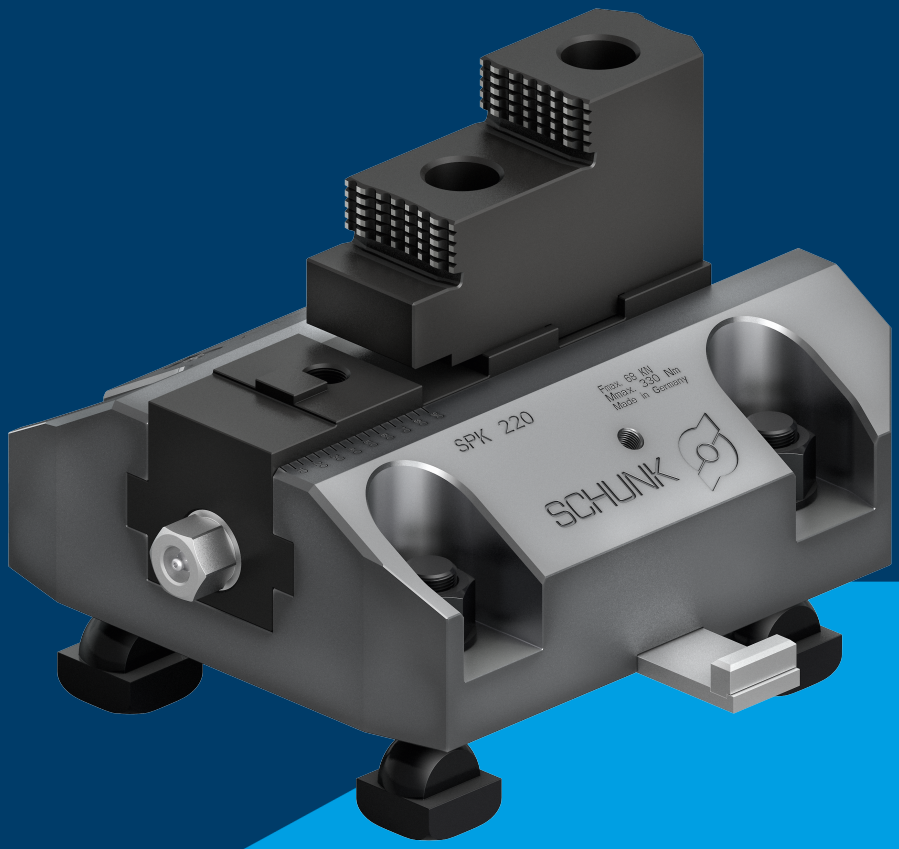


Jaw boxes SPK

Assembly and Operating Manual

Translation of Original Operating Manual

Hand in hand for tomorrow

Imprint

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

Document number: 0889015

Version: 04.00 | 20/07/2023 | en

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
cmm@de.schunk.com

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

Table of Contents

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 [🗋 7]

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 Warnings

The following key words and symbols are used to highlight dangers.

⚠ DANGER

It threatens an immediate danger.
Non-observance will result in death or irreversible injury.

⚠ WARNING

It threatens a possible dangerous situation.
Non-observance may result in death or irreversible injury.

⚠ CAUTION

It can be threaten a possible dangerous situation.
Non-observance may result in property damages and injuries.

CAUTION

Informations and Instructions.
Non-observance may result in property damages.

1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Calculation of the jaw centrifugal forces, "Technology" chapter in the lathe chuck catalog *

The documents labeled with an asterisk (*) can be downloaded from **schunk.com**.

2 Basic safety instructions

Improper handling, assembly and maintenance of this product may result in risks 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 original SCHUNK spare parts may be used.

NOTE
We hereby confirm that the components comply with the relevant basic and proven safety principles of Annex A and C of ISO 13849-2, taking into account the requirements of the documentation. The parameters, limitations, ambient conditions, characteristic values, etc. for proper operation are defined in the operating manual.

2.1 Intended use

The jaw boxes are suitable for clamping workpieces on face plates with parallel guided T-slots on machine tools and other suitable technical equipment, paying particular attention to the technical data specified by the manufacturer. The technical data specified by the manufacturer must never be exceeded.

The product is intended for industrial use.

Intended use also means that the user has read and understood this operating manual in its entirety, especially the chapter “Basic safety notes”.

The maximum speed of the face plate and the necessary clamping force must be determined by the operator for each clamping task in accordance with the valid standards or technical specifications of the manufacturer.
(See also "Calculations for clamping force and speed of rotation" in chapter "Technical data".) ▸ 6 [🗋 18]

2.2 Not intended use

The jaw box is not being used as intended if, for example:

- It is used as a press, a punch, a toolholder, a load-handling device or as lifting equipment.
- It is used in working environments that are not permissible.
- Workpieces are not clamped properly, paying particular attention to the clamping forces specified by the manufacturer.

- People work on machines or technical equipment that do not comply with the EC Machinery Directive 2006/42/EC, disregarding the applicable safety regulations.
- The technical data specified by the manufacturer for using the jaw box are exceeded.
- The jaw box is used with machines/systems or workpieces that are not designed to be used with it.

2.3 Notes on particular risks

This product may pose a danger to persons and property if, for example:

- It is not used as intended;
- It is not installed or maintained properly;
- The safety and installation instructions, local applicable safety and accident prevention regulations or the EC Machinery Directive are not observed.

⚠ DANGER

Possible risk of fatal injury to operating personnel if a jaw breaks or if the jaw box 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 jaw box must never be exceeded.
- The jaw box 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.

⚠ DANGER

Possible risk of fatal injury to operating personnel from clothing or hair being caught on the jaw box and being dragged into the machine!

Loose clothing or long hair may become caught on projecting parts of the jaw box and be drawn into the machine!

- The machines and equipment must 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.
- Always wear tight-fitting clothing and a hairnet when working on the machine and the jaw box.

⚠ WARNING

Risk of injury due to dropping the jaw box during transport, installation or removal.

- Take special care in the danger zone when transporting, installing or removing the jaw box.
- Note the relevant load securing regulations for working safely with cranes, ground conveyors, lifting gear and load-handling equipment.

⚠ CAUTION

Risk of slipping or falling if the jaw box'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 during operation of the jaw box, especially when working with machine tools and other technical equipment.

