Assembly and Operating Manual

AGE-Z

Compensation Unit in Z-direction

Superior Clamping and Gripping

SCHUNK®

Imprint

Technical changes:

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

Document number: 389009

Version: 02.00 | 28/05/2019 | 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
Spann- und Greiftechnik

Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

Tel. +49-7133-103-0
Fax +49-7133-103-2399

info@de.schunk.com
schunk.com

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.

NOTICE

Material damage!

Information about avoiding material damage.

1.1.2 Definition of Terms

The term "product" replaces the product name on the title page in this manual.

1.1.3 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**

1.2 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

- Compensation Unit in Z-direction AGE-Z in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.4 Accessories

A wide range of accessories are available for this product

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

1.4.1 Accessories pack

Content of the accessory pack:

Type	Designation	ID number
AGE-Z 50	Cylindrical pin DIN 6325	9682023
AGE-Z 63	Cylindrical pin DIN 6325	9682023
AGE-Z 80	Cylindrical pin DIN 6325	9682089

1.4.2 Sealing kit

ID.-No. of the seal kit

Seal kit for	ID number
AGE-Z 50	5515771
AGE-Z 63	5515770
AGE-Z 80	5515772

Contents of the sealing kit, Assembly drawing [▶ 24].

1.4.3 Sensors

Overview of the compatible sensors

Designation	Type
Magnetic switch	MMS

- Exact type designation of the compatible sensors see catalog.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

2 Basic safety notes

2.1 Intended use

The product is designed for the mechanical adjustment and saving of a positioning point for workpieces and other devices .

- The product may only be used within the scope of its technical data, Technical Data [▶ 13].
- When implementing and operating components in safety-related parts of the control systems, the basic safety principles in accordance with DIN EN ISO 13849-2 apply. The proven safety principles in accordance with DIN EN ISO 13849-2 also apply to categories 1, 2, 3 and 4.
- 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

- 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 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, Technical Data [▶ 13].

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 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.

2.10 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.

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.

⚠ WARNING

Risk of injury due to uncontrolled movements!

Due to faulty control the product can move uncontrolled and cause serious injuries.

- Do not reach into the movement range of the product during commissioning, conversion and adjustment work.
- Observe the direction of rotation of the product when designing the control.

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.

3 Technical Data

Size	50	63	80
Weight [kg]	0.35	0.60	1.10
Operating pressure [bar]			
Min.	2		
Max.	8		
Compensation path in Z direction [mm]	8		
Ambient temperature [°C]			
Min.	+5		
Max	+60		
Noise emission [dB(A)]	≤ 70		
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4		

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

4 Assembly and installation

⚠ WARNING

Risk of injury due to improperly carried out assembly!

Improperly carried out assembly work can lead to severe injuries and property damage.

- Before beginning work, ensure sufficient assembly clearance.
- Secure components from falling down or over.
- Ensure that all work has been carried out in accordance with the specifications in these instructions.
- Observe tightening torques.

⚠ WARNING

Risk of injury when the machine/system moves unexpectedly!

