Power chuck
ROTA NCR-A
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.

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Dear Customer,

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

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

Best regards,

Your SCHUNK team

Customer Management

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

Table of Contents

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.

CAUTION

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**.

1.1.3 Sizes

This operating manual applies to the following sizes:

- ROTA NCR-A
  190; 225; 250; 315; 400; 500; 630; 800; 1000
- ROTA NCR-A-F
  225; 250; 315; 400; 500; 630

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 ▸ 6.2 [🗋 36]

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	**Power Chuck**
3	**Fastening screws** (up to size 400)
6	**Fastening screws** (from size 500 on)
12	**T-nuts** for fine serration
12	**Screws** for tongue and groove
1	**Eye bolt** from size 250 and up
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.

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**.

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.

Instructed person Instructed persons have been instructed by the operator regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.

Manufacturer's service personnel 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.
- Do not start the machine spindle until the clamping force has built up on the chuck jaws and clamping has taken place in 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).

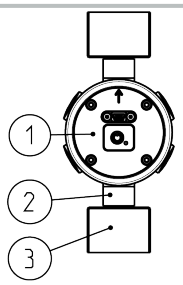
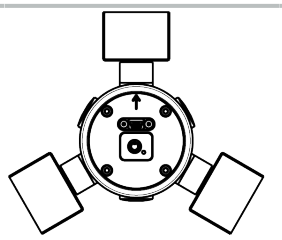
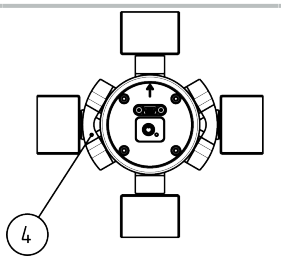
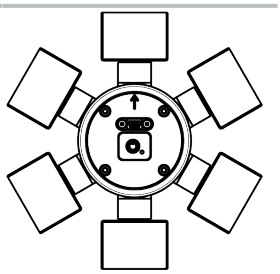
Maintenance instructions

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)
				
Measuring device	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester	SCHUNK IFT clamping force tester
Accessories	–	–	IFT MA4	–
Measuring points	0°/180°	0°/120°/240°	0° / 180° / 90° / 270° (IFT MA4)	0°/60°/120°/180°/ 240°/300°
Please note	Operating manual SCHUNK IFT Clamping force tester	Operating manual SCHUNK IFT Clamping force tester	Operating manual SCHUNK IFT Clamping force tester **Attention** Compensation must be activated, otherwise it may lead to inconsistent results.	Operating manual SCHUNK IFT Clamping force tester **Attention** 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 is 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)

CAUTION

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 NCR-A	190	225	250	315	400
Max. actuating force [kN]	20	28	38	40	54
Max. clamping force [kN]	36	50	64	80	100
Max. speed [RPM]	4000	3500	3000	2500	1400
Stroke per jaw [mm]	6	6	8	8	12
Piston stroke [mm]	13.5	15.0	18.5	20.0	30.0
Pendular compensation	1+1	1+1	2+2	2+2	2.5+2.5
Moment of inertia [kgm²]	0.055	0.11	0.31	0.71	2.4
Weight [kg]	13.5	19.5	35	54	118
Centrifugal force of the base jaw M_{cGB} [kgm]	0.015	0.023	0.041	0.063	0.216
Max. jaw eccentricity of center of gravity in axial direction a_{max} [mm]	12	24	24	24	32

ROTA NCR-A	500	630	800	1000
Max. actuating force [kN]	65	80	80	150
Max. clamping force [kN]	125	160	160	300
Max. speed [RPM]	1200	1000	700	600
Stroke per jaw [mm]	12	16	16	25
Piston stroke [mm]	30.0	40.0	40.0	60.0
Pendular compensation	2.5+2.5	3.5+3.5	3.5+3.5	6+6
Moment of inertia [kgm²]	5.6	19.1	31.7	143
Weight [kg]	175	375	480	1250
Centrifugal force of the base jaw M_{cGB} [kgm]	0.338	0.935	1.491	3.360
Max. jaw eccentricity of center of gravity in axial direction a_{max} [mm]	32	32	32	40

Sizes 1200 to 2500 on request

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

If unhardened top jaws or special chuck jaws are used, ensure that the jaws weigh as little as possible.
For soft top jaws or special chuck jaws the speed permitted for the cutting task must be calculated in accordance with VDI 3106 whereby the max. recommended speed may not be exceeded. The calculated values must be checked by dynamic measurement. Function monitoring (piston movement and actuating pressure) must be performed in accordance with the guidelines of the Berufsgenossenschaft (employers' mutual insurance association).

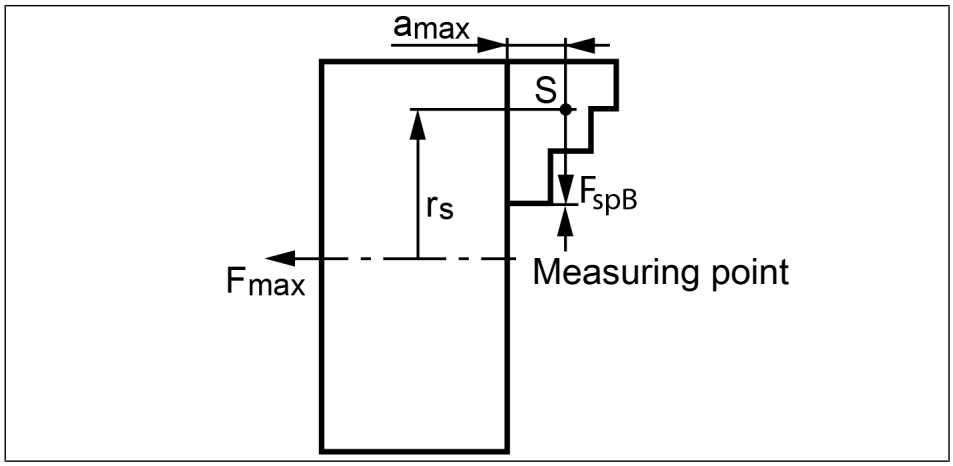
3.2 Clamping force / speed diagrams

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 jaws.

The chuck is in perfect condition and lubricated with SCHUNK LINOMAX plus special grease.

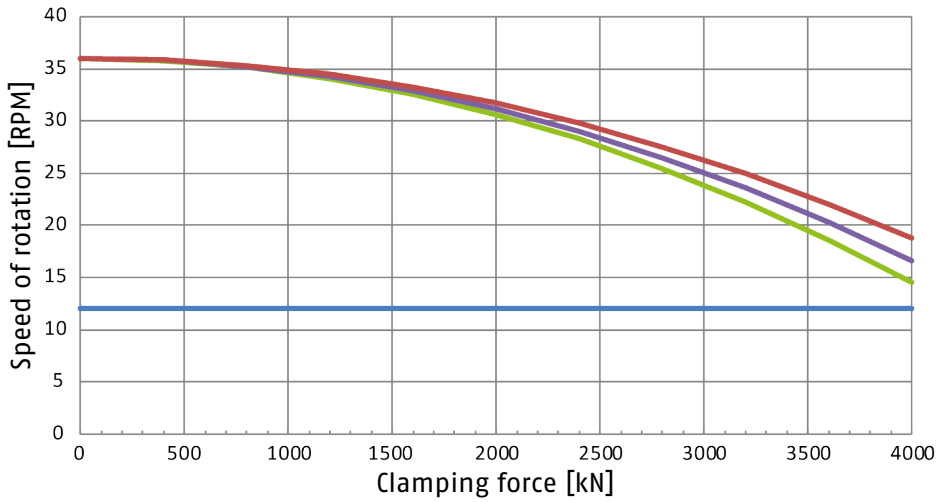
If one or more of these prerequisites is modified, the graphs will no longer be valid.

