Warranty conditions for clamping systems

The general terms and conditions of HEMA Maschinen- und Apparateschutz GmbH apply; these can be viewed at www.hema-schutz.de. The following additional points apply to the clamping system range of products:

RotoClamp

- Due to its construction, the tolerance range of the RotoClamp (tolerance: cylindricity) between the shaft and the clamp must be maintained within the defined range; a deviation from this range may result in damage to the housing or the diaphragm when in continuous operation. A deviation from the tolerance range results in loss of the warranty.

- The warranty period for RotoClamp Inside Standard is 12 months from the date of delivery or at most 1,000,000 clamping cycles (no emergency or brake clamping). In case of warranty, the customer must provide suitable proof of the actual number of clamping cycles.

- The warranty period for RotoClamp Inside Active is 12 months from the date of delivery or at most 500,000 clamping cycles (no emergency or brake clamping). In case of warranty, the customer must provide suitable proof of the actual number of clamping cycles.

- The Inside and Outside RotoClamp systems are ground to the nominal dimension at the manufacturer’s, based on the axial location surface in the open state.

LinClamp

- The LinClamp S clamping elements are designed for static and dynamic clamping. LinClamp S safety clamping elements have a warranty of 12 months from the date of delivery, or at most 1,000,000 clamping cycles (S/SK)/100,000 (SA) clamping cycles (no emergency stop braking) or 500 emergency stop brakings (brake only permissible with sinter linings; if other linings are used then this warranty and the features described do not apply). In case of warranty, the customer must provide suitable proof of the actual number of clamping cycles.

- The LinClamp A clamping elements are designed for static functional clamping (no precision clamping). LinClamp A safety clamping elements have a warranty of 12 months after the date of delivery, but at most a clamping cycle of a maximum of 10,000 clamping cycles (no emergency stop braking). In case of warranty, the customer must provide suitable proof of the actual number of clamping cycles.

- The LinClamp S/SK/SA clamping elements are preset at the factory to the respective rail dimensions. The contact surfaces of the brake and clamping linings are pressed onto the free surfaces of the respective linear guide rail. The pressing procedure therefore does not influence the accuracy and lifetime of the mounting rail.

PClamp

- The PClamp clamping elements are designed for static clamping. PClamp safety clamping elements have a warranty of 12 months after the date of delivery, but at most a clamping cycle of a maximum of 1,000,000 clamping cycles. In case of warranty, the customer must provide suitable proof of the actual number of clamping cycles.

- The PClamp clamp elements are preset at the factory to the respective rod length and cylinder size.

DiskClamp

- For the individual warranty conditions of DiskClamp please see HEMA website.

The clamping elements are NOT intended for securing loads. Correct use of the clamping elements presupposes that these are only used within the possibilities laid out and described in the technical specifications. Other usages of the elements invalidate warranty.

Operating conditions - Ambient temperature min 10°C and max 45°C, pneumatic operating pressure 4 bar (+0.5/-0.3 bar) or 6 bar (+0.5/-0.3 bar), mainly operation with dry, filtered air (particles: Class 4, condensate: Class 4, oil content: Class 3) according to ISO 8573-1:2010.

During assembly, reconstruction, maintenance and repairs, the assembly instructions must be observed and the required equipment and accessories must be used. During all work on the clamping elements, the accident-prevention regulations as well as the VDE safety and assembly instructions valid in each case must be observed.

The operating and assembly instructions must be passed on to the installation engineer, the operator and the user.
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Checkliste Produktauswahl
Select the solution best suited to you from our wide range of products. The HEMA clamping systems provide an innovative and above all fast and compact solution for the most important applications. When making your selection, please consider whether you want to actively clamp or release using the applied compressed air based on the model. The operating pressure you select decides on the possible clamping force and is important when selecting the model.

**RotoClamp**
RotoClamp is ideal for rotary position clamping in axes, tables and swivel heads of machines. Two versions – Inside and Outside – allow various directions of the clamping function.

**DiskClamp**
DiskClamp is a security clamping system with emergency brake, to be specified on particular parameters.
**LinClamp**
For single linear applications in which you do not want to exclude emergency braking, the LinClamp systems with sinter linings are recommended. Of course, you can also use LinClamp for almost all types of linear guide systems or for processed surfaces for fast and safe clamping (steel coverings).

