



TANDEM Clamping force block

KSF plus, KSF-LH plus, KSF-F plus

Assembly and Operating Manual

Translation of Original Operating
Manual

Imprint

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Technical changes:

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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

Customer Management

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Please read the operating manual in full and keep it close to the product.

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1 General

1.1 About this manual

This manual contains important information for the safe, correct use of the product.

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

Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is a prerequisite to ensure safe work processes.

The illustrations are intended to provide a basic understanding and may deviate from the actual version.

Besides this manual, other documents which apply are those listed under ▶ 1.1.2 [6]

1.1.1 Illustration of warning notices

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



⚠ DANGER

Denotes a hazard with a high degree of risk that, if not avoided, will result in death or serious injury.



⚠ WARNING

Denotes a hazard with a medium degree of risk that, if not avoided, could result in death or serious injury.



⚠ CAUTION

Denotes a hazard with a low degree of risk that, if not avoided, could result in a minor or moderate injury.

CAUTION

Information about avoiding material damage.

1.1.2 Applicable documents

- General Terms and Conditions *
- Catalog data sheet for the attached product *
- Technical data sheet for optional attachments *
- Approval drawings

Documents marked with a star (*) can be downloaded at **schunk.com**.

1.1.3 Sizes

This operating manual applies to the following sizes:

- KSF plus 100, 140, 160, 250
- KSF-LH plus 100, 140, 160, 250
- KSF-F plus 100, 140, 160, 250

1.2 Warranty

The warranty for standard products is 24 months from the date of delivery from the factory, or 50,000 cycles* for manually operated clamping devices and 500,000 cycles* for power operated clamping devices. For special clamping devices, it is 12 months from the date of delivery from the factory, assuming appropriate use in accordance with the following conditions:

- Observe the applicable documents, ▶ 1.1.2 [6]
- Observance of the ambient conditions and operating conditions, ▶ 2.5 [8]
- Observance of maintenance and lubrication intervals, ▶ 5 [21]

Parts touching the workpiece and wearing parts are not covered by the warranty.

* One cycle comprises one complete clamping procedure ("opening" and "closing").

1.3 Scope of Delivery

Clamping force block

KSF plus or KSF-LH plus or KSF-F plus

(without top jaws)

ACCESSORY KIT:

(for contents, see sealing kit list and parts list) ▶ 8.1 [27]

2 Basic safety notes

Improper handling, assembly and maintenance of this product may result in risk to persons and equipment if this operating manual is not observed.

2.1 Appropriate use

- The product is used for clamping metal and plastic workpieces on machine tools.
- The product may only be used within the scope of its technical data.
- The product is designed to be set up on a machine table or machine pallets.
- The product is intended for industrial and commercial use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- Use suitable top jaws with a suitable interface.
- Clamping workpieces with temperatures between 0°C and 100°C.
- The outer dimensions of the workpiece must be smaller than or at most equal to the outer diameter of the clamping device.
- The workpiece must not undergo plastic deformation while under clamping force (clamping indentations are permissible).

2.2 Inappropriate use

The product is not being used appropriately if:

- the product is used as a press or a punch, as a toolholder, as a lathe chuck, as a drill or as a cutting tool.
- the technical data specified are exceeded during usage.
- workpieces are not properly clamped, paying particular attention to the specified clamping forces.
- the top jaws are not mounted properly.
- the product is not being operated properly.
- the product is operated in the stroke end positions.
- the guideways are overloaded due to the chuck jaws being too high or the selected clamping point being too high.
- the product has been insufficiently maintained.
- the product is used for turning applications over 100 RPM without consulting SCHUNK.
- the product is brought into contact with aggressive media, especially acids.
- the product is used in abrasive blasting processes, especially sandblasting.

2.3 Structural changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- 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.

- Only use original spare parts and spares authorized by SCHUNK.

2.5 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

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

- Make sure that the product is only used within its defined application parameters.
- Ensure that the product is of a sufficient size for the application.
- Ensure that maintenance and lubricating intervals are observed.
- When machining, use only coolant emulsions with anti-rust properties.
- Depending on the operating conditions, the function must be checked after a certain period of operation.

2.6 Material limitations

The product is made of steel alloys, elastomers, aluminum alloys and brass. In addition, Microgleit LP 410 grease, Branotect anti-rust oil and Renolit HLT2 are incorporated into the product as auxiliary and operating materials. The safety data sheet for Microgleit LP 410 can be found at www.schunk.com.

2.7 Chuck Jaws

Requirements of the chuck jaws

When using chuck jaws, please observe the following rules:

- Change chuck jaws at a standstill and without a clamped workpiece.
- Do not use welded jaws.
- Design the chuck jaws 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 guides and can significantly reduce the clamping force.)
- If the clamping point is at a greater distance from the housing, the operating pressure must be reduced.
- After a collision, the clamping device and the chuck jaws must be subjected to a crack detection test before being used again. Replace damaged parts with original SCHUNK spare parts.
- The chuck jaw mounting screws and if present, the T-nuts, must be replaced if there are signs of wear or damage. Only use screws of quality grade 12.9 in compliance with the specified tightening torques. For clamping devices with fine serration, the jaw mounting screws must be screwed into the holes closest to the clamping point.

2.8 Personnel qualifications

Inadequate qualification of personnel

Any work on the product by inadequately qualified personnel can lead to serious injuries and considerable material damage.

- All work must be performed by appropriately qualified personnel.
- Personnel must have read and understood the complete manual before beginning any work on the product.
- Observe country-specific accident prevention regulations and the general safety notes.

The following personnel qualifications are required for the various activities on the product:

Qualified electrician

Qualified electricians have the professional training, knowledge, and experience to work on electrical systems, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Specialist personnel

Specialist personnel have the specialized training, knowledge, and experience to perform the tasks entrusted to them, to recognize and avoid potential dangers, and know the relevant standards and regulations.

- Instructed person** Instructed persons have been instructed by the operator regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.
- Manufacturer's service personnel** The manufacturer's service personnel have the specialized training, knowledge, and experience to perform the work entrusted to them and to recognize and avoid potential dangers.

2.9 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff in the event of a danger that may interfere with their health or safety at work.

2.10 Transport

Handling during transport

Incorrect handling during transport can make the product unsafe and risks the danger of serious injuries and considerable material damage.

- During transport and handling, secure the product to prevent it from falling.
- Use the transport thread on the clamping device.

2.11 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly can make the product unsafe and can risk the danger of serious injuries and considerable material damage.

- All work must only be performed by appropriately qualified personnel.
- Secure the system against accidental operation during all work.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

2.12 Protection during commissioning and operation

Falling or violently ejected components

Falling and ejected components can lead to serious injury or death.

- Take suitable protective measures to secure the danger zone.

2.13 Notes on safe operation

Incorrect manner of working by personnel

An incorrect manner of working can make the product unsafe and risks serious injuries and considerable material damage.

- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. Products for special ambient conditions are excluded.
- Rectify malfunctions as soon as they occur.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention, and environmental protection regulations for the application field of the product.
- Do not start the machine spindle until the force has built up in the chuck jaw and clamping is complete in the permissible operating range.
- Unclamping may only occur once the machine spindle has come to a standstill.

IMPORTANT!

Following a longer shutdown period (more than 8 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.

2.14 Disposal

Handling of disposal

Incorrect handling during disposal can make the product unsafe and risks serious injuries and considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.15 Fundamental dangers

General

- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- Do not reach into the open mechanism or movement area of the product during operation.

2.16 Protection against dangerous movements

Safe condition

1. Clamping force block with workpiece:
Workpiece clamped outside the end positions of the clamping force block with clamping pressure applied.
2. Clamping force block without workpiece, without clamping or release pressure applied.
3. Clamping force block with spring force:
Clamped without energy without workpiece.
Special feature: Due to the built-in spring, an opened clamping force block clamps without release pressure.
Unexpected clamping movements could result if the release pressure fails. Take suitable measures, e.g. a pilot-controlled check valve with manual venting.

Unexpected movements

If the system still retains residual energy, serious injuries can be caused while working on the product.

- Establish a safe state, switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.

2.17 Notes on particular risks



⚠ WARNING

Risk of injury in the event of workpiece loss due to component failure on the product as a result of exceeding the technical data.

- The product is only allowed to be used within the scope of its technical data.



⚠ WARNING

Danger of crushing due to the chuck jaws moving to the workpiece during the clamping procedure when loading and unloading manually.

- Do not reach between the workpiece and the chuck jaw during the clamping procedure.
- Implement the safety functions according to the integrator's risk assessment.



⚠ WARNING

Risk of injury in the event of workpiece loss due to failure or pressure reduction.

- Implementing safety functions according to the integrator's risk assessment.
- Ensure stable pressure supply.
- Use pressure maintenance valves.



⚠ WARNING

Risk of injury from falling parts during transport, assembly and disassembly of the product and its accessories.

- Use suitable load handling equipment for transport.
- Do not linger in the danger zone.
- Wear protective equipment (protective shoes).



⚠ CAUTION

Ergonomic risk to the musculoskeletal system when lifting and transporting the product using manual force.

- Use load handling equipment for lifting and transporting.



⚠ CAUTION

Allergic reactions or irritation due to skin or eye contact with lubricants on the product.

- In case of foreseeable contact with lubricants on the product (e.g. when lubricating or cleaning),
- wear protective equipment (protective gloves, protective goggles).



⚠ CAUTION

Danger for the operating personnel in case of insufficient clamping force due to ejection or falling of the workpiece!

Due to settling behavior, the clamping force may decrease over time.

- Ensure that the clamping pressure is applied to the clamping force block while the workpiece is being machined.
- Re-clamping of the workpiece with manual or pneumatic clamping force blocks.

3 Technical data

Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Operating pressure [bar]	max. 6
Operating temperature [°C]	5 to 60
Installation position	Any
Noise emission [dB(A)]	≤70

CAUTION

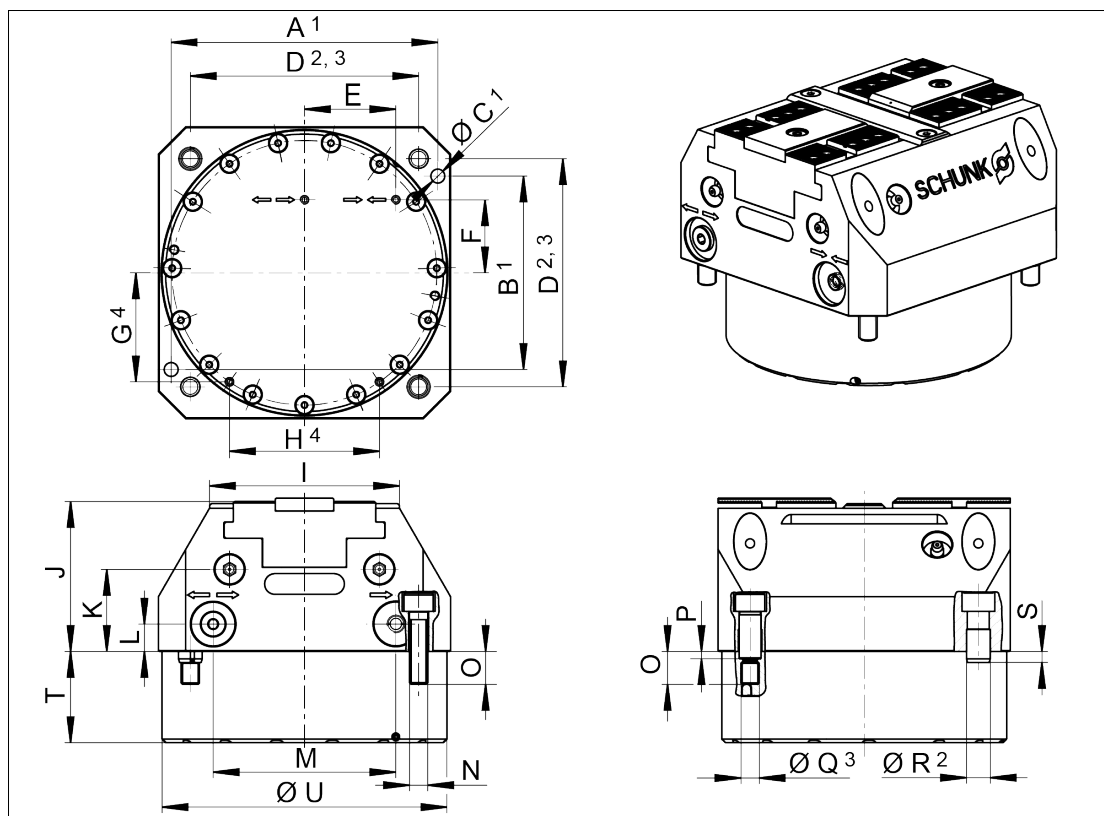
The TANDEM clamping blocks **KSF plus** and **KSF-F plus** may **not** be operated with the turbo function. Additional pressure support can damage the clamping blocks.

KSF plus	100	140	160	250
Stroke per jaw [mm]	2	3	3	5
Clamping force* at max. pressure [kN]	10	16	25	50
Max. pressure*** [bar]	6	6	6	6
Repeat accuracy** [mm]	0.01	0.015	0.02	0.03
Max. jaw height [mm]	60	60	60	150
Weight [kg]	5	10	16	42
KSF-LH plus	100	140	160	250
Stroke per jaw [mm]	6	7	8	15
Clamping force* at max. pressure [kN]	4.5	7.5	10	16
with turbo	10	17.5	25	38
Max. pressure*** [bar]	6	6	6	6
Repeat accuracy** [mm]	0.01	0.015	0.02	0.03
Max. jaw height [mm]	150	120	200	500
Weight [kg]	5	10	16	42
KSF-F	100	140	160	250
Stroke per jaw [mm]	4	6	6	10
Clamping force* at max. pressure [kN]	10	16	25	50
Max. pressure*** [bar]	6	6	6	6
Repeat accuracy** [mm]	0.01	0.015	0.02	0.03
Max. jaw height [mm]	60	60	60	150
Weight [kg]	5	10	16	42

* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at a distance of "H" (see catalog data sheet ▶ 1.1.2 [6]).

