Assembly- and Operating Manual
SKE
Swivel Unit

Superior Clamping and Gripping

SCHUNK®

Imprint

Technical changes:

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

Document number: 389407

Version: 06.00 | 23/02/2021 | 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

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Fax +49-7133-103-2239

cms@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.

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 [▶ 5] 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**

1.2 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

- Swivel Unit SKE in the version ordered
- 2 One-way restrictors
- Brackets for proximity switches

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 Sensors

Overview of the compatible sensors

Designation	Type
Inductive proximity switches	IN

- 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 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 [▶ 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

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 [▶ 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 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

	SKE 18	SKE 22	SKE 40	SKE 55
Torque [Nm]	0.4	0.75	5.0	9.0
Angle of rotation [°]	90.0			
End position adjustability[°]	5.0			
IP rating	30			
Weight [kg]	0.13	0.2	0.92	1.95
Cycle time (1 x nominal angle of rotation) without attached load [s]	0.5	0.8	1.0	1.5
Air consumption per cycle (2 x nominal angle) [cm3]	10.0	20.0	100.0	160.0
Nominal working pressure [bar]	4.0			
Min. pressure [bar]	1.0			
Max. pressure [bar]	6.0			
Diameter hose connection [mm]	4.0			
Min. ambient temperature [°C]	5.0			
Max. ambient temperature [°C]	50.0			
Repeatability [mm]	0.03			
Noise emission [dB(A)]	≤ 70			

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

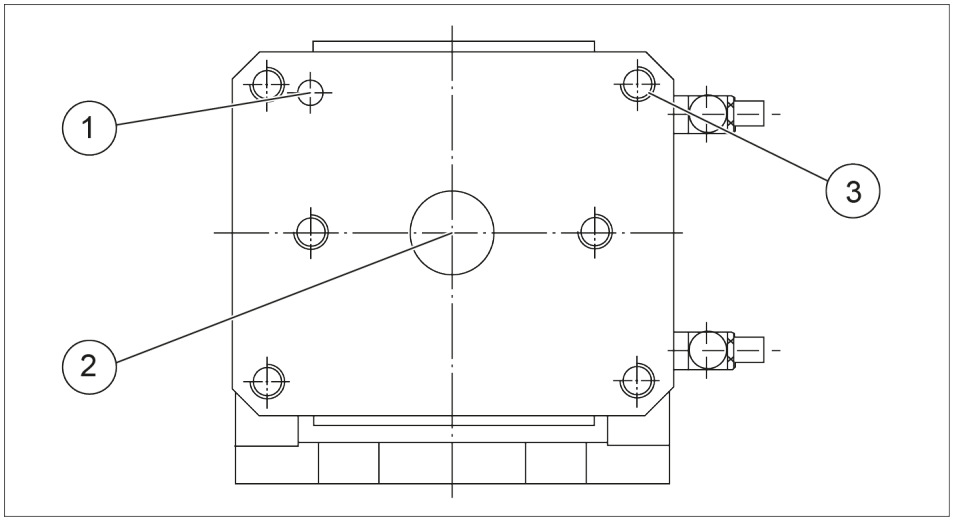
4 Assembly

4.1 Connections

4.1.1 Mechanical connection

Connections on the housing

1. Fasten the product with the aid of the threads (3) on the bottom.
2. Center the product on the central fitting bore (2).
3. Use off-center fitting bore (1) for positioning.



Assembly options (principle drawing)

Mounting material (provided by the customer)

Item	Mounting	SKE 18	SKE 22	SKE 40	SKE 55
1	Positioning	Ø 5 $^{+0.03}$ 5 deep	Ø 5$^{+0.03}$ 6 deep	Ø 5 $^{+0.03}$ 8 deep	Ø 6 $^{+0.03}$ 6 deep
2	Centering bore	Ø 7 1.8 deep	Ø 20 3.0 deep	Ø 20 3.0 deep	Ø 20 3.0 deep
3	Mounting thread	M3 / 4 deep (6x) M4 / 7 deep (4x)	M5 / 6 deep (4x) M6 / 8 deep (2x)	M6 / 20 deep (4x) M8 / 15 deep (2x)	M8 / 15 deep (6x)

4.1.2 Pneumatic connection

⚠ WARNING

Risk of injury due to moving parts!

Rotating components and/or components moving linearly may cause severe injuries.

- Do not interfere with moving parts during operation.
- Wear protective equipment.

NOTE

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

NOTE

The air connections are equipped with one-way flow control valves.

