



## Translation of the original operating instructions

# RÖHM – HSK clamping system SK tool clamping system Stationary unclamping unit

consisting of:

- HSK / SK clamping set
- Draw bar extension
- SEH clamping unit or ASP tool clamp
- SLEH stationary unclamping unit
- Coolant rotary supply unit

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DEUBLIN installation 040-505	Attachment
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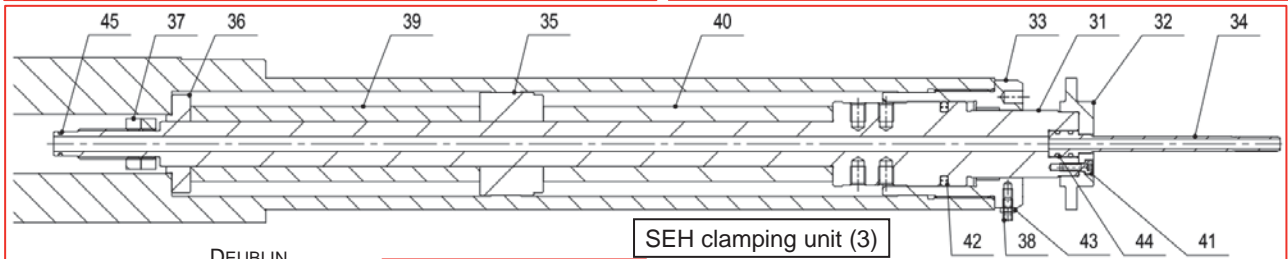
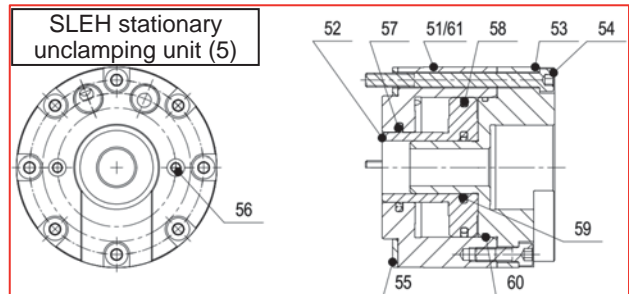
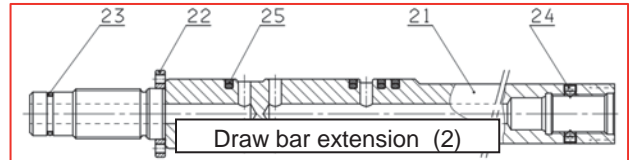
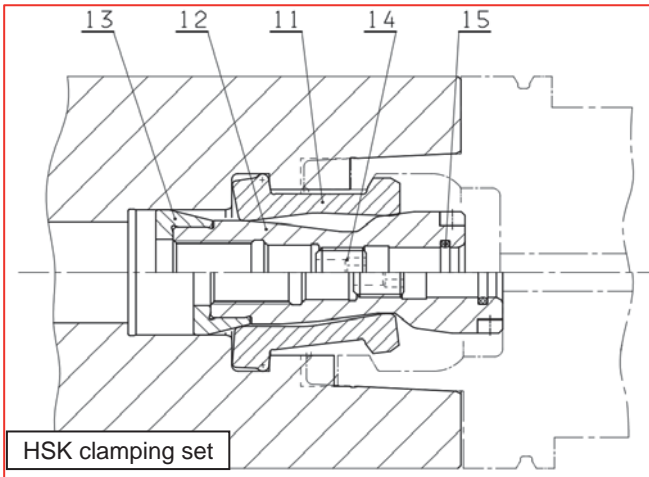
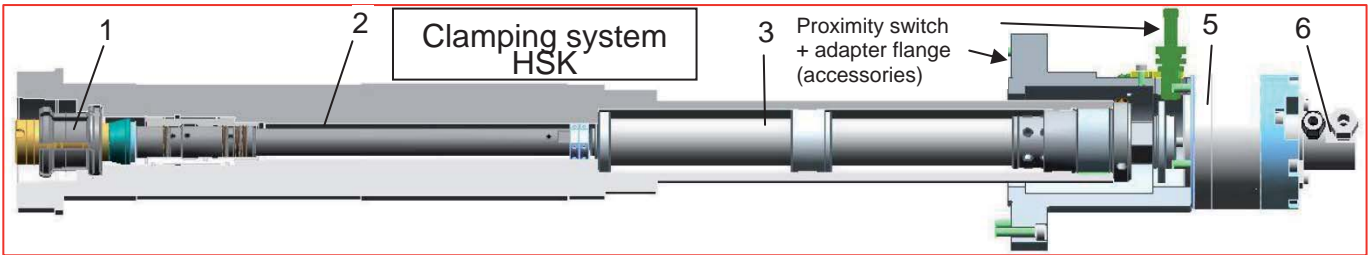
**RÖHM** - The most important HSK components (schematic diagrams)

Clamping system HSK

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**Note:** The actual version might deviate from these schematic diagrams.

**Do not use this table for ordering spare parts!**

Designation	Item	Designation	Item
HSK clamping set	1	Washer	35
Draw bar extension	2	Guide disc	36
SEH clamping unit	3	Threaded ring	37
SLEH stationary unclamping unit	5	Threaded pin	38
Coolant rotary supply unit (various)	6	Left helical disc spring/disc spring package	39
		Right helical disc spring/disc spring package	40
		Cylinder screw	41
HSK segment collet	11	TC Glyd ring	42
HSK pressure piece	12	Hex. nut	43
HSK intermediate disc	13	O-ring	44
Threaded pin	14	O-ring	45
O-ring	15		
		Housing	51
Draw bar extension	21	Pressure piston	52
Shim	22	Cover	53
O-ring	23	Cylinder screw	54
Threaded pin	24	Shim	55
TC Glyd ring	25	Cylinder screw	56
		TC step seal	57
		TC Glyd ring	58
Guide piston	31	TC step seal	59
Stroke control ring	32	O-ring	60
Sealing cover	33	Kant seal	61
Connection pipe	34		

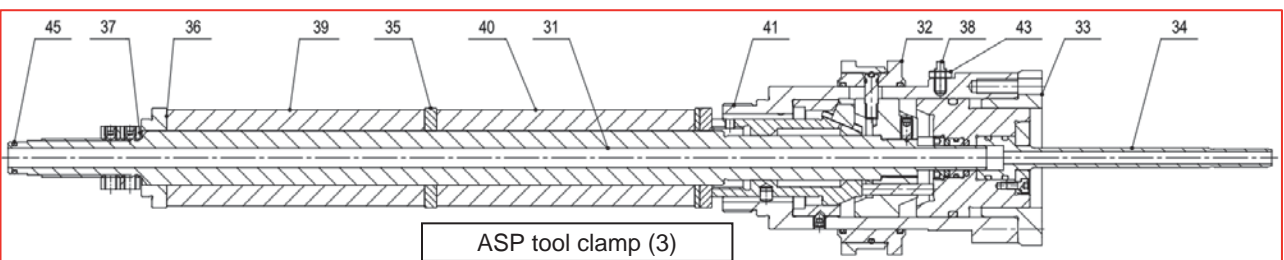
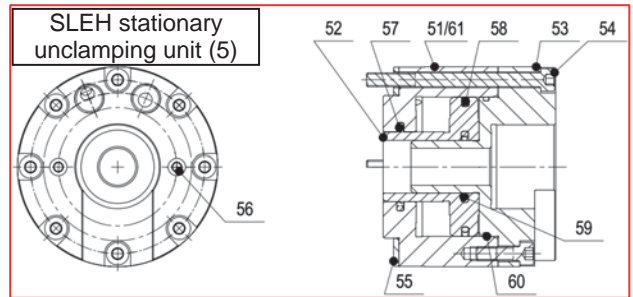
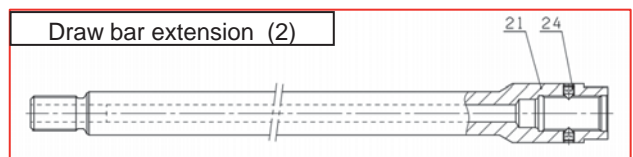
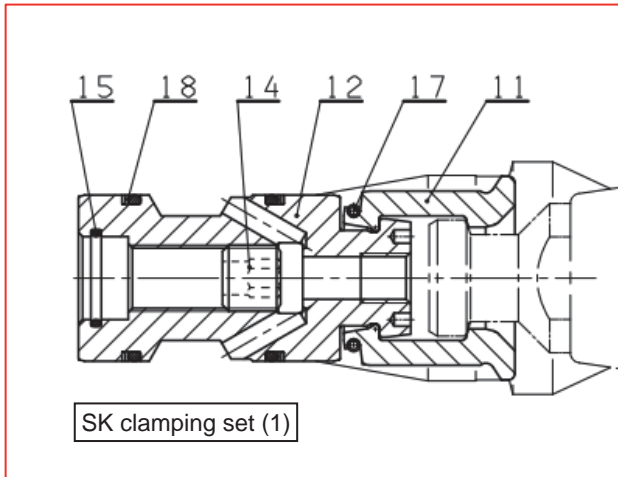
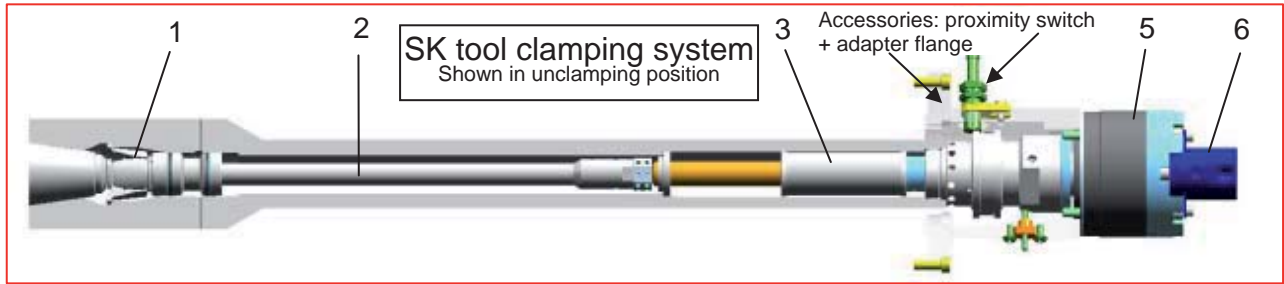
**RÖHM** - The most important SK components (schematic diagrams)

SK tool clamping system

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**Note:** The actual version might deviate from these schematic diagrams.

**Do not use this table for ordering spare parts!**

Designation	Item	Designation	Item
SK clamping set	1	Washer	35
Draw bar extension	2	Guide disc	36
ASP tool clamp	3	Threaded ring	37
SLEH stationary unclamping unit	5	Threaded pin	38
Coolant rotary supply unit (various)	6	Left helical disc spring/disc spring package	39
		Right helical disc spring/disc spring package	40
		Piston housing	41
SK segment collet	11	Hex. nut	43
SK clamping piece	12	O-ring	45
Threaded pin	14		
O-ring	15		
Spring cord	17	Housing	51
Gasket	18	Pressure piston	52
		Cover	53
		Cylinder screw	54
Draw bar extension	21	Shim	55
Threaded pin	24	Cylinder screw	56
		TC step seal	57
		TC Glyd ring	58
Draw bar	31	TC step seal	59
Stroke control ring	32	O-ring	60
Sealing cover	33	Kant seal	61
Connection pipe	34		

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**The following terms apply for using this document.**

### Actuating force

Force which acts on the HSK clamping set (1) or on the HSK pressure piece (12) or on the SK clamping set (1) or on the SK clamping piece (12) in the clamping position.

### Pulling-in force

**(a) HSK:** The clamping force (see below, standardized term for **HSK clamping system**) is often referred to as the "pull-in force", since this expression excellently describes the effect of the force.

**(b) SK:** In the case of the **SK tool clamping system:** Force at which the **taper tool** is pulled axially into the tool spindle **with its draw bolt** by the SK segment collet (11).

### Spring force

Force, generated by the left helical disc spring/disc spring package (39) or right helical disc spring/disc spring package (40), and is dissipated with the clamping system

**(a) HSK:** to the guide piston (31).

**(b) SK:** via the wedge slide gear of the ASP tool clamp (3) to its draw bar (31).

### HSK

Clamping system for tools with a **hollow shank taper**, DIN 69893-1:2011-04 and VDMA 34181:2005-07, for installation in tool spindles in acc. with DIN 69063-1:2005-05.

### Unclamping force

Force required to safely unclamp the SEH clamping unit (3) or the ASP tool clamp (3) and to eject the tool out of the tool spindle.

### Nominal pull-in force

Also: Nominal clamping force. Clamping force which must be reached in a new clamping system or one in well-maintained condition.

### SK

Clamping system for tools with a **steep taper** in acc. with DIN ISO 7388-1 and draw bolt in acc. with DIN ISO 7388-3 or JIS B 6339 (for machine tools in the Asian region, formerly MAS-BT) for installation in tool spindles, either in acc. with DIN 2079 or ISO 9270-1 or ISO 9270-2.

