Assembly and operating manual

TCU-Z

Tolerance Compensation Unit

Translation of the original manual

Hand in hand for tomorrow

Imprint

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

Document number: 389464

Version: 05.00 | 19/08/2025 | 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. +49-7133-103-2503
Fax +49-7133-103-2189
cmg@de.schunk.com

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 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.

NOTICE

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 labeled with an asterisk (*) can be downloaded from **schunk.com/downloads**.

1.1.3 Sizes

This operating manual applies to the following sizes:

- TCU-Z 50
- TCU-Z 64
- TCU-Z 80
- TCU-Z 100
- TCU-Z 125
- TCU-Z 160
- TCU-Z 200

1.1.4 Variants

This operating manual applies to the following variations:

- TCU-Z Without "locking"
- TCU-Z 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 ambient conditions and operating conditions, ▶ 2.5 [🗋 8]
- Observe the specified maintenance intervals, ▶ 6 [🗋 20]

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-Z in the version ordered
- Safety information (product-specific instructions available online)
- 1x wrench (15 mm)

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 Seal kit

Seal kit for	ID number
TCU-Z 64-MV	0324871
TCU-Z 80-MV	0324873
TCU-Z 100-MV	0324875
TCU-Z 125-MV	0324877
TCU-Z 160-MV	0324879
TCU-Z 200-MV	0324881

Tab.: ID.-No. of the seal kit

contents of the sealing kit, ▶ 6.6 [🗋 25].

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, ▶ 3 [🗋 12].
- The product is intended for installation in a machine/ automated system. The applicable guidelines for the machine/ automated system 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

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 [🗋 12].
- Make sure that the product is a sufficient size for the application.
- Ensure that maintenance and lubrication intervals are observed, ▶ 6 [🗋 20].
- 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 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)

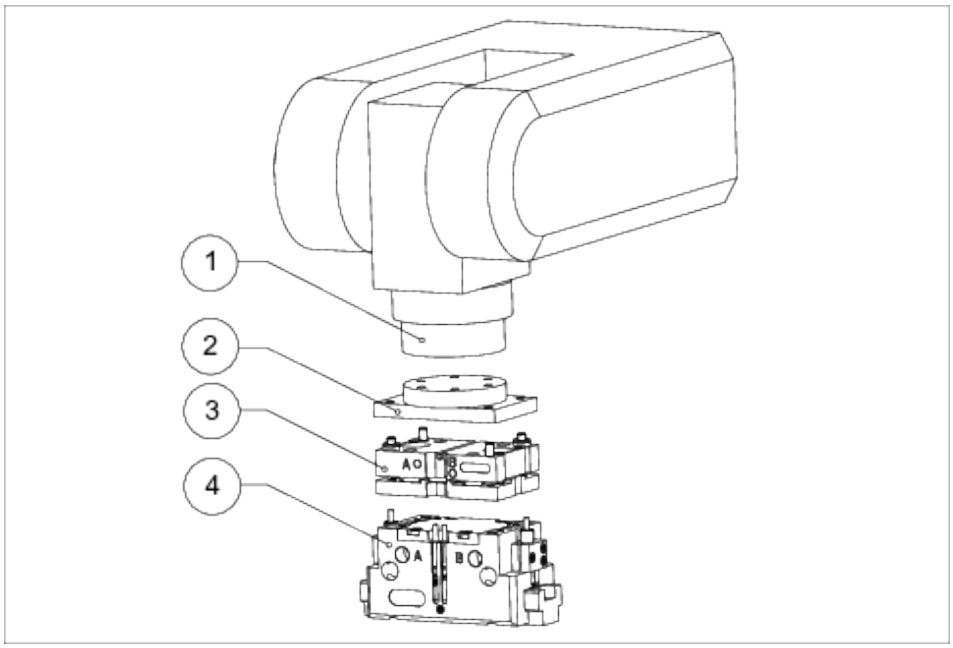
	TCU-Z					
	64	80	100	125	160	200
Weight [kg]	0.18	0.25	0.48	0.85	1.63	2.75
permissible operating temperature [°C]	- 10 to + 90					
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]					
Min. pressure [bar]	4					
Max. pressure [bar]	8					
Noise emission [dB(A)]	≤ 70					

3.2 Without "Locking" (0V)

	TCU-Z						
	50	64	80	100	125	160	200
Weight [kg]	0.09	0.15	0.3	0.47	0.65	1.35	2.45
permissible operating temperature [°C]	- 10 to + 90						
Noise emission [dB(A)]	≤ 10						

4 Assembly

4.1 Assembly example



Assembly example at robot

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-Z (3) (see our catalog for mounting data).

