

INSTALLATION AND OPERATING INSTRUCTIONS

DKHS1000 Series
Rotary clamping element
Hydraulic

DDOC00230

THE KNOW-HOW FACTORY

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1 Supporting documents

NOTICE



Read through the installation and operating instructions before installing or working with the product.

The installation and operating instructions contain important notes for your personal safety. They must be read and understood by all persons who work with or handle the product during any phase of the product lifetime.



The documents listed below are available for download on our website www.zimmer-group.com:

- Installation and operating instructions
- Catalogs, drawings, CAD data, performance data
- Information on accessories
- Technical data sheets
- General Terms and Conditions, including warranty information.

⇒ Only those documents currently available on the website are valid.

In these installation and operating instructions, "product" refers to the product designation on the title page.

2 Safety notices

CAUTION



Risk of injury and material damage in case of non-compliance

Installation, commissioning, maintenance and repairs may only be performed by qualified specialists in accordance with these installation and operating instructions.

The product may only be used in accordance with these installation and operating instructions and the product's technical data. Any changes or additions to the intended use of the product, as well as modifications to the product, such as those in the following examples, require the written permission of the manufacturer:

- Use of the product under extreme conditions, such as aggressive fluids or abrasive dusts
- Additional drilled holes or threads

⇒ Zimmer GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

Installation, commissioning, maintenance and repairs may only be performed by qualified specialists in accordance with these installation and operating instructions.

- ▶ Whenever work is carried out on the product, make sure that the product cannot be actuated by mistake.
- ▶ Do not reach into the operational range of the product.
- ▶ In the event of maintenance, conversion or expansion work, remove the product from the machine and carry out the work outside the danger zone.
- ▶ Avoid using the product with missing or loosened attachment screws.
- ▶ Avoid power supply faults (e.g. due to pressure fluctuations).

3 Proper use

NOTICE



The product is only to be used in its original state with its original accessories, with no unauthorized changes and within the stipulated parameter limits and operating conditions. Any other or secondary use is deemed improper.

- ▶ Operate the product only in compliance with the associated operating instructions.
- ▶ Operate the product only when it is in a technical condition that corresponds to the guaranteed parameters and operating conditions.
- ⇒ Zimmer GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

The product may only be used in the following areas or, more specifically, in the following machines or systems:

- The product is designed solely for torque absorption on rotating machine components.
- The clamping of the rotation axis may only take place in a static state.
- The product may only be operated under the conditions specified in the technical data sheet.
- The product may only be operated under the predefined installation and tolerance specifications.
- The product is designed for operation with HLP46 hydraulic fluid or types with proven compatibility for blending only.
- The guide must be provided externally. The product does not feature any guide characteristics.

4 Improper use

The product may not be used in the following areas or, more specifically, in the following machines or systems, without further protective or control measures:

- Equipment used to transport persons (e.g. elevators)
- With loads suspended over persons
- Use as a brake or bearing is not permitted
- In vehicles
- Underwater or in other fluids
- Corrosive environment (e.g. in connection with acids)
- Contact with abrasive media (e.g. grinding dust)
- Vacuum
- Direct contact with foods or other perishable goods
- Potentially explosive atmosphere
- Unauthorized modifications must not be made.

The product is not suitable for use with other media or pressure ranges, except for those defined in the supporting documents and not as a service brake.

INFORMATION



Zimmer Customer Service is available to provide you with assistance if you have any further questions.

5 Personnel qualification

Installation, commissioning and maintenance may only be performed by qualified personnel.

These personnel must have read and understood the installation and operating instructions in full.

6 Product description

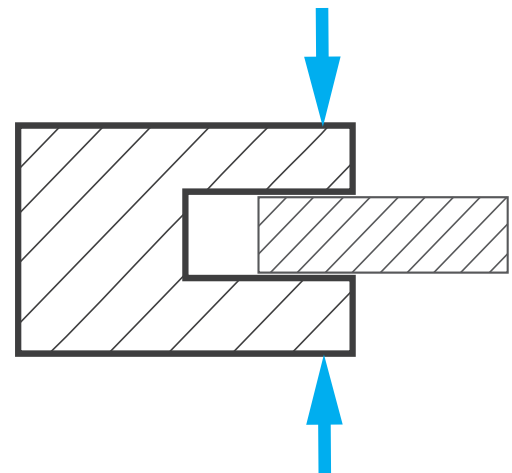
The DKHS1000 series product is designed for the highly rigid and precise fixing of rotation axes with high angle accuracy during torque absorption.

