

# TANDEM Clamping force block

## KSA plus, KSA-LH plus, KSA-F plus

### Assembly and Operating Manual



Superior Clamping and Gripping

**SCHUNK** 

## Imprint

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### Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

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Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

Tel. +49-7572-7614-1300

Fax +49-7572-7614-1039

[customercentermengen@de.schunk.com](mailto:customercentermengen@de.schunk.com)



**Please read the operating manual in full and keep it close to the product.**

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## 1 General

This operating manual is an integral component of the product and contains important information on safe and proper assembly, commissioning, operation, care, maintenance and disposal. This manual must be stored in the immediate vicinity of the product where it is accessible to all users at all times.

Before using the product, read and comply with this manual, especially the chapter “Basic safety notes”. ▶ 2 [ 5]

If the product is passed on to a third party, these instructions must also be passed on.

Illustrations in this manual are provided for basic understanding of the product and may differ from the actual product design.

**We accept no liability for damage resulting from the failure to observe and comply with this operating manual.**

### 1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.



#### **⚠ DANGER**

**Danger for persons!**

Non-observance will inevitably cause irreversible injury or death.



#### **⚠ WARNING**

**Dangers for persons!**

Non-observance can lead to irreversible injury and even death.



#### **⚠ CAUTION**

**Dangers for persons!**

Non-observance can cause minor injuries.

#### **CAUTION**

**Material damage!**

Information about avoiding material damage.

### 1.2 Applicable documents

- General terms of business \*
- Catalog data sheet of the purchased product \*

The documents labeled with an asterisk (\*) can be downloaded from [schunk.com](https://www.schunk.com).

## 2 Basic safety notes

Improper handling, assembly and maintenance of this product may result in risk to persons and equipment if this operating manual is not observed.

Report any failures and damage immediately and repair without delay to keep the extent of the damage to a minimum and prevent compromising the safety of the product.

**Only use original SCHUNK spare parts.**

### 2.1 Intended use

- This product is intended for clamping and holding workpieces on machine tools and other suitable technical devices.
- It is designed to be set up on a machine table or machine pallets.
- The product may only be used within the scope of its technical data, ▶ 5 [12].
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

### 2.2 Not intended use

- The product is not being used as intended if, for example:
- It is used as lifting equipment, as a press, as a punching tool, as a lathe chuck, as a drill or as a cutting tool.
- It is used in working environments that are not permissible.
- Workpieces are not properly clamped.
- Safety regulations are disregarded and persons are working at this product (for example, to machine clamped workpieces) without additional protective equipment.
- The technical data specified by the manufacturer are exceeded during usage.
- It is used with machines/systems or workpieces that are not designed to be used with it.

### 2.3 Notes on particular risks

The TANDEM clamping block can cause injury for persons and material damage, for example:

- it is used other than as intended;
- it is not installed or maintained properly;
- the safety and installation instructions, the safety and accident prevention regulations valid at the usage site or the EC Machinery Directive are not observed.



### **⚠ WARNING**

**Risk of injury to operating personnel if the clamping block fails because the technical data have been exceeded and a workpiece is released or parts fly off!**

- The technical data specified by the manufacturer for using the clamping block must never be exceeded.
- The clamping block may only be used on machines and facilities that fulfill the minimum requirements of the EC Machinery Directive 2006/42/EC; specifically, they must have effective technical measures to protect against possible mechanical hazards.



### **⚠ WARNING**

**Risk of injury from clamping block or chuck jaws falling during transport, installation or removal!**

- Make sure the clamping block and chuck jaws do not fall during transport, installation or removal.
- Use a crane and/or a transport truck for transport.
- Only install the clamping block on machines with the appropriate connection dimensions.



### **⚠ CAUTION**

**Risk of crushing from chuck jaws opening and closing when manually loading and unloading!**

- Do not reach between the chuck jaws.
- Wear personal protective equipment.
- Prevent the clamping block from being actuated unintentionally.
- Use automated loading.



### **⚠ CAUTION**

**Risk of slipping or falling if the clamping block's operational environment is not clean (e.g. contaminated with cooling lubricants or oil).**

- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety boots.
- Follow the safety and accident-prevention regulations when operating the clamping block, especially when working with machine tools and other technical equipment.



## ⚠ CAUTION

**Risk of burns due to workpieces with high temperatures.**

- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.

## 2.4 Notes on safe operation

**Follow the care and maintenance instructions.**

### Assembling the TANDEM clamping block

Do maintenance work, modifications, and add attachments outside of the danger zone.

### Functional testing

- After installing the TANDEM clamping block, its proper function must be checked before putting it into operation. There must be no leaks in the piping system here.
- If the clamping block is involved in a collision, it must be tested to see if it is still functioning properly before using it again. Only use original SCHUNK spare parts when replacing damaged items.
- Check the clamping block at least once per shift for externally visible damage and malfunctions.
- If there are signs of wear or damage, the fixing screws for the chuck jaws must be replaced. Only use screws with a quality of 12.9.

### Maintenance instructions

The reliability of the clamping block can be guaranteed only if the maintenance instructions are followed exactly.

### Use of special chuck jaws

When using special chuck jaws, please observe the following rules:

- The chuck jaws should be designed to be as low as possible. The clamping point must be as near as possible to the housing. (clamping points at a greater distance cause higher surface pressures in the jaw guides and can significantly reduce the clamping force.)
- For higher clamping points, the operating pressure must be reduced.
- Do not use welded jaws.

### 2.4.1 Constructional changes, attachments or modifications

Modifications and rework (additional threads or bore holes) or attaching fittings that are not offered as accessories by SCHUNK may be performed only with permission of SCHUNK. This also applies to the installation of safety devices.

## 2.5 Personnel qualification

Only specialist personnel may install or remove, commission or maintain the clamping block. Specialist personnel are persons who by their technical training, experience and knowledge are capable of assessing the work to be performed and recognizing potential dangers, and are thus able to take appropriate countermeasures. Have personnel trained by the manufacturer if required.

Every person called upon by the operator to work on the clamping block must have read and understood the complete assembly and operating manual, especially chapter 2 "Basic safety notes".

The responsibility for operation, maintenance and repair must be clearly specified. Only allow persons to service or repair parts of the clamping block which are relevant to safety who can be considered to be a specialist, as understood in the safety regulations.

Specify the operator's responsibility, also with regard to safe behavior, and authorize the operator to reject instructions from third parties which breach safety regulations.

During training and instruction, personnel must only be permitted to work with the clamping block if continuously supervised by a specialist.

## 2.6 Organizational measures

### Obeying the rules

Via suitable organizational measures and instructions, the operator must ensure that the relevant safety rules are obeyed by the persons asked to operate, maintain and repair the clamping block.

### Checking the behavior of personnel

The operator must at least occasionally check that the personnel are behaving in a safety conscious manner and are aware of the potential hazards.

### Danger signs

The operator must ensure that the signs concerning safety and hazards mounted on the machine where the clamping block is mounted are clearly legible and are observed.

### Faults

If a fault occurs on the clamping block which endangers safety or if a problem is suspected due to production characteristics, the machine where the clamping block is mounted must be immediately stopped and remain shut down until the fault has been located and remedied. Only allow specialists to remedy faults.

### **Spare parts**

Only use original SCHUNK spare parts.

### **Environmental regulations**

The applicable environmental regulations must be observed for all maintenance and repair work.

