TANDEM Clamping Block
KSP plus, KSP-LH plus, KSP-F plus

Assembly and Operating Manual

Imprint

Technical changes:

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

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Dear Customer,

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

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

Best regards,

Your SCHUNK team

H.-D. SCHUNK GmbH & Co.
Spanntechnik KG

Lothringer Str. 23
D-88512 Mengen

Tel. +49–7572-7614-0
Fax +49-7572-7614-1099

info@de.schunk.com
schunk.com

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1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under (☞ 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.

⚠ 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 *

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 64, 100, 140, 160, 250
- KSP-LH plus 64, 100, 140, 160, 250
- KSP-F plus 64, 100, 140, 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 8)
- Observance of the specified care and maintenance instructions (☞ 7, Page 24)

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 block
KSP plus or KSP-LH plus or KSP-F plus
(without top jaws)

ACCESSORY PACK:
(for contents, see sealing kit and parts list) (☞ 8.1, Page 28)

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 15).
- 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 15).
- Make sure that the product is a sufficient size for the application.
- Ensure that maintenance and lubrication intervals are observed, (☞ 7, Page 24).
- Ensure that the environment is free from ferromagnetic particles or chips.

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.

IMPORTANT!

Following a longer shutdown period (more than approx. 6 hours), always re-tension the clamping device in order to compensate for the setting properties of the clamping situation or possible pressure losses and the resulting loss of clamping force.

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

⚠ WARNING

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!

- 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.

⚠ WARNING

Risk of injury from workpiece loss if compressed air or oil pressure fails or is reduced and from improper controlling (operator error)!

- Use pressure maintenance valves.
- Safeguards in user program.

⚠ WARNING

Risk of injury from clamping block or chuck jaws falling during transport, installation or removal!

- 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

Designation	KSP plus					KSP-LH plus					KSP-F plus				
	64	100	140	160	250	64	100	140	160	250	64	100	140	160	250
Stroke per jaw [mm]	2	2	3	3	5	4	6	7	8	15	2	4	6	6	10
Clamping force* at max. pressure [kN]	4.5	18	30	45	55	2.3	8	15	20	20	4.5	18	30	45	55
max. pressure [bar]	9	9***	9	9***	6	9	9***	9	9***	6	9	9***	9	9***	6
Repeat accuracy** [mm]	0.01	0.01	0.015	0.02	0.03	0.01	0.01	0.015	0.02	0.03	0.01	0.01	0.015	0.02	0.03
max. jaw height [mm]	60	60	60	60	150	100	150	120	200	500	60	60	60	60	150
Weight [kg]	1.5	4	7.5	11	32	1.5	4	7.5	11	32	1.5	4	7.5	11	32

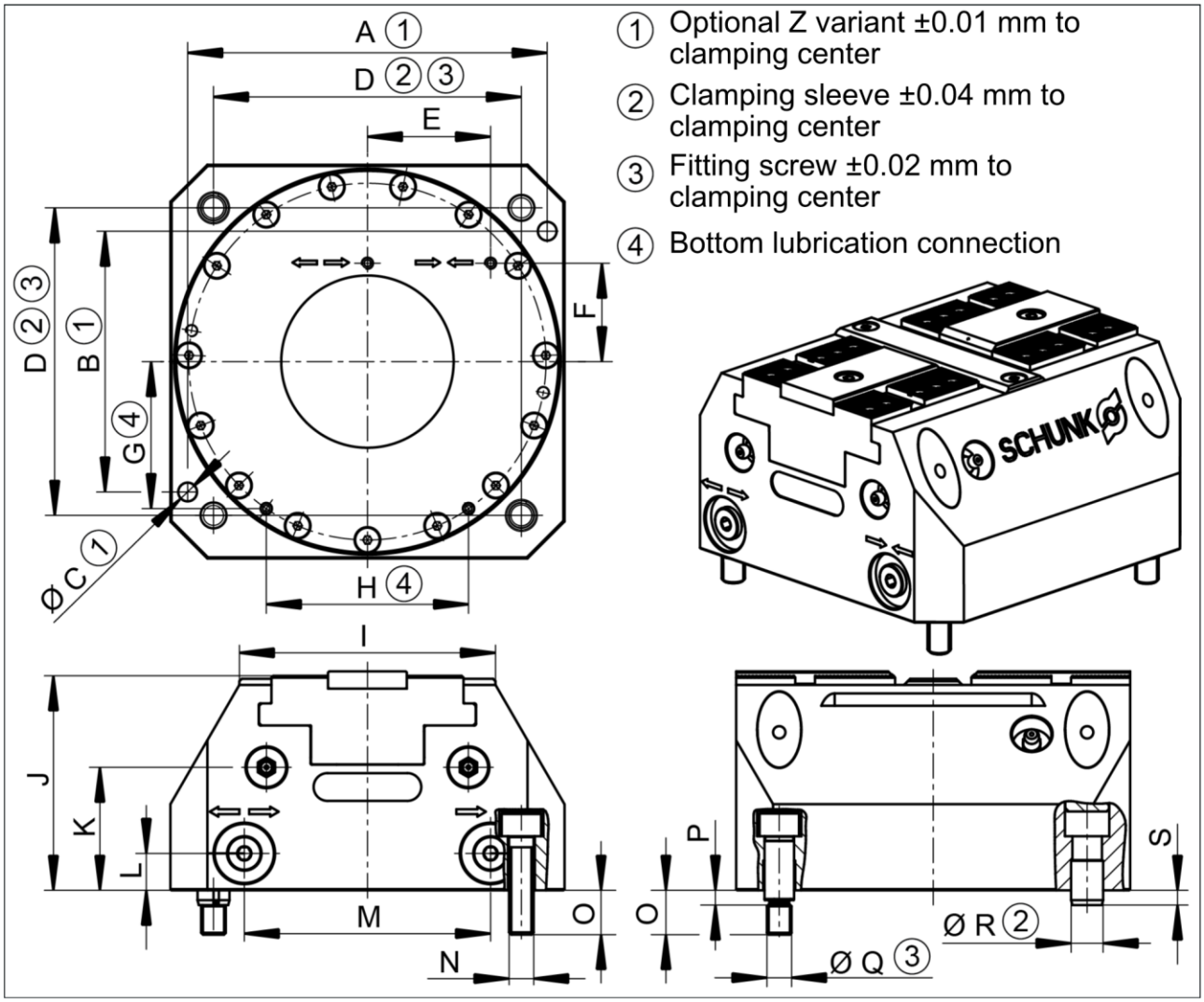
* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at distance "H" (see also catalog).