### Clamping force (HSK) only)

Force according to definition in DIN 69063-1:2005-05, DIN 69893-1:2011-04 and VDMA 34181:2005-07, at which the **hollow shank taper tool** is pulled axially into the tool spindle by the HSK segment collet (11).

A recommendation for the amount of clamping force is given in DIN 69893-1:2011-04, depending on the tool size.

### Limit bending moment

**(a) HSK:** The bending moment on a tool clamped at the recommended clamping force in acc. with DIN 69893-1:2011-04; when this is exceeded, it is to be expected that the tool collar will **lift up on one side** from the tool spindle plane face.

**(b) SK:** The bending moment on a tool clamped with at least the min. clamping force in acc. with the table "**Limit values for the SK clamping system**" (in chapter "**Intended use + Description**"); when this is exceeded, it is to be expected that the tool collar will **lift up on one side** from the tool spindle plane face.

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**Limit torque**

**(a) HSK:** The torque on a tool clamped at the recommended clamping force in acc. with DIN 69893-1:2011-04; when this is exceeded, it is to be expected that the tool shaft will **spin** inside the tool spindle bore against the acting frictional forces.

If, for example, the load of the driver (slot nut) is taken into consideration for a hollow shank taper of type "A" or "C", a considerably higher limiting torque results.

**(b) SK:** The torque on a tool clamped with at least the min. clamping force in acc. with the table "**Limit values for the SK clamping system**" (in chapter "**Intended use + Description**"); when this is exceeded, it is to be expected that the tool shaft will **spin** inside the tool spindle bore against the acting frictional forces.

**Wear limit**

**(a) HSK:** The wear limit (or better: clamping force wear limit) is exceeded when the measured clamping force falls below the recommended clamping force in acc. with DIN 69893-1:2011-04.

**(b) SK:** The wear limit (or better: clamping force wear limit) is exceeded when the measured clamping force falls below the min. clamping force in acc. with the table "**Limit values for the SK clamping system**" (in the chapter "**Intended use + Description**").

## **RÖHM** - Intended use + description

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<b>Foreword:</b>	<ol style="list-style-type: none"> <li>1. These operating instructions have been compiled with due consideration being given to DIN EN ISO 12100-1, DIN EN ISO 12100-2, DIN EN ISO 23125 and associated and relevant standards.</li> <li>2. If component names are mentioned in the following text, the item number from the sketches is also always specified in parentheses in the chapter "<b>The most important components</b>" starting on page 2. These item numbers generally correspond to the numbers specified in the component list in the chapter "<b>The most important components</b>".</li> </ol>
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### **Assemblies**

- HSK clamping set (1) or SK clamping set (1).
- Draw bar extension (2).
- SEH clamping unit (3) or ASP tool clamp (3)
- SLEH stationary unclamping unit (5).
- Coolant rotary supply unit (6).

### **Ambient conditions**

- Ambient conditions (in accordance with EN 60204):
  - Relative air humidity (at 40°C) 50%.
  - Contamination of the surroundings within the boundary of the contamination coming from the machine itself.
  - No ionising and non-ionising radiation.
  - Not a potentially explosive area.
  - Vibration-free base / attachments.
  - Ambient temperature on site (tool spindle bore) 5°C to 80°C. Higher ambient temperatures only with written permission from the manufacturer.
  - Ambient temperature during transportation and storage - 15°C to 55°C (for 24 h also up to 70°C).

### **- Intended use**

**Note:** The manufacturer can naturally not accept any responsibility for personal injury or property damage caused by improper use of this product.

#### **Specifically for HSK clamping system**

- The inner contour of the tool spindle, in which the HSK clamping system, but particularly the HSK clamping set (1), is to be installed and operated, must correspond to the type HSK **DIN 69063-1**.
- Only tools with shafts satisfying **DIN 69893** may be clamped with the HSK clamping system, particularly with the HSK clamping set (1).
- If media (e.g. coolant) is conducted through the HSK clamping system, then a tool must also be used with an undamaged outlet tube (e.g. coolant tube). Non-observance of this fundamental principle will lead to a deterioration in the clamping force, and therefore to a reduction in the transferable moments.



## - Intended use + description

The HSK clamping system and SK tool clamping system

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### Specifically for SK tool clamping system

- The inner contour of the tool spindle in which the tool clamping system, but particularly the SK clamping set (1), is to be installed and operated, must either satisfy **DIN 2079** or **ISO 9270-1** or **ISO 9270-2**.
- With this tool clamping system, particularly with the SK clamping set (1), only tools with a shaft satisfying **DIN ISO 7388-1** and with draw bolts satisfying **DIN ISO 7388-3** or **JIS B 6339** (formerly **MAS-BT**, for machine tools from the Asian region) may be clamped.

### General for HSK/SK

- Only intended for commercial use.
- Only when there is written approval from the manufacturer may the HSK clamping system / the SK tool clamping system
  - be installed in tool spindles deviating from the afore-mentioned standards.
  - be used for clamping tools whose shafts and/or draw bolts deviate from the afore-mentioned standards.
- The HSK clamping system / the SK tool clamping system is constructed and manufactured according to the state of the art. All relevant safety precautions have been adhered to. There are, however, always residual risks involved in the use of the clamping system, even when used as intended.
- The HSK clamping system / the SK tool clamping system is meant for attachment and installation in tool spindles.
- The tool may only be clamped or hydraulically or pneumatically unclamped when the tool spindle is at a standstill.
- All cylinder screws (54) of the SLEH stationary unclamping unit (5) must be tightened to the prescribed tightening torque.
- In the clamped state of the HSK clamping system / SK tool clamping system, the SEH stationary unclamping unit (5) must be actively lifted up from the SEH clamping unit (3) or from the ASP tool clamp (3).
- The setting dimension in the unclamping position must be checked regularly according to the specifications in the "**Maintenance**" chapter and readjusted, if necessary.
- The limits (e.g. spindle speed, actuation pressures, etc.) specified in the technical specifications (see associated drawing(s) in the attachment) must not be exceeded.
- The machine in which the HSK clamping system / SK tool clamping system is installed may only be operated with water-based cooling lubricants with an oil component < 15%.
- The respective and necessary safety precautions (e.g. fire protection system) must be taken when using a water-based cooling lubricant with an oil ration in excess of 15% and / or non-water-based cooling lubricants.
- When using a minimum quantity lubrication system or when dry machining, adverse effects are to be expected on the service life of the clamping system components and, under unfavorable conditions, on machine safety. Such system may therefore only be used after consultation with the manufacturer and checks must be carried out to establish, which systems are required to ensure safe operation of the machine.
- Neither the permissible **limit bending moment** nor the permissible **limit torque** may be exceeded on the used tool. See also "**Technical specification**" -> "**Limit values**" below or the specifications on the associated assembly drawing in the attachment.
- Gaseous or liquid media may be conducted centrally through the HSK clamping system / SK tool clamping system. The used coolant rotary supply unit (6) is usually decisive for the amount of

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permissible media pressure, the type of the permissible media and the minimum required filter fineness. See also the operating instructions for this.

- If there is no coolant rotary supply unit (6) belonging to the scope of the clamping system, then the following **minimum requirements for the fed-through media** apply:
  - Max. perm. media pressure 60 bar.
  - No flammable, explosive, corrosive or caustic fluids or gases.
  - Filter fineness max. 60 µm.
- During the tool change, another medium (e.g. compressed air for taper cleaning) can be switched to as an option, depending on the used rotary supply unit (6).
- To prevent premature wear and the resulting loss of clamping force, the filter finenesses of the selected media (specified below under "**Features**") must be complied with.

## Use contrary to regulations / Obvious abuse

### Specifically for HSK clamping system

- If the HSK clamping system is operated with a **tool without an outlet tube** (e.g. coolant tube), no medium (e.g. coolant) may be fed through.

### General for HSK/SK

- The HSK clamping system / SK tool clamping system must not be used to carry loads (e.g. as a gripper).
- **The HSK clamping system and particularly the SEH clamping unit (3) or the SK tool clamping system and ASP tool clamp (3) must not be disassembled.**
- **Changing the tool or unclamping the HSK clamping system / SK tool clamping system during the circulating operation of the tool spindle is strictly prohibited.**
- **The HSK clamping system / SK tool clamping system must not be operated at speeds above 500 rpm without a tool inserted!**
- The "clamping" and "unclamping" connections of the SLEH stationary unclamping unit (5) must not be switched.
- The "clamping" connection of the SLEH stationary unclamping unit (5) must never be depressurized during the circulating operation of the tool spindle.
- The HSK clamping system / SK tool clamping system must not be operated without correctly installed, adjusted stroke-monitoring sensors (e.g. proximity switches) which are ready for operation.
- The shape and weight of the tool is of great importance. The following therefore applies:
  - The tools must have a well-balanced mass.
  - If a well-balanced mass is not possible, the speed must be reduced to an uncritical value for unbalanced tools.
  - Only clamping systems approved by the manufacturer may be used with the corresponding individual components, e.g. a clamping set.
  - The HSK clamping system / SK tool clamping system must be designed and used according to the specifications in the user documentation and the valid guidelines.
- The used tools must not be faulty or damaged.
- The tools must not be fed imprecisely. A collision with the HSK clamping system / SK tool clamping system must be avoided under all circumstances.
- An overload of the HSK clamping system / SK tool clamping system with regard to speed, bending moment or torque will lead to component breakage and therefore to the damage or failure of the





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HSK clamping system / SK tool clamping system.

- During regular operation, no manual tool change may be carried out, even when pressure is applied to the taper cleaning / blast air. Exception: Setup mode.
- The use of impermissible or impure media can lead to increased wear and the loss in clamping or pull-in force resulting from this.
- The coolant rotary supply unit (6) is a complete unit and must not be opened or modified.
- The connections "Feed" and "Leakage" on the coolant rotary supply unit (6) must not be switched or installed incorrectly.
- The use of **external** compressed air for the general cleaning of the HSK clamping system / SK tool clamping system is not permissible.
- The fed-through media must not be corrosive.

## User responsibilities

- In order to be able to recognize an insufficient or deficient tool clamping in time, the correct axial position of the HSK pressure piece (12) must be checked. To do this, the HSK clamping system / SK tool clamping system must be monitored with a **stroke monitoring device**.
- In order to be able to rule out **the unclamping of the clamping system while the tool spindle rotates**, the machine control must be programmed accordingly.
- To protect the operator from hurled-out parts, there must be **separating protective equipment** on the machine tool in acc. with DIN EN ISO 23125:2012-07.
- **The temperature of the machine spindle bore must be monitored.**  
The left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) must not be subjected to a continuous operating temperature above 80°C, since otherwise, premature fatigue of the spring forces and therefore considerably diminished clamping or pull-in forces are to be expected.
- When the tool spindle is at a standstill, the supply line to the coolant rotary supply unit (6) must be **depressurized**.
- The values given in the technical specifications of the clamping system with regard to speed, bending moment and torque must not be exceeded.
- Before doing any work on the components of the clamping system, make sure that:
  - The competent personnel has ready access to the respective parts of the user documentation.
  - The competent personnel has read and understood the user documentation as well as the information plates on the machine and clamping device. This applies particularly to all safety and warning instructions.
  - The competent personnel is suitably and sufficiently qualified to carry out their respective tasks. This applies particularly to commissioning, maintenance / servicing and repair work as well as to all work on electrical installations and components. The respective and current regulations and directives as well as instructions in the user documentation must be adhered to.
  - All safety devices have been fitted correctly and are fully operational. Safety devices must not be manipulated or made inoperative. The resistance classes of the isolating safety devices (e.g. protective hoods, safety windows) must be adhered to.
  - The machine and the HSK clamping system / SK tool clamping system must be in technically perfect condition.
  - All damaged or defective parts must be renewed without delay. This applies particularly to all safety devices.
- Changes to the HSK clamping system / SK tool clamping system generally involve a safety risk. The following therefore applies:

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### The HSK clamping system and SK tool clamping system

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- Changes to the HSK clamping system / SK tool clamping system may only be carried out with written permission from the manufacturer. This applies particularly to all safety devices, electrical circuits and the machine control software.
- All changes must be traceably recorded.
- The use of original parts is of deciding importance for the safety / security of the clamping system. The following therefore applies:
  - Spare parts, additional equipment, assemblies or other accessories from outside suppliers must be approved by the manufacturer.
  - Information and instructions contained in the documentation of the outside supplier must be strictly observed and adhered to.
- Collisions should be avoided. Check the movement sequence for a potential collision. If a collision still occurs, the HSK clamping system / SK tool clamping system must be checked according to the specifications in the user documentation.
- Information relating to auxiliary materials, coolant and lubricants as well as maintenance / servicing instructions for the clamping system must be observed. All necessary and additional safety devices must be used for transportation, maintenance / servicing and repair work.
- The relevant rules and regulations must be observed when disposing of the clamping system or of auxiliary materials, coolants and lubricants.
- Serious development of heat, open flames or other sources of ignition (e.g. cigarettes) are not permitted in the immediate vicinity of the clamping system.
- The user is obliged to prevent any fires and / or explosions. The necessary measures must be determined in association with the respective organizations (e.g. Fire safety representative, fire insurers, fire service). This applies particularly for machines which generally operate unsupervised.