The optimal swiveling speed is achieved by adjusting the swiveling time on the exhaust air throttles.

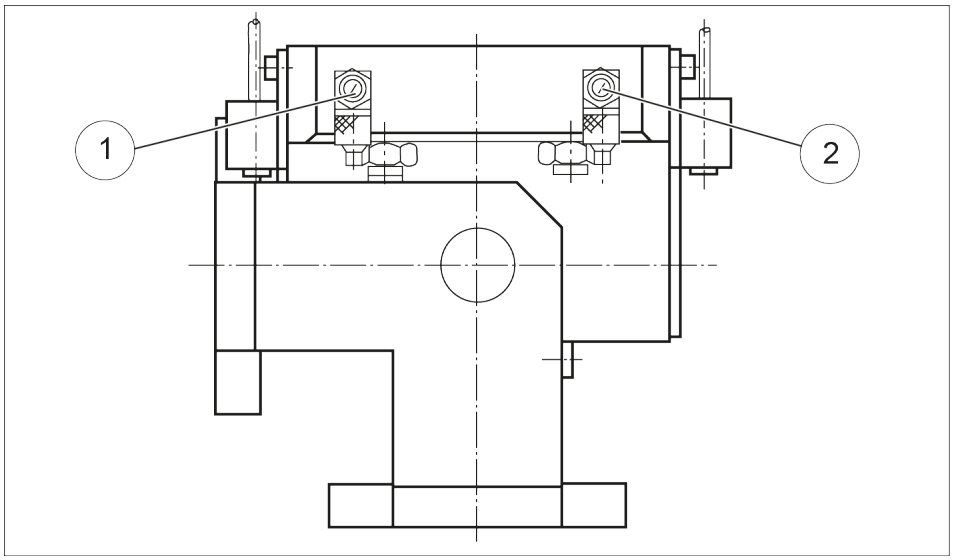
Fine adjustment must be carried out on the fully assembled system. Never operate the swivel unit without the one-way flow control valves mounted. Do not go below the specified swiveling time.

CAUTION

Material damage due to too high swiveling speed!

If the swiveling speed is too high, the assembly will be decelerated abruptly by the shock absorber and will continue to oscillate until reaching the end position. This will overload the shock absorber and may cause damage to it.

- Adjust the swiveling speed in a way, that the movement decelerate smoothly in the end position.



Pneumatic connections

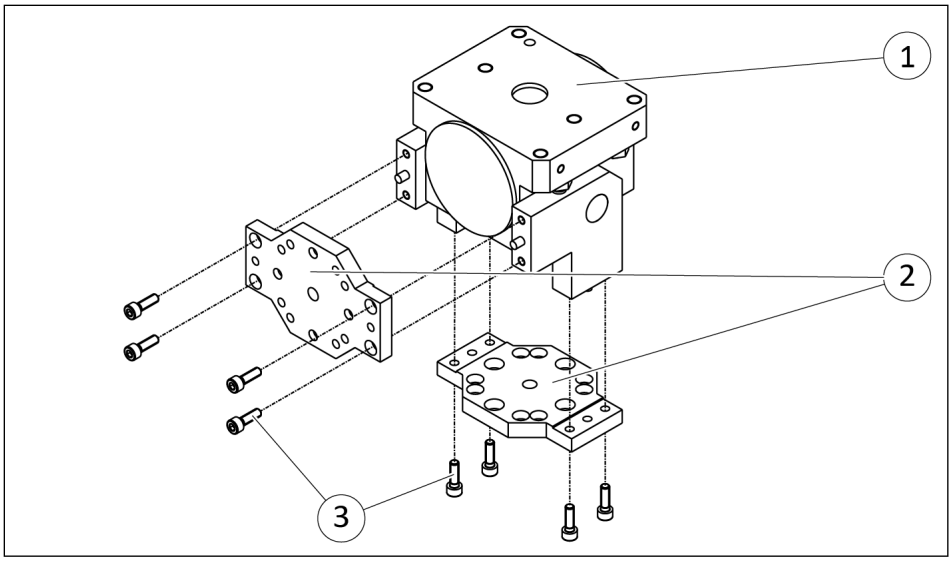
1	Throttle A
2	Throttle B

- 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.
- Turn the set screws of the one-way flow control valves to center position.
- Connect the hoses with dimension Ø4 / 6 mm.

4.2 Gripper assembly

One or two grippers can be mounted on the swivel unit (1).

