



# Manual lathe chuck

## ROTA-S plus

### Assembly and Operating Manual

## Imprint

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### Technical changes:

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

**Document number:** 0889004

**Version:** 06.00 | 28/01/2026 | 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

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

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# 1 General

## 1.1 About this manual

This manual contains important information for the safe, correct use of the product.

It is an integral part of the product and must be kept accessible for personnel at all times.

Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is a prerequisite to ensure safe work processes.

The illustrations are intended to provide a basic understanding and may deviate from the actual version.

Besides this manual, other documents which apply are those listed under ▶ 1.1.2 [ 6 ]

### 1.1.1 Illustration of warnings

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



#### **⚠ DANGER**

Denotes a hazard with a high degree of risk that, if not avoided, will result in death or serious injury.



#### **⚠ WARNING**

Denotes a hazard with a medium degree of risk that, if not avoided, could result in death or serious injury.



#### **⚠ CAUTION**

Denotes a hazard with a low degree of risk that, if not avoided, could result in a minor or moderate injury.

#### **NOTICE**

Information about avoiding material damage.

### 1.1.2 Applicable documents

- General Terms and Conditions \*
- Calculation of the jaw centrifugal forces and jaw guidance load, in the "Technology" chapter of the lathe chuck catalog \* and the "Calculating the clamping force and RPM" chapter
- Brief operating instructions if available
- Approval drawings

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

### 1.2 Warranty

The warranty for standard products is 24 months from the date of delivery from the factory, or 50,000 cycles\* for manually operated clamping devices and 500,000 cycles\* for power operated clamping devices. For special clamping devices, it is 12 months from the date of delivery from the factory, assuming appropriate use in accordance with the following conditions:

- Observe the applicable documents, ▶ 1.1.2 [ 6 ]
- Observance of the ambient conditions and operating conditions, ▶ 2.5 [ 8 ]
- Observance of the specified maintenance and lubrication intervals ▶ 6 [ 32 ]

Parts touching the workpiece and wearing parts are not part of the warranty.

\* One cycle comprises one complete clamping procedure ("opening" and "closing")

### 1.3 Scope of delivery

#### 1 Manual Chuck (complete)

either with cylindrical recess and mounting screws  
or with the respective flange and accessories for spindle in accordance with

- DIN ISO 702-1 short-taper mount with the screws to the front
- DIN ISO 702-2 short-taper mount with Camlock mounting
- DIN ISO 702-3 short-taper mount with bayonet mounting

#### 1 Spanner wrench

#### 1 Assembly and operating manual

## 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.

### 2.1 Appropriate use

- The product is used for clamping metal and plastic workpieces on machine tools.
- The product may only be used within the scope of its technical data.
- The product is intended for industrial and commercial use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- The maximum speed 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 "Calculation for clamping force and speed of rotation" in the chapter "Technical data").
- Use suitable top jaws with a suitable interface.
- The interference circuit diameter of the workpiece must be smaller or at most equal to the outer diameter of the clamping device.
- The workpiece must not experience plastic deformation under clamping force (clamping pressures are permissible).

### 2.2 Inappropriate use

The product is not being used appropriately if:

- the product is used as a press, a punch, a toolholder, a load-handling device or as lifting equipment.
- the specified technical data for use of the product are exceeded.
- workpieces are not properly clamped, paying particular attention to the specified clamping forces.
- the top jaws are not mounted properly.
- the product is not being operated properly.
- the product is operated in the stroke end positions.
- the guideways are overloaded due to the chuck jaws being too high or the clamping point being selected too high.
- the product has been insufficiently maintained.
- the product is brought into contact with aggressive media, especially acids.
- the product is used in abrasive blasting processes, especially sandblasting.
- the product is operated in a potentially explosive area (EX area (ATEX directive)).

## 2.3 Structural changes

### Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- Structural changes should only be made with the written approval of SCHUNK.

## 2.4 Spare parts

### Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Only use original spare parts and spares authorized by SCHUNK.

## 2.5 Ambient conditions and operating conditions

### Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction in the service life of the product.

- Make sure that the product is only used within its defined application parameters.
- Ensure that the product is of a sufficient size for the application.
- Ensure that maintenance and lubricating intervals are observed.
- Only use cooling emulsions with anti-corrosive additives when machining.

Depending on the operating conditions, the function and clamping force must be checked after a certain period of operation.

With the smallest possible actuation pressure on the clamping cylinder, the base jaws should move evenly. This method is not a substitute for measuring the clamping force.

If the clamping force has dropped too much or if the base jaws and/or the release mechanism no longer move properly, the clamping device must be disassembled, cleaned, and relubricated.

## 2.6 Material limitations

The product is made of steel alloys, elastomers, aluminum alloys and brass. In addition, Linomax plus grease, Branotect anti-rust oil and Renolit HLT2 are incorporated into the product as auxiliary and operating materials. The safety data sheet for LINOMAX plus can be found at [www.schunk.com](http://www.schunk.com).

## 2.7 Chuck Jaws

### Requirements of the chuck jaws

Rotational or if applicable, accumulated energy, can make the product unsafe and risk the danger of serious injuries and considerable material damage.

- Change chuck jaws at a standstill and without a clamped workpiece.
- Do not use welded jaws.
- Design the chuck jaws to be as light and as low as possible. The clamping point must be as close as possible to the chuck face (clamping points at a greater distance lead to greater surface pressure in the jaw guidance and can significantly reduce the clamping force).
- If the clamping point is at a greater distance from the housing, the operating pressure must be reduced.
- After a collision, the clamping device and the chuck jaws must be subjected to a crack detection test before being used again. Replace damaged parts with original SCHUNK spare parts.
- The chuck jaw mounting screws and if present, the T-nuts, must be replaced if there are signs of wear or damage. Only use screws of quality grade 12.9 in compliance with the specified tightening torques. For clamping devices with fine serration, the jaw mounting screws must be screwed into the holes closest to the clamping point.

## 2.8 Personnel qualifications

### Inadequate qualification of personnel

Any work on the product by inadequately qualified personnel can lead to serious injuries and considerable material damage.

- All work must be performed by appropriately qualified personnel.
- Personnel must have read and understood the complete manual before beginning any work on the product.
- Observe country-specific accident prevention regulations and the general safety notes.

The following personnel qualifications are required for the various activities on the product:

#### Qualified electrician

Qualified electricians have the professional training, knowledge, and experience to work on electrical systems, to recognize and avoid potential dangers, and know the relevant standards and regulations.

#### Specialist personnel

Specialist personnel have the specialized training, knowledge, and experience to perform the tasks entrusted to them, to recognize and avoid potential dangers, and know the relevant standards and regulations.

<b>Instructed person</b>	Instructed persons have been instructed by the operator regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.
<b>Manufacturer's service personnel</b>	The manufacturer's service personnel have the specialized training, knowledge, and experience to perform the work entrusted to them and to recognize and avoid potential dangers.

## 2.9 Personal protective equipment

### Use of personal protective equipment

Personal protective equipment serves to protect staff in the event of a danger that may interfere with their health or safety at work.

## 2.10 Transport

### Handling during transport

Incorrect handling during transport can make the product unsafe and risks the danger of serious injuries and considerable material damage.

- During transport and handling, secure the product to prevent it from falling.
- Use the transport thread on the clamping device.

## 2.11 Protection during handling and assembly

### Incorrect handling and assembly

Incorrect handling and assembly can make the product unsafe and can risk the danger of serious injuries and considerable material damage.

- All work must only be performed by appropriately qualified personnel.
- Secure the system against accidental operation during all work.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

## 2.12 Protection during commissioning and operation

### Falling or violently ejected components

Falling and ejected components can lead to serious injury or death.

- Take suitable protective measures to secure the danger zone.

## 2.13 Notes on safe operation

### Incorrect manner of working by personnel

An incorrect manner of working can make the product unsafe and risks serious injuries and considerable material damage.

- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. Products for special ambient conditions are excluded.
- Rectify malfunctions as soon as they occur.

- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention, and environmental protection regulations for the application field of the product.
- The chuck may only be accelerated to speed or otherwise when a workpiece is correctly clamped. This means that the clamping force has been applied to the workpiece and the clamping has taken place within the permissible operating range.
- Unclamping may only occur once the machine spindle has come to a standstill.

### Functionality check

After installation of the clamping device, its function must be checked prior to commissioning.

