

ORG85

O-RING GRIPPER



Dear Customer,

Congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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Document last updated: 17.12.2009



Reg. No. 3496-01



Reg.-No. DE-3496-01



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1 Safety

1.1 Symbol key



You will find this symbol wherever **hazards for persons or damage to the product** are possible.



This symbol indicates **important information** on the product or its handling.

1.2 Appropriate use

The gripper was designed for gripping and temporary secure holding of workpieces or other objects.

The unit is intended for installation / mounting for machinery and equipment. The requirements of the applicable directives must be observed and complied with.










The gripper may only ever be employed within the restrictions of its technical specifications. Using the system with disregard to even a minor specification will be deemed inappropriate use. The manufacturer assumes no liability for any injury or damage resulting from inappropriate use.

1.3 Environmental and operating conditions

- Use the unit only within the application parameters defined in the Technical Catalog. The most recent version applies (according to the General Terms and Conditions).
- Standard for quality of the compressed air according to ISO 8573-1: **6 4 4**
- Clean ambient conditions at room temperature are required. If these conditions are not ensured, the maintenance interval will be shorter, depending on the actual utilization.
- The environment must be free of splashing water and vapors, and also of abrasive dust and process dust. This does not apply to units designed especially for dirty environments.

1.4 Safety notes

1. There are potential risks associated with the unit, for example if:
 - the gripper is improperly used, installed or serviced.
 - the gripper is used other than for the intended purpose.
 - the EC Machine Directive, the accident prevention regulations, the VDE guidelines or the safety and installation instructions are not observed.
2. All personnel who are responsible for installation, commissioning and servicing must have read and understood the entire operating manual, in particular the chapter on »Safety«. It is recommended to have this confirmed in writing.
3. Installation and dismantling, mounting of the proximity switches, connections and commissioning may be carried out only by authorized personnel.

4. Work procedures that impair the correct functioning and operational safety of the product are prohibited.
5.  Do not move any parts by hand when the unit is connected to the power supply.
6. Do not touch the mechanics when they are uncovered and do not reach between the gripper fingers.
7.  The power supply cables must be removed for assembly, modification, maintenance and adjustment of the unit.
8.  Carry out all maintenance, modifications or attachments outside of the danger zone.
9.  During installation, connection, adjusting, commissioning and testing, measures must be taken to prevent the risk of inadvertent activation of the unit by the fitter or other persons.
10. Protective covers must be provided for the use of all handling modules in accordance with EC Machine Directive, Section 1.4.
11.  There is a danger due to falling or ejected objects. Preventive measures must be taken to prevent the falling or ejection of potentially dangerous objects (machined workpieces, tools, chips, debris, waste, etc.).
12.  Additional bore holes, threads or attachments not offered by SCHUNK as accessories may be mounted only after obtaining the approval of SCHUNK.
13.  Grippers which use spring force for clamping, or which have a gripping force maintenance system with springs, are spring loaded. Therefore special care is to be taken when dismantling this type of unit.
14.  After an emergency stop, grippers with a mechanical gripping force maintenance system can keep on moving independently in the direction determined by the mechanical gripping force maintenance system. The gripper limit positions can be secured using SCHUNK SDV-P valves in the event of an emergency stop.
15.  The top jaws, especially for grippers with mechanical gripper support, must be designed so that the gripper, when depressurized, reaches one of the end positions – open or closed – so that no residual energy can be released during changing of the top jaws.
16. In addition, the applicable safety regulations and accident prevention regulations must be observed.

2 Warranty

The warranty period is 24 months from the date of delivery when utilized as intended in single-shift operations and in compliance with the specified maintenance and lubrication intervals and the defined environmental and operating conditions (see chapter 1.3).

Parts that come into contact with the workpiece and wearing parts are not covered by the warranty. Wearing parts are designated accordingly in the replacement parts lists (see chapter 9). See also our General Terms and Conditions in this regard. .

The unit is considered defective when the basic gripping is inoperable.

3 Scope of delivery

The scope of delivery comprises:

- Pneumatic six-finger gripper in the version ordered (without sensors and top jaws)
- Centering elements

4 Technical data

The airborne sound emitted from the unit is $\leq 70\text{dB(A)}$.

Please consult our catalogue for further technical details.

The latest version is valid in each case (in accordance with Chapter 2.3 General Terms and Conditions).

5 Assembly and installation

5.1 Assembly

For connection dimensions, please refer to the corresponding drawings in the latest catalogue, or our CAD data service on the Internet (link at www.schunk.com).



The power supply must be switched off during assembly of the gripper. Please also observe the safety notes in Chapter 1.4, page 4.

Required evenness of the attachment face
 (referring to the total gripper's attachment face)
 < 0.02 mm at an angle of up to 100 mm
 < 0.05 mm at an angle as of 100 mm

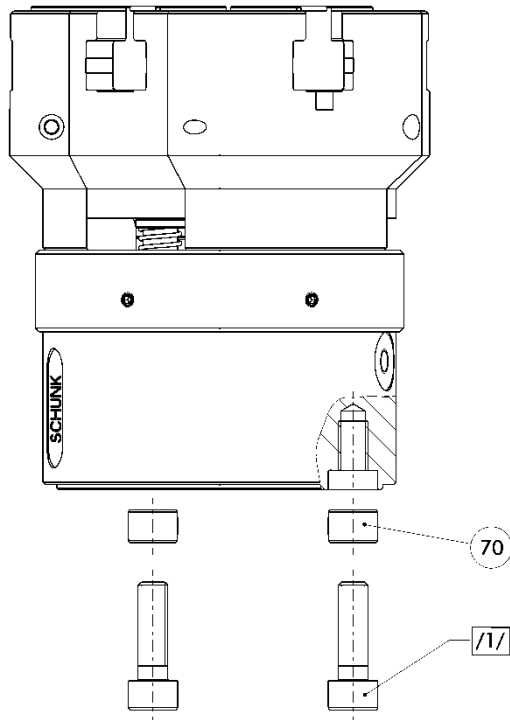


Figure 1: Mounting the gripper

The centering elements required to mount the gripper are included in the scope of delivery. Mount the gripper with the three fastening threads intended for this purpose at the base of the housing. The necessary mounting screws are not included in the scope of delivery.

No.	Description
/1/	Screw M6

Table 1: Mounting the gripper

5.2 Commissioning

5.2.1 Connection Dimensions

For connection dimensions, please refer to the corresponding drawings in the latest catalogue, or our CAD data service on the Internet (link at www.schunk.com).

5.2.2 Air / media connection



The power supply must be switched off during assembly of the gripper. Please also observe the safety notes in Chapter 1.4, page 4.

Notes

- Standard for quality of the compressed air according to ISO 8573-1: **6 4 4**.
- Operating pressure: min. 2 bar, max. 8 bar.



During internal assembly in the range from $d1=10$ mm to $d1=15$ mm, or when working with an assembly finger with a width of less than 2 mm, the operating pressure of triple jaw A must be reduced to max. 2.5 bar! If the operating pressure is not reduced, the assembly fingers could be damaged or destroyed.

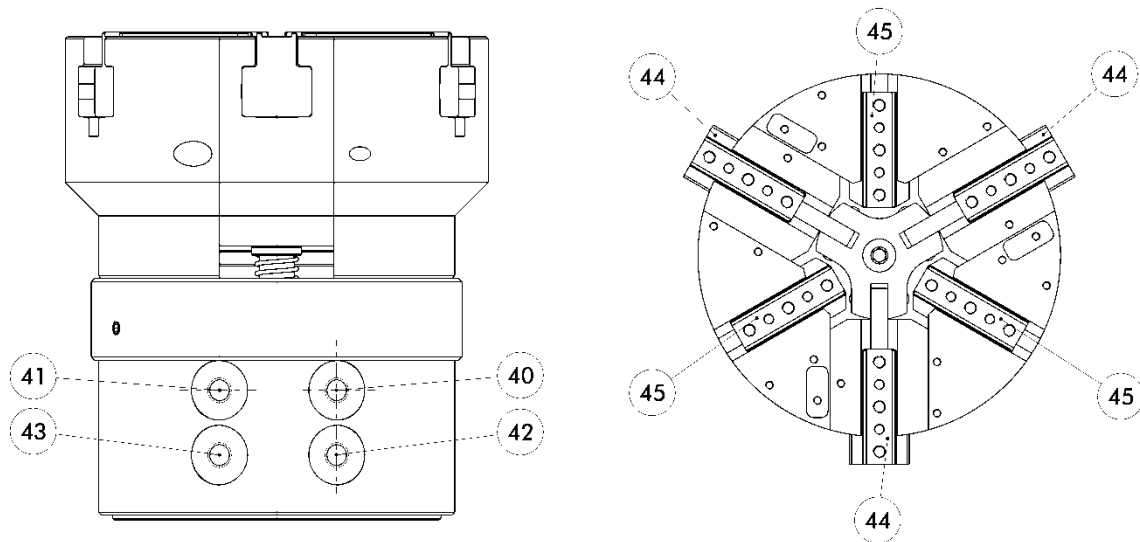


Figure 2: Definition of air connections and triple jaw



No.	Description	Thread size
40	Open air connection triple jaw A	M5
41	Close air connection triple jaw A	M5
42	Open air connection triple jaw B	M5
43	Air connection Z-stroke	M5
44	Triple jaw A ^{*1}	---
45	Triple jaw B ^{*2}	---

Table 2: Definition of air connections and triple jaw

*1 Triple jaw A means the three base jaws, which are axially pulled downwards by the Z-stroke.

*2 Triple jaw B means the three base jaws which do not change their height position.

5.2.3 Setting the end positions

-  The power supply must be switched off while setting the end positions. Please also observe the safety notes in Chapter 1.4, page 4.
-  The piston rod (Item 9) can be adjusted with max. 0.8 Nm!

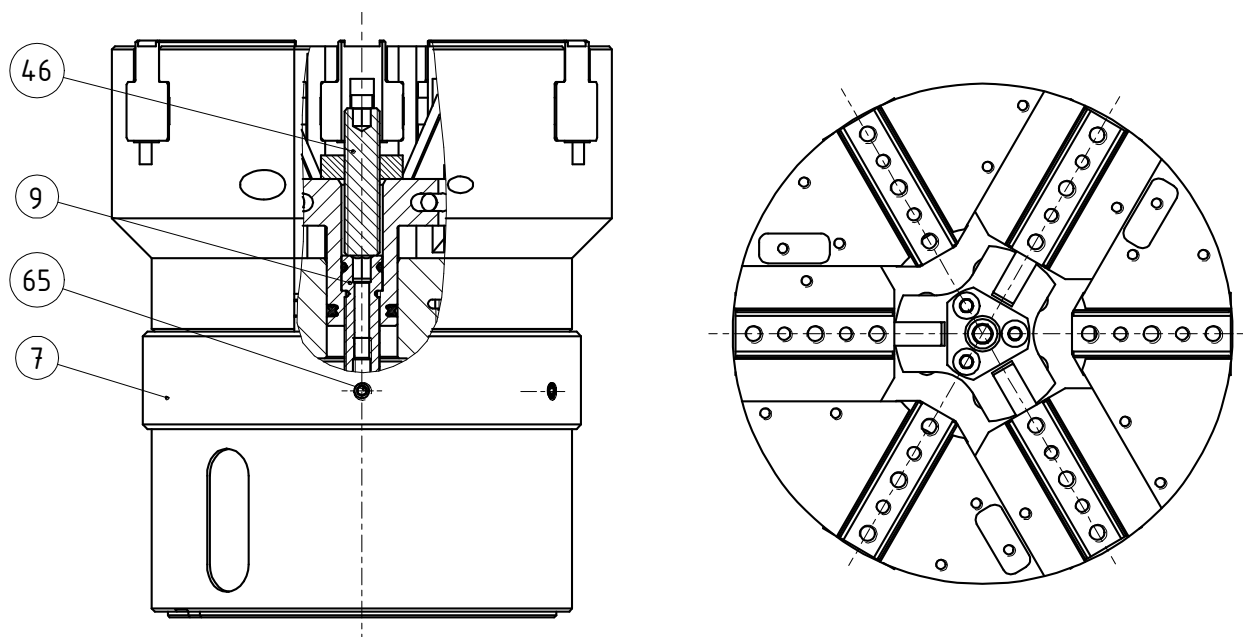



Figure 3: Setting the end positions

No.	Description	Notes
9	Piston rod - Adjustment triple jaw A stroke	SW 3
7	Stroke adjustment ring - Adjustment triple jaw B stroke	---
65	Set screws to counter the stroke adjustment ring	SW 1.5

Table 3: Setting the end positions

Adjustment triple jaw A stroke

The stroke limitation of triple jaw A is performed by adjusting the piston rod (item 9). The stroke of triple jaw A is increased by turning the piston rod (item 9) clockwise. The stroke of triple jaw A is reduced by turning the piston rod (item 9) counterclockwise.

 It is not necessary to secure the piston rod against rotation!

Adjustment triple jaw B stroke



Both counter set screws (item 65) must be loosened before adjusting the stroke of triple jaw B! They must be unscrewed from the stroke adjustment ring (item 7) until the ring (item 7) can be turned!

The stroke of triple jaw B can be adjusted after both counter set screws (item 65) have been loosened.

The stroke of triple jaw B is performed by adjusting the stroke adjustment ring (item 7). The stroke of triple jaw B is increased by turning the stroke adjustment ring (item 7) clockwise. The stroke of triple jaw B is reduced by turning the stroke adjustment ring (item 7) counterclockwise.



After the desired stroke has been set, the stroke adjustment ring (item 7) must be secured against unintentional turning using **one** of the two counter set screws (item 65) (depending on the angle of turning, it may not be possible to clamp both set screws against the base body triple jaw B (item 12)).



Carefully tighten the counter set screw using only your hand. If it is tightened too much, assembly group 1 may become jammed as a result (cf. page 52).



Proceed as follows if triple jaw B does not open up after turning the stroke adjustment ring (item 7):

- Disconnect gripper from the energy supply
- Loosen the counter set screws (item 65)
- Slightly turn the stroke adjustment ring (item 7) in the direction opposite to the one last rotated
- Retighten the counter set screws (item 65)

5.2.4 Checking the opening and closing times

If you cannot reach the opening and closing times mentioned in the latest catalog, please check the following:

- Flow control valves are opened to the maximum extent possible?
(Movement still has to be shock-free!)
- Inner diameter of air hoses is sufficient for the gripper's air consumption?
- Air hose between valve and gripper is as short as possible?
- Flow rate of valve is sufficient for the gripper's air consumption?