⚠ CAUTION

Risk of limbs being crushed when opening and closing the chuck jaws during manual loading or unloading or when exchanging moving parts.

- Do not reach between the chuck jaws.
- Wear protective gloves.
- Follow the safety and accident-prevention regulations during operation of the jaw box, 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.

⚠ CAUTION

Hazard from vibration due to imbalanced rotating parts and noise generation.

Physical and mental strains due to imbalanced workpieces and noise during the machining process on the clamped and rotating workpiece.

- Ensure the jaw box's axial and concentric runout.
- Check options for remedying imbalances on special top jaws and workpieces.
- Reduce the speed.
- Wear hearing protection.

2.4 Notes on safe operation

⚠ WARNING

Danger of shifting of the jaw box when the slide is not locked

If the slide is not locked, the jaw box can shift and the workpiece can be thrown out.

- The workpiece may only be fully clamped when the slide of the jaw box is locked in the crosswise slot of the face plate.
- All mounting screws must also be tightened with the maximum permissible tightening torque.

Working with the jaw boxes

When mounting the jaw boxes on the face plate of the machine tool, the following safety requirements must be observed:

- The number and position of the jaw boxes on the face plate must be selected so that no imbalance of the machine structure occurs.
- The working area of the machine operator must not be limited. Good access to the jaw box must be guaranteed for set-up work, so that work can be performed safely.
- The base jaws of the individual jaw boxes must be adjusted so that the workpiece is in the turning center.
- As a rule, the jaw boxes must be locked in place on the face plate using a crossbar to prevent them from falling out.
- Tighten the fastening screws of the jaw boxes and the intermediate plates evenly with the permissible torque.

- The clamping force should always be applied using a torque wrench, but the permissible torque on the drive spindle must not be exceeded.
- Do not start the machine spindle until the workpiece is clamped and the spanner wrench has been removed from the clamping device.
- Turning may only be carried out with a sufficiently clamped workpiece.
- For safe operation, a protective housing of the machine is essential.
- The safety specifications from the relevant operating manuals must be followed precisely.

Observe the care and maintenance instructions.

Maintenance instructions

The jaw box's reliability can only be guaranteed if the operator complies with the manufacturer's maintenance instructions.

- For lubrication, we recommend our tried and tested special grease, LINO MAX. Unsuitable lubricants can have a negative impact on the functioning of the clamping device (clamping force, coefficient of friction, wear behavior).
  (For product information about LINO MAX, see the "Accessories" chapter of the SCHUNK lathe chuck catalog or contact SCHUNK.)
- Use a suitable high-pressure grease gun to ensure that you reach all the greasing areas.
- To ensure correct distribution of the grease, move the mechanism to its end positions several times with the spanner wrench.

Safety notes for servicing

Follow all the applicable legal standards for health and safety during servicing. Use suitable personal protective equipment, especially protective gloves, goggles, and safety boots – paying particular attention to the operating system and hazard assessment.

⚠ DANGER

Possible risk of fatal injury to operating personnel due to jaw box failure if the maintenance and servicing instructions for the jaw box are disregarded

The servicing instructions specified by the manufacturer must be complied with to ensure safe operation of the jaw box.
Work must be carried out by qualified specialist personnel with the relevant safety training.

Use of customized jaws

When using customized jaws, please observe the following rules:

- The chuck jaws should be designed to be as low as possible. The clamping point must be as close 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.)
- The base jaws with tongue and groove have a frontal attachment option for special chuck jaws.
- Fasten the mounting screws so as to achieve the greatest possible effectiveness.
- At high speeds, the jaw boxes may only be used with robust protective equipment.
- If the clamping device is involved in a collision, it must be subjected to a crack test before using it again. Damaged parts must be replaced with original SCHUNK spare parts.
- Renew the mounting bolts on the chuck jaws if there are signs of wear or damage. Only use screws with a quality of 12.9.

2.4.1 Substantial modifications

Do not carry out any major changes to the jaw box.

If the operator carries out a substantial modification to the jaw box, the product shall no longer conform to the EC Machinery Directive 2006/42/EC!

2.5 Personnel qualification

The jaw box must only be installed, removed, started up, operated and serviced by qualified specialist personnel with the relevant safety training.

All persons charged with operating, maintaining and servicing this jaw box must have access to the operating manual, especially the chapter "Basic safety notes". We recommend that the operator draw up in-house safety operating instructions.

Trainees may work on machines and technical equipment in which a jaw box is installed provided that they are supervised at all times by qualified specialist personnel.

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 jaw box.

Monitoring 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 jaw box is mounted are clearly legible and are observed.

Faults

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

Spare parts

Only ever use original SCHUNK spare parts.

Environmental regulations

Comply with the applicable legal norms when disposing of waste.

2.7 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

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 [🗋 6]
- Observe the ambient conditions and operating conditions
- Observe the maximum number of clamping cycles ▶ 6 [🗋 18]
- Observe the specified maintenance and lubrication intervals, ▶ 9 [🗋 29]

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

4 Torque per screw

Tightening torque for hexagon nuts with collar according to DIN 6331, in conjunction with screws for T-slots according to DIN 787. (Screw quality 8.8)

Or mounting screws according to DIN EN ISO 4762 in conjunction with nuts for T-slots according to DIN 508. (Screw quality 10.9)

Applies to the mounting of jaw boxes on face plates with T-slots.

