



Steady rest

ZENTRICO THL plus

Assembly and Operating Manual

Translation of Original Operating
Manual

Hand in hand for tomorrow

Imprint

Copyright:

This manual is protected by copyright. The author is SCHUNK SE & Co. KG.
All rights reserved.

Technical changes:

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

Document number: 0889088

Version: 09.00 | 18/10/2023 | en

Dear Customer,

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

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

Best regards,

Your SCHUNK team

Customer Management

Tel. +49-7572-7614-1300

Fax +49-7572-7614-1039

cmm@de.schunk.com



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

Table of Contents

1 General	5
1.1 About this manual.....	5
1.1.1 Presentation of Warning Labels	5
1.1.2 Applicable documents	6
1.1.3 Sizes.....	6
1.2 Warranty	6
1.3 Scope of Delivery.....	6
2 Basic safety notes	7
2.1 Intended use.....	7
2.2 Not intended use	7
2.3 Constructional changes.....	7
2.4 Spare parts	7
2.5 Environmental and operating conditions.....	8
2.6 Personnel qualification	8
2.7 Personal protective equipment	9
2.8 Notes on safe operation.....	9
2.9 Transport.....	10
2.10 Malfunctions.....	10
2.11 Disposal	10
2.12 Fundamental dangers	10
2.12.1 Protection during handling and assembly	11
2.12.2 Protection during commissioning and operation	11
2.12.3 Protection against dangerous movements	11
2.12.4 Notes on particular risks	12
3 Technical data	15
4 Mounting and connection of the steady rest	17
4.1 Torques per screw	17
4.2 Attaching the steady rest at the bracket	17
4.3 Adjustment of the steady rest	18
4.4 Connection and adjustment of the operating pressure	20
4.4.1 Connection dimensions for hydraulics and attachment.....	22
4.5 Workpiece r.p.m.	23
4.6 Lubrication.....	24
4.7 Connection of air purge	25
4.8 Rinsing connection	26
4.9 Connection dimensions for central lubrication air purge and rinsing	27
4.10 Connecting of the path monitoring	29
4.11 APS stroke measuring system	30
4.12 Control of proper function	30

5 Troubleshooting	31
6 Maintenance	32
6.1 Exchange of rollers	32
6.2 Cleaning of the steady rests' interior	33
7 Assembly drawings	34
7.1 Basic steady rest	34
7.2 Cylinder	35
8 Part lists	36

1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

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

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

In addition to these instructions, the documents listed under ► 1.1.2 [6] are applicable.

NOTE: The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

1.1.1 Presentation of Warning Labels

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



⚠ DANGER

Dangers for persons!

Non-observance will inevitably cause irreversible injury or death.



⚠ WARNING

Dangers for persons!

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



⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

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

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

1.1.3 Sizes

This operating manual applies to the following sizes:

- THL plus / THL-A plus 100
- THL plus / THL-A plus 200
- THL plus / THL-A plus 300
- THL plus / THL-A plus 310
- THL plus / THL-A plus 400
- THL plus / THL-A plus 500
- THL plus 320
- THL plus 500
- THL plus 510
- THL plus 600
- THL plus 400 pneumatic

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility or 500 000 cycles* under the following conditions:

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

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

* A cycle consists of a complete clamping process ("Open" and "Close").

1.3 Scope of Delivery

- 1 Steady rest**
- 4 Mounting screws**
- 4 Washers**
- 1 Eye bolt (THL plus 300 and higher)**
- 1 Operating manual**

2 Basic safety notes

2.1 Intended use

This product is intended for clamping workpieces on machine tools and other suitable technical devices.

- The product may only be used within the scope of its technical data, ▶ 3 [15].
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- For stationary use of the steady rest:
Use cylindrical rollers.
For use of the steady rest axially on a line:
Use spherical rollers.

2.2 Not intended use

A not intended use of the product is for example:

- It is used as a press, a punch, a toolholder, a load-handling device or as lifting equipment.
- the product is used for unintended machines or workpieces.
- the technical data is exceeded when using the product. ▶ 3 [15]
- if workpieces are not clamped properly, paying particular attention to the clamping forces specified by the manufacturer.
- if it is used in working environments that are not permissible.
- if the product is operated without a protective cover.

2.3 Constructional 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.

- Use only original spare parts or spares authorized by SCHUNK.

2.5 Environmental 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 to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, ▶ 3 [□ 15].
- Make sure that the product is a sufficient size for the application.
- Only use high-quality cooling emulsions with anti-corrosive additives during processing.
- Lubricating intervals must be adhered to ▶ 4.6 [□ 24].

2.6 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

Trained electrician

Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.

Qualified personnel

Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.

Instructed person

Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.

Service personnel of the manufacturer

Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.7 Personal protective equipment

Use of personal protective equipment

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

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

2.8 Notes on safe operation

Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.
- **The steady rest must not be closed if the workpiece is rotating at a high speed.**

2.9 Transport

Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

2.10 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.

2.11 Disposal

Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

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

2.12 Fundamental dangers

General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

2.12.1 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

2.12.2 Protection during commissioning and operation

Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

2.12.3 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

2.12.4 Notes on particular risks



⚠ DANGER

Risk of fatal injury from suspended loads!

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



⚠ 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!

In the event of a power failure, the clamping force may fail immediately and the workpiece may be released in an uncontrolled manner. This poses a risk of death or injury to the operating personnel and can result in serious damage to the system.

- The machine manufacturer and the operator of the machine must carry out and document a hazard assessment and risk analysis to ensure that suitable measures are taken to maintain the clamping force until the machine comes to a standstill and the workpiece can be secured (e.g. using a crane or suitable lifting equipment).
- The steady rest must be pressurized constantly during operation.
- The standard check valve of the steady rest must not be disabled or removed.
- There must be a pressure accumulator in the clamping line of the steady rest.
- Take appropriate protective measures to secure the danger zone.



⚠ DANGER

Risk of fatal injury to operating personnel due to workpiece release and flying parts if a lever breaks or if the steady rest fails because the technical data have been exceeded!

- The technical data specified by the manufacturer for using the steady rest must never be exceeded.
- Take appropriate protective measures to secure the danger zone.



⚠ DANGER

Risk of fatal injury to operating personnel due to clothing or hair being caught on the steady rest and dragged into the machine!

Loose clothing or long hair may become caught on rotating parts of the steady rest and be dragged into the machine!

- Always wear tight-fitting clothing and a hairnet when working on the machine and the steady rest.
- Take appropriate protective measures to secure the danger zone.



⚠ DANGER

Risk of injury due to the loss of the workpiece and damage to the steady rest if the maximum RPM and the permissible maximum circumferential speed of the rollers are exceeded.

- The technical data and the maximum circumferential speed of the rollers must never be exceeded.
- 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!
- The steady rest must not be closed if the workpiece is rotating at a high speed.



⚠ WARNING

There is a risk of injury due to the steady rest falling during transport, installation or removal.

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



⚠ WARNING

Risk of injury due to high oil pressure if hydraulic lines are not properly installed.

Hydraulic lines that have not been installed properly can come loose, causing hydraulic oil to escape at high pressure.

- Wear personal protective equipment.
- Take appropriate protective measures to secure the danger zone.



⚠ CAUTION

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

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



⚠ CAUTION

Risk of limbs being crushed when opening and closing the levers during manual loading or unloading, or when replacing moving parts.

- Do not reach in between the levers.
- Wear protective gloves.
- Follow the safety and accident prevention regulations when operating the steady rest, especially when working with machine tools and other technical equipment.



⚠ CAUTION

Risk of burns due to workpieces with high temperatures.

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



⚠ CAUTION

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

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

- Observe the axial and concentric run-out of the chuck and the steady rest.
- Check options for remedying imbalances on special top jaws and workpieces.
- Reduce the speed.
- Wear hearing protection.

3 Technical data

THL plus	100	200	300	310	320
Piston diameter [mm]	30	50	103 / 55	103 / 55	103 / 55
Piston stroke [mm]	34	49.5	77	77	79
Min. operating pressure [bar]	6	8	8	8	8
Max. operating pressure [bar]	50	60	60	60	60
Max. clamping force / roller [daN]	100	350	1000	1000	1000
Centering accuracy [mm] (overall area)	0.02	0.02	0.04	0.04	0.04
repeat accuracy [mm]	0.005	0.005	0.007	0.007	0.007
Max. circumferential speed [m/min]	800	800	725	725	725
Clamping range \emptyset [mm] (without chip protection)	4 - 66	8 - 101	12 - 152	20 - 165	50 - 200
Clamping range \emptyset [mm] (with chip protection)	7 - 66	16 - 101	22 - 152	-	-
weight [kg]	6.5	15.8	50	50	51
THL plus	400	400 pneum.	500	510	600
Piston diameter [mm]	70 / 129.7	70 / 129.7	100	100	2 x 90
Piston stroke [mm]	107.8	107.8	137.5	137.5	182
Min. operating pressure [bar]	8	6	8	8	8
Max. operating pressure [bar]	60	8	60	60	60
Max. clamping force / roller [daN]	1500	2500	2000	2000	2000
Centering accuracy [mm] (overall area)	0.05	0.05	0.06	0.06	0.06
repeat accuracy [mm]	0.01	0.01	0.01	0.01	0.01
Max. circumferential speed [m/min]	715	715	700	700	700
Clamping range \emptyset [mm]	35 - 245	35 - 245	50 - 310	85 - 350	125 - 460
weight [kg]	102	102	166	168	360

THL-A plus	100	200	300	310	400	500
Piston diameter [mm]	30	50	103 / 55	103 / 55	70 / 129.7	100
Piston stroke [mm]	34	44.8	77	76.8	107	127
Min. operating pressure [bar]	6	8	8	8	8	8
Max. operating pressure [bar]	50	60	60	60	60	60
Max. clamping force / roller [daN]	100	350	1000	1000	1500	2000
Centering accuracy [mm] (overall area)	0.02	0.02	0.04	0.04	0.05	0.06
repeat accuracy [mm]	0.005	0.005	0.007	0.007	0.01	0.01
Max. circumferential speed [m/min]	800	800	725	725	715	700
Clamping range \varnothing [mm] (without chip protection)	4 - 52	8 - 80	12 - 130	20 - 150	35 - 220	50 - 268
Clamping range \varnothing [mm] (with chip protection)	7 - 52	16 - 80	22 - 130	-	-	-
weight [kg]	6.5	15.8	50	50	102	166

CAUTION

The maximum workpiece speed in relation to the steady rest depends on the permissible circumferential speed of the steady rest rollers.