The product may only be used for the static clamping of axes or shafts. The product must not be used as a bearing or brake.

The product is a hydraulically operated rotary clamping element with a spring accumulator (NC).

The product is closed in the event of a loss of power (pressureless).

⇒ NC (normally closed)



6.1 Laser engraved type plate

A type plate, as a laser engraving, is affixed to the housing of the product.

The laser engraving includes the serial number, article number and the adjustment dimension.

⇒ It is recommended to assign the serial number to your project, in case any questions arise.

⇒ Example:

- Article number: DKHS1xxx
- Serial number: 06-12345678
- Adjustment dimension [mm]: X.XX

DKHS1xxx
06-123456789
X,XX



INFORMATION



Please always state the serial number in the event of damage or a complaint.

Under no circumstances may the laser engraving on the product be removed or changed. Should the laser engraving nevertheless be removed or changed, Zimmer GmbH is not liable for any damages or claims.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

7 Function

Hydraulic pressure is applied to the housing. Under this pressure, the housing expands slightly and releases the shaft connection, which is screwed to the rotation axis.

In the pressureless state, the housing resumes its original shape and clamps the shaft connection via the pretension retained in the housing.

This pretension enables the holding torque absorption to be achieved in the clamped state.

The product is closed in a pressureless state and offers an integrated emergency function that ensures that all moving components are held securely if the pressure drops or the entire system fails.

The product is not suitable for dynamic emergency braking.