**PClamp**
PClamp clamps and brakes rod loads safely and quickly. It can be adapted to standard systems such as pneumatic cylinders from leading manufacturers (e.g., SMC, Festo) or to individual solutions. Rotary clamping can also be achieved with PClamp. Certified systems from Employer's Liability Insurance Associations can be realised.
**RotoClamp/DiskClamp**

- **RotoClamp Inside**
- **RotoClamp Outside**
- **DiskClamp**
**ADVANTAGES**

1. Pneumatic clamping with high forces

2. Safety clamping RotoClamp Standard – If the air supply fails then system clamps

3. The values of hydraulic clamping are reached and exceeded

4. Low system costs in comparison to hydraulics

5. Simple installation

6. Compact design

7. Suitable for all shaft sizes
**Comparison of Operating Principles**

### Hydraulic Clamping

**Function** The chamber formed by the expansion ring and the O-ring is supplied with hydraulic oil. The upper ring of the expansion ring is pressed upwards and away elastically and clamps the rotating brake disk between the fixed expansion and counter rings. Standard table sizes with 500x500 mm pallets achieve approx. 3000 to 4000 Nm holding torque at 80 to 120 Bar hydraulic pressure.

**Safety** No safety clamping. If there is a power loss then this axis is no longer clamped.

**Reaction Times** Long and short times with high effort can be achieved.

**Costs** Precisely manufactured mechanical parts, expensive hydraulic valves, hydraulic piping incl. assembly times, assembly and matching of the mechanical parts; replaceable in part. Safety clamping can only be realised at great effort. Extra material costs of hydraulic vis-à-vis pneumatic (hydraulic valves, flexible hydraulic lines, piping and screwed joints, relays due to higher rate of power consumption).

**Cleanliness** Hydraulic.

### Pneumatic Clamping

**Function** Clamps with spring actuator. Depressurizing the inner spring diaphragm chamber and ventilating the outer spring diaphragm chamber relaxes the diaphragm and presses on the radial contact surfaces at the inner and outer diameter of the spring. The clamping element is reformed elastically in the area of the clamping surface and presses on the shaft. Adding pressurized air to the inner spring diaphragm chamber (4 or 6 Bar) and venting the outer spring diaphragm chamber bends the diaphragm and the distance between the two radial contact surfaces at the inner and outer diameter of the spring is shortened: The clamping surface lifts off from the shaft. You have the optional possibility of increasing the clamping force by extra loading of the outer spring diaphragm chamber with compressed air when clamped (4 or 6 Bar).

**Safety** Safety clamping by spring actuator. In case of a power loss, the axis is immediately clamped.

**Reaction Times** Very short due to pneumatics. With quick air-vent valve and quick-acting gate valve attached directly to the clamping mechanism, you can realise extremely short clamping times.

**Costs** Low costs (in comparison to hydraulics), pneumatic valves and pneumatic piping, low installation costs, no cost for matching, easily replaceable, including safety clamp.

**Cleanliness** Very clean due to pneumatics.

**Materials** Clamping-body housing hardened and tempered in tool steel, optional
- supported flange joint hardened with case-hardening steel,
- steel coated, alternative lining procedure possible.
**Operating principle of the RotoClamp Inside**

### Release RotoClamp Inside
Adding pressurized air to the inner spring diaphragm chamber (open, 4 or 6 Bar) and venting the outer spring diaphragm chamber (close) bends the diaphragm and the distance between the two radial contact surfaces at the inner and outer diameter of the spring is shortened. The clamping element is opened in this state.

### Clamping RotoClamp Inside
Depressurizing the inner spring diaphragm chamber (open) and venting the outer spring diaphragm chamber (close, 4 or 6 Bar) relaxes the diaphragm and presses on the radial contact surfaces at the inner and outer diameter of the spring. The clamping element is reformed in the area of the clamping surface. The clamping element is closed in this state.

### RotoClamp Inside with secondary air
You have the optional possibility of increasing the clamping force by extra loading of the outer spring diaphragm chamber (close) with compressed air (4 or 6 Bar). The clamping element is closed in this state.

### Release RotoClamp Inside
The spring diaphragm is bent on assembly and the distance between the two radial contact surfaces at the inner and outer diameter of the spring is reduced. The clamping element is opened in this state.

### Clamping RotoClamp Inside
Depressurizing the inner spring diaphragm chamber (open) and venting the outer spring diaphragm chamber (close, 4 or 6 Bar) reforms the diaphragm and presses on the radial contact surfaces at the inner and outer diameter of the spring. The clamping element is reformed in the area of the clamping surface. The clamping element is closed in this state.
**Operating Principle of the RotoClamp Outside**

**Function of the RotoClamp Outside**

- **Release RotoClamp Outside**
  - Adding pressurized air to the inner spring diaphragm chamber (open, 4 or 6 Bar) and venting the outer spring diaphragm chamber (close) bends the diaphragm and the distance between the two radial contact surfaces at the inner and outer diameter of the spring is shortened. The clamping element is opened in this state.

