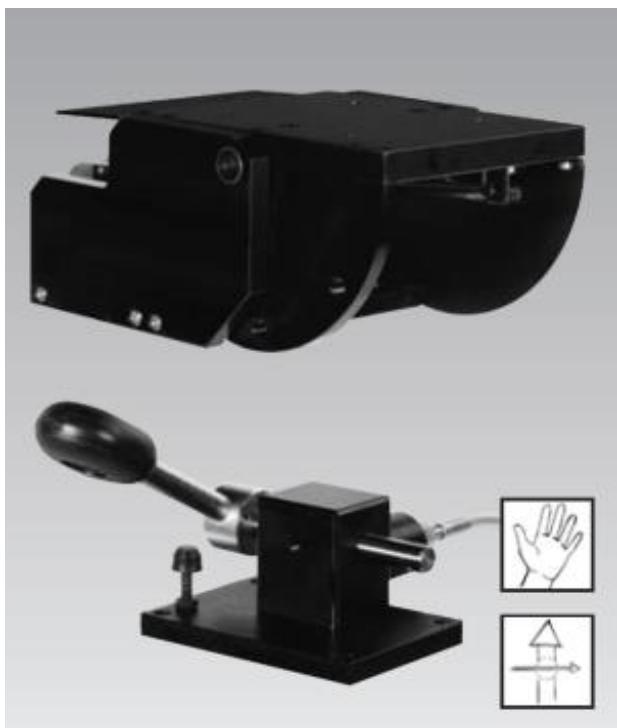




Tilting module KMB 100

max. load 1,000 N, load balanced manual operation



1 Description of the product

Description

The tilting module with pedal-operated indexing offers the possibility of easy manual tilting of heavy components by $\pm 90^\circ$ and their reliable fixing.

The tilting module is equipped with a pneumatic balancer and a brake cylinder that compensates almost completely generated torques during tilting. Therefore only little forces are required for tilting of the component part.

The balancer is adapted to the weight of the component part by a pneumatic pressure reducing valve.

The operating unit of the indexing is connected by a 2 m long hydraulic hose to the tilting module.

This flexible connection allows the individual placement of the operating unit at the most favourable ergonomic position.

The standard indexing positions are set by default (see Technical Data).

Other engagement positions are available on request.

2 Validity of the documentation

Products of data sheet M2101. The following types or part numbers are concerned:

- 6507 0190 OIL – hydraulic release

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydro-mechanical expert knowledge.

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 of function and design of the corresponding components.

A specialist 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 Symbols and signal words

⚠ 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.

ℹ Note

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

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 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/fixtures 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.

6 Application

6.1 Intended use

tilting modules are designed for universal use in assembly and handling processes in the industry.

They are used for industrial/commercial applications in order to tilt workpieces rationally, quickly and safely.

In addition, use in compliance with the intended purpose includes:

- Max. forces and / or torques at the drive and output only with the values indicated below technical characteristics.
- Use only within closed, low-dust rooms
- Use within the capacity indicated below further technical characteristics (see data sheet).
- Use as described in this operating manual.
- Compliance with maintenance 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!

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

The use of these products is not admitted:

- For domestic use.
- On pallets or machine tool tables in primary shaping and metal forming machine tools.
- In areas for which special guidelines apply, especially installations and machines:
 - For the use on fun fairs and in amusement parks.
 - In food processing or in areas with special hygiene regulations.
 - In mines.
 - In explosive and aggressive environments (e.g. ATEX).
- For other operating and environmental conditions.
- With add-on parts that can endanger persons.

7 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).

⚠️ CAUTION

Damage caused by incorrect transport or means of transport!

Lift the product only at the provided devices.

The product is delivered on a transport pallet and may only be transported to the place of destination by corresponding conveyors (pay attention to the weight), or be lifted from the pallet (see figure).



Figure 1: Eyes for lifting

For transport and ease of assembly, several threads M10 for eye bolts are provided in the housing.

8 Installation

8.1 Design

⚠️ WARNING

Injury by dropping parts!

Some products have a heavy weight and can cause injury when dropping.

- Transport products professionally.
- Wear personal protection equipment!

