

Operating instructions

[incl. installation manual]

Tandem cylinder

EN

Translation of the original operating instructions

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1 General

1.1 Information about this manual

This manual enables you to work safely and efficiently with the product.

This manual is part of the product and must be kept in a location directly beside the product that is accessible to the personnel at all times. The personnel must have read this manual carefully and understood its contents before starting any work. The basic requirement for safe work is compliance with all stipulated safety notices and work-related instructions in this manual.

If the product is passed onto a third party, this manual must accompany it.

Illustrations in this manual are there to facilitate a basic understanding, and may differ from the actual design configuration of the product.



WARNING

Serious injuries caused by individual products or by inappropriate combinations of them!

- Read and pay attention to all operating instructions for individual products and combinations of them.

1.2 Key to symbols

Safety instructions in this manual are designated by symbols. The safety notices are invoked by signal words that express the level of hazard involved.

Always comply with safety notices and exercise caution to avoid accidents, injury to people and damage to materials.

Safety notices



DANGER

... indicates an immediate and hazardous situation that can lead to death or serious injury if not avoided.



WARNING

... indicates a potentially hazardous situation that can lead to death or serious injury if not avoided.



CAUTION

... indicates a potentially hazardous situation that can lead to moderate or slight injuries if not avoided.



NOTE

... indicates a potentially hazardous situation that can lead to damage to materials if not avoided.

Tips and recommendations



INFORMATION

... highlights useful tips and recommendations as well as information for efficient and problem-free operation.



... refers to other documents relating to personal and general safety.

Warning symbols may appear on the product or its components.

Always pay attention to warning symbols, and exercise caution to avoid accidents, injury to people and damage to materials.



... warns of stored energy [for example involving springs].



... warns of hand injuries.



... draws attention to the fact that the operating instructions of the product must be read.

1.3 Definition of terms

1.3.1 Release setting

Release setting means that the clamping device is released. If the clamping device is released, this also releases the workpiece.

1.3.2 Complete clamping reserve

Complete clamping reserve means that the clamping device is clamped without a workpiece. The complete stroke has been used up, which means that the clamping device is therefore at the limit position for clamping reserve.

1.4 Limitation of liability

All details and notices in this manual were compiled with due reference to applicable standards and specifications, state-of-the-art technology and our many years of expertise and experience.

The manufacturer accepts no liability for damage arising from any of the following:

- Non-compliance with this manual
- Unintended use
- Use of untrained personnel
- Autonomous conversion work
- Technical modifications
- Use of non-approved spare parts
- Use of non-approved accessories

Subject to any commitments agreed to in the supplier contract, the General Terms & Conditions of Business and the delivery terms of the manufacturer and all legislative stipulations valid at the time of conclusion of this contract.

1.5 Copyright

This manual is protected by copyright, and are only intended for internal use.

The dissemination of this manual to third parties, reproductions in any shape or form - even in part - as well as commercial use and/or communication of their contents are prohibited for anything other than internal use, except with the written consent of the manufacturer.

Infringements oblige the offending party to pay compensation. Without restriction on further claims.

1.6 Scope of delivery

The scope of delivery of this product includes:

- Tandem cylinder
- The operating instructions

Additionally needed and included as optional items in the scope of delivery:

- Clamping device

1.7 Spare parts and accessories



WARNING

Serious injuries can be caused by incorrect or defective spare parts!

- Always use genuine spare parts made by the original manufacturer.



WARNING

Serious injuries can be caused by incorrect or missing clamping devices!

- Only use genuine clamping devices from the manufacturer.



NOTE

Damage, malfunctions or total failure of the product or the machine tool caused by an incorrect or defective spare parts!

- Always use genuine spare parts made by the original manufacturer.



NOTE

Damage, malfunctions or total failure of the product or machine tool caused by incorrect or missing clamping devices!

- Only use genuine clamping devices from the manufacturer.

Spare parts and accessories can be sourced from contract dealers or directly from the manufacturer [see »Contact« chapter].

Without exception, wearing parts and components in contact with the workpiece are not covered by warranty.

1.8 Warranty terms

The warranty terms are included in the manufacturer's General Terms & Conditions of Business.

2 Safety

This section provides an overview of all the important safety aspects for optimum protection of personnel, and for safe and problem-free operation.

2.1 Responsibility of the operator

The product is used in the industrial sector. The operator of the product is therefore governed by the provisions of Health & Safety at Work legislation.

As well as the safety notices in this manual, the area of use of the product must also comply with locally applicable safety, accident prevention and environmental protection specifications as well as those in the manual for the machine tool.

No modifications must be made to the product. The operator is wholly and solely responsible for any resultant personal injury and/or damage to materials.



DANGER

Serious injuries caused by parts being ejected centrifugally due to a drop in actuating force / supply pressure!

- On the machine, ensure that the actuating force / the supply pressure do not drop while the product is in use.
- If no precautions have been taken on the machine to maintain the actuating force / the supply pressure, it is prohibited to use this product on the machine.
- Pay attention to the operating instructions for the machine tool.

2.2 Personnel requirements



WARNING

Serious injuries caused by incorrect handling of the product by insufficiently skilled or trained personnel!

- All activities must be performed by skilled staff from the relevant specialist field.



WARNING

Serious injuries caused by unauthorized presence of unauthorized personnel in the working area!

- Keep unauthorized people away from the working area.
- If in doubt, speak to people and direct them to leave the working area.
- Interrupt work until unauthorized people have left the working area.



NOTE

Serious damage to materials caused by incorrect handling of the product by insufficiently skilled or trained personnel!

- All activities must be performed by skilled staff from the relevant specialist field.

This manual name the following skills sets required for various different areas of activity:

Skilled specialist

Skilled specialists, due to their professional training, knowledge and experience and awareness of applicable provisions, are capable of carrying out the work entrusted to them and independently to identify and avoid potential hazards.

Hydraulics specialist

Hydraulics specialists are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, hydraulics specialists can work on hydraulic systems and can independently identify and avoid potential hazards.

Pneumatics specialist

Pneumatics specialists are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, pneumatics specialists can work on pneumatic systems and can independently identify and avoid potential hazards.

Electricians

Electricians are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, electricians can work on electrical systems and can independently identify and avoid potential hazards.

Trainees

Trainees can only work on the machine under the supervision and direction of staff skilled in the relevant specialist field.

The only people admitted as personnel are those who can reasonably be expected to carry out their work to a reliable standard. People whose response capabilities are impaired, for example by drugs, alcohol or medication, are prohibited.

For the selection of personnel, pay attention to the stipulations applicable at the place of work governing age and specific vocational requirements.

2.3 Intended use

The product is only intended for installation in a CE-compliant machine tool with a separating set of guards.

The product is only intended for the type of use described in this manual [see »Use« chapter]. Furthermore, an extended form of use can be agreed contractually between manufacturer and operator.

Only skilled staff from the appropriate specialist fields may install, operate, maintain and clean the product [see »Personnel requirements« chapter].

Never exceed the technical values stipulated for the product [see »General information« and »Operating conditions« chapters].

Maintain the product at regular intervals [see »Maintenance schedule« chapter].

When used for its intended purpose, the operational safety of the product is assured, subject to compliance with relevant safety stipulations, to the full extent foreseeable.

Intended use also includes compliance with all stipulations in this manual.

Any form of use beyond the scope of intended use, or other forms of use of the product, is considered as misuse, and can lead to dangerous situations.