** End position spread after 100 consecutive strokes.

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

Dimension	KSP plus / KSP-LH plus / KSP-F plus				
	64	100	140	160	250
A	36	90	126	146	230
B	56	64	92	106	154
Ø C	4H7 x 7.5	6H7 x 12	8H7 x 14	8H7 x 14	10H7 x 20
D	50	80	110	125	200
E	17	29.5	44	50	75
F	17	32	45.5	40	64

Dimension	KSP plus / KSP-LH plus / KSP-F plus				
	64	100	140	160	250
G	21	34.5	51.8	59.7	92.6
H	33.6	55	74	82	139.6
I	41	64	91	104	170
J	50.7	69.2	72.7	82.2	98.2
K	30.8	42	41	45	52
L	12	10	13.5	15	20
M	34	59	88	100	150
N	M6	M8	M8	M10	M12
O	12	15	15.5	18	20
P	2.5	4	3.5	4	5
Ø Q	8f7	10f7	10f7	12f7	14f7
Ø R	8	11	11	13	16
S	4	4.5	5.5	6	6



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
Tightening torque M_A (Nm)	4	4	13	28	50	88	120	160	200	290	400	500

Tightening torques for mounting 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 41)

⚠ WARNING

Risk of injury due to accidental actuation of the clamping force block during assembly and connection.

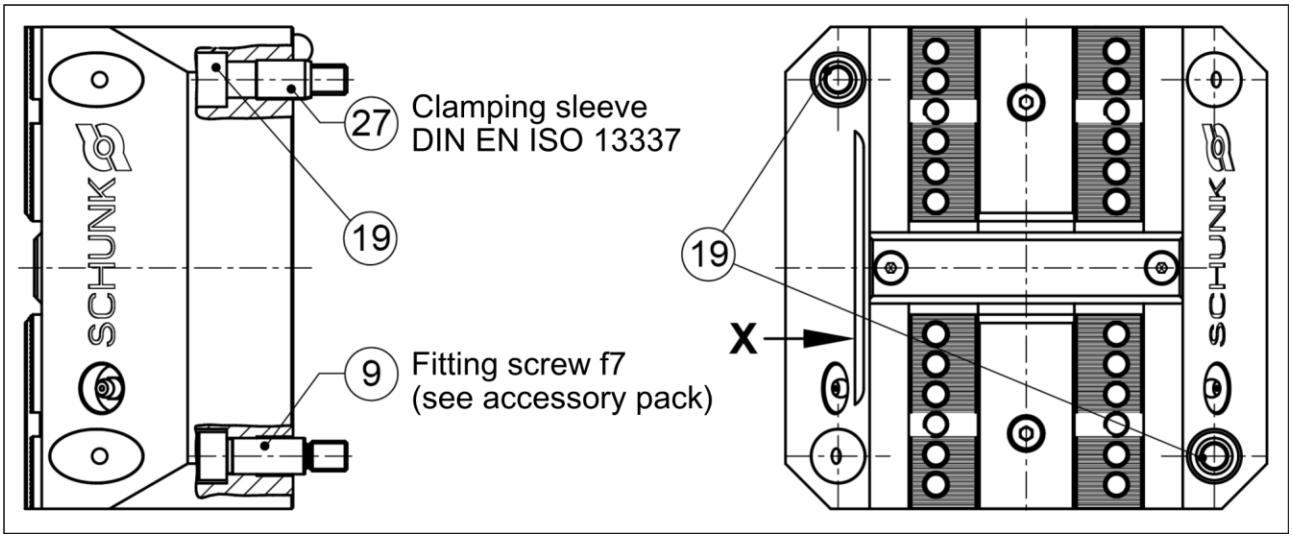
- Make sure the power supply for the clamping block is off during assembly and connection.
- Perform maintenance, modifications, or installations outside of the danger zone.

