

EN

## Translation of the Original Operating Manual Power-operated Centric Clamp KZS-P/KZS-PG pneumatically operated



Store for reference

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# 1 About this Operating Manual

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This operating manual describes in detail the use, installation, assembly and maintenance for a centric clamp KZS-P/KZS-PG. The efficiency of the centric clamp depends primarily on correct use and careful maintenance. This operating manual serves as the leading document and is provided on delivery of the product. The personnel must have carefully read and understood the operating manual before beginning any work. Observance of all safety instructions and instructions for use in this operating manual are the basic prerequisite for safe work with the centric clamp. In addition to the regulations listed here, the local and user-related operating instructions and the professional accident prevention regulations are to be observed.

## 1.1 Manufacturer Details

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## 1.2 Copyright

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This operating manual is protected by copyright and is intended for internal purposes only.

The forwarding of the operating manual to third parties, reproduction by any means - even in part - as well as use and/or communication of the content without the permission of the manufacturer is prohibited (except for internal purposes).

Infringements will lead to claims for compensation. We reserve the right to assert further claims.

### 1.3 Warranty and Liability

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All information and instructions in this operating manual are given in good faith on the basis of our experience and knowledge to date. The products of RÖHM GmbH are subject to constant further development. The manufacturer therefore reserves the right to make any modifications and improvements deemed useful. However, there is no obligation to extend these modifications and extensions to any previously delivered centric clamps. The centric clamp is constructed exclusively for the purpose specified under “Intended Use”. Any use beyond this is deemed to be inappropriate. RÖHM GmbH is not liable for damage resulting from such use. The risk is borne solely by the owner. Product liability for consequential damage of any type is excluded for damage and operational interruptions resulting from operating errors, failure to observe this operating manual or incorrect maintenance by unauthorised personnel.

RÖHM GmbH expressly points out that replacement and wear parts supplied by the manufacturer must be authorised by RÖHM GmbH. The company RÖHM GmbH does not accept liability for unauthorised replacement and wear parts. This applies to both product liability for consequential damage of all types and to liability for damage to property.

All unauthorised conversions, modifications to the centric clamp and/or changes in conditions are not permitted for safety reasons and exclude all liability of RÖHM GmbH for any damage which may result. If modifications to the centric clamp are necessary or the area of use differs from the intended use, this must be agreed with the express permission of RÖHM GmbH.

The statutory and contractually agreed terms and conditions apply.

The following damage or defects are excluded from the warranty:

- caused by the operator due to non-compliance with the written instructions of the manufacturer with regard to
  - commissioning (e.g. incorrect construction and assembly work),
  - operation and
  - maintenance of the equipment (insofar as this maintenance has not been contractually taken over by the manufacturer);
- caused by technical operating conditions unknown to the manufacturer (e.g. chemical or electrolytic influences) and/or machine specifications;
- caused by natural wear;
- caused by force majeure;
- caused by incorrect operation of all types or by incorrect use or operation of the centric clamp. This also includes loading beyond the specified load limits (e.g. speed, pressure, force etc.).

This also includes damage caused

- if the operator or third parties carry out modifications or repairs to the services / products without prior permission of the manufacturer. Excepted from this are damage or defects which have occurred which were demonstrably not due to these modifications or repairs.
- which occur due to use of the centric clamp under altered operating conditions (e.g. materials, tools, cutting parameters, programs etc.), in particular without consulting and obtaining written authorisation from the seller or manufacturer.
- which are due to altered environmental conditions.

## 1.4 Conventions of Presentation

### 1.4.1 Text Display

To improve legibility and comprehension of the text, the following conventions were agreed:

Text type	Marking	Function
Operating instruction	1. 2., etc.	Marks a sequence of actions
	•	Marks an individual operating instruction
	➤	Marks an intermediate result of an operating instruction
	✓	End result of an operating instruction
List	▪	Marks elements of a list
	○	Marks comments within a list










Contains useful information or further information.

## 1.4.2 Display of Safety and Warning Instructions

Safety and warning instructions are marked by pictograms. The signal word and the colouring show the level of danger.

Observe the safety instructions to prevent personal injury and damage to property.

 <b>DANGER</b>	
	<p><b>Indicates an imminently dangerous situation</b> which may lead to death or permanent personal injury if not avoided.</p> <ul style="list-style-type: none"> <li>➤ List of all measures which must be taken to prevent consequences.</li> </ul>
 <b>WARNING</b>	
	<p><b>Indicates a possible danger</b> which may lead to permanent personal injury or death if not avoided.</p> <ul style="list-style-type: none"> <li>➤ List of all measures which must be taken to prevent consequences.</li> </ul>
 <b>CAUTION</b>	
	<p><b>Indicates a possible danger</b> which may lead to minor reversible injuries if not prevented.</p> <ul style="list-style-type: none"> <li>➤ List of all measures which must be taken to prevent consequences.</li> </ul>
<b>NOTICE</b>	
	<p><b>Indicates a possible danger</b> which may lead to damage to property if not avoided.</p> <ul style="list-style-type: none"> <li>➤ List of all measures which must be taken to prevent consequences.</li> </ul>



## 2 Safety

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Safety instructions and safety equipment serve to prevent accidents and damage when working on the centric clamp. The safety instructions contain warnings and basic safety instructions. In addition to the safety instructions in this chapter, the following chapters contain action-related warnings. Maximum protection of personnel and the environment from dangers and trouble-free operation is only possible when all safety instructions and warnings in this operating manual are observed.

### 2.1 Intended Use

---

The centric clamp KZS-P/KZS-PG is used to clamp regularly and irregularly shaped workpieces.

- In the case of special workpiece geometries, corresponding top jaws must be used.
- In the case of irregular workpieces, compensatory clamping jaws must be used.
- In the case of vertically non-parallel workpieces, pendulum jaws (inserted vertically) must be used.
- In the case of horizontally non-parallel workpieces, pendulum jaws (inserted horizontally) must be used.
- In the case of unmachined parts with a tendency to lift, claw jaws must be used.

The workpieces to be clamped must have a sufficient strength for the clamping force and minimum compressibility. Other materials may only be used with the agreement of RÖHM GmbH. Clamping of imbalanced workpieces is permissible. Imbalanced workpieces must always be clamped in the centre of the top jaws. The centric clamp is suitable for internal and external clamping of workpieces. Clamping up to a maximum speed is permitted up to 60 rpm.

The centric clamp

- may be installed in all machining centres and processing machines for cutting and non-cutting processes.
- may be installed both horizontally and vertically.
- may be operated in a stationary position.
- may only be operated when screwed on (e.g. on a machine table or machine pallet).

The centric clamp is a 2-jaw centric clamp. Only original RÖHM base jaws and top jaws may be used. Third-party makes may impair the safety of the centric clamp and lead to damage. The clamping point of the jaws must lie as close as possible to the centric clamp.

The centric clamp can be used for both wet and dry machining. The permissible usage and environmental conditions must be observed (see **Conditions of Use and Environmental Conditions [▶ 18]**).