If you still cannot achieve the cycle times mentioned in the latest catalog, we recommend the use of quick-air-vent-valves directly at the gripper.

5.3 Seals to be assembled

5.3.1 External assembly: Range of inside seal diameter: between $d_1=5$ mm and $d_1=60$ mm

Depending on the seals to be assembled, the necessary top jaws (assembly finger- and segment jaws with clamping jaws) must be selected and ordered, if necessary.

(Material specifications for seal, see Table 4)

d_2 [mm]	NBR 70 Shore A		VITON FPM 70		Quantity [unit]	Part No. for a unit
	$d_{1min.}$ [mm]	$d_{1max.}$ [mm]	$d_{1min.}$ [mm]	$d_{1max.}$ [mm]		
$0.5 < d_2 < 1.0$	5	45	5	45	6	304 113
$1.0 < d_2 < 2.0$	5	55	5	45	6	304 114
$2.0 < d_2 < 3.0$	10	60	14	60	6	304 115
$3.0 < d_2 < 4.0$	15	60	24	60	6	304 116

Table 4: Assembly finger selection external assembly, Ø Range: $d_1=5$ mm to $d_1=60$ mm

The values given in Table 4 are guide values and refer to seals which are assembled at a distance P (see catalogue) from the housing! Further seals available on request!

5.3.2 External assembly: Range of inside seal diameter: between $d_1 > d_{1max.}$ and $d_1 = ca. 150$ mm

Mountable seals as well as segment jaws with clamping jaws upon request!

5.3.3 Internal assembly: Range of inside seal diameter: $d_1=10$ mm bis $d_1 = ca. 120$ mm

Mountable seals as well as segment jaws with clamping jaws and assembly fingers internal assembly upon request!

5.4 Transfer point seal



To allow the reliable reception of the seal, a transfer point must be defined. The following is a description as to how this transfer point can be engineered.

The transfer point of the seal is to be designed as follows:

1. The seal must be prepositioned on a plane parallel to the direction of movement of the triple jaws.
2. The centre axis of the seal is to be concentric with the centre axis of the O-ring gripper.
3. Furthermore, the seal, as far as possible by means of separation, should be provided in a round shape especially for large seal diameters to be assembled and for internal assembly.
4. The assembly fingers and segment jaws must have sufficient space at the transfer point to pick up the seal.

5.5 Preparatory measures external assembly, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm



If you are using the mounting kit list for proximity switches to monitor the gripper, please first continue with Chapter 10

Preconditions for external seal assembly, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm:

- Six assembly fingers for external assembly (Figure 4) are required.
- The seal must be available in accordance with Chapter 5.4, page 11.

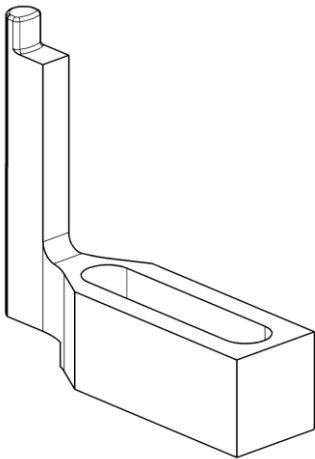


Figure 4: Assembly finger external assembly MFA, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

6 assembly fingers for external assembly MFA are required.



Triple jaws A and B must be closed before adjusting the assembly fingers. Compressed air connection 41 pressurised, compressed air connection 42 **not** pressurised (cf. Figure 5). The Z-stroke must be in the upper end position, i.e. compressed air connection 43 must **not** be pressurised.

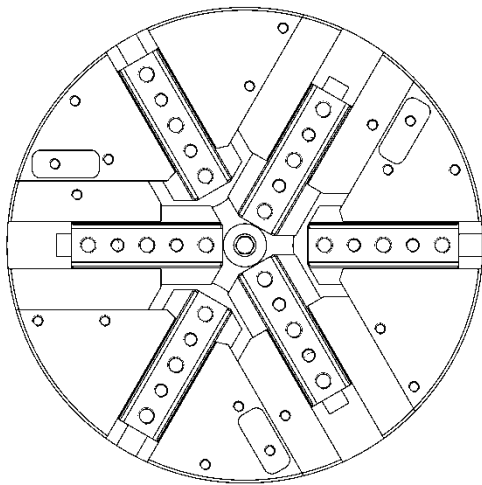


Figure 5: Gripper closed

The six assembly fingers for the external assembly are first mounted with one/two M3 screw(s) /2/ each on the base jaws (item 16). The position of the assembly fingers on the base jaws depends on the seal to be assembled.

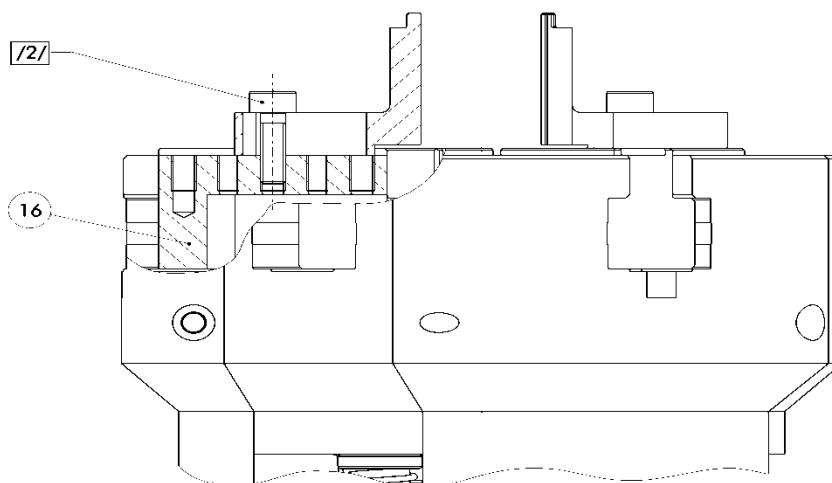


Figure 6: Fastening assembly fingers for external assembly, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

No.	Description
/2/	Screw M3

Table 5: Fastening assembly fingers for external assembly

Further assembly procedure (for a detailed description, see Chapter 6, page 21):

External assembly AM_1.1:	Adjust assembly fingers
External assembly AM_1.2:	Widen seal into the shape of a hexagon
External assembly AM_1.3:	Position gripper with widened seal at the position / level of the seal groove of the shaft
External assembly AM_1.4:	Pull back Z-stroke triple jaws A
External assembly AM_1.5:	Move the gripper towards the back axially

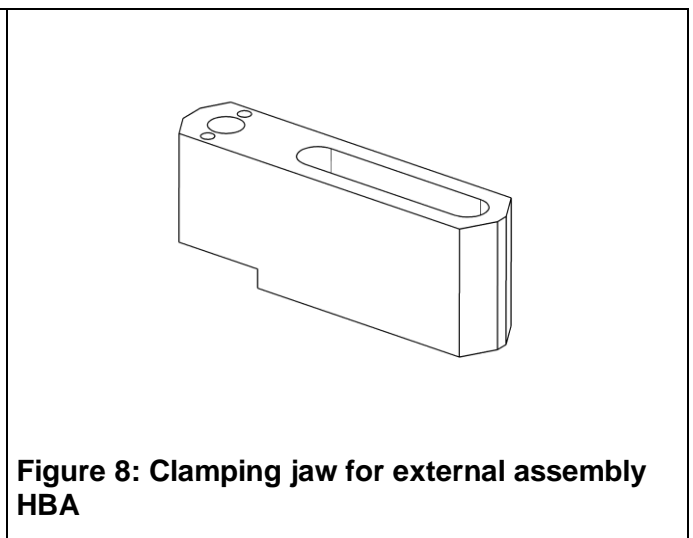
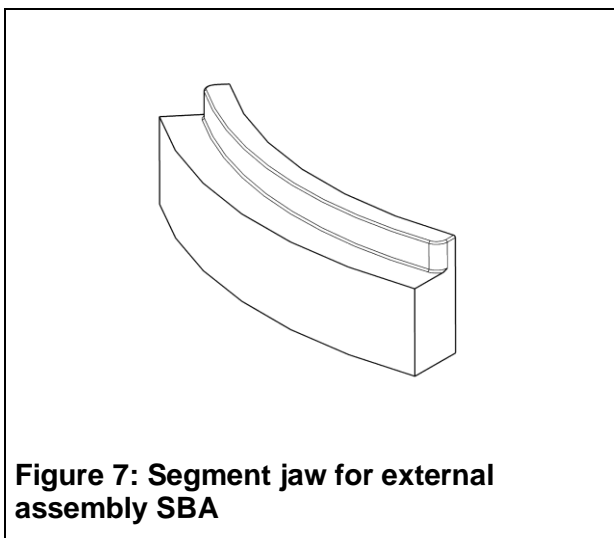
5.6 Preparatory measures external assembly , Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm



If you are using the mounting kit list for proximity switches to monitor the gripper, please first continue with Chapter 10.

Preconditions for external assembly, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm:

- 6 segment jaws for external assembly (Figure 7) and six clamping jaws for external assembly (Figure 8) are required.
- The seal must be available in accordance with Chapter 5.4, page 11.



6 pieces each are required of the segment jaw for external assembly SBA and of the clamping jaw for external assembly HBA are required.

The six segment jaws for external assembly and the six clamping jaws for external assembly must first be assembled. For this purpose, the segment jaw must be bolted to the clamping jaw for external assembly and then connected with a screw which can be taken out (see Figure 9).



Figure 9 is only a schematic diagram. It may slightly deviate from the actual arrangement! This is due to seal specific design versions.

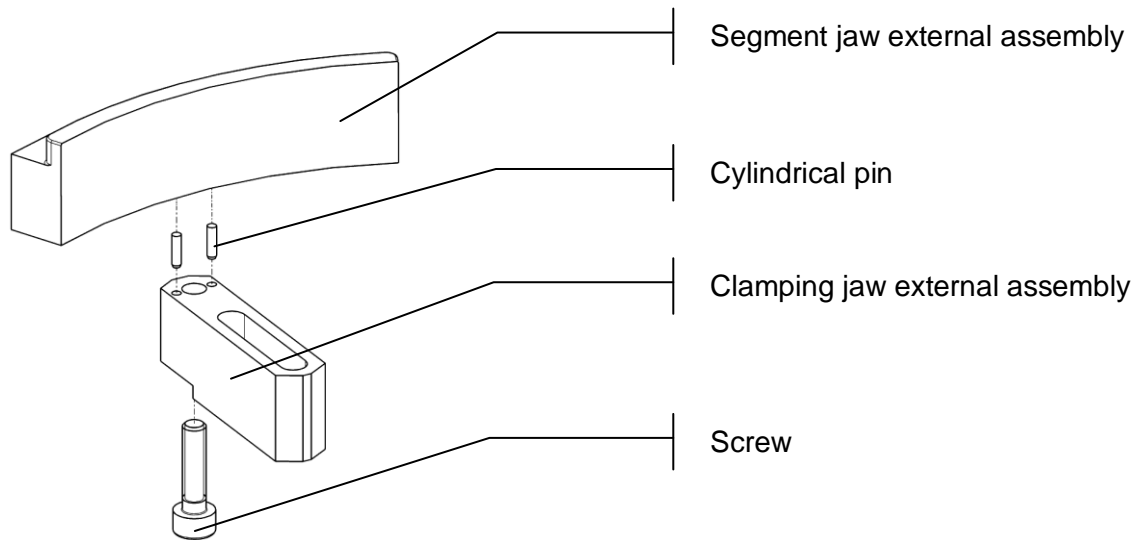


Figure 9: Assembly segment jaw with clamping jaw for external assembly

6 pieces of the assembly segment jaw for external assembly SBA with clamping jaw for external assembly HBA are required.



Triple jaw A and triple jaw B must be closed before the top jaws (consisting of: segment jaws with clamping jaws for external assembly) are adjusted. Compressed air connection 41 pressurised, compressed air connection 42 **not** pressurised (cf. Figure 5, page 12). Depressurise compressed air connection for Z-stroke 43.

The six top jaws for the external assembly are now mounted on the base jaws (item 16) of triple jaws A and B using one/two M3 screw(s) /2/ each. The position of the top jaws on the base jaws depends on the seal to be assembled.

