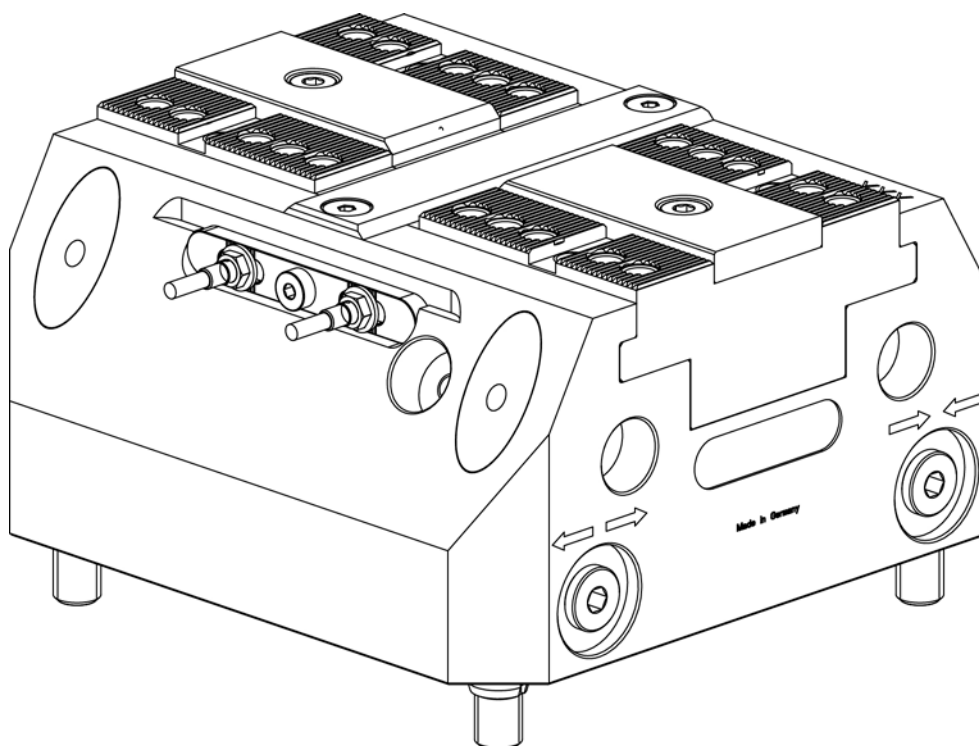


TANDEM pneumatic power clamping block

KSP plus-IN, KSP-LH plus-IN, KSP plus-IN2, KSP-LH plus-IN2

Assembly and Operating Manual



Imprint

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

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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

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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 [\(☞ 1.1.2, Page 6\)](#) are applicable.

1.1.1 Presentation of Warning Labels

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

	<p>⚠ DANGER</p> <p>Danger for persons! Non-observance will inevitably cause irreversible injury or death.</p>
	<p>⚠ WARNING</p> <p>Dangers for persons! Non-observance can lead to irreversible injury and even death.</p>
	<p>⚠ CAUTION</p> <p>Dangers for persons! Non-observance can cause minor injuries.</p>
	<p>NOTICE</p> <p>Material damage! Information about avoiding material damage.</p>

1.1.2 Applicable documents

- General terms of business*
- Catalog data sheet of the purchased product *

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

1.1.3 Sizes

This operating manual applies to the following sizes:

- KSP plus IN 100, 160, 250
- KSP-LH plus IN 100, 160, 250
- KSP plus IN2 100, 160, 250
- KSP-LH plus IN2 100, 160, 250

1.2 Warranty

The warranty period is 24 months after delivery date from factory or 500 000 cycles*, if it is used as intended, under the following conditions:

- Observe the applicable documents ([☞ 1.1.2, Page 6](#))
- Observe the ambient conditions and operating conditions, ([☞ 2.6, Page 9](#))
- Observance of the specified care and maintenance instructions ([☞ 7, Page 37](#))

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

* A cycle consists of a complete clamping process ("Open" and "Close").

1.3 Scope of Delivery

Clamping force block

KSP plus-IN, KSP-LH plus-IN, KSP plus-IN2 or KSP-LH plus-IN2

including inductive proximity switch
(without top jaws)

ACCESSORY PACK:

(for contents, see sealing kit and parts list)([☞ 8.1, Page 41](#))

1.4 Accessories

(see catalog or data sheets when ordering separately)

Top jaw blanks, type: STR, KTR

Supporting jaws, type: TBA-D

TANDEM Base plates

Valves, pneumatic screws

Extension cable for INW inductive proximity switch

Retrofitting kit IN2

2 Basic safety notes

2.1 Intended use

- This product is intended for clamping and holding workpieces on machine tools and other suitable technical devices.
- It is designed to be set up on a machine table or machine pallets.
- The product may only be used within the scope of its technical data, ([👉 3, Page 16](#)).
- 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

- The product is not being used as intended if, for example:
- It is used as lifting equipment, as a press, as a punching tool, as a lathe chuck, as a drill or as a cutting tool.
- It is used in working environments that are not permissible.
- Workpieces are not properly clamped.
- Safety regulations are disregarded and persons are working at this product (for example, to machine clamped workpieces) without additional protective equipment.
- The technical data specified by the manufacturer are exceeded during usage.
- It is used with machines/systems or workpieces that are not designed to be used with it.

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 Use of special chuck jaws

Requirements of the chuck jaws

When using special chuck jaws, please observe the following rules:

- The chuck jaws should be designed to be as low as possible. The clamping point must be as close as possible to the housing. (clamping points at a greater distance cause higher surface pressures in the jaw guidance and can significantly reduce the clamping force.)
- Do not use welded jaws.
- Reduce operating pressure for higher clamping points.

2.6 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, Page 16](#)).
- Make sure that the product is a sufficient size for the application.
- Observe maintenance and lubrication intervals.
- Ensure that the environment is free from ferromagnetic particles or chips.

Make sure that the base jaws are not impeded (e.g. by chip accumulations).

2.7 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.

2.8 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.

2.9 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.

2.10 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.

2.11 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.

2.12 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.

2.13 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.

2.13.1 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.

2.13.2 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.




2.13.3 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.

2.13.4 Notes on particular risks

	<p>⚠ WARNING</p> <p>Risk of injury to operating personnel if the clamping block fails because the technical data have been exceeded and a workpiece is released or parts fly off!</p> <ul style="list-style-type: none"> • The technical data specified by the manufacturer for using the clamping block must never be exceeded. • The clamping block may only be used on machines and facilities that fulfill the minimum requirements of the EC Machinery Directive 2006/42/EC; specifically, they must have effective technical measures to protect against possible mechanical hazards.
	<p>⚠ WARNING</p> <p>Risk of injury from workpiece loss if compressed air or oil pressure fails or is reduced and from improper controlling (operator error)!</p> <ul style="list-style-type: none"> • Use pressure maintenance valves. • Safeguards in user program.
	<p>⚠ WARNING</p> <p>Risk of injury from clamping block or chuck jaws falling during transport, installation or removal!</p> <ul style="list-style-type: none"> • Make sure the clamping block and chuck jaws do not fall during transport, installation or removal. • Use a crane and/or a transport truck for transportation. • Only install the clamping block on machines with the appropriate connection dimensions.

**⚠ CAUTION**

Risk of crushing from chuck jaws opening and closing when manually loading and unloading!

- Do not reach between the chuck jaws.
- Wear personal protective equipment.
- Prevent the clamping block from being actuated unintentionally.
- Use automated loading.

**⚠ CAUTION**

Risk of slipping or falling if the operational environment of the clamping block is not clean (e.g. contaminated with cooling lubricants or oil).

- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety boots.
- Follow the safety and accident-prevention regulations when operating the clamping block, especially when working with machine tools and other technical equipment.

**⚠ CAUTION**

Risk of burns due to workpieces with high temperatures.

- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.

3 Technical data

Installation position	Any
Operating temperature	+5°C to +60°C
Noise emission [dB(A)]	≤ 70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4

	KSP plus-IN, KSP-LH plus-IN, KSP plus-IN2, KSP-LH plus-IN2					
	100	160	250	LH 100	LH 160	LH 250
Stroke per jaw [mm]	2	3	5	6	8	15
Clamping force* with max. pressure [kN]	18	45	55	8	20	20
max. pressure **	9	9	6	9	9	6
Repeat accuracy [mm]***	0.01	0.02	0.03	0.01	0.02	0.03
max. jaw height [mm]	60	60	150	150	200	500
Weight [kg]	4	11	32	4	11	32

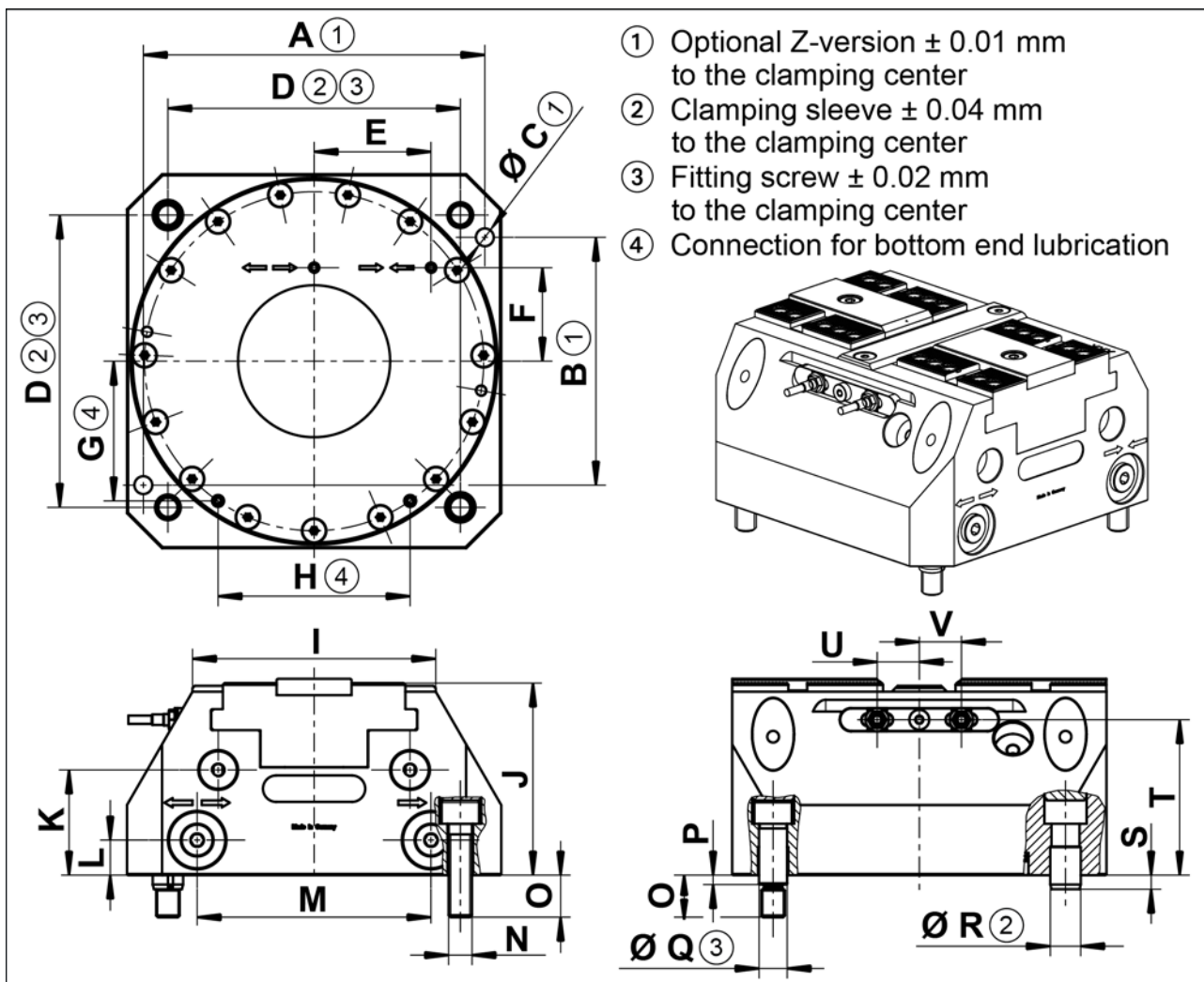
* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at a distance of "H" (see catalog ([↗ 1.1.2, Page 6](#))).

