Pneumatic power chuck
ROTA TB2 / ROTA TB2 LH
Assembly and 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.

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 ▶ 6.2.1 [🗋 52]

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 Sizes

This operating manual applies to the following sizes:

- ROTA TB2 470-185 / 470-185 LH
- ROTA TB2 520-191 / 520-191 LH
- ROTA TB2 570-230 / 570-230 LH
- ROTA TB2 600-275 / 600-275 LH
- ROTA TB2 630-275 LH
- ROTA TB2 685-325 / 685-325 LH
- ROTA TB2 740-375 LH
- ROTA TB2 850-375 / 850-375 LH
- ROTA TB2 1000-560 / 1000-560 LH

1.4 Scope of delivery

Power lathe chuck in ordered version

- Mounting screws
- Screws, combination T-nuts or T-nuts with screws (Jaw mounting)
- 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**.

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.
- 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.

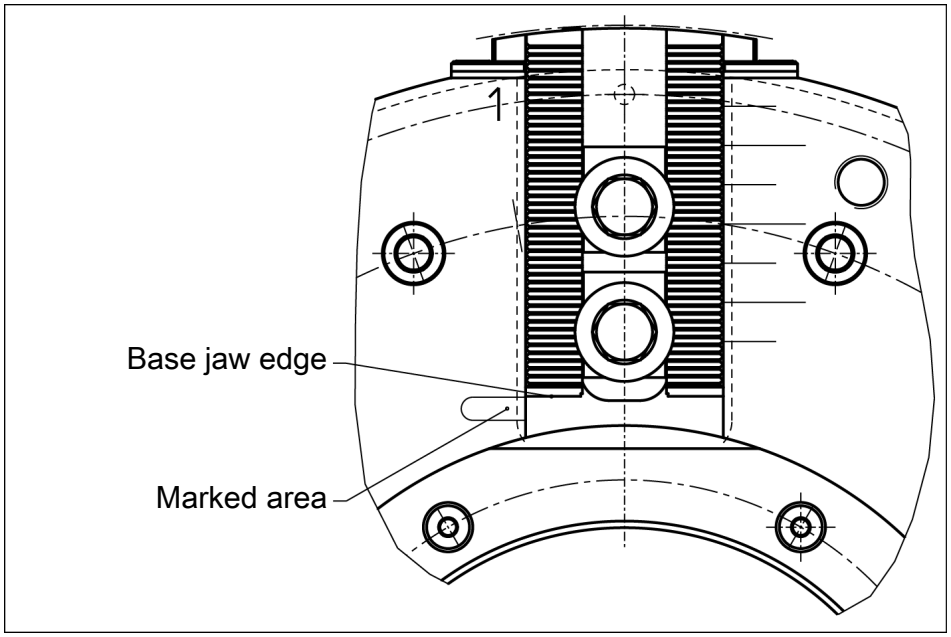
Two important points are:

- **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.

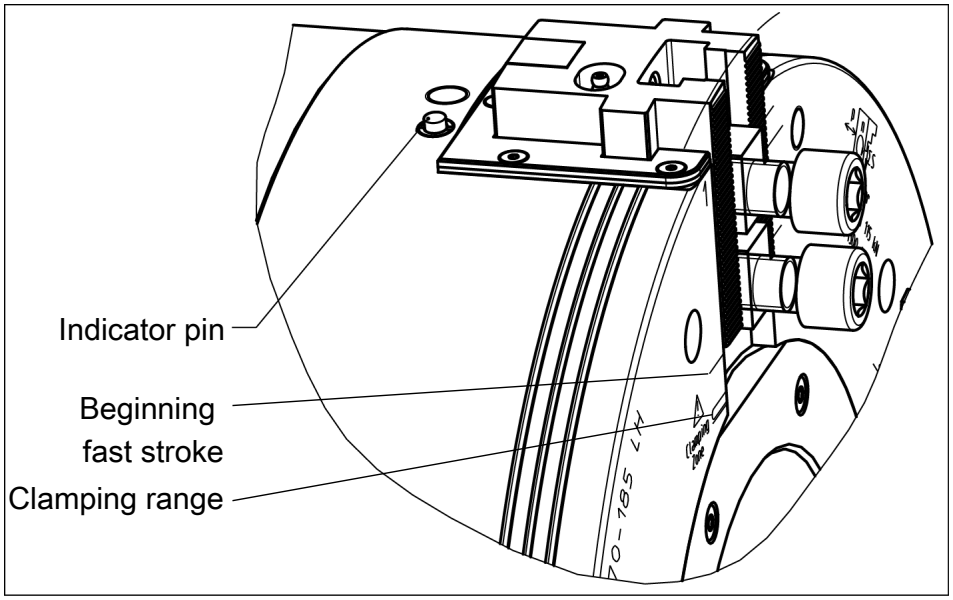
With manual clamping devices, stroke control is carried out via the indicator pin. Clamping is only correct if the indicator pin is countersunk and clamping force is applied to the workpiece.

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).

Stroke control lathe chuck ROTA TB2 with continuous stroke:
The base jaw edge should be within the marked range during clamping.



Lathe chuck ROTA TB2 with rapid and clamping stroke (LH version):
Visual inspection: The gold-colored indicator pin (on each jaw) should not protrude or the base jaw edge should be within the area marked "Clamping Zone".



Option for path control of the control cam with stationary inductive proximity switch:
Neither of the two proximity switches should be wired.

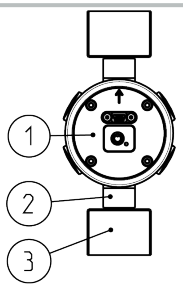
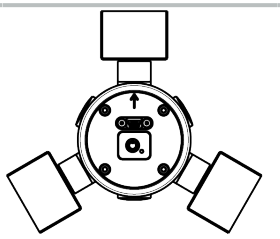
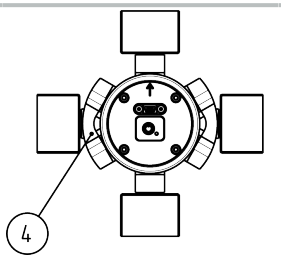
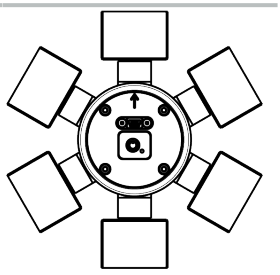
Maintenance instructions

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	Operating manual SCHUNK IFT Clamping force tester **Attention** Compensation must

		be activated, otherwise it may lead to inconsistent results.	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 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.15 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.

2.16 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.

2.17 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.

2.18 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%.

2.19 2-jaw chuck

In the 2-jaw version the maximum actuating force must be limited to 6 bar (temporary load) **.**

In the 2-jaw version the working pressure must be limited to 5.5 bar.

3 Technical data

3.1 Chuck data

min. operating pressure [bar]	2
max. operating pressure [bar]	8
Jaw serration	3/32" x 90°

ROTA TB2 Size	470	520	570	600	685	850	1000
Chuck body outer Ø [mm]	470	520	570	605	685	850	1000
Distributor ring inner Ø [mm] Distributor ring outer Ø [mm]	400 467	446 520	500 570	535 605	610 685	775 850	850 925
Total clamping force at 6 bar [kN]	115	115	195	200	280	240	240
Toolholder through-hole [mm]	185	191	230	275	325	375	560
Overall stroke per jaw [mm]	7	14.6	11.7	11.7	10	11.8	12.8
Speed of rotation [RPM]	1700	1300	1300	1300	1000	750	500
Weight [kg]	182	282	345	366	440	908	1012
Centrifugal torque of the base jaw $\mathbf{M}_{cGB}$ [kgm]	0.68	1.06	1.15	1.06	1.81	4.17	4.33
Max. jaw eccentricity of center of gravity in axial direction $\mathbf{a}_{max}$ [mm]	36	36	36	36	36	42	42

ROTA TB2 LH Size	470	520	570	600	630	685	740	850	1000
Chuck body outer Ø [mm]	470	520	570	605	627	685	740	850	1000
Distributor ring inner Ø [mm] Distributor ring outer Ø [mm]	400 467	446 520	500 570	535 605	535 605	610 685	660 735	775 850	850 925
Total clamping force at 6 bar [kN]	115	115	190	185	200	280	280	220	240
Toolholder through-hole [mm]	185	191	230	275	275	325	375	375	560
Overall stroke per jaw [mm]	20	38.5	25.4	25.4	38.1	25.4	25.4	25.4	12.8
Fast stroke [mm] clamping stroke [mm]	13 7	30 8.5	16.9 8.5	16.9 8.5	28.1 10	16.9 8.5	16.9 8.5	13.4 12	15 10.4
Speed of rotation [RPM]	1300	1300	1300	1100	1000	900	750	750	500
Weight [kg]	194	280	345	366	431	500	560	1009	1000
Centrifugal torque of the base jaw $\mathbf{M}_{cGB}$ [kgm]	0.67	1.02	1.15	1.19	1.45	2.22	2.44	4.57	4.68
Max. jaw eccentricity of center of gravity in axial direction $\mathbf{a}_{max}$ [mm]	36	36	36	36	36	36	36	42	42

The specified maximum speed of rotation stated only applies when using the maximum clamping force and the SHB-type, hard, standard stepped jaws that go with the chuck.

If untempered 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 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. Monitoring of functions (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

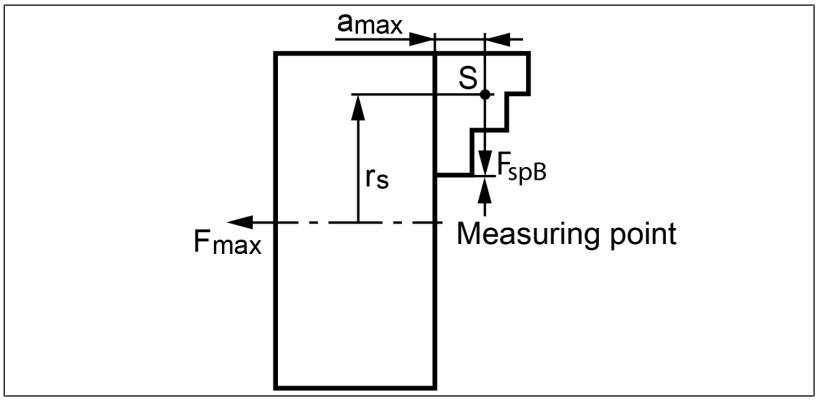
The diagrams relate to a 3-jaw chuck.

Clamping force/RPM curves have been calculated using standard hard stepped jaws SHB, SWB and SWB-AL. In doing this, the maximum actuating force was applied and the jaws were set flush with the outer diameter of the chuck.

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

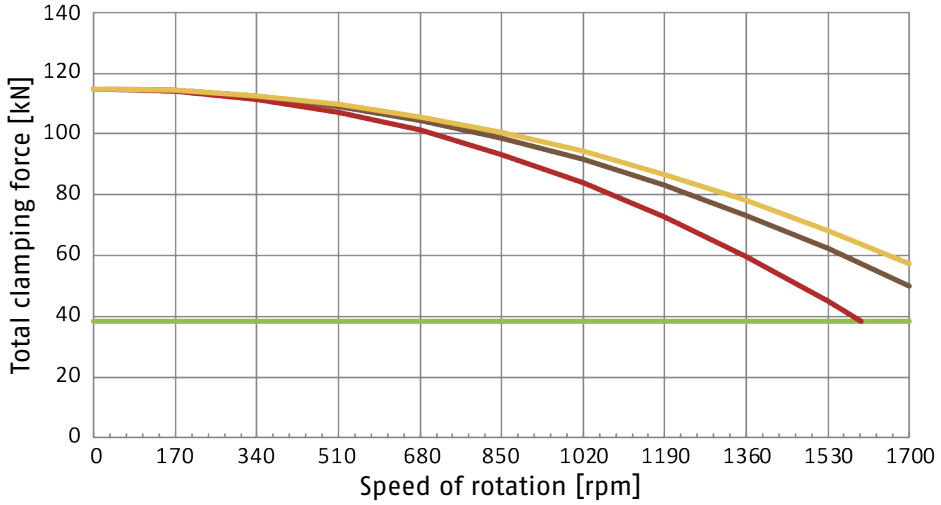
If one or more of these prerequisites is altered, the diagrams will no longer be valid.