Screw size	M16	M20	M24	M30
Tightening torques M_A (Nm)	150	308	530	1053

Tightening torques for mounting top jaws on the jaw box. (Screw quality 12.9)

Screw size	M16	M20
Tightening torques M_A (Nm)	200	320

5 Scope of delivery

1 **Jaw box with assembly accessories**
Sizes: SPK 140, SPK 180, SPK 220, SPK 260 including hard base jaw with tongue and groove or base jaw with fine serration and T-slot

2 **Eye bolts** DIN 580

1 **Operating manual**

Scope of delivery: Assembly accessories for jaw box suitable for machines with T-slots according to DIN 650

4 **Screws for T-slots DIN 787**
or screws DIN EN ISO 4762

4 **Collar nuts DIN 55027**
or nuts DIN 6331 – M30

2 **T-nuts, flat or fixed**
incl. Screws

6 Technical data

Size	140	180	220	260
Weight [kg]	23	33.5	52.7	68.8
Screws	M16	M20 – M24	M20 – M24	M24 – M30
Gauge				
Min.	120	140	180	220
Max.	140	180	220	260
max. clamping force [kN]	35	55	68	75
max. tightening torque [Nm]	150	230	330	360

Length of warranty	24 Months
Maximum clamping cycle number	10 000 Cycles

Tab.: Warranty and maximum clamping cycles

6.1 Permissible speed of rotation for jaw boxes on face plates

CAST IRON face plate with 4 jaw boxes		STEEL face plate with 4 jaw boxes	
Face plates Ø (mm)	Max. rotation speed [min-1]	Face plates Ø (mm)	Max. rotation speed [min-1]
800	430	800	720
900	380	900	640
1,000	340	1,000	570
1,100	312	1,100	520
1,200	290	1,200	480
1,300	265	1,300	440
1,400	245	1,400	410
1,500	230	1,500	410
1,600	215	1,600	380
1,800	190	1,800	340
2,000	170	2,000	305
2,200	155	2,200	280
2,400	144	2,400	255
2,500	138	2,500	244

The recommended speed is applicable for jaw boxes on face plates with SCHUNK top jaws with tongue and groove, hard, type SHF.

CAUTION

The guide values for the maximum permissible speeds of rotation are only valid when the workpiece is exactly aligned on the face plate, and no imbalance occurs during machining.

The speed of rotation must be reduced for jaws with a higher weight and workpiece machining with high imbalance!

6.2 Calculations for clamping force and speed

Missing information or specifications can be requested from the manufacturer.

Legend			
F_c	Total centrifugal force [N]	M_{cAB}	Centrifugal torque of top jaws [Kgm]
F_{sp}	Effective clamping force [N]	M_{cGB}	Centrifugal torque of base jaws [Kgm]
F_{spmin}	Minimum required clamping force [N]	n	Speed [rpm]
F_{sp0}	Initial clamping force [N]	r_s	Center of gravity radius [m]
F_{spz}	Cutting force [N]	r_{sAB}	Center of gravity radius of top jaw [m]
m_{AB}	Mass of one top jaw [kg]	s_{sp}	Safety factor for clamping force
m_B	Mass of chuck jaw set [kg]	s_z	Safety factor for machining
M_c	Centrifugal force torque [Kgm]	Σ_s	Max. clamping force of chuck [N]

6.2.1 Calculation of the required clamping force in case of a given rpm

The initial clamping force F_{sp0} is the total force impacting radially on the workpiece via the jaws due to actuation of the jaw box during shutdown. Under the influence of rotation, the jaw mass generates an additional centrifugal force. The centrifugal force reduces or increases the initial clamping force depending on whether gripping is from the outside inwards or from the inside outwards.

The sum of the initial clamping force **F_{sp0}** and the **total centrifugal force F_c** is **the effective clamping force F_{sp}**.

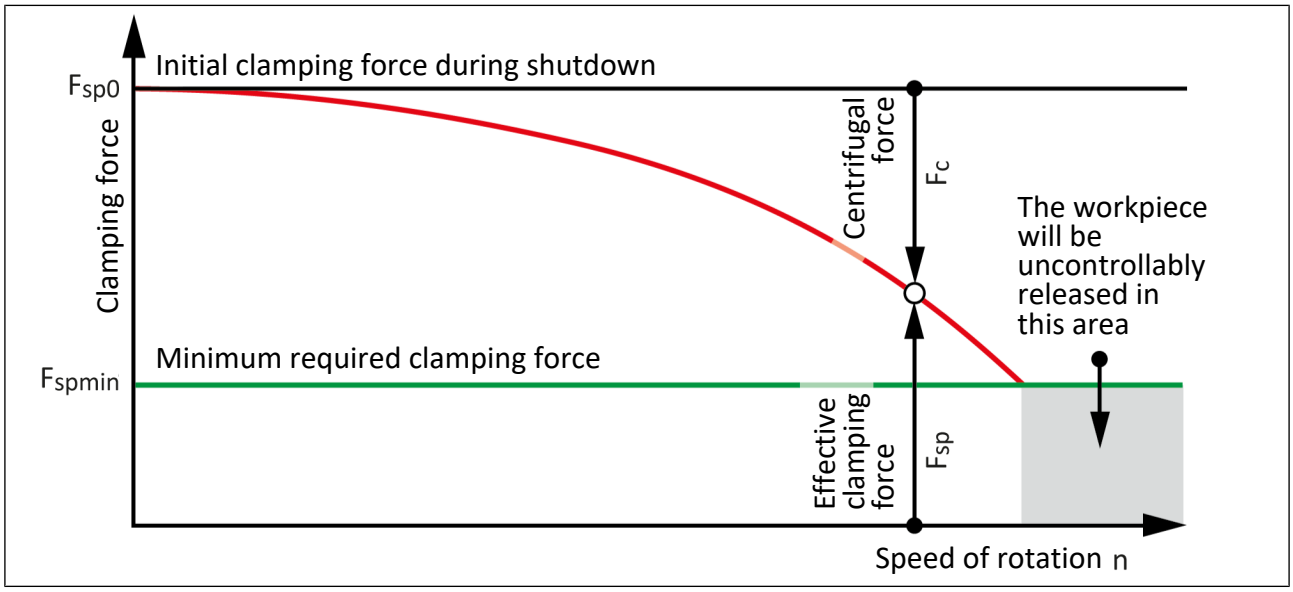
$$F_{sp} = F_{sp0} \mp F_c \text{ [N]}$$

(–) for gripping from the outside inwards
(+) for gripping from the inside outwards

⚠ DANGER

Risk to life and limb of the operating personnel and significant property damage when the RPM limit is exceeded! With gripping from the outside inwards, and with increasing RPM, the effective clamping force is reduced by the magnitude of the increasing centrifugal force (the forces are opposed). When the RPM limit is exceeded, the clamping force drops below the required minimum clamping force F_{spmin}. Consequently, the workpiece is released spontaneously.

- Do not exceed the calculated RPM.
- Do not fall below the necessary minimum clamping force.