The centric clamp is only intended for commercial use.

## 2.2 Improper Use

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If the centric clamp is operated for a purpose other than the intended use as specified in this operating manual, this is deemed to be improper use.

Any utilisation beyond the scope of the intended use poses risks and is not approved by RÖHM GmbH.

Improper use refers to the following:

- use of defective jaws (e.g. sprockets on base jaw broken off or cracks in the jaws).
- use of an actuation device which does not maintain the clamping force in the event of a power failure.
- clamping of workpieces when the centric clamp is not installed.
- clamping of compressible workpieces.
- clamping of other workpieces without the permission of RÖHM GmbH.
- clamping of excessively heavy workpieces - (for bases of calculation, see RöhM norm RN 1391).
- clamping of excessively long workpieces (for bases of calculation, see RöhM norm RN 1391).
- clamping of workpieces with insufficient clamping depth (for bases of calculation, see RöhM norm RN 1391).
- one-sided clamping of a workpiece.
- operation without assembly on a suitable machine table or machine pallet.
- operation without an unlockable check valve (e.g. to prevent an uncontrolled decrease in pressure).
- direct pointing of the coolant spray at guides or lubricating nipples.
- operation without or with insufficiently clamped workpiece.
- removal of swarf during operation.
- use of the centric clamp in explosive atmospheres.
- operation with insufficient maintenance.
- use of non-OEM parts as replacement parts.
- use of the centric clamp for suspending loads.
- operation outside of the defined operating parameters.
- operation with modifications not approved by the manufacturer.
- operation without effective safety equipment.

- assembly of the centric clamp and individual parts with incorrect tightening torque (see **Checking the Tightness of Screw Connections** [▶ 35]).

## 2.3 Obligations of the Owner

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Before all work on and with the centric clamp, the operator is to ensure:

- that the operating instructions are available to the responsible personnel.
- that the responsible personnel are sufficiently qualified for their work.
  - This applies in particular to assembly, maintenance and repair.
- that the responsible personnel have read and understood the operating instructions.
  - RÖHM GmbH recommends that this be documented in a suitable form.
- that all safety equipment is correctly mounted and operational.
  - Safety equipment must never be by-passed, manipulated or shut down.
- that the centric clamp is in perfect working order.
- that all damaged and defective parts are replaced immediately.

## 2.4 Qualification of Operating and Specialist Personnel

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### Trained personnel

Trained personnel have been instructed in correct handling and possible dangers when using the centric clamp. In particular, the personnel must have been instructed in the safety equipment.

### Qualified personnel

Personnel without experience of handling a centric clamp are exposed to increased risks of injury in the event of incorrect conduct, especially during assembly and maintenance work, due to the clamping movements and forces.

Therefore, the centric clamp may only be assembled, maintained and serviced by persons who have received special training or instruction for this purpose or who have extensive experience. The qualified personnel must be able to read and understand the displays and to act accordingly. The qualified personnel must have read and understood this operating manual.

In particular, qualified personnel are:

- Mechanics

Work on the mechanical equipment may only be carried out by a trained mechanic or by personnel under the direction and supervision of a trained mechanic. Work on gas, pneumatic and hydraulic equipment may only be carried out by mechanics trained for this purpose.

- Electricians

Work on the electrical equipment may only be carried out by a qualified electrician or by personnel under the direction and supervision of a qualified electrician in accordance with the electrical regulations.

## 2.5 Personal Protective Equipment and Personnel Qualification

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When working on and with the centric clamp KZS-P/KZS-PG, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the centric clamp KZS-P/KZS-PG, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the centric clamp KZS-P/KZS-PG is at a standstill.



Wear protective gloves



Wear safety goggles



Wear safety shoes

Work on and with the centric clamp may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▶ 11]**).

## 2.6 General Dangers

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When using the device there is a special potential of residual risks

- during assembly and set-up work,
- during operation and
- during maintenance and service work.

This potential risk cannot be completely eliminated considering the functional availability of the operating manual. Therefore, all individual regulations of this operating manual are to be observed.

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### 2.6.1 Dangers due to Flying Parts

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During operation, the connection between the clamped workpiece and the centric clamp KZS-P/KZS-PG may become loose due to mechanical failure (e.g. due to defective parts) or incorrect operation. The workpiece may then fly out and cause serious crushing and impact injuries.

To prevent cutting and crushing injuries, ensure perfect functioning of the centric clamp KZS-P/KZS-PG before each operation.

- The centric clamp only reaches the maximum specified clamping force total when the maximum actuation force is applied.
- The clamping force must be checked regularly.
- Operation is only permitted with an effective safety guard.

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### 2.6.2 Skin Irritation due to Operating Materials

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The lubricant consists of substances which may lead to skin irritations in the event of frequent skin contact.

In order to minimise the risk of skin irritations, wear long work clothing and avoid contact with the lubricant. Also observe the safety data sheet of the lubricant and wear safety goggles and protective gloves during maintenance work when handling lubricants.

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### 2.6.3 Eye Injuries due to Metal Chips

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Dangerous metal chips may be produced during machining of metal. During operation or when cleaning the centric clamp KZS-P/KZS-PG, sharp metal chips may be stirred up and cause eye injuries and cuts.

To prevent eye injuries and cuts, wear personal protective equipment during operation and cleaning work. Cleaning with compressed air or a high-pressure cleaner is not permitted.

## 2.6.4 Danger of Crushing

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The machine manufacturer and / or operator must ensure that all danger to persons due to unavoidable travel movements is excluded. For this purpose, 2-handed operation, for example, or preferably suitable safety guards can be used.

If there is a gap of **less than 25 mm** after the distance is travelled, there is generally a risk of crushing extremities. For this reason,

- the speed of movement of components moving towards each other must generally not be reduced to more than 2 m/min (specification as per DIN EN ISO 23125). This also applies to **commissioning work, set-up mode and service work**.
- or in the case of clamping equipment with clamping movements where workpiece loading in normal mode is carried out either mechanically or with a ramrod.
- or the object to be clamped is fixed with a permanently or temporarily attached workpiece holder (e.g. prism) before the movement is started.
- or, for example, in the case of cylinders and comparable moving components, the gap is to be covered by a safety guard so as to be inaccessible.

