



**Clamping force Block with jaw-quick-change system**  
**TANDEM KRH3/KRP3/KSH3/KSP3-PM-BWA**  
**Assembly and Operating Manual**

## Imprint

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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

Tel.

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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.

#### **NOTICE**

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

The following table shows the available sizes of the TANDEM clamping force blocks with jaw quick-change. In the further course of the manual, the clamping force blocks KRH3-PM-BWA, KRP3-PM-BWA, KSH3-PM-BWA and KSP3-PM-BWA will be shortened to KRH3, KRP3, KSH3 and KSP3 for ease of reading.

Type / Size	100	140	160	200	250
KRH3			X		
KRH3-LH			X		X
KRP3			X		X
KRP3-LH			X		X
KSH3	X	X	X		
KSH3-LH	X	X	X		X
KSP3	X	X	X	X	X
KSP3-LH	X	X	X	X	X

- Variants with clamping force maintenance (AS)
- Variants with Jig-machined positioning bores (Z)
- Variants with sensorial piston detection (SM)
- Quick-change jaws WTR-A 100, WTR-A 140, WTR-A 160, WTR-A 160/3, WTR-A 200, WTR-A 250, WTR-A 250/3
- Quick-change jaws WTG-A 100, WTG-A 140, WTG-A 160, WTG-A 250
  - Clamping inserts and clamping bars SEI, STG

### 1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility or 500 000 cycles\* under the following conditions:

- Observe the applicable documents, ▶ 1.1.2 [ 6 ]
- Observe the ambient conditions and operating conditions, ▶ 2.6 [ 9 ]
- Observance of the specified care and maintenance instructions ▶ 6 [ 44 ]

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

The scope of delivery includes:

- TANDEM Clamping force block in the version ordered
- Accessory kit: (for contents, see ▶ 9.2 [📄 62])
- 2 cylindrical pins for Z variant
- Assembly and Operating Manual

### 1.4 Accessories

(see catalog or data sheets when ordering separately)

- Changing jaw type: WTR-A, WTG-A ▶ 4.5 [📄 31]
- SEI 6x reversible clamping inserts suitable for WTG-A
- STG clamping bars suitable for WTG-A
- Gripper finger FIN WTR-A for handling the changing jaws, suitable for SCHUNK universal grippers
- SCHUNK universal grippers

## 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 [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

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.

- 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 conditions:

- 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 further away cause higher surface pressures in the jaw guides and can significantly reduce clamping force).
- Do not use welded changing jaws.
- Reduce operating pressure for higher clamping points.
- Fasten accessories such as SEI 6x reversal jaws or STG clamping bars to the changing jaws with the specified torque ▶ 4.1 [ 23].

## 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 [ 15].
- Make sure that the product is a sufficient size for the application.
- Ensure that maintenance and lubrication intervals are observed, ▶ 6 [ 44].
- 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 can make the product and its accessories unsafe and risks the danger of serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Handles with set-screws for transport are included in the scope of delivery for size 250. These are to be mounted on the front of the base jaws.
- During transport and handling, secure the product to prevent it from falling.
- Do not walk under 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 installations.
- Before commissioning the product, take suitable protective measures to secure the danger zone.
- Provide a secured protective enclosure for automated use of the clamping device.
- Disconnect power sources before assembly, conversion, maintenance or adjustment work. Ensure that no residual energy remains in the system.
- Do not reach into the open mechanism or movement area of the product during operation.

### 2.13.1 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 ejected parts or components can lead to serious injury or death.

- Take suitable protective measures to secure the danger zone.
- Never step into the danger zone during operation.
- Do not reach into the danger zone when setting up the automated program sequence for jaw changing. Wear protective goggles during automated set-up of the jaw change procedures on the TANDEM with a robot.

## 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 (dynamic pressure monitoring with pressure sensors) to avert danger. Assume that the drive movement is faulty as long as the installed monitors are not effective, since the effect depends on the control and the current operating state of the drive. Perform maintenance, modification and attachment work outside of the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the range of movement of the clamping force block and its automated system for jaw changing must be restricted. Apply technical safety measures to limit / prevent accidental access for people in this area. The protection 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 commissioning 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 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**

**Risk of injury due to immediate closing of the product with high spring force in the event of pneumatic pressure failure (AS variant).**

- Ensure stable compressed air supply
- Use pressure maintenance valves



**⚠ 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 remain in the danger zone
- Wear protective equipment (protective shoes)



**⚠ WARNING**

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

- Prioritize automated loading
- Do not reach between the workpiece and the chuck jaw during the clamping procedure



**⚠ WARNING**

**Risk of injury due to accidental actuation when working on the product**

- Disconnect the power supply when working on the product



**⚠ 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.**

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

## 3 Technical data

### 3.1 General

#### KRH3 & KSH3

Installation position	any
Operating temperature [°C]	+5 to +60
Noise emission [dB(A)]	≤ 70
Pressure medium	Hydraulic oil according to ISO VG 46, purity class according to ISO 4406:2021-01 [21/18/13]
Requirement for the pressure medium	filtered (10 µm), lubricity 30 N/mm <sup>2</sup> according to DIN 51347-1:2000-01
Volumetric flow [l/min]	max. 2
Oil loss by adhering oil removal	max. 0.5 mg/cycle
Pressure medium (PM-monitoring)	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Max. speed of rotation [RPM]	100

#### KRP3 & KSP3

Installation position	any
Operating temperature [°C]	+5 to +60
Noise emission [dB(A)]	≤ 70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Pressure medium (PM-monitoring)	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
Max. speed of rotation [RPM]	100

### 3.2 2-Jaws TANDEM

Designation	KSH3 / KSP3					
	100	140	160	200	250	
Stroke per jaw [mm]	2	3	3	4	5	
Clamping force at max. pressure* [kN]	18	30	45	55	55	
Additional clamping force resulting from spring assembly**(AS) [kN]	2.5 – 6.5	4.5 – 9	5.5 – 11	8.5 – 16	10.5 – 20	
Operating pressure [bar] ****	KSH3	10 – 60	10 – 60	10 – 60	–	–
	AS-Version	3 – 9	3 – 9	3 – 9	3 – 9	3 – 6
	KSP3	2 – 9	2 – 9	2 – 9	2 – 9	2 – 6
Repeat accuracy [mm]***	0.01	0.01	0.01	0.02	0.02	
Repeat accuracy jaw change [mm]	0.01	0.01	0.01	0.01	0.02	
max. jaw height [mm]	27	33	41	47	52	
Air consumption per double stroke at 6 bar [cm <sup>3</sup> ]	1000	2300	3400	5100	9100	
Weight [kg]	KSH3	5	9.5	14	–	–
	KSP3	3.8	7.6	11.4	19.8	34

Designation	KSH3-LH / KSP3-LH					
	100	140	160	200	250	
Stroke per jaw [mm]	6	7	8	10	15	
Clamping force at max. pressure* [kN]	KSH3-LH	16	30	40	–	50
	KSP3-LH	8	15	20	25	20
Additional clamping force resulting from spring assembly**(AS) [kN]	1.5 – 2.5	2 – 4	2 – 4.5	3.5 – 7	3.5 – 7	
Operating pressure [bar] ****	KSH3-LH	10 – 120	10 – 120	10 – 120	–	10 – 60
	AS-Version	3 – 9	3 – 9	3 – 9	3 – 9	3 – 6
	KSP3-LH	2 – 9	2 – 9	2 – 9	2 – 9	2 – 6
Repeat accuracy [mm]***	0.01	0.01	0.01	0.02	0.02	
Repeat accuracy jaw change [mm]	0.01	0.01	0.01	0.01	0.02	
max. jaw height [mm]	27	33	41	47	52	
Air consumption per double stroke at 6 bar [cm <sup>3</sup> ]	1000	2300	3400	5100	9100	
Weight [kg]	KSH3-LH	5	9.5	14	–	36.5
	KSP3-LH	3.9	7.6	11.6	20.2	34.2

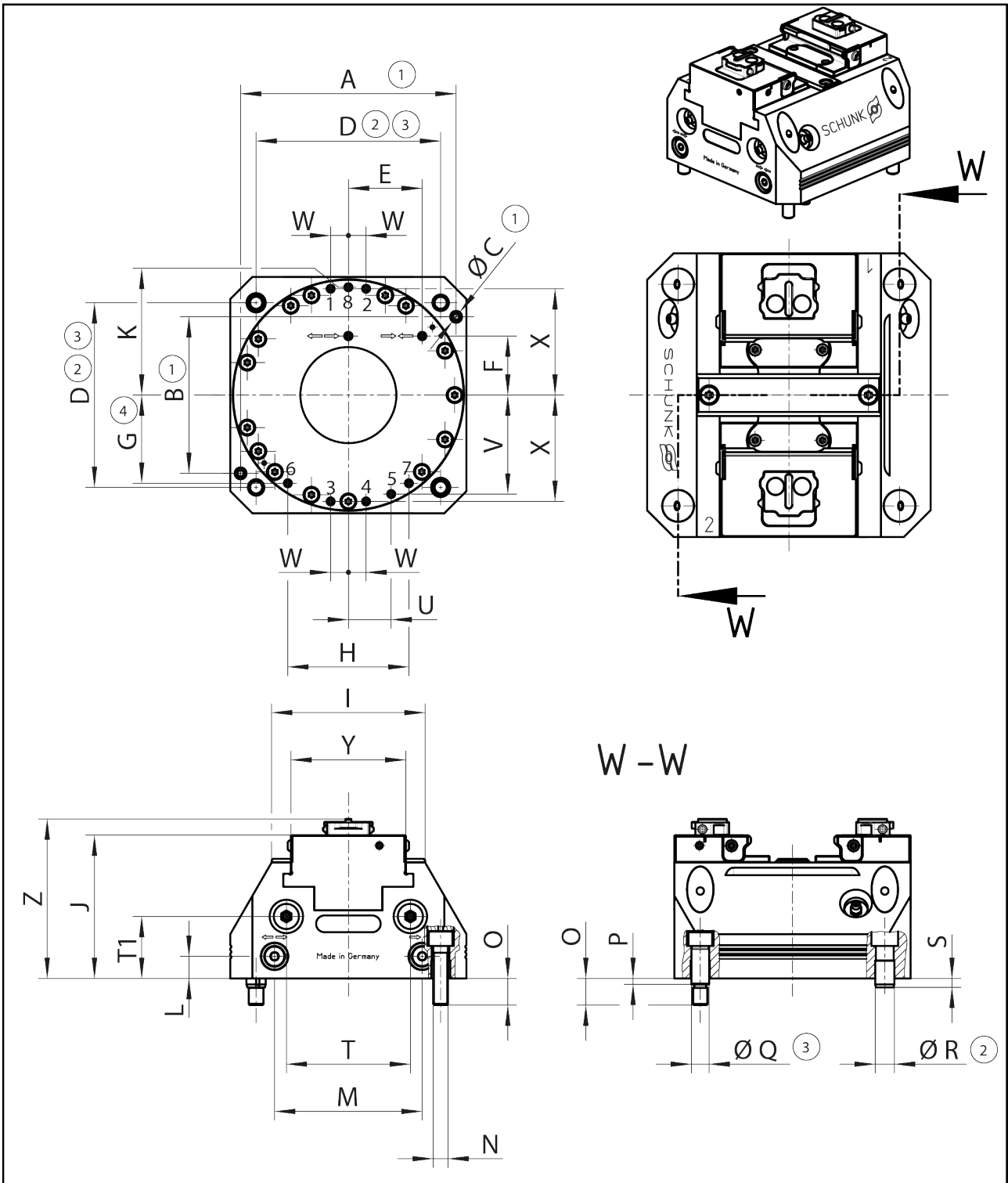
\* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at a distance of "H" (see catalog).

\*\* The clamping force increase caused by the spring assembly depends on the stroke because of the spring tension. The maximum spring force is reached in the "open" state, the minimum spring force in the "closed" state.

\*\*\* Distribution of the clamping position with 100 consecutive clamping operations.

\*\*\*\* When using an ABP-A base plate, the maximum pressure must be limited to **7 bar** (Only relevant for KRP3 / KSP3).

Dimension	Size 100		Size 140		Size 160		Size 200	Size 250	
	KSH3	KSP3	KSH3	KSP3	KSH3	KSP3	KSP3	KSH3	KSP3
A [mm]	90	90	126	126	146	146	184	180	230
B [mm]	64	64	92	92	106	106	146	160	154
ØC [mm]	6H7 x 12	6H7 x 12	8H7 x 14	8H7 x 14	8H7 x 14	8H7 x 14	8H7 x 14	10H7 x 20	10H7 x 20
D [mm]	80	80	110	110	125	125	160	200 x 180	200
E [mm]	29.5	29.5	25 (2x)	44	50	50	64.5	45 (off-center)	75
F [mm]	32	32	40	45,5	40	40	64.5	80	64
G [mm]	34.5	34.5	51.8	51.8	59.7	59.7	72	50	92.6
H [mm]	55	55	74	74	82	82	116	140	139.6
I [mm]	64	64	91	91	104	104	138	170	170
J [mm]	84	79	90.5	85.5	102	97	104	121	116
K [mm]	-	44	-	64	-	73	-	92	116
L [mm]	15	10	13.5	13.5	15	15	17.5	20	20
M [mm]	57	59	88	88	100	100	129	45	150
N [mm]	M8	M8	M8	M8	M10	M10	M12	M12	M12
O [mm]	15	15	16	15.5	18	18	21	20	20
P [mm]	4	4	4	3.5	4	4	6	5	5
ØQ [mm]	10f7	10f7	10f7	10f7	12f7	12f7	14f7	14f7	14f7
ØR [mm]	11	11	11	11	13	13	16	16	16
S [mm]	4.5	4.5	5.5	5.5	6	6	6	6	6
T [mm]	54	54	74	76	82	84	110	140	140
T1 [mm]	41	36	43	38	47	42	48	57	52
U [mm]	18.7	18.7	26	26	29	29	41	54	54
V [mm]	40	40	58.5	58.5	67	67	83	104	104
W [mm]	9.5	9.5	12	12	12	12	17	18	18
X [mm]	43	43	63	63	72	72	91	115	115
Y [mm]	46.8	46.8	67.8	67.8	77.8	77.8	101.8	124.8	124.8
Z [mm]	93	88	101.5	96.5	113	108	115	136	131



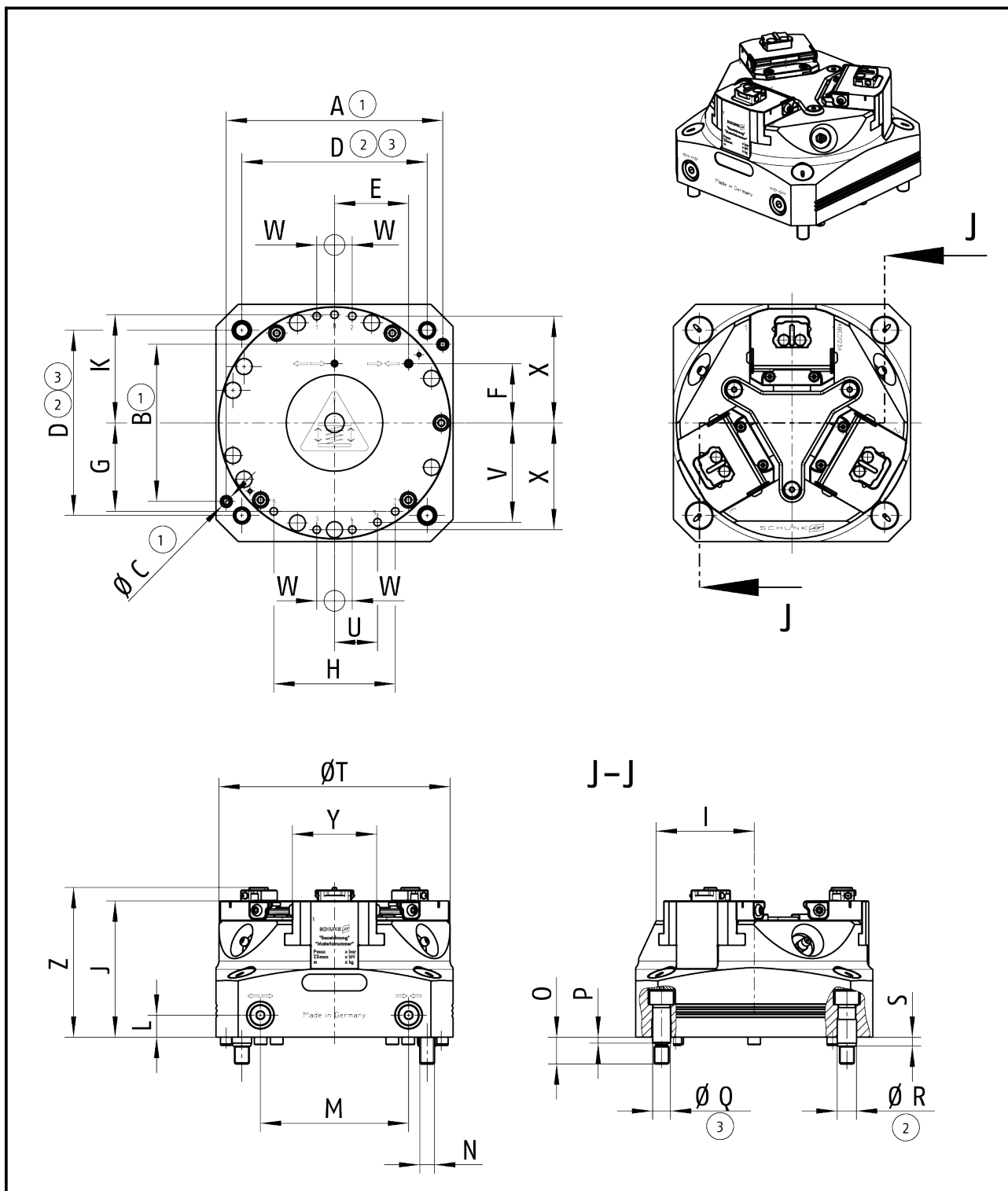
- 1 Optional Z variant  $\pm 0.01$  mm positioning accuracy to clamping center
- 2 Clamping sleeve  $\pm 0.04$  mm positioning accuracy to clamping center
- 3 Fitting screw  $\pm 0.02$  mm positioning accuracy to clamping center

### 3.3 3-Jaws TANDEM

Designation	KRH3 / KRP3			
	160	250	LH 160	LH 250
Stroke per jaw [mm]	3	5	8	15
Clamping force at max. pressure* [kN]	KRH3	45	-	40
	KRP3	45	55	15
Additional clamping force resulting from spring assembly**(AS) [kN]	4 - 8	9 - 15	2 - 3.5	3 - 5.5
Operating pressure [bar] *****	KRH3	12 - 60	-	12 - 120
	AS-Version	3 - 9	3 - 9	3 - 9
	KRP3	2 - 9	2 - 9	2 - 9
Repeat accuracy [mm]***	0.01	0.02	0.01	0.02
Repeat accuracy jaw change [mm]	0.01	0.02	0.01	0.02
max. jaw height [mm]	33	41	33	41
Air consumption per double stroke at 6 bar [cm <sup>3</sup> ]	1000	2300	3400	9100
Weight [kg]	KRH3	14	-	14
	KRP3	11	32	11

- \* Clamping force is the arithmetic sum of the individual forces occurring at the chuck jaws at a distance of "H" (see catalog).
- \*\* The clamping force increase caused by the spring assembly depends on the stroke because of the spring tension. The maximum spring force is reached in the "open" state, the minimum spring force in the "closed" state.
- \*\*\* Distribution of the clamping position with 100 consecutive clamping operations.
- \*\*\*\*\* When using an ABP-A base plate, the maximum pressure must be limited to **7 bar** (Only relevant for KRP3 / KSP3).