Chuck setup for clamping force/RPM graph



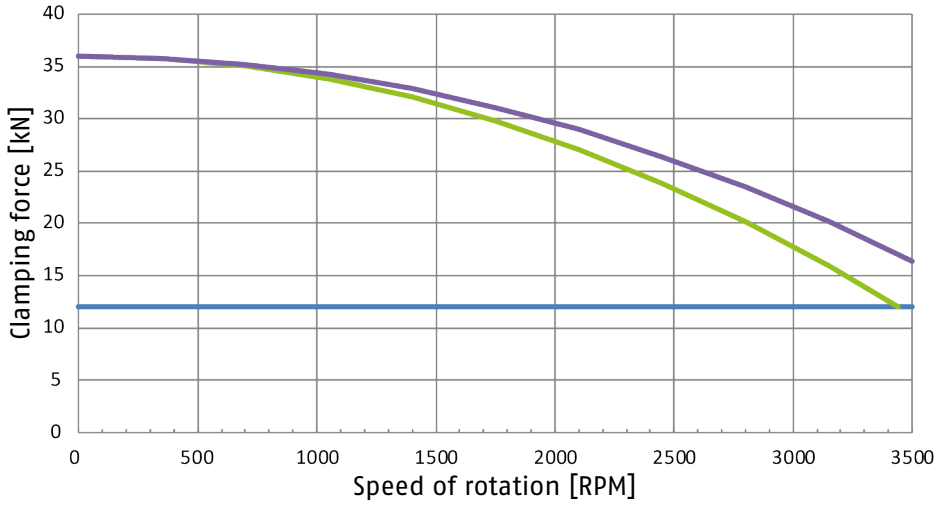
F_{spB}	Jaw clamping force	S	Center of gravity
r_s	Radius of center	a_{max}	Max. jaw eccentricity of center of gravity in axial direction
F_{max}	Max. actuating force		

Clamping force/RPM graph for ROTA NCR-A 190



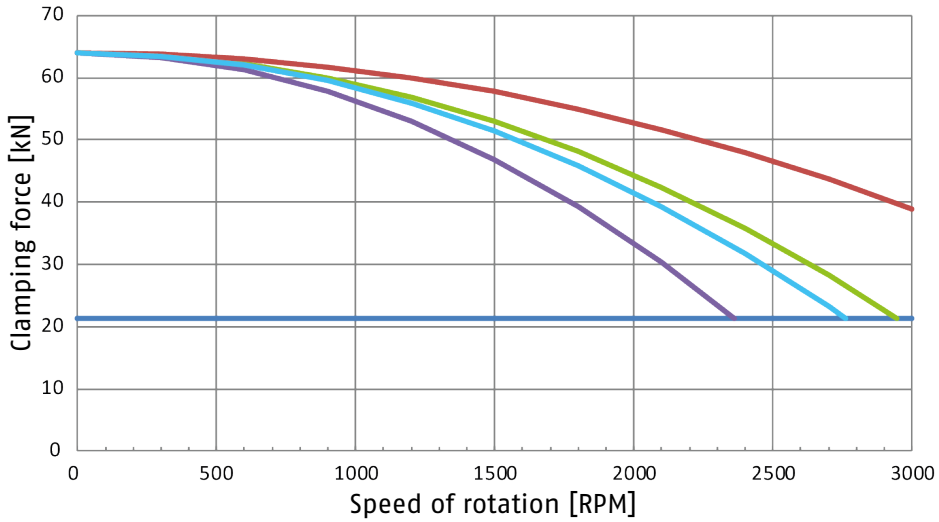
Colour	Jaw ID	Weight [kg]
	SRK 132	0,9
	SRK 132	1,2
	SRK 132	1,5
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 225



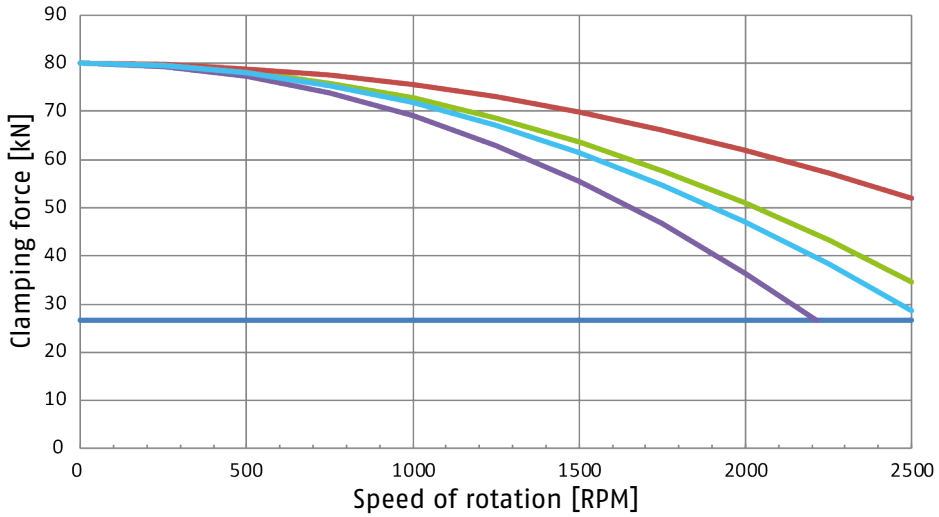
Colour	Jaw ID	Weight [kg]
	SHF 160	1,2
	SFA 160	2,3
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 250



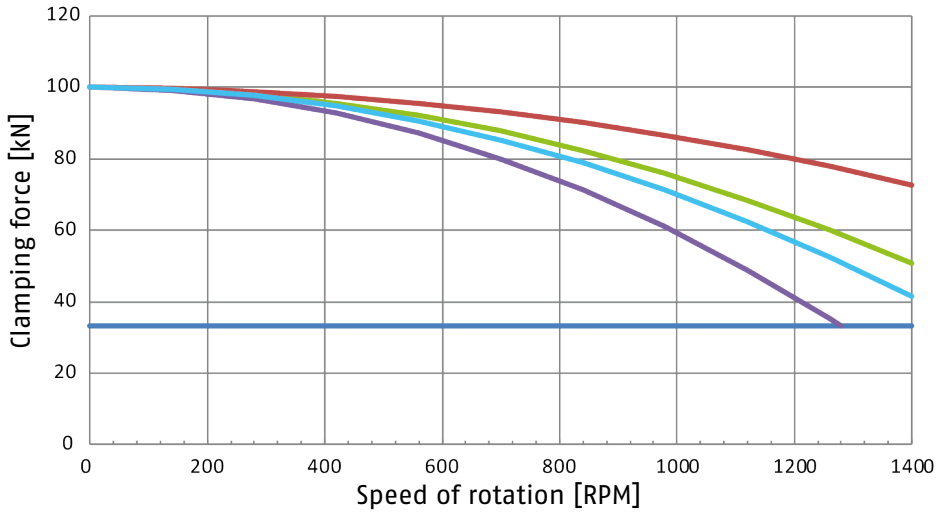
Colour	Jaw ID	Weight [kg]
	SHB 165*	2,6
	SWB 165*	5,0
	SHB 165**	2,6
	SWB 165**	5,0
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 315