DANGER

Serious injuries caused by misuse of the product!

- Only use in CE-compliant machine tool with a separating guard.
- Only use for the disclosed purpose [see »Use« chapter].
- Product only to be used by trained specialists in the relevant field [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General details« and »Operating conditions« chapters].
- The product requires regular maintenance [see the »Maintenance schedule« chapter].
- Only use with approved attachments.



NOTE

Material damage caused by misuse of the product!

- Only use in CE-compliant machine tool with a separating guard.
- Only use for the disclosed purpose [see »Use« chapter].
- Product only to be used by trained specialists in the relevant field [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General details« and »Operating conditions« chapters].
- The product requires regular maintenance [see the »Maintenance schedule« chapter].
- Only use with approved attachments.

Claims of all kinds will be rejected that are due to unintended use.

Here are some examples of unintended use of the product

- If people fail to observe the safety stipulations when working on the product, by failing to use additional protective equipment.
- if the product is used on non-intended machines and/or clamping devices.

2.4 Personal protective equipment

During work, it is essential to wear personal protective equipment to minimize the health hazards.

Always wear the required personal protective equipment when working on any given job.

Always wear



Additional personal protective equipment



Always pay attention to any notices about personal protective equipment displayed in the working area.

When working, always wear the following items:

Workplace clothing

Workplace clothing should be close-fitting, with low tear-resistance, narrow cuffs and no protruding parts. It serves primarily to protect the wearer from coming into contact with moving machine parts. Do not wear rings, chains or other jewelry.

Safety footwear

To protect the wearer from any heavy items that may fall, and from losing their footing on slippery ground.

Protective goggles

To protect the eyes from projectile parts and liquid splashes.

Hair net

To protect long hair from getting snagged in rotating parts on the machine tool.

When carrying out certain work, additional personal protective equipment is required. Separate reference is made to this in the individual chapters of this manual. The following section explains these additional items of personal protective equipment:

Protective gloves

To protect the hands from friction, chafing, stabbing or deeper injuries and from contact with hot surfaces.

Hard hat

To protect against falling and projectile parts and materials.

2.5 Particular hazards

The following section names residual risks resulting from the installation of the product in a machine tool. In all cases, the residual risks detected during a risk assessment of the machine tool need to be named by the operator.

Pay attention to the safety instructions named here, as well as the warning notices in other chapters of these operating instructions to reduce the risk of health hazards and to prevent dangerous situations.

Moving parts



WARNING

Serious injuries caused by touching rotating and/or moving parts!

- Do not open guards while the system is operating.
- During operation, do not reach for rotating and/or moving parts.
- Pay attention to the gap dimensions of moving parts.
- Before opening the guards, ensure that none of the parts are moving any more.

Missing clamping device



WARNING

Serious injuries without clamping device fitted, caused by media escaping under high pressure!

- Never install and actuate product without first installing a clamping device on the machine.
- Avoid accidental initiation of the clamping process [for example through incorrect installation of the power supply or inaccurate programming].

Sharp-edged parts



WARNING

Serious cut injuries caused by sharp-edged parts and burrs!

- All installation of individual parts must be performed by skilled staff from the relevant specialist field.
- Also wear the following items of personal protective equipment, in addition to the basic equipment:



2.6 Other safety instructions



WARNING

Serious head injuries caused by bending into the working area of the machine!

- Only ever bend into the working area of the machine if there are no cutting tools or sharp objects in it, or if these are covered.
- Never move body parts under parts in the working area of the machine with the potential to drop down.



WARNING

Serious injuries caused by snagging body parts on the rotating machine spindle!

- Never reach into the product while the machine spindle is still rotating.
- Before working on the product, ensure that the machine spindle is unable to start up.



WARNING

Serious injuries caused by media escaping under high pressure due to missing / damaged seal elements!

- Ensure that all sealing elements for the media ports are present and are undamaged.
- Lubricate the sealing elements before every installation and at every maintenance operation.



WARNING

Serious injuries caused by reaching into slots and bores!

- Never reach into slots or bores.



WARNING

Serious injuries caused by the use of damaged products or by their components and accessories!

- Check products or their components and accessories on a regular basis for visible signs of damage [see »Inspections« and »Cleaning« chapters].
- Use of damaged products, their damaged components and/or their damaged accessories is prohibited.
- Report damage to the operator immediately.
- Damaged components / accessories must be replaced with genuine spare parts / accessories made by the manufacturer.



CAUTION

Injuries caused by slipping on escaping media!

- Ensure that media are not able to escape.
- Drain the rest of the product.



CAUTION

Cut injuries caused by sharp edges and burrs resulting from wear and/or repeated rework!

- Remove sharp edges and burrs.
- If necessary, replace worn components with genuine parts made by the manufacturer.



NOTE

Damage to materials caused by untightening the wrong screws!

- Do not open the screws secured with sealing lacquer.

2.7 Screws



WARNING

Serious injuries caused by radially installed screws being ejected centrifugally if installed incorrectly / poor handling!

- Do not open the screws secured with sealing lacquer.
- Screws and threaded pins fitted radially to the product that were bonded with adhesive need to be secured again using a standard, medium-strength screw adhesive and tightened to the specified tightening torque [see nomenclature or the »Screw tightening torques« chapter]. Before reinstallation, clean and degrease the screw and internal thread.
- Radially mounted screws and threaded pins that were not bonded with sealing lacquer or an adhesive need to be tightened back down to the specified tightening torque [see nomenclature or the »Screw tightening torques« chapter].
- If in doubt, contact the manufacturer immediately to determine how best to proceed.

2.8 Functionality



WARNING

Serious injuries caused by severe contamination of the product!

- Always comply with the cleaning instructions and intervals [see »Cleaning« chapter].

2.9 Environmental protection



NOTE

Substantial damage to the environment can result from non-compliant handling or incorrect disposal of environmentally hazardous substances!

- If environmentally hazardous substances enter the environment accidentally, take immediate remedial action.
- If in doubt, notify the relevant municipal authorities about the incident.

The following environmentally hazardous substances are used:

Lubricants, auxiliary materials and operating fluids

Lubricants such as grease and oil can contain toxic substances. These must not enter the environment.

Dispose of environmentally hazardous substances properly [see »Disposal« chapter].

3 Technical data

3.1 General information

Axial total stroke [mm]	Total weight [kg]	Dimensions [length x width x height] [mm]	Supply pressure p_{max} [bar]	Axial clamping force $F_{ax,max}$ [kN]
7	1.4	79.8 x 79.8 x 35	55	13.5

Table 1: Technical data

3.2 Performance values



NOTE

Material damage to the products use and/or to the machine tool caused by exceeding the maximum performance values!

- Do not exceed the maximum performance values [see »General information« chapter].
- On all products used, do not exceed the lowest of the maximum performance values.
- Only use product in machine tools with the same performance values.



INFORMATION

Details of maximum performance values can be found on each product.

If, due to abrasive wear, those performance values are no long legible, refer to the operating instructions.

The achievable actuation forces may vary as a result of the maintenance status [lubrication status and level of contamination] of the product [see »Maintenance schedule« chapter].

3.3 Balancing quality

The product is not balanced ex-factory because it is designed for stationary operation.

3.4 Speed

The product was designed for stationary operation.



WARNING

Serious injuries caused by imbalance during continuous rotational operation!

