



Swing clamps without swing stroke

Top flange with reinforced swing mechanism, double acting



1 Description of the product

Hydraulic swing clamps are used for clamping of workpieces when it is essential to keep the clamping area free of straps and clamping components for unrestricted workpiece loading and unloading.

Functional feature of the swing clamps without axial swing stroke:

No swing movement can be carried out without displacing the internal piston.

To swivel the piston rod, the internal piston can only be activated and axially displaced by hydraulic pressure.

An axial force acting only on the clamping arm or on the piston rod does not cause the piston rod to retract and therefore does not cause the clamping arm attached to the end of the piston rod to swing.

However, if an axial pulling force is exerted on the clamping arm or the piston rod, the piston rod is pulled out of the housing of the swing clamp up to the start of the clamping stroke range (clamping stroke 0 mm). No swing motion occurs when in this state. The fixture manufacturer must ensure construction in such a way that removal of the workpiece is prevented.

If a collision while swinging from unclamped to clamped occurs, the swing clamp in the current swing position moves axially in the clamping direction without continuing to swing. This must be taken into account in the risk assessment and collision analysis.

The capacity of the swing clamp (see the data sheet or installation drawing) must be observed.

Table of contents

1	Description of the product	1
2	Validity of the documentation	2
3	Target group of this document	2
4	Symbols and signal words	2
5	For your safety	2
6	Application	3
7	Installation	3
8	Start up	7
9	Maintenance	8
10	Trouble shooting	8
11	Technical characteristics	8
12	Storage	9
13	Disposal	9
14	Declaration of manufacture	10

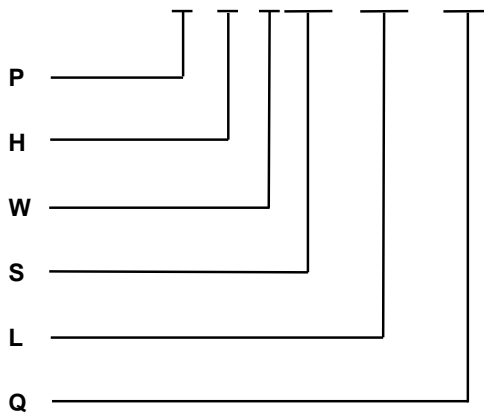
- Radial anti-rotation device in the clamping stroke
With swivelling clamping devices, workpieces can also be machined overhead. In the event of a sudden drop in clamping pressure, the radial anti-rotation device prevents the clamping arm from swivelling back. The workpiece is then no longer clamped. However, a sensible arrangement of several swing clamps and workpiece positioning aids can prevent the workpiece from falling out of the fixture.
- Reinforced swing mechanism
The reinforced swing mechanism ensures that the angle position of the clamping arm remains the same even if a slight collision with the workpiece during loading and unloading or during clamping occurs.

2 Validity of the documentation

This document applies to the following products:

Swing clamps without swing stroke of data sheet B18807. The following types or part numbers are concerned:

ID. V1SAA X B X 5 X XXX H XXX W XXX ONE



ID Part no.	S Swing angle
P Size	015 = 15° 055 = 55°
D = Size 1	020 = 20° 060 = 60°
L = Size 2	025 = 25° 065 = 65°
R = Size 3	030 = 30° 070 = 70°
H Clamping arm seat	035 = 35° 075 = 75°
K = Cone 1:10	040 = 40° 080 = 80°
P = Pendulum eye	045 = 45° 085 = 85°
G = Fork head	050 = 50° 090 = 90°
W Swing direction	L Clamping stroke
R = Clockwise	Size 1
L = Counter-clockwise	008 = 8 mm
0 = Without swing motion	015 = 15 mm
	Size 2 and 3
	012 = 12 mm
	025 = 25 mm
	Q Angle of clamping position W
	For cone 1:10
	000 = 0°
	For pendulum eye and fork head
	000 to 175= 0° to 175°

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydraulic 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 (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

⚠ 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/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.

6 Application

6.1 Intended use

The products are used in industrial / commercial applications to transform hydraulic pressure into movement and /or force. They must only be operated with hydraulic oil.

