



# Operating instructions

[incl. installation manual]

hs dock

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:

- hs dock actuating unit
- 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].

Furthermore, never exceed the limits for use of the product [see »Limits of use« chapter].

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 in a CE-compliant machine tool with a separating set of guards.
- Only use for the type of use indicated [see »Use« chapter].
- Only skilled staff from the appropriate specialist fields may use the product [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General information« and »Operating conditions« chapters].
- Never exceed the limits for use of the product [see »Limits of use« chapter].
- Maintain the product at regular intervals [see »Maintenance schedule« chapter].
- Only use with approved attachments.



## **NOTE**

### **Damage to materials caused by incorrect use of the product!**

- Only in a CE-compliant machine tool with a separating set of guards.
- Only use for the type of use indicated [see »Use« chapter].
- Only skilled staff from the appropriate specialist fields may use the product [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General information« and »Operating conditions« chapters].
- Never exceed the limits for use of the product [see »Limits of use« chapter].
- Maintain the product at regular intervals [see »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 pay attention to any notices about personal protective equipment displayed in the working area.

### Always wear



#### 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.

### Additional personal protective equipment

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 crushing injuries without a clamping device installed caused by the stroke of the product!**

- Never actuate the actuating unit without first installing a clamping device.
- Prevent accidental initiation of the clamping process [for example due to an installation error with the power supply or a programming error].



### 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 injuries caused by the release of stored energy!**

- When unfastening the relevant screws, these must be actuated crosswise in alternating fashion to reduce clamping action to a minimum.
- Do not open the screws secured with sealing lacquer.



#### **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 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 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**

**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.



**CAUTION**

**Injuries caused by slipping on escaping media!**

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



#### 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

##### Version »without springs«

Size	Axial total stroke [mm]	Total weight [kg]	Dimensions [ø x length] [mm]	Supply pressure $p_{max}$ [bar]	Axial clamping force $F_{ax\ max.}$ [kN]
XXS-4 / A-F	7.5	6.0	Ø 139 x 62	56	35
5-7	7.5	18.5	Ø 230 x 62	51	45

Table 1: Technical data – version »without springs«

##### Version »with springs«

Size	Axial release stroke [mm]	Axial clamping reserve [mm]	Total weight [kg]	Dimensions [ø x length] [mm]	Supply pressure $p_{max}$ [bar]	Minimum release pressure needed [bar]	Axial clamping force $F_{ax\ max.}$ [kN]	Spring force in clamping po- sition [kN]
XXS-4 / A-F	2.0	1.5	6.2	Ø 139 x 62	56	12	35	4
5-7	2.0	1.5	18.7	Ø 230 x 62	51	8	45	4

Table 2: Technical data – version »with springs«

### 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.
- Paying attention to media supply lines, do not rotate the product at 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 Conversion of supply pressure – actuating force

To find the right machine settings, you need to convert from supply pressure to actuating force or vice versa.

#### 3.5.1 Nomenclature

Brief designation	Unit	Explanation
$F_{ax}$	$kN$	Axial actuating force
$F_{ax\ max}$	$kN$	Maximum axial actuating force
$p$	$bar$	Supply pressure
$p_{max}$	$bar$	Maximum supply pressure

Table 3: Nomenclature conversion supply pressure – actuating force

#### 3.5.2 Calculation

The following formula should be used to determine the supply pressure that needs to be set to achieve a defined level of actuating force:

$$p = \frac{p_{max} * F_{ax}}{F_{ax\ max}}$$



#### INFORMATION

The maximum supply pressure  $p_{max}$  and the maximum actuating force  $F_{ax\ max}$  can be taken from the »General information« chapter.

The following formula should be used to determine the actuating force present at a given supply pressure setting:

$$F_{ax} = \frac{F_{ax\ max} * p}{p_{max}}$$



#### INFORMATION

The maximum supply pressure  $p_{max}$  and the maximum actuating force  $F_{ax\ max}$  can be taken from the »General information« chapter.

#### 3.5.3 Sample calculation

##### Clamping head chuck

- hs dock size XXS-4 / A-F

##### Actuating force

- Actuating force to be set  $F_{ax} = 20kN$

##### Calculation

$$p = \frac{p_{max} * F_{ax}}{F_{ax\ max}} = \frac{56bar * 20kN}{35kN} = 32bar$$

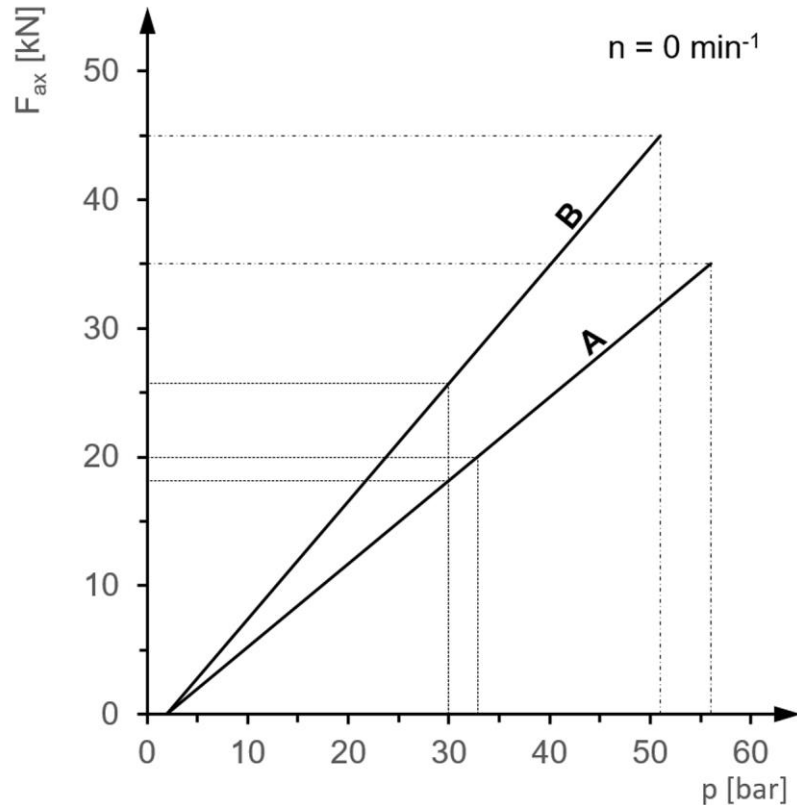
### 3.5.4 Supply pressure diagram - actuating force

#### Scan sample 1:

At a supply pressure of 30 bar, the axial actuating force for size xXS-4 / A-F is 18 kN and 26 kN for size 5-7.

#### Scan sample 2:

At a required axial actuating force of 20 kN, a supply pressure of 33 bar must be present for size XXS-4 / A-F.



A Size XXS-4 / A-F

B Size 5-7

### 3.6 Operating conditions

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

Table 4: Operating conditions

### 3.7 Type designation

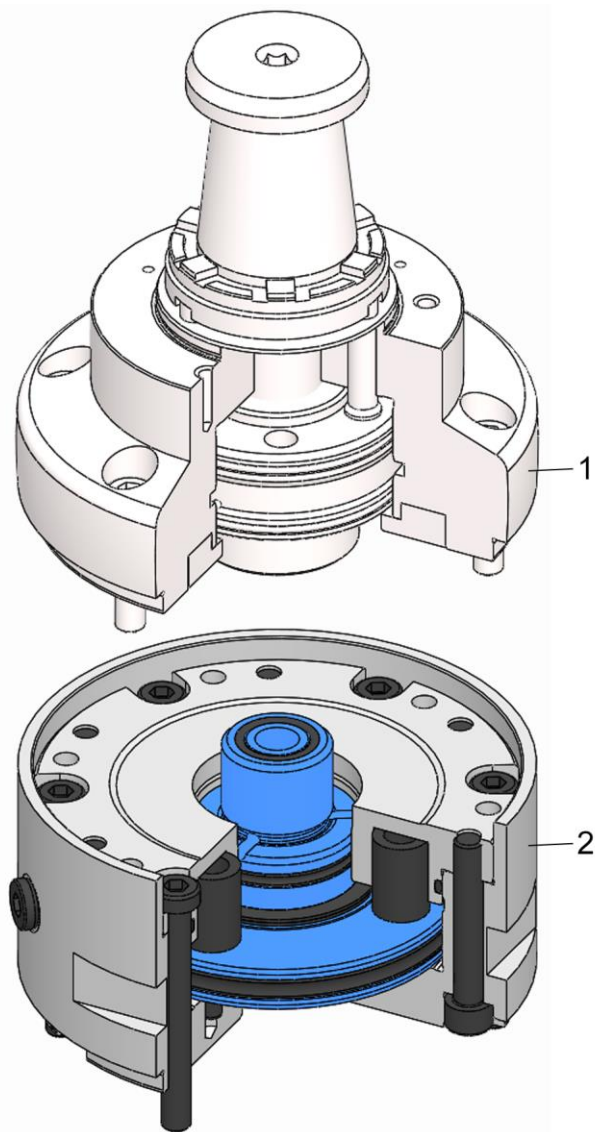
The type designation is on the product and it includes the following indications:

- 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



- 1 Clamping device
- 2 Actuating unit

The actuating unit provides a support for clamping devices. The actuating unit was designed for stationary operation. The actuating unit is screwed to the machine table. The media guides are connected to the actuating unit. The clamping device is secured to the actuating unit and it clamps the workpiece to be machined.

### 4.2 Accessories required

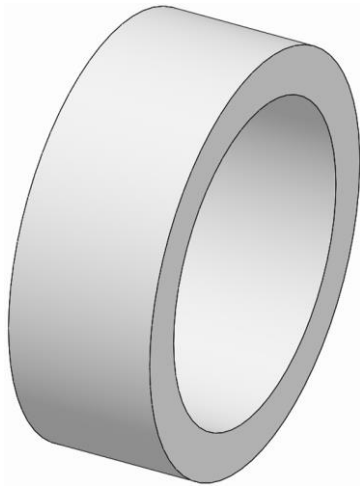
#### 4.2.1 Clamping devices

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

### 4.3 Optional accessories

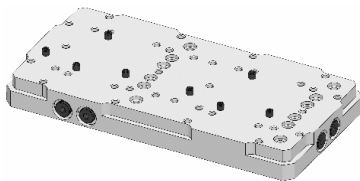
The following optional accessories are available for different sizes of product.

#### 4.3.1 Spacer



When using the tandem version of the product, the spacer is needed to connect both products together.

#### 4.3.2 Multiple clamping plate



The multiple clamping plate is used to install up to four hydraulic clamping devices in a linear or square configuration.

## 5 Use and limits of use

### 5.1 Use

The product is there solely to support HAINBUCH clamping devices on chip-cutting machine tools.

The product can only be used in conjunction with a suitable clamping device from HAINBUCH.

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.

#### 5.1.1 Use of the tandem version of the product

The tandem version of the product is used to achieve higher axial actuating force at a consistent supply pressure.

The tandem version doubles the piston surface area of the product, and therefore also doubles the axial actuating force.



#### NOTE

**Damage to materials on the products used and/or to the machine tool caused by exceeding the maximum performance values!**

- Do not exceed the maximum performance values of the clamping device used.
- On all products used, do not exceed the lowest of the maximum performance values.

Using the tandem version doubles the clamping and release times.

For the tandem version, the product is needed twice.

The second product is installed on the first product, and is then connected to the first product using the lateral hydraulic ports [see »Installation of the tandem version« chapter].