The use of petroleum ether is prohibited. It is extremely flammable, can build up an electrostatic charge and can form an explosive gas air mixture. When selecting greases and lubricating oils, pay attention to environmental compatibility, health risks, disposal regulations and to local options for disposal according to regulations.

## **2.7 Using personal protective equipment**

When using this product, you must comply with the relevant health and safety at work rules and you must use the required personal safety equipment (minimum: category 2).

### 3 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the applicable documents, ▶ [1.2 \[ 4 \]](#)
- Observe the ambient conditions and operating conditions
- Observe the maximum number of clamping cycles ▶ [5 \[ 12 \]](#)
- Observance of the specified care and maintenance instructions ▶ [9 \[ 19 \]](#)

Parts touching the workpiece and wear parts are not included in the warranty.

## 4 Scope of delivery

The scope of delivery includes

- in the version ordered (without top jaws)
- Accessory pack

## 5 Technical data

|                                  | <b>KSA plus 100</b> | <b>KSA plus 160</b> | <b>KSA-LH plus 100</b> | <b>KSA-LH plus 160</b> | <b>KSA-F plus 100</b> | <b>KSA-F plus 160</b> |
|----------------------------------|---------------------|---------------------|------------------------|------------------------|-----------------------|-----------------------|
| Stroke per jaw                   | 2 mm                | 3 mm                | 6 mm                   | 8 mm                   | 4 mm                  | 6 mm                  |
| Clamping force* at max. pressure | 18 kN               | 45 kN               | 8 kN                   | 20 kN                  | 18 kN                 | 45 kN                 |
| Max. torque                      | 8 Nm                | 15 Nm               | 8 Nm                   | 15 Nm                  | 8 Nm                  | 15 Nm                 |
| Repeatability**                  | 0.01 mm             | 0.02 mm             | 0.01 mm                | 0.02 mm                | 0.01 mm               | 0.02 mm               |
| Max. jaw height                  | 60 mm               | 60 mm               | 60 mm                  | 60 mm                  | 60 mm                 | 60 mm                 |
| Weight                           | 5 kg                | 14 kg               | 5 kg                   | 14 kg                  | 5 kg                  | 14 kg                 |

\* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at a distance of "H" (see catalog).

\*\* After 100 consecutive strokes to end positions.

*Warranty and maximum clamping cycles*

|                               |                |
|-------------------------------|----------------|
| Length of warranty            | 24 Months      |
| Maximum clamping cycle number | 300 000 Cycles |

## 6 Tightening torques for screws

**Tightening torques to mount the clamping system on the machine table (screw quality 10.9)**

| Screw size                      | M4  | M5  | M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 |
|---------------------------------|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Admissible torque<br>$M_A$ (Nm) | 4.2 | 7.5 | 13 | 28 | 50  | 88  | 120 | 160 | 200 | 290 | 400 | 500 |

**Tightening torques to mount top jaws on the TANDEM clamping block (screw quality 12.9)**

| Screw size                       | M4 | M5 | M6 | M8 | M10 | M12 | M14 | M16 | M20 | M24 |
|----------------------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|
| Tightening torques<br>$M_A$ (Nm) | 5  | 9  | 15 | 32 | 62  | 108 | 170 | 262 | 510 | 880 |

**Tightening torques to mount the chuck piston onto the cylinder piston (screw quality 12.9)**

| Screw size                       | M5 | M8 | M10 | M12 |
|----------------------------------|----|----|-----|-----|
| Tightening torques<br>$M_A$ (Nm) | 9  | 32 | 62  | 108 |

## 7 Assembly

### 7.1 Mounting of the Clamping System on the machine table

(For item numbers see Illust. "Mounting" and "Connections of the Clamping System" and Chapter "Drawings" ► 11 [□ 31])

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#### NOTE

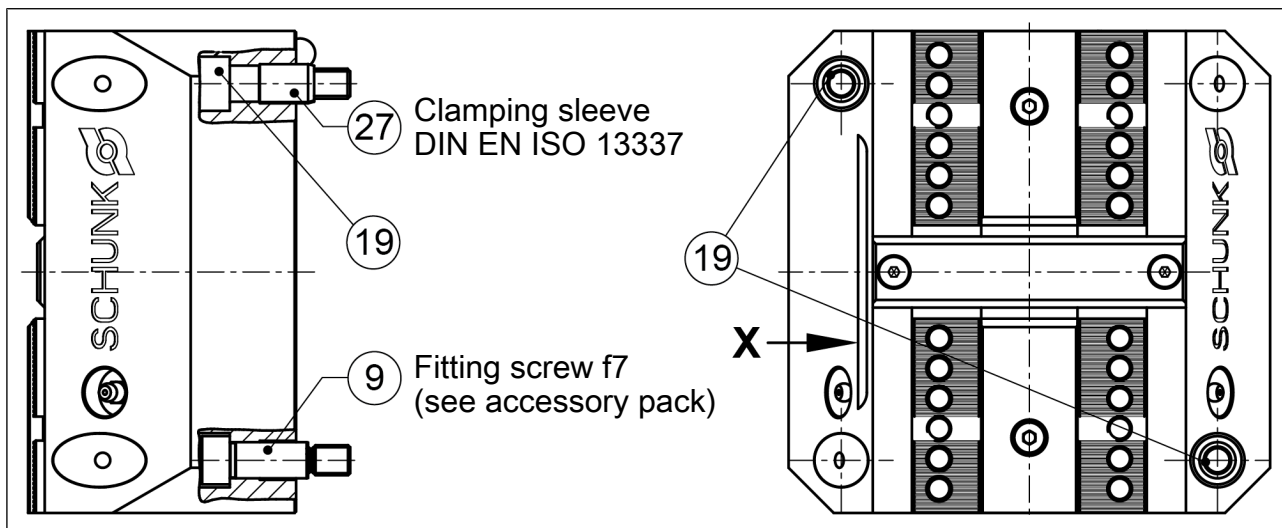
- In case of vertical installation, make sure that the opening for the coolant outlet (item 13) shows to the bottom.
  - Surface **X** is parallel to the base jaw's guideway (item 2), to make it possible to align the Clamping System on the machine table.
  - The clamping surface of the machine table must have a sufficiently precise flatness, in order to ensure that the clamping system will not brace during assembly, and that malfunctions will be avoided.
- 

#### Assembly of clamping sleeves:

The clamping system is assembled in combination of clamping sleeves (Item 27) and screws (Item 19) on the machine table. Sufficient positioning and form tolerances for the centering seats over the fastening bores at the machine table have to be observed.

#### Assembly of locating screws:

The housing (item 1) is equipped with two fittings, which allow, with the optional available locating screws (item 9) a repeat-accurate centering of the Clamping System on the machine table. After disassembly of the power block from the machine table (i.e. after the change of sealings), it is not necessary to realign it again. If locating screws (item 9) are used, the clamping sleeves (item 27) and both appropriate screws (item 19) will be replaced by them. Sufficient positioning and form tolerances for the centering seats over the fastening bores at the machine table have to be observed, in order to assure a repeat-accurate centering of the clamping system.