- **Release (open) RotoClamp Outside**
  - Depressurizing the inner spring diaphragm chamber (open) and venting the outer spring diaphragm chamber (close) relaxes the diaphragm and presses on the radial contact surfaces at the inner and outer diameter of the spring. The clamping element is reformed in the area of the clamping surface. The clamping element is closed in this state.

- **Clamping RotoClamp Outside with secondary air**
  - You have the possibility of increasing the clamping force by extra loading of the outer spring diaphragm chamber (close) with compressed air (4 or 6 Bar). The clamping element is closed in this state.

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**Funktion RotoClamp Outside Active**

- **Release RotoClamp Outside**
  - The spring diaphragm is bent on assembly and the distance between the two radial contact surfaces at the inner and outer diameter of the spring is reduced. The clamping element is opened in this state.

- **Clamping (close) RotoClamp Outside**
  - Depressurizing the inner spring diaphragm chamber (open) and venting the outer spring diaphragm chamber (close) with compressed air (4 or 6 Bar) reforms the diaphragm and presses on the radial contact surfaces at the inner and outer diameter of the spring. The clamping element is reformed in the area of the clamping surface. The clamping element is closed in this state.
Technical Data of the RotoClamp S

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This technical data applies to the RotoClamp S Standard. Data for the RotoClamp S Active is available on request. Data for tandem versions calculable by factor 1.8.

Profile B-B

Profile A-A

In case of an alternative connection, seal using an M5 threaded screw

Air connection alternatively via housing and o-ring seal, then remove M5 threaded screw

In case of an alternative connection, seal using an M5 threaded plug

Air connection alternatively via housing and o-ring seal, then remove M5 threaded screw
## Technical Data

### Technical Data of the RotoClamp N

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<th>Elastic holding torque at 0 Bar Pn = 6 Bar</th>
<th>Elastic holding torque with secondary air at 6 Bar Pn = 4 Bar</th>
<th>Elastic holding torque with secondary air at 4 Bar Pn = 4 Bar</th>
<th>Max. mass</th>
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This technical data applies to the RotoClamp N Standard. Data for the RotoClamp N Active is available on request. Data for tandem versions calculable by factor 1.8.
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<th>t2</th>
<th>t3</th>
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<th>Air requirements per max. stroke</th>
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This technical data applies to the RotoClamp L Standard. Data for the RotoClamp L Active is available on request. Data for tandem versions calculable by factor 1.8.
## Technical Data of the RotoClamp Y

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<th>B [mm]</th>
<th>E [mm]</th>
<th>F [mm]</th>
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<th>d1 [mm]</th>
<th>d2 [mm]</th>
<th>t1 [°]</th>
<th>t2 [°]</th>
<th>t3 [°]</th>
<th>Elastic holding torque at 0 Bar [Nm]</th>
<th>Elastic holding torque at 6 Bar [Nm]</th>
<th>Elastic holding torque at 4 Bar [Nm]</th>
<th>Max. mass [kg]</th>
<th>Air requirements per max. stroke [mL]</th>
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This technical data applies to the RotoClamp Y Standard. Data for the RotoClamp Y Active is available on request. Data for tandem versions calculable by factor 1.8.
### Technical Data of the RotoClamp Outside S

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<th>B</th>
<th>E</th>
<th>F</th>
<th>n number of fixing screws</th>
<th>a</th>
<th>b</th>
<th>t1</th>
<th>t2</th>
<th>Elastic holding torque at 0 Bar Pn = 6 Bar</th>
<th>Elastic holding torque with secondary air at 6 Bar Pn = 6 Bar</th>
<th>Elastic holding torque with secondary air at 4 Bar Pn = 4 Bar</th>
<th>max. Mass</th>
<th>Air requirements per max stroke</th>
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<td>36</td>
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This technical data applies to the RotoClamp S Standard. Data for the RotoClamp S Active is available on request. Data for tandem versions calculable by factor 1.8.

In case of alternative connection, seal using M5 screw.

Air connection alternatively via housing and o-ring-seal, then remove M5 threaded screw.
## Technical Data of the RotoClamp Outside N

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<th>D3</th>
<th>B</th>
<th>E</th>
<th>F</th>
<th>n number of fixing screws</th>
<th>a</th>
<th>t1</th>
<th>t2</th>
<th>Elastic holding torque at 0 Bar Pn = 4 Bar</th>
<th>Elastic holding torque with secondary air at 6 Bar Pn = 6 Bar</th>
<th>Elastic holding torque with secondary air at 4 Bar Pn = 4 Bar</th>
<th>Mase max.</th>
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This technical data applies to the RotoClamp N Standard. Data for the RotoClamp N Active is available on request. Data for tandem versions calculable by factor 1.8.
Technical Data of the RotoClamp Outside XL

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<th>E</th>
<th>F</th>
<th>n number of fixing screws</th>
<th>a</th>
<th>t1</th>
<th>t2</th>
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<th>Elastic holding torque with secondary air at 4 Bar Pn = 4 Bar</th>
<th>Mass max.</th>
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This technical data applies to the RotoClamp XL Standard. Data for the RotoClamp XL Active is available on request. Data for tandem versions calculable by factor 1.8.
Clamping Systems

Options/Installation

RotoClamp with optional shaft flange
RotoClamp can also be delivered as a complete solution with the shaft flange manufactured to your specifications using various materials. The optional clamping flange is available in the following qualities: hardened with case-hardened steel or plasma-coated steel.