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

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

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

4.2 Mechanical connection

NOTICE

Break of the product because of faulty installation is possible!

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

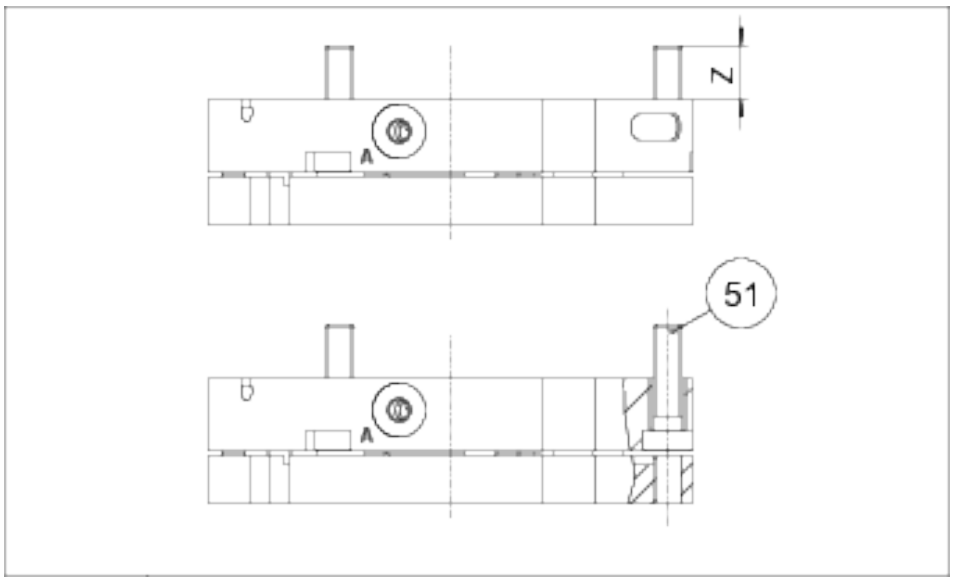
Evenness of the mounting surface

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

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

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

4.2.1 Assembly at the robot



Mounting possibilities

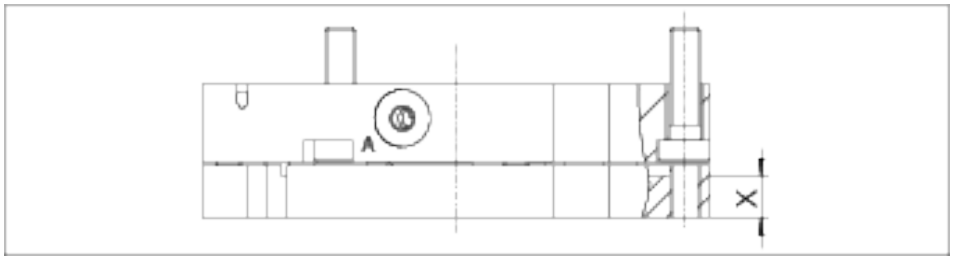
The cylindrical pin, needed to fix the product, is not included in the delivery. The mounting screws (51) are pre-assembled in the product.

1. Fix the product on the fixing bore, using the cylindrical pin.
2. Tighten mounting screws (51) with a hexagon screwdriver.**NOTICE! Observe tightening torque**

Item	Mounting	TCU-Z						
		50	64	80	100	125	160	200
51	pan screw DIN 7984	M3	M4	M6	M6	M8	M8	M10
	Tightening torque [Nm]	1.27	3.0	10.1	10.1	24.6	24.6	48
	maximum screw-in depth Z [mm]	3.2	6.5	6.5	11.5	13.5	10.5	14.5
	cylindrical pin fit diameter	Ø3 h6	Ø4 h6	Ø5 h6	Ø5 h6	Ø6 h6	Ø6 h6	Ø8 h6
	max.fitting depth [mm]	4	6	6	6	8	10	12