⚠ WARNING

Risk of injury from clamping block or chuck jaws falling during transport, installation or removal!

- 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 Assembly of the Clamping Block on the machine table



Assembly of the Clamping Block

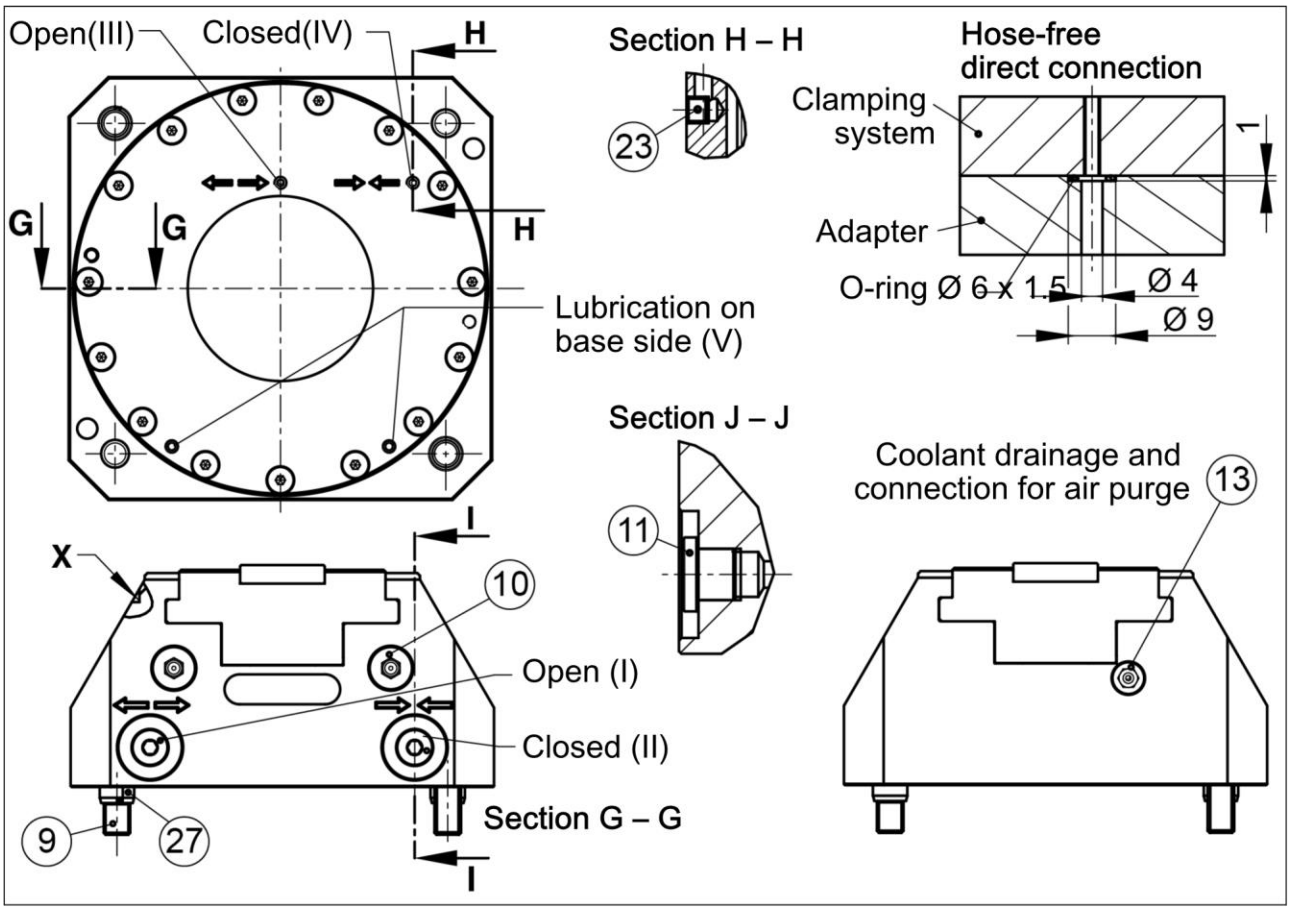
NOTE

- 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.