Fig. 1: Cutaway view of the DKHS1000 series product

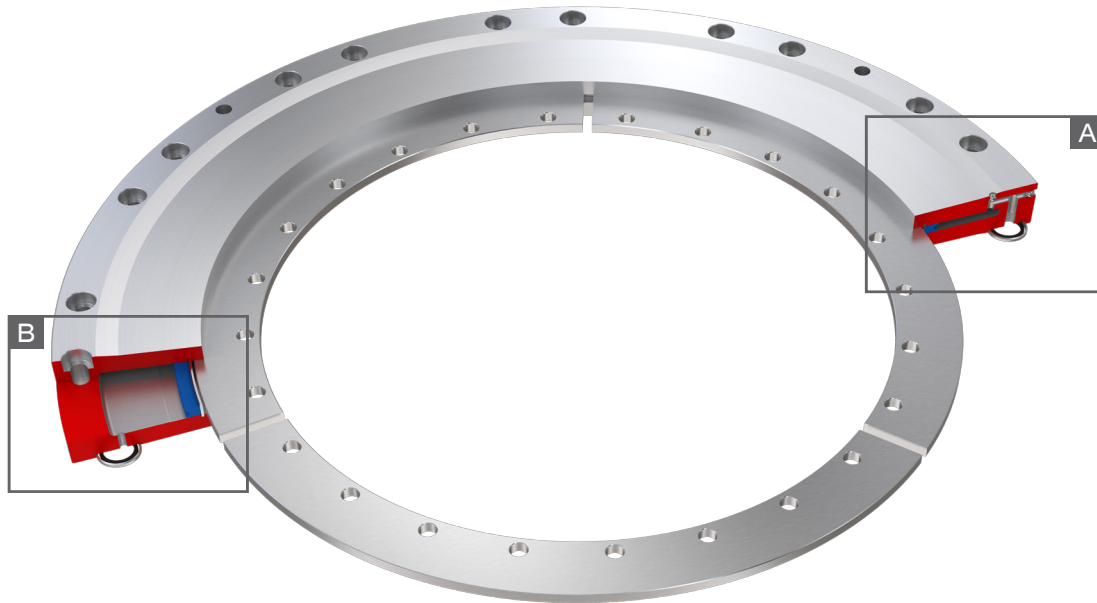


Fig. 2: DKHS1000 series product – cutaway view A

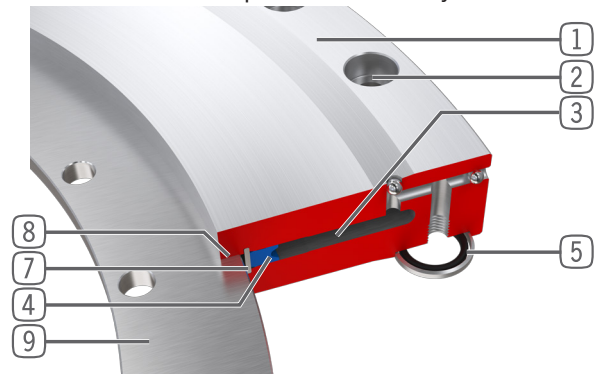
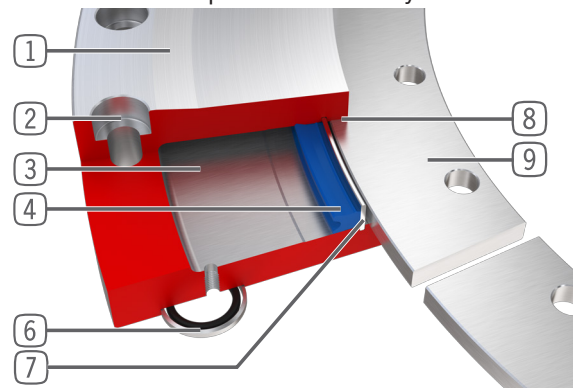


Fig. 3: DKHS1000 series product – cutaway view B



- ① Housing
- ② Housing connection
- ③ Pressure chamber
- ④ Sealing
- ⑤ Hydraulic connection (A)
- ⑥ Bleed connection (C)
- ⑦ Holding plate
- ⑧ Clamping area
- ⑨ Shaft connection

8 Technical data

The product has a service life (**B_{10d} value**) of **5,000,000 cycles**.

The B10d value is determined in accordance with ISO 19973-1 (dangerous failures with regard to the safety of machinery).

INFORMATION



For technical data, please refer to our website at www.zimmer-group.com/de/it-faq.

This data varies within the series, depending on the specific design.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

Example explanation of the holding torque:

Example technical specification "holding torque 1": 1,000 Nm" means a maximum twist of the shaft of 1 arcsec (arcsecond) under the influence of a torque of 1,000 Nm.

Example technical specification "holding torque 5": 1800 Nm" means a maximum twist of the shaft of 5 arcsec (arcsecond) under the influence of a torque of 1800 Nm.

9 Tightening torque of mounting screws

The listed tightening torques are based on calculations with assumed application parameters.

The tightening torques must be calculated separately for each individual application in accordance with the VDI2230 directive.

Thread	Tightening torque (ISO 4762)
M6	16 Nm
M8	38 Nm

NOTICE



To install the product, only mounting screws of strength class 12.9 may be used. Using other strength classes may result in a loss of the maximum clamping force, failure of the product or material damage and personal injury.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

10 Installation

WARNING



Risk of injury due to uncontrolled movement

Risk of injury in case of unexpected movement of the machine or system into which the product is to be installed.

- ▶ Switch off the machine before any work.
- ▶ Secure the machine against being switched on unintentionally.
- ▶ Check the machine for any residual energy that may be present.

Risk of injury during overhead assembly work

- ▶ For overhead assembly work, select a suitable lifting or holding device.
- ⇒ The weight within the series may vary.

CAUTION



Risk of injury due to uncontrolled movement

Risk of injury in the event of unexpected movement of the product when the power supply is connected.