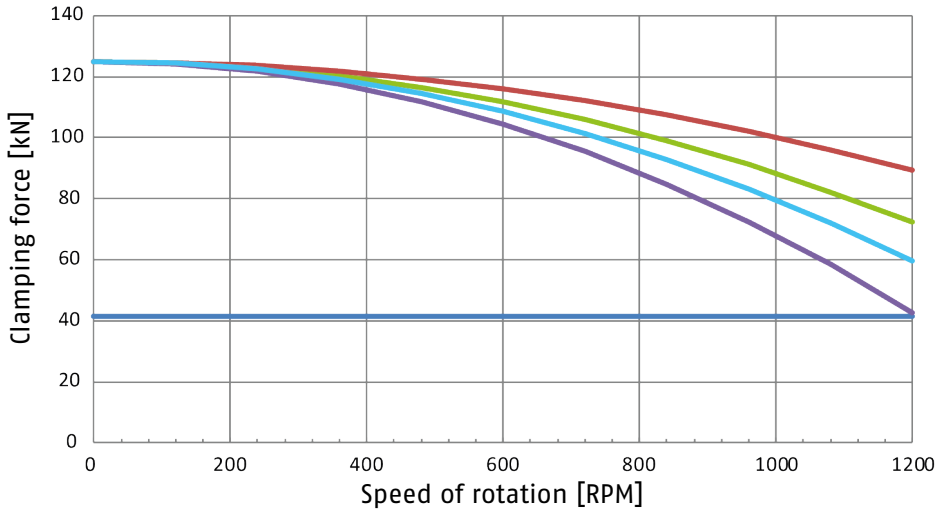
Colour	Jaw ID	Weight [kg]
	SHB 165*	2,6
	SWB 165*	5,0
	SHB 165**	2,6
	SWB 165**	5,0
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 400



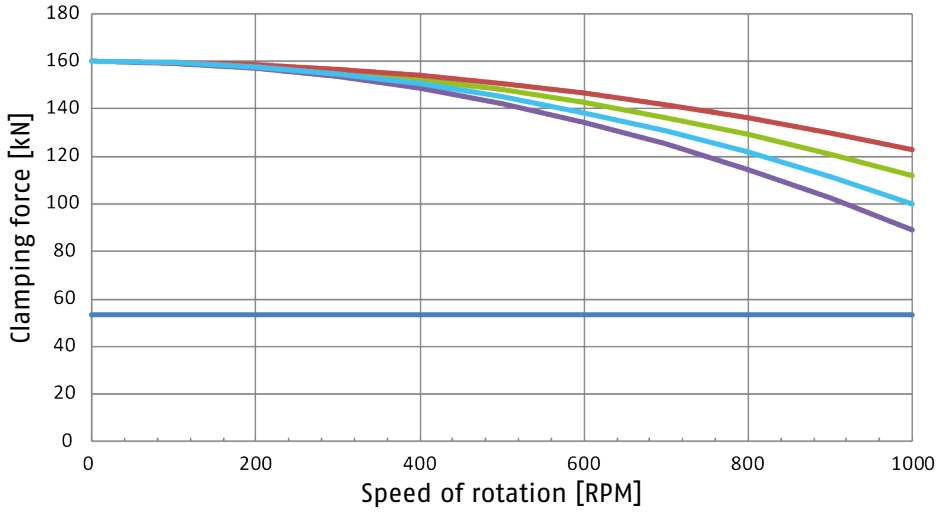
Colour	Jaw ID	Weight [kg]
	SHB 250*	7,0
	SWB 250*	18,8
	SHB 250**	7,0
	SWB 250**	18,8
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 500



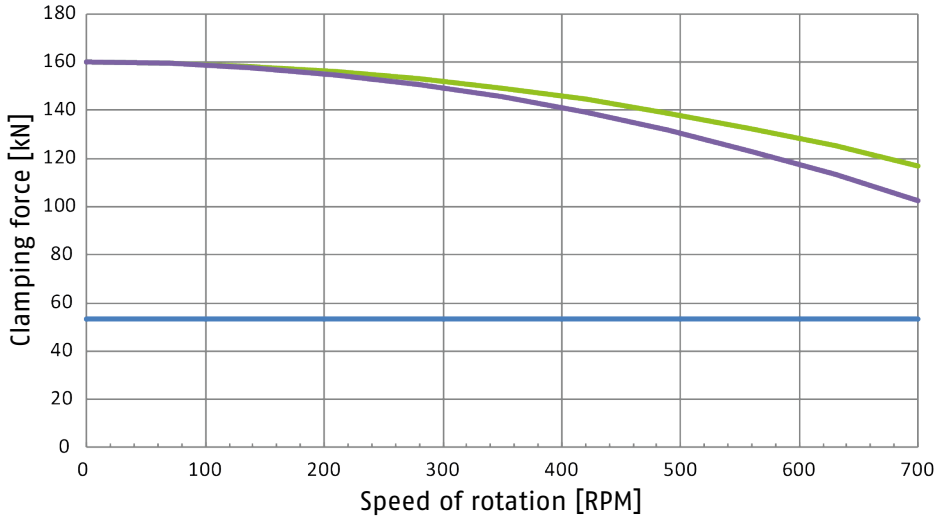
Colour	Jaw ID	Weight [kg]
	SHB 250*	7,0
	SWB 250*	18,8
	SHB 250**	7,0
	SWB 250**	18,8
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 630



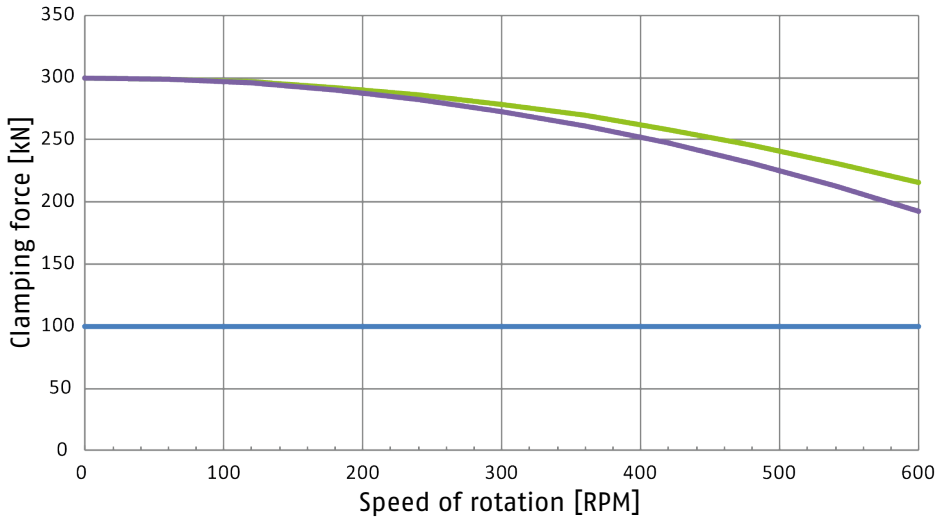
Colour	Jaw ID	Weight [kg]
	SHB 315*	9,2
	SWB 250*	18,8
	SHB 315**	9,2
	SWB 250**	18,8
	Minimum required clamping force 33%	

Clamping force/RPM graph for ROTA NCR-A 800



Colour		Jaw ID	Weight [kg]
		SHB 315	9,2
		SWB 250	18,8
	Minimum required clamping force 33%		

Clamping force/RPM graph for ROTA NCR-A 1000



Colour		Jaw ID	Weight [kg]
		SHB 400	16,0
		SWB 400	36,6
	Minimum required clamping force 33%		

* without centrifugal force compensation

** with centrifugal force compensation

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]	Σ_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}**.