- Do not operate the product in continuous rotation.
- Rotate the product at no more than max. 60 rpm.
- From all of the maximum speeds indicated for the combined products, always remain at the lowest of those maximum speeds.

3.5 Operating conditions

Indication	Value	Unit
Ambient temperature range	15 - 65	°C
Humidity	≤ 80	%

Table 2: Operating conditions

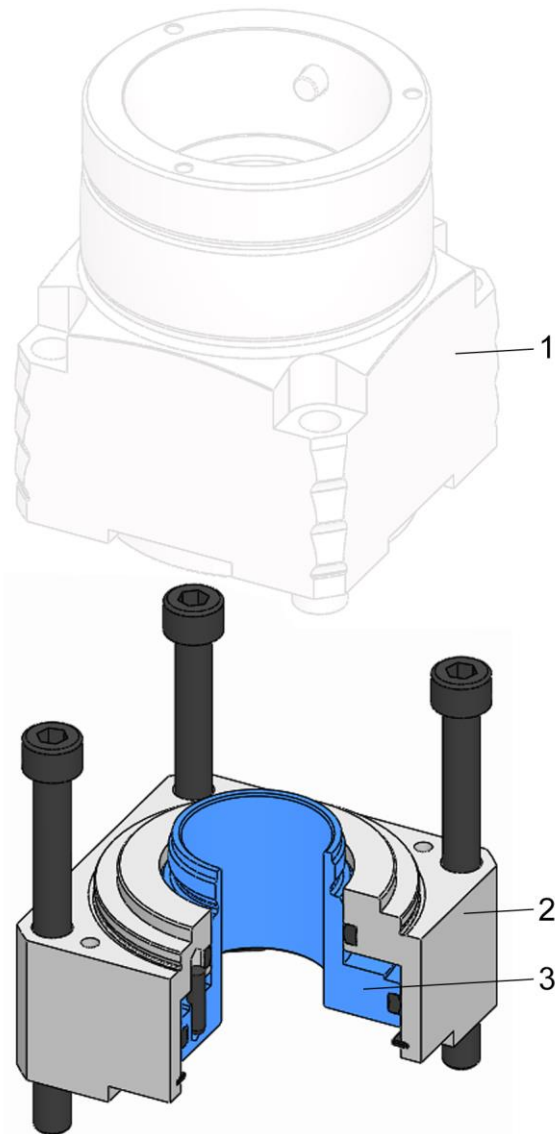
3.6 Type designation

The type designation is on the product and it includes the following indications:

- Manufacturer
- Product designation
- ID number [marked with a # symbol]
- Build year
- Maximum actuating force $F_{ax\ max}$ [kN]
- maximum supply pressure p_{max} [bar]

4 Layout and function

4.1 Overview and brief description



The tandem cylinder is designed as a single-action piston to increase the actuating force of clamping devices at a consistent level of supply pressure.

It is screwed to the clamping device by its thread.

The clamping device is then installed on the machine together with the tandem cylinder.

4.2 Accessories required

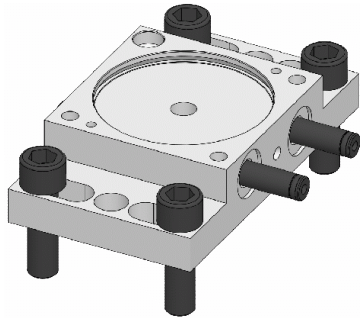
4.2.1 Clamping devices

The clamping device is secured to the product to adapt it to the machine tool.

4.3 Optional accessories

The following optional accessories are available for different sizes of product.

4.3.1 Hydraulic baseplate



The hydraulic baseplate is used to install the HYDROK on the machine table.

5 Use and limits of use

5.1 Use

The product is only used to increase the actuating force for clamping a clamping device, at a consistent supply pressure.

Only ever operate the product with a suitable fluid.

The product can only be used in conjunction with a suitable pull-back clamping device from HAINBUCH, of the kind used on chip-cutting machine tools.

As well as for its general field of application, this product was designed and developed for use, when necessary, in a specific and documented application [see clamping situation drawing or order confirmation].

Any other fields of application require the explicit approval of the manufacturer.

6 Transport, packaging, storage

6.1 Safety, transport, packaging, storage



WARNING

High level of physical strain due to the weight of the product or of its components if not transported properly!

- From a weight of 10 kg, use appropriate transport equipment, lifting gear and lifting tackle.



WARNING

Serious crushing injuries and breakages caused by falling parts if transported incorrectly!

- Ensure that the product cannot roll away or fall.
- Place on a non-slip surface.
- When using lifting gear, use appropriate load-bearing equipment and lifting tackle.



WARNING

Serious injuries caused by transporting off-center equipment!

- Pay attention to marks on the packaging items.
- Attach the crane hook directly above the center of gravity.
- Raise carefully and correct the lifting points if necessary.



WARNING

Serious injuries caused by incorrect transport with lifting gear!

- Never raise loads above people.
- Never step under suspended loads.
- Pay attention to information about the intended lifting points. Ensure that the lifting gear is mounted on a secure base.
- Only use authorized and undamaged lifting gear, load-bearing equipment and lifting tackle.
- Never exceed the maximum load-bearing capacity of lifting gear, load-bearing equipment and lifting tackle.



NOTE

Damage to materials caused by falling parts if transported incorrectly!

- Ensure that the product cannot roll away or fall.
- Place on a non-slip surface.
- When using lifting gear, use appropriate load-bearing equipment and lifting tackle.



NOTE

Damage to materials caused by escaping medium and / or the ingress of dirt!

- During transportation, ensure that the hydraulic connections are secured with suitable sealing plugs.
- Ensure that the sealing elements do not fall out or get damaged during installation / removal, and apply a thin coat of grease if necessary.

6.2 Symbols on the packaging



Fragile

Designates packaging items with fragile or breakable contents.

Handle the packaging item with care. Do not drop it and protect it against collision impacts.



Keep it dry

Keep packaging items dry and protect them from the ingress of water.



Position designation

Points to the correct upright position of the packaging item.

6.3 Transport inspection

Check the delivery on receipt immediately to ensure it is complete and has not been damaged in transit.

Proceed as follows if you find any externally visible signs of damage while in transit:

- Refuse to accept the delivery, or only subject to later approval
- Make a note of the extent of damage on the transportation documents or on the delivery note of the transportation company

- Initiate a complaint



INFORMATION

Raise a complaint for every defect as soon as it is discovered. Compensation claims can only be enforced during the applicable complaint periods.

6.4 Unpacking and internal transportation

The total weight of the product depends on its size.

Depending on the weight involved, it may be necessary to use lifting gear to lift the product or its components out of the packaging safely, to transport them and to position and install them in the machine tool or on the machine table.

1. The product is packaged in a stable position, and it has threads / bores for transportation.
2. Lifting tackle can be installed in these transportation threads / bores. To lift the product out of its packaging, the front-end functional threads can if necessary be used to attach lifting tackle to upright packaged products.
3. Attach load-bearing equipment to the lifting tackle.
4. Subject to weight, use lifting gear to lift the product out of its packaging safely, and place it down on a stable, flat surface.
5. Secure the product to prevent it from rolling away.
6. When transporting on a trolley or car, ensure that the product is securely installed in a suitable transport cradle.

6.5 Packaging

The individual packaging items are packaged in an appropriate manner for the type of transportation involved. Always use environmentally compatible materials for packaging purposes.