<table>
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<th>Ø C</th>
<th>n counter-sinkings</th>
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<td>270</td>
<td>296</td>
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<td>12</td>
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</table>

Installation and assembly

General
- To transfer the maximum clamping forces, the connection to the machine structure should be as rigid as possible.
- The characteristics indicated for the clamping elements can only be achieved by correct construction, manufacturing, assembly and use of the system.

Assembly instructions of the shaft flange
- The seating at the shaft should be a g6-fit. The shaft flange is placed on the flat machined side, screwed down lightly and then aligned for smooth running.
- The required tightening torque for the tightening screws M8/12.9 is 44 Nm in order to transfer the maximum torque.

Assembly instructions of the RotoClamp
- Compressed air is applied to the RotoClamp and it is opened. Clamping can then be initiated via the shaft. The RotoClamp is then placed on the flat matching side and screwed down with a reduced torque.
- The compressed air is then reduced to 0 Bar, thereby activating the clamping. This procedure centres the clamping mechanism relative to the shaft. The RotoClamp must be free at the outer diameter (>1 mm) to ensure safe function.

- After the RotoClamp is centred in the intended position, the fixing screws are tightened cross-wise in several phases to the defined torque.
- After fixing, the clamping mechanism is opened and a check is made whether the shaft can be turned freely. Only this ensures correct function.

Make sure that there is a rigid connection and correct attachment to transmit the forces!
**RotoClamp/DiskClamp**

**Details of construction**

**Design recommendations**

- The accuracy of the clamping surface is established by matching the precision ground inside diameter to the flat machined mounting surface of the RotoClamp. The total running tolerance of the clamping surface to the defined flat matching surface is smaller than 0.02 mm.
- The contact width of the clamping surface is between 2.5 and 4 mm, depending on the gap width. In this area, compressive stresses up to ca. 180 N/mm² arise at the clamping diameter when using the secondary air function.
- Transferable torque (example): When using 12.9 M8 screws and at a prestressing force of 30700 N for each screw and a coefficient of friction of µ=0.1 and a radius of 100 mm, a transferable torque of 307 Nm is achieved for each screw.
- The roundness and radial eccentricity of the shaft in assembled state should be <0.02 mm.
- The total running tolerance of the plane surface to the shaft for attaching the clamping mechanism should be <0.02 mm.
- The flat attachment should not be wider than D3 ± 60 mm.
- The RotoClamp must be free at the outer diameter (RotoClamp Inside) or at the inside diameter (RotoClamp Outside) to be able to centre itself.
## Technical Data

**DiskClamp - Security clamping system with Emergency Brake**

### Technical Data of the DiskClamp

<table>
<thead>
<tr>
<th>Size</th>
<th>Brake clamping torque at 0 Bar Pn = 6 Bar [Nm]</th>
<th>Brake clamping torque at 6 Bar Pn = 6 Bar [Nm]</th>
<th>Brake clamping torque with booster at 0 Bar Pn = 4 Bar [Nm]</th>
<th>Brake clamping torque with booster at 4 Bar Pn = 4 Bar [Nm]</th>
<th>Max. Brake disk [kg]</th>
<th>Mass max. [kg]</th>
<th>Air requirements per max stroke [mL]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 100</td>
<td>240</td>
<td>420</td>
<td>160</td>
<td>290</td>
<td>0.65</td>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

This technical data applies to the DiskClamp clamping with air. Data for hydraulic systems on request.

---

### Diagrams

- **Profile B-B**
- **Profile A-A**

---

**General information**

- RotoClamp
- DiskClamp
- LinClamp
- PCclamp
REQUEST FORM

Company name: ____________________________
Address: __________________________________
Contact: ___________________________________
Telephone: ___________ DiD: ___________ Fax: ___________
E-Mail: ___________
Country/Zip/Location: ______________________
Area/Department: ___________________________
Direct: ___________

RotoClamp systems can be adjusted for various applications. The following criteria decide on the configuration of the system. Please enter the information as completely and detailed as possible.