** Sizes 100, 160: When using an ABP-A base plate, the maximum pressure must be limited to **7 bar**.

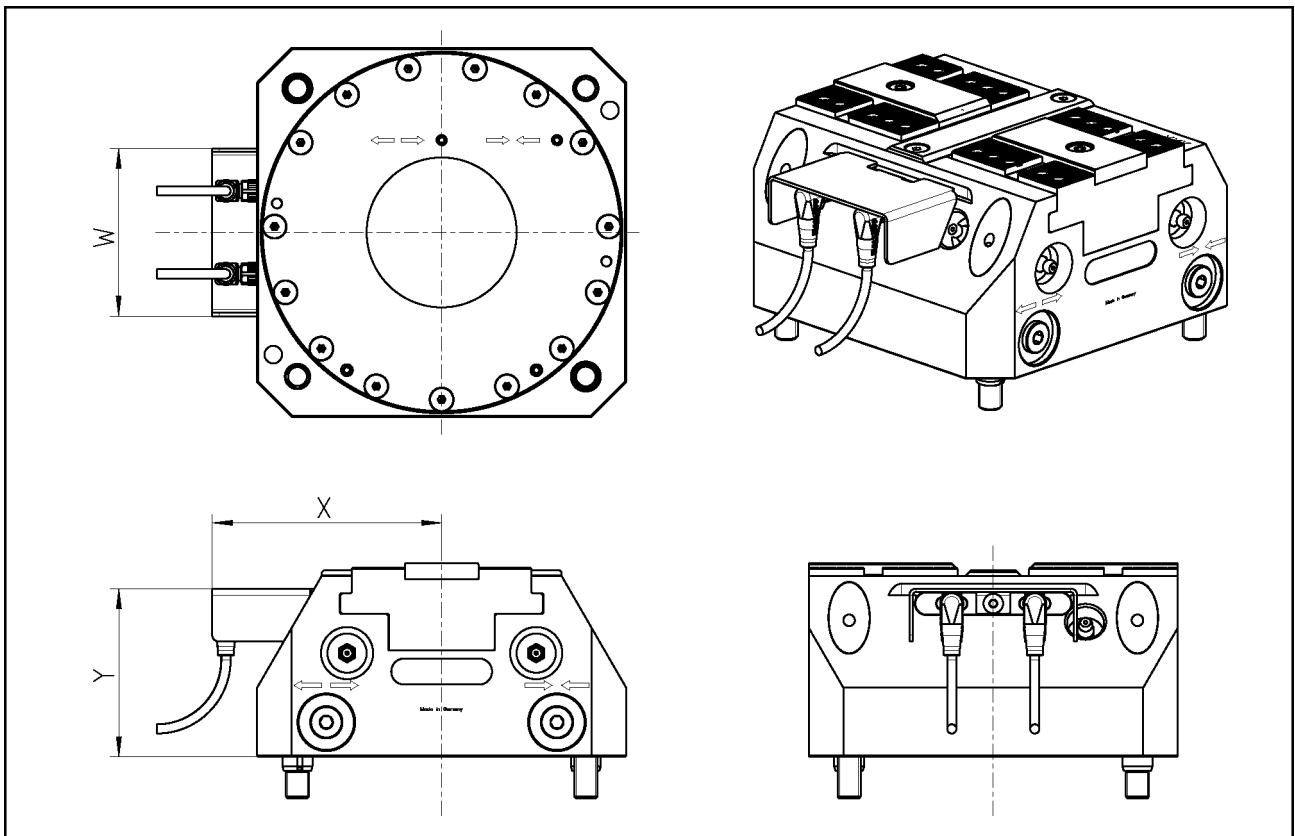
*** End position spread after 100 consecutive strokes.

Dimension	KSP plus-IN, KSP-LH plus-IN, KSP plus-IN2, KSP-LH plus-IN2		
	100	160	250
A	90	146	230
B	64	106	154
∅ C	6H7 x 12	8H7 x 14	10H7 x 20
D	80	125	200
E	29.5	50	75
F	32	40	64
G	34.5	59.7	92.6
H	55	82	139.6
I	64	104	170
J	69.2	82.2	98.2
K	42	45	52
L	10	15	20

Dimension	KSP plus-IN, KSP-LH plus-IN, KSP plus-IN2, KSP-LH plus-IN2		
	100	160	250
M	59	100	150
N	M8	M10	M12
O	15	18	20
P	4	4	5
∅ Q	10f7	12f7	14f7
∅ R	11	13	16
S	4.5	6	6
D	57.5	66.5	77.2
U	14 ... 20	14 ... 22	27.5 ... 42.5
V	14 ... 20	14 ... 22	27.5 ... 42.5
W (only IN2)	65.8	72.8	134.8
X (only IN2)	82.1	99	124.5
Y (only IN2)	63.5	73	87.2



Design IN



Design IN2

4 Tightening torques for screws

Tightening torques to mount the clamping system on the machine table (screw quality 10.9)

Screw size	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
Admissible torque M_A (Nm)	4.2	7.5	13	28	50	88	120	160	200	290	400	500

Tightening torques to mount top jaws on the TANDEM clamping block (screw quality 12.9)


Screw size	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24
Tightening torques M_A (Nm)	5	9	15	32	62	108	170	262	510	880


Tightening torques to mount the chuck piston onto the cylinder piston (screw quality 12.9)

Screw size	M5	M8	M10	M12
Tightening torques M_A (Nm)	9	32	62	108

5 Assembly


The numbers shown for individual components refer to the assembly illustrations or clamping block connections and to the "Drawings" chapter. ([👉 9, Page 53](#))

	<p>⚠️ WARNING</p>
	<p>Risk of injury due to accidental actuation of the clamping force block during assembly and connection.</p> <ul style="list-style-type: none"> • Make sure the power supply for the clamping block is off during assembly and connection. • Perform maintenance, modifications, or installations outside of the danger zone.

	<p>⚠️ WARNING</p>
	<p>Risk of injury from clamping block or chuck jaws falling during transport, installation or removal!</p> <ul style="list-style-type: none"> • Make sure the clamping block and chuck jaws do not fall during transport, installation or removal. • Use a crane and/or a transport truck for transportation. • Only install the clamping block on machines with the appropriate connection dimensions.

5.1 Pre-assembly measures

Carefully lift the product (e.g. using suitable lifting gear) from the packaging.

	<p>⚠️ CAUTION</p>
	<p>Danger of injury due to sharp edges and rough or slippery surfaces</p> <p>Use personal protective gear, especially safety gloves.</p>

Check the delivery for completeness and for transport damage.

5.2 Assembly of the Clamping Block on the machine table

- For vertical installation, the opening of the coolant drain (item 13) must always face downwards.
- Surface "X" is parallel to the guideway of the base jaws (item 2) so the clamping block can be aligned on the machine table.

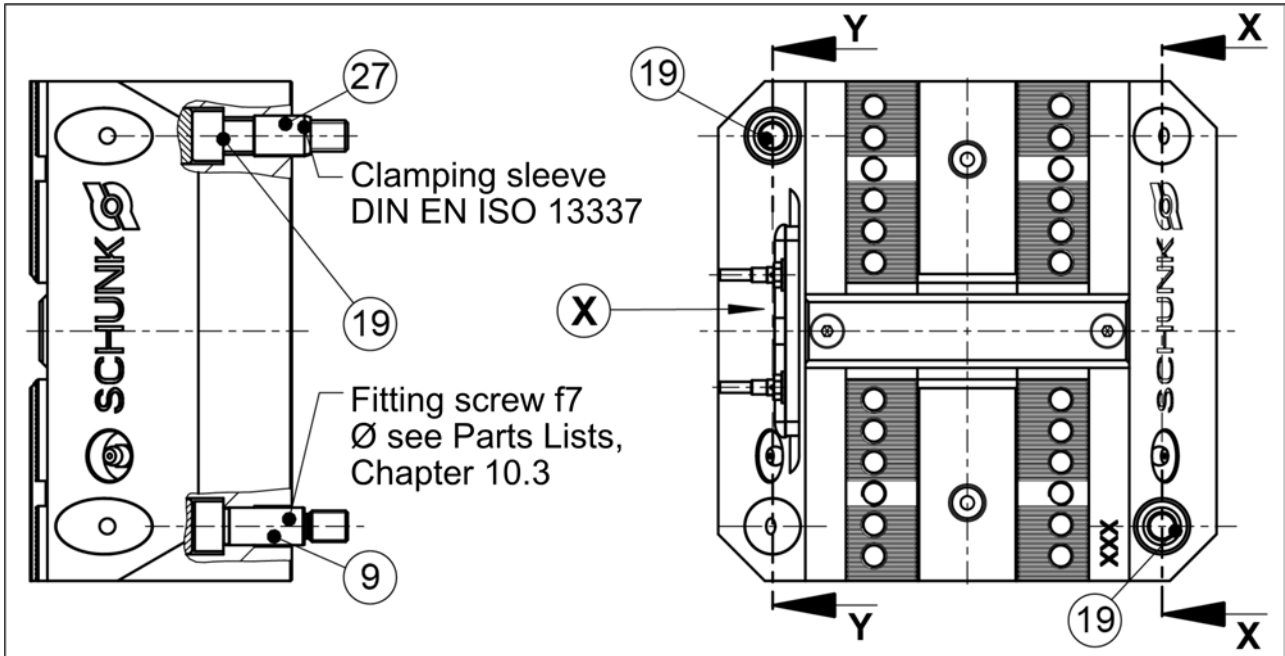


Image 2 assembling the clamping block

Assembly with clamping sleeves

Mount the clamping block on the machine table together with clamping sleeves (item 27) and screws (item 19).

Assembly with fitting screws:

There are two fittings in the housing (item 1) that, along with the optional fitting screws (item 9), are used to center the clamping block on the machine table with repeat accuracy. Do not realign the clamping block after removing it from the machine table (e.g., after replacing the seals). When using fitting screws (item 9), use them instead of the clamping sleeves (item 27) and the two corresponding screws (item 19).

5.3 Connecting the clamping block

Make sure the power supply is off when connecting the clamping block. See chapter "Basic Safety Notes".



NOTICE

Risk of workpiece loss and damage to system due to loss of air pressure caused by damaged pneumatic lines.

Always make sure the connections are tight, and use appropriate protection covers to protect the pneumatic hoses and lines from hot chips.