Reduction in effective clamping force by the magnitude of the total centrifugal force, for gripping from the outside inwards.

The required effective clamping force for machining F_{sp} is calculated from the product of the **machining force F_{spZ}** and the **safety factor S_z**. This factor takes into account uncertainties in the calculation of the machining force. According to VDI 3106: **$S_z \geq 1.5$.**

$$F_{sp} = F_{spz} \cdot S_Z \text{ [N]}$$

From this we can derive the calculation of the initial clamping force during shutdown:

$$F_{sp0} = S_{sp} \cdot (F_{sp} \pm F_C) \text{ [N]}$$

(+) for gripping from the outside inwards
(–) for gripping from the inside outwards

CAUTION

This calculated force must not be greater than the maximum clamping force ΣS.

See also the table in chapter 6.1 "Chuck data"

From the above formula it is evident that the sum of the effective clamping force F_{sp} and the total centrifugal force F_c is multiplied by the **safety factor for the clamping force S_{sp}**. According to VDI 3106, the following also applies here: **$S_{sp} \geq 1.5$.**
The **total centrifugal force F_c** is dependent on both the sum of the masses of all jaws and on the center of gravity radius and the rpm.

CAUTION

For safety reasons, in accordance with DIN EN 1550, the centrifugal force may be a maximum of 67% of the initial clamping force.

The formula for the calculation of the total centrifugal force F_c is:

$$F_C = \sum(m_B \cdot r_S) \cdot (\frac{\pi \cdot n}{30})^2 = \sum M_C \cdot (\frac{\pi \cdot n}{30})^2 \text{ [N]}$$

For this, **n is the given speed of rotation** in RPM. The product **$m_B \cdot r_s$ is referred to as the centrifugal force torque M_c.**

$$M_C = m_B \cdot r_S \text{ [kgm]}$$

In case of jaw boxes with split chuck jaws, i.e., with base jaws and top jaws, for which the base jaws change their radial position only by the stroke amount, the **centrifugal moment of the base jaws M_{cGB}** and the **centrifugal moment of the top jaws M_{cAB}** need to be added:

$$M_C = M_{cGB} + M_{cAB} \text{ [kgm]}$$

For the calculation of the centrifugal moment of the base jaws M_{cGB}, see also applicable documents ▶ 1.2 [🗋 6]The centrifugal moment of the top jaws$_{McAB}$ is calculated according to:

$$M_{cAB} = m_{AB} \cdot r_{sAB} \text{ [kgm]}$$

6.2.2 Calculation example: Required initial clamping force Fsp0 for a given rpm n

The following data is known for the machining job:

- Gripping from the outside in (application-specific)
- Machining force F_{spz} = 3000 N (application-specific)

- max. speed of rotation n_{max} = 3200 RPM (Table "Permissible speed of rotation for jaw boxes on face plates" ▶ 6 [🗋 18])
- RPM n = 1200 min^{-1} (application-specific)
- Mass of one (!) top jaw m_{AB} = 5.33 kg (application-specific)
- Center of gravity radius of top jaw r_{sAB} = 0.107 m (application-specific)
- Safety factor S_z = 1.5 (according to VDI 3106)
- Safety factor S_{sp} = 1.5 (according to VDI 3106)

Note: Masses of the jaw mounting screws and T-nuts are not taken into account.

First the required effective clamping force F_{sp} is calculated using the machining force stated:

$F_{sp} = F_{spz} \cdot S_z = 3000 \cdot 1.5 \Rightarrow \mathbf{F_{sp} = 4500\ N}$

Initial clamping force during shutdown:

$F_{sp0} = S_{sp} \cdot (F_{sp} + F_c)$

Calculation of total centrifugal force:

$$F_c = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2$$

For two-part chuck jaws, the following applies:

$M_c = M_{cGB} + M_{cAB}$

Calculated centrifugal moments of the base jaw and the top jaw:

$\mathbf{M_{cGB} = 0.319\ kgm}$

For the centrifugal torque of the top jaw, the following applies:

$M_{cAB} = m_{AB} \cdot r_{sAB} = 5.33 \cdot 0.107 \Rightarrow \mathbf{M_{cAB} = 0.57\ kgm}$

Centrifugal torque for one jaw:

$M_c = 0.319 + 0.571 \Rightarrow \mathbf{M_c = 0.89\ kgm}$

The clamping jaw boxes have 3 jaws, the total centrifugal moment is:

$\sum M_c = 3 \cdot M_c = 3 \cdot 0.889 \Rightarrow \mathbf{\sum M_c = 2.667\ kgm}$

The total centrifugal force can now be calculated:

$$F_c = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2 = 2.668 \cdot \left(\frac{\pi \cdot 1200}{30}\right)^2 \Rightarrow \mathbf{F_c = 42131\ N}$$

Initial clamping force during shutdown that was sought:

$F_{sp0} = S_{sp} \cdot (F_{sp} + F_c) = 1.5 \cdot (4500 + 42131) \Rightarrow \mathbf{F_{sp0} = 69947\ N}$

6.2.3 Calculation example: permissible RPM for a given effective clamping force

The following formula can be used to calculate the permissible RPM for a given initial clamping force during shutdown:

$$n_{zul} = \frac{30}{\pi} \cdot \sqrt{\frac{F_{sp0} - (F_{spz} \cdot S_z)}{\sum M_c}} \; [min^{-1}]$$

CAUTION

The calculated permissible RPM may not exceed the maximum specified RPM for safety reasons! ▶ 6 [🗋 18]

Example of calculation: Permissible RPM for a given effective clamping force

The following data is known from previous calculations:

- Initial clamping force during shutdown F_{sp0} = 17723 N
- Machining force for machining job F_{spz} 3000 N (application-specific)
- Total centrifugal torque of all jaws ΣM_c = 2,668 kgm
- Safety factor S_z = 1.5 (according to VDI 3106)
- Safety factor S_{sp} = 1.5 (according to VDI 3106)

NOTE:
Masses of the jaw mounting screws and T-nuts are not taken into account.