Chuck setup for clamping force/RPM diagram



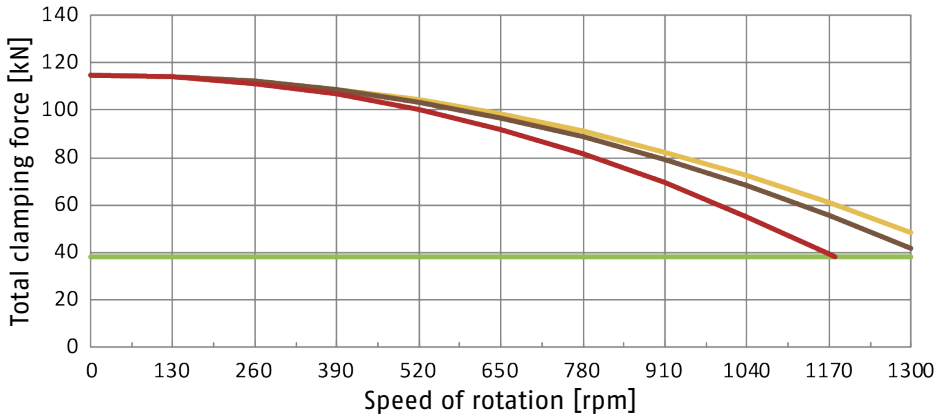
F_{spB}	Clamping force per jaw	S	Center of gravity
r_s	Center of gravity radius	a_{max}	Max. jaw center of gravity eccentricity in axial direction
F_{max}	Max. actuating force		

Clamping force/RPM diagram for ROTA TB2 470-185



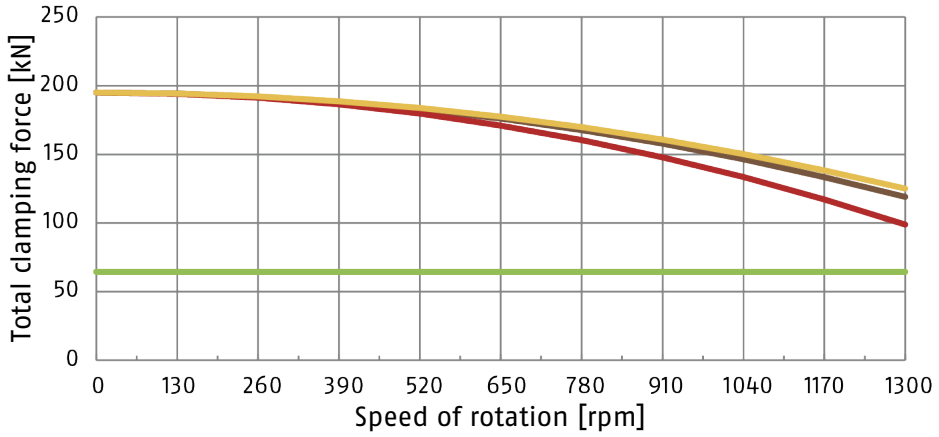
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	159.0
	SHB 400	8.8	180.0
	SWB 400	16.7	159.0
	minimum required clamping force 33%		

Clamping force/RPM diagram ROTA TB2 520-191



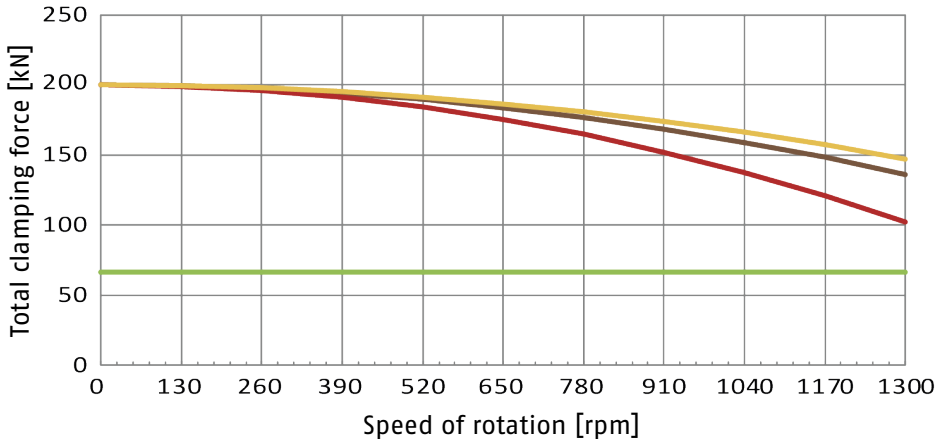
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	6.9	193.5
	SHB 400	8.6	215.0
	SWB 400	16.8	193.5
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 570-230



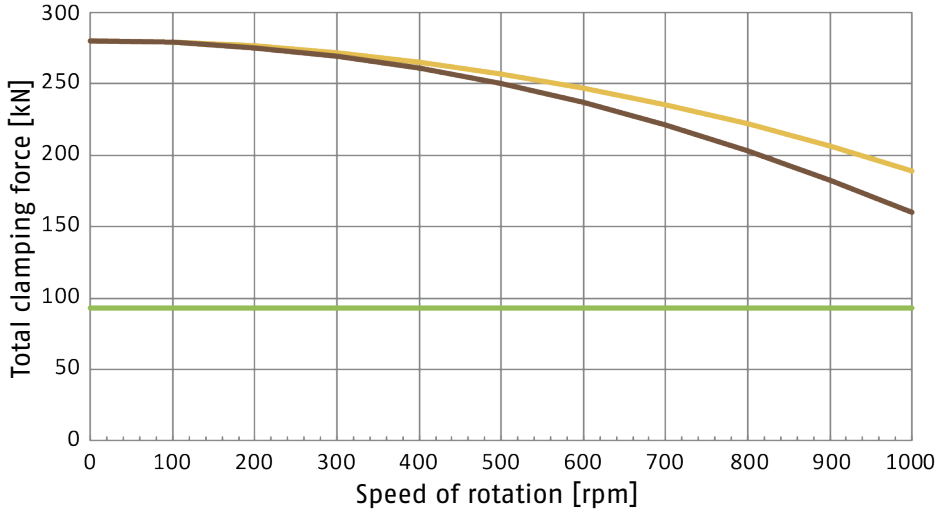
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	213.0
	SHB 400	8.8	235.0
	SWB 400	16.7	213.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 600-275



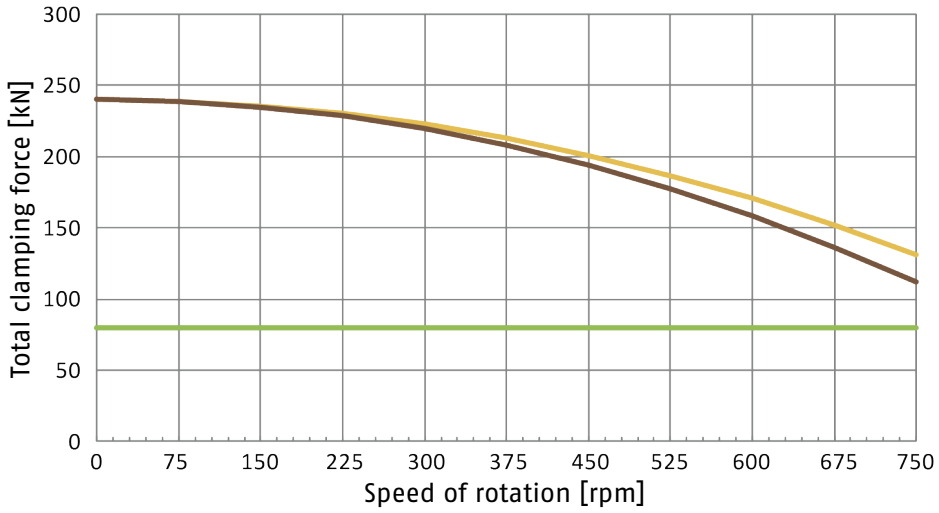
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	245.0
	SHB 400	8.8	212.0
	SWB 400	16.7	219.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 685-325



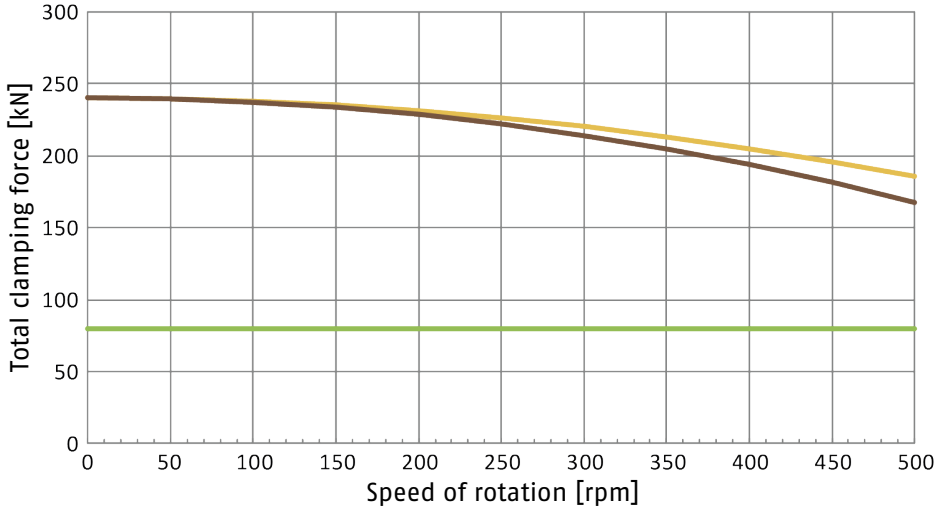
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-HB 630	17.4	229.5
	SP-WB 630	34.1	214.5
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 850-375



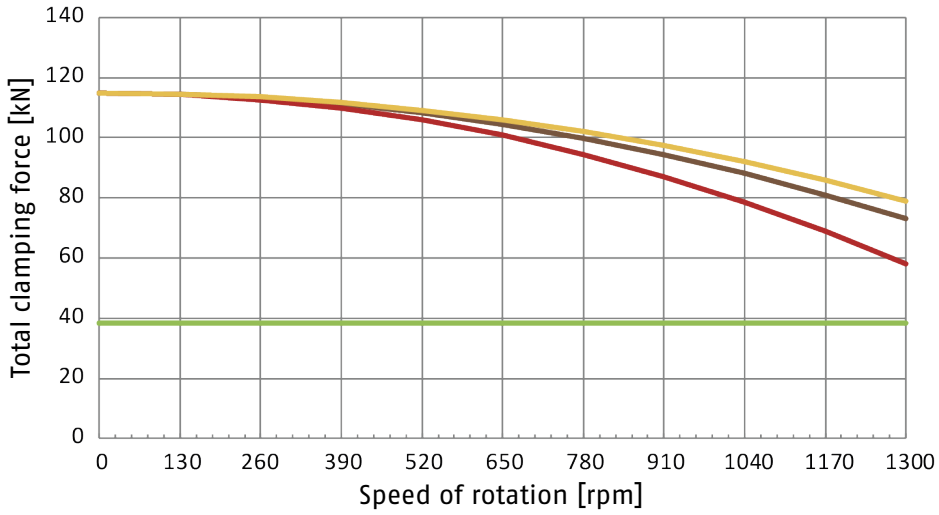
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-WB 800	30.6	276.0
	SP-HB 800	43.2	276.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 1000-560



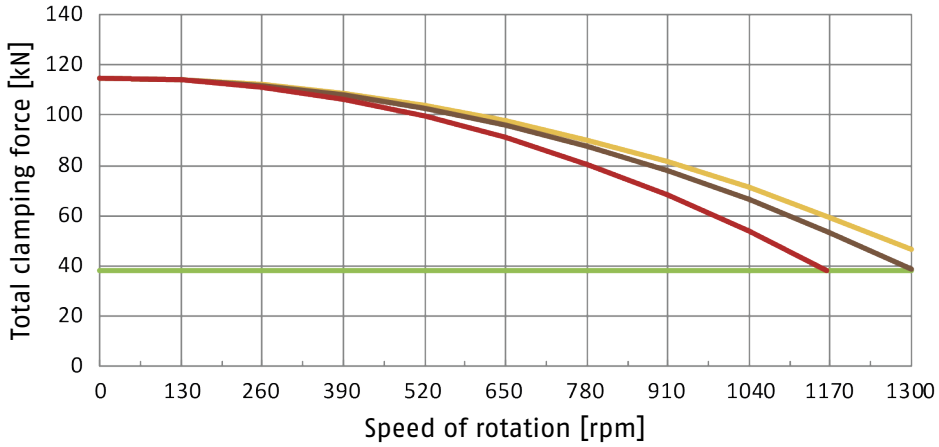
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-WB 800	30.6	407.5
	SP-HB 800	43.2	357.5
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 470-185 LH



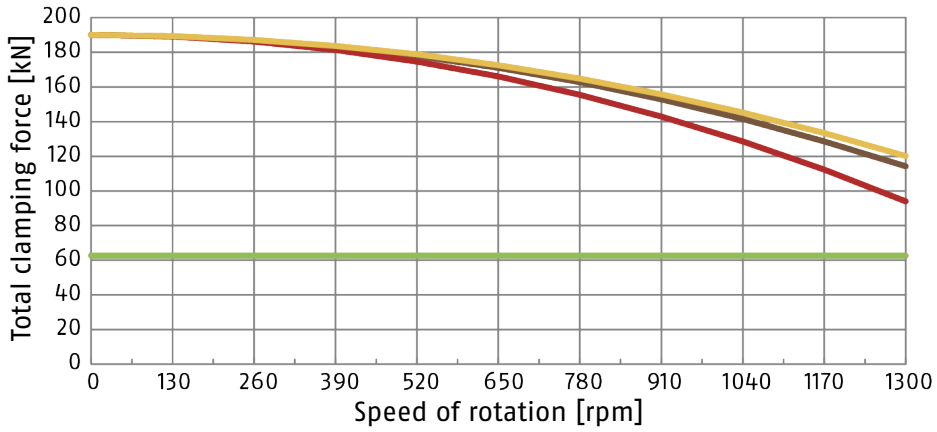
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	161.0
	SHB 400	8.8	182.0
	SWB 400	16.7	161.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 520-191 LH



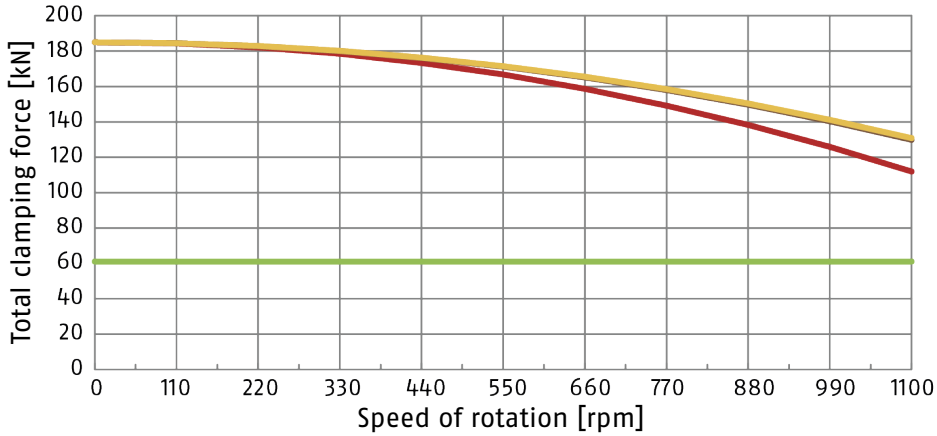
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	6.9	184.4
	SHB 400	8.4	216.7
	SWB 400	16.8	184.4
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 570-230 LH