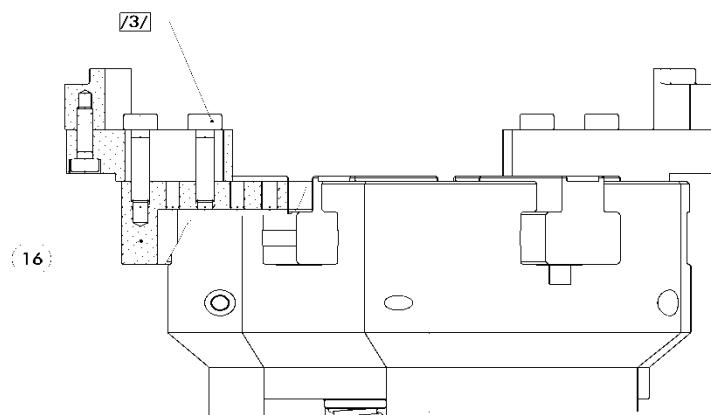


Figure 10: Mounting segment jaws with clamping jaws for external assembly, Dichtungs-Innen-Ø Bereich $d_1 > 60$ mm bis ca. $d_1 = 150$ mm

No.	Description
-----	-------------

No.	Description
/3/	Screw M3

Table 6: Mounting segment jaws with clamping jaws for external assembly , Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

Further assembly procedure (for a detailed description, see Chapter 6, page 21):

External assembly AM_2.1: Adjust the top jaws (segment jaws with clamping jaws for external assembly)

External assembly AM_2.2: Widen seal

External assembly AM_2.3: Position gripper with widened seal at the position / level of the seal groove of the shaft

External assembly AM_2.4: Pull back Z-stroke triple jaws A

External assembly AM_2.5: Move the gripper towards the back axially

5.7 Preparatory measures interior assembly , Range of inside seal diameter between $d_1 = 10$ mm and $d_1 = 120$ mm



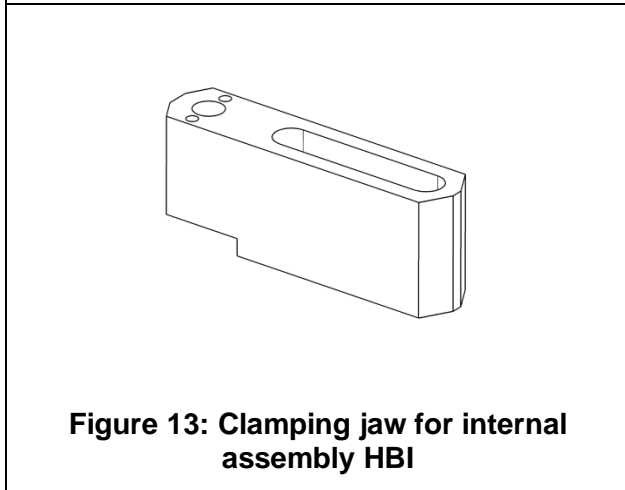
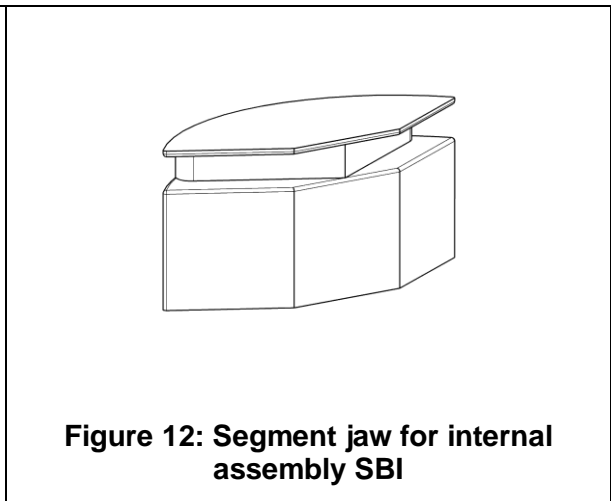
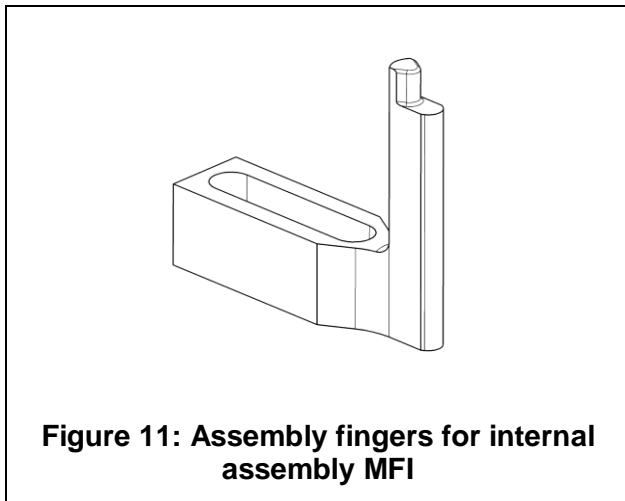
If you are using the mounting kit list for proximity switches to monitor the gripper, please first continue with Chapter 10.

Requirements for internal assembly, range of inside seal diameter between $d_1 = 10$ mm and $d_1 = 120$ mm:

- Three assembly fingers for internal assembly (Figure 11), three segment jaws for internal assembly (Figure 12) and three clamping jaws for internal assembly (Figure 13) are required.
- The seal must be available in accordance with Chapter 5.4, page 11.



During internal assembly in the range from $d_1 = 10$ mm to $d_1 = 15$ mm, or when working with an assembly finger with a width of less than 2 mm, the operating pressure of triple jaw A must be reduced to max. 2.5 bar! If the operating pressure is not reduced, the assembly fingers could be damaged or destroyed.



3 pieces each are required of the assembly finger for internal assembly MFI, the segment jaw for internal assembly SBI and of the clamping jaw for internal assembly HBI.

The three segment jaws for internal assembly and the three clamping jaws for internal assembly must first be assembled. For this purpose, the segment jaw for internal assembly must be bolted to the clamping jaw for internal assembly and then connected with a screw which can be taken out (Figure 14, page 18).



Figure 14 is only a schematic diagram. It may slightly deviate from the actual arrangement due to seal specific design versions!

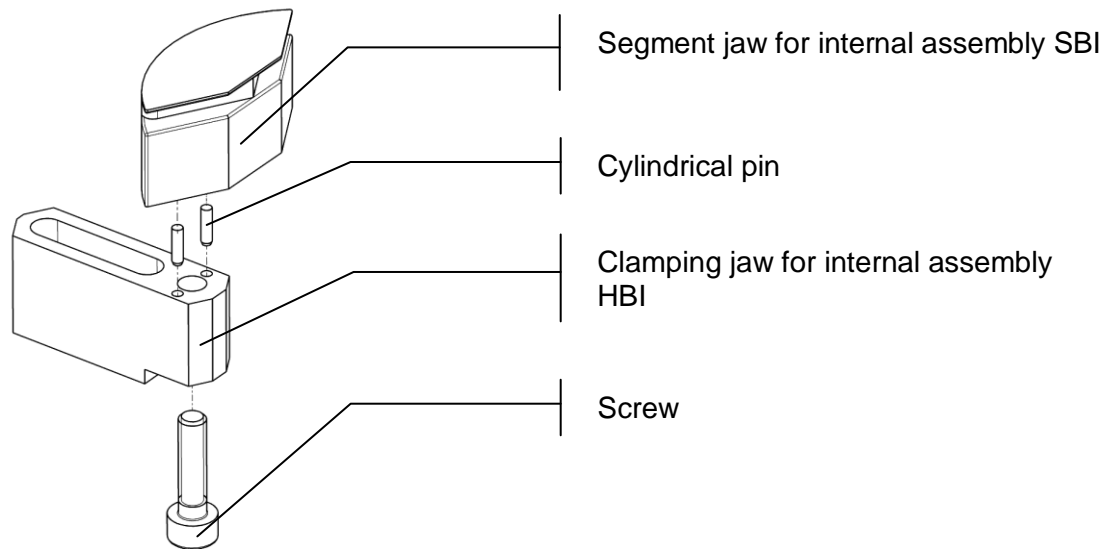


Figure 14: Assembly segment jaw with clamping jaw for internal assembly

3 pieces of the assembly segment jaw for internal assembly SBI with clamping jaw for internal assembly HBI are required.



Triple jaw A must be open (compressed air connection 40 pressurised) and triple jaw B must be closed (compressed air connection 42 **not** pressurised) before adjusting the top jaws (assembly fingers, segment jaws with clamping jaws for internal assembly). Cf. Figure 15.

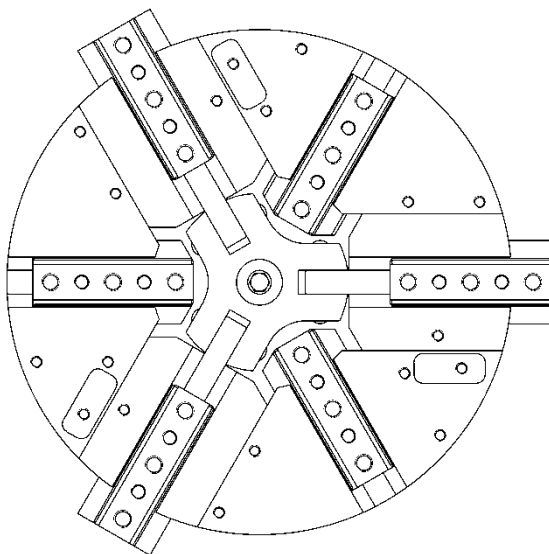


Figure 15: Triple jaw A "OPEN" triple jaw B "CLOSED"



The three assembly fingers must be mounted on the base jaws (item 16) triple jaw A and the three segment jaws with clamping jaws must be mounted on the base jaws (item 16) triple jaw B! (cf. Figure 2, page 8)

For this purpose, the three assembly fingers are mounted on the base jaws (item 16) of triple jaw A and the segment jaws with clamping jaws with one/two M3 screw(s) /4/ each are mounted on the base jaws (item 16) of triple jaw B. The position of the three assembly fingers and the three segment jaws with clamping jaws on the base jaw depends on the seal to be assembled.

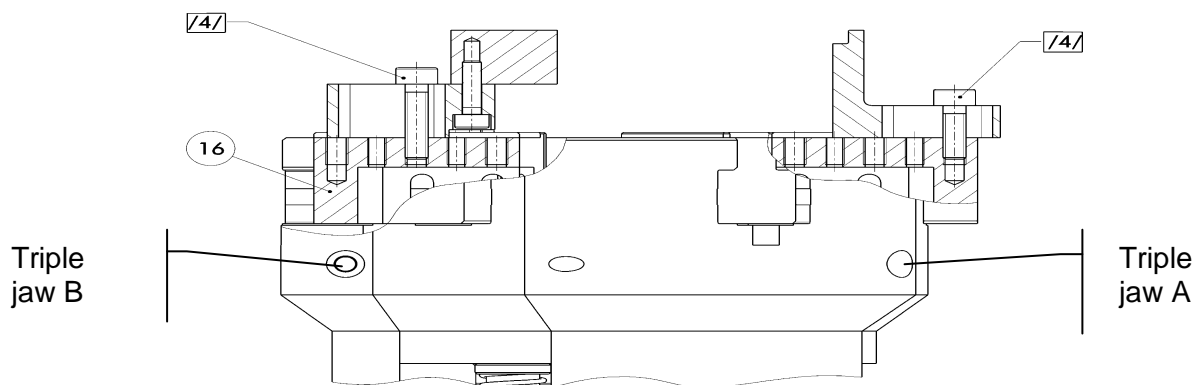


Figure 16: Mounting assembly fingers and segment jaws with clamping jaws for internal assembly

No.	Description
/4/	Screw M3

Table 7: Mounting assembly fingers and segment jaws with clamping jaws for internal assembly

Weiterer Montageablauf (for a detailed description, see Chapter6, page 21):

- Innenmontage IM_1.1:** Adjust the assembly fingers and segment jaws with clamping jaws
- Innenmontage IM_1.2:** Close triple jaw A. Assembly fingers mould the seal locally between the segment jaws.
- Innenmontage IM_1.3:** Position gripper with redirected seal at the position / level of the seal groove of the shaft
- Innenmontage IM_1.4:** Open triple jaw B
- Innenmontage IM_1.5:** Pull back Z-stroke triple jaws A
- Innenmontage IM_1.6:** Bring Z-stroke jaw triple A back forward into the end position
- Innenmontage IM_1.7:** Open triple jaw A
- Innenmontage IM_1.8:** Close assembly finger and segment jaws with clamping jaws and move the gripper out of the assembly bore

5.8 Adjusting the assembly fingers and the three segment jaws with clamping jaws

The three assembly fingers and the three segment jaws with clamping jaws are to be mounted on the base jaws as follows:

1. When triple jaw A is open, the assembly fingers must be outside of the seal with a defined clearance (dimension o) to the seal (cf. Figure 17 und Figure 35).
2. When triple jaw B is closed, the segment jaws must each be set at a defined distance (dimension t) to each other (cf. Figure 17 und Figure 35).
At the same time, the enclosing circle of the three segment jaws (dimension $\varnothing p$) must be smaller than the inner diameter d_2 of the seal (cf. Figure 35).
3. When triple jaw A is closed, the assembly fingers must be moved inwards sufficiently so that the seal is resting properly around the segment jaws and is slightly stretched in the area around the assembly fingers (cf. Figure 39).



The three segment jaws must be set at a defined distance (dimension t) to each other. Dimension t must be slightly larger than the tip of the assembly finger (dimension r) plus two times the safety distance (dimension s)! A reliable assembly process is ensured if the safety distance (dimension s) is set as small as possible. (Value range s : $0.1 \text{ mm} < s < 0.3 \text{ mm}$).

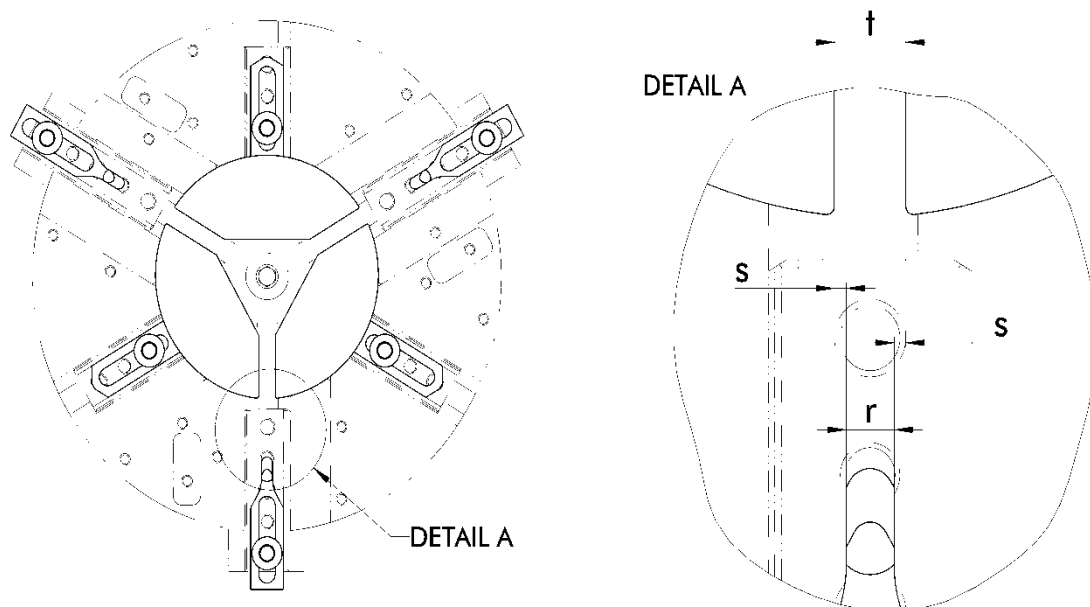


Figure 17: Settings of the assembly fingers and segment jaws

6 Function and handling

6.1 Pneumatic circuit diagram

The O-ring gripper is driven by three drive units:

1. Triple jaw A (double-action)
2. Triple jaw B (single-action)
3. Z-stroke (single-action)

The use of four 3/2-way valves is recommended to operate the gripper.