Identifying the permissible RPM:

$$n_{zul} = \frac{30}{\pi} \cdot \sqrt{\frac{F_{sp0} - (F_{spz} \cdot S_z)}{\sum M_c}} = \frac{30}{\pi} \cdot \sqrt{\frac{69947 - (3000 \cdot 1.5)}{2.668}} \Rightarrow \mathbf{n_{zul} = 1495\ min^{-1}}$$

The calculated speed n_{perm} = 1495 RPM, is greater than the maximum permissible speed of the jaw boxes n_{max} = 430 RPM (▶ 6 [🗋 18]).

This calculated RPM may not be used.

6.3 Grades of Accuracy

Tolerances for radial and axial run-out accuracy correspond to the Technical Supply Terms for lathe chucks as per DIN ISO 3442-3.

6.4 Permissible imbalance

Rotating clamping stations without pallets and workpieces correspond to balancing quality class 6.3 (according to DIN ISO 21940-11). Residual imbalance risks may arise due to insufficient rotation compensation being achieved (see DIN EN 1550 6.2 e). This applies in particular to high speeds of rotation, asymmetrical workpieces or the use of lathe chucks that do not correspond to balancing grade 6.3, as well as uneven lubricant application. In order to prevent damage resulting from these residual risks, the entire rotor is to be dynamically balanced in accordance with DIN ISO 21940-11.

7 Attachment of the jaw boxes

7.1 Preparing the installation

Before mounting the jaw boxes, check the face plate of the machine tool for damage.

The clamping surface must be clean and flat.

Rectify any damage to the clamping surface.

If the jaw box is mounted on face plates or intermediate disks using T-slots, a crossbar to prevent the jaw box from falling out must generally be installed .

The T-slots of the face plate must be clean and without damage to ensure the mounting screws have a high clamping force.

The width of the T-slots must be adjusted to the mounting screws and T-nuts, so that the jaw box does not move or twist on the face plate when under load.

The crosswise slots of the face plate must be clean and free of damage to guarantee form-fitting locking with the crossbar of the clamping device.

The slot depth must be sufficiently deep enough for the crossbar to be able to move freely. Check the locking slide of the jaw box and the assembly accessories (fastening screws, nuts, T-nuts) for damage and replace if necessary.

Jaw boxes are supplied with different gauges. Therefore, clamping devices are available for the most common face plates.

Appropriate assembly accessories are included in the scope of delivery. (If you have any questions, please contact our office or area techincal sales representatives.)

7.2 Mounting the jaw boxes

1. Clean the face plate and the bottom-side clamping surface of the jaw boxes.
2. Insert screws for T-slots from below into the jaw boxes and screw loosely with hexagon nuts DIN 55027.
3. Align the crossbar in the center position (middle face plate groove).
4. Slide the jaw box into the 2 parallel running T-slots of the face plate and move it by hand to the position of the required crosswise slot.
5. Lock the crossbar in one of the alternately arranged labyrinth grooves of the face plate.
6. Tighten the mounting screws evenly with the permissible torque ▶ 4 [🗋 16].

7.3 Adjustment of the jaw boxes on the face plate

The number and position of the jaw boxes on the face plate must be selected so that no imbalance of the machine structure occurs.

The base jaws of the individual jaw boxes must be adjusted so that the workpiece is roughly close to the turning center, to avoid increased imbalance.

Check the concentricity of the workpiece with a dial gauge to ensure there is no imbalance in the clamping structure. If necessary, install counterweights.

When setting up the workpiece, tighten the spindle with a torque wrench.

7.4 Mounting the jaw boxes on intermediate plates

1. The jaw boxes can be mounted on different face plates by mounting them on intermediate plates.
2. The intermediate plates can be equipped with T-slots for connecting jaw boxes with screws and can also be equipped with T-slots for using DIN787 T-slot screws. Or they can be equipped with mounting thread for DIN EN ISO 4762 screws.
3. The jaw box on the intermediate plate must be secured in the longitudinal direction using T-nuts or a crossbar to prevent it from slipping.
4. In the lateral direction it is necessary to align the jaw box parallel to the clamping slots using T-nuts and to secure it to prevent it from twisting.
5. The intermediate plate must be secured on the face plate in the longitudinal direction using T-nuts or a crossbar to prevent it from moving. In the lateral direction the intermediate plate must be aligned on the face plate using T-nuts and secured to prevent it from twisting.
6. The face plate and the corresponding intermediate plate can be equipped with crosswise slots for locking the crossbar used when positioning the jaw box on the face plate. This makes it possible to move and lock the jaw box on the face plate, or the entire jaw box is moved and locked using the intermediate plate.
7. A sufficient number of fastening screws must be used to screw heavy intermediate plates onto the face plate.
8. If the jaw box is mounted on face plates or intermediate disks using T-slots, a crossbar to prevent the jaw box from falling out must generally be installed .
9. Tighten the mounting screws of the jaw boxes and the intermediate plates evenly with the permissible torque ▶ 4 [🗋 16].

8 Function

8.1 Function of the jaw box

The jaw box is a spindle powered clamping vise. The clamping function is suited for both O.D. workpiece clamping and I.D. workpiece clamping. Depending on the clamping direction, the same clamping force is also available at the spindle under the same torque (for changes to the clamping force under machining conditions, see chapter "Calculating the clamping force and RPM" ▶ 6.2 [🗋 19]).

The jaw stroke of the base jaw is limited on the inner spindle mechanical system in both end positions, and is therefore prevented from moving too far out of the jaw guidance. It is therefore not possible to remove the base jaw from the jaw box mounted on the face plate.

If the drive spindle is turned clockwise, the base jaw moves toward the center of the workpiece.

If the base jaw is completely retracted, the rear end face is flush with the end face of the base body.

The scale provided makes it easier to set the chuck jaws of all jaw boxes mounted on the face plate equally.

8.2 Important notes

- **When gripping the spindle, do not tighten with an extension pipe or using hammer blows! Do not place your entire weight on the spanner wrench or stand on it.**
- **Clamp the jaw boxes exclusively with a torque wrench. The maximum permissible torque on the drive spindle must not be exceeded.** ▶ 6 [🗋 18]
- **Make sure that a sufficient clamping reserve is calculated and that all jaw boxes are in roughly the same clamping position. Do not move the base jaws beyond the end positions, as this damages the jaw boxes.**
- **The number and position of the jaw boxes on the face plate must be selected so that no imbalance occurs during turning operations.**

- **The base jaws of the individual jaw boxes must be adjusted so that the workpiece is roughly close to the turning center, to also reduce increased imbalance.**

⚠ WARNING

Danger of shifting of the jaw box when the slide is not locked

If the slide is not locked, the jaw box can shift and the workpiece can be thrown out.