Furthermore the following belongs to possible uses:

- Use within the capacity indicated in the technical characteristics.
- 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!

Modifications can lead to weakening of the components, reduction in strength or malfunctions.

- Do not modify the product!

The use of the products is not authorised:

- For domestic use.
- For use at fairgrounds and amusement parks.
- In food processing or in areas with special hygiene regulations.
- In mines.
- In ATEX areas (in explosive and aggressive environments, e.g. explosive gases and dusts).
- If physical effects (welding currents, vibrations or others) or chemically acting media damage the seals (resistance of the seal material) or components and this can lead to functional failure or premature failure.

Special solutions are available on request!

7 Installation

WARNING

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Improper connection can lead to escapes of oil under high pressure at the connections.

- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil under high pressure.

- Before using them make a visual control.

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".

Poisoning due to contact with hydraulic oil.

Wear, damage of the seals, aging and incorrect mounting of the seal kit by the operator can lead to escapes of oil.

Incorrect connection can lead to escapes of oil at the ports.

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

7.1 Design

This hydraulic clamping element is a pull-type cylinder where a part of the total stroke is used to swing the piston.

The swing stroke is not visible.

Thereby the clamping points are free for loading and unloading the fixture.

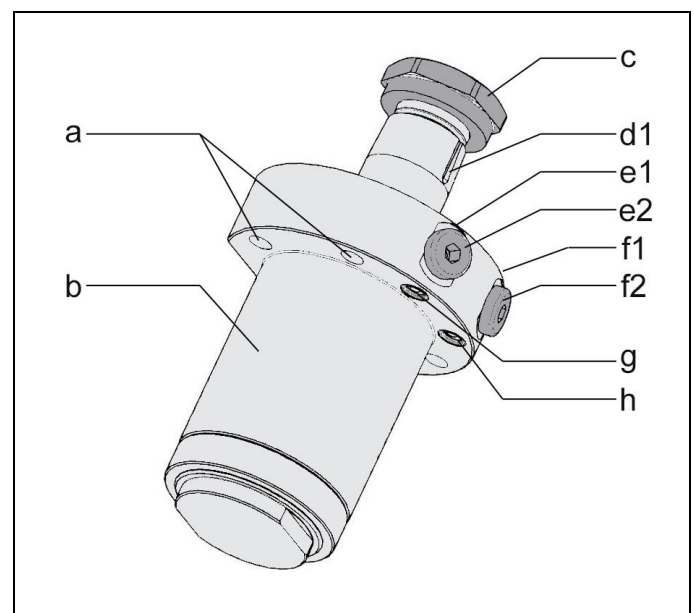


Fig. 1: Component with cone

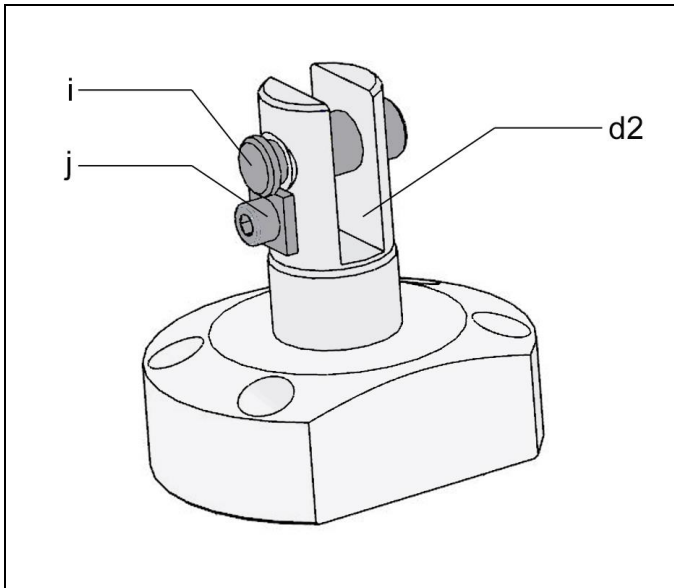


Fig. 2: Component with fork head

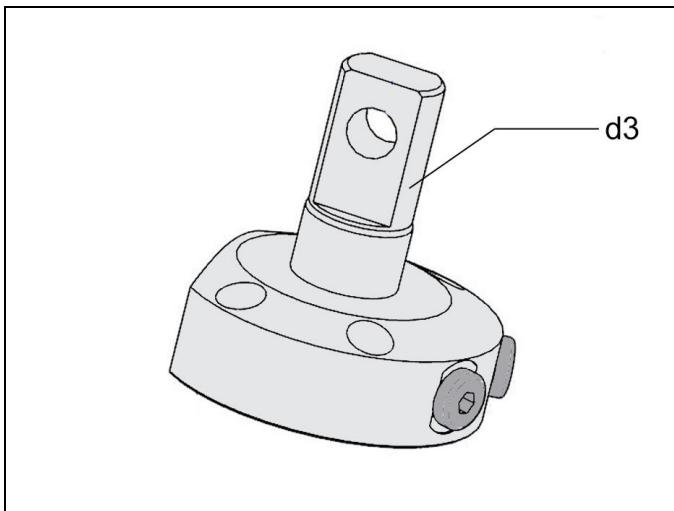


Fig. 3: Component with pendulum eye

a Mounting holes (4x)	e2 Screw plug port A
b Body	f1 Bleeding screw port B
c Fixing nut	f2 Screw plug port B
d1 Piston with cone and indexing mark	g Port A
d2 Piston with fork head	h Port B
d3 Piston with pendulum eye	i Bolt
e1 Bleeding screw port A	j Fixing screw with disk

7.2 Setting the throttle valve (accessory)

NOTICE

Connection through drilled channels

This application is only possible when using drilled ducts as connections because the throttle valves are screwed into the existing G1/8 pipe connections.

Throttling too strong

In the case of strong throttling, increasing back pressure upstream of the throttle valve can trigger premature switching of pressure switches and sequence valves.

To throttle the retracting or extension speed of the piston, turn the adjusting screw (m) in direction a using a 2.5 mm Allen key.

To increase the extension speed, turn the adjusting screw (m) in direction b.

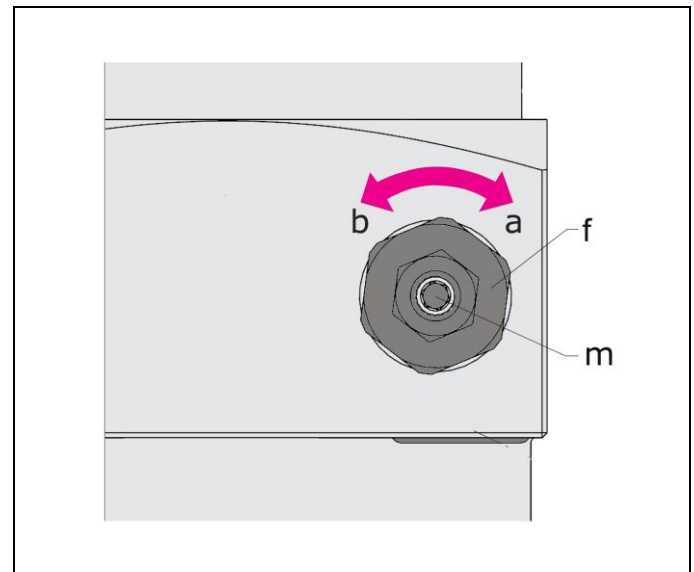


Fig. 4: Throttle valve

f Throttle valve	m Adjusting screw
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7.3 Swing angle and direction

The swing clamps are available with standard swing angle of 90°.

"Swing direction cw" means clockwise rotation, looking from above onto the piston (from unclamped position to clamped position).