Figure 18 shows the pneumatic circuit diagram with 3/2-way valves:



Alternatively to four 3/2-way valves, one 5/3-way valve with vented centre position can be used for triple jaw A and one 3/2-way valve each for triple jaw B and the Z-stroke. THAT IS: 4 x 3/2 or 1 x 5/3 + 2 x 3/2

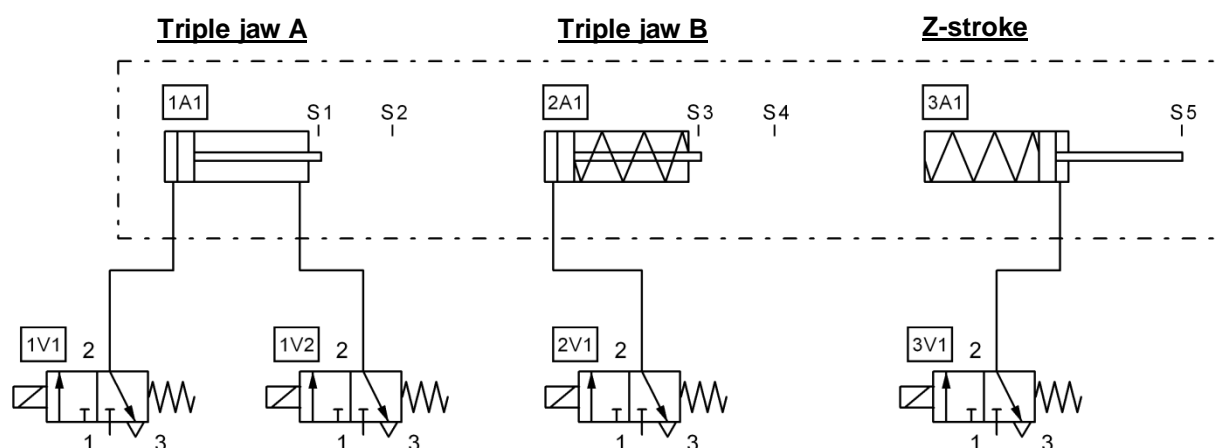


Figure 18: Pneumatic circuit diagram for ORG

The proximity switches S1 and S2 are dampened by the drive unit triple jaw A, whereby proximity switch S1 only scans the "CLOSED" position and proximity switch S2 only scans the "OPEN" position.

The proximity switches S3 and S4 are dampened by drive unit triple jaw B, whereby proximity switch S3 only monitors the "CLOSED" position and proximity switch S4 only scans the "OPEN" position.

Proximity switch S5 is dampened by the drive unit Z-stroke, whereby proximity switch S5 is only dampened when the Z-stroke is up / forward.



Figure 19 shows the positions and designations of the proximity switches on the gripper!

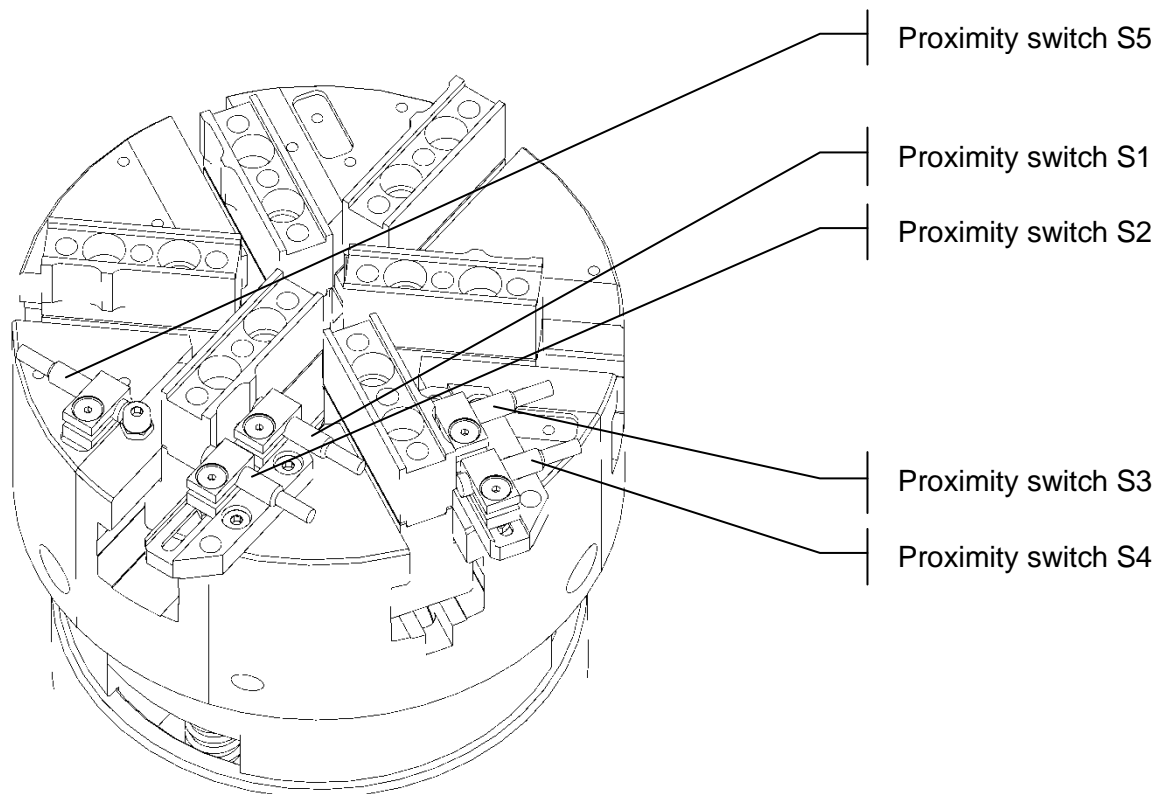


Figure 19: Overview of proximity switches on the gripper

6.2 Function diagram external assembly

Figure 20 shows the conditions and condition changes of the O-ring gripper for external assembly as a chart.

The function diagram uses four 3/2-way valves in the same way as in the pneumatics circuit diagram on page 21.

Please note the additional information and comments on the function diagram and the assembly procedure below the function diagram!

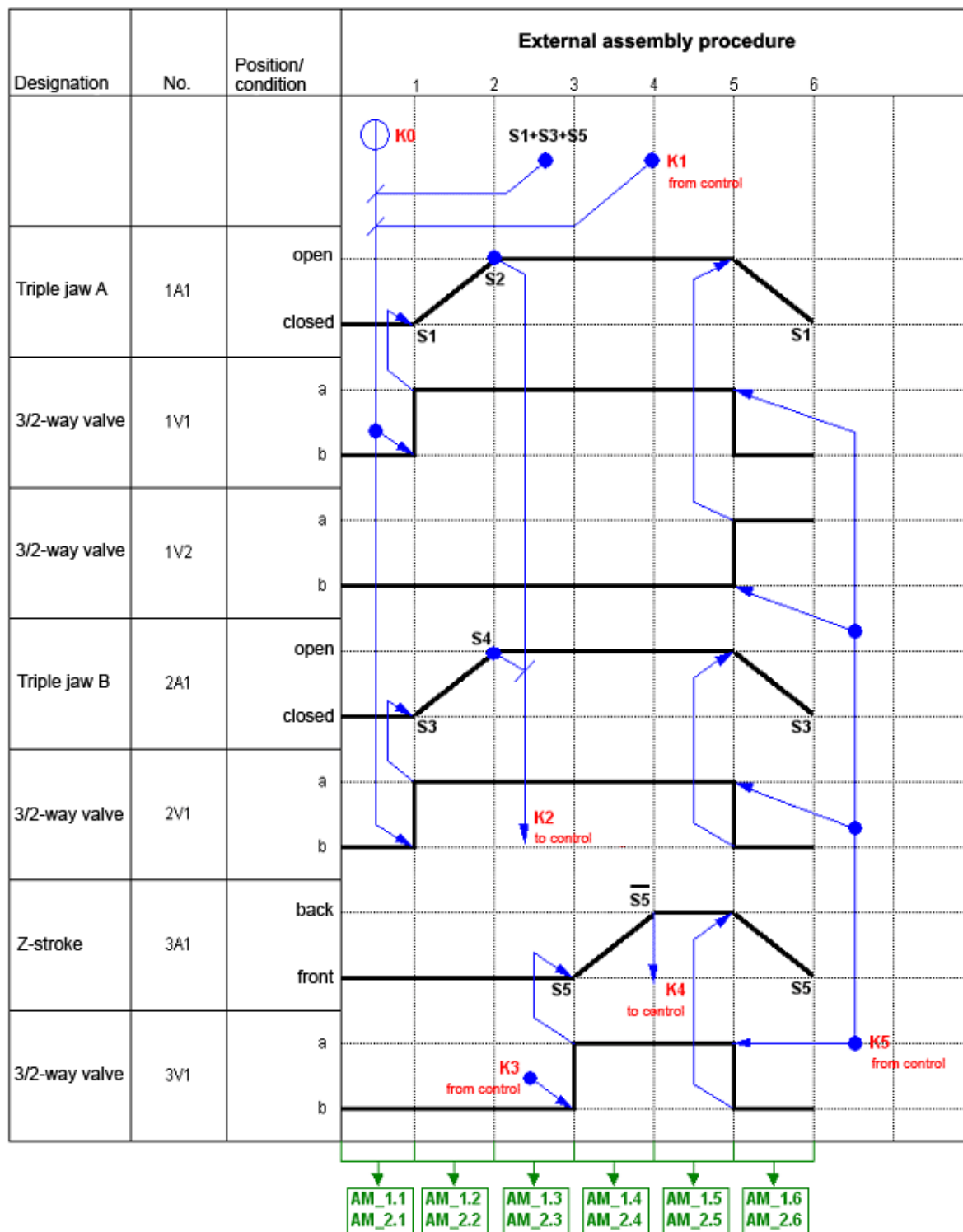


Figure 20: Function diagram external assembly

Notes on the external assembly function diagram:

To ensure the correct control sequences of the O-ring gripper during external assembly, it is necessary, among other things, that various signals are returned by or for the control. In the function diagram, they are highlighted in red by "K0 to K5".

Basic or starting position of the gripper during external assembly:

Triple jaw A and triple jaw B closed and Z-stroke at the front (cf. 6.3.1 External assembly AM_1.1, page 25).

Process step external assembly AM_1.1

The O-ring gripper has been positioned at the transfer point. The control sends back the signal **K1** "gripper arrived at transfer point".

Since triple jaw A and triple jaw B are closed and the Z-stroke is forward, proximity switches S1, S3 and S5 are dampened.

The next process step can be started together with the signals S1, S3, S5, **K1** and **K0** "start the assembly procedure".

Process step external assembly AM_1.2 (cf. 6.3.2 External assembly AM_1.2, page 26)

The O-ring gripper continues to be positioned at the transfer point.

Triple jaw A and triple jaw B open up. Proximity switches S2 and S4 are now dampened.

The control will now send back the signal **K2** "Move gripper to assembly position".

Process step external assembly AM_1.3 (cf. 6.3.3 External assembly AM_1.3, page 27)

The O-ring gripper is moved to the shaft and positioned at the groove level. The control sends back the signal **K3** "Assembly position has been reached".

Triple jaw A and triple jaw B are still in "condition open". The proximity switches S2 and S4 continue to be dampened.

The next process step can be started together with the signals S2, S4 and **K3** "assembly position has been reached".

Process step external assembly AM_1.4 (cf. 6.3.4 External assembly AM_1.4, page 28)

The O-ring gripper continues to be positioned at the assembly position.

The Z-stroke moves to the back. The proximity switch S5 is **no longer** dampened.

The next process step can be started since proximity switch S5 is no longer dampened.

The control now receives back the signal **K4** "move gripper to position above the shaft end".

Process step external assembly AM_1.5 (cf. 6.3.5 External assembly AM_1.5, page 29)

The O-ring gripper is moved from the assembly position to a position above the shaft end.

When this position has been reached, the control sends back the signal **K5** "gripper above shaft end".

The next process step can be started.

Process step external assembly AM_1.6 (cf. 6.3.6 External assembly AM_1.6, page 29)

Triple jaw A and triple jaw B move to "CLOSED" and the Z-stroke moves to the front again.

The external assembly procedure is completed and a new cycle can follow.



The external assembly procedure AM_2.1 to AM_2.6 runs analogous to the external assembly procedure AM_1.1 to AM_1.6!

6.3 Details of external assembly procedure, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

6.3.1 External assembly AM_1.1

The six assembly fingers must be adjusted so that they are in the gripper condition "CLOSED" within the seal and aligned centrally towards the centre axis of the gripper. Depending on the ovality of the seal, there must be a sufficient safety distance (dimension x, Figure 21) between the seal and the assembly fingers.

