

1 Supporting documents

NOTE:

The documents mentioned below are available for download on our website [www.zimmer-group.de](http://www.zimmer-group.de). Only the documents currently available on the website are valid.



- Catalogs, drawings, CAD data, performance data
- Detailed installation and operating instructions
- General Terms and Conditions

2 Safety notes

CAUTION:

Non-compliance may result in severe injuries.



Injuries/malfunctions can occur especially with:

- Contusion during assembly due to unsecured connection structure
- Improperly assembled hydraulic connections
- Hydraulic supply interferences, e.g. due to pressure fluctuations
- Damaged or loose hydraulic lines
- Missing or loosened fastening screws
- Removal of the safety cover
- Not switching off the working medium during assembly or repair work on the element
- Human error
- Failure to observe the safety and warning instructions during installation and start-up

These installation and operating instructions are intended for installation and maintenance technicians as well as design engineers requiring the element for an application. Please read all installation and operation instructions carefully before start-up and pay Special attention to the following hazard warnings and notes.

3 Proper use

NOTE:

The element MKS/MKRS should only be used in its original state with its original accessories, with no unauthorized changes and within the scope of its defined parameters for use. ZIMMER GmbH accepts no liability for any damage caused by improper use.



The MKS/MKRS element is designed for operation with compressed air only. According to EN ISO 13849-1, the element is to be regarded as a safety-relevant component of controls. Furthermore, we can confirm the manufacture of the product using the basic and proven safety principles (Annex B.1 and B.2 of EN 13849-2). Thus, according to EN 13849-1, chap. 6.2.4, para. b the clamping and braking element MKS/MKRS can be regarded as a proven component. The element can be used in control systems of category B or 1 without further control measures. For category 2 controls, a test channel must be provided. For use in higher control categories, the control must be executed in a multi-channel manner, whereby each channel must realize the safety function itself.

The element must not be mounted on a linear guide rail other than what the manufacturer has specified.

The element without additional protection or control measures must not ...

- be mounted on a linear guide rail other than what the manufacturer has specified,
- be installed in facilities that are used for transporting people (e.g. elevators),
- be used in vehicles,
- be used underwater or in other fluids,
- be used in a corrosive environment (for example, in connection with acids),
- come in contact with abrasive media (such as grinding dust),
- be used in a vacuum,
- come in direct contact with food,
- be used in areas with a potentially explosive atmosphere.

The leadership must be provided externally. The element does not provide guidance properties.

If you have any questions regarding the use of the MKS/MKRS series element, please contact ZIMMER GmbH.

4 Personnel qualification

DANGER:

Various components of the element are continuously under spring tension. Never open the housing. No intervention is permitted and can lead to serious injuries. Warranty and disclaimer.



The assembly, commissioning, maintenance and repairs may only be undertaken according to the present installation and operating instructions and by only qualified personnel who have the professional expertise and know the conditions, as well as the dangers, of the machine into which the element is being installed.

5 Product description

The pneumatically operated MKS/MKRS series is a safety component. The pneumatically operated MK series is designed for clamping on linear guide rails, while the MKR series is designed for clamping to round guide rails. The function is based on a dual-acting wedge-type gear, each with a spring accumulator for depressurized clamping. The spring accumulator closes the element without pressure, which makes high holding forces possible. The holding forces can be increased by means of PLUS connection (not with MKRS), insofar as this is stated under the technical data, by pneumatic pressure support of the spring accumulator. The clamping elements are factory set to the respective rail measure.

Fig.1: MKS element

1	Adapter plate (optionally height compensation)
A	Air connection / Standard connection
B	Air filter/PLUS-connection
4	Mounting holes
5	Wedge-type gear
6	Adjustment screw
7	Piston
8	Spring accumulator
9	Linear guide rails (Series MKS or MKRS)

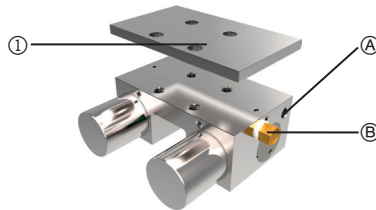
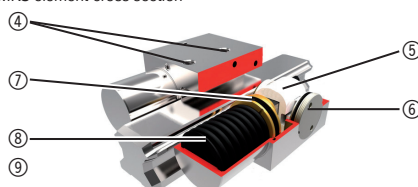


Fig.2: MKS element cross section



6 Connections

NOTE:

The element of the MKS/MKRS series features two **A and B air connections** facing one another. The air connection preset by the factory and the venting filter can be replaced on the opposite side surface. Only one standard A connection has to be occupied for the MKS/MKRS element series to function safely. Using the PLUS-connection, insofar as this is stated under the technical data, of the air filter B should be removed and replaced by a second pneumatic line. The reinforcement of the holding force in PLUS-operation does not work when the pressure drops.



The PLUS connection B can alternatively be supplied with operating pressure. In doing so, the holding force is increased by approximately 35%. If a PLUS connection is not used, then the supplied air filter must be screwed into the PLUS-Terminal.

7 Transport lock

WARNING:

The transport lock can only be removed once the air connection A was pressurized with a minimum air pressure. The element may only be depressurized if the guide rail or the transport lock is between the contact surfaces.



The MKS/MKRS element series are shipped with a transport lock between the contact surfaces.