Dimension	Size 160		Size 250	
	KRH3	KRP3	KRH3	KRP3
A [mm]	146	146	230	230
B [mm]	106	106	154	154
ØC [mm]	8H7 x 14	8H7 x 14	10H7 x 14	10H7 x 14
D [mm]	125	125	200	200
E [mm]	50	50	45	75
F [mm]	40	40	80	64
G [mm]	59.7	59.7	92.6	92.6
H [mm]	82	82	139.6	139.6
I [mm]	66	66	106	106
J [mm]	97	92	117.2	112.2
K [mm]	73	73	116	116
L [mm]	15	15	20	20
M [mm]	100	100	150	150
N [mm]	M10	M10	M12	M12
O [mm]	18	18	20	20
P [mm]	4	4	5	5
ØQ [mm]	12f7	12f7	14f7	14f7
ØR [mm]	13	13	16	16
S [mm]	6	6	6	6
T [mm]	156	156	244	244
U [mm]	29	29	54	54
V [mm]	67	67	104	104
W [mm]	12	12	18	18
X [mm]	72	72	115	115
Y [mm]	56.8	56.8	84.8	84.8
Z [mm]	106	101	128.2	123.2



- 1 Optional Z variant  $\pm 0.01$  mm positioning accuracy to clamping center
- 2 Clamping sleeve  $\pm 0.04$  mm positioning accuracy to clamping center
- 3 Fitting screw  $\pm 0.02$  mm positioning accuracy to clamping center

## 4 Assembly and connection

The specified item numbers for the corresponding individual components refer to the illustrations for assembly or connections of the clamping force block and to the "Assembly Drawings" chapter ▶ 10 [ 66].



### **⚠ WARNING**

**Danger of crushing due to the product approaching the machine table during assembly.**

- Do not reach between the product and machine table during assembly



### **⚠ 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 remain in the danger zone
- Wear protective equipment (protective shoes)
- The clamping force block may only be completed with the additional changing jaws after full assembly



### **⚠ CAUTION**

**Danger of abrasions, cuts or crushing due to rough or sharp-edged components of the product and its accessories (changing jaws)**

- Wear protective equipment (protective gloves, protective shoes) when working on the product and when handling its accessories

## 4.1 Tightening torques for screws

**Tightening torques for mounting 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 for mounting clamping inserts or clamping bars on the changing jaws** (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 for mounting the chuck piston onto the cylinder piston** (screw quality 12.9)

Designation	Screw size	Tightening torque $M_A$ (Nm)			
		M5	M8	M10	M12
KRH3		9	32	62	108
KRH3-LH		9	32	75	140
KRP3 / KRP3-LH		9	32	62	108
KSH3		9	32	62	108
KSH3-LH		9	32	75	140
KSP3 / KSP3-LH		9	32	62	108

**Tightening torques for mounting the cover on the body for KRH3 / KSH3** (screw quality: see following table)

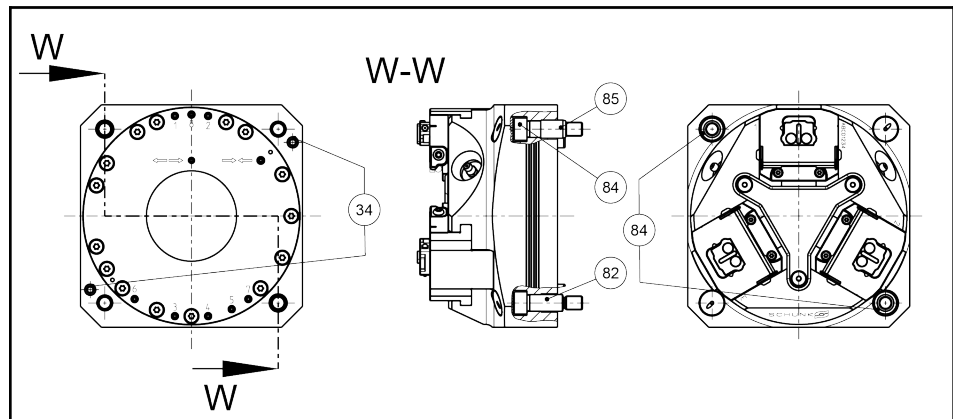
Size	100	140	160	250
Screw size	M5	M5	M5	-
Screw quality	8.8	10.9	10.9	-
Tightening torque $M_A$ (Nm)	5.5	7.5	7.5	-

**Tightening torques for mounting the cover on the body** (screw quality: see following table)

Size	100	140	160	200	250	
Screw size	M5	M5	M5	M6	M6	
Screw quality	A2-70	A2-70	A2-70	A2-70	A2-70	
Tightening torque $M_A$ (Nm)	KRP3	3	3	3	-	6
Tightening torque $M_A$ (Nm)	KSP3	4.5	4.5	4.5	7	7

## 4.2 Assembling the clamping block on the machine table

### KRH3 / KRP3



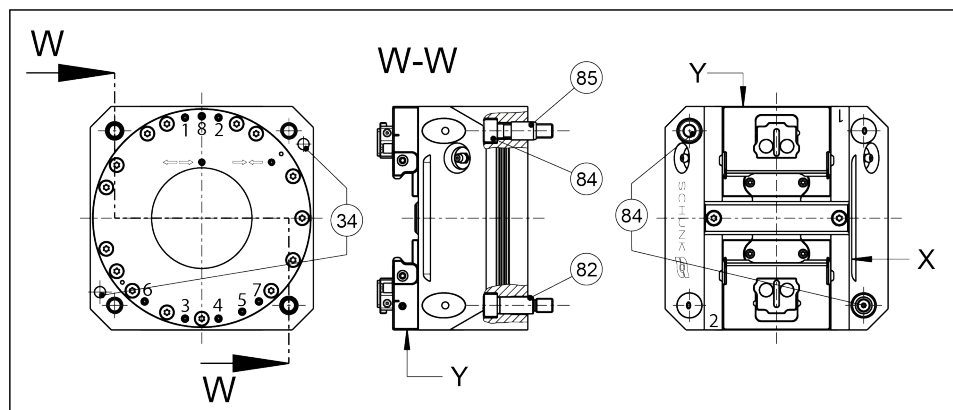
34 Cylindrical pins  $\varnothing$  m6 ▶ 9.3 [ 62]

82 Fitting screw  $\varnothing$  f7 ▶ 9.3 [ 62]

84 Screw DIN EN ISO 4762

85 Clamping sleeve DIN EN ISO 13337

### KSH3 / KSP3



34 Cylindrical pins  $\varnothing$  m6 ▶ 9.3 [ 62]

82 Fitting screw  $\varnothing$  f7 ▶ 9.3 [ 62]

84 Screw DIN EN ISO 4762

85 Clamping sleeve DIN EN ISO 13337

#### NOTE

- For vertical installation, the opening of the coolant drain (V) must always face downwards.
- For KSP3/KSH3, surface »X« is parallel to the guideway of the base jaws (2) in order to be able to align the clamping force block on the machine table or check the positioning.
- From size 200, the sides »Y« of the base jaws contain a transport thread M10.

**Mounting with clamping sleeves:**

Mount the clamping force block on the machine table together with clamping sleeves (85) and screws (84).

**Mounting with fitting screws:**

There are two fittings in the housing (1) that, along with the fitting screws (82), are used to center the clamping force block on the machine table with repeat accuracy. Do not realign the clamping force block after removing it from the machine table (e.g. after replacing the seals). When using fitting screws (82), these are used instead of the clamping sleeves (85) and two of the four screws (84).

**Centering with cylindrical pins (Z variant):**

The clamping force block is fastened to the machine table with 4 screws (84). The two cylindrical pins (34) are used for alignment with repeat accuracy. Do not realign the clamping force block after removing it from the machine table (e.g. after replacing the seals).

**4.3 Mounting the clamping force block on the base plate (If both parts are delivered separately)**

When mounting TANDEM clamping force blocks on the **ABP-h plus TANDEM** base plates, use the shorter mounting screws included in the base plate accessory kit instead of the standard mounting screws (19) that come with the clamping force block.

**The ABP-h plus base plates can only be used for pneumatic clamping force blocks (KRP3/KSP3).**

**NOTE:**

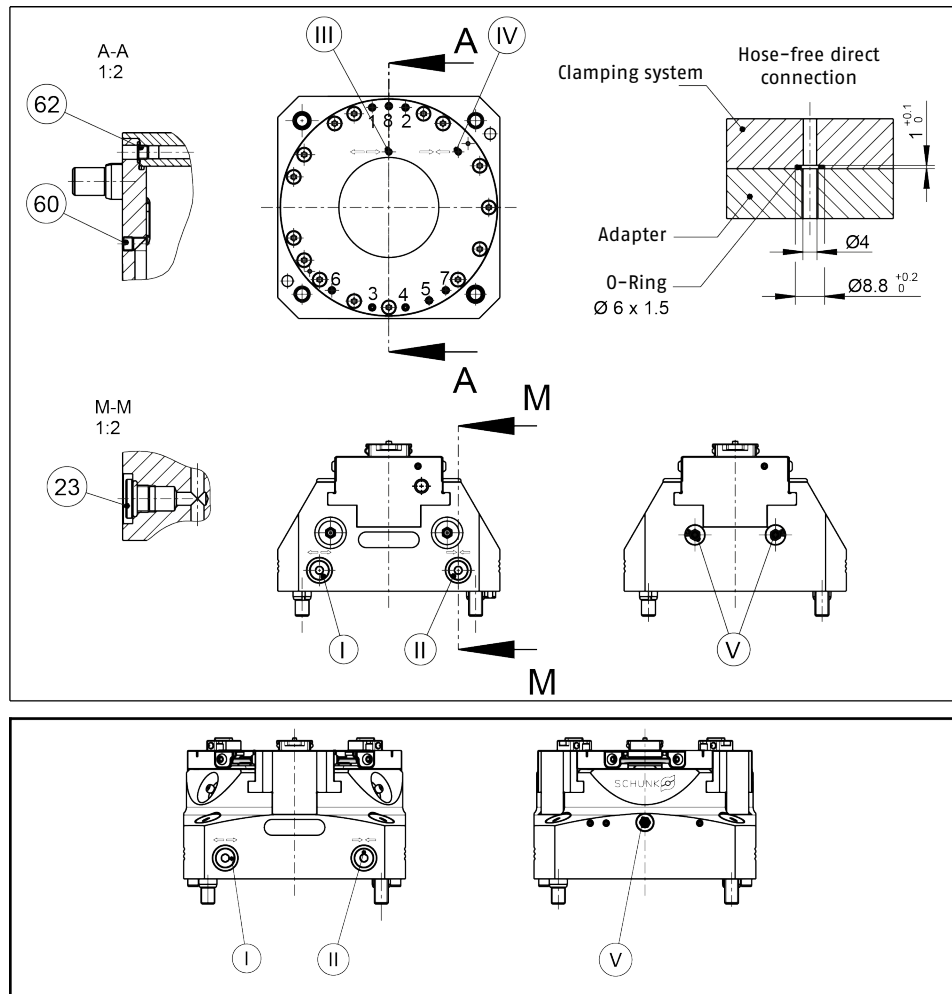
If the clamping force block and base plate are ordered separately, the screws, O-rings and clamping sleeves for assembling the parts are included in the accessory kit that comes with the clamping force block.

- 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 kit into the centering holes on the base plate.
- Remove the center plugs from the base plate (internal media feed-through III, IV) and insert the O-rings from the accessory kit into the recesses for the media feed-throughs.
- Mount the clamping force block onto the base plate.

**NOTE:**

The clamping force block is delivered with all four connections sealed. On the bottom side with set-screws (60) and on the front with locking screws (23).

### 4.4 Connecting the clamping block



Connection	KRH3 / KRP3	KSH3 / KSP3
I	OPEN (front)	OPEN (front)
II	CLOSED (front)	CLOSED (front)
III	OPEN (bottom)	OPEN (bottom)
IV	CLOSED (bottom)	CLOSED (bottom)
V	Coolant drainage / connection for air purge (front)	Coolant drainage / connection for air purge (front)
1	Dynamic pressure monitoring for jaw end position "open"	Dynamic pressure monitoring for jaw end position "open"
2	Dynamic pressure monitoring for jaw end position "closed"	Dynamic pressure monitoring for changing jaw no. 1 with simultaneous blow-out function
3	Dynamic pressure monitoring for changing jaw no. 2, Air transfer in changing jaw no. 2	Dynamic pressure monitoring for changing jaw no. 2 with simultaneous blow-out function
4	Dynamic pressure monitoring for changing jaw no. 3, Air transfer in changing jaw no. 3	Dynamic pressure monitoring for jaw end position "closed"
5	Bottom connection for coolant drain or use for air purge	Bottom connection for coolant drain or use for air purge
6	Bottom connection for lubrication (one-sided supply, left)	Bottom connection for lubrication (one-sided supply, left)
7	Bottom connection for lubrication (one-sided supply, right)	Bottom connection for lubrication (one-sided supply, right)
8	Dynamic pressure monitoring for changing jaw no. 1, Air transfer in changing jaw no. 1	Air transfer in changing jaw no. 1, dynamic pressure monitoring workpiece (2 bar)

### 4.4.1 Supply lines

The clamping force block has four connections for supplying the clamping function: **I, II, III, IV**.

Two connections for OPEN (**I and III**) and two connections for CLOSE (**II and IV**).

The application determines whether the clamping force block for the clamping function is connected on the bottom side or on the front side.

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

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

Thread for pneumatic fitting (front side):

Size	100	140	160	200	250
KSH3, KRH3	G1/8"	G1/8"	G1/8"	-	G1/8"
KSP3, KRP3	M5	G1/8"	G1/8"	G1/8"	G1/8"

#### NOTE

All four connections of the clamping stroke actuation come sealed on delivery of the clamping force block. On the bottom side with set-screws (60) and on the front with locking screws (23).

#### Hose-free direct connection

If the clamping system is connected via hose-free direct connections in the machine table, the bottom side openings in the cover (5) must be sealed against the attachment point. Do not open the front connections (**I, II**) on the clamping system, seal them pressure-tight with locking screws (M5 / G1/8").

When using the air purge via connection 5, the two sound absorbers (**V**) must be removed and replaced by set-screws (93) ▶ 9.2 [62].

Requirements for compressed air supply: Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]. Unconditioned compressed air contains dust, 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 bottom side connections (**6/7**) for direct lubrication through the mounting point. These connections of the clamping force block come sealed with locking screws (62) on delivery.

#### 4.4.2 Dynamic pressure monitoring of the jaw end positions

Dynamic pressure monitoring for the jaw end positions is integrated via connections on the bottom, ▶ 4.4.1 [ 27].

The max. pressure for the monitoring functions is 2 bar.

Limit volumetric flow to 10 l/min.

Pressure difference between stroke end positions min. 1 bar.

#### 4.4.3 Dynamic pressure monitoring of the jaw systems with simultaneous cleaning of the change interfaces

Dynamic pressure monitoring for checking the jaw changing system is integrated via connections on the bottom.

The max. pressure for the monitoring functions is 2 bar. Limit volumetric flow rate for dynamic pressure monitoring to 10 l/min pressure difference between system contact and separation min. 1 bar.

#### 4.4.4 Air transfer in quick-change jaw WTR-A

A media transfer to one or more changing jaws is integrated via connections on the floor side, depending on the version of the TANDEM.

##### Use of the media transfer

On the customer's side, channels can be inserted into the changing jaws in order to clean the clamping and locating surfaces by means of compressed air or to check the presence of the workpiece by means of dynamic pressure.

For KRP3/KRH3, the bore hole on each base jaw can be used either for media transfer or for checking the presence of the changing jaw. For KSP3/KSH3, a separate media transfer is provided at base jaw no.1.

For monitoring via dynamic pressure, the customer must provide a 2 mm  $\emptyset$  monitoring hole to the contact zone so that the sealing air can escape up to the workpiece contact.

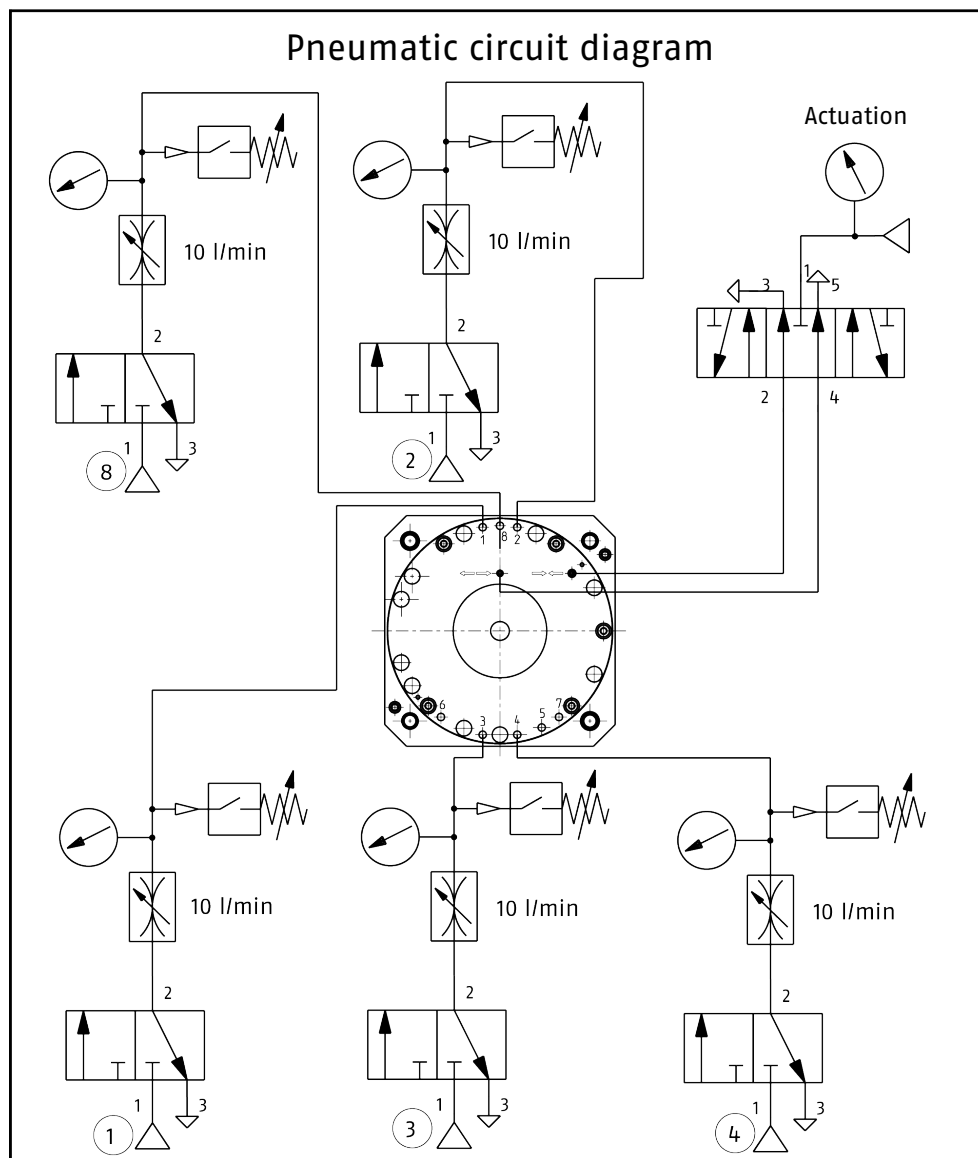
The dimensions of the media transfer are described in chapter ▶ 4.5.1 [ 31]. The dynamic pressure occurring in the workpiece system can be detected via a differential pressure switch. The max. pressure for the monitoring function is 2 bar.

Limit volumetric flow to 10 l/min.