#### Two important points are:

- **Clamping force:** At max. actuation force/pressure/torque, the clamping force specified for the clamping device must be reached.
- **Stroke control:** The stroke of the clamping piston must have a margin of safety at the front and back end positions. The machine spindle must not start up until the clamping piston has passed through this safety margin.

With manual clamping devices, stroke control is carried out via the indicator pin. Clamping is only correct if the indicator pin is countersunk and clamping force is applied to the workpiece.

When determining the clamping force required to machine a workpiece, the centrifugal force acting on the chuck jaws must be taken into account (according to VDI 3106).

### Maintenance instructions

The clamping device's reliability and safety can only be guaranteed if the operator complies with the manufacturer's maintenance instructions.

- For lubrication, we recommend our tried and tested special grease, LINOMAX plus. 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 LINOMAX plus, 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 clamping device to its end positions several times, lubricate again, and then check the clamping force.
- Move the clamping device through to its end position several times after 500 clamping strokes, at the latest. This moves the lubricant back to the surfaces of the force transmission.
- Check the clamping device regularly for clamping force and jaw stroke.

### Clamping force measurement

- Depending on the operating conditions, the function and clamping force must be checked after a certain period of operation. For this purpose, a calibrated clamping force meter (e.g. SCHUNK IFT) must be used. The loading conditions are shown below for the different chuck variants.

	2-jaw	3-jaw	4-jaw (compensating)	6-jaw (compensating)
<b>Measuring device</b>	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester
<b>Accessories</b>	-	-	IFT MA4	-
<b>Measuring points</b>	0°/180°	0°/120°/240°	0° / 180° / 90° / 270° (IFT MA4)	0°/60°/120°/180°/240°/300°
<b>Please note</b>	Operating manual SCHUNK IFT Clamping force tester	Operating manual SCHUNK IFT Clamping force tester	Operating manual SCHUNK IFT Clamping force tester	Operating manual SCHUNK IFT Clamping force tester
			<b>Attention</b> Compensation must be activated, otherwise it may lead to inconsistent results.	<b>Attention</b> Compensation must be activated, otherwise it may lead to inconsistent results.

- ① Measuring head
- ② Clamping insert
- ③ Chuck jaw
- ④ Bridge element (IFT MA4)

- If the clamping force has dropped too much or if the base jaws and piston no longer move properly, the chuck will have to be disassembled, cleaned and relubricated.
- The clamping force should always be measured with the clamping device in the same condition as it is used in for the current clamping application. If top jaws with clamping steps are used, measuring must be performed in the same step as for the respective clamping task. In the event of high operating speeds, clamping force losses must be accounted for due to the centrifugal force acting on the chuck jaws. In this case the value of the operating clamping force should be measured dynamically.
- We recommend checking the clamping force using a clamping force tester before starting a new production run and between maintenance intervals. "Optimum safety can only be guaranteed through regular checks".

## 2.14 Disposal

### Handling of disposal

Incorrect handling of disposal can make the product unsafe and lead to risks of environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

## 2.15 Fundamental dangers

### General

- Disconnect power sources before installation, modification or calibration. Ensure that no residual energy remains in the system.
- Do not reach into the open mechanism or movement area of the product during operation.

## 2.16 Protection against dangerous movements

### Unexpected movements

If the system still retains residual energy, serious injuries can be caused while working on the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely merely on the response of the monitoring function to avert danger. Assume that the drive movement is faulty as long as the installed monitors are not effective, since the effect depends on the control and the current operating state of the drive.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted.

## 2.17 Notes on particular risks



### **⚠ DANGER**

#### **Risk of fatal injury to operating personnel due to the workpiece falling down or being flung out in the event of a power failure**

This poses a risk of death or injury to the operating personnel and can result in serious damage to the machine.



### **⚠ DANGER**

#### **Possible risk of death for the operating personnel in case of insufficient clamping force due to ejection or falling of the workpiece!**

Due to settling behavior, the clamping force may decrease over time.

- Re-clamping of the workpiece with manual or pneumatic clamping devices after 4 hours.
- The energy supply must be constantly applied to power-operated clamping devices during operation.
- Use clamping cylinders with energy conservation.



**⚠ DANGER**

**Possible risk of death for operating personnel if the clamping device's top speed of rotation is exceeded and a workpiece is released or parts fly off.**

If the machine tool or the technical equipment can reach a higher speed than the maximum speed of the clamping device, the speed must be limited for safety purposes!



**⚠ DANGER**

**Possible risk of death for operating personnel if a jaw breaks or if the clamping device fails because the technical data has been exceeded and a workpiece is released or parts fly off!**

- Never exceed the technical data specified by the manufacturer for using the clamping device.



**⚠ DANGER**

**Possible risk of death for operating personnel from clothing or hair getting caught on the clamping device and being dragged into the machine!**

Loose clothing or long hair may become caught on projecting parts of the clamping device and be drawn into the machine.

- Always wear tight-fitting clothing and a hairnet when working on the machine and the lathe chuck.



**⚠ WARNING**

**Possible risk of death for the operating personnel due to impact of the rotating clamping device!**

- Keep a safe distance to the rotating clamping device!
- Do not reach into the rotating clamping device!



**⚠ 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.



### ⚠ 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 clamping device's axial and concentric runout.
- Check options for remedying imbalances on special top jaws and workpieces.
- Reduce the speed.
- Wear hearing protection.



### ⚠ CAUTION

#### **There is a risk of limbs being crushed by moving parts during manual loading and unloading and the clamping procedure.**

- Do not reach between the chuck jaws.
- Use loading devices.



### ⚠ CAUTION

#### **Allergic reactions or irritation due to skin or eye contact with lubricants on the product.**

- In case of foreseeable contact with lubricants on the product (e.g. when lubricating or cleaning)
- Wear protective equipment (protective gloves, protective goggles)

### NOTICE

#### **Risk of damage due to incorrect choice of clamping position for chuck jaws on workpiece.**

If an incorrect clamping position is chosen for the chuck jaws on the workpiece, the base and top jaws may become damaged.

- Observe maximum positions of base and top jaws.
- The diameter of the workpiece must not be greater than the clamping device diameter.
- For clamping devices with fine serration, do not allow the T-nuts for connecting the top jaws to protrude beyond the base jaws in radial direction.
- The outer diameter of the screwed-on top jaws must not exceed the outer diameter of the clamping device by more than 10%.

### 3 Technical data

#### 3.1 Chuck data

ROTA-S plus	400	500	630	800	1000
Chuck bore [mm]	102	162	252	252	402
Max. enlargement of the chuck bore [mm]	130	180	270	270	412
Max. torque [Nm]	280	320	350	350	350
Max. clamping force [kN]	230	270	270	270	270
Max. speed [RPM]	2200	1500	1000	1000	900
Stroke per jaw [mm]	12.0	12.0	15.0	15.0	15.0
Centrifugal force of the base jaw $M_{cGB}$ [kgm]	For the ROTA-S plus chuck, it is necessary to specifically determine this data. Examples of calculation can be found in the "Chuck jaws in special design/ technology" chapter in our current chuck jaw catalog.				
Max. jaw eccentricity of center of gravity in axial direction $a_{max}$ [mm]	For the ROTA-S plus chuck, it is necessary to specifically determine this data. Examples of calculation can be found in the "Chuck jaws in special design/ technology" chapter in our current chuck jaw catalog.				

#### Sizes from 1200 on request

The maximum RPM stated is only valid with the maximum clamping force and when using the hard standard stepped jaws that go with the chuck.

For soft top jaws or special chuck jaws, the speed of rotation permitted for the cutting task must be calculated in accordance with VDI 3106 and in doing so the maximum recommended speed may not be exceeded. The calculated values must be verified by means of a dynamic measurement. Functional monitoring must be performed according to the guidelines of the insurance association.

#### The recommended speed is valid for ROTA-S plus with SCHUNK stepped block jaws, hard, type STF.

For this, the base jaws are inserted flush with outer diameter of the chuck.

Jaw type	STF 400	SFG 630 SHF 630	SFG 800 SHF 800*	SFG 1000 SHF 1000*
Weight / set [kg]	10.8	34.35	36.4	45.1

\* Delivery on request. The speed of rotation must be reduced for jaws with a higher weight!