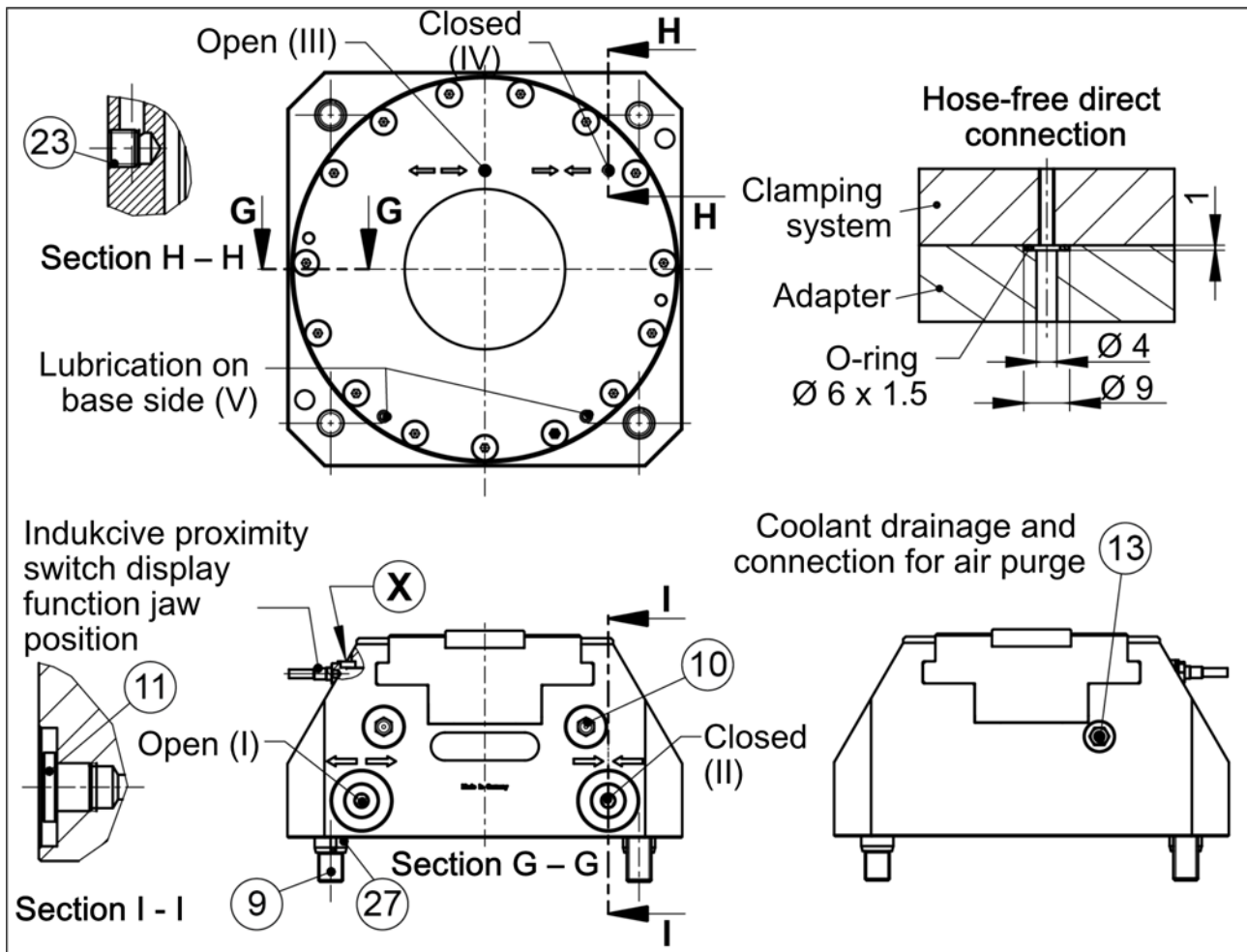


Fig.*3 Connecting the clamping block

The clamping force block has four air connections: **I, II, III, IV**. Two connections for OPEN (**I** and **III**) and two connections for CLOSE (**II** and **IV**).

Which of the two air connections has to be opened for actuation depends on the application:

- Connections **I** and **II** for operation without a base plate.
- Connections **III** and **IV** in the base for hose-free, direct connection to the machine table or on the base plate.

The threads for hose-free, direct connection are not designed for pneumatic fittings.

Thread for pneumatic screwed connection (on the front):
 KSP plus 100-IN and IN2, KSP-LH plus 100-IN and IN2: M5

KSP plus 160-IN and IN2, KSP-LH plus 160-IN and IN2: G1/8"
KSP plus 250-IN and IN2, KSP-LH plus 250-IN and IN2: G1/8"

NOTE:

All four air connections come sealed on delivery of the clamping force block. On base side with set-screws (item 23) and on front with locking screws (item 11).

The compressed air used to operate the clamping block must be dry, filtered and oiled.

Unconditioned compressed air contains dust and oil particles and moisture, all of which can lead to malfunctions or premature wear in the clamping block. The oiler should be no more than 2 meters from the coupling point.

The clamping force block has two more base connections (**V**) for direct lubrication through the machine table. These connections come sealed on delivery with set-screws (item 24).

5.4 Mounting the clamping block on the base plate

(If the two parts are delivered separately)

When mounting PLUS series TANDEM clamping blocks on **ABP-h**, **ABP-a** or **SBP TANDEM** base plates, use the shorter mounting screws included in the base plate accessory pack instead of the standard mounting screws (item 19) that come with the clamping block.

For KSP plus 100, KSP-LH plus 100 und KSP-F plus 100:

Use the **M8 x 30** screws from the base plate accessory pack instead of the M8 x 35 screws (item 19).

For KSP plus 160, KSP-LH plus 160 und KSP-F plus 160:

Use the **M10 x 40** screws from the base plate accessory pack instead of the M10 x 35 screws (item 19).

For KSP plus 250, KSP-LH plus 250 und KSP-F plus 250:

Use the **M12 x 45** screws from the base plate accessory pack instead of the M12 x 40 screws (item 19).

NOTE:

If the clamping block and base plate are ordered separately, the screws, O-rings and clamping sleeves for assembling the parts are included in the accessory pack that comes with the clamping block.

- Do not open the connections on the front of the clamping force block (**I, II**), or seal them with suitable dummy plugs (M5 or G1/8").

- Insert the clamping sleeves from the accessory pack into the centering holes on the base plate.
- Remove the seal plugs from the base plate (internal air feed-through **III, IV**) and insert the O-rings from the accessory pack into the recesses for the air feed-throughs.
- Mount the clamping block onto the base plate.

NOTE:

The TANDEM base plates do not have a connection possibility for the inductive proximity switches on the TANDEM clamping blocks. The function for monitoring the jaw position can only be connected externally. When joining, make sure the air feed-throughs for the clamping system and the base plate are precisely aligned.

- Screw the two parts together using the four screws (item 19) from the accessory pack. In doing so, observe tightening torques. ([👉 4, Page 18](#))
- Remove the locking screws from the pneumatic connections on the base plate.
- Connect the diaphragm pressure switch and set the switch to the required minimum pressure.

5.5 Monitoring of the jaw position via inductive proximity switches

The TANDEM KSP-IN / KSP-LH-IN or KSP-IN2 / KSP-LH-IN2 clamping system is prepared for use with INW 50 / INW 80 or IN S-M8-1 / IN S-M8-2 inductive proximity switches for monitoring jaw positions.

The jaw stroke end positions for O.D. and I.D. clamping as well as the exact clamping position can be monitored through recesses in the base jaws of the clamping block. The signals can be directly processed by the machine control system.

The monitoring result is: The clamping force block is open or closed (for I.D. or O.D. clamping depending on the application)

- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.
- Technical data for the sensors can be found in the data sheets (included in the scope of delivery or at schunk.com).

The proximity switch used has reverse polarity protection and is short-circuit-proof.

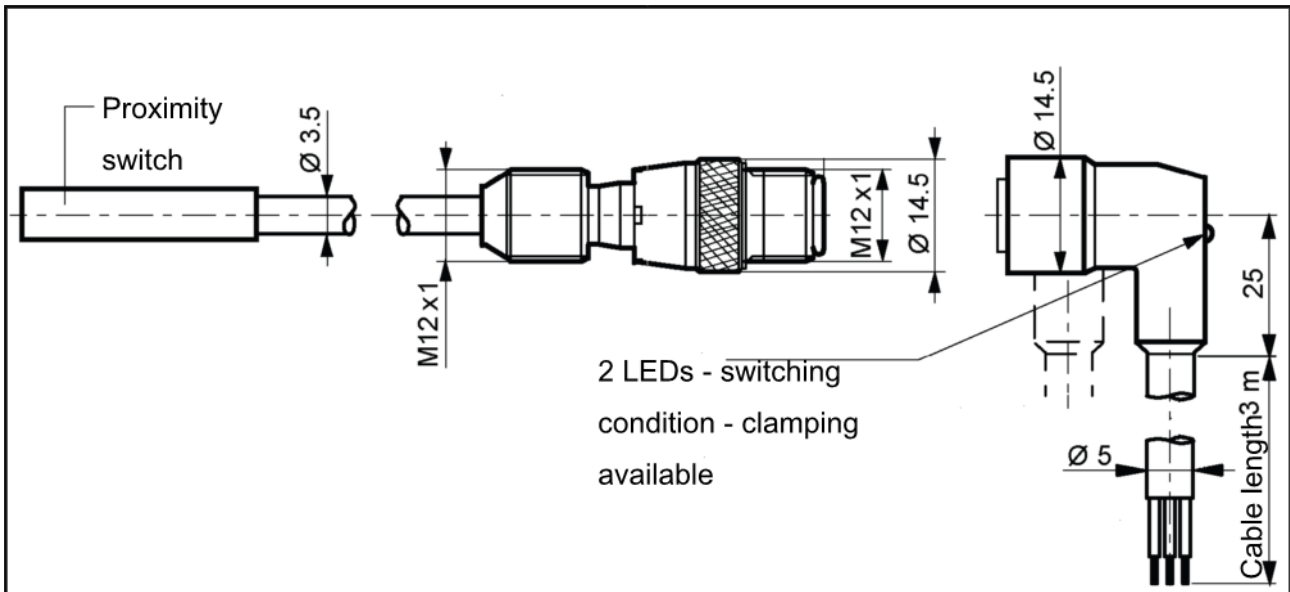
For the proper use of the proximity switches, observe the following:

- Protect the connection cables against hot chips and falling parts by using a suitable metal hose or protection cover. For the IN2 version, merely protection against falling parts is required.
- Do not pull forcefully on the sensor cable.
- Do not subject the sensor cable to tensile strain.
- Install the sensor connection cable straight and do not twist it.
- Tighten the counter nut for clamping the sensor using a suitable tool and moderate manual force.
- Do not exceed the permissible bending radius of the cable (see catalog specifications)
- Position the sensor so that the signal LED on the sensor head is clearly visible (with cover, LED is not visible).
- Prevent the proximity switch from coming into contact with hard objects or with chemicals; in particular, nitric, chromic or sulfuric acid.

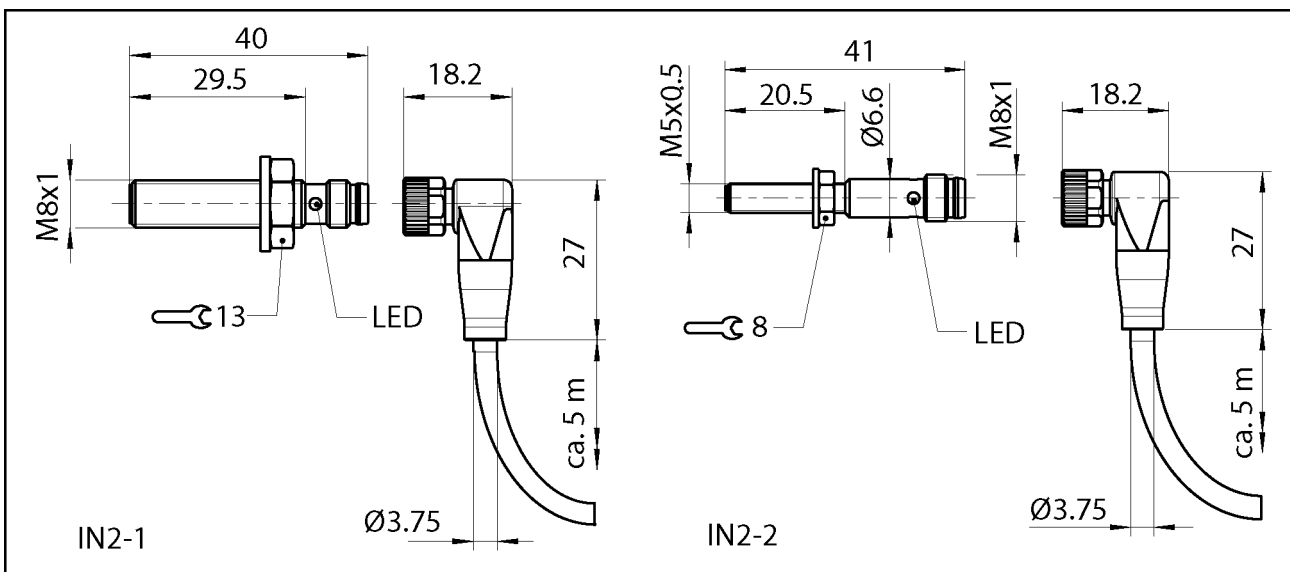
Proximity switches are electronic components which can react sensitively to high-frequency interference or electromagnetic fields.