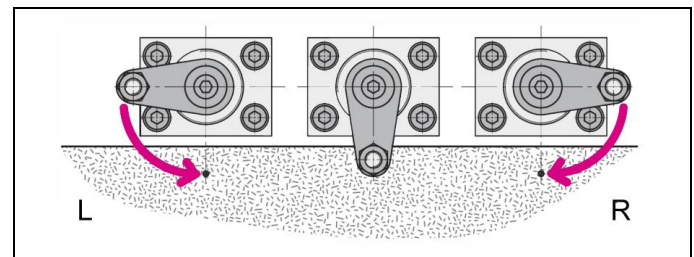


Figure 5: Swing direction (L =counterclockwise "ccw", R = clockwise "cw")

7.4 Mounting types

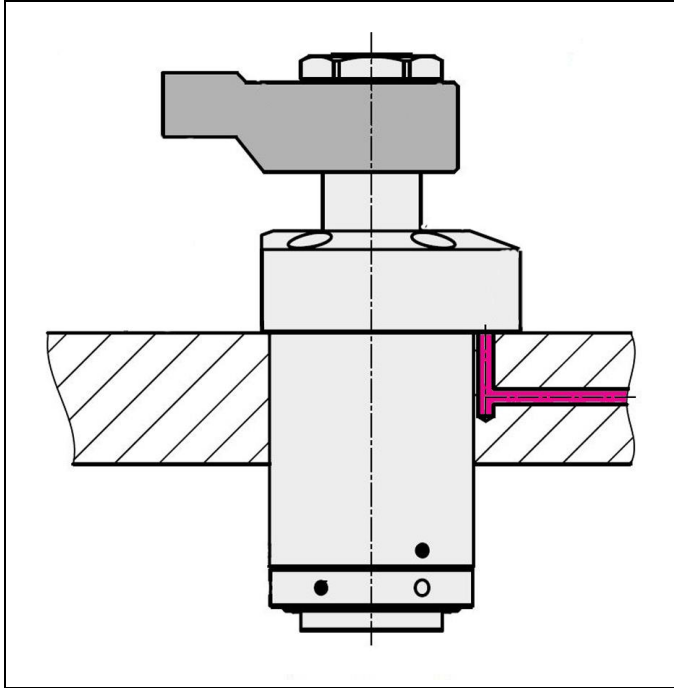


Fig. 6: Flange version (hydraulic connection without tubes)

7.5 Admissible oil flow rate

⚠ WARNING

Injury due to overload of the element

High-pressure injection (squirting out of hydraulic oil under high pressure) or flying components!

- Due to throttling or closing of ports a pressure intensification can occur.
- Connect the ports professionally!

⚠ CAUTION

Malfunction or early failure

Exceeding the max. flow rate can lead to overload and premature failure of the product..

- The maximum flow rate must not be exceeded!

7.5.1 Calculation of the admissible flow rate

Admissible flow rate

The admissible flow rate or the admissible stroke speed is valid for vertical mounting positions in combination with standard add-on parts as clamping arms or contact bolts, etc.

In case of other mounting positions and/or add-on parts the flow rate has to be reduced.

If the pump flow rate divided by the number of elements is larger than the admissible flow rate of one element, the flow rate has to be throttled.

This prevents an overload and therewith an early failure.

The flow rate can be checked as follows:

$$Q_P \leq 0,06 \cdot \dot{V}_Z \cdot n \text{ and/or } Q_P \leq 6 \cdot v_Z \cdot A_K \cdot n$$

Maximum piston speed

At specified pump flow rate Q_P and with the effective piston area A_K the piston speed can be calculated as follows:

$$v_m < \frac{Q_P}{6 \cdot A_K \cdot n}$$

Legend

\dot{V}_Z = Admissible flow rate of the element in [cm³/s]

Q_P = Flow rate of the pump in [l/min]

A_K = Piston area in [cm²]

n = Number of elements, same dimensions

$v_Z = v_m$ = Admissible/maximum stroke speed in [m/s]

NOTE

Flow rate

- For the max. flow rate, refer to the installation drawing.

Further "things worth knowing about hydraulic cylinders, basics, detailed knowledge and calculations on hydraulic cylinders" see Technical information on the internet!