#### Max. oscillating circle – With type SFG base jaws

ROTA-S plus	400	500	630	800	1000
Oscillating circle $\varnothing$ [mm]	511	594	820	891	1200

At the rated speed the chucks are balanced to Q 6.3

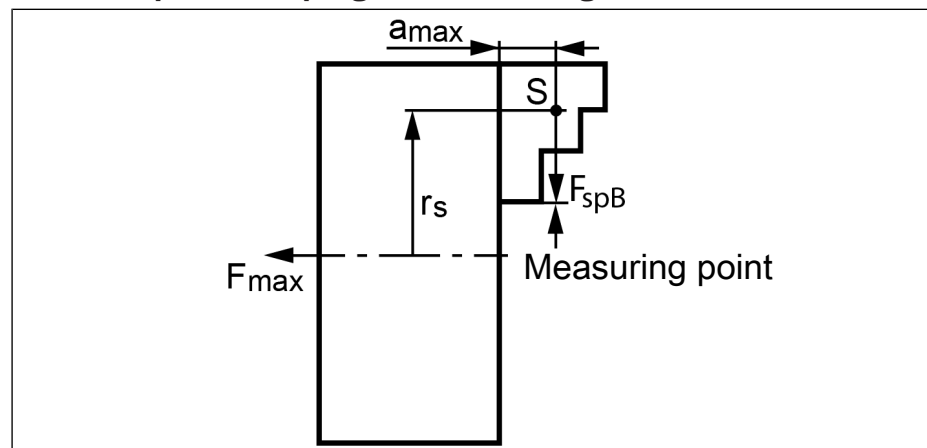
### 3.2 Clamping force / speed diagrams

Clamping force/RPM curves have been determined by using hard jaws. In the determination process, the maximum actuating force was applied and the jaws were set flush with the outer diameter of the chuck.

It is also assumed the chuck is in perfect condition and lubricated with SCHUNK LINOMAX plus special grease .

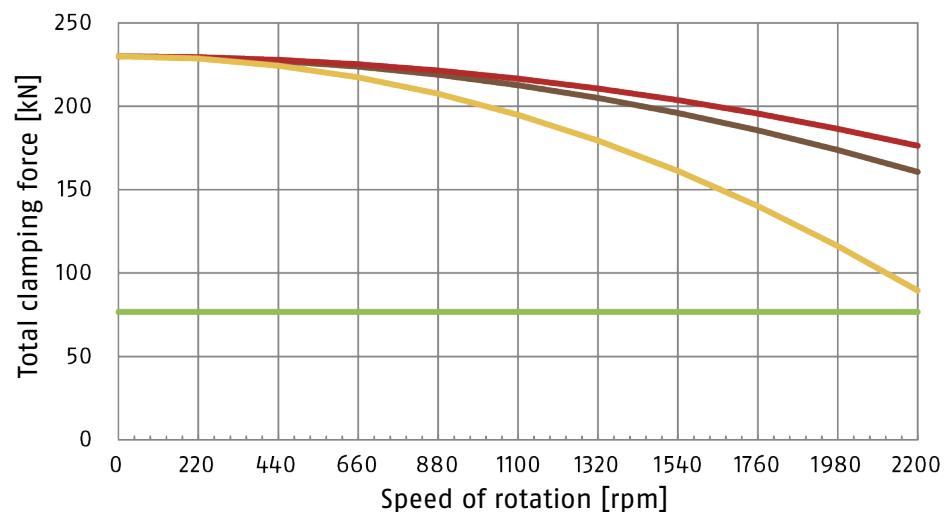
If one or more of these prerequisites is altered, the diagrams will no longer be valid.

#### Chuck setup for clamping force/RPM diagram



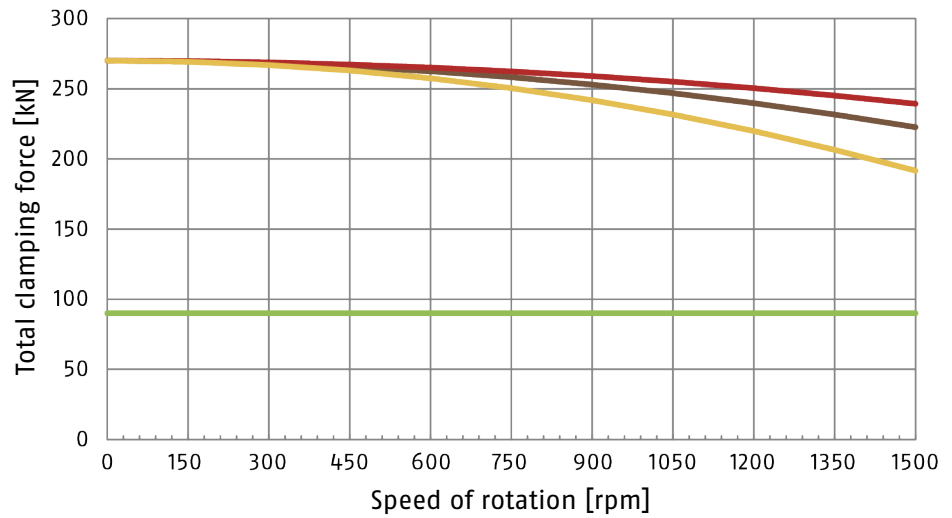
$F_{spB}$	Clamping force per jaw	S	Center of gravity
$r_s$	Center of gravity radius	$a_{max}$	Max. jaw center of gravity eccentricity in axial direction
$F_{max}$	Max. actuating force		








#### Clamping force RPM diagram, ROTA-S plus 400-102



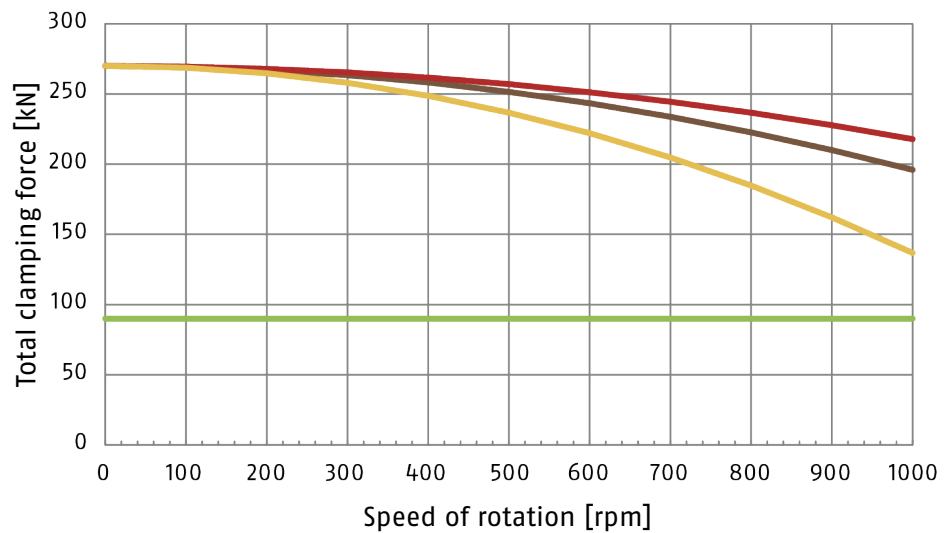
Colour	Jaw ID	Weight [kg]
	SFA 400	13.5
	SHF 400	6.8
	STF 400	10.8
	Minimum required clamping force 33%	








### Clamping force RPM diagram, ROTA-S plus 500-162



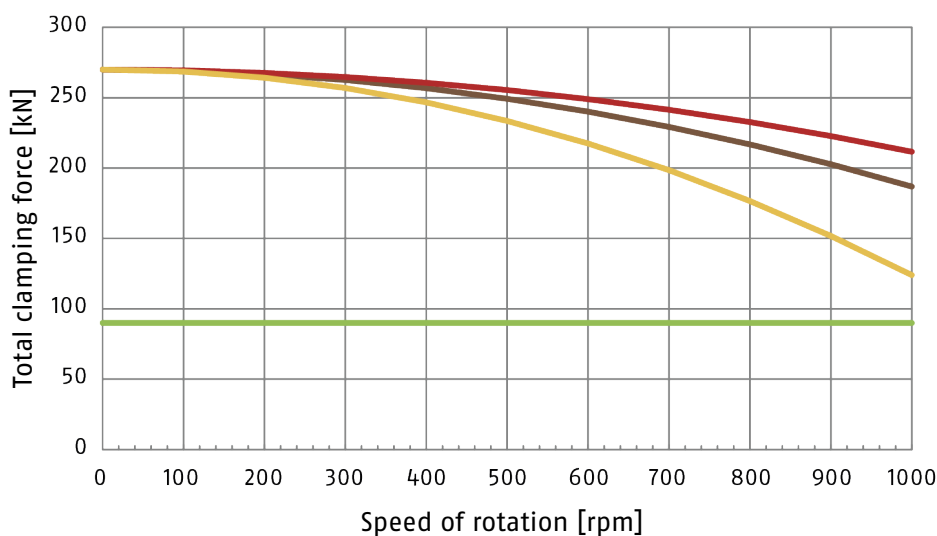
Colour	Jaw ID	Weight [kg]
	 SFA 400	13.5
	 SHF 400	6.8
	 STF 400	10.8
	Minimum required clamping force 33%	