### Personal protective equipment

- The machine user must ensure the availability of personal safety equipment. The use of personal safety equipment is closely related to the production process. The use of personal safety equipment should be cleared with the safety representative.
- Personal safety equipment, which may be necessary:
  - Ear protectors
  - Eye protection (safety goggles)
  - Hand protection (gloves)
  - Foot protection (safety shoes)
  - Head protection (safety helmet)
  - Close-fitting, flame-retardant working clothes
  - Hair net
  - Skin protection agent.

### Putting out of operation / shutting down

- The clamping system must be put out of operation or shut down
  - after the service life specified on the assembly drawing expires.  
If the clamping system should be operated past the specified service life or be put back into operation after it has been shut down, it must undergo a general overhaul by the manufacturer or the inspection measures listed in the "**Maintenance**" chapter must be carried out.
  - if the measured values listed in the "**Maintenance**" chapter can no longer be reached during inspection.

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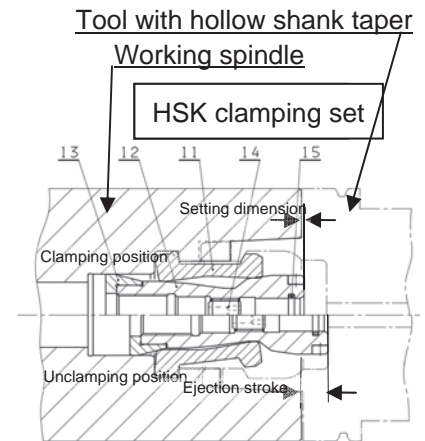
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Further operation is only permissible if, due to reduced clamping force, there is also a correspondingly reduced **limit bending moment** or **limit torque** acting on the inserted tool. See also "**Technical specification**" -> "**Limit values**" below or the specifications on the associated assembly drawing in the attachment.

**Characteristics**

HSK clamping set (1)

- With the HSK clamping set (1) (for graphics, see below), hollow shank taper tools can be clamped in acc. with DIN 69893. The precondition, however, is that the bore of the tool spindle, in which the clamping system/HSK clamping set (1) is to be installed and operated, meets **DIN 69063** as well as the specifications of the clamping system manufacturer which go beyond this.
- The right size can be found in the associated drawing (see attachment).
- The HSK clamping set (1) grips the hollow shank taper tool with its HSK segment collet (11) and pulls this into the hollow shank taper bore of the tool spindle, after which it transfers the axial or clamping force.
- The surface of the HSK pressure piece (12) is coated with a "DLC" wear protection layer. See also "**DLC coating**".
- In principle, the HSK clamping set (1) consists of
  - HSK segment collet (11),
  - HSK pressure piece (12)
  - intermediate disc (13)
  - threaded pin (14) and
  - O-ring (15).
- If the HSK clamping set (1) is opened, first its HSK segment collet (11) releases the hollow shank taper tool, which is then ejected via the HSK pressure piece (12). **Important: Hold the hollow shank taper tool on the outside!**
- By adjusting the thickness of the shim (22) of the draw bar extension (2) (or by inserting an additional shim), the setting dimension/control dimension of the HSK pressure piece (12) can be adjusted in the unclamping position. See the part view "Unclamping position".
- HSK technical specification:



Size	A25/B32	A32/B40	A40/B50	A50/B63	A63/B80	A80/B100	A100/B125
Actuation force [kN]	0.7	1	2	3	4	7.5	10
Clamping force [kN]	3.5	5	10	15	25	37.5	50
Total stroke [mm]	7	9	13	15	14	17	18
Clamping stroke [mm]	4	5.5	7	8	8	11	12
Ejection stroke [mm]	0.2	0.3	0.5	0.5	0.5	0.5	0.8
Total length [mm]	28.8	35.1	42.5	50	62	80	98.5

- See also the "**General operating instructions for the HSK clamping sets**". This is made available on request (generally free of charge for languages "German" and "English", other languages on request<sup>1</sup>).

**Important: If part of the HSK segment collet (11) breaks, then the HSK clamping system may only continue to be operated after exchanging the entire HSK clamping set (1).**

<sup>1</sup> These are available free of charge on request in the languages German, English, Italian, Chinese and Spanish (version at the date of creation).

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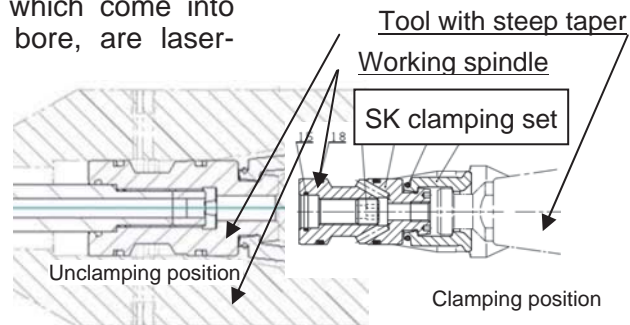
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SK clamping set (1)

- With the SK clamping set (1) (see graphic below), steep-taper tools in acc. with DIN 69871 or ISO 7388-1 with draw bolts in acc. with DIN ISO 7388-3 (formerly DIN 69872) and MAS BT can be clamped. The precondition, however, is that the bore of the tool spindle, in which the clamping system/SK clamping set (1) is to be installed and operated, meets **DIN 2079** as well as the specifications of the clamping system manufacturer which go beyond this.
- The right size can be found in the associated drawing (see attachment).
- The SK clamping set (1) grips the steep-taper tool with the SK segment collet (11), pulls this into the steep-taper bore of the tool spindle and then transfers the axial / pull-in force.
- The surfaces on the SK segment collet (11), which come into contact with the tool pin or the tool spindle bore, are laser-hardened according to a special method.
- In principle, the SK clamping set (1) consists of
  - SK segment collet (11)
  - SK clamping piece (12)
  - O-ring (15).
  - Threaded pin (14)
  - spring cord (17) and
  - Gasket (18)
- If the SK clamping set (1) is opened, then its SK segment collet (11) first releases the draw bolt of the steep-taper tool, which is then ejected via the SK clamping piece (12). **Important: Hold the outside of the steep-taper tool!**
- By adapting the **screw-in depth** of the draw bar extension (21) of the draw bar extension (2) in the SK clamping piece (12) of SK clamping set (1) with subsequent countering with its threaded pin (14), the setting dimension / control dimension of the SK clamping piece (12) can be adjusted in the unclamping position.
- SK technical specification:

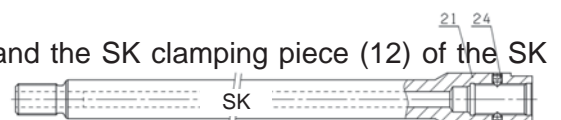
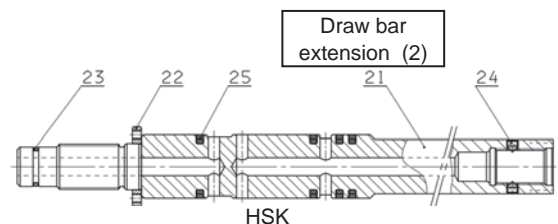


Size	30	40	45	50	60
Actuation force [kN]	6	12	15	25	65
Pull-in force [kN]	6	12	15	25	65
Total stroke [mm]	5.8	6.0	6.2	6.2	9.5
Clamping stroke [mm]	5.4	5.5	5.6	5.6	8.5
Ejection stroke [mm]	0.95	0.7	1.5	0.7	1.15

**Important: If part of the SK segment collet (11) breaks, then the SK tool clamping system may only continue to be operated after exchanging the entire SK clamping set (1).**

Draw bar extension (2)

- The draw bar extension (2) is the mechanical connection between
  - **HSK system:** the guide piston (31) of the SEH clamping unit (3) and the HSK pressure piece (12) of the HSK clamping set (1).
- or
- **SK system:** the draw bar (31) of the tool clamp (3) and the SK clamping piece (12) of the SK clamping set (1).
- It is for transferring forces and strokes, as well as adjusting the length to the specified individual tool spindle length.



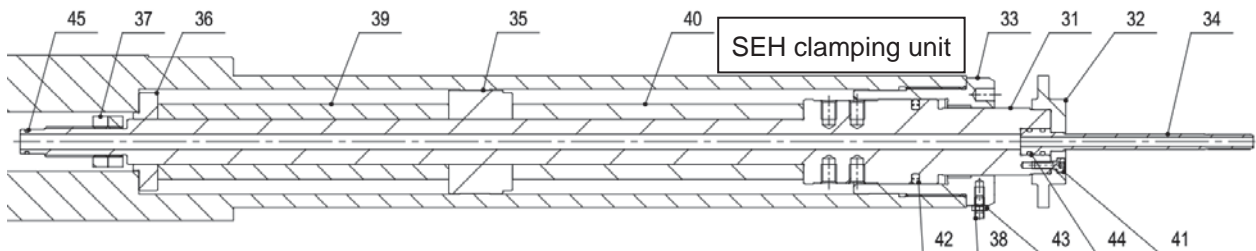
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SEH clamping unit (3)



- In the clamped state and during the entire circulating operation, the tool is only mechanically held via the HSK clamping set (1) through the spring force of the left helical disc spring /disc spring package (39) and the right helical disc spring/disc spring package (40) of the SEH clamping unit (3) and pulled into the tool spindle (clamping force).

**Caution:** Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.

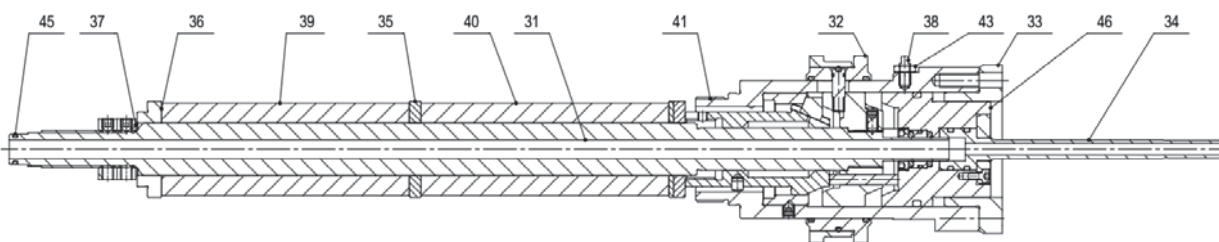


The SEH clamping unit (3) may only be disassembled by the manufacturer.  
Wear eye protection!

**Note:** Depending on the used coolant rotary supply unit (6), the technical version of the connection pipe (34) might vary from what is shown in the figure in these instructions.


**Important:** The max. perm. operating temperature is specified above under "Ambient conditions". Temperature monitoring of the tool spindle is required.

ASP tool clamp (3)



- In the clamped state and during the entire circulating operation, the tool is only mechanically held via the SK clamping set (1) through the spring force of the left helical disc spring /disc spring package (39) and the right helical disc spring/disc spring package (40) of the ASP tool clamp (3) and pulled into the tool spindle (pull-in force).
- The wedge slide gear in the ASP tool clamp (3) ensures both power transmission as well as a mechanical self-locking system thanks to multiple successively arranged wedges.

**Caution:** Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.



The ASP tool clamp (3) may only be disassembled by the manufacturer.  
Wear eye protection!

**Note:** Depending on the used coolant rotary supply unit (6), the technical version of the connection pipe (34) might vary from what is shown in the figure in these instructions.

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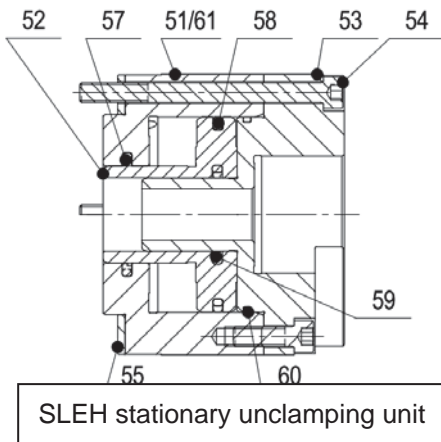
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**Important: The max. perm. operating temperature is specified above under "Ambient conditions". Temperature monitoring of the tool spindle is required.**

SLEH stationary unclamping unit (5)



- To make it possible to exchange the used tool, the SLEH stationary unclamping unit (5) can be used to hydraulically push open/unclamp the SEH clamping unit (3) when the tool spindle is at a standstill.
- During the entire circulating operation, the SLEH stationary unclamping unit (5) **must** be open to the stop on the cover (53). The "clamping" connection in the cover (53) must therefore be charged with hydraulic pressure during the entire circulating operation.
- Direct contact between the pressure piston (52) and the stroke control ring (32) / guide piston (31) of the mechanical SEH clamping unit (3) may not occur during circulating operation.