The cutting speed on the clamping diameter is the same as the circumferential speed of the rollers.



⚠ WARNING

Risk of injury due to the loss of the workpiece and damage to the steady rest if the permissible maximum circumferential speed of the rollers is exceeded.

- The technical data and the maximum circumferential speed of the rollers must never be exceeded.

Pressure loss

In order to ensure that the workpiece remains reliably clamped for a longer period of time in the case of a sudden drop in pressure, a pressure accumulator must be fitted in the clamping line of the steady rest. The following leaks may occur at the check valve:

THL plus	100	200	300	310	320	400	500	510	600
Approximate leak at 60 bar [ml/min]	2	3	3	3	3	3	3	3	3
Approximate drop in pressure [bar/min]	35	40	40	40	40	40	40	40	40

4 Mounting and connection of the steady rest

Only perform assembly, conversion, maintenance and adjustment work when the machine is shut down. Ensure that the steady rest and the machine cannot be operated accidentally by the installation technician or other persons.

4.1 Torques per screw

Tightening torques for the fastening screws for the steady rest (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

4.2 Attaching the steady rest at the bracket

The proper function of the steady rest depends on the right bracket. Precondition is a connection area which has to be positioned even and rectangular to the rotating axis.

The table contains the recommended shape/positional tolerances of the steady rest bracket's mounting surface.

Size of the steady rest	100	200	300	310	320	400	500	510	600
Evenness of the mounting surface [mm]	0.02	0.02	0.03	0.03	0.03	0.03	0.05	0.05	0.05
Rectangularity of mounting surface to rotating axis [mm]	0.02	0.02	0.03	0.03	0.03	0.03	0.05	0.05	0.05

Before assembly check whether the bracket is exactly positioned 90° to the rotating axis.

Align the bracket again or rework it if necessary.

Fasten the steady rest at the steady rest bracket with the supplied **four fastening screws and washers**. Tighten the fastening screws with the prescribed tightening torque ▶ 4.1 [17].

- For transport of the steady set use the supplied ring bolt (from size 300).

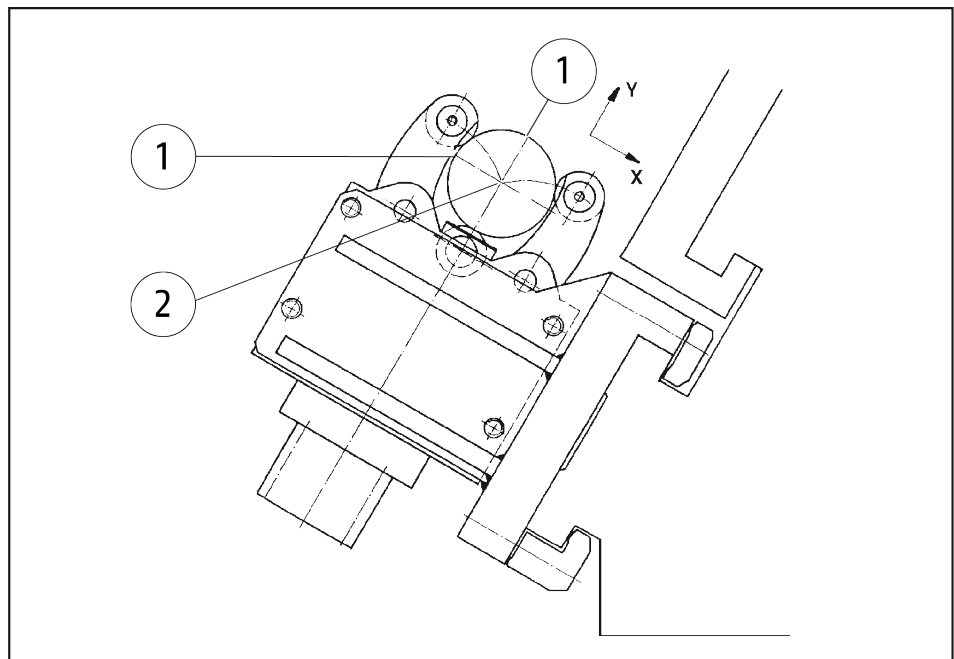


⚠ WARNING

Risk of injury from falling of the steady set during transport, installation and removal.

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

4.3 Adjustment of the steady rest



Alignment of the steady rest

1	Dial gauge	2	Plug gauge
---	------------	---	------------

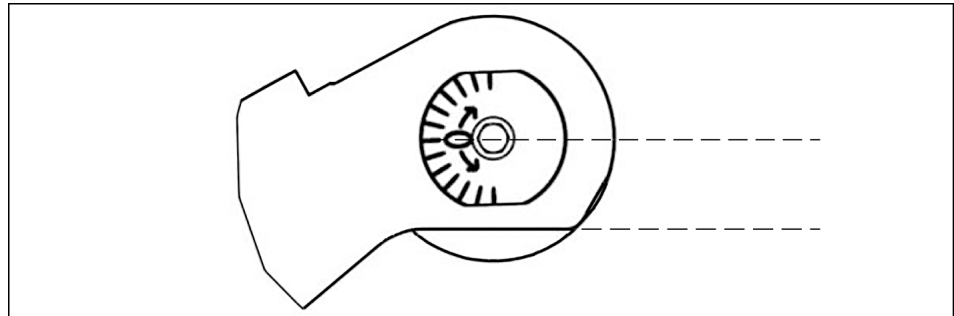
- Clamp in a plug gauge between the peaks or in the chuck and support using a tailstock center. (The plug gauge should be a short, hardened and toughened ground shaft).
To achieve the repeat accuracy specified in the catalog, the diameter of the plug gauge must correspond with the workpiece diameter.
- Place two dial gauges with 0.01 mm reading and 90° offset on the plug gauge and check the concentricity at two levels. Set dial gauges to "0" and keep turned on.

Without fine adjustment to the rollers

- Loosen slightly the four fastening screws on the steady rest, so that it is gripped with friction.
- Clamp the steady rest with the prescribed operation pressure and tighten the fastening screws slightly. Open the tailstock center. By reading the dial gauges, ascertain whether the plug gauge is pressed out of the middle.
If this is the case, correct the steady rest accordingly until the dial gauges read "0" again.
- Tighten the fastening screws. Observe the dial gauges. The needles must remain on "0".
- Open the steady rest and clamp again. Check on the dial gauges whether the plug gauge remains in its position. If the needles of the dial gauges are displaced, the alignment procedure must be repeated.

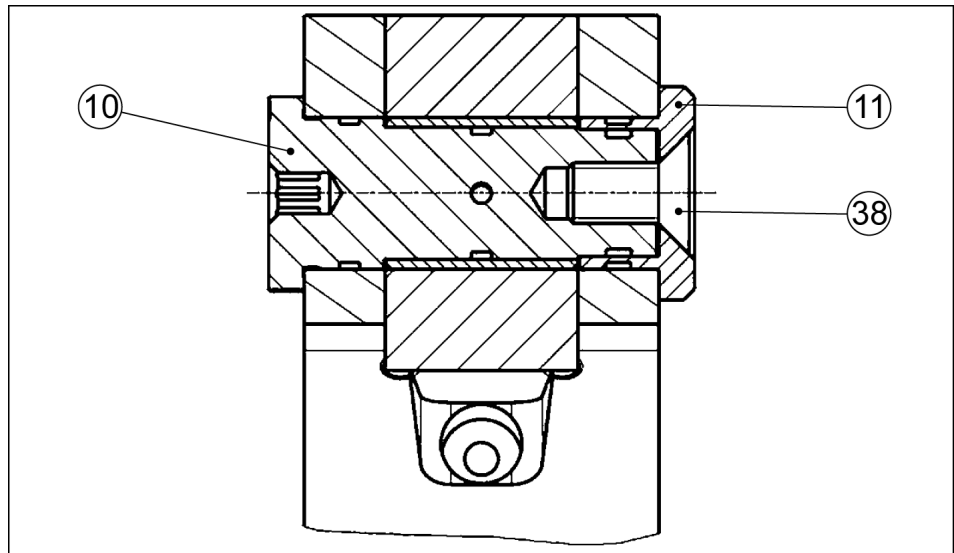
With fine adjustment to the rollers:

- Before using the fine adjustment of the rollers, the steady rest must be aligned in the conventional way, see section "Without fine adjustment to the rollers". Here, the 0 marking must be aligned in parallel to the bottom edge of the lever. The fine adjustment is used for readjustment for approaching clamping pressures and clamping diameters.