### Clamping force RPM diagram, ROTA-S plus 630-252



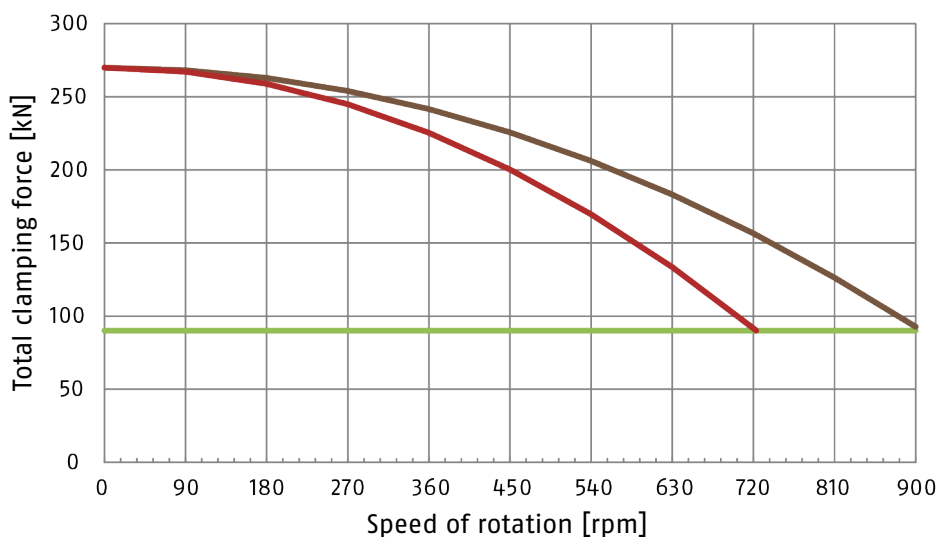
Colour	Jaw ID	Weight [kg]
	 SFA 630	40
	 SHF 630	18
	 SFA-AL 630	14.8
	Minimum required clamping force 33%	






### Clamping force RPM diagram, ROTA-S plus 800-252



Colour	Jaw ID	Weight [kg]
	 SFA 630	40
	 SHF 630	18
	 SFA-AL 630	14.8
	Minimum required clamping force 33%	

### Clamping force RPM diagram, ROTA-S plus 1000-402



Colour	Jaw ID	Weight [kg]
	 SFA-AL 1000	32
	 SFA 1000	87
	Minimum required clamping force 33%	

### 3.3 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 of rotation [RPM]
$F_{sp0}$	Initial clamping force [N]	$r_s$	Center of gravity radius [mm]
$F_{spz}$	Cutting force [N]	$r_{sAB}$	Center of gravity radius of top jaw [mm]
$m_{AB}$	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 torque [kgm]	$\Sigma_s$	Max. clamping force of lathe chuck [N]

#### 3.3.1 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 lathe chuck 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

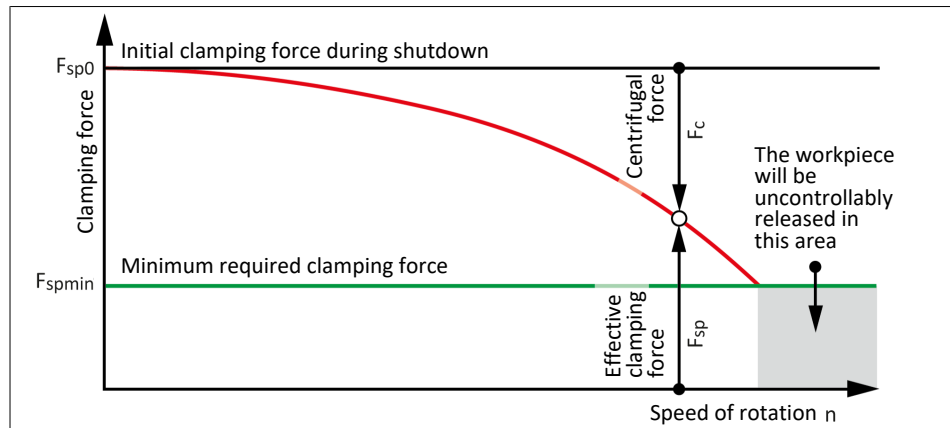
(+) for gripping from the inside outwards



#### **⚠ 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

### NOTICE

**This calculated force must not be larger than the maximum clamping force  $\Sigma S$  engraved on the lathe chuck.**

See also "Lathe chuck data" table ▶ 3.1 [ 16 ]

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.

### NOTICE

**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:

$$F_c = \sum(m_B \cdot r_s) \cdot \left(\frac{\pi \cdot n}{30}\right)^2 = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2 \text{ [N]}$$

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

$$M_c = m_B \cdot r_s \text{ [kgm]}$$

In case of toolholders 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 torque of the base jaws  $M_{cGB}$**  and the **centrifugal torque of the top jaws  $M_{cAB}$**  need to be added:

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

The centrifugal torque of the base jaws  $M_{cGB}$  can be found in the table "Lathe chuck data" ▶ 3.1 [16]. The centrifugal torque of the top jaws  $M_{cAB}$  is calculated as per:

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

### 3.3.2 Calculation example: required initial clamping force for a given speed

#### Required initial clamping force $F_{sp0}$ for a given RPM $n$

The following data is known for the machining job:

- Gripping from the outside in (application-specific)
- Machining force  $F_{spz} = 3000 \text{ N}$  (application-specific)
- max. RPM  $n_{max} = 3200 \text{ RPM}$  ("Lathe chuck data" table)
- RPM  $n = 1200 \text{ RPM}$  (application-specific)
- Mass of one (!) top jaw  $m_{AB} = 5.33 \text{ kg}$  (applicationspecific)
- Center of gravity radius of top jaw  $r_{sAB} = 0.107 \text{ m}$  (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:

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

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:

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

Take the centrifugal torque of the base jaw and top jaw specified from the "Lathe chuck data" table:

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

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

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

Centrifugal torque for one jaw:

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

The chuck has 3 jaws, the total centrifugal torque is:

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

The total centrifugal force can now be calculated:

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

Initial clamping force during shutdown that was sought:

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

### 3.3.3 Calculation of the permissible speed in case of a given initial clamping force

**Calculation of the permissible RPM  $n_{perm}$  in case of a given initial clamping force  $F_{sp0}$**

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

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

#### NOTICE

**For safety reasons, the calculated permissible RPM may not exceed the maximum RPM inscribed on the lathe chuck!**

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

The following data is known from previous calculations:

- Initial clamping force during shutdown  $F_{sp0} = 17723 \text{ N}$
- Machining force for machining job  $F_{spz} 3000 \text{ N}$  (application-specific)
- Total centrifugal torque of all jaws  $\sum M_c = 2,668 \text{ kgm}$
- 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:

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

The calculated RPM  $n_{perm} = 1495 \text{ RPM}$  is smaller than the maximum permissible RPM of the lathe chuck  $n_{max} = 3200 \text{ RPM}$  (see "Lathe chuck data" table ▶ 3.1 [16]).

**This calculated RPM may be used.**

### **3.4 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.

### **3.5 Permissible imbalance DIN ISO 21940-11**

The ROTA-S plus in ungreased state without chuck jaws corresponds to the 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 particularly to high speeds, asymmetrical workpieces or the use of various chuck jaws, as well as uneven application of lubricants. 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.