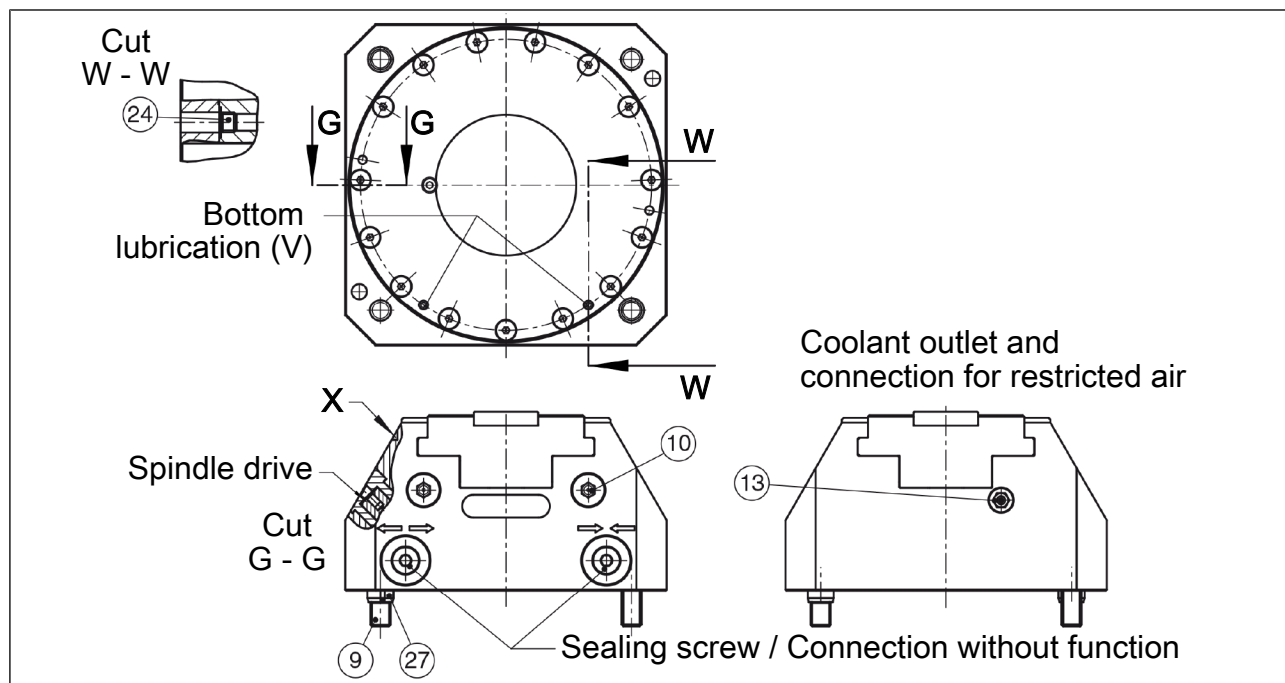


Mounting

## 7.2 Connections of the Clamping System

(For item numbers see Illust. "Mounting" and "Connections of the Clamping System" and Chapter "Drawings" ▶ 11 [ 31])

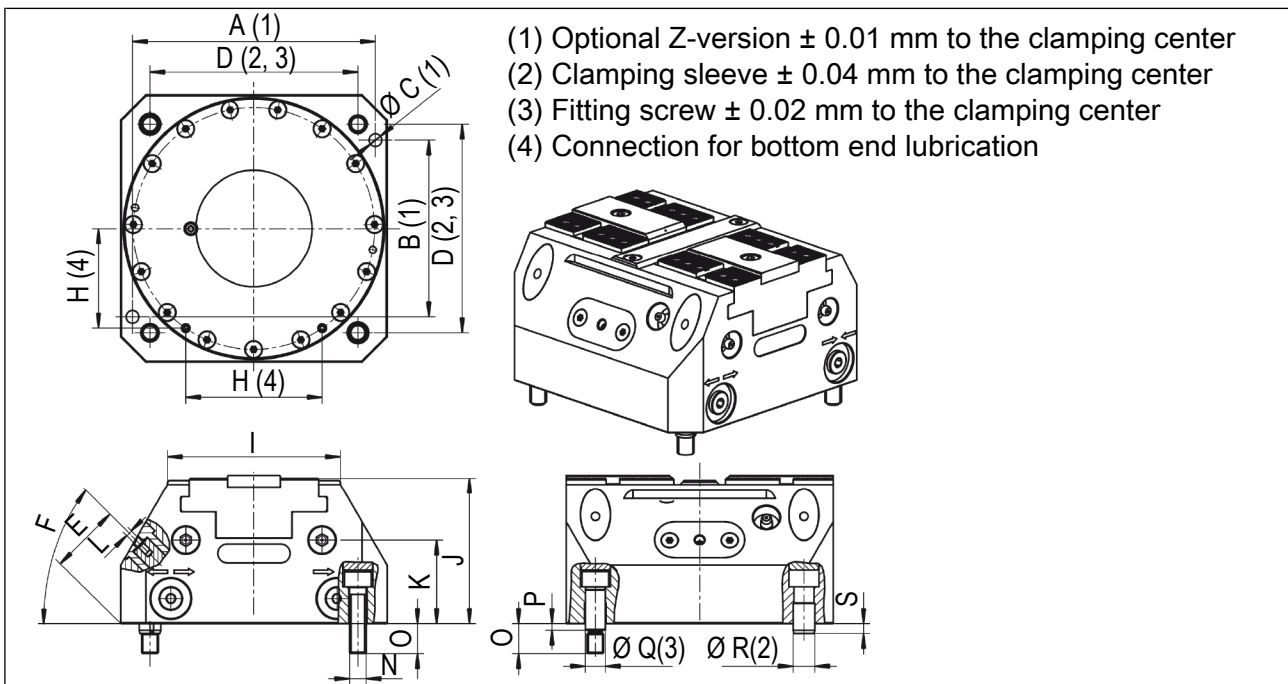
|                           |                                                     |
|---------------------------|-----------------------------------------------------|
| Actuation:                | Hexalobular (TORX)-actuation key, manually actuated |
| Operation temperature:    | +5 °C bis +60 °C                                    |
| Torque:                   | see chapter "Technical data"                        |
| Position of installation: | application dependent                               |



Connections of the Clamping System

| Dimension | 100 | 160 |
|-----------|-----|-----|
| A         | 90  | 146 |
| B         | 64  | 106 |

| Dimension | 100      | 160       |
|-----------|----------|-----------|
| Ø C       | 6H7 x 12 | 8 H7 x 14 |
| D         | 80       | 125       |
| E         | 36       | 42        |
| F         | 45°      | 45°       |
| G         | 34.5     | 59.7      |
| H         | 55       | 82        |
| I         | 64       | 104       |
| J         | 74.2     | 87.2      |
| K         | 47       | 50        |
| L (TORX)  | T30      | T30       |
| N         | M8       | M10       |
| O         | 15       | 18        |
| P         | 4        | 4         |
| Ø Q       | 10f7     | 12f7      |
| Ø R       | 11       | 13        |
| S         | 4.5      | 6         |



Dimensions

**NOTE**

The connection thread for pneumatic screw connections (closed at the face with sealing screws), as well as the function icons have no function.

---

The clamping system has two more bottom connections (V), which allow direct lubrication via the machine table. Prior to delivery these connections are closed with setscrews (Item 24).

If necessary, the clamping system can be automatically supplied with lubricant. The clamping system is equipped with two bottom end connections for lubricant supply. One each bore provides the slideway of both base jaws with lubricant. Therefore both lines have to be connected.