#### 5.2 Aid to selection of the hydraulic unit

The clamping and release times can be relevant to the selection of an appropriate hydraulic unit. The clamping and release time depends on the volume involved.

### 5.2.1 Nomenclature

Brief designation	Unit	Explanation
$A$	$cm^2$	Piston surface area
$F_{ax\ max}$	$kN$	Maximum axial actuating force
$p_{max}$	$bar$	Maximum supply pressure
$H$	$mm$	Stroke
$t$	$s$	Time
$V$	$cm^3$	Volume
$\vartheta$	$\frac{l}{min}$	Volumetric flow rate

Table 5: Nomenclature for selection of hydraulic unit

### 5.2.2 Clamping and release volume

Refer to the following table for details of the clamping and release volume.

Size of the product	Clamping volume $V/1$ product [l]	Release volume $V/1$ product [l]
XXS-4 / A-F	0.0252	0.0231
5-7	0.0352	0.0319

Table 6: Clamping and release volumes

Here is a sample calculation to explain the values.

#### Example:

- Hs dock size XXS-4 / A-F
- Stroke [release stroke]  $H = 4.0mm$
- Maximum axial actuating force  $F_{ax\ max} = 35kN$
- Maximum supply pressure  $p_{max} = 56bar$
- Volumetric flow rate of the hydraulic assembly  $\vartheta = 4 \frac{l}{min}$

#### Volumetric calculation:

$$V = A * H$$

$$p = \frac{F}{A} \rightarrow A = \frac{F}{p} = \frac{35000N}{56 * 10 \frac{N}{cm^2}} = 62.5cm^2$$

$$V = A * H = 62.5cm^2 * 0.4cm$$

$$V = 25cm^3 = 0.025dm^3 = 0.025l$$

### 5.2.3 Clamping / release times

Refer to the following tables of clamping and release times for details of the hydraulic unit fitted. The volumetric flow rate of the hydraulic unit is a factor here.



#### INFORMATION

None of the values shown here take account of the pipework systems and fittings attached to the inlet and outlet ends.

Size of the product	Clamping / release time $t$ [s]		
	1 Product	2 Products	4 Products
XXS-4 / A-F	0.756	1.512	3.024
5-7	1.056	2.112	4.224

Table 7: Clamping / release times on a  $2 \frac{l}{min}$  - hydraulic assembly

Size of the product	Clamping / release time $t$ [s]		
	1 Product	2 Products	4 Products
XXS-4 / A-F	0.378	0.756	1.512
5-7	0.528	1.056	2.112

Table 8: Clamping / release times on a  $4 \frac{l}{min}$  - hydraulic assembly

Size of the product	Clamping / release time $t$ [s]		
	1 Product	2 Products	4 Products
XXS-4 / A-F	0.189	0.378	0.756
5-7	0.264	0.528	1.056

Table 9: Clamping / release times on a  $8 \frac{l}{min}$  - hydraulic assembly

#### Calculation of the clamping and release time:

$$t = \frac{V}{\vartheta} = \frac{0.025l}{4 \frac{l}{60s}} = 0.375s$$

## 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 10: Screw tightening torques, metric control threads

### Aluminum components

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

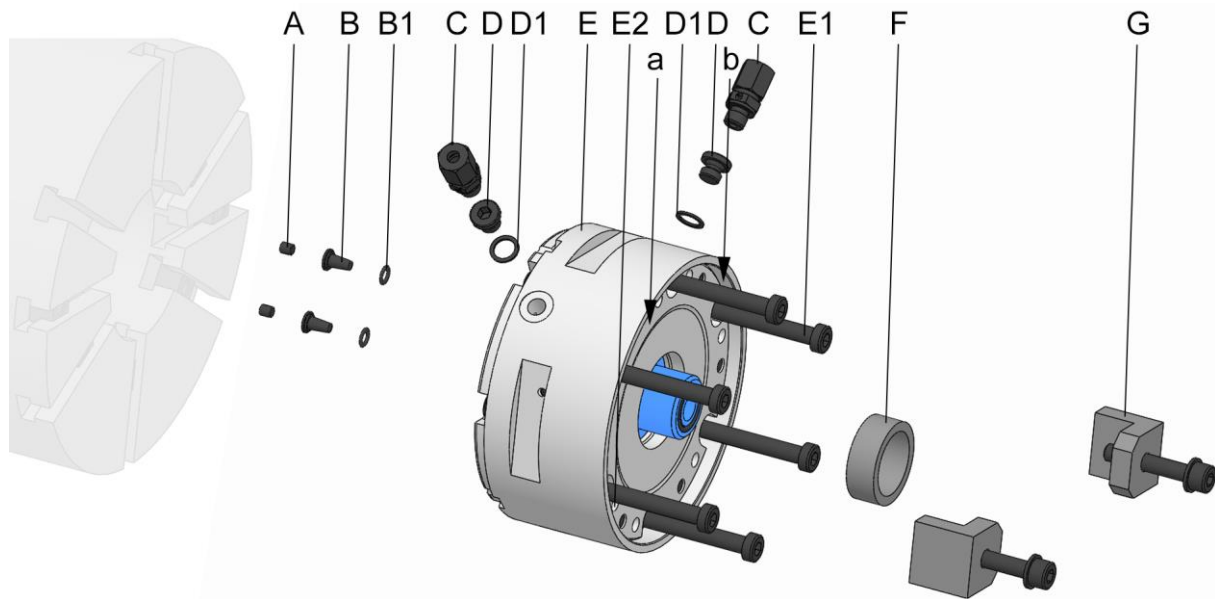
Thread designation	Tightening torque [Nm]	Minimum screw depth [mm]
M6	10	12
M8	23	16
M10	46	20

Table 11: 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 Expander
- B Cap plug
- B1 Cap plug seals
- C Swivel joints
- D Screw plugs
- D1 Screw plug seals
- E Product
- E1 Fixing screws on the product
- E2 Transport thread on product
- F Spacer [on tandem version]
- G Clamping bracket
- a Test surface, product face run-out
- b Test surface, position product

The product can be connected to the hydraulic supply line on the machine in two different ways.

Either the hydraulic ports on the underside of the product are used for direct connection to the machine, where necessary via a base plate. Or the product is connected to the hydraulic supply via the ports on its side.

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

### 7.5.1 Compatibility check

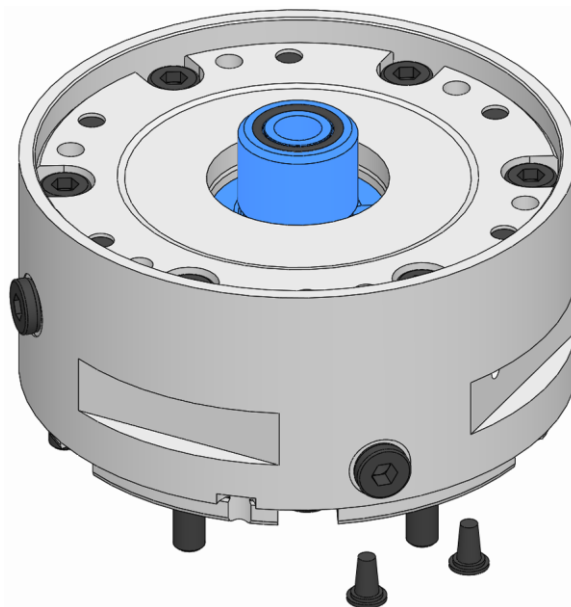
Check the compatibility of the product and the connection point of the machine.

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 hydraulic port variant of the product on the underside of the product

The product is supplied in assembled condition.  
The following preparatory steps are needed to install the product.



### 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.

1. Remove the cap plug from the product.

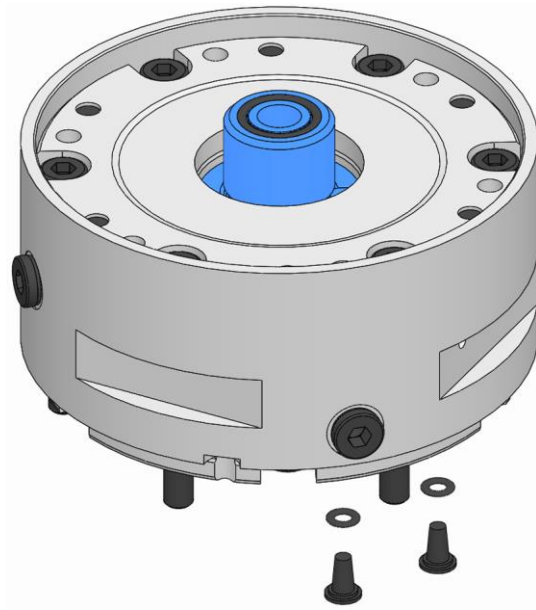
## 7.5.3 Preparation of the hydraulic port variant on the side of the product



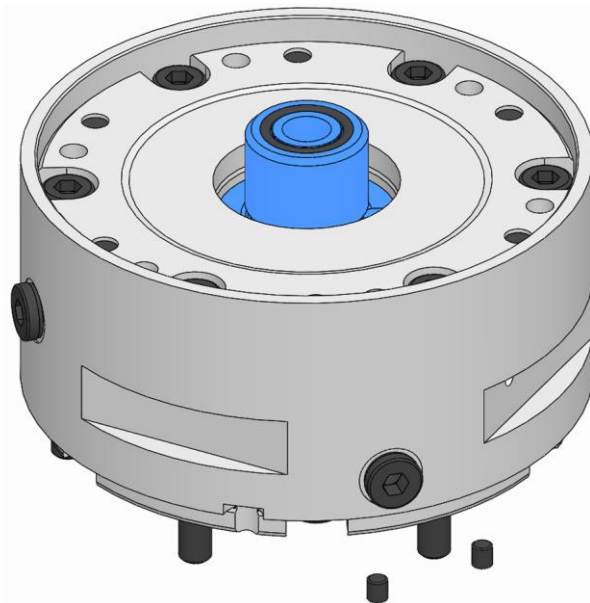
### INFORMATION

If this connection variant is selected, it is then no longer possible to convert the product to the other connection variant.

The product is supplied in assembled condition.  
The following preparatory steps are needed to install the product.



1. Remove the cap plugs and the cap plug seals from the product.

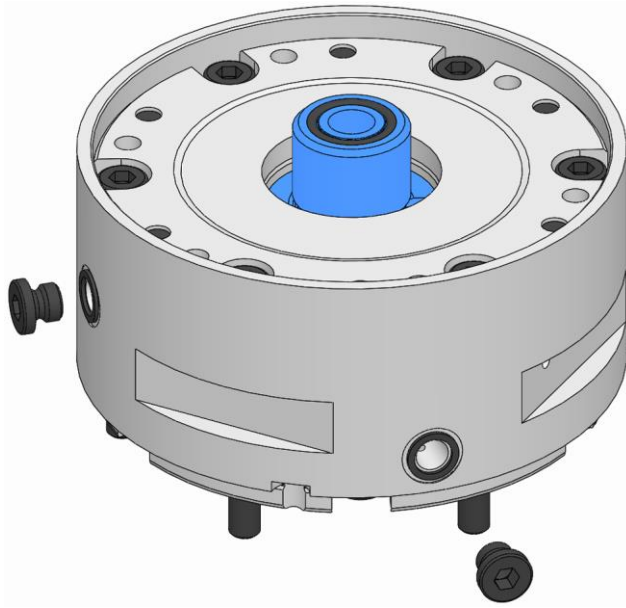


## INFORMATION

After being installed in its intended bore, the expander must always be sealed using an appropriate device.