Tab.: Data for mounting at the robot-side adapter plate

4.2.2 Mounting at the handling device



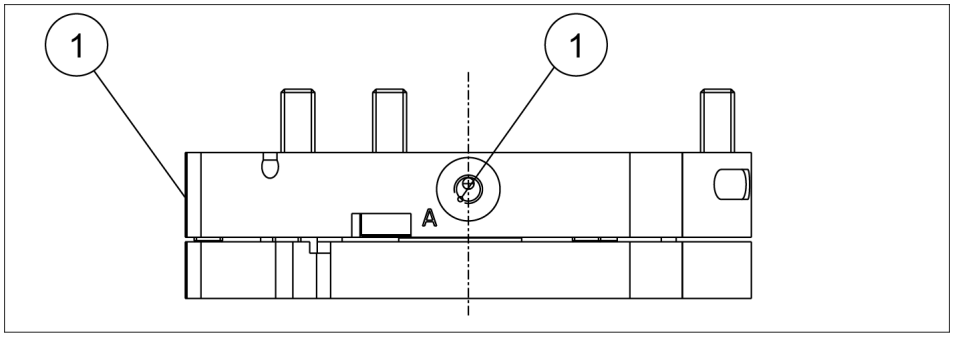
Item	Mounting	TCU-Z						
		50	64	80	100	125	160	200
	thread diameter	M3	M5	M6	M6	M8	M8	M10
X	Max. screw-in depth [mm]	7	8	8	8	9	10	10

Tab.: Data for mounting at the adapter plate / at the handling devic

4.3 Pneumatic connection

NOTICE

Observe the requirements for the air supply, ▶ 3 [🗋 12].



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

Designation	TCU-Z					
	64	80	100	125	160	200
Thread 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)					

4.4 Mounting the sensor

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

The product is equipped for the use of sensors.

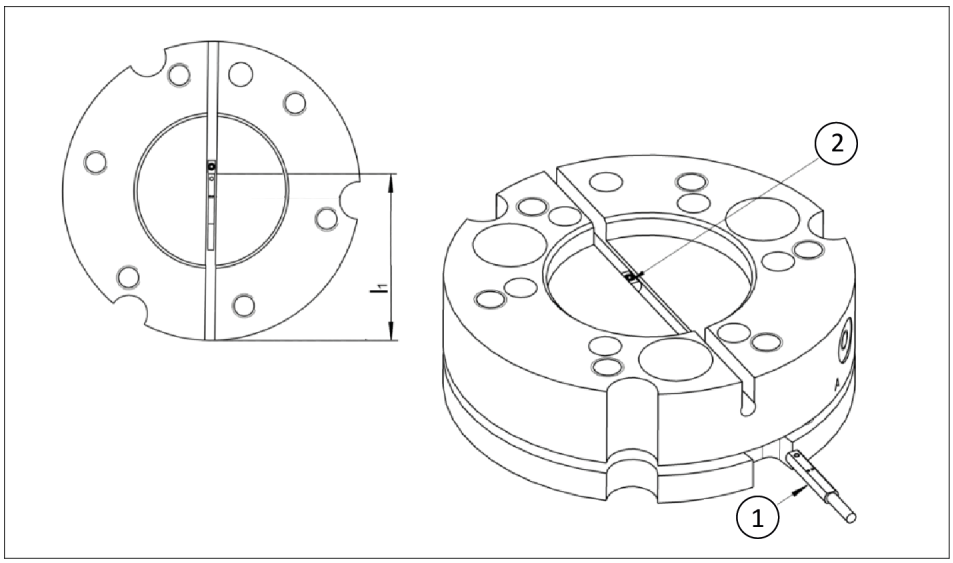
- For the exact type designations of suitable sensors, please see the catalog data sheet.
- For technical data for the suitable sensors, see Assembly and Operating Manual and catalog data sheet.
  - The Assembly and Operating Manual and catalog data sheet are included in the scope of delivery for the sensors and are available at schunk.com.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

4.4.1 Installing and adjusting the programmable magnetic switch (MMS-P).

NOTICE

Risk of damage to the sensor during assembly!