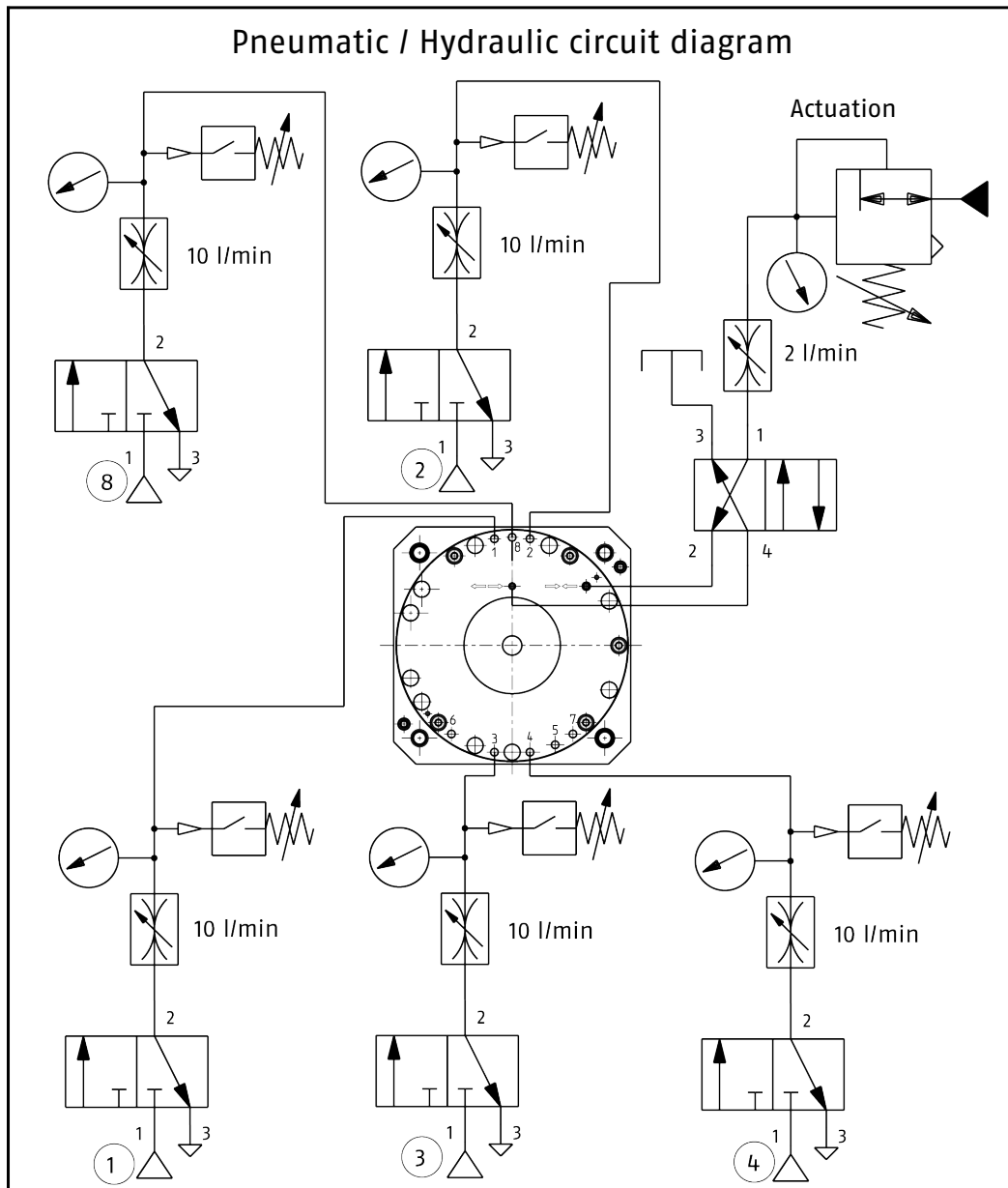
Pressure difference between system contact and separation min. 1 bar.

- Additional channel bores for the air line in the changing jaw can be sealed pressure-tight with the set-screws from the accessory kit.

### 4.4.5 Circuit diagrams



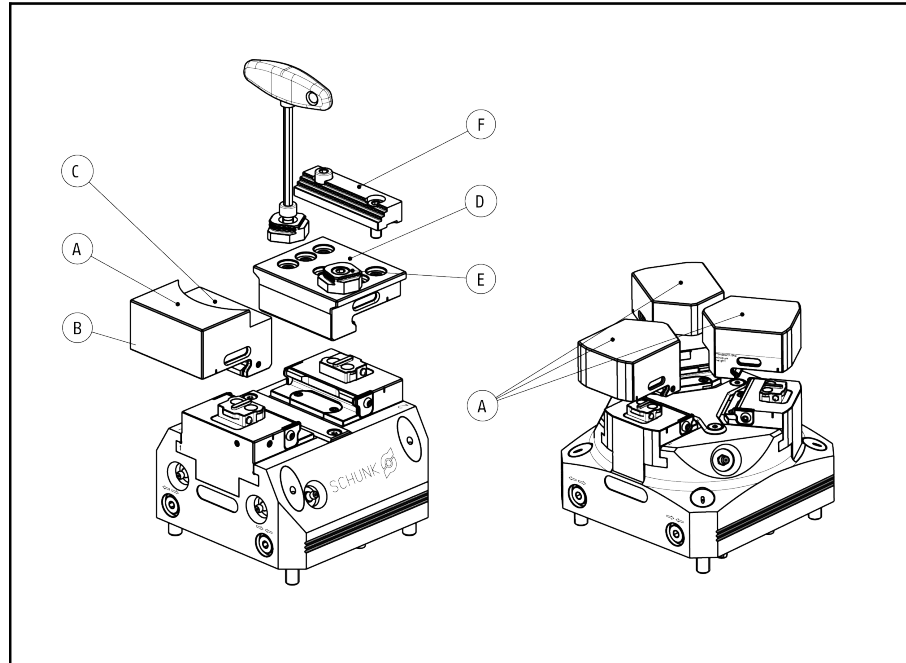
	<b>KRP3</b>	<b>KSP3</b>
①	Dynamic pressure monitoring for jaw stroke "open"	Dynamic pressure monitoring for jaw stroke "open"
②	Dynamic pressure monitoring jaw stroke "closed"	Dynamic pressure monitoring of quick-change jaw no. 1 with simultaneous blow-out function
③	Dynamic pressure monitoring of quick-change jaw no. 2, air transfer in changing jaw no. 2	Dynamic pressure monitoring of quick-change jaw no. 2 with simultaneous blow-out function
④	Dynamic pressure monitoring of quick-change jaw no. 3, air transfer in changing jaw no. 3	Dynamic pressure monitoring jaw stroke "closed"
⑧	Dynamic pressure monitoring of quick-change jaw no. 1, air transfer in changing jaw no. 1	Air transfer in changing jaw no. 1, dynamic pressure monitoring of the workpiece
← → / → ←	"Open"/"Closed" jaw stroke end position	"Open"/"Closed" jaw stroke end position



	<b>KRH3-BWA</b>	<b>KSH3-BWA</b>
①	Dynamic pressure monitoring for jaw stroke "open"	Dynamic pressure monitoring for jaw stroke "open"
②	Dynamic pressure monitoring jaw stroke "closed"	Dynamic pressure monitoring of quick-change jaw no. 1 with simultaneous blow-out function
③	Dynamic pressure monitoring of quick-change jaw no. 2, air transfer in changing jaw no. 2	Dynamic pressure monitoring of quick-change jaw no. 2 with simultaneous blow-out function
④	Dynamic pressure monitoring of quick-change jaw no. 3, air transfer in changing jaw no. 3	Dynamic pressure monitoring jaw stroke "closed"
⑧	Dynamic pressure monitoring of quick-change jaw no. 1, air transfer in changing jaw no. 1	Air transfer in changing jaw no. 1, dynamic pressure monitoring of the workpiece
← → / → ←	"Open"/"Closed" jaw stroke end position	"Open"/"Closed" jaw stroke end position

## 4.5 Quick-change jaws and accessories

The TANDEM clamping force block can be equipped with suitable quick-change jaws. These are designed with mounts for the automated change procedure. They can also be changed manually. The system is only designed for O.D. workpiece clamping.



- A Quick-change jaw WTR-A  
(blank for producing customized clamping contours)

---

- B Marking of the changing jaw number  
(ensure the same numbering when changing)

---

- C Customized clamping contour for WTR-A

---

- D Quick-change jaws type: WTG-A  
(hard, with bore hole grid for reversible clamping inserts and clamping bars, only KSP3 and KSH3)

---

- E Swiveling, hardened 6x reversible clamping insert with 3 jaw steps (2x serrated and 1x smooth).

---

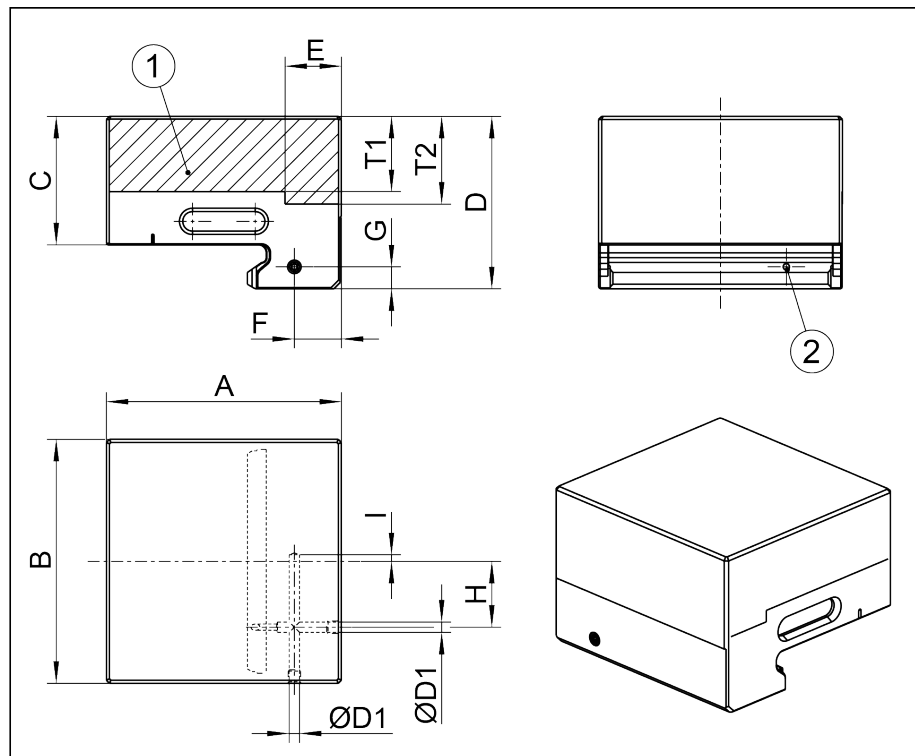
- F Hardened clamping bar with 4 jaw steps (3x serrated and 1x smooth).

### 4.5.1 Quick-change jaws WTR-A

The quick-change jaws WTR-A correspond to a top jaw blank. The clamping contour can be individually adjusted ▶ 4.5.2 [ 34]. The jaw steps can be milled to a limited extent. The clamping contour must be placed under clamping pressure.

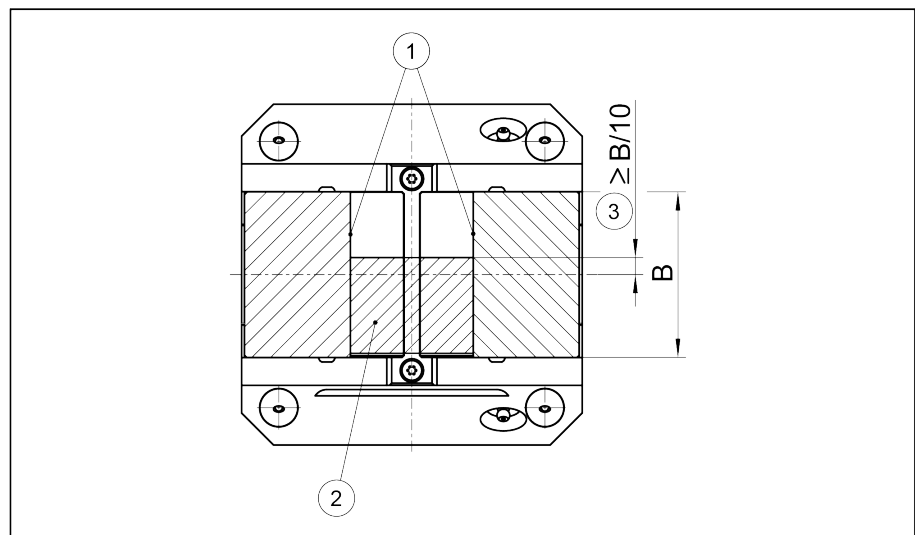
- Blank, soft.
- Material 16MnCr5, multi-part design, hardenable.
- Before heat treatment, the set-screws of the channel bores need to be removed.
- Workpiece-specific adjusting possible by machining under clamping pressure.

- Changing mounts on both sides for automation via parallel grippers and robots.



- ① Work surface
- ② Air transfer from change interface, prepared monitoring bores for workpiece system control (check monitoring options)

**Required workpiece clamping range for 2-jaw TANDEM**

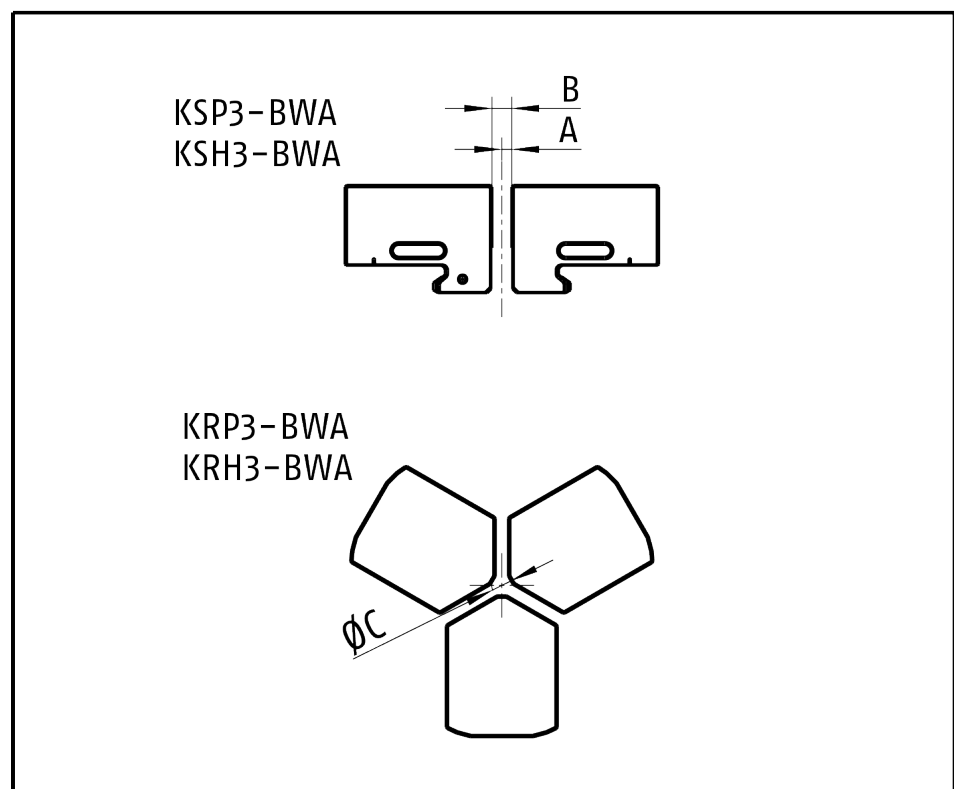


- ① Jaw steps
- ② Workpiece
- ③ Parallel workpiece position via clamping centre

The parallel workpiece position must be **at least 10%** of the jaw width **B** overlapping the clamping centre.

Designation	WTR-A 100	WTR-A 140	WTR-A 160	WTR-A 160/3	WTR-A 200	WTR-A 250	WTR-A 250/3
ID number	1479313	1479314	1479315	1556816	1626345	1479316	1556817
Size	KSH3 / KSP3 100	KSH3 / KSP3 140	KSH3 / KSP3 160	KRH3 / KRP3 160	KSP3 200	KSH3 / KSP3 250	KRH3 / KRP3 250
A [mm]	46.4	65	75	72	94	118	110.5
B [mm]	46.8	67.8	77.8	56.8	101.8	124.8	84.8
C [mm]	27	33	41	33	47	52	41
D [mm]	36	45	55	42	61	70	55
E [mm]	-	15	18	-	18	30	36
F [mm]	9	12	15	23.5	15	15	30
G [mm]	4.3	6	7	4.3	7	8.8	7
H [mm]	12	18	21	14.5	25	31	26
I [mm]	2.1	2.1	2.1	6.6	2.1	2.6	7.6
T1 [mm]	15	18	24	21	30	32	24
T2 [mm]	-	22	28	-	34	38	28
ØD1 [mm]	3.3	3.3	3.3	3.3	3.7	4.2	3.3
Individual weight [kg]	0.47	1.2	2	0.98	3.8	6.5	2.87
Weight / set [kg]	0.94	2.4	4	2.94	7.6	13	8.61

### Clamping range of the WTR-A on the TANDEM



Stroke width KSH3 / KSP3	Standard stroke		Long stroke	
	A [mm]	B [mm]	A [mm]	B [mm]
Size 100	1.6 ... 3.6	3.2 ... 7.2	3.6 ... 9.6	7.2 ... 19.2
Size 140	2 ... 5	4 ... 10	6.4 ... 9.4	4.8 ... 18.8
Size 160	2 ... 5	4 ... 10	5 ... 13	10 ... 26
Size 200	2 ... 6	4 ... 12	6 ... 16	12 ... 32
Size 250	2 ... 7	4 ... 14	1.5 ... 16.5	3 ... 33

Stroke width KRH3 / KRP3	Standard stroke	Long stroke
	C [mm]	C [mm]
Size 160	Ø4.5 ... Ø10.5	Ø4.9 ... Ø20.9
Size 250	Ø8.4 ... Ø18.4	Ø6.7 ... Ø36.7

#### 4.5.2 Inserting clamping contour into WTR-A

The clamping contour is individually machined into the changing jaws. The permissible range for milling the changing jaw is described in the drawing. A recessed step to the workpiece support aids permanent contact of the workpiece to the workpiece support areas.

- The changing jaws can be provided separately with the clamping contour.
- The most accurate clamping is achieved under clamping pressure with the spacer inserted. The manufacturing process for producing the clamping contour is explained below.

The quick-change jaws can be provided separately with the clamping contour.

1. Position spacer at desired clamping height
2. Clamp the spacer (Select actuating pressure identical to later workpiece machining)
3. If necessary, remove components for adjusting the clamping height of the spacer
4. Machine the clamping contour
5. Move the clamping force block to the open position and remove the spacer

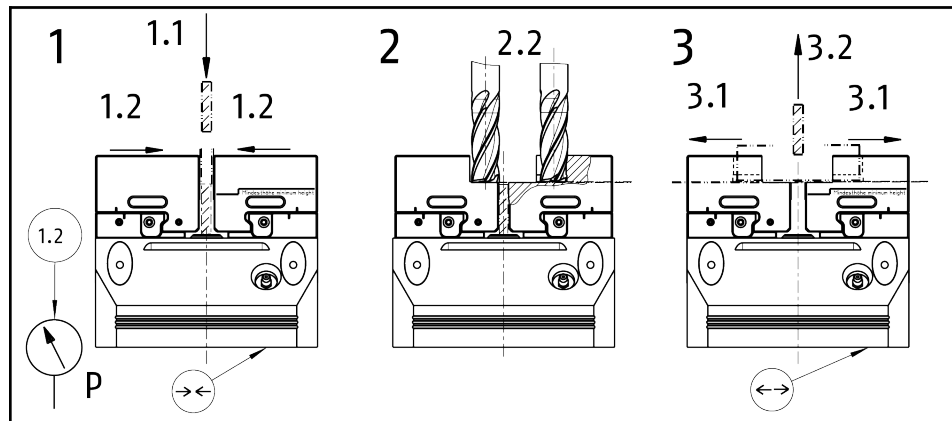


#### **⚠ WARNING**

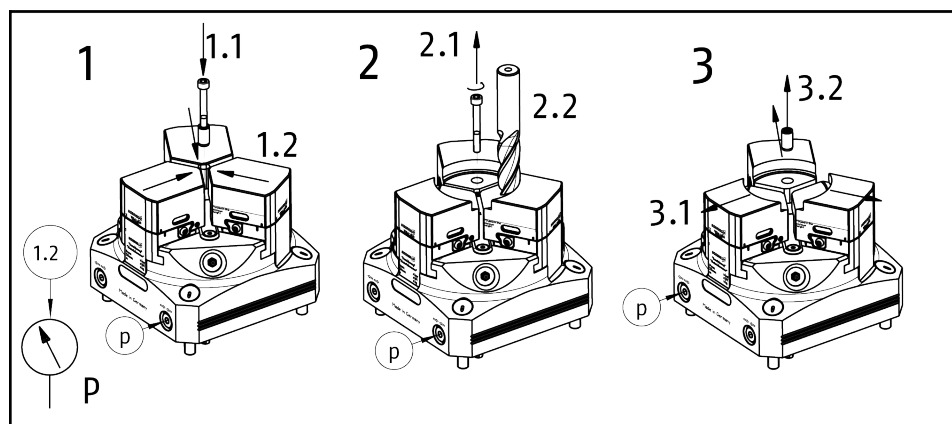
**Danger of crushing due to the chuck jaws approaching the workpiece during the clamping procedure when loading and unloading manually.**

- Do not reach between the workpiece and the chuck jaw during the clamping procedure

**KSH3 / KSP3**

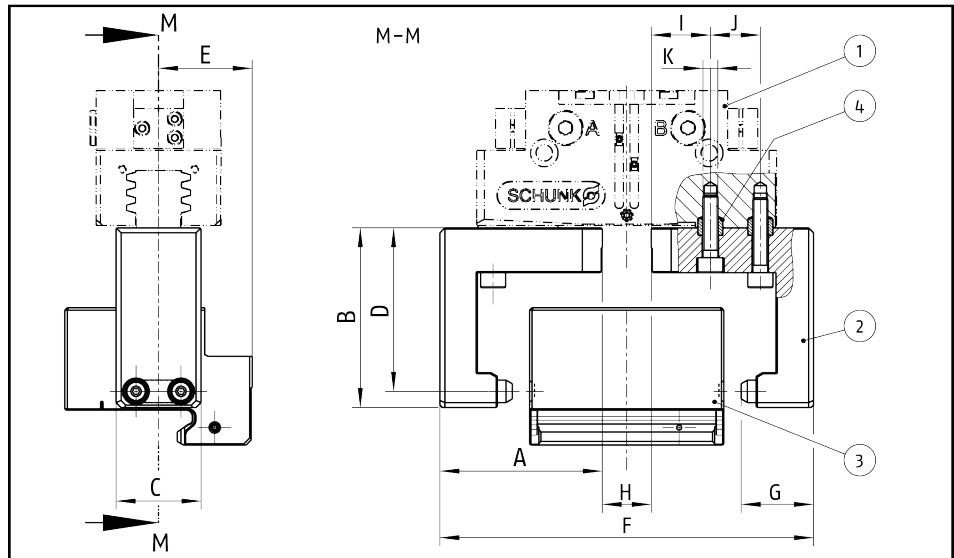


**KRH3 / KRP3**



**4.5.3 Gripper finger FIN WTR-A**

For the automated handling of the WTR-A and WTG-A quick-change jaws, gripper fingers with spring-loaded mounting pieces are provided. The gripper fingers are symmetrically oriented and engage in the mount recesses of the changing jaws on both sides. The gripper fingers ensure a compensating mount within the closed stroke position that is transverse to the insertion direction of the change interface. For adjusting to angular or positional deviations.