2. Install the expanders.



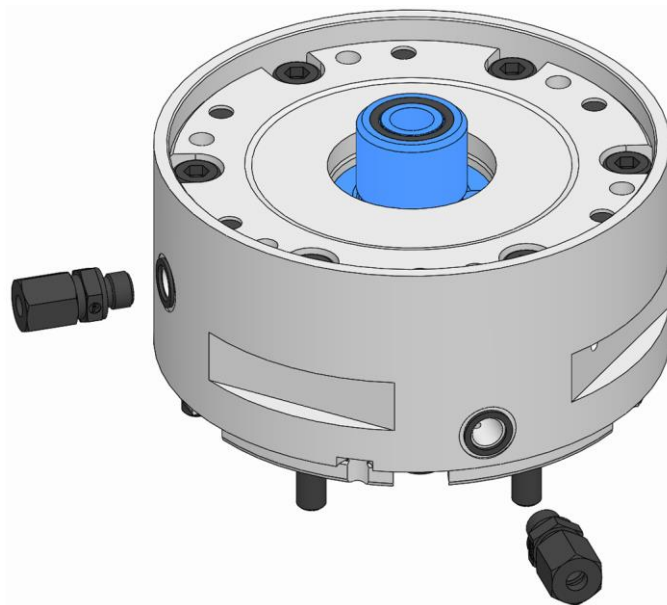


**NOTE**

**Damage to equipment caused by lost / missing seals during installation / removal of the screw plugs!**

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

3. Unfasten and remove the screw plugs. Ensure while doing so that the screw plug seals remain in the product.



4. Screw in the swivel screw connections and tighten them to the specified tightening torque [see nomenclature].

#### 7.5.4 Preparation of the product for installation of the tandem version

For installation of the tandem version, the product is needed twice.

The product is supplied in assembled condition.

The following preparatory steps are needed to install product 1, installed on the machine table / the base plate.

If the lateral hydraulic ports are to be used to install product 1, the product needs to be prepared in the way described in the »Preparation of the laterally mounted hydraulic port variant of the product« chapter. For this, the swivel screw connections need to be replaced with T-screw connections [not included in the scope of delivery].

If the hydraulic ports on the underside of the product are to be used to install product 1, the product needs to be prepared in the way described in the »Preparation of the laterally mounted hydraulic port variant of the product« chapter. This dispenses with the expander installation step and the cap plug seals must remain in the product.

The following preparatory steps are needed to install product 2, installed on product 1.

Product 2 is prepared in the same way as preparation for the use of lateral hydraulic ports [see »Preparation of the laterally mounted hydraulic port variant of the product« chapter].

#### 7.5.5 Installation of the hydraulic port variant of the product to the underside of the product

1. Depressurize the hydraulic unit.



##### **DANGER**

**Serious injuries caused by projectile workpieces, ejected by incorrectly connected hydraulic ports!**

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



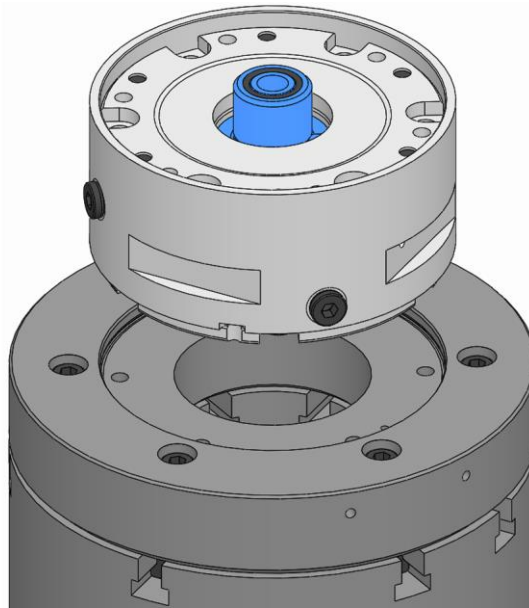
##### **WARNING**

**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.

2. If necessary, fit the baseplate to the machine table. To do this, the hydraulic ports on machine and baseplate must be aligned with one another.
3. Attach any lifting gear that may be required.

4. If necessary, fit the mounting aid onto a vertically suspended spindle.



## **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.

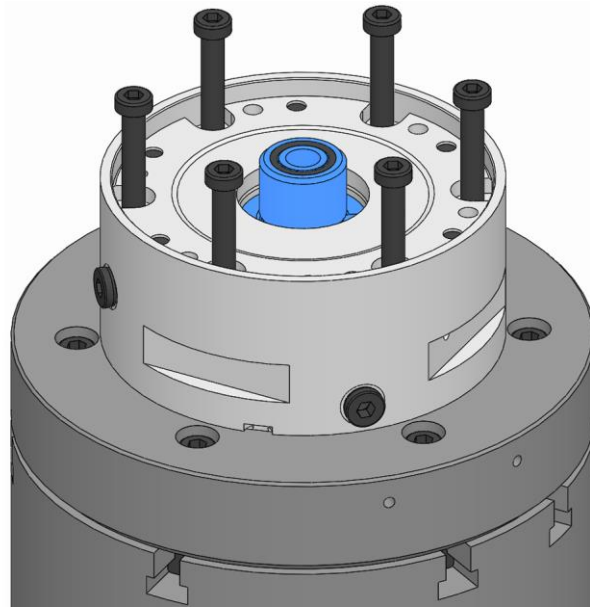


## **WARNING**

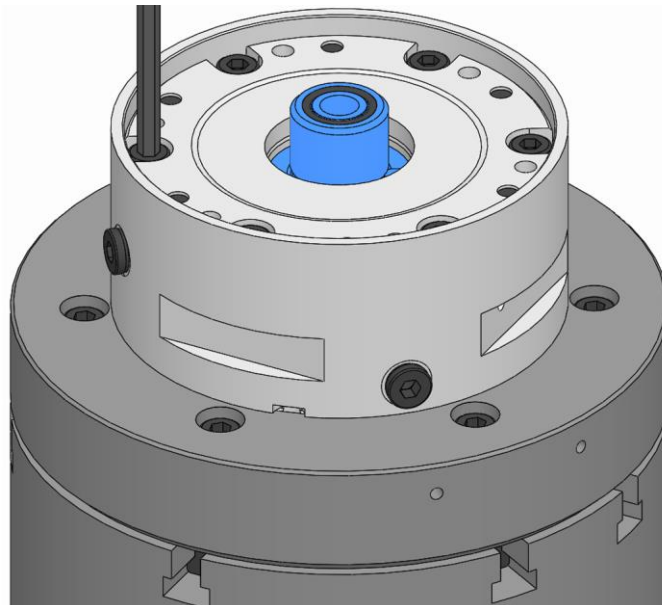
**Serious injuries can be caused by escaping media when seals and damaged / missing!**

- 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. Fit the product to the machine table / the base plate. The hydraulic ports on the machine / base plate and product must be aligned.



6. Screw in the product fixing screws and tighten them gently.
7. Unfasten and remove any lifting gear that may have been required.
8. Remove the mounting aid on a vertically suspended spindle if one was used.
9. Check the position of the product relative to the position of the test surface [ideally  $\leq 0.01$  mm] and, if necessary, correct carefully with a plastic hammer.



10. Tighten the product fixing screws to the specified tightening torque [see »Screw tightening torques« chapter].
11. Check face run-out on the test surface of the product [ideally  $\leq 0.01$  mm].
12. Check the position of the product relative to the position of the test surface [ideally  $\leq 0.01$  mm].

If the face run-out is greater than the maximum permitted value:

1. Remove the product.
2. Clean the locating face and the mating faces of the machine table / the baseplate and the product.
3. If there is a burr or slight damage to the locating face of the product and the machine table / the baseplate, rub it down gently with an oil stone.
4. Reinstall the product.
5. Repeat the alignment process.
6. Repeat the face run-out test.

#### 7.5.6 Installation of the hydraulic port variant of the product to the side of the product - secured using fixing screws

1. Depressurize the hydraulic unit.



#### **DANGER**

**Serious injuries caused by projectile workpieces, ejected by incorrectly connected hydraulic ports!**

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

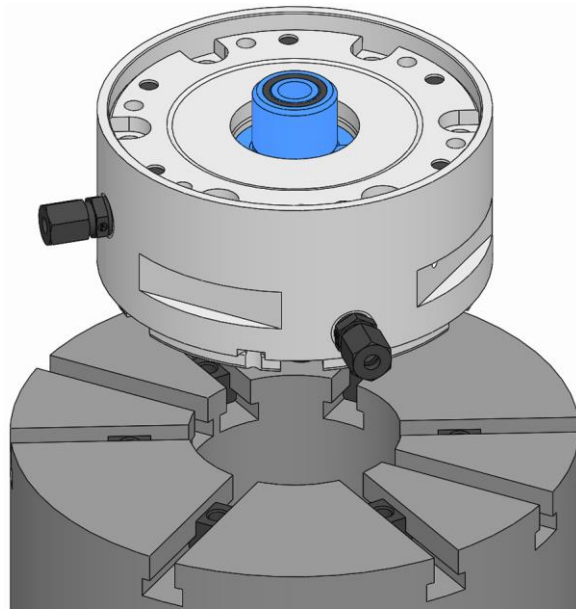


#### **WARNING**

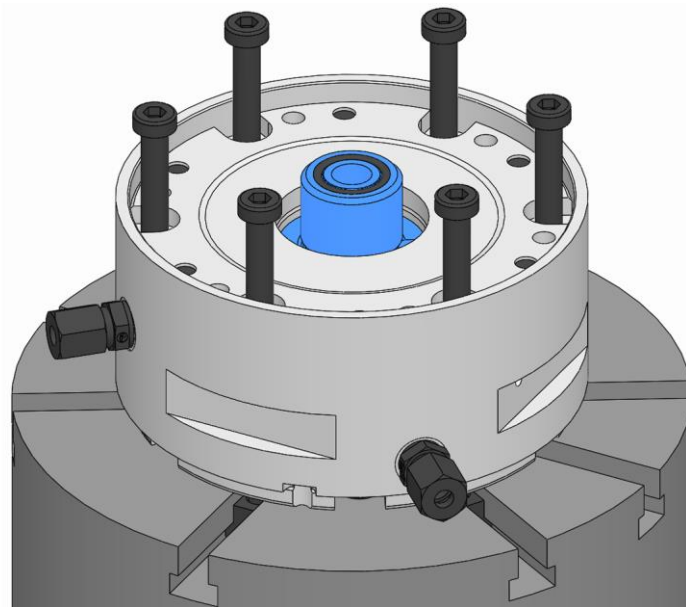
**Serious injuries can be caused by escaping media when seals and damaged / missing!**

- 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.

2. If necessary, fit the baseplate to the machine table. To do this, the hydraulic ports on machine and baseplate must be aligned with one another.
3. Attach any lifting gear that may be required.
4. If necessary, fit the mounting aid onto a vertically suspended spindle.



5. Fit the product to the machine table / the base plate.



6. Screw in the product fixing screws and tighten them gently.
7. Unfasten and remove any lifting gear that may have been required.
8. Remove the mounting aid on a vertically suspended spindle if one was used.



