

Assembly and operating manual

KONEX S

Plastic pneumatic rotary actuator



Imprint

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Technical changes:

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

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Dear Customer,

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

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

Best regards,

Your SCHUNK team

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

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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 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

- Plastic pneumatic rotary actuator KONEX S in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.3.1 Accessory pack

Content of the accessory pack:

- 4x cylindrical pin DIN 6325 - Ø6m6

ID.-No. of the accessory pack

Accessory pack for	ID number
KONEX S 50	5510621

Content of the accessories pack: [Assembly drawing](#) [▶ 22].

1.4 Accessories

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

- Sensors
- Adapter plate
- Snap connector with removal key

1.4.1 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.

1.4.2 Seal kit

Content of the sealing kit:

- 2x cylinder seal
- 2x M6 thread seal
- 4x O-ring DIN 3771 18.0x1.0

ID.-No. of the seal kit

Seal kit for	ID number
KONEX S 50	0370787

Contents of the sealing kit, [Assembly drawing](#) [▶ 22].

2 Basic safety notes

2.1 Intended use

The product may only be used for swiveling permissible attachment parts or workpieces.

- The product may only be used within the scope of its technical data, [Technical data](#) [▶ 14].
- 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

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 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](#) [▶ 14].

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 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 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.

2.13 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.



⚠ WARNING

Risk of injury from objects falling and being ejected!

Falling and ejected objects during operation can lead to serious injury or death.

- Take appropriate protective measures to secure the danger zone.



⚠ 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.



⚠ WARNING

Risk of injury from sharp edges and corners!

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.

3 Technical data

Size	KONEX S 50
Torque [Nm]	0.9
Angle of rotation [°]	180.0
End position adjustability [°]	2.0
Max. permissible axial bearing load [N]	800.0
Max. permissible radial bearing load [Nm]	10.4
Weight [kg]	0.53
Noise emission [dB(A)]	≤ 70
IP rating	40
Nominal working pressure [bar]	6.0
Min. pressure [bar]	2.0
Max. pressure [bar]	6.5
Ambient temperature [°C]	
Min. ambient temperature [°C]	+ 5
Max. ambient temperature [°C]	+ 60

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

4 Assembly

4.1 Connections

4.1.1 Mechanical connection

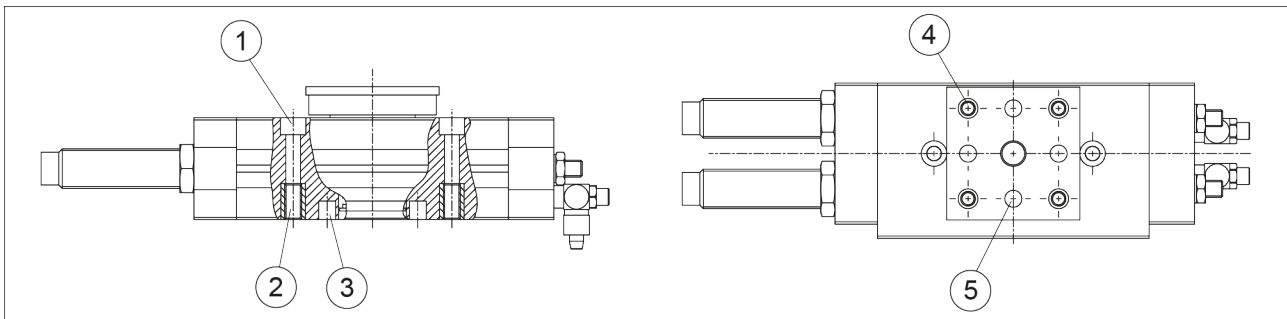
Evenness of the mounting surface

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

Mounting the rotary actuator



1	Screw M5x45 (2x)	4	M5 internal thread (4x)
2	M6 thread (2x)	5	Fitting bore $\varnothing 6$ H9 (4x)
3	Cylindrical pin (50) $\varnothing 6$ m6x12		

The rotary actuator can be fastened to two internal threads from below or with two screws from above.

Use the cylindrical pins from the accessory pack for centering.

Assembly of the adapter plates

The adapter plate can be fastened with four M5 screws to the internal threads of the pinion.

Use the cylindrical pins (50) from the accessory pack for centering.

Assembly of the snap connectors

The KONEX V50 or V55 snap connectors can be clipped onto the pinion or onto the bottom of the housing.