Fine adjustment to the rollers

- In its open position, the steady rest can be twisted beyond the adjustment range of $\pm 90^\circ$ after the screw (pos. 38) is loosened using a wrench from the eccentric bolts (pos. 10), after which the screw (pos. 11) is re-tightened. The adjustment range is:
 ± 0.10 mm THL(A) plus 200 to 510
 ± 0.15 mm THL(A) plus 600



Eccentric bolt

- After adjustment, the concentricity must be checked using a suitable test shaft. If the desired accuracy is not achieved using the fine adjustment, the steady rest must be realigned to the bracket.

CAUTION

If the fastening screws of the steady rest are tightened too strongly, it may influence the easy moving of the steady rest's arms.

- Check if the levers are easily moving at a lower operating pressure.
- Tighten the fastening screws with the prescribed tightening torque.

CAUTION

If the operating pressure or the clamping pressure are changed, the steady rest has to be adjusted again.

4.4 Connection and adjustment of the operating pressure

The steady rests are actuated hydraulically by means of an integrated cylinder or pneumatically as a special version.

NOTE

For pneumatic actuation, the seals and the safety check valve must be replaced.

The connection lines from the hydraulic or pneumatic unit up to the self-sealing plug-in couplings are installed as rigid lines, whereas all the other connection lines must be made of flexible, metal-sheathed, high-pressure hoses.

NOTE

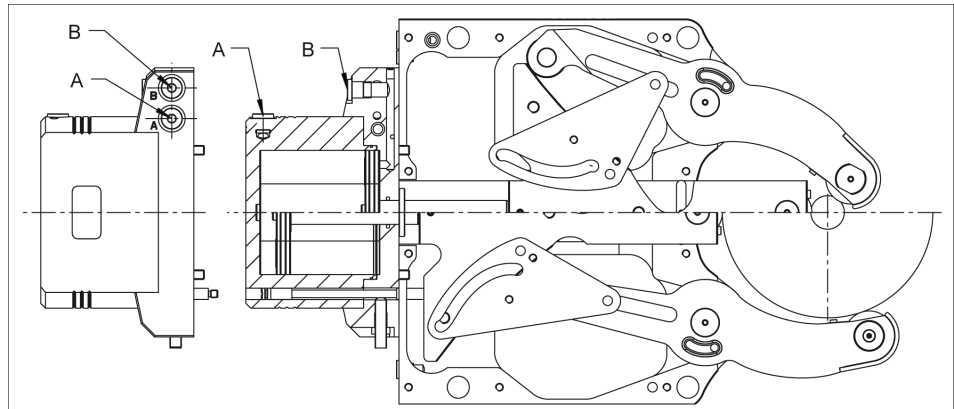
The hydraulic pressure actuation is done by a 4/2-way directional control valve. The pressure valves are connected with the compressed air lines.

The pneumatic pressure actuation is done by a 5/2-way directional control valve. The double check valve is integrated in the opening line and is working like an exhaust air control valve. There are connections on the back and sides of the steady rest for the hydraulic lines.

- The connections that are not used must be sealed off using the locking screws supplied!

Use hoses and wires with a nominal width of 8 at an operating pressure of minimum 100 bar.

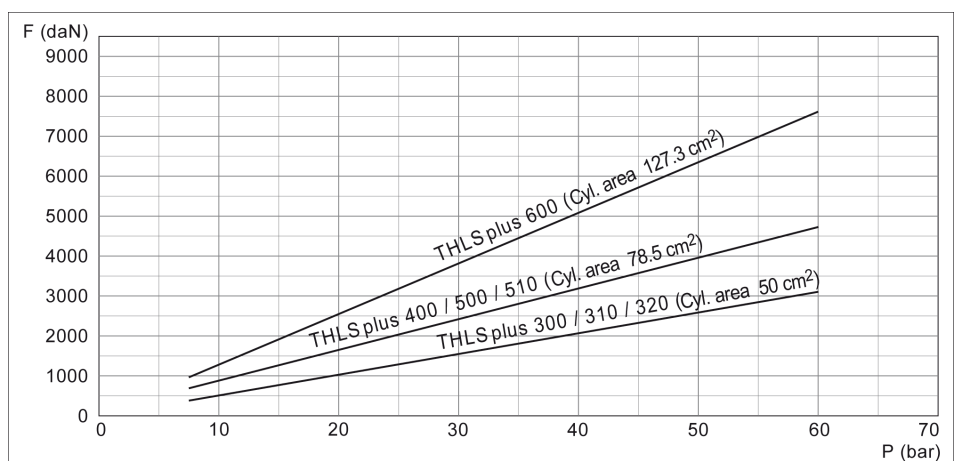
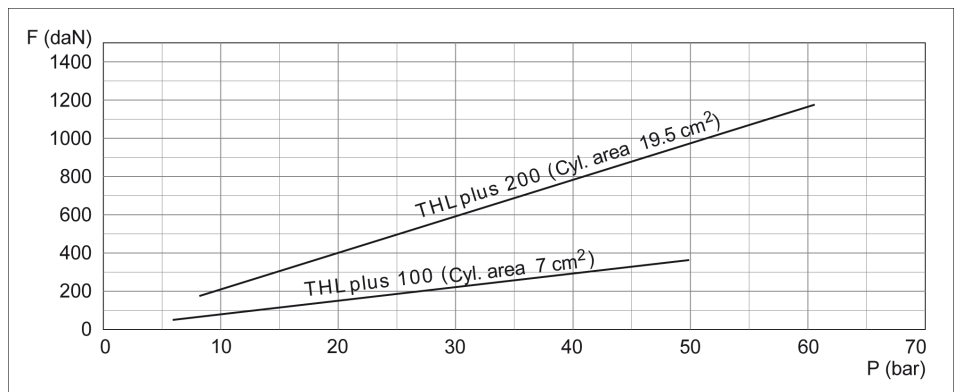
A = clamping - Connection thread with connection screw closed
 B = opening - Connection thread with connection screw closed



Connections of the hydraulic lines

Adjustment of the operating pressure

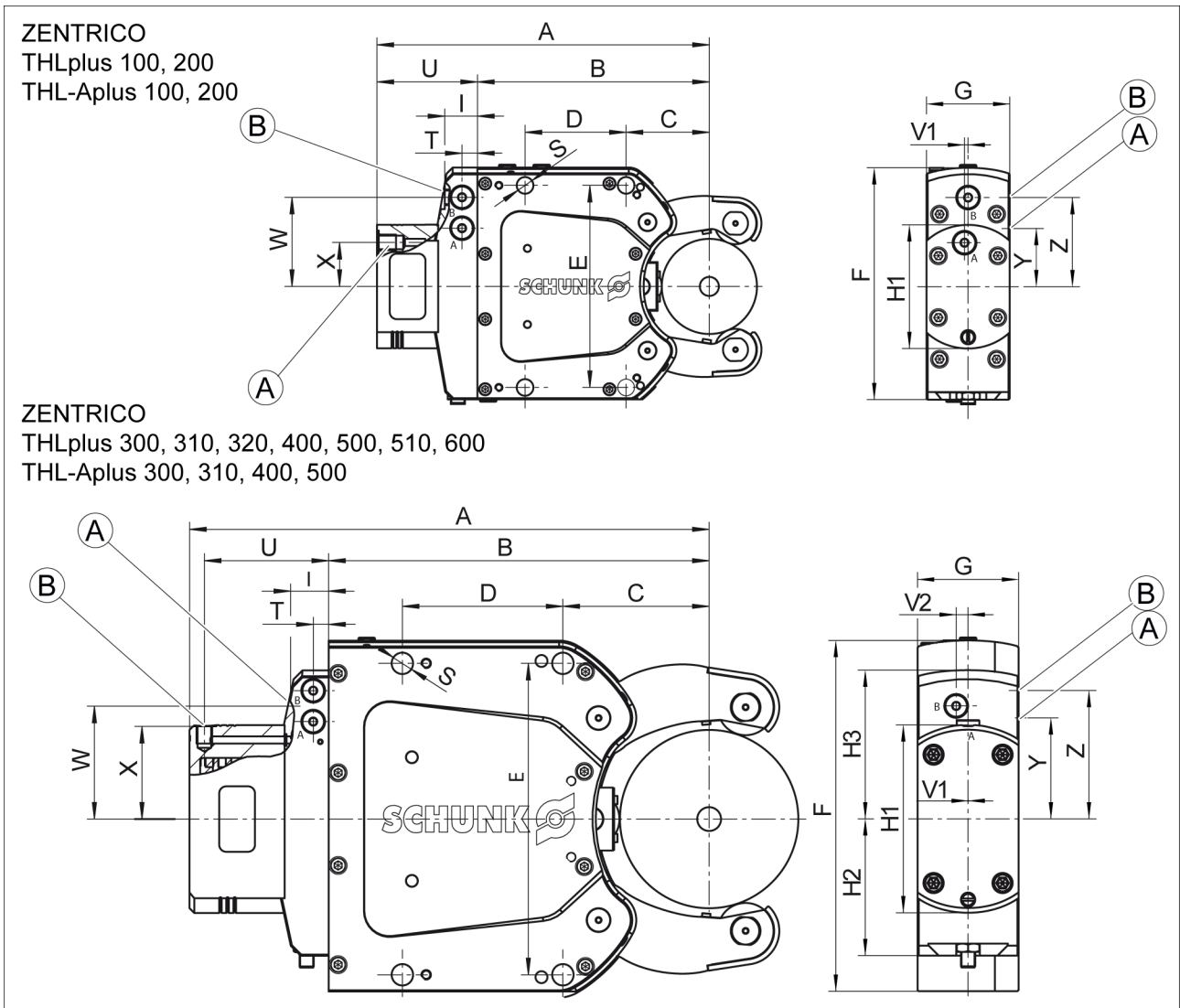
Depending on the workpiece weight, workpiece length, cutting forces and r.p.m., the operating pressure has to be adjusted on the pressure control at the machine side.