Packaging should protect individual components from damage in transit, corrosion and other forms of damage, up until installation. For this reason, do not destroy the packaging, and do not remove it until shortly before installation.



INFORMATION

The packaging units are packaged, wrapped in air-tight film and placed in cardboard boxes. On the individual weights of each of the sizes [see »General information« chapter].

Dispose of packaging material in accordance with applicable legislative provisions and local regulations.



NOTE

Damage to the environment caused by improper disposal of packaging materials!

- Dispose of packaging materials in an environmentally responsible manner.
- Pay attention to local disposal regulations and, if necessary, appoint a specialist waste disposal company with this work.

6.6 Storage



INFORMATION

The packaged items may display information relating to storage and readmission to storage that extend beyond the scope of these requirements. Pay attention to these notices.

Store packaged items under the following conditions:

- Safe for storage.
- Do not store outdoors.
- Store in a dry, dust-free place.
- Avoid exposure to aggressive media.
- Protect against direct sunlight.
- Avoid mechanical vibration.
- Storage temperature: 15 to 35°C.
- Relative humidity: Maximum 60%.
- In the event of storage for more than 3 months:
 - On a regular basis, check the general condition of all parts and packaging.
 - If necessary, refresh the preservation or replace it.

6.7 Preservation

1. Clean the product [see »Cleaning« chapter].
2. Apply a light coating of preserving oil to the inner and outer faces of the product. Wipe away surplus preserving oil with a soft, lint-free, tear-resistant cloth.
3. Pack product air-tight in foil.
4. Return product to storage [see »Return to storage« chapter].

6.8 Return to storage

Return product to storage under the following conditions:

1. Preserve the product [see »Preservation« chapter].
2. The product must be stored in a safe condition. Use an appropriate container for the product, on a non-slip surface, or fit the floor of the shelving unit with an all-round safety border.
3. For storage conditions, see the »Storage« chapter.

7 Installation

7.1 Installation safety



WARNING

Serious injuries caused by unskilled staff during installation / removal!

- Installation and removal must be performed by skilled staff from the relevant specialist field.



WARNING

Serious injuries can be caused if the machine tool starts up accidentally!

- Set the machine tool into set-up mode.
- Remove all tools, auxiliary equipment and items of test equipment immediately from the working area of the machine.
- Remove all lifting gear from the product and from the working area of the machine.



WARNING

Serious injuries caused by the escape of media under high pressure!

- Shut down media delivery during installation and removal.
- Relieve any pressure trapped in the system.
- Shut down the system.



WARNING

Serious crushing injuries and breakages caused by falling parts during incorrect installation or removal!

- Ensure that the product cannot roll away or fall.
- If necessary, use an appropriate mounting aid for installation or removal on a vertically suspended machine spindle.



WARNING

Serious crushing injuries caused by improper machine movement during installation or removal!

- Machine movements are only permitted in set-up mode during installation and removal.
- Never reach into a gap.
- Pay attention to the gap dimensions of moving parts.



WARNING

Serious head injuries caused by bending into the working area of the machine!

- Only ever bend into the working area of the machine if there are no cutting tools or sharp objects in it, or if these are covered.
- Never move body parts under parts in the working area of the machine with the potential to drop down.
- Depending on weight, use an appropriate mounting aid for installation or installing on a vertically suspended machine spindle.



WARNING

High level of physical strain due to the weight of the product or of its components if not transported properly!

- From a weight of 10 kg, use appropriate transport equipment, lifting gear and lifting tackle.



NOTE

Damage to materials caused by lifting gear left in the product!

- Always remove lifting gear immediately after installing the product.



NOTE [only for aluminum components]

Damage to materials can be caused by incorrect screw tightening torques on aluminum components!

- Pay attention to the reduced screw tightening torques for aluminum components [see »Screw tightening torques« chapter].

7.2 Preliminary remarks

- In accordance with their thread size and strength class, screws must be tightened crosswise to the specified tightening torque [see »Screw tightening torques« chapter]. When tightening the screws, do so evenly to prevent any distortion under load.
- To avoid precision errors, clean all screw-fitting points and mating surfaces [Notes on cleaning, see »Cleaning« chapter]. Factory wetting of flat surfaces and, where necessary of clamping elements, only serves as a corrosion inhibitor. This is not functionally related lubrication.

- Only apply lubricant to the mechanical mating surfaces. Pay attention to notes about lubricants [see »Use of lubricants« chapter].
- Avoid too much lubricant on the locating face because this can cause face run-out errors.
- Apply grease to the sealing elements [for example O-rings, rectangular rings] and sealing surfaces. Pay attention to notes about greases [see »Use of lubricants« chapter].
- Do not damage the functional surfaces [flat, mating, tapered and sealing surfaces].

7.3 Screw tightening torques

The tables show the specified values.

Knowledge of the applicable guidelines and design criteria is essential.



NOTE

Damage to materials caused by defective screw tightening torques!

- To secure the product to the machine, pay attention to the values specified by HAINBUCH and by the machine manufacturer for screw tightening torques. If the machine manufacturer stipulates different values, you must consult HAINBUCH.

Metric control threads

The following table contains the guide values in Nm for screw tightening torques for achieving the highest permitted preload for metric control threads.

- Total friction coefficient $\mu_{ges} = 0.12$

Thread designation	Tightening torque at screw quality [Nm]	
	10.9	12.9
M4	4	5
M5	7	9
M6	12	15
M8	25	38
M10	50	70
M12	100	130
M16	220	300

Thread designation	Tightening torque at screw quality [Nm]	
	10.9	12.9
M20	400	550
M24	600	800

Table 3: Screw tightening torques, metric control threads

Aluminum components

The following table contains the reduced screw tightening torques for securing aluminum components.

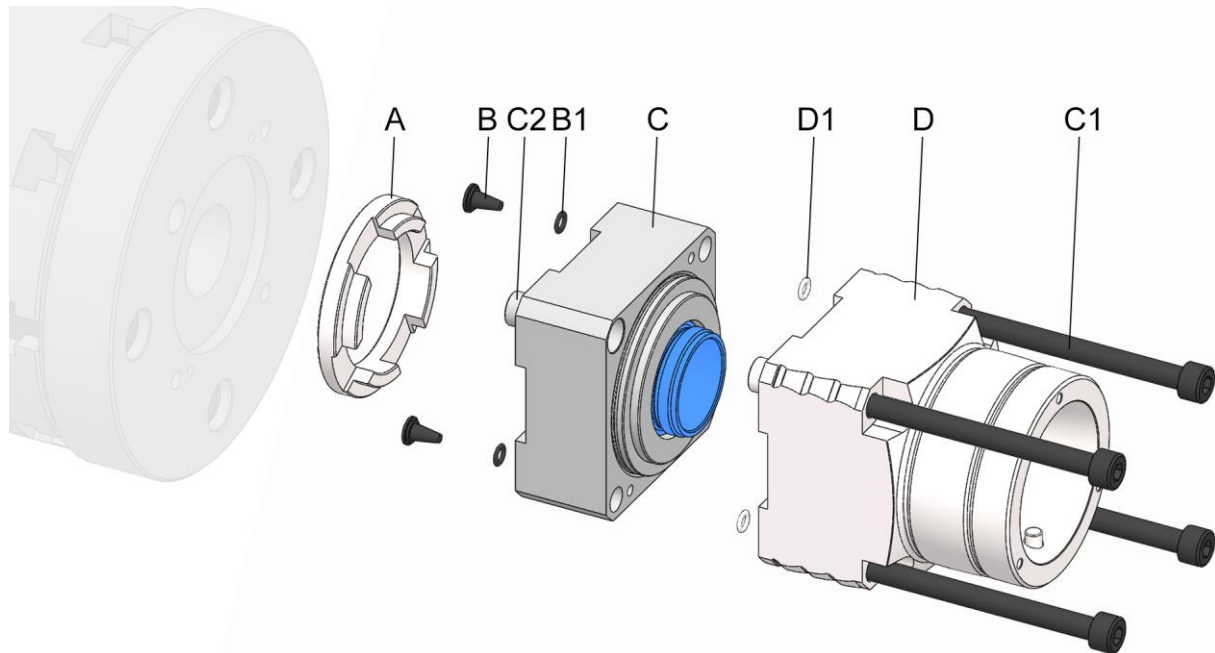
Thread designation	Tightening torque [Nm]	Minimum screw depth [mm]
M6	10	12
M8	23	16
M10	46	20