The automatic lubricant supply should be carried out in interval operations. For this purpose, the bottom end openings have to be sealed. Sealing is done with an O-ring, which is inserted in an O-ring seat at the table top. Installation dimensions for axially sealing O-ring seats have to be manufactured (see illustration 2) according to corresponding indications dia.  $9^{+0.1} \times 1.1^{+0.05}$ . The set-screws M6 x 4.0 Torx (Item 24) have to be removed from the cover (Item 5) first.

The recommended O-rings for sealing the supply lines  $\varnothing 6 \times 1.5$  are not included in the clamping block's scope of delivery.

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#### **NOTE**

**The threads for hose-free, direct connection are not designed for pneumatic fitting.**

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## 8 Trouble shooting

### The jaws of the Clamping System don't move:

| Possible cause                                                                                      | Corrective action                                   |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Hexalobular socket (TORX) for actuation at the spindle drive (driving bevel gear Item 34) is defect | Replace damaged parts with SCHUNK replacement parts |
| Actuation key was overtightened, or the hexalobular socket (TORX) is damaged                        | Replace damaged parts with SCHUNK replacement parts |
| Break of the spindel (overload)                                                                     | Replace damaged parts with SCHUNK replacement parts |
| Break of the serration at the gear drive of the bevel gear or the spindle drive                     | Replace damaged parts with SCHUNK replacement parts |
| Screw fracture at the chuck piston (overload)                                                       | Replace damaged parts with SCHUNK replacement parts |
| Break of the piston rod (over-load)                                                                 | Replace damaged parts with SCHUNK replacement parts |

### The Clamping System does not move the full stroke:

| Possible cause                                          | Corrective action                    |
|---------------------------------------------------------|--------------------------------------|
| Chips or dirt between the cover strip and the base jaws | Clean and if necessary re-lubricate. |

### Drop of Clamping force:

| Possible cause           | Corrective action            |
|--------------------------|------------------------------|
| Insufficient lubrication | Clean and lubricate product. |

### The Clamping System moves jerkily:

| Possible cause                                                   | Corrective action                                   |
|------------------------------------------------------------------|-----------------------------------------------------|
| Steel guidances at the sliding faces are not lubricated          | Clean and lubricate product.                        |
| Damage at the gear drive of the bevel gear or the spindle drive. | Replace damaged parts with SCHUNK replacement parts |

## 9 Maintenance and care

The item numbers specified for the corresponding individual components relate to chapter drawings. ▶ 11 [□ 31]

### NOTE

**The base jaws (item 2, 31), the chuck piston (item 3) and the housing (item 1) are inter-coordinated. For replacement of these parts, send the complete Clamping System to SCHUNK together with a repair order.**

In order to keep the Clamping System in proper working order, observe the following notes:

- Make sure that the bore for the coolant drainage is always kept clear!
- Depending on the load but at least once a month or every 10,000 clampings, lubricate the guides on the two frontal or the two lateral lubricating nipples with LINO MAX 200 or equivalent lubricant. For this purpose the chuck jaws should be in opened position. For this purpose the chuck jaws should be in opened position.
- Disassemble the base jaw and chuck piston at least every three months (or more often, if required). Clean the housing, base jaw and chuck piston and lubricate all the guides (housing, base jaw, chuck piston) with LINO MAX 200 or an equivalent lubricant. Reassemble everything and relubricate the two frontal or two lateral lubricating nipples and at the gear of the spindle with LINO MAX 200 or an equivalent lubricant.

### 9.1 Disassembly and assembly of the Clamping System

When replacing wearing parts (e.g. seals), adhere to the following order:

1. Pull out the plugs (Item 8) of the housing (Item 1). At the plugs O-rings (Item 18) are mounted for clamping the housing. If necessary, they can be removed.
2. Loosen the screws (Item 9, 19) and disassemble the clamping system from the machine table.
3. Remove the cover strip (Item 7) and the guiding gib (Item 6).
4. Remove the screws (Item 38) from the housing (Item 1). Remove the sleeves (Item 36) and the bevel gear (Item 34) from the housing.
5. For pulling off the cover (Item 5), all the screws (Item 21) have to be removed first. For pulling of the cover (Item 5), two screws have to be screwed into the outer tapped hole:  
for size 100: two M3 x > 25 screws,

for size 160: two M5 x > 25 screws

On demand, the screw (Item 37) for the front support of the bevel gear (Item 34) can be removed.

6. Remove all seals (Item 23).
7. Remove the cylindrical screw (Item 14) from the chuck piston.  
For this purpose, the spindle (Item 4) must be counter-held with a suitable tool at the hexagon.
8. For pulling off the chuck piston (Item 3) from a KSA plus 100: an M10 x > 25 screw has to be screwed into the center bore KSA plus 160: an M12 x > 25 screw has to be screwed into the center bore and has to be squeezed off from the spindle (Item 4).  
Make sure that the bevel gear (Item 33) and the spindle (Item 4) will not drop out of the housing. In addition for version KSA-Fplus: Remove the spherical washer (Item 28) from the chuck piston (Item 3). Remove the screw (Item 32) between the base jaw (Item 31) and the housing (Item 1). Pull off the positioning pin (Item 29) between the base jaw (Item 31) and the housing (Item 1). For sizes 100 and 160 an M5 screw is screwed into the thread of the positioning pin (Item 29). Pull off the base jaw (Item 31) from the housing (Item 1).
9. Remove the base jaws (Item 2) from the housing (Item 1).
- 10 Remove the bevel gear (Item 33) together with the spindle (Item 4) from the housing (Item 1), and disassemble both components by opening the thread.
- 11 If necessary, remove the seals (Item 15, 20).
- 12 The attachment parts lubrication nipple (Item 10), sealing screws (Item 11) and silender (Item 13) can be detached from the housing if necessary.
- 13 Before assembly of the clamping system, every component must be thoroughly cleaned and controlled on damages. Wear parts have to be replaced.
- 14 The new seals (Item 15, 20, 23) have to be lubricated with Renolit HLT 2 or any equivalent grease.
- 15 Carefully assemble the new seals and do not damage them.
- 16 The sliding surfaces of the housing (Item 1), the base jaws (Item 2) and the chuck piston (Item 3) have to be lubricated with LINO MAX 200 or any equivalent lubricant.
- 17 Assemble the base jaws (Item 2) and the chuck piston (Item 3).  
Thereby please observe the installation position of the base jaws and of the chuck piston.