Pressure-overall force (3 rollers)-diagram

4.4.1 Connection dimensions for hydraulics and attachment

THL plus	100	200	300	310	320	400	500	510	600
A [mm]	206	279.5	429	437	452	608	697.5	717.5	
B [mm]	137	195	312	320	335	448	510	530	705
C [mm]	51	70	115	123	138	146	178	198	215
D [mm]	64	85	135	135	135	240	270	270	330
E [mm]	118	170		262	262	365	400	400	640 / 610
F [mm]	135	195	295	295	295	402	448	448	688
G [mm]	55	70	85	85	85	110	145	145	145
H1 [mm]	80	104	158	158	158	200	165	165	240
H2 [mm]	-	-	115	115	115	130	130	130	190
H3 [mm]	-	-	125.1	125.1	125.1	151	138	138	245
I [mm]	31	27.5	37.5	37.5	37.5	58.4	49.8	49.8	59.8
S [mm]	11	14	18	18	18	23	23	23	27
T [mm]	-	13	13	13	13	23	19	19	26
U [mm]	69	84.5	104.5	104.5	104.5	142	175.5	175.5	235.5
V1 [mm]	0	3	0	0	0	3	23	23	29
V2 [mm]	0	0	10	10	10	0	0	0	0
W [mm]	53	75	95	95	95	128	115	115	180
X [mm]	28	37	78	78	78	98	73.5	73.5	112
Y [mm]	-	49	82	82	82	98	64	64	180
Z [mm]	-	75	108	108	108	130	115	115	220
A [inch]	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 3/8	G 3/8	G 3/8	G 3/8
B [inch]	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 3/8	G 3/8	G 3/8	G 3/8



4.5 Workpiece r.p.m.

CAUTION

The max. workpiece r.p.m. referring to the steady rest depends on the admissible circumferential speed of the steady rest's rollers. The cutting speed at the clamping diameter is the same as for the circumferential speed of the roller.

Size of the steady rest	100	200	300	310	320	400	500	510	600
Rollers diameter [mm]	19	35	47	47	47	52	62	62	80
Vmax [m/min]	800	800	725	725	725	715	700	700	700



WARNING

Risk of injury from objects falling and damage of the steady rest when the admissible maximum circumferential speed is exceeded. The technical data specified by the manufacturer for using the steady rest must never be exceeded.

4.6 Lubrification

Manual lubrication

Versions which are provided for manual lubrication, except size 100, are lubricated via 5 lubrication nipples on the upside of the steady rest, next to the SCHUNK logo.

Version 100 is equipped with 8 lubrication areas. The two deflection pins are lubricated on both sides. The three roller pins are equipped with one each lateral lubrication area. At the housing you will find a lubrication area on each side for the guidance of roller 3.

Period of lubrication:

Minimum once a day – or more often according to the case of application – lubricate all lubrication areas (all in all 7 or 8) with a grease gun until some grease removes from the lubrication areas. Use lubrication grease as per DIN 51502 (e.g. Turmogrease Li 802 Et).

Central lubrication

Connection of the central lubrication:

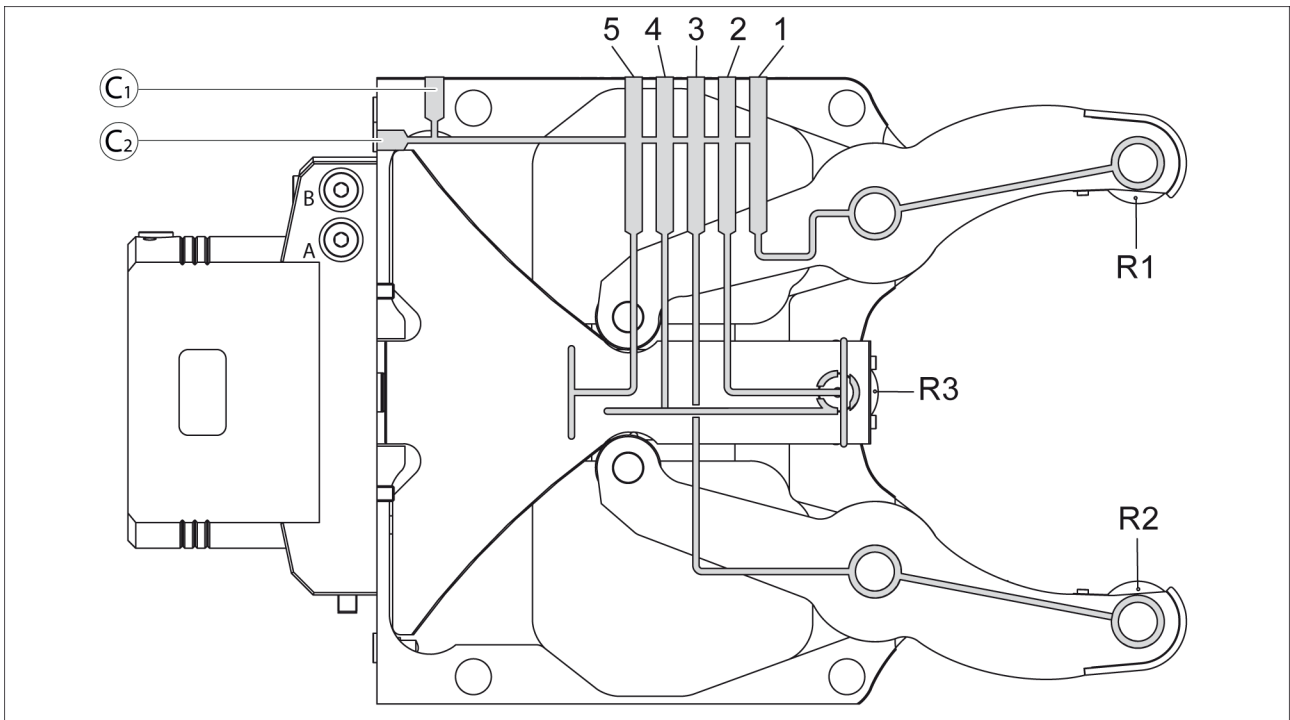
The connection of the central lubrication (connection C) has to be connected at the centralized lubricating system of the machine or at a separate lubricating unit. The lubricating pressure must be between min. 16 and max. 45 bars.

Repeat the lubricating until oil removes from the rollers.

Recommended type of oil: HLP 32 DIN 51502

1. Valves integrated in the steady rest supply the lubricating areas directly with an adjusted quantity of lubricant.
2. If the steady rest is connected to the central lubrication of the machine the lubrication period has to be adjusted to the demand of the steady rest.
3. Depending on the case of application the automatic lubrication has to be adjusted from 3 to 10 signals to grease per hour.

Size of the steady rest	100	200	300	310	320	400	500	510	600
Volume of lubricant per impulse [cm ³]	0.4	0.4	0.4	0.4	0.4	0.8	1.2	1.2	1.2
Thread [inch]	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8



C₁ Connection C of THLplus 300, 310, 320

C₂ Connection C of THLplus 400, 500, 510, 600

Lubrication channel	Lubrication area
1	Roller 1
2	Front guiding
3	Roller 2
4	Roller 3
5	Rear guiding

4.7 Connection of air purge

The sealed air generates an overpressure inside the body of the steady rest and air escapes through the gaps at the lever, housing and sealing strips. Therefore water or dirt can't penetrate into the system.

The sealed air for reduction of the air consumption should be used during operation works only.