Table 4: Screw tightening torques for aluminum components

7.4 Preparation of the machine for installation

1. Set the machine into set-up mode.
2. Reduce the operating pressure to a minimum.
3. Remove cutting tools and/or sharp objects from the working area of the machine, or cover them.

7.5 Installation of the product



- A Centering ring
- B Cap plug
- B1 Cap plug seals
- C Product
- C1 Product fixing screws
- C2 Product positioning sleeve
- D Clamping device
- D1 Clamping device seals

1. As described in the »Preparation of the machine for installation« chapter, prepare for the following steps.

7.5.1 Compatibility check

Check the compatibility of the product and the connection point of the machine.

For this, check that the connection point and the product share the same adaptation geometry. Also check if the actuating element / coupling element is suitable.

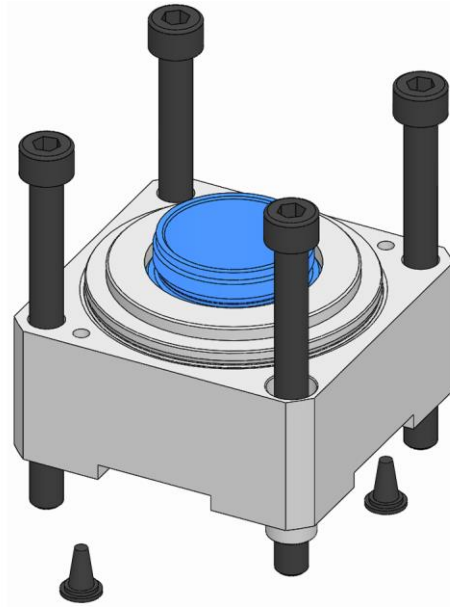
It may be necessary to install an adapter between the actuating element on the machine and the product.

7.5.2 Preparation of the product

The product is supplied in assembled condition.

The following preparatory steps are needed to install the product.

1. Install the clamping device on the product [see »Installation of the clamping device« chapter].



NOTE

Damage to materials caused by lost / missing seals during installation/removal of the cap plugs!

- During installation/removal of the cap plugs, the cap plug seals must remain in the product.

2. Remove the cap plug from the product.

7.5.3 Installation of the product on the machine

1. Depressurize the hydraulic unit.



INFORMATION

Installation / removal of the clamping device with product installed is identical to installation / removal of the clamping device without a product installed, and is described in the operating instructions for the clamping device.

Therefore, installation / removal of the centering ring are also identical.



In addition to these operating instructions, also read and follow the operating instructions for the relevant clamping device.

2. Install the product. For this, use the product fixing screws instead of the fixing screws for the clamping device.

8 Use

8.1 Use-related safety



WARNING

Serious injuries can be caused if the machine tool starts up accidentally!

- Prior to commissioning, close all safety doors or hoods on the machine tool.



WARNING

Serious injuries caused by unskilled personnel during the installation / removal of the clamping device!

- Installation / removal of the clamping device must be performed by skilled specialists from the relevant field.



WARNING

High level of physical strain due to the weight of the product or of its components if not transported properly!

- From a weight of 10 kg, use appropriate transport equipment, lifting gear and lifting tackle.



NOTE

Damage to materials caused by lifting gear left in the product!

- Always remove lifting gear immediately after installation / removal of the clamping device.



NOTE

Damage to components caused by cooling lubricants with sufficient levels of corrosion inhibitor!

- The components made of steel materials must be protected before the usual oxidation process.
- Only ever use cooling lubricants with sufficient levels of corrosion inhibitor.



NOTE

Damage to materials caused by contaminated / unprocessed cooling lubricants!

- For the product to function properly, in particular for internal flushing with cooling lubricants and/or when using tools with internal flushing, ensure that the cooling lubricant is cleaned / processed, and that it contains no particles measuring >100 microns [filtered with a mesh width of 100 microns].

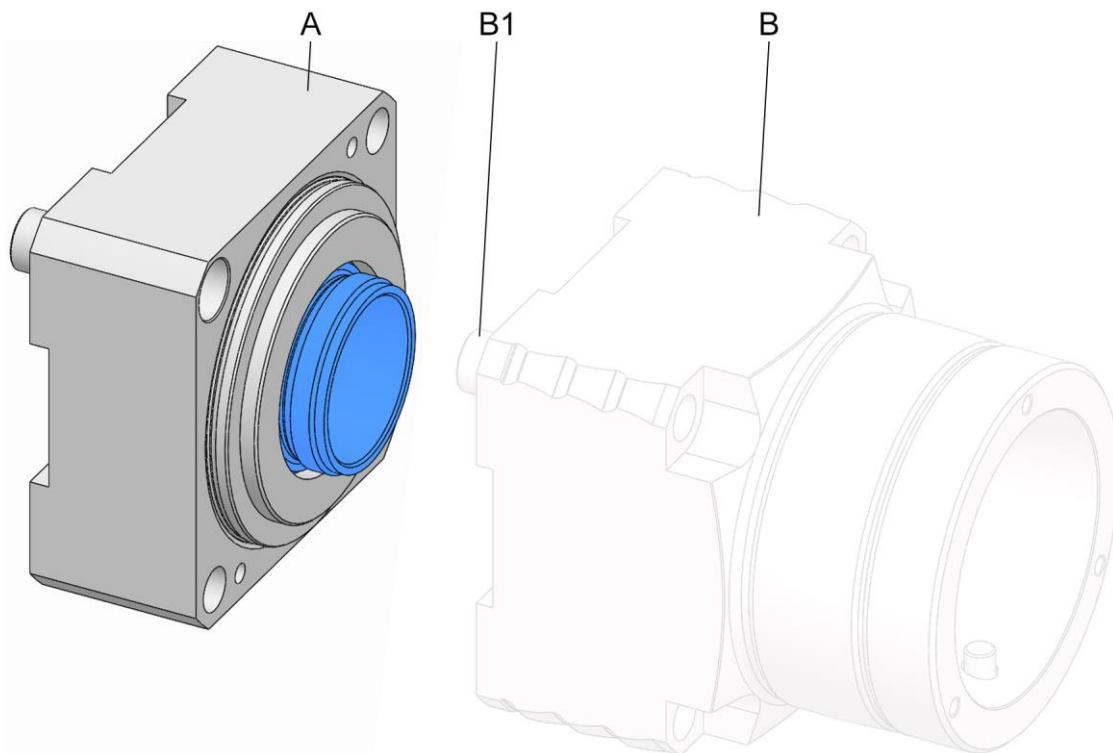


NOTE

Damage to seals caused by using the wrong coolant lubricants!