#### 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.

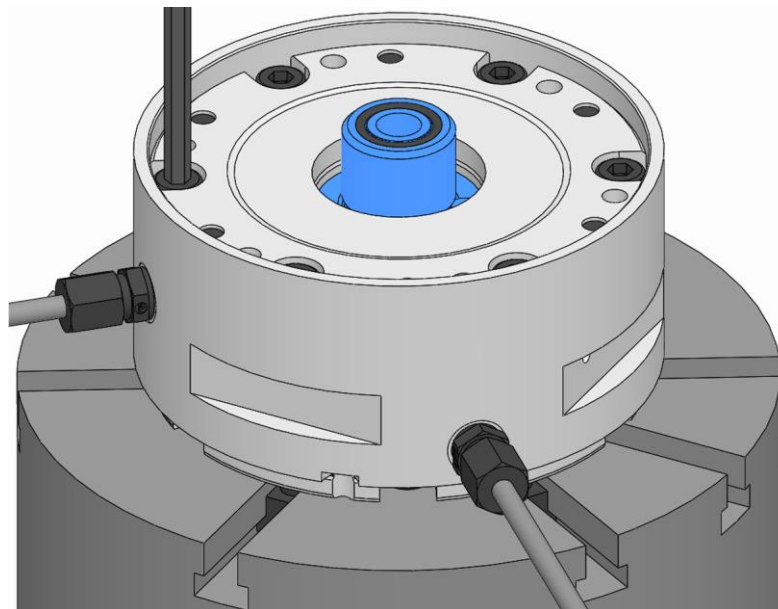


#### WARNING

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

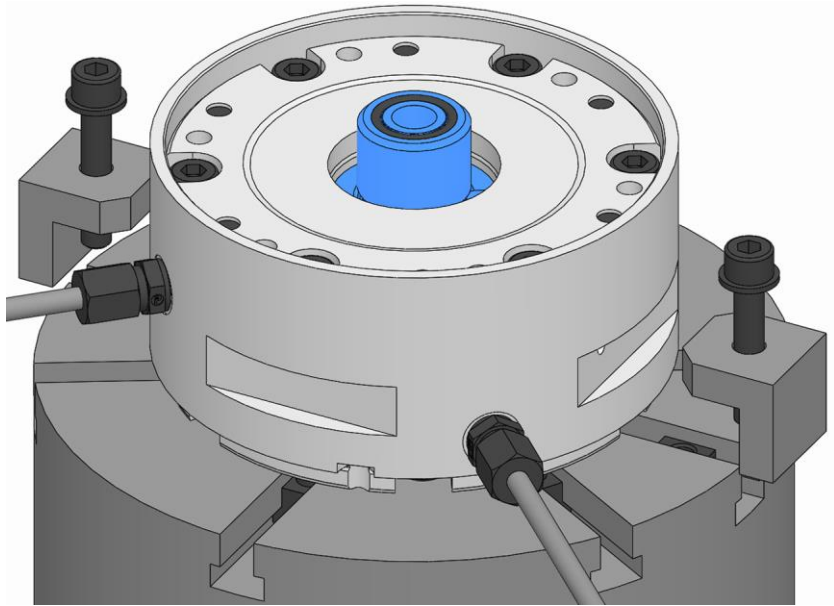
- Replace missing or damaged sealing elements.
- Ensure that the sealing elements do not fall out or get damaged during installation / removal, and apply a thin coat of grease if necessary.

9. Connect up the hydraulics. For this the hydraulic ports on the machine and product must be aligned.
10. Check the position of the product relative to the position of the test surface [ideally  $\leq 0.01$  mm] and, if necessary, correct carefully with a plastic hammer.



11. Tighten the product fixing screws to the specified tightening torque [see »Screw tightening torques« chapter].





12. Where required, install the clamping brackets needed on the product and the machine table.
13. Check face run-out on the test surface of the product [ideally  $\leq 0.01$  mm].

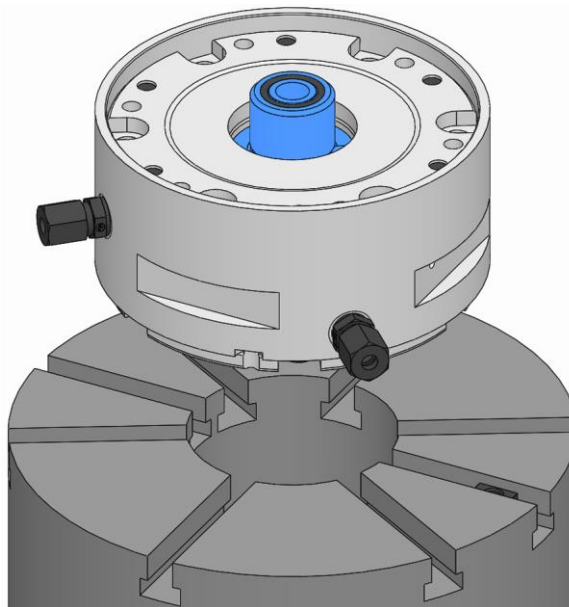
If the face run-out is greater than the maximum permitted value:

1. Remove the product.
2. Clean the locating face and the mating faces of the machine table / the baseplate and the product.
3. If there is a burr or slight damage to the locating face of the product and the machine table / the baseplate, rub it down gently with an oil stone.
4. Reinstall the product.
5. Repeat the alignment process.
6. Repeat the face run-out test.

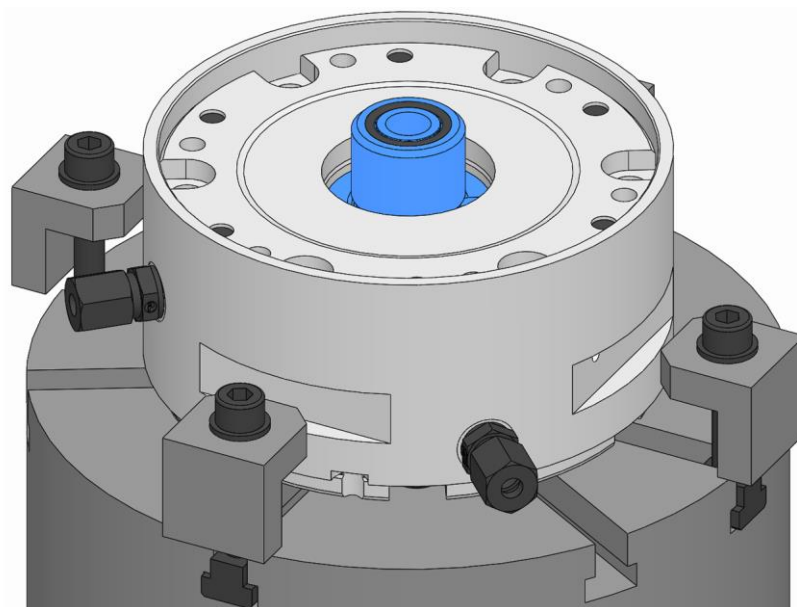


### 7.5.7 Installation of the hydraulic port variant of the product to the side of the product - secured using clamping brackets

1. Depressurize the hydraulic unit.
2. Attach any lifting gear that may be required.
3. If necessary, fit the mounting aid onto a vertically suspended spindle.



4. Place the product on the machine table.



5. Install the clamping brackets on the product and machine table and gently bring them into contact.
6. Unfasten and remove any lifting gear that may have been required.
7. Remove the mounting aid on a vertically suspended spindle if one was used.



#### 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.

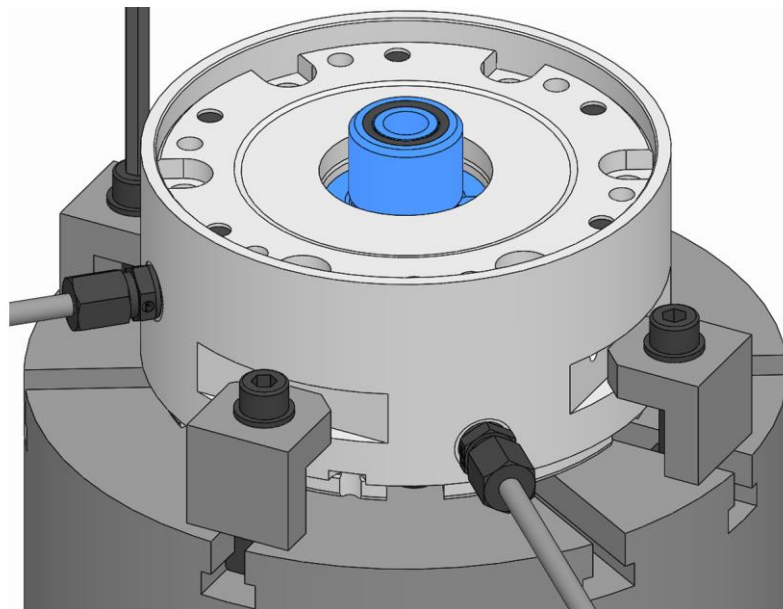


#### WARNING

**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.

8. Connect up the hydraulics. For this the hydraulic ports on the machine and product must be aligned.
9. Check the position of the product relative to the position of the test surface [ideally  $\leq 0.01$  mm] and, if necessary, correct carefully with a plastic hammer.



10. Tighten down the clamping brackets.
11. Check face run-out on the test surface of the product [ideally  $\leq 0.01$  mm].

If the face run-out is greater than the maximum permitted value:

1. Remove the product.

2. Clean the locating face and the mating faces of the machine table / the baseplate and the product.
3. If there is a burr or slight damage to the locating face of the product and the machine table / the baseplate, rub it down gently with an oil stone.
4. Reinstall the product.
5. Repeat the alignment process.
6. Repeat the face run-out test.

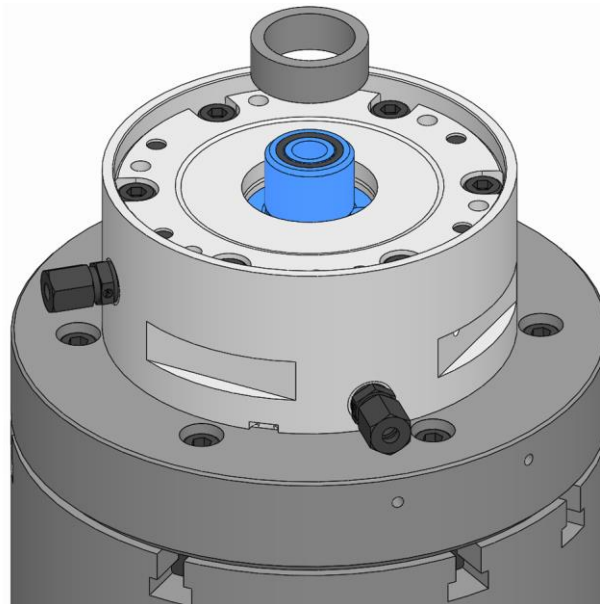
## 7.5.8 Installation of the tandem version

1. Depressurize the hydraulic unit.
2. Before installation, move product 1 into its rear limit stop position.
3. Install product 1 [see »Installation of the hydraulic port variant of the product to the underside of the product« chapter, or the »Installation of the laterally mounted hydraulic port variant of the product« chapter as applicable].
4. Attach any lifting gear that may be required to product 2.
5. If necessary, fit the mounting aid onto a vertically suspended spindle.

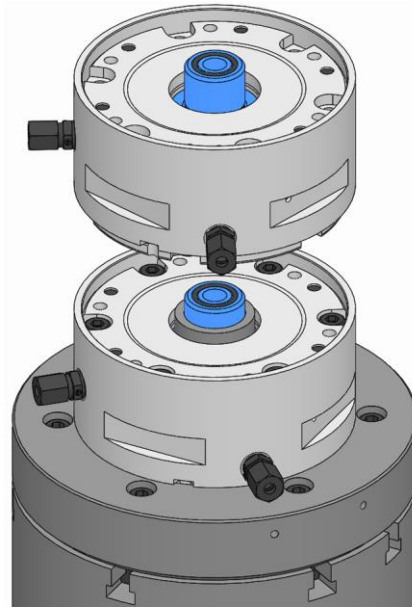


### INFORMATION

The spacer is specifically designed for the tandem version [see »Optional accessories« chapter].