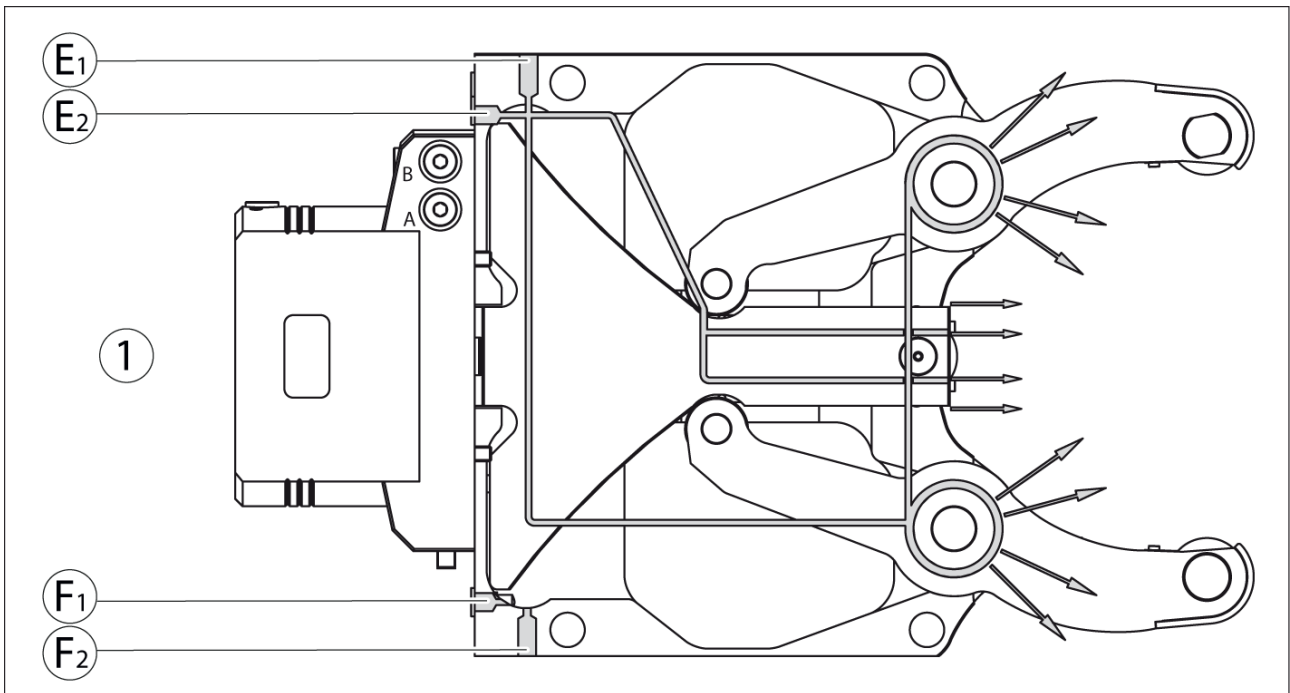
The set screw (item 59) behind the roller in the guide part must be removed in order to use the sealed air. To do this, the roller in the guide part must be disassembled. The set screw to be removed is at the bottom of the pocket in the guide part.

CAUTION

For connection with the air blow bore (connection E) the outlets (F) on the upper and lower side have to be closed.

If the option sealed air is not used, all the outlets (F) have to remain open.

Pressure of sealing air: 0.5 – 1.5 bar

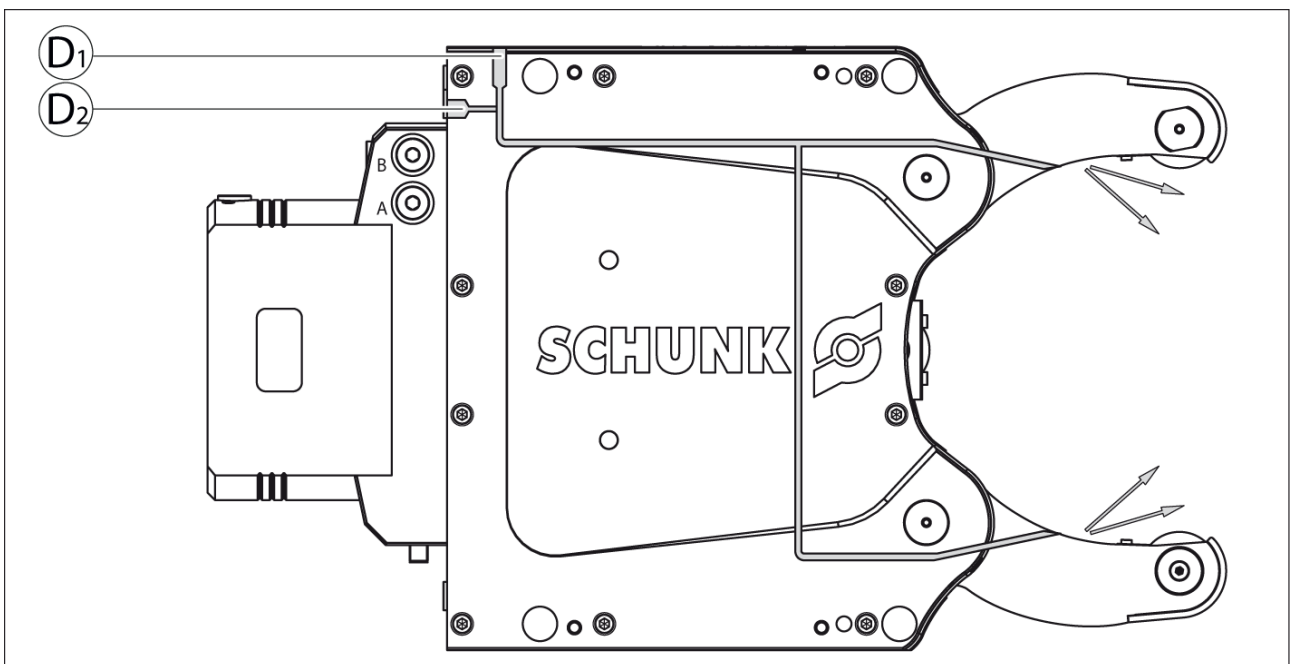


Connection of air purge

1	Outlets closed with sealing screw	F ₁	THLplus 400, 500, 510, 600 G1/4"
E ₁	Connection E of THLplus 300, 310, 320	F ₂	THLplus 300, 310, 320 G1/8"
E ₂	Connection E of THLplus 400, 500, 510, 600		

4.8 Rinsing connection

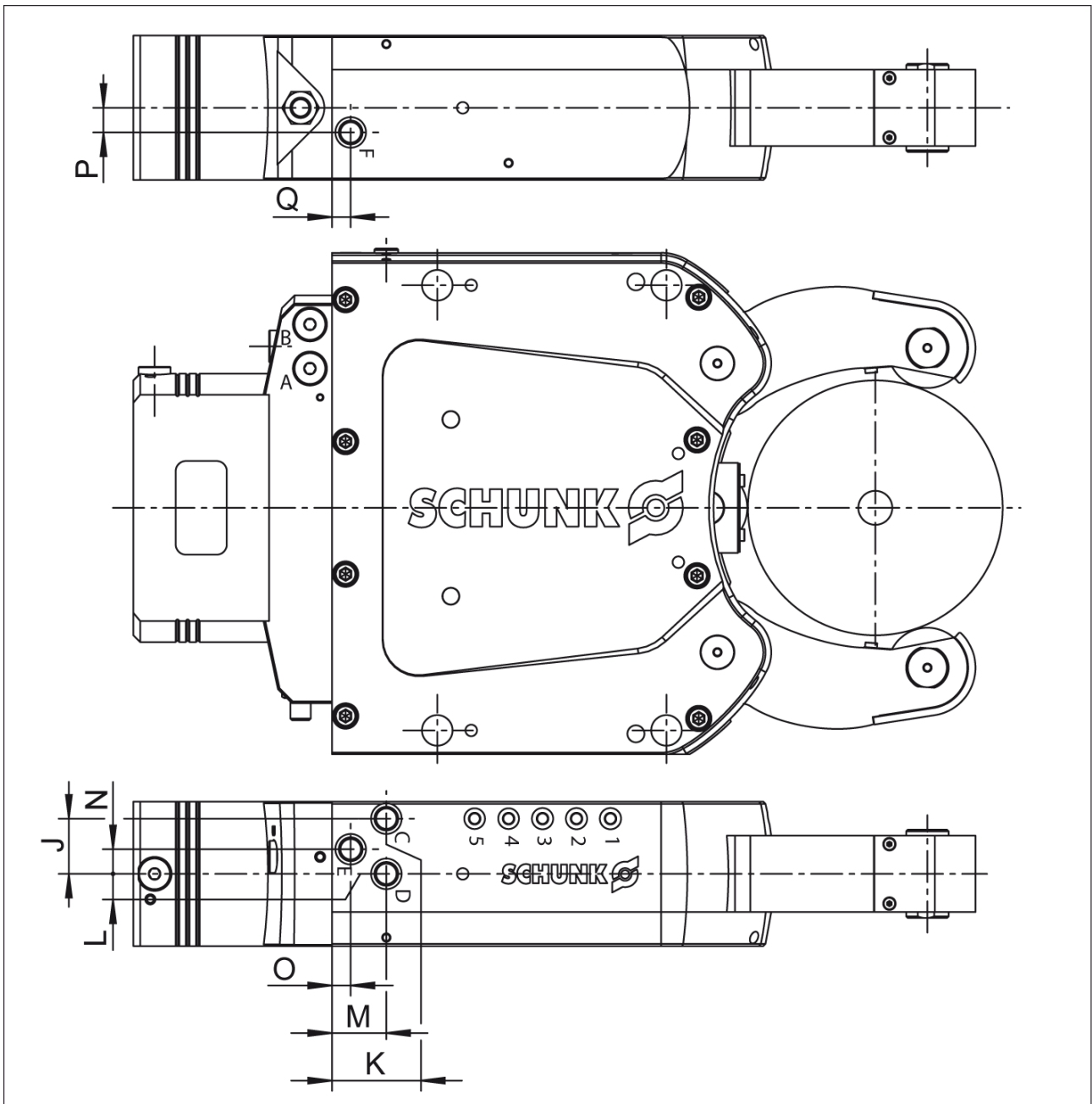
Cooling lubricant or compressed air can be used for workpiece rinsing (connection **D**). The medium is conducted into the lever and comes out between the roller and the lever bearing. The spray can be adjusted by means of a spray nozzle at the outlet hole on the lever using an Allen key. Insert the key about 5 mm into the spray nozzle and adjust in the required direction.