## 4 Mounting

### 4.1 Torque per screw

Tightening torques for mounting screws for clamping the chuck  
(screw quality 10.9)

Screw size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
Admissible torque $M_A$ (Nm)	13	28	50	88	120	160	200	290	400	500	1050	1500

Tightening torques to mount top jaws onto the chuck (screw  
quality 12.9)

Screws for base jaws SFG/SFGK/SFK-V/SFGL/SFGX	M6	M8 x 1	M10	M12 x 1.5	M16 x 1.5	M20	M24
Admissible torque $M_A$ (Nm)	16	30	60	85	105	180	230

### 4.2 Mounting in general

#### 4.2.1 Pre-assembly measures

Carefully lift the product (e.g. using suitable lifting gear) from the packaging.



#### ⚠ WARNING

##### Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



#### ⚠ CAUTION

##### Danger of injury due to sharp edges and rough or slippery surfaces

- Wear personal protective equipment, particularly protective gloves.

Check the delivery for completeness and for transport damage.

In order to achieve high run-out accuracy of the chuck, the machine side must be aligned before mounting the chuck. To do this, check the mounting surfaces for radial and axial run-out using a dial indicator.

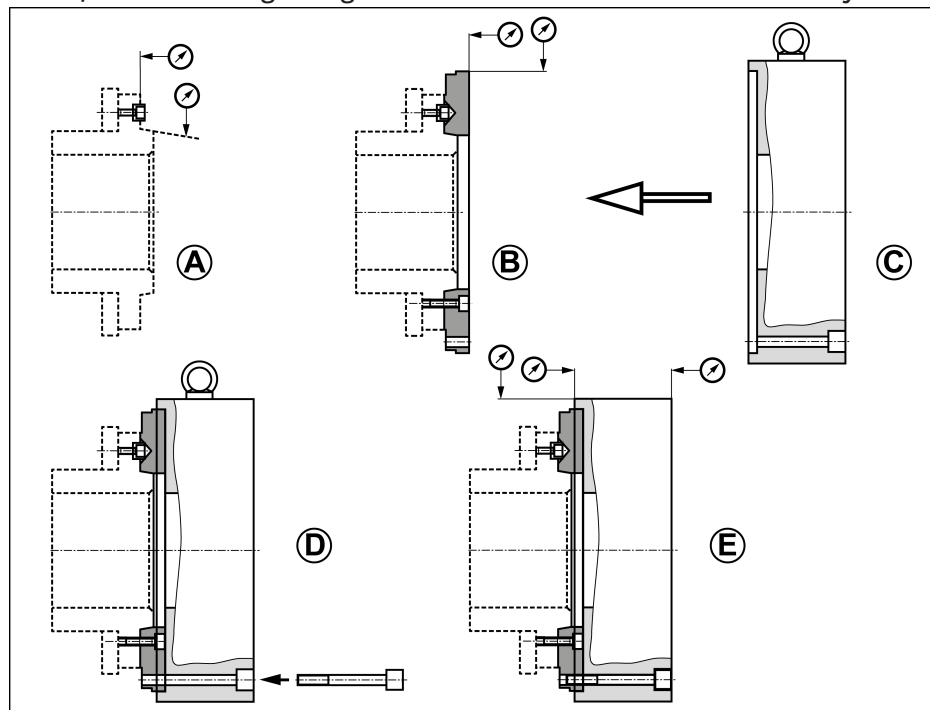
**A maximum concentricity error of 0.01 mm should be ensured for the centring of the mount and a maximum axial run-out error of 0.01 mm for the contact surfaces. In addition, the flat surface must be checked for evenness using a straight edge (flat surface deburred and clean at the bore holes).**

Radial and axial run-out tolerances of the chuck:

Chuck size [mm]	Max. Radial run-out tolerance [mm]	Max. Axial run-out tolerance [mm]
≤ 315	0.02	0.02
≤ 400	0.03	0.03
≤ 800	0.04	0.04
≤ 1200	0.05	0.05
≤ 1600	0.06	0.06

#### 4.2.2 Chuck assembly options

If the interface of the machine spindle and chuck is identical, assembly is carried out without assembly preparation. If the interface of the machine spindle deviates from the interface of the chuck, a connecting flange must be installed before assembly.



Chuck assembly

- Direct assembly of the chuck to the machine spindle
- Assembly of the chuck with connecting flange
  - Direkt flange (insert ring)
  - Reduction flange
  - Expansion flange

#### NOTICE

When mounting with the connecting flange, never allow the outer rim of the chuck body to make contact. The flange must support on the entire surface.

#### NOTICE

Use a crane to install the chuck. Fasten the chuck to the eye bolt provided for this purpose (see Fig. "Chuck assembly" – C) The eye bolt must be removed prior to commissioning.

## 4.3 Mounting of the chuck

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [ 40].

### 4.3.1 Handling prior to attachment

Before mounting on the lathe, remove the base jaws from the chuck, then re-install the base jaws and turn the spindle several times as far as it will go to the right and left.

- Use the spanner wrench to turn the spindle (item 8) as far as possible to the left.
- Press the cartridge (item 19) under the first jaw (item 4). The base jaw is now free to move.
- Remove the base jaw.
- Slide the base jaw into the chuck again, until the jaw safety lock (plunger pin, item 25) locks into place.
- Proceed in this way for all three base jaws.

**The numbered jaws must be inserted into the correspondingly numbered guides (jaw 1 in guide 1, etc.).**

Finally, turn the spindle a few times as far as it will go to the right and left.

### 4.3.2 Mounting of the Manual Chuck

- Before putting on the chuck on the spindle nose, carefully clean the centering and contact surfaces of both parts and rub in some oil.
- While the chuck is lightly pressed on, there should be noticeable play in the taper and at most 0.02 mm play between the flat surfaces (feeler gauge).
- Insert and **slightly tighten** the mounting screws depending on the type of fastening.
- Check the chuck for radial and axial run-out and, if necessary, align it at the outer diameter with gentle taps using a plastic hammer (See Fig. "Chuck assembly" – E and table for the attainable maximum radial and axial run-out tolerances).
- Then tighten the fastening screws with a torque wrench. Observe the specified maximum admissible torques ▶ 4.1 [ 25].
- Check radial and axial run-out again.

#### NOTICE

**Danger of damage to the cartridge (item 19) when setting down the chuck on the cartridge, e.g., for cleaning or maintenance.**

Never set the chuck down on the cartridge (item 19)!

## 5 Function

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [ 40].

### 5.1 Handling and jaw change



#### ⚠ WARNING

**If the indicator pin protrudes, the entire serration of the wedge bars (items 5 and 6) no longer engages into the base jaws. The base jaws are not sufficiently engaged by the wedge bars.**

**Risk of injury from jaws and workpiece being flung out.**

- If the indicator pin protrudes, do not clamp the chuck and do not start up.
- Once the spindle (item 8) has reached the stop, press the cartridge (item 19) under the base jaw. The corresponding jaw is released and can now be adjusted or exchanged.

#### NOTICE

**If the cartridge (item 19) is stuck or does not move easily, it must be removed and cleaned (see Section "Disassembling and assembling the chuck"). Never apply force (e.g. with a hammer, etc.) to loosen the cartridge, since this could damage the plunger pin (item 24), which in turn could impair the safety mechanism.**

**ATTENTION: Do not disassemble the cartridge!**

**Oil the cleaned cartridge, do not grease with chuck grease!**

**The numbered chuck jaws must be inserted into the correspondingly numbered guides of the chuck body (jaw no. 1 in guide 1, etc.).**

For improved handling, an M10 thread is located at the front of type SFG 800 and SFG 1000 base jaws. Changing the base jaws can be done with mounted, heavy top jaws using an M10 eye bolt and appropriate lifting equipment. This simplifies the jaw change especially with a horizontal application of the chuck.

- Adjust exchanged jaws until the desired clamping diameter has been reached. The jaw safety locks (item 10) must snap in.

**For all the wedge bar teeth to be supportive, the base jaws in the guides must always be inserted at least up to the marking line on the chuck body. All jaws have to be at the same marking line. An additional actuating lock prevents the spindle from being turned to the right without chuck jaws.**

**NOTICE**

If force is used to continue turning, the chuck will be damaged and the jaw lock function will no longer be active.

