Assembly and Operating Manual

TCU-P

Tolerance Compensation Unit

Superior Clamping and Gripping

SCHUNK

Imprint

Technical changes:

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

Document number: 389462

Version: 05.00 | 15/05/2020 | 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

SCHUNK GmbH & Co. KG
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Table of Contents

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.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

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

1.1.1 Presentation of Warning Labels

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

⚠ DANGER

Danger 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 *
- Assembly and operating manuals of the accessories *

The documents marked with an asterisk (*) can be downloaded on our homepage **schunk.com**

1.1.3 Sizes

This operating manual applies to the following sizes:

- TCU-P 050
- TCU-P 064
- TCU-P 080
- TCU-P 100
- TCU-P 125
- TCU-P 160
- TCU-P 200
- TCU-P 240

1.1.4 Variants

This operating manual applies to the following variations:

- TCU-P Without "locking"
- TCU-P With "locking"

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the specified maintenance and lubrication intervals
- Observe the ambient conditions and operating conditions

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

1.3 Scope of delivery

The scope of delivery includes

- Tolerance compensation unit TCU-P in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.4 Accessories

The following accessories, which must be ordered separately, are required for the product:

- Sensors, with extension cables if necessary

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

1.4.1 Sealing kit

ID.-No. of the seal kit

Seal kit for	ID number
TCU-P 64-MV	0324870
TCU-P 80-MV	0324872
TCU-P 100-MV	0324874
TCU-P 125-MV	0324876
TCU-P 160-MV	0324878
TCU-P 200-MV	0324880
TCU-P 240-MV	0324882

Contents of the sealing kit, Drawings [▶ 26].

2 Basic safety notes

2.1 Intended use

This product is designed for compensating tolerances and positioning inaccuracies in handling workpieces.

- The product may only be used within the scope of its technical data, Technical data [▶ 15].
- The product is intended for installation in a machine/system. The applicable guidelines must be observed and complied with.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

It is not intended use if the product is used, for example, as a pressing tool, stamping tool, lifting gear, guide for tools, cutting tool, clamping device or a drilling tool.

- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.3 Constructional changes

Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- 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, Technical data [▶ 15].
- Make sure that the product is a sufficient size for the application.
- Ensure that maintenance and lubrication intervals are observed, Maintenance [▶ 24].
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are products that are designed especially for contaminated environments.

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.

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 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.

2.11 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.

2.11.1 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.

2.11.2 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.

2.11.3 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.

2.11.4 Protection against electric shock

Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

2.12 Notes on particular risks

⚠ WARNING

Risk of injury due to spring forces!

Parts are under spring tension on products which clamp using spring force or which have a gripping force maintenance.

- Only specially trained staff should disassemble the product.

3 Technical data

More technical data is included in the catalog data sheet.
Whichever is the latest version.

3.1 With “Locking” (MV)

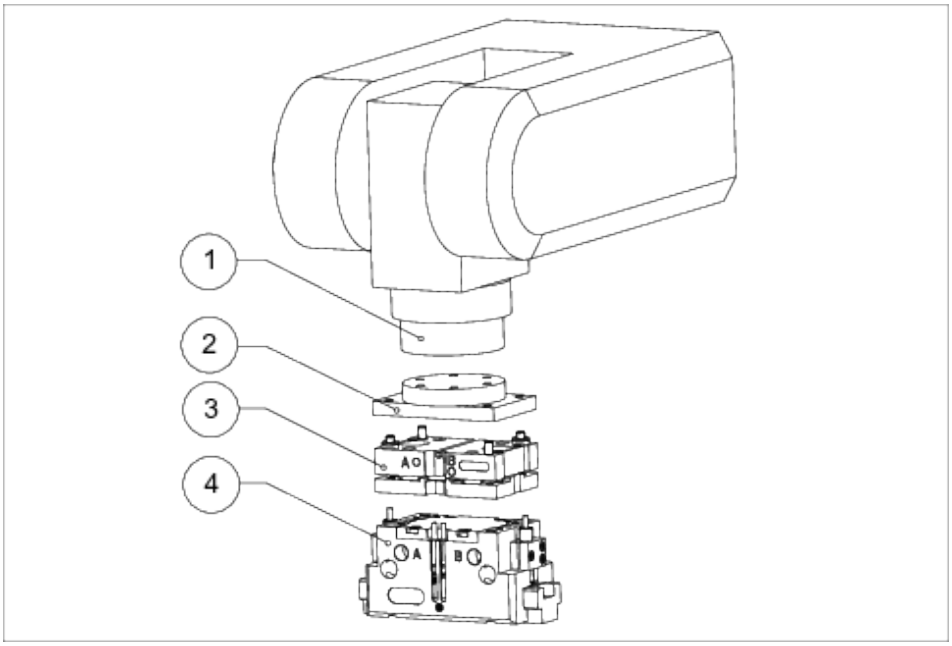
Size	64	80	100	125	160	200	240
Weight [kg]	0.1	0.15	0.27	0.4	0.7	1.3	2.1
permissible operating temperature	-10 to +90 °C / 14 to 194 °F						
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4						
Min. pressure [bar]	4						
Max. pressure [bar]	8						
Noise emission [dB(A)]	≤ 70						