- Observe the maximal tightening torque.



NOTE
If there is no T-nut available, slide the sensor according to dimension l1 into the groove (2), see following table.

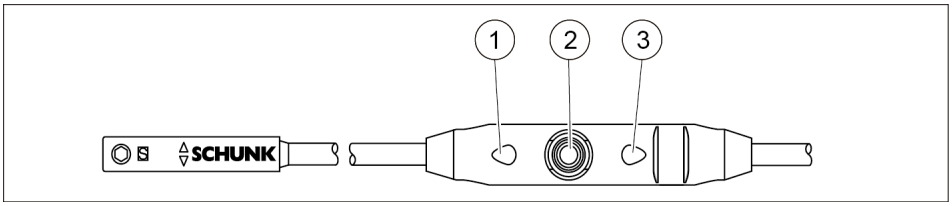
1. Turn the sensor (1) into the groove (2).
   OR: Push the sensor (1) into the groove (2) until the suensor (1) is sitting at the T-nut (3).
2. Secure the sensor (1) using the set-screw (4).
   Tightening torque: 10 Ncm

	TCU-Z						
	50	64	80	100	125	160	200
Dimension l_1 [mm]	-	40.9	48.9	58.9	71.4	88.9	99

Tab.: Setting dimensions

Adjusting the sensor

1. Move the module to the locked position (air connection A) for switching point 1.
2. Press the "Teach" button (2) for 2 s.
   ⇨ LED 1 (1) flashes after 2 s.
3. Briefly press the "Teach" button (2).
   ⇨ LED 1 (1) lights up once the switching point has been taught.
   ⇨ LED 2 (3) flashes.
4. Move the module to switching point 2 unlocked (air connection B).
   ⇨ LED 2 (3) flashes.
   ⇨ LED 1 (1) goes out as soon as the module leaves Switch-off point for switching point 1.
5. Briefly press the "Teach" button (2).
   ⇨ LED 2 (3) lights up when the switching point has been taught.



NOTE

This procedure is an example, you can assign switching points 1 and 2 as you wish.
You can also adjust the switch-off point of the sensor using the hysteresis function. For this, please refer to the operating instructions for the sensor.

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. ▶ 4.3 [🗋 16]

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

⚠ WARNING

Risk of injury from electric shock due to contact with live parts!

- Before starting any work: Disconnect the power supply from the mains and secure against accidental switch-on.
- Work may only be performed by appropriately qualified personnel.

Original spare parts

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

6.2 Maintenance and lubrication intervals

NOTICE

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.

Interval [Mio. cycles] for TCU-Z			Maintenance work
50 – 100	125 – 160	200	
4	3	2	Clean all parts thoroughly, check for damage and wear, if necessary replace seals and wearing parts ▸ 6.5 [🗋 24]
4	3	2	Treat all grease areas with lubricant ▸ 6.3 [🗋 21]

For extreme ambient and application conditions, shortened maintenance cycles can ensure the lifespan is maintained.

NOTICE

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.

6.3 Lubricants/Lubrication points (basic lubrication)

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

SCHUNK recommends the lubricants listed.

Greasing area	Lubricant
Metallic sliding surfaces	SCHUNK grease 1
Seals and sealing surfaces	SCHUNK grease 1
Bore hole at the piston	SCHUNK grease 1

Details regarding SCHUNK lubricant designations are available at **schunk.com/lubricants**.

The product contains food-compliant lubricants as standard. **The requirements of standard EN 1672-2:2020 are not fully met.**

NOTE

- Change contaminated food-compliant lubricant.
- Observe information in the safety data sheet from the lubricant manufacturer.

6.4 Disassemble the product

6.4.1 Variant with locking (MV)

Position of the item numbers ▶ 6.6 [🗋 25]

⚠ 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.

1. Disconnect cable connections.
2. Remove compressed air lines.
3. Remove product from handling device.
4. Remove screws (51) and separate product form the adapter plate.
5. Remove screws (52) from the housing-top (02).
6. **WARNING! Danger of injury due to spring forces! The cylinder piston is under spring tension.** Remove screws (53) then remove bolt (09).
7. Separate housing top (02) from the flange bottom (01).
8. Unscrew screws (49) and remove cylinder cover (04).
9. Remove cylinder piston (03) from the housing-top (02)

6.4.2 Variant without locking (0V)

Position of the item numbers ▶ 6.6 [🗋 25]

⚠ 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.