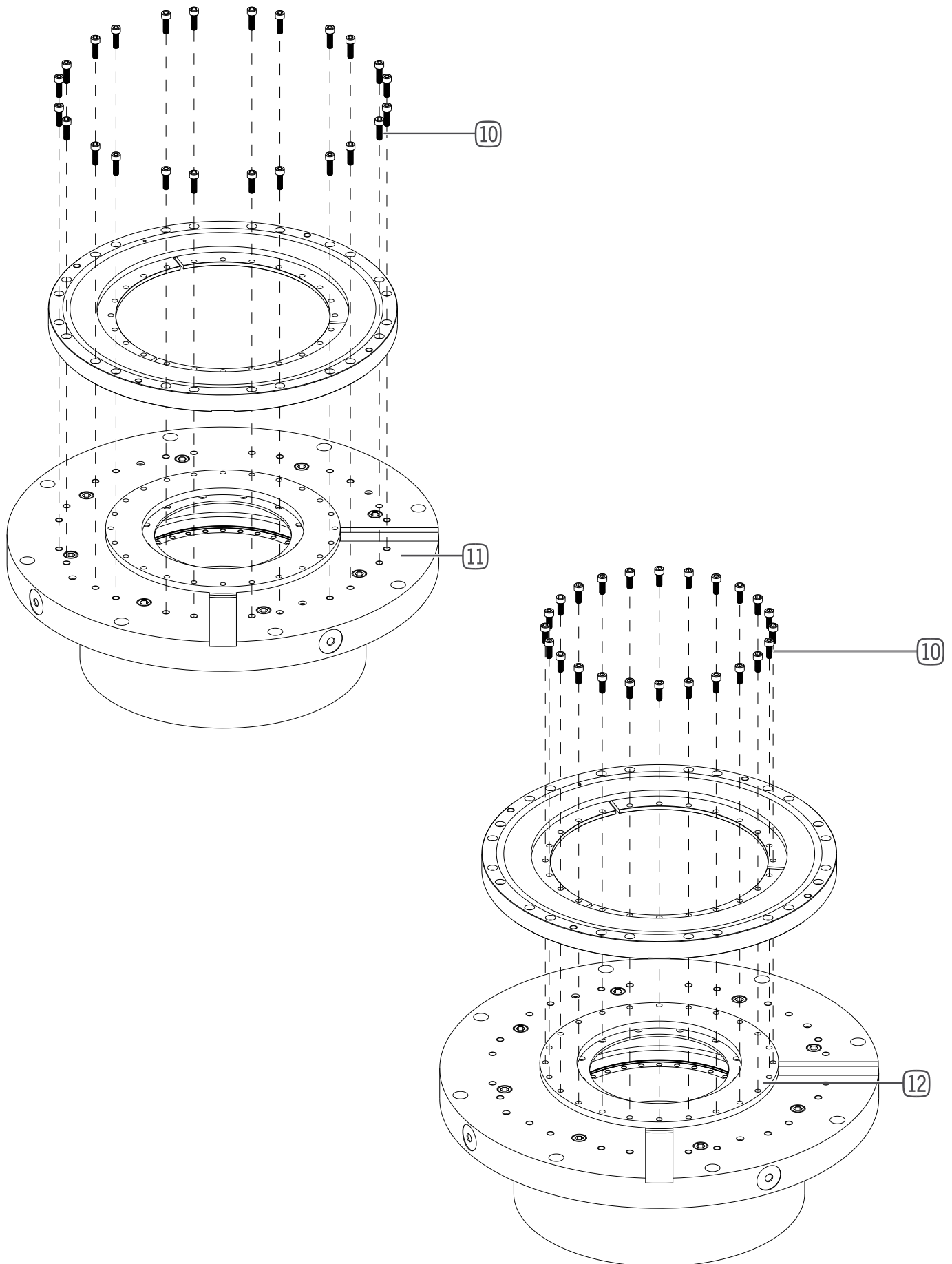
- ▶ Switch off the power supply to the product before all work.
- ▶ Secure the power supply against being switched on unintentionally.
- ▶ Check the product for any residual energy that may be present.

NOTICE



- The adjustment of the axle or shaft/shim ($\pm 5 \mu\text{m}$) is absolutely mandatory. The dimensions, shape and position tolerances between the shaft and product must be adhered to within the specified and defined parameters. Any deviation can result in damage to the product during continuous operation.
- During installation, ensure that the mounting piece is sufficiently rigid and flat in accordance with Machinery Directive 2006/42/EC.
- Ensure that the cutting rings and O-rings are inserted on the spotface.
- All mounting points on the product must be used.
- Tighten the mounting points crosswise.
- Hydraulic connection A = Pressurization
- Bleed connection C = Venting

10.1 Installing the mechanical system



MOUNTING SURFACES



Mounting surface of the housing:

⇒ Outer diameter of the product – 40 mm

The minimum mounting surface with which the product may be mounted to the mounting piece is minus 40 mm of the outside diameter of the product housing.