3.2 Without “Locking” (OV)

Size	50	64	80	100	125	160	200	240
Weight [kg]	0.1	0.08	0.1	0.22	0.3	0.55	1.0	1.8
Permissible operating temperature	-10 to +90 °C / 14 to 194 °F							
Noise emission [dB(A)]	≤ 10							

4 Assembly

4.1 Assembly example



Assembly example

Item	Description
1	robot or gantry axis
2	adapter plate (optional from SCHUNK or provided by customer)
3	tolerance compensation unit
4	handling device e.g. Gripper

Optional, SCHUNK can provide an adapter plate with hole pattern for mounting holes.

The adapter plate (2) is mounted to the robot (1) and to the TCU-P (3) (see our catalog for mounting data).

SCHUNK gripper types PGN-plus, DPG, PGB and JPG are attached directly to the TCU-P.

For all other handling devices (4) is an adapter plate required.

Air connection and electrical cables must be fixed and bun-dled with cable clamp, in order that during use the greatest possible freedom of movement is possible.

4.2 Mechanical connection

CAUTION

Break of the product because of faulty installation is possible!

Observe maximum depth of engagement at robot side and handling device.

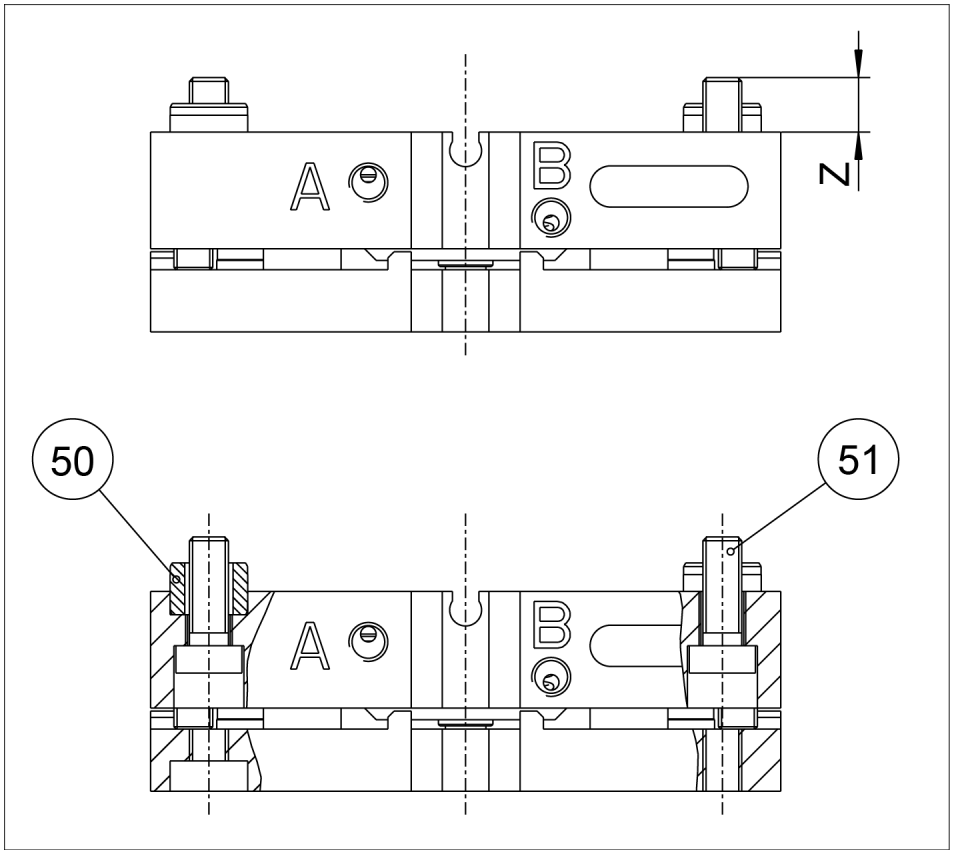
Evenness of the mounting surface