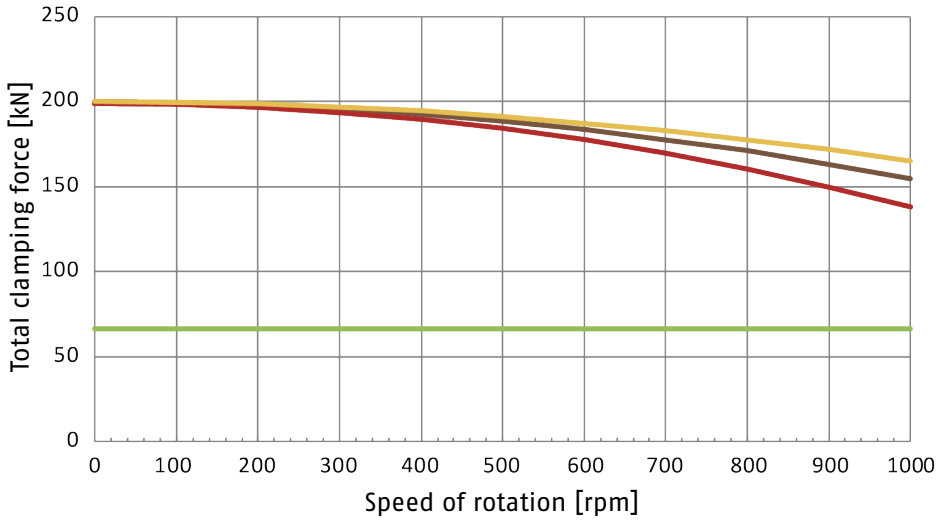
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	212.0
	SHB 400	8.8	233.0
	SWB 400	16.7	212.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 600-275 LH



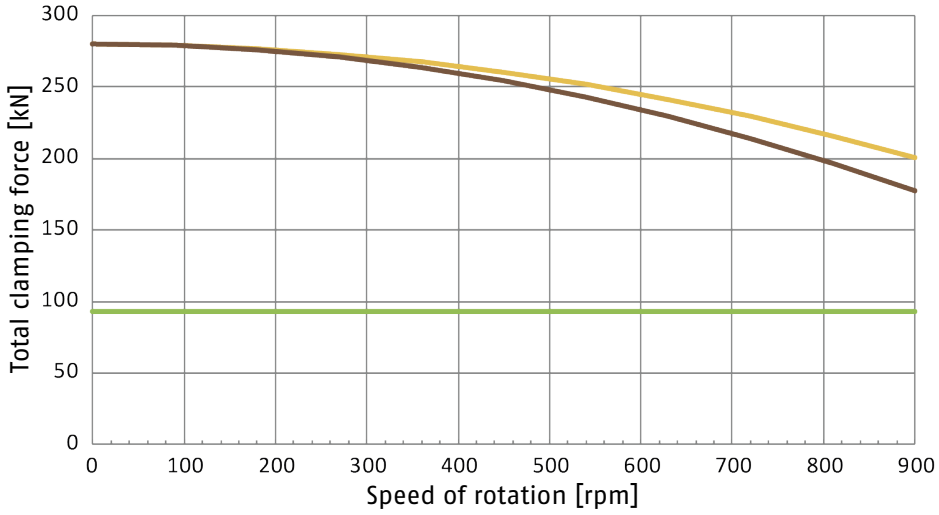
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	258.0
	SHB 400	8.8	225.0
	SWB 400	16.7	232.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 630-275 LH



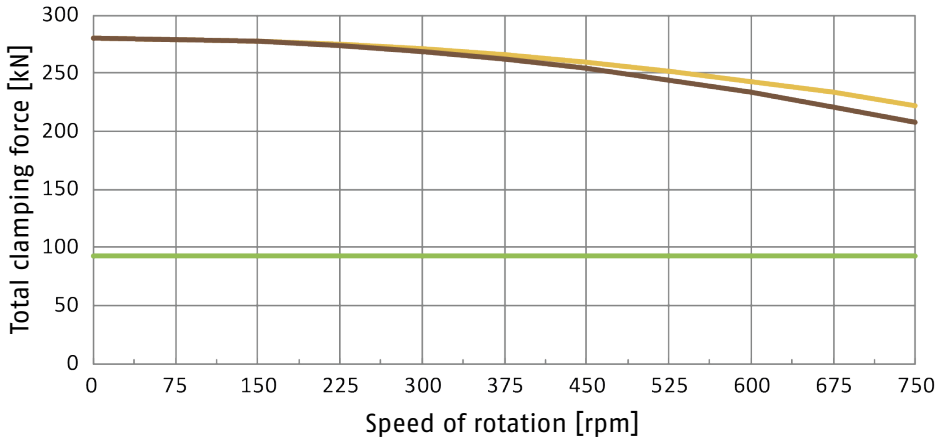
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SWB-AL 400	7.2	242.2
	SHB 400	8.9	263.7
	SWB 400	16.7	242.1
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 685-325 LH



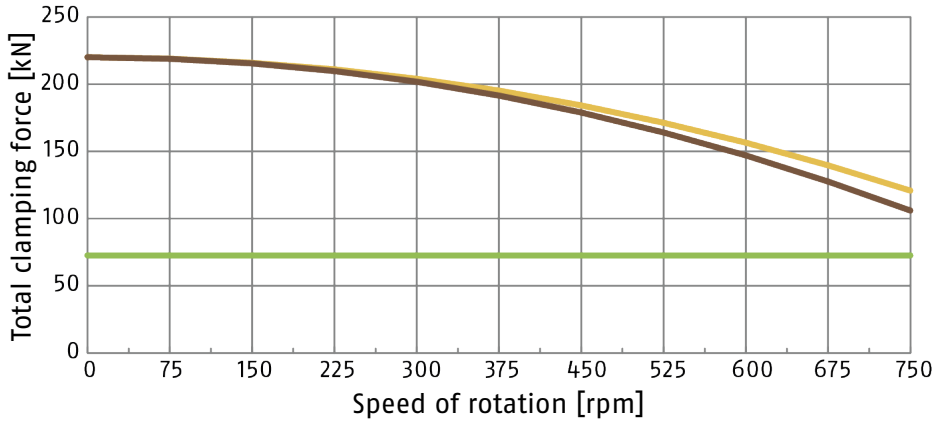
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-HB 630	19.9	281.5
	SP-WB 630	36.6	231.5
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 740-375 LH



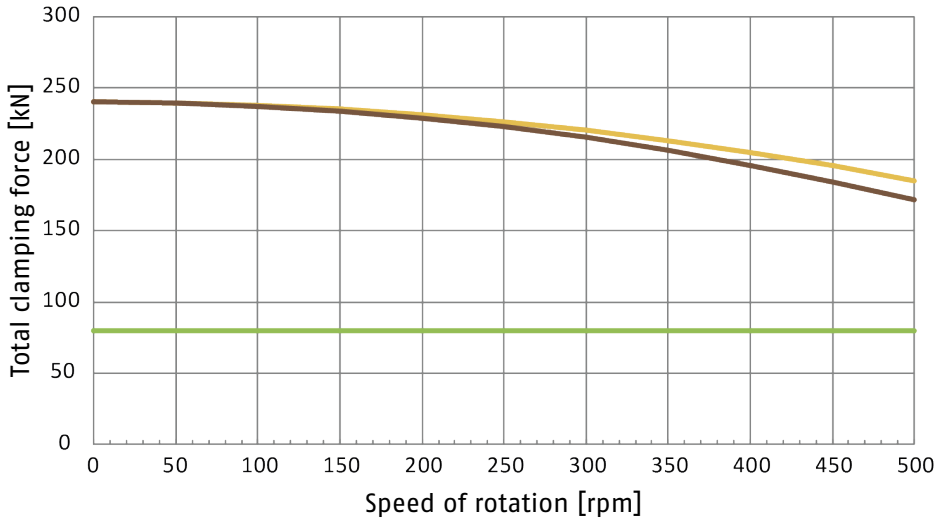
Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-HB 630	19.9	306.5
	SP-WB 630	36.6	256.5
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 850-375 LH



Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-HB 800	30.6	275.0
	SP-WB 800	43.2	275.0
	minimum required clamping force 33%		

Clamping force/RPM diagram for ROTA TB2 1000-560 LH



Color	Jaw ID	Weight [kg]	Center of gravity radius [mm]
	SP-HB 800	30.6	405.0
	SP-WB 800	43.2	355.0
	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]	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}**.

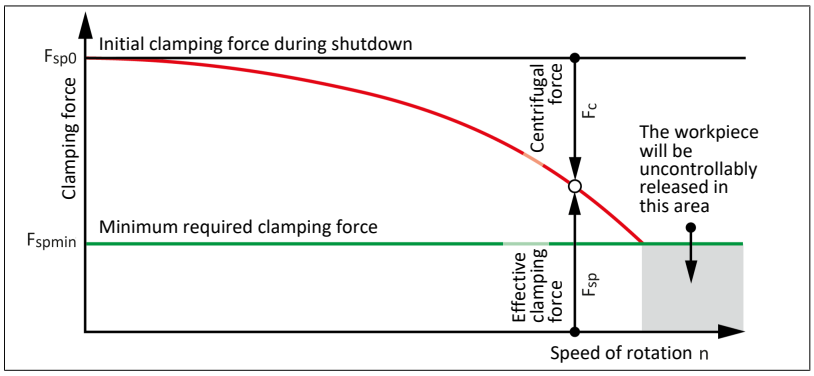
$$F_{sp} = F_{sp0} \mp F_c \text{ [N]}$$

(–) 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

NOTICE

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 [🗋 19]

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:

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

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 $\mathbf{M_c}$.**

$$M_C = m_B \cdot r_S [kgm]$$

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:

$$M_C = M_{CGB} + M_{CAB} [kgm]$$

The centrifugal torque of the base jaws M_{cGB} can be found in the table "Lathe chuck data"▶ 3.1 [🗋 19]. The centrifugal torque of the top jaws M_{cAB} is calculated as per:

$$M_{CAB} = m_{AB} \cdot r_{SAB} [kgm]$$

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:

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

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:
M_{cGB} = 0.319 kgm

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

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

Centrifugal torque for one jaw:

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

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

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

The total centrifugal force can now be calculated:

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

Initial clamping force during shutdown that was sought:

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

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:

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

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 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 [🗋 19]).

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 TB2 / ROTA TB2 LH in ungreased state without T-nuts and top 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 top 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.

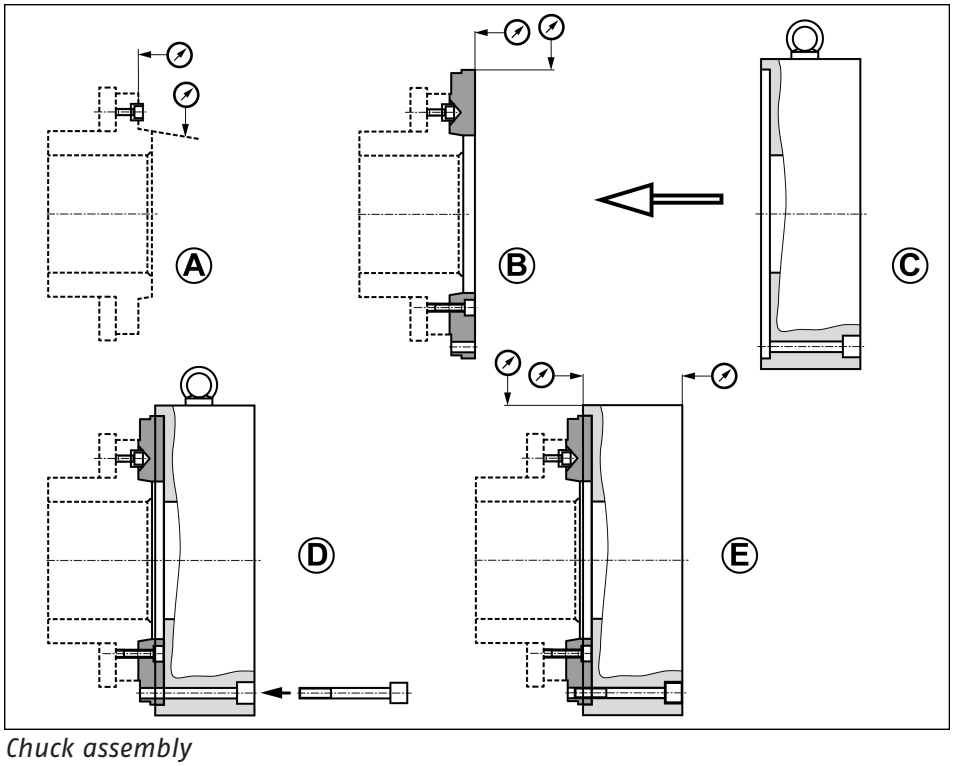
A maximum concentricity error of 0.01 mm should be ensured for the centring of the mount and a maximum axial run-out error of 0.01 mm for the contact surfaces. In addition, the flat surface must be checked for evenness using a straight edge (flat surface deburred and clean at the bore holes).

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

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 Attachment of the ROTA TB2 chuck

NOTICE

Excessively long fastening screws can stand up in the tapping drill hole or damage the machine spindle.

During assembly of the chuck and flange the length of the mounting screws must be taken into account.