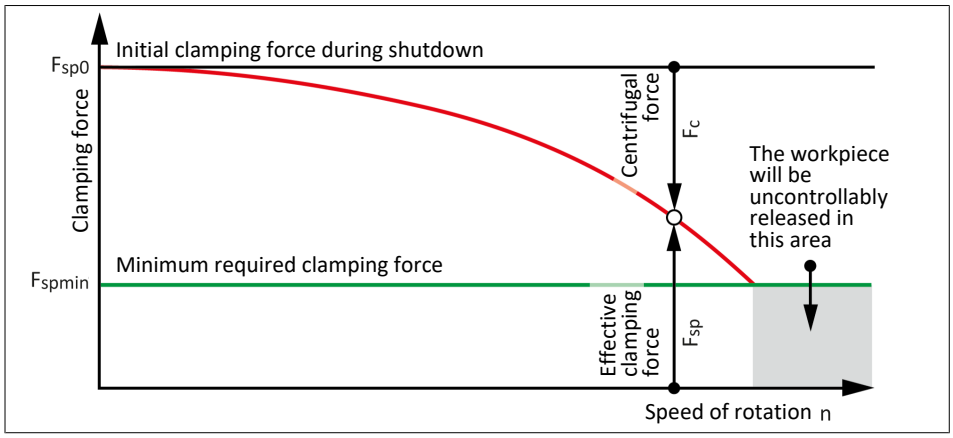
$$F_{sp} = F_{sp0} \mp F_c \text{ [N]}$$

(–) 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

CAUTION

This calculated force must not be larger than the maximum clamping force ΣS engraved on the lathe chuck.

See also "Lathe chuck data" table ▶ 3.1 [🗋 17]

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 $\mathbf{m_B \cdot r_s}$ **is referred to as the centrifugal torque $\mathbf{M_c}$.**

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

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 $\mathbf{M_{cGB}}$** and the **centrifugal torque of the top jaws $\mathbf{M_{cAB}}$** 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 [🗋 17]. 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 N (application-specific)
- max. RPM n_{max} = 3200 RPM ("Lathe chuck data" table)
- RPM n = 1200 RPM (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:

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

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:

M_{cGB} = 0.319 kgm

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

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

Centrifugal torque for one jaw:

$M_c = 0.319 + 0.571 \Rightarrow$ **M_c = 0.89 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 kgm**

The total centrifugal force can now be calculated:

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

Initial clamping force during shutdown that was sought:

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

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

CAUTION

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 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 RPM n_{perm} = 1495 RPM is smaller than the maximum permissible RPM of the lathe chuck n_{max} = 3200 RPM (see "Lathe chuck data" table ▶ 3.1 [🗋 17]).

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

The ROTA NCR-A 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 Torques per screw

Tightening torques for mounting screws used to clamp the chuck on lathes or other suitable technical equipment (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 for mounting screws used to attach top jaws onto the chuck (screw quality 12.9)

Screw size	M6	M8	M10	M12	M14	M16	M20	M24
Max. admissible torque M_A (Nm)	16	30	50	70	130	150	220	450

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.

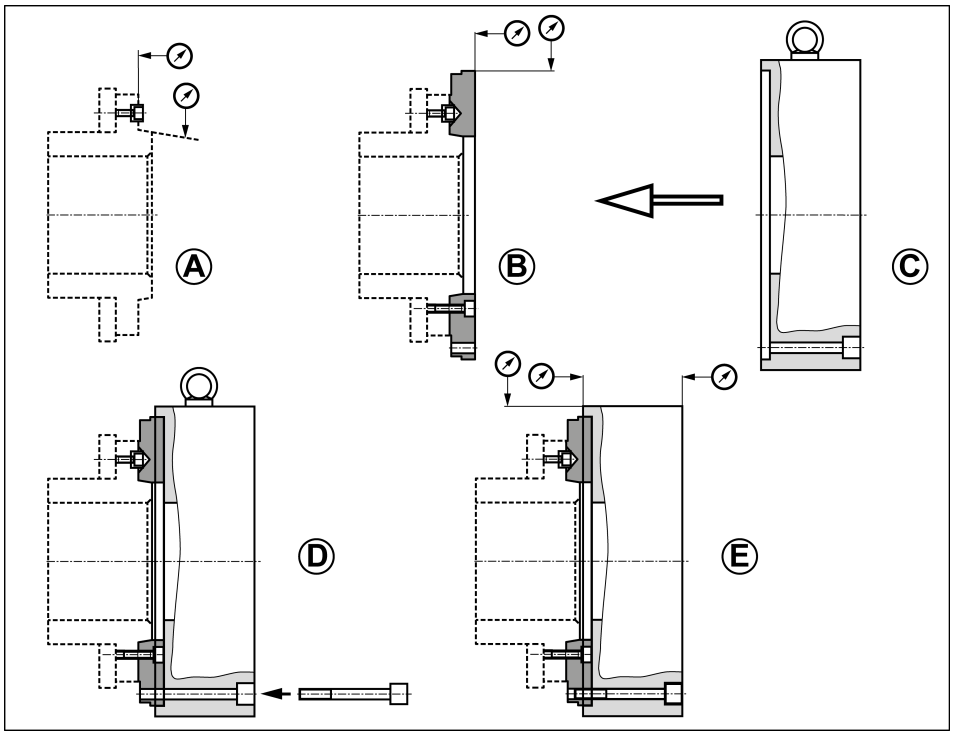
A maximum concentricity error of 0.01 mm should be ensured for the centring of the mount and a maximum axial run-out error of 0.01 mm for the contact surfaces. In addition, the flat surface must be checked for evenness using a straight edge (flat surface deburred and clean at the bore holes).

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

CAUTION

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.

CAUTION

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 Installing and connecting

⚠ 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.

1. Checking the chuck mount
2. Mounting of the chuck ▸ 4.4 [🗋 30]
3. Check the function▸ 5.2 [🗋 35]

4.4 Assembly of the chuck on the machine

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▸ 9 [🗋 42].

Chucks in sizes 190 and 225

The screws (item 10) cannot be inserted into the piston (item 3) and rotated.