** End positions spread after 100 consecutive strokes.

*** For applications without turbo function



- 1 Optional Z variant ± 0.01 mm to clamping center 2 Clamping sleeve ± 0.04 mm to clamping center
 3 Fitting screw ± 0.02 mm to clamping center 4 Bottom lubrication connection

KSF plus, KSF-LH plus, KSF-F plus				
Dimension	100	140	160	250
A [mm]	90	126	146	230
B [mm]	64	92	106	154
Ø C	6 H7 x 12	8 H7 x 14	8 H7 x 14	10 H7 x 20
D [mm]	80	110	125	200
E [mm]	29.5	44 (2x)	50	75
F [mm]	32	45.5	40	64
G [mm]	34.5	51.8	59.7	92.6
H [mm]	55	74	82	139.6
I [mm]	64	91	104	170
J [mm]	69.2	72.7	82.2	98.2
K [mm]	42	41	45	52
L [mm]	10	13.5	15	20
M [mm]	59	88	100	150
N	M8	M8	M10	M12
O [mm]	15	15.5	18	20
P [mm]	4	3.5	4	5
Ø Q	10 f7	10 f7	12 f7	14 f7
Ø R [mm]	11	11	13	16
S [mm]	4.5	5.5	6	6
T [mm]	37.3	44.2	50	58
Ø U [mm]	97.5	136.5	156	246

4 Assembly

The numbers shown for individual components refer to the assembly illustrations or clamping block connections and to the "Drawings" chapter, ▶ 9 [□ 30].

Make sure the power supply for the clamping block is off during assembly and connection. See chapter "Basic Safety Notes".

4.1 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)	4.2	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)

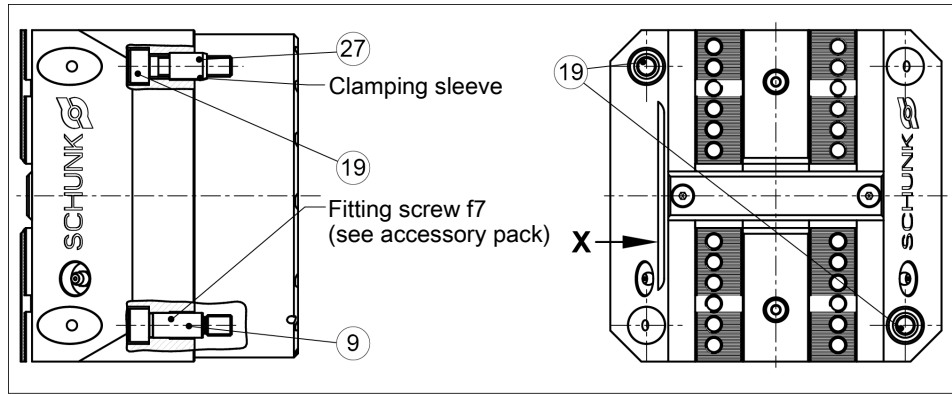
Screw size	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24
Tightening torque M_A (Nm)	5	9	15	32	62	108	170	262	510	880

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

4.2 Assembly of the clamping block on the machine table

- The clamping block must be partly built into the table top. The cover (item 5) is built into the table top via a mounting- or through-hole. To mount the clamping block with the flat bottom surface of the housing (item 1) to the machine table, the cover must be built into a cylindrical mounting- or through-hole in the table top. The cylindrical mounting hole should be drilled +0.2 to +0.4 mm wider than the $\varnothing U$ of the clamping block (see "Technical Data" ▶ 3 [□ 14] and fig. "Connections of the clamping block" ▶ 4.3 [□ 17]). The clamping block is not positioned over the cover.
- If installed vertically, 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 that the clamping block can be aligned on the machine table.



Assembling the clamping block

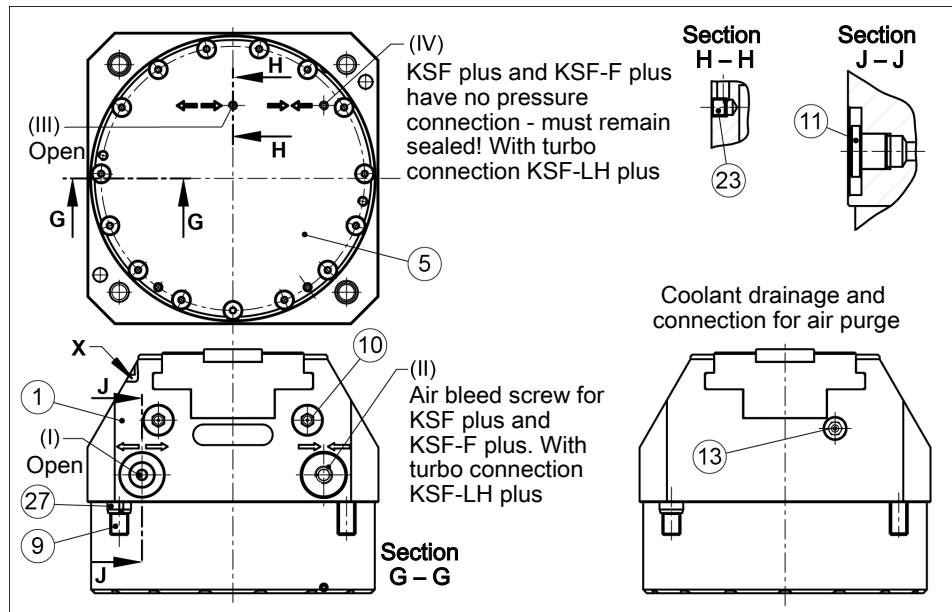
Assembly with clamping sleeves:

the clamping block is mounted 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).

4.3 Connections of the clamping block



Connections of the clamping block

KSF plus and KSF-F plus:

The clamping block has two air connections: »I« and »III«

- Open against spring assembly, no turbo function.

The clamping block is closed mechanically via the integrated spring assembly. A sound absorber for ventilation is built into the front instead of connection "II". **Connection "IV" has no function and must remain closed.**

KSF-LH:

The clamping force can be raised by the additional turbo function at connections "II" and "IV".

The clamping block has four air connections: "I, II, III, IV".

- Open against spring assembly, optionally at connection "I" or "III". Ventilation is performed via the return flow of the air supply, optionally at connection "II" or "IV".

The clamping block is closed mechanically via the integrated spring assembly and additional pressure support from the turbo connection.