- Check that the cable is correctly connected and installed. There must be sufficient distance between the switches and sources of interference and their supply cables.
- Parallel switching of multiple sensor outputs of the same design (nnp, pnp) is permissible, though this does not increase the permissible load current.
- Please note that the leakage current of the individual sensors is accumulative (by about 2 mA).

5.5.1 Basic construction and dimensions of the inductive proximity switches with screw-fastened connection cable

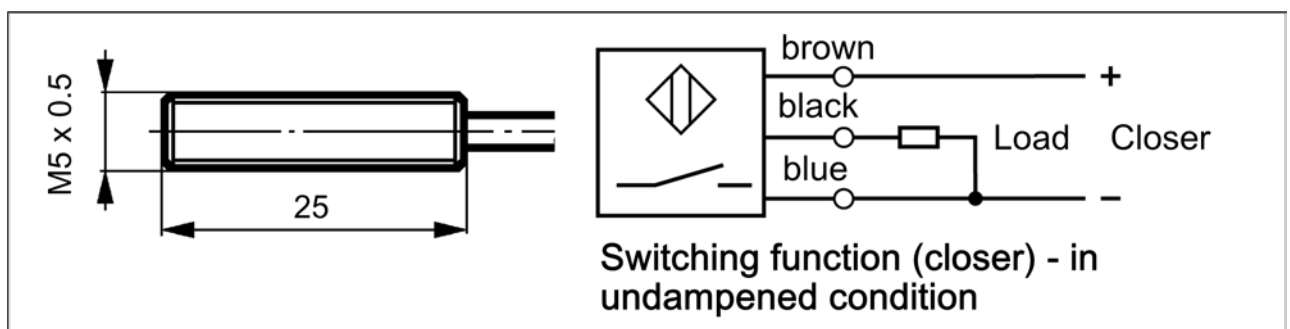


Dimensions IN



Dimensions IN2: IN S-M8-1 left and IN S-M8-2 right

5.5.2 Dimensions and switching functions of the INW 50 / S-M12

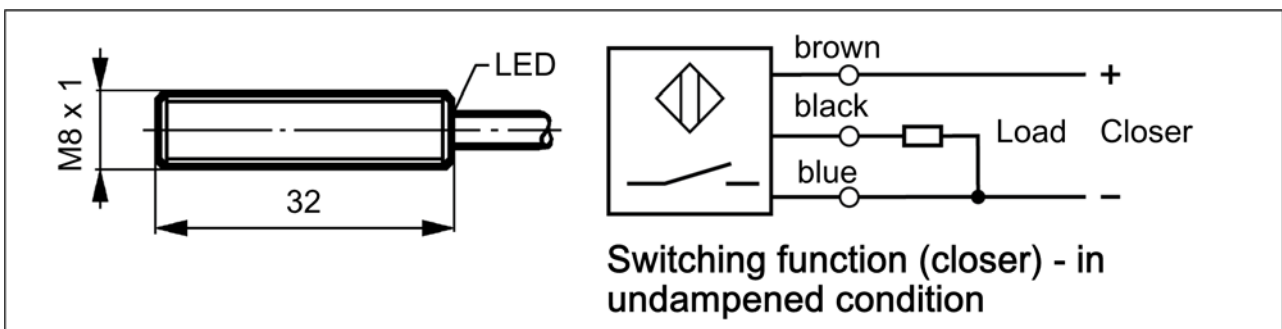


Technical data:

Size:	M5 x 0.5 x 25
Switching function:	Closer
Switching distance:	1 mm
Voltage:	10 – 30 V DC
Ripple:	≤ 15%
Max. current on contact:	200 mA, short-circuit-proof
Switching hysteresis:	≤ 15% of the nominal switching distance
Temperature range:	–25°C to +70°C
Switching frequency approx.:	3000 Hz
Voltage drop (max. load):	1.5 V
Thread on connecting plug for feed cable:	M12 x 1
Protection class in accordance with DIN EN 60529:	IP 67*

* for the pin terminal only when screwed on

5.5.3 Dimensions and switching functions INW 80 / S-M12



Technical data:

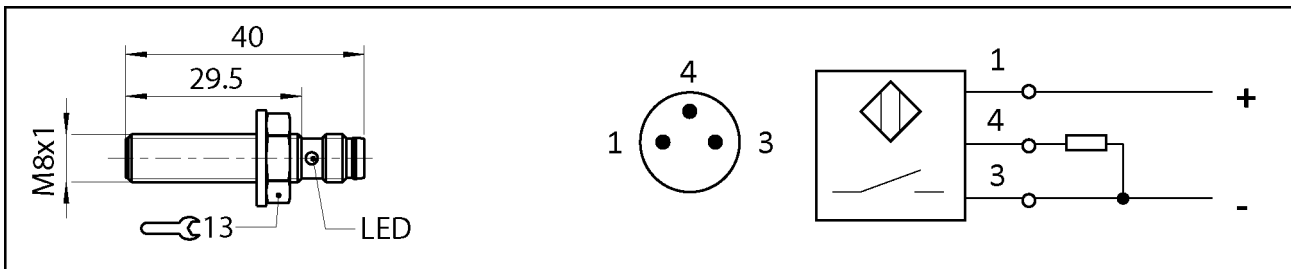
Seize:	M8 x 1 x 32 mm
Switching function:	Closer
Switching distance:	1.5 mm
Voltage:	10 - 30 [V DC]
Residual ripple	≤ 15%
Max. current on contact:	200 mA, short-circuit-proof
Switching hysteresis:	≤ 15% of the nominal switching distance
Temperature range	-25° [C] to + 70° [C]
Switching frequency approx.:	1000 [Hz]
Voltage drop (max. loading):	1.5 V

Thread at connection plug of supply cable: M12 x 1

Protection class in accordance with DIN IP 67*
60529:

*) only when screwed in place in case of circular connector

5.5.4 Dimensions and switching function of the IN S-M8-1



Dimensions and switching function of the IN S-M8-1

Connection colors

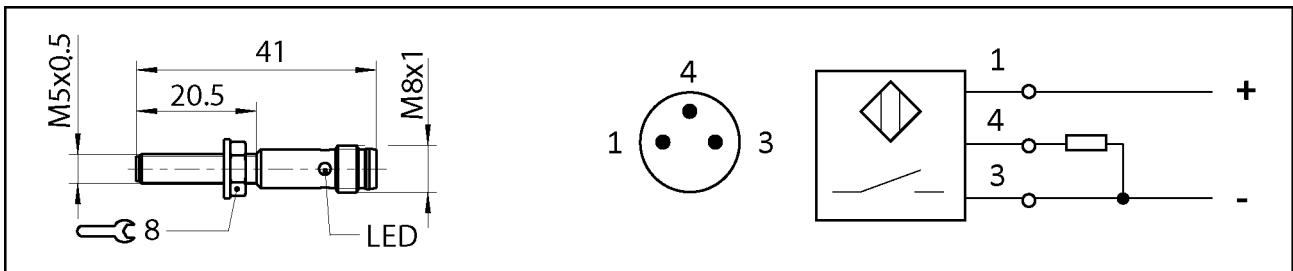
Pin 1: Brown	Pin 3: Blue	Pin 4: Black
--------------	-------------	--------------

Technical data:

Size:	M8 x 1 x 40 mm
Switching function:	Closer
Switching distance:	1.5 mm
Voltage:	10 – 30 V DC
Ripple:	≤ 15%
Max. current on contact:	200 mA, short-circuit-proof
Switching hysteresis:	≤ 15% of the nominal switching distance
Temperature range:	–25°C to +70°C
Switching frequency approx.:	1000 Hz
Voltage drop (max. load):	2.5 V
Thread on connecting plug for feed cable:	M8 x 1
Protection class in accordance with DIN IP 67* EN 60529:	

* for the pin terminal only when screwed on

5.5.5 Dimensions and switching function of the IN S-M8-2



Dimensions and switching function of the IN S-M8-2

Connection colors

Pin 1: Brown	Pin 3: Blue	Pin 4: Black
--------------	-------------	--------------

Technical data:

Size:	M5 x 0.5 x 41 mm
Switching function:	Closer
Switching distance:	1.5 mm
Voltage:	10 – 30 V DC
Ripple:	≤ 10%
Max. current on contact:	100 mA, short-circuit-proof
Switching hysteresis:	≤ 15% of the nominal switching distance
Temperature range:	–25°C to +70°C
Switching frequency approx.:	5000 Hz
Voltage drop (max. load):	2 V
Thread on connecting plug for feed cable:	M8 x 1
Protection class in accordance with DIN EN 60529:	IP 67*

* for the pin terminal only when screwed on

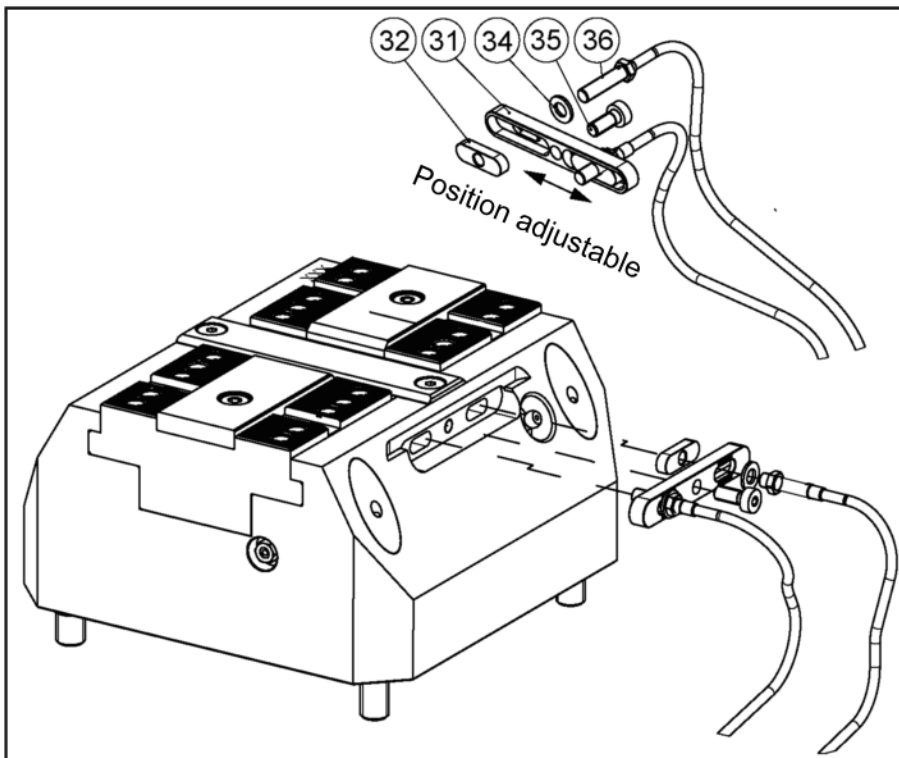
5.5.6 Assembly and adjustment of the proximity switches

For the TANDEM KSP-IN / KSP-LH-IN or KSP-IN2 / KSP-LH-IN2, two inductive proximity switches have been fitted. The proximity switches can be moved on the retaining plate (item 31) so that the switching point can be individually adjusted. The proximity switches are used for monitoring the jaw stroke end position for O.D. and I.D. clamping as well as for monitoring the clamping position. Adjust the switching point of proximity switch "S1" (installed on the left) so that the required switching signal is present when the stroke end position is "open" or "closed."