7.6 Installation of manifold-mounted types

1. Drill the holes for hydraulic oil supply and return in the fixture (see also data sheet or installation drawing).
2. Grind or finish mill flange surface ($Ra \leq 0.8$ and a flatness of 0.04 mm to 100 x 100 mm. Marks, scratches, shrink holes are not admissible on the surface).
3. Clean the support surfaces.
4. Position and fix on the fixture.

NOTICE

Pipe connection

Both O-rings (h) must also be (see chapter Design) inserted for pipe connection.

Use screw material 12.9

Tightening torques for screw material 12.9 (see chapter Technical data).

7.7 Connection of the hydraulic equipment

1. Connect hydraulic lines to qualifying standards and pay attention to scrupulous cleanness (A = Clamp, B = Unwind)!

NOTE

More details

- See ROEMHELD data sheets A 0.100, F 9.300, F 9.310 and F 9.360.

Screwed Plug

- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

Hydraulic connection

- Do not use sealing tape, copper rings or coned fittings.

Pressure fluids

- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

7.8 Assembly and disassembly of the clamping arm

⚠ WARNING

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!

⚠ CAUTION

Damage or functional failure

Internal components can be damaged when tightening and loosening the fixing nut.

- It is imperative to back up the piston.
- No torques must be introduced into the piston.
- The conical surfaces of the piston and the clamping arm must be clean and grease free!

i NOTICE

Tightening and loosening the fixing nut

When tightening and loosening the fixing nut, the clamping arm or the hexagon socket in the piston have to be held in place. It is recommended to tighten and loosen when clamped.

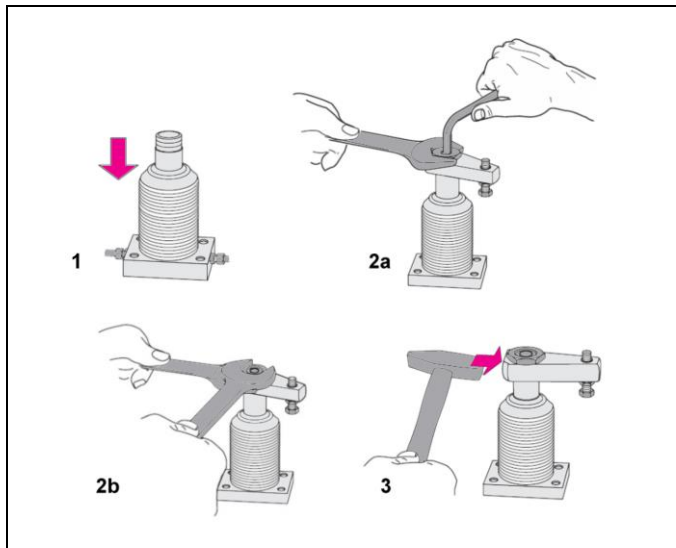


Fig. 7: Assembly/disassembly (example)

7.8.1 Assembly of the clamping arm - with pressure

1. Retract piston and pressurise clamping line (port A) (Fig. Assembly, **Pos. 1**).
2. Put the clamping arm in the intended clamping position.
3. Fasten fixing nut and hold clamping arm with an Allen key (Tightening torque of the fixing nut for the clamping arm see technical characteristics. Fig. Assembly, **Pos. 2**).
4. Clamp several times.
5. Check if the clamping point is within the clamping stroke (Fig. Adjustment of the clamping arm, **Pos. 2**).

7.8.2 Assembly of the clamping arm - without pressure

1. Put the clamping arm onto the piston.
2. Move the piston manually to the clamping position.
3. Align clamping arm.
4. Fasten fixing nut with an Allen key and hold the clamping arm with an open-ended wrench (Tightening torque of the fixing nut for the clamping arm see technical characteristics. Fig. Assembly, **Pos. 2**).
5. Clamp several times.

6. Check if the clamping point is within the clamping stroke (Fig. Adjustment of the clamping arm, **Pos. 2**).

i NOTE

Tightening torque of the fastening nut

- Tightening torque of the fixing nut for the clamping arm see technical characteristics.