Connection of the KSF plus and KSF-F plus versions:

The clamping block has two air connections for OPEN: "I" and "III" (opening against spring assembly, no turbo function) and an air bleed screw (sound absorber). The application determines which of the two air connections (at the front or at the base) must be opened for actuation:

- Connection "I" for operations with external hose line.
- Connection "III" for air supply to the base side in the machine table.

Connection of the KSF-LH version:

The clamping block has four air connections: "I, II, III, IV". Which of the two air connections (at the front or at the base) must be opened for actuation depends on the application:

- Connections "I" and "II" for operations with external hose line.
- Connections "III" and "IV" for air supply to the base side in the machine table.

NOTE:

A pneumatic plug-in connection with an M5 connecting thread for actuating the clamping block can be built in at the thread of the base side OPEN air supply in the cover (item 5). The hose line must have a nominal width of min. 6 mm. In KSF-LH, both connections can be fitted with a pneumatic plug-in connection.

Thread for pneumatic fitting (at the front on housing item 1):

- KSF plus, KSF-F plus, KSF-LH plus 100: M5
- KSF plus, KSF-F plus, KSF-LH plus 140, 160, 250: G1/8"

Thread for pneumatic fitting (at the base in cover item 5):

- All sizes of KSF plus, KSF-F plus and KSF-LH plus: M5

The clamping block is delivered with all four air connections sealed. 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.

CAUTION

Always make sure that the connections are tight and use a suitable metal hose to protect the pneumatic hoses against hot chips, falling parts or other damage.



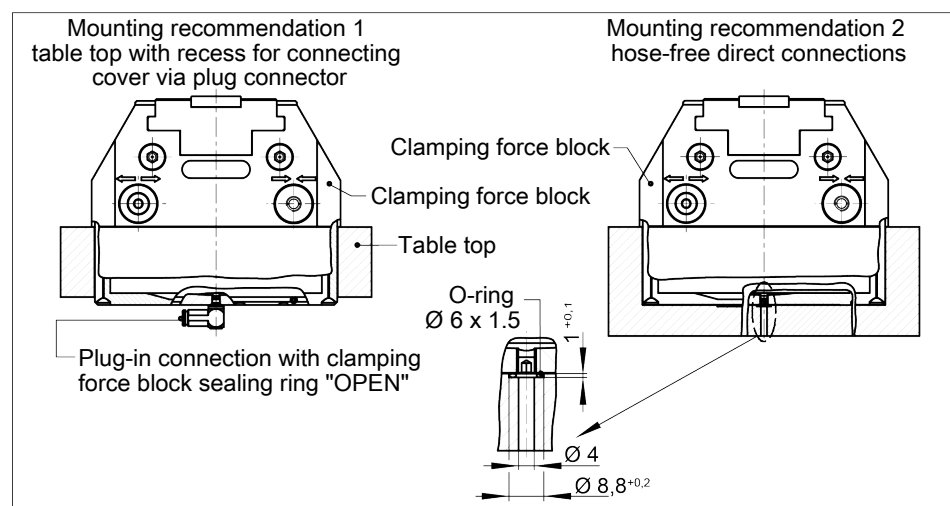
WARNING

Risk of injury due to immediate closing of the clamping block with a high spring pressure in case of failure of the pneumatic pressure.

- Do not reach between the chuck jaws when manually loading and unloading.
- Remove the power supplies of the clamping block for maintenance work.

4.4 Mounting recommendations

The clamping block must be partly (1) or completely (2) built into the table top.



Mounting recommendations

4.4.1 Installation recommendation for partial integration:

- The cover (part 5) is built into the table top via a mounting- or through-hole.
- Compressed air is supplied to the base-side air connection »III« on the clamping block by a hose line with a pneumatic plug-in connection that is built into the opening in the cover (item 5) below the table top.
- Do not open the frontal connection »I« of the clamping block, or seal it airtight with a suitable dummy plug (M5 or G1/8").
- Before mounting the clamping block on the table top, unscrew the Torx setscrew (item 23) at the base-side air connection »III« in the cover (item 5) and replace it with the screw-in union with the M5 connection thread.

NOTE:

- Screw the clamping block onto the machine table or the device. Observe the screw tightening torques in doing so ▶ 4.1 [16].
- For the different ways to mount the clamping block, see the chapter on "Mounting the clamping block on the machine table" ▶ 4.2 [16].
- Before commissioning the clamping block, ensure that the frontal pneumatic connection »I« is properly sealed.
- The assembly parts (screws, clamping sleeves) are included in the accessory pack. The recommended plug-in connections are not delivered with the clamping block.

4.4.2 Installation recommendation for full installation

- The cover (item 5) is built into the table top via a mounting hole.
- Compressed air is supplied to the air connection »III« at the base of the clamping force block by a hose-free direct connection in the machine table. The base-side opening is sealed with an O-ring for this purpose.
- The cylindrical mounting hole should be drilled +0.1 to +0.4 mm wider than the \emptyset »U« of the clamping force block.
- Exact compliance with the specified mounting depth of the cover (item 5) is essential. The mounting depth is determined by the dimension »T« and must be finished to a tolerance of +0.1 to +0.3 mm (see "Technical data" ▶ 3 [14]).
- Do not open the frontal connection »I« of the clamping force block or seal it airtight with a locking screw (M5 or G1/8").
- The pneumatic pressure supply to connection "III" is sealed by an O-ring, which is laid into the O-ring seat in the flat surface of the mounting hole. The mounting dimensions for the axially sealing O-ring seat must be machined to appropriate specifications for mounting recommendation 2, namely $\emptyset 8.8^{+0.2} \times 1^{+0.1}$.
- Before mounting the clamping force block on the table top, the Torx set-screw (item 23) must be removed from the base-side air connection "III" in the cover (item 5) of the clamping force block.

NOTE:

- When joining the clamping force block and the table top, ensure that the feed-through of the compressed air supply line for the clamping force block and the table top is precisely aligned and the O-ring for sealing has been inserted.
- Screw the clamping force block to the machine table in compliance with the screw tightening torques ▶ 4.1 [16].
- The assembly parts (screws, clamping sleeves, O-rings) are included in the accessory kit.
- For the different mounting variations of the clamping force block, see the chapter on "Mounting the clamping force block on the machine table" ▶ 4.2 [16].
- Before commissioning the clamping force block, make sure that the frontal hydraulic connections are properly sealed.

5 Maintenance and care

To ensure the clamping force block operates perfectly, the following instructions are to be observed:

- Make sure the bore hole for coolant drainage remains unblocked!
- Depending on the load, but at least once a month or after every 10,000 clampings, grease the guides on the two frontal or the two lateral lubrication nipples with LINOMAX plus or an equivalent lubricant. Make sure the chuck jaws are in the open position.
- Disassemble the base jaw and chuck piston at least once every three months (or more often, if necessary). Clean the housing, base jaw and chuck piston and lubricate all the guides (housing, base jaw, chuck piston) with LINOMAX plus or an equivalent lubricant. Reassemble everything and relubricate the two frontal or the two lateral lubricating nipples with LINOMAX plus or an equivalent lubricant.