They are removed with the supplied removal key.

4.1.2 Pneumatic connection

NOTICE

Damage to the gripper is possible!

If the maximum permissible finger weight or the permissible mass moment of inertia of the fingers is exceeded, the gripper can be damaged.

- A jaw movement always has to be without jerks and bounce.
- You must therefore implement sufficient reduction and/or damping.
- Observe the diagrams and information in the catalog data sheet.

NOTE

- Observe the requirements for the compressed air supply, [Technical data](#) [▶ 14].
- In case of compressed air loss (cutting off the energy line), the components lose their dynamic effects and do not remain in a secure position. However, the use of a SDV-P pressure maintenance valve is recommended in this case in order to maintain the dynamic effect for some time. Product variants are also offered with mechanical gripping force via springs, which also ensure a minimum clamping force in the event of a pressure drop.

Position of the item numbers [Assembly drawing](#) [▶ 22]

Swivel mode

The air connections used to operate the swivel unit can be found on the face side in the cover (3).

These connections are equipped with one-way flow control valves (31).

Always use one-way flow control valves for connection.

Connection	Function
A	Swivel unit, clockwise rotation
B	Swivel unit, counter-clockwise rotation

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

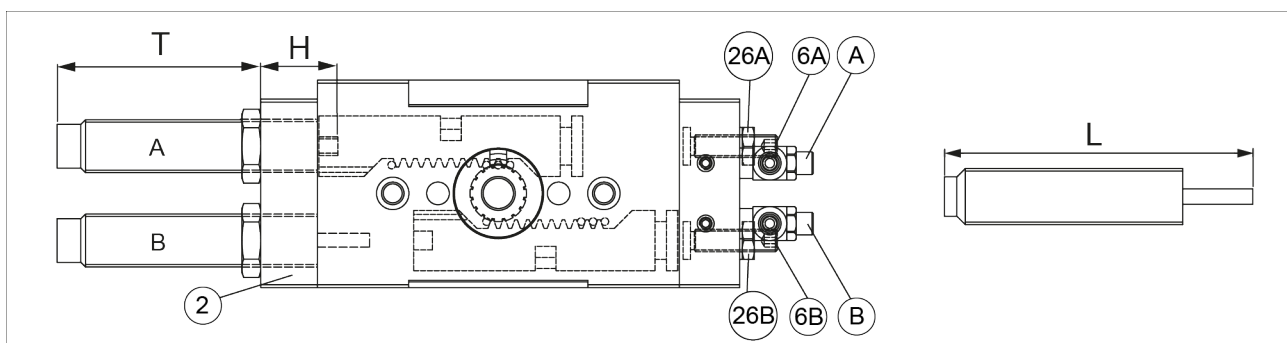
4.2 Rotating angle adjustment

- Adjust the end position with the set screw (6). The adjustment range is $\pm 2^\circ$.
- Connect the pressure lines to connection A.
- Loosen the lock nut (26B) by the set screw (6B).
- Turn the set screw until the desired end position is reached.
- Re-tighten the lock nut (26B).
- Remove the pressure line from connection A and connect it to connection B.
- Adjust the second rotating angle stop with the set screw (26A).
- Loosen the lock nut (26A) by the set screw (6A).
- Turn the set screw until the desired end position is reached.
- Connect both pressure lines and check them again after swiveling the pinion several times.

4.3 Shock absorber replacement

NOTE

Check the rotating angle after replacing a shock absorber.



L= total shock absorber length in extended condition of the new damper

- To replace shock absorber A, connect the pressure line to connection A.
- Loosen the hexagon nut of the shock absorber.
- Unscrew the shock absorber.
- Determine the dimension **H** and remove the pressure line.
- Determine the dimension **L** on the new shock absorber.
- Turn the pinion by hand to move the piston away from the end position until its piston rod is not resting on the piston of the rotary actuator when screwing in the new damper.
- Screw the new shock absorber into the cover (2) up to dimension **T**.
Dimension T = L - H - 11.5 mm.
- Lock the shock absorber with a hexagon nut.

- To replace shock absorber B, connect the pressure line to connection B.
- Loosen the hexagon nut of the shock absorber.
- Unscrew the shock absorber.
- Determine the dimension **H** and remove the pressure line.
- Determine the dimension **L** on the new shock absorber.
- Turn the pinion by hand to move the piston away from the end position until its piston rod is not resting on the piston of the rotary actuator when screwing in the new damper.
- Screw the new shock absorber into the cover (2) up to dimension T.