Weight specifications see chapter "Technical characteristics".

⚠️ CAUTION

Heavy weight may drop

- Some product types have a considerable weight. These have to be secured against dropping 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.

Max. adm. operating torque

The maximum operating torque at the operating shaft must not be exceeded.

This can be achieved e.g. by limiting the operating stroke of the customer's operating element (hand lever or pedal) by the floor.

Stroke module, pump lever not operate on bottom base plate

Foot pedal is pressed down below the lower edge of the base plate.

- The customer has to make sure that this will be prevented by the concrete floor or a corresponding base plate connecting construction.

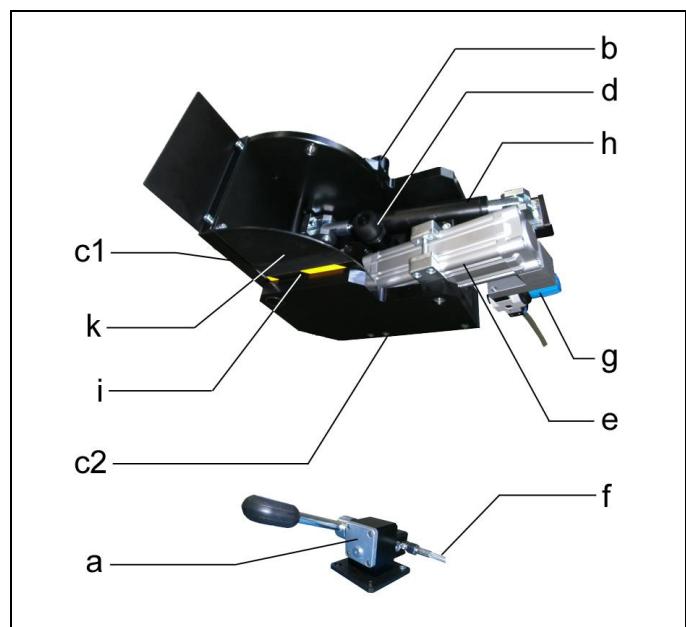


Figure 2: Components, overview

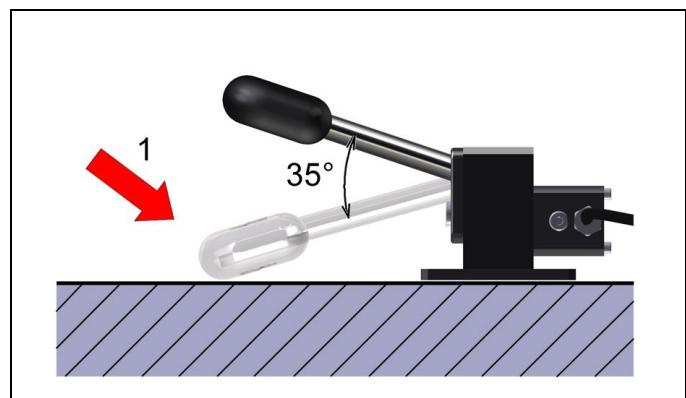


Figure 3: External stop, pedal of the pressure generator

| | | | |
|----|---|---|---|
| a | Pressure generator (transmitter unit) | f | Hydraulic hose |
| b | Hydraulic indexing (receiver unit) | g | Pressure reducing valve with insertion nipple for the connection of pneumatics |
| c1 | Swivel plate with 4 x threads to fix the add-on parts | h | Hydraulic brake cylinder |
| c2 | Fixing plate 4 x counter-bores to fix the tilting module at the fixture | i | Marking swivel plate horizontal, or table vertical (visible, depending on the position) at both sides |
| d | Damper | k | Safety casing |
| e | Pneumatic standard cylinder | 1 | External stop for pedal |

NOTE

Pressure generators, hoses and hydraulic indexing must not be opened.
Penetrating air can lead to malfunction.

8.2 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.

CAUTION
Stroke module, pump lever not operate on bottom base plate

Foot pedal is pressed down below the lower edge of the base plate.

- The customer has to make sure that this will be prevented by the concrete floor or a corresponding base plate connecting construction.