- The workpiece may only be fully clamped when the slide of the jaw box is locked in the crosswise slot of the face plate.
- All mounting screws must also be tightened with the maximum permissible tightening torque. ▶ 4 [🗋 16]

8.3 Checking the jaw boxes

The condition of the clamping device should be checked regularly.

After installation on the machine, the jaws of all jaw boxes must be easy to move.

The spindle and the jaw drive of each jaw box must turn smoothly.

If the base jaw is stiff when mounted, the base body was screwed on incorrectly. The clamping device may have become twisted.

9 Maintenance and care

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 11 [🗋 36].

In principle, the jaw boxes do not require any special maintenance beyond the usual care for clamping devices.

Depending on the type of stress, the clamping device should be serviced at certain intervals ▶ 9.2 [🗋 31]. We recommend cleaning the jaw boxes regularly and lubricating the stressed parts and guides with special grease LINO MAX.

For lubrication, the jaw box is equipped with a grease nipple (item 15) for manual lubrication. For complete cleaning, disassemble and clean the jaw box.

9.1 Disassembling and assembling the jaw box

When replacing spare parts or cleaning, the jaw box will have to be disassembled.

⚠ WARNING

Risk of injury due to dropping the jaw box during transport, installation or removal

During transport and when installing or removing the jaw box, secure it to prevent it from falling.

First remove the jaw box from the face plate of the lathe.

1. Loosen the mounting screws of the SPK evenly.
2. For transport, screw in an eye bolt.
3. Release the locking device with the face plate, pushing the crossbar to the center position.
4. Extend the SPK out of the face plate.
5. Disassembly of the jaw box requires access to the floor-side clamping surface.
6. Tilt the jaw box to the side.
7. Loosen the mounting screws (item 13) of the crossbar slide (item 7) and remove the slide (item 7).
8. To remove the clamping unit, first unscrew the mounting screws (item 11) of the spindle holding nut (item 3).
9. The spindle holding nut (item 3) is fastened with a bearing bolt (item 6). First remove the safety ring (item 12) and then pull out the bearing bolt (item 6). (The bearing bolt is provided with a pulling off thread.)
10. The base jaw (item 2) can now be pushed out of the guide with the integrated force unit.

11. To remove the spindle holding nut (item 3), the seat of bearing (item 5) is removed from the spindle bearing of the base jaw (item 2), then the spindle (item 4) is turned counterclockwise.
12. Now the spindle holding nut (item 3) can be removed from the base jaw (item 2).
13. There is an O-ring (item 9) and a grease nipple (item 15) on the spindle (item 4). **During disassembly and assembly please take care that the O-ring (item 9) does not become damaged.**
14. The spindle holding nut (item 3) is fastened with a bearing bolt (item 6). First remove the safety ring (item 12) and then pull out the bearing bolt (item 6). (The bearing bolt has a pull-off thread.) **During disassembly and assembly, please take care that the safety ring (item 12) does not become damaged or deformed.**

Clean and degrease all parts carefully and check all parts for wear and damage.

Only use original SCHUNK spare parts when replacing damaged parts.

Before assembly, grease all individual components with a suitable grease (LINO MAX).

To assemble the jaw box, complete the above procedure in reverse order:

IMPORTANT: The mounting screws (item 11) must be assembled with a medium-strength threadlocker.

9.2 Maintenance intervals

Lubricating the jaw box

Lubrication intervals	Contamination
At least once a month	Normal to medium contamination
300 operating hours	Normal to medium contamination
200 operating hours	Severe contamination
Approx. 1000 operating hours	Full cleaning with disassembly of jaw box depending on type of contamination and quantity

Using a hand press, lubricate the moving parts such as the spindle (item 4) and the spindle holding nut (item 3) using the tapered grease nipple (item 15) in the spindle hexagon (item 4).

Lubricate the jaw box between the rear jaw position and up to half the jaw stroke position.

All jaw boxes of the clamping assembly should be evenly lubricated.

10 Spare parts

When ordering spare parts, it is imperative to state the type, size and above all the manufacturing number of the chuck to prevent erroneous deliveries.

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.

140 SFG 315 KV

Item	ID	Designation	Quantity
1	1515516	Base body	1
2	1515489	Base jaw SFG 400	1
3	1515507	Spindle holding nut	1
4	1515509	Spindle	1
5	1515510	Seat of bearing	1
6	1515512	Bearing bolt	1
7	1515514	Slide	1
8	1515515	Bracket	1
9	9966359	O-ring DIN 3771 NBR 70 20.0 x 2.5	1
10	9907032	Spring-loaded rotary piece	1
11	9907032	Screw DIN EN ISO 4762 – M8 x 25 – 10.9	4
12	9935533	Safety ring DIN 472 - 30 x 1.2	1
13	9900325	Screw DIN 7984 - M6 x 10	2
14	9664002	Countersunk screw DIN EN ISO 10642 - M6 x 12	2
15	9628500	Funnel lubrication nipple	1
16	9985706	T-nut, flat	2
17	9907272	Screw M6 x 16	2
18	9990545	Screw for T-slot DIN 787	4
19	9980034	Collar nut M16	4
20	9980324	Eye bolt	2

SPK 180 SFG 400 KV

Item	ID number	Designation	Quantity
1	8704510	Base body	1
2	8704511	Base jaw SFG 400	1
3	8704512	Spindle holding nut	1
4	8704513	Spindle	1
5	8704514	Seat of bearing	1
6	8704515	Holding piece	1

Item	ID number	Designation	Quantity
7	8704516	Slide	1
8	8704517	Bracket	1
9	9980207	O-ring DIN 3771 NBR 70 27.0 x 2.5	1
10	9907023	Compression spring VD 132 D 0.8 x 5.6 L0 = 43.0	1
11	9907336	Screw DIN EN ISO 4762 – M10 x 25 – 10.9	4
12	9935533	Safety ring DIN 472 - 30 x 1.2	1
13	9900325	Screw DIN 7984 - M6 x 10	2
14	9664002	Countersunk screw DIN EN ISO 10642 - M6 x 12	2
15	9905437	Conical lubrication nipple	1
16	9629007	Steel ball, hardened Ø 6.0	1
30	0158103	Screw M16 x 40 fine thread	2