1. Disconnect cable connections.
2. Remove compressed air lines.
3. Remove product from handling device.
4. Remove screws (51) and separate product form the adapter plate.
5. Remove screws (52) from the housing-top (02).
6. Remove screws (53) then remove bolt (09).
7. Separate housing top (22) from the flange bottom (01).

6.5 Servicing and assembling the product

Position of the item numbers ▸ 6.6 [🗋 25]

⚠ WARNING

Risk of injury due to spring forces!

The cover may be ejected due to the high spring forces.

- Dismantle the product carefully.

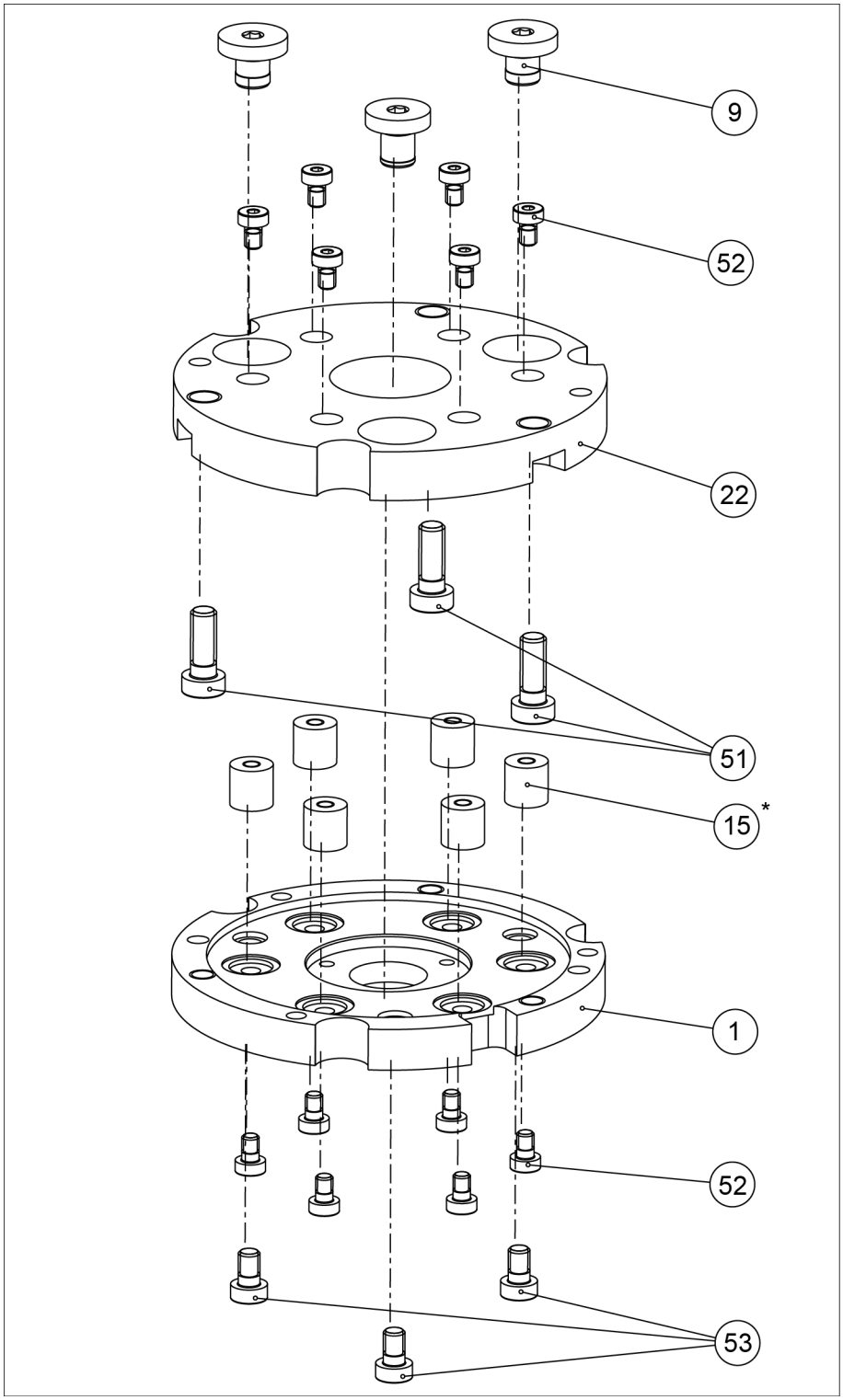
Maintenance

- Remove screws (52) from the flange-bottom (01) and replace shear-pads (15).
- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant.
  ▸ 6.3 [🗋 21]
- Oil or grease bare external steel parts.
- Replace all wear parts / seals.
  - Position of the wearing parts ▸ 6.6 [🗋 25]
  - Seal kit ▸ 1.4.1 [🗋 7]