Model (please check):

☐ RotoClamp Outside (A = Active) ☐ RotoClamp Inside (A = Aktiv) ☐ DiskClamp
☐ S ☐ N ☐ XL ☐ S ☐ N ☐ L ☐ Y
☐ SA ☐ NA ☐ XLA ☐ SA ☐ NA ☐ LA ☐ YA

Type designation according to the table: ________________
Clamping cycles: ________________ per ________________
special requirement: ________________________________

Clamping torque: ________________ Nm
Planned connection pressure: ________________
☐ 4 Bar ☐ 6 Bar

Dimensions:
Outer diameter D3: ________________ mm
Inside diameter D1: ________________ mm
Fixing diameter D2: ________________ mm
Overall height: ________________

Standard bore according to drawing:
☐ Yes ☐ No
In case of deviation, please enclose the drawing for the application or mail to info@hema-schutz.de.

Optional shaft flange: ________________________________
Required quantity: ________________________________
Date of delivery: ________________________________
☐ Please call back ☐ Please visit

Other: _____________________________________________
You can also download this form at: www.hema-schutz.de.
**Advantages**

1. Suitable for almost all sizes and manufacturers of linear guide systems as well as for surfaces (LinClamp A)

2. Compact design, suitable for high and low carriages, simple installation

3. Compatible to other rail clamping systems

4. Pneumatic clamping or braking of the highest forces

5. Optimum safety clamping, failure of pneumatics results in clamping

6. Low system costs in comparison to hydraulics and electronic solutions

7. Special linings for clamping without loss of holding power for linear guides with grease lubrication.
**Operating Principle of the LinClamp**

**Function of the LinClamp S/SK**

**LinClamp S/SK released**
Compressed air is applied to the chamber between the two spring steel diaphragms. This deforms the spring steel sheets elastically and shortens them in the horizontal direction. The clamp body is deformed in such a way that it contacts at the top with the spring steel sheets and expands at the bottom around the brake shoes. This lifts the brake shoes from the rail and it can be moved freely.

**LinClamp S/SK clamped**
The chamber between the two spring steel diaphragms is vented. The spring steel sheets spring back to their normal position and expand the upper part of the clamping body. However, this expansion at the top simultaneously leads to a narrowing at the bottom. This narrowing causes the brake shoes to press against the rail and to clamp it.

**Function of the LinClamp SA**

**LinClamp SA released**
Venting causes the sheet to spring back and splays out the clamping body below the slide way. The base plate, which has previously been reformed elastically, now springs back to its starting position. It is thereby narrower above the cross web and wider beneath it. The brake shoes lift off from the rail. Operating pressure 4 to 6 Bar.

**LinClamp SA clamped**
To activate the clamping mechanism, the chamber below the spring steel sheet is filled with compressed air. The prestressed spring steel sheet is thereby pressed upwards and simultaneously stretched. Simultaneously, the lower part of the clamping body is narrower over the cross web as pivot point. This presses the brake shoes against the rail.
**Operating Principle of the LinClamp**

**LinClamp A released**
Compressed air is applied to the chamber between the two spring steel diaphragms. This elastically deforms the spring steel sheets and the entire system contracts. This contraction causes the clamping jaw to lift from the base frame - the carriage can now be moved freely. The gap between the clamping jaws and the frame at an operating pressure of 4 Bar is 0.05 mm. The distance between the carriages and the frame remains constant due to the high accuracy of the precision rails; the gap of 0.05 mm is therefore not a problem.

**LinClamp A clamped**
The chamber between the two spring steel diaphragms is vented. The energy stored in the spring steel sheets causes the clamping element to expand towards the machine frame. When the clamping jaws touch the machine frame, a large part of the energy is still within the spring actuator - the carriage is clamped.
Applications directly over linear guides. Long, slender design, passive.
Consisting of a single-piece clamping body and two spring plates including air chamber, any adaptations on linear guide rails. Available as a clamp or brake for high or low linear guide carriages, for 4 or 6 Bar. Sizes 15–65, retaining forces 540–10,000 N, special solutions like air connection from above or special screw attachment points on request.

Applications directly over linear guides. Wide, short design, passive.
Consisting of a single-piece clamping body and two spring plates including air chamber, any adaptations on linear guide rails. Available as a clamp or brake for high or low linear guide carriages, for 4 or 6 Bar. Sizes 15–55, retaining forces 300–2100 N, special solutions like air connection from above or special screw attachment points on request.

Applications directly over linear guides. Wide, short design, active.
Consisting of a single-piece clamping body and a spring plate including airbag, any adaptations on linear guide rails, available as a clamp or brake for high or low linear guide carriages, for 4 or 6 Bar. Sizes 20, 25, and 35, retaining forces 390–1250 N. Special solutions like air connection from above or special screw attachment points on request.