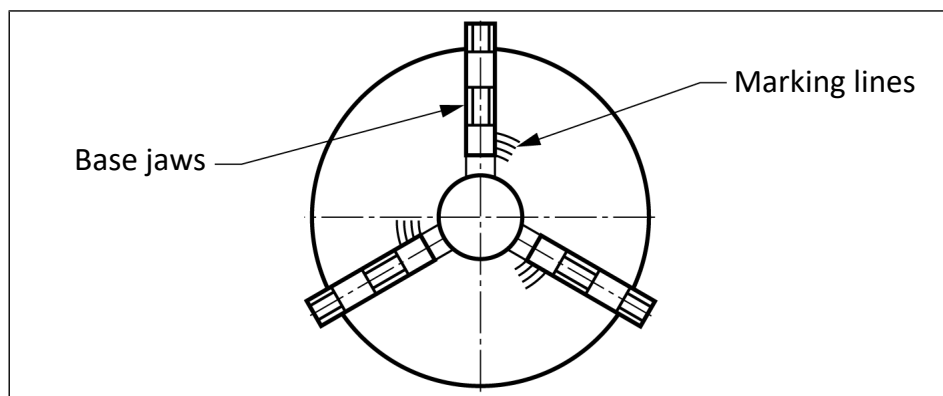
**Do not forcefully turn the spindle further!**

**Only after all the chuck jaws have been inserted into the guide will the jaw lock be unlocked. Then the wedge bars can be shifted into working position (Turn spindle to the right!).**

**Sluggish jaws**

If sluggish jaws do not snap in properly, slightly offset one jaw (by gently knocking e.g.) and carefully turn the spanner wrench to the right until the serration engages. Then turn the spindle back and offset other sluggish jaws as well.

**In the event of noticeable resistance (jaw not engaged), do not turn further forcefully. Slightly move the base jaw until it engages.**



If you turn the spindle to the right, the indicator pin will protrude from the chuck body (gold-colored pin).

**⚠ WARNING**

**If the indicator pin protrudes, the entire serration of the wedge bars (items 5 and 6) no longer engages into the base jaws. The base jaws are not sufficiently engaged by the wedge bars.**

**Risk of injury from jaws and workpiece being flung out.**

- If the indicator pin protrudes, do not clamp the chuck and do not start up.

## 5.2 Important notes

**When working with a very short opening stroke or large series, lubrication grease may be pressed out between the loaded surfaces of the chuck gear. In this case efficiency will decrease!**

Following a number of clampings, activate the chuck several times without a workpiece inserted at full stroke so that the grease can be distributed evenly again on the sliding areas on the inside of the chuck. The chuck will then attain its full clamping force again.

- Never remove the base jaws without actuating the cartridge (item 19).
- Regularly adjust the lathe chuck during operations to compensate for loss of clamping force caused by vibrations.
- Following a longer period of shutdown (more than 8 hours), always re-tension the clamped chuck in order to compensate for the spindle settling and the resulting loss of clamping force.
- When gripping the spanner wrench, do not tighten with an extension pipe or by using hammer blows! Only grip using the flange-mounted chuck!
- Do not flange-mount the chuck against the edge of the chuck body!
- Do not grip the base jaws outside of the marking lines ▶ 5.1 [📄 28]!
- Do not use force (e.g. hammer blows) to move jaws that are difficult to move! Clean the guides and jaws.
- Subsequently delivered hard top jaws (type SHF) or unsplit, hard jaws (type STF) must be ground in the chuck for run-out accuracy.
- For precise clamping, do not remove the ground top jaws from the base jaws. This will result in loss of true-running accuracy. Use a different set of jaws when changing the jaws.
- When re-equipping from cylindrical mounting to short-taper flange, the lid (item 2) must be removed if the centering lid is used.

## 5.3 Control of the chuck

The ROTA-S plus manual chuck can only be checked in flange-mounted condition. The round and planar surfaces in the rear chuck body area must run true.

The jaws must be just as easy to move after attachment as it was before ▶ 6.1 [📄 32].

**If the jaws are more difficult to move than before attachment, the chuck body has been incorrectly attached. The chuck may have become twisted.**

### 5.4 Control of true-running

(on delivery of ROTA-S plus with STF/SHF hard jaws ground on the chuck)

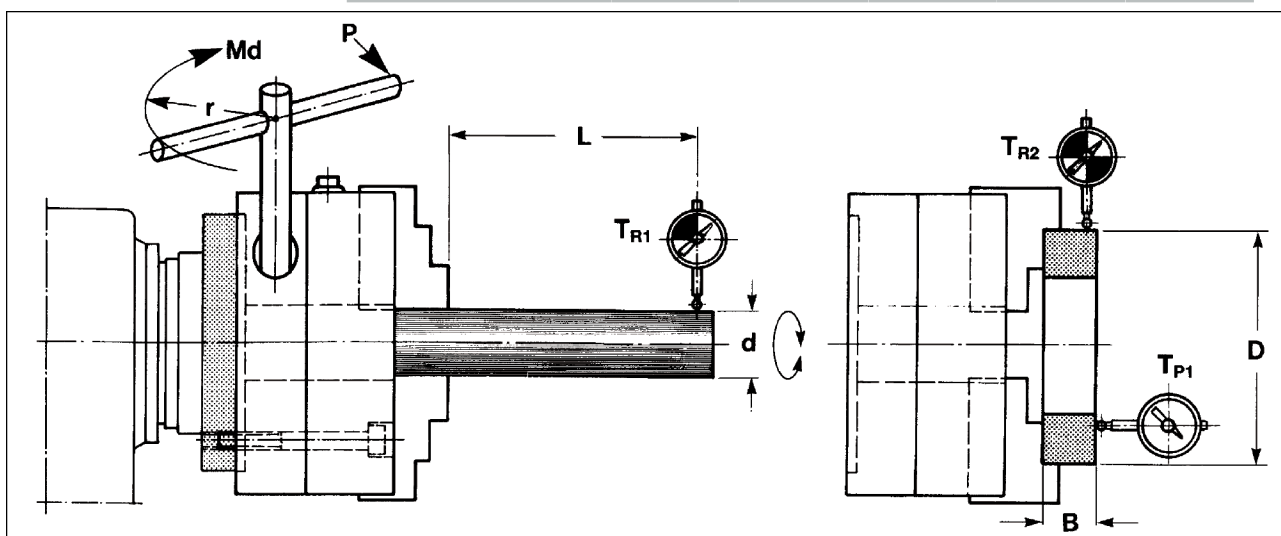
To check the radial and axial run-out accuracy, hardened and ground test pins or test disks are clamped (see Fig. "True running check"). The torque (Md) at the key when gripping the test pins and test disks is provided in the table.

If the permissible radial and axial run-out error  $T_R$  (see table) is exceeded, check the following points:

- applied wrench torque (Md)
- correct mounting of the chuck
- Test pins and test disks deviate from the factory specification

**Table of the maximum permissible radial and axial run-out error for the ROTA-S plus chuck with STF or SHF jaws**

ROTA-S plus	400	500	630	800	1000
Jaw type	STF-400	STF-400	-		
	SHF-400	SHF-400	SHF-630		
Md [Nm]	100	100	100		
L [mm]	120	160	160		
d (STF) [mm]	∅ 103	∅ 103	-		
d (SHF) [mm]	∅ 119	∅ 119	∅ 120		
$T_{R1}$ max [mm]	0.04	0.05	0.05		
D (STF) [mm]	∅ 313	∅ 313	-		
D (SHF) [mm]	∅ 234	∅ 234	∅ 243		
W [mm]	35	35	50	on request (special stepped jaws)	on request (special stepped jaws)
$T_{P1}$ max [mm]	0.03	0.03	0.03		



True running check

## 6 Maintenance

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [ 40].

A high load bearing capacity with a secure workpiece clamping device can only be guaranteed with regular lubrication using a high-performance lubricant.

For this reason, it is recommended to regularly clean the chuck and lubricate it using SCHUNK LINOMAX plus special grease.



### ⚠ CAUTION

**Allergic reactions if lubricating grease comes into contact with the skin.**

- Wear protective gloves.

The chuck will have to be disassembled and cleaned at regular intervals according to its application.

### 6.1 Disassembling and assembling the chuck

#### Disassembly

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

- First remove the manual lathe chuck from the lathe.