1. Install the product so that for the required cleaning and maintenance works there is all around a clearance zone.
2. Install the product in horizontal position (flatness 0.20 mm) on a flat and sufficiently dimensioned, rigid connecting construction.
3. Fasten the fixing plate of the product with hexagon socket head cap screws ISO 4762 - M10 onto the connecting construction.

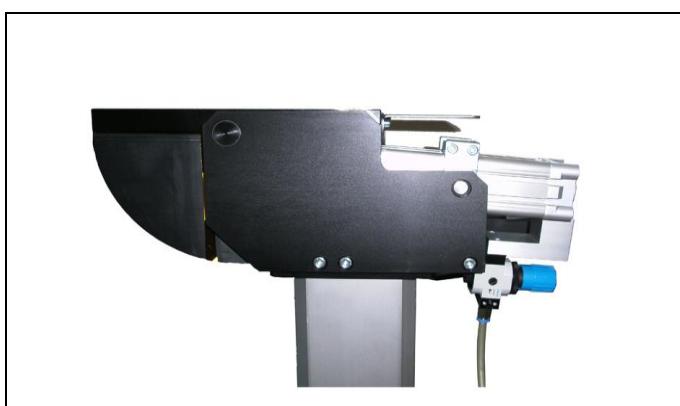


Figure 4: Type of fixing, example on a lifting column.

NOTE
Correct alignment

The tilting module may only be fixed in the shown manner on a fixture or a column.
Other types of fixing are not allowed.

8.3 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.

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.

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

9 Start up

WARNING
Injury by crushing!

- Loads (torques) can lead to an unexpected start of the product.
- When releasing the index, counter hold the existing load.
- Pay attention to an ergonomic working place and max. physical forces.

Injury by crushing!

Due to protruding components there can be pinch points during installation.

- Keep hands and fingers away from pinch points!

In delivery state, the brake cylinder of the tilting module is adjusted to max. load and the pneumatic standard cylinder to 0 bar.

This is to prevent that the customer's load can move unbraked or the swivel plate tilts unintended quickly after mounting.

NOTE
Adjust the cylinders

Both the standard cylinder and the brake cylinder have to be matched to the load.

The following measures are to be implemented after the fixation and the pneumatic connection:

1. Adjust the standard cylinder so that the mass can be moved in a balanced way.
2. Adjust the brake cylinder if the setting is too high.

9.1 Adjust standard cylinder



Figure 5: Adjust the pressure reducing valve

1 Turning knob with locking | 2 Pressure gauge

Pull the turning knob of the pressure reducing valve for unlocking.

- Turn to the right to increase pressure.
- Turn to the left to reduce pressure.

Push the turning knob of the pressure reducing valve for locking.

The index must be engaged or the load (m) must be held.

1. Tilt to position 90°.
2. Depressurise the indexing.
3. Loosen the bolt.
4. Adjustment, see procedure, adjust brake cylinder.

Procedure, adjust brake cylinder:

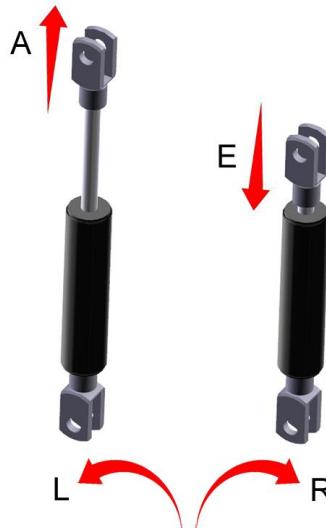


Figure 7: Adjust brake cylinder

| | |
|---|---|
| A Extended | E Retracted |
| L Direction of rotation counterclockwise, low damping, high speed | R Direction of rotation clockwise, high damping, slow speed |

NOTE

Adjust brake cylinder

Adjustment only in **completely** extended (A) or retracted (E) position possible.

1. Firmly hold brake cylinder.
2. Depending on the piston position:
 - a. With extended piston rod:
Adjustment by rotation of the piston rod as per figure.
Slightly pull at the piston during the rotating movement so that the piston engages.
 - a. With retracted piston rod:
Adjustment by rotation of the piston rod as per figure.
Slightly push in the piston during the rotating movement so that the piston engages.
3. With noticeable increase of the resistance during rotation terminate the adjusting process.
ATTENTION: Do not forcibly rotate, otherwise the adjusting segment can be damaged.
4. Control the adjustment of the damping and repeat the steps 1 to 3, if required.