## 2.6.5 Procedure in the Event of Danger and Accidents

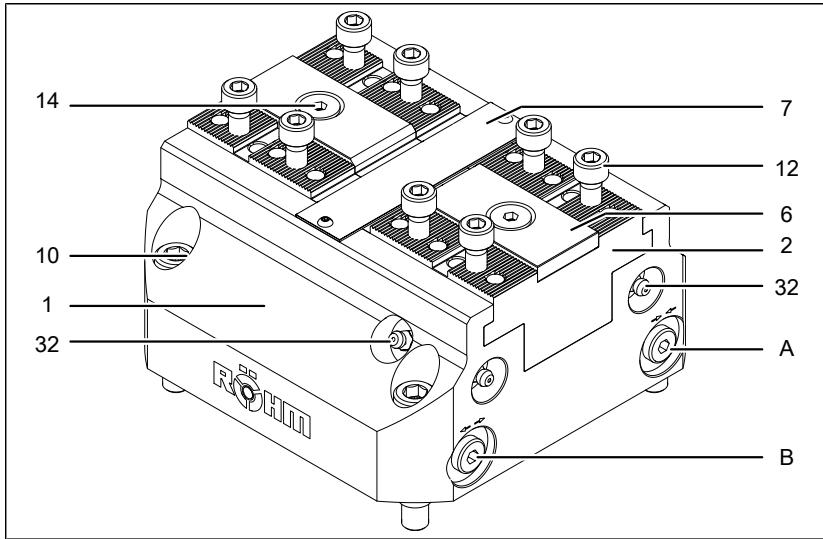
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In the event of danger and accidents, it must be ensured that first aid measures can be taken immediately.

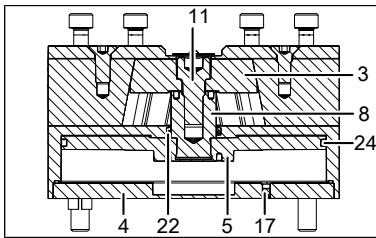
1. Shut the machine down immediately via the Emergency-Stop button.
2. Remove the person involved from the danger zone and sit or lay the person down.
3. Call a doctor.
  - Do not make any changes to the accident site.
4. Administer first aid.
  - Stop any bleeding.
  - Cool burns.
5. Report all accidents to a superior.

## 3 Product Description

### 3.1 About this Centric Clamp



#### Cross-section



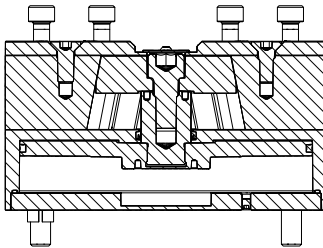
1	Basic body	11	Cylinder screw
2	Base jaw	12	Jaw holding screws
3	Piston	14	Countersunk screw
4	Cover	17	Threaded pin
5	Piston disc	22	Rod seal
6	Guide strip	24	Quad-ring
7	Cover	A	Pressure connection close
8	Piston rod (not with size 64)	B	Pressure connection open
10	Cylinder screw		

The centric clamp is a 2-jaw centric clamp with an integrated cylinder and is used for stationary clamping of regularly and irregularly shaped workpieces and is designed for use in 3-axis, 4-axis or 5-axis machining centres.

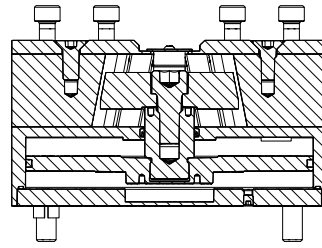
The workpiece is clamped between two top jaws and always remains central to the middle axis of the centric clamp. Various top jaws can be mounted, depending on the workpiece.

The movement of the centric clamp is controlled via the two pressure connections Close  $\Rightarrow \leftarrow$  and Open  $\leftarrow \Rightarrow$  (with external clamping):

Pressure connection under pressure		Position of the jaws
Open	[ ]	Clamping position (closed)
Close	[X]	
Open	[ ]	Sliding freely
Close	[ ]	
Open	[X]	Release position (opened)
Close	[ ]	



Open position

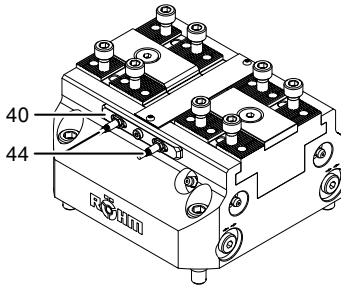


Clamping position

The centric clamp is available with the standard jaw stroke or with an increased jaw stroke.



## Centric Clamp with inductive sensors



As an option, the centric clamp can be equipped with inductive sensors. The version with inductive proximity switches (44) is used for the jaw stroke query. The use of the jaw stroke query is recommended in particular in automation mode.

Two inductive proximity switches (44) are installed on the centric clamp. The proximity switches can be moved on the holding plate (40) and enable the switching point to be set individually. The jaw end position for external or internal clamping and the clamping position are queried via the proximity switches (44).

The proximity switches are equipped with a status LED on the sensor head.

## 3.2 Technical Specifications

### 3.2.1 Overview of Construction Sizes

**KZS-P, standard jaw stroke, base jaws with serration 1.5 x 60° and cross tenon**

ID no.	181480	181482	181486	181490	181494
ID no. with inductive sensors	181580	181582	181586	181590	181594
Size	64	100	160	200	250
Jaw stroke [mm]	2.3	2.3	3.5	4.8	6.0
Max. Actuation pressure [bar]	9	9	9	9	6
Max. Total clamping force [kN]	4.6	18.0	45.0	52.0	55.0
Weight [kg]	1.15	3.6	10,3	18.5	30.4
Cylinder volume (double stroke) [cm <sup>3</sup> ]	38	180	600	900	1760
Closing time [s]	0.1	0.25	0.5	0.6	1.1
Repetitive clamping accuracy [mm]	0.01	0.01	0.02	0.03	0.03

### KZS-PG, large jaw stroke, base jaws with serration 1.5 x 60° and cross tenon

ID no.	181483	181487	181491	181495
ID no. with inductive sensors	181583	181587	181591	181595
Size	100	160	200	250
Jaw stroke [mm]	7.0	9.6	12.1	17.6
Max. Actuation pressure [bar]	9	9	9	6
Max. Total clamping force [kN]	8.0	20.0	24.0	21.0
Weight [kg]	3.7	10.5	18.9	30.4
Cylinder volume (double stroke) [cm <sup>3</sup> ]	180	600	900	1730
Closing time [s]	0.25	0.5	0.6	1.1
Repetitive clamping accuracy [mm]	0.01	0.02	0.03	0.03

#### 3.2.2 Conditions of Use and Environmental Conditions

The centric clamp is designed for the following environmental and operating conditions:

Ambient medium	Air and non-aggressive gases
Place of use	Interior
Relative humidity (at + 50 °C)	< 100 % Use in very humid conditions leads to faster corrosion and may reduce the useful life
Potentially explosive environments	No
Ambient temperature at place of operation	+ 10 °C to + 60 °C
Ambient temperature for storage	- 15 °C to + 60 °C For 24 hours also at + 70 °C
Dry and wet machining	Wet machining permissible
Compressed air quality	ISO 8573-1 purity class 7:4:4, maintained


Pollution of the environment caused by the machine itself is permitted. However, perfect operation of the centric clamp must be ensured and checked regularly. The centric clamp must also be cleaned of coarse dirt with a broom or brush. Cleaning with compressed air is not permitted.