The values apply to the whole mounting surface to which the product is mounted.

Requirements for evenness of the mounting surface (Dimensions in mm)

Edge length	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

4.2.1 Assembly at the robot



Assembly options

The centering sleeves (50) are included in the accessory kit. The mounting screws (51) are already pre-assembled in the product.

➢ Fix the product via the boreholes provided using the centering sleeves (50).

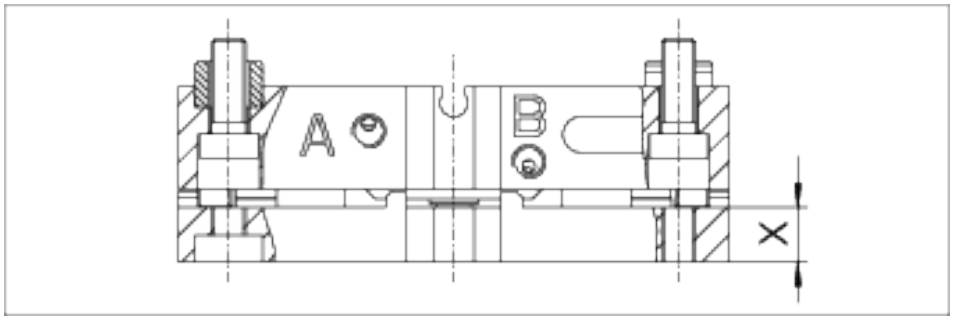
NOTE

Observe the tightening torque.

➢ Tighten the mounting screws (51) using a hexagon screwdriver.

Item	Mounting	50	64	80	100	125	160	200	240
50	Dimensions	Ø6 / 5.35	Ø8 / 5.35		Ø10 / 6.65	Ø12 / 6.65		Ø14 / 8.6	Ø16 / 8.6
51	Thread diameter	M3	M4		M5	M6		M8	M10
	Tightening torque [Nm]	1.27	3.0		5.9	10.0	10.1	24.6	49
Z	Maximum depth of engagement [mm]	6			7	8	9	10	14

4.2.2 Mounting at the handling device



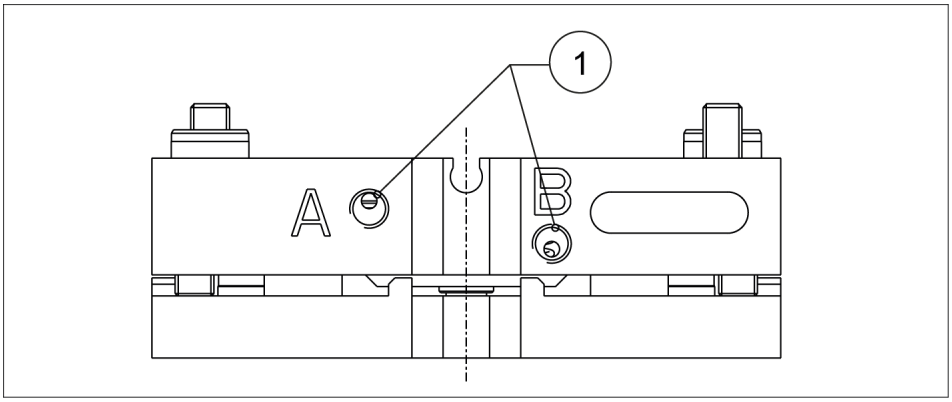
Data for mounting at the adapter plate / handling device

Item	Mounting	50	64	80	100	125	160	200	240
x	thread diameter	M3	M4		M5	M6		M8	M10
	Max. screw-in depth [mm]	7	8			9	10	11	15

4.3 Air connection

CAUTION

Observe the requirements for the air supply
Technical data [▶ 15].