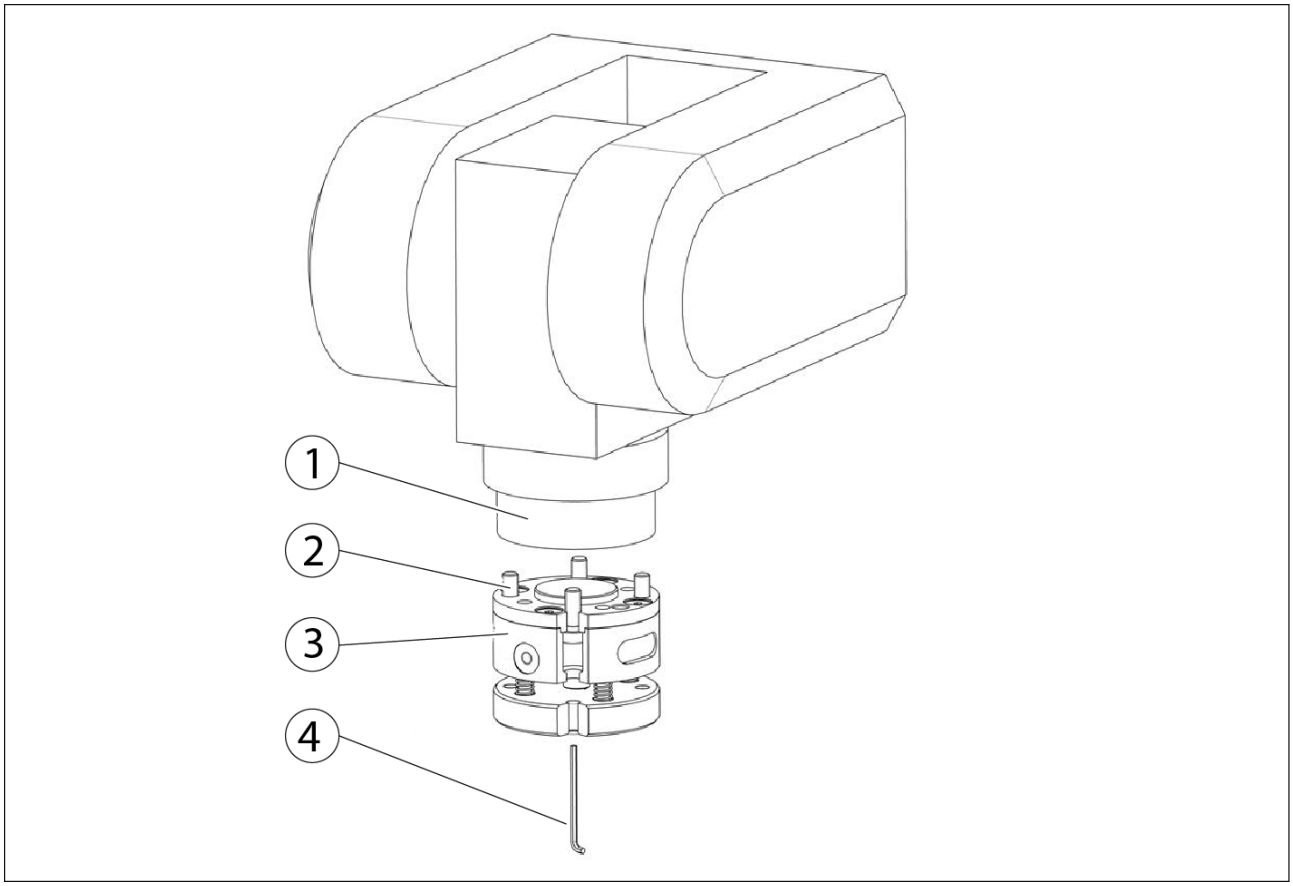
Remove the energy supplies.

Make sure that no residual energy remains in the system.

NOTE

To increase the life of the unit, it is recommended to retract the unit during fast movements and/or heavy loads.

4.1 Assembly example



Assembly example

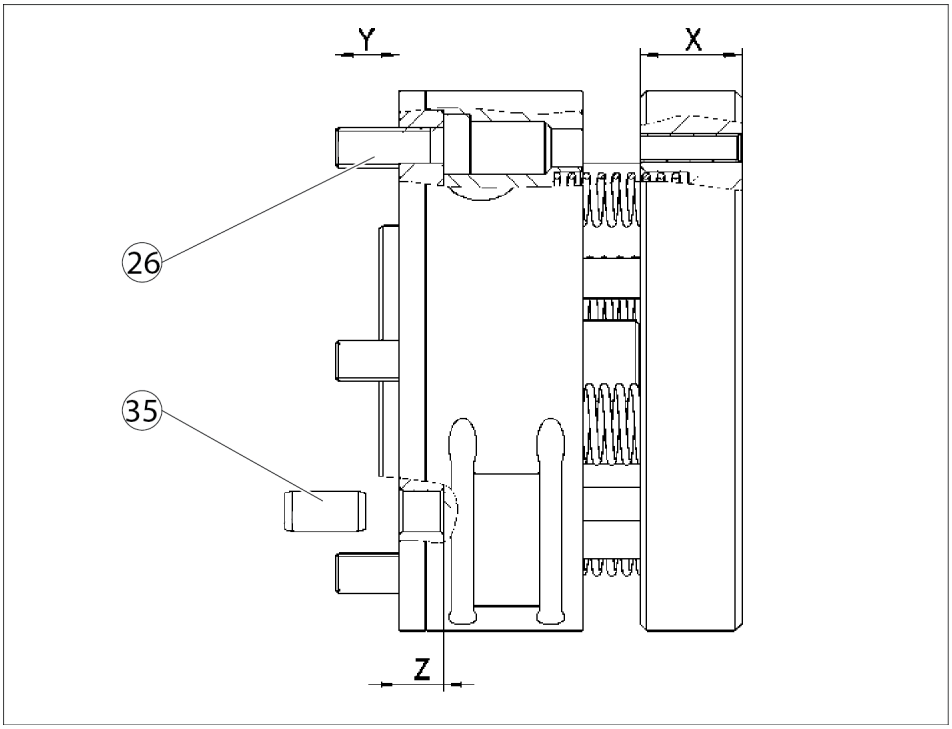
Item	Description	Notes
1	robot arm	With interface according to DIN ISO 9409
2	Mounting screw (preassembled)	
3	AGE-Z compensation element	AGE-Z compensation element
4	Allen key	For fastening the preassembled screws (2)

4.2 Mechanical connection

NOTICE

Breakage due to faulty assembly possible!