### 3.2.3 Permissible Operating Materials

The following operating materials are permitted for use on the centric clamp:

- Röhme grease F80, lubrication grease for moving parts
- Screw-lock lacquer, low or medium strength
- With central lubrication: lubrication oil G CLP DIN 51517-3:2014-02, viscosity class VG 68 DIN ISO 3448:2010-02, max. permissible temperature 70 °C

## 4 Transport

<b>⚠ WARNING</b>	
	<p><b>Falling of the centric clamp.</b></p> <p>Crushing injuries in the event of unsecured transport of the centric clamp.</p> <ul style="list-style-type: none"> <li>➤ Use suitable hoisting gear and slings.</li> <li>➤ Wear personal protective equipment.</li> <li>➤ Do not remain under suspended loads.</li> </ul>

### 4.1 Personal Protective Equipment and Personnel Qualification

When working on and with the centric clamp KZS-P/KZS-PG, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the centric clamp KZS-P/KZS-PG, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the centric clamp KZS-P/KZS-PG is at a standstill.



Wear protective gloves



Wear safety goggles



Wear safety shoes

Work on and with the centric clamp may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel** [► 11]).

## 4.2 Tapped Holes for Transport Purposes

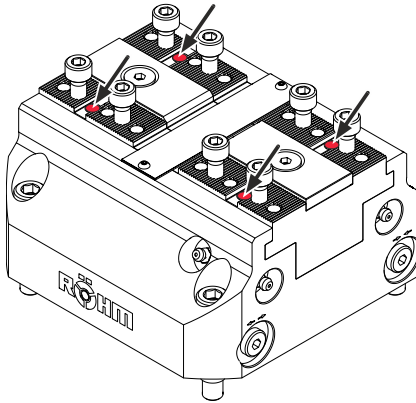
With a weight of more than 15 kg, the centric clamp must be transported with suitable slings.

### KZS-P



Size	64	100	160	200	250
Weight [kg]	1.25	3.6	10,3	18.5	30.4

### KZS-PG

Size	100	160	200	250
Weight [kg]	3.7	10.5	18.9	30.4



## 5 Assembly of the Centric Clamp

<b>⚠ WARNING</b>	
	<p><b>Injuries due to insufficient securing on assembly, incorrect tightening torque of the screws.</b></p> <p>Crushing due to falling of the centric clamp.</p> <ul style="list-style-type: none"> <li>➤ Use tapped holes for transport purposes.</li> <li>➤ Observe tightening torque of the screws.</li> <li>➤ Wear personal protective equipment.</li> </ul>
<b>⚠ WARNING</b>	
	<p><b>Crushing injuries and cuts due to start-up of the machine during set-up work.</b></p> <p>Flying parts may cause serious injuries.</p> <ul style="list-style-type: none"> <li>➤ Disconnect the power supply before assembly.</li> <li>➤ Protect the machine against being re-started.</li> <li>➤ Wear personal protective equipment.</li> </ul>

### 5.1 Personal Protective Equipment and Personnel Qualification

When working on and with the centric clamp KZS-P/KZS-PG, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the centric clamp KZS-P/KZS-PG, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the centric clamp KZS-P/KZS-PG is at a standstill.



Wear protective gloves



Wear safety goggles



Wear safety shoes

Work on and with the centric clamp may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel** [► 11]).

## 5.2 Basic Principles

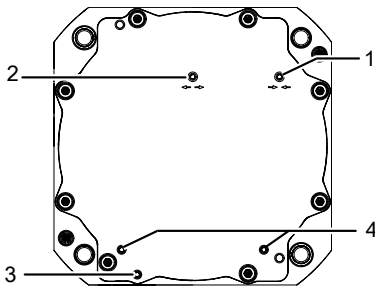
### 5.2.1 Connection Types

The centric clamp can either be connected directly, e.g. via a pallet (direct connection) or via pipelines.

#### Direct connection

In the case of direct connection, the centric clamp is supplied with pressure medium via the connections on the underside.

When using sealing air via a direct connection, the connection (5) must be disassembled and the borehole closed with the threaded pin (35).

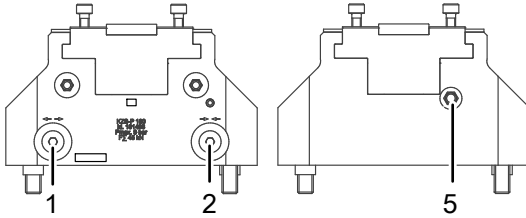


1	Pressure connection close	3	Connection for sealing air
2	Pressure connection open	4	Connections for central lubrication*

\*both connections must be connected.

## Connection via pipelines

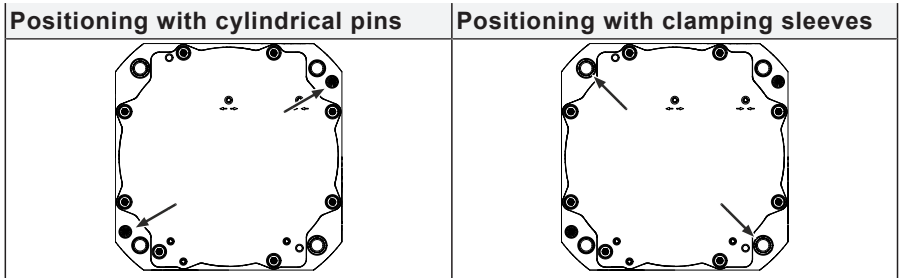
In the case of connection via pipelines, the centric clamp is supplied with pressure medium via the connections on the basic body.



1	Pressure connection open	5	Connection for sealing air
2	Pressure connection close		

### 5.2.2 Positioning

When positioning, the centric clamp is adjusted either with cylindrical pins or with clamping sleeves. There are locating holes on the body for the cylindrical pins and clamping sleeves. The machine table must be equipped with counterparts of the same diameter.



### 5.3 Mounting the Centric Clamp

#### NOTICE



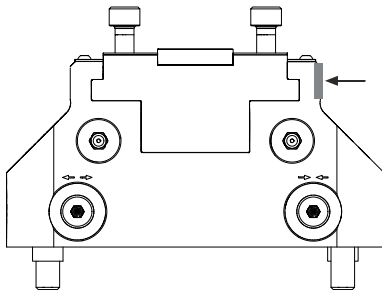
#### Deformation of the cover.

In the case of excessive actuation pressure, the cover of the centric clamp may be deformed.

- For test purposes, operation of the centric clamp KZS-P/KZS-PG up to 3 bars is permitted during assembly on the test bench.
- From more than 3 bars, the centric clamp must be bolted to the machine table.

The following assembly instructions describe the general procedure for assembly of the centric clamp on a suitable assembly surface. The assembly surface and the lines must be suitably prepared for the individual centric clamp.

- The machine is switched off and protected against being switched on again.
1. Check the machine table and the underside of the centric clamp for unevenness and microswarf and fix the latter if necessary.
  2. Depending on the connection type, remove the seals of the connections on the body (see **table “Remove seals of the connections”**).
  3. Place the centric clamp on the assembly surface to test it. The body must lie completely and flatly on the surface.
  4. Depending on the prepared type of positioning, use clamping sleeves or cylindrical pins (see **table “Position centric clamp”**).
  5. The alignment of the centric clamp can be checked by measuring via the ground flanks on the side of the body.