Mounting surface of the shaft connection:

⇒ Inner diameter of the shaft connection + 40 mm (minimal + 22 mm)

The minimum mounting surface with which the product may be mounted to the shaft bracing is plus 22 mm of the inner diameter of the product shaft connection.

Zimmer GmbH recommends a mounting surface of + 40 mm!

SURFACE ROUGHNESS



The flat surface must have a minimum roughness of Ra 1.6.

⇒ O-ring and cutting ring

NOTICE



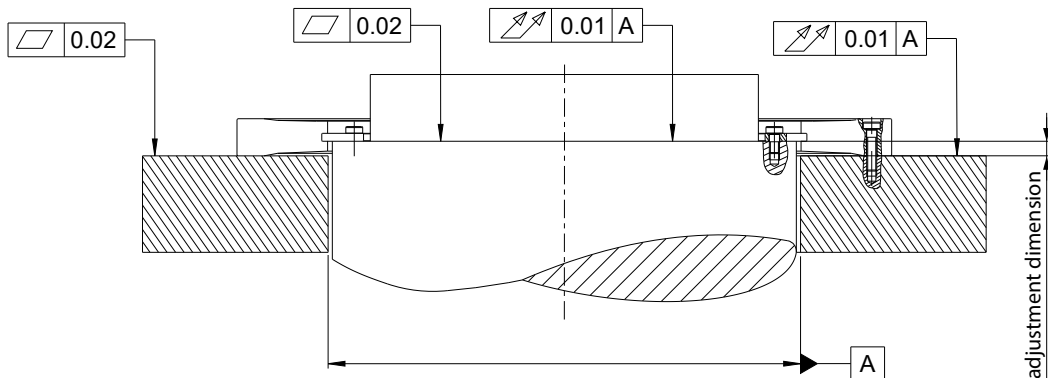
Vertical installation:

The bleed connection C must be facing upwards for a vertical installation.

⇒ The built-in sealing plug of the bleed connection C is not suitable for sealing!

The following work steps must be observed when installing at the mounting piece ⁽¹¹⁾ :

- ▶ Before mounting the product, the pressure setting and operability of the pressure relief valve must be checked.
- ▶ The product must be installed on an appropriate mounting surface in accordance with the levelness and total run-out specifications.
 - ⇒ Permissible unevenness and total run-out of < 0.02 mm
 - ⇒ Make sure the mounting surface is sufficiently rigid and flat.



- ▶ Adjust the shim ⑫ to the specified adjustment dimension.
 - ⇒ Refer to the laser marking on the product for the adjustment dimension.
- ▶ Check whether all cutting rings and O-rings are properly inserted in the product.
- ▶ Remove the sealing plugs from the hydraulic connections A ⑤ and bleed connection C ⑥.
- ▶ Set the product onto the ⑫ shim and mounting piece ⑪.
 - ⇒ Ensure that the hydraulic connection A ⑤ and the bleed connection C ⑥ sit on the spotfaces.
- ▶ Loosely attach the housing ① and shaft connection ⑧ using the mounting screws ⑩ to the mounting piece ⑪ and shim ⑫.

CAUTION



Under no circumstances may the product be pressurized before all screws are tightened with the necessary tightening torque.

- ⇒ Screw-in depth = at least 1.2 · x Ø
- ⇒ The mounting screws are not included in the scope of delivery.
- ⇒ Strength class of the mounting screws at least 12.9 ⇒ DIN EN ISO 4762.
- ⇒ The product is centered via the screw fittings.
- ⇒ Maximum tolerance of the shim ± 5 µm.