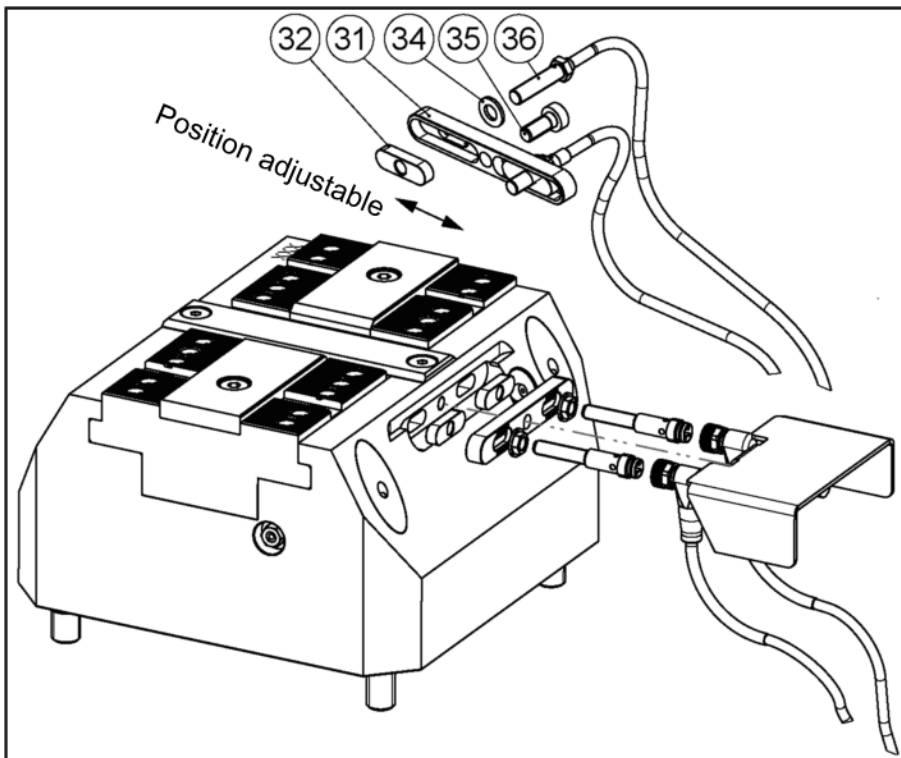
Proximity switch "S2" is used for monitoring the clamping position between the two jaw end positions. Adjust the switching point so that a switching signal is present in the area of the clamping position. Exceeded workpiece tolerances can be monitored via the signal output of switch "S2".

The function and circuit diagram for adjusting the proximity switches is shown in illustrations 6, 7 and 8. The proximity switches are equipped with an LED signal display on the sensor head.

Insert the counter-supports (item 32) into the retaining plate (item 31). Screw both proximity switches (item 36) together with hexagon nuts and washers (item 34) into the counter-support with the sensor facing forward so that the switches are flush or protrude slightly. Tighten the retaining plate (item 31) using the screw (item 35) in the recess of the clamping block (body item 1). If the cover is used (item 46), tighten it with the bolt (item 35) to the holding plate (item 31). To fine-tune the switching distance, manually screw in each proximity switch until it stops at the base jaw and then unscrew it by approximately 1.5 turns. The connection cable must not be excessively twisted nor damaged in any way. When making the adjustment, make sure that the signal LED on the sensor is easily visible. Then fasten the proximity switch to the retainer plate (item 31) using the counter nut.



IN sensor assembly



IN2 sensor assembly

Test the function by clamping and opening the clamping system. If necessary, adjust the switching position. Then link the plug connection between the proximity switch and connecting cable.

NOTE:

The sensor head of the proximity switches may not touch the base jaws under any circumstances in the operating condition. Both proximity switches must be installed in the operating condition to prevent chips from entering the clamping system through the open clamp.

5.5.7 Circuit and functional diagram for external workpiece clamping

Circuit diagram and monitoring/control functions for external workpiece clamping

The circuit diagram and the functional diagram show the recommended settings of the proximity switches for monitoring "End position open" and "Clamping position reached."

The circuit diagram can also be adjusted for monitoring "Stroke end position closed" and "Missed clamping position." The proximity switches can also be individually adjusted on the retaining plate.

Circuit diagram and monitoring/control functions for external workpiece clamping

	Circuit diagram proximity switch			
proximity switch	S1		S2	
Signal output	0	1	0	1
Jaw end position open		1		
Clamping position	1		1	
Jaw end position closed				1

	S1	S2
Jaw end position on clamping force block open	1	0
Clamping position	0	1
Jaw end position closed clamping force block closed	0	0

Fig.°5 Circuit diagram for external workpiece clamping

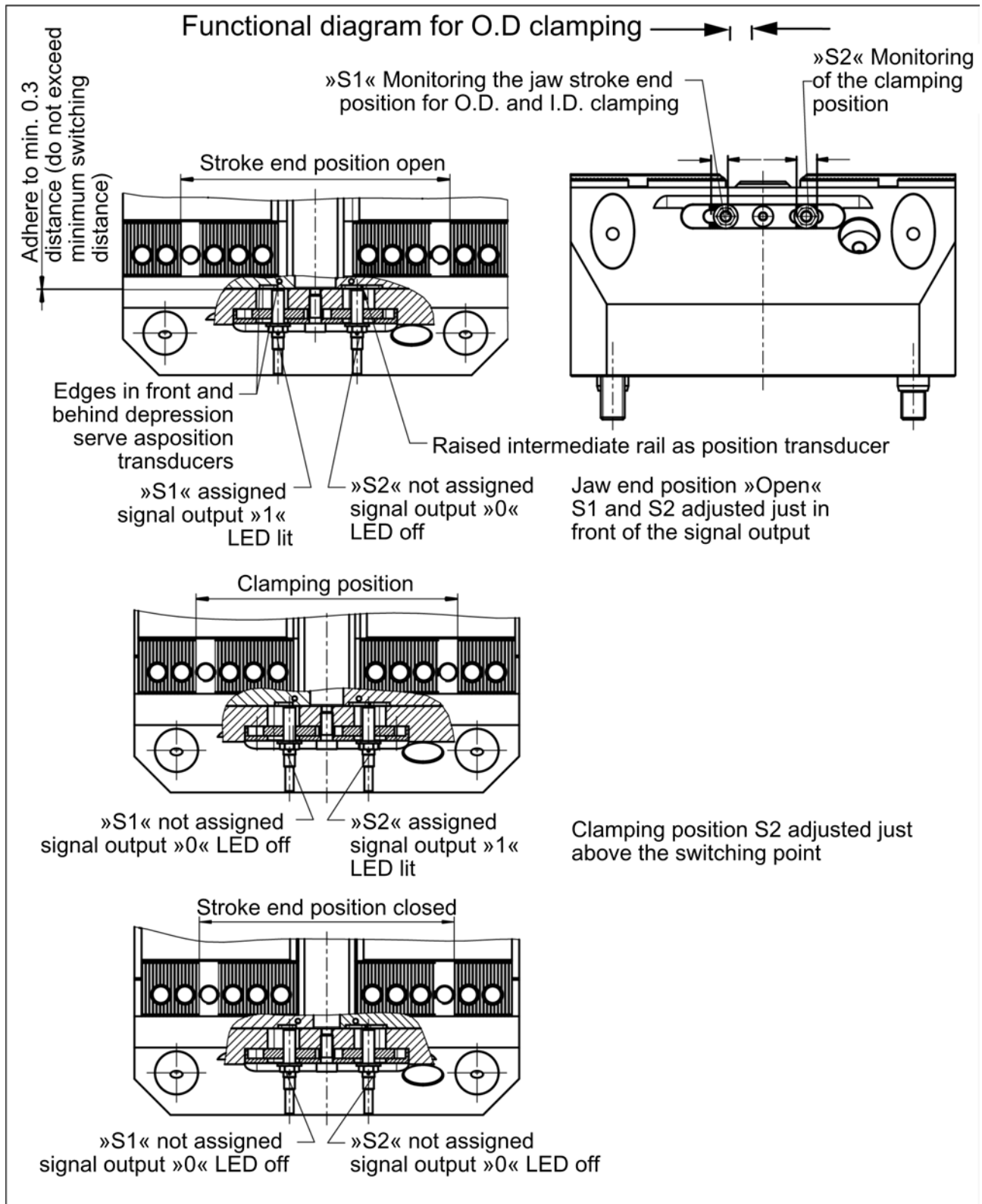


Fig.°6 Functional diagram for external workpiece clamping

5.5.8 Circuit and functional diagram for internal workpiece clamping

Circuit diagram and monitoring/control functions for internal workpiece clamping

The circuit diagram and the functional diagram show the recommended settings of the proximity switches for monitoring "End position closed" and "Clamping position reached."

The circuit diagram can also be adjusted for monitoring "Stroke end position open" and "Missed clamping position." The proximity switches can also be individually adjusted on the retaining plate.

Circuit diagram and monitoring/control functions for internal workpiece clamping

	Circuit diagram proximity switch			
proximity switch	S1		S2	
Signal output	0	1	0	1
Jaw end position open				
Clamping position				
Jaw end position closed				

	S1	S2
Jaw end position on clamping force block open	1	0
Clamping position	0	1
Jaw end position closed clamping force block closed	0	0

Fig.°7 Circuit diagram for internal workpiece clamping

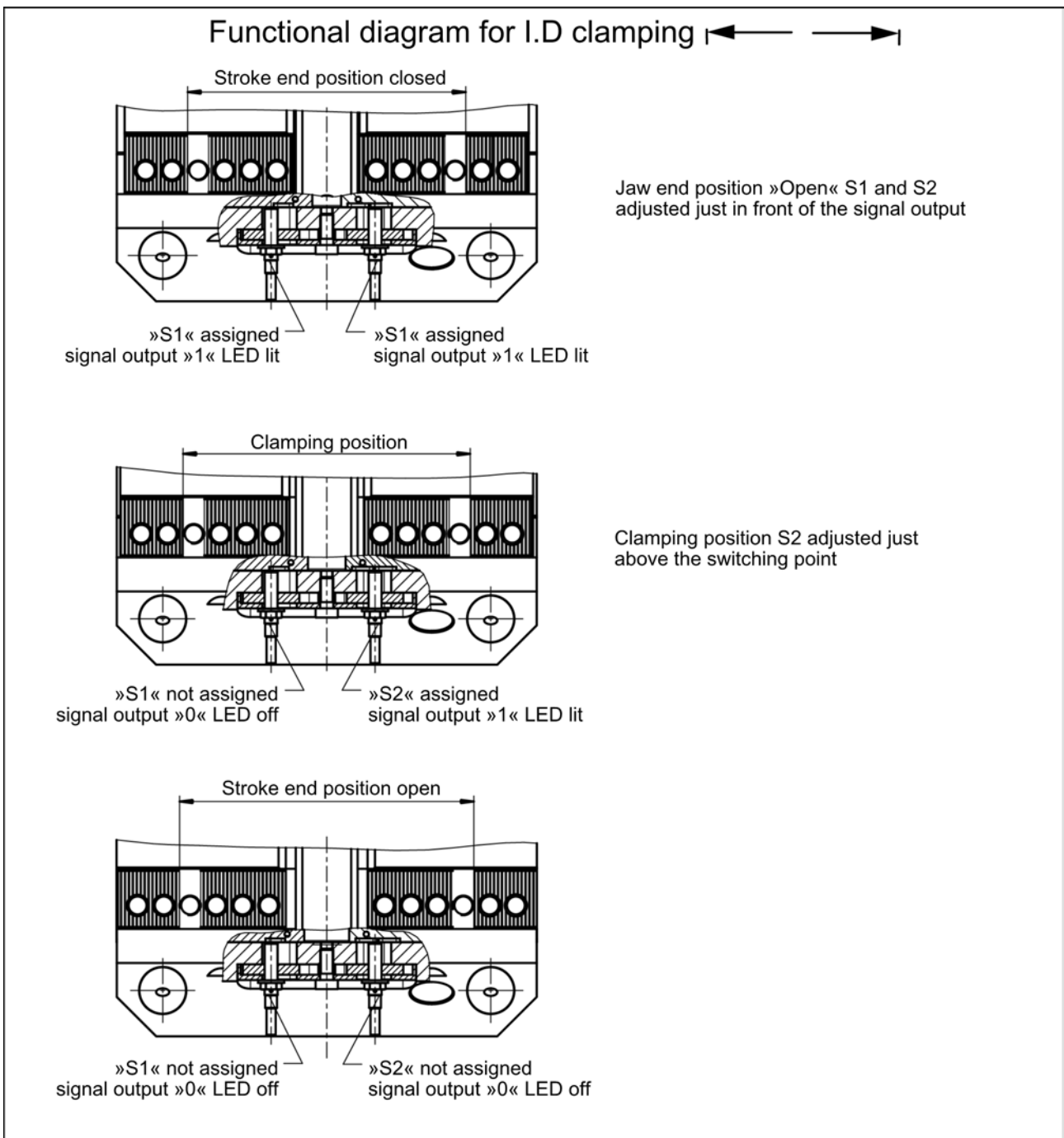


Fig.° 8 Functional diagram for internal workpiece clamping

6 Troubleshooting

Clamping block chuck jaws will not move

Possible cause	Remedial measures
Air supply interrupted	Check air supply
System pressure too low	Increase system pressure according to clamping system technical specifications
Connections mixed up	Check connections and functions and connect properly
Unused air connections not sealed	Seal front or base connections using accessories (included in scope of delivery)
Active air connections sealed	Remove set-screws from sealed air connections