Dimension T = L - H - 11.5mm.

4.4 Mounting the sensor

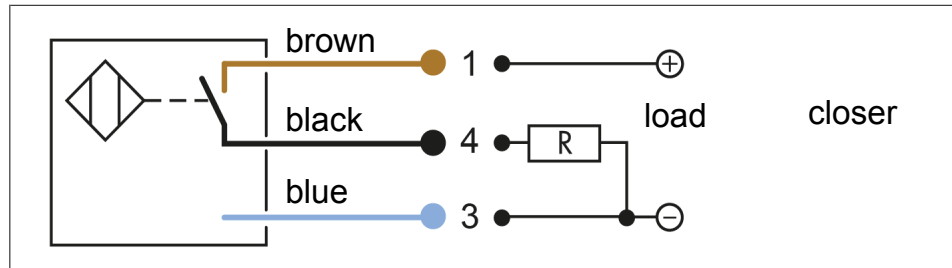
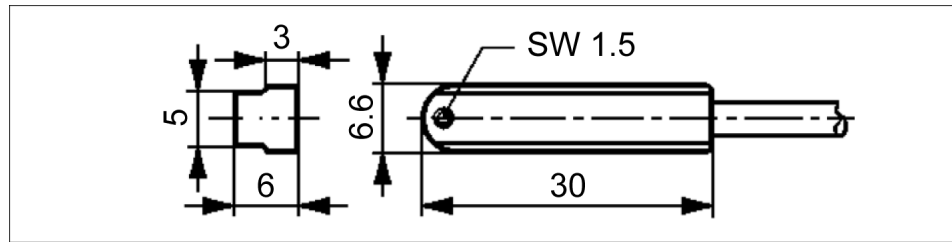
NOTE

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 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 MMS 30 magnetic switch



NOTICE

Risk of damage to the sensor during the assembly.

Observe a maximum tightening torque of 0.2 Nm for the set-screws.

NOTE

Ferromagnetic material changes the switching positions of the sensor. For example: Adapter plate made of ordinary steel.

At ferromagnetic adapter plates:

- First mount the product on the adapter plate.
- Then set the position of the magnetic switch.

Assembly and adjustment of the magnetic switches

- Actuate the rotary actuator connection until it reaches its end positions.
- Push magnetic switch 1 from above into the intended T-slot with the cable pointing downwards until it switches.
- Mount magnetic switch 1 by tightening the set-screw.
- Swivel the rotary actuator into its other end position in order to test the function.
- Actuate the rotary actuator connection until it reaches its end positions.
- Push magnetic switch 2 from above into the intended T-slot with the cable pointing downwards until it switches.
- Mount magnetic switch 2 by tightening the set-screw.
- Swivel the rotary actuator into its other end position in order to test the function.

5 Maintenance

5.1 Notes

Original spare parts

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

5.2 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.

Size	50
Interval [Mio. cycles]	2

5.3 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
Serration of the pinion	Molykote BR 2 plus
All seals	Renolit HLT 2
Metallic sliding surfaces	Renolit HLT 2

5.4 Disassembly of the module

Position of the item numbers [Assembly drawing](#) [► 22]



⚠ 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.

- Remove the compressed air lines.
- Remove the screws (27) and detach the bottom cover (2/3).
- Remove the O-rings (23).
- Mark the installation position of the pinion (4) and the position of the two pistons (5).
- Remove the shaft retaining ring (30).
- Press the pinion out of the housing from below.
- Push the piston out of the housing in **X** direction.
- Remove all seals.
- Clean all parts and check them for defects and wear.

5.5 Servicing and assembling the module

Maintenance

- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant.
[Lubricants/Lubrication points \(basic lubrication\)](#) [▶ 20]
- Oil or grease bare external steel parts.
- Replace all wear parts / seals.
 - Position of the wearing parts [Assembly drawing](#) [▶ 22]
 - Seal kit [Seal kit](#) [▶ 7]

Assembly

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

- Unless otherwise specified, secure all screws and nuts with Loctite no. 243 and tighten with the appropriate tightening torque.