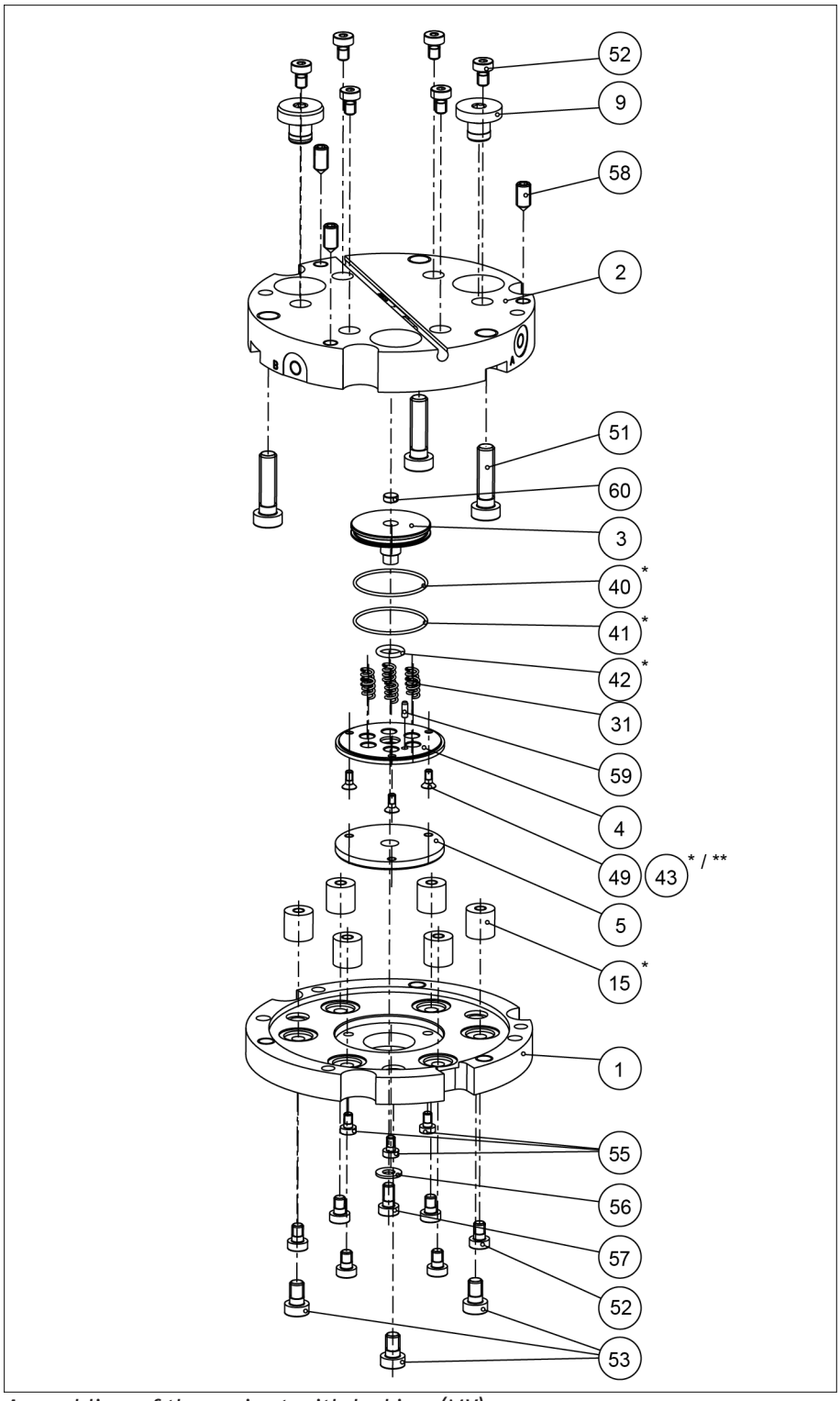
Assembly

Assembly takes place in the opposite order to disassembly

6.6 Assembly drawing



Assembling of the variant without locking (0V)



Assembling of the variant with locking (MV)

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

** only for TCU-Z 64, TCU-Z 100. TCU-Z 160

7 Translation of the original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1 Section B.

Manufacturer/ Distributor	SCHUNK SE & Co. KG Spanntechnik | Greiftechnik | Automatisierungstechnik Bahnhofstr. 106 – 134 D–74348 Lauffen/Neckar

We hereby declare that the partly completed machine described below

Product designation:	Tolerance Compensation Unit / TCU–Z /pneumatic
ID number	324766, 324784, 324798, 324820, 324838, 324856, 1377682

meets the following basic occupational health and safety of the Machinery Directive 2006/42/EC:

No. 1.1.1, No. 1.1.2, No. 1.1.3, No. 1.1.5, No. 1.3.2, No. 1.5.3, No. 1.5.4, No. 1.5.6, No. 1.5.8, No. 1.5.10, No. 1.5.11, No. 1.5.13

The partly completed machinery may not be put into operation until it has been confirmed that the machine into which the partly completed machinery is to be installed complies with the provisions of the Machinery Directive (2006/42/EC). The declaration shall be rendered invalid if modifications are made to the product.

Applied harmonized standards, especially:

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

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

Person authorized to compile the technical documentation:
Stefanie Walter, Address: see manufacturer's address

Signature: see original declaration

Lauffen/Neckar, August 2025

Dr.–Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

8 UKCA declaration of incorporation

in accordance with the Supply of Machinery (Safety) Regulations 2008.

Manufacturer/ Distributor	SCHUNK Intec Limited Clamping and gripping technology 3 Drakes Mews, Crownhill MK8 0ER Milton Keynes

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
"Supply of Machinery (Safety) Regulations 2008".
The declaration shall be rendered invalid if modifications are made to the product.