6. Grease the fixing screws in the thread area and on the head contact surface.
7. Tighten the fixing screws with the permissible tightening torque (see **Checking the Tightness of Screw Connections [▶ 35]**).
  - The centric clamp is assembled and connected.
8. Check clamping force (see **Checking the Clamping Force [▶ 39]**)
  - ✓ The centric clamp is ready for operation.




### Remove seals of the connections

Direct connection	Connection via pipelines
<ul style="list-style-type: none"> <li>a) Insert the O-rings into the sealing seats of the pressure connections (assembly surface).</li> <li>b) Remove the threaded pins from the corresponding connections on the underside of the centric clamp (Open, Close and , if fitted, Sealing Air and 2x lubrication).</li> <li>c) Leave all other connections sealed.</li> </ul>	<ul style="list-style-type: none"> <li>a) Remove the seals of the connections (Open, Close and, if fitted, Sealing Air) on the fronts of the body and connect pressure lines.</li> <li>b) Leave all other connections sealed.</li> </ul>

### Positioning the centric clamp

With clamping sleeves	With cylindrical pins
<ul style="list-style-type: none"> <li>a) Insert clamping sleeves into the corresponding locating holes on the machine table as far as they will go.</li> <li>b) Mount in such a way that the protruding part of the clamping sleeves engages with the locating holes on the body.</li> </ul>	<ul style="list-style-type: none"> <li>a) Insert cylindrical pins into the corresponding locating holes on the machine table as far as they will go.</li> <li>b) Mount in such a way that the protruding part of the cylindrical pins engages with the locating holes on the body.</li> </ul>

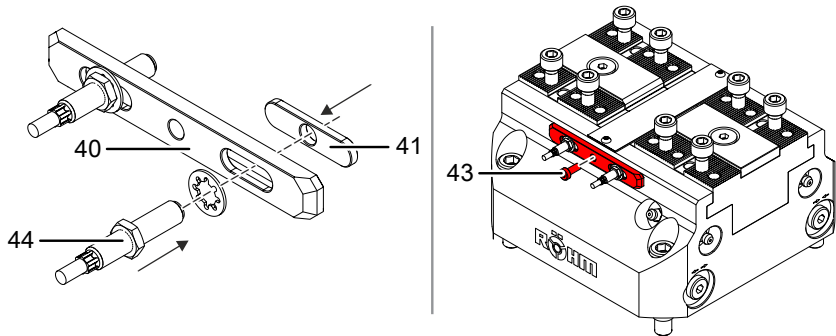
## 5.4 Mounting the Inductive Proximity Switches

<b>NOTICE</b>	
	<p><b>Ingress of dirt and swarf.</b> Damage to the centric clamp.</p> <ul style="list-style-type: none"> <li>➤ Never operate the centric clamp without the proximity switch screwed in.</li> </ul>



On assembly, do not excessively twist the connection cables and possibly always turn them as well.

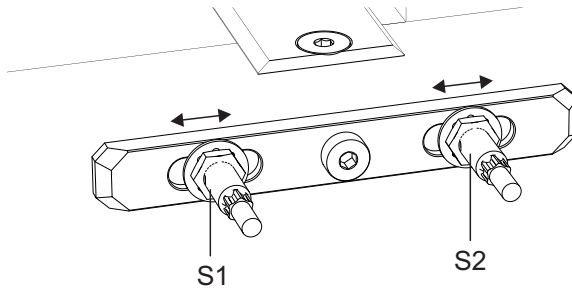
## Mounting the proximity switch



1. Insert the counter-holders (41) into the holding plate (40).
2. Screw both proximity switches (44) through the holding plate (40) into the counter-holder (41) with a nut and locking washer.
  - Screw in the proximity switches (44) flat or only with a minimum protrusion.
3. Fix the holding plate (40) to the centric clamp with the screw (43).
4. Turn in the two proximity switches (44) as far as they will go.
5. Turn back the proximity switches (44) by 1.5 revolutions each.

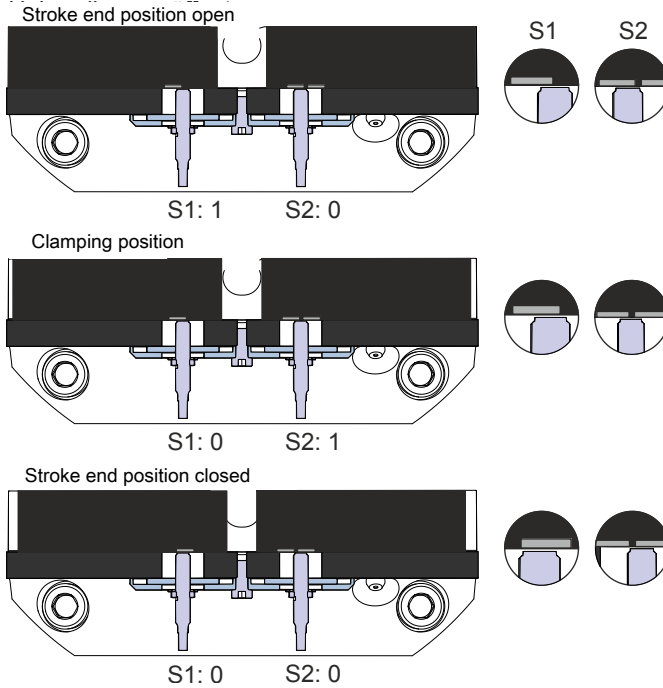
**I** If the proximity switches are not turned back, they scrape against the jaws when operated and may be damaged.

## Setting the proximity switch



1. Set the switching point of the left-hand proximity switch (S1) so that the corresponding switching signal is active when the stroke end position is open or closed.
2. Set the switching point of the right-hand proximity switch (S2) so that a switching signal is active in the area of the clamping position.
3. Fix the proximity switches with the lock nut. Only slightly tighten the lock nut.
4. Clamp and open the centric clamp to test the reaction of the proximity switches.
  - The status LED on the proximity switch is lit when a signal (switching signal "1") is issued (see **table "Switching diagram proximity switch"**).
  - ✓ Proximity switch mounted and set.