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).

5.2 Connecting the clamping block



Connecting the clamping force block

CAUTION

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 and falling parts.

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 fitting (frontal):

KSP plus, KSP-LH plus, KSP-F plus 64 and 100	M5
KSP plus, KSP-LH plus, KSP-F plus 140, 160 and 250	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).

Compressed air supply requirements: Compressed air, compressed air quality according to ISO 8573-1:7 4 4

Unconditioned compressed air contains dust and oil particles and moisture, all of which can lead to malfunctions or premature wear in the clamping force 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. On delivery, these connections are sealed with set-screws (item 23 and item 24).

5.3 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 17)
- 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.

6 Troubleshooting

Clamping block chuck jaws will not move

Possible cause	Solution(s)
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	Solution(s)
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 with original SCHUNK replacement parts(☞ 7.1, Page 24)
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 24)
Active air connections sealed	Remove set-screws from sealed air connections

Clamping block does not complete stroke

Possible cause	Solution(s)
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	Solution(s)
Clamping block not sealed tightly	Check connection and seal screws; reseal or replace
Seals damaged	Disassemble the clamping block (☞ 7.1, Page 24) and replace all the seals (see sealing kit lists, (☞ 8.1, Page 28))
Inadequate lubrication	Lubricate the lubrication nipples with LINO MAX 200 (☞ 7, Page 24)

Clamping block movement jerky

Possible cause	Solution(s)
Steel guide rollers on sliding surfaces not greased	See chapter "Maintenance and Care" (☞ 7, Page 24)

7 Maintenance and care

The item numbers specified for the corresponding individual components relate to chapter drawings.(☞ 9, Page 41)

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.
- Upgrade the base jaws and the chuck piston at least every three months or more often if necessary (see chapter (☞ 7.1, Page 24), Disassembling and assembling the clamping block). 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 LINOMAX 200 can be requested from SCHUNK).

IMPORTANT!

Please regularly check the clamping device for tightness by applying a clamping force tester over a longer period of time (>10 min.). The clamping force should not drop during this period. Please adjust the inspection interval to the operating conditions of the clamping device, however, we do recommend conducting a check every 5,000 clamping cycles at the latest.

⚠ CAUTION

Allergic reactions due to grease in contact with skin!
Wear gloves.

7.1 Disassembly and assembly the clamping block

When replacing wearing parts (e.g. seals - for seal kit lists see (☞ 8.1, Page 28)) adhere to the following order:

NOTE:

The base jaws (items 2, 31), chuck piston (item 3) and housing (item 1) are specially tuned to one another. These parts cannot be

replaced individually. To replace these parts, ship the entire clamping force block to SCHUNK along with a repair 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 (item 3)
for size 64 screw in one M6 x > 25 screw in the center bore,
for size 100, screw in one M10 x > 25 screw in the center bore,
for size 140 and 160, screw one M12 x 25 screw in the center bore,
for size 250, screw in two M6 x 25 screws in the lateral threaded holes.

In addition, for variant KSP-F plus:
- Remove the screw (item 32) between the base jaw (item 31) and housing (item 1).
- Remove the positioning bolt (item 29) between base jaw (item 31) and housing (item 1). Also, screw an M3 screw for size 64, a M5 screw for sizes 100, 140 and 160 or an M6 screw for size 250 in the thread of the positioning bolt (item 29).
- Pull the base jaw (item 31) out of the housing (item 1).

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 pull off the cover (item 5), screw two screws into the outer threaded holes:
for size 64, two M3 x > 25 screws,
for size 100, two M3 x > 25 screws,
for size 140, two M4 x > 25 screws,
for size 160 and 250, two M5 x > 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 spare 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) inwards 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 (☞ 4, Page 17).

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.

In addition, for variant KSP-F plus:
- Mount base jaw (item 31) in the housing (item 1).
- Mount the positioning bolt (item 29) between base jaw (item 31) and housing (item 1).
- Screw in the screw (item 32) between the base jaw (item 31) and the housing (item 1).

26 Connect the clamping system to the air supply and move the jaws to the CLOSED position.

27 Screw down the chuck piston (item 3) and cylinder piston (item 4). Tighten the screw (item 14) with a torque wrench (☞ 4, Page 17).