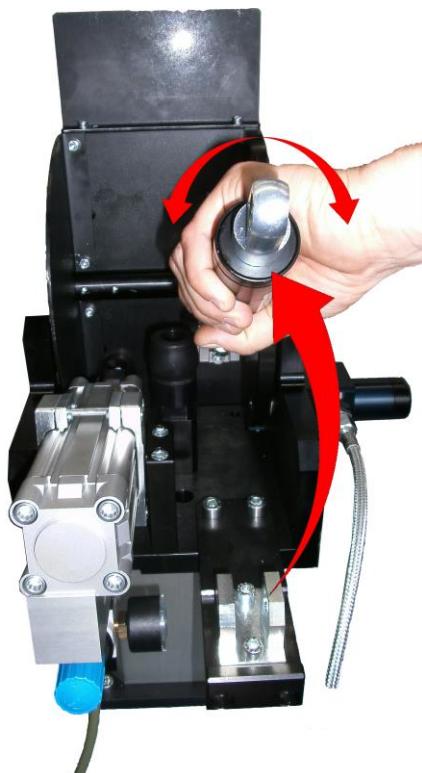


Figure 6: Adjust brake cylinder

To adjust the brake cylinder, loosen the upper bearing and swivel out (see figure)

10 Operation

⚠ WARNING

Injury by crushing!

- Loads (torques) can lead to an unexpected start of the product.
- When releasing the index, counter hold the existing load.
- Pay attention to an ergonomic working place and max. physical forces.

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!

10.1 Hydraulic indexing

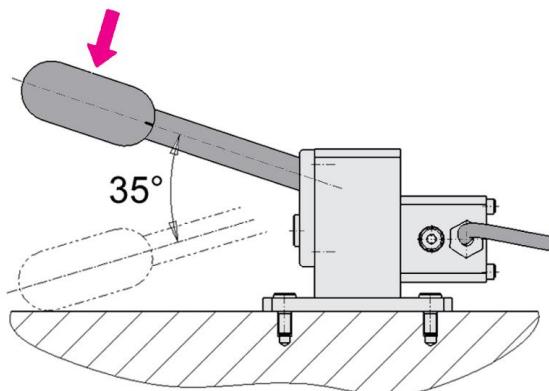


Figure 8: Operation - Indexing operated by a foot pedal

By operating the foot pedal by 35° the index is released and the workpiece or the fixture can be rotated.

If the foot pedal is not operated, the index bolt engages automatically into the next indexing position.

The operation with a foot pedal guarantees that the operator always has both hands free.

10.2 Hydraulic indexing

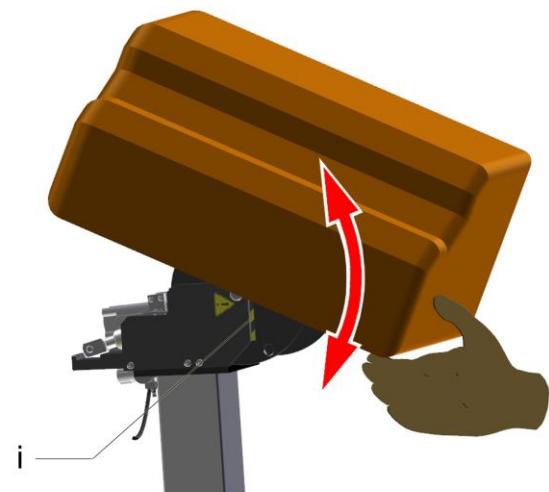


Figure 9: Operation of the tilting module

After operating the hydraulic indexing, the load can be manually tilted.