- Note the max. depth of engagement robot or tool-side (☞ table: permitted mountings, centering and screw tightening torque).



Module mounting

Type	Robot interface
AGE-Z 50	ISO 9409-1-50-4-M6
AGE-Z 63	ISO 9409-1-63-4-M6
AGE-Z 80	ISO 9409-1-80-6-M8

The cylindrical pin required (35) is included in the accessory pack Accessories pack [▶ 6]. The mounting screws (26) are already shown preassembled in the module.

- The AGE can be centered using the cylindrical pin (35).
- Fasten the AGE to the robot interface (☞ table below) by tightening the preassembled screws (26).
- The pneumatic connection and electric cables are fastened, bundled, and mounted with strain relief so that the greatest possible freedom of movement is available during use.

Permissible fastenings, centering and screw tightening torque

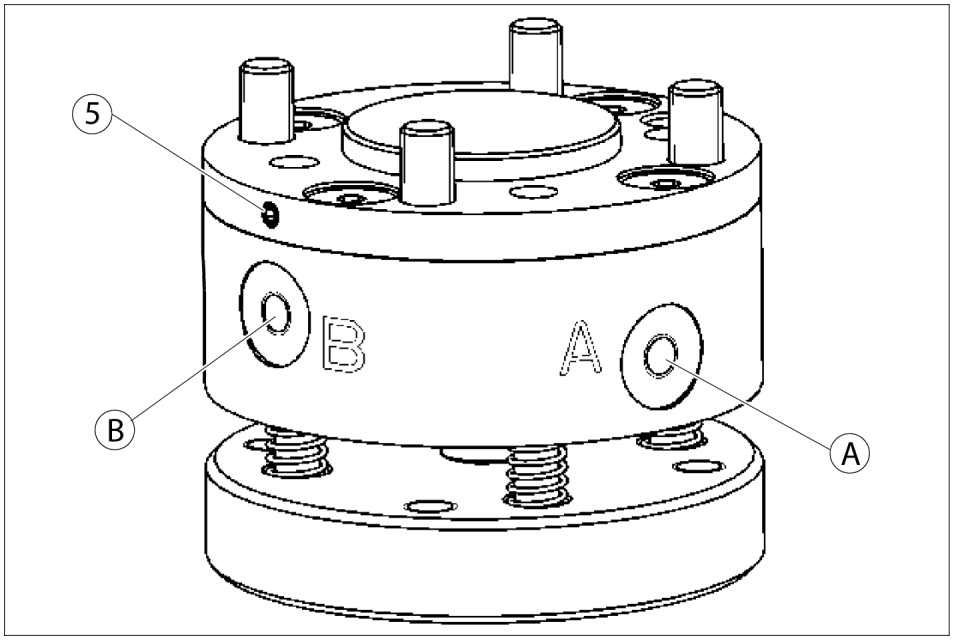
Size	50	63	80
Thread diameter and max. depth of engagement X, tool-side [mm]	M6 / 12 deep	M6 / 14 deep	M8 / 14 deep
Max. depth of engagement Y, robot-side [mm]	9	10	9
Centering diameter and depth Z [mm]	Ø6H7x6	Ø6H7x6	Ø8H7x8
Cylindrical screw DIN 7984 (26)	M6	M6	M8
Tightening torque of the mounting screws [Nm] (26)	10	10	25

For the connection dimensions, see the relevant drawings in the latest catalog.

4.3 Pneumatic connection

NOTICE

Observe the requirements for the air supply
Technical Data [▶ 13].



Compressed air connection

B	Extend connection B	A	Retract connection A

Hose connection A thread diameter	M5
Hose connection B thread diameter	M5

Further information on the hose-free direct connection contains the catalog data sheet.

4.4 Installing the sensors

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 Link Übersicht Sensoren.
- 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.