Applications on surfaces next to linear guides, e.g. machine frame, passive.
Consisting of a single-piece clamping body and two spring plates including airbag and lined clamping area, for installation on separate surfaces next to the linear guide on the carriage. Available exclusively as a clamp for 4 Bar. Sizes 25 and 35, retaining forces 1100–2200 N.
**Features LinClamp**

Gap width between brake and clamping faces and linear guide rails

The inner dimension $I$ between the faces of each LinClamp is polished to an exact value. This is always 0.01 mm to 0.03 mm larger than the maximum size $J_{\text{max}}$ from the manufacturer documentation of the respective linear guide rail (refer to the diagram). The greatest possible holding force is at $J_{\text{max}}$. In unfavourable cases, there are resulting losses of holding force of up to 30% (refer to the table).

<table>
<thead>
<tr>
<th>Air gap bellows/linear guide rail (mm)</th>
<th>Loss in holding force (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>5</td>
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<tr>
<td>0.03</td>
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<tr>
<td>0.05</td>
<td>20</td>
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<tr>
<td>0.07</td>
<td>30</td>
</tr>
</tbody>
</table>

Clamping in the middle area of a linear guide rail

Example: Clamping in the upper area of a linear guide rail
Clamping- or Braking system

Clamping / Braking
All S, SK, and SA type LinClamps can be used both as brake and clamping elements.
Use as brake: Sintered metal brake lining.
Use as clamp: Clamp linings made of tool steel.

Carriages

Mounting of the carriages
Comparison of higher/lower runner block LinClamp S:
In accordance to the configuration of the linear guide used, you can select between a high or a low fixing element.
Research results for pneumatically operated brake systems

Within the scope of a research project carried out by the VDW/VDMA (German Machinery Plant Manufacturer's Association), measurements were carried out at the Institut für Fertigungstechnik und Werkzeugmaschinen (IWF) at Hanover University, Germany over the course of two years to determine the braking distance of LinClamp brake systems using sintered metal in comparison to alternative products.

**Comparative test of the braking distance**

![Image of a test object](image)

**Test configuration**

Institut für Fertigungstechnik und Werkzeugmaschinen (IWF) at Hanover University, Project "Fast braking" of the VDW/VDMA

**Test object**

LinClamp S 55

**Rated values**

6 kN holding force per element
Guide rails INA, air pressure min. 5.5 Bar

**Measurements carried out**

The measurements were made to determine the braking distance in comparison to alternative products

**Parameter**

60 and 120 m/min at 550 kg to 1550 kg in 200-kg steps, 50 horizontal measurements, air pressure 5.5 Bar

### Results

<table>
<thead>
<tr>
<th>Test object</th>
<th>60 m/min, 1150 kg</th>
<th>60 m/min, 1350 kg</th>
<th>60 m/min, 1550 kg</th>
<th>120 m/min, 550 kg</th>
<th>120 m/min, 750 kg</th>
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<td>89.3</td>
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<td>101.9</td>
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Technical Data of the LinClamp S

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<th>Rail size</th>
<th>2 fixing holes</th>
<th>4 fixing holes</th>
<th>Low carriage</th>
<th>High carriage</th>
<th>Holding force at 6 Bar</th>
<th>Holding force at 4 Bar</th>
<th>Mass</th>
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<td>31</td>
<td>23</td>
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LINCLAMP

TECHNICAL DATA

Technical data of the LinClamp SK

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<td>35</td>
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<td>M8</td>
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Low carriage

Medium carriage

High carriage
### Technical Data of the LinClamp SA

<table>
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<tr>
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<th>L</th>
<th>B</th>
<th>H</th>
<th>H1</th>
<th>A</th>
<th>H1</th>
<th>A</th>
<th>B1</th>
<th>C</th>
<th>G</th>
<th>M</th>
<th>Holding force at 6 Bar</th>
<th>Holding force at 4 Bar</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>40</td>
<td>75</td>
<td>30</td>
<td>23</td>
<td>15</td>
<td>-</td>
<td>-</td>
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<td>20</td>
<td>9</td>
<td>20</td>
<td>G1/8</td>
<td>M8</td>
<td>1250</td>
<td>1.14</td>
</tr>
</tbody>
</table>

- **Rail size**: The rail size of the LinClamp SA.
- **L**: Length of the low carriage.
- **B**: Length of the high carriage.
- **H**: Height of the low carriage.
- **H1**: Height of the high carriage.
- **A**: Side length of the low carriage.
- **A**: Side length of the high carriage.
- **B1**: Side length of the latch.
- **C**: Side length of the latch.
- **G**: Side length of the screw.
- **M**: Side length of the nut.
- **Holding force at 6 Bar**: Holding force at 6 Bar.
- **Holding force at 4 Bar**: Holding force at 4 Bar.
- **Mass**: Weight of the LinClamp SA.
# Technical Data

## Technical data of the LinClamp A

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<th>Rail size</th>
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<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>Holding force at 4 Bar</th>
<th>Mass</th>
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<tbody>
<tr>
<td>Unit</td>
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<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[N]</td>
<td>[kg]</td>
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</tbody>
</table>

![Diagram of LinClamp A]
General

To be able to transmit the indicated holding forces, the connection to the carriage(s) of the linear guide system used should be as rigid as possible.