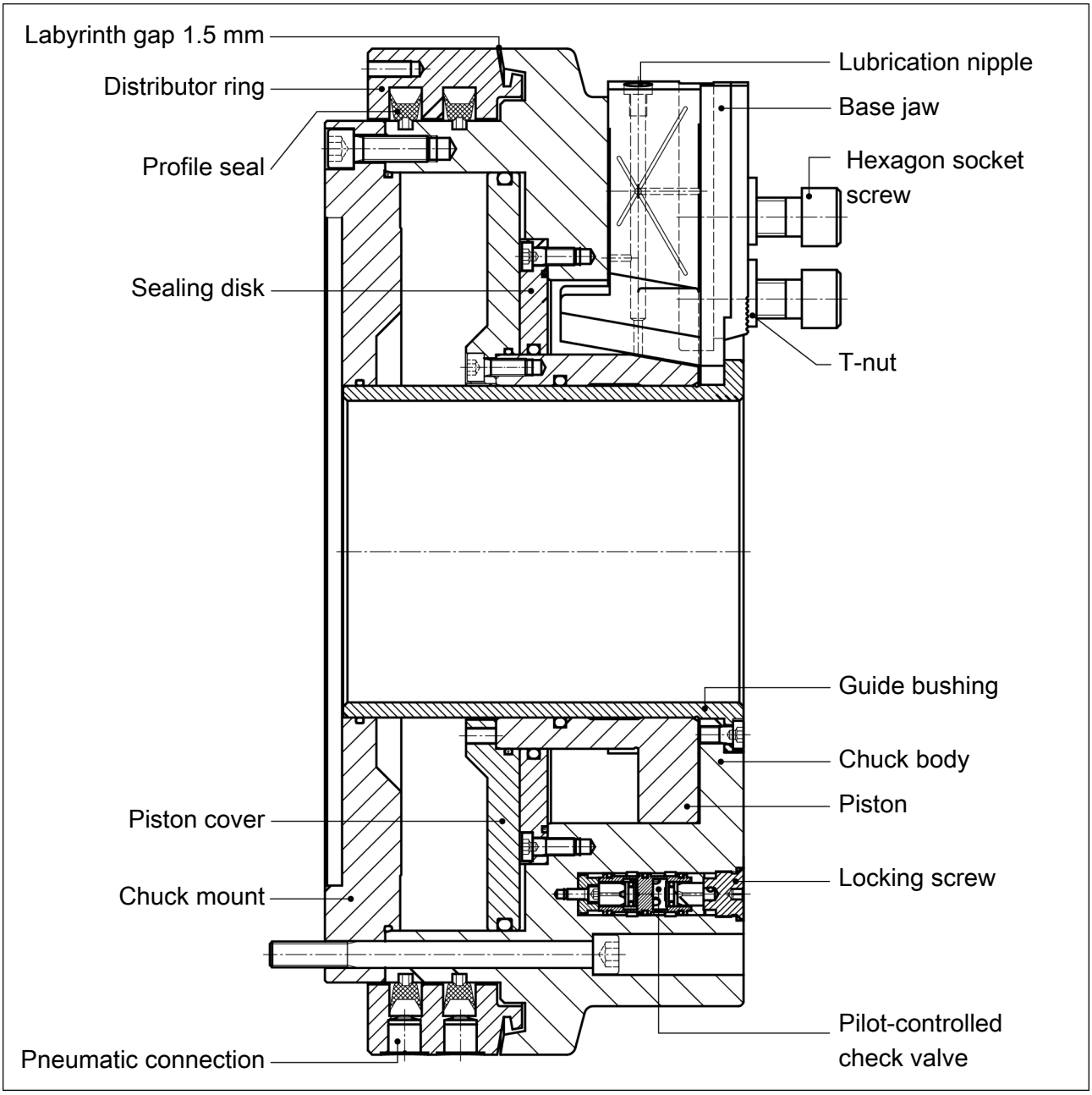
In case of optional mechanical pressure monitor with inductive proximity switch:
Loosen set screw (107) and remove switch cam (93).

For mechanical stroke monitoring with inductive proximity switches:
Disassemble switch cam (92) (in case of dual stroke chuck).

Assembly procedure

- A chuck flange is mounted on the spindle nose. 9 or 12 M16 or M24 hexagon socket screws are used to screw the chuck onto the chuck flange by the front face side.
- Insert and **slightly tighten** the mounting screws.
- 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 the table of the attainable maximum radial and axial run-out tolerances)
- Then tighten the fastening screws alternately with a torque wrench. Observe the specified maximum tightening torques ▶ 4.1 [🗋 34].
- Check radial and axial run-out again.

SCHUNK provides standard flanges that can be used to mount the ROTA TB2 chuck on spindles in accordance with DIN 702-1, DIN 702-3 and DIN 702-2.

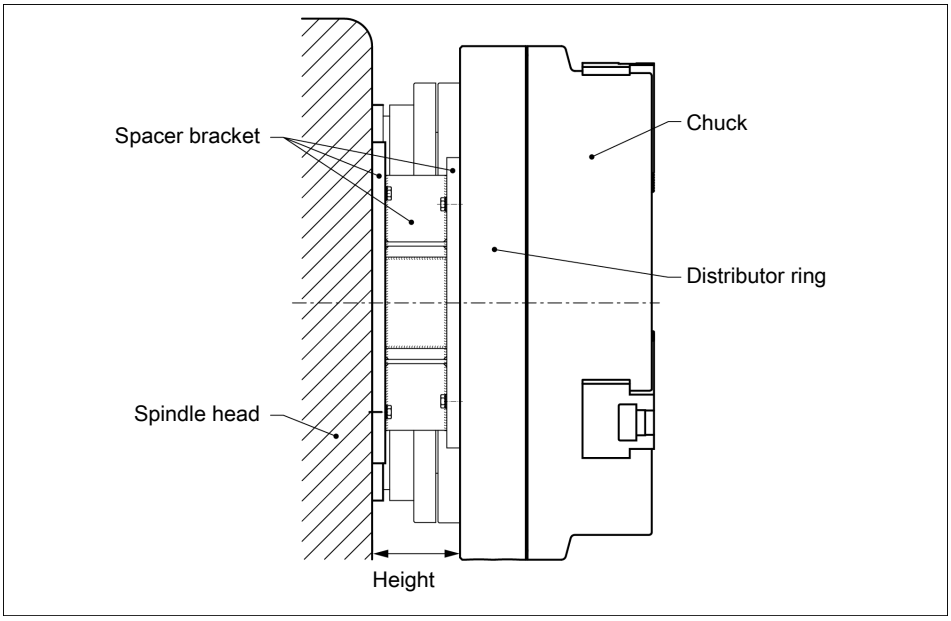


4.3.1 Distributor ring

The distributor ring is a completely separate component from the chuck and is centered and held stationary on the spindle head of the lathe axially and radially with a spacer bracket.

After the first set-up of the chuck on the spindle nose of the lathe, the height of the spacer bracket is defined. For the execution of the spacer bracket it is important to know whether the screw-on surface on the front of the spindle box of the lathe is machined or unmachined.

NOTE:
The axial labyrinth gap between the chuck body and the distributor ring must be 1.5 mm for all TB2 chucks. Only then is the correct transfer of air from the distributor ring to the chuck body ensured.



4.3.1.1 Mounting with bracket

The console height dimension is calculated by adding together the distances between the face side of the headstock and that of the distributor ring. If the headstock face surface is machined, the calculated dimension can be taken as the height dimension for the spacing console. If the end face of the headstock is unmachined, the height dimension should be calculated by adding together the individual distances then subtracting 4 – 5 mm. In accordance with the sketch overleaf, the spacing console comprises two shells and is made of suitable steel plate. The main dimensions match the individual chuck sizes, and can be taken from the sketch overleaf.

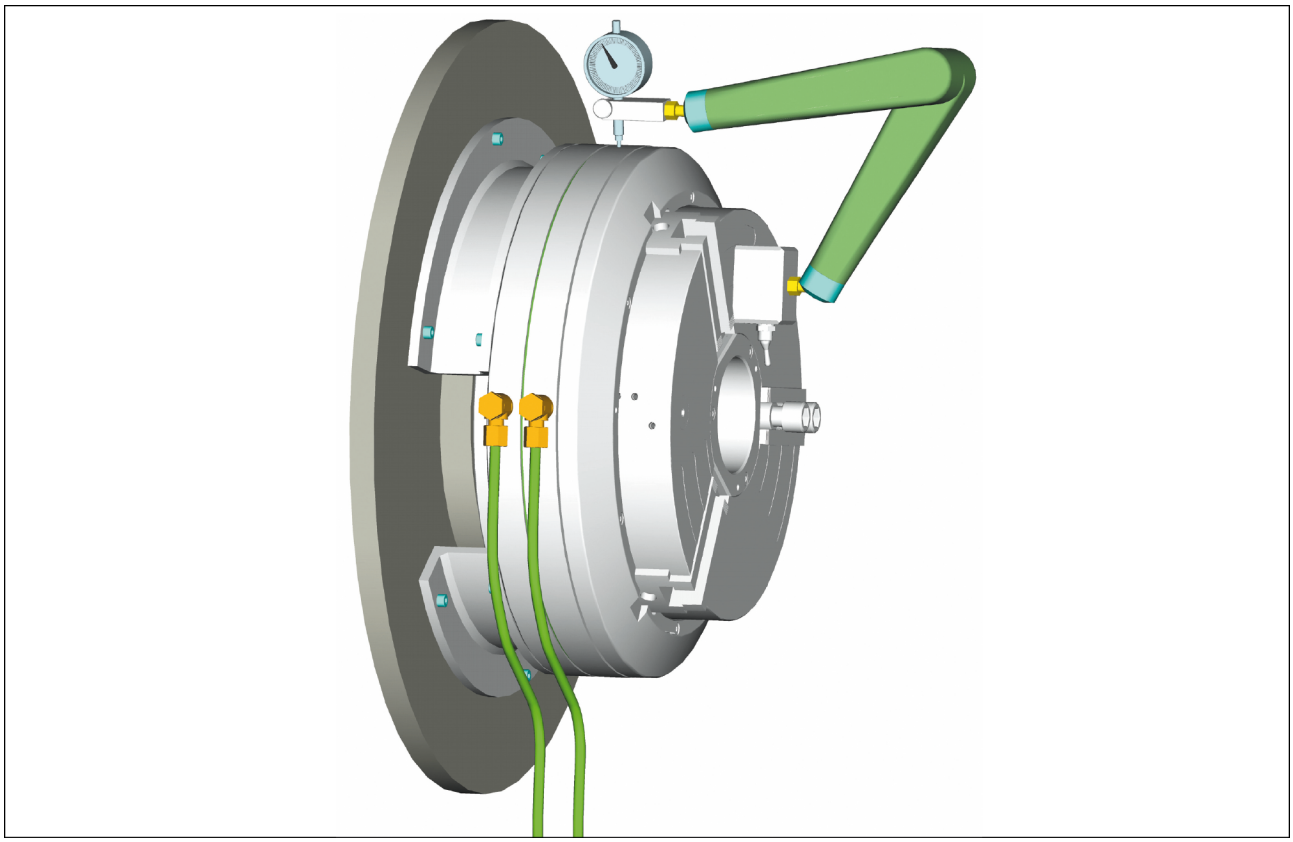
The spacing console can also be customized, but it should achieve the stability of the design shown. The spacing console is mounted using 6 M8 threaded holes in the chuck distributor ring, which have been drilled in at a 60° angle. When the threaded mounting holes in the headstock and the holes in the spacing console have been drilled, the spacing console is screwed onto the distributor ring.

The chuck with the distributor ring and the bolted-on spacing console are now finally mounted on the spindle nose. The outer diameter of the distributor ring matches the max. outer diameter of the chuck. As such, the distributor ring can be centrally aligned with the chuck using a ruler for complete accuracy, then screwed onto it.

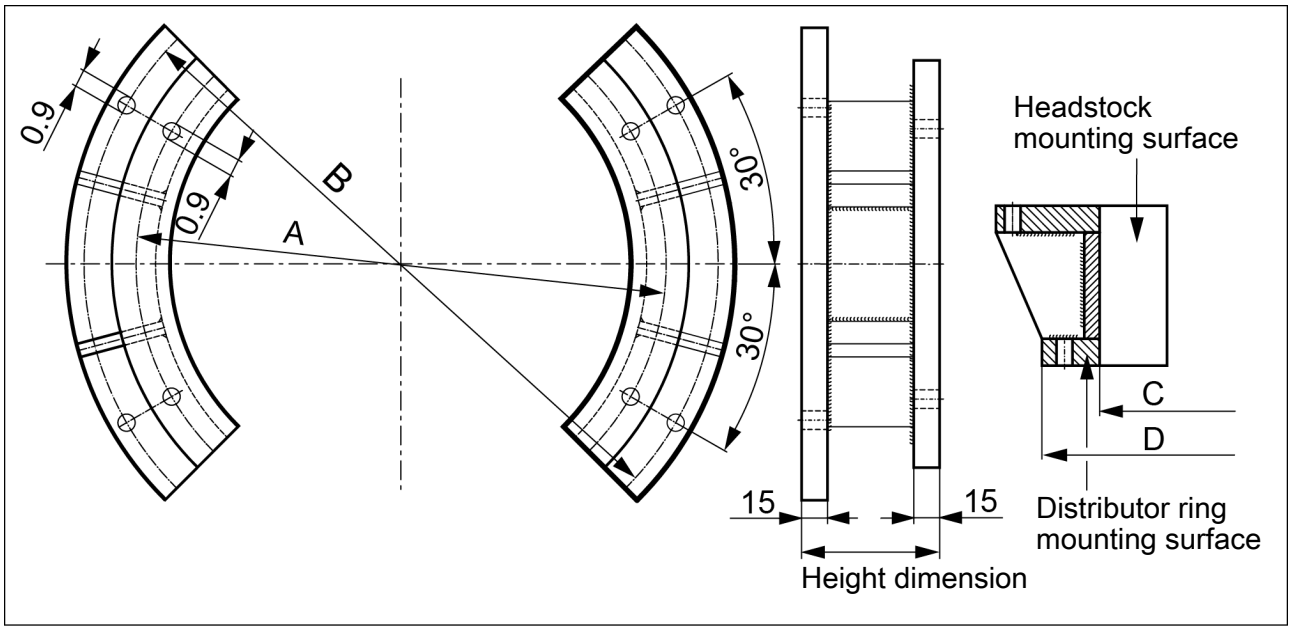
NOTE

The distributor ring must be aligned with the outer chuck diameter in such a way that a radial and axial run-out tolerance of at least 0.1 mm is achieved.

When detaching the chuck from the spindle nose, the spacing console remains attached to the distributor ring, and is only detached from the headstock. No more adjustments must be made to the positioning sleeves. When detaching the chuck from the spindle nose, the spacing console remains attached to the distributor ring, and is only detached from the headstock. No more adjustments must be made to the positioning sleeves.