- ① 2-finger parallel gripper SCHUNK PGN-plus-P
- ② Gripper finger FIN WTR-A
- ③ Quick-change jaw WTR-A/ WTG-A
- ④ Sleeve for aligning and mounting (included with parallel gripper)

Description	FIN WTR-A 100	FIN WTR-A 140	FIN WTR-A 160	FIN WTR-A 200	FIN WTR-A 250	
ID	1485599	1485599	1485600	1485601	1626347	1485602
suitable for sizes	WTR-A 100	WTR-A 160/3*	WTR-A 140	WTR-A 160 WTR-A 250/3*	WTR-A 200	WTR-A 250
suitable for parallel grippers	PGN-plus-P 80-1	PGL-plus-P 13	PGN-plus-P 100-1	PGN-plus-P 100-1	PGN-plus-P 100-1	PGN-plus-P 125-1
A	44	44	65	65	77	89
B	50	50	64	72	78	86
C	32	32	34	34	34	42
D	44.5	44.5	57.5	65.5	71.5	78
E	23.2	25.6	32.5	37.5	47	59
F	103...88	108.5...98	149.6...130	149.6...130	173.6...154	201...178
G	23...21.4	23...21.4	34...32.4	29...27.4	29...27.4	29.5...27.9
H	15...0	10.5...0	19.6...0	19.6...0	19.6...0	23...0
I	19	19	23.7	23.7	23.7	32
J	16	16	20	20	20	24
K	M5	M5	M6	M6	M6	M6
Weight set [kg]	0.22	0.22	0.44	0.45	0.5	0.72

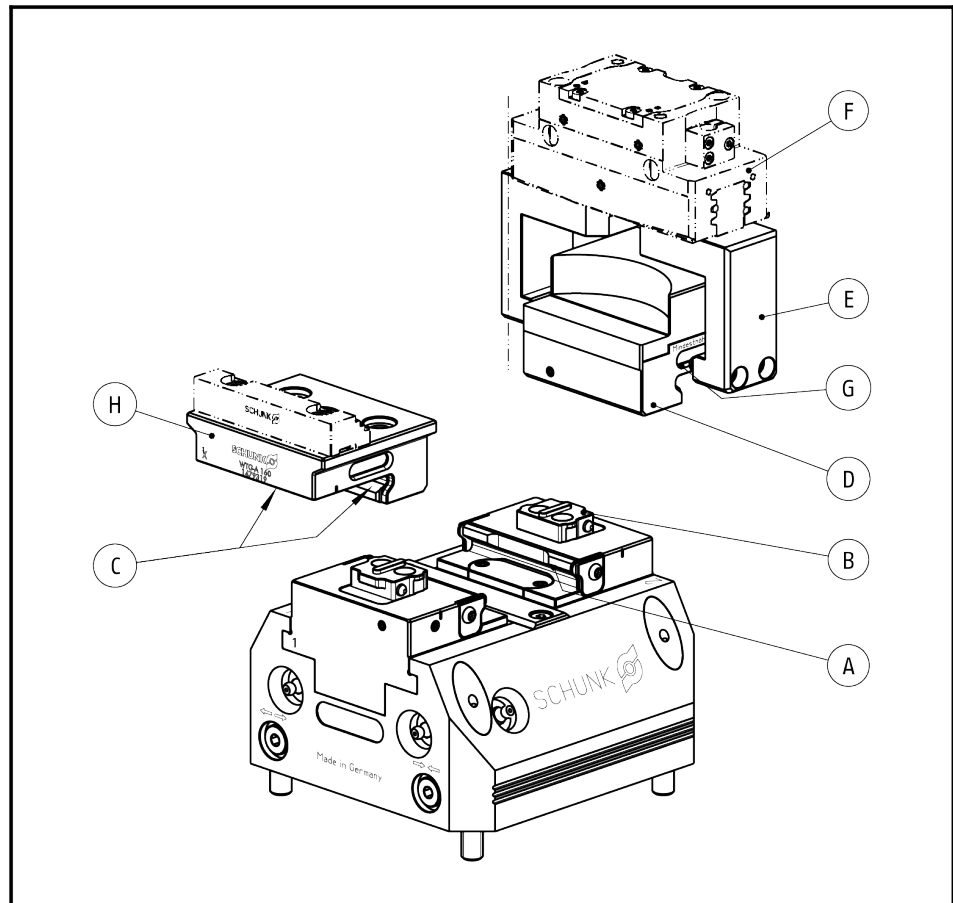
\* To use the gripper fingers for the changing jaws listed, the spacers from the accessory pack must be screwed in.

## 5 Function

The clamping force block offers the following functions:

- Clamping function for workpiece O.D. clamping
- Jaw quick-change, optionally manual or automated
- Monitoring functions for automation mode

### 5.1 Components of the quick-change jaw system



- |   |  |
|---|--|
| A | Change interface TANDEM clamping force block   |
| B | Centering insert with spring-loaded spring bolts for locking and aligning the changing jaw |
| C | Change interface of quick-change jaw   |
| D | WTR-A (illustration with clamping contour)   |
| E | Gripper finger   |
| F | 2-finger universal gripper SCHUNK PGN-plus-P   |
| G | Changing mounts on both sides with mold contour  |
| H | WTG-A (illustration with clamping contour)   |

The TANDEM-BWA clamping force blocks come with a jaw quick-change system. The clamping force is transmitted to the changing jaws via a positive clamping slope (A). These are locked and aligned via a spring-loaded mount.

The changing process takes place in the open position by pushing the changing jaw into or out of the changing interfaces. Pushing out the changing jaw requires force to release the lock.

Designation	WTR-A 100	WTR-A 140	WTR-A 160	WTR-A 160/3	WTR-A 200	WTR-A 250	WTR-A 250/3
Extension force* [N]	40	105	105	105	105	165	
Jaw weight (raw) [kg]	0.47	1.18	2.03	0.98	3,8	6.64	2.87

\* The specified extension forces are used to select the appropriate robot and depend on the environmental and operating conditions and the maintenance frequency of the clamping device used.



**⚠ WARNING**

**Risk of injury due to approach of the robot gripper when gripping and changing the quick-change jaws in offset positions**

- Use suitable SCHUNK gripper fingers with position compensation and collision compensation
- Slow movements on the robot handling when setting up the changing jaws in the area of the product
- Wear protective gloves
- Observe visual markings for changing and teaching positions



**⚠ WARNING**

**Risk of injury due to mechanical collision in the event of position deviation during automated changeover operation of the changing jaws on the clamping force block**

- Use suitable SCHUNK gripper fingers with position compensation and collision compensation
- Slow movements on the robot handling when setting up the changing jaws in the area of the product
- Observe visual markings for changing and teaching positions

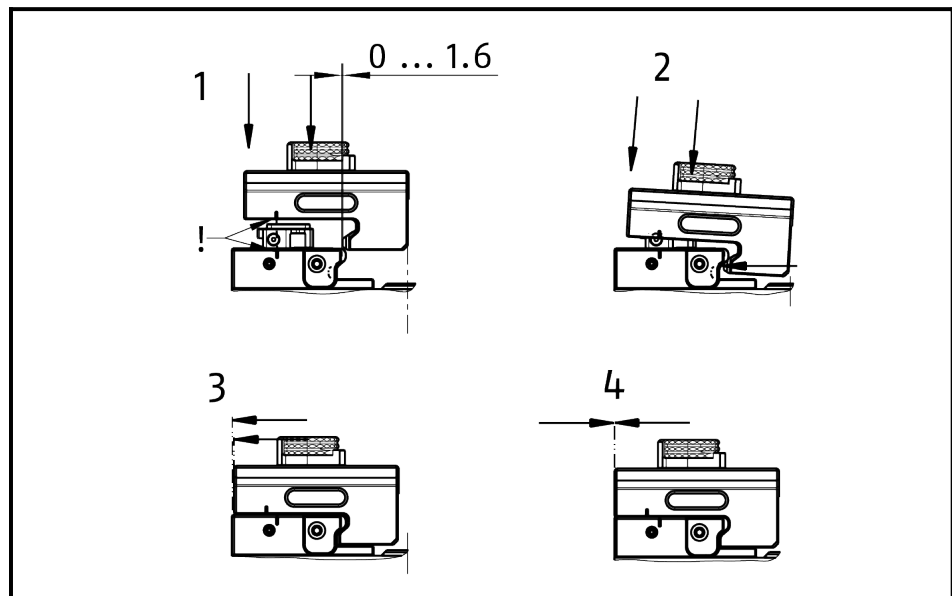
**NOTE**

A quick-change jaw set consists of two or three individual jaws. These are marked with numbers. Always insert the changing jaws on the TANDEM clamping block's change interface with the same number in order to ensure maximum repeat clamping accuracy.

**NOTE**

After each changing process, the changing interfaces must be cleaned or their contact surfaces must be free of chips.

## 5.2 Function of the jaw change

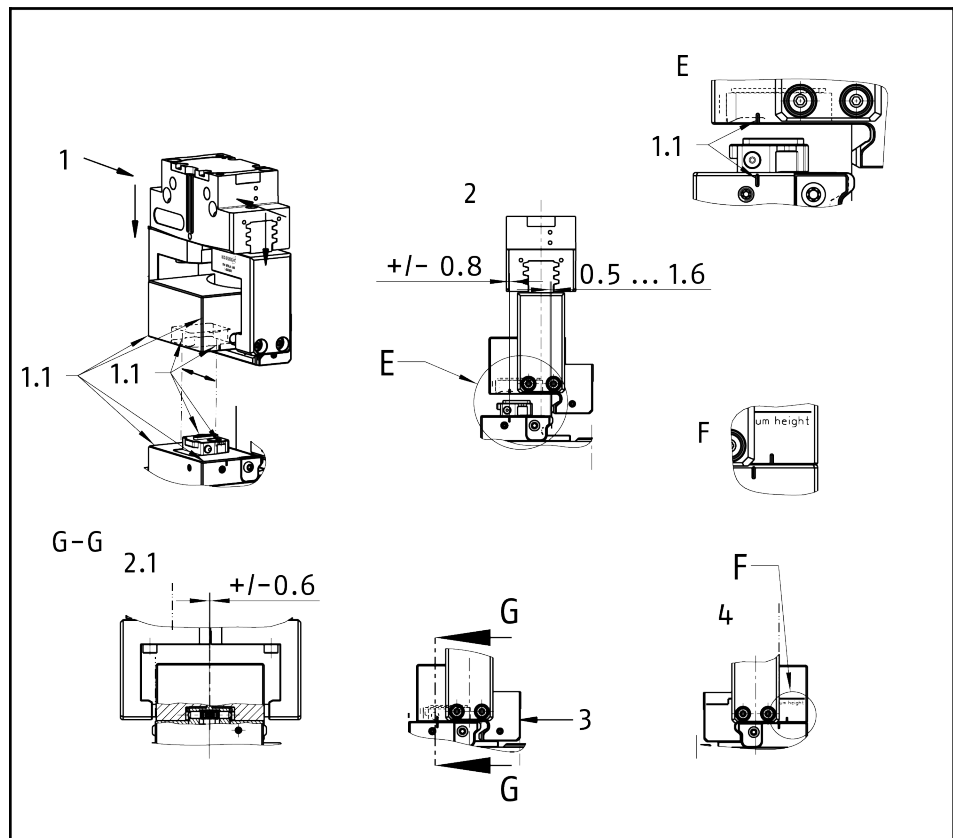


### ⚠ CAUTION

During manual insertion and removal of the changing jaws or workpieces, there is a risk of crushing or cutting injuries due to contact with the opposite chuck jaw or due to joining on the change interface

- Setup only with the clamping force block completely open.
- Wear personal protective equipment.
- Prevent the clamping force block from being actuated unintentionally.
- Do not sharpen the edges of your own clamping contours.
- Prioritize automated loading

### 5.3 Automated jaw change with quick-change jaws



Automated jaw change with WTR-A

#### Inserting the changing jaw into the change interface

1. Bring the TANDEM into the open position and position the changing jaw centrally over the change interface (observe 1.1)
2. Lower the changing jaw onto the plane surface
  - Permissible position deviation transverse to the clamping direction  $\pm 0.6$  mm
  - Permissible position deviation in clamping direction  $\pm 0.8$  mm
3. Lock the jaw by moving it out of the clamping centre. Jaw is locked when the rear faces of the changing and base jaws are flush

#### Removing the changing jaw from the change interface

1. TANDEM in open position ready for the change procedure, changing jaw is picked up with gripper fingers
2. Push out the changing jaw of the change interface from the outside to the inside using sufficient force against the spring lock
3. Lifting the jaw upwards when the markings on the base and changing jaw coincide

**NOTE**

Ensure collision-free positioning of the change parts during setup and the automated change procedure. Inaccurate positioning will result in damage to the components. If the jaw is pushed too far in the direction of the clamping centre during replacement, the jaw's fail-safe device engages and prevents it from being lifted upwards.

**NOTE**

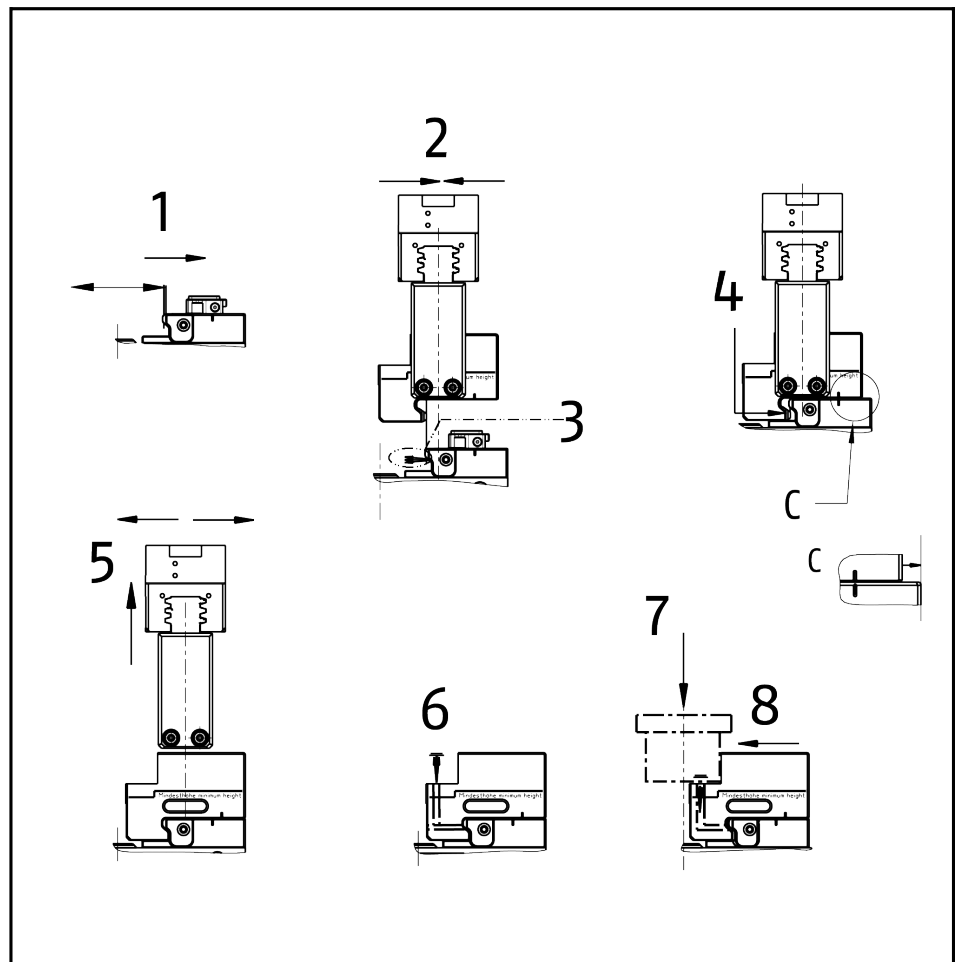
For the automated change operation of the changing jaws, it is recommended to use the dynamic pressure monitoring functions to check the stroke end positions.

**NOTE**

After each change procedure, the change interfaces must be cleaned.

### 5.3.1 Function sequence for automation with quick-change jaws

The following describes the functional sequence using pneumatic monitoring during jaw and workpiece change.



### Jaw change procedure

1. opening of the clamping device; monitoring of the "open" position via the base jaw monitoring
2. pick up the jaw via gripper handling
3. actuation of the connection to check the presence of the changing jaw via air purge
4. locking of the jaw in the interface, air purge must be applied, the rear side of the base jaw and the changing jaw must be flush (see detail C)
5. opening the gripper and gripping the workpiece
6. actuation of the connection of the media transfer in the changing jaw to monitor "workpiece presence" (if present)
7. placing the workpiece on the changing jaws
8. closing of the clamping device, air purge at the connection "Media transfer" must be present

## 5.4 Operating conditions

When changing the jaws, make sure that the changing jaws are securely locked to the clamping force block.

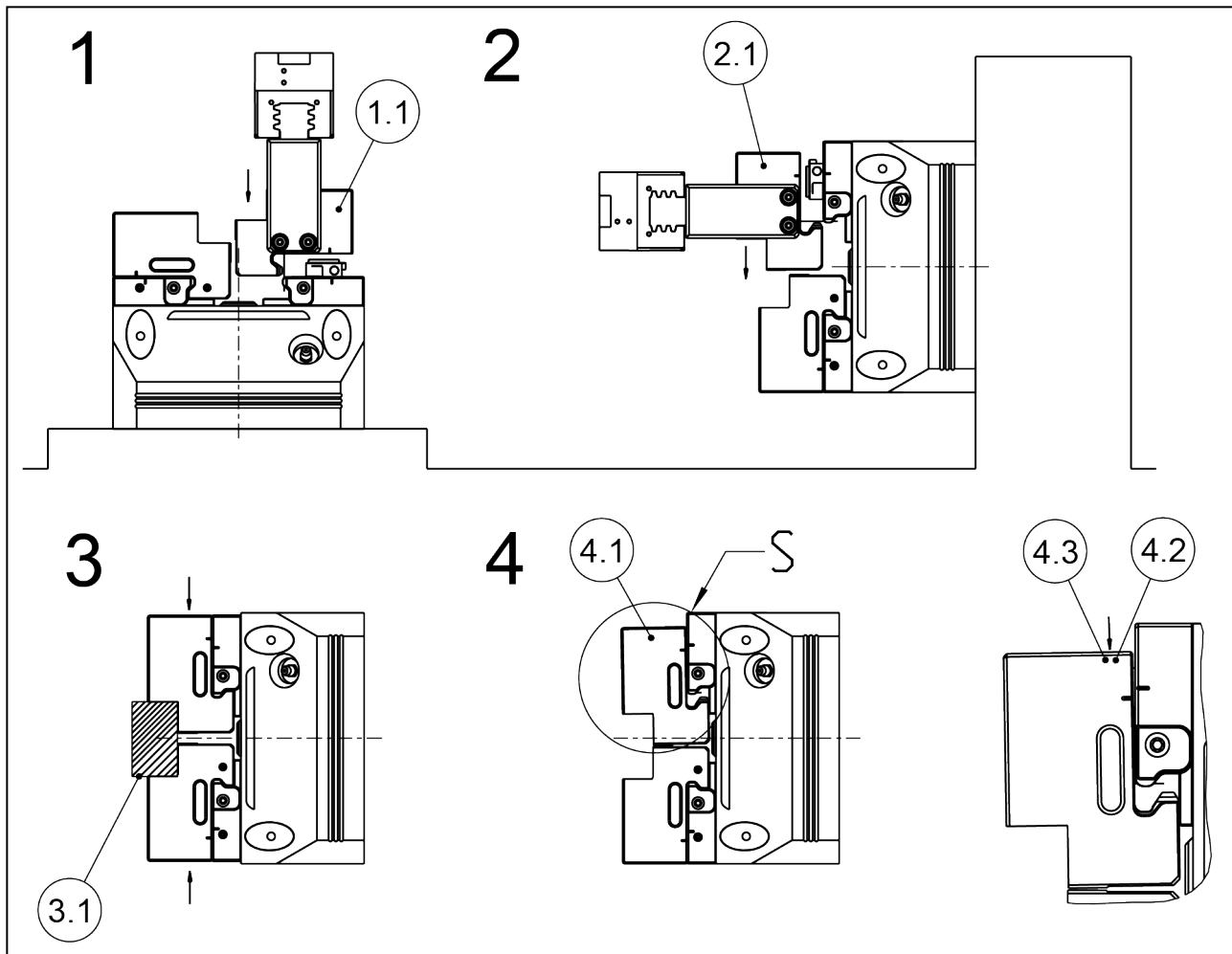
- If changing jaws are joined, workpiece clamping must also be carried out.
- If clamping force blocks are in the machining area or, for example, in a tombstone where no workpiece clamping takes place, the changing jaws must be removed.
- No strong shocks or vibrations may occur during the set-up process.