(product information about LINOMAX plus can be requested from SCHUNK).



⚠ CAUTION

Allergic reactions if lubricating grease comes into contact with the skin.

Wear protective gloves.

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.

5.1 Disassembly and assembly of the clamping block

The item numbers specified for the corresponding individual components relate to the chapter Drawings, ▶ 9 [📄 30].



⚠ WARNING

Danger of injury during disassembly of clamping block because of the high spring pressure in the cover.

- Only specialist personnel may disassemble the clamping block!
- The cover may only be removed with the aid of a suitable disassembly device!

NOTE:

The base jaws (items 2, 31), the chuck piston (item 3) and the housing (item 1) are specially attuned to each other. To replace these parts, ship the entire clamping block to SCHUNK along with a repair order.

When replacing wearing parts (e.g. seals), adhere to the following order:

1. Pressurize the clamping block at 6 bar 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. Close the clamping block so that the jaws are in the CLOSED position.
5. **Remove the pressure line. There must be no more residual energy in the clamping block.**
6. Pull the plugs (item 8) out of the housing (item 1).
7. Loosen the screws (items 9, 19) and remove the clamping block from the machine table. Residual air may escape at this point.
8. To remove the chuck piston (item 3) of KSF plus 100, screw an M10 x > 25 screw into the center bore and, in the case of KSF plus 160 and 250, screw in a M12 x > 25 screw.

Additionally in the KSF-F plus version

- Remove the screw (item 32) between base jaw (item 31) and housing (item 1).
 - Remove the positioning bolt (item 29) between base jaw (item 31) and housing (item 1). To do this, screw an M5 screw into the thread of the positioning bolt (item 29).
 - Pull the base jaw (item 31) out of the housing (item 1).
9. Pull the base jaws (item 2) out of the housing (item 1).
 10. **Carefully clamp the clamping block into a suitable disassembly device between the housing (item 1) and the cover (item 5). The cover is under high spring tension!**
Loosen the screws (item 21) evenly and remove them. Slowly lift the cover and unclamp the spring assembly.
 11. Pull the cylinder piston (item 4) out of the housing (item 1).
 12. Remove the entire spring assembly (item 50) as well as the sleeve (item 42) from the housing (item 1). In model sizes 160 and 250, the sleeve (item 42) is glued in and can only be removed after being heated by a hot-air blower. The sleeve should therefore remain built into the base body.
 13. Remove the seals (items 20, 22).
 14. Remove the seals (items 12, 15, 17).

15. Clean all the parts thoroughly and check for damage and wear. Damaged and worn parts must be replaced.
16. Lubricate the new seals (items 12, 15, 17, 20, 22) with Renolit HLT 2 or equivalent grease.
17. Mount the new seals carefully. The seals must not be damaged in the process.
18. Place the O-Rings (items 20 and 22) in the housing (item 1) and lay the O-ring (item 17) around the cover (item 5).
19. Grease the sliding surfaces of the cylinder and piston with Renolit HLT 2 or equivalent grease.
20. **For model size 100:** insert the sleeve (item 42) with the collar in front into the housing.
For model sizes 140, 160 and 250: place the sleeve (item 42) with the conical taper facing forward into the housing and screw it to the body (item 1) by fastening the screws (item 43).
21. Grease the springs of the disassembled spring assembly with Renolit HLT 2 or an equivalent grease. Assemble the spring assembly; the spring coils have an alternating clockwise and counter-clockwise thread.
22. Loosely insert the cylinder piston (item 4) into the cylinder, ensuring that the spring assembly is positioned centrally and not displaced. Lay the end coils of the innermost springs into the recess in the cylinder piston.
23. Gently press the quad ring (item 12) inwards from all sides so that it slides more easily over the edge of the cover (item 5).
24. Carefully push the cover (item 5) over the cylinder piston (item 4) as well as the sleeve, making sure that the openings of the air feed-throughs lie vertically opposite each other.
25. Carefully clamp the clamping block into a suitable assembly device between the housing (item 1) and the cover (item 5). Work carefully while assembling the parts and make sure that the cover is not twisted in the housing.
26. Insert the screws (item 21) and screw the cover (item 21) onto the housing (item 1). Observe the screw-tightening torques ► 4.1 [16].
Alternatively, the cover can also be assembled with mounting screws in graduated lengths by tightening them in cross-wise diagonal sequence. It is absolutely necessary to install the original fastening screws (item 21) afterwards.
27. If using clamping sleeves (item 27) for centering, insert these into the housing (item 1) now.
28. Grease the sliding surfaces of the housing (item 1), base jaws (item 2) and chuck piston (item 3) with LINOMAX plus or an equivalent lubricant.

29. 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.
Additionally for the KSP-F plus variant:
 - Mount the base jaw (item 31) into 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).
30. Connect the clamping block to the air supply and set the jaws in the OPEN position.
31. Screw down the chuck piston (item 3) and cylinder piston (item 4). Tighten the screw (item 14) with a torque wrench ▶ 4.1 [16].
32. Fasten the guide strips (item 6) and the covering strip (item 7).
33. Check for leaks.

5.2 Control of tightness

- The following components are required to check for leaks: pressure gauge, pneumatic fitting, supply line and quick coupler.
- Check for leaks with the clamping block in the CLOSED position.

Proceed as follows:

1. Connect the following sequence of parts to the connection in the OPEN (I) position: pressure gauge, pneumatic fitting, supply line with fast coupler.
 2. Apply compressed air to the clamping block.
 3. Close the shut-off valve and remove the supply line.
- If the clamping system is leaking, check the screws first (e.g. with Metaflux leak detection spray). Seal any leaking screws.
If the screw fastenings are tight, check the seals and replace if necessary, ▶ 5.1 [21].

6 Trouble shooting

The chuck jaws of the clamping block do not move

Possible cause	Remedial measures
Air supply is interrupted or pressure is insufficient.	Check air supply
Connections unintentionally interchanged	Check the connections. ▶ 4.3 [□ 17]
Air connections that are not required are not sealed	Check connections and close
Active air connections sealed	Check and open connections
Screw breakage on the chuck piston or piston rod breakage (e.g. due to overload)	Disassemble clamping block and replace damaged parts ▶ 5.1 [□ 21] or send to Schunk for repair

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 weakens

Possible cause	Remedial measures
Clamping block not sealed tightly	Check connection or sealing screws; reseal or replace
Seals damaged	Disassemble clamping block ▶ 5.1 [□ 21] and replace all the seals (see sealing kit lists ▶ 8.1 [□ 27])
Inadequate lubrication	Grease the lubrication nipples with LINOMAX plus (see chapter "Maintenance and Care" ▶ 5 [□ 21])

Clamping block moves jerkily

Possible cause	Remedial measures
Steel guide rollers on sliding surfaces not greased	See chapter "Maintenance and Care" ▶ 5 [□ 21]

7 Storage

When storing the product for a longer period of time, observe the following points:

- Clean the product and lubricate it lightly.
- Store the product in a suitable transport container.
- Only store the product in dry rooms.
- Protect the product from major temperature fluctuations.