Piston will not move

Possible cause	Remedial measures
Air is not oiled	Check maintenance unit, perform maintenance Place oiler closer to clamping system Set required oil level
Chuck piston screw broken (overload)	Send clamping system to SCHUNK for repairs or disassemble clamping system and repair using original SCHUNK spare parts (↗ 7.1, Page 37)
Piston rod or piston rod screw connection broken (overload)	Send clamping system to SCHUNK for repairs or disassemble clamping system and repair using original SCHUNK spare parts (↗ 7.1, Page 37)
Active air connections sealed	Remove set-screws from sealed air connections

No control of switching valves due to missing signal output

Possible cause	Remedial measures
Proximity switch not switching	Adjust the switching distance to the recess in the base jaw and clamp it in place Adjust position slightly forward or backward
Proximity switch not switching	Completely disassemble the proximity switch along with the retaining plate and check the switching functions on the sensor head (replace proximity switch if necessary)
Proximity switch switching sporadically	Readjust the position Adjust position to workpiece tolerances
Proximity switch cable damaged	Replace proximity switch Replace feed cable

Possible cause	Remedial measures
Cable plug-in connection to the supply cable	Check the plug connectors, tighten if necessary Replace IN proximity switch or separately available supply cable
Proximity switch moves independently	Tighten the hexagonal nut for clamping Replace IN proximity switch
Both proximity switches reporting the same switching signal at the same time	Readjust the proximity switch
Proximity switch switching sporadically	Readjust the position Adjust position to workpiece tolerances

Clamping block does not complete stroke

Possible cause	Remedial measures
Chips or dirt between covering strip and base jaws	Unscrew the covering strip (item 7) and remove chips and dirt

Clamping force getting weaker

Possible cause	Remedial measures
Clamping block not sealed tightly	Check connection and seal screws; reseal or replace
Seals damaged	Disassemble clamping block (↗ 7.1, Page 37) and replace all the seals (see seal kit lists (↗ 8.1, Page 41))
Inadequate lubrication	Lubricate the lubrication nipples with LINO MAX 200 (↗ 7, Page 37)

Clamping block movement jerky

Possible cause	Remedial measures
Steel guide rollers on sliding surfaces not greased	See chapter "Maintenance and Care" (↗ 7, Page 37)

7 Maintenance and care

The item numbers specified for the corresponding individual components relate to chapter drawings. ([👉 9, Page 53](#))


Regularly check inductive proximity switches for proper functioning. Check for damage to connection cables, connection plugs and the sensor head.

The base jaws (2), chuck piston (3) and housing (1) are made to go together. To replace these parts, ship the entire clamping system to SCHUNK along with a repair order.

Please observe the following instructions in order to keep the clamping system operating smoothly:

- Make sure the bore hole for coolant drainage remains unblocked!
- Lubricate the guides on the two front or the two side lubricating nipples with LINOMAX 200 depending on load, but at least once per month or every 10,000 clamps. Make sure the chuck jaws are in the open position.
- Disassemble the base jaws and the chuck piston at least once every three months (or more often, if necessary). Clean the housing, base jaws and chuck piston, and lubricate all the guides (housing, base jaws, chuck piston) with LINOMAX 200. Reassemble everything and relubricate the two front or two side lubricating nipples with LINOMAX 200.

(Product information for LINO MAX 200 can be requested from SCHUNK).

	⚠ CAUTION
	<p>Allergic reactions due to grease in contact with skin! Wear gloves.</p>

7.1 Disassembling and assembling the clamping block

NOTE:

The base jaws (item 2), the chuck piston (item 3) and the housing (item 1) are matched to each other. These parts cannot be replaced individually. To replace these parts, ship the entire clamping force block to SCHUNK along with a repair order.

When maintaining the clamping force block, first disassemble the inductive proximity switches and if necessary the cover to avoid damaging the sensitive connection cables.

- Disassemble the connection cable to the pin terminal of the inductive proximity switch on the separable elbow connector.
- Unscrew the screw (item 35).
- Remove the retainer plate (item 31) and if necessary the cover with the inductive proximity switches (item 36) from the body (item 1).
- Each inductive proximity switch is fastened with a hexagon nut and washer (item 34).
The counter-supports (item 32) can be removed at the same time as the proximity switches.

When replacing wearing parts (e.g. seals - for seal kit list see [\(👉 8.1, Page 41\)](#)) adhere to the following order:

- 1 Apply 6 bar of air pressure to the clamping system until the jaws are in the OPEN position.
- 2 Remove the covering strip (item 7) and the guide strips (item 6).
- 3 Remove the cylindrical screw (item 14) from the chuck piston.
- 4 Remove the pressure line.
- 5 Pull the plugs (item 8) out of the housing (item 1).
- 6 Loosen the screws (items 9, 19) and remove the clamping system from the base plate or machine table. Air may escape at this point.
- 7 To remove the chuck piston (3)
for size 100, screw in one M10 x 25 screw in the center bore,
for size 160, screw one M12 x 25 screw in the center bore,
for size 250, screw two M6 x 25 screws in the lateral threaded holes.
- 8 Pull the base jaws (item 2) out of the housing (item 1).
- 9 Before pulling off the cover (item 5), all the screws (item 21) need to be removed. To take off the cover (5), screw two screws into the outer threaded holes:
for size 100-IN and IN2: two M3x 25 screws
for size 160-IN and IN2: two M5x 25 screws
for size 250-IN, two M5x >25 screws.
- 10 Remove the seals (items 20, 22).
- 11 Underlay the clamping force block so the cylinder piston (item 4) can be pushed out.
- 12 Remove the seals (items 12, 15, 17).
- 13 Clean all the parts thoroughly and check for damage and wear.
Replace damaged and worn parts with original SCHUNK replacement parts.

- 14 Lubricate the new seals (items 12, 15, 17, 20, 22) with Renolit HLT 2 or equivalent grease.
- 15 Mount the new seals carefully. The seals must not be damaged in the process.
- 16 Grease the sliding surfaces of the cylinder and piston with Renolit HLT 2 or equivalent grease.
- 17 Place the cylinder piston (item 4) loosely into the cylinder. Make sure the cylinder piston (item 4) is level and not tilted.
- 18 Gently press the quad ring (item 12) inward from all sides, so that it slides more easily over the edge of the housing (item 1).
- 19 Press the cylinder piston (item 4) into the cylinder of the housing (item 1). Do not tilt the cylinder piston (item 4).
- 20 Place the O-rings (items 20, 22) in the housing (item 1) and the O-ring (item 17) around the cover (item 5).
- 21 Insert the cover (item 5) into the housing (item 1), making sure the openings for the air feed-throughs are aligned.
- 22 Screw the cover (item 5) onto the housing (item 1). Use a torque wrench at the values specified in the table (see [\(☞ 4, Page 18\)](#)).
- 23 If using clamping sleeves (item 27) for centering, insert these into the housing (item 1) now.
- 24 Grease the sliding surfaces of the housing (item 1), base jaws (item 2) and chuck piston (item 3) with LINOMAX 200.
- 25 Assemble the base jaws (item 2) and the chuck piston (item 3). Be sure to observe the installation position for the base jaws and the chuck piston.
- 26 Connect the clamping system to the air supply and move the jaws to the OPEN position.
- 27 Screw down the chuck piston (item 3) and cylinder piston (item 4). Tighten the screw (item 14) with a torque wrench (see [\(☞ 4, Page 18\)](#)).
- 28 Fasten the guide strips (item 6) and the covering strip (item 7).
- 29 Prepare each inductive proximity switch (item 36) with its hexagon nut and washer (item 34). Insert the counter-supports (item 32) into the retaining plate (item 31). Screw both proximity switches into the counter-support with the sensor facing forward so that the switches are flush or protrude slightly. Tighten the retaining plate (item 31) and if necessary the cover to the body (item 1) using the screw (item 35).

- 30 Screw in each proximity switch by hand until it stops at the base jaw and then unscrew it by approximately 1.5 turns. Then fasten the proximity switches to the retainer plate using the counter nut of the inductive proximity switches. If necessary, adjust the switching position. The sensor head of the proximity switches may not touch the base jaws under any circumstances during operation.
- 31 Check for leaks.
- 32 Adjust the inductive proximity switches while checking for correct signal output.

7.2 Leak test

The following components are required to check for leaks: pressure gauge, shut-off valve and quick coupling.

Check for leaks in the clamping block in the CLOSED position.

- The following is needed to check for leaks: compressed air supply, pressure gauge, shut-off valve and quick couplings.
 - Check for leaks in the clamping system in the OPEN and CLOSED positions.
- 1 Connect the components to the open CLOSED connection in the following order:
pressure gauge, shut-off valve, coupling, supply line.
 - 2 Pressurize the clamping force block.
 - 3 Close the shut-off valve and remove the supply line.
 - 4 Let the clamping block sit clamped for 24 hours.
 - 5 After 24 hours, the clamping force block is:
 - sealed if the pressure gauge indicates a drop in pressure of less than 0.5 bar
 - leaking if the pressure gauge indicates a drop in pressure of more than 0.5 bar

If the clamping system is leaking, check the screws first (e.g., with Metaflux leak detection spray). Seal any leaking screws.

Once the screws are sealed, check for leaks and replace if necessary (see Disassembling and assembling the clamping block ([👉 7.1, Page 37](#))).

8 Sealing kits, accessory packs and parts lists

When ordering spare parts, the type, size and, if possible, the serial number of the clamping block must always be stated to avoid delivery mistakes.

Seals, sealing elements, screw connections, springs, bearings, screws, wiper bars and parts that come into contact with the workpiece are not covered by the warranty.