7.8.3 Disassembly of the clamping arm - without pressure

⚠ CAUTION

Damage or functional failure of the piston rod guide

Hard blows may impair the function of the product or lead to failure.

- No direct or indirect blows may be used to loosen the clamping arm.

1. Loosen the fixing nut one revolution. Hold the clamping arm with an Allen key (**Pos. 2b**).
2. Hammer **slightly** onto the front face to loosen the clamping arm (**Pos. 3**).

7.9 Assembly of the clamping arm with pendulum eye

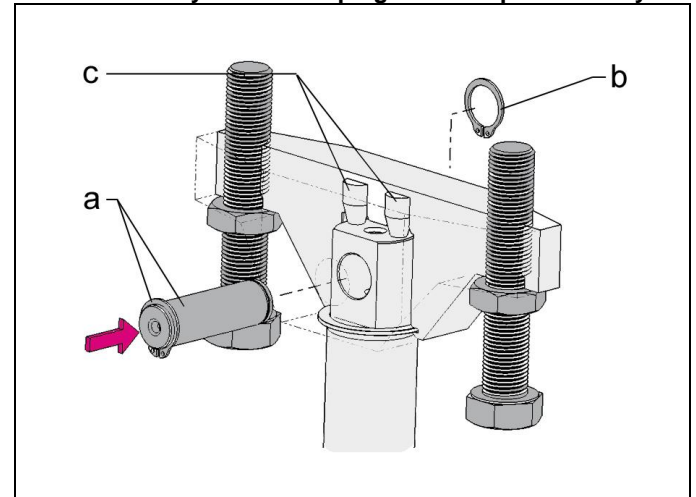


Figure 8: Assembly and disassembly of the pendulum clamping arm

a Bolt with safety ring	c Spring element for return to zero position
b Safety ring	

Procedure:

- Check completeness of components and their position.
- Put on and align clamping arm.
- Mount the safety ring on one side of the bolt (**a**).
- Insert the bolt into the bore hole.
- Mount safety ring (**b**).

7.10 Assembly of the clamping arm with fork head

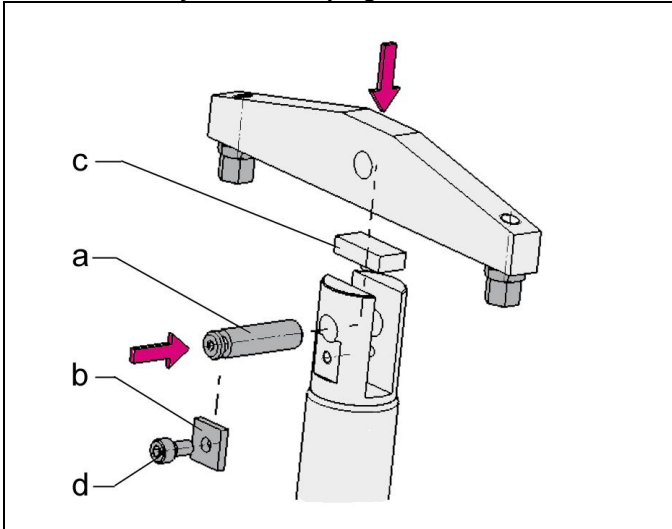


Figure 9: Assembly and disassembly of the pendulum clamping arm

a Bolt	d Socket head cap screw, to the secure the square washer
b Square washer	
c Spring element for return to zero position (not included in the delivery)	

Procedure:

- Check completeness of components and their position.
- Insert and align clamping arm.
- Insert the bolt into the bore hole.
- Position the square washer (b) in the slot of the bolt.
- Secure the square washer by means of the socket head cap screw (d).