28 Fasten the guide strips (item 6) and the covering strip (item 7).

29 Check for leaks.

7.2 Leak test

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

- 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 – quick coupler – supply line.

2 Pressurize the clamping force block.

3 Close the shut-off valve and remove the supply line.

4 Leave the clamping force block force 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 24)).

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

KSP plus 64, KSP-LH plus 64, KSP-F plus 64 (ID 0405119)

Item	Designation	Quantity
12	Quad ring	1
15	Combined sealing element	1
17	O-ring	1
18	O-ring	4
20	O-ring	12
54	O-ring	2
55	O-ring	2

KSP plus 100, KSP-LH plus 100, KSP-F plus 100 (ID 0405219)

Item	Designation	Quantity
12	Quad ring	1
15	Combined sealing element	1
17	O-ring	1
18	O-ring	4
20	O-ring	13
22	O-ring	1
54	O-ring	4

KSP plus 140, KSP-LH plus 140, KSP-F plus 140(ID 1352791)

Item	Designation	Quantity
12	Quad ring	1
15	Combined sealing element	1
17	O-ring	1
18	O-ring	4
20	O-ring	18
54	O-ring	4

KSP plus 160, KSP-LH plus 160, KSP-F plus 160(ID 0405319)

Item	Designation	Quantity
12	Quad ring	1
15	Combined sealing ring	1
17	O-ring	1
18	O-ring	4
20	O-ring	15
22	O-ring	2
45	O-ring	2
54	O-ring	4

KSP plus 250, KSP-LH plus 250, KSP-F plus 250 (ID 0405519)

Item	Designation	Quantity
12	Quad ring	1
15	Combined sealing ring	1
17	O-ring	1
18	O-ring	4
20	O-ring	19
22	O-ring	1
45	O-ring	2
54	O-ring	4

Wear parts - replacement recommended during maintenance

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

8.2 Accessory packs

KSP plus 64, KSP-LH plus 64, KSP-F plus 64(ID 8507912)

Item	Designation	Quantity
8	Plug	4
9	Fitting screw	2
18	O-ring	4
19	Screw	4
27	Clamping sleeve	2
51	Screw	8
54	O-ring	4
55	O-ring	2

KSP plus 100, KSP-LH plus 100, KSP-F plus 100(ID 8507911)

Item	Designation	Quantity
8	Plug	4
9	Fitting screw	2
18	O-ring	4
19	Screw	4
27	Clamping sleeve	2
51	Screw	8
54	O-ring	4

KSP plus 140, KSP-LH plus 140, KSP-F plus 140(ID 1344305)

Item	Designation	Quantity
	Plug	4
9	Fitting screw	2
18	O-ring	4
19	Screw	4
27	Clamping sleeve	2
51	Screw	8
54	O-ring	4

KSP plus 160, KSP-LH plus 160, KSP-F plus 160(ID 8507913)

Item	Designation	Quantity
8	Plug	4
9	Fitting screw	2
18	O-ring	4
19	Screw mm	4
27	Clamping sleeve	2
51	Screw	8
54	O-ring	4

KSP plus 250, KSP-LH plus 250, KSP-F plus 250(ID 8507914)

Item	Designation	Quantity
8	Plug	4
9	Fitting screw	2
18	O-ring	4
19	Screw mm	4
27	Clamping sleeve	2

Item	Designation	Quantity
51	Screw	8
52	T-handle for KSP M10	2
53	Set-screw	2
54	O-ring	4

8.3 Parts lists

KSP plus 64 (ID: 0405100), KSP-LH plus 64 (ID: 1313055)

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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing element	1
16	Screw	2
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	12
21	Countersunk screw	9
23	Set-screw	5
25	Countersunk screw	2
27***	Clamping sleeve	2

KSP-F plus 64 (ID: 0405110)

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	1
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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing element	1
16	Screw	1
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	12
21	Countersunk screw	9
23	Set-screw	5
25	Countersunk screw	2
27***	Clamping sleeve	2
29	Socket pin	1
30	Screw	1
31*	Base jaw	1
32	Screw	1
33	Guide strip	1

KSP plus 100 (ID: 0405200), KSP-LH plus 100 (ID: 0405220)

Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2

Item	Designation	Quantity
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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing element	1
16	Screw	2
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	13
21	Countersunk screw	11
22**	O-ring	1
23	Set-screw	2
24	Set-screw	2
25	Countersunk screw	2
27***	Clamping sleeve	2

KSP-F plus 100 (ID: 0405210)

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

Item	Designation	Quantity
9***	Fitting screw	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing element	1
16	Screw	1
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	13
21	Countersunk screw	11
22**	O-ring	2
23	Set-screw	2
24	Set-screw	2
25	Countersunk screw	2
27***	Clamping sleeve	2
28	Spherical washer	1
29	Socket pin	1
30	Screw	1
31*	Base jaw	1
32	Screw	1