- Fully screw the chuck into the drawbar.
- Fasten the chuck with the mounting screws supplied (item 60) to the spindle nose. Tighten the chuck mounting screws (item 60) alternately.
- Check radial and axial run-out at the checking edge.
- Check the jaw stroke of the base jaws and that these can move easily.
- Attach top jaws according to the marking to the base jaws.

Chuck from size 250

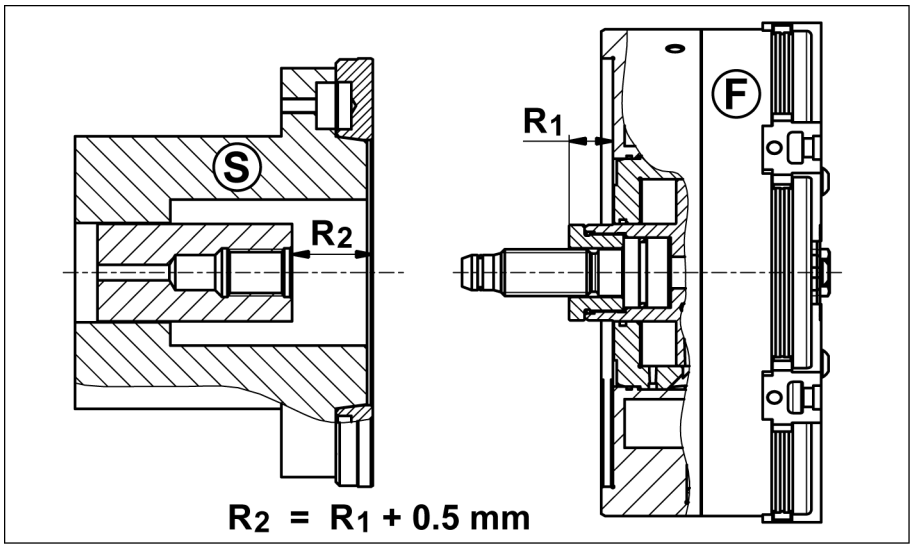
- Remove screws (item 39) and take off cover (item 34).
- Screw the screw (item 33) fully into the piston.
- Disassemble the three stop pins (item 40). (The pins can be unscrewed on the 2-edge).
- Completely unscrew screw (item 33) from the piston.
  Caution: Secure loose pins (item 31) separately.
- The rotatable screw (item 10) can only be actuated directly using an Allen key.
- Lift the chuck using lifting equipment on the eye bolt so that it is flush with the center of the spindle.
- Screw the rotatable screw (item 10) onto the draw tube using the assembly key as far as this will go.
- Tighten the chuck mounting screws (item 60) alternately.
- Check radial and axial run-out at the checking edge.
- Check the jaw stroke of the base jaws and that these can move easily.
- Screw screws (item 33) together with pins (item 31) into the piston (item 3) as far as it will go (non-compensating (centric) clamping is active).
- Assemble the three stop pins (item 40).
- Place cover on (item 34) and tighten with screws (item 39).
- Attach top jaws according to the marking to the base jaws.

The spindle is disassembled in the same way but in the reverse order.

The following must be taken into account during chuck assembly:

The attachment of the chuck to the machine spindle must be designed in such a way so that when the chuck is open, a safety distance between the piston (item 3) and cover (item 34) or from size 400 between the piston (item 3) and the chuck body (item 1) of $0.5^{+0.5}$ mm is adhered to.

The stop when opening the chuck must take place via the activation cylinder and may not take place in the chuck!



S	Spindle nose	**F**	Chuck

Cylinder piston in foremost position
R1 = Push the chuck piston to its foremost position and measure with a depth gauge.
R2 = Draw bar in foremost position. Measure with a depth gauge.

4.4.1 Mounting the chuck with a reduction or extension flange

If the chuck is screwed on with an intermediate flange, the following points must be observed:

- For mounting the chuck on the machine spindle with a short taper by means of a reduction or extension flange, a corresponding chuck flange is attached on the spindle nose.
- Before installing the chuck flange, remove any dirt or swarf from the machine spindle and from the centring mount and the contact surface of the flange.
- A chuck flange made by the user himself must be finished machining on the machine spindle and must be balanced before the chuck is mounted.
- After mounting, it must be ensured that the flange is fitted tightly on the entire surface.
- Then check the run-out accuracy and true running as described in "Measures before starting assembly" (see Fig. "Assembly of the chuck" – B)

The chuck is mounted after the flange has been aligned. During this, it must be ensured that any contaminations on the flange and on the chuck contact surfaces are removed.

⚠ WARNING

Risk of injury from falling of the unit during transport and assembly!

The use of a crane is necessary for assembling the lathe chuck. This can be fastened on the eye bolt provided (see Fig. "Assembly of the chuck" – C). The eye bolt is in all deliveries from chuck size 250 and up included.

Before commissioning the lathe chuck, the eye-bolt has to be removed.

- Push the chuck onto the intermediate flange. During this, it must be ensured that the through-holes for attaching the chuck coincide with the threaded holes of the flange (see Fig. "Assembly of the chuck" - D).
- Next, turn in the fastening screws and tighten them slightly. Check the chuck for radial and axial run-out (see figure "Assembly of the chuck" - E) and align with slight blows with a hammer on the outer diameter if necessary. Next, screw the chuck tightly onto the chuck flange by means of the fastening screws using a torque wrench. During this, pay attention to the specified maximum tightening torques ▸ 4.1 [🗋 28]. Next, check the radial and axial run-out again as described in figure (see figure "Assembly of the chuck" - E).

4.4.2 Mounting the chuck by means of a direct mount

When mounting the chuck by means of a direct mount with a through screw connection, the flange is first attached to the chuck and subsequently mounted on the spindle.

- Before mounting the chuck flange on the cylindrical recess of the chuck, dirt and swarf must be removed from the centring mount and contact surface of the flange.
- The flange must be slightly tightened on the chuck by means of the supplied screws and aligned towards the chuck body. The radial and axial run-out must be checked.
- Next, the screws must be tightened with the specified torque ▸ 4.1 [🗋 28].
- After mounting, it must be ensured that the flange is fitted tightly on the entire surface. Check radial and axial run-out.

After mounting the flange on the chuck, the chuck must be mounted on the machine spindle.

- Push the chuck onto the intermediate flange. During this, it must be ensured that the through-holes for attaching the chuck coincide with the threaded holes of the flange (see Fig. "Assembly of the chuck" - D).
- Then screw in the mounting screws and tighten slightly. Then check the chuck for radial and axial runout (see Fig. "Assembly of the chuck" - E). Tighten the mounting screws on the chuck flange with a torque wrench. During this, pay attention to the specified maximum tightening torques ▸ 4.1 [🗋 28]. Then check again for radial and axial runout (see Fig. "Assembly of the chuck" - E).

4.5 Replacement of jaws

When changing the top jaws, the serration must be cleaned.

Chuck jaws for maximum clamping repeat accuracy must be turned or ground in the lathe chuck under clamping pressure.

When turning or grinding, ensure that the turning ring or turning pin is clamped **by the top jaws** and not by the base jaws.
Tighten jaw mounting screws (screw quality 12.9) to specified torque (see "Screw torques" chapter" ▸ 4.1 [🗋 28]).