Note for the corresponding mountings:

- For direct mounting in accordance with DIN ISO 702-1: Evenly loosen the mounting screws (item 36) and remove the chuck from the spindle.
- For direct mounting in accordance with DIN ISO 702-3 (bayonet): Loosen flanged nut, twist the bayonet disk and take the chuck out of the spindle.
- For direct mounting in accordance with DIN ISO 702-2 (camlock): Unlock the camlock bolts and take the chuck out of the spindle.
- For mounting with an intermediate flange (DIN ISO 702-1): Evenly loosen the mounting screws (item 35 and 36) and loosen the chuck of the intermediate flange.



### ⚠ WARNING

**Risk of injury due to dropping the manual lathe chuck during transport, installation or removal**

During transport and when installing or detaching the manual lathe chuck, ensure it does not fall off.

- Remove the jaws from the guideways (see ▶ 5.1 [ 28])
- Place the chuck on its front, undo the screws (item 34) and remove the cover (item 2).
- Carefully remove the drive ring (item 3) (**Attention: spring tension!**), the ball (item 18), the sliding blocks (item 7) and the threadless wedge bars (item 9) from the chuck.
- Using the spanner wrench, turn the spindle (item 8) to the right until the threaded wedge bar (item 5) is just before the back stop. **\*Do not advance to the back stop!\***

- Remove the seat of bearing (item 15) at the front of the spindle (item 8).
- Remove the spindle (item 8) and the screwed-in wedge bar (item 5) with the seat of bearing (item 13) diagonally upwards out of the chuck body.
- Unscrew the wedge bar (item 5) from the spindle (item 8) and remove the seat of bearing (item 13).
- Remove the screw (item 31) and the safety disk (item 39).
- Take out the indicator pin (item 17) and the corresponding compression spring (item 28).

### NOTICE

**The cartridges (item 19) are safety equipment and may never be disassembled!**

**If the cartridge (item 19) is stuck or does not move easily, never use force to loosen it! Clean and oil the cartridges (do not lubricate with chuck grease!).**

- Disassemble the threadless wedge bar (item 9): Remove clamping pins (item 30). Disassemble the compression springs (item 29) and the bolt (item 10) from the wedge bar (item 9).
- Disassemble the set-screws (item 41) from the chuck body and remove the compression springs (item 40) and the second plunger pin (item 24).

Clean all parts carefully with degreasing agent and check for wear and damage.

**Replace damaged parts with original SCHUNK spare parts only.**

Before assembly, grease all individual components (except for the cartridges) using LINOMAX plus.

### Assembly

The chuck is assembled in the reverse order. Observe the following when doing this:

- **Do not forget any parts! Even small components are essential for safety!**
- Assemble all cartridges. Reassemble plunger pins with washers, springs and safety rings.
- Before inserting the drive ring (item 3) mount the indicator pin (item 17) with compression spring and ball in the chuck body (item 1). In doing so, insert the ball fully into the bore hole and hold the indicator pin steady on the chuck's front side using a suitable tool.



### ⚠ CAUTION

**Risk of injury due to the ball flying out.**

The ball is under spring tension.

- Wear protective goggles.

## 6.2 At least once a month

- Use a grease gun to lubricate the spindle (item 8) via the lubrication nipple (item 32) in the square profile of the spindle.
- Relubricate the wedge bar mechanics with grease (LINOMAX plus) with a manual press at the 6 grease nipples (item 44 or item 33 & 44) on the circumference of the chuck body (Before greasing, turn the base jaws all the way to the inside without a workpiece!).

After lubricating, open and close the chuck 2 – 3 times fully without a workpiece to evenly distribute the grease well to all greasing areas.

**Lubricate all 3 segments evenly in order to avoid large imbalances.**

## 6.3 In the case of decreasing clamping force or after approx. 200 operating hours

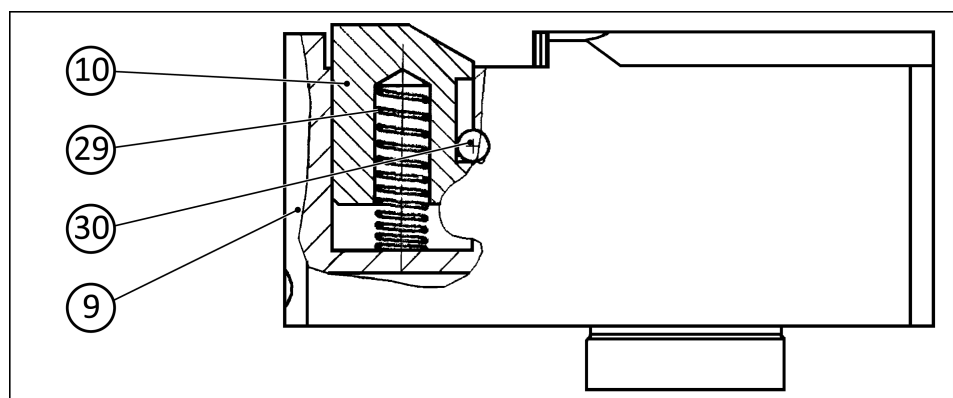
If the clamping force decreases, the inside of the chuck is contaminated or the coolant has washed out or decomposed the grease.

In this case, disassemble the chuck, carefully clean all parts with degreasing agent and check for wear and damage.

**Replace damaged parts with original SCHUNK spare parts only.**

Before installation, lubricate all individual components with SCHUNK LINOMAX plus special grease.

This cleaning procedure should be performed about every 200 operating hours, depending on the extent of stress on the chuck.



## 6.4 Jaw change

Clean and lubricate jaws if there is no film of grease.

## 7 Storage

When storing the product for a longer period of time, observe the following points:

- Clean the product and lubricate it lightly.
- Store the product in a suitable transport container.
- Only store the product in dry rooms.
- Protect the product from major temperature fluctuations.

**NOTE:** Before recommissioning, clean the product and all attachments, check for damage, functionality and leaks.

## 8 Disposal

After decommissioning, place the chuck in a position that enables any liquids in the chuck to drain out.

- Collect the escaping liquids and dispose of them properly in line with the statutory provisions.
- Remove any identifiable plastic or aluminum parts installed in or on the chuck and dispose of them properly in line with the statutory provisions.
- Dispose of the chuck's metal parts as scrap metal.

Alternatively, you can return the chuck to SCHUNK for proper disposal.

## 9 Parts list

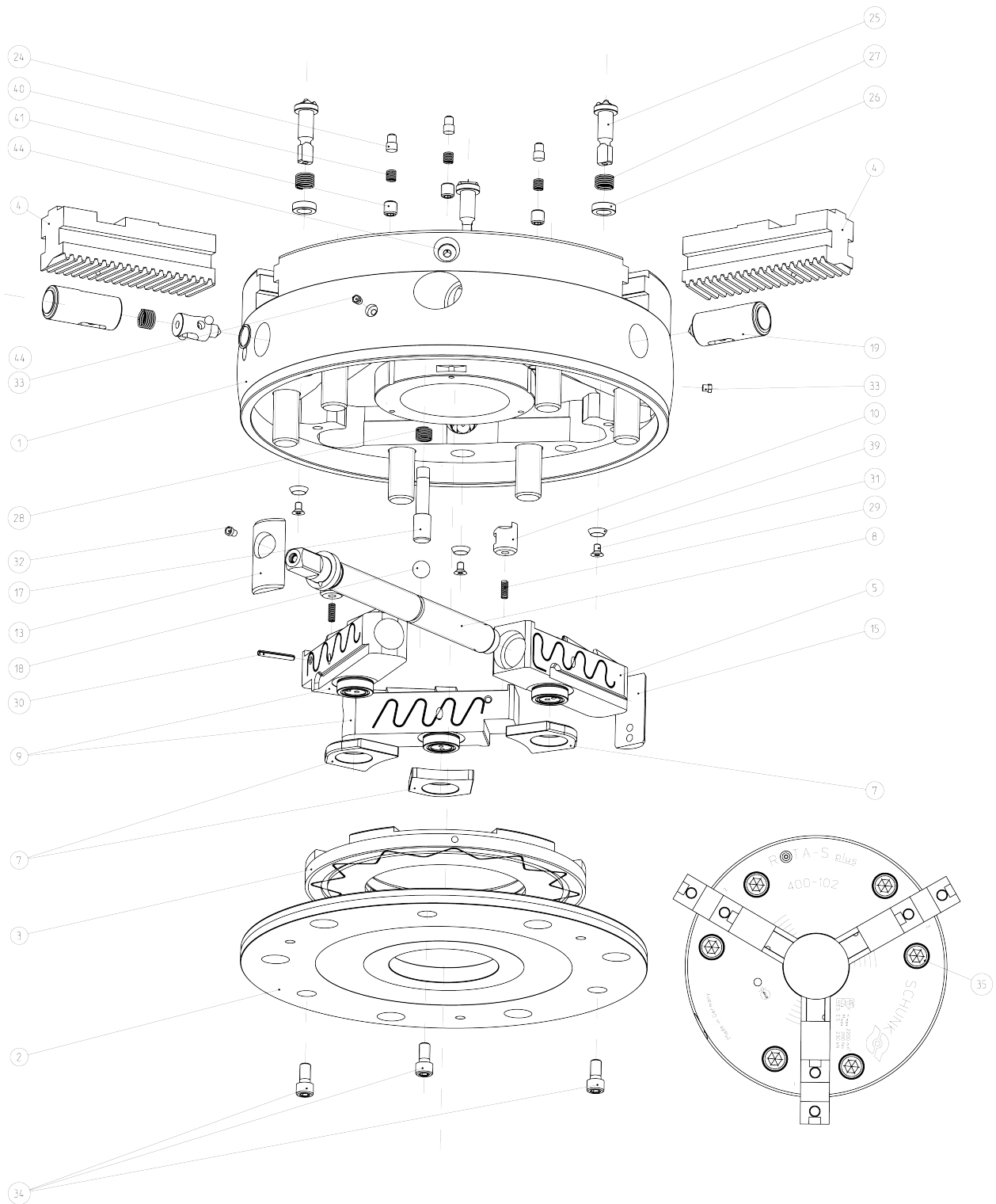
When ordering spare parts, it is essential to specify the type, size and, above all, the serial number of the chuck. **Seals, sealing elements, screw connections, springs, bearings, screws and wiper strips as well as parts that come into contact with the workpiece are not covered by the warranty.**