- ▶ Tighten the mounting screws ⑩ with the specified tightening torque to the mounting piece ⑪.
- ▶ Tighten the mounting screws ⑩ on the housing first, then on the shaft connection.
- ▶ Observe the tightening torques of the mounting screws ⑩.
- ▶ Tighten the mounting screws ⑩ crosswise.
- ▶ Bleed the product by flushing it with hydraulic oil HLP46.
 - ⇒ Hydraulic connection A = Pressurization
 - ⇒ Bleed connection C = Venting
- ▶ Add hydraulic oil to the product at low pressure using hydraulic connection A ⑤
- ▶ Flush the product until the hydraulic oil escapes from the bleed connection C ⑥.
- ▶ Seal the bleed connection C ⑥ at mounting piece ⑪ using a suitable pressure-resistant closure.
- ▶ Carry out a functional check.
 - ⇒ The procedure of the functional test is described in section "Function check".

NOTICE



Non-compliance may result in material damage.

10.2 Hydraulic diagram

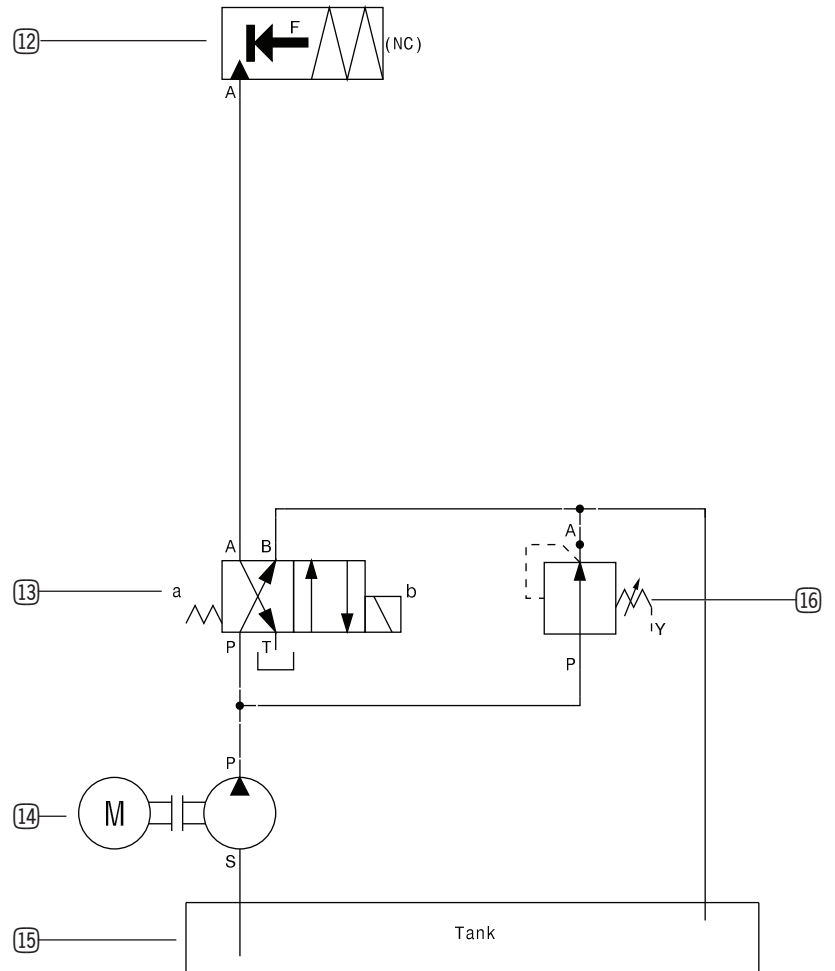
INFORMATION



The illustrated hydraulic diagram is an exemplary representation.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

- ⑫ Rotary clamping element
- ⑬ Hydraulic directional valve
- ⑭ Hydraulic pump
- ⑮ Oil tank
- ⑯ Pressure regulator



10.3 Uninstalling the product

Uninstallation of the product is carried out in the reverse order of that described in section "Installing the mechanical system".

11 Function check

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

- If the product is under pressure, check the ease of movement by turning the shaft slowly.
- If the product is not under pressure, check the clamping process by applying the required torque to the shaft.
- Check the spotface for leaks at maximum pressure by performing a visual inspection.
- Check the hydraulic circuit to ensure the absence of bubbles (flushing the hydraulic circuit).
- Check all mounting screws for their tightening torques.
- The product must not cause an increase in torque of the rotating parts on the machine when in the open state.

INFORMATION



The function of the product can be tested by depressurizing the product and then applying a torque less than or, at most, equal to the holding torque of the product.