1	Main connections (Hose connection) (A = unlock, B = lock)

Designation	TCU-P						
	64	80	100	125	160	200	240
Threads in the main air connections	M5			G1/8			
Hose connection	Connect the compressed air line to the mounted air connection (air connection not included in the scope of delivery)						

- Open only the air connections that are needed.
- Close unused main air connections using the screw plugs from the enclosed pack.
- For a hose-free direction connection, use the O-rings from the enclosed pack.

4.4 Mounting the sensor

NOTE

Observe the assembly and operating manual of the sensor for mounting and connecting.

The product is prepared for the use of sensors.

- For the exact type designations of suitable sensors, please see catalog datasheet and Overview of sensors [▶ 22].
- For technical data for the suitable sensors, see assembly and operating manual and catalog datasheet.
  - The assembly and operating manual and catalog datasheet are included in the scope of delivery for the sensors and are available at schunk.com.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

4.4.1 Overview of sensors

Designation	TCU-P
	050 - 240
Programmable magnetic switch MMS-P 22	x

4.4.2 Mounting the programmable magnetic switch MMS-P 22

CAUTION

Risk of damage to the sensor during assembly!

- Observe the maximal tightening torque.

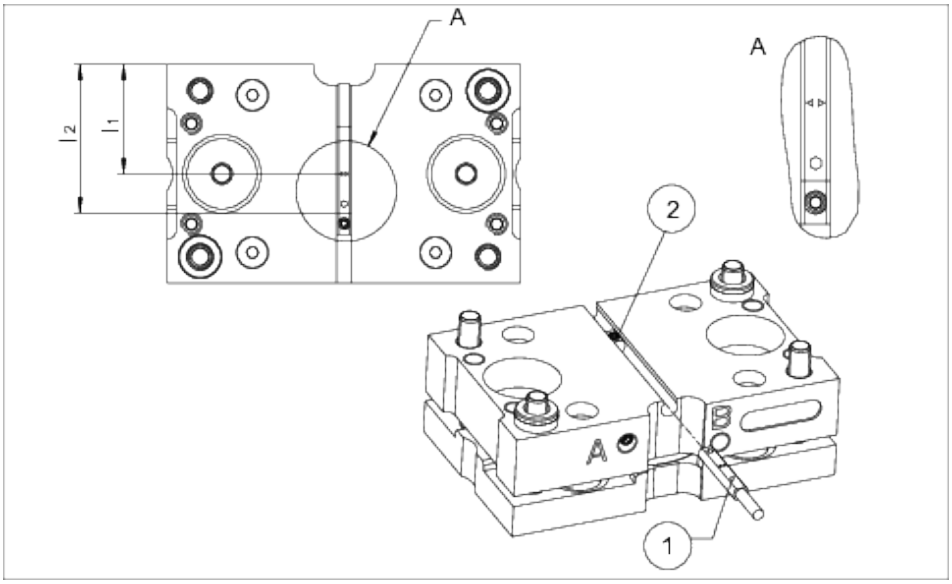
NOTE

Ferromagnetic materials changes the switching positions of the sensor.For example adapter plate made ordinary steel.

In case of ferromagnetic adapter plate:

- First TCU-P mounted on adapter plate
- Then,set the positions of the magnetic switch.

- Move the sensor (1) into the bracket up to the stop (2).
  OR: If there is no stop, adjust the L1 or L2 protrusion of the sensor (see table "adjustment dimensions").
- Fasten the senor using a threaded pin.
  Tightening torque: 10 Ncm
- Adjust the sensor, see assembly and operating manual of the sensor.



Assembling the sensor, .

1	sensor
2	stop
l1	lower edge TCU-Pup to the double arrow on the sensor
l2	bottom edge of TCU-Pup to front side of sensor

Adjustment dimensions

Size	50	64	80	100	125	160	200	240
dimension l1 [mm]	-	18	21	25	30	36	50	57.5
dimension l2 [mm]	-	26.9	29.9	33.9	38.9	44.9	58.9	66.4

5 Troubleshooting

5.1 Product is not moving

Possible cause	Corrective action
Incorrect air supply.	Check air supply.