7.11 Adjustment of contact bolt

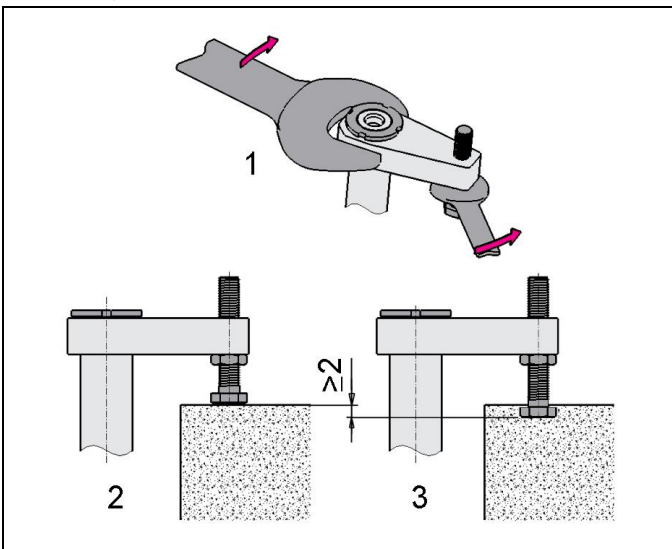


Figure 10: Adjustment of the clamping arm (example)

1. Loosen the lock nut at the contact bolt and completely turn back the contact bolt. (Fig. Adjustment of the clamping arm, Pos. 1).
2. Move the clamping arm to the clamping position above the workpiece. (Pay attention to the tolerance of the swing angle)
3. Screw out the contact bolt until it contacts the workpiece. (Fig. Adjustment of the clamping arm, Pos. 2).

4. Move the clamping arm back to the unclamping position.
5. Unscrew the contact bolt again by the half of the clamping stroke.
6. Tighten the lock nut at the contact bolt. Hold the clamping arm with an open-ended wrench. (Fig. Adjustment of the clamping arm, Pos. 1).

7.11.1 Check adjustment of the contact bolt

1. Move the clamping arm, with throttled flow rate and low pressure to the clamping position onto the workpiece. Pay attention that the contact bolt touches the workpiece only after completion of the swing stroke.
2. Measure and note the distance between clamping arm and upper edge of the workpiece in clamped condition (Pos. 2).
3. Unclamp swing clamp again.
4. Unload workpiece out of the fixture.
5. Clamp swing clamp again.
6. Measure the distance as described below item 2. The distance measured now should be at least 2 mm smaller .

8 Start up

⚠ WARNING

Poisoning due to contact with hydraulic oil.

Wear, damage of the seals, aging and incorrect mounting of the seal kit by the operator can lead to escapes of oil.

Incorrect connection can lead to escapes of oil at the ports.

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

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!

⚠ CAUTION

Injury due to bursting or malfunction

Exceeding the max. operating pressure (see technical data) can cause the product to burst or malfunction.

- The maximum operating pressure must not be exceeded.
- If necessary, avoid overpressure by using suitable valves.

- Check tight seating (check tightening torque of the fixing screws, see chapter "Technical characteristics").
- Check tight seating of hydraulic connections (check tightening torque of the hydraulic connections, see chapter "Technical characteristics").
- Bleed the hydraulic system.

ℹ NOTE

Clamping time

- Without bleeding the clamping time will be considerably prolonged and function problems may occur.

8.1 Bleeding of manifold-mounted types

1. If the oil pressure is low, carefully loosen the fixture's bleeding screws or the fittings on the swing clamp.
2. Pump until bubble-free oil comes out.
3. Tighten the bleeding screws

Size	Screw size	Torque
D	M3	1.5
L	M4	3
R	M5	6

4. Check for correct function.
5. Check the hydraulic connections for leaks.

8.2 Admissible operating pressure

NOTE

Various Clamps

- The swing clamps are designed for a maximum pressure (see chapter Technical characteristics).
- According to the version of the used clamping arm, the operating pressure must be reduced considerably.

9 Maintenance

WARNING

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

9.1 Cleaning

CAUTION

Material damage, damage to moving components

Damage to piston rods, plungers, bolts, etc., as well as wipers and seals can lead to leakage or premature failure!

- Do not use cleaning agents (steel wool or similar) that cause scratches, marks or the like.

Material damage, damage or functional failure

Aggressive cleaning agents can cause damage, especially to seals.

The product must not be cleaned with:

- corrosive or caustic substances or
- organic, solvents such as halogenated or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.).