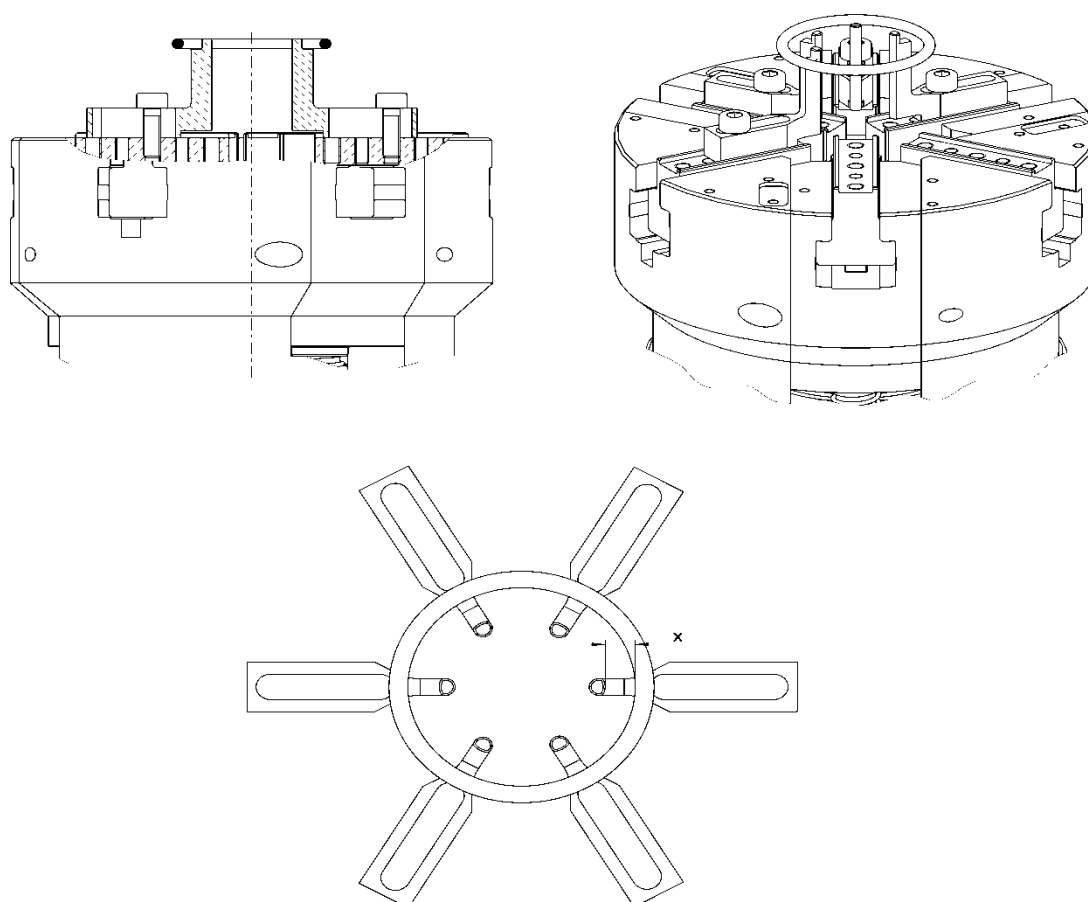


Figure 21: External assembly AM_1.1, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm



It must be checked whether the stroke of triple jaw A and triple jaw B are set so that the assembly fingers of the gripper do not overstretch the seal in the opened condition!

THEREFORE: When starting up, open up the assembly fingers of the gripper **without the seal** to set the top jaws! (compressed air connection 40 and 42 pressurised) Then, before proceeding with external assembly AM_1.2, adjust the jaw stroke to the seal

size to be assembled in accordance with Chapter 5.2.2, page 9 (see Chapter 5.2.2).

6.3.2 External assembly AM_1.2

The assembly fingers of the gripper can be opened (compressed air connections 40 and 42 pressurised). The seal is widened into the shape of a hexagon (Figure 22).

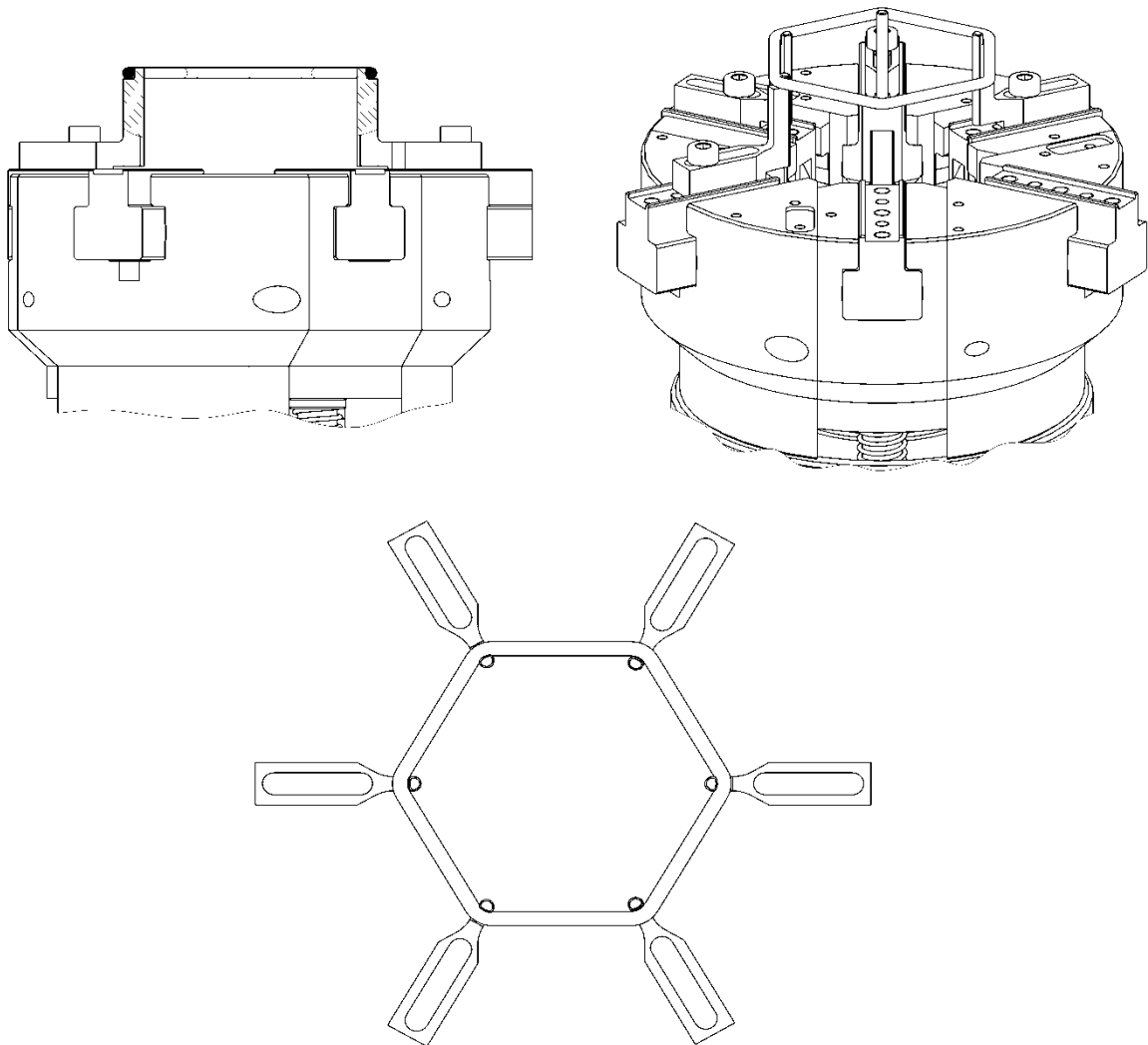


Figure 22: External assembly AM_1.2, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

6.3.3 External assembly AM_1.3

In the "OPEN" gripper condition, the seal must be widened sufficiently so that a distance larger than zero (dimension y, Figure 23) is created between the widened seal (shape of a hexagon) and the shaft.

With the widened seal, the gripper can then be positioned at the position / level of the seal groove of the shaft.



Dimension y should be as small as possible to ensure a reliable assembly cycle and to prevent overextension of the seal!

The centre axis of the gripper and the shaft must be aligned **concentrically!**

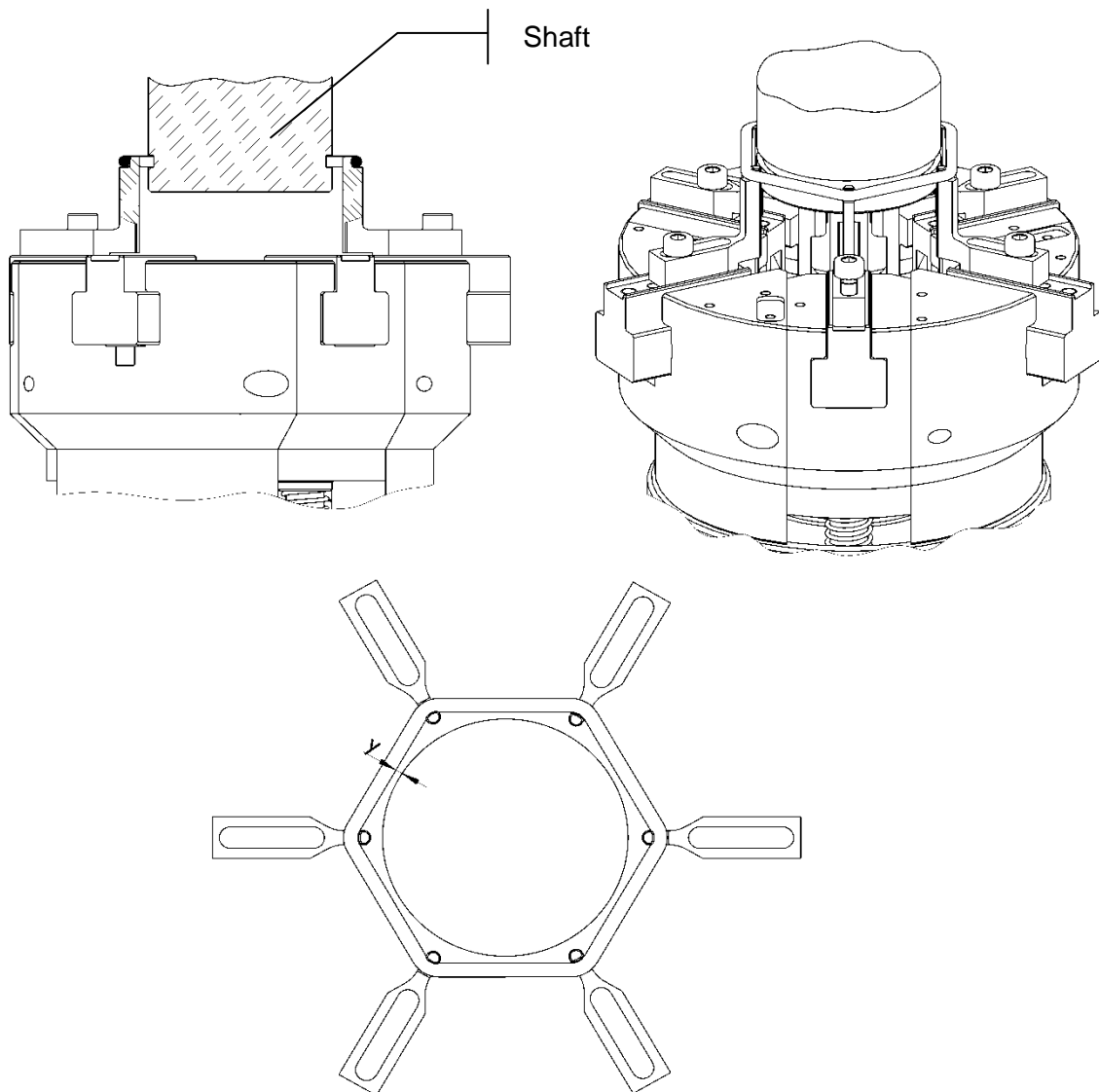


Figure 23: External assembly AM_1.3, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

6.3.4 External assembly AM_1.4

After the seal picked up by the gripper was moved to the position / level of the seal groove of the shaft, the Z-stroke of triple jaw A is pulled back in the the next step (pressurise compressed air connection 43).

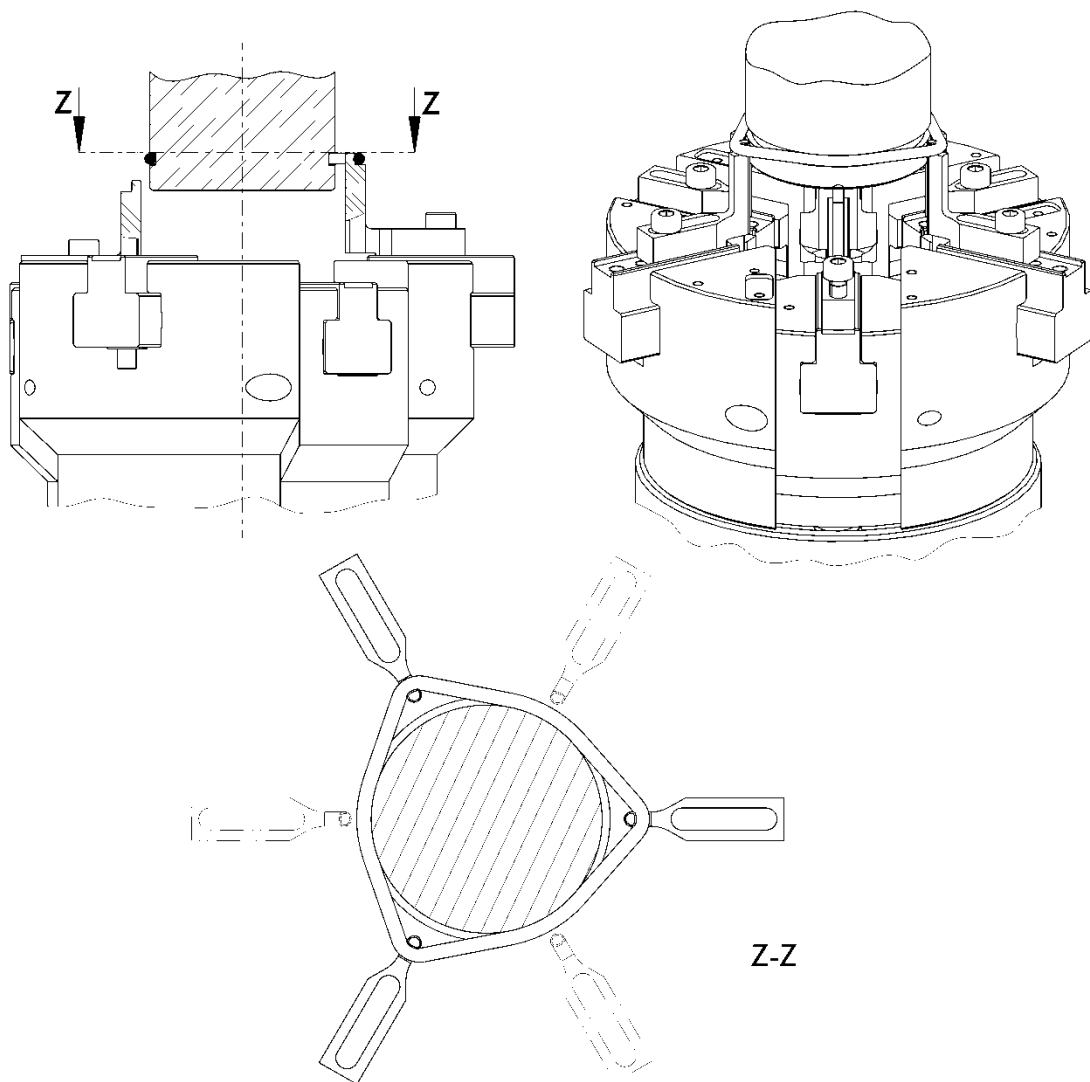


Figure 24: External assembly AM_1.4, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

The seal is now positioned at three points in the groove of the shaft.