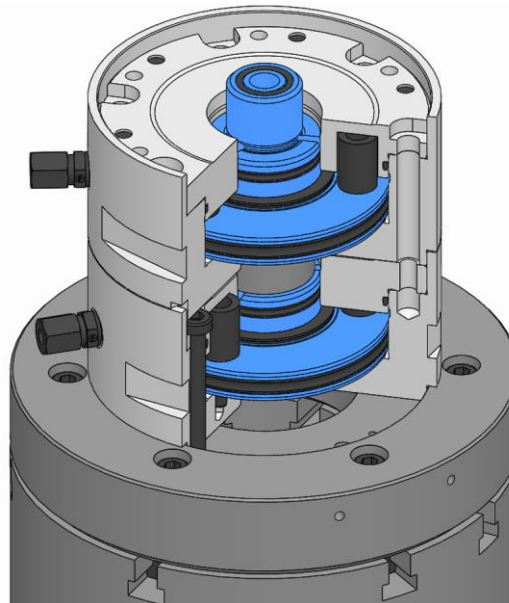
6. Place the spacer onto product 1.
7. Before installation, move product 2 into its rear limit stop position.



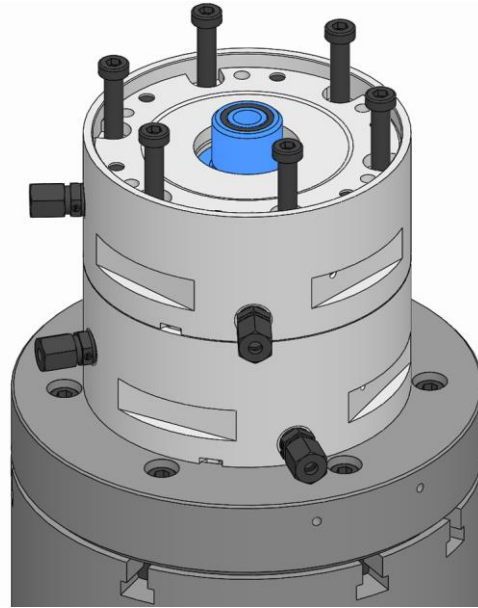
#### INFORMATION

Before screwing on product 2, product 1 must still be in its rear limit position.

8. Screw product 2 firmly home on product 1.



9. Turn back product 2 until the hole patterns on products 2 and 1 match up.



10. Screw the product fixing screws into product 2 and tighten to the specified tightening torque [see »Screw tightening torques« chapter].
11. Unfasten and remove any lifting gear that may have been required.
12. Remove the mounting aid on a vertically suspended spindle if one was used.



## **DANGER**

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

- The hydraulic ports on product 1 and product 2 must be connected up properly.
- Hydraulic ports for »Clamping« of product 1 and product 2 must be connected together which also same applies to connection of the »Release« hydraulic port.



## **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.

13. Connect up the hydraulics. For this the hydraulic ports on product 1 and product 2 must be aligned.
14. Check the face run-out of product 2 on the test surface for checking product face run-out [ideally  $\leq 0.01$  mm].

15. Check the position of product 2 relative to the position of the product test surface [ideally  $\leq 0.01$  mm].

Whenever the face run-out and/or the position is greater than the maximum permitted value:

1. Remove product 2.
2. Clean the locating face and the mating faces of product 1 and product 2.
3. If there is a burr or slight damage to the locating face of product 1 and product 2, rub it down gently with an oil stone.
4. Reinstall product 2.
5. Repeat the face run-out test.
6. Repeat the position check.

### 7.5.9 Installation of the product together with the installed clamping device

Usually, the clamping device is installed after the product has been installed on the machine table / the base plate.

It is possible to install the product and clamping device to the machine table / the base plate.

For this, the following conditions must be satisfied:

- The fixing hole patterns of the product and the clamping device must match up.
- The screw size of the fixing screws for the product and the clamping device must match up.
- Choose the screw length of the fixing screws for this combination in accordance with the build height.

The following steps are needed to install the product and clamping device to the machine table / the base plate.

1. Prepare the product for installation on the machine table / the base plate [see »Preparation of the hydraulic port variant of the product to the underside of the product« chapter, or the »Preparation of the laterally mounted hydraulic port variant of the product« chapter as applicable].
2. Install the clamping device on the product [see »Installation of the clamping device« chapter]. Attention must be paid to the following points:
  - The actuating unit must be moved manually into both limit stop positions.
  - The clamping device must be turned back to the fixing bores on the actuating unit, not up to the fixing threads in the actuating unit.
  - This dispenses with the screw connection for the clamping device using clamping device fixing screws. This takes place later, together with the actuating unit, using the fixing screws selected for this combination.
  - This dispenses with the alignment and test process.

3. Install the product together with the clamping device to the machine table / the base plate [see »Installation of the hydraulic port variant of the product to the underside of the product« chapter, or the »Installation of the laterally mounted hydraulic port variant of the product- secured by means of fixing screws« chapter]. Attention must be paid to the following points:
  - The product is secured together with the clamping device directly onto the machine table / the base plate using the fixing screws selected for this combination.
  - The alignment and checking process is performed together with the clamping device on the test surfaces of the clamping device.



## 8 Use

### 8.1 Use-related safety



#### 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

**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 tools and items of test equipment being ejected centrifugally!**

- Prior to commissioning, ensure that all tools and items of test equipment are removed from the working area of the machine.



#### WARNING

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

- Shut down media supply during installation / removal of the clamping device.
- Relieve any pressure trapped in the system.
- Shut down the system.



#### WARNING

**Serious crushing injuries and breakages caused by parts dropping off due to incorrect installation / removal of the clamping device!**

- Ensure that the product cannot roll away or fall off.
- For installation / removal of the clamping device on a vertically suspended spindle in the machine, use a suitable mounting aid if necessary.





**WARNING**

**Serious crushing injuries caused by inappropriate machine movement during installation / removal of the clamping device!**

- Machine movements are only permitted in set-up mode during installation and removal of the clamping device.
- Never reach into the gap.
- Watch out for gaps between moving parts.



**WARNING**

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

- Only bend down into the working area of the machine if it contains no cutting tools or sharp objects, or if these are covered.
- Never place parts of your body below items in the working area of the machine that might drop down.
- For installation / removal of the clamping device on a vertically suspended spindle in the machine, use a suitable mounting aid if necessary due to the weight.



**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].

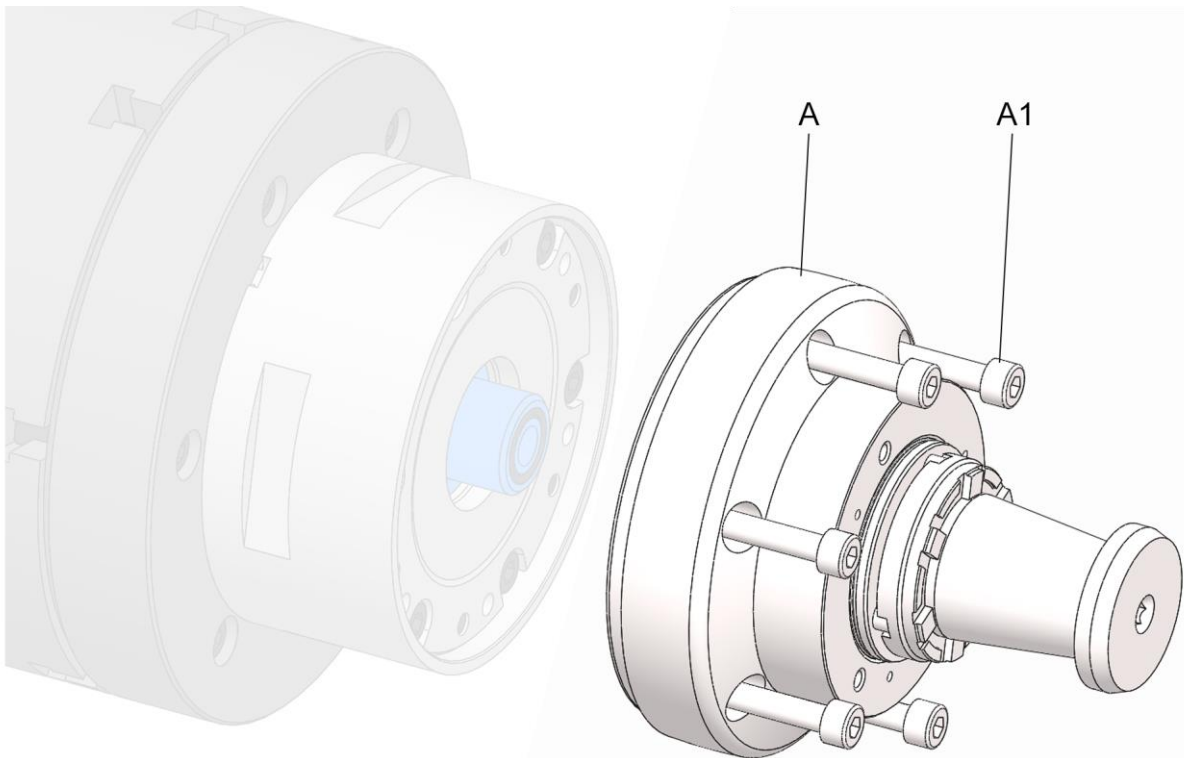


**NOTE**

**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.

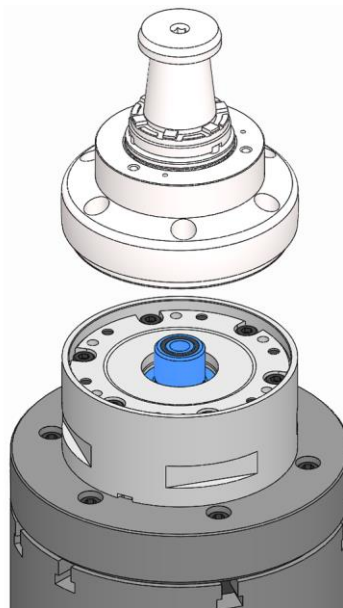
## 8.2 Installation of the clamping device



- A Clamping device  
A1 Fixing screws clamping device

1. As described in the »Preparation of the machine for installation« chapter, prepare for the following steps.
2. Attach any lifting gear that may be required.

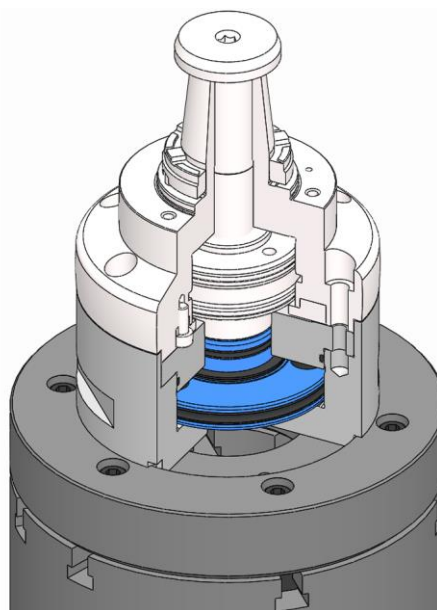
3. If necessary, fit the mounting aid onto a vertically suspended spindle.
4. Move the actuating unit into its front limit stop position.