- The exact setting of the axial end position of the pressure surface of the pressure piston (52) of the SLEH stationary unclamping unit (5) relative to the end of the tool spindle is made by adjusting the thickness of its shim (55).
- Operation with hydraulic oil. See also "**Hydraulic oil**" below.

Coolant rotary supply unit (6)

- The coolant rotary supply unit (6) is for introducing and supplying a medium (e.g. cooling lubricant, cutting oil or oil/air mixture for inner minimum quantity lubrication) from a stationary supply line to a rotating machine shaft.
- When the tool spindle is stopped, blast air can be introduced to clean the hollow shank taper.
- The coolant rotary supply unit (6) is an independent unit, which is installed, put into operation and tested according to certain criteria. See below.
- It is not permitted to put the coolant rotary supply unit (6) into operation after opening or modifying it.
- There are several different types of conventional coolant rotary supply units available. Depending on the HSK clamping system, one of the following coolant rotary supply units (6) will be included in delivery:
- The permissible media and their max. perm. operating pressures, if specified, can be found in the relevant one of the enclosed operating manuals/operating instructions.

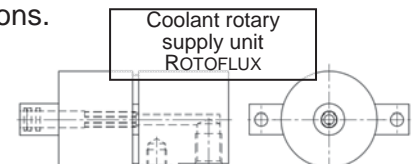
**ROTOFLUX**

- See **operating instructions RN 1727 "General operating instructions for the "Rotoflux" coolant rotary feed-through"**

and [www.rotoflux.com](http://www.rotoflux.com).

**DEUBLIN**

- See **"Operating manual for 040-555x DEUBLIN"** and [www.deublin.com](http://www.deublin.com).



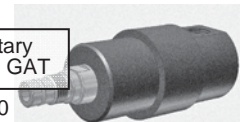
Coolant rotating union, DEUBLIN



**GAT**

- See **"Operating instructions for GAT ROTODISK"** and [www.gat-](http://www.gat-)

Coolant rotary feedthrough, GAT



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[mbh.de](http://mbh.de).

### Media feed-through (HSK)

- The guide piston (31) of the SEH clamping unit (3) and their connection pipe (34), the draw bar extension (21) of the draw bar extension (2) as well as the pressure piece HSK (12) of HSK clamping set (1) and its threaded pin (14) are supplied with through holes.
- Through these through holes, despite the stationary unclamping unit (5) being decoupled during circulating operation, a medium supplied via the **coolant** rotary supply unit (6) can be transferred to the HSK clamping system or to the HSK clamping set (1).
- During the tool change, another medium (e.g. **compressed air** for taper cleaning) can be switched to as an option, depending on the used rotary supply unit (6).
- Possible media: See "**Coolant rotary supply unit (6)**".

### Media feed-through (SK)

- The draw bar (31) of the ASP tool clamp (3) and their connection pipe (34), the draw bar extension (21) of the draw bar extension (2) as well as the SK clamping piece (12) of the SK clamping set (1) and its threaded pin (14) are supplied with through holes.
- Through these through holes, despite the stationary unclamping unit (5) being decoupled during circulating operation, a medium supplied via the **coolant** rotary supply unit (6) can be transferred to the HSK clamping system or to the HSK clamping set (1).
- During the tool change, another medium (e.g. **compressed air** for taper cleaning) can be switched to as an option, depending on the used rotary supply unit (6).
- Possible media: See "**Coolant rotary supply unit (6)**".

### Hydraulic oil

- Operation of the SLEH stationary unclamping unit (5) with hydraulic oil.
- The max. perm. operating pressure of the SLEH stationary unclamping unit (5) must be taken from the drawing(s) (see attachment).
- A hydraulic oil with the designation HLP in accordance with DIN 51525 and a kinematic viscosity between 32 and 46 centistokes at 40°C is to be fundamentally used as a hydraulic medium (HLP 32 or HLP 46).
- A pressure filter is to be used against foreign particles in the **hydraulic medium**. Insertion on a hydraulic unit between the pump and control valve is recommended.  
**The filter gauge should be 0.01 mm (absolute).**

### Compressed air

- The compressed air used for blast air (e.g. for the taper cleaning) must be cleaned and enriched with a drop of machine lubricating oil (e.g. SHELL MORLINA OIL 10) or a lubricant in acc. with ISO designation C GLP DIN 51502 with viscosity class VG 68 DIN 51519 with a maintenance unit approx. every 6 - 10 min.
- A pressure filter is to be used against foreign particles. Insertion is recommended after the air supply maintenance unit.  
**The filter gauge should be between 0.005 mm and 0.01 mm (absolute).**

### Cooling lubricant

- A filter is to be used against foreign particles in the cooling lubricant. It is recommended to install it in the intake socket in front of the pump.  
**The filter gauge should be 0.05 mm (absolute).**

<p><b>Attention: If other values are expressly specified for the filter fineness in the text or in drawings, these are binding.</b></p>
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DLC coating:

- With a carbon-containing plasma, DLC layers (= **Diamond Like Carbon**) can be adhesively deposited on almost all metals and metal alloys (steel, bronze etc.), carbides and light metals (aluminum, magnesium etc.), but also on non-metals (silicon, glass, ceramics, plastic, etc.).
- With this method, it is of considerable advantage that the properties of the DLC layers can be influenced via the various process parameters, such as the treatment duration. With this, the layer thickness, the specific resistance, the hydrogen content, etc. can be adjusted to the requirement profile over a wide range.
- The hardness of the DLC layer is many times higher than the hardness of stainless steel, for example. Therefore, this coating is often found on (highly stressed) tools. Thanks to the DLC coating, the service life of these tools is prolonged, among other things.
  - Superhard surface (20,000-60,000 N/mm<sup>2</sup>).
  - Very thin layer thicknesses from 0.5 – 3 µm or even more can be achieved.
  - Operation temperature max. 200°C.
  - Has the same structure as highly crosslinked polymers.
  - Good anti-adhesive properties.
  - Excellent corrosion resistance.
  - Good biocompatibility (approved in the food and medical areas).
  - Extremely low friction coefficient.

**Technical data**

- See drawing(s) in the attachment.



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HSK clamping system limit values<sup>2</sup>:

Size	Form	Clamping force [N]		Limit bending moment [Nm]	Limit torque [Nm]		
		min.	max.		min.	medium	max.
32	A/C <sup>3</sup>	5 000	7 000	85		320	
	E				4.5		16
40	A/C <sup>3</sup>	6 800	12 000	140		640	
	E				8		33
50	A/C <sup>3</sup>	11 000	18 000	230		1 120	
	E				15		57
63	A/C <sup>3</sup>	18 000	30 000	450		1 600	
	E				34		130
80	A/C <sup>3</sup>	28 000	40 000	810		3 300	
	E				65		250
100	A/C <sup>3</sup>	45 000	70 000	1 230		6 000	
	E				130		540
125	A/C <sup>3</sup>	70 000	110 000	2 900		11 500	
	E				250		1 000

**Attention:** The table values do not apply if deviating limit values are specified on the drawings!

**Note:** Limit values for hollow shank taper tools in acc. with DIN 69893 with HSK interface forms "B", "D" and "F" on request from the manufacturer<sup>5</sup>.

SK tool clamping system limit values<sup>4</sup>:

Size		30	40	45	50	60
Pull-in force [N]	min.	4 500	9 000	11 000	18 000	50 000
	max.	7 500	15 000	15 000	26 000	80 000
Limit bending moment [Nm]		on request <sup>5</sup>				
Limit torque [Nm]		On request <sup>5</sup>				

**Attention:** The table values do not apply if deviating limit values are specified on the drawings!

<sup>2</sup> based on VDMA 34181:2005-07 / DIN 69063 / DIN 69853

<sup>3</sup> Torque specification **with** load of the driver (slot nut)

<sup>4</sup> The basis for the determined limit bending moments and limit torques is the massive tool shaft (nominal Ø). The general tool load is to be determined with regard to the further geometric shape.


<sup>5</sup> Telephone number at the bottom of every page of these operating instructions.

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	<p><b>Warning:</b> <b>Faulty assembly of the components can endanger the safety of the entire machine.</b></p> <p>If one doesn't have one's own skilled personnel, then the clamping device may generally only be disassembled and reassembled by skilled personnel from RÖHM.</p>
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### I. Qualifications of operating personnel

This HSK clamping system / SK tool clamp may only be used, set up and maintained by personnel specially trained or instructed for this purpose and/or who have long years of experience doing this.

Personnel lacking any experience in the handling of HSK clamping systems / SK tool clamps are at particular risk of sustaining injury due to incorrect handling and usage, such injuries emanating in particular from the clamping movements and forces involved during setup work.

### II. Injury risks

Due to technical reasons, this subassembly might be made up of sharp and/or sharp-edged components. Any tasks involving this module should be carried out with extreme care to prevent risks of injury!

#### 1. Activation


In order to prevent unintentionally switching the actuation pressure to the unclamping or clamping line, only locking valves may be used in the hydraulic control.

#### 2. Integrated energy storage

Moving parts which are pretensioned with pressure springs, tractive springs and other springs, or other flexible elements, are a potential source of risk, due to the intrinsic energy stored. Underestimation of this can lead to serious injury caused by uncontrolled, flying parts being propelled through the air.

Before performing further work on the associated components, this stored energy must be dissipated. Clamping fixtures which are to be dismantled should be inspected for such sources of danger with the assistance of the respective assembly drawings.

The fixture may only be dismantled by authorized RÖHM personnel if it should prove impossible to "safely" dissipate this stored energy.

	<p><b>Caution:</b> <b>Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.</b></p> <p><b>The SEH clamping unit (3) / ASP tool clamp (3) may only be disassembled by the manufacturer. Wear eye protection!</b></p>
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#### 3. Maximum permissible speed

The operating data can be found on the assembly drawing and must not be exceeded.

If the maximum speed of the machine is greater than that permissible for this HSK clamping system / SK tool clamp, then a corresponding speed limiting mechanism must be activated on the machine.

If these values should be exceeded for reasons not caused by us, damage cannot be ruled out, even if this damage isn't immediately apparent.

This damage could provoke the danger of flung-away components and possibly personal injury/material damage resulting from this.

#### 4. Exceeding the permissible speed

This equipment is intended for revolving operation. Centrifugal forces created by excessive speed and/or peripheral speed can result in individual parts loosening and becoming potential

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sources of danger for personnel or objects in the near vicinity.  
Operation at speeds higher than those permitted for these units is prohibited for the above-mentioned reasons.

Even exceeding the permissible values one time can lead to damage and can pose a hazard source not easy to detect. The manufacturer should be informed immediately in such cases so that an inspection of functional and operational safety can be conducted. Further safe operation of the clamping unit can only be guaranteed in this manner.

**5. Fixing and replacing screws**

Inferior replacements or inadequate fixing of screws which are being changed or become loose can lead to risks of both injury to personnel and material damage. It is therefore imperative that, unless otherwise expressly specified, only such tightening torque as expressly recommended by the screw manufacturer and suitable for the screw quality be applied when tightening fixing screws.

**Note:** All specified torques must be adhered to with the usual tolerance of the torque wrench of about  $\pm 10\%$ .

The following torque table applies for the common sizes M5 - M24 and qualities 8.8, 10.9 and 12.9:

Quality	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	
<b>8.8</b>	5.9	10.1	24.6	48	84	133	206	295	415	567	714	<b>Nm</b>
<b>10.9</b>	8.6	14.9	36.1	71	123	195	302	421	592	807	1017	<b>Nm</b>
<b>12.9</b>	10	17.4	42.2	83	144	229	354	492	692	945	1190	<b>Nm</b>

All details in Nm

**Attention:** The values in the table do not apply when the tightening torque is expressly specified elsewhere!

Screw quality 12.9 should be selected in cases of doubt when replacing original screws. Fixing screws for clamping inserts, top jaws, fixed stops, preloaded covers, balancing weights and similar elements should fundamentally have quality class 12.9.

All fixing screws which, due to the purpose for which they are intended, are loosened frequently and must then be tightened again (e.g. during conversion work) should have their threads and the bearing surface of their heads coated with a lubricating medium every six months (grease paste).

Even securely tightened screws can become loose under adverse outside conditions such as, for instance, vibrations. In order to prevent this happening, all safety-related screws (clamping fixture fastening screws, top tooling set fastening screws etc.) must be checked and, if necessary, tightened at regular intervals.

**6. SLEH stationary unclamping unit (5) without continuous pressure supply**

If the hydraulic or pneumatic connection to the pressure source is interrupted, this could lead to a pressure drop in the active cylinder chamber of the SLEH stationary unclamping unit (5). In the process, the unclamping force of the HSK clamping system / SK tool clamp is usually reduced and the tool can no longer be removed or changed out.

For this reason, the release force must be maintained without interruption during the entire removal and supply operation.

**Attention:** During circulating operation, the hydraulic pressure must act on the clamping connection of the SLEH stationary unclamping unit (5) without interruption.