6.3.5 External assembly AM_1.5

The entire gripper is now moved backward in axial direction, whereby the seal is stripped off the three assembly fingers of the triple jaw B and slides completely into the groove. The assembly cycle has been completed.

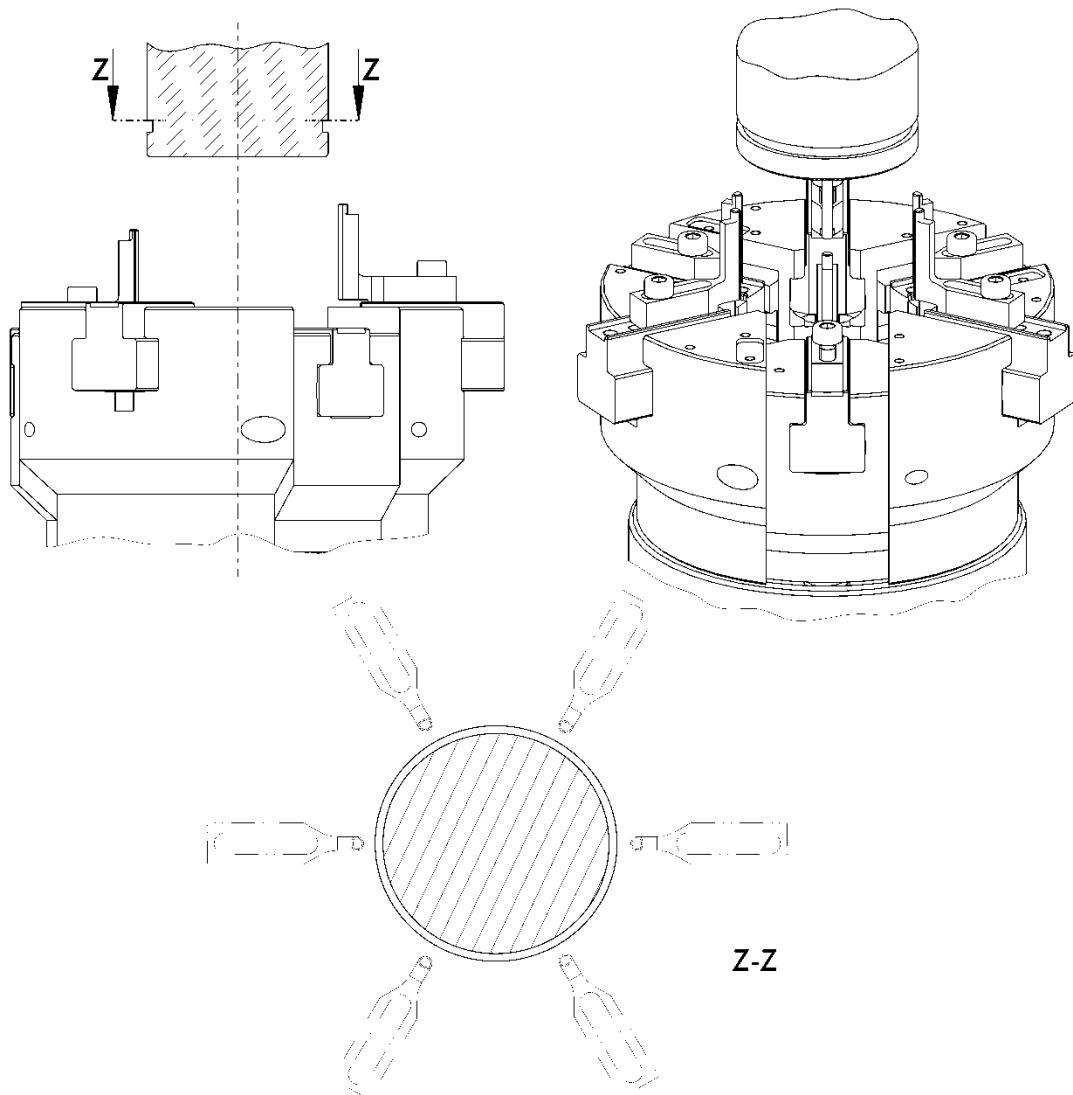


Figure 25: External assembly AM_1.5, Range of inside seal diameter between $d_1=5$ mm and $d_1=60$ mm

6.3.6 External assembly AM_1.6

For another assembly cycle, move the triple jaws A and B as well as the Z-stroke into the starting position. Close triple jaws A and B as well as Z-stroke toward the front. Compressed air connection 41 pressurised, compressed air connections 42 and 43 not pressurised.

6.4 Details of external assembly procedure, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

6.4.1 External assembly AM_2.1

The top jaws must be adjusted so that they are inside the non-widened seal in the "CLOSED" gripper condition. Depending on the ovality of the seal, there must be a sufficient safety distance at the transfer point (dimension v , Figure 26) between the seal and the top jaws. Moreover, the segment jaws must not collide in the "CLOSED" gripper condition, i.e. a second safety distance (dimension w , Figure 26) must be observed between the segment jaws.

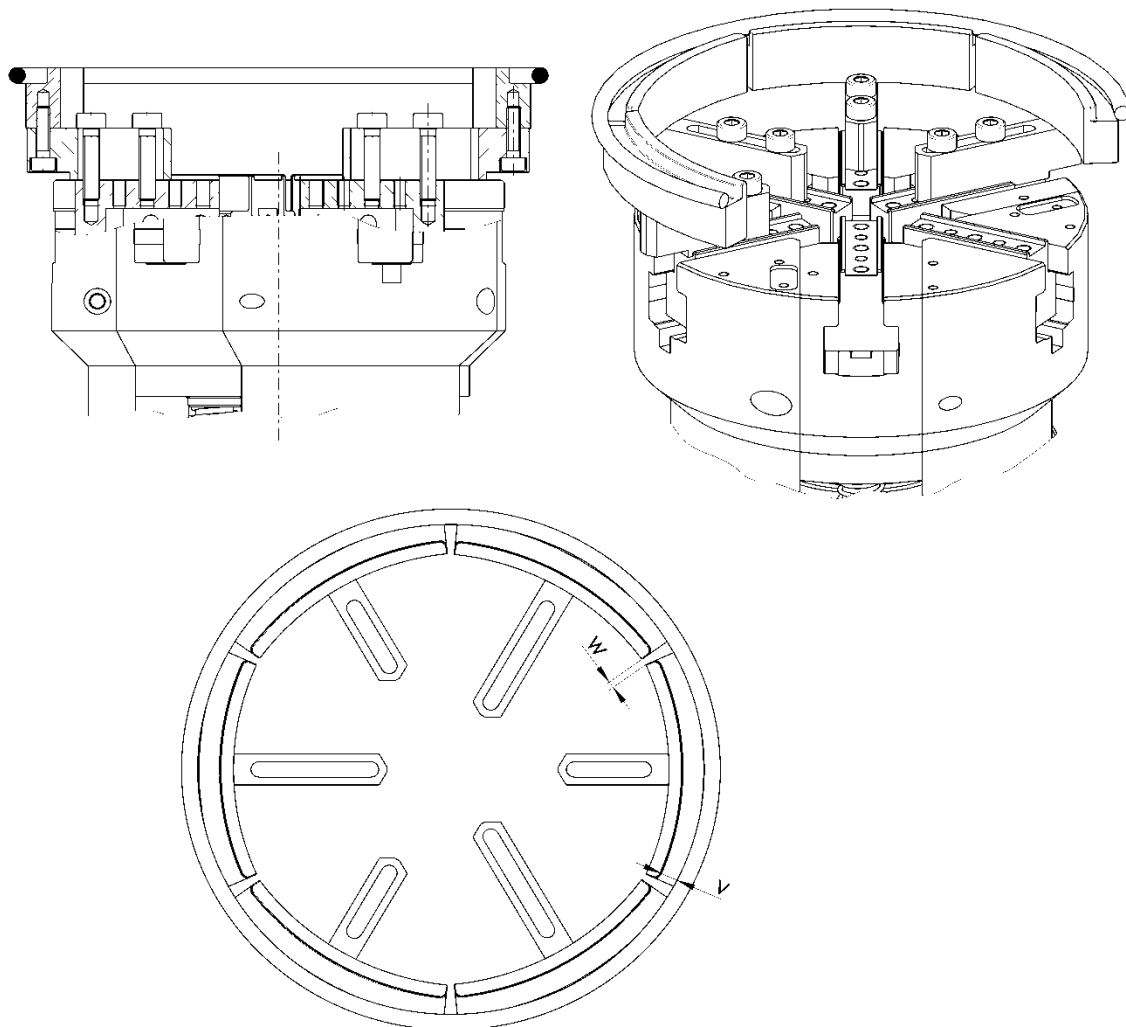


Figure 26: External assembly AM_2.1, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm



It must be checked whether the stroke of triple jaw A and triple jaw B is adjusted so that the top jaws of the gripper do not overstretch the seal in the opened condition!
THEREFORE: Open up the top jaws of the gripper *without the seal!*
 (compressed air connections 40 and 42 pressurised. Then, before proceeding with the external assembly AM_2.2, adjust the jaw stroke to the seal size to be assembled in accordance with Chapter 5.2.2, page 9 (see Chapter 5.2.2).

6.4.2 External assembly AM_2.2

The triple jaws of the gripper can be opened (compressed air connections 40 and 42 pressurised). The seal is widened by means of the segment jaws.

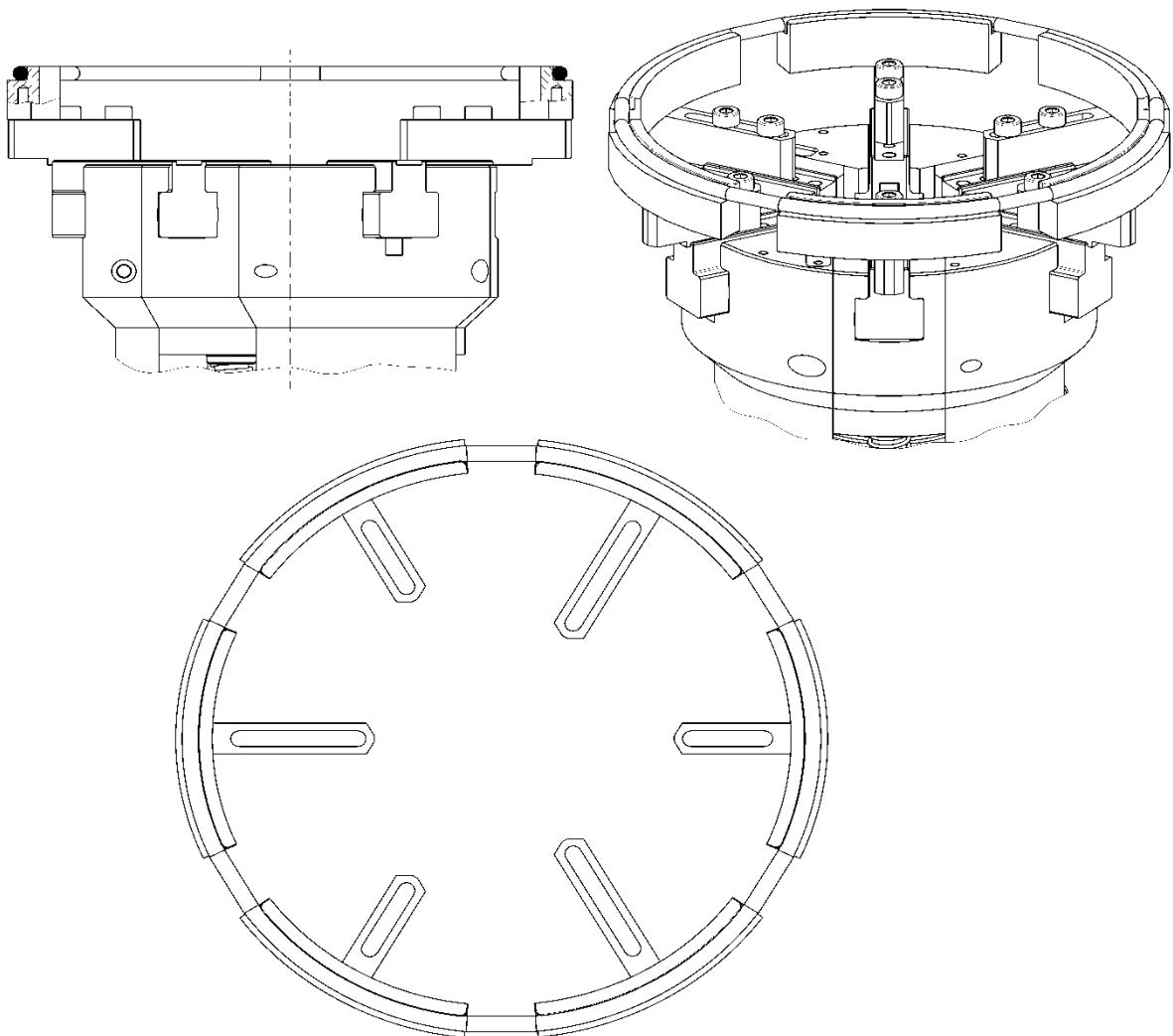


Figure 27: External assembly AM_2.2, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

6.4.3 External assembly AM_2.3

In the "OPEN" gripper condition, the seal must be widened sufficiently so that a distance larger than zero (dimension u , Figure 28) is created between the segment jaws and the shaft. With the widened seal, the gripper can then be moved to or positioned at the position / level of the seal groove of the shaft.



The dimension u should be as small as possible to ensure a reliable assembly cycle!
The centre axis of the gripper and the shaft must be aligned concentrically!