The product must be cleaned at regular intervals, especially the area of the piston or the plunger housing has to be cleaned from swarf and other liquids.

In the case of heavy contamination, the cleaning has to be made in shorter intervals.

9.2 Regular checks

1. Check tightness of hydraulic connections (visual control).
2. Check running surfaces (of the piston rod or bolt) if there are marks and scratches. Traces of marks can be an indication for a contaminated hydraulic system or an inadmissible side load of the block cylinder.
3. Leakage check at the housing - piston rod, bolt or flange.
4. Clamping force control by pressure control.
5. Check if the maintenance intervals are kept.

9.3 Exchange seal kit

The exchange of the seal kit has to be made in case of external leakages. For high availability we recommend to change the seals at the latest after 500,000 cycles or 2 years.

Due to the complex design a seal exchange must only be effected by ROEMHELD service personnel.

CAUTION

Maintenance and repair work

All maintenance and repair works only to be effected by ROEMHELD service staff.

10 Trouble shooting

Interference	Cause	Remedy
Piston rod with clamping arm does not retract:	Clamping pressure is not available or too low	Check at the pressure generator if pressure is available and high enough (minimum pressure: 20 bar)
Swing angle is not completely effected or exceeded (tolerance of end position $\pm 2^\circ$):	Too much clearance in the swing mechanism	Repair must be performed by ROEMHELD
Piston rod has too much play:	Guide or helix rod are worn out	Replace swing clamp, if necessary to be checked by ROEMHELD service personnel
Clamping pressure reduces due to leakages at the swing clamp:	Wear at the seals	Replace swing clamp, if necessary to be checked by ROEMHELD service personnel

11 Technical characteristics

Characteristics

Size	Min. operating pressure (bar)	Max. operating pressure (bar)
1	20	250
2		
3		

*) Values dependent on the operating pressure used, see diagram in the data sheet.

Size	1	2	3
Clamping stroke (mm)	8/15*	12/25*	12/25*
Weight approx. (kg)	0.9	2.3	5.4

*) Clamping stroke swing clamp without swing motion.

Size	Tightening torque of the fastening screw 12.9 (Nm)
1 (M5)	10
2 (M6)	18
3 (M10)	84

Size	Tightening torque of the fixing nut of the clamping arm (Nm)
1	16
2	50
3	110

NOTE

Further information

- For further technical data see ROEMHELD data sheet.

12 Storage

CAUTION

Damage due to incorrect storage of components

In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion on/in the element can occur.

- Storage in the packaging and moderate environmental conditions.
- The product must not be exposed to direct sunlight, since UV light may cause serious damage to the seals.

The elements are tested by default with mineral oil. The exterior of the elements is treated with a corrosion inhibitor.

The oil film remaining after the test provides for a six-month interior corrosion protection, if stored in dry and uniformly tempered rooms.

For longer storage times, the element has to be filled with a non-resinifying corrosion inhibitor and the outside surfaces must be treated.

13 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.

14 Declaration of manufacture

Manufacturer

Römheld GmbH Friedrichshütte
Römheldstraße 1-5
35321 Laubach, Germany
Tel.: +49 (0) 64 05 / 89-0
Fax: +49 (0) 64 05 / 89-211
E-mail: info@roemheld.de
www.roemheld.com

Responsible person for the documentation:

Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

Declaration of manufacture of the products

They are designed and manufactured in line with the relevant versions of the directives **2006/42/EC** (EC MSRL) and in compliance with the valid technical rules and standards.

In accordance with EC-MSRL, these products are components, that are not yet ready for use and are exclusively designed for the installation in a machine, a fixture or a plant.

According to the pressure equipment directives the products are not to be classified as pressure reservoirs but as hydraulic placing devices, since pressure is not the essential factor for the design, but the strength, the inherent stability and solidity with regard to static or dynamic operating stress.

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 manufacturer commits to transmit the special documents of the products to state authorities on request.

The technical documentation as per appendix VII part B was prepared for the products.

Laubach, 24.03.2025