### Function with external clamping



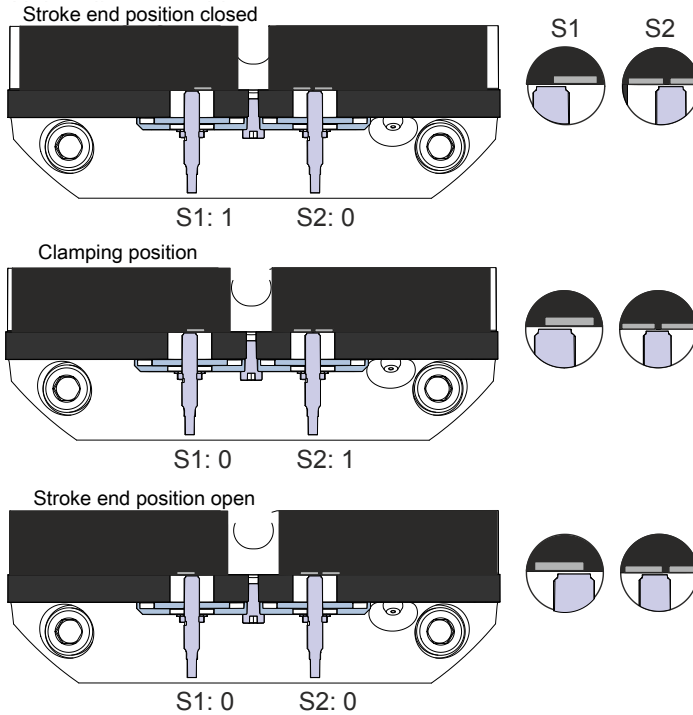
The switching diagram shows the recommended setting of the proximity switches “S1” and “S2” on query of the “end-of-stroke position closed” and “reached clamping position”.

The proximity switches can be moved on the holding plate in order to alter the query to “End-of-stroke position open” and “Overrunning the clamping position”.

Proximity switch	Switching diagram proximity switch			
	S1 (end position)		S2 (clamping position)	
Signal output	0	1	0	1
Jaw end position up, centric clamp open		X	X	
Clamping position	X			X
Jaw end position down, centric clamp closed	X		X	

The bar serves as a position sensor for the proximity switches. When the proximity switch is activated (1 is displayed), the status LED on the proximity switch is lit.

### Function with internal clamping



The switching diagram shows the recommended setting of the proximity switches “S1” and “S2” on query of the “end-of-stroke position closed” and “reached clamping position”.

The proximity switches can be moved on the holding plate in order to alter the query to “End-of-stroke position open” and “Overrunning the clamping position”.

Proximity switch	Switching diagram proximity switch			
	S1 (end position)		S2 (clamping position)	
Signal output	0	1	0	1
Jaw end position down, centric clamp closed		X	X	
Clamping position	X			X
Jaw end position up, centric clamp open	X		X	

The bar serves as a position sensor for the proximity switches. When the proximity switch is activated (1 is displayed), the status LED on the proximity switch is lit.

## 6 Operation of the Centric Clamp

### ⚠ DANGER



#### **Danger of slipping due to spilled operating materials.**

Serious injuries due to falling.

- Wipe up spilled operating materials immediately.

### ⚠ CAUTION



#### **Skin irritations due to contact with lubricants.**

Lubricants may cause irritations in the event of contact with the skin.

- When handling the centric clamp, wear safety goggles, long work clothes and gloves.
- Avoid skin contact with lubricants.

### ⚠ CAUTION



#### **Danger of crushing when clamping the centric clamp.**

Trapping of fingers.

- Do not hold fingers between the workpiece and the top jaws or between the top jaws when clamping the centric clamp.

### ⚠ CAUTION



#### **Risk of Burns due to Hot Surfaces.**

Burns on hands.

- Do not touch the centric clamp when in operation.
- Allow the centric clamp to cool down before carrying out necessary work.
- Wear personal protective equipment.

## 6.1 Personal Protective Equipment and Personnel Qualification

---

When working on and with the centric clamp KZS-P/KZS-PG, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the centric clamp KZS-P/KZS-PG, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the centric clamp KZS-P/KZS-PG is at a standstill.



Wear protective gloves



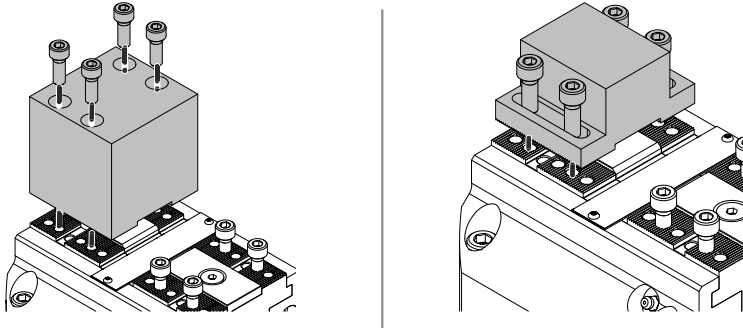
Wear safety goggles



Wear safety shoes

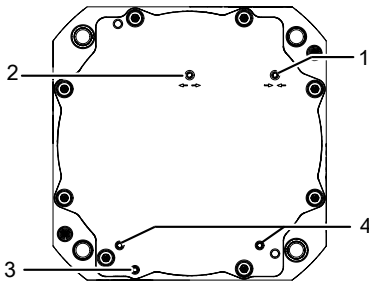
Work on and with the centric clamp may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel** [▶ 11]).

## 6.2 Mounting the Top Jaws



- The machine is switched off and protected against being switched on again.
  - The base and top jaws are cleaned.
1. Place the top jaws on the base jaws and fix with the jaw fixing screws. Observe the labelling of the jaws. (Top jaw 1 on base jaw 1, top jaw 2 on base jaw 2.)
  2. Tighten the fixing screws with the permissible tightening torque (see **Checking the Tightness of Screw Connections** [▶ 35]).
    - ✓ The top jaws are mounted.

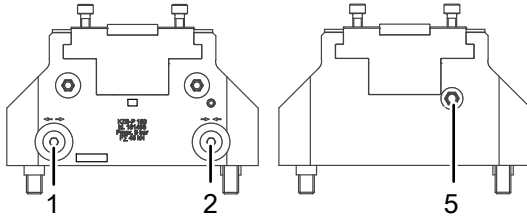
## 6.3 Clamping the Workpiece



1	Pressure connection close	3	Connection for sealing air
2	Pressure connection open	4	Connections for central lubrication*

\*both connections must be connected.





1	Pressure connection open	5	Connection for sealing air
2	Pressure connection close		

### External clamping

1. Position the workpiece.
2. Apply pressure to the centric clamp on the pressure connection to open (2).
  - Pressure is built up in the centric clamp.
  - The top jaws fix the workpiece from the inside.
  - ✓ The workpiece is clamped.

### Internal clamping

1. Position the workpiece.
2. Apply pressure to the centric clamp on the pressure connection to close (1).
  - Pressure is built up in the centric clamp.
  - The top jaws fix the workpiece externally.
  - ✓ The workpiece is clamped.

## 7 Maintenance

### 7.1 Personal Protective Equipment and Personnel Qualification

When working on and with the centric clamp KZS-P/KZS-PG, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the centric clamp KZS-P/KZS-PG, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the centric clamp KZS-P/KZS-PG is at a standstill.



Wear protective gloves



Wear safety goggles



Wear safety shoes

Work on and with the centric clamp may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel** [▶ 11]).