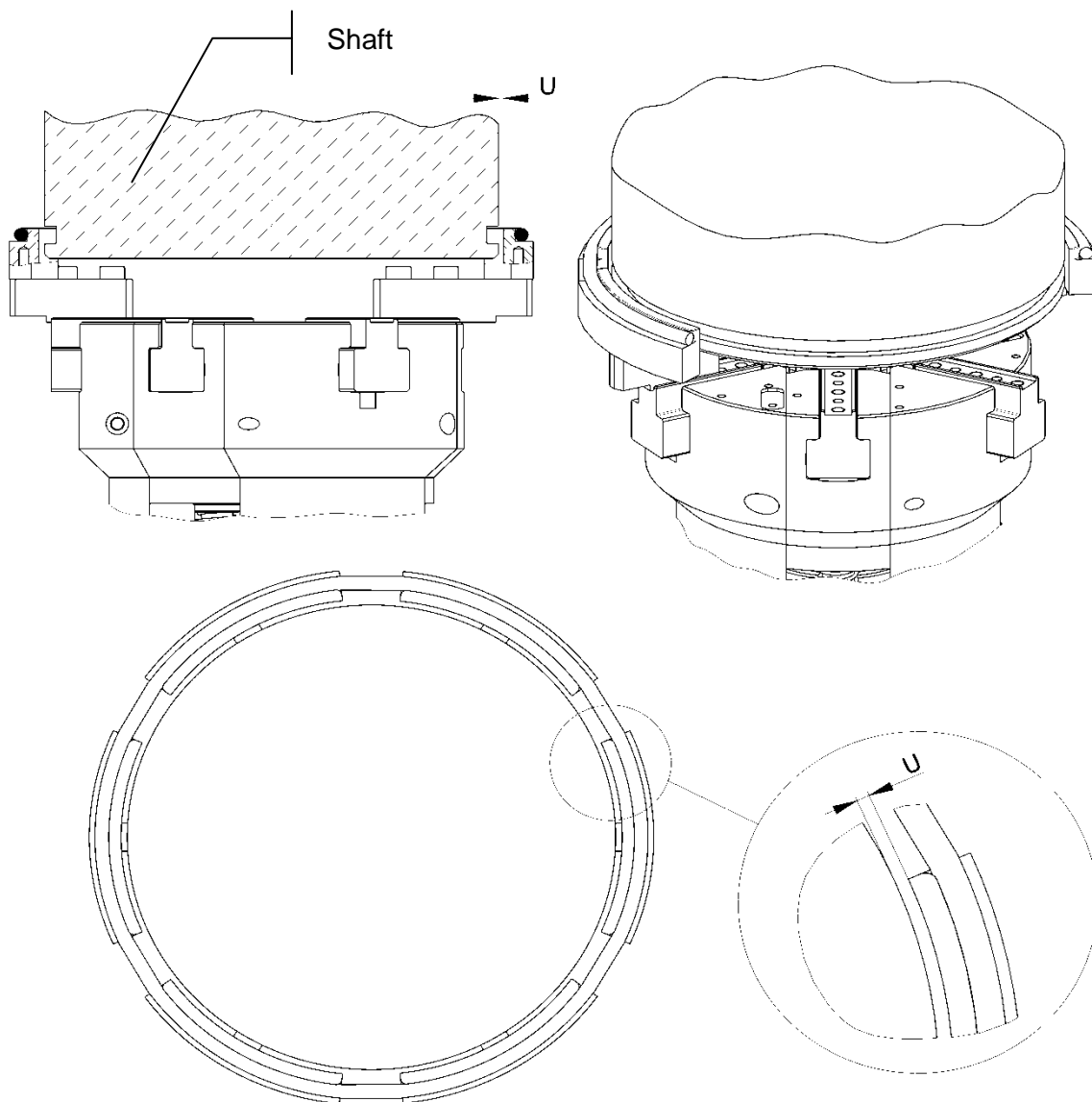


Figure 28: External assembly AM_2.3, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

6.4.4 External assembly AM_2.4

After the gripper has been moved to the position / level of the seal groove of the shaft, the Z-stroke of triple jaw A is pulled back axially in the next step (pressurise compressed air connection 43).

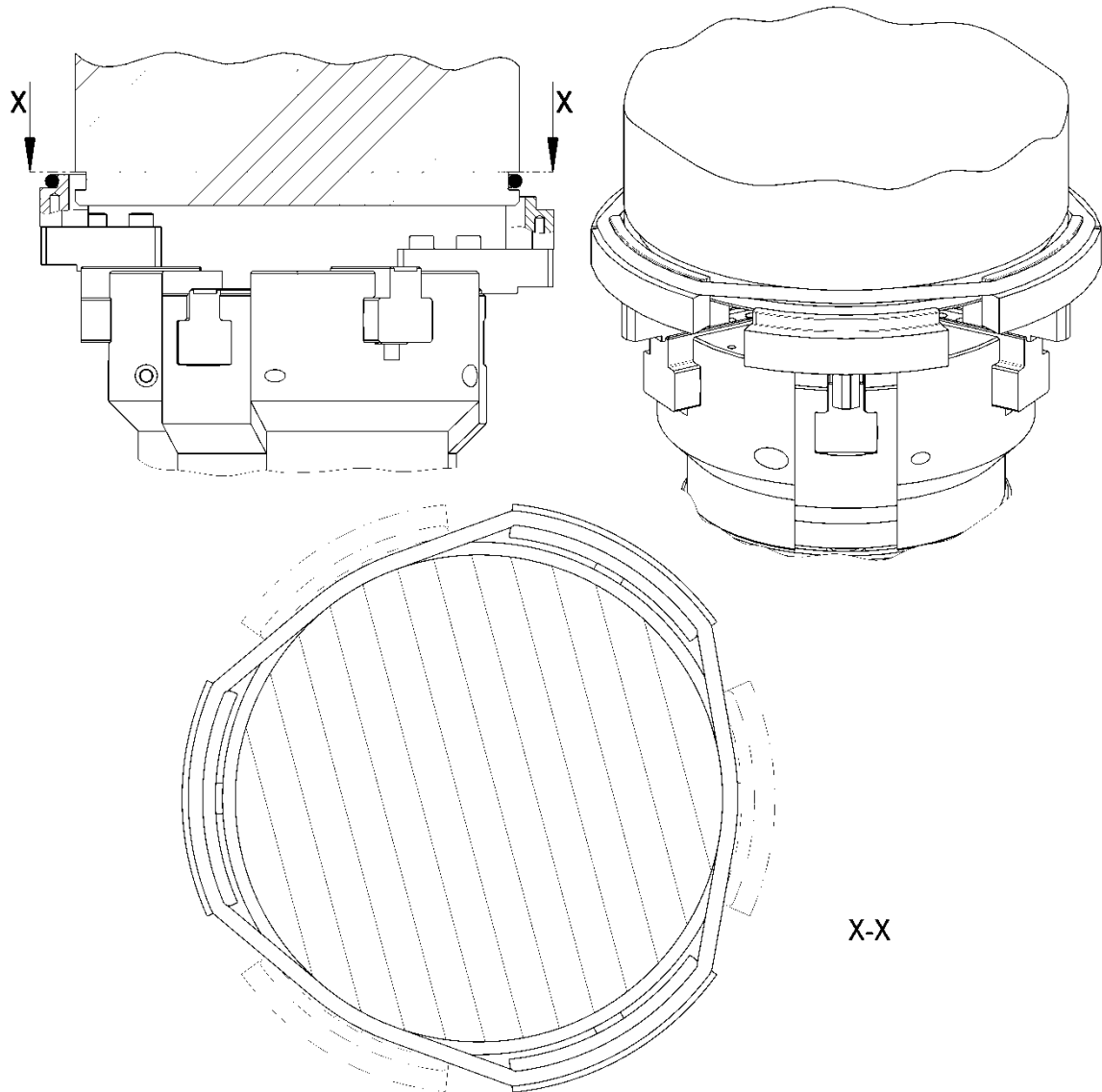


Figure 29: External assembly AM_2.4, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

The seal is now positioned at three points in the groove of the shaft.

6.4.5 External assembly AM_2.5

The entire gripper is now moved backward in axial direction, whereby the seal is stripped off the three assembly fingers of the triple jaw B and slides completely into the groove. The assembly cycle has been completed.

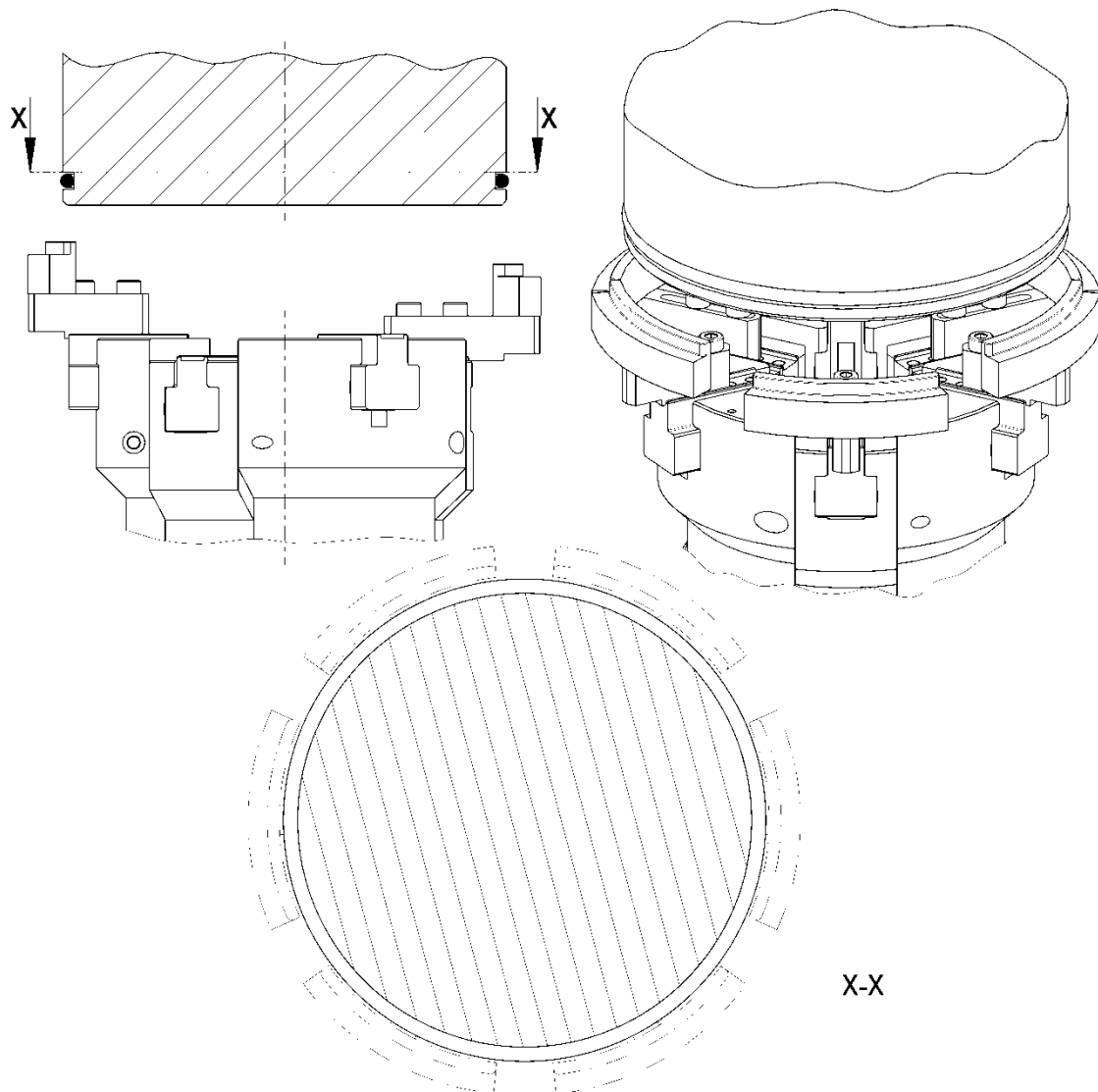


Figure 30: External assembly AM_2.5, Range of inside seal diameter between $d_1 > 60$ mm and approx. $d_1 = 150$ mm

6.4.6 External assembly AM_2.6

For another assembly cycle, move the triple jaws A and B as well as the Z-stroke into the starting position. Close triple jaws A and B as well as Z-stroke toward the front. Compressed air connection 41 pressurised, compressed air connections 42 and 43 not pressurised.

6.5 Function diagram internal assembly

Figure 31 shows the conditions and condition changes of the O-ring gripper for internal assembly as a chart.

The function diagram uses four 3/2-way valves in the same way as in the pneumatics circuit diagram on page 21.

Please note the additional information and comments on the function diagram and the assembly procedure below the function diagram!