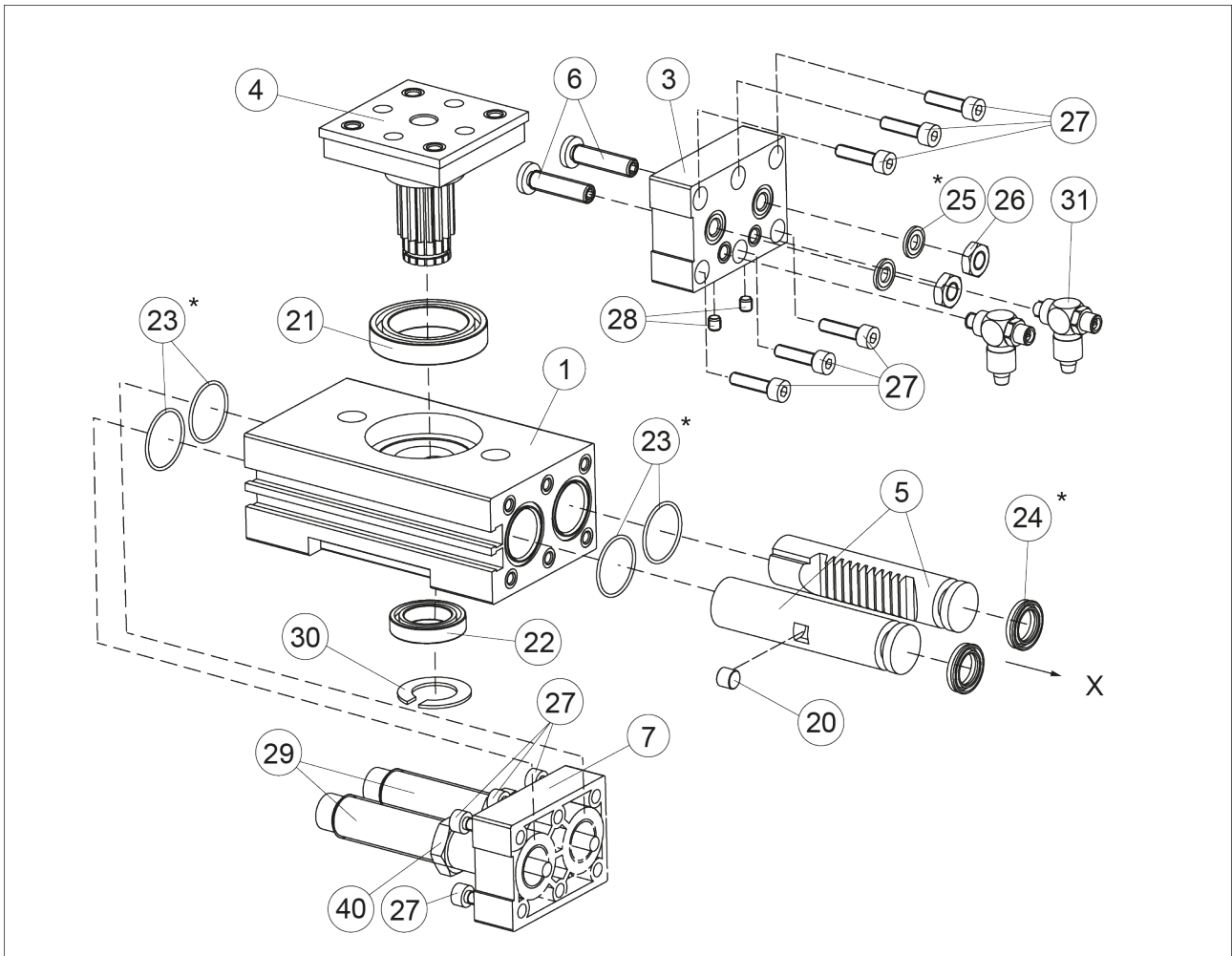
5.6 Disposal

The plastics which had been used to manufacture this gripper can be recycled very easily.

You can send it back to SCHUNK

SCHUNK will take care of a proper disposal of the material.