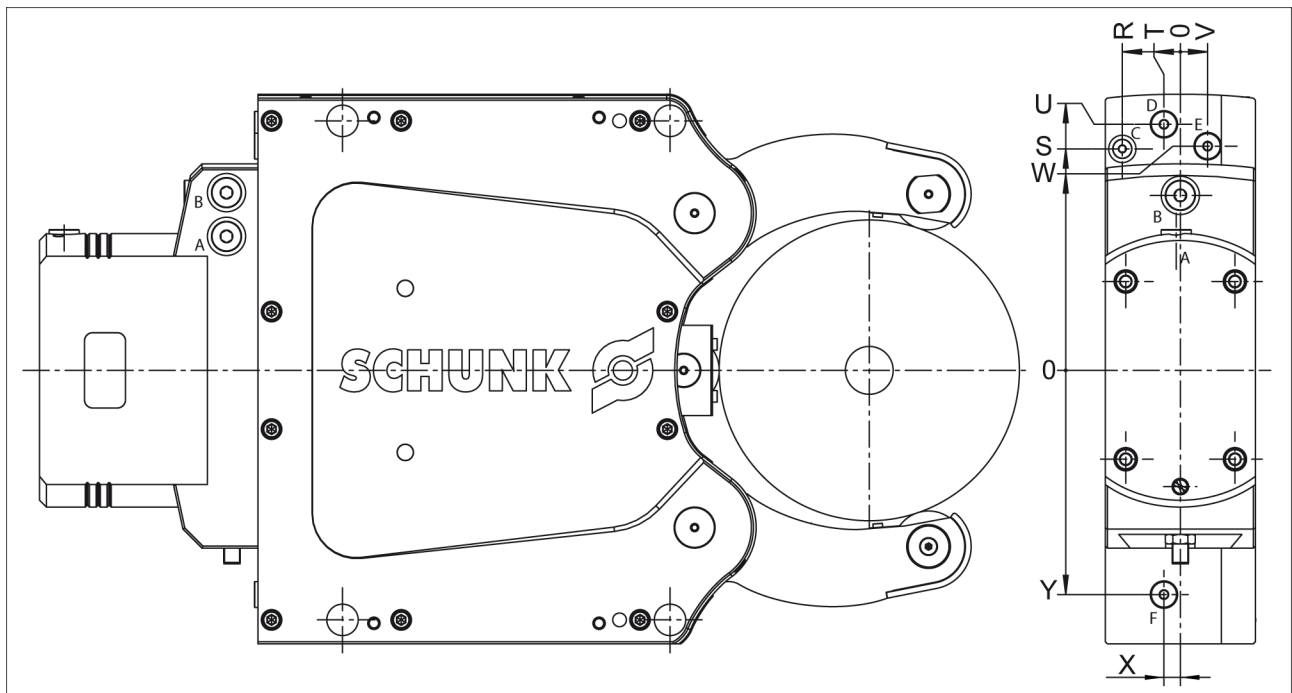
D ₁	Connection D of THLplus 100, 200, 300, 310, 320	D ₂	Connection D of THLplus 400, 500, 510, 600
----------------	---	----------------	--

4.9 Connection dimensions for central lubrication air purge and rinsing

ZENTRICO THLplus 300, 310, 320



ZENTRICO THLplus 400, 400, 510, 600



Tab.: Connection dimensions

THL plus	100	200	300	310	320	400	500	510	600
J (Connection C) [mm]	19	25.5	32.5	32.5	32.5	—	—	—	—
K (Connection C) [mm]	35.5	25	32	32	32	—	—	—	—
L (Connection D) [mm]	19	0	0	0	0	—	—	—	—
M (Connection D) [mm]	50	25	32	32	32	—	—	—	—
N (Connection E) [mm]	10	0	14.5	14.5	14.5	—	—	—	—
O (Connection E) [mm]	9	54	11	11	11	—	—	—	—
P (Connection F) [mm]	10	11.5	14.5	14.5	14.5	—	—	—	—
Q (Connection F) [mm]	9	9	11	11	11	—	—	—	—
R (Connection C) [mm]	—	—	—	—	—	30.5	55	55	55
S (Connection C) [mm]	—	—	—	—	—	162	182	182	295
T (Connection D) [mm]	—	—	—	—	—	12	16.5	16.5	14.5
U (Connection D) [mm]	—	—	—	—	—	180	200	200	320
V (Connection E) [mm]	—	—	—	—	—	20	27.5	27.5	18
W (Connection E) [mm]	—	—	—	—	—	164	182	182	295
X (Connection F) [mm]	—	—	—	—	—	12	19.5	19.5	0
Y (Connection F) [mm]	—	—	—	—	—	162	182	182	300
C Lubrication [inch]	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8
D Rinsing [inch]	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/4	G 1/4	G 1/4	G 1/4
E Air purge [inch]	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/4	G 1/4	G 1/4	G 1/4
F Outlet [inch]	G 1/8	G 1/8	G 1/8	G 1/8	G 1/8	G 1/4	G 1/4	G 1/4	G 1/4

4.10 Connecting of the path monitoring

The end position of the clamping arm can be queried using the end position check of the machine control system.

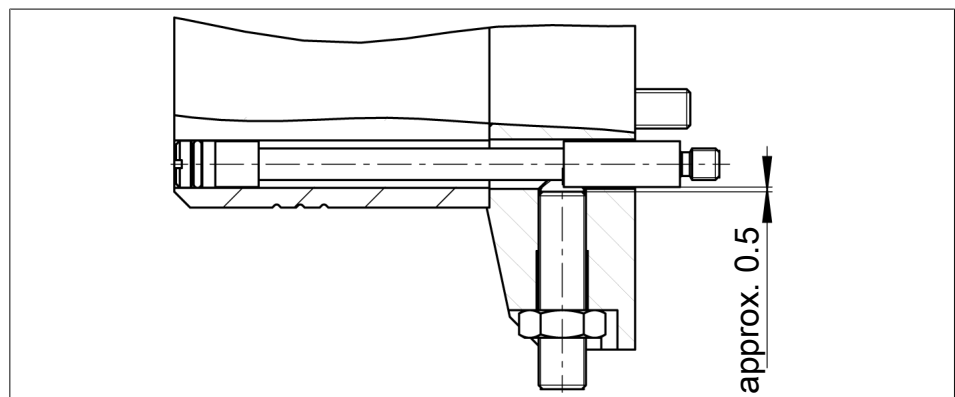
In the opened and closed position, the inductive proximity switch is dampened. Depending on how the machine control system is set up, an "Opener" or a "Closer" may be inserted as a switch.

With the standard query, a defined intermediate position is not queried.

Move steady rest into the opened or closed position and screw the proximity switch into the prescribed M12 x 1 thread on the lower section of the cylinder housing. Carefully screw in proximity switch up to the block, then screw back by approx. one revolution (depending on the switching distance of the proximity switch).

Secure proximity switch using a counter nut.

Check the signal transfer and the switching points before commissioning.



CAUTION

Do not screw the proximity switch into the bore hole too deep, as this may damage the switch and when using a "Closer", erroneous information may be sent to the control system.

Only have authorized specialist personnel perform assembly and adjustment.

4.11 APS stroke measuring system

The "APS stroke measuring system" accessories set permits the entire clamping range of the steady rest to be queried.

Only have authorized specialist personnel perform assembly and adjustment.

Assembly must be carried out with the steady rest open.

Replace the monitoring rod (pos. 68) with the conical rod contained in the accessories set. The sleeve is screwed into the prescribed M12 x 1 thread on the lower part of the cylinder housing, with the slotted side of the steady rest pointing away. Screw the nut loosely onto the sleeve and insert the APS sensor into the sleeve.

As described in the operating instructions provided, connect the APS sensor to the evaluation electronics.

Slide the APS sensor into the sleeve until the evaluation electronics emit a signal.

Tighten the nuts and check seating of the APS sensor.

4.12 Control of proper function

After having installed the steady rest in the desired way, all functions of the steady rest have to be controlled whilst the workpiece is in stopped position!

- The complete lubrication system must be deaerated.
- In case of the centralized lubricating system, oil must remove from all rollers.
- The achieved operating pressure must be kept constantly – there should be no obvious leakage.
- Rinsing medium must come out at both lever arms.