NOTE: Before recommissioning, clean the product and all attachments, check for damage, functionality and leaks.

8 Sealing kits, accessory kits and parts lists

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

Seals, sealing elements, fittings, 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

Sealing kit *	ID
Size 100	9985763
Size 140	1352795
Size 160	9985764
Size 250	1370978

* For included items, see note **X** in the following Parts List chapter. Seals are wearing parts and are recommended to be replaced during maintenance. The sealing kit can only be ordered as a complete set.

8.2 Accessory kits

Accessory kit *	ID
Size 100	8508184
Size 140	1344305
Size 160	8508185
Size 250	8508534

* For included items, see note **Z** in the Parts List chapter below.

8.3 Parts lists

Item	Designation	Quantity	Note
1	Body	1	*
2	Base jaw	1	F *
	Base jaw	2	*
3	Chuck piston	1	*
4	Cylinder piston	1	
5	Cover	1	
6	Guide strip	1	140-F
	Guide strip	2	
7	Covering strip	1	
8	Plug	4	Z
9	Fitting screw	2	Z
10	Lubrication nipple	4	
11	Locking screw	1	
	Locking screw	2	LH
12	X-ring	1	X
13	Sound absorber	1	
14	Screw	1	
15	Combined sealing ring	1	X
16	Screw	1	F
	Screw	2	
17	O-ring	1	X
18	O-ring	4	Z
19	Screw	4	Z
20	O-ring	13	100 / X
	O-ring	15	140-LH / 160
	O-ring	19	250
	Flat gasket	4	140 / X
21	Countersunk screw	11	100
	Countersunk screw	15	160
	Screw	15	140
	Screw	19	250
22	Flat gasket	1	250
	Flat gasket	2	100 / 160-LH / 160-F / X
	Flat gasket	4	140-LH

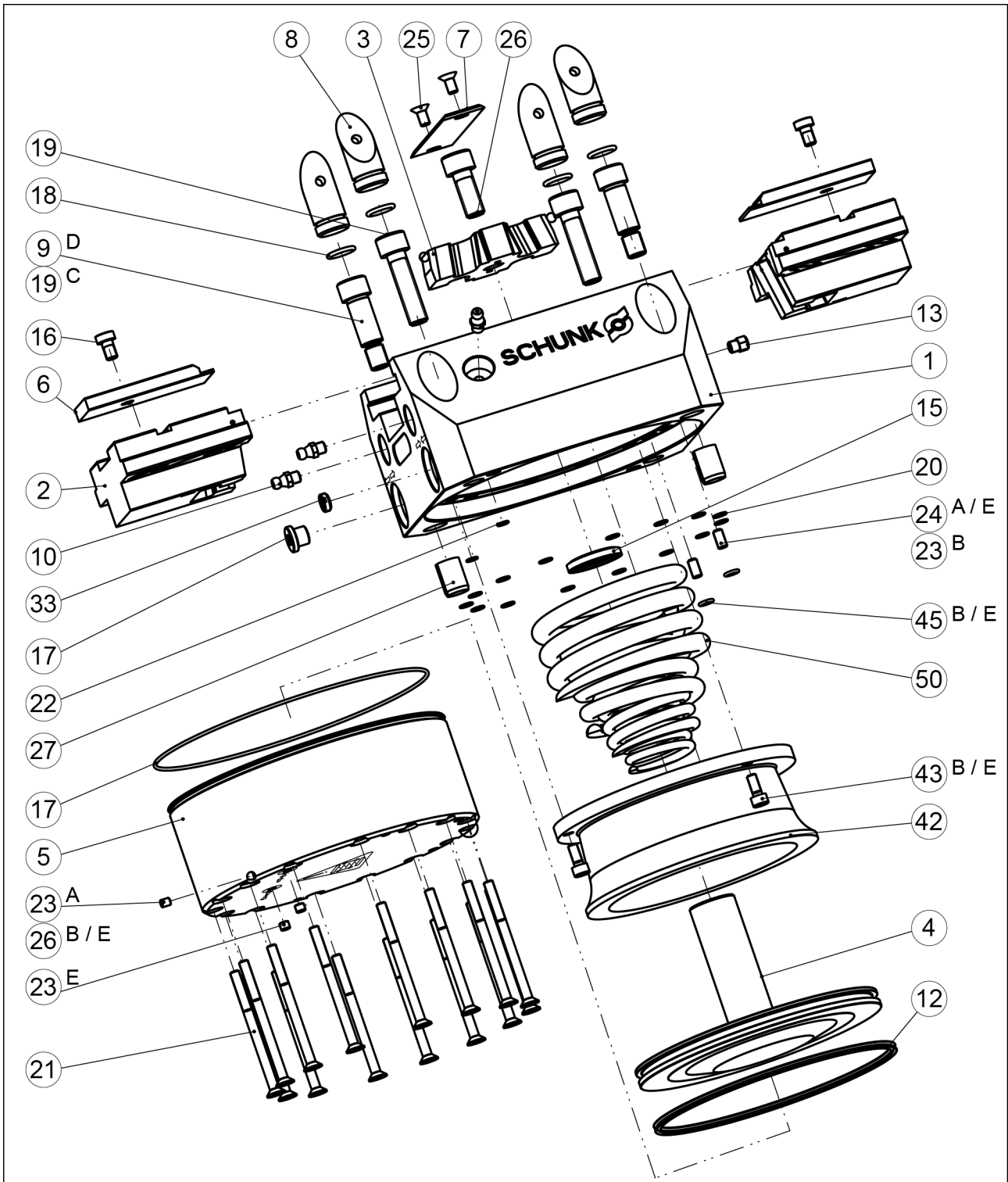
Item	Designation	Quantity	Note
23	Set-screw	2	100 / 250
	Set-screw	4	140 / 160
24	Set-screw	2	100 / 250
25	Countersunk screw	2	
26	Set-screw	1	160 / 250
27	Clamping sleeve	2	Z
28	Spherical washer	1	F
29	Socket pin	1	F
30	Screw	1	F
31	Base jaw	1	F *
32	Screw	1	F
33	Sound absorber	1	Not for LH
42	Sleeve	1	
43	Screw	3	140 / 160 / 250
45	O-ring	2	160 / 250
50	Compression spring	1	100
	Compression spring set	1	140 / 160 / 250
51	Screw	8	Z
52	T-handle	2	250 / Z
53	Set-screw	2	250 / Z
54	O-ring	4	Z
55	Guide strip	1	140-F

Parts list key

100	for size 100	F	with "fixed jaw" variants
140	for size 140	LH	with "LH" variants
160	for size 160	X	included in the sealing kit
250	for size 250	Z	included in accessory kit