5.2 Product does not lock itself?

Possible cause	Corrective action
Proximity switch defective or set incorrect.	Disassemble and clean the product.
Pressure drops below minimum.	Readjust or change sensor.

5.3 Product does not execute the full stroke for the locking?

Possible cause	Corrective action
Dirt between cylinder and cylinder cover.	Disassemble and clean the product.
Pressure drops below minimum.	Check air supply. Air connection [▶ 20]

5.4 Locking force decreases during locking

Possible cause	Corrective action
Compressed air can escape.	Check seals, if necessary, disassemble the product and replace seals.
Too much grease in the mechanical movement space.	Clean and lubricate product.
Pressure drops below minimum.	Check air supply.

6 Maintenance

6.1 Notes

Original spare parts

Use only original spare parts of SCHUNK when replacing spare and wear parts.

6.2 Maintenance intervalls

CAUTION

Material damage due to hardening lubricants!

Lubricants harden more quickly at temperatures above 60°C, leading to possible product damage.

- Reduce the lubricant intervals accordingly.

at			Maintenance work
100 - 50	125 - 150	200 - 240	
4	3	2	Treat all grease areas with lubricant, Lubricants/Lubrication points (basic lubrication) [▶ 24]
4	3	2	Clean all parts thoroughly, check for damage and wear, if necessary replace seals and wearing parts,Oil or grease external steel parts, Drawings [▶ 26]
4	3	2	Replace shear pads, Disassembly and assembly [▶ 25]

6.3 Lubricants/Lubrication points (basic lubrication)

SCHUNK recommends the lubricants listed.

During maintenance, treat all greased areas with lubricant. Thinly apply lubricant with a lint-free cloth.

Lubricant point	Lubricant
Metallic sliding surfaces	Toothgood 1
All seals	Sealgood 1
Bore hole at the piston	Sealgood 1

6.4 Disassembly and assembly

6.4.1 Variant with locking (MV)

Position of the item numbers Drawings [▶ 26]

⚠ 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.

- ➢ Detach cable connections.
- ➢ Remove the compressed air line.
- ➢ Remove product from handling device.

NOTE

Housing-top (22) and adapter plate are aligned to each other, using centering sleeves (50).

- ➢ Remove screws (51) and separate product form the adapter plate.
- ➢ Remove screws (52) from the housing-top (02).

⚠ WARNING

Risk of injury due to spring forces!

The cylinder piston is under spring tension.

Carefully disassemble the product.

- ➢ Remove screws (53) and remove bolt (09).
- ➢ Separate housing top (22) from flange bottom (01).
- ➢ Unscrew screws (49) and remove cylinder cover (04).
- ➢ Remove cylinder piston (03) from the housing-top (02)
- ➢ Remove screws (52) from the flange-bottom (01) and replace shear pads (15).

6.4.2 Variant without locking (OV)

Position of the item numbers Drawings [▶ 26]

⚠ 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.

➢ Detach cable connections.
➢ Remove compressed air lines.
➢ Remove product from handling device.