SPK 180 SV 3/32 x 90 25.5 H7 NS 200 S&T

Item	ID number	Designation	Quantity
2	8704519	Base jaw SV 3/32 x 90 25.5 H[7]	1
30	0140103	NS 200 T-nuts incl. screws	2

SPK 220 SFG 630 KV

Item	ID number	Designation	Quantity
1	8704520	Base body	1
2	8704521	Base jaw SFG 400	1
3	8704522	Spindle holding nut	1
4	8704523	Spindle	1
5	8704524	Seat of bearing	1
6	8704525	Holding piece	1
7	8704526	Slide	1
8	8704517	Bracket	1
9	9980391	O-ring DIN 3771 NBR 70 30.0 x 2	1
10	9907023	Compression spring VD 132 D 0.8 x 5.6 L0 = 43.0	1
11	9907240	Screw DIN EN ISO 4762 – M12 x 25 – 10.9	4
12	9621008	Safety ring DIN 472 - 30 x 1.2	1
13	9900325	Screw DIN 7984 - M6 x 10	2
14	9664002	Countersunk screw DIN EN ISO 10642 - M6 x 12	2
15	9905437	Conical lubrication nipple	1
16	9629007	Steel ball, hardened Ø 6.0	1
30	9660086	Screw DIN EN ISO 4762 - M20 x 50 - 12.9	2

SPK 220 SV 3/32 x 90 30 H7 NS 240 S&T

Item	ID number	Designation	Quantity
2	8704527	Base jaw SV 3/32 x 90 30 H[7]	1
30	0140114	NS 240/1 T-nuts incl. screws	2

SPK 260 SFG 630 KV

Item	ID number	Designation	Quantity
1	8704528	Base body	1
2	8704529	Base jaw SFG 400	1
3	8704530	Spindle holding nut	1
4	8704531	Spindle	1
5	8704524	Seat of bearing	1
6	8704525	Holding piece	1
7	8704532	Slide	1
8	8704517	Bracket	1
9	9980391	O-ring DIN 3771 NBR 70 30.0 x 2	1
10	9907023	Compression spring VD 132 D 0.8 x 5.6 L0 = 43.0	1
11	9907240	Screw DIN EN ISO 4762 – M12 x 25 – 10.9	4
12	9621008	Safety ring DIN 472 - 30 x 1.2	1
13	9900325	Screw DIN 7984 - M6 x 10	2
14	9664002	Countersunk screw DIN EN ISO 10642 - M6 x 12	2
15	9905437	Conical lubrication nipple	1
16	9629007	Steel ball, hardened Ø 6.0	1
30	9660086	Screw DIN EN ISO 4762 - M20 x 50 - 12.9	2

SPK 260 SV3 / 32 x 90 30 H7 NS240 S&T

Item	ID number	Designation	Quantity
2	8704533	Base jaw SV 3/32 x 90 30 H[7]	1
30	0140114	NS 240/1 T-nuts incl. screws	2

10.1 Assembly accessories

SPK 180 assembly accessories

ID number 0899120 - suitable for machines with T-slots DIN 650 - M20 x 22

Item	ID number	Designation	Quantity
17	9984760	Screw for T-slot DIN 787 – M20 x 22 x 80 - 8.8	4
18	9980035	Collar nut DIN 6331 M20	4
19	9985273	Flat T-nut for size 22 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

ID number 0899125 – suitable for machines with T-slots DIN 650 – M24 x 28			
Item	**ID number**	**Designation**	**Quantity**
17	9984948	Screw for T-slot DIN 787 – M24 x 28 x 100 – 8.8	4
18	9980036	Collar nut DIN 6331 M24	4
19	SNT001339	Flat T-nut for size 28 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

SPK 220 assembly accessories

ID number 0899130 – suitable for machines with T-slots DIN 650 – M20 x 22			
Item	**ID number**	**Designation**	**Quantity**
17	9984760	Screw for T-slot DIN 787 – M20 x 22 x 80 – 8.8	4
18	9980035	Collar nut DIN 6331 M20	4
19	9985273	Flat T-nut for size 22 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