### **⚠ WARNING**

#### **Risk of injury due to incorrectly locked quick-change jaws during manual or automated jaw changes**

- A horizontal position for changing / exchanging the changing jaws is preferable
- Wear protective equipment (protective gloves, protective shoes) when working on the product and when handling its accessories
- When changing the jaws, observe the joint position and change position of the changing jaws up to the markings
- Monitor correct locking by means of dynamic pressure monitoring
- Clean the change interface before replacing changing jaws



1 Horizontal positioning for changing and exchanging the changing jaws is preferable

1.1 Setting down and lifting in horizontal clamping device orientation

2 Change procedure in vertical installation situation

2.1 Ensure that the changing jaw is completely locked before lifting off the gripper

3 In automated operation and during swiveling movements when using a multi-equipped clamping device with clamping force blocks, always provide for workpiece clamping. If this is impossible, remove the changing jaws

3.1 Workpiece clamping

4 Failure mechanism at both change interfaces

4.1 In the event of jerky pulses during the jaw change, the failure mechanism ensures that the changing jaw does not fall down

4.2 Raised bar on change lock on TANDEM

4.3 Recess on changing jaw

## 6 Maintenance and care

### 6.1 Notes

#### Original spare parts

Only use original spare parts from SCHUNK when replacing wearing parts/spare parts.

#### Replacing the housing and base jaws

The base jaws and the guides in the housing are matched to each other. To replace these parts, send the entire product to SCHUNK with a repair order.

#### Maintenance of variants with clamping force maintenance (AS)

The cylinder piston must be disassembled or assembled using a disassembly and assembly device. We therefore recommend you have maintenance work and change of seals performed at SCHUNK.

### 6.2 Maintenance and lubrication intervals

The following maintenance work should be carried out after the specified cycle numbers or, at the latest, according to the monthly data.

Maintenance work	Interval [cycles/months]
Lubrication	10,000 / 1
Basic cleaning	- / 6
Leak test	5,000 / 1

### 6.3 Lubricants / greasing areas

Use only the listed lubricants.

Greasing area	Lubricant
Sliding surfaces body – base jaw	microGLEIT LP 410
Sliding surfaces base jaws–chuck piston	microGLEIT LP 410
Lubrication nipple	microGLEIT LP 410
Central lubrication	microGLEIT LP 410
All seals	RENOLIT HLT 2
Sliding surfaces cylinder piston–housing	RENOLIT HLT 2
Sliding surfaces of spring bolts in centering inserts	RENOLIT HLT 2

(Product information about microGLEIT LP 410 & RENOLIT HLT 2 can be requested from SCHUNK).

## 6.4 Maintenance work

### 6.4.1 Lubrication



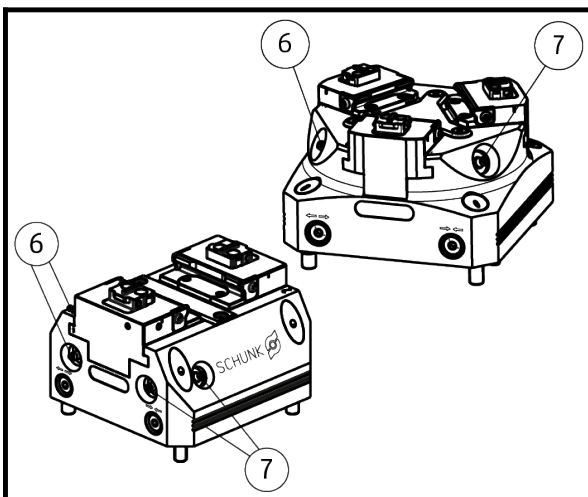
#### ⚠ CAUTION

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

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

To maintain reliable function and high quality of the product, it has to be regularly lubricated. This can be done with a hand lever press for grease or by means of central lubrication.

#### Manual lubrication

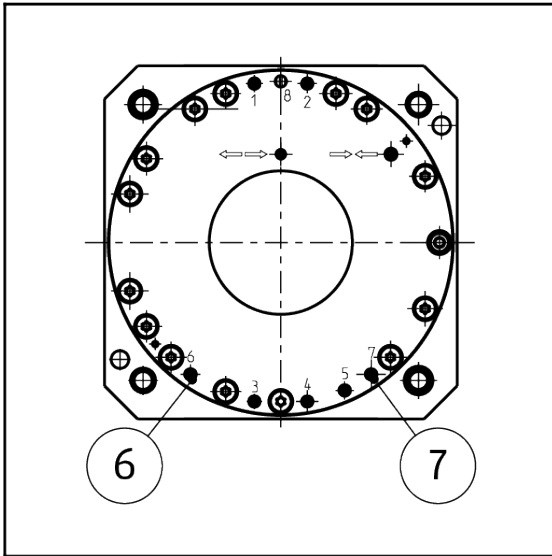


- **KRH3 / KRP3:** Press grease into all grease nipples (6/7).
- **KSH3 / KSP3:** Press grease either into the grease nipples at the side or front of the respective supply line (6/7).
- Only lubricate in the open position.
- After greasing, run through the complete stroke several times.
- Grease to be used and lubrication intervals, ▶ 6.3 [ 44].

#### Grease quantity (strokes per grease nipple)

Size	KRH3 / KRP3	KSH3 / KSP3
100	2	2
140	2	2
160	3	2
200	–	2
250	3	3

### Central lubrication



- To use central lubrication, the set-screws of the factory sealed connections (6, 7) must be removed.
- For proper lubrication, both supply lines must be connected.
- The central lubrication system must be suitable for greases of NLGI 2 classification.
- Only lubricate in the open position.
- After greasing, run through the complete stroke several times.
- Grease to be used and lubrication intervals, ▶ 6.3 [ 44].

Size	Grease quantity (per connection) [cm <sup>3</sup> ]
100	4
140	4
160	4
200	4
250	4

#### 6.4.2 Basic cleaning, disassembly and reassembly



#### **⚠ DANGER**

##### **Danger to life in case of improper disassembly.**

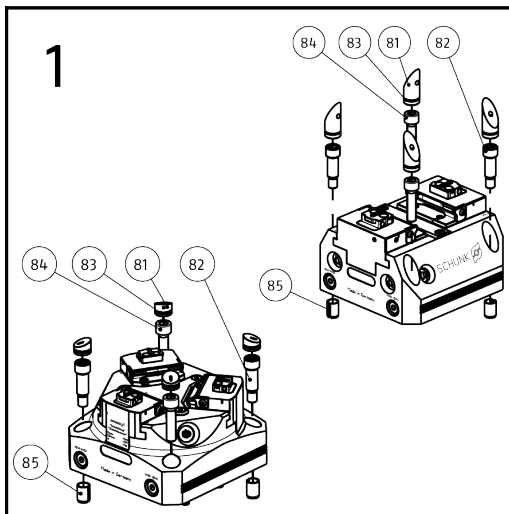
With the AS variant, the cylinder piston and the cover are under tremendous spring force, which can eject the parts.

- With the AS variant, when dismantling the cylinder piston and cover, use a device that prevents the cover and cylinder piston from being ejected.
- It is recommended to have the maintenance work and change of seals carried out by SCHUNK.

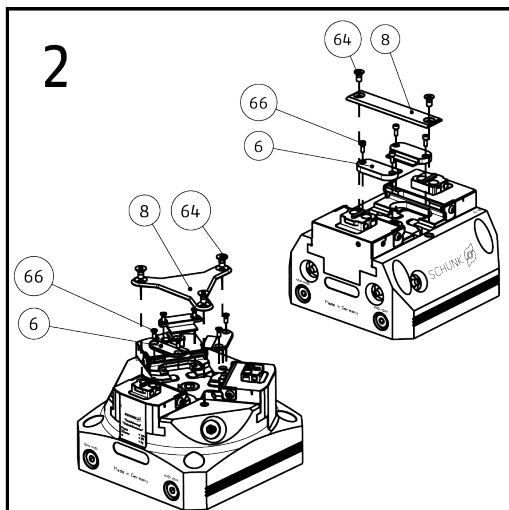
For basic cleaning, the product must be disassembled, cleaned and reassembled. After assembly, the pneumatic jaw end position control must also be set.

## Disassembly

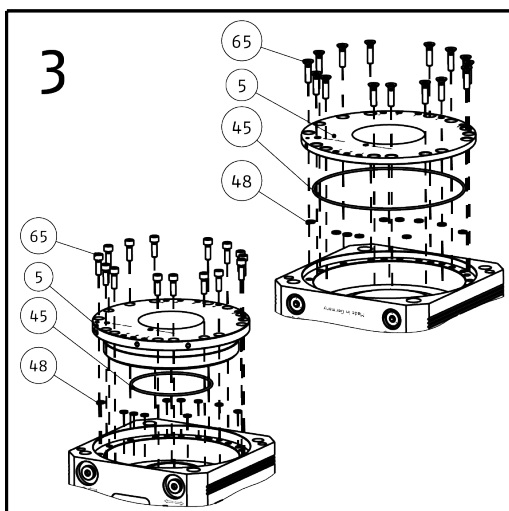
**Before disassembling the machine, switch it off and secure it against being switched on again. Then remove all compressed air lines. No residual energy may be left in the clamping device.**



Pull out plug (81) with installed O-ring (83). Unscrew the screws (84) and the fitting screws (82) and disassemble the clamping system from the machine table. If using clamping sleeves (85), remove them from the housing.



Remove screws (64) and take off the cover strip (8). Remove screws (66) and take off the covering strips (6).



Remove screws (65) and pull out cover (5) together with O-ring (45) and flat gaskets (48) out of the housing. To do this, screw two screws into the threaded holes as extraction tools.

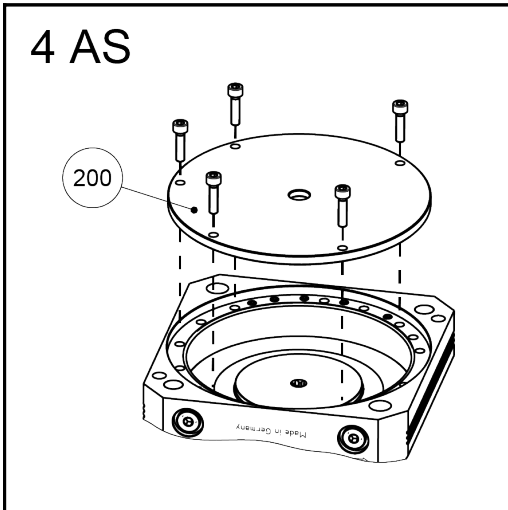
for size 100: M3 x L > 25

for size 140: M4 x L > 25

for size 160: M3 x L > 25

for size 200: M5 x L > 25

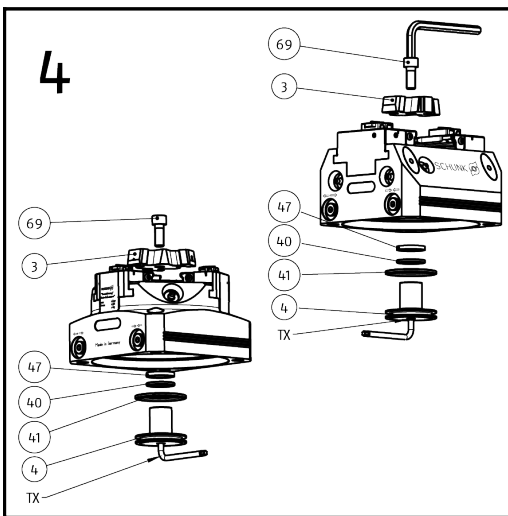
for size 250: M5 x L > 25



**Variant with clamping force maintenance (AS, only KRP3 / KSP3)**

Fasten mounting cover (200) with cheese-head screws DIN EN ISO 4762 ▶ 6.5 [ 55].

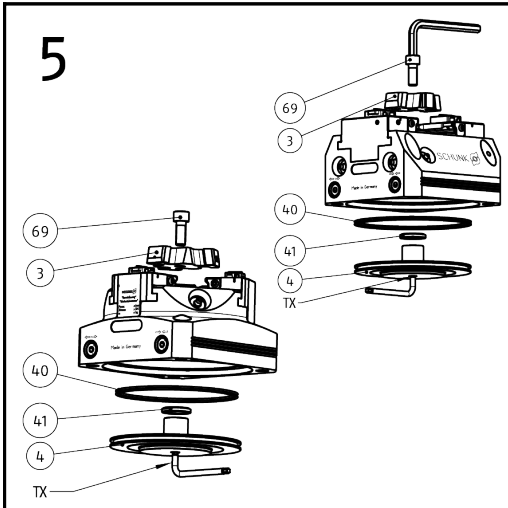
- for size 100: M5 x 8 – 14
- for size 140: M5 x 12 – 16
- for size 160: M5 x 16 – 20
- for size 200: M5 x 16 – 20
- for size 250: M6 x 20 – 25

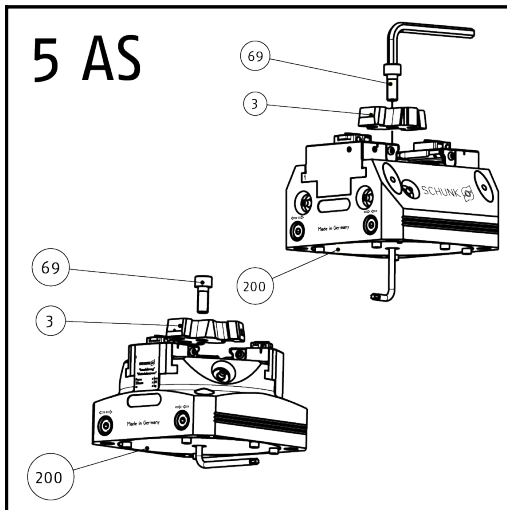


**Variant without clamping force maintenance**

Unscrew the screw (69) by holding it against the cylinder piston (4).

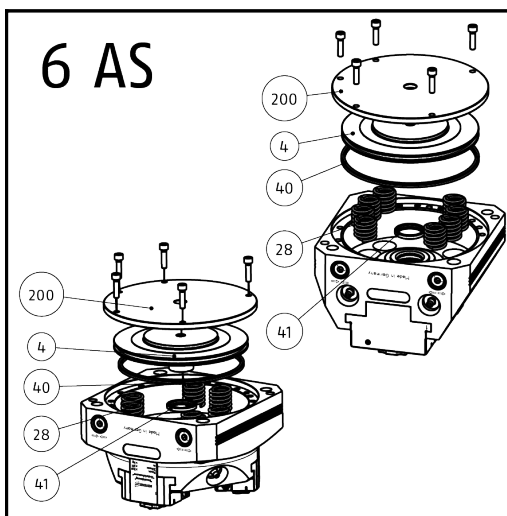
Then pull the chuck piston (3) out of the housing via its extraction thread. Then push the cylinder piston together with the sealing ring (40) out of the housing. Remove the combination sealing ring (41) from the housing.





### Variant with clamping force maintenance (AS)

Mounting cover (200) mounted at rear. Unscrew the screw (69) by holding it against the cylinder piston (4). Then pull the chuck piston (3) out of the housing via its extraction thread.

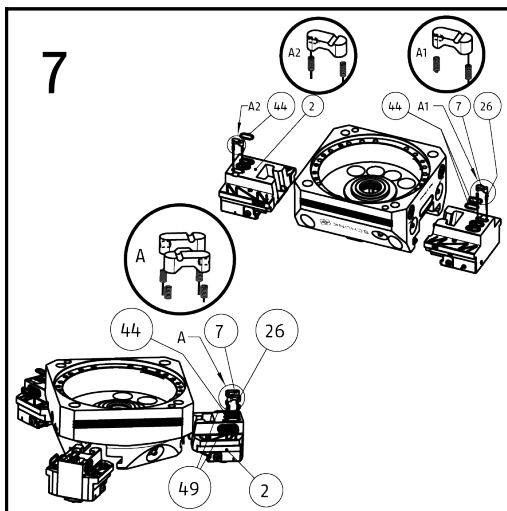


### Variant with clamping force maintenance (AS)

**Warning! Risk of injury due to spring forces! The cylinder piston and cover are under spring tension!**

Clamp the product between the base jaws (2) and the mounting cover (200) using a suitable device (e.g. press, vise) so that the screws in the cover can still be removed. Remove screws (65) and slowly open device until compression springs are released.

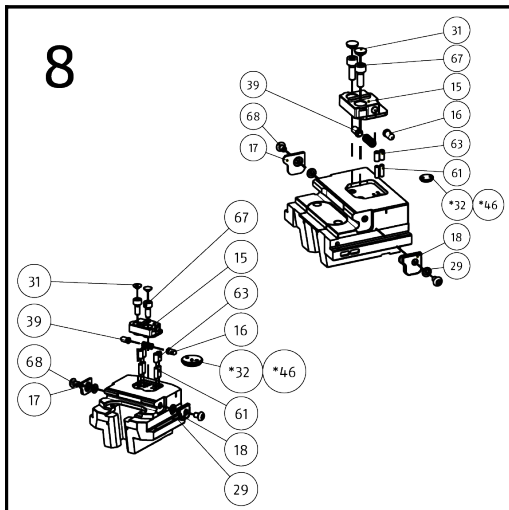
Remove the mounting cover (200), compression springs (28), combination sealing ring (41) and cylinder piston (4) together with the sealing ring (40) from the housing.



Pull the base jaws (2) out of the housing.

The base jaws also include an O-ring (44, 49), a monitoring piece (7) and compression springs (26).

**Caution! The monitoring piece is under spring pre-load and is installed directionally oriented for each base jaw! See detail views!**



If each base jaw is disassembled further, keep all the individual components for the corresponding base jaw separately (observe the identification number). Remove cover plugs (31). Remove mounting screws (67). Lift out the centering insert (15). Remove compression spring (39) and spring bolt (16) from centering insert from inside. If necessary, disassemble the sealing elements (17) and (18) at the side with mounting screws (68) and internal spacer (29). For sizes 200 & 250, unscrew the locking screw (32) with face pliers. If necessary, remove O-ring (46). If necessary, remove the M4 Torx set-screws (63). Loosen the M3 set-screw (61).