- Additionally for version KSP-Fplus: Assemble the base jaw (Item 31) into the housing (Item 1). Assemble the positioning pin (Item 29) between the base jaw (Item 31) and the housing (Item 1). Screw in the screw (Item 32) between base jaw (Item 31) and housing (Item 1).
- 18 Apply LINO MAX 200 or any equivalent lubricant at the sliding surfaces of the bevel gear (Item 33) and the spindle (Item 4).
- 19 Separately integrate the spindle into the bevel gear (Item 33). For this purpose, the spindle must be screwed in almost completely into the bevel gear. Insert the components into the housing. The bevel gear must lie on top of the housing's flat surface evenly.
- 20 Screw together the chuck piston (Item 3) and the spindle (Item 4). In case of type KSA-Fplus, the spherical washer (Item 28) must be inserted below the screw (Item 6). The arched spherical surface points in direction of the chuck piston. Tighten the screws (Item 14) with an Allen key (see chapter 4). During assembly, the spindle must be counter-held with a hexagon socket spanner at the hexagon. Please make sure that the alignment of the locking in the spindle head match with the fitting groove of the chuck piston. Therefore the spindle will be positively fixed in the chuck piston, and will be secured against unexpected loosening.
- 21 Insert the O-rings (Item 23) into the housing.
- 22 Insert the cover (Item 5) into the housing (Item 1). The openings at the bottom end lubrication and the O-ring seats in the housing must lie on top of each other, and the recess for the bevel gear must be oriented in direction of the spindle drive.
- 23 Screw the cover (Item 5) together with the housing (Item 1). Use a torque wrench with the values indicated on the chart in chapter 4.0
- 24 If clamping sleeves (Item 27) will be used for centering, drive them now into the housing (Item 1).
- 25 Apply LINO MAX 200 or any equivalent lubricant at the sliding surfaces of the sleeve (Item 36) and the bevel gear (Item 34).
- 26 Insert the sleeve (Item 36) together with the bevel gear (Item 34) into the housing (Item 1). The serration of the bevel gear (Item 34) has to mesh into the serration of the bevel gear (Item 33). Thereby the sleeve has to contact and fit the recessed flat surface of the housing. Fasten the sleeve with the screws (Item 38) in the housing with screws.

27 Adjust the gear backlash in the bevel gear with the screw (Item 37) in the cover (Item 5). As a result, the driving bevel gear (Item 34) is mounted at the end faces and supported. Control proper function. An optimum adjustment is assured, if a jerk-free function of the gearwheel drive is noticeable. The screw must be secured with a medium thread locking compound against loosening.

28 Fasten the guide beads (Item 6) and the cover strip (Item 7).

29 Finally control proper function (see chapter 9.2).

## 9.2 Control of the clamping function

The clamping system is a spindle-driven clamping system with manual actuation.

The clamping function is suitable for O.D.- and I.D. clamping of workpieces.

Depending on the clamping direction, the same torque and the same clamping force will be available at the spindle.

The jaw stroke of the base jaws is limited by the internal spindle mechanism of both end positions.

The clamping force can be adjusted via the introduced torque.

### For control of function you will require:

- A clamping wrench with hexalobular (TORX) (An hexalobular (TORX) wrench with a T-handle would be advantageous)
- Or:
- A screwdriver for clockwise and anti-clockwise operation with torque selector and hexalobular (TORX) bit holder would be an alternative.

### Control of the clamping function:

1. Insert the clamping wrench completely into the hexalobular (TORX) socket of the actuation spindle (Item 34).
2. Cautiously actuate the clamping system with the clamping wrench. The maximum admissible torque is achieved, as soon as the jaws are located in both end positions of the clamping system. The maximum admissible torque at the spindle should never be exceeded (see chapter 6).
  - If the drive spindle should be turned in clockwise direction, the following components move: In case of types KSA plus and KSA-LH the base jaws symmetrically move in direction of the workpiece center. In case of type KSA-F plus the moveable base jaw moves against the fixed one.

3. The base jaws of the clamping system should be moved 1 x completely into both end positions back and forth. Due to the reduction of the spindle drive, several rotations at the drive spindle are necessary. The whole spindle drive should be smoothly running without any jerks.

If the spindle drive should be stiff or should move jerkily, the gear backlash in the bevel gear has to be adjusted at the screw (Item 37) in the cover (Item 5). If now proper function can be achieved, the clamping system has to be disassembled and controlled on damage (see chapter 9.1 Disassembly and Assembly of the Clamping System).

### **9.3 Important note**

**Operate the Clamping System preferred with a torque-key. The maximum admissible torque at the drive spindle should never be exceeded.**

## 10 Sealing kits, accessory packs and parts lists

When ordering spare parts, the type, size and, if possible, the serial number of the clamping block must always be stated to avoid delivery mistakes.

**Seals, sealing elements, screw connections, springs, bearings, screws, wiper bars and parts that come into contact with the workpiece are not covered by the warranty.**

### 10.1 Seal kit lists

KSApius 100 (Id.-No.: 0405290) KSA-LHplus 100 (Id.-No.: 0405294) KSA-Fplus 100 (Id.-No.: 0405292)

| Item | Designation                  | Quantity |
|------|------------------------------|----------|
| 15   | Sealing ring                 | 1        |
| 20   | O-ring DIN 3771 18.77 x 1.78 | 1        |

KSApius 160 (Id.-No.: 0405390) KSA-LHplus 160 (Id.-No.: 0405390) KSA-Fplus 160 (Id.-No.: 0405392)

| Item | Designation      | Quantity |
|------|------------------|----------|
| 15   | Sealing ring     | 1        |
| 20   | Turcon glyd ring | 1        |

### 10.2 Accessory packs

KSApius 100 (Id.-No.: 0405290) KSA-LHplus 100 (Id.-No.: 0405294) KSA-Fplus 100 (Id.-No.: 0405292)

| Item | Designation                                   | Quantity |
|------|-----------------------------------------------|----------|
| 8    | Plug                                          | 4        |
| 9    | Fitting screw 10f7/M8                         | 2        |
| 18   | O-ring DIN 3771 9 x 2.00                      | 4        |
| 19   | Screw DEI 4762/10.9 M8 x 35 mm                | 4        |
| 27   | Clamping sleeve DIN EN ISO 13337 DRM. 11 x 16 | 2        |
| 51   | Screw DEI 4762/12.9 M6 x 16 mm                | 8        |

KSApius 160 (Id.-No.: 0405390) KSA-LHplus 160 (Id.-No.: 0405390) KSA-Fplus 160 (Id.-No.: 0405392)

| Item | Designation                                   | Quantity |
|------|-----------------------------------------------|----------|
| 8    | Plug                                          | 4        |
| 9    | Fitting screw 12f7/M10                        | 2        |
| 18   | O-ring DIN 3771 12 x 2.00                     | 4        |
| 19   | Screw DEI 4762/10.9 M10 x 40 mm               | 4        |
| 27   | Clamping sleeve DIN EN ISO 13337 DRM. 13 x 18 | 2        |
| 51   | Screw DEI 4762/12.9 M8 x 20 mm                | 8        |

### 10.3 Part lists

KSApius 100

| Item | Designation | Quantity |
|------|-------------|----------|
| 1    | Body        | 1        |
| 2    | Base jaw    | 2        |

| Item | Designation                                        | Quantity |
|------|----------------------------------------------------|----------|
| 3    | Piston                                             | 1        |
| 4    | Spindle                                            | 1        |
| 5    | Cover                                              | 1        |
| 6    | Guide strip                                        | 2        |
| 7    | Cover plate                                        | 1        |
| 8**  | Plug                                               | 4        |
| 9**  | Fitting screw 10f7/M8                              | 2        |
| 10   | Grease nipple DIN 3405                             | 4        |
| 11   | Screw plug                                         | 2        |
| 13   | Sound absorber                                     | 1        |
| 14   | Screw DEI 4762/10.9 M8 x 20 mm                     | 1        |
| 15*  | Sealing ring                                       | 1        |
| 16   | Screw DIN 7984/8.8 M6 x 10 mm                      | 2        |
| 18** | O-ring DIN 3771 9 x 2.00                           | 4        |
| 19** | Screw DEI 4762/10.9 M8 x 35 mm                     | 4        |
| 20*  | O-ring DIN 3771 18.77 x 1.78                       | 1        |
| 21   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 12 mm | 10       |
| 24   | Set screw                                          | 2        |
| 25   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |
| 27** | Clamping sleeve DIN 7346 DRM. 11 x 16              | 2        |
| 33   | Bevel gear, driven                                 | 1        |
| 34   | Bevel gear, floating                               | 1        |
| 36   | Sleeve                                             | 1        |
| 37   | Screw DEI 4762/10.9 M4 x 12 mm                     | 1        |
| 38   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |

## KSA-LHplus 100

| Item | Designation           | Quantity |
|------|-----------------------|----------|
| 1    | Body                  | 1        |
| 2    | Base jaw              | 2        |
| 3    | Piston                | 1        |
| 4    | Spindle               | 1        |
| 5    | Cover                 | 1        |
| 6    | Guide strip           | 2        |
| 7    | Cover plate           | 1        |
| 8**  | Plug                  | 4        |
| 9**  | Fitting screw 10f7/M8 | 2        |

## Sealing kits, accessory packs and parts lists

| Item | Designation                                       | Quantity |
|------|---------------------------------------------------|----------|
| 10   | Grease nipple DIN 3405                            | 4        |
| 11   | Screw plug                                        | 2        |
| 13   | Sound absorber                                    | 1        |
| 14   | Screw DEI 4762/10.9 M8 x 20 mm                    | 1        |
| 15*  | Sealing ring                                      | 1        |
| 16   | Screw DIN 7984/8.8 M6 x 10 mm                     | 2        |
| 18** | O-ring DIN 3771 9 x 2.00                          | 4        |
| 19** | Screw DEI 4762/10.9 M8 x 35 mm                    | 4        |
| 20*  | O-ring DIN 3771 18.77 x 1.78                      | 1        |
| 21   | Countersunk srew DIN EN ISO 10642/10.9 M4 x 12 mm | 10       |
| 24   | Set screw                                         | 2        |
| 25   | Countersunk srew DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |
| 27** | Clamping sleeve DIN 7346 DRM. 11 x 16             | 2        |
| 33   | Bevel gear, driven                                | 1        |
| 34   | Bevel gear, floating                              | 1        |
| 36   | Sleeve                                            | 1        |
| 37   | Screw DEI 4762/10.9 M4 x 12 mm                    | 1        |
| 38   | Countersunk srew DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |

### KSA-Fplus 100

| Item | Designation            | Quantity |
|------|------------------------|----------|
| 1    | Body                   | 1        |
| 2    | Base jaw               | 1        |
| 3    | Piston                 | 1        |
| 4    | Spindle                | 1        |
| 5    | Cover                  | 1        |
| 6    | Guide strip            | 2        |
| 7    | Cover plate            | 1        |
| 8**  | Plug                   | 4        |
| 9**  | Fitting screw          | 2        |
| 10   | Grease nipple DIN 3405 | 4        |
| 11   | Screw plug             | 2        |
| 13   | Sound absorber         | 1        |
| 14   | Screw                  | 1        |
| 15*  | Sealing ring           | 1        |
| 16   | Screw                  | 2        |
| 18** | O-ring                 | 4        |

| Item | Designation                                        | Quantity |
|------|----------------------------------------------------|----------|
| 19** | Screw                                              | 4        |
| 20*  | O-ring                                             | 1        |
| 21   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 12 mm | 10       |
| 24   | Set screw                                          | 2        |
| 25   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |
| 27** | Clamping sleeve DIN EN ISO 13337 DRM. 11 x 16      | 2        |
| 28   | Spherical washer                                   | 1        |
| 29   | Positioning pin                                    | 1        |
| 30   | Screw DIN 7984/ 8.8 M6 x 20 mm                     | 1        |
| 31   | Base jaw                                           | 1        |
| 32   | Screw DEI 4762/10.9 M6 x 25 mm                     | 1        |
| 33   | Bevel gear, driven                                 | 1        |
| 34   | Bevel gear, floating                               | 1        |
| 36   | Sleeve                                             | 1        |
| 37   | Screw DEI 4762/10.9 M4 x 12 mm                     | 1        |
| 38   | Countersunk screw DIN EN ISO 10642/10.9 M4 x 8 mm  | 2        |

## KSAPlus 160

| Item | Designation                     | Quantity |
|------|---------------------------------|----------|
| 1    | Body                            | 1        |
| 2    | Base jaw                        | 2        |
| 3    | Piston                          | 1        |
| 4    | Spindle                         | 1        |
| 5    | Cover                           | 1        |
| 6    | Guide strip                     | 2        |
| 7    | Cover plate                     | 1        |
| 8**  | Plug                            | 4        |
| 9**  | Fitting screw 12f7/M10          | 2        |
| 10   | Grease nipple                   | 4        |
| 11   | Screw plug                      | 2        |
| 13   | Sound absorber                  | 1        |
| 14   | Screw DEI 4762/10.9 M10 x 25 mm | 1        |
| 15*  | Sealing ring                    | 1        |
| 16   | Screw DIN 7984/8.8 M6 x 10 mm   | 2        |
| 18** | O-ring DIN 3771 12 x 2.00       | 4        |
| 19** | Screw DEI 4762/10.9 M10 x 40 mm | 4        |
| 20*  | Turcon glyd ring                | 1        |

| Item | Designation                                        | Quantity |
|------|----------------------------------------------------|----------|
| 21   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 20 mm | 10       |
| 24   | Set screw                                          | 2        |
| 25   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 10 mm | 2        |
| 27** | Clamping sleeve DIN EN ISO 13337 DRM. 13 x 18      | 2        |
| 33   | Bevel gear, driven                                 | 1        |
| 34   | Bevel gear, floating                               | 1        |
| 36   | Sleeve                                             | 1        |
| 37   | Screw DEI 4762/10.9 M4 x 10 mm                     | 1        |
| 38   | Countersunk screw M5 x 12 mm                       | 2        |

## KSA-LHplus 160

| Item | Designation                                        | Quantity |
|------|----------------------------------------------------|----------|
| 1    | Body                                               | 1        |
| 2    | Base jaw                                           | 2        |
| 3    | Piston                                             | 1        |
| 4    | Spindle                                            | 1        |
| 5    | Cover                                              | 1        |
| 6    | Guide strip                                        | 2        |
| 7    | Cover plate                                        | 1        |
| 8**  | Plug                                               | 4        |
| 9**  | Fitting screw 12f7/M10                             | 2        |
| 10   | Grease nipple DIN 71412 A                          | 4        |
| 11   | Screw plug                                         | 2        |
| 13   | Sound absorber                                     | 1        |
| 14   | Screw DEI 4762/10.9 M10 x 25 mm                    | 1        |
| 15*  | Sealing ring                                       | 1        |
| 16   | Screw DIN 7984/8.8 M6 x 10 mm                      | 2        |
| 18** | O-ring DIN 3771 12 x 2.00                          | 4        |
| 19** | Screw DEI 4762/10.9 M10 x 40 mm                    | 4        |
| 20*  | Turcon glyd ring                                   | 1        |
| 21   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 10 mm | 15       |
| 24   | Set screw                                          | 2        |
| 25   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 10 mm | 2        |
| 27** | Clamping sleeve DIN EN ISO 13337 DRM. 13 x 18      | 2        |
| 33   | Bevel gear, driven                                 | 1        |

| Item | Designation                    | Quantity |
|------|--------------------------------|----------|
| 34   | Bevel gear, floating           | 1        |
| 36   | Sleeve                         | 1        |
| 37   | Screw DEI 4762/10.9 M4 x 10 mm | 1        |
| 38   | Countersunk screw M5 x 12 mm   | 2        |