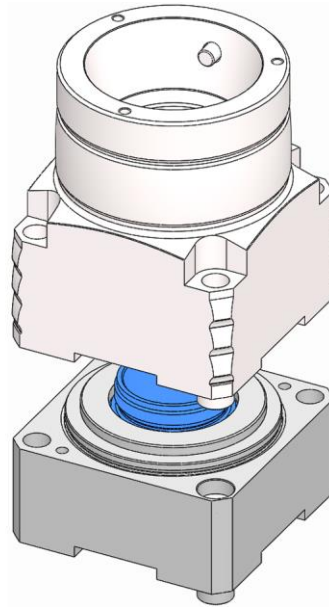
- To clean the product, never use a cooling lubricant that attacks and damages the sealing elements installed. Those installed sealing elements can be made of NBR, Viton and PUR materials.
- Never use cooling lubricants that contain ester or a polar solvent.

8.2 Installation of the clamping device



- A Product
- B Clamping device
- B1 Positioning sleeve, clamping device

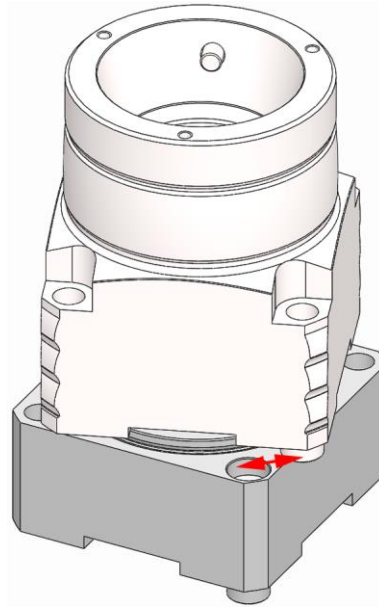
1. Prepare the clamping device for the following steps, as described in the operating instructions for the clamping device.
2. Move the clamping device into a reserve position.
3. Move the product into a front limit stop position.



INFORMATION

To maintain the correct stroke position, the clamping device and the product must remain in their set position while the screws are being installed.

4. Using its threads, screw the product firmly home in the clamping device.



DANGER

Serious injuries caused by projectile workpieces when the hydraulic ports are connected up incorrectly!

- The hydraulic connections on the machine / the baseplate and the product must be connected up correctly.
- The »Clamping« hydraulic ports on machine / baseplate and product must be connected together. The same applies to the »Release« ports.

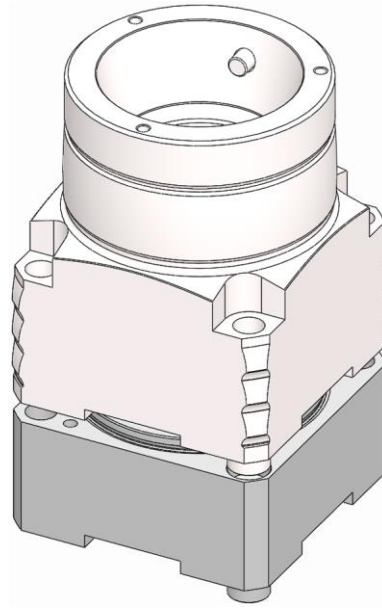


WARNING

Serious injuries can be caused by escaping media when seals and damaged / missing!

- Replace missing or damaged sealing elements.
- Ensure that the sealing elements do not fall out or get damaged during installation / removal, and apply a thin coat of grease if necessary.

5. Unscrew the product until the positioning bore of the product and the positioning sleeve of the clamping device are aligned with one another.

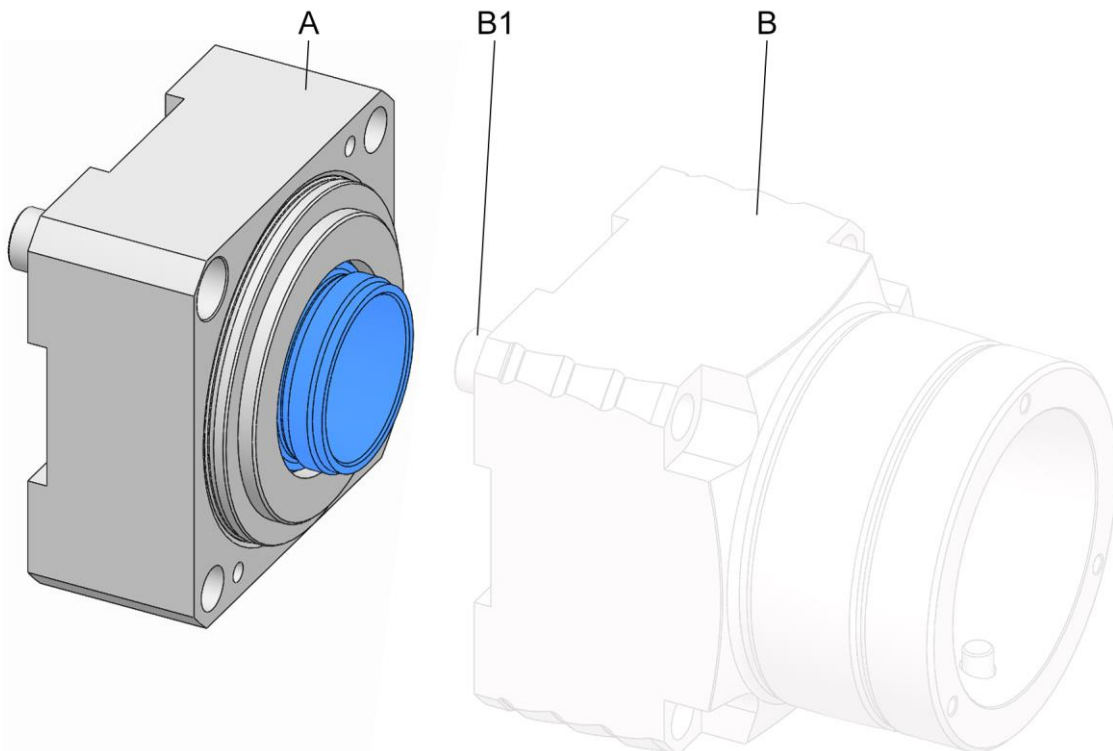


INFORMATION

During installation / removal of the clamping device, it is possible for fluid in the product to escape.

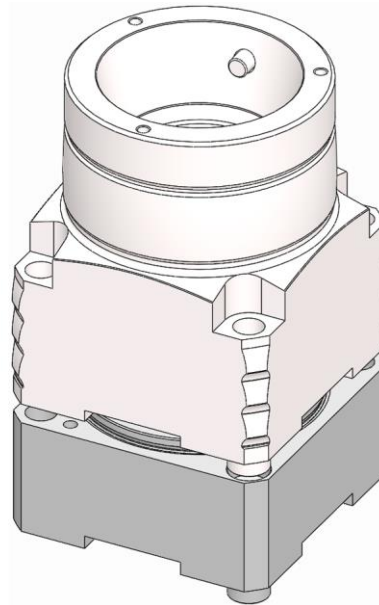
6. Press the product firmly down onto the clamping device. This causes the moving parts of the product to relocate.