Tighten the mounting screws of the top jaws with a torque wrench.

⚠ WARNING

If the workpiece is clamped at the end of the base jaw stroke, this poses the risk that the entire clamping force is not transferred onto the workpiece.

Risk of injury due to loss of workpiece.

- **Always clamp the workpiece at the middle of the base jaw stroke.**

4.6 Switching between compensating/non-compensating (centric) clamping

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▸ 9 [🗋 42].

With the bolts (item 31), the mechanism blocks the oscillation of the pendulum bodies (item 5) installed in the piston. The bolts (item 31) are moved by screwing in or unscrewing the screw (item 33).

Tightening torques for screw (Pos. 33)

Size	190	225	250	315	400	500	630	800	1000
Tightening torque [Nm]	10,0	10,0	20,0	20,0	35,0	35,0	50,0	50,0	50,0

Activate non-compensating (centric) clamping:

The chuck must not be in the open position.

- Remove the screw (item 35).
- Fully screw in the screw (item 33) as far as it will go into the piston (item 3).
- Screw in the screw (item 35).

Activate compensating clamping:

Piston position or jaw position freely selectable.

- Remove the screw (item 35).
- Fully unscrew the screw (item 33) until the stop on the stop pins (item 40).
  Observe the maximum permissible torque. The stop pin (item 40) may be damaged.
- Screw in the screw (item 35).

5 Function

5.1 Function and handling

The lever chuck is actuated using a rotating solid or through-hole cylinder. The axial tension and pressure forces are diverted into the radial clamping force via lever action.

The clamping and opening path of the chuck jaws is determined by the clamping cylinder. The serration of the base jaws can be used to standard jaws as well as mount customized chuck jaws for complicated workpiece shapes. The top jaws are moved or changed in the open clamping position.

The 6-jaw compensation chuck has paired pendulum chuck jaws that clamp concentrically. Two base jaws are always connected with a compensation piece. The result is workpiece centering between six points of contact, which are averaged in pairs. Even raw parts can be centered without distortion of the workpiece.

For special applications, the compensating clamping can be disabled and all jaws simultaneously clamp concentrically. ▸ 4.6 [🗋 34]

5.2 Functional testing

Functional test

After installation of the chuck, its function must be checked prior to start-up.

Two important points are:

- **Clamping Force!** The clamping force of the chuck must be achieved at max. operating force/pressure.
- **Stroke control!** The stroke of the clamping piston must allow a safety zone at the front and rear end position. The machine spindle may only be started when the clamping piston has passed through the safety zone. Only limit switches that meet the requirements for safety limit switches specified in DIN EN 60204-1 may be used.

When determining the necessary clamping force to machine a workpiece, take the centrifugal force acting on the chuck jaws into account (according to VDI 3106).
If the chuck jaws are changed, adjust the stroke control to the new situation.

Speed of rotation

⚠ DANGER

Risk of fatal injury to operating personnel if the top speed is exceeded, resulting in workpiece loss and parts flying off!

- A reliable speed limiter must be installed in the machine tool or technical equipment and proof must be provided that the speed limiter is effective!

6 Maintenance

6.1 Lubrication

To maintain the safe function and high quality of the power chuck it is important to lubricate it regularly at the greese nipples (item 90).

Lubricate the chuck without a workpiece, with the base jaws in the fully closed position.

For optimum grease distribution, the clamping piston must travel the entire clamping stroke several times after lubrication.

Chuck size	190	225	250	315	400	500	630	800	1000
No. of grease-gun strokes	6	8	10	12	16	20	25	30	30

Operating Conditions

Depending on operating conditions, check the function and the clamping force after a certain time of operation (see chapter "Maintenance intervals" ▶ 6.2 [🗋 36]). Measure the clamping force only by using a calibrated Grip Force Tester (SCHUNK IFT).

Technical Condition

The base jaws must move evenly at the smallest possible operating pressure (cylinder). This method is only to some extend expressive and cannot replace clamping force measurement.

If clamping force has dropped too low, or if base jaws and piston cannot be moved perfectly, it is necessary to disassemble the chuck to clean it and to relubricate it.

Use original SCHUNK spare parts only when exchanging damaged parts.

6.2 Maintenance intervals

Lubricating the greasing areas:

Lubrication interval	Demands
every 100 hours	normal / use of coolant
every 25 hours	high / use of coolant
after 1200 hours or when needed	Full cleaning with disassembly of chuck depending on type of contamination and quantity

6.3 Disassembly and assembly of the Chuck

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▸ 9 [🗋 42].

The lathe chuck must only be disassembled once it has been uninstalled.
(See chapter "Mounting the chuck to the machine" ▸ 4 [🗋 28].)

For chuck sizes 190 / 225

- If present, remove top jaws.
- Remove screws (item 24) and take off the intermediate piece (item 14) connected to the base jaw including the sealing elements (items 17/22).
- Remove screws (item 39) and take off the cap (item 34). For this purpose, first move the piston to the "closed" position.
- Remove the screws (item 61) and take off the mount (item 7). The mount (item 7) can be pushed off the chuck body (item 1) from the rear with the suitable screws (screws not included in the scope of delivery).
- Remove the six levers (item 6) together with the bearing seat (item 8) from the chuck body. To do this, there is a bore hole on the side of the bearing seat in which a removal tool can be inserted.
- Push the six base jaws (item 2) radially outwards to the stop and push the piston (item 3) out of the chuck body (item 1).
- Slide the base jaws (item 2) radially inwards until they can be removed from the chuck body (item 1).

From chuck size 250:

- If present, remove top jaws.
- Remove screws (item 39) and take off the cover (item 34).
- Remove the screws (item 61) and take off the mount (item 7). The mount (item 7) can be pushed off the chuck body (item 1) from the rear with the suitable screws (screws not included in the scope of delivery)
- Remove screws (item 58) and the covering strips (items 15/16).
- Take the seal (item 22) along the base jaw out of the groove.
- Remove the six levers (item 6) together with the bearing seat (item 8) from the chuck body. To do this, there is a bore hole on the side of the bearing seat in which a removal tool can be inserted.
- Remove screws (item 20) and take the cover plates (item 18) out of the chuck body.
- Remove the seals (items 21/17)

- Remove the six base jaws (item 2) radially outwards (size 250: inwards) and push the piston (item 3) out of the chuck body (item 1).
- Degrease and clean all parts and check them for damage or wear.

Only use genuine SCHUNK spare parts when replacing damaged parts.

Before assembly, grease well with LINOMAX plus special grease paste.

The lathe chuck is assembled in the same way but in the reverse order.

During assembly, the following must be observed in particular:

- The piston has a point marking on the front side. This is assigned to base jaw guide 1 during assembly.
- The bore hole on the side of the bearing seat (item 8) must point in the direction of the mount.
- Scraper strips (items 15/16) may only be placed lightly on the base jaws (item 2). Free movement must be ensured.
- For mounting the seal along the base jaw, using the optional assembly tool (ID: 1384194) is recommended. The seal should not be stretched during the assembly process.

6.4 Disassembling and assembling the piston

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 9 [🗋 42].