## KSA-Fplus 160

| Item | Designation                                        | Quantity |
|------|----------------------------------------------------|----------|
| 1    | Body                                               | 1        |
| 2    | Base jaw                                           | 1        |
| 3    | Piston                                             | 1        |
| 4    | Spindle                                            | 1        |
| 5    | Cover                                              | 1        |
| 6    | Guide strip                                        | 2        |
| 7    | Cover plate                                        | 1        |
| 8**  | Plug                                               | 4        |
| 9**  | Fitting screw 12f7/M10                             | 2        |
| 10   | Grease nipple DIN 71412 A                          | 4        |
| 11   | Screw plug                                         | 2        |
| 13   | Sound absorber                                     | 1        |
| 14   | Screw DEI 4762/10.9 M10 x 25 mm                    | 1        |
| 15*  | Sealing ring                                       | 1        |
| 16   | Screw DIN 7984/8.8 M6 x 10 mm                      | 2        |
| 18** | O-ring DIN 3771 12 x 2.00                          | 4        |
| 19** | Screw DEI 4762/10.9 M10 x 40 mm                    | 4        |
| 20*  | Turcon glyd ring                                   | 1        |
| 21   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 20 mm | 15       |
| 24   | Set screw                                          | 2        |
| 25   | Countersunk screw DIN EN ISO 10642/10.9 M5 x 10 mm | 2        |
| 27** | Clamping sleeve DIN EN ISO 13337 DRM. 13 x 18      | 2        |
| 28   | Spherical washer                                   | 1        |
| 29   | Positioning pin                                    | 1        |
| 30   | Screw DIN 7984/8.8 M6 x 22 mm                      | 1        |
| 31   | Base jaw                                           | 1        |
| 32   | Screw DEI 4762/10.9 M6 x 35 mm                     | 1        |
| 33   | Bevel gear, driven                                 | 1        |
| 34   | Bevel gear, floating                               | 1        |
| 36   | Sleeve                                             | 1        |

| Item | Designation                    | Quantity |
|------|--------------------------------|----------|
| 37   | Screw DEI 4762/10.9 M4 x 10 mm | 1        |
| 38   | Countersunk srew M5 x 12 mm    | 2        |

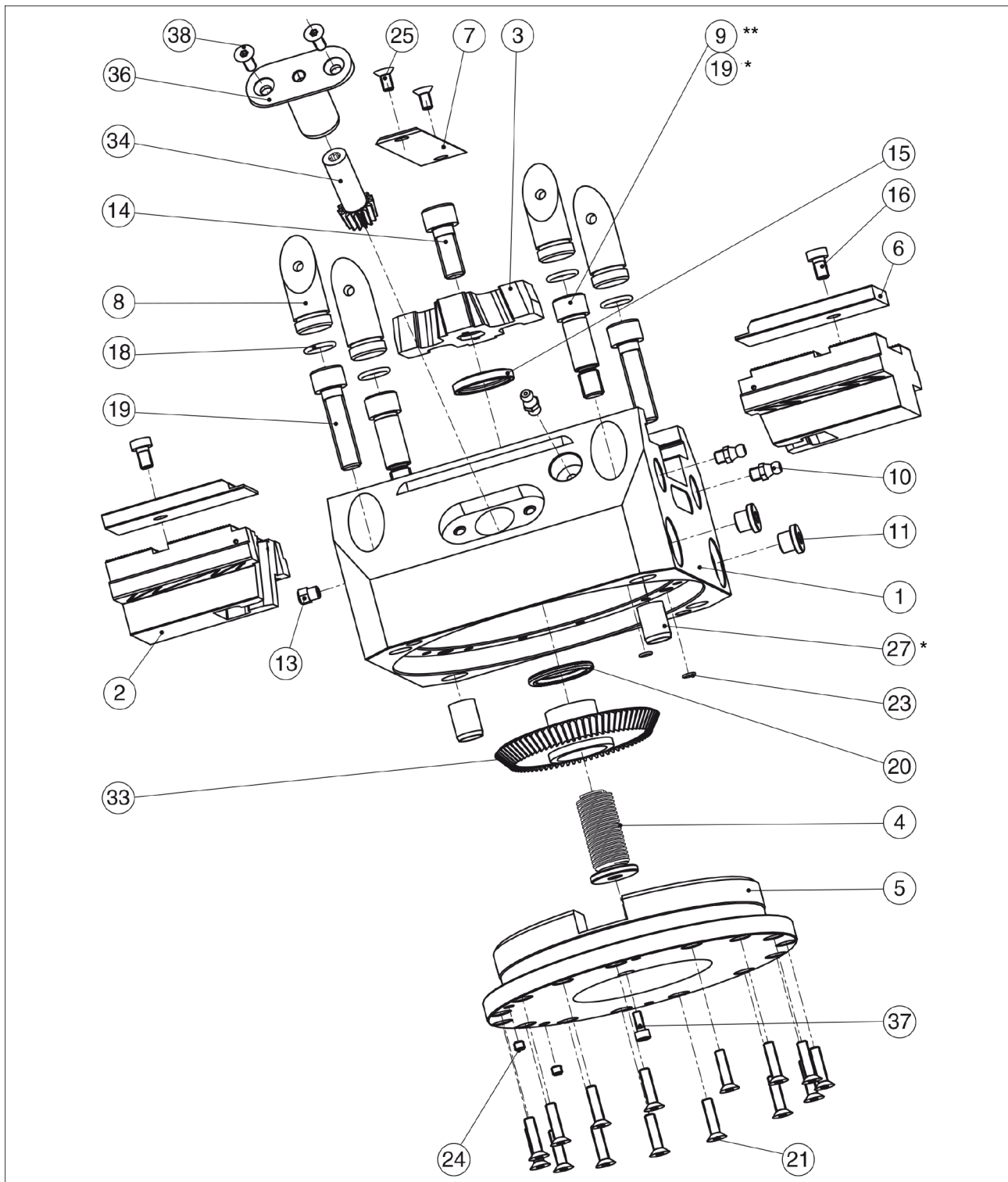
See seal kit list – The parts cannot be ordered separately