8.3 Removal of the clamping device



- A Product
- B Clamping device
- B1 Positioning sleeve, clamping device

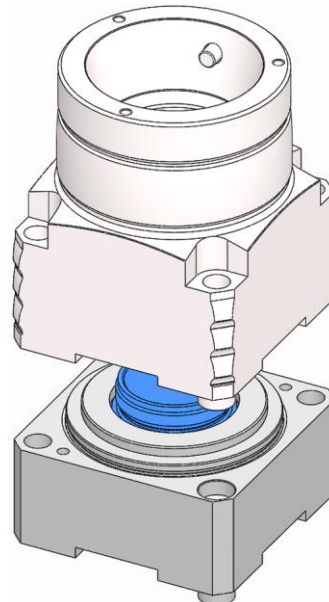
1. Move the product and clamping device into their clamp reserve position.



INFORMATION

During installation / removal of the clamping device, it is possible for fluid in the product to escape.

2. Pull the product off the clamping device completely until the positioning sleeve on the clamping device is free. This causes the moving parts of the product to relocate.



3. Using its thread, unscrew and remove the product from the clamping device.
4. Install the cap plugs in the clamping device.

8.4 Suitable fluid

The oil grades to be used are described in ISO 3448 Type HM 32.



NOTE

Damage to components caused by fluids without sufficient levels of corrosion inhibitor!

- The components made of steel materials must be protected before the usual oxidation process.
- Only ever use fluids with sufficient levels of corrosion inhibitor.



NOTE

Damage to materials caused by dirty / unprepared fluid!

- For the product to function properly, ensure that the fluid is cleaned / processed, and that it contains no particles measuring >10 microns [filtered with a mesh width of 10 microns].



NOTE

Damage to seals caused by the wrong fluid!

- Do not use any fluid that attacks and damages the installed sealing elements. Those installed sealing elements can be made of NBR, Viton and PUR materials.
- Always use ester-free and non-polar fluids.

8.5 Tests



NOTE

Serious damage to, or destruction of, the machine tool and the workpiece caused by damaged, incomplete or incorrectly installed products!

- Only install undamaged and complete products properly.
- If in doubt, contact the manufacturer.

Assure the following points before every installation and/or before every time the products are put into service:

- The products used are undamaged.
- All fixing screws are present on the products, and are tightened to the correct tightening torque.
- None of the edges and races are chipped or show any signs of wear.

- The speed set on the machine tool must not exceed the maximum speed of the product [$n = 0$ on stationary products]. Always take the lowest value of all maximum speeds for combined products indicated.
- Do not exceed the maximum actuating force indicated on the product. Always take the lowest value of all actuating forces indicated for combined products.
- All installation tools are removed from the machining area.

8.6 Procedure after a collision

In the event of a collision, the product and its components must be checked for cracks and damage before being used again.

For this, remove the product from the machine [see »Removal of the product« chapter] and dismantle it [for level of disassembly, see »Cleaning« chapter].

9 Activities after end of production

1. Switch off machine tool and secure it to prevent it from being switched back on.
2. Open the safety door / hood.



WARNING

Eye injuries and cuts caused by failure to wear protective clothing during cleaning operation!

- Never use compressed air to clean the product.
- Also wear the following items of personal protective equipment, in addition to the basic equipment:



3. Clean the product of swarf and production residue with a soft, lint-free cloth and apply a light coating of oil.
4. Close the safety door / hood.

10 Removal

If a break in production occurs that lasts for more than three days, the product must be removed and stored safely in accordance with the manufacturer's stipulations [see »Transport, packaging, storage« chapter].

10.1 Safe removal



WARNING

Serious injuries caused by unskilled staff during installation / removal!

- Installation and removal must be performed by skilled staff from the relevant specialist field.



WARNING

Serious injuries can be caused if the machine tool starts up accidentally!

- Set the machine tool into set-up mode.
- Remove all tools, auxiliary equipment and items of test equipment immediately from the working area of the machine.
- Remove all lifting gear from the product and from the working area of the machine.



WARNING

Serious injuries caused by the escape of media under high pressure!

- Shut down media delivery during installation and removal.
- Relieve any pressure trapped in the system.
- Shut down the system.



WARNING

Serious crushing injuries and breakages caused by falling parts during incorrect installation or removal!

- Ensure that the product cannot roll away or fall.
- If necessary, use an appropriate mounting aid for installation or removal on a vertically suspended machine spindle.



WARNING

Serious crushing injuries caused by improper machine movement during installation or removal!

- Machine movements are only permitted in set-up mode during installation and removal.
- Never reach into a gap.
- Pay attention to the gap dimensions of moving parts.



WARNING

Serious head injuries caused by bending into the working area of the machine!

- Only ever bend into the working area of the machine if there are no cutting tools or sharp objects in it, or if these are covered.
- Never move body parts under parts in the working area of the machine with the potential to drop down.
- Depending on weight, use an appropriate mounting aid for installation or installing on a vertically suspended machine spindle.



WARNING

High level of physical strain due to the weight of the product or of its components if not transported properly!

- From a weight of 10 kg, use appropriate transport equipment, lifting gear and lifting tackle.



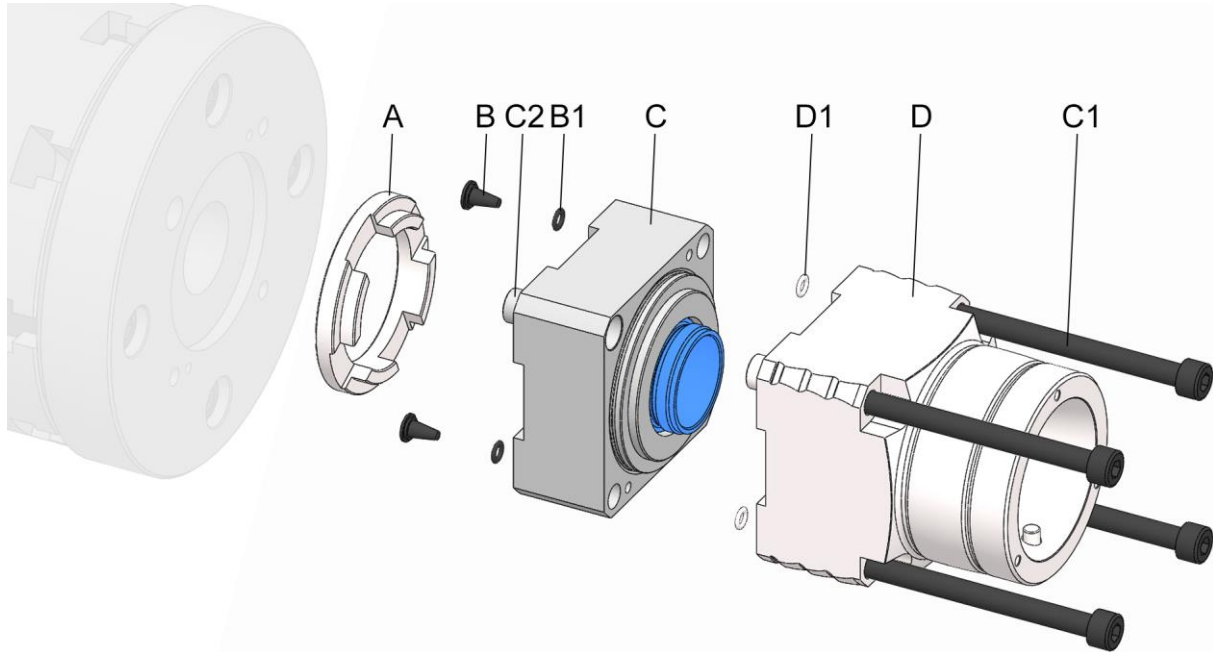
INFORMATION

If necessary, use any forcing / extraction threads in the components of the product, changing parts or clamping elements.