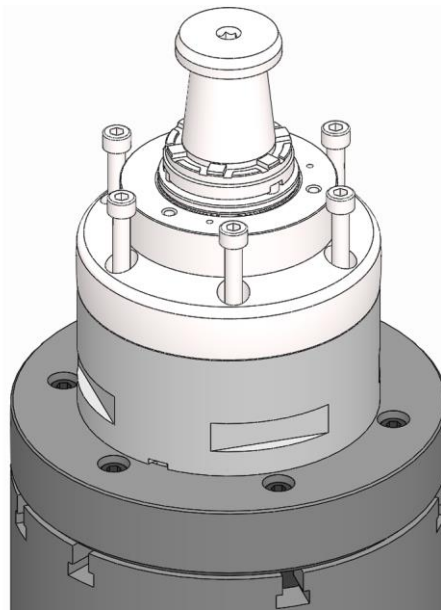
#### INFORMATION

If lifting gear needs to be used, rotate the actuating unit and machine spindle to tighten / untighten the clamping device.

5. Screw the clamping device firmly home on the actuating unit.



6. Turn back the clamping device until the hole patterns on the actuating unit and clamping device match up.
7. Move the actuating unit into its rear limit stop position.

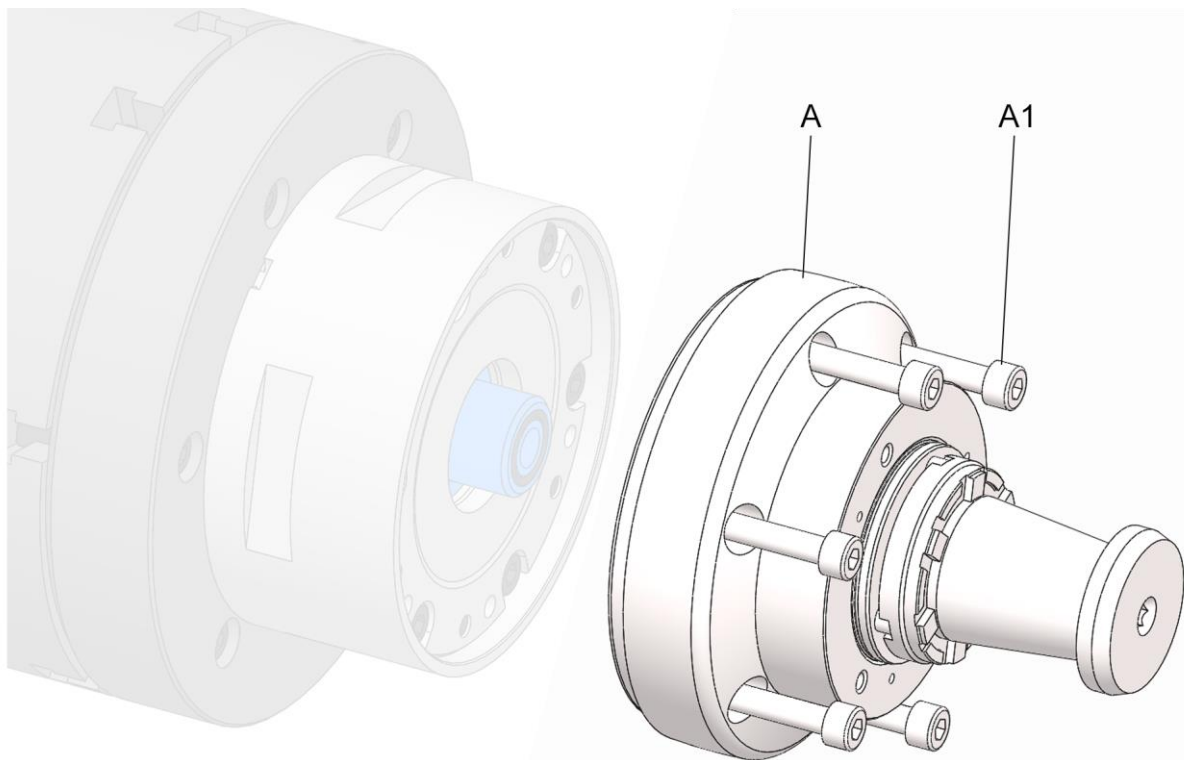


8. Screw the fixing screws into the clamping device and tighten them to their specified tightening torque [see the »Screw tightening torques« chapter].
9. Unfasten and remove any lifting gear that may have been required.
10. Remove the mounting aid on a vertically suspended spindle if one was used.
11. Check the face run-out of the clamping device on a suitable test surface [ideally  $\leq 0.01$  mm].
12. Check the axial run-out of the clamping device on a suitable test surface [ideally  $\leq 0.01$  mm].

Whenever the face run-out and/or the axial run-out is greater than the maximum permitted value:

13. Remove the clamping device.
14. Clean the locating surface and mating surfaces of the flange and the clamping device.
15. If there is a burr or slight damage, rub down the locating surface of the flange and the clamping device gently with an oil stone.
16. Reinstall the clamping device.
17. Repeat the face run-out test.
18. Repeat the axial run-out test.

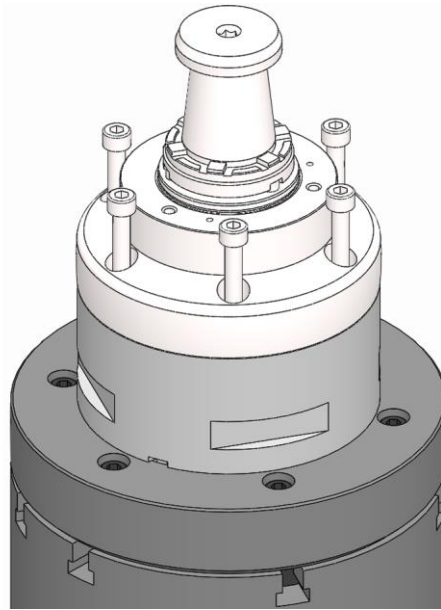
### 8.3 Removal of the clamping device



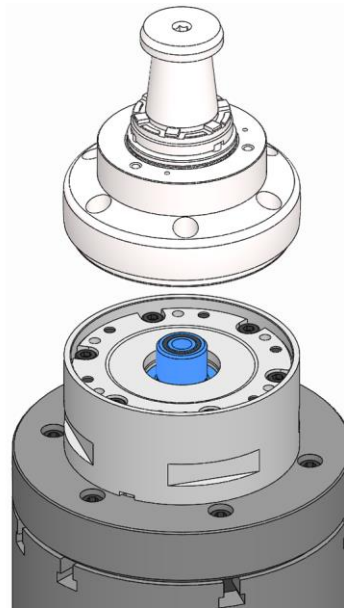
- A Clamping device
- A1 Fixing screws clamping device

If a break in production occurs that lasts for more than three days, the clamping device must be removed and stored safely in accordance with the manufacturer's stipulations [see operating instructions for the clamping device].

1. As described in the »Preparing the machine for removal« chapter, prepare for the following steps.
2. Attach any lifting gear that may be required.
3. If necessary, fit the mounting aid onto a vertically suspended spindle.
4. Move the actuating unit into its rear limit stop position.



5. Unfasten and remove the fixing screws from the clamping device.
6. Move the actuating unit into its front limit stop position.



#### INFORMATION

If lifting gear needs to be used, rotate the actuating unit and machine spindle to tighten / untighten the clamping device.

7. Unscrew and remove the clamping device from the actuating unit.

## 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.



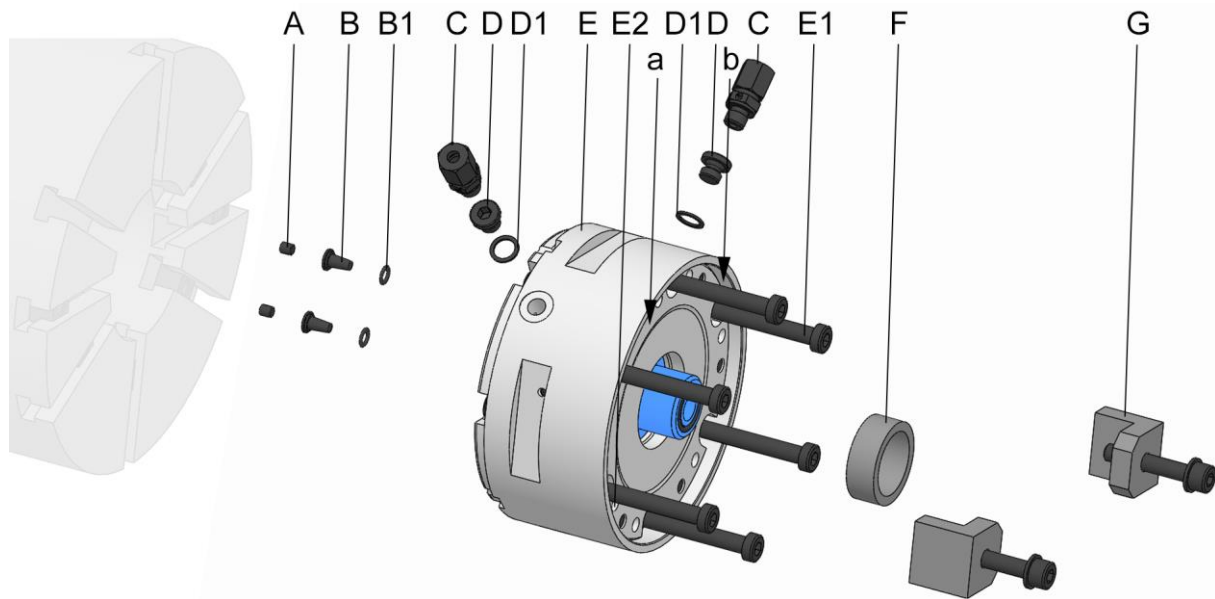
## INFORMATION

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 Expander
- B Cap plug
- B1 Cap plug seals
- C Swivel joints
- D Screw plugs
- D1 Screw plug seals
- E Product
- E1 Fixing screws on the product
- E2 Transport thread on product
- F Spacer [on tandem version]
- G Clamping bracket
- a Test surface, product face run-out
- b Test surface, position product

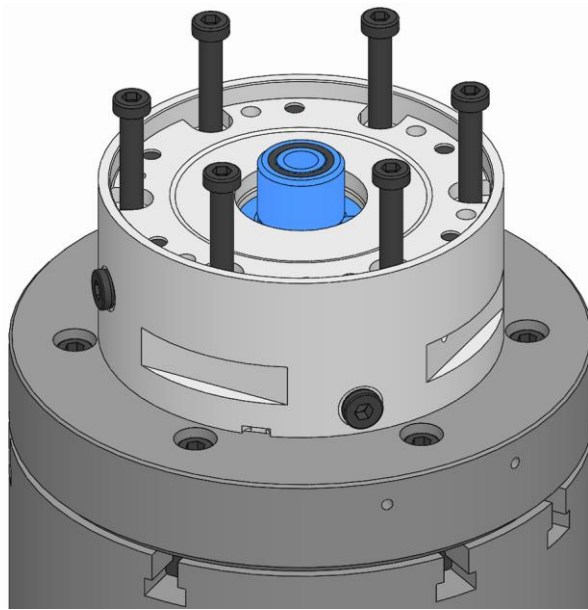
The product can be connected to the hydraulic supply on the machine in two different ways.