\*\* Is included in the accessories kit

**Wear parts; replacement during maintenance recommended**

## 11 Assembly drawings

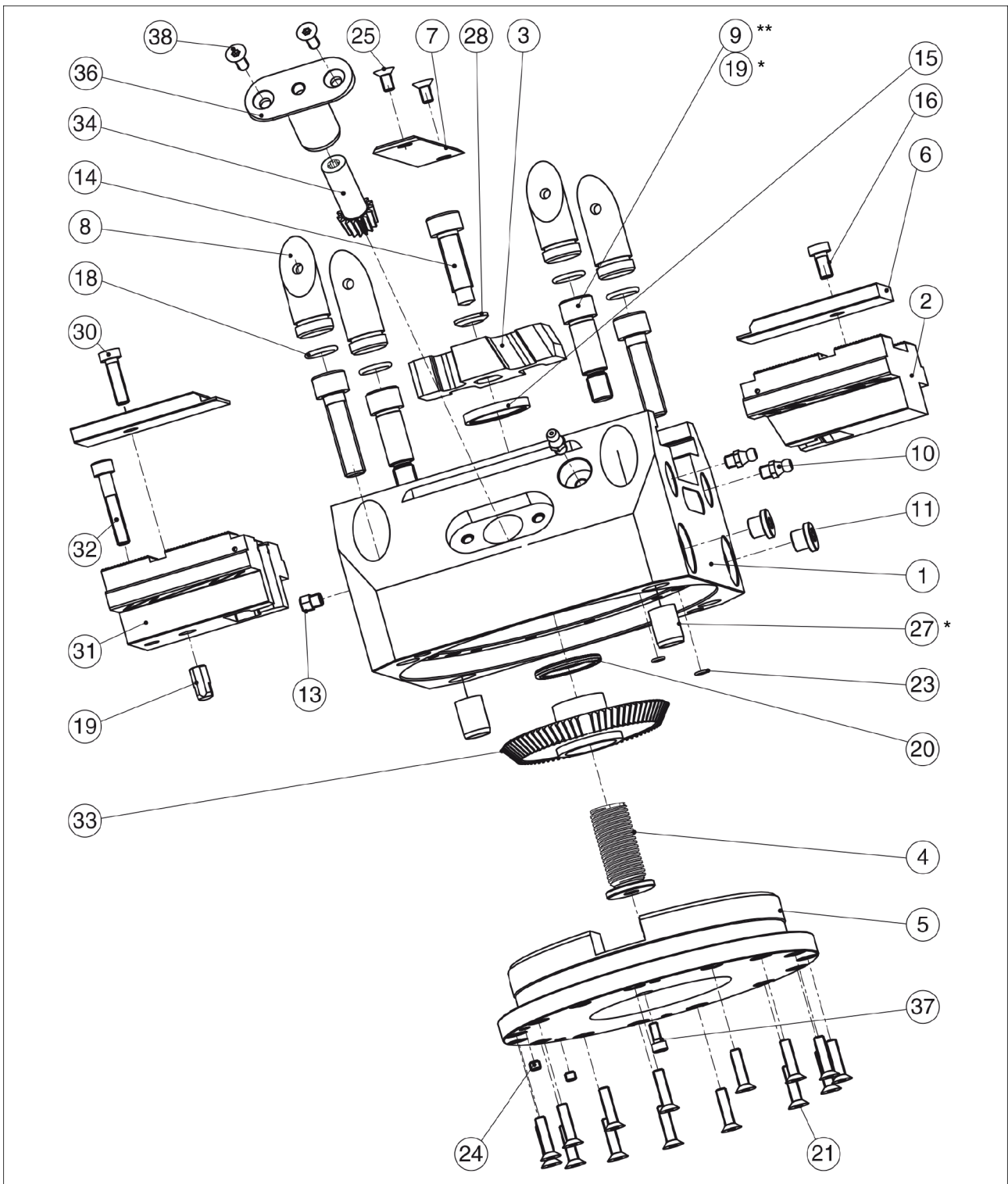
### 11.1 KSAplus, KSA-LHplus



\* Centering with clamping sleeves

\*\* Centering with fitting screws

### 11.2 KSA-Fplus

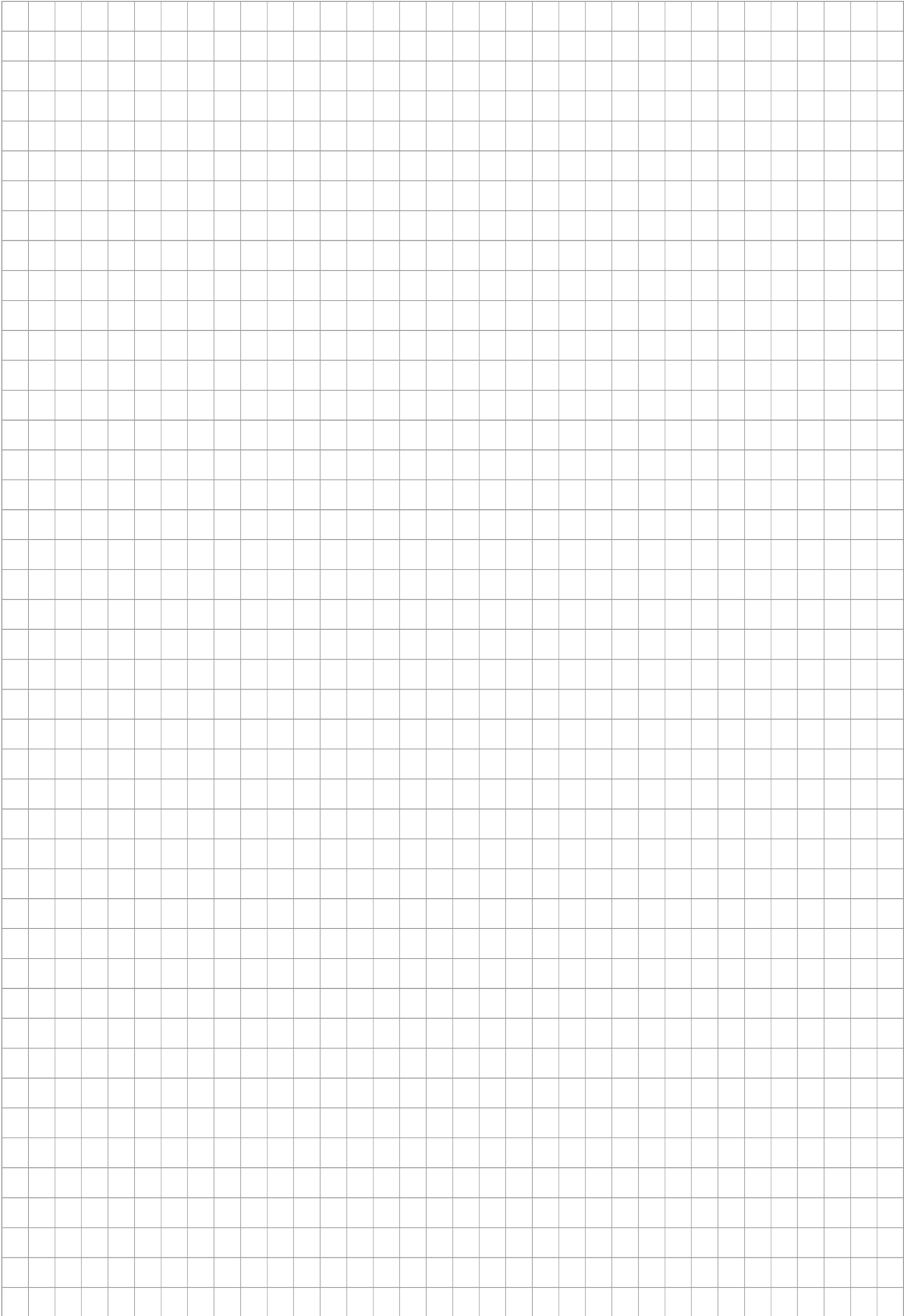


\* Centering with clamping sleeves

\*\* Centering with fitting screws







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**H.-D. SCHUNK GmbH & Co.  
Spanntechnik KG**

Lothringer Str. 23  
D-88512 Mengen  
Tel. +49-7572-7614-0  
Fax +49-7572-7614-1099  
info@de.schunk.com  
schunk.com

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