The mounting surface of the LinClamp is always at the same height as the mounting surfaces of the carriages (low or high) used in the linear guide due to the use of high or low fixing elements. Special heights of LinClamp as well as models adapted to lower rail sizes can be delivered on request.

Installation and assembly

Air Pressure is applied to the LinClamp and it is opened (Type S, SK) or it is pushed over the rail without air pressure (Type SA) and then attached to the mounting surface via the fixing screws. The screws are only tightened by hand at first.

The air pressure is now reduced to 0 Bar (Type S, SK) or increased to the required pressure (Type SA), thereby activating the clamping mechanism. This procedure centres the LinClamp relative to the rail.

The mounting surface for fixing the LinClamp must be perfectly machined geometrically and must be flat.

Check the air supply, line lengths and feeds and both check and test the valve selection.

Braking element (brake linings) that are greased achieve approx. 60% of the holding forces.

Clamping elements (steel linings) that are greased achieve 100% of the holding forces.

If the combination of tolerances is unfavourable then there is a potential loss of holding force of up to 30% (due to the system).

After the LinClamp has been centred in the intended position, the fixing screws are tightened in several steps up to the defined tightening torque.

After assembly, a check is made whether the LinClamp can be freely moved over the rail when open. Only in this way is perfect function ensured.
LinClamp systems can be adjusted for various applications. The following criteria decide on the configuration of the system. Please enter the information as completely and detailed as possible.

Model (please check):

☐ LinClamp S  ☐ LinClamp SK  ☐ LinClamp SA  ☐ LinClamp A

Type designation according to the table: ____________

Holding force: _____ N  Air pressure: _____ Bar

☐ System should clamp with air
☐ System should open with air
☐ Horizontal operation
☐ Vertical operation
☐ Vertical operation (with free fall)

Use as:
☐ brake system
☐ emergency brake
☐ mechanical fall arrester
☐ clamping system
☐ process terminal

Clamping cycles ____________ per ____________

Surface operating conditions:
☐ dry  ☐ oiled  ☐ greased

Exact designation of the oil/grease: ____________

Exact designation of linear guidance:

Manufacturer: ______________________

Type/Size: ______________________

Carriage type high/low: ______________________

Required quantity: ______________________

Date of delivery: ______________________

☐ Please call back
☐ Please visit

Other: ______________________

You can also download this form at: www.hema-schutz.de.
LinClamp

HLGClamp

39
PClamp N

PClamp E
Advantages

1. Pneumatic clamping with high forces
2. Optimum safety clamping – pneumatic failure locks the system
3. The performance of hydraulic clamps will be achieved and exceeded
4. Low system costs in comparison to hydraulics
5. Simple installation
6. Compact design
7. Wide range for many shaft sizes can be delivered
**Operating Principle of the PClamp**

**Funktion PClamp N**

**PClamp N released**
Pressure is applied to the air chambers between the spring steel sheets. The spring steel sheets bend outwards, reducing their radial width. The clamping collet can therefore expand, releasing the rod.

**PClamp N clamped**
The air chambers between the spring steel sheets are vented, the elastic spring steel sheets return to their original position, thereby clamping the collet against the rod. In this condition, the PClamp N is able to hold both rotary motion as well axial forces.

**Function of the PClamp X**

**PClamp X released**
The clamping can only be unlocked after lifting the load.

**PClamp X clamped**
PClamp X offers an additional safety feature: In case of emergency clamping, an air escape channel opens, and the PClamp X cannot be released in this state.

**Increasing power**

**Intelligent modular concept PClamp stacking**
The easiest method of increasing the clamping force by stacking several clamping units. The clamping forces can be increased by arranging up to three clamping units between the base plate and the surface plate.

PClamp is suitable for clamping rods with diameters of 12 mm to 40 mm. The flange dimension as well as the outside dimensions are matched to those of standard cylinders ISO 6431. The lengths vary depending on the clamping force required. Additional data for special solutions are available on request.
**PRODUCT OVERVIEW**

**PCclamp N**

*Signal output for clamping closed/open*

Standard version

Comprising the standard cover plate, one to four clamping units and base plate with connections for initiators as well as air inlet. Suitable for linear and rotary loads.