Item	Designation	Quantity	Note
1	Chuck body	1	
2	Cover	1	
3	Drive ring	1	
4	Base jaws	3	
5	Wedge bar with thread	1	
6	Wedge bar	1	
7	Sliding block	3	
8	Spindle	1	
9	Wedge bar without thread	2	
10	Safety bolt	2	
13	Seat of bearing with bore hole	1	
15	Seat of bearing	1	
17	Indicator pin	1	
18	Ball	1	
19	Cartridge	3	
20	Bushing	3	
21	Control pin	3	
22	Ball	6	
23	Compression spring	3	
24	2nd plunger pin	3	
25	Plunger pin	3	
26	Washer	3	
27	Compression spring for plunger pin	3	
28	Compression spring for indicator pin	1	
29	Compression spring for safety bolt	2	
30	Clamping sleeve	2	
31	Screw for plunger pin	3	
32	Lubrication nipple for spindle	1	

Item	Designation	Quantity	Note
33	Lubrication nipple for chuck body	3	400 / 500
34	Screw 10.9 (cover)	3	400 / 500 / 630 / 800
	Screw 10.9 (cover)	6	1000
35	Screw 10.9	3	400 / 500 / 630
	Screw 10.9	12	800 / 1000
36	Screw 10.9	3	
38	Screw 10.9	1	1000
39	Safety disk	3	
40	Compression spring	3	
41	Set-screw	3	
42	Circlip	3	
	Screw 10.9	3	630
44	Lubrication nipple	3	400 / 500
	Lubrication nipple	6	630 / 800 / 1000
	Screw	6	630
52	Scraper left	3	630
53	Scraper right	3	630
	Screw 10.9	9	1000
54	Flat-head screw	24	630
55	Scraper left	3	1000
56	Scraper right	3	1000
57	Flat-head screw	33	1000
61	Eye-bolt	1	400 / 500 / 630
81	Eye-bolt	1	1000
90	O-ring	3	
94	Scraper right	3	800
95	Scraper left	3	800
	Sleeve	3	630
99	Eye-bolt	1	800
102	O-ring	3	630 / 800
103	O-ring	3	630 / 800
104	Sleeve	3	800
105	Compression spring	3	630 / 800
108	Flat-head screw	36	800

<b>Item</b>	<b>Designation</b>	<b>Quantity</b>	<b>Note</b>
109	Screw 10.9	3	800

## 10 Assembly drawing



## 11 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Lathe chuck
Designation:	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)

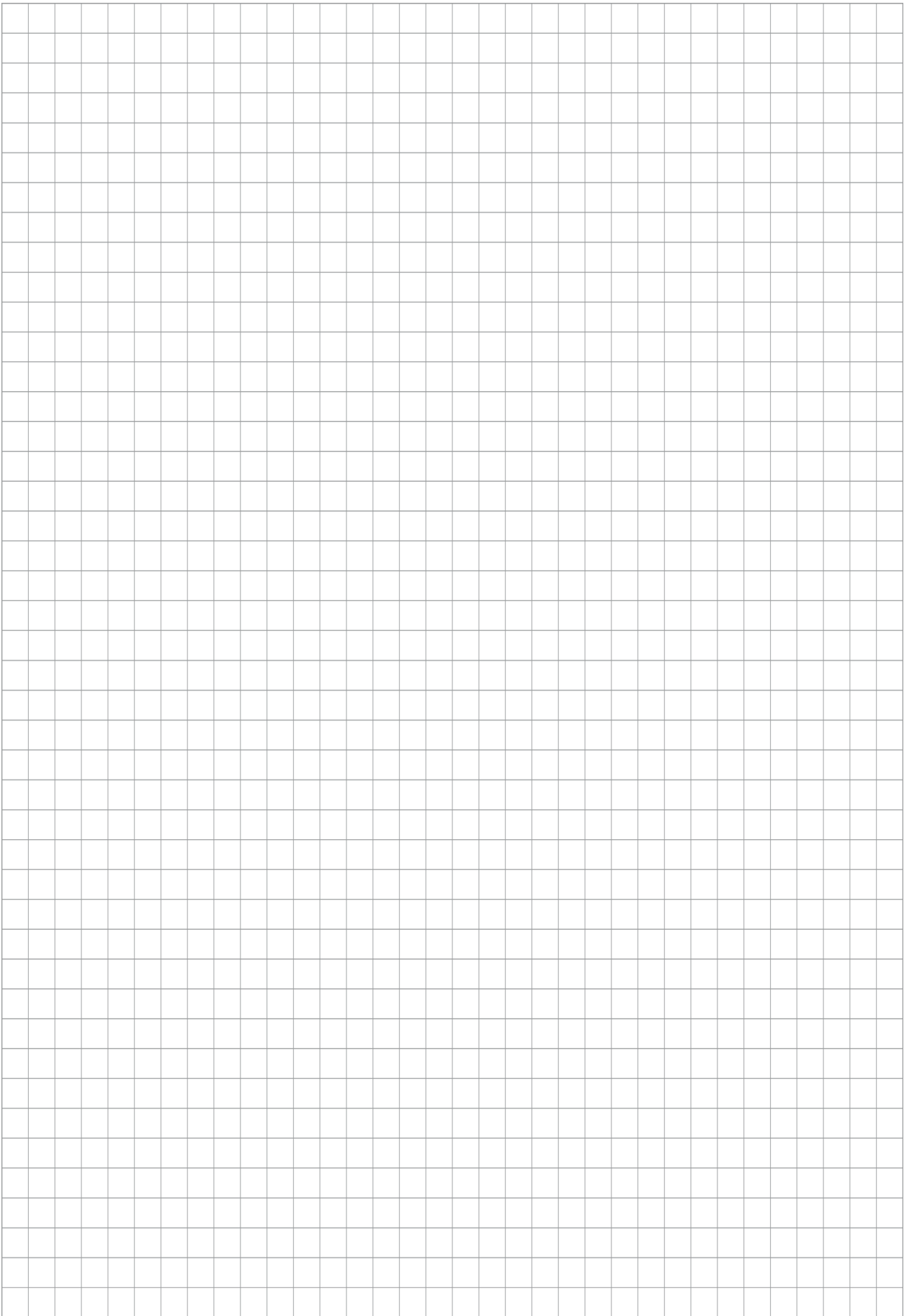
Mengen, 25th of April 2023

*Signature: see original declaration*

*Signature: see original declaration*

p.p. Philipp Schröder  
Head of Development standard products

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







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