- **For chuck sizes 165 and 200** the screw (item 10) is screwed in directly to the piston (item 3) and secured using the pin (item 67). Items 9, 70 and 80 are no longer required.
- Unscrew the stop pins (item 40) from the piston.
- Unscrew and remove the screw (item 33) and take off the safety ring (item 38), then remove the thrust washer (item 32).
- Remove the screws (item 64), take off the plate (item 12), and pull the pendulum body (item 5) out of the piston (item 3).
- The screw (item 66) is glued into the pendulum body (item 5) such that the connecting member (item 11) is pivot-mounted with 0.2 mm axial play. Only remove the connecting member (item 11) if disassembly is required.
- Undo the securing screws (item 67) such that the flange (item 9) or the screw (item 10) can be removed from the piston (item 3).

Degrease and clean all parts and check them for damage or wear.

Only use genuine SCHUNK spare parts when replacing damaged parts.

Before assembly, grease well with LINOMAX plus special grease paste.

The piston is assembled in the same way but in the reverse order.

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 Part 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.**

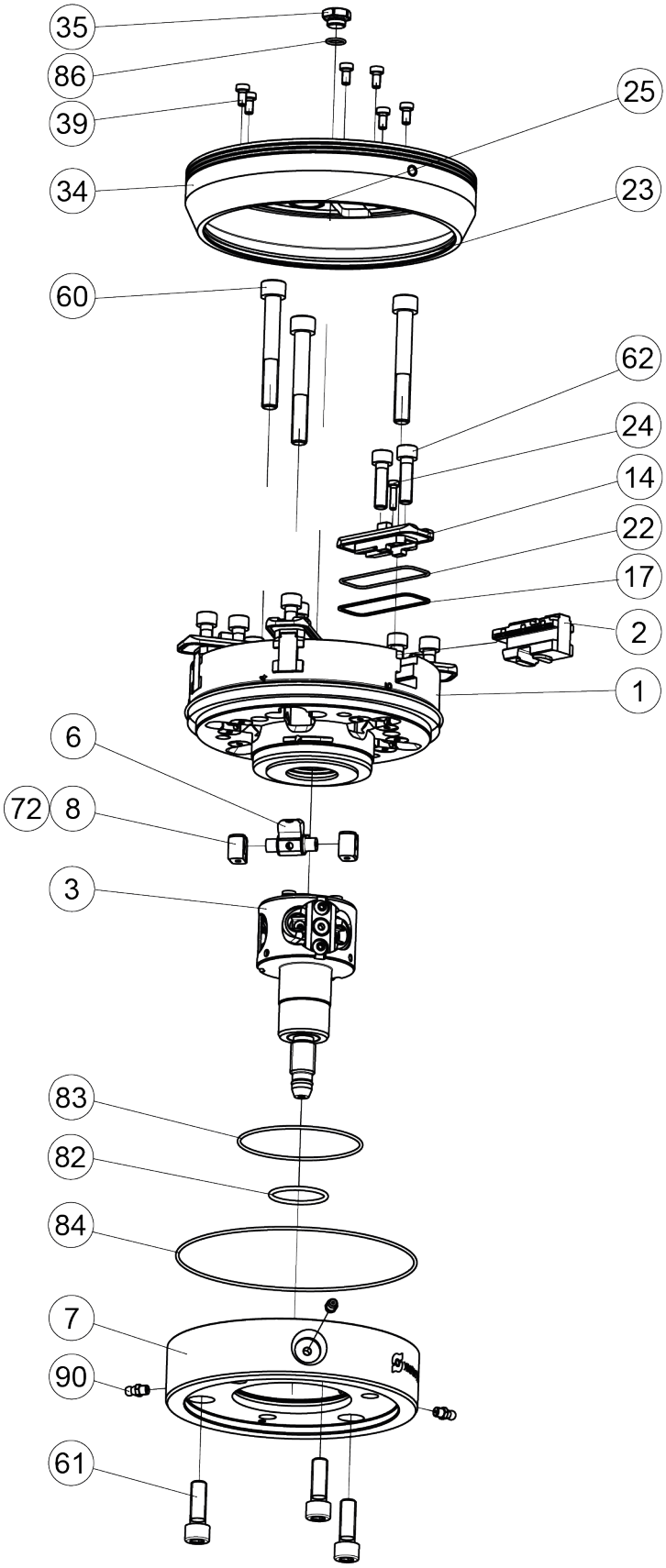
Item	Characterization	Quantity	Note
1	Chuck body	1	
2	Base jaws	6	
3	Piston	1	
5	Pendulum body	3	
6	Lever	6	
7	Mount	1	
8	Seat of bearing	12	
9	Nut	1	
10	Screw	1	
11	Connecting member	6	
12	Plate	3	
14	Intermediate piece	6	190 – 225
15 / 16	Scraper strips	12	250 – 1000
17	Base jaw seal	6	
18	Cover plate	6	250 – 1000
20	Cover plate screws	12	250 – 1000
21	Cover plate seal	6	250 – 1000
22	Base jaw seal	6	
23	Cover seal	1	
24	Screw	6	
25	Cover seal	6	
29	Screw	6	800 / 1000
31	Bolts	3	
32	Thrust washer	1	
33	Screw	1	
34	Cover	1	
35	Locking screw	1	
38	Safety ring	1	
39	Screws	*	
40	Stop pins	3	
56	Mounting position orientation	3	

Item	Characterization	Quantity	Note
57	Piston torque pin	3	400 – 1000
58	Mounting screws for scraper strips	*	250 – 1000
59	Mounting screws from front	6	800 / 1000
60	Mounting screw	*	
61	Mounting screw (machine from behind)	*	
64	Pan-head screw	6	
65	Set-screw	*	
66	Connecting member countersunk screw	6	
67	Piston set-screw	1	
69	Set-screw	*	
70	Plunger pin	2	
72	Seat of bearing torque pin	12	165 – 250
73	Screws	*	400 – 1000
78	Eye bolt	1	
80	Screw seal	1	
81	Adapter seal	1	
82	Piston seal	1	
83	Mounting seal	1	
84	Chuck body seal	1	
85	Pipe seal	1	
86	Locking screw seal	1	
88	Screw seal	1	
90	Conical lubrication nipple	*	
91	Piston set-screw	3	
92	Lever set-screw	6	
93	Lever set-screw	6	
94	Lever set-screw	*	
95	Set-screw	1	1000