NOTE

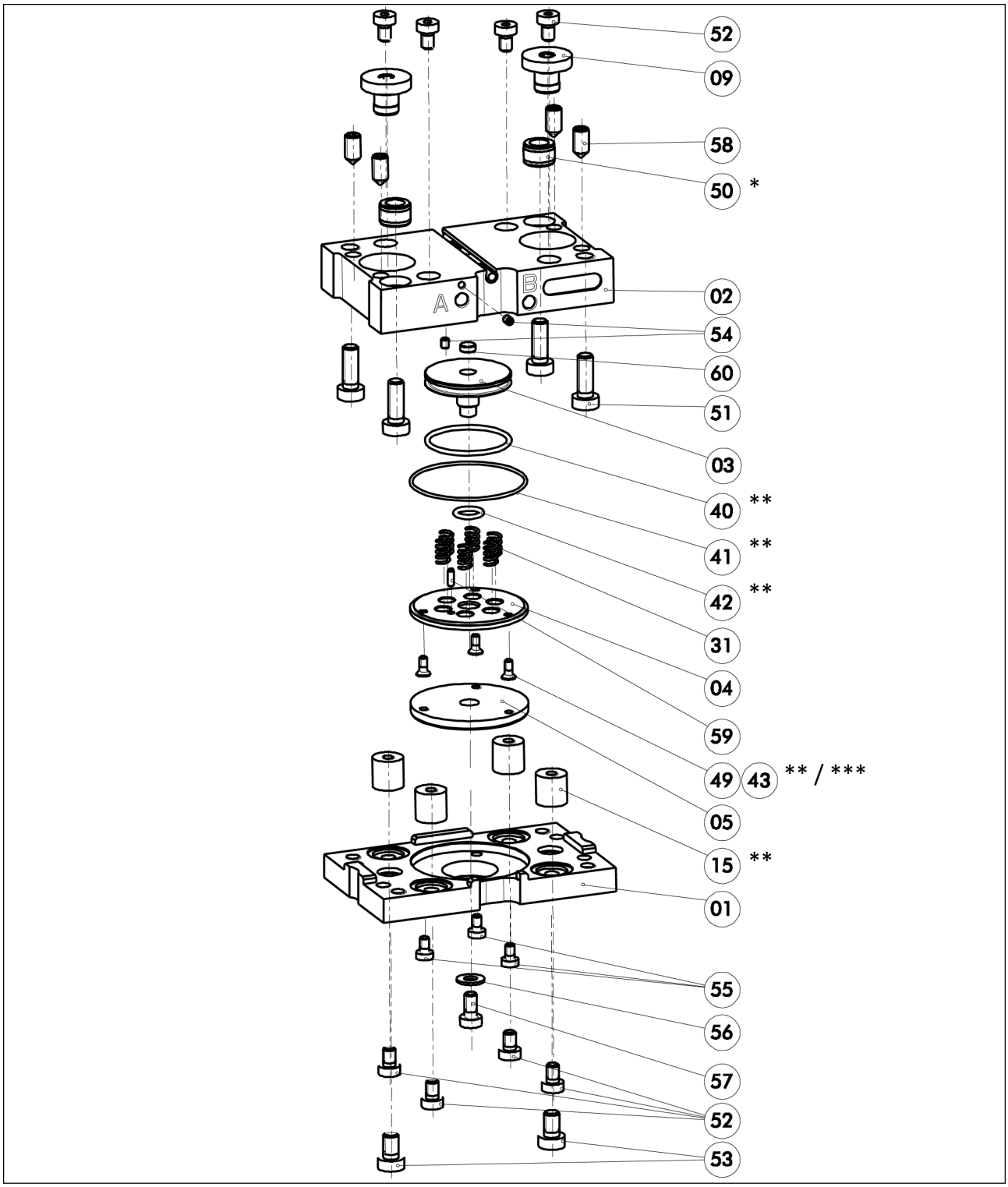
Housing-top (22) and adapter plate are aligned to each other, using centering sleeves (50).

➢ Remove screws (51) and separate product form the adapter plate.
➢ Remove screws (52) from the housing-top (02).
➢ Remove screws (53) and remove bolt (09).
➢ Separate housing top (22) from flange bottom (01).
➢ Remove screws (52) from the flange-bottom (01) and replace eleastomer (15/16).

6.5 Drawings

The following figures are example images.
They serve for illustration and assignment of the spare parts.
Variations are possible depending on size and variant.