### Maintenance

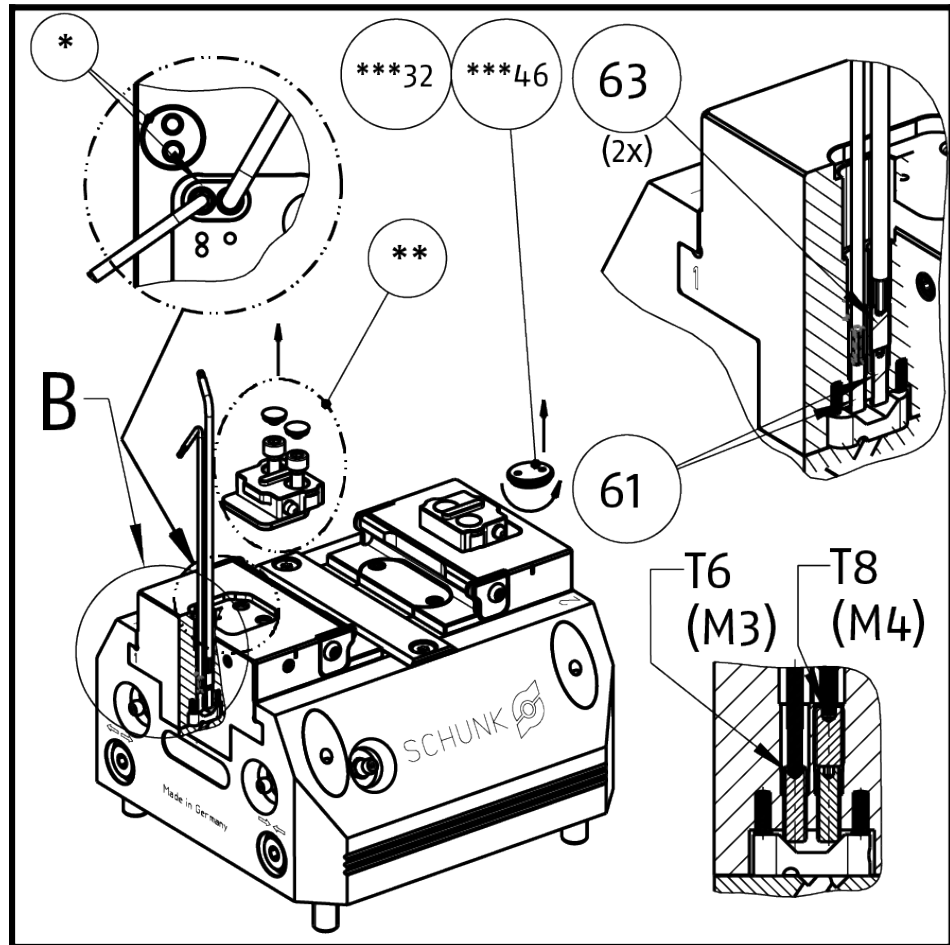
- Clean all parts thoroughly and check for damage and wear.
- Treat all greasing areas with lubricant, ▶ 6.3 [□ 44].
- Replace all wearing parts and seals if necessary ▶ 9 [□ 61].

### Assembly

Assembly is done in the reverse order of disassembly. In doing so, observe the following:

- Pay attention to the mounting position of the base jaws (2) and the chuck piston (3).
- Observe the tightening torques for the screws, ▶ 4.1 [□ 23].
- Note the installation directions of the monitoring pieces. For installation of O-rings (44, 49) provide 2x on jaw no. 1, and 1x on jaw no. 2. For insertion, press a suitable block against the O-rings (44, 49) and against the front of the housing. Carefully insert the completed base jaws (2) into the jaw guidances with the respective jaw number so they are flush with the front side in the housing. To do this, hold the monitoring piece (7) flat against the bottom side. Make sure that the O-rings (44, 49) are not damaged during the insertion process.
- After completion of the assembly, carry out a leak test and a function test, ▶ 6.4.5 [□ 54].
- For variants with clamping force maintenance (AS), mount the cylinder piston using an assembly device, ▶ 6.5 [□ 55].
- Readjust the pneumatic jaw end position control before mounting the centering inserts (15) or locking screws (32).

### 6.4.3 Adjusting the pneumatic jaw end position monitoring (KSH3/KSP3)



\* Depending on the size, access provided to the pneumatic jaw end position monitoring

\*\* Disassembly for sizes 100, 140, 160

\*\*\* Disassembly for size 200, 250

Access to the pneumatic jaw end position monitoring is below the centering insert (15) for sizes 100, 140 and 160. For size 200 and 250, the adjustment is below the locking screws (32). The locking screw with thread must be disassembled using a face wrench.

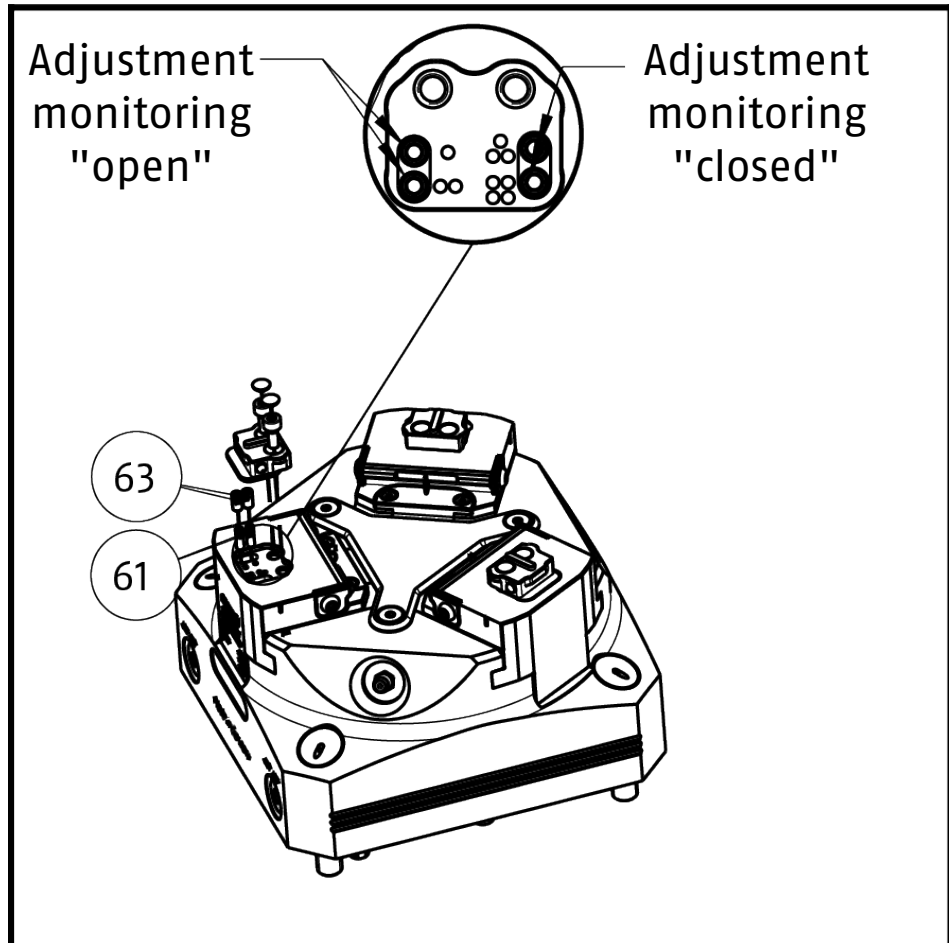
### **Base jaw 1: monitoring open jaw position**

- Move base jaws to OPEN position
- Remove set-screws (63)
- Screw the set-screw (61) into the bore hole with the marking "o" up to the stop and then unscrew it again by a few turns.
- Slowly screw the set-screw (61) into the bore hole with the marking "oo" until the differential pressure sensor emits a switching signal
- Hand-tighten the set-screw (61) in the bore hole with the marking "o"
- Screw set-screw (63) in both bore holes and hand-tighten.

### **Base jaw 2: monitoring closed jaw position**

- Move base jaws to CLOSED position
- Remove set-screws (63)
- Screw the set-screw (61) into the bore hole with the marking "oo" up to the stop and then unscrew it again by a few turns.
- Slowly screw the set-screw (61) into the bore hole with the marking "o" until the differential pressure sensor emits a switching signal
- Hand-tighten the set-screw (61) in the bore hole with the marking "oo"
- Screw set-screw (63) in both bore holes and hand-tighten

#### 6.4.4 Adjusting the pneumatic jaw end position monitoring (KRH3/KRP3)



On the KRP3 or KRH3, both monitoring devices for the base jaw position are located in base jaw no. 1. For size 160, the access to this is below the centering insert (15). For size 250, the adjustment is below the locking screw (32). The locking screw with thread must be disassembled using a face wrench.

##### Jaw 1: monitoring open jaw position

- Move base jaws to OPEN position
- Remove set-screws (63)
- Screw the set-screw (61) into the bore hole with the marking "o" up to the stop and then unscrew it again by a few turns.
- Slowly screw the set-screw (61) into the bore hole with the marking "oo" until the differential pressure sensor emits a switching signal
- Hand-tighten the set-screw (61) in the bore hole with the marking "o"
- Screw set-screw (63) in both bore holes and hand-tighten.

### **Jaw 1: monitoring closed jaw position**

- Move base jaws to CLOSED position
- Remove set-screws (63)
- Screw the set-screw (61) into the bore hole with the marking "oooo" up to the stop and then unscrew it again by a few turns.
- Slowly screw the set-screw (61) into the bore hole with the marking "ooo" until the differential pressure sensor emits a switching signal
- Hand-tighten the set-screw (61) in the bore hole with the marking "oooo"
- Screw set-screw (63) in both bore holes and hand-tighten

#### **6.4.5 Leak test**

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

- 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 coupling – supply line.
  2. Pressurize the clamping force block.
  3. Close the shut-off valve and remove the supply line.
  4. Let the clamping force 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 fittings first (e.g. with leak detection spray). Seal any leaking fittings.

Once the fittings are sealed, check the seals for leaks and replace if necessary, ▶ 6.4.2 [ 47].

## 6.5 Assembly device for -AS variant

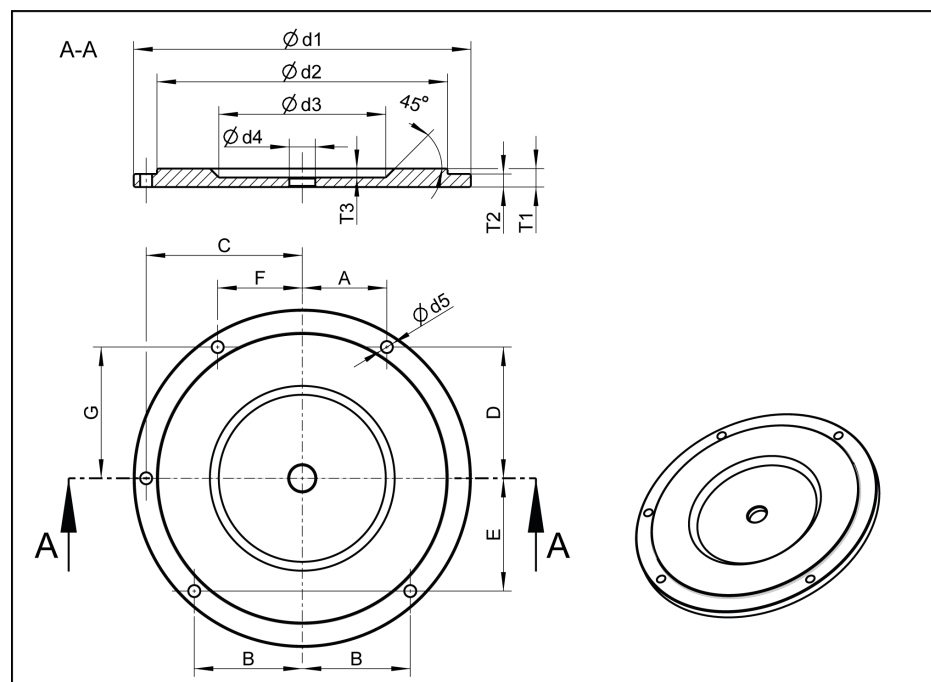


### **⚠ DANGER**

#### **Danger to life in case of improper disassembly.**

With the AS variant, the cylinder piston and the cover are under tremendous spring force, which can eject the parts.

- With the AS variant, when dismantling the cylinder piston and cover, use a device that prevents the cover and cylinder piston from being ejected.
- It is recommended to have the maintenance work and change of seals carried out by SCHUNK.



Dimension	Sizes				
	100	140	160	200	250
$\varnothing d1$	97.5	137.5	155.5	195.5	245
$\varnothing d2$	79	118	135	171	219
$\varnothing d3$	40	57	77	90	123
$\varnothing d4$	10	12	12	12	12
$\varnothing d5$	5.5	5.5	5.5	6.6	6.6
T1	5	6.5	8.5	10	10.5
T2	3	3.5	6	6.5	7.5
T3	1.8	3	4.1	3.5	5
A	38.9	45.5	39	50	93.8
B	38.9	36	49.8	50	93.8
C	43.5	63.5	72	91.5	116
D	19.4	44	60.5	76.5	68.3
E	19.4	52	52	76.5	68.3
F	34.3	45.5	39	55	93.8
G	26.8	44	60.5	73	68.3

## 6.6 Assembly devices for piston seals (KRH3/KSH3)

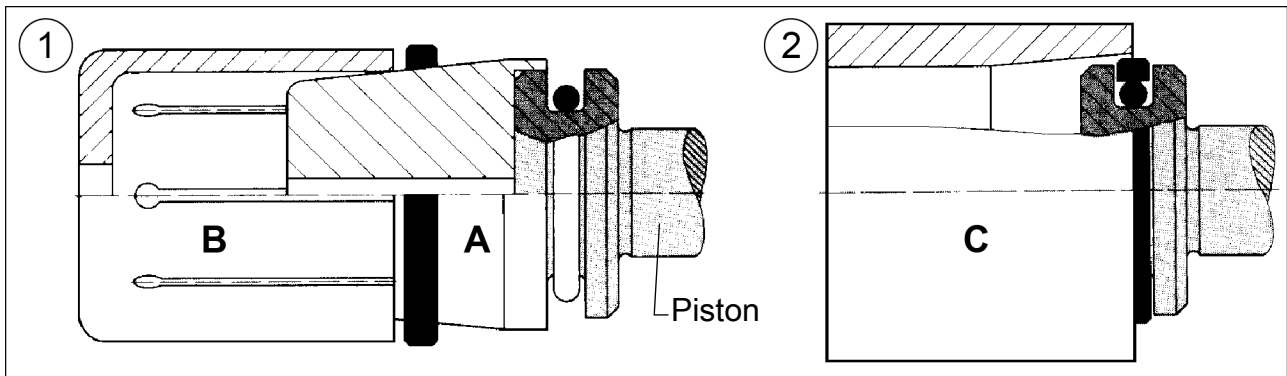
To assemble the seal (40), a multi-part assembly tool is required. If no assembly tool is available, repair work on the TANDEM clamping force block should be carried out by SCHUNK.

### 1. Assembly

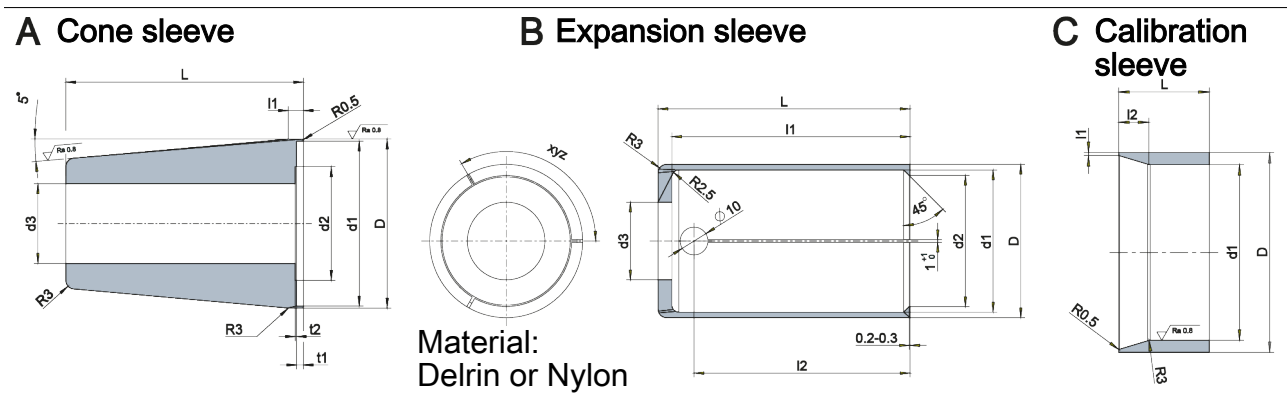
- Disassemble the two-part seal (40) and grease with Renolit HLT 2 or an equivalent grease.
- Pull the O-ring of the seal (40) over the cylinder piston (4) and into the groove (Do not overstretch or tear the O-ring in the process).
- Stretch the sealing ring with an expansion sleeve over the cone sleeve and slide over the cylinder piston and the O-ring that was previously inserted into the groove.

### 2. Calibration

After sliding it over, the Turcon-ring snaps into the groove. However, assembly is still not complete. The stretched ring needs to be returned to its original shape with a calibration sleeve.



Assembling the piston seal



Assembly tools for the piston seal

**A cone sleeve /**  
**Material: steel**

Size	Piston Ø	D	$d_1^{+0.15}$	$d_2$	$d_3$	L	$l_1$	$t_1^{+0.3}$	$t_2$
100	35	36.5	35	22	17	75	5.7	2.7	0.5
140	50	51.5	50	37	25	80	50	2	0.5
160	58	59.5	58	40	28	85	5.4	2.4	0.5
250	105	106.5	105	80	58	100	6	3	0.5

**B expansion sleeve /**  
**Material: POM,**  
**NYLON® or similar**

Size	Piston Ø	D	$d_1$	$d_2$	$d_3$	L	$l_1$	$t_1^{+0.3}$	xyz
100	35	34.64	30.64	26.64	17	81	76	68	3 x 120°
140	50	48.94	44.94	40.64	25	86	81	73	4 x 90°
160	58	55.22	51.22	47.22	28	91	86	78	4 x 90°
250	105	99.67	95.67	91.67	35	96	91	83	6 x 60°

**C calibration sleeve /**  
**Material: steel**

Size	Piston Ø	D	$d_1$	L	$l_1$	$l_2^{\pm 1}$
100	35	43.05	35.05	30	1	10
140	50	58.05	50.05	30	1	10
160	58	66.05	58.05	30	1	10
250	105	120.5	105.05	30	1	10

## 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 Trouble shooting

### Clamping force block chuck jaws will not move

Possible cause	Solution(s)
Air or oil supply interrupted	Check air or oil 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 connections not sealed	Seal front or bottom connections using accessories (included in scope of delivery).
Active connections sealed	Remove set-screws from sealed connections.

### Piston will not move

Possible cause	Solution(s)
Air is not oiled (only for pneumatic clamping force blocks KSP3 and KRP3)	Check maintenance unit, perform maintenance work. Place the oiler closer to the clamping system, adjust the necessary oil quantity.
Chuck piston screw broken (overload)	Send clamping system to SCHUNK for repairs or disassemble clamping system and repair using original SCHUNK spare parts, ▶ 6.4.2 [ 51].
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.
Active connections sealed	Remove set-screws from sealed connections.

### Clamping force block does not complete stroke

Possible cause	Solution(s)
Chips or dirt between covering strip and base jaws	Unscrew the covering strip (8) and remove chips and dirt.

### Clamping force getting weaker

Possible cause	Solution(s)
Clamping force block not sealed tightly	Check connection and seal screws; reseal or replace.
Seals damaged	Disassemble clamping force block ▶ 6.4.2 [ 51] and replace all the seals, (see sealing kit lists ▶ 9 [ 61]).
Inadequate lubrication	Lubricate the lubrication nipples with MicroGleit LP 410, ▶ 6 [ 44].

### Clamping force block movement jerky

Possible cause	Solution(s)
Steel guide rollers on sliding surfaces not greased	See ▶ 6 [ 44].
The monitoring piece in a base jaw is pressed too tightly against the housing	Loosen the adjustment screw and readjust the monitoring piece.

### Jaw changing function not operating correctly

Possible cause	Solution(s)
Spring bolt of a centering insert not functioning	Check spring bolt for external damage. Check that the deflection of the spring bolts is safe and even. Remove dirt, oil a little.
Repeat accuracy not achieved during jaw change	Clean change interfaces and check for damage. Replace damaged parts, if necessary. The changing jaws have been switched. Changing jaw and base jaw numbers must match.
Increased lifting of changing jaw	Clean interfaces between base jaws and changing jaws. Insert changing jaw firmly into change interface by pulling it backward.

### Monitoring functions of the stroke end positions do not work properly

Possible cause	Solution(s)
Monitoring pieces in the base jaws not positioned exactly	Readjust monitoring piece for the required function.
Compressed air leakage because the monitoring piece is pressed too lightly against the housing.	Readjust monitoring piece for the required function.
Pressure change due to clamping stroke too low	Adjust clamping stroke to the workpiece to > 0.3 mm/jaw.
Seals damaged	Replace seals in cover and adapter plate ▶ 9 [ 61].