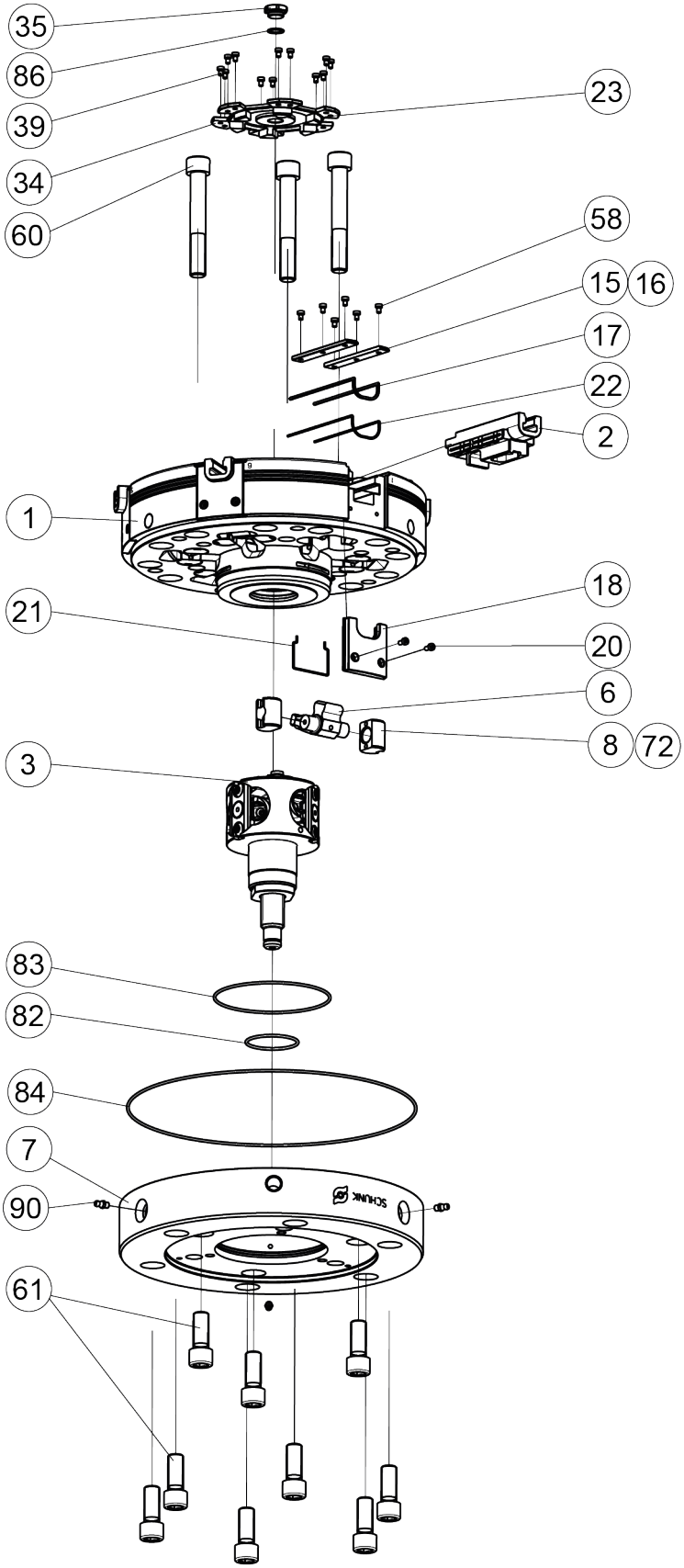
* The number of components varies with chuck size

9 Assembly drawings

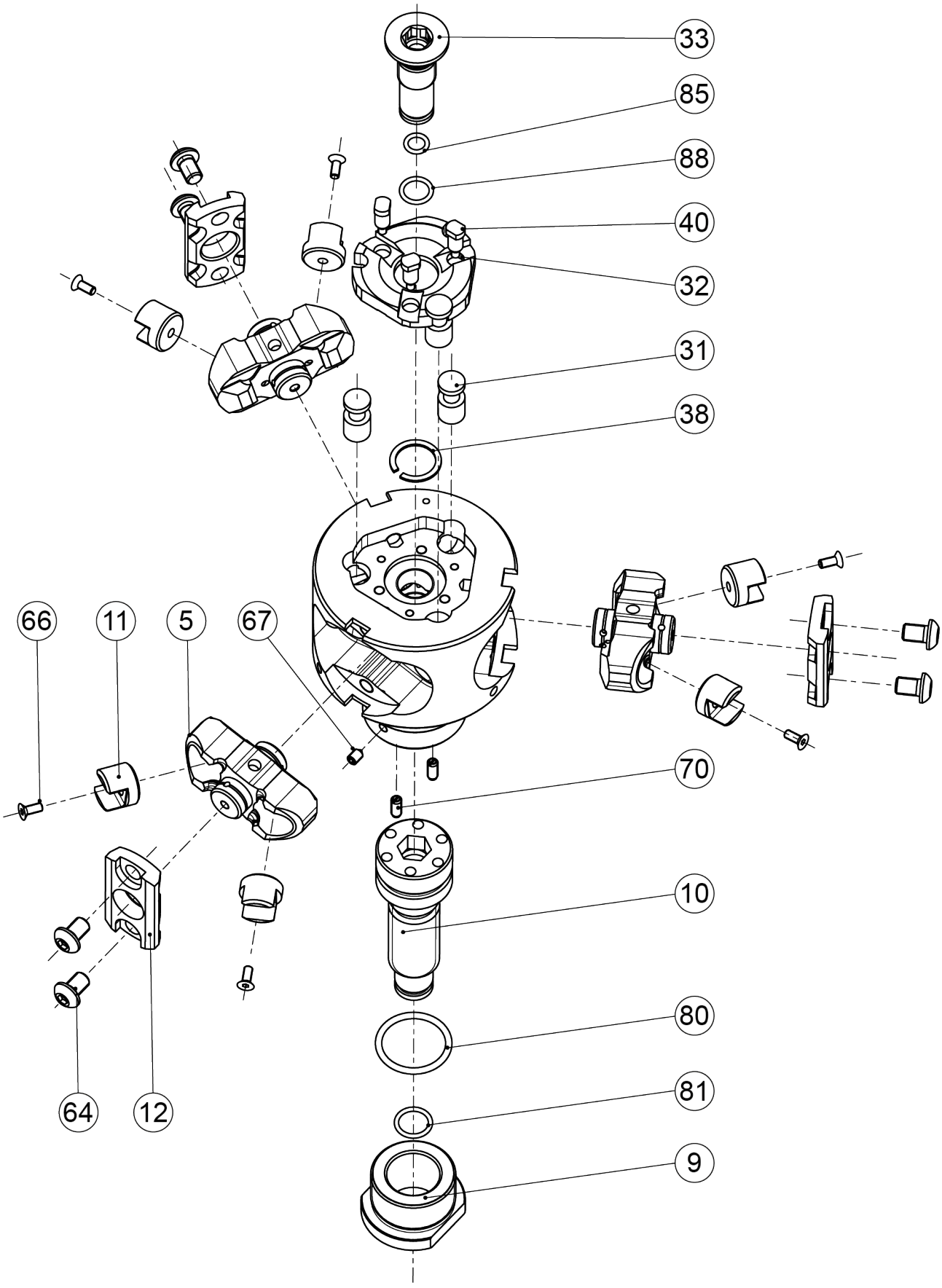
Size NCR-A-190/225



From size NCR-A-250



Piston from size NCR-A-250



10 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Lathe chuck
Designation:	ROTA
Type designation:	2B, NCA, NCD, NCE, NC, NCF, NCK, NCO, NCR, NCS, NCX, TH, THW, HSH, HSA, DFF

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.
- **fault exclusion** against the fault "Unexpected release without pending release signal".
- 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.
- that internal bore diameters in the **pipe or control lines** are at least 2 mm for pneumatic clamping systems and at least 3 mm for hydraulic clamping systems

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 702-4:2010-04** 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, 02nd of August 2023

Signature: see original declaration

p.p. Philipp Schräder
Head of Development standard products

Signature: see original declaration

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

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