Either to the machine using the hydraulic ports on the underside of the product, if necessary with a base plate. Or the product can be connected to the hydraulic supply using its side ports.

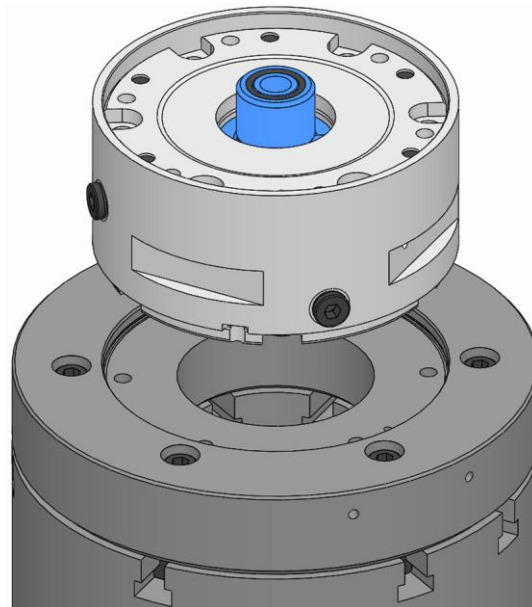
1. As described in the »Preparing the machine for removal« chapter, prepare for the following steps.

### 10.3.1 Removal of the hydraulic port variant of the product to the underside of the product

1. Move the product into its rear limit stop position.
2. Depressurize the hydraulic unit.
3. Attach any lifting gear that may be required.
4. If necessary, fit the mounting aid onto a vertically suspended spindle.



5. Unfasten and remove the fixing screws on the product.

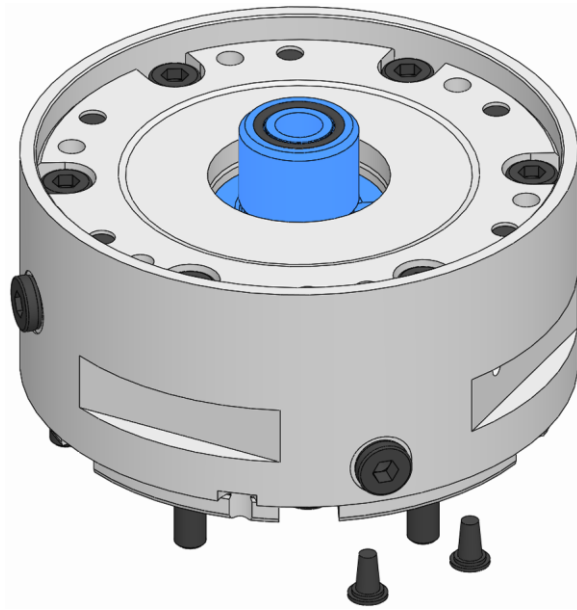


## **WARNING**

**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.

6. Remove the product from the machine table / the baseplate.



**NOTE**

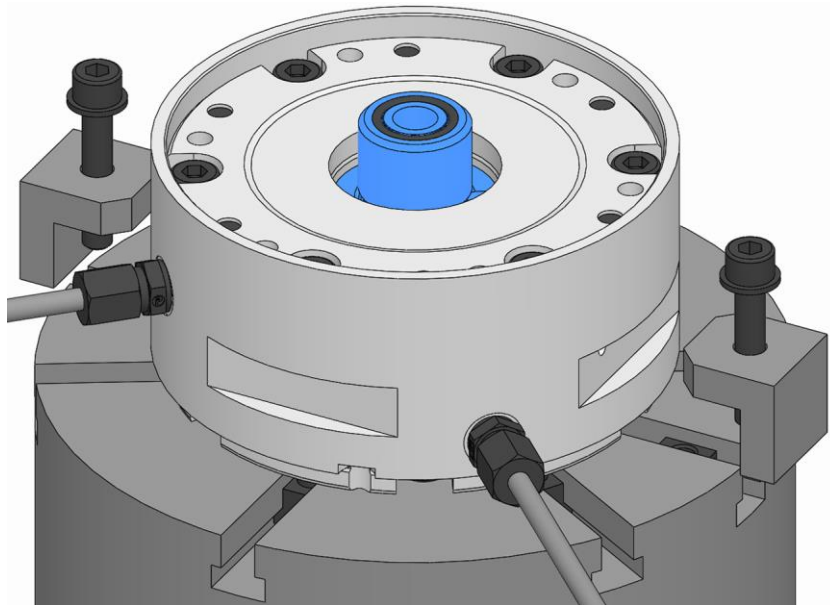
**Damage to materials caused by lost / missing seals during installation/removal of the cap plugs!**

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

7. Install the cap plug in the product.

### 10.3.2 Removal of the hydraulic port variant of the product from the side of the product - secured using fixing screws

1. Move the product into its rear limit stop position.
2. Depressurize the hydraulic unit.
3. Attach any lifting gear that may be required.
4. If necessary, fit the mounting aid onto a vertically suspended spindle.



5. Where required, remove the clamping brackets from the product and the machine table.

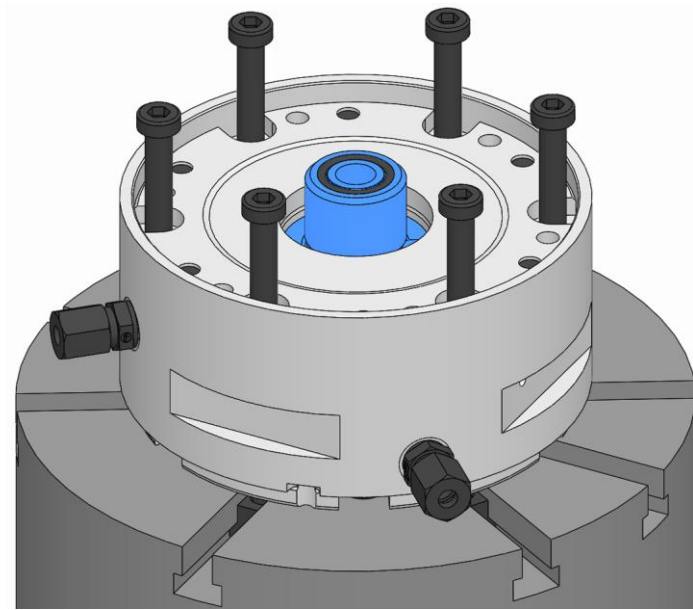


#### **WARNING**

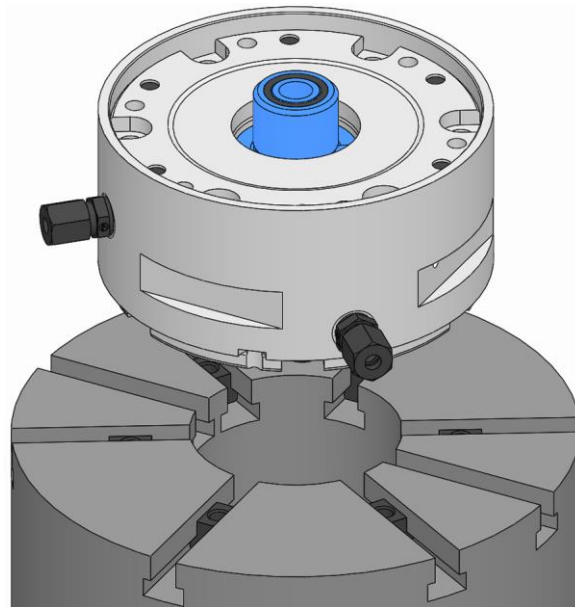
**Serious injuries can be caused by escaping media when seals are damaged / missing!**

- 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.

6. Disconnect the hydraulic ports.



7. Unfasten and remove the fixing screws on the product.



8. Remove the product from the machine table / the baseplate.



## 10.3.3 Removal of the hydraulic port variant of the product from the side of the product - secured using clamping brackets

1. Move the product into its rear limit stop position.
2. Depressurize the hydraulic unit.
3. Attach any lifting gear that may be required.
4. If necessary, fit the mounting aid onto a vertically suspended spindle.

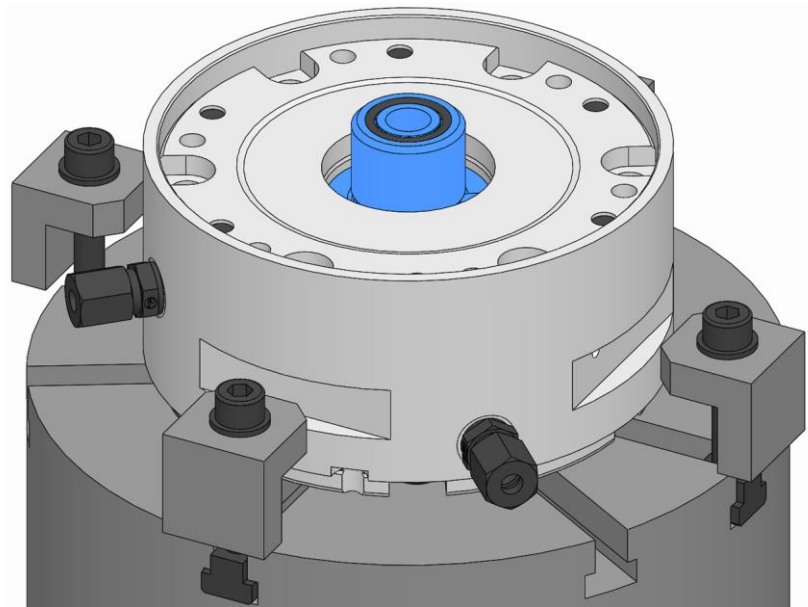


### **WARNING**

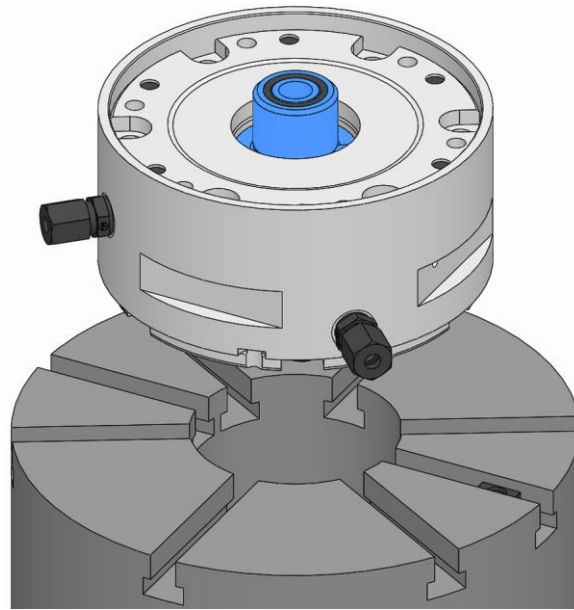
**Serious injuries can be caused by escaping media when seals are damaged / missing!**

- 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. Disconnect the hydraulic ports.



6. Remove the clamping brackets from the product and the machine table.



7. Remove the product from the machine table.

#### 10.3.4 Removal of the tandem version

1. Move the product into its rear limit stop position.
2. Depressurize the hydraulic unit.
3. Attach any lifting gear that may be required to product 2.
4. If necessary, fit the mounting aid onto a vertically suspended spindle.