5 Troubleshooting

Problem	Possible cause	Corrective action
Non-round workpiece	Air cushion in the hydraulic system	Bleed the hydraulic system
	Piston seal is defective	Replace the piston seal
	Clamping seat is not round	Lathe the clamping seat
Conical workpiece	Steady rest is not at the center of the workpiece	Align the steady rest under operating pressure
Workpiece is pulled out of the chuck	Steady rest is not at the center and/ or not perpendicular to the turning center	Align the steady rest / steady rest holder
Damage to the lever or middle piece	Collision with the tool turret	Send the steady rest to SCHUNK
Rollers get hot (version with central lubrication)	Central lubrication is defective	Inspect the lubrication unit, replace the dosing elements, clean the lubrication channels
	No lubricant	Refill lubricating oil
Roller wear on the outer diameter / flat surfaces	Movement of the steady rest with stationary workpiece in closed state	Change the process sequence
	Steady rest is closed with high workpiece speed	Reduce the speed until the rollers are accelerated
Clamping force is not achieved	Piston seal is defective	Replace the piston seal
	Defect on the hydraulic unit (incl. valves)	Check the pressure and filters on the hydraulic unit
Leakage of hydraulic oil from the steady rest or cylinder flange	Seal on the cylinder housing is defective	Replace the seal and check parts for damage
	Seal on the piston rod is defective	Replace the seal and check parts for damage
Steady rest does not open	No pressure in the pressure line – check valve does not open	Check the hydraulic unit – replace the check valve
Machine does not start	No enable signal of the travel monitoring – proximity switch defective when using an "opener"	Check cables for damage – replace the proximity switch
Machine does not start	Workpiece clamping diameter too close to the clamping range limit, meaning the travel monitoring does not emit an enable signal.	Readjust the proximity switch
Automatic loading sequence interrupted	No enable signal of the travel monitoring – proximity switch defective when using a "closer"	Check cables for damage – replace the proximity switch

6 Maintenance

6.1 Exchange of rollers

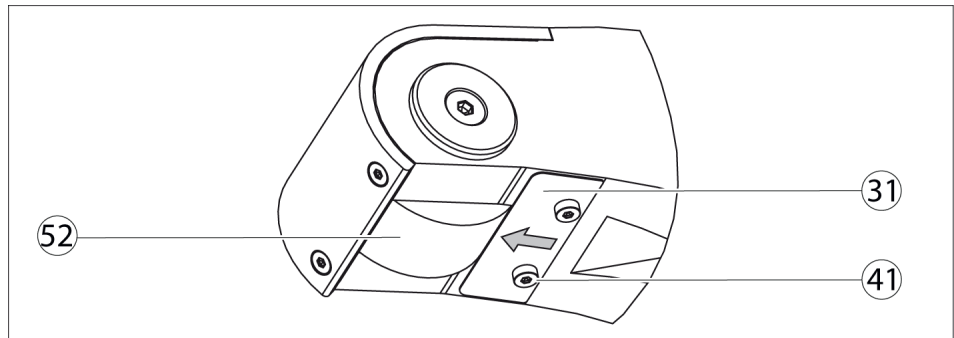
Change track roller using the levers.

- Remove the bolts (item 41) from the lever and take off chip protection (item 33) and protective cover (item 32).
- Remove set-screw (item 46) from the lever (item 5).
- Hold roller pins (item 10) using wrench and unscrew hexagon socket screw (item 38).
- Take off washer (item 11) and carefully drive out roller pin (item 10) with aluminum drift.
- Remove support roller (item 52).

Clean lubrication channels in the roller pin (item 10).

Assembly is performed in the reverse order.

Ensure that the lower wiper (item 31) is on the roller (item 52). For this purpose, loosen the screws (item 41) and push the wiper (item 31) against the roller. Then retighten the screws (item 41).



Change track roller on the guide part

- Move the steady rest into an intermediate position so that the roller pin (item 16) is fully visible.
- Loosen the 4 bolts (item 40) and take off cover plate (item 17) and wiper (item 18).
- Loosen set-screw (item 42).
- Carefully drive out roller pin (item 16) with aluminum drift.
- Remove the support roller (item 52).

Clean roller chamber of dirt and chips.

Clean lubrication channels in the roller pin (item 16).

Replace cover plate (item 17) and wiper (item 18) with new parts.

Assembly is performed in the reverse order.

NOTE

After replacing the rollers, the central lubrication must be actuated until oil comes out of the rollers.

CAUTION

Fit the roller pin (item 16) precisely and flush. The lubricating channels must be above one another and not protrude over the roller pin (item 16) at any point.

6.2 Cleaning of the steady rests' interior

1. Remove the screws (items 80/81/82) that are screwed into the cover (item 2). Loosen the remaining screws (items 80/81/82).
2. Drive out the cylindrical pins (item 47) toward the cover (item 2).
3. Remove the screws (item 34).
4. Remove the cover (item 2).
5. The relay levers (items 20 and 22) can now be removed. The levers (item 5) can then be pulled off the relay bolts (item 8).
6. Clean the inside of the steady rest and lubricate it with the lubrication oil used for central lubrication in order to preserve it.
7. Before assembly, the running surfaces of the control cam (item 4) and the relay bolts (item 8) should be coated with the oil used for central lubrication.

To assemble the steady rest, complete the procedure above in reverse order.

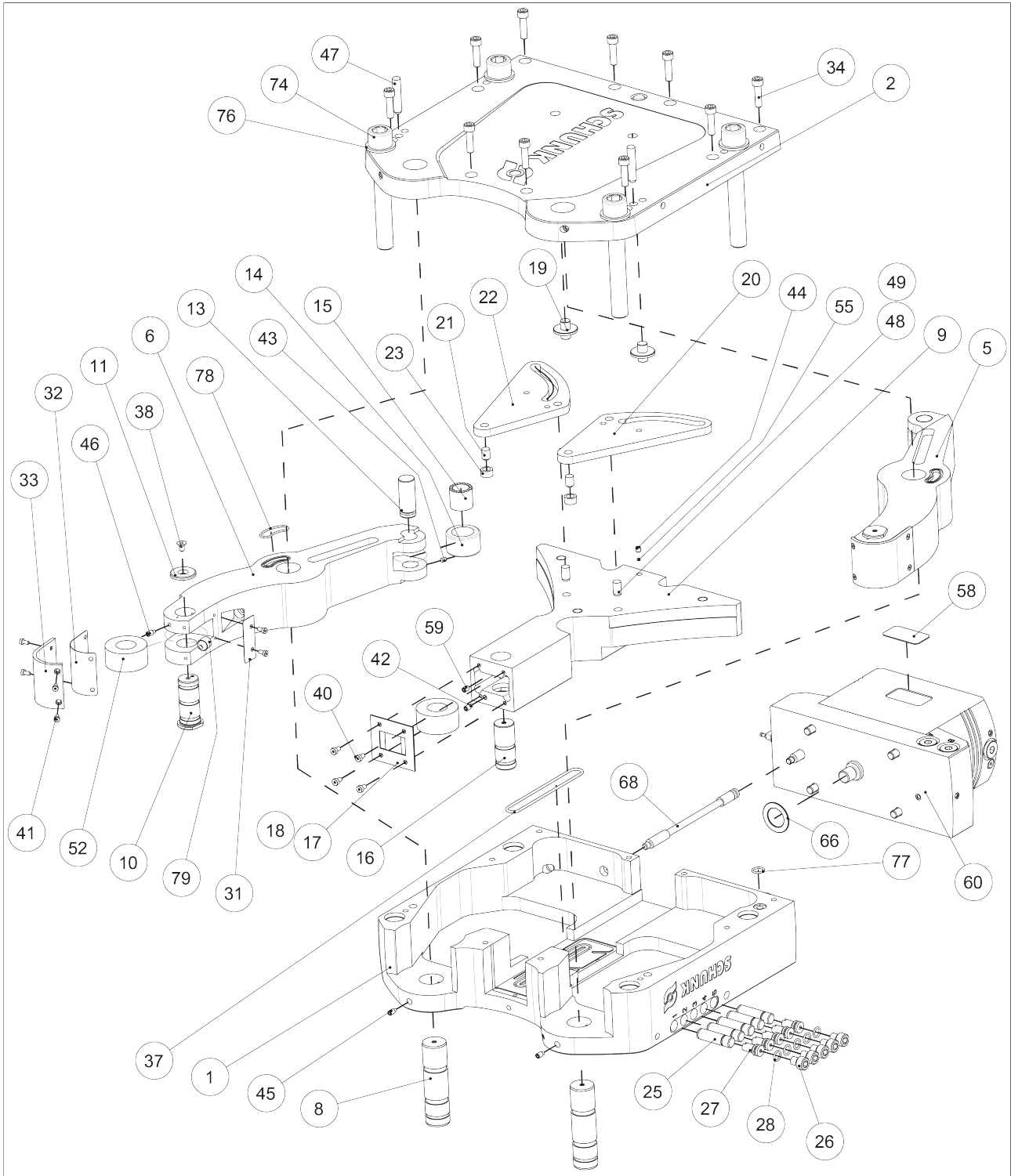
Only original SCHUNK spare parts may be used.

Recommended:

Extensive maintenance work or major repairs on the steady rest should be carried out by SCHUNK.