True running check



Dimensions of the console

ROTA TB2 / TB2 LH	470	520	570	600	630	685	740	850	1000
Ø A [mm]	448	500	550	585	585	666	716	830	910
Ø B* [mm]	497	550	600	630	630	715	765	880	960
Ø C [mm]	410	456	510	545	545	620	670	785	869
Ø D [mm]	467	520	570	605	605	685	735	850	925

* Example only (deviations possible)

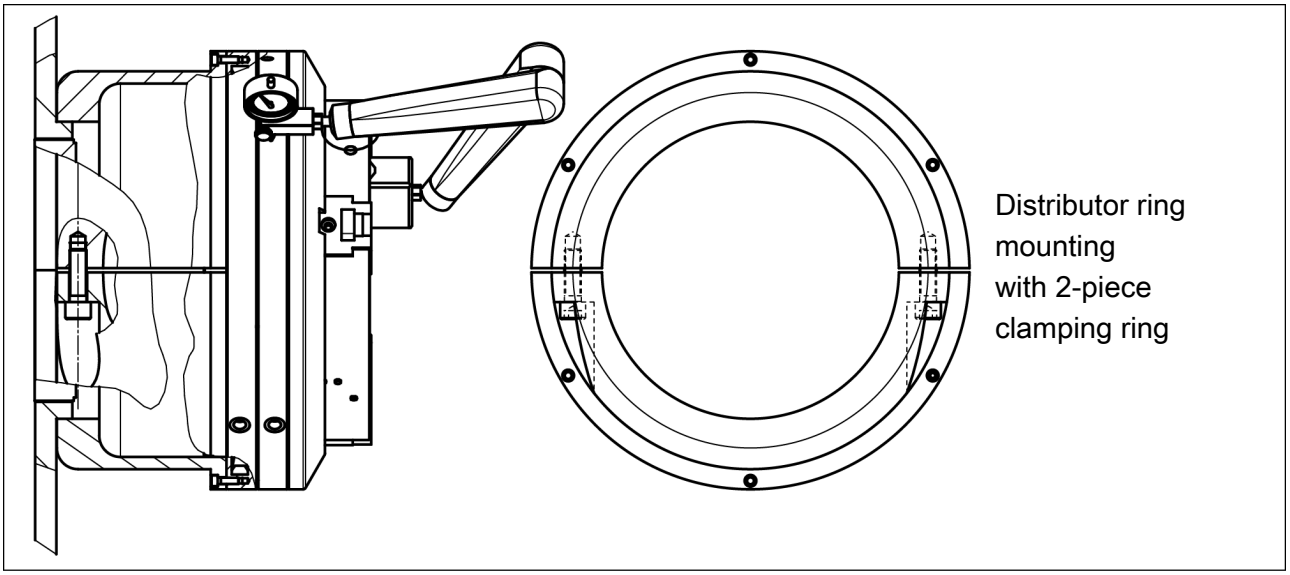
4.3.1.2 Mounting with 2-part clamping ring (D.R.M.B.)

The distributor ring may be clamped onto a rigid collar on the machine (at least 8 mm wide) by means of a DRMB. Here, the distributor ring is clamped onto this collar radially using two screws. The height of the clamping ring is designed as per the chapter ▸ 4.3.1.1 [🗋 39].

During assembly, this two-piece clamping ring is first screwed to the threads of the distributor ring. Once this is done, the entire assembly group is clamped onto the rigid collar of the machine. When mounting the chuck with a bayonet or camlock, the clamping ring should have a cut-out to allow access to the collar nuts or clamping cams using the corresponding wrench.

NOTE

The distributor ring must be aligned with the outer chuck diameter in such a way that a radial and axial run-out tolerance of at least 0.1 mm is achieved.



Distributor ring mounting

4.3.2 Optional mechanical pressure monitor with inductive proximity switch

If the chuck is ordered with the optional mechanical pressure monitoring (ID number 0818205), this option is already integrated in the chuck.

The monitoring function has been set to the working pressure of 6 bar. **If the working pressure has to be changed, refer to the chapter ▸ 7.2.1 [🗋 57].**

Pressure monitoring is possible only if the chuck is in a specified position within the lathe. The pressure can be monitored only for O.D. clamping setups.

After attaching the chuck and the distributor ring the mechanical pressure monitoring system should be put into operation.

Insert the switch cam (93) into the rod (99) and tighten the set screw (107).

Pressurize the chuck to the working pressure (6 bar) so that the jaws move radially inward. The switch cam moves to the right.

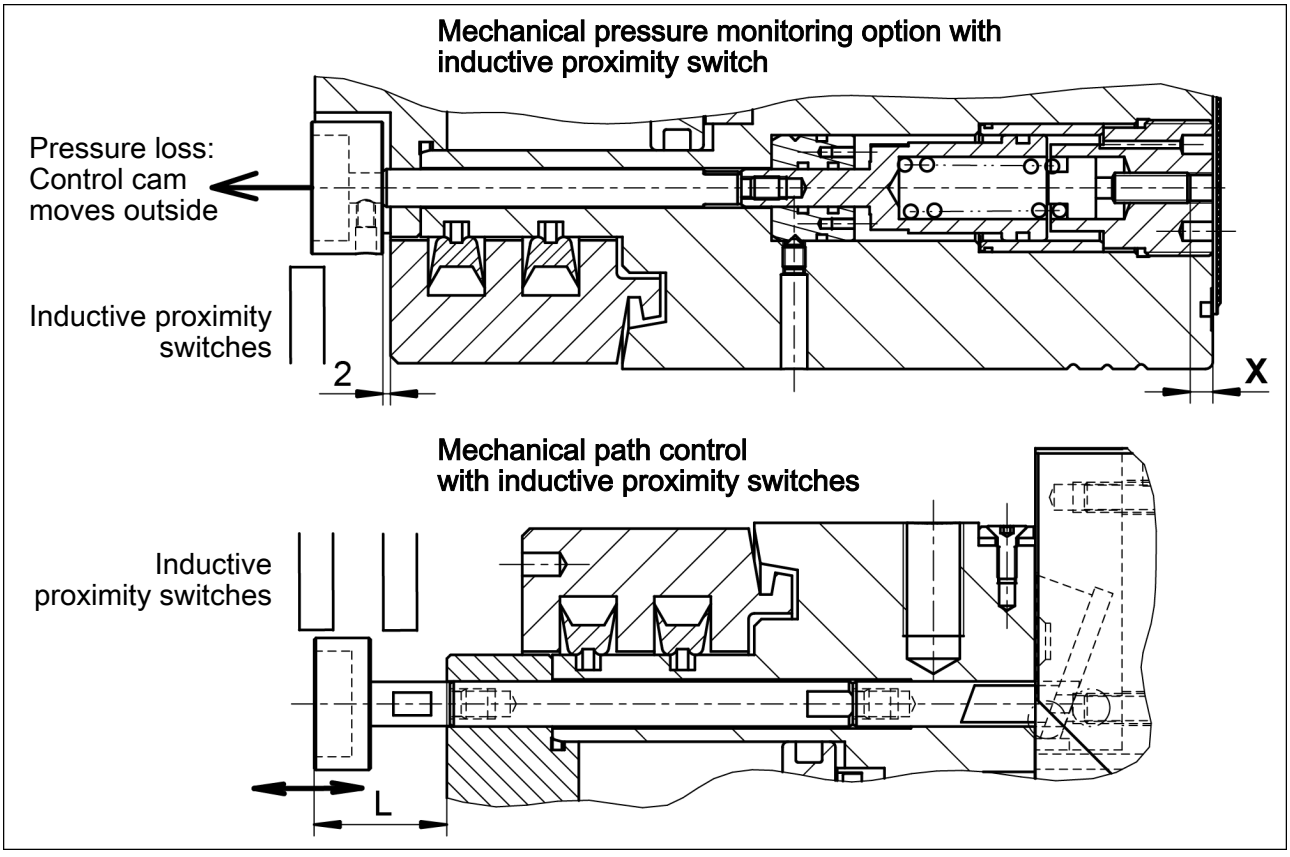
Adjust the inductive proximity switch mounted on the machine so that it is triggered by a 1 mm leftward movement of the switch cam – this corresponds to a pressure loss of 1 bar (see Fig. "Mechanical monitoring"). Mechanical pressure monitoring is possible only for O.D. clamping.

⚠ DANGER

Potential danger of death for operating personnel due to loss of workpiece and objects flying off.

If the inductive proximity switch responds there is a loss of clamping force in the chuck.

- **If the inductive proximity switch responds, do not operate the machine!**



Mechanical monitoring

4.3.3 Mechanical stroke monitoring with inductive proximity switches on dual stroke chucks

Mechanical path control is prepared for each lathe chuck with rapid stroke and clamping stroke (long stroke (LH) version) as well as for each lathe chuck with continuous stroke.

For lathes on which the monitoring is prepared, the mechanical path control should be put into operation.

Path control is only possible if the lathe chuck is in a certain position in the lathe.

For chucks with rapid stroke and clamping stroke (LH version):

The right-hand inductive proximity switch ▸ 4.3.2 [🗋 41] is set so that it responds just when the base jaws are in the inner radial position.

The left-hand inductive proximity switch should trigger when the dimension **"L"** of the control cam has the following dimension:
ROTA TB2 470-185 LH: 29.4 mm
ROTA TB2 520-191 LH: 28.7 mm
ROTA TB2 570-230 LH: 27.8 mm
ROTA TB2 600-275 LH: 28.1 mm
ROTA TB2 630-275 LH: 24.1 mm
ROTA TB2 685-325 LH: 28.1 mm
ROTA TB2 740-375 LH: 28.1 mm
ROTA TB2 850-375 LH: 29.3 mm
ROTA TB2 1000-560LH: 28.8 mm

For chucks with continuous stroke:

The left-hand inductive proximity switch ▸ 4.3.2 [🗋 41] is set so that it responds just when the base jaws are fully in the outer radial position.

The right-hand inductive proximity switch ▸ 4.3.2 [🗋 41] is set so that it responds just when the base jaws are fully in the inner radial position.

⚠ WARNING

Risk of injury from ejected workpieces and risk of damage to the lathe chuck if the machine is started up despite the indication on the proximity switch display.

- The machine may only be released for machining if the left and right inductive proximity switches do not respond!
- The following applies with external clamping: lathe chuck may be enabled in the workpiece loading position and for automatic workpiece loading only if the left-hand proximity switch responds and the right-hand one does not.
- The following applies with internal clamping: lathe chuck may be enabled in the workpiece loading position and for automatic workpiece loading only if the right-hand proximity switch responds and the left-hand one does not.

5 Function

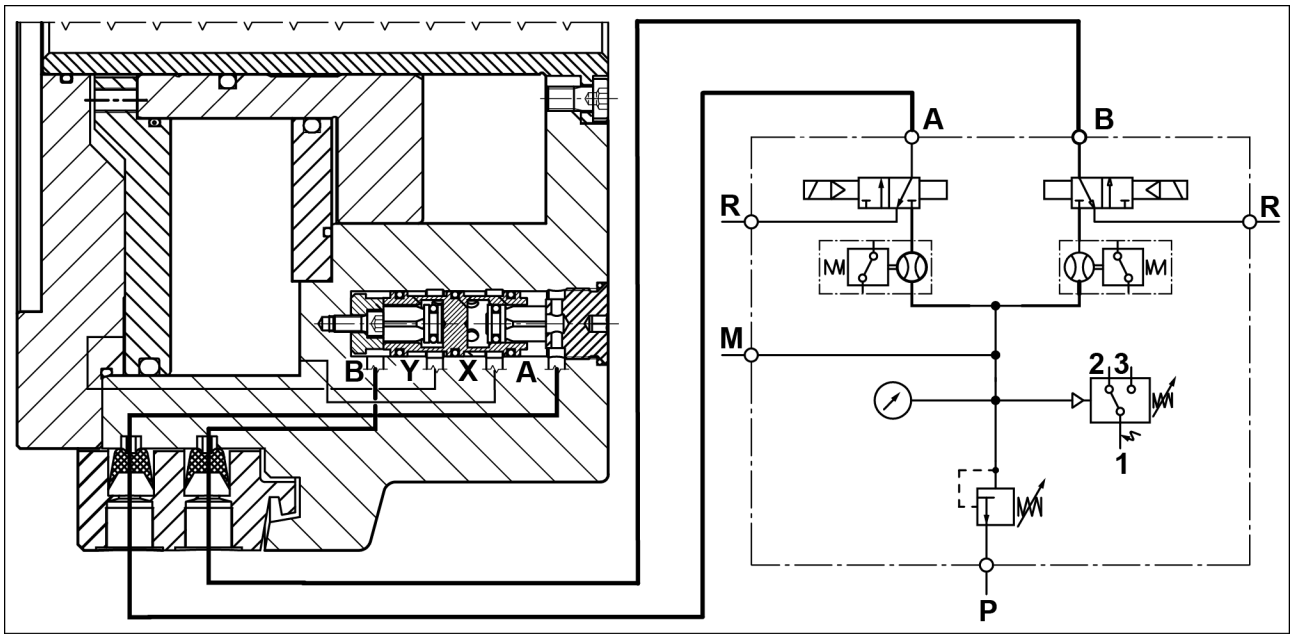
The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [🗋 63].

5.1 Principle of Operation

The problem of air supply was solved by a stationary distributor ring with profiled ring seals arranged in it.

Via passage openings in the two elastically radially flexible profile seals, the compressed air flows via a twin non-return valve to one of the two pressure chambers. The pilot-controlled non-return valve controls the feeding into one pressure chamber and the forced and simultaneous venting of the second pressure chamber. This triggers the piston stroke and the wedge hooks move the base jaws. The pressure in the chuck body is shut off and stored by the valve system (retensioning), while the profile seals are lifted off the chuck body by their elasticity via the venting of the feed lines and therefore cannot wear out while the chuck is rotating.

5.2 Air transmission system



Air transmission

The air is only transmitted when the lathe spindle is at a standstill via profile seals arranged radially in the distributor ring. The profile seal is designed in such a way that the outer upper surface part is larger than the surface of the passage openings. When pressure is applied, the difference in area in the annular chamber of the distributor ring results in a radial force on the profile seal, which provides an optimum static seal of the

profile seal at the air transfer interface. The air can thus flow into the cylinder chamber of the chuck through the passage openings in the profile seal with low loss.

When the compressed air supply is stopped, the double check valve closes and the pretensioned profile seal lifts itself off the chuck body again due to its elasticity and cannot wear out while the chuck is rotating.