Product designation:	Tolerance Compensation Unit / TCU-Z / pneumatic
ID number	324766, 324784, 324798, 324820, 324838, 324856, 1377682

The partly completed machine may not be put into operation until it has been confirmed that the machine into which the partly completed machine is to be installed complies with the provisions of the "Supply of Machinery (Safety) Regulations 2008".

Applied harmonized standards, especially:

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

Person authorized to compile the technical documentation:
Marcel Machado, address: refer to manufacturer's address

Lauffen/Neckar, August 2025

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

9 Information on the RoHS Directive, REACH Regulation and Substances of Very High Concern (SVHC)

RoHS Directive

SCHUNK products are classified as "large-scale stationary installations" or as "large-scale stationary industrial tools" within the meaning of Directive 2011/65/EU and its extension 2015/863/EU "on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)", or fulfill their intended function only as part of one. Therefore products from SCHUNK do not fall within the scope of the directive at this time.

REACH Regulation

Products from SCHUNK fully comply with the regulations of Regulation (EC) No. 1907/2006 "concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)" and its amendment 2022/477. SCHUNK attaches great importance to completely avoiding chemicals of concern to humans and the environment wherever possible.

Only in rare exceptional cases do SCHUNK products contain SVHC substances on the candidate list with a mass content above 0.1%. In accordance with Article. 33 (1) of Regulation (EC) No. 1907/2006, SCHUNK complies with its duty to "communicate information on substances in articles" and lists the components concerned and the substances used in an overview that can be viewed at **schunk.com\SVHC**.

Signature: see original declaration

Lauffen/Neckar, August 2025

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

SCHUNK SE & Co. KG
Spanntechnik | Greiftechnik | Automatisierungstechnik

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