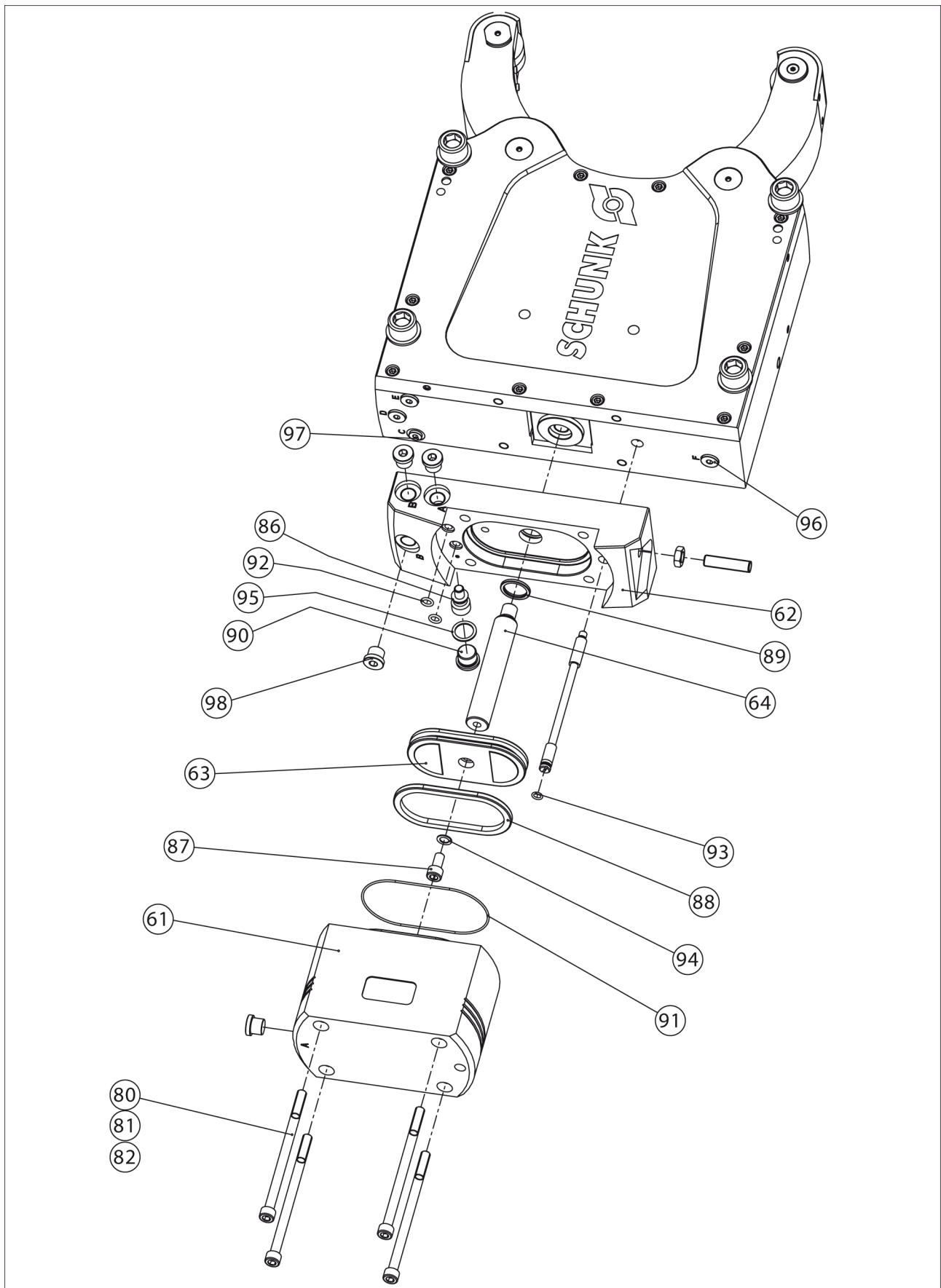
7 Assembly drawings

7.1 Basic steady rest



Assembly drawing basic steady rest

7.2 Cylinder



Assembly Drawing Cylinder

8 Part lists

When ordering spare parts, it imperative to state the type, size, and above all the serial number of the steady rest.

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

Spare parts for the basic steady rest

Item	Designation	Quantity	Note
1	Housing	1	
2	Cover	1	
5	Lever, right	1	
6	Lever, left	1	
8	Relay bolt	2	
9	Cam segment	1	
10	Roller pin, workpiece	2	
11	Washer	2	200 / A-200 / 300 / A-300 / 310 / A-310 / A-400 / 500 / A-500 / 510 / 600
	Washer	4	100 / A-100 / 320 / 400
13	Roller pin cam segment	2	
14	Roller cam segment	2	
15	Needle roller bearing	2	400 / A-400 / 500 / A-500 / 510 / 600
16	Roller pin guide part	1	
17	Cover plate	1	
18	Wiper	1	
19	Disk stud	2	
20	Relay lever, right	1	A-100 / A-200 / A-300 / A-310 / A-400 / A-500
21	Cylindrical pin	2	
22	Relay lever, left	1	A-100 / A-200 / A-300 / A-310 / A-400 / A-500
	Relay lever, left	2	100 / 200 / 300 / 310 / 320 / 400 / 500 / 510 / 600
23	Roller	2	
25	Dosing unit	4	100 / A-100
	Dosing unit	5	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510 / 600
26	Sealing plug	4	100 / A-100
	Sealing plug	5	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510
27	Spacer	4	100 / A-100
	Spacer	5	200 / A-200 / 400 / A-400 / 500 / A-500 / 510 / 600
28	O-ring	4	100 / A-100
	O-ring	5	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510 / 600

Item	Designation	Quantity	Note
31	Cover	2	
32	Protective cover	2	
33	Chip protection	2	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510 / 600
34	Screw	8	200 / A-200 / 300 / A-300 / 310 / A-310 / 320
	Screw	10	100 / A-100 / 400 / A-400 / 500 / A-500 / 510 / 600
37	O-ring	1	
38	Countersunk screw	2	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510 / 600
40	Screw	4	100 / A-100 / 200 / A-200 / 400 / A-400 / 500 / A-500 / 510 / 600
	Screw	16	300 / A-300 / 310 / A-310 / 320
41	Screw	4	200 / A-200
	Screw	12	100 / A-100 / A-200 / 400 / A-400 / 500 / A-500 / 510 / 600
42	Set-screw	1	
43	Set-screw	2	
44	Set-screw	1	100 / A-100 / 200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 600
	Set-screw	2	510
45	Set-screw	2	
46	Set-screw	2	
47	Cylindrical pin	2	
48	Cylindrical pin	2	
49	Set-screw	2	100 / A-100 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510 / 600
	Set-screw	8	200 / A-200
52	Support roller	3	
55	Copper bolts	1	100 / A-100 / 200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510
	Copper bolts	2	600
58	Name plate	1	
59	Set-screw	1	
60	Cylinder	1	
66	Spacer ring	1	A-100 / A-200 / A-310 / A-400 / A-500
68	Rod	1	100 / A-100 / 200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / A-500 / 510
74	Screw	4	
76	Washer	4	
77	O-ring	1	200 / A-200 / 300 / A-300 / 310 / A-310 / 320 / 400 / A-400 / 500 / 510 / 600
	O-ring	5	A-500
78	O-ring	2	

Spare parts for cylinder (60)

Item	Designation	Quantity	Note
61	Cylinder housing	1	
62	Cylinder flange	1	
63	Piston disc	1	100 / 200 / 300 / 310 / 320 / 400 / 500 / 510
	Piston disc	2	600
64	Piston rod	1	300 / 310 / 320 / 400 / 500 / 510
	Piston rod	2	600
80	Screw	4	100 / 200 / 300 / 320 / 400 / 500
	Screw	6	600
81	Screw	2	200
	Screw	4	100 / 500 / 510 / 600
82	Screw	1	100 / 310 / 320 / 400 / 500 / 510
	Screw	2	200
	Screw	5	600
86	Check valve	1	
87	Screw	1	300 / 310 / 320 / 400 / 500 / 510
	Screw	2	600
88	Turcon Glyd Ring	1	100 / 200 / 300 / 310 / 320 / 400 / 500 / 510
	Turcon Glyd Ring	2	600
89	Turcon Stepseal	1	100 / 200 / 300 / 310 / 320 / 400 / 500 / 510
	Turcon Stepseal	2	600
90	Locking screw	1	
91	O-ring	1	
92	O-ring	2	100 / 200 / 300 / 310 / 320 / 400 / 600
	O-ring	3	500 / 510
93	O-ring	1	
94	Copper sealing ring	1	300 / 310 / 320 / 400 / 500 / 510
	Copper sealing ring	2	600
95	Copper sealing ring	1	100 / 200 / 300 / 320 / 400 / 500
96	Locking screw	3	400 / 500 / 510 / 600
	Locking screw	4	200 / 300 / 310 / 320
97	Locking screw	1	400 / 500 / 510 / 600
	Locking screw	2	100
98	Locking screw	4	400 / 500 / 510 / 600



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

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

Folgen Sie uns | *Follow us*



Wir drucken nachhaltig | *We print sustainable*

Manufacturer certificate

Manufacturer / Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG.
Distributor: Lothringer Str. 23
D-88512 Mengen

Product: Lathe chuck
Description: ROTA
Type designation: THL

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 correct 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 "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

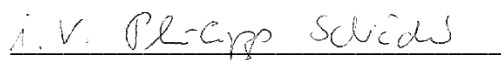
Harmonized standards applied:

- **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, 25. Apr. 2023



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



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