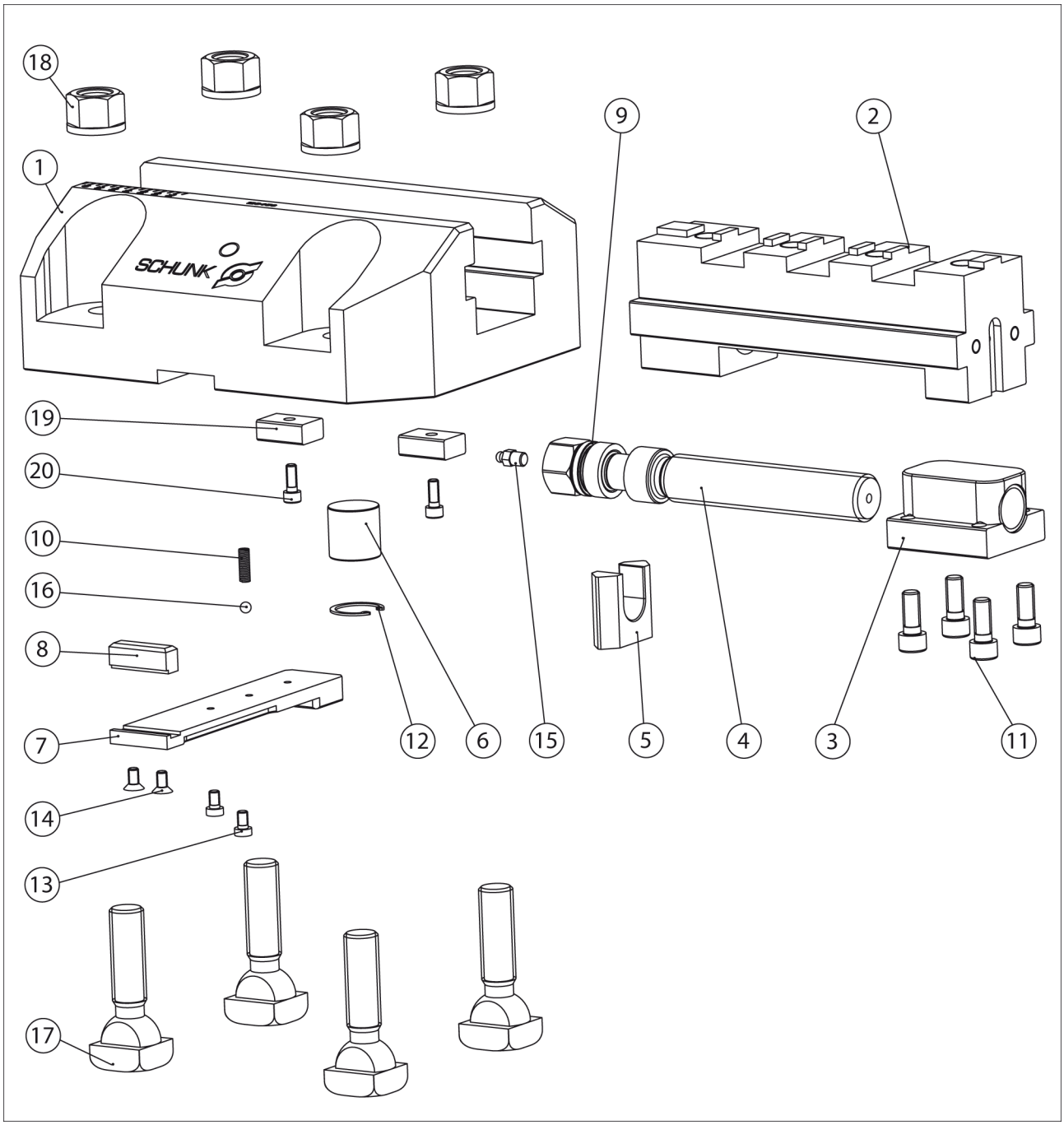
ID number 0899135 – suitable for machines with T-slots DIN 650 – M24 x 28			
Item	**ID number**	**Designation**	**Quantity**
17	9984948	Screw for T-slot DIN 787 – M24 x 28 x 100 – 8.8	4
18	9980036	Collar nut DIN 6331 M24	4
19	SNT001339	Flat T-nut for size 28 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

SPK 260 assembly accessories

ID number 0899140 – suitable for machines with T-slots DIN 650 – M24 x 28			
Item	**ID number**	**Designation**	**Quantity**
17	9984948	Screw for T-slot DIN 787 – M24 x 28 x 100 – 8.8	4
18	9980036	Collar nut DIN 6331 M24	4
19	SNT001339	Flat T-nut for size 28 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

ID number 0899145 – suitable for machines with T-slots DIN 650 – M30 x 36			
Item	**ID number**	**Designation**	**Quantity**
17	SNT001392	Screw DIN EN ISO 4762 – M30 x 90 – 10.9	4
18	SNT001393	Nut DIN 508 – M30 x 36	4
19	SNT001391	Flat T-nut for size 36 slot	2
20	9907272	Screw DIN EN ISO 4762 – M6 x 16 – 10.9	2

11 Assembly drawing



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

Folgen Sie uns I *Follow us*

Wir drucken nachhaltig I *We print sustainable*

07-2023

04.00 | Jaw boxes SPK | en | 0889015

Manufacturer certificate

Manufacturer / Distributor:	Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG. Lothringer Str. 23 D-88512 Mengen
Product:	**Lathe chucks**
Description:	**ROTA**
Type designation:	M-flex 2+2, S-flex, SPK, ROTA-G, ROTA-S, Vario-M

Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG certifies that the above-mentioned products, when used as intended and in compliance with the operating manual and the warnings on the product, are safe according to the national regulations and:

- a **risk assessment** has been carried out in accordance with ISO 12100:2010.
- an **operating manual** for the assembly instructions has been created in accordance with the contents of the Machinery Directive 2006/42/EC Annex I No. 1.7.4.2. and the contents of the provisions of Annex VI of the Machinery Directive 2006/42/EC.
- the relevant basic and proven safety principles of the Annexes of **ISO 13849-2:2012**, taking into account the requirements of the documentation have been observed for the component. The parameters, limitations, ambient conditions, characteristic values, etc. for proper operation are defined in the operating manual.
- an $MTTF_D$ value of 150 years can be estimated for mechanical components using the informative procedure in Table C.1 of ISO 13849-1:2015.
- the **fault exclusion** against the fault "Breakage during operation" in compliance with the parameters, limitations, ambient conditions, characteristic values and maintenance intervals, etc., specified in the operating manual.

Harmonized standards applied:

- **ISO 12100:2010** Safety of machinery - General principles for design - Risk assessment and risk reduction
- **EN 1550:1997+A1:2008** Machine-tools safety – Safety requirements for the design and construction of lathe chucks for the workpiece mount

Other related technical standards and specifications:

- **ISO 702-1:2010-04** Machine tools – Connecting dimensions of spindle noses and lathe chucks – Part 1: front short-taper mount with screws
- **ISO 702-2:2010-04** Machine tools – Connecting dimensions of spindle noses and lathe chucks – Part 2: front short-taper mount with camlock mounting
- **ISO 702-3:2010-04** Machine tools – Connecting dimensions of spindle noses and lathe chucks – Part 3: front short-taper mount with bayonet mounting
- **ISO 702-4:2010-04** Machine tools – Connecting dimensions of spindle noses and lathe chucks – Part 4: cylindrical mount
- **VDI 3106:2004-04:** Determination of permissible RPM of lathe chucks (jaw chucks)

Mengen, 25. Apr. 2023

i. V. Philipp Schräder

p.p. Philipp Schräder / Head of Development standard products

i.V. Alexander Koch

p.p. Alexander Koch / Head of Engineering Design special products

FB No. 821M ; Ver. 00 Created / Date:: A. Koch / 31/05/2022; Reviewed and approved / Date: P. Schräder / 31/05/2022

Revision status 00/10/16/2021