8.1 Sealing kit lists

KSPplus 100-IN, KSP-LH plus 100-IN (ID no. 0405219)

Item	Designation	Quantity
12	Quad ring, 72.62 x 3.53	1
15	Combined sealing element	1
17	O-ring, DIN 3771 93 x 2.00	1
18	O-ring, DIN 3771 9 x 2.00	4
20	O-ring, DIN 3771 4.5 x 1.00	13
22	O-ring, DIN 3771 3.5 x 1.00	2
54	O-ring, DIN 3771 6 x 1.50	2

KSPplus 160-IN, KSP-LH plus 160-IN (ID no. 0405319)

Item	Designation	Quantity
12	Quad ring, 126.59 x 3.53	1
15	Combined sealing ring	1
17	O-ring, DIN 3771 150 x 2.00	1
18	O-ring, DIN 3771 12 x 2.00	4
20	O-ring, DIN 3771 5.5 x 1.00	17
22	O-ring, DIN 3771 4.5 x 1.00	2
54	O-ring, DIN 3771 6 x 1.50	2

KSPplus 250-IN, KSP-LH plus 250-IN (ID no. 0405519)

Item	Designation	Quantity
12	Quad ring, 209.14 x 3.53	1
15	Combined sealing ring	1
17	O-ring, DIN 3771 238 x 2.00	1
18	O-ring, DIN 3771 15 x 1.78	4
20	O-ring, DIN 3771 7.0 x 1.00	21
22	O-ring, DIN 3771 5.5 x 1.00	2
54	O-ring, DIN 3771 6 x 1.50	2

Wear parts - replacement recommended during maintenance

The sealing kit can only be ordered as a complete kit.

8.2 Accessory packs

KSP plus 100-IN, KSP-LH plus 100-IN KSP plus 100-IN2, KSP-LH plus 100-IN2

Item	Designation	Quantity
8	Plug	4
9	Fitting screw, 10f7/M8	2
18	O-ring, DIN 3771 9 x 2.00	4
19	Screw, DEI 4762/10.9 M8 x 30 mm	4
27	Clamping sleeve, DIN EN ISO 13337 DRM 11 x 16	2
51	Screw, DEI 4762/12.9 M6 x 16 mm	8
54	O-ring, DIN 3771 6 x 1.50	4

KSP plus 160-IN, KSP-LH plus 160-IN KSP plus 160-IN2, KSP-LH plus 160-IN2

Item	Designation	Quantity
8	Plug	4
9	Fitting screw, 12f7/M10	2
18	O-ring, DIN 3771 12 x 2.00	4
19	Screw, DEI 4762/10.9 M10 x 35 mm	4
27	Clamping sleeve, DIN EN ISO 13337 DRM 13 x 18	2
51	Screw, DEI 4762/12.9 M8 x 20 mm	8
54	O-ring, DIN 3771 6 x 1.50	4

KSP plus 250-IN, KSP-LH plus 250-IN KSP plus 250-IN2, KSP-LH plus 250-IN2

Item	Designation	Quantity
8	Plug	4
9	Fitting screw, 114f7/M12	2
18	O-ring, DIN 3771 15 x 1.78	4
19	Screw, DEI 4762/10.9 M12 x 45 mm	4
27	Clamping sleeve, DIN EN ISO 13337 DRM. 16 x 22	2
51	Screw, DEI 4762/12.9 M10 x 30 mm	8
52	T-handle for KSP M10	2
53	Set-screw, DIN EN ISO 4026 M10 x 30 mm	2
54	O-ring, DIN 3771 6 x 1.50	4

8.3 Parts lists

KSP plus 100-IN, KSP-LH plus 100-IN

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 10f7/M8	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 72.62 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M8x20 mm	1
15**	Combined sealing element	1
16	Screw, DIN 7984/8.8 M6 x 10 mm	2
17**	O-ring, DIN 3771 93 x 2.00	1
18***	O-ring, DIN 3771 9 x 2.00	4
19***	Screw, DEI 4762/10.9 M8x35 mm	4
20**	O-ring, DIN 3771 4.5 x 1.00	13
21	Countersunk screw, DIN EN ISO 10642/10.9 M4 x 12 mm	11
22**	O-ring, DIN 3771 3.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M3 x 3 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M4 x 4 mm IN6RD/VZ/PA	2
25	Countersink screw, DIN EN ISO 10642/10.9 M4x8 mm	2
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 11 x 16	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw DIN 7984 M4 x 12	1
36	IN 50-S-M12, NHS PNP TURNKEY	2
37	KA BW12-L 3P-0300-PNP	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP plus 100-IN2, KSP-LH plus 100-IN2

Item	Designation	Quantities
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 10f7/M8	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 72.62 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M8x20 mm	1
15**	Combined sealing element	1
16	Screw, DIN 7984/8.8 M6 x 10 mm	2
17**	O-ring, DIN 3771 93 x 2.00	1
18***	O-ring, DIN 3771 9 x 2.00	4
19***	Screw, DEI 4762/10.9 M8x35 mm	4
20**	O-ring, DIN 3771 4.5 x 1.00	13
21	Countersunk screw, DIN EN ISO 10642/10.9 M4 x 12 mm	11
22**	O-ring, DIN 3771 3.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M3 x 3 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M4 x 4 mm IN6RD/VZ/PA	2
25	Countersink screw, DIN EN ISO 10642/10.9 M4x8 mm	2
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 11 x 16	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw DIN 7984 M4 x 12	1
36	IN S-M8-2	2
37	KA BW8-L 3P-0500	2
46	Cover SBG 100-1.0	1
47	Connector M12 BCC02H9	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP plus 160-IN, KSP-LH plus 160-IN

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 12f7/M10	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 126.59 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M10x25 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M6 x 10 mm	2
17**	O-ring, DIN 3771 150 x 2.00	1
18***	O-ring, DIN 3771 12 x 2.00	4
19***	Screw, DEI 4762/10.9 M10x40 mm	4
20**	O-ring, DIN 3771 5.5 x 1.00	17
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	15
22**	O-ring, DIN 3771 4.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	4
25	Countersink screw, DIN EN ISO 10642/10.9 M5x10 mm	2
26	Set-screw, DIN EN ISO 4026/45H M4 x 4 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 13 x 18	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M5 x 12	1
36	IN 50-S-M12, NHS PNP TURNKEY	2
37	KA BW12-L 3P-0300-PNP	2
45	O-Ring DIN 3771 5.5 x 1.50	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP plus 160-IN2, KSP-LH plus 160-IN2

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 12f7/M10	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 126.59 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M10x25 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M6 x 10 mm	2
17**	O-ring, DIN 3771 150 x 2.00	1
18***	O-ring, DIN 3771 12 x 2.00	4
19***	Screw, DEI 4762/10.9 M10x40 mm	4
20**	O-ring, DIN 3771 5.5 x 1.00	17
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	15
22**	O-ring, DIN 3771 4.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	4
25	Countersink screw, DIN EN ISO 10642/10.9 M5x10 mm	2
26	Set-screw, DIN EN ISO 4026/45H M4 x 4 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 13 x 18	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M5 x 12	1
36	IN S-M8-2	2
37	KA BW8-L 3P-0500	2
45	O-Ring DIN 3771 5.5 x 1.50	2
46	Cover SBG 160-1.5	1
47	Connector M12 BCC02H9	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP plus 250-IN

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 14f7/M12	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 209.14 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M12x30 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M8 x 16 mm	2
17**	O-ring, DIN 3771 238 x 2.00	1
18***	O-ring, DIN 3771 15 x 1.78	4
19***	Screw, DEI 4762/10.9 M12 x 45 mm	4
20**	O-ring, DIN 3771 7.0 x 1.00	21
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	19
22**	O-ring, DIN 3771 5.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M6x6 mm IN6RD/VZ/PA	2
25	Countersunk screw, DIN EN ISO 10642/10.9 M6 x 12 mm	2
26	Set-screw, similar to DIN EN ISO 4026/45H M5x5 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM 16 x 22	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M6 x 14	1
36	IN 80-S-M12, NHS PNP	2
37	KA BW12-L 3P-0300-PNP	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP-LH plus 250-IN

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 14f7/M12	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 209.14 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M12x30 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M8 x 16 mm	2
17**	O-ring, DIN 3771 238 x 2.00	1
18***	O-ring, DIN 3771 15 x 1.78	4
19***	Screw, DEI 4762/10.9 M12 x 45 mm	4
20**	O-ring, DIN 3771 7.0 x 1.00	21
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	19
22**	O-ring, DIN 3771 5.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M6x6 mm IN6RD/VZ/PA	2
25	Countersunk screw, DIN EN ISO 10642/10.9 M6 x 12 mm	2
26	Set-screw, similar to DIN EN ISO 4026/45H M5x5 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 16 x 22	2
28	Expander SK-552-040 4 x 6,5	4
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M6 x 14	1
36	IN 80-S-M12, NHS PNP	2
37	KA BW12-L 3P-0300-PNP	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP plus 250-IN2

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 14f7/M12	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 209.14 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M12x30 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M8 x 16 mm	2
17**	O-ring, DIN 3771 238 x 2.00	1
18***	O-ring, DIN 3771 15 x 1.78	4
19***	Screw, DEI 4762/10.9 M12 x 45 mm	4
20**	O-ring, DIN 3771 7.0 x 1.00	21
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	19
22**	O-ring, DIN 3771 5.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M6x6 mm IN6RD/VZ/PA	2
25	Countersunk screw, DIN EN ISO 10642/10.9 M6 x 12 mm	2
26	Set-screw, similar to DIN EN ISO 4026/45H M5x5 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 16 x 22	2
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M6 x 14	1
36	IN S-M8-1	2
37	KA BW8-L 3P-0500	2
46	Cover SBG 250-1.5	1
47	Connector M12 BCC02H9	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

KSP-LH plus 250-IN2

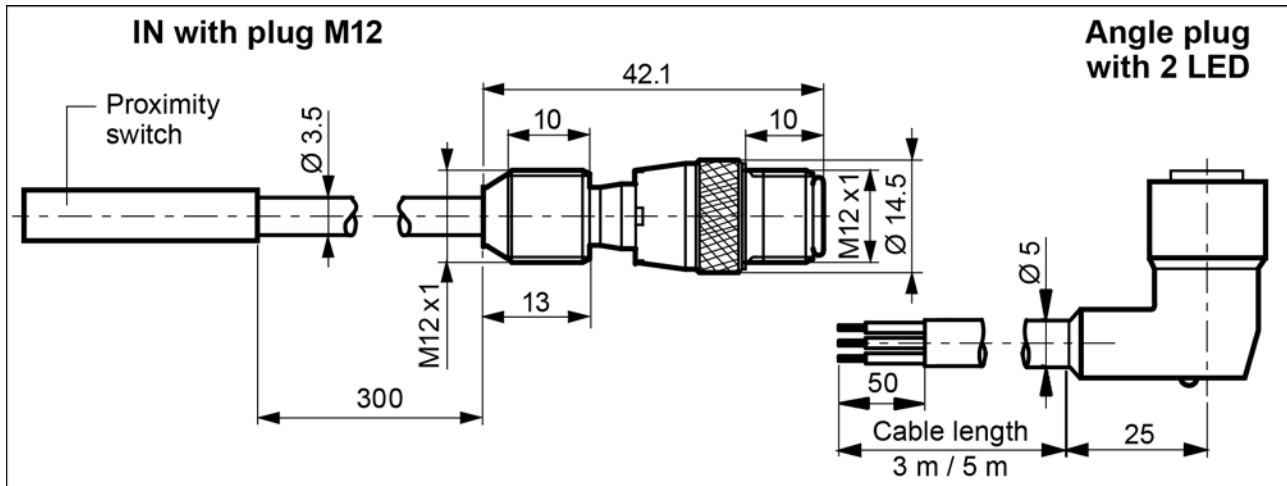
Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw, 14f7/M12	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring, 209.14 x 3.53	1
13	Sound absorber	1
14	Screw, DEI 4762/10.9 M12 x 30 mm	1
15**	Combined sealing ring	1
16	Screw, DIN 7984/8.8 M8 x 16 mm	2
17**	O-ring, DIN 3771 238 x 2.00	1
18***	O-ring, DIN 3771 15 x 1.78	4
19***	Screw, DEI 4762/10.9 M12 x 45 mm	4
20**	O-ring, DIN 3771 7.0 x 1.00	21
21	Countersunk screw, DIN EN ISO 10642/10.9 M5 x 20 mm	19
22**	O-ring, DIN 3771 5.5 x 1.00	1
23	Set-screw, similar to DIN EN ISO 4026/45H M5 x 4 mm	2
24	Set-screw, similar to DIN EN ISO 4026/45H M6x6 mm IN6RD/VZ/PA	2
25	Countersunk screw, DIN EN ISO 10642/10.9 M6 x 12 mm	2
26	Set-screw, similar to DIN EN ISO 4026/45H M5x5 mm IN6RD/VZ/PA	1
27***	Clamping sleeve, DIN EN ISO 13337 DRM. 16 x 22	2
28	Expander SK-552-040 4 x 6,5	4
31	Retaining plate	1
32	Counter-support	2
34	Washer	2
35	Screw, DIN 7984 M6 x 14	1
36	IN S-M8-1	2
37	KA BW8-L 3P-0500	2
46	Cover SBG 250-1.5	1
47	Connector M12 BCC02H9	2

* Individual components are specially tuned to one another and cannot not be replaced by the customer.