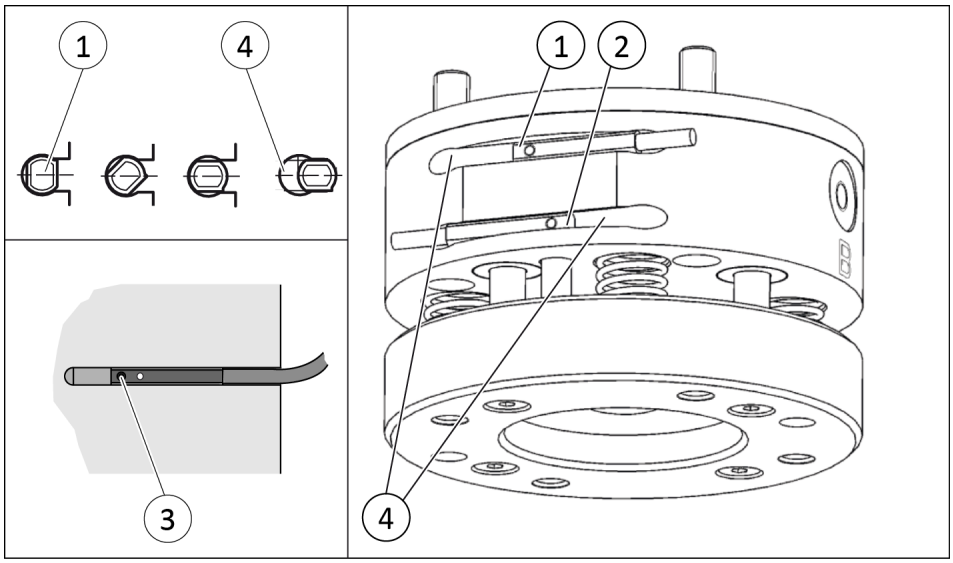
4.4.1 Installing the MMS 22 magnetic switch

NOTICE

Risk of damage to the sensor during assembly!

- Observe the maximal tightening torque.

The switching function is illustrated in deenergized state.



1	Sensor 1 "retracted state"	2	Sensor 2 "extended state"

Compensation unit retracted

- ➢ Apply pressure to connection A.
  - ✓ Product is retracted.
- ➢ Slide the sensor (1) into the groove (4).
- ➢ Pull the sensor (1) back again slowly until it activates.
- ➢ Secure the sensor (1) in this position using the set screw (3). Tightening torque: 10 Ncm
- ➢ Extend and retract the product and test the function.

Compensation unit extended

- ➢ Apply pressure to connection B.
  - ✓ Product is extended.
- ➢ Slide the sensor (2) into the groove (4).
- ➢ Pull the sensor (2) back again slowly until it activates.
- ➢ Secure the sensor (2) in this position using the set screw (3). Tightening torque: 10 Ncm
- ➢ Extend and retract the product and test the function.

5 Troubleshooting

Malfunction / fault occurring	Possible cause / Corrective action
The AGE-Z is leaking air at standstill	Air connection not installed correctly.
	Unused air connections open.
The AGE-Z is leaking air during operation	The AGE-Z will have to be sent back to the production facility for inspection

6 Maintenance

6.1 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.

Size	50 - 80
Interval [Mio. cycles]	1.5

6.2 Lubrication

During maintenance, certain parts should be coated with oil or grease (basic lubrication). At every maintenance of the AGE-Z all seals must be renewed. The complete sealing kit can be ordered from SCHUNK.

6.3 Disassembling the product

Position of the item numbersAssembly drawing [▶ 24]

NOTICE

Take care not to damage any seals during assembly.

The complete sealing kit can be ordered from SCHUNK.

- Remove the pressure lines and cable connections.
- Unscrew the screws (25) and remove robot flange (2); then remove the screws (26).
- Screw out the screw (30) and simultaneously apply counter pressure to the (27) and simultaneously screw out the cylinder piston (6) and piston rod (5) from the housing (1).
- Push the centering piston (4) with the cylinder piston (5) out of the housing (2).
- To assemble the module, complete the procedure above in reverse.

6.4 Servicing and assembling the product

Maintenance

- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant.
  Lubrication [▶ 22]
- Oil or grease bare external steel parts.
- Replace all wear parts / seals.