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### 7. Maintenance work

The reliability and safety of the HSK clamping system / SK tool clamping system can only be ensured if service regulations in the operating instructions are followed exactly.

It is advantageous to run on several times the end positions of internal moving components after 200 clamping operations at the latest. (Lubricant which has been pressed out is reapplied to the pressure surfaces as a result. The clamping force is maintained for a longer period of time as a consequence).

### 8. Danger due to ejection

So as to protect the operator against ejected parts and in line with DIN EN 23125 a separating protective equipment must be fitted to the machine tool.

## III. Check

### 1. Stroke monitoring

The stroke monitoring device must be adjusted to suit the new situation if an HSK clamping system with a stroke monitoring device is newly mounted.

### 2. Maintenance checks

The reliability and safety of the HSK clamping system can only be ensured if service regulations in the operating instructions are followed exactly.

### 3. Force checks

The clamping force of the HSK clamping system must be checked using a clamping force measuring device at regular intervals.

## IV. Environmental hazards

### 1. Materials

Sometimes, a wide range of lubricating, cooling, cleaning and other media are required for operating an HSK clamping system. These are usually supplied to the HSK clamping system / SK tool clamp via the SLEH stationary unclamping unit (5) or the coolant rotary supply unit (6). Most common are hydraulic oil, coolant and oiled compressed air. Careful attention must be paid to these substances when handling the HSK clamping system / SK tool clamp to prevent them penetrating the soil or contaminating water. **Danger! Environmental hazard!**

This applies in particular

- during assembly/dismantling, since residual quantities of such substances can still be present in lines, components and piston chambers,
- to porous, defective or incorrectly-fitted seals,
- for coolant and/or blast air, which, for design or production-related reasons, emerge from the HSK clamping system / SK tool clamp during operation or is ejected from this.

These emerging substances must therefore be collected and reused (or disposed of in accordance with applicable regulations)!

### 2. Noise

In very rare cases, the operation of rotating assemblies can release noise emissions. These are usually determined during commissioning.

If these emissions should not be able to be eliminated by means of constructive measures on the HSK clamping system / SK tool clamp or with production-related measures, suitable noise insulation might have to be provided on the machine by the manufacturer or user of the

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machine.

## V. Safety-related requirements for the HSK clamping system / SK tool clamping system

1. The actual position of the HSK clamping system / SK tool clamp must be measured (e.g. via the stroke control ring (32)) and be processed by the machine control, keeping the actuation of the tool spindle drive in mind.
2. The tool spindle may only start up once the unclamping pressure has been dissipated **and** the clamping pressure built up in the SLEH stationary unclamping unit (5) **and** clamping has been done in the permissible working range.
3. Unclamping the tool clamping system must **only** be possible while the tool spindle is at a standstill.
4. If the permissible working range of the clamping is left, a signal must immediately shut down the tool spindle.
5. If the tool spindle is shut down, the tool must remain firmly clamped in until the tool spindle comes to a standstill.
6. If the power should fail and then return again, the possibility of a change in the current switch setting must be ruled out.

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**Important:** If part of the HSK (11) or SK (11) segment collet breaks, then the HSK clamping system / SK tool clamping system may only be further operated after exchanging the entire HSK (1) / SK (1) clamping set.


**Personnel qualification**

The HSK clamping set / SK tool clamp can be operated by **instructed personnel** (in automatic mode). The instructed person must be certifiably instructed by the **user** about the tasks he is assigned and the potential hazards which arise due to improper behavior.

**Personal protective equipment**

1. The following personal protective equipment must be worn:

- Eye protection
- Hand protection
- Helmet

**Warning:** **Sharp-edged components can cause cut injuries.**  
 Keep extremities away from sharp-edged components.  
 **Use hand protection.**


**Speed limit**

1. If the tool spindle is made to rotate during operation without a tool being clamped with the HSK clamping system / SK tool clamping system, it must be made sure beforehand that the max. speed cannot exceed 500 rpm.


**Function procedure**

1. Fed-through media

- When the machine spindle is shut down, it must be made sure that the media feeds for fluids are depressurized.
- For suitable rotary supply units (6), it is permissible to switch from coolant to compressed air during the **automatic** tool change.

**Warning:** **Fluids or gases which emerge under high pressure can cause serious injuries and/or possible scalding, especially in the facial region.**  
 Before the **manual** tool change, check to make sure the pressure connections and their lines are depressurized. Actively vent.  
 **Use eye protection!**

2. Inserting the tool

**Important:** **The tool is only inserted when the tool spindle at a standstill.**  
**Danger:** **Components moving under high forces.**  
 Do not reach into the tool take-up bore of the tool spindle. Danger of accident (crushing/shearing).  
 **Use hand protection.**

In the case of manual as well as mechanical insertion in the tool spindle, the tool **must** both

- be fed so exactly (coaxialism < 0.5 mm, applies to all sizes) that damage (e.g. of the coolant

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tube) or faulty clamping are ruled out.

- be actively re-pushed until the clamping operation (see below) has been completed.

**Note:** The clamping force as well as the setting dimension of the HSK pressure piece (12) / SK clamping piece (12) must be checked regularly. See also the "Assembly" and "Maintenance" chapters.

### 3. Clamping the tool

**Important:** The tool is only clamped when the tool spindle at a standstill.

#### Movement sequence of the SLEH stationary unclamping unit (5)

- During the clamping operation, the pressure piston (52) of the SLEH stationary unclamping unit (5) is lifted up, **actively** hydraulically actuated, from the stroke control ring (32) of the SEH clamping unit (3), and moved back to the stop on the cover (53).
- There is no longer a mechanical contact between the pressure piston (52) of the SLEH stationary unclamping unit (5) and stroke control ring (32) of the SEH clamping unit (3).
- To rule out an unintentional change in position of the pressure piston (52), the clamping pressure must be maintained during the entire clamping period.

#### Movement sequence of the SEH clamping unit (3)

- During the clamping operation, the left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the SEH clamping unit (3) push their guide piston (31) toward the rear away from the tool spindle opening.
- The stroke movement of the SEH clamping unit (3) lasts until the clamping operation has been fully completed through traction.

#### Movement sequence of the ASP tool clamp (3)

- During the clamping operation, the left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the ASP tool clamp (3) push its draw bar (31) away from the tool spindle opening toward the rear.
- The stroke movement of the ASP tool clamp (3) lasts until the clamping operation has been fully completed through traction.

#### Movement sequence of the draw bar extension (2)

- Since the guide piston (31) of the SEH clamping unit (3) and the HSK pressure piece (12) of the HSK clamping set (1) / the draw bar (31) of the ASP tool clamp (3) and the SK clamping piece (12) of the SK clamping set (1) are screwed directly to one another via the draw bar extension (2), the actuation force generated by the SEH clamping unit (3) / ASP tool clamp (3) is directly introduced to the HSK clamping set (1) and its HSK pressure piece (12) / the SK clamping set (1) and its SK clamping piece (12).

#### Clamping set movement sequence

**Important:** In order to be able to recognize an insufficient or deficient tool clamping system in time, the correct axial position of the HSK pressure piece (12) / SK clamping piece (12) must be checked. To do this, the clamping system / tool clamping system must be monitored with a stroke monitoring device.

##### (a) HSK clamping set (1)

- During the clamping movement, the HSK pressure piece (12) of the HSK clamping set (1) presses the segments of its HSK segment collet (11) into the taper of the hollow shank taper tool.
- The axial force is generated by the taper of the hollow shank taper tool as well as the shape of the HSK segment collet (11) of the HSK clamping set (1), which acts on the

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hollow shank taper tool as a so-called "clamping force".

**Note:** During the entire clamping operation, the hollow shank taper tool must be actively pushed into the tool spindle bore.

- The power effect is retained as long as the clamped condition lasts.

### (b) SK clamping set (1)

- During the clamping movement, the SK clamping piece (12) of the SK clamping set (1) presses the segments of its SK segment collet (11) into the taper of the draw bolt in the steep-taper tool.

- An axial force is generated by means of the taper of the draw bolt in the steep-taper tool as well as the shape of the SK segment collet (11) of the SK clamping set (1), which acts as a so-called "pull-in force" on the steep-taper tool.

**Note:** During the entire clamping operation, the steep-taper tool must be actively pushed into the tool spindle bore.

- The power effect is retained as long as the clamped condition lasts.

## 4. Unclamping the tool

**Important: The tool is only unclamped when the tool spindle is at a standstill.**

### **Movement sequence of the SLEH stationary unclamping unit (5)**

- During the unclamping operation, the pressure piston (52) of the SLEH stationary unclamping unit (5) moves hydraulically actuated on the stroke control ring (32) of the SEH clamping unit (3) or on the pressure piston (46) of the ASP tool clamp (3) and presses this forward against the forces of its left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40).

**Note:** In special cases, an external stop of the pressure piston (52) (also possibly via other components of the HSK clamping system / SK tool clamping system) is also possible. See the associated assembly drawing.

- The stop of the pressure piston (52) of the SLEH stationary unclamping unit (5) at the front is realized in its housing (51).

### **Movement sequence of the SEH clamping unit (3)**

- By pressing the left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the SEH clamping unit (3) together, its guide piston (31) is pushed forward toward the tool spindle opening.

### **Movement sequence of the ASP tool clamp (3)**

- By pressing the left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the ASP tool clamp (3) together, its draw bar (31) is pushed forward toward the tool spindle opening.

### **Movement sequence of the draw bar extension (2)**

- The guide piston (31) of the SEH clamping unit (3) and the HSK pressure piece (12) of the HSK clamping set (1) / the draw bar (31) of the ASP tool clamp (3) with the SK clamping piece (12) of the SK clamping set (1) are screwed directly to one another via the draw bar extension (2).

- As a result, the movement forced by the SLEH stationary unclamping unit (5) with the unclamping force reduced by the spring force (for compressing the left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the SEH clamping unit (3) / ASP tool clamp (3)) is introduced directly into the HSK clamping set (1) / SK clamping set (1).



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**Movement sequence of the HSK clamping set (1)**

- The HSK pressure piece (12) of the HSK clamping set (1), due to the contact geometries to its HSK segment collet (11), causes the segments of the HSK segment collet (11) of the HSK clamping set (1) to fold inward.
- This exposes the taper of the hollow shank taper tool.
- As a result of the pressure piece (12) setting, the hollow shank taper tool is actively ejected from the tool spindle by a small amount. **Important: Hold the hollow shank taper tool on the outside!**

**Movement sequence of the SK clamping set (1)**

- The SK clamping piece (12) of the SK clamping set (1), due to the contact geometries to its SK segment collet (11) and the inserted spring cord (17), causes the segments of the SK segment collet (11) of the SK clamping set (1) to fold outward.
- With this, the draw bolt in the steep-taper tool is released.
- Due to the setting of the SK clamping piece (12), the steep-taper tool is actively ejected from the tool spindle by a small amount. **Important: Hold the outside of the steep-taper tool!**



**Danger:** **Components moving under high forces.**  
 Do not reach into the tool take-up bore of the tool spindle. Danger of accident (crushing/shearing).  
**Wear hand protection**

5. Removing the tool

**Important: The tool is only removed when the tool spindle is at a standstill.**

- The tool can be removed from the tool spindle and exchanged for a different one. This completes the function circuit.

## The HSK clamping system and SK tool clamping system

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### I. Personnel qualification

The HSK clamping system / SK tool clamp may only be **installed** on/in the tool spindle by **trained, skilled personnel from the manufacturer of the tool spindle, the machine or clamping system**, who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

### II. Personal protective equipment

1. The following personal protective equipment must be worn:

- Eye protection
- Helmet
- Hand protection
- Foot protection



**Warning:** **Sharp-edged components can cause cut injuries.**  
Keep extremities away from sharp-edged components.  
**Use hand protection.**



**Danger:** **Parts/tools pulled out of the clamping due to insufficient mechanical strength or overload (bending, torque) can cause serious injuries.**  
**Wear personal protective gear.**

### III. Space requirement

1. The available work area on the end of the tool spindle for mounting the HSK clamping system or SK tool clamping system should be at least 1x the tool spindle length.

### IV. Tightening torques for cylinder screws

1. If cylinder screws (according to DIN 912 + DIN 6912) have to be loosened or tightened for mounting or dismounting / for the operation of the clamping system, then the tightening torques according to the VDI directive 2230 are generally to be applied.
2. This is the only way to guarantee the greatest possible strength of the cylinder screw.
3. A selection of these tightening torques for the usual screw sizes and for 3 different screw qualities (8.8 to 12.9) can be found in the tightening torque table in the chapter "**General warnings**" in the paragraph "**Fastening and exchange of screws**".
4. For this clamping system, screw quality 12.9 is used almost exclusively. If in doubt, refer to the piece list: There, the screw qualities for standard screws are specified. The screw quality can also be found on the screw head.
5. Tightening torques deviating from this specification for screws which have to be loosened or tightened in the scope of mounting or dismounting or during the operation of the clamping system are given on the assembly drawing.