8 Assembly

- ▶ Check the element for any damages before assembly.
  - The element may only be used in conjunction with linear rail carriages.
- ▶ The mounting face of the element has to be completely covered with the connection.
  - Make sure the connection structure is sufficiently rigid.
  - Use screws with a minimum 8.8 strength class <http://www.schrauben-normen.de/anziehmomente.html>
- ▶ The vent holes and filters have to be atmospherically free over their entire cross-section and protected against liquids (oil, grease, etc.) and chips.
  - Suitable pneumatic connections have to be used.
- ▶ To ensure a short response time, choose the shortest possible hose length. Insert a quick exhaust valve, if necessary.
- ▶ The position of the adjusting screws is marked at the factory. Moving the position of the adjusting screws is not permitted.

Installation and operating instruction MKS/MKRS  
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 DDOC00060 Index g  
 EN / 03.05.2019 [www.zimmer-group.de](http://www.zimmer-group.de)

Recommendation of a piston rod (standard piston rod) MKRS-Serie	
Tolerance	f8/g8/h7
Roundness	1/2 dimensional tolerance
Surface	Ra 0,2 - 3,2 µm
Material	Stretching limit min. 400 N/mm²
Hardness	min. 54HRC with min. hardening depth 0,5 mm or hard chrome plated 20 µm 800HV (e.g. C45)

8.1 Assembly procedure

CAUTION:



If the fastening screws are tightened when the element is not clamped, the element can shift and therefore be unable to achieve the optimum clamping force! Furthermore, the guide rail could become damaged.

- ▶ Remove sealing plugs
- ▶ Apply pneumatic connection to connection A (the pneumatic connection can be connected to either side). The unused A connection has to be closed off with a sealing screw.
- ▶ Connect pneumatic, clamping and braking element by pressurizing the A connection to loosen and remove the transport lock.
- ▶ Pay attention to cleanliness and flatness of the mounting surface.
- ▶ Depending on the type of guide rail, push the element over the end of the guide rail or place it from above.
- ▶ If necessary, insert the adapter plate between the element and the connection structure. Manually screw the assembly screws crosswise into the threaded hole. Note the minimum screw-in depth of 0.9 x Ø.
- ▶ The element centers itself through multiple cycles (at least 20 times open and close within 5s)
- ▶ Switch the element into depressurized state and clamp. Tighten the mounting screws crosswise with the specified tightening torque  
 ⇨ <http://www.schrauben-normen.de/anziehmomente.html> ⇨ DIN 912 bzw. ISO 4762

8.2 Removal

Disassembly is carried out in the reverse order of that described in 6.1. Do not forget the transport lock!

8.3 Checking operational readiness

After the element has been properly installed, check that it is ready to be operated according to the following characteristics:

- The pneumatic connections are checked for leaks by looking/listening.
- All mounting screws are checked for their specified tightening torque (see Technical Data table).
- The pressurized clamping and braking element are checked for leaks by looking/listening.
- The ability to move on the linear guide rail when the clamping and braking element is open is checked.
- The clamping process is checked by manually moving the connection structure.

9 Maintenance

The elements are maintenance-free up to the number of cycles listed in chapter „Technical Data“ under the following conditions:

- Compressed air quality as per ISO 8573-1 Class 4.
- The air filter must be kept clean and cleaned, if necessary. The elements must not be operated without this filter.
- The guide rail must be clean and free from greasy films.
- ▶ Even though the element is, as mentioned, maintenance-free, perform a regular visual inspection for possible corrosion, damage and contamination on the clamping and braking Element. A readjustment is not required after proper Installation due to the factory default contact surface.
- ▶ Clean the element as needed using a commercially available machine cleaning agent and then apply an anticorrosion agent to the housing.

10 Technical Data

INFORMATION:

The technical data can be found on our homepage [www.zimmer-group.com/en/it-td](http://www.zimmer-group.com/en/it-td). If you have any further questions about the product or the technical data, please contact the customer Service of ZIMMER GmbH. Our technical hotline ☎ +49 7844 9138-5556 is available for this.

11 Troubleshooting

INFORMATION:

For an exact and detailed overview of possible malfunctions and their remedies, please visit our website [www.zimmer-group.com/en/it-faq](http://www.zimmer-group.com/en/it-faq). If these measures do not lead to success, please contact the customer service of ZIMMER GmbH. For this purpose our technical-hotline ☎ +49 7844 9138-5556 is available.

12 Transport and storage

The element is to be transported and stored only in the packaging supplied by ZIMMER GmbH. If the element is stored differently or transported, it must be provided with corrosion protection to prevent any corrosion.

After the appropriate installation of the element the operating readiness has to be tested:

- The mobility has to be tested by manually moving the slide.
- The process of clamping has to be tested by manually moving the connecting construction.
- The appropriate mounting of the fixed and flexible hydraulic pipe installation has to be tested by visual control.
- All hydraulic connections at the pressurized element have to be visually checked for leakage.
- All attachment screws have to be checked for their required moment.

13 Declaration of conformity

in terms of the EC Directive 2006/42/EC on Machinery (appendix II 1 A)

Name and Address of the manufacturer:

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We hereby declare that the following, identically constructed safety components,

Product designation: Clamping element with spring accumulator  
 Type description: MKS/MKRS

conform to the requirements of the 2006/42/EU in their design and the version we put on the market.

The following harmonized standards have been used: (A full list of applied standards is available at the manufacturer's facilities.)

DIN EN ISO 12100:2011-03	Safety of machinery - General principles - Risk assessment and risk reduction
DIN EN ISO 13849-1 / -2	Safety of machinery - Safety-related parts of control systems
DIN EN ISO 4414	Safety-related requirements for pneumatic systems and their components

Authorized representative for compiling the relevant documents:

Michael Hemler	(see manufacturer's address)	Rheinau, 30.06.2014	Martin Zimmer
First name, last name	address	Place and date	(legally binding signature)