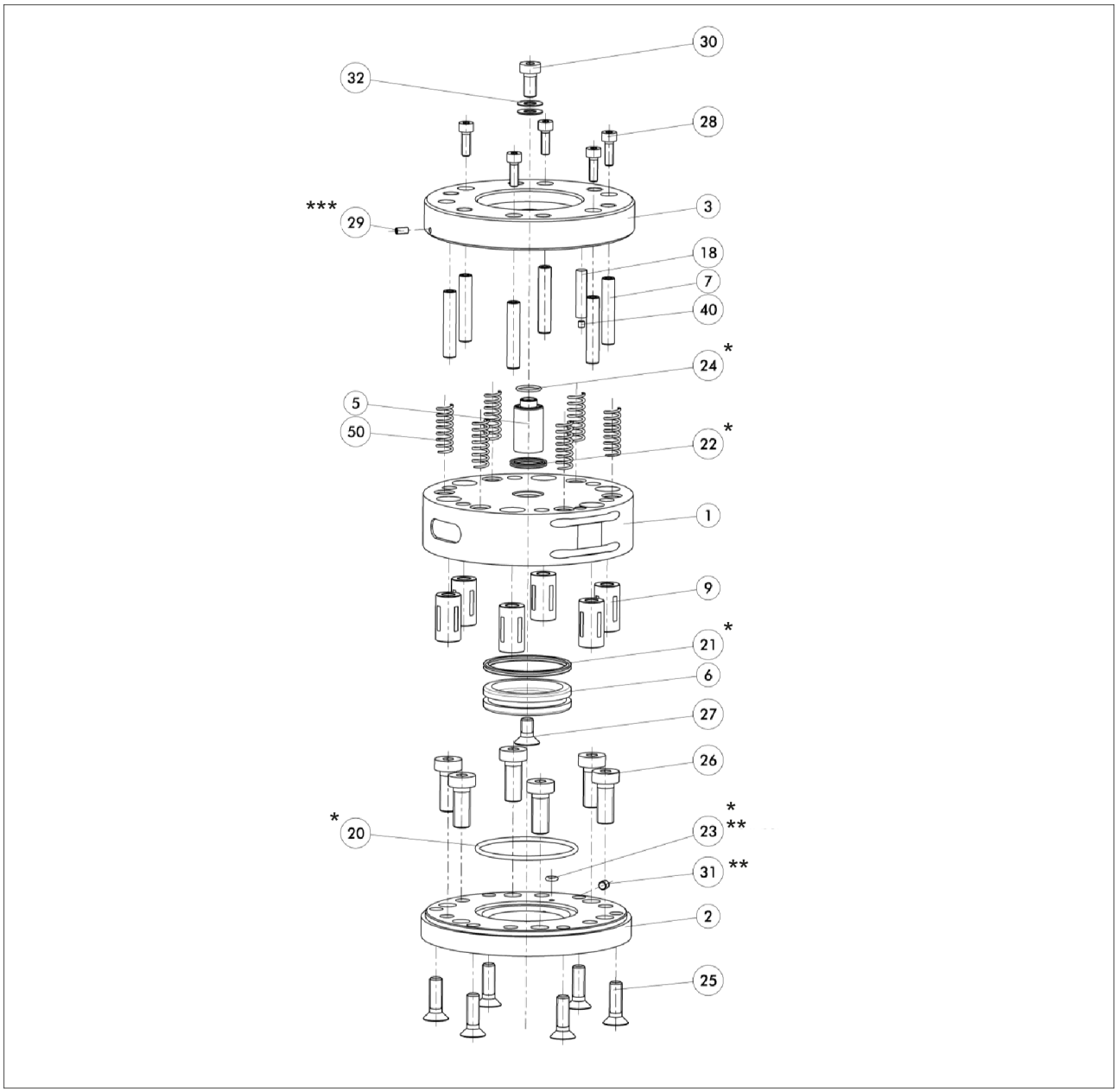
Assembly

Assembly takes place in the opposite order to disassembly.
Observe the following:

- Unless otherwise specified, secure all screws and nuts with Weicon no. 30243 and tighten with the appropriate tightening torque.

7 Assembly drawing

The following figure is an example image.
It serves for illustration and assignment of the spare parts.
Variations are possible depending on size and variant.



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

** Not for AGE-Z 63

*** Not for AGE-Z 50 and 63

8 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 Spann- und Greiftechnik 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:	Compensation Unit in Z-direction / AGE-Z / pneumatic
ID number	324452, 324465, 324482

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 2019

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

9 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	Compensation Unit in Z-direction
Type designation	AGE-Z
ID number	324452, 324465, 324482

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	Protection against mechanical hazards			
1.3.5	Risks related to combined machinery			X
1.3.6	Risks related to variations in operating conditions			X
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	