11 Maintenance

11.1 Plan for maintenance

| Maintenance works | Interval | by... |
|---|---------------------|--|
| Cleaning, visual inspection of the rotating module and control of the indexing | daily | Operator |
| Check tightness and leakage of hydraulic connections (visual control) every day. | | |
| Check all fixing screws, retighten if required. Control of the indexing | half-yearly checks | Expert |
| Check smooth running with little load over the entire rotating range | yearly | Expert |
| Check smooth running with load over the entire rotating range | | |
| An expert has to check all hydraulic hoses at least once a year if they are still work-proof. Assessed damages have to be repaired immediately. | | |
| Hydraulic hoses have to be exchanged in accordance with the BGR 237 with new hydraulics hoses. | after 6 years | Specialist with expert knowledge in hydraulics |
| Revision by the manufacturer (recommendation) | after 50,000 cycles | ROEMHELD service staff |
| Repair | in case of damages | ROEMHELD service staff |

NOTE

Qualification

Pay attention to the qualification of the personnel.

11.1.1 Cleaning

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.).

11.1.2 Monthly checks

- Visual inspection.
- Check the unit for damages and possible running marks, repair if required.
- Check the axial and radial clearance, repair if required.
- Check the indexing for smooth running and clearance

NOTE

Repair works

- Repair works, as e.g. the change of the interior lifting jack may only be effected by the ROEMHELD service technicians.

11.1.3 Yearly checks

Hydraulic system, hydraulic hoses

An expert has to check all hydraulic components at least once a year if they are still work-proof. Assessed damages have to be repaired immediately.

The following checks and works have to be effected:

- An expert has to check all hydraulic hoses at least once a year if they are still work-proof. Assessed damages have to be repaired immediately.
- The hydraulic hoses of the device have to be exchanged as per BGR 237 at least after 6 years by new ones.

11.2 Repair

NOTE

Repair works

- Repair works, as e.g. the change of the interior lifting jack may only be effected by the ROEMHELD service technicians.

11.3 Maintenance of the hydraulic indexing

The rotating module with hydraulic indexing is a compact and functional unit.

It consists of a basic module with integrated indexing mechanism and an operating unit with foot pedal, connected by a 2 m long hydraulic hose.

This flexible connection allows the individual placement of the operating unit at the most favourable ergonomic position.

The rotating operation is manually effected at the workpiece or at the assembly fixture.

The design of the indexing is a closed system.

When opening the system, the preloaded effect will get lost.

To guarantee a system free from air, the transmitter unit, the high-pressure hose and the receiver unit must be flushed.

Procedure:

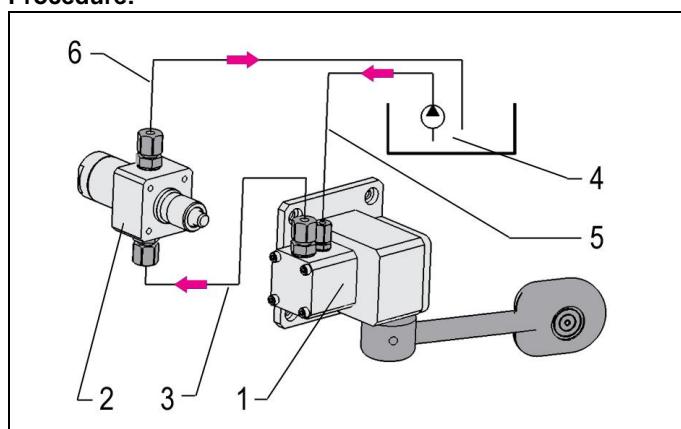


Figure 10: Sketch how to vent the indexing

| | |
|--------------------------|--|
| ▶ Direction of flushing | 4 Pressure generator for flushing, with return line to the reservoir |
| 1 Transmitter unit | |
| 2 Receiver unit | 5 Flushing line |
| 3 High-pressure hose 2 m | 6 Reservoir line |

1. Connection of hose lines (see fig. of the sketch).

NOTE

The ports have to be aligned towards the top.

2. Connect to a pressure generator (preferably to a small power unit).
3. Flush the system several minutes.
Actuate the pedal several times to loosen trapped air bubbles.