** See sealing kit list – parts cannot be ordered individually

*** contained in accessory pack

8.4 Proximity Switches and Supply Cables variant IN for Single or Replacement Orders



The INW inductive proximity switch (complete set) consists of one IN sensor with a short connection cable and cylindrical connector plus an angular plug with a W-M12 supply cable.

If required, the single components for the two-part INW inductive proximity switch can be ordered separately.

The supply cable is available in two connecting lengths.

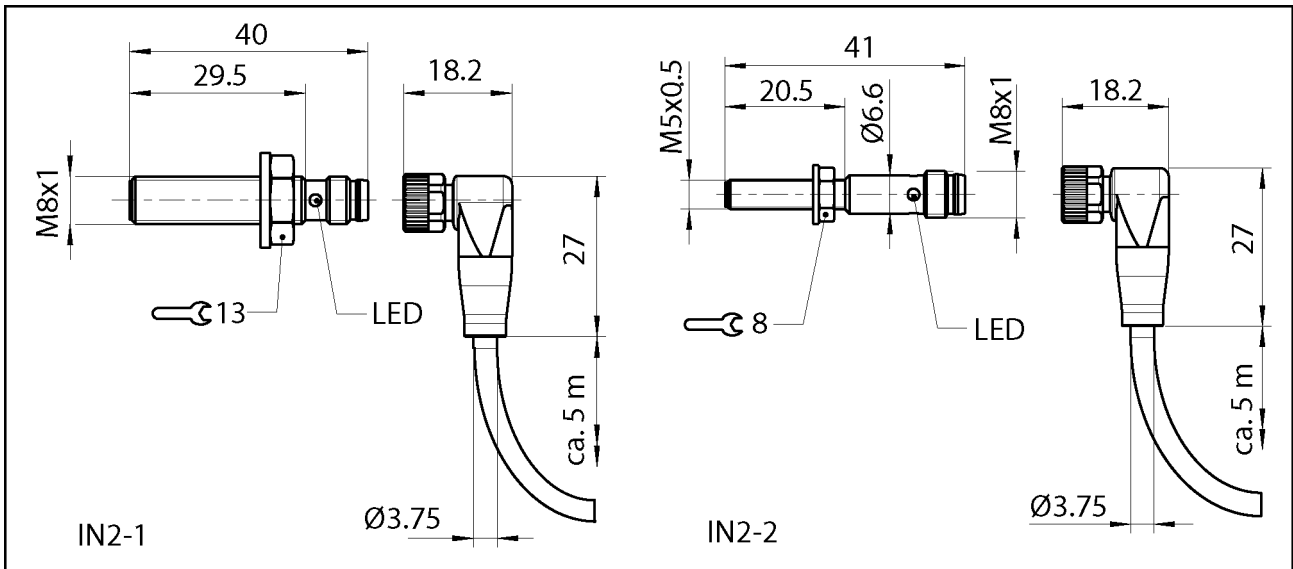
IN inductive proximity switch - M12 plug connector

Designation	ID number
IN-50 / S-M12	0301575

Angular plug with supply cable W – M12 plug connection

Designation	ID number
W 3-M12 (cable length 3 m)	0301503
W 5-M12 (cable length 5 m)	0301507

8.5 Proximity Switches and Supply Cables variant IN2 for Single or Replacement Orders



For the IN2 variant, there is a request from the sensor type IN, an angular supply cable type KA-M12 and a self-converting plug connector.

Inductive proximity switch IN – M8 plug connection

Designation	ID number
IN S-M8-1	1349984
IN S-M8-2	1349990

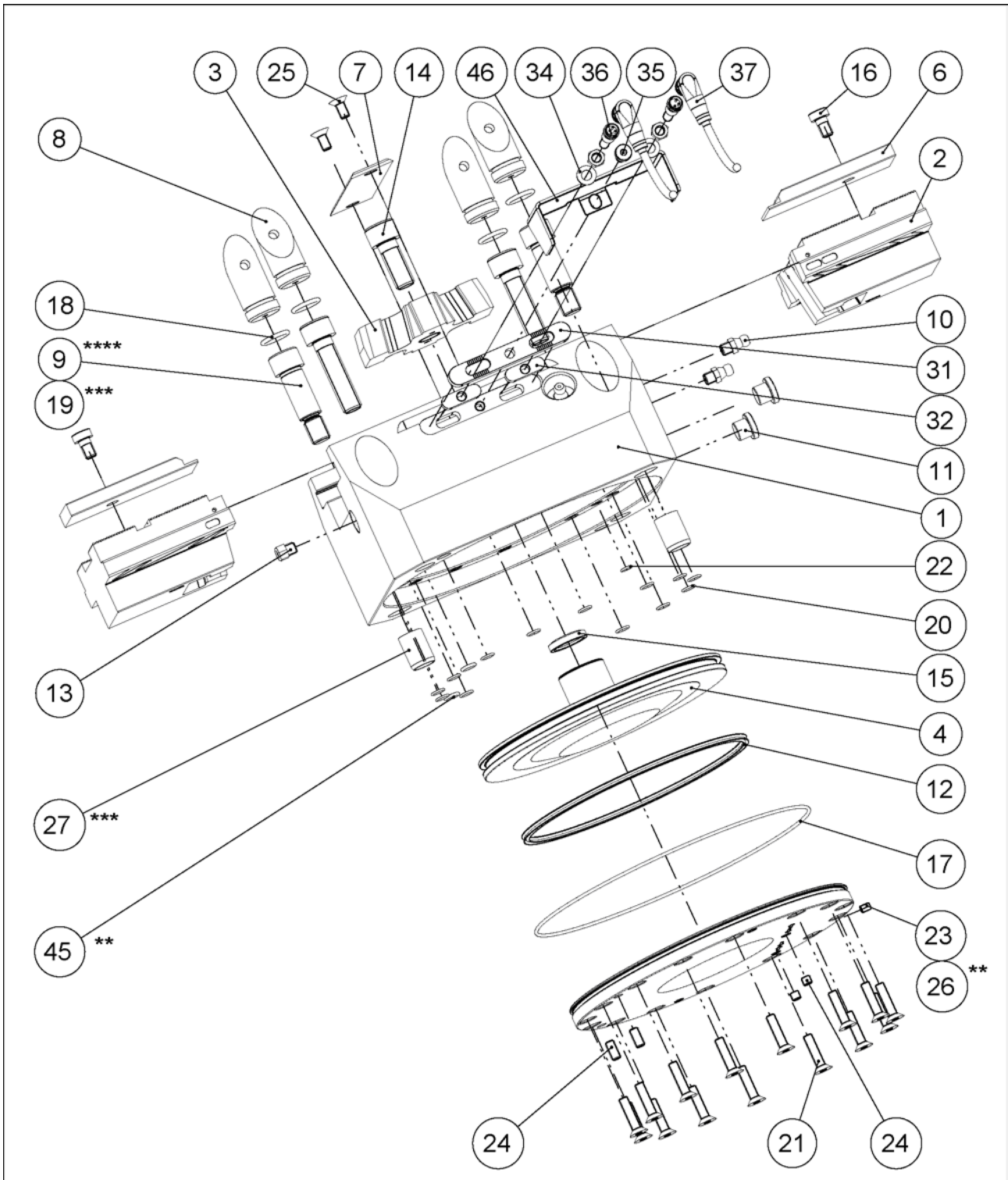
Angular plug KA – M12 plug connection

Designation	ID number
KA BW8-L 3P-0500 (cable length 5 m)	1350000

Self-converted plug connector M12

Designation	ID number
Connector M12 BCC02H9	1154135

9 Assembly drawing



*	Size 160	**	for sizes 160/250
***	Centering with clamping sleeves	****	Centering with fitting screws

10 Translation of the 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/ H.-D. SCHUNK GmbH & Co. Spanntechnik KG
Distributor Lothringer Str. 23
D-88512 Mengen

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 TANDEM Clamping Block, pneumatic (with inductive proximity switch)
designation:

Type KSP plus 100-IN; KSP-LH plus 100-IN; KSP-Z plus 100-IN; KSP-LH-Z plus 100-
designation: IN; KSP plus 160-IN; KSP-LH plus 160-IN; KSP-Z plus 160-IN; KSP-LH-Z plus 160-IN; KSP plus 250-IN; KSP-LH plus 250-IN; KSP-Z plus 250-IN; KSP-LH-Z plus 250-IN; KSP plus 100-IN2; KSP-LH plus 100-IN2; KSP-Z plus 100-IN2; KSP-LH-Z plus 100-IN2; KSP plus 160-IN2; KSP-LH plus 160-IN2; KSP-Z plus 160-IN2; KSP-LH-Z plus 160-IN2; KSP plus 250-IN2; KSP-LH plus 250-IN2; KSP-Z plus 250-IN2; KSP-LH-Z plus 250-IN2

ID number 0405207; 0405227; 0405208; 0405228; 0405307; 0405327; 0405308;
0405328; 0405507; 0405527; 0405508; 0405528; 1349646; 1349647;
1349648; 1349649; 1349650; 1349651; 1349664; 1349665; 1349666;
1349667; 1349668; 1349670

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

EN ISO 4414:2010 Pneumatic fluid power – General rules and safety requirements
for systems and their components

Other related technical standards and specifications:

VDI 3035:2008-05 Design of machine tools, production lines and peripheral
equipment for the use of metalworking fluids

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:

Philipp Schröder, Address: see manufacturer's address

Signature: see original declaration

Mengen, November 2017

p.p. Philipp Schröder; Head of Engineering Design

11 Appendix on Declaration of Incorporation, as per 2006/42/EC, annex II, No. 1 B

1. Description of the basic safety and health protection requirements, as per 2006/42/EC, Annex I, that apply to and are fulfilled for the scope of the partly completed machinery:

Product designation	TANDEM pneumatic power clamping block (with inductive proximity switch)		
Type designation	KSP plus 100-IN; KSP-LH plus 100-IN; KSP-Z plus 100-IN; KSP-LH-Z plus 100-IN; KSP plus 160-IN; KSP-LH plus 160-IN; KSP-Z plus 160-IN; KSP-LH-Z plus 160-IN; KSP plus 250-IN; KSP-LH plus 250-IN; KSP-Z plus 250-IN; KSP-LH-Z plus 250-IN; KSP plus 100-IN2; KSP-LH plus 100-IN2; KSP-Z plus 100-IN2; KSP-LH-Z plus 100-IN2; KSP plus 160-IN2; KSP-LH plus 160-IN2; KSP-Z plus 160-IN2; KSP-LH-Z plus 160-IN2; KSP plus 250-IN2; KSP-LH plus 250-IN2; KSP-Z plus 250-IN2; KSP-LH-Z plus 250-IN2		
ID number	0405207; 0405227; 0405208; 0405228; 0405307; 0405327; 0405308; 0405328; 0405507; 0405527; 0405508; 0405528; 1349646; 1349647; 1349648; 1349649; 1349650; 1349651; 1349664; 1349665; 1349666; 1349667; 1349668; 1349670		
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
1.3.7	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