1. Remove the adapter plates (2) to facilitate installation.
2. Fasten gripper(s) to adapter plates (2) with screws. **IMPORTANT! Make sure that the screw heads do not protrude.** Note: The grippers can be mounted centrally on the adapter plate either parallel or vertical to the swivel axis.
   ✓ Observe the tightening torque.
3. Fasten the adapter plates (2) with screws (3).
   ✓ Observe the tightening torque.



Gripper fastening screw dimension

Usable grippers and dimensions of fastening screws

Type	Gripper type/fastening screw dimension (DIN EN ISO 4762)		
SKE 18	RHL 0 / M3	RH 901 / M3	RH 901 ST 10 / M3
SKE 22	RH 801 / M3	RH 905 / M4	RH 907 / M4
SKE 40	RH 806 KP / M4	RH 925 / M5	-
SKE 55	RH 940 / M6	-	-

Tightening torque

Tightening torque, fastening screws, gripper/adapter plate

Type	Fastening screw dimension DIN EN ISO 4762, 10.9	Tightening torque [Nm]
SKE 18	M2.5	0.9
SKE 22	M3	1.6
SKE 40	M4	3.8
SKE 55	M5	7.5

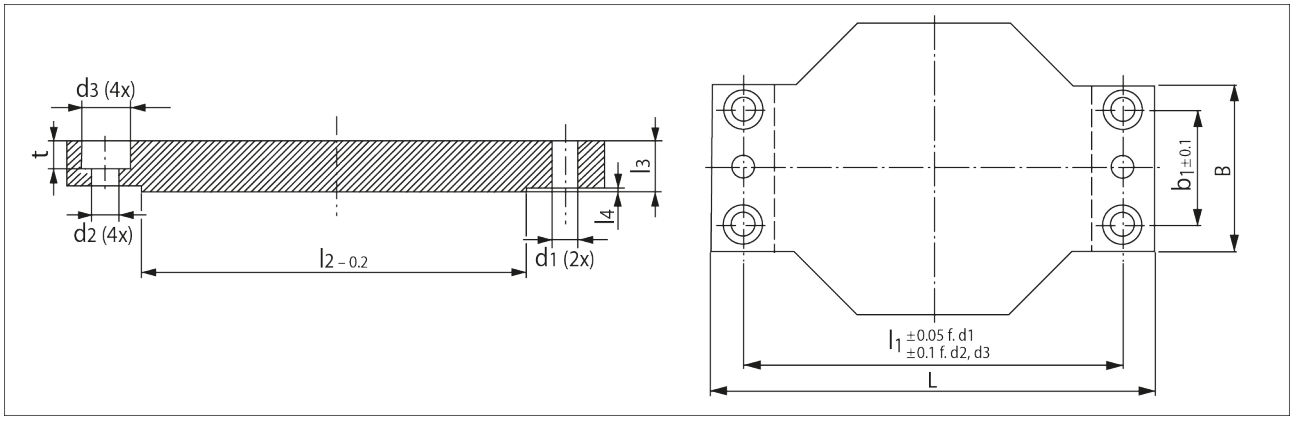
4.3 Other grippers

Further grippers can be flanged-mounted by using special adapter plates.

Use four screws according to DIN EN ISO 4762 for fastening. Observe the tightening torque, Gripper assembly [▶ 17].

Positioning is achieved using 2 fitting bores and longitudinal milling.

Main dimensions of the special adapter plates:



Special adapter plate dimension

Type	L	B	l_1	l_2	l_3	l_4	b_1	d_1	d_2	d_3	t
SKE 18	42	16	8	30	4	0.5	10	3 F7	2.8	5.0	2.8
SKE 22	54	20	46	38	6	1.0	13	5 F7	3.3	6.0	3.4
SKE 40	74	30	64	54	8	1.0	20	5 F7	4.4	7.6	4.6
SKE 55	106	40	91	76	10	1.0	28	5 F7	5.4	9.0	5.5

