning due to contact with lubricating grease!

For cleaning works and regreasing always wear safety goggles, protective shoes and safety gloves.

Trouble	Cause	Remedy
Interior spindle lifting unit makes extraordinary noises during lifting or lowering (squeaks,...) or vibrates	Spindle lifting unit has no more lubrication	Switch off the lifting module and regrease as per maintenance instructions
	Spindle lifting unit is worn	ROEMHELD service personnel
Lifting module does not make any stroke movement after actuation by the push-button	Plug of the mains cable or the push-button not correctly plugged in	Check and plug in the plug
	Push-button defect	Replace push-button
	Lifting module was overloaded	Switch on overload safety switch by an expert
	Electric control defect, e.g. over-current release, parting of cable, fuses	Check and repair electric control by an expert.
	Final positions were overrun, thus spindle unit moved to the upper or lower stroke end position.	ROEMHELD service personnel

13 Repair

⚠ WARNING

Injuries, material damages or malfunctions!

- The product must never be opened. At the product no changes must be made, except the ones expressly mentioned in the operating instructions!

Repair of electrical components

- Repair works, as e.g. the change of electric components may only be effected by the service technicians of the company Römheld.

14 Technical characteristics

Max. lifting force	2000N
Lifting speed	70 mm/s
Function	electrical
Duty cycle	20% ED
Protection class	I
Code class	IP 54
Electric connection	1/PE(230VAC/50Hz)
Rating	0.75 kW
Control voltage	24 VDC
Safety fuse	16 A, slow
Operation	Hand panel or foot pedal
Adm. environment conditions (storage and operation)	[°C] +5...+40
Adm. relative humidity	[%] 30...75
Adm. environmental pressure	[hPa] 700...1060
Lifting profile	Aluminium, colourless anodised
Top and bottom plate	aluminium, black anodised
Motor cover	Steel sheet, light grey lacquered

Type	Weight	Stroke
8924-02-44-E	73 kg	440 mm
8924-02-54-E	77 kg	540 mm
8924-02-74-E	84 kg	740 mm
8924-02-94-E	91 kg	940 mm

Side loads

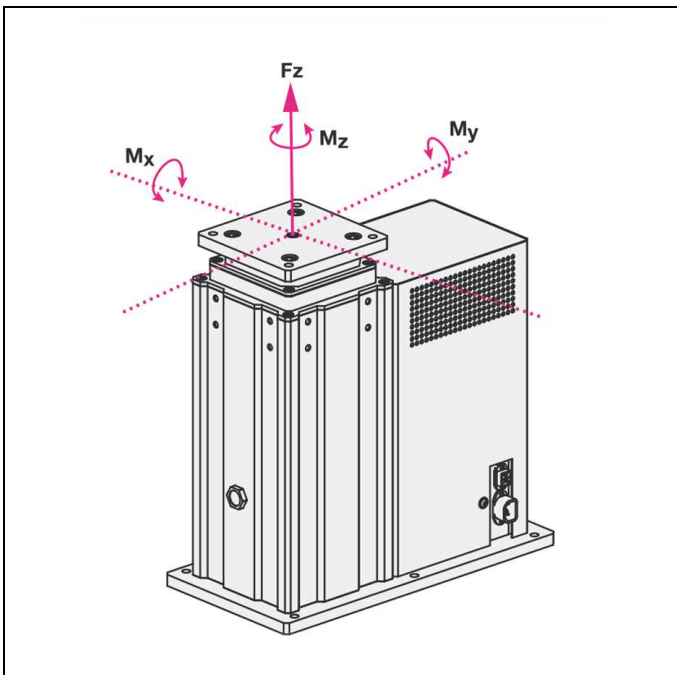


Figure 8: Side loads

Max. load torque M_z	300 Nm
Max. load torque M_x or M_y	500 Nm

In the case of eccentric loads, it is recommended to compensate these by counterweights. In off-position the indicated maximum torques may occur.