**PCclamp ISO**

*Cover plate*

Version for ISO pneumatic cylinder

Cover plate and base plate are matched to the flange dimension of the ISO cylinder. Due to the integrated attachments in the housing, the ISO version is ideal for use with standard cylinders. The clamping unit is identical to versions N and X.

**PCclamp X**

*Spring loaded base*

Version with additional safety mechanism for highest safety standards for vertical axes

Models with improved safety for vertical axes. After clamping the piston rod, the clamping mechanism can only be released when the axis is moved upwards. The clamping unit is identical to the versions N and ISO.

**PCclamp E**

Compact version for lower clamping forces

PCclamp E has a lower overall height – ideal for applications with limited installation space or operating ranges in which lower holding forces are required. Sensors can not be used. The clamping unit has a different outward appearance than Version N, X and ISO, although the active principle is identical.
## Technical Data of the PClamp N

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### Safety note for construction

The holding forces specified can be achieved under optimal conditions; we recommend a safety factor of >10%. Please consider that the surface, material, and cleanliness of the rod as well as wear and the use of wipers leads to changed holding forces. For new or safety applications, check the clamp by testing it in its environment and measure the actual values. Plan regular functional checks and functional monitoring. Please indicate these intervals as safety instructions for the end user. The axis/shaft must be designed at least with an h9 fit. Expect reduced holding forces if using the entire range of tolerances. To achieve optimum holding force, machine the fit as closely as possible to the nominal size.

### Example of tabulation

- **PC 63-20-1**: PClamp suitable for ISO cylinders, size 63, rod diameter 20 mm, one clamping module.
- **Sizes A, B, C, D and E** are geometric data (refer to the drawing).
- **Air connection M5**: Connecting thread for hose connector.
- **Holding force Version 4 Bar**: 1400N/holding force Version 6 Bar: 2000N. The versions for various pressure ranges achieve different holding forces.
- **Holding torque Version 4 Bar**: 15 Nm/holding torque version 6 Bar: 20 Nm. Like before, there are different holding torques at different pressures.
- **Standard rod diameter starting from the standard value**, you can get versions with reduced diameter. Available diameter and corresponding holding forces on request.
### Technical Data of the PClamp ISO

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<th>A (mm)</th>
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<th>D (mm)</th>
<th>E (mm)</th>
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- **M 8 x 1** (for inductive sensors)
- **G 1/8** Air connection
- **Profile A-A**
- **Rod wiper optional**
TECHNICAL DATA

Technical Data of the PClamp X

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<th>C</th>
<th>D</th>
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<th>Holding force Version 6 Bar</th>
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Technical Data of the PClamp E

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REQUEST FORM

Company name: 
Address: 
Country/Zip/Location: 
Contact: 
Area/Department: 
Telephone: 
Fax: 
DID: 
Direct: 
E-Mail: 
Internet: 

PClamp systems are suited to for various applications. The following criteria decide on the configuration of the system. Please enter the information as completely and detailed as possible.

Model (please check):

☐ PClamp N  ☐ PClamp ISO  ☐ PClamp X  ☐ PClamp E

Type designation according to the table: 
Required holding force: N
Required holding torque: Nm

System can only open with air:
☐ 4 Bar compressed air
☐ 6 Bar compressed air
☐ Horizontal operation
☐ Vertical operation
☐ Vertical operation (with free fall)

Use as:
☐ brake system
☐ clamping system
☐ translatory
☐ rotary

Clamping cycles: for each

Surface operating conditions:
☐ dry  ☐ oiled  ☐ greased

Exact designation of the oil/grease: 
Piston diameter: mm

Required quantity:
Date of delivery:

☐ Please call back
☐ Please visit

Other: 

You can also download this form at: www.hema-schutz.de.
Quality at HEMA

All clamping systems are subject to the most stringent quality requirements according to the HEMA ISO 9001 System. A 100% check of components at all stages of production ensures absolute quality.

The most modern 3D measuring machines and our own, specially developed testing machines ensure high quality on delivery and continuous performance data.

A batch number system allows for unique identification of all performance data for the clamping system delivered in each case. Detailed operating instructions supplement the high-performance systems.
Qualität von HEMA
Our range of service

- Protection systems
- Clamping and braking systems
- LED Lighting systems
- Service, logistics and maintenance

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Authorized contract partner:

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Values indicated are not binding; the value indicated on the order confirmation always applies. RotoClamp, LinClamp and PClamp are developments of InnoTech Engineering GmbH. DiskClamp is a development of HEMA Maschinen- und Apparateschutz GmbH.

Tailor made Protective Systems