KSP plus 140 (ID: 1330207), KSP-LH plus 140 (ID: 1330209)

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	2

Item	Designation	Quantity
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing element	1
16	Screw	2
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	18
21	Countersunk screw	15
23	Set-screw	4
25	Countersunk screw	2
27***	Clamping sleeve	2

KSP-F plus 140 (ID: 1330211)

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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing elements	1
16	Screw	1
17**	O-ring	1

Item	Designation	Quantity
18***	O-ring	4
19***	Screw	4
20**	O-ring	18
21	Countersunk screw	15
13	Set-screw	4
25	Countersunk screw	2
27***	Clamping sleeve	2
28	Spherical washer	1
29	Socket pin	1
30	Screw	1
31*	Base jaw	1
32	Screw	1

KSP plus 160 (ID: 0405300), KSP-LH plus 160 (ID: 0405320)

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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing ring	1
16	Screw	2
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	15

Item	Designation	Quantity
21	Countersunk screw	15
22**	O-ring	1
23	Set-screw	4
25	Countersunk screw	2
26	Set-screw	1
27***	Clamping sleeve	2

KSP-F plus 160 (ID: 0405310)

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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing ring	1
16	Screw	1
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	15
21	Countersunk screw	15
22**	O-ring	1
23	Set-screw	4
25	Countersunk screw	2
26	Set-screw	1
27***	Clamping sleeve	2

Item	Designation	Quantity
28	Spherical washer	1
29	Socket pin	1
30	Screw	1
31*	Base jaw	1
32	Screw	1

KSP plus 250 (ID: 0405500), KSP-LH plus 250 (ID: 0405520)

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	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing ring	1
16	Screw	2
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	19
21	Countersunk screw	19
22**	O-ring	1
23	Set-screw	2
24	Set-screw	2
25	Countersunk screw	2
26	Set-screw	1

Item	Designation	Quantity
27***	Clamping sleeve	2
45	O-ring	2

KSP-F plus 250 (ID: 0405510)

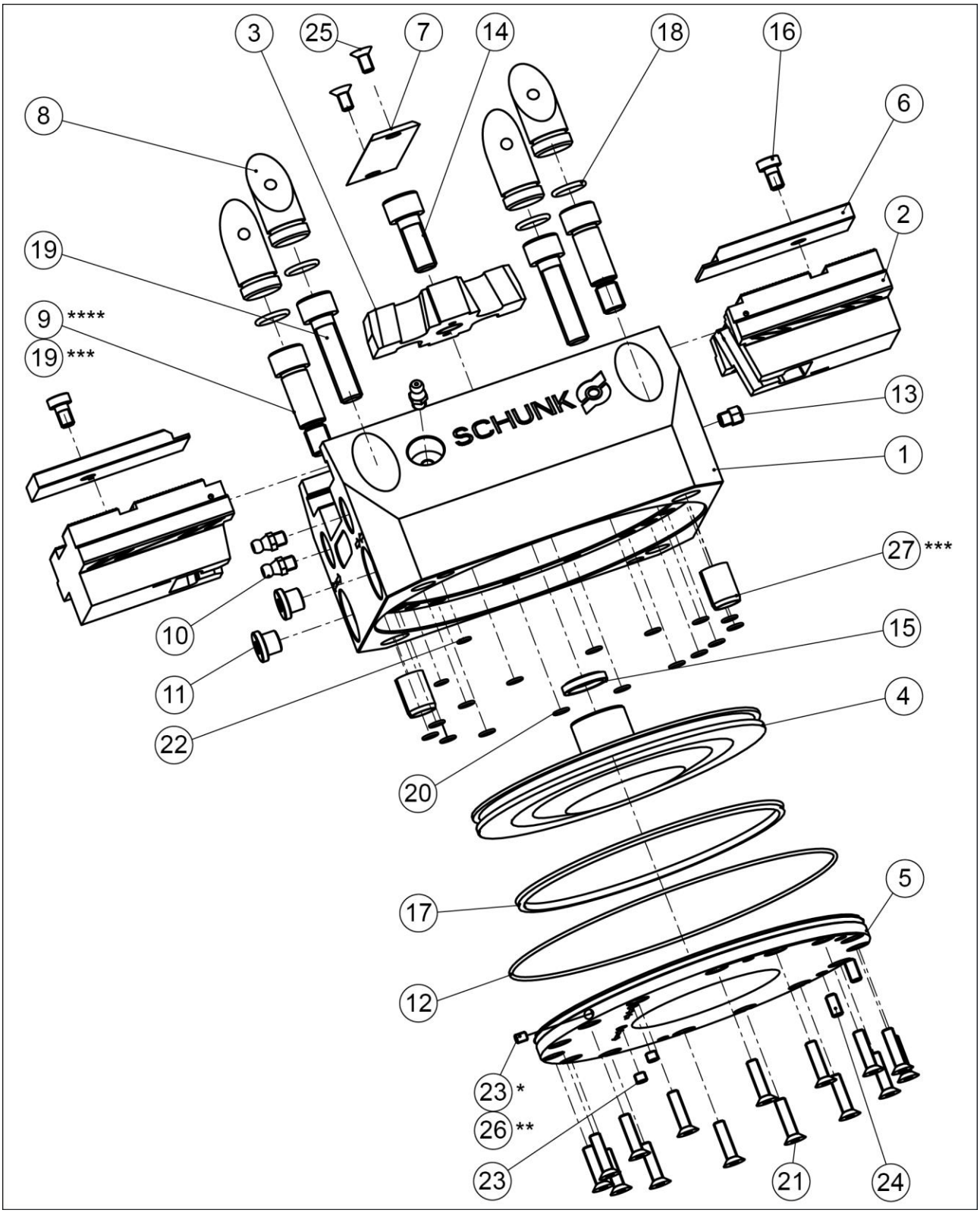
Item	Designation	Quantity
1*	Body	1
2*	Base jaw	2
3*	Chuck piston	1
4	Cylinder piston	1
5	Cover	1
6	Guide strip	2
7	Covering strip	1
8***	Plug	4
9***	Fitting screw	2
10	Funnel lubrication nipple	4
11	Locking screw	2
12**	Quad ring	1
13	Sound absorber	1
14	Screw	1
15**	Combined sealing ring	1
16	Screw	1
17**	O-ring	1
18***	O-ring	4
19***	Screw	4
20**	O-ring	19
21	Countersunk screw	19
22**	O-ring	1
23	Set-screw	2
24	Set-screw	2
25	Countersunk screw	2
26	Set-screw	1
27***	Clamping sleeve	2
28	Spherical washer	1
29	Socket pin	1
30	Screw	1