### 7.2 Maintenance Interval

The regular maintenance work is described in the following:

Activity	Interval
Check tightness of screw connections. See <b>Checking the Tightness of Screw Connections</b> [▶ 35].	Weekly.
Partial cleaning (preliminary cleaning and oiling). See <b>Partial Cleaning</b> [▶ 36].	After every use.
Lubricate the centric clamp. See <b>Lubricating the Centric Clamp</b> [▶ 36].	Depending on conditions of use and use of coolant after approx. 8 hrs. or at the latest after 20 hrs. or 10,000 clamping cycles.

Activity	Interval
Checking the Clamping Force. See <b>Checking the Clamping Force [▶ 39]</b> .	Monthly or at the latest after 10,000 clamping cycles.
Complete cleaning (maintenance, basic cleaning and replacement of wear parts). See <b>Complete Cleaning [▶ 39]</b> .	Depending on conditions of use and use of coolant after approx. 2000 hrs. or at the latest after 100,000 clamping cycles.

## 7.3 Maintenance Work

### 7.3.1 Checking the Tightness of Screw Connections

If screws are replaced or undone, incorrect replacement or incorrect attachment may lead to dangers for persons and objects. For this reason, for all holding screws, the screw recommended by the manufacturer of the screw must be used and the tightening torque applied in accordance with the screw quality.

For **cylinder head screws** of the conventional sizes M4 – M24 and strength classes 8.8, 10.9 and 12.9, the following tightening torque table applies:



#### Tightening torque in Nm

Strength class	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
8.8	3.0	5.9	10.1	24.6	48	84	133	206	295	415	567	714
10.9	4.6	8.6	14.9	36.1	71	123	195	302	421	592	807	1017
12.9	5.1	10	17.4	42.2	83	144	229	354	492	692	945	1190

The table values do **not** apply to tightening torques expressly specified elsewhere!

When replacing the original screws, the strength class specified by the manufacturer is to be observed. In the case of mounting screws for clamping devices, clamping inserts, top jaws, rigid stops, pre-clamped covers, equalising weights and comparable elements, strength class 12.9 is always to be used.


### 7.3.2 Partial Cleaning

<b>⚠ WARNING</b>	
	<p><b>Danger from stirred-up swarf</b></p> <p>Injuries when cleaning with compressed air are possible due to stirred-up swarf.</p> <ul style="list-style-type: none"> <li>➤ Never use compressed air for cleaning.</li> </ul>
<b>⚠ CAUTION</b>	
	<p><b>Skin irritations due to contact with lubricants.</b></p> <p>Lubricants may cause irritations in the event of contact with the skin.</p> <ul style="list-style-type: none"> <li>➤ When handling the centric clamp, wear safety goggles, long work clothes and gloves.</li> <li>➤ Avoid skin contact with lubricants.</li> </ul>

It is not necessary to disassemble the centric clamp for partial cleaning. Cleaning with compressed air or a high-pressure cleaner is not permitted.

1. Remove dirt and swarf towards the drive side with a brush or broom.
2. Clean the top jaws with a cloth or brush.
3. Thoroughly clean the top jaws with a cloth soaked in petroleum or benzine.
4. Thoroughly clean the centric clamp with a cloth soaked in petroleum or benzine.
5. Brush the ground surfaces with acid-free oil.
  - ✓ The centric clamp is cleaned and oiled.

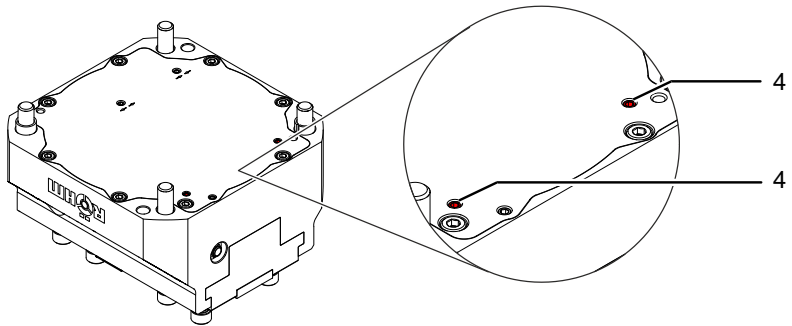
### 7.3.3 Lubricating the Centric Clamp

<b>⚠ CAUTION</b>	
	<p><b>Skin irritations due to contact with lubricants.</b></p> <p>Lubricants may cause irritations in the event of contact with the skin.</p> <ul style="list-style-type: none"> <li>➤ When handling the centric clamp, wear safety goggles, long work clothes and gloves.</li> <li>➤ Avoid skin contact with lubricants.</li> </ul>

## Central lubrication

Recommended oil	
Lubricating oil	G CLP DIN 51517-3:2014-02
Viscosity class	VG 220 DIN ISO 3448:2010-02
Temperature	Max. 70 °C

Construction size	Oil quantity [per connection]
64	2 cm <sup>3</sup>
100	2 cm <sup>3</sup>
160	4 cm <sup>3</sup>
200	6 cm <sup>3</sup>
250	8 cm <sup>3</sup>



The central lubrication connections (4) are sealed in the factory with threaded pins. For central lubrication,

- the threaded pins are removed from the cover,
  - the boreholes are sealed with O-rings and
  - **both** supply lines are connected.
1. Pour in the oil (for oil quantity, see **Table**) via **both** connections of the central lubrication unit (4) on the underside of the base body.
    - Each connection supplies a guide of both base jaws, for which reason **both** connections must be connected.
  2. Move through the complete stroke several times.
    - The oil is distributed.
    - After 400 clamping cycles, move through the complete stroke again at least twice.
- ✓ The centric clamp is lubricated.

## Manual lubrication

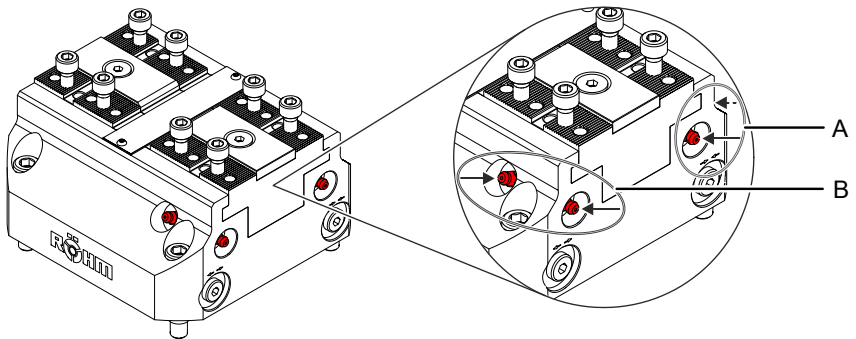
Construction size	Quantity of grease [strokes per lubricating nipple set]
64	1
100	1
160	2
200	3
250	4

Recommended grease gun	ID no.:
RÖHM grease gun	329093

Recommended RöhM grease F 80	ID no.:
0.1 kg	630869
0.25 kg	304345
0.5 kg	308555
1.0 kg	028975
5 kg	318310
25 kg	658047



1. With the grease gun, press RöhM grease F 80 (for grease quantity, see **Table**) into the side **or** front lubricating nipples of the corresponding lubricating nipple set (A/B) of the base body.
2. Move through the complete stroke several times.
  - The grease is distributed.
  - After 400 clamping cycles, move through the complete stroke again at least twice.
  - ✓ The centric clamp is lubricated.