4.4 Mounting the sensor

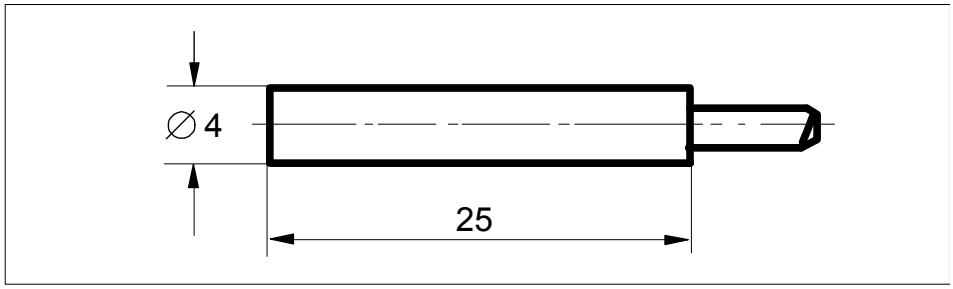
NOTE

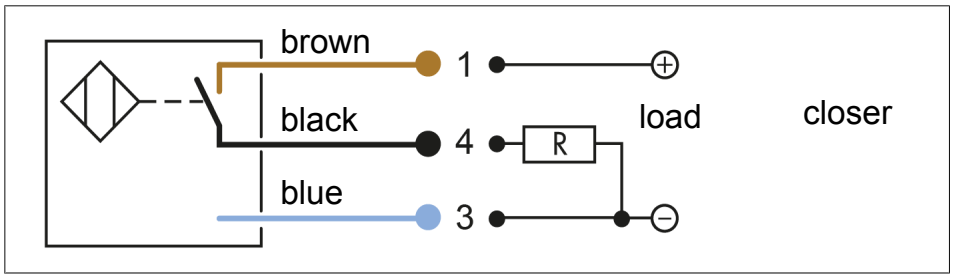
Observe the assembly and operating manual of the sensor for mounting and connecting.

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 Inductive proximity switch IN 40





Types that can be ordered (☞ catalog):

The inductive proximity switches used are equipped with reverse polarity protection and are short-circuit-proof.

Make sure that you handle the proximity switches properly:

- Do not pull on the cable.
- Do not allow the sensor to dangle from the cable.
- Do not overtighten the mounting screw or mounting clip.
- Please adhere to a permitted bend radius of the cable (☞ catalog).
- Avoid contact of the proximity switches with hard objects and with chemicals, in particular nitric acid, chromic acid and sulphuric acid.

The inductive proximity switches are electronic components, which can react sensitively to high-frequency interference or electromagnetic fields.

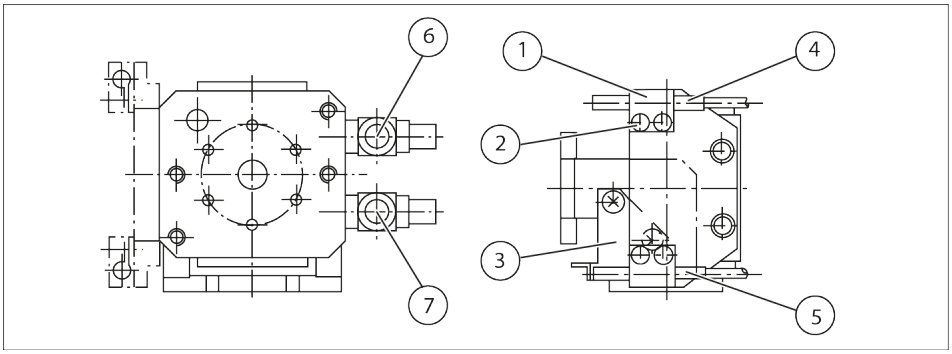
- Check to make sure that the cable is fastened and installed correctly. Provide for sufficient clearance to sources of high-frequency interference and their supply cables.
- Parallel switching of several sensor outputs of the same type (npn, pnp) is permissible, but does not increase the permissible load current.
- Note that the leakage current of the individual sensors (approx. 2 mA) is cumulative.

Pressurize connection A with compressed air.

Plug in the proximity switch 1 into the bracket of the contact plate until the distance between them is 1.5 mm and fix it with an attachment screw.

Do the same for connection B and proximity switch 2.