5.7 Assembly drawing

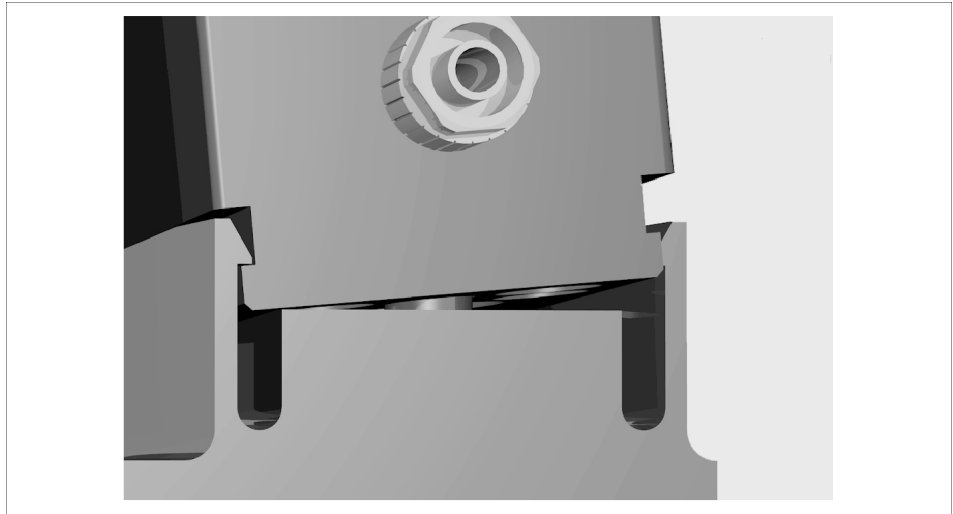


Assembly

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

6 Connection technique

6.1 Assembly / Disassembly of the Module



Every interface of the module is equipped with undercuts, which allow to snap in the connector. Therefore, the modules may be connected 90° offset.

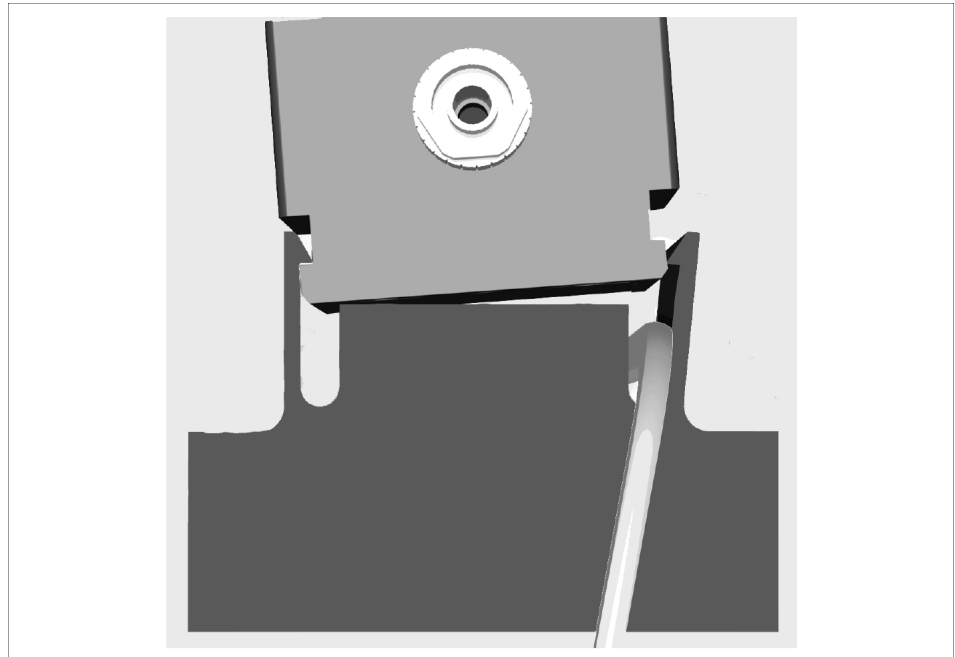
6.2 Connection



The snap connector as a component, takes over the functions centering and fastening of the module.

For connection, the components are jammed, until the snap connector snaps into the undercut.

6.3 Loosen the connection in a „one second“- cycle time



For disassembling you do not have to cope with damaged or jammed screws.

Just use the tool which is adjusted to the rate of expansion of the snapconnector and that is included in the delivery of every module.

Insert the key into the provided groove of the snap connector and turn the key by 90° in order to loosen the snap connector.

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	Plastic pneumatic rotary actuator
Type designation	KONEX S
ID number	0305450

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	

Translation of original declaration of incorporation

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	