### 7.3.4 Checking the Clamping Force

- Check clamping force with clamping force measurement system.

Recommended clamping force measurement system	ID no.:
F-Senso Chuck	179800

### 7.3.5 Complete Cleaning

#### ⚠ CAUTION



#### Skin irritations due to contact with lubricants.

Lubricants may cause irritations in the event of contact with the skin.

- When handling the centric clamp, wear safety goggles, long work clothes and gloves.
- Avoid skin contact with lubricants.

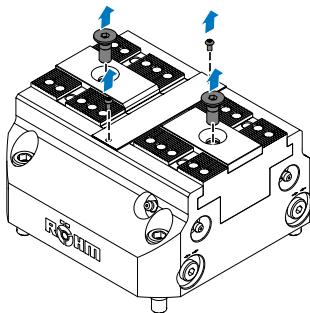
For complete cleaning, the centric clamp must be removed from the machine table, completely dismantled, cleaned and re-assembled.

#### Disassembly and dismantling of the centric clamp

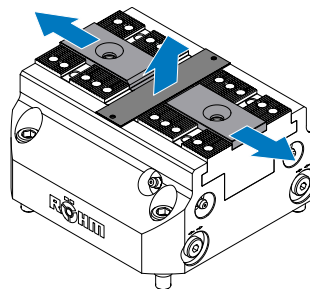


Before dismantling, plan the required time for a leak test.

- The machine is switched off and protected against being switched on again.
1. To make all screws accessible, disassemble the top jaws.
  2. Undo the screws of the cover (7) and of the guide strips (6) (A).

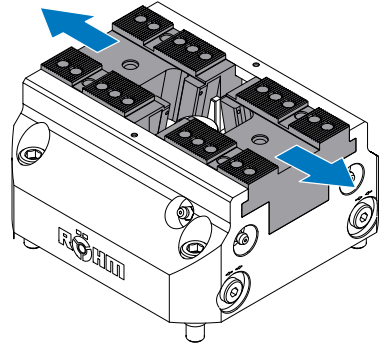
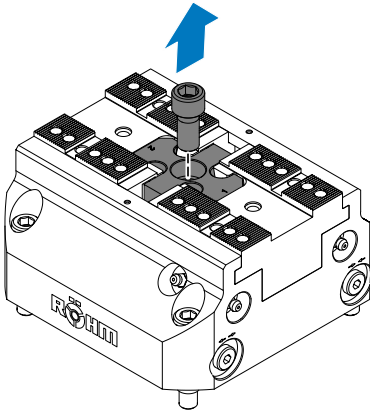


A



B

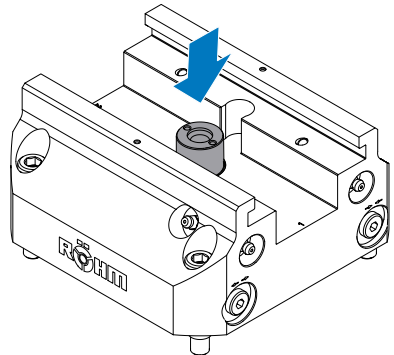
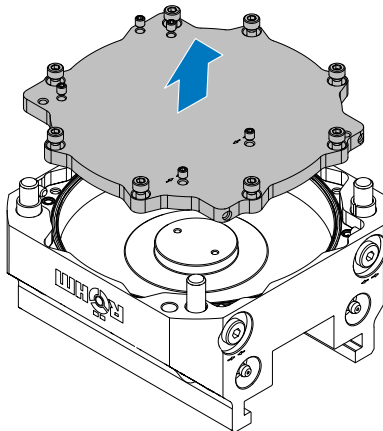
3. First remove the cover (7) and then the guide strips (6) (B).
4. Release the central cylindrical head screw (11) from the piston (3) (C).



C

D

5. Pull the base jaws (2) out of the base body (1) (D).
6. Turn the base body (1) around and disassemble the cover (4) (E).



E

F

✓ The centric clamp is dismantled.



## Replacement of wear parts

Wear parts include: seals, O-rings and quad-rings.

1. Check the dismantled centric clamp for wear and damage.
2. Replace worn and damaged parts with OEM replacement parts.
  - ✓ Wear parts are replaced.

The following seal sets are available, depending on the construction size:

### KZS-P

ID no.	181480	181482	181486	181490	181494
Size	64	100	160	200	250
Seal set	1369581	1369582	1369583	1369584	1369585

### KZS-PG

ID no.	181483	181487	181491	181495
Size	100	160	200	250
Seal set	1369582	1369583	1369584	1369585

## Cleaning the centric clamp

- Thoroughly clean the dismantled centric clamp with a cloth soaked in petroleum or benzine and free of grease residue, dirt and abrasion.
  - ✓ The centric clamp is cleaned.

Cleaning with compressed air or a high-pressure cleaner is not permitted.

## Lubrication of the centric clamp

- Brush the individual parts of the dismantled centric clamp with Röhm grease F 80.
  - ✓ The dismantled centric clamp is lubricated.

## Assembly of the centric clamp

The centric clamp is assembled in reverse order. Installation parts which re used several times must be mounted in the original position in accordance with their signature. Tighten the fixing screws with the permissible tightening torque (see **Checking the Tightness of Screw Connections** [▶ 35]).

## Leak test

Apply pressure to the centric clamp and monitor for possible loss of pressure. The decrease in pressure should be less than 0.5 bars in 24 hours. as otherwise the centric clamp is defective and not operational.

## 8 Storage

If the centric clamp is not in use, the centric clamp is to be stored in a dry, protected place in accordance with the storage temperature (environmental and operational conditions).

## 9 Troubleshooting

Fault	Possible cause	Measure
The centric clamp does not go into clamping position.	Leakage on a pneumatic line	Check pneumatic line.
The measured clamping force decreases from measurement to measurement.	Insufficient lubrication.	Lubricate the centric clamp.
	Internal soiling.	Complete cleaning (see <b>Complete Cleaning [▶ 39]</b> ).
	Defective seals.	Replace seals (see replacement of wear parts in <b>Complete Cleaning [▶ 39]</b> ).

## 10 Disposal

### NOTICE



**Operating materials are hazardous waste!**

Incorrect disposal may lead to serious damage to the environment.

- Used operating materials must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

After final disassembly, the materials must be disposed of in an environmentally way in accordance with the valid regulations.

- Metals

Metals must be recycled. They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

- Plastics

They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

- Rubber (e.g. O-rings)

They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.