Item	Designation	Quantity
31*	Base jaw	1
32	Screw	1
45	O-ring	2

* Individual components are made to go together and cannot not be replaced by the customer.
** See sealing kit list – parts cannot be ordered individually
*** Included in accessory kit

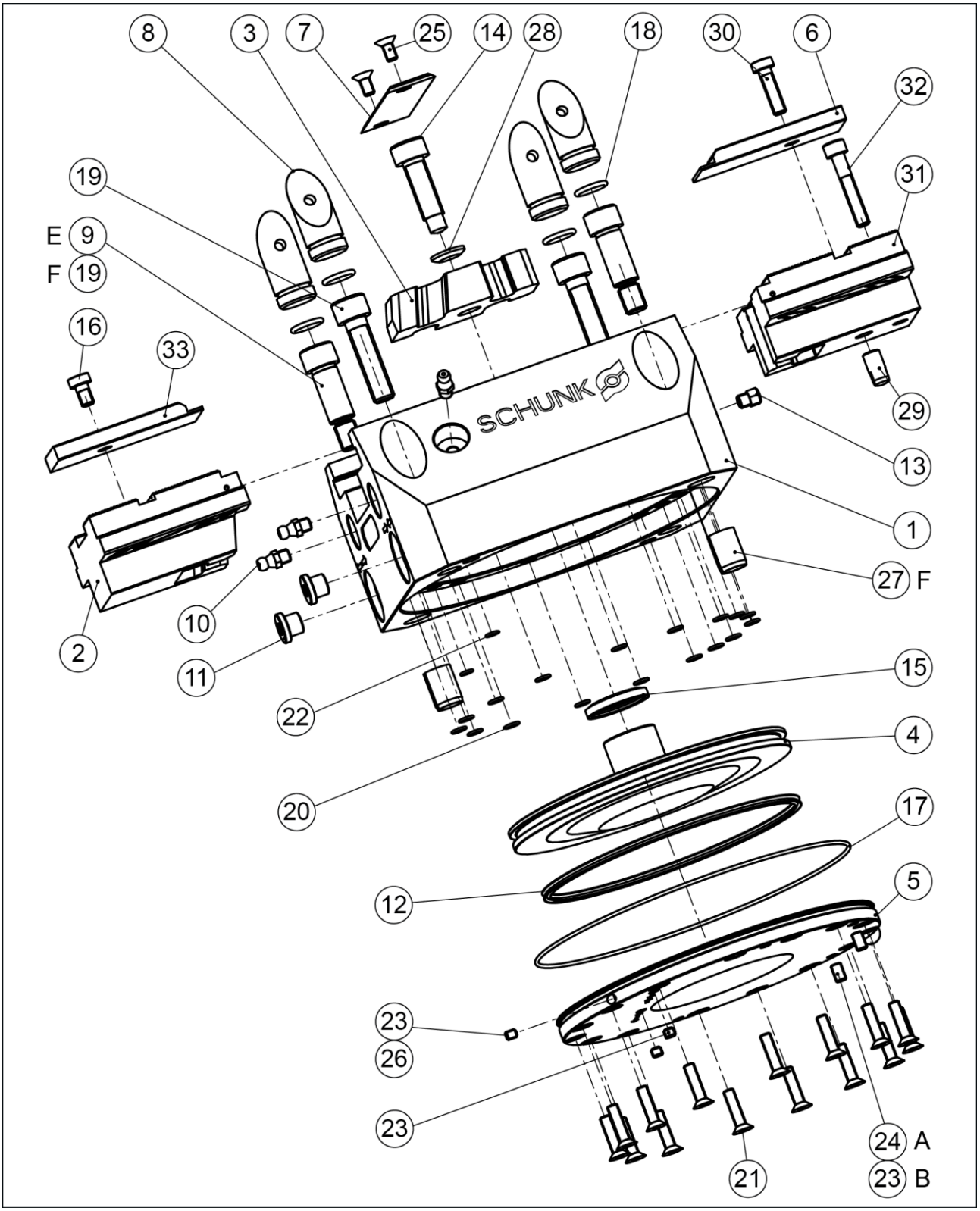
9 Assembly drawings

9.1 KSP plus, KSP-LH plus



*	for size 100	**	for sizes 160/250
***	Centering with clamping sleeves	****	Centering with fitting screws

9.2 KSP-F plus



A	for sizes 100/250	B	for sizes 64/140/160
E	Centering with fitting screws	F	Centering with clamping sleeves

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 / Distributor	H.-D. SCHUNK GmbH & Co. Spanntechnik KG 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 designation:	TANDEM clamping force block, pneumatic
Type designation:	KSP plus 64; KSP-Z plus 64; KSP plus 100; KSP-Z plus 100; KSP plus 160; KSP-Z plus 160; KSP plus 250; KSP-Z plus 250; KSP-LH-Z plus 64; KSP-LH plus 100; KSP-LH-Z plus 100; KSP-LH plus 160; KSP-LH-Z plus 160; KSP-LH plus 250; KSP-LH-Z plus 250; KSP-F plus 64; KSP-F-Z plus 64; KSP-F plus 100; KSP-F-Z plus 100; KSP-F plus 160; KSP-F-Z plus 160; KSP-F plus 250; KSP-F-Z plus 250; KSP plus 140; KSP-Z plus 140; KSP-LH plus 140; KSP-LH-Z plus 140; KSP-F plus 140; KSP-F-Z plus 140.