NOTE:

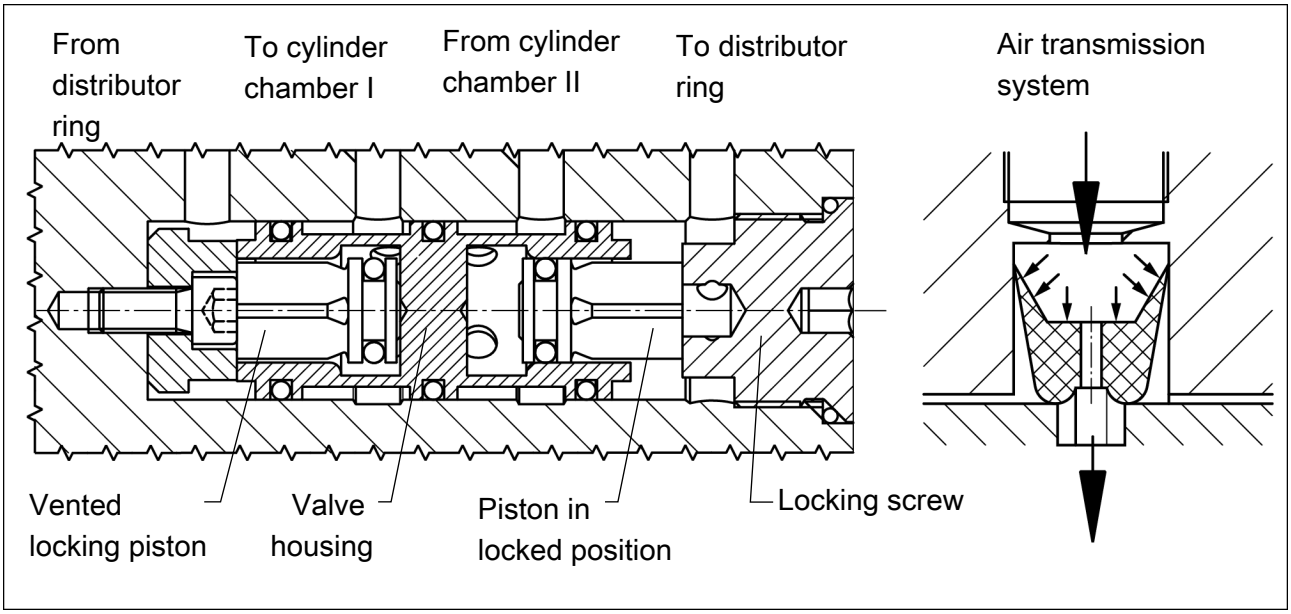
The venting is diverted to the outside by a quick venting function directly via sound absorbers. This significantly reduces clamping times and noise development. On the Size 570 (LH) to 1000 (LH), the double check valve is integrated in one insert (see chapter ▸ 10 [🗋 63]).

NOTICE

When actuating the clamping device (clamping or releasing), allow a short pause for ventilation between each shifting operation. This ventilation pause must be at least 0.5 seconds, depending on the length of the hose. We recommend using a 4/3 or 5/3 directional control valve for this (center position depressurized).

5.3 Pilot controlled check valve

The pilot controlled check valve is a self-contained structural unit consisting of a valve body and two blocking pistons. It can easily be serviced from the face side of the chuck by means of a locking screw. The valve unit controls the flow of two air channels from and to the profile seals through the two blocking pistons. The change of the air flow at the profile seals causes the air channel to one cylinder chamber (release chamber) to be ventilated. The reversal of compressed air from one cylinder chamber to another is caused by the axial movement of the valve body, while the two single blocking or non-return pistons execute only one stroke during blocking of their corresponding cylinder chambers. Both O.D. and I.D. clamping are therefore possible through the entire valve system.



Pilot-controlled check valve

5.4 Faults, causes and solutions

Fault	Causes and solutions
O.D. or I.D. clamping: The chuck closes, but opens again right away	Valve system executes no switching movement: Remove check valve system, clean bore and lightly oil, reinstall valve system.
Audible escape of air under the distributor ring when control unit is actuated after the jaws complete the clamping movement	Foreign object under the profile seals: Disassemble distributor ring, remove profile seals, wash out, knead with grease, oil and reinstall.
Distributor ring becomes hot	Profile ring seals are in contact with the chuck body, resulting in wear; check pressure; distributor ring must be without pressure during the rotary movement; completely dismantle the chuck, clean, grease and replace profile ring seals.
Distributor ring becomes hot (stationary mounting)	Align distributor ring to chuck (see ▸ 4.3.1 [🗋 37]); the gap between the distributor ring and the body must be even.
Clamping force decreases after extended use	Completely dismantle the chuck, clean, grease and reassemble; replace seals.
Audible escape of air at the chuck after completion of the clamping process	O-ring in chuck is damaged or seal rings under the hexagon socket screws are missing or not tight.

Fault	Causes and solutions
Dual stroke chuck: When clamping the workpiece the 3 indicator pins protrude from the front side more than 0.5 mm; or the base jaw edge is outside of the permissible area marked "Clamping Zone"; or, if mechanical stroke monitoring with an inductive proximity switch is installed, the machine receives the signal "Clamping not permissible"	The overlap of the clamping stroke in the chuck piston is insufficient. There is a danger that parts will be damaged in the force transmission area. The top jaws must be offset radially outward by one or more teeth until the indicator pin in the chuck body is countersunk during O.D. clamping; or the base jaw edge is within the "Clamping Zone"; or, if stroke monitoring is installed, the machines receives a release signal.
Pressure monitoring with the inductive proximity switch sends no release signal.	Check working pressure. Clamping cylinder is leaking in the cylinder or valve area; check working pressure. Replace defective seal elements. If necessary, completely dismantle chuck, clean, grease and replace O-rings and/or profile seals.
Pressure monitoring with the inductive proximity switch initially sends a release signal. After a short time the machine no longer receives a release signal.	Chuck is leaking in the cylinder or valve area. Check working pressure. Replace defective seal elements. If necessary, completely dismantle chuck, clean, grease and replace O-rings and/or profile seals.

5.5 Control of types TB2, TB2 LH

An electropneumatic safety control block (24 V) is available to actuate the front-end power lathe chuck, consisting of a pressure control valve, pressure switch, 2 magnetic valves with automatic clamping time monitoring including 2 sensors, and 2 evaluation devices (see separate operating manual).

A maintenance unit, consisting of filter, water separator, and oiler, must be connected upstream of this control block.

5.6 TB2S, TB2S LH stationary power chucks

NOTICE

No distributor ring, no check valve, continuous pressure

The operating manual for the types TB2 / TB2 LH also applies analogously for the types TB2S / TB2S LH. Due to the horizontal chuck utilization, extra care should be taken with respect to lubrication of the base jaws and cleaning of the fine serration.

Instead of the control unit described above, normal 5/2-way valves are used for actuation.

6 Commissioning and maintenance

6.1 Commissioning

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 10 [🗋 63].

Check whether the jaw guides and the piston of the ROTA TB2 power chuck are sufficiently lubricated at the lubrication nipples countersunk into the base jaws; otherwise use LINOMAX plus special grease to lubricate the base jaws in retracted position.

An insufficiently lubricated chuck loses significant clamping force.

On the front face side of the chuck there is a hexagon socket locking screw, size 6.

Behind the locking screw (15) the pilot-controlled double check valve controls the pressurization and ventilation of the two pressure chambers and shuts off the pressure toward the outside.

It is very important to lightly lubricate the bore hole of the valve system with Klüber special grease QNB 50/100, to ensure a smoothly operating valve system. Excessive grease as well as impurities in the valve bore significantly impair the function of the chuck and should be avoided.

NOTICE

During actuation of the clamping device (clamping or releasing) it must be ensured that a short ventilation time is maintained between the switching processes. This ventilation time must last at least 0.5 seconds, depending on the hose length. For this purpose we recommend the use of a 4/3- or 5/3- way valve (central position depressurized).

NOTE

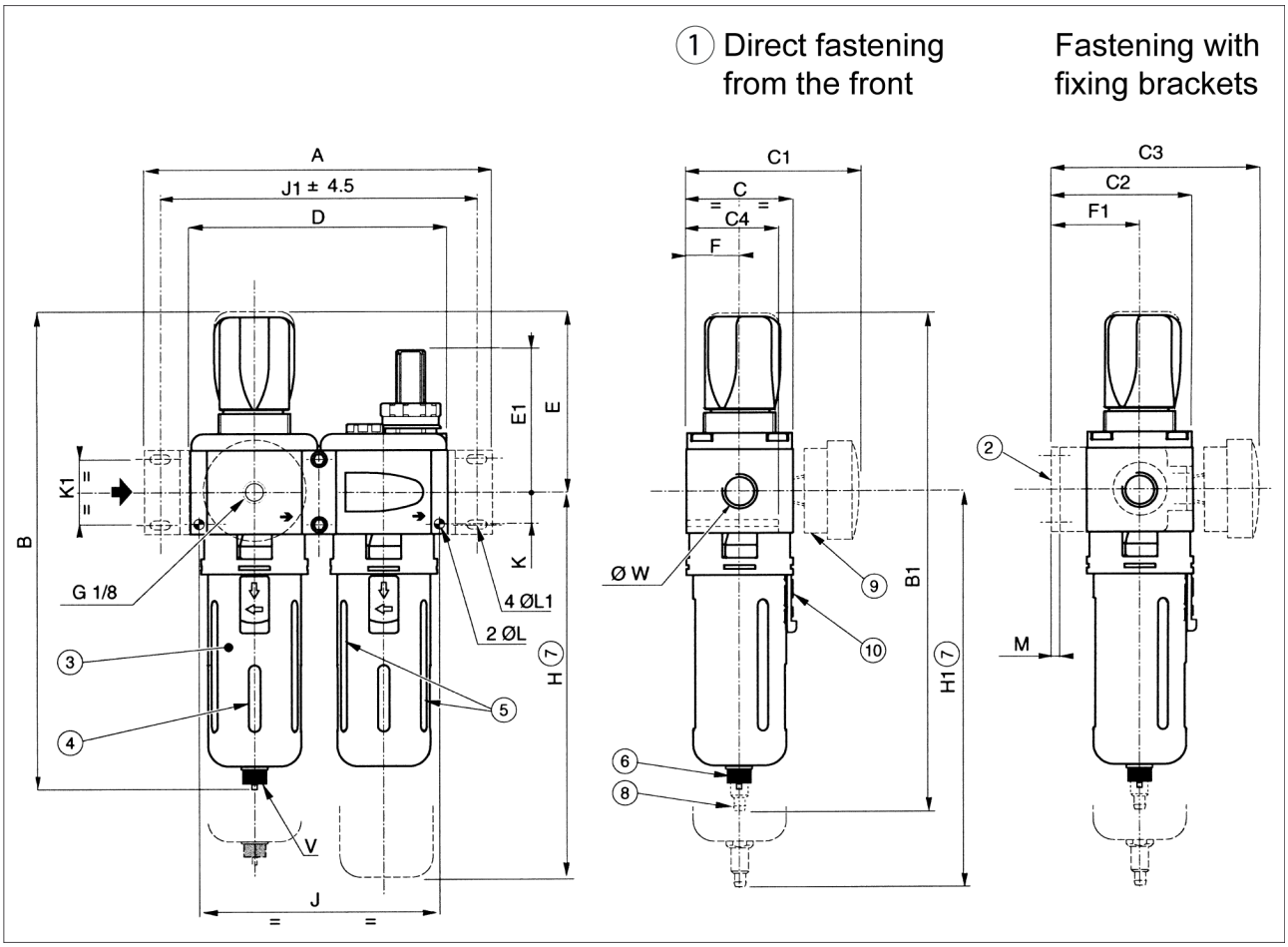
Turning, facing or finish-turning of the ROTA TB2 power chuck is not allowed. Drilling in the front face side of the chuck is permitted only after consulting the SCHUNK technical sales department.

6.2 Maintenance

A type WEH maintenance unit, consisting of filter, water separator, and oiler, must be connected upstream of the power chuck. The air enriched with oil supplies all sliding parts of the cylinder chamber with an oil film. The oil level of the oil tank must be checked daily, and oil must be added if necessary. If the oil consumption is too low, i.e. if the oil level does not visibly drop over a period of 2–3 days, the oil adjustment screw must be opened slightly. Depending on the accumulation of condensation, the condensation drain screw must be opened occasionally.

2-part maintenance unit, type WEH with filter, oiler, and pressure control valve

Type	WEH-1
ID number	0890021
Oil type	Shell Tellus S2 MA 32 Esso Febis
Connection	G 1/4"
Nominal pressure	10 bar



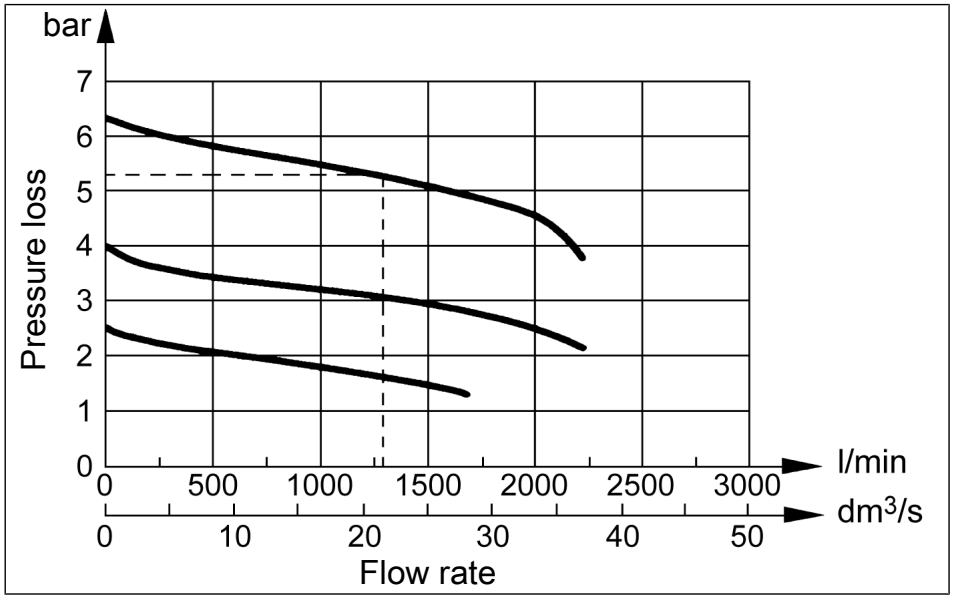
1	Mounted directly from front: 2 bore holes Ø L, depth C4	7	Required distance for removing the container
2	Lateral mounting with two retaining brackets (accessories)	8	Automatic condensate drain can be connected by means of a hose with inner Ø 6
3	Protective metal cage with container made of transparent polycarbonate	9	Pressure gauge, Ø 40
4	Fill level indication for condensate (small inspection port)	10	Protective cage lock
5	Fill level indication for oil – min./max. (large inspection port)	11	Distributor module as accessory: with two connections (Ø T) at front and rear and one already mounted center plug
6	Semi-automatic condensate drain, G 1/8 connection		

Ø W	G 1/4"	C4	38	J	74
Container	7 cl	D	84	J1	110.5
A	125	D1	42	K	10
B	213	E	89	K1	28
B1	–	E1	65	Ø L	4.1
C	42	F	21	Ø L1	4.5
C1	76	F1	40	M	3
C2	61	H	215	Ø T	G 1/8"
C3	95	H1	–	V	G 1/8"
				Weight [kg]	0.76 (weight without pressure gauge)

Basic setting for oiler

Chuck type	Air consumption/ jaw stroke at 6 bar	Clamping strokes	Number of oil drops	Oil amount
ROTA TB2 470 (LH) – ROTA TB2 1000 (LH)	5–11 liters	1000	approx. 1000	50000 mm^3 = 0.05 liter

Flow rate characteristic curves and pressure drops



Cleaning and lubrication of the lathe chuck

The even clamping force, accuracy, and life span of the chuck depend greatly on regular cleaning and sufficient lubrication. Rust, scale, casting dust, and chips produce friction and reduce motion.