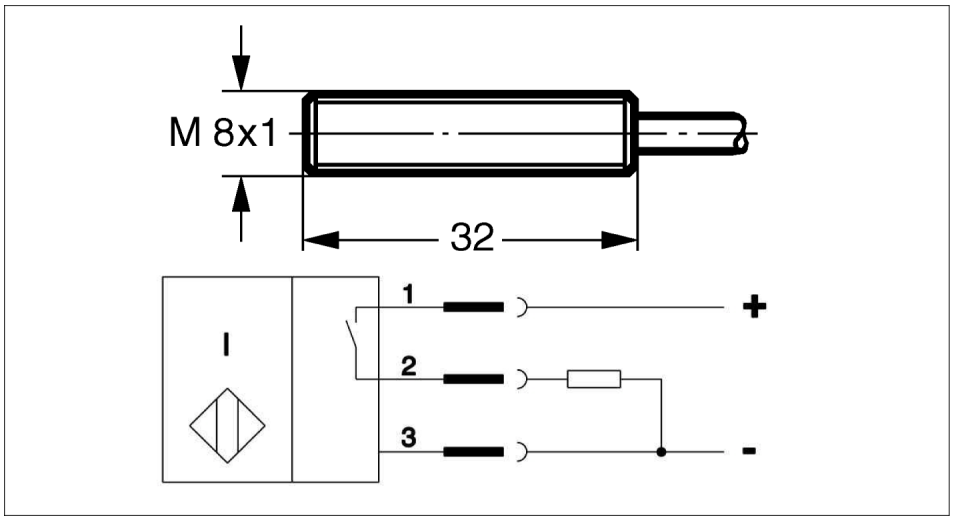
Proximity switch for SKE 18



Proximity switch for SKE 18

1	Bracket
2	Attachment screw (DIN 912 M2.5 x 6)
3	Contact plate
4	Proximity switch **2**
5	Proximity switch **1**
6	Connection **A**
7	Connection **B**

4.4.2 Inductive proximity switch IN 80



Connection example for IN 80

1	brown	2	black	3	blue

The inductive proximity switches used are equipped with reverse polarity protection and are short-circuit-proof.

Make sure that you handle the proximity switches properly:

- Do not pull on the cable.
- Do not allow the sensor to dangle from the cable.
- Do not overtighten the mounting screw or mounting clip.
- Please adhere to a permitted bend radius of the cable. (☞ catalog)
- Avoid contact of the proximity switches with hard objects and with chemicals, in particular nitric acid, chromic acid and sulphuric acid.

The inductive proximity switches are electronic components, which can react sensitively to high-frequency interference or electromagnetic fields.

- Check to make sure that the cable is fastened and installed correctly. Provide for sufficient clearance to sources of high-frequency interference and their supply cables.
- Parallel switching of several sensor outputs of the same type (npn, pnp) is permissible, but does not increase the permissible load current.
- Note that the leakage current of the individual sensors (ca. 2 mA) is cumulative.

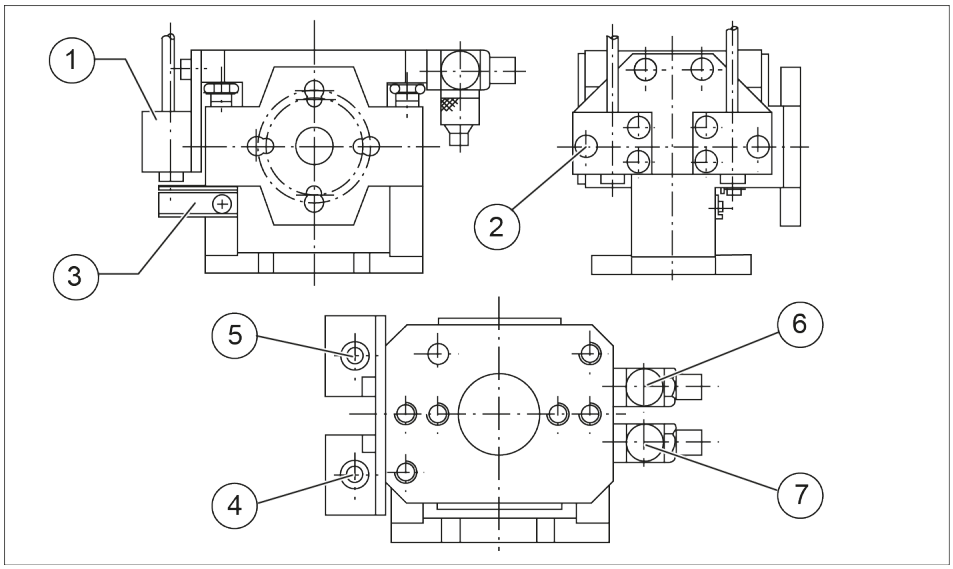
Pressurize connection A with compressed air.

Plug in the proximity switch 1 into the bracket of the contact plate until the distance between them is 1.5 mm and fix it with an attachment screw.

In case of SKE 55, the adapter plates have the function of a contact plate.

Do the same for connection B and proximity switch 2.