ID number	0405100; 0405102; 0405200; 040520; 0405300; 0405302; 0405500; 0405502; 1313055; 1313056; 0405220; 0405222; 0405320; 0405322; 0405520; 0405522; 0405110;0405112; 0405210; 0405212; 0405310; 0405312; 0405510; 0405512; 1330207; 1330208; 1330209; 1330210; 1330211; 1330212

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 Schräder, Address: see manufacturer's addr

Signature: see original declaration

Mengen, March 2017 p.p. Philipp Schräder; 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 incomplete machine:

Product designation	$Company name$
Type designation	KSP plus 64; KSP-Z plus 64; KSP plus 100; KSP-Z plus 100; KSP plus 160; KSP-Z plus 160; KSP plus 250; KSP-Z plus 250; KSP-LH-Z plus 64; KSP-LH plus 100; KSP-LH-Z plus 100; KSP-LH plus 160; KSP-LH-Z plus 160; KSP-LH plus 250; KSP-LH-Z plus 250; KSP-F plus 64; KSP-F-Z plus 64; KSP-F plus 100; KSP-F-Z plus 100; KSP-F plus 160; KSP-F-Z plus 160; KSP-F plus 250; KSP-F-Z plus 250; KSP plus 140; KSP-Z plus 140; KSP-LH plus 140; KSP-LH-Z plus 140; KSP-F plus 140; KSP-F-Z plus 140.
ID number	0405100; 0405102; 0405200; 040520; 0405300; 0405302; 0405500; 0405502; 1313055; 1313056; 0405220; 0405222; 0405320; 0405322; 0405520; 0405522; 0405110;0405112; 0405210; 0405212; 0405310; 0405312; 0405510; 0405512; 1330207; 1330208; 1330209; 1330210; 1330211; 1330212

		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
.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	
1.45.6	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