### V. Speed limit

1. If the tool spindle has to be made to rotate during installation or commissioning of the HSK clamping system / SK tool clamping system, then it must be made sure beforehand that the max. speed cannot exceed 500 rpm.

### VI. Pressures

1. All actuation pressures must be shut down during all installation steps as well as during setting

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mode, except for testing purposes.

**VII. Fed-through media (for the installation / commissioning of individual components)**

1. Before beginning work, it must be made sure that all media feeds are depressurized and are actively vented.

**VIII. Installation of SEH clamping unit (3) / ASP tool clamp (3) + draw bar extension (2)**

**Caution:** **Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.**




The SEH clamping unit (3) / ASP tool clamp (3) may only be disassembled by the manufacturer.  
**Wear eye protection!**

1. Delivery

1. The draw bar extension (2) is delivered already completely screwed to the SEH clamping unit (3) / ASP tool clamp (3) and secured with 2 threaded pins (24).

**Warning:** **Components could be overloaded and destroyed due to improper torque introduction. As a result, pretensioned elastic elements could relax explosively.**



The screw connection between the draw bar extension (2) and the SEH clamping unit (3) / ASP tool clamp (3) may **only** be released or screwed by the manufacturer of the HSK clamping system or SK tool clamping system. See also above note.


2. Preparing the tool spindle

1. Clean the bore of the tool spindle and check the concentricity and axial run-out. Max. perm. error (depending on the magnitude of the spindle speed) max. 0.02 mm.

3. Preparing the SEH clamping unit (3) / ASP tool clamp (3)

1. All components must be present and undamaged.

**Warning:** **Parts/tools which are torn out of the clamping by machining forces can cause serious injuries.**



Do not use any damaged components.

2. All components must be free of dirt.

3. The left helical disc spring/disc spring package (39) and right helical disc spring/disc spring package (40) of the SEH clamping unit (3) / ASP tool clamp (3) must be greased with grease F80\*.

* Recommended F80 grease						
<b>Package [kg]</b>	0.1	0.25	0.5	1	5	25
<b>Id.No.</b>	630869	304345	308555	028975	318310	658047

**SEH clamping unit (3) (HSK clamping system)**

4. Remove the shim (22) of the draw bar extension (2) from its draw bar extension (21).

4. Installation of the SEH clamping unit (3) / ASP tool clamp (3) with draw bar extension (2)

1. Insert the SEH clamping unit (3) / ASP tool clamp (3) all the way into the tool spindle from

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the rear with the draw bar extension (2) screwed in.

**SEH clamping unit (3) (HSK clamping system)**

2. Push the shim (22) of the draw bar extension (2) into the tool spindle bore from the front and onto the draw bar extension (21) of the draw bar extension (2).

**Note:** The shim (22) of the draw bar extension (2) has several threaded bores. Using these threads and matching long screws, the mounting/dismounting of the shim (22) of the draw bar extension (2) can be simplified.

**HSK clamping system / SK tool clamp**

3. Check the whole assembly with the specified dimensions. See the assembly drawing in the attachment.

**IX. Assembly of the SLEH stationary unclamping unit (5)**

1. Delivery

1. The SLEH stationary unclamping unit (5) is delivered completely preassembled.

2. Preparing the tool spindle

1. There must be an adapter flange matching the tool spindle housing available with take-up/mounting options for several stroke control switches, and this must be mounted to the tool spindle housing.
2. The prescribed dimension between the end of the tool spindle and the screw-on surface of the housing (51) of the SLEH stationary unclamping unit (5) on the adapter flange must be complied with. See drawings in the attachment. The thickness of the shim (55) might have to be adjusted within the likewise prescribed tolerances.

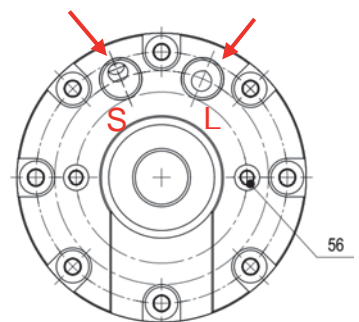
3. Assembly of the SLEH stationary unclamping unit (5)

1. Screw the complete SLEH stationary unclamping unit (5) to the adapter flange fastened stationary to the tool spindle housing with the cylinder screws (54) to the prescribed tightening torque (see note).

**Note:** The prescribed tightening torque for the cylinder screws (54) is specified next to these on the take-up cover (53).  
If this should not be the case, use the prescribed tightening torque from the tightening torque table in the chapter "**General warnings**" in the paragraph "**Fastening and exchanging screws**". See also item IV.

4. Hydraulic connections, SLEH stationary unclamping unit (5)

1. The hydraulic connections of the SLEH stationary unclamping unit (5) are located on its cover (53). The connection thread sizes as well as the connection designations (here, e.g. "S" and "L") can be found on the enclosed drawings. See also the right schematic diagram.
2. The connection lines may be designed as hose lines or pipe connections as long as they are designed such that the effect of external forces on the cover (53) can be ruled out.
3. Only connection lines can be used whose pressures as well as environmental influences for the application are suitable with regard to the type of media.
4. To remove any contamination from the connection lines, these should be flushed with the later-intended flow medium or blown through **before** connecting to the cover (53).
5. Remove the closure caps from the hydraulic connections in the cover (53).



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**Note:** It is recommended that the closure caps be kept in a safe place, as these can be useful if SLEH stationary unclamping unit (5) is dismantled at a later stage. Contamination penetrating into the SLEH stationary unclamping unit (5) must be avoided under all circumstances, since otherwise, premature wear has to be expected on the dynamically stressed seals and sliding surfaces.

6. Establish the hydraulic connections to the cover (53). The tightening torques for the screw joints given on the enclosed drawings must be complied with.

**Note:** When filling the SLEH stationary unclamping unit (5) with hydraulic oil for the first time, reduce the hydraulic pressure to max. 10 bar.

**X. Assembly of the coolant rotary supply unit (6)**

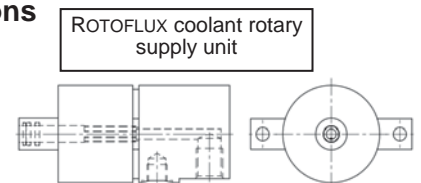
- There are several different types of conventional coolant rotary supply units available. Depending on the HSK clamping system, one of the following coolant rotary supply units (6) will be included in delivery:
- Refer to the corresponding enclosed instructions for assembly:

**ROTOFLUX**

- Operating instructions RN 1727 "**General operating instructions**

**for coolant rotary supply unit" ROTOFLUX".**

- "**ROTOFLUX installation and run-in instructions**" (English/Italian).



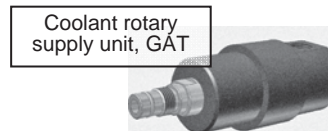
**DEUBLIN**

- "**Operating manual 040-555x DEUBLIN**".
- "**DEUBLIN installation 040-505**".



**GAT**

- "**GAT Rotodisk operating instructions**".



- After installing the connections, check again whether the feed lines are correct and check for leaks.

**Note:** You can find updated information about its coolant rotary supply unit on the websites of the manufacturer. The web addresses are listed in the chapter "**Intended use + Description**" in the section "**Coolant rotary supply unit (6)**".  
When the coolant rotary supply unit (6) is charged with the intended medium for the first time, first reduce its pressure to max. 10 bar (liquids) or 3 bar (gases).

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**XI. Clamping set installation**

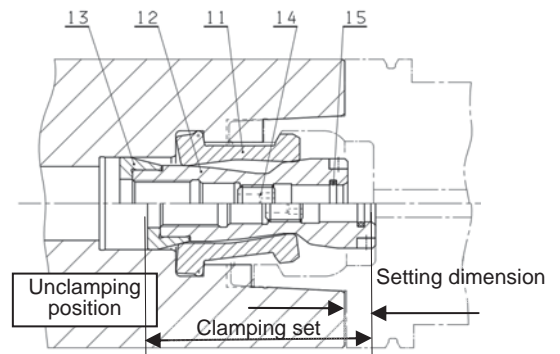
**(a) HSK clamping set (1)**

**Danger:** **It is imperative that the specifications in acc. with DIN 69063, particularly the dimensional specifications and geometries of the tool spindle bore, be complied with.**




Deviations from the dimensions and geometries of the tool spindle bore in acc. with DIN 69063 can lead to malfunctions or diminished clamping forces. Risk of accident (crushing/impact).

1. See also the "**General operating instructions for the HSK clamping sets**"<sup>6</sup>.
2. Put the SEH clamping unit (3) into the unclamping position using the SLEH stationary unclamping unit (5).
3. Determine the **actual setting dimension** taking the clamping set length into account (length of the HSK pressure piece (12) and HSK intermediate disc (13). To do this, measure from the plane face of the tool spindle to the shoulder on the shim (22) of the draw bar extension (2). See also the dimensions on the assembly drawing of the HSK clamping system ("unclamping position").
4. Determine the difference between the actual setting dimension and the theoretical setting dimension and correct the clamping set length by
  - **either** grinding down the thickness of the shim (22) of the draw bar extension (2)
  - **or** adjusting the thickness of the intermediate disc (13) (if present)
  - **or** a self-fabricated disc is inserted between the draw bar extension (2) and HSK clamping set (1).



**Note:** The shim (22) of the draw bar extension (2) has several threaded bores. Using these threads and matching long screws, the mounting/dismounting of the shim (22) of the draw bar extension (2) can be simplified.


**Attention:** **The vulcanisate of the HSK segment collet (11) must not be removed.**



This serves to keep the individual segments in the circumference spaced apart and is the precondition for the safe function.

5. Put the SEH clamping unit (3) into its end position (clamping position without tool or clamped-through-empty position) using the SLEH stationary unclamping unit (5).
6. Grease the marked surfaces of the flexible HSK segment collet (11) of the HSK clamping set (1)<sup>7</sup> and insert these in the ring groove of the working spindle.

**Danger:** **Tools which are torn out of the clamping by machining forces can cause extremely serious injuries.**



Do not use damaged clamping set parts.

7. Also grease <sup>7</sup> the HSK pressure piece (12) and screw it onto the draw bar extension (2). The enclosed drawings must be referred to for the tightening torque for the HSK pressure

<sup>6</sup> These are available free of charge on request in the languages German, English, Italian, Chinese and Spanish (version at the date of creation).

<sup>7</sup> See the "**Maintenance**" chapter

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piece (12). See also the table below.

- Counter the HSK pressure piece (12) with the threaded pin (14). Refer to the enclosed drawings for the countering torque for the threaded pin (14). See also the table below.

**Note:** Matching socket wrenches for the HSK pressure piece (12) and matching hexagon screwdrivers for the threaded pin (14) in common sizes can be purchased as accessories. See the table below.

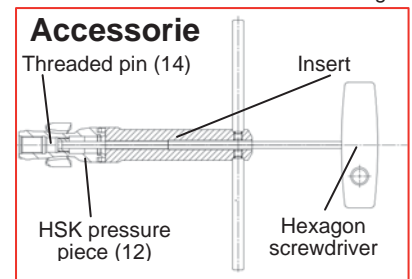
	<b>Danger:</b> <b>Components moving under high forces.</b> Do not reach into the tool take-up bore of the tool spindle. Danger of accident (crushing/shearing).
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**Table:** Socket wrenches and hexagon screwdrivers (accessories) and tightening torques for the common sizes:

Nominal size		A25/B32	A32/B40	A40/B50	A50/B63	A63/B80	A80/B100	A100/B125
HSK pressure piece (12)	Socket wrench [Id.No.]	-	830252	831296	831291	831274	831289	831434
	Tightening torque <sup>8</sup> approx. [Nm]	2.5	6	15	20	25	50	100
Threaded pin (14)	Hexagon screwdriver [Id.No.]	671237	830253	863494	817262	844250	756660	381601
	Tightening torque approx. [Nm]	2.5	6	15	20	25	50	100


The tightening torques can also be found on the enclosed drawings.

- Put the SEH clamping unit (3) into the unclamping position using the SLEH stationary unclamping unit (5).
- At the end of assembly, check the **actual setting dimension** one more time. To do this, measure from the plane face of the tool spindle to the shoulder on the shim (22) of the draw bar extension (2). See also the dimensions on the assembly drawing of the HSK clamping system ("unclamping position").



**Important:** After approx. 100 clamping strokes, the setting dimension and the countering of the HSK pressure piece (12) must be checked again.

**(b) SK clamping set (1)**

	<b>Danger:</b> <b>It is imperative that the specifications be complied with, either according to the dimension sheet of the SK clamping set (1), DIN 2079 or in acc. with ISO 9270-1 / ISO 9270-2, particularly the dimensional specifications and geometries of the tool spindle bore.</b> Deviations from the dimensions and geometries of the tool spindle bore on the dimension sheet of the clamping set (1) or in acc. with DIN 2079 or ISO 9270-1 / ISO 9270-2 can lead to malfunctions or diminished clamping forces. Risk of accident (crushing/impact). <b>Wear hand protection, foot protection and head protection, if applicable.</b>
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- Put the ASP tool clamp (3) into the unclamping position using the SLEH stationary unclamping unit (5).
- Insert the SK clamping piece (12) with the inserted SK segment collet (11) and spring cord (17) as well as the threaded pin (14) screwed as far as it can go in the SK clamping piece (12) into the tool spindle bore and screw onto the threaded pin of the draw bar extension

<sup>8</sup> For expanded draw bar bores, the tightening torque might have to be reduced. Ask the manufacturer!