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

9 Drawings



KSF plus, KSF-LH plus

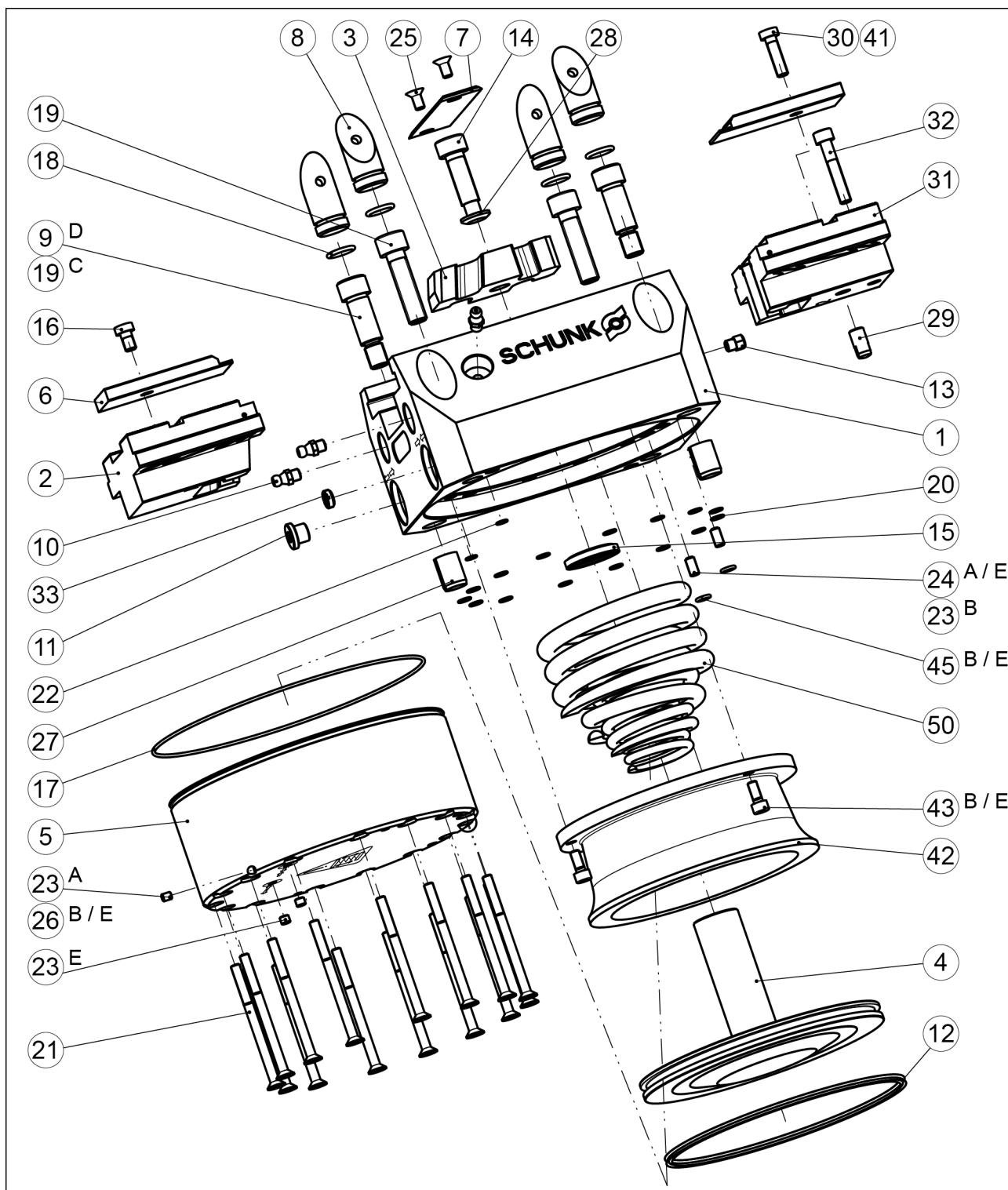
A For size 100

B For sizes 140/160

C Centering with clamping sleeves

D Centering with fitting screws

E For size 250



KSF-F plus

A For size 100

B For sizes 140/160

C Centering with clamping sleeves

D Centering with fitting screws

E For size 250

10 Manufacturer certificate

Manufacturer /
Distributor: H.-D. SCHUNK GmbH & Co. Spanntechnik KG
Lothringer Str. 23
D-88512 Mengen

Product: Clamping force block

Designation: TANDEM

Type designation: KSF, KRF

Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG certifies that the above-mentioned products, when used as intended and in compliance with the operating manual and the warnings on the product, are safe according to the national regulations and:

- a **risk assessment** has been carried out in accordance with ISO 12100:2010.
- an **operating manual** for the assembly instructions has been created in accordance with the contents of the Machinery Directive 2006/42/EC Annex I No. 1.7.4.2. and the contents of the provisions of Annex VI of the Machinery Directive 2006/42/EC.
- **Markings** have been made in accordance with EN 1550:1997+A1:2008 Section 6.3.1, VDMA 34192:2019 Section 6.3 or ISO 16156:2004 Section 6.3. The requirements of Annex I No. 1.7.3. of the Machinery Directive 2006/42/EC have been complied with.
- the relevant basic and proven safety principles of the Annexes of **ISO 13849-2:2012**, taking into account the requirements of the documentation have been observed for the component. The parameters, limitations, ambient conditions, characteristic values, etc. for proper operation are defined in the operating manual.
- an $MTTF_D$ value of 150 years can be estimated for mechanical components using the informative procedure in Table C.1 of ISO 13849-1:2015.
- **fault exclusion** against the fault "Unexpected release without pending release signal".
- the **fault exclusion** against the fault "Breakage during operation" in compliance with the parameters, limitations, ambient conditions, characteristic values and maintenance intervals, etc., specified in the operating manual.
- that internal bore diameters in the **pipe or control lines** are at least 2 mm for pneumatic clamping systems and at least 3 mm for hydraulic clamping systems

Harmonized Standards applied:

- **ISO 12100:2010** Safety of machinery – General principles for design – Risk assessment and risk reduction

Other related technical Standards and specifications:

- **VDMA 34192:2019** Safety requirements for clamping devices for use on machines