6.5.1 Assembling of the variant with locking (MV)



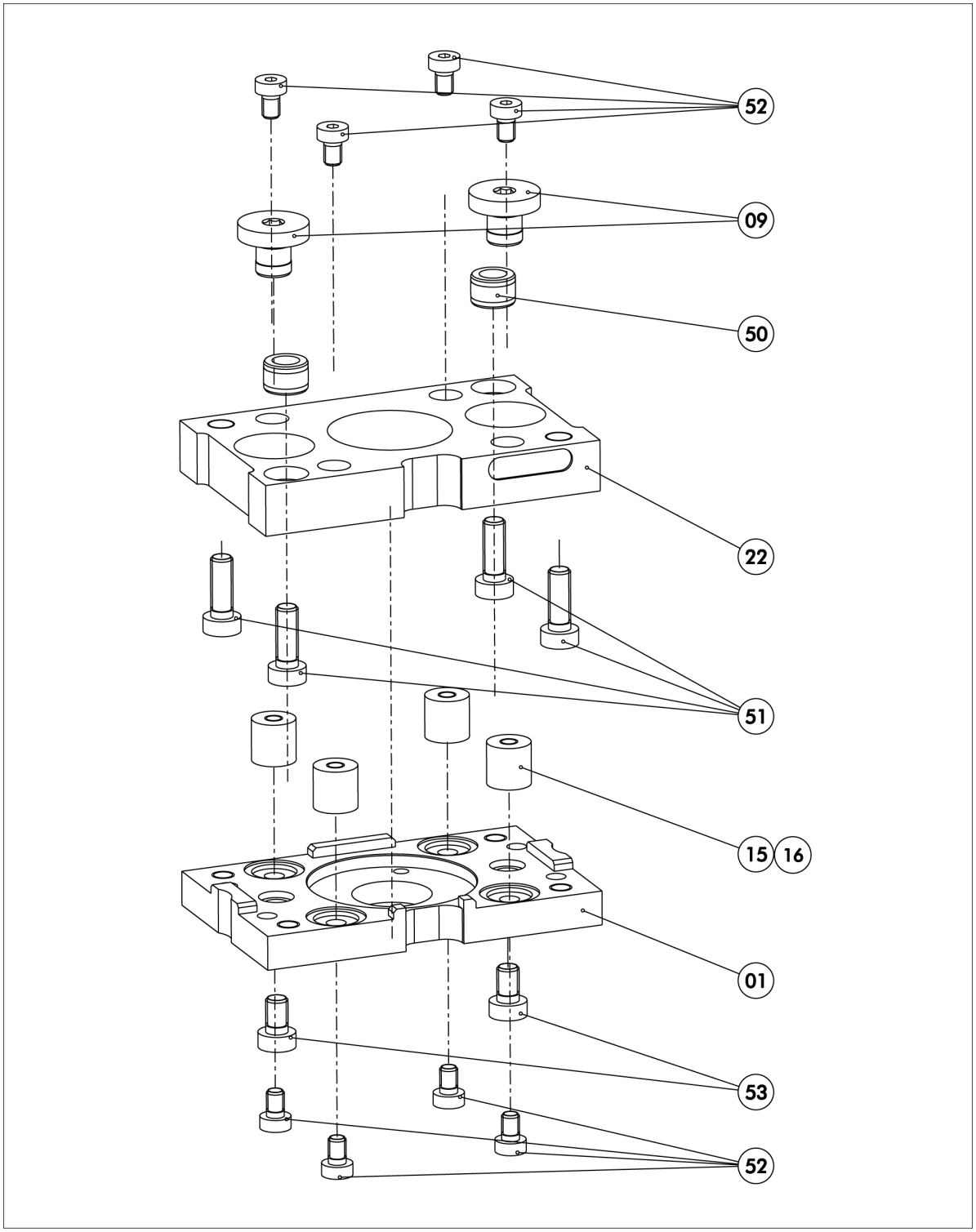
Assembling of variants with locking (MV)

* Contained in accessory pack.

** Wearing part, replace during maintenance.
Included in the seal kit. Seal kit can only be ordered completely.

*** only for TCU-P 64, TCU-P 100, TCU-P 160

6.5.2 Assembling of the variant without locking (OV)



Assembling of the variant without locking (OV)

7 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

Manufacturer/ Distributor	SCHUNK GmbH & Co. KG Clamping and gripping technology Bahnhofstr. 106 - 134 D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation:	Tolerance compensation unit / TCU-P / pneumatic
ID number	0324774, 0324792, 0324808, 0324828, 0324846, 0324864, 0324730

The partly completed machine may not be put into operation until conformity of the machine into which the partly completed machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Robert Leuthner, Address: see manufacturer's address

Signature: see original declaration

Lauffen/Neckar, May 2020

p.p. Ralf Winkler,
Manager for development
of gripping system components

7.1 Annex to Declaration of Incorporation

according 2006/42/EG, Annex II, No. 1 B

1.Description of the essential health and safety requirements pursuant to 2006/42/EC, Annex I that are applicable and that have been fulfilled with:

Product designation	Tolerance compensation unit
Type designation	TCU-P
ID number	0324774, 0324792, 0324808, 0324828, 0324846, 0324864, 0324730

To be provided by the System Integrator for the overall machine			⇓
Fulfilled for the scope of the partly completed machine		⇓	
Not relevant	⇓		

1.1	**Essential Requirements**			
1.1.1	Definitions		X	
1.1.2	Principles of safety integration		X	
1.1.3	Materials and products		X	
1.1.4	Lighting		X	
1.1.5	Design of machinery to facilitate its handling		X	
1.1.6	Ergonomics		X	
1.1.7	Operating positions			X
1.1.8	Seating			X

1.2	**Control Systems**			
1.2.1	Safety and reliability of control systems		X	
1.2.2	Control devices		X	
1.2.3	Starting		X	
1.2.4	Stopping		X	
1.2.4.1	Normal stop		X	
1.2.4.2	Operational stop		X	
1.2.4.3	Emergency stop		X	
1.2.4.4	Assembly of machinery		X	
1.2.5	Selection of control or operating modes		X	
1.2.6	Failure of the power supply			X

1.3	**Protection against mechanical hazards**			
1.3.1	Risk of loss of stability			X
1.3.2	Risk of break-up during operation			X
1.3.3	Risks due to falling or ejected objects			X
1.3.4	Risks due to surfaces, edges or angles		X	
1.3.5	Risks related to combined machinery			X
1.3.6	Risks related to variations in operating conditions			X

1.3	Protection against mechanical hazards			
1.3.7	Risks related to moving parts		X	
1.3.8	Choice of protection against risks arising from moving parts			X
1.3.8.1	Moving transmission parts		X	
1.3.8.2	Moving parts involved in the process			X
1.3.9	Risks of uncontrolled movements			X

1.4	Required characteristics of guards and protective devices			
1.4.1	General requirements			X
1.4.2	Special requirements for guards			X
1.4.2.1	Fixed guards			X
1.4.2.2	Interlocking movable guards			X
1.4.2.3	Adjustable guards restricting access			X
1.4.3	Special requirements for protective devices			X

1.5	Risks due to other hazards			
1.5.1	Electricity supply		X	
1.5.2	Static electricity		X	
1.5.3	Energy supply other than electricity		X	
1.5.4	Errors of fitting		X	
1.5.5	Extreme temperatures			X
1.5.6	Fire			X
1.5.7	Explosion			X
1.5.8	Noise			X
1.5.9	Vibrations			X
1.5.10	Radiation	X		
1.5.11	External radiation	X		
1.5.12	Laser radiation	X		
1.5.13	Emissions of hazardous materials and substances			X
1.5.14	Risk of being trapped in a machine	X		
1.5.15	Risk of slipping, tripping or falling	X		
1.5.16	Lightning			X

1.6	Maintenance			
1.6.1	Machinery maintenance		X	
1.6.2	Access to operating positions and servicing points		X	
1.6.3	Isolation of energy sources		X	
1.6.4	Operator intervention		X	
1.6.5	Cleaning of internal parts		X	

1.7	**Information**			
1.7.1	Information and warnings on the machinery		X	
1.7.1.1	Information and information devices		X	
1.7.1.2	Warning devices		X	
1.7.2	Warning of residual risks		X	
1.7.3	Marking of machinery	X		
1.7.4	Instructions	X		
1.7.4.1	General principles for the drafting of instructions	X		
1.7.4.2	Contents of the instructions	X		
1.7.4.3	Sales literature	X		

	The classification from Annex 1 is to be supplemented from here forward.			
2	Supplementary essential health and safety requirements for certain categories of machinery			X
2.1	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products			X
2.2	Portable hand-held and/or guided machinery			X
2.2.1	Portable fixing and other impact machinery			X
2.3	Machinery for working wood and material with similar physical characteristics			X
3	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery		X	
4	Supplementary essential health and safety requirements to offset hazards due to lifting operations		X	
5	Supplementary essential health and safety requirements for machinery intended for underground work			X
6	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons		X	