The chuck must therefore be lubricated after every 40 operating hours by means of the grease gun at the 3 base jaw lubrication nipples with LINO MAX special grease plus. Afterwards, the chuck must be actuated two to three times without a workpiece; the fully extended jaw stroke will then distribute the grease.

The valve system of the chuck must be occasionally lightly lubricated with oil after the locking screw has been removed on the face side of the chuck. The double check valve is removed from the bore hole and the bore hole and the valve are cleaned to remove dirt and any foreign bodies.

The silencers (item 50) must be cleaned or renewed every 2 months or whenever they become blocked.

For less significant contamination, it is sufficient to blow out the filters with air in the opposite direction. For significant contamination, the filters should be freed of grease and oil with a solvent. In doing so, the warning labels for hazardous substances from the solvent manufacturer should be observed!

The fine serration of the base jaws and top jaws must be cleaned when the hardened reversible jaws or soft top jaws are adjusted, because otherwise the run-out accuracy will be reduced.

Foreign matter, such as rust, scale, casting dust, and fine chips, penetrates into almost every chuck, even though there is optimum sealing provided by the hardened guide bushing in the

through-hole and by the closed base jaws. Coolant washes away lubricant. Therefore, every lathe chuck occasionally must be completely disassembled, cleaned, and lubricated, and the sealing rings replaced. The time for which the chuck can be used before full maintenance is required depends on the level of dirt it accumulates and the clamping frequency. As such, it is not possible to specify a generally applicable rule for this.

Please regularly check the lathe chuck for tightness by applying a clamping force tester over a longer period of time (> 10 min.). The clamping force should not drop during this period. Please adjust the inspection interval to the operating conditions of the clamping device. We recommend conducting a check every 5,000 clamping cycles at the latest however.

6.2.1 Maintenance and lubrication plan

The specified intervals are guide values and must be adjusted by the operator depending on the ambient and operating conditions and the frequency of use of the clamping device used. In order to determine a suitable lubrication interval for the respective application, it is recommended to carry out a regular clamping force test. If only 80% of the maximum clamping force is reached, the clamping device must be lubricated. In accordance with VDI 3106, it must be ensured that sufficient clamping force is available for the application.

Maintenance task	Strain	Interval
Lubricate	normal / coolant utilization	Daily / every 16 hours*
	high / coolant utilization	1x per shift / every 8 hours*
Check clamping force		To be determined by the operator
Complete cleaning / disassembly	depending on soiling	as required / after 1200 hours
Clean / replace silencer	depending on soiling	every 2 months

* Depending on which event occurs earlier.

6.2.2 Hardened Reversible Jaws and Soft Top Jaws

The fine serration of the base and top jaws for sizes 470 – 1000 is 3/32" x 90°, so the adjusting stroke from tooth to tooth is 2.4 mm.

Care must be taken to ensure that the top jaws are set on the fine serration in such a way that a maximum of 2/3 of the jaw stroke is extended for clamping (clamping reserve).

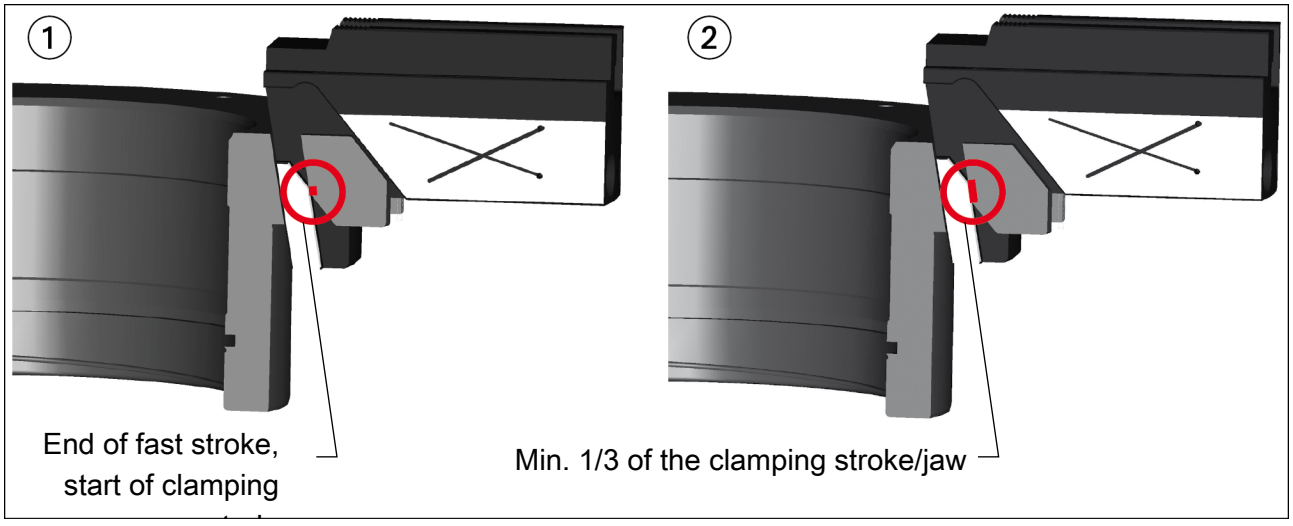
With long stroke chucks, ensure that the indicator pin is completely recessed or that the correctly configured path control releases the clamping.

Hardened reversible jaws should only be used in sets in accordance with the packaging, as they are ground on the chuck in sets. 1 set of hardened reversible jaws is normally ordered for a chuck. When installing and removing the reversible jaws numbered 1 to 3, make sure that the individual jaws are installed/removed on/from the base jaws with the same designation in order to ensure a high level run-out accuracy.

The soft top jaws are turned on the chuck in the same clamping position and under the same operating pressure as are used for machining the workpiece. When doing this, it is important to ensure that all the mounting screws are screwed in tightly and evenly. ▶ 4.1 [🗋 34]

The fine serration of the base jaws and top jaws should always be cleaned, especially when the top jaws are adjusted, otherwise the run-out accuracy will be impaired. Hardened reversible jaws and soft top jaws must be tightened to the same torque. Insufficient tightening of the top jaws will cause significant run-out inaccuracies!

Do not use dual stroke chucks (LH series) for I.D. clamping. Also, do not clamp workpieces on the fast stroke, since this stroke executes very large jaw strokes but very low clamping forces **(1)**. In chucks of the TB2 LH series, make sure that the entire fast stroke plus at least 1/3 of the clamping stroke (corresponding to the basic overlap) is traveled during workpiece clamping **(2)**.



7 Disassembly and assembly

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▸ 10 [🗋 63].

7.1 Disassembly and cleaning

1. Unscrew both the pneumatic quick coupling pieces from the distributor ring (item 8), and detach the distributor ring (item 8) from the spindle nose together with the bracket. Loosen the chuck mounting screws (item 24) and lift the chuck from the spindle nose with a crane using the supplied eye bolt (thread on the chuck body circumference).
2. Remove both profile ring seals (item 47) from the distributor ring (item 8) and check for wear. Before inserting the profile ring seals (item 47) in the slots in the distributor ring, it is recommended that you rub them with grease by hand so that they remain elastic. There must be no visible grease residue. **When the profile ring seals (item 47) are reinserted, ensure that air passage openings do not align with the pneumatic connections of the distributor ring.**

⚠ WARNING

Pressure in the chuck! Risk of injury due to ejected parts.

It is absolutely necessary to carefully remove the valve system (item 13) before any further disassembly!

3. **Valve insert ROTA TB2 470 (LH)**
   Carefully unscrew the locking plug (item 15) with O-ring (item 37) and remove the pilot-controlled double check valve system (item 13).
   Valve insert ROTA TB2 570 – 1000 (LH)
   Remove the screws (item 11). Remove the insert (item 1). The screw counterbore holes are provided with M10 forcing-off threads. The four O-rings (item 12) can be removed. Remove the screws (item 15) with the O-ring (item 37). Remove the pilot-controlled check valve (item 2).
4. Check all the O-rings in the valve system for wear and replace them if necessary.
5. Remove the screws (item 36), the cover (item 12) and the flat gasket (item 11) on all three sides of the jaws.
   Unscrew the screws (item 108). Remove the plate (item 90) out of the chuck. Pull the bar and the bolts (items 89 and 91) out of the chuck; these parts are securely glued together.

6. Unscrew the locking screws with the 0-rings (items 10 and 48) and remove the diaphragms (item 33) from the chuck. Remove the sound absorber (item 50).
7. *ROTA TB2 without mechanical pressure monitoring:*
   Loosen the set-screw (item 103) in the chuck body radial bore. Remove the lock (item 69), the bar (item 99) and 2 0-rings (item 105).
   ROTA TB2 with mechanical pressure monitoring:
   (see ▸ 10 [🗋 63])
   Loosen set-screw (item 107) and remove the cam (item 93).
   CAUTION! The parts are under spring tension! Unscrew the locking screw (item 96). Remove the bolt (item 97) and the compression spring (item 101). Push the piston (item 94) with the extension (item 99) from behind and remove it to the front. Use a longer threaded rod (M3) to pull the sleeve (item 95) out to the front. If the sleeve bore is worn, remove the sleeve (item 98). Replace the 0-rings (items 102, 105, 106, 111) (Mounting of the mechanical pressure monitoring as per the chapter ▸ 7.2.1 [🗋 57])
8. On the chuck mount (item 7) with 0-ring (items 39, 44), unscrew the hexagon socket screws (item 23) and screw these screws into the threaded extraction holes to push off the mount.
9. Loosen the hexagon socket screws (item 25) which connect the piston cover (item 6) to the piston (item 3). Screw three hexagon socket screws into the threaded holes on the piston cover (item 6) and extract the piston cover (item 6) from the piston (item 3).
10. Remove 0-rings (items 41 and 44) from the piston cover.
11. On the front of the chuck, loosen the three hexagon socket screws (item 20) of the sleeve (item 4) and pull out the sleeve (item 4) to the front by lightly knocking from the back side of the chuck.
12. Remove the 0-ring (item 46) from the sleeve.
13. Disassemble the sealing disk (item 5) attached by hexagon socket head screws (item 21) and remove the 0-rings (items 42 and 43).
14. The piston (item 3) can be pulled out of the chuck body (item 1) as can the base jaws (item 2) from the base jaw guides by pulling inwards through the piston bore of the chuck body. The base jaws (2), the base jaw guides in the chuck body

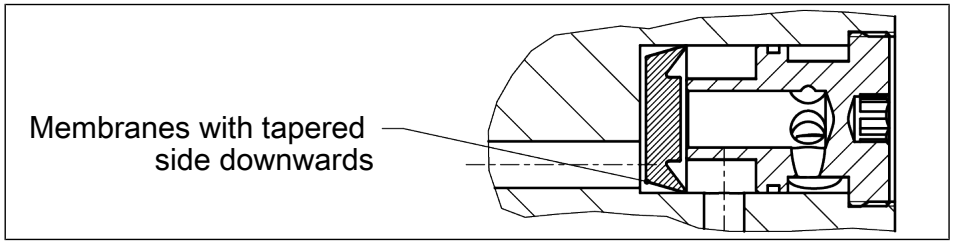
(item 1) and the hardened reversible jaws are designated as 1, 2, and 3 so that the same position and thus the same true running accuracy is achieved during assembly.

15. **CAUTION! Parts of the indicator pin function are under spring pressure!** Remove the set screw (item 27) on all 3 jaw sides and remove the compression springs (item 28), pins (item 18) and indicator pins (item 17) from the chuck.
16. Remove O-ring segments (item 32) from the lathe chuck.
17. Clean and blow out all parts of the chuck.
    Check all O-rings for possible damage and wear, replace them if necessary, and carefully reinstall them.
    The cylinder chamber of the chuck must be oiled.
    The jaw guidances in the chuck body, base jaws, and piston at the wedge hooks are greased with microGLEIT LP 410.

7.2 Assembly

1. Tighten all screws to the torque specified (▸ 4.1 [🗋 34]) using a torque wrench. Insert compression spring (item 28) and pin (item 18) into the chuck body bore. **CAUTION! The indicator pin is under spring tension!**
2. Mount the flat seals (item 11) with the cover (item 12) and countersunk screws (item 36) on the three jaw guidances. Insert O-ring segments (item 32) into the appropriate grooves.
   Chuck in LH design:
   Insert the indicator pin (item 17) with the compression spring (item 28) into the radial bore in the chuck body. **CAUTION! The indicator pin is under spring tension!**
3. Apply liquid threadlocker to the set screw (item 27) and screw it into the bore against the spring pressure until the set screw is flush with the chuck circumference.
4. Insert the marked base jaws (item 2) into the corresponding guides.
   NOTE:The piston wedge hook with the dot marking on the inside is aligned using jaw guide 1.
5. Allow the piston with the O-ring (item 40) to snap into the base jaw wedge hooks (item 2) and push it in up to the end of the stroke.
6. Insert the O-ring (item 43) and the sealing disk (item 5) with the O-ring (item 42) and tighten to the chuck body until firm and airtight using the hexagon socket screws (items 14, 21).
   For chuck sizes ROTA TB2 850 (LH) and TB2 1000 (LH) the screws (item 21) are not required, i.e. the sealing disk is inserted into the chuck body.