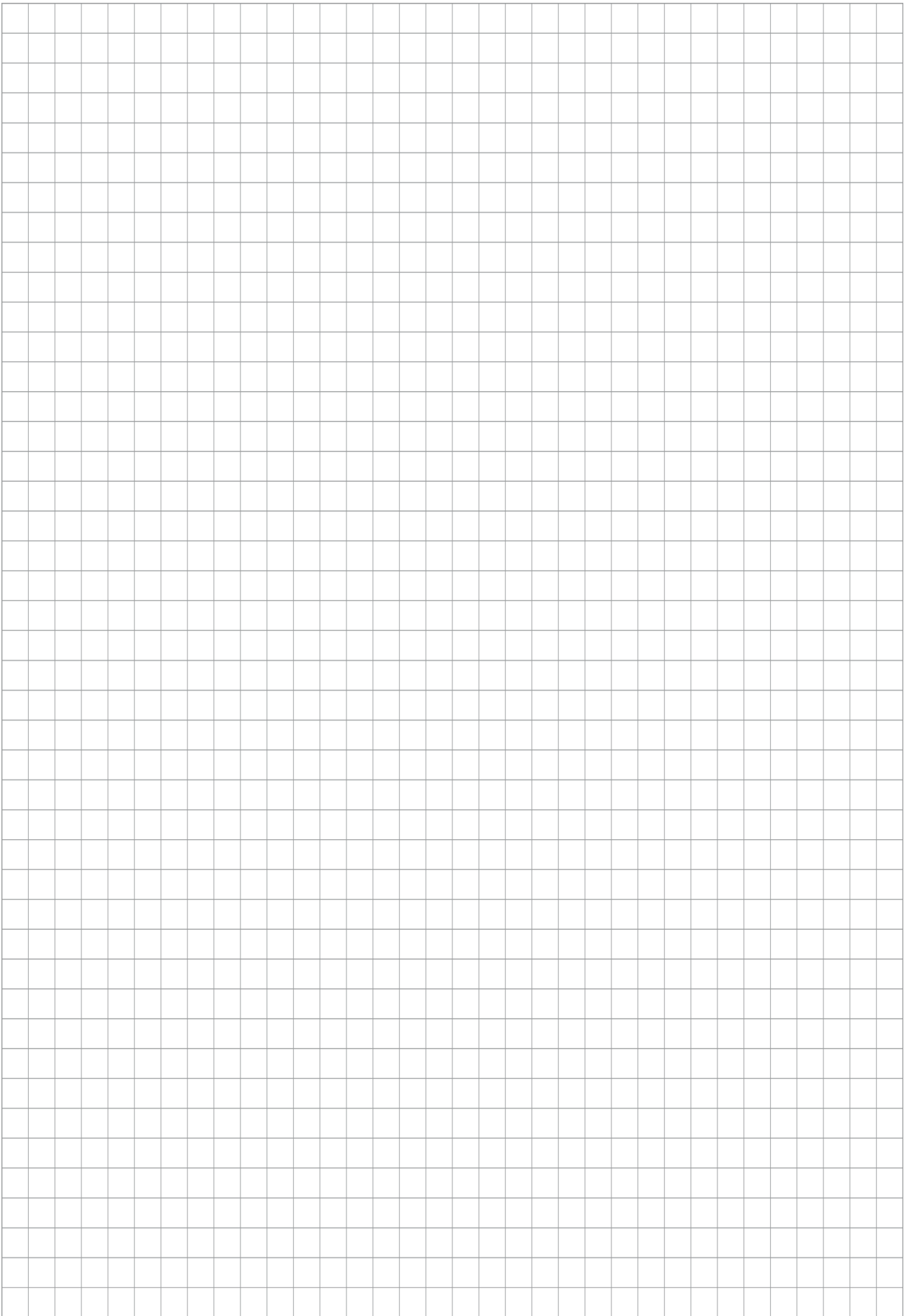
Mengen, 25th of April 2023

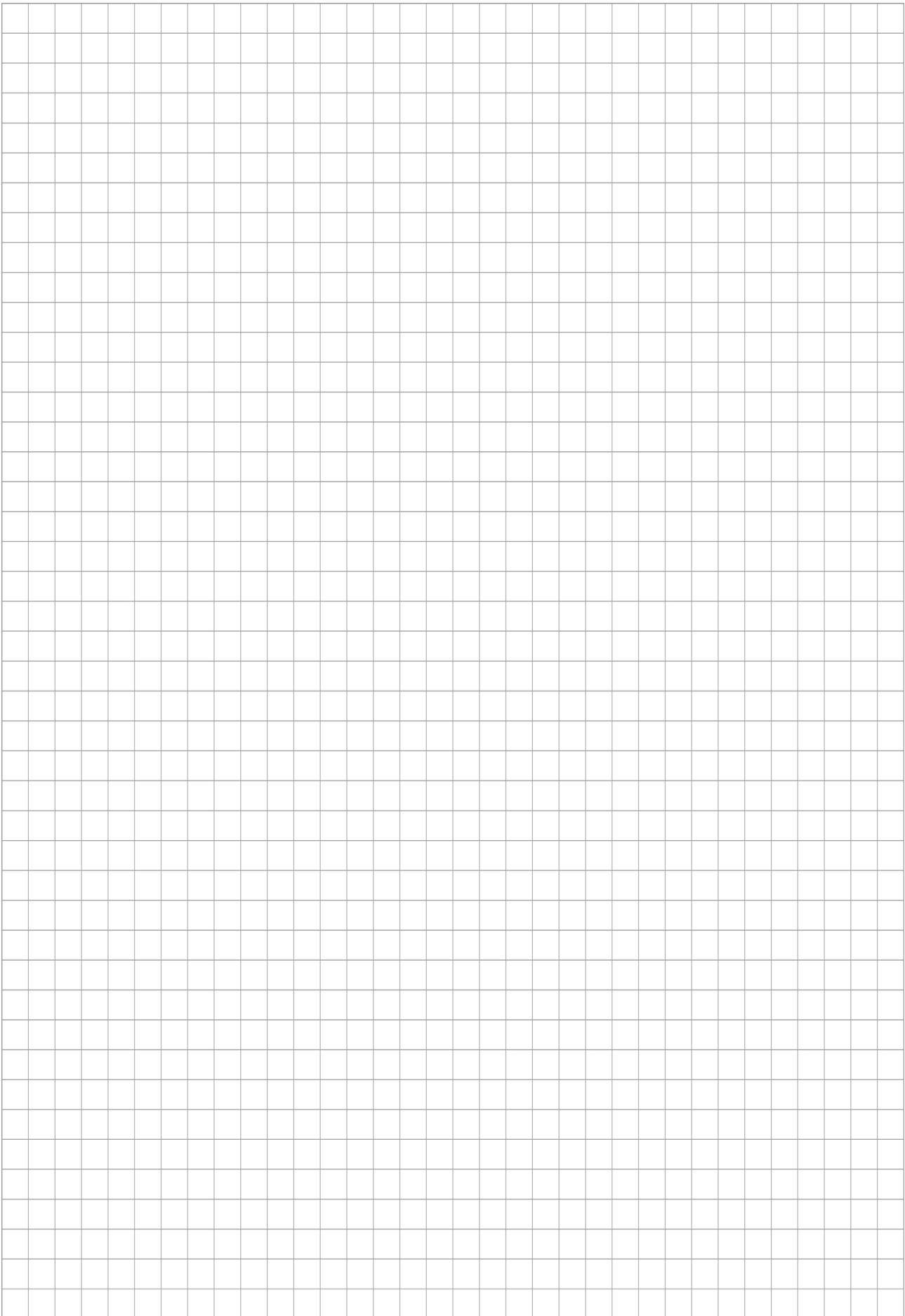
Signature: see original declaration

Signature: see original declaration

p.p. Philipp Schröder
Head of Development standard products

p.p. Alexander Koch
Head of Engineering Design special products









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