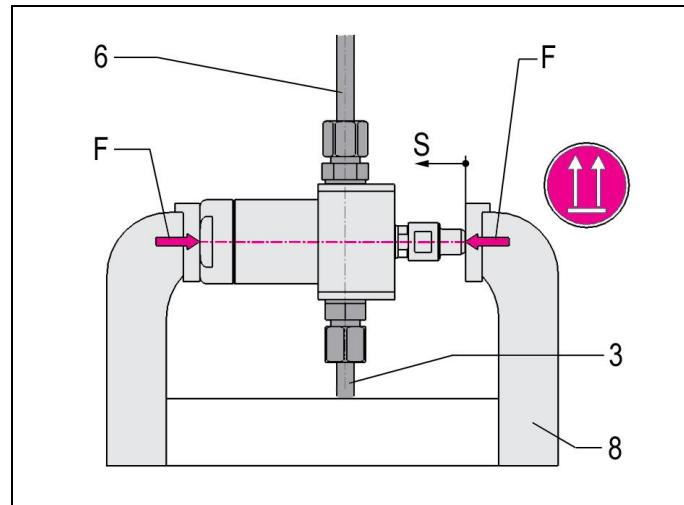


Figure 11: Alignment for bubble free mounting of the fittings

| | |
|----------------------------------|--------|
| ! Pay attention to the oil level | 7 Plug |
|----------------------------------|--------|

4. Align the transmitter unit as shown and remove the flushing line.

NOTE

Align the transmitter unit as shown in the figure.
Oil must be in the connecting port up to the upper edge of the connecting thread.
Refill oil, if required.

Put the plug slightly tilted onto the surface of the oil and screw in.

5. Vent the receiver unit

CAUTION

Injury due to the spring in the subassembly!

The component can slip and the piston extends.
Provide a holding device!

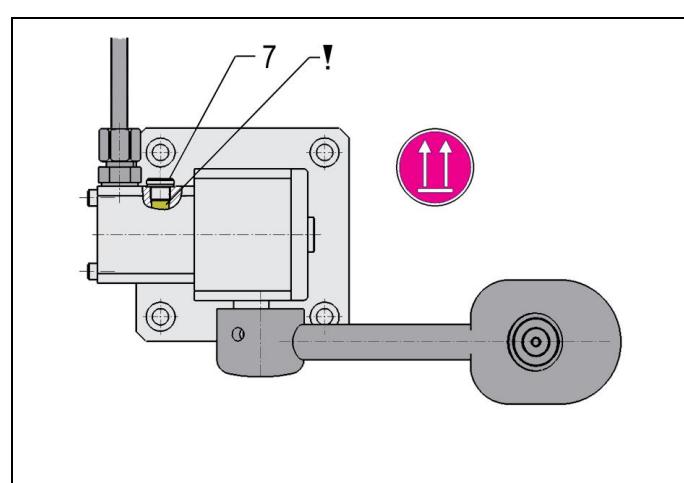


Figure 12: Alignment for bubble free mounting of the fittings

| | |
|--------------------------|--------------------------|
| 3 High-pressure hose 2 m | F Force required |
| 6 Reservoir line | S Stroke approx. 13.5 mm |
| 8 Vice or clamp | |

Receiver unit in shown alignment, in the vice, preload and remove reservoir line.

NOTE

Align the receiver unit as shown in the figure.

Oil must be in the connecting port up to the upper edge of the connecting thread.

Refill oil, if required.

Put the plug slightly tilted onto the surface of the oil and screw in.

6. Loosen the preload of the receiver unit.
7. Check function.

12 Trouble shooting

CAUTION

All work by service personnel only!

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

All tilting modules

| Trouble | Cause | Remedy |
|---|--|--|
| Indexing does not engage | Too fast tilting movement | Slow down tilting movement. Adjust brake cylinder. |
| Swivel plate lowers without operation of the foot pedal | Indexing does not engage | Caution ! Works only to be effected by ROEMHELD service personnel. |
| | Indexing position is not reached | Tilt indexing position 0° or 90° and release the index |
| Clearance in the indexing too large | Wear or max. admissible torques exceeded | Caution ! Works only to be effected by ROEMHELD service personnel. |

Only for indexing with foot pedal

| Trouble | Cause | Remedy |
|-----------------------------|--|--|
| Indexing does not disengage | Air in the hydraulic system Components were opened | Caution ! Works only to be effected by ROEMHELD service personnel. |