### Monitoring functions for automation mode do not work properly

Possible cause	Solution(s)
Compressed air leakage, changing jaw is not placed flat on base jaw	Clean and check the interfaces.
Changing jaw is not completely inserted and locked in the interface	Clean and check interfaces and change lock on base jaw.
Compressed air leakage, workpiece not lying flat on clamping area	Insert the workpiece again.
Seals damaged	Replace seals and cover in the adapter plate ▶ 9 [ 61].

## 9 Sealing kit lists, 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.**

### 9.1 Sealing kit lists

There are two sealing kits. One for the piston chamber (piston chamber sealing kit) and one for the pneumatic monitoring (monitoring sealing kit). The sealing elements for the bottom connections are included in both sealing kits.

#### 9.1.1 Piston chamber sealing kit

The sealing kit for the piston chamber contains all seals for the parts installed inside (e.g. cylinder pistons), as well as the O-rings of the bottom connections.

Sealing kit*	ID	
	KRH3 / KSH3	KRP3 / KSP3
Size 100	1477671	1470645
Size 140	1477673	1470642
Size 160	1477675	1470647
Size 200	–	1508677
Size 250	1477677	1470648

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

#### 9.1.2 Monitoring sealing kit / connection / base jaws

The sealing kit for monitoring includes all seals and wearing parts for the pneumatic monitoring of the PM variants, as well as the O-rings of the bottom connections.

Sealing kit*	KRH3 / KRP3	ID	
		KSH3	KSP3
Size 100	–	1550143	1445185
Size 100-LH	–	1550144	1463231
Size 140	–	1548836	1445188
Size 160	1563791	1550145	1445189
Size 200	–	–	1657465
Size 250	1563794	1550146	1445193

\* For included items, see note Y in the Parts List chapter below. Seals are wearing parts and are recommended to be replaced during maintenance. The sealing kit can only be ordered as a complete kit. Compression springs (26) are included in the sealing kit.

## 9.2 Accessory packs

Accessory kit *	ID			
	KRH3	KRP3	KSH3	KSP3
Size 100	-	-	1446556	1428583
Size 140	-	-	1446557	1428599
Size 160	1516940	1502963	1446558	1428591
Size 200	-	-	-	1428597
Size 250	1516942	1506773	1446559	1428597

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

## 9.3 Parts lists

### 9.3.1 TANDEM Clamping Block

Item	Description	Quantity	Note
1	Body >Housing<	1	*
2	Base jaw	2	KSH3 / KSP3 *
	Base jaw	3	KRH3 / KRP3 *
3	Chuck piston	1	
4	Cylinder piston	1	
5	Cover	1	
6	Covering strip	2	KSH3 / KSP3
	Covering strip	3	KRH3 / KRP3
7	Monitoring piece	2	
8	Covering strip	1	
15	Centering insert	2	KSH3 / KSP3
	Centering insert	3	KRH3 / KRP3
16	Spring bolt	4	KSH3 / KSP3
	Spring bolt	6	KRH3 / KRP3
17	Sealing insert L	2	KSH3 / KSP3 / 100 / 160
	Sealing insert L	3	KRH3 / KRP3
18	Sealing insert R	2	KSH3 / KSP3 / 100 / 160
	Sealing insert R	3	KRH3 / KRP3
19	Wiper set	1	KSH3 / KSP3 / 140 / 250
21	Lubrication nipple	2	KRH3 / KRP3
	Lubrication nipple	4	KSH3 / KSP3
22	Sound absorber	2	KSH3 / KSP3
	Sound absorber	1	KRH3 / KRP3
23	Locking screw	2	
26	Compression spring	4	<b>Y</b>
28	Set of compression springs	8	KSH3 / KSP3 / A
	Set of compression springs	6	KRH3 / KRP3 / A
29	Spacer	4	KSH3 / KSP3
	Spacer	6	KRH3 / KRP3

Item	Description	Quantity	Note
31	Cover cap	4	KSH3 / KSP3 / Y
	Cover cap	6	KRH3 / KRP3 / Y
32	Locking screw	2	KSH3 / KSP3 / 200 / 250
	Locking screw	6	KRH3 / KRP3 / 250
33	Sealing plug	1	KRH3 / KSH3 / 250
34	Cylindrical pin	2	B / Z
39	Compression spring	2	KSH3 / KSP3
	Compression spring	3	KRH3 / KRP3
40	Sealing ring	1	X
41	Sealing ring	1	X
44	O-ring	3	Y
45	O-ring	1	X
46	O-ring	2	KSH3 / KSP3 / 200 / 250 / V / Y
	O-ring	6	KRH3 / KRP3 / 250 / V / Y
47	Sealing ring	1	KRH3 / KSH3 / X
48	Flat gasket	10	X
49	O-ring	6	KRH3 / KRP3
51	Steel ball	7	KRH3 / KRP3 / 160
	Steel ball	4	KRH3 / KRP3 / 250
58	Set-screw	10	KSH3 / KSP3
60	Set-screw	2	
	Set-screw	4	KRH3 / KSH3 / 250
61	Set-screw	4	
62	Set-screw	10	KSP3
	Set-screw	8	KRH3 / KRP3 / KSH3 / 100 / 140 / 160
	Set-screw	8	KRP3 250
	Set-screw	6	KRH3 / KRP3 / KSH3 / 250
63	Set-screw	4	
64	Countersunk screw	2	KSH3 / KSP3
	Countersunk screw	3	KRH3 / KRP3
65	Screw	9	100
	Screw	13	KRP3 / KSP3 / 140
	Screw	15	160 / KRH3 / KSH3 / 140
	Screw	16	KSP3 200
	Screw	18	KRP3 / KSP3 / 250
66	Screw	4	KSH3 / KSP3
	Screw	6	KRH3 / KRP3

Item	Description	Quantity	Note
67	Screw	4	KSH3 / KSP3
	Screw	6	KRH3 / KRP3
68	Panhead screw	4	KSH3 / KSP3
	Panhead screw	6	KRH3 / KRP3
69	Screw	1	
70	Set-screw	1	KRP3 / KSP3 / 160 / 250
	Sealing plug	3	KRH3 / KSH3 / 100
	Sealing plug	4	KRH3 / KSH3 / 140 / 160
73	Set-screw	3	KRH3 / KRP3
81	Plug	4	<b>Z</b>
82	Fitting screw	2	<b>Z</b>
83	O-ring	4	<b>X / Y / Z</b>
84	Screw	4	<b>Z</b>
85	Clamping sleeve	2	<b>Z</b>
86	Screw	8	KSH3 / KSP3 **
	Screw	12	KRH3 / KRP3 **
87	O-ring	10	<b>X / Y / Z</b>
93	Set-screw	2	KSP3 / <b>Z</b>
	Set-screw	1	KRH3 / KRP3 / KSH3 / <b>Z</b>
100	Eye bolt	2	KSH3 / KSP3 / 200 / 250
	Eye bolt	3	KRH3 / KRP3 / 250

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

\*\* Components are not required (included in universal accessory pack).

#### Parts list key

100	for size 100	A	for AS variant
140	for size 140	B	for Z variant
160	for size 160	V	wearing part
200	for size 200	<b>X</b>	included in the piston chamber sealing kit
250	for size 250	<b>Y</b>	included in the monitoring sealing kit
		<b>Z</b>	included in the accessory kit

### 9.3.2 Quick-change jaw WTR-A

Item	Description	Quantity
1	Changing jaw	1
2	Set-screw	2
3	Accessory kit (set-screws)	1

### 9.3.3 Gripper finger FIN WTR-A

Item	Description	Quantity
1	Top jaw	2
2	Mounting piece	2
3	Compression spring	2 / 4*
4	Pan-head screw	4
5	Screw	2 / 4*
6	Screw	2 / 0*
7	Support pin M5, soft	2**

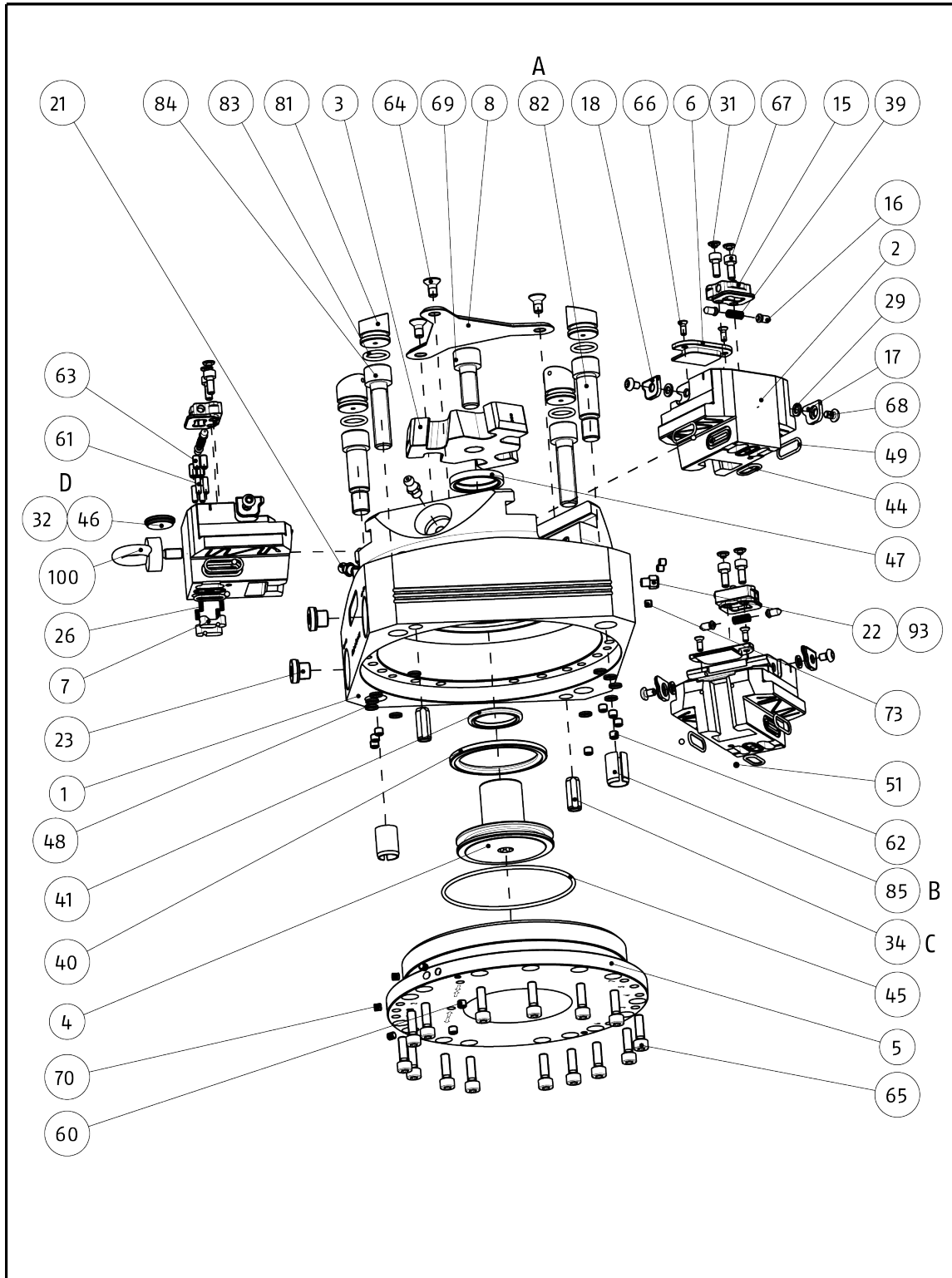
\* For size 100 / 200 / 250

\*\* Only necessary for size 100 when used with WTR-A 160/3.

Serves as a distance limiter for the opposing gripper fingers on 3-jaw TANDEM with WTR-A 160/3.

## 10 Assembly drawings

### 10.1 TANDEM KRH3



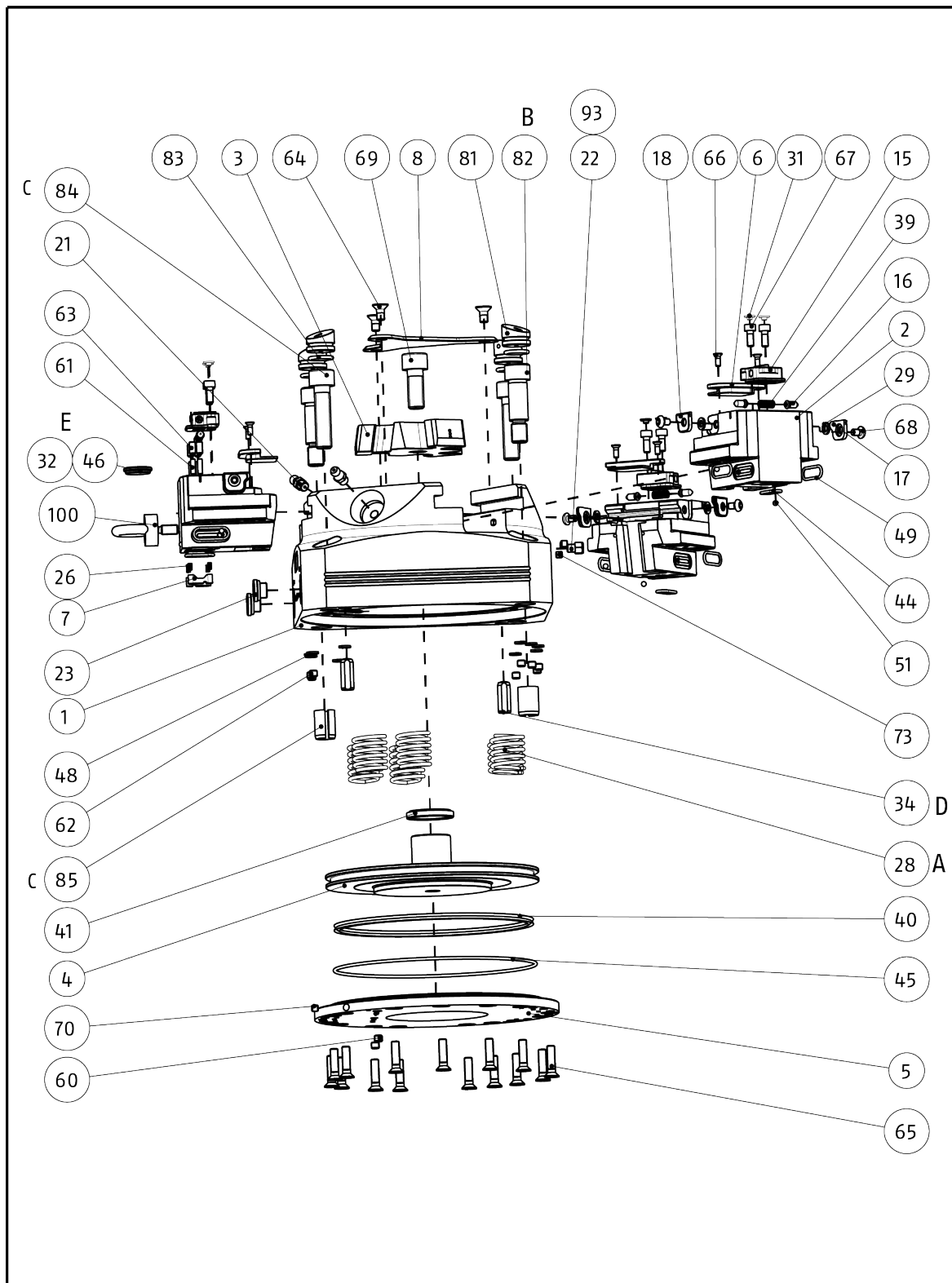
A Centering with fitting screws

B Centering with clamping sleeves

C Centering with cylindrical pins  
(Z variant)

D Locking screw with O-ring  
(size 250)

## 10.2 TANDEM KRP3



A for variant "-AS"

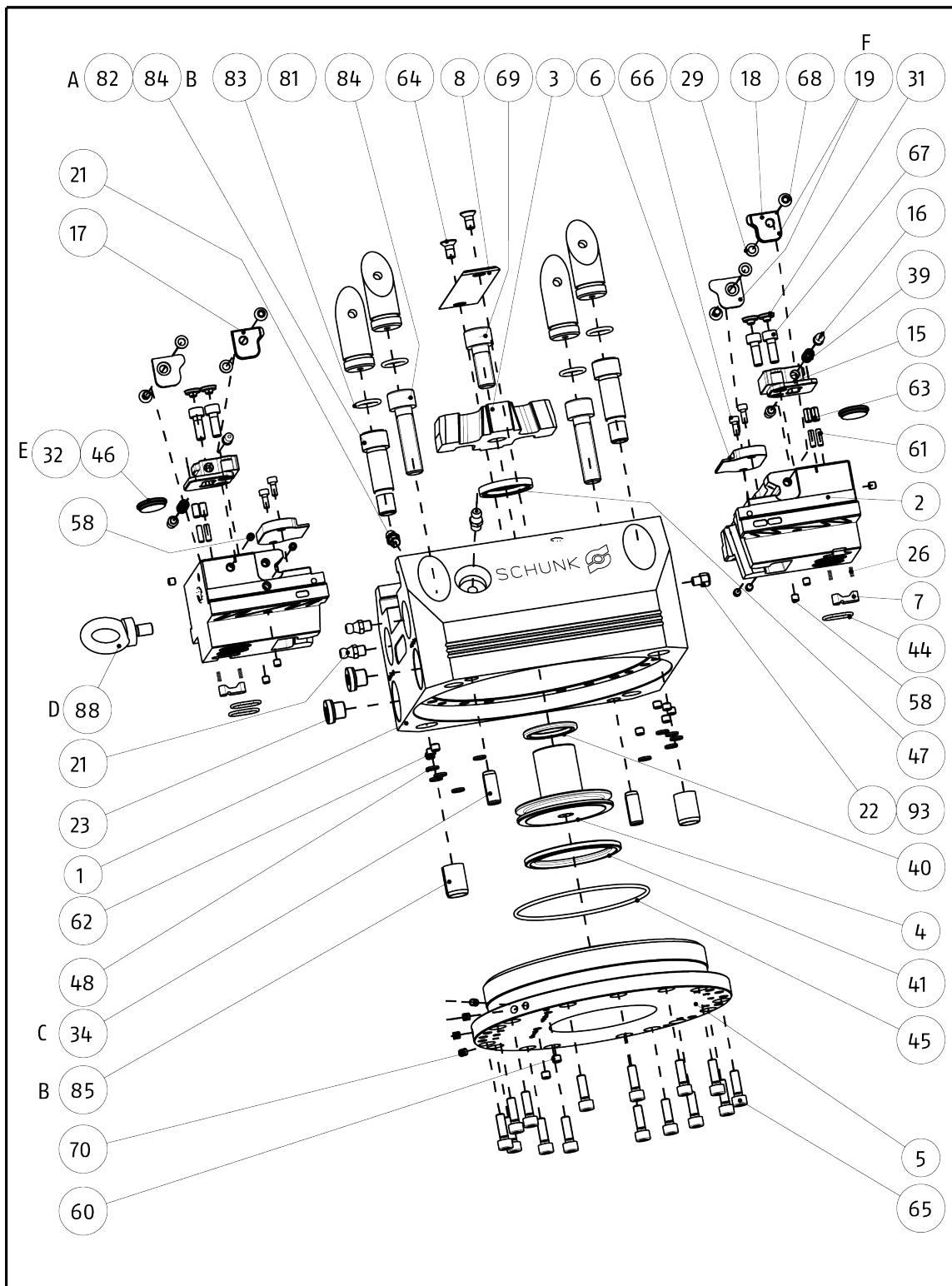
B Centering with fitting screws

C Centering with clamping sleeves

D Centering with cylindrical pins  
(Z variant)