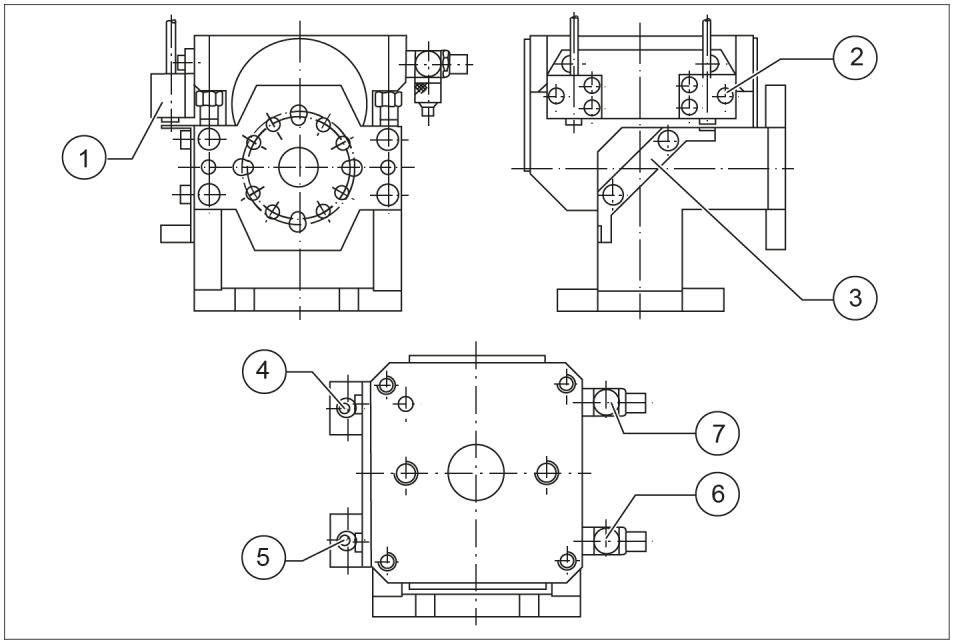
Proximity switch for SKE 22



Proximity switch for SKE 22

1	Bracket
2	Attachment screw (DIN 912 M3 x 8)
3	Control cam
4	Proximity switch **2**
5	Proximity switch **1**
6	Connection **A**
7	Connection **B**

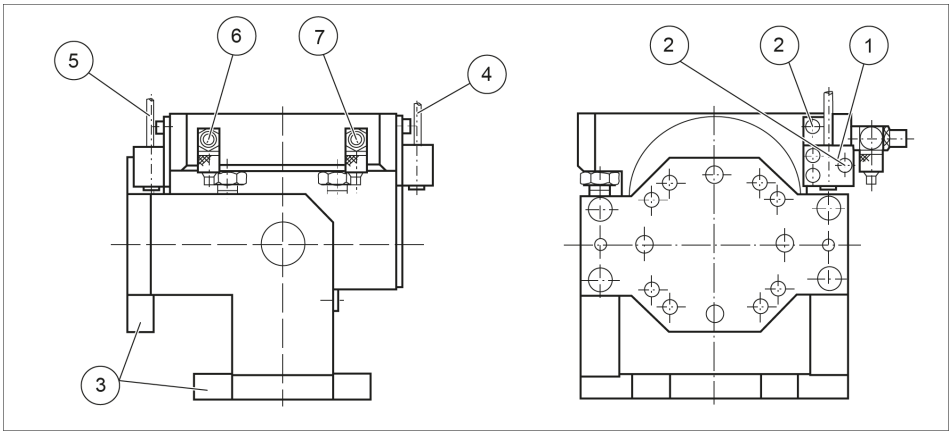
Proximity switch for SKE 40



Proximity switch for SKE 40

1	Bracket
2	Attachment screw (DIN 912 M3 x 8)
3	Contace plate
4	Proximity switch **2**
5	Proximity switch **1**
6	Connection **A**
7	Connection **B**

Proximity switch for SKE 55



Proximity switch for SKE 55

1	Bracket
2	Attachment screw (DIN 912 M3 x 8)
3	Adapter plate
4	Proximity switch **2**
5	Proximity switch **1**
6	Connection **A**
7	Connection **B**

5 Maintenance and care

The swivel unit is maintenance-free.

If the product gets dirty, wipe it carefully with a soft cloth. Do not use solvents.

6 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:	Swivel Unit / SKE / pneumatic
ID number	0351100 ... 0351106

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, February 2021

p.p. Ralf Winkler;
Head of Technology & Engineering,
Mechanics Gripping Systems

6.1 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	Swivel Unit
Type designation	SKE
ID number	0351100 ... 0351106

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	

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