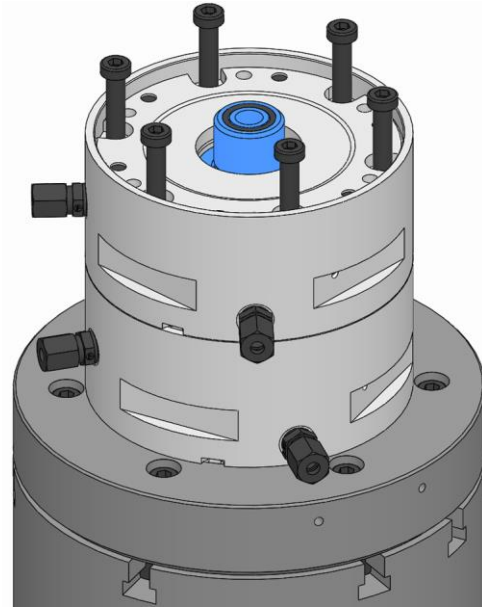


#### **WARNING**

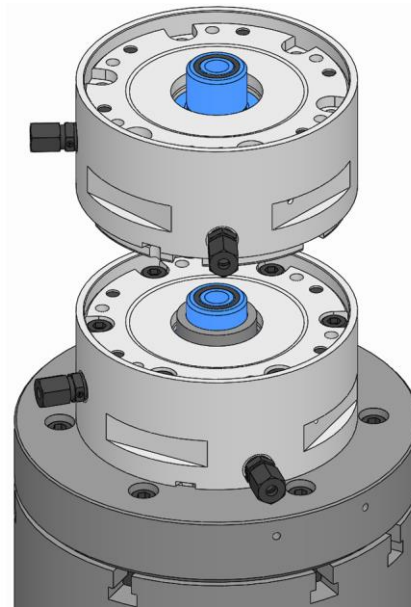
**Serious injuries can be caused by escaping media when seals and damaged / missing!**

- 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.

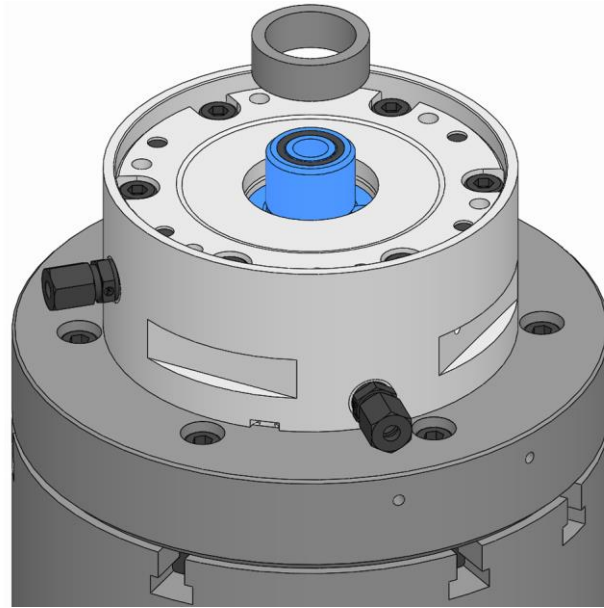
5. Disconnect the hydraulic ports.



6. Unfasten and remove the fixing screws from product 2.



7. Unscrew and remove product 2 from product 1.



8. Remove the spacer from product 1.
9. Remove product 1 [see »Removal of the hydraulic port variant of the product from the underside of the product« chapter, or the »Removal of the laterally mounted hydraulic port variant of the product« chapter as applicable].

#### 10.3.5 Removal of the product together with the installed clamping device

1. Remove the product together with the clamping device from the machine table / the base plate [see »Removal of the hydraulic port variant of the product to the underside of the product« chapter, or the »Removal of the laterally mounted hydraulic port variant of the product- secured by means of fixing screws« chapter]. Attention must be paid to the following points:
  - The fixing screws on the product are replaced by the fixing screws for the combination.
2. Remove the clamping device from the product [see »Removal of clamping device« chapter]. Attention must be paid to the following points:
  - The actuating unit must be moved manually into both limit stop positions.
  - This dispenses with the releasing and removal of fixing screws from the clamping device. The fixing screws for the combination were removed in the previous step.

# 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.
- It is essential to check the maintenance status of the product at regular intervals with a structural clamping force measurement.



### CAUTION

**Health risks caused by incorrect handling of cleaning agents!**

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



### INFORMATION

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

## 11.2 Maintenance schedule

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

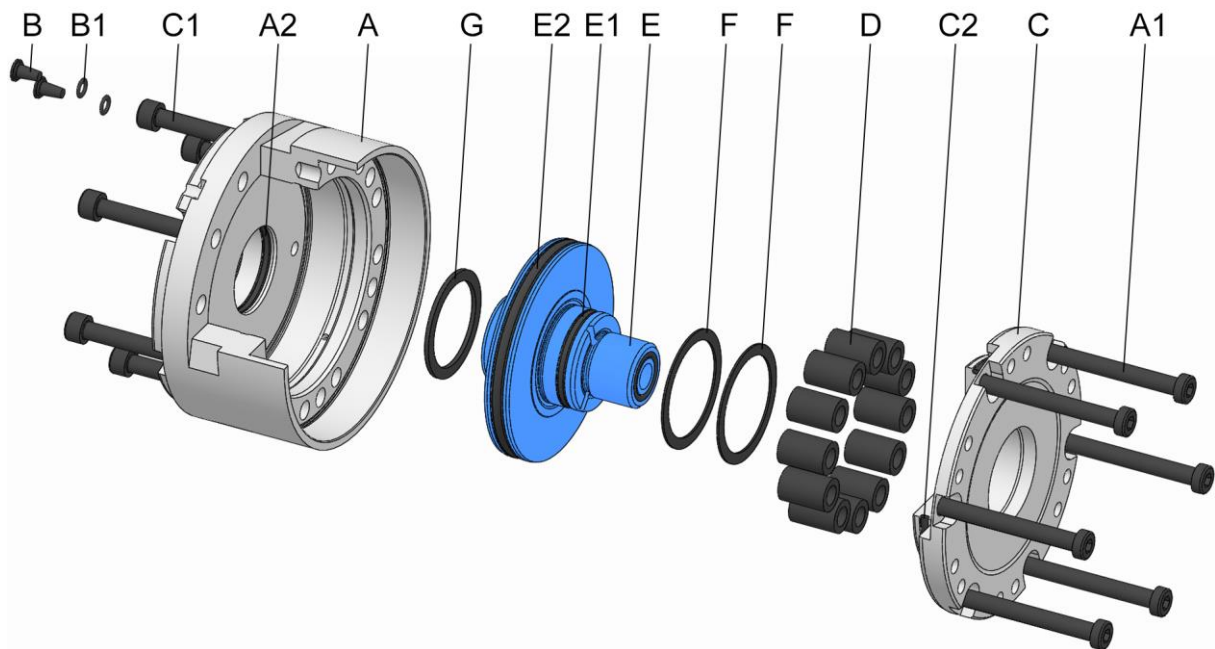
If increased levels of wear are detected during regular checks, shorten the maintenance intervals to reflect the actual rate at which signs of wear appear.

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]
Every two years or after 5000 operating hours*	Maintain the complete product [see »Scheduled maintenance« chapter]
	Lubricate the product [see »Lubricating the product« chapter]
with storage	See »Storage« chapter

\* depending upon which stipulation is achieved first  
Table 12: Maintenance table

### 11.3 Scheduled maintenance



- A Housing
- A1 Housing fixing screws
- A2 Housing gasket [gasket kit]
- B Cap plug
- B1 Cap plug seals
- C Cover
- C1 Cover fixing screws
- C2 Cover gasket [gasket kit]
- D Springs [on version »with springs«]
- E Piston
- E1 Gasket 1 piston [gasket kit]
- E2 Gasket 2 piston [gasket kit]
- F Shim 1 [on version »with springs«]
- G Shim 2 [on version »with springs«]



#### 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 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.



**NOTE**

**Damage to materials caused by incorrect installation of sealing elements!**

- 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.

Cleanliness of the relevant limit stop and guide diameter are essential for achieving axial and face run-out tolerances.

1. Remove the clamping device from the product [see »Removal of clamping device« chapter].
2. Remove the product from the machine [see »Removal of the product« chapter].



**WARNING**

**Serious injuries caused by imbalance resulting from incorrect reassembly!**

- The product components must be installed back in the same position.
- If necessary, mark out the relative positions of components prior to disassembly.



**NOTE**

**Damage to materials caused by incorrect Removal of the product!**

- More extensive disassembly than shown on the exploded drawing is prohibited.

3. Dismantle the product as shown on the exploded drawing. Pay attention to the following during disassembly:
  - Unfasten the cover fixing screws uniformly, alternately and crosswise.
4. Clean all oil and grease residues off all components with an ester-free, non-polar, soft, lint-free cloth and check for visible signs of damage.

5. Assemble the product in accordance with the exploded drawing and lubricate during assembly [see »Lubricating the product« chapter]. Pay attention to the following during assembly:
  - Replace worn or damaged fixing screws.
  - Tighten all fixing screws to the specified tightening torque [see nomenclature and/or »Screw tightening torques« chapter]. When tightening the screws, do so evenly to prevent any distortion under load.
  - 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].
  - The seals in the gasket kit must be replaced before installing the piston and cover.
  - Reinstall the springs in the same sequence and arrangement.
  - When using the hydraulic ports on the underside of the products, replace the cap plugs before installing the seals.



## 11.4 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 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 clamping device from the product [see »Removal of clamping device« chapter].
2. Remove the product from the machine [see »Removal of the product« 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.

## 11.5 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].

## 11.6 Lubricating the product



### **DANGER**

**Serious injuries caused by workpiece being ejected centrifugally due to insufficient lubrication of the product!**

- Maximum clamping force is reduced by approximately 20% if lubrication is insufficient.
- Always comply with the maintenance intervals [see »Maintenance schedule« chapter].

Lubrication takes place every time the system is cleaned, maintained or assembled, and also when required.

1. Dismantle the product for lubrication purposes. Consult the »Scheduled maintenance« chapter for details of the level of disassembly required.
2. At all lubrication points, remove escaping, consumed or surplus grease, and dispose of it in accordance with locally enforceable legislative provisions.

## 11.7 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.



### CAUTION

#### **Injuries caused by the accidental escape of media!**

- Open the pressure relief screws and drain off the remaining media.
- Dispose of media properly.



### 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 clamping device and, if necessary, disassemble and clean the actuating unit	Skilled specialist
	Incorrect clamping device	Use a suitable clamping device	
	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	
Clamping device cannot be swapped in or out	Defective axial strokes in the clamping device	See fault »Defective axial strokes in the adaptation clamping device«	
	Connection thread damaged	Replace damaged components	Skilled specialist
The clamping device is difficult to remove	Connection thread is dirty	Use force to release the clamping device and clean the actuating unit	Skilled specialist
Clamping force is too weak	The clamping device is not mounted correctly.	Remove and reinstall the clamping device	Skilled specialist
	Supply pressure too low	Check machine setting and correct if necessary	
	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 are worn	Replace the gasket kit [see »Scheduled maintenance« chapter]	Hydraulic/pneumatic specialist
	Defective fluid port	Check actuating unit port, replacing if necessary	Hydraulic/pneumatic specialist
		Check machine port and replace if necessary	Machine manufacturer

Fault	Possible cause	Remedial action	Remedied by
Geometry deviation on the work-piece	Axial run-out error on the actuating unit	Check axial run-out of the clamping device and the actuating unit and correct if necessary	Skilled specialist
	Face run-out error on the actuating unit	Check face run-out of the clamping device and of the actuating unit and clean the mating surfaces if necessary	

Table 13: 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](http://www.hainbuch.com).

### 14.2 Manufacturer certification

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







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