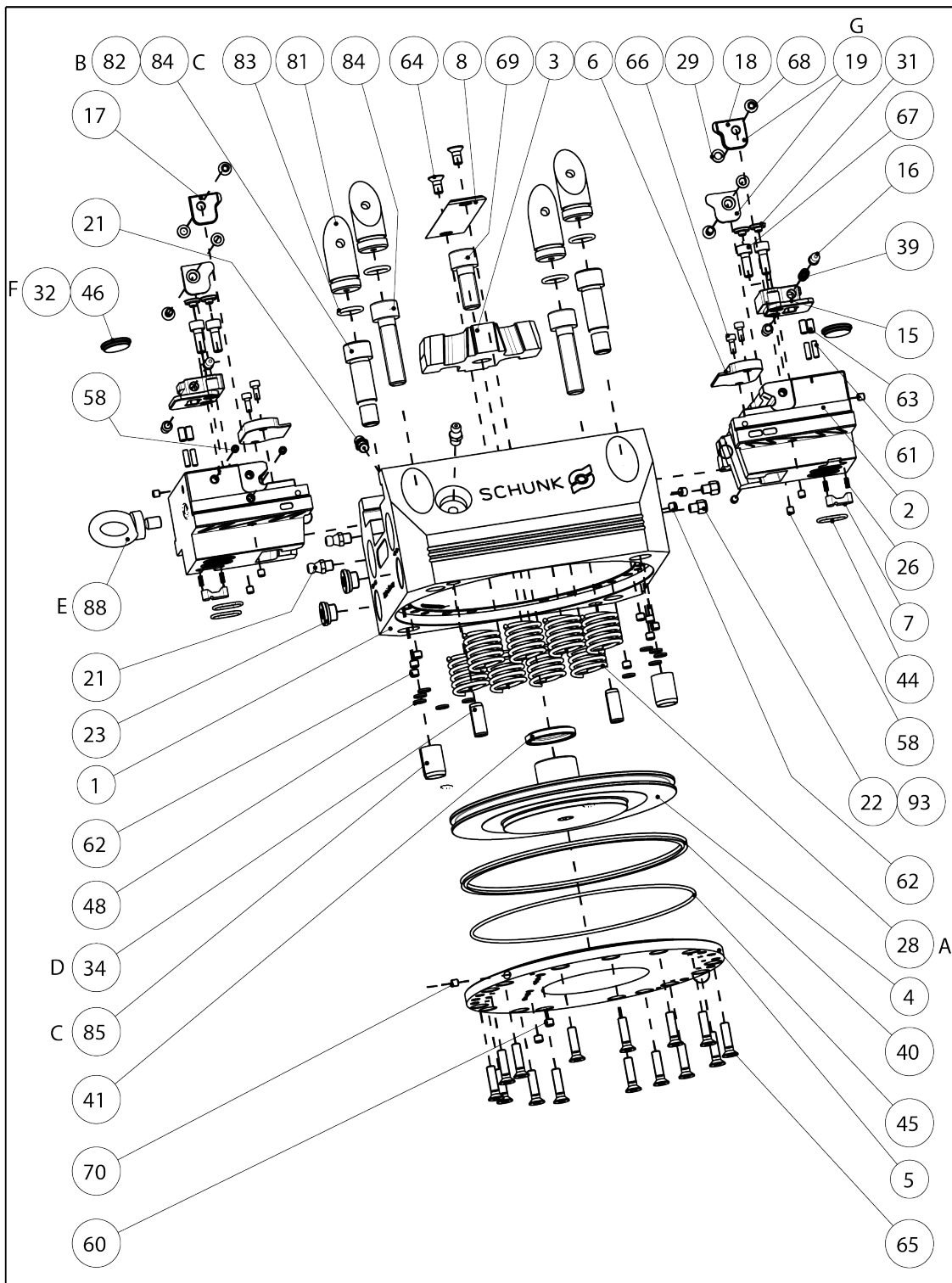
E Locking screw with O-ring  
(size 250)

### 10.3 TANDEM KSH3



- |   |   |   |                                       |
|---|---|---|---------------------------------------|
| A | Centering with fitting screws               | B | Centering with clamping sleeves       |
| C | Centering with cylindrical pins (Z variant) | D | for transport (size 250)              |
| E | Locking screw with O-ring (size 250)        | F | Wiper set = 2 x item 17 + 2 x item 18 |

### 10.4 TANDEM KSP3



A for variant "-AS"

B Centering with fitting screws

C Centering with clamping sleeves

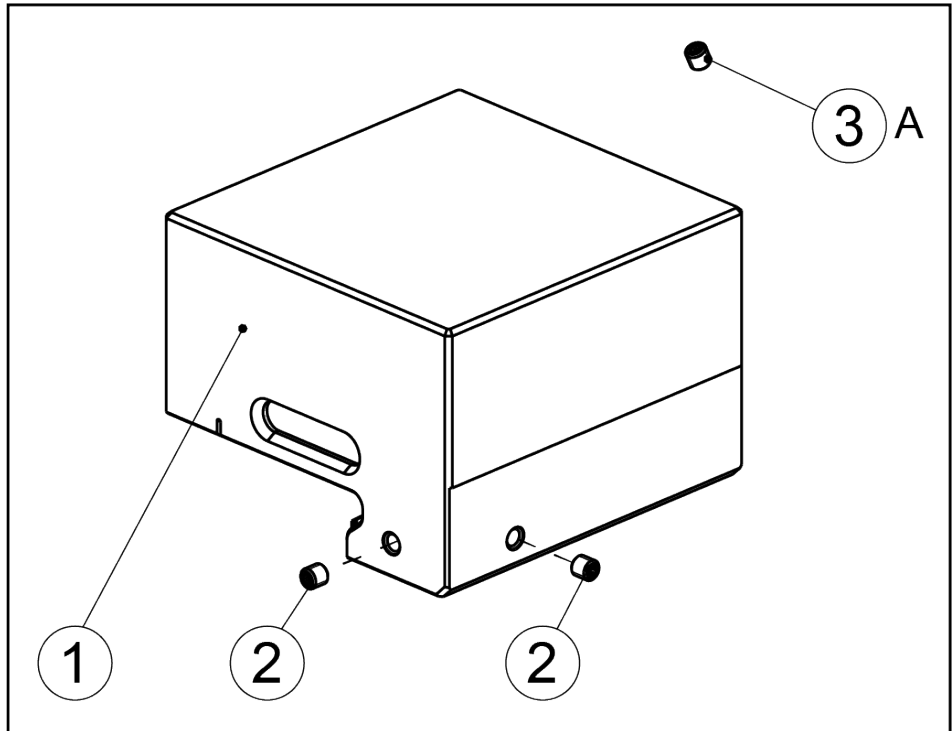
D Centering with cylindrical pins  
(Z variant)

E for transport (sizes 200 & 250)

F Locking screw with O-ring (sizes 200 & 250)

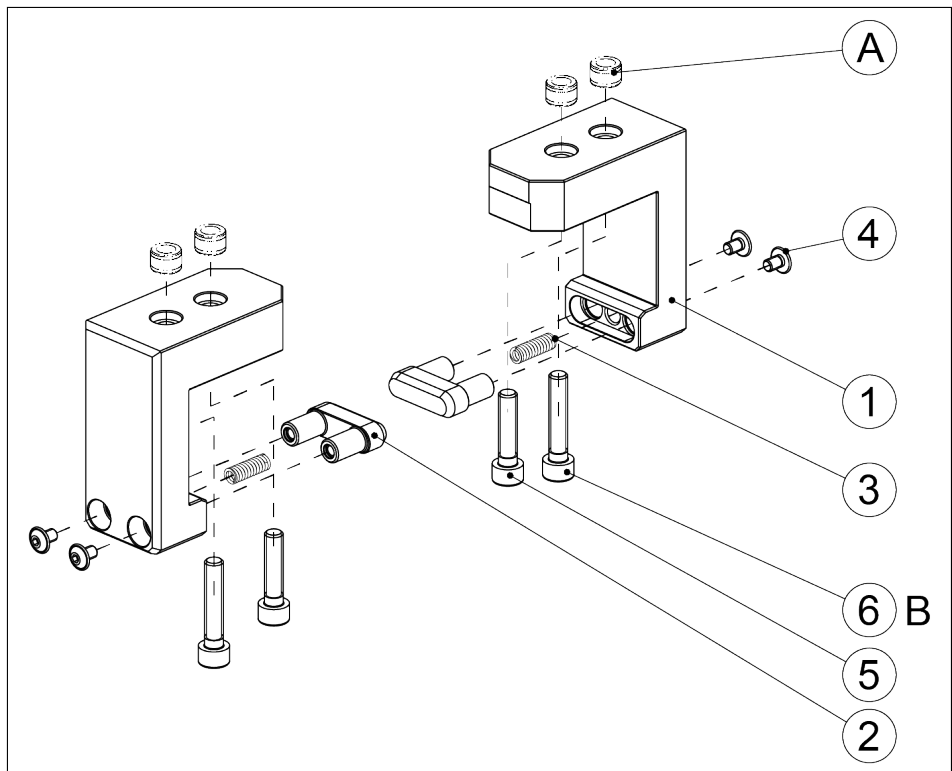
G Wiper set = 2 x item 17 + 2 x item 18

### 10.5 Quick-change jaw WTR-A



A contained in accessory kit

### 10.6 Gripper finger FIN WTR-A



A Sleeves included with SCHUNK universal gripper

B for sizes 140 & 160

## 11 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Quantities
Product:	Clamping force block
Designation:	TANDEM
Type designation:	KSH, KRH, HZS

**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

Quantities, 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

## 12 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Quantities
Product:	Clamping force block
Designation:	TANDEM
Type designation:	KSP, KRP, PZS, PZS-D, PGS

**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:

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### Harmonized Standards applied:

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### Other related technical Standards and specifications:

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

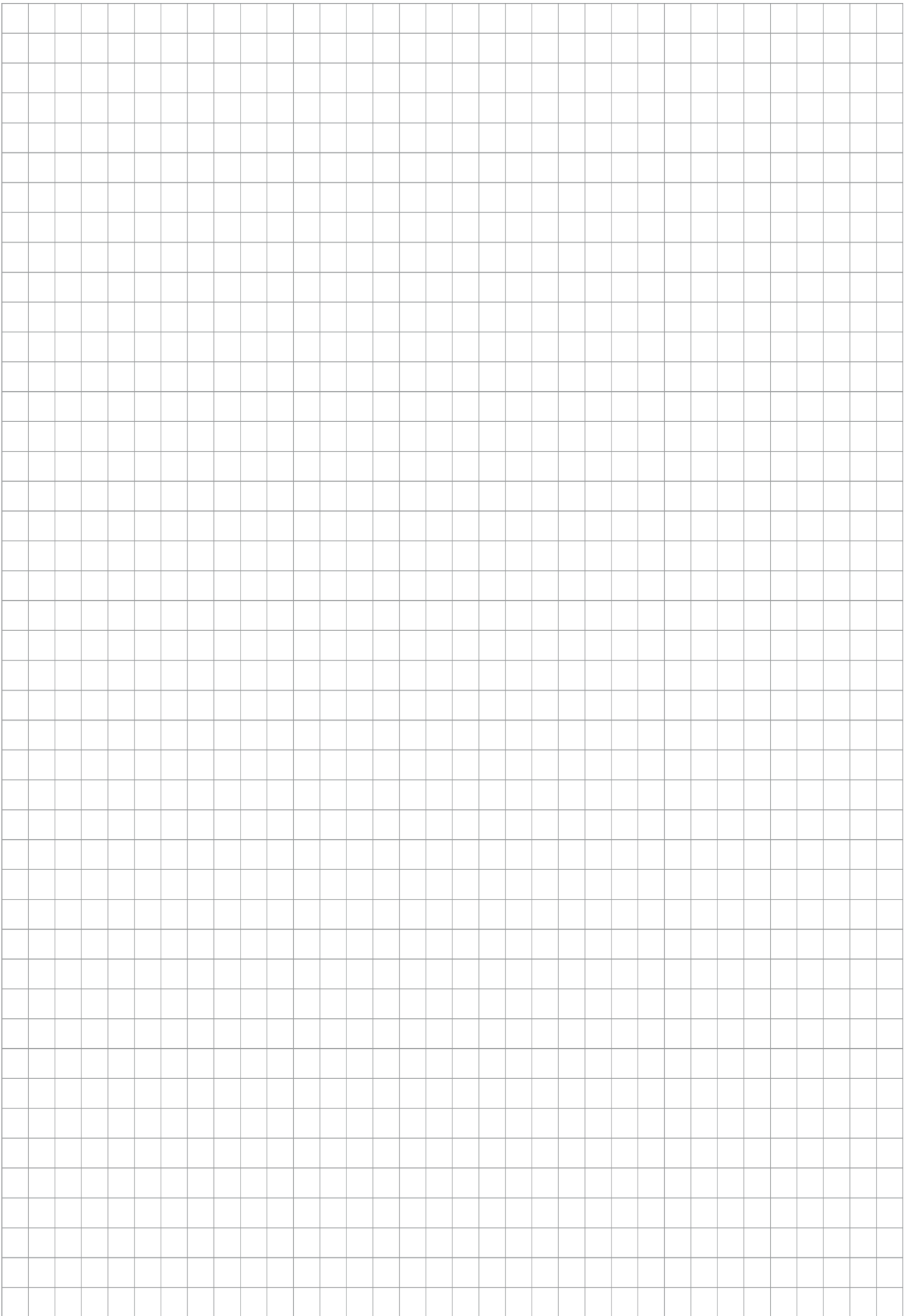
Quantities, 25th of April 2023

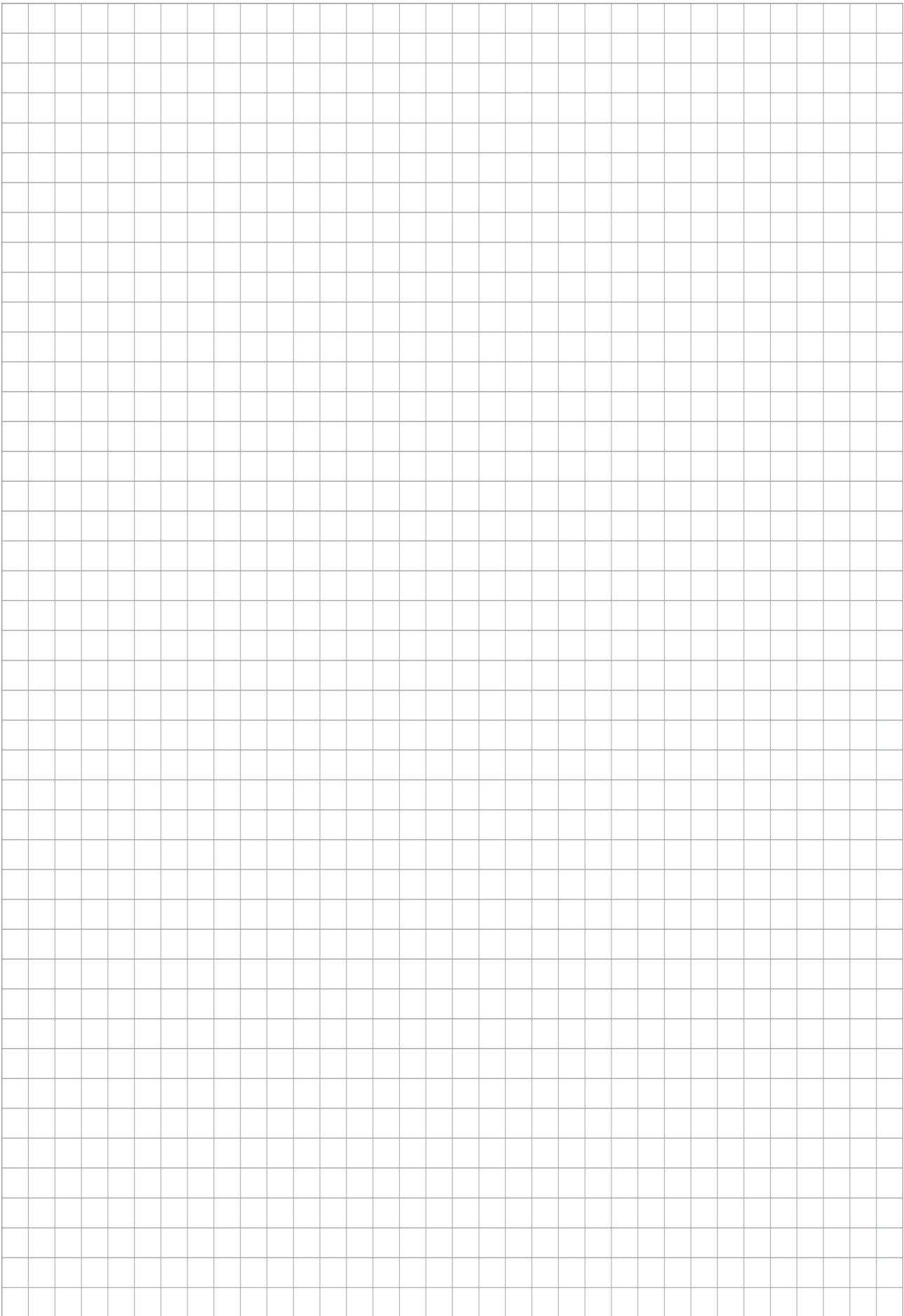
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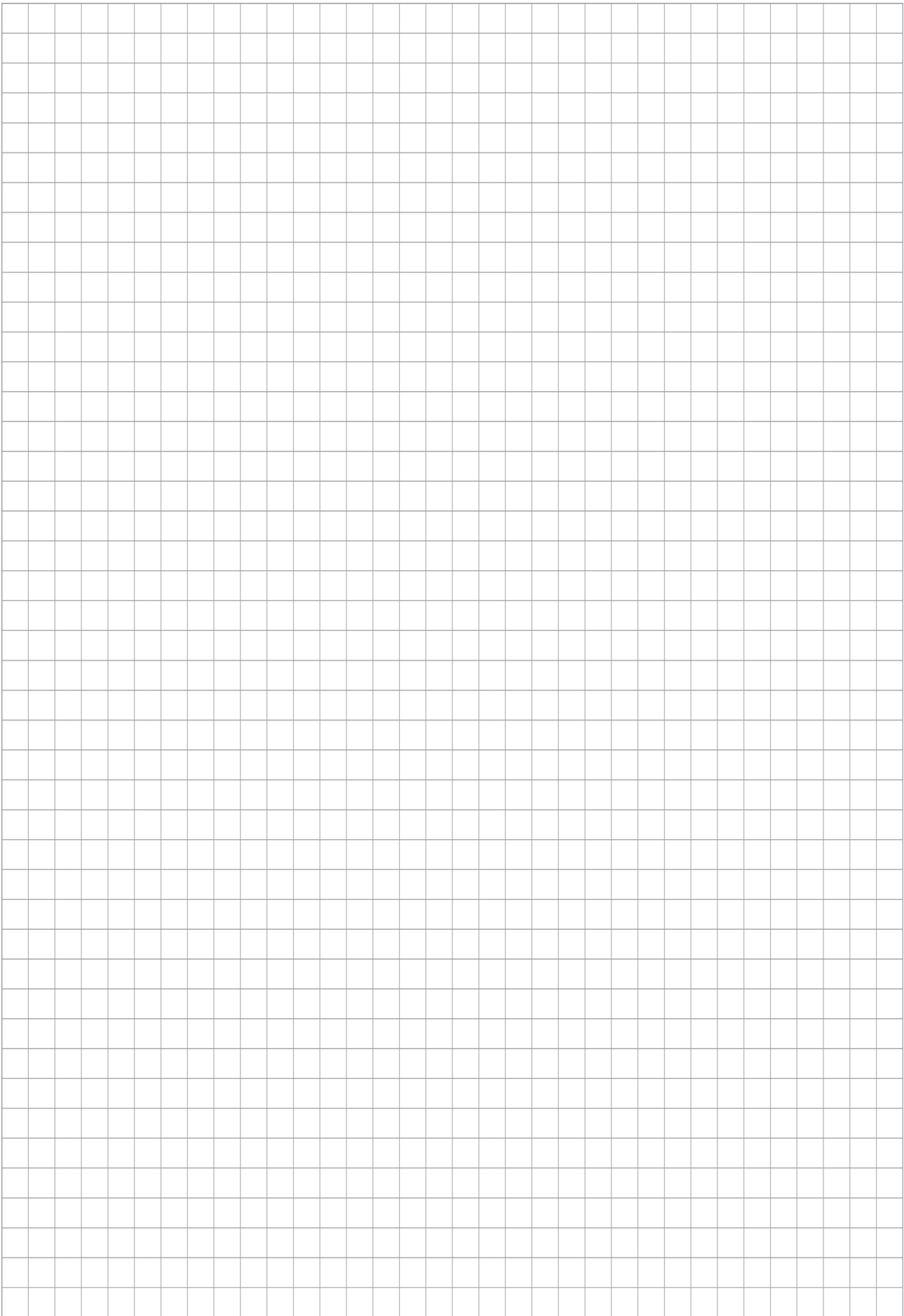
*Signature: see original declaration*

p.p. Philipp Schröder  
Head of Development standard products

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









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