7. Push the piston cover (item 6) with O-ring (items 41 and 44) into the piston (item 3) and tighten the hexagon socket screws (item 25).
8. Hold the chuck holder with inserted O-rings (items 39 and 45) with eye bolt over the rear of the chuck body and align the alignment of the mounting stud (item 112) with the matching bore in the chuck body. Screw in together with hexagon socket screws (item 23).
9. Lubricate the valve system (item 13) and valve bore hole with oil, install the valve system, and seal it with the locking screw (item 15) and O-ring (item 37).
10. *ROTA TB2 570 - 1000 (LH):*
    Insert the valve insert into the bore and mount it in the chuck body with the three hexagon socket screws.
11. Insert the sleeve (item 4) with inserted O-ring (item 46) from the front of the chuck and secure with the hexagon socket head screws (item 20).
12. Mounting the distributor ring (see chapter ▸ 4.3.1.2 [🗋 41].
13. Mount the valve insert (item 13) in the chuck body with the locking screws (item 11).
14. Insert the diaphragms (item 33) in the correct orientation (tapered part towards the inside) in the appropriate holes. Fit the locking screws with O-ring (item 10) into the chuck body. Mount the sound absorber (item 50) radially on the circumference and tighten. Insert the rod with high-strength bonded pin (items 89 and 91) into the bore of the chuck body in a correctly aligned position. Insert plate (item 90) into base jaw 1. Use the groove to insert the milled bevel in the bolt (item 91).



7.2.1 Mounting of optional mechanical pressure monitoring system

In general, the working pressure may only be inspected for O.D. clamping.

1. Loosen set-screw (pos. 103) at the circumference of the chuck body.

2. Remove lock (pos. 69) with the extension (pos. 99) and the O-rings (pos. 105) from the lathe chuck from the front.
3. Remove extension (pos. 99) from the lock (pos. 69). The extension is used for the mechanical pressure monitoring (see below).
4. Carefully insert the sleeve (pos. 98) with O-ring (pos. 102) into the chuck bore to the stop.
5. Carefully insert sleeve (pos. 95) with inserted O-rings (pos. 105 and 106) with longer thread rods (M3) into the lower bore hole.
6. Tighten set-screw (pos. 103) radially in the chuck body.
7. Firmly stick together the piston (pos. 94) with extension (pos. 99). After the drying time, insert O-ring (pos. 111) and insert from the front to the stop into the bore hole of the chuck body.
8. Insert the springs (pos. 101) into the piston. Screw in locking screw (pos. 96) with inserted bolt against the spring pressure into the chuck body. **CAUTION! The parts are under spring tension!**
9. Apply fluid screw lock to the threaded pin (pos. 100) and mount into the bore hole of the locking screw (pos. 96).
10. Depending on the working pressure, the depth **X** of the threaded pin is adjusted. The values are only a guideline.
    X = 3.8 mm at 4 bar
    X = 6 mm at 6 bar
    X = 8.1 mm at 8 bar.
11. When commissioning the clamping chuck on the machine, it should be ensured that with the working pressure (O.D. clamping) the cam (pos. 93) protrudes 2 mm out of the groove of the mounting (pos. 7) (see ▸ 4.3.2 [🗋 41]). The cam (pos. 93) is fixed in the extension with a threaded pin (pos. 107).

8 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.

9 Part list

When ordering spare parts, it is mandatory to specify the type, size and above all the manufacturing no of the chuck.

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

Item	Designation	Quantity	Note
1	Chuck body without stroke monitoring	1	
2	Base jaw	2	
3	Piston	1	
4	Sleeve	1	
5	Sealing disk	1	
6	Piston cover	1	
7	Mount	1	470 / 520 / 570 / 600 / 630 / 685 / 740
	Cylinder	1	850 / 1000
8	Distributor ring	1	
9	T-nut	6	
10	Locking screw	2	
11	Flat gasket	3	
12	Cover	3	
13	Valve insert	1	570 / 600 / 630 / 685 / 740 / 850 / 1000
	Double check valve	1	470 / 520
15	Locking screw	1	470 / 520
16	Filling plug	1	
17	Indicator pin	3	LH
18	Pin	3	LH
19	Cylindrical screw	1	
20	Cylindrical screw	6	470 / 570 / 600 / 630 / 685 / 740
	Cylindrical screw	9	520 / 850 / 1000
21	Cylindrical screw	12	470 / 520 / 570 / 600 / 630 / 685 / 740 / 850
22	Base jaw with stroke monitoring	1	
23	Cylindrical screw	3	
24	Cylindrical screw	9	470 / 520
	Cylindrical screw	12	570 / 600 / 630 / 685 / 740 / 850 / 1000

Item	Designation	Quantity	Note
25	Cylindrical screw	9	470
	Cylindrical screw	12	685 / 740 / 850 / 1000
	Cylindrical screw	18	520
	Cylindrical screw	24	570 / 600 / 630
26	Conical lubrication nipple	3	
27	Set-screw	3	LH
28	Compression spring	6	LH
32	O-ring	1	470 / 520 / 600 LH / 630 / 685 / 740
	O-ring	2	600 / 850 / 1000
33	Diaphragm (quick venting)	2	
36	Countersunk screw	15	
37	O-ring	1	470 / 520
38	O-ring	1	470 / 520
	O-ring	2	570 / 600 / 630 / 685 / 740
	O-ring	3	850 / 1000 LH
	O-ring	4	1000
39	O-ring	1	
40	O-ring	1	
41	O-ring	1	
42	O-ring	1	
43	O-ring	1	
44	O-ring	1	
45	O-ring	1	
47	Profile seal	2	
48	O-ring	2	
50	Sound absorber	2	
52	Straight screw connection	2	
53	Swivel fitting	2	
54	Fiber seal	4	
65	Copper sealing ring	12	470
69	Plug	1	
89	Stroke monitoring extension	1	

Item	Designation	Quantity	Note
90	Stroke monitoring Plate	1	
91	Stroke monitoring Bolt	1	
92	Stroke monitoring Bolt	1	
99	Pressure monitoring extension	1	
103	Set-screw	1	
105	O-ring	2	
108	Cylindrical screw	2	
110	Drill bushing	2	850 / 1000
112	Sword bolt	1	
150	Eye bolt	1	

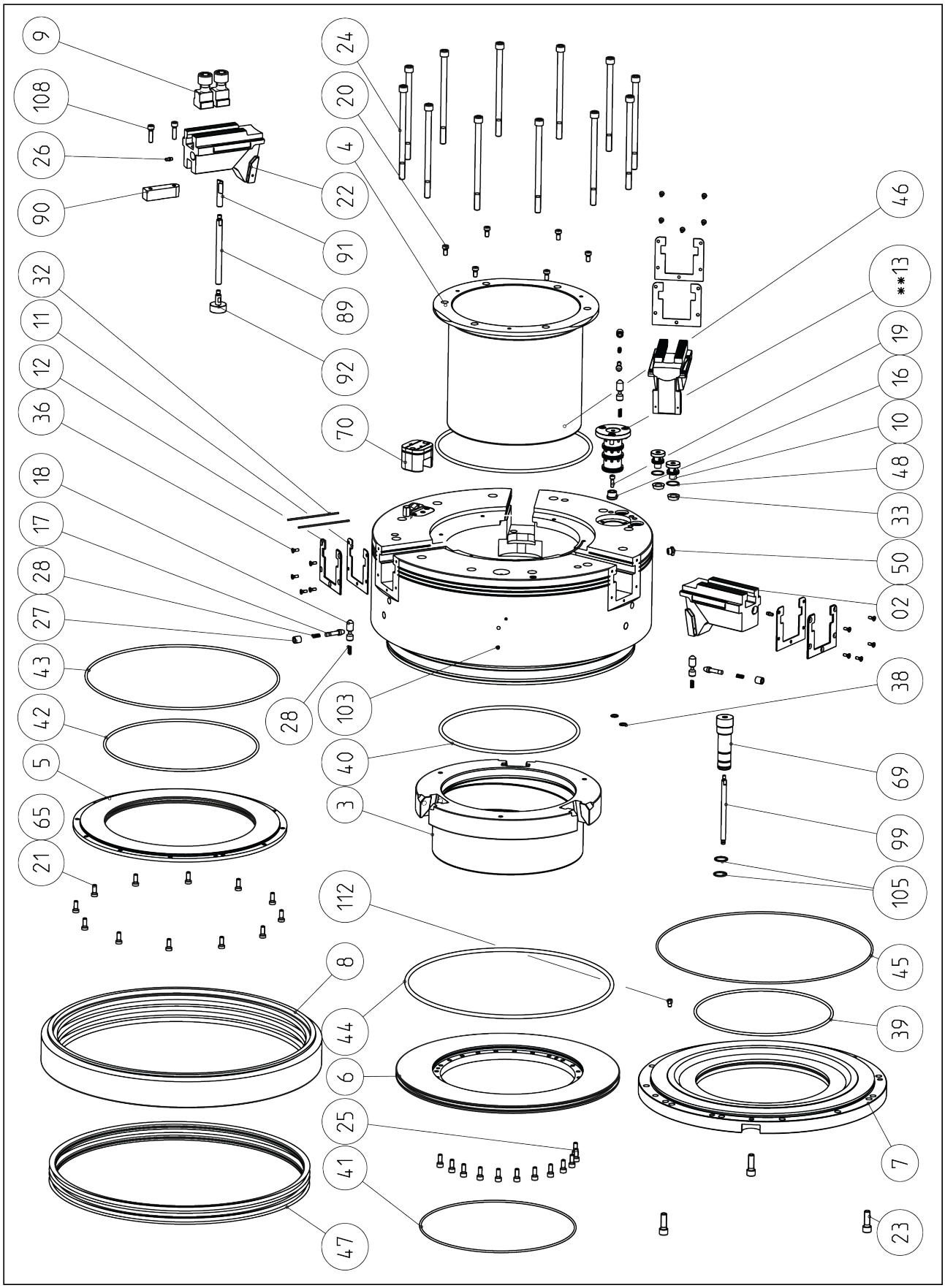
Assembly group mechanical pressure monitoring

Item	Designation	Quantity
93	Cams	1
94	Piston	1
95	Sleeve	1
96	Bolt	1
97	Thrust bolt	1
98	Sleeve	1
100	Set-screw	1
101	Compression spring	1
102	O-ring	1
105	O-ring	1
106	O-ring	2
107	Set-screw	1
111	O-ring	1

Valve insert ROTA TB2 570-1000 (LH)

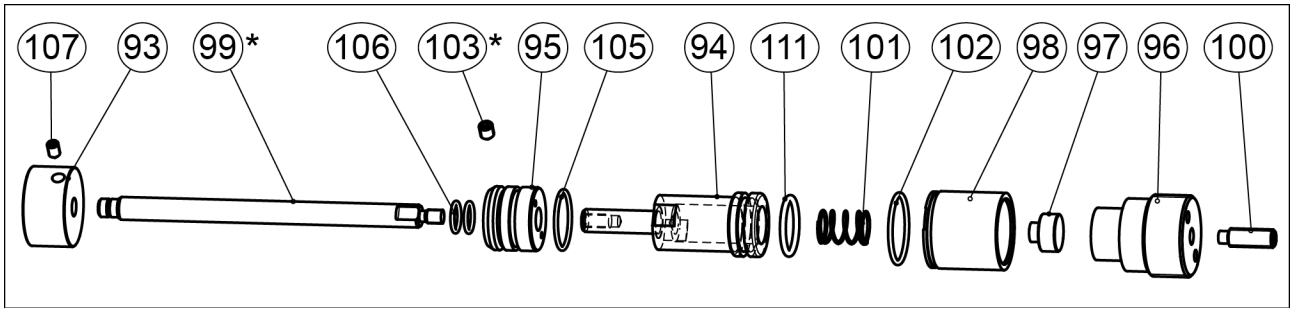
Item	Designation	Quantity
1	Insert	1
2	Double check valve	1
11	Cylindrical screw	3
12	O-ring	4
15	Locking screw	1
37	O-ring	1

10 Assembly drawings



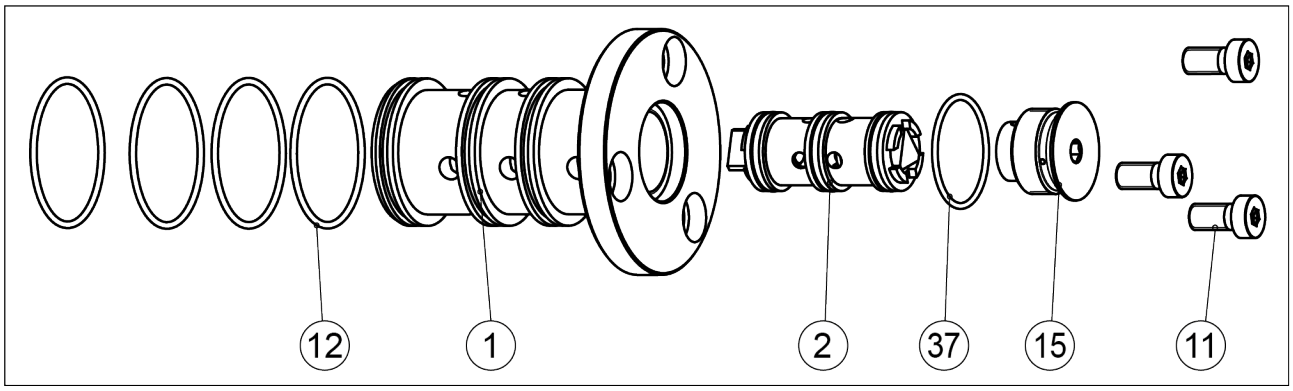
** ROTA TB2 470 & 520 (LH) valve only without insert

Mechanical pressure monitoring



* included in the part list of the chuck

Valve insert



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:	TB, EP, TP, ROTA-P

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.
- 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, 25th of April 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

H.-D. SCHUNK GmbH & Co.
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