13 Technical characteristics

General characteristics

| | |
|--------------------|---|
| Operation: | manual |
| Tilting angle: | 0° and 90° |
| Standard cylinder: | pneumatic, max. balanceable torque 300 Nm, compressed air 0 to 10 bar (adjusting range) |

| | |
|-----------|--|
| Indexing: | hydro-mechanical, operation with pedal. indexing positions 0° / 90°, positioning precision < ±1° |
| Weight: | Tilting module 39 kg Operation 4 kg |

Maximum admissible load

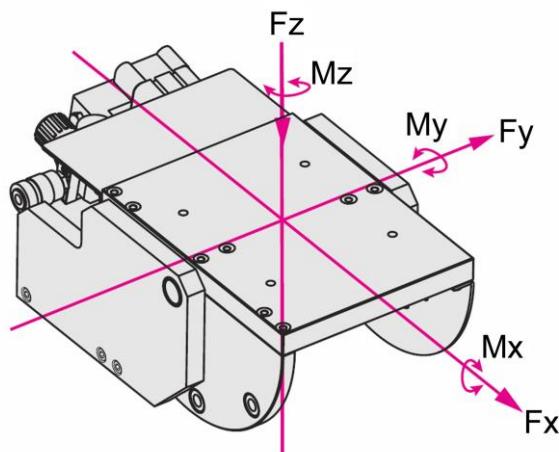


Figure 13: Axes of the introduced forces and torques

M Max. torques in the axes: X, Y or Z F Max. admissible forces in the axes: X, Y or Z

Max. admissible forces

$F_x = \pm 1,000 \text{ N}$

$F_y = \pm 1,000 \text{ N}$

$F_z = \pm 1,000 \text{ N}$

Max. admissible torques

$M_x \text{ or } M_z = 500 \text{ Nm}$

$M_y = 500 \text{ Nm}$ (for the engaged mode)

$M_y = 180 \text{ Nm}$ (for the disengaged mode)

Max. admissible torques

NOTE

Total forces and torques

The total of all occurring forces or torques must not exceed the highest single value.

Balanceable torque

The pneumatic balancer can balance torques up to 300 Nm. The torque, which will be balanced, depends on the existing pneumatic pressure that can be adjusted at the pneumatic pressure reducing valve of the balancer.

Range of adjustment: 0 to 10 bar

NOTE

Further information

- For further technical data see ROEMHELD data sheet. M2101

14 Accessory

NOTE

Accessories

- See data sheet.

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.

Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.

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 Declaration of conformity

**Manufacturer**

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E-mail: info@roemheld.de
www.roemheld.com

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:
Products of data sheet M2101. The following types or part numbers are concerned:

- 6507 0190 OIL – hydraulic release

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:

- **2006/42/EC**, Machinery directive [www.eur-lex.europa.eu]

The following harmonised standards have been applied:

Product Safety Act - ProdSG; [editor: Federal Ministry of Justice and Consumer Protection, Germany]

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

DIN EN ISO 4413, 2011-04, Hydraulic fluid power - General rules and safety requirements for systems and their components

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, 12.08.2022

i.V.

Ralph Ludwig
Head of Research and Development

Römheld GmbH
Friedrichshütte

17 Declaration of conformity

**Importer**

Roemheld (UK) Limited
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SG4 0TY Hitchin

E-Mail: sales@roemheld.co.uk
www.roemheld.co.uk

Authorised person to compile the technical documentation:

Darren Rowell, 28 Knowl Piece, Wilbury Way, SG4 0TY Hitchin.

This declaration of conformity applies to the following products:
Products of data sheet M2101. The following types or part numbers are concerned:

- 6507 0190 OIL – hydraulic release

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 UKCA directives.

The following additional UKCA directives were applied:

- **Directive 2008 No. 1597**, Health and Safety

The following harmonised standards have been applied:

Product Safety Act - ProdSG; [editor: Federal Ministry of Justice and Consumer Protection, Germany]

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

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SG4 0TY Hitchin, 12.08.2022

Darren Rowell
Managing Director,

Roemheld UK Ltd