The forces and torques have to be considered by the operator. During the lifting motion only 50% of the maximum values are admitted.

Tightening torques

The tightening torques for the fixing screws of the customer's connecting construction are to be taken from the VDI guideline 2230.

15 Accessory

Base plate for increased stability, data sheet M 8.100, M8.110

Part-no.	6311-460
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Electrical accessories, data sheet M 8.200

Foot switch	3823-029
Hand panel	3823-025
Mains cable	3829-202

Further accessory	M8.110, M8.130, M8.131
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16 Disposal

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.



Hazardous to the environment

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

16.1 EC-Declaration of conformity

Manufacturer

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Declaration of conformity

For the purpose of EC Guide Line Machine Tool [mm]
2006/42/CE, Appendix II A

16.2 Validity of the documentation

These operating instructions are available for lifting modules Range of the following types:

8924-02-XX-E, in the following named product.

17 List of the applied standards

2001/95/EC, General product safety

2004/108/EC EMC - Electromagnetic compatibility

2006/95/EC, Low voltage directive

92/58/EEC, Minimum requirements for the provision of safety and/or health signs at work

89/391/EEC, Introduction of measures to encourage improvements in the safety and health of workers at work

89/655/EEC, Minimum safety and health requirements for the use by workers of personal protective equipment at the workplace

2002/95/EC, Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

2002/96/EC Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE)

Operating safety regulations (BetrSichV) for the transposal of the directive on the introduction of measures to encourage improvements in the safety and health of workers at work. (German implementation of the Work Equipment Directive 89/655/EEC)

Product Safety Act - PSG; November 2011

EMC law (Germany)

ElektroG, Act governing the sale, return and environmentally sound disposal of electrical and electronic equipment (Electrical and Electronic Equipment Act - ElektroG) §§ 2, 4, 5, 7, 10

DIN EN ISO 12100, 2011-03, Safety of machinery; Basic concepts, General principles for design (replacement for part 1 and 2)

DIN EN ISO 13857; 2008-06, Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs. (replaces: DIN EN 294)

DIN EN 349, 2008-09, Safety of machinery. Minimum gaps to avoid crushing of parts of the human body

DIN EN ISO 14121-1, 2007-12, Safety of machinery- Risk assessment- Part 1: Principles

DIN EN ISO 13732-1, 2008-12, Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces

DIN EN 614-1 a. 2, 2009-06, Safety of machinery - Ergonomic design principles

DIN EN 626-1, 2008-09, Safety of machinery - Reduction of risks to health from hazardous substances emitted by machinery

DIN EN ISO 13849-1, 2008-12, Safety of machinery - Safety-related parts of control systems - General principles for design

DIN EN ISO 13849-2, 2008-09, Safety of machinery - Safety-related parts of control systems - Validation

DIN EN 1037, 2008-11, safety of machinery - prevention of unexpected start-up.

DIN EN ISO 11201, 2009-11, Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station

EN 50080-1; 1993, Electromagnetic compatibility (EMC) Generic standards - Emission standard for industrial environments

DIN EN 60073; 2003-05, Basic and safety principles for man-machine interface

DIN EN 60204-1; 2007-06, Safety of machinery - Electrical equipment of machines, Part 1: General requirements

EN 60417 Safety of machinery - Electrical equipment of machines - General requirements

Replaced by EN 60204-1

DIN EN 60529; 2000-09, Degrees of protection provided by enclosures (IP- Codes)

DIN EN 61000-6-2; 2006-03, Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environment

DIN EN 61310-1; 2008-09, Safety of machinery - Indication, marking and actuation. Requirements on signals

DIN EN 81714-2, 2007-08, Design of graphical symbols for use in the technical documentation of products

IEC/TS 62046-1; 1998, Safety of machinery - Application of protective equipment to detect the presence of persons

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Laubach, 08.04.2013