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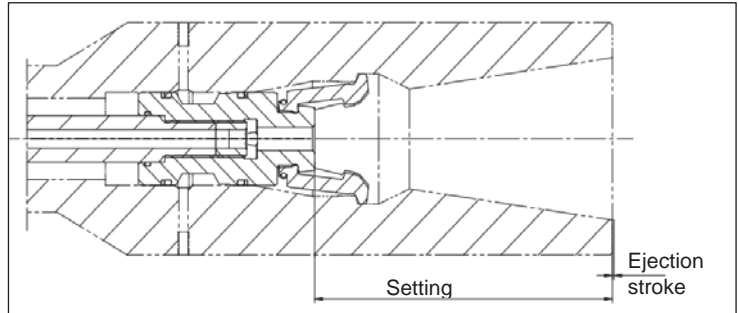
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(21) of the draw bar extension (2).

3. Determine the **actual setting dimension**. To do this, measure from the plane face of the tool spindle to the plane face on the SK clamping piece (12). See also the dimensions on the assembly drawing of the SK tool clamping system ("unclamping position").



4. Compensate for the difference between the actual setting dimension and the theoretical setting dimension by screwing on the SK clamping piece (12) more or less further onto the threaded pin of the draw bar extension (21) of the draw bar extension (2) and then countering with the threaded pin (14). The tightening torque can be found in the table below.

**Note:** Matching socket wrenches for the SK clamping piece (12) and matching hexagon screwdrivers for the threaded pin (14) in common sizes can be purchased as accessories. See the table below.

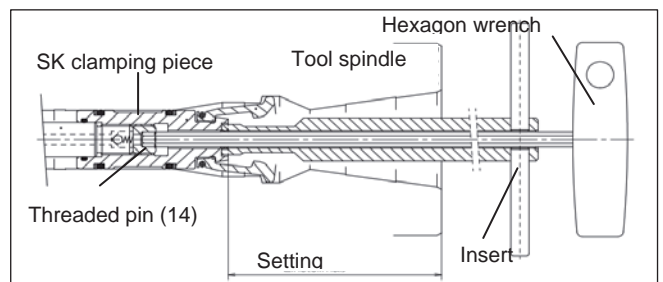
**Danger:** **Components moving under high forces.**  
 Do not reach into the tool take-up bore of the tool spindle. Danger of accident (crushing/shearing).

**Table:** Socket wrenches and hexagon screwdrivers (accessories) and tightening torques for the common sizes:

Nominal size		30	40	45	50	60
SK clamping piece (12)	Socket wrench [Id.No.]	772214	756393 +756396	756396	760229	747337
	Tightening torque approx. [Nm]	-	-	-	-	-
Threaded pin (14)	Hexagon screwdriver [Id.No.]	367665	802094	802094	769078	769078
	Tightening torque approx. [Nm]	6	25	25	50	50

The tightening torques can also be found on the enclosed drawings.

5. Put the ASP tool clamp (3) into the unclamping position using the SLEH stationary unclamping unit (5).
6. At the end of assembly, check the **actual setting dimension** one more time. To do this, measure from the plane face of the tool spindle to the plane face on the SK clamping piece (12). See also the dimensions on the assembly drawing of the SK tool clamping system ("unclamping position").



**Important:** After approx. 100 clamping strokes, the setting dimension and the countering of the SK clamping piece (12) must be checked again.

## XII. Final check

1. After completing installation - even only of individual components of the clamping system - a stroke check as well as clamping force measurement must be done as a matter of principle. See also the "**Maintenance**" chapter.



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### I. Personnel qualification

The HSK clamping system / SK tool clamp may only be **dismounted** from the tool spindle by **trained, skilled personnel from the manufacturer of the tool spindle, the machine or clamping system**, who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

### II. Personal protective equipment

1. The following personal protective equipment must be worn:

- Helmet
- Hand protection
- Eye protection
- Foot protection

	<p><b>Warning:</b> <b>Sharp-edged components can cause cut injuries.</b> Keep extremities away from sharp-edged components. <b>Use hand protection.</b></p>
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### III. Pressures

1. All operating and actuation pressures must be shut off during the entire dismounting procedure.

### IV. Dismounting the clamping set

#### (a) HSK clamping set (1)

1. Put the SEH clamping unit (3) into its end position (clamping position without tool or clamped-through-empty position) using the SLEH stationary unclamping unit (5).
2. Loosen the threaded pin (14) of the HSK clamping set (1) by 2 - 3 turns.
3. Screw the HSK pressure piece (12) of the HSK clamping set (1) out of the draw bar extension (21) of the draw bar extension (2) and pull it forward and out of the tool spindle.

**Note:** For information about the matching socket wrench for the HSK pressure piece (12) and the hexagon screwdriver for the threaded pin (14), see the "**Assembly**" chapter under "**HSK clamping set (1)**".

4. Remove the flexible HSK segment collet (11) of the HSK clamping set (1) from the ring groove of the working spindle.

#### (b) SK clamping set (1)

1. Put the ASP tool clamp (3) into its end position (clamping position without tool or clamped-through-empty position) using the SLEH stationary unclamping unit (5).
2. Loosen the threaded pin (14) of the SK clamping set (1) by 2 - 3 turns.
3. Screw the SK clamping piece (12) of the SK clamping set (1) out of the threaded pin of the draw bar extension (21) of the draw bar extension (2) and pull toward the front and out of the tool spindle together with the threaded pin (14), the SK segment collet (11) and the spring cord (17).

**Note:** For information about the matching socket wrench for the SK clamping piece (12) and the hexagon screwdriver for the threaded pin (14), see the "**Assembly**" chapter under "**SK clamping set (1)**".

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**V. Dismounting the coolant rotary supply unit (6)**

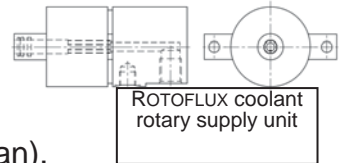
1. Shut off all media pressures on the coolant rotary supply unit (6) and actively relieve the pressure lines (aerate).
2. Leave the connection lines screwed into the coolant rotary supply unit (6) when dismantling.
3. Either refer to the corresponding enclosed instructions for the dismantling of the coolant rotary supply unit (6) itself or follow the assembly procedure in the opposite order:

ROTOFLUX

- Operating instructions RN 1727 "**General operating instructions**

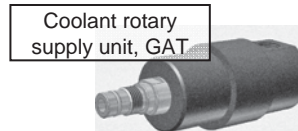
**for coolant rotary supply unit "ROTOFLUX".**

- "**ROTOFLUX installation and run-in instructions**" (English/Italian).



DEUBLIN


- "**Operating manual 040-555x DEUBLIN**".
- "**DEUBLIN installation 040-505**".



GAT

- "**GAT Rotodisk operating instructions**".

**Warning:** Fluids or gases which emerge under high pressure can cause serious injuries and/or possible scalding, especially in the facial region.




Before dismantling, check to make sure the pressure connections and their lines are depressurized. Actively vent.  
**Use eye protection!**

**VI. Dismounting the SLEH stationary unclamping unit (5)**

1. Shut off all media pressures on the SLEH stationary unclamping unit (5) and actively relieve the pressure lines (aerate).
2. Screw the connection lines out of the cover (53) of the SLEH stationary unclamping unit (5).


**Warning:** Fluids or gases which emerge under high pressure can cause serious injuries and/or possible scalding, especially in the facial region.



Before dismantling, check to make sure the pressure connections and their lines are depressurized. Actively vent.  
**Use eye protection!**

3. Seal the connecting threads to the cover (53) with plugs.
4. Screw the cylinder screws (54) out of the adapter flange fastened stationary to the tool spindle housing and, together with this, take the complete SLEH stationary unclamping unit (5) down toward the rear.

**Attention:** DANGER - SLIPPERY!



Oil leaking from the SLEH stationary unclamping unit (5) and/or from the connection lines.  
**Use collecting devices and dispose of properly.**


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## VII. Dismounting the SEH clamping unit (3) / ASP tool clamp (3) + draw bar extension (2)

	<b>Danger:</b> The SEH clamping unit (3) / ASP tool clamp (3) and the draw bar extension (2) may only be screwed apart by the manufacturer!
	The SEH clamping unit (3) / ASP tool clamp (3) may only be disassembled by the manufacturer!

### SEH clamping unit (3)

1. Remove the shim (22) of the draw bar extension (2) toward the front and out of the tool spindle bore.

**Note:** The shim (22) of the draw bar extension (2) has several threaded bores. Using these threads and matching long screws, the mounting/dismounting of the shim (22) of the draw bar extension (2) can be simplified.

2. Pull the SEH clamping unit (3) with the screwed draw bar extension (2) toward the rear and out of the tool spindle bore.
3. Push the shim (22) of the draw bar extension (2) back onto its draw bar extension (21).
4. Keep the SEH clamping unit (3) and the draw bar extension (2) screwed together.

	<b>Caution:</b> Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.
	Use eye protection! Do not disassemble the SEH clamping unit (3)!

### ASP tool clamp (3)

1. Pull the ASP tool clamp (3) with the screwed draw bar extension (2) toward the rear and out of the tool spindle bore.
2. Keep the ASP tool clamp (3) and the draw bar extension (2) stored screwed together.

	<b>Caution:</b> Parts hurled out by pretensioned elastic elements can cause injuries, especially in the face area.
	Use eye protection! Do not disassemble the ASP tool clamp (3)!

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### Personnel qualifications

To carry out the work that has to be done during the course of maintenance measures, different personnel qualifications are required. These are categorized into the following groups:

#### 1. Qualification group 1

**Instructed personnel:** The instructed person must be certifiably instructed by the **user** about the tasks he is assigned and the potential hazards which arise due to improper behavior.

Assigned tasks:

- Inspection (e.g. visual inspection, clamping force check, checking the signals output (adjustment) of the stroke control sensors, leak checks).
- Cleaning and lubrication of the tool spindle cone or tool shaft.
- Setting dimension check.

#### 2. Qualification group 2

**Trained, skilled personnel from the manufacturer of the tool spindle, machine or the clamping system** or from the **user:** Skilled personnel who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

Assigned tasks:

- All maintenance and repair measures on the HSK clamping system / SK tool clamp, which are limited to the removal and installation of entire groups. The draw bar extension (2) screwed to the SEH clamping unit (3) / ASP tool clamp (3) counts as 1 group here.
- Setting dimension correction.

#### 3. Qualification group 3

**Trained, skilled personnel from the clamping system manufacturer:** Skilled personnel who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

Assigned tasks:

- Dismounting the draw bar extension (2) and SEH clamping unit (3) / ASP tool clamp (3).
- Disassembly of the SEH clamping unit (3) / ASP tool clamp (3).


### Personal protective equipment

1. The following personal protective equipment must be worn:

- Hand protection
- Helmet
- Eye protection

### Pressures

1. Except for testing purposes, all actuation pressures must be switched off during maintenance measures. This particularly applies when the tool take-up has to be grabbed for maintenance purposes.



	<p><b>Warning:</b> <b>Fluids or gases which emerge under high pressure can cause serious injuries and/or possible scalding, especially in the facial region.</b></p>
	<p>Before maintenance measures, check to make sure the pressure connections and their lines are depressurized. Actively vent. <b>Wear eye protection!</b></p>

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## Function and safety check:

	<p><b>Warning:</b> <b>Sharp-edged components can cause cut injuries.</b> Keep extremities away from sharp-edged components. <b>Use hand protection.</b></p>
	<p><b>Danger:</b> <b>Components moving under high forces.</b> Do not reach into the tool take-up bore of the tool spindle. Danger of accident (crushing/shearing). <b>Use hand protection.</b></p>

### Weekly or after 75 hours of operation<sup>9</sup>

#### 1. Visually inspect the HSK clamping set (1) / SK clamping set (1) (qualification group 1):

- Clamping movement
- Check the adjustment (signal output) of the stroke control sensors above the stroke control ring (32) of the SEH clamping unit (3) or ASP tool clamp (3).
- Damage
- Leak check of SLEH stationary unclamping unit (5) and coolant rotary supply unit (6).
- Contamination, with cleaning and lubrication of tool spindle cone or tool shaft (also O-ring (15) of the HSK clamping set (1)), if necessary.
- Degreasing

In the event of

- Stroke control error: Optimize the adjustment of the stroke control sensors according to their operating instructions.
- Damage: Exchange the entire HSK clamping set (1) / SK clamping set (1) (**qualification group 2**).
- Oil/coolant escape: Dismount the SLEH stationary unclamping unit (5) and fix the cause of the leak. Insert new seals, if necessary. Then remount the SLEH stationary unclamping unit (5). If there is a coolant rotary supply unit (6), replace this.
- contamination: Remove the HSK clamping set (1) / SK clamping set (1) and clean, together with the inner contour of the spindle (**qualification group 2**). Observe the warning!
- degreasing: Find the reason for the degreasing and rectify it (e.g. defective seals, unsuitable cooling lubricant, washing out in unfitted state). Relubricate the HSK segment collet (11) / SK segment collet (11) (in installed state, e.g. using a brush). For lubricants, see below (**qualification group 2**).