If any strain on the axis or shaft can be detected, it must be assumed that the inner elements are worn.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

WARNING



Risk of injury from hot surfaces

Touching the product immediately after operation at the maximum allowable operating temperature can cause burns.



► Wear personal protective equipment.



Lubricants in the clamping area

If the product comes into contact with lubricants, perform another functional test to check whether the product still reaches the required holding torque.

⇒ If the product does not reach the required holding torque, clean the clamping area from all lubricants and check it by performing a functional test.

12 Error diagnosis

INFORMATION



For an accurate and detailed overview of possible faults and their remedies, visit our website at www.zimmer-group.com/de/lt-faq.

Zimmer Customer Service is available to provide you with assistance if you have any further questions.

13 Accessories/scope of delivery

INFORMATION



If any accessories not sold or authorized by Zimmer GmbH are used, the function of the product cannot be guaranteed.

Zimmer GmbH accessories are specifically tailored to the individual products.

Please refer to our website for information on corresponding accessories.

14 Maintenance

When used as intended, there are no known limitations until the specified number of cycles has been reached.

The service life may shorten under the following circumstances:

- Dirty environment.
- Improper use and use that does not comply with the power specifications.
- Incorrect installation
- Failure to comply with the operating temperature.

Even though the product is maintenance-free as mentioned above, perform a regular visual inspection to check for any corrosion, damage or contamination.

Zimmer GmbH shall not be liable in the event of unauthorized dismantling and reassembling of the product or in the event of any malfunction or damage resulting from this.

15 Transportation/storage/preservation

- ▶ Transport and storage of the product must take place only using the original packaging or similar packaging.
- ▶ If the product is already mounted onto the superordinate machine unit, ensure that during transport the product is not subjected to any load (for example, if there is a swivel bridge at the top).
- ▶ Before commissioning the machine after transport, check all power connections and all mechanical connections.
- ▶ Observe the following points when storing the product for longer periods of time:
 - Keep the storage location as dust-free and dry as possible.
 - Observe the temperature range and avoid fluctuations in temperature.
 - Avoid wind, air currents and the formation of condensation.
 - Cover the product in a dustproof manner with weather-resistant, tear-resistant foil.
 - Package the product so that is protected from corrosion.
 - Place additional desiccant under the film as necessary.
 - Avoid direct sunlight.
- ▶ Clean all components. There must be no soiling left on the components.
- ▶ Visually inspect all of the components.
- ▶ Remove foreign substances.
- ▶ Apply corrosion protection in the correct manner.
- ▶ Close hydraulic connections using suitable covers.

16 Decommissioning and disposal

INFORMATION



When the product reaches the end of its operational phase, it can be completely disassembled and disposed of. Completely disconnect the product from the power supply. The product can be disassembled and properly disposed of according to material groups.

When disposing of them, observe the locally applicable environmental regulations and codes and regulations for disposal.

17 Declaration of Conformity

In terms of the EC Directive 2014/30/EC on electromagnetic compatibility

Name and address of the manufacturer:

Zimmer GmbH

📍 77866 Rheinau, Im Salmenkopf 5

☎ +49 7844 9138 0

📠 +49 7844 9138 80

✉ www.zimmer-group.com

We hereby declare that the products described below

Product designation: Rotary clamping element, hydraulic

Type designation: DKHS1000 series

conform to the requirements of the Electromagnetic Compatibility Directive 2014/30/EU in their design and the version we put on the market.

The following harmonized standards have been used:

DIN EN ISO 12100:2011-03 Safety of machinery – General principles for design – Risk assessment and risk reduction

DIN EN ISO 13849-1/13849-2 Safety of machinery – Safety-related parts of control systems (Appendix C.1/C.2 of EN 13849-2, Chap. 6.2.4, Para. b of EN 13849-1)

DIN EN ISO 4413 Safety-related requirements for hydraulic systems and their components

A full list of applied standards can be obtained from the manufacturer.

Authorized representative for the compilation of relevant technical documents

Michael Hemler	See manufacturer's address	Rheinau, Germany 2020-08-31	Martin Zimmer
First name, last name	Address	(Place and date of issuance)	(Legally binding signature) Managing Partner