10.2 Preparing the machine for removal

1. Set the machine into set-up mode.
2. Reduce the operating pressure to a minimum.
3. Remove cutting tools and/or sharp objects from the working area of the machine, or cover them.
4. Remove operating and auxiliary materials as well as remaining processing materials and dispose of them in an environmentally responsible manner.

10.3 Removal of the product



- A Centering ring
- B Cap plug
- B1 Cap plug seals
- C Product
- C1 Product fixing screws
- C2 Product positioning sleeve
- D Clamping device
- D1 Clamping device seals

1. As described in the »Preparing the machine for removal« chapter, prepare for the following steps.

10.3.1 Removal of the product from the machine

1. Depressurize the hydraulic unit.



INFORMATION

Installation / removal of the clamping device with product installed is identical to installation / removal of the clamping device without a product installed, and is described in the operating instructions for the clamping device.

Therefore, installation / removal of the centering ring are also identical.



In addition to these operating instructions, also read and follow the operating instructions for the relevant clamping device.

2. Remove the product.

11 Maintenance

11.1 Maintenance safety



WARNING

Serious injuries caused by parts being ejected centrifugally after a loss of clamping power!

- Maintain the maintenance and cleaning intervals of the product at all times.



CAUTION

Health risks caused by incorrect handling of cleaning agents!

- Pay attention to hazard specifications and the safety data sheet of the manufacturer.

11.2 Maintenance schedule

The following sections describe the maintenance work needed to ensure optimum and fault-free operation.

If increased levels of wear are detected during regular checks, shorten the maintenance intervals to reflect the actual rate at which signs of wear appear.

Contact the manufacturer for questions relating to maintenance work and maintenance intervals [see »Contact« chapter].

Interval	Maintenance work
daily	Visual inspection of wear locations, nicks and cracks [see »Visual inspection« chapter]
	Complete cleaning if heavily soiled [see »Cleaning« chapter]
with storage	See »Storage« chapter

Table 5: Maintenance table

11.3 Cleaning



WARNING

Eye injuries and cuts caused by failure to wear protective clothing during cleaning operation!

- Never use compressed air to clean the product.
- Also wear the following items of personal protective equipment, in addition to the basic equipment:





NOTE

Damage to materials caused by incorrect Removal of the product!

- Never remove the product.



NOTE

Damage to seals caused by the wrong solvent!

- To clean the product, never use a solvent that attacks and damages the sealing elements installed. Those installed sealing elements can be made of NBR, Viton and PUR materials.
- To clean the product, never use a solvent that contains ester, nor a polar solvent.

1. Remove the product from the machine [see »Removal of the product« chapter].
2. Remove the clamping device from the product [see »Removal of clamping device« chapter].
3. Clean all surfaces on the product that can be accessed without disassembly, using an ester-free, non-polar cleaning agent and a soft, lint-free, tear-resistant cloth, wiping away all oil and grease residue and checking for visual signs of damage.

11.4 Visual inspection

Perform a daily visual inspection of the product to identify any damage to the product at an early stage.

Check the product for cracks and damage.

A check is also required to ensure that all fixing screws are tightened down.

If damage is detected, the relevant components must be exchanged immediately for genuine spare parts from the manufacturer.

Complete cleaning of the product is required if heavily soiled [see »Cleaning« chapter].

11.5 Use of lubricants

To achieve ultimate performance from the products, use the specified lubricants.

Only use grease that complies with the fundamental requirements governing adhesion, pressure resistance and solubility in coolants. Furthermore, there must be no particles of dirt in the grease because these cause an operational malfunction if they come between two interference fit surfaces. For this, the following lubricants are recommended:

Special grease GL 261

[see the HAINBUCH product catalogue]



NOTE

Malfunction of the product due to a combination of different greases!

- Never mix different greases with one another.
- Clean the product completely before using a different grease.

12 Disposal

If no agreement exists for return or disposal, send dismantled components off for recycling.



NOTE

Substantial damage to the environment can result from incorrect disposal of environmentally hazardous substances!

- Lubricants, auxiliary materials and operating fluids are governed by legislation for the processing of special-category waste: All disposal to be performed by authorized waste disposal specialists.

Catch exchanged oils and greases in suitable containers and dispose of them in accordance with applicable local provisions.

The local municipal authority or specialist waste disposal companies can provide information about environmentally compliant disposal.

13 Faults

The following chapter describes possible causes for faults, and the work involved in remedial action.

If multiple faults occur, shorten the maintenance intervals in accordance with actual load levels.

Contact the manufacturer if faults occur that cannot be remedied by following these instructions [see »Contact« chapter].

13.1 Procedure with faults

This applies in all cases:

1. With faults that constitute an immediate danger to people or capital equipment, press the Emergency Stop button on the machine tool immediately.
2. Establish the cause of the fault.
3. If troubleshooting requires work to be conducted in the danger area, switch the machine tool into set-up mode.
4. Notify the person on location of the fault immediately.
5. Depending on the type of fault, get it remedied by authorized and appropriately skilled specialists.



INFORMATION

The troubleshooting table in the following section provides information about who is authorized to remedy a given fault.

6. In the event of a fault not caused by the product, the fault may be caused by something close to the machine tool. For this, refer to the operating instructions of the machine tool.

13.2 Fault table

Fault	Possible cause	Remedial action	Remedied by
Defective axial strokes in the clamping device	Dirt in the parts in the power flow	Remove and clean the product	Skilled specialist
	Mistakenly swapped fluid port	Check fluid port and correct if necessary	Hydraulic/pneumatic specialist
	Seals worn	Check fluid pressure at the ports and replace the seals if necessary	Hydraulic/pneumatic specialist
Clamping force is too weak	Supply pressure too low	Check machine setting and correct if necessary	Skilled specialist
	Seals worn	Check fluid pressure at the ports and replace the seals if necessary	Hydraulic/pneumatic specialist
Clamping force is too high	Supply pressure is too high	Check machine setting and correct if necessary	Skilled specialist
Fluid loss	Seals worn	Replace gasket kit	HAINBUCH
	Defective fluid port	Check product port, replacing if necessary	Hydraulic/pneumatic specialist
		Check machine port and replace if necessary	Machine manufacturer

Table 6: Fault table

13.3 Commissioning after a fault has been remedied

After the fault has been remedied, perform the following steps to recommission it:

1. Reset the emergency stop equipment.
2. Acknowledge the fault on the control unit of the machine tool.
3. Ensure that no-one is in the danger area.
4. Start the machine tool.

14 Annex

14.1 Contact

The following hotlines are available to you for orders, schedule tracking and emergencies.

Order hotline

Ordered quickly, supplied swiftly. Just phone:

+49 7144. 907-333

Tracking hotline

Current status of your order? Just call:

+49 7144. 907-222

24 hour emergency phone line

Has a system crash occurred, or some other technical emergency?

Our experts are there for you around the clock:

+49 7144. 907-444

For advice or help, you can contact the sales partners and service staff listed in www.hainbuch.com.

14.2 Manufacturer certification

Manufacturer certification is supplied with the product and with this manual.

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