**Note:** The use of **external** compressed air for the general cleaning of the HSK clamping system / SK tool clamping system is not permissible.

### Monthly, or after 300 hours of operation<sup>9</sup>

#### 1. Check the setting dimension of the HSK pressure piece (12) / SK clamping piece (12) (qualification group 1).

If there is a setting dimension error: Correct the setting dimension or reset (**qualification group 2**). See chapter "Assembly" → "Clamping set assembly" → "HSK clamping set (1)" or "SK clamping set (1)"

#### 2. Measure the clamping force / pull-in force. To do this, an approved clamping force measuring device<sup>10</sup> must be used.

#### HSK clamping system:

For a measured value below the values specified in **DIN 69893 / DIN 69063**<sup>11</sup>, the following catalog of measures must be worked through, one by one, until the measured value at least

<sup>9</sup> Whichever comes first.

<sup>10</sup> E. g. RÖHM clamping force measuring device F-SENSO SPINDLE 10 - 100 kN, Id.No. 1255729, with adapter HSK 100, Id.No. 1255741, or adapter SK 50, Id.No. 1255745

<sup>11</sup> See table in chapter "Intended use + Description" -> "Limit values".

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corresponds to the nominal value (**qualification group 2**):

1. Regrease the HSK segment collet (11) and measure the clamping force again.
2. Exchange the HSK clamping set (1) and measure the clamping force again.
3. Put the HSK clamping system out of operation and completely replace.

**Note:** See also the chapter "**Intended use + Description**" -> "**Putting out of operation / shutting down**".

### SK clamping system:

For a measured value below the specified minimum values<sup>12</sup>, the following catalog of measures must be worked through, one by one, until the measured value at least corresponds to the nominal value (**qualification group 2**):

1. Regrease the SK segment collet (11) and measure the pull-in force again.
2. Exchange the SK clamping set (1) and measure the pull-in force again.
3. Put the SK tool clamping system out of operation and completely replace.

**Note:** See also the chapter "**Intended use + Description**" -> "**Putting out of operation / shutting down**".

## Maintenance:

Annually or after 500,000 tool changes<sup>13</sup>

### HSK clamping system and SK tool clamp:

1. Replace the O-ring (15) of the HSK clamping set (1) / SK clamping set (1) (**qualification group 2**).

### Lubricant recommendation for HSK clamping set (1):

#### 1. Grease pastes:

- LUBRICATING METAL PASTE **TECHNO-SERVICE GmbH**  
70-85: Detmolder Str. 515  
33605 Bielefeld, Germany
- MOLYKOTE TP42 **DOW CORNING GMBH**  
Pelkovenstr. 152  
80992 Munich, Germany
- GREASE PASTE **TECHNO-SERVICE GMBH**  
METAFLUX 70-8508 Detmolder Str. 515  
33605 Bielefeld, Germany

#### 2. Lubricating sprays:

- LUBRICATING METAL SPRAY **TECHNO-SERVICE GMBH**  
METAFLUX 70-81 Detmolder Str. 515  
33605 Bielefeld, Germany
- FIN GREASE + **INTERFLON DEUTSCHLAND GMBH**  
TEFLON SPRAY Herrenpfad-Süd 6  
41334 Nettetal, Germany

<sup>12</sup> See table in chapter "**Intended use + Description**" -> "Limit values".

<sup>13</sup> Whichever comes first.

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## Repair

- Have the HSK clamping set (1) / SK clamping set (1) exchanged by personnel from **qualification group 2**.
- Of the HSK clamping system / SK tool clamp, with exchange of individual components by personnel from **qualification group 3**.
- The stationary unclamping unit (5) by personnel from **qualification group 3**.
- The coolant rotary supply unit (6) by personnel from **qualification group 3** or by the **supplier of the coolant rotary supply unit (6)**.
- In order to avoid extensive downtimes in the event of a malfunction, it is recommended to always have a set of **wear parts** in stock, as indicated on the piece lists.
- Furthermore, on request, **repair clamping sets** and **spare part sets** with the corresponding **exchange instructions** will be provided.

**RÖHM** - FAILURE - CAUSES

Clamping system HSK

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<p><b>Malfunction</b> The hollow shank taper tool is ...</p>	<p><b>Cause</b></p>
<p><b>... not correctly pulled in</b></p>	<p>Wrong setting up dimensions.</p> <p>The securing device of the HSK clamping set (1) and/or the thread of the draw bar extension (21) of the draw bar extension (2) has come loose.</p> <p>Wrong hollow shank taper installed ( see tool specification).</p> <p>Incorrect or faulty inner contour of the tool spindle.</p> <p>The hollow shank taper or inner contour of the tool spindle is dirty.</p> <p>Left helical disc spring/disc spring package (39) and/or right helical disc spring/disc spring package (40) of the SEH clamping unit (3) is partly broken or fatigued.</p> <p>Hollow shank taper tool is not actively "pushed further" when inserted.</p>
<p><b>... not released</b></p>	<p>Wrong setting up dimensions.</p> <p>SLEH stationary unclamping unit (5) defective.</p> <p>Fretting corrosion in the taper surfaces of the tool spindle or tool.</p>
<p><b>... pulled out during machining</b></p>	<p>HSK segment collet (11) of HSK clamping set (1) is broken.</p> <p>Guide piston (31) of the SEH clamping unit (3) or draw bar extension (21) of the draw bar extension (2) is broken.</p> <p>Hollow shank taper tool or HSK pressure piece (12) of the HSK clamping set (1) is broken.</p> <p>Clamping force is too low.</p> <p>Left helical disc spring/disc spring package (39) and/or right helical disc spring/disc spring package (40) of the SEH clamping unit (3) is partly broken or fatigued.</p>



**RÖHM** - FAILURE - CAUSES

SK tool clamping system

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<b>Failure</b> The steep-taper tool is ...	<b>Cause</b>
<b>... not correctly pulled in</b>	Wrong setting up dimensions.
	The securing device of the SK clamping set (1) and/or the thread of the draw bar extension (21) of the draw bar extension (2) has come loose.
	Steep taper or draw bolt is installed with the wrong geometry (see tool standard).
	Incorrect or faulty inner contour of the tool spindle.
	Steep taper or inner contour of the tool spindle is dirty.
	Left helical disc spring/disc spring package (39) and/or right helical disc spring/disc spring package (40) of the ASP tool clamp (3) is partly broken or fatigued.
	Steep-taper tool is not actively "pushed further" when inserted.
<b>... not released</b>	Wrong setting up dimensions.
	SLEH stationary unclamping unit (5) defective.
	Fretting corrosion in the taper surfaces of the tool spindle or tool.
<b>... pulled out during machining</b>	SK segment collet (11) of the SK clamping set (1) is broken.
	Draw bar (31) of the ASP tool clamp (3) or draw bar extension (21) of the draw bar extension (2) is broken.
	Steep-taper tool or draw bolt / SK clamping piece (12) of the SK clamping set (1) is broken.
	Clamping force is too low.
	Left helical disc spring/disc spring package (39) and/or right helical disc spring/disc spring package (40) of the ASP tool clamp (3) is partly broken or fatigued.



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Please note that only ORIGINAL **RÖHM** spare parts or components acquired from suppliers authorized by **Röhm** GmbH should be used. **MESSRS. RÖHM** will not accept any liability for any damage caused by the use of components provided by other suppliers.

**Note:** Details of the 6-digit identity number engraved on the module and the manufacturing number (if available) are required to facilitate spare parts or individual components ordering. The manufacturing number consists of a letter followed by 2 numbers and, possibly, an incremental number, this being either on the nameplate or in the near vicinity of the identity number.

Manufacturer's address:

Firm  
**RÖHM** GmbH  
Heinrich-Röhm-Str. 50  
89567 Sontheim /Brenz  
GERMANY

**RÖHM** - Warranty exclusions

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**The warranty of the seller does not include damage or deficiencies**

1. caused by the user due to non-compliance with the written instructions of the seller with regard to commissioning (e.g. deficient construction and installation work), the operation and the maintenance of the equipment (as far as this maintenance is not taken over by the manufacturer as part of a contractual agreement).
2. caused by technical operating conditions (e.g. chemical or electrolytic influences) and/or machine data unknown to the manufacturer.
3. caused by natural wear.
4. caused by forces of nature.
5. caused by erroneous operation of any sort or caused by improper use or operation of the clamping device or part thereof. This also includes loading beyond the specified load limits (e.g. speed, pressure, force, etc.).
6. which are not our responsibility. This also includes damage caused when the customer or third parties make modifications or repairs to the manufacturer's work/products without having the previous written permission of the manufacturer. Excluded from this are damage and deficiencies proven not to be caused by these modifications or repairs.
7. which occur during use of the system/installation or parts thereof under altered operating conditions (e.g. materials, tools, cutting parameters, programs, etc.), in particular without consultation with and written release by the seller or the manufacturer.
8. which were caused by altered environmental conditions.

## The HSK clamping system and SK tool clamping system

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### Materials

The main materials used for the **HSK clamping system** and **SK tool clamping system**:

Material	Used for	Weight % approx.
Steel	Main components	100
Grease, oil, organic COH groups	Operating materials, lubrication	Traces
Silicone / rubber (black)	Spacing of the HSK segment collet (11) of the HSK clamping set (1)	Traces
NBR (PERBUNAN®, nitrile butadiene rubber, black)	Seals (O-rings, gaskets, Usit seals, wipers)	Traces
FPM/FKM (VITON®, fluorinated rubber, brown)	O-rings	Traces
PTFE (TURCON®, polytetrafluorethylene, white/light gray)	Seals (support rings)	Traces
H-PU (thermoplastic polyurethane, red), PA (polyamide, natural white) or POM (polyoxymethylene, white)	Rod and piston seals	Traces

**Note:** The colors specified for the plastics are not binding. Other colors might be used, depending on the manufacturer. Observe the piece list.

### Disposal information

#### Personnel qualifications

To carry out the work that has to be done during the course of disposal (dismounting and disassembly, if applicable), different personnel qualifications are required. These are categorized into the following groups:

#### **Qualification group 2**

**Trained, skilled personnel from the manufacturer of the tool spindle, machine or the clamping system:** Skilled personnel who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

Assigned tasks:

- Removal of entire groups from the tool spindle. The draw bar extension (2) screwed to the SEH clamping unit (3) / ASP tool clamp (3) counts as 1 group here.

#### **Qualification group 3**

**Trained, skilled personnel from the clamping system manufacturer:** Skilled personnel who, based on their professional training, are familiar with the work assigned to them as well as the potential hazards, and are able to minimize these by taking suitable safety measures.

Assigned tasks:

- Disconnect the draw bar extension (2) and SEH clamping unit (3) / ASP tool clamp (3).
- Disassemble the SEH clamping unit (3) / ASP tool clamp (3).

#### Personal protective equipment

1. The following personal protective equipment must be worn:

- Foot protection
- Hand protection
- Helmet
- Eye protection

## The HSK clamping system and SK tool clamping system

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1. Dismount the HSK clamping system / SK tool clamping system. Please refer to the chapter "**Dismounting**".  
**Important:** The SEH clamping unit (3) / ASP tool clamp (3) and the draw bar extension (2) may not be screwed apart here.
2. Before disposal, the SLEH stationary unclamping unit (5) must be drained. The accumulated **hydraulic oil** must be disposed of with the waste oil or recycled according to the local regulations.
3. As long as the installed seals (made of various plastics) don't have to be disposed of separately, all components of the **HSK clamping system** or **SK tool clamping system** can be disposed of in the usual steel scrap.



**Danger:** The SEH clamping unit (3) / ASP tool clamp (3) and the draw bar extension (2) may only be screwed apart by the manufacturer!  
The SEH clamping unit (3) / ASP tool clamp (3) may only be disassembled by the manufacturer!

Measures (qualification group 3)

1. The HSK clamping system / SK tool clamping system must already be dismounted. See also the "**Dismounting**" chapter.
2. If even the smallest traces of foreign (e.g. non-magnetic) substances have to be separated due to any locally valid regulations, then the **entire** drained **HSK clamping system** or the entire drained **SK tool clamping system** must be disassembled and separated into its different materials before disposal and disposed of separately according to the used materials (see list above or piece list).
3. If the **HSK clamping system** or the **SK tool clamping system** is disassembled, individual items from the chapter "**General warnings**" must be observed (operator qualification, dangers of injury (partially), environmental hazards).

KOB Sontheim, issued: 28.06.2016