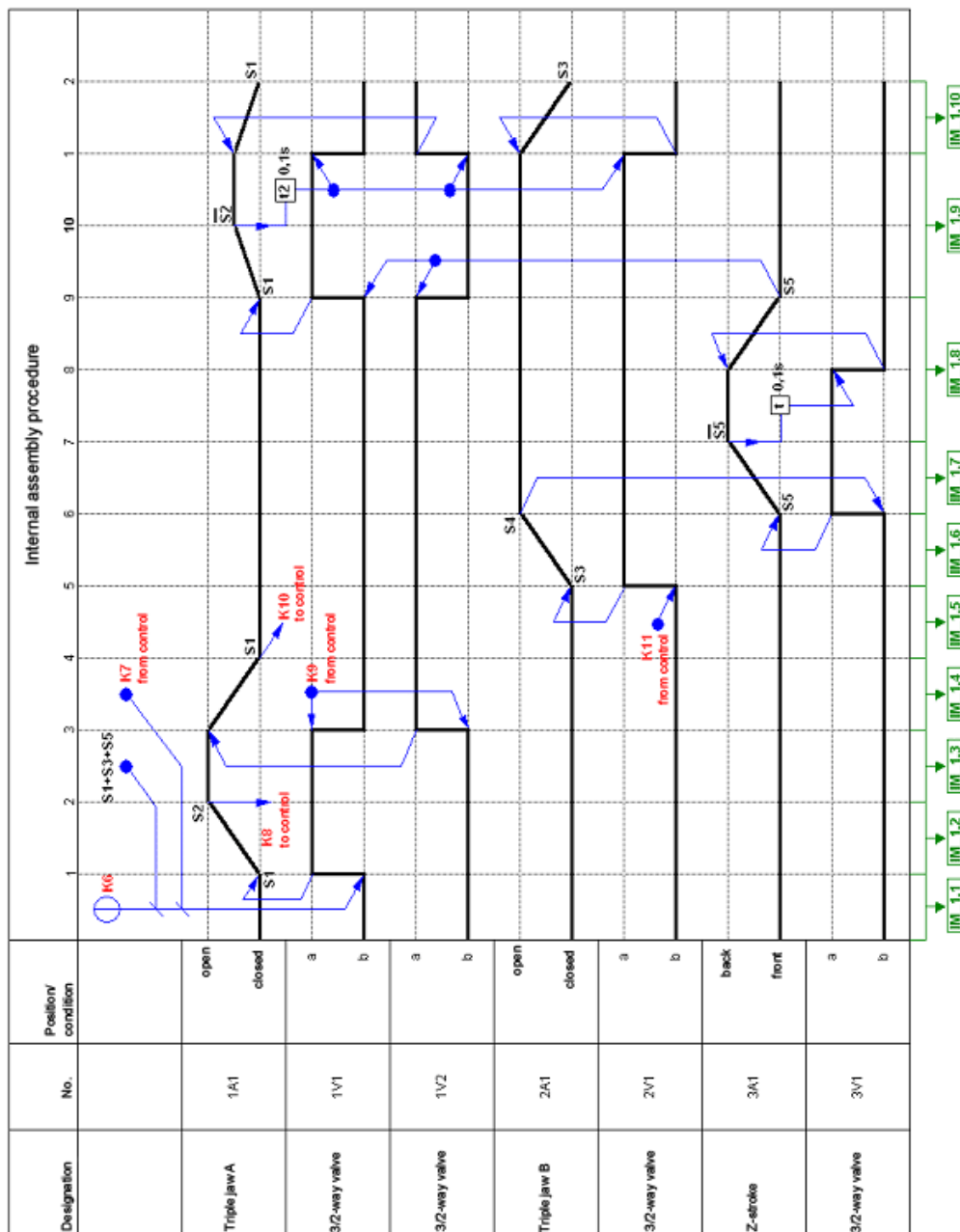


Figure 31: Function diagram internal assembly

Notes on the function diagram internal assembly:

To ensure the correct control sequences of the O-ring gripper during internal assembly, it is necessary, among other things, that various signals are returned by or for the control. In the function diagram, they are highlighted in red by "K6 to K11".

Basic or starting position of the gripper during internal assembly:

Triple jaw A and triple jaw B closed. The Z-stroke is forward.

Process step internal assembly IM_1.1 (vgl. 6.6.1 Internal assembly IM_1.1, page 38)

The O-ring gripper was positioned on a position above the seal at the transfer point. The control sends back the signal **K7** "gripper arrived at transfer point above the seal".

Since triple jaw A and triple jaw B are closed and the Z-stroke is forward, proximity switches S1, S3 and S5 are dampened (basic position).

The next process step can be started together with the signals S1, S3, S5, **K7** and **K6** "start the assembly procedure".

Process step internal assembly IM_1.2 (cf. 6.6.2 Internal assembly IM_1.2, page 39)

The O-ring gripper is still at the position above the seal at the transfer point.

The triple jaw A opens. Triple jaw B remains closed and the Z-stroke remains forward.

Proximity switch S2 is now dampened by the opening of triple jaw A. The control is now sent back the signal **K8** "moving O-ring gripper axially back down to the transfer point".

Process step internal assembly IM_1.3 (cf. 6.6.3 Internal assembly IM_1.3, page 40)

The O-ring gripper is positioned at the transfer point to pick up the seal.

Triple jaw A is open. Triple jaw B remains closed. The Z-stroke remains forward.

The control sends back the signal **K9** "gripper positioned on transfer point".

Process step internal assembly IM_1.4 (cf. 6.6.4 Internal assembly IM_1.4, page 41)

The O-ring gripper remains at the transfer point position to pick up the seal.

Triple jaw A is being closed. Triple jaw B remains closed. The Z-stroke remains forward.

Proximity switch S1 is now dampened again by closing triple jaw A. The control is sent back the signal **K10** "moving O-ring gripper to assembly position".

Process step internal assembly IM_1.5 (cf. 6.6.5 Internal assembly IM_1.5, page 44)

The O-ring gripper is positioned at the assembly position to assemble the seal.

Triple jaw A and triple jaw B remain closed. The Z-stroke remains forward.

The control sends back the signal **K11** "gripper positioned in assembly position".

Process step internal assembly IM_1.6 (cf. 6.6.6 Internal assembly IM_1.6, page 45)

The O-ring gripper remains at the assembly position to assemble the seal.
Triple jaw A remains closed. Triple jaw B opens. The Z-stroke remains forward.
Proximity switch S4 is dampened by opening triple jaw B.

Process step internal assembly IM_1.7 (cf. 6.6.7 Internal assembly IM_1.7, page 47)

The O-ring gripper remains at the assembly position to assemble the seal.
Triple jaw A remains closed. Triple jaw B remains open. The Z-stroke is pulled axially to the back.

By moving back the Z-stroke, proximity switch S5 switch is no longer dampened.

Process step internal assembly IM_1.8 (cf. 6.6.8 Internal assembly IM_1.8, page 48)

The O-ring gripper remains at the assembly position to assemble the seal.
Triple jaw A remains closed. Triple jaw B remains open.
The Z-stroke remains at the back for 0.1 seconds (time relay). After 0.1 seconds have lapsed, the Z-stroke is moved forward again.
Proximity switch S5 is dampened again by moving the Z-stroke forward.

Process step internal assembly IM_1.9 (cf. 6.6.9 Internal assembly IM_1.9, page 49)

The O-ring gripper remains at the assembly position to assemble the seal.
The triple jaw A opens. Triple jaw B remains open. The Z-stroke remains forward.
Sensor S2 is not dampened since triple jaw A moves against the wall of the bore and does not open completely. That is why a time relay of 0.1 seconds must be used in this case. This means that triple jaw A opens and remains in the "OPEN" position for 0.1 seconds.

Process step internal assembly IM_1.10 (cf. 6.6.10 Internal assembly IM_1.10, page 50)

The O-ring gripper remains at the assembly position to assemble the seal.
Triple jaw A and triple jaw B move together after 0.1 seconds (IM_9). The Z-stroke remains forward.
Proximity switches S1 and S3 are dampened again by closing triples jaws A and B.

The internal assembly procedure is completed and a new cycle can follow.

6.6 Details of internal assembly procedure

6.6.1 Internal assembly IM_1.1

Triple jaw A and triple jaw B are closed. The Z-stroke is forward. In the first step, the O-ring gripper must be positioned **above** the seal (the precondition is that the seal is picked up on a level).

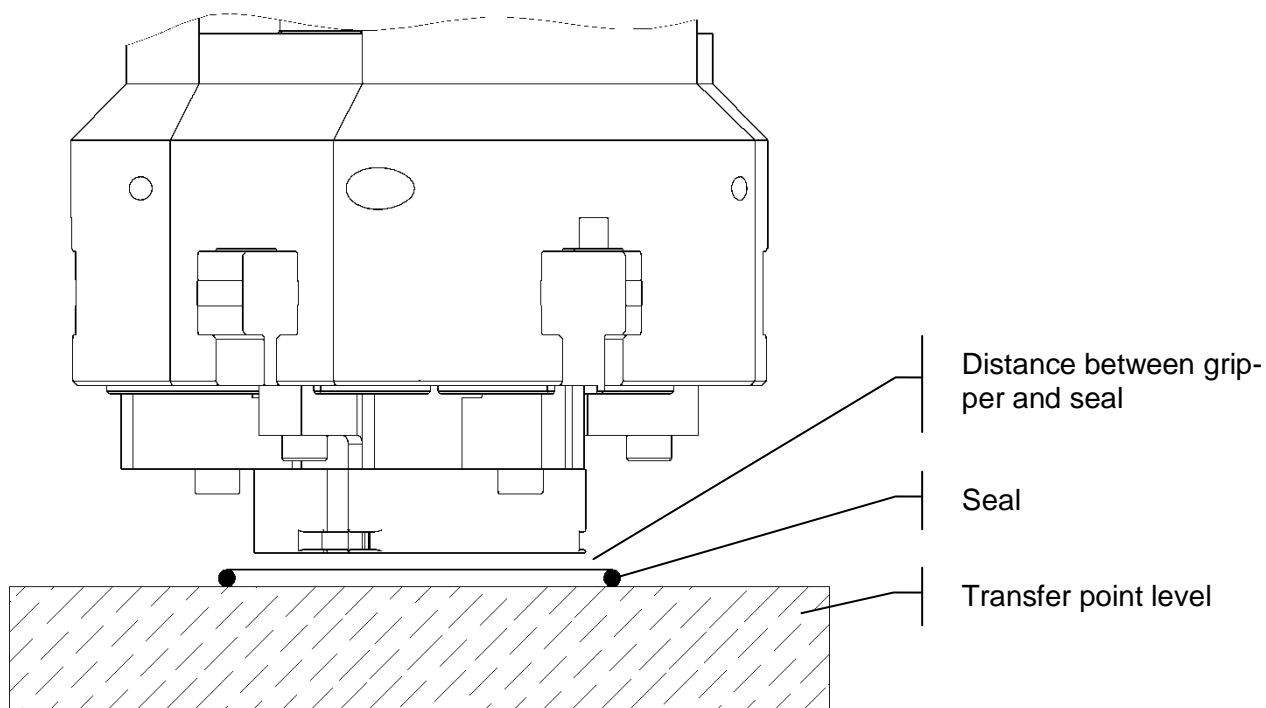


Figure 32: Internal assembly IM_1.1

6.6.2 Internal assembly IM_1.2

The triple jaw A opens. Triple jaw B remains closed and the Z-stroke remains forward.

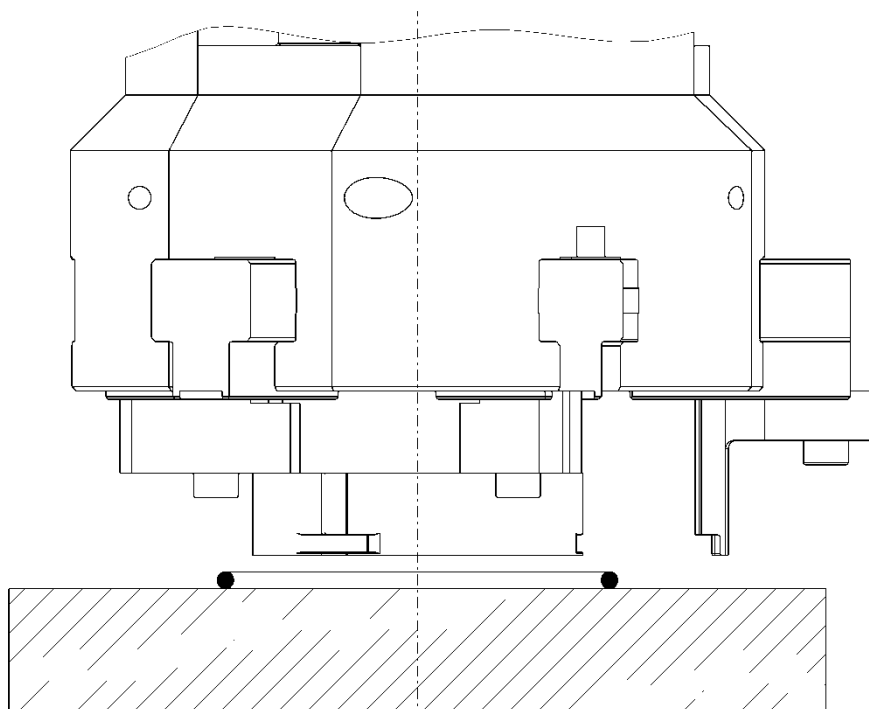


Figure 33: Internal assembly IM_1.2

6.6.3 Internal assembly IM_1.3

Triple jaw A is open. Triple jaw B is closed. The Z-stroke is forward.
The O-ring gripper moves axially downward to the transfer point to pick up the O-ring.

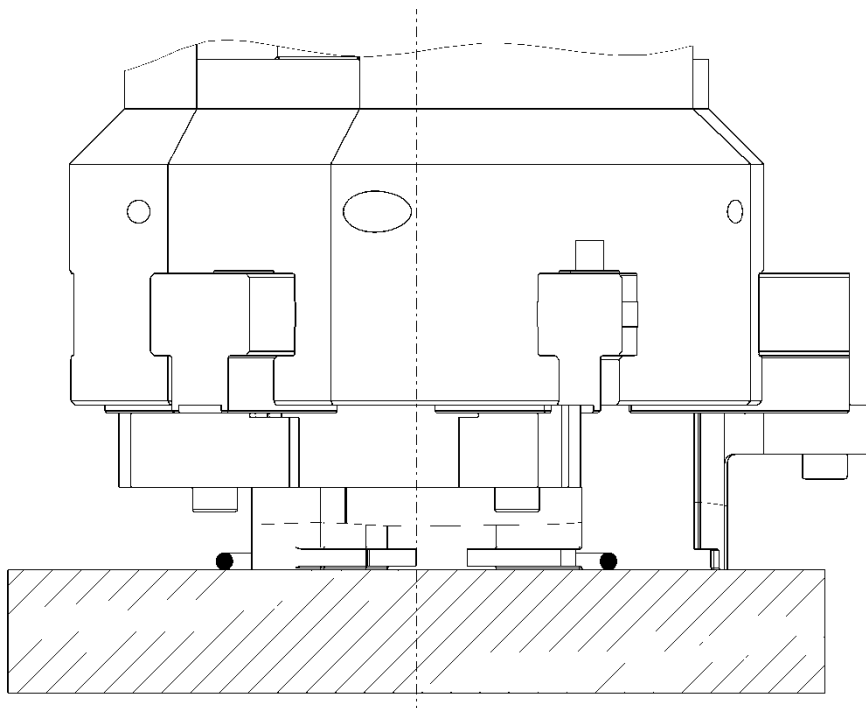


Figure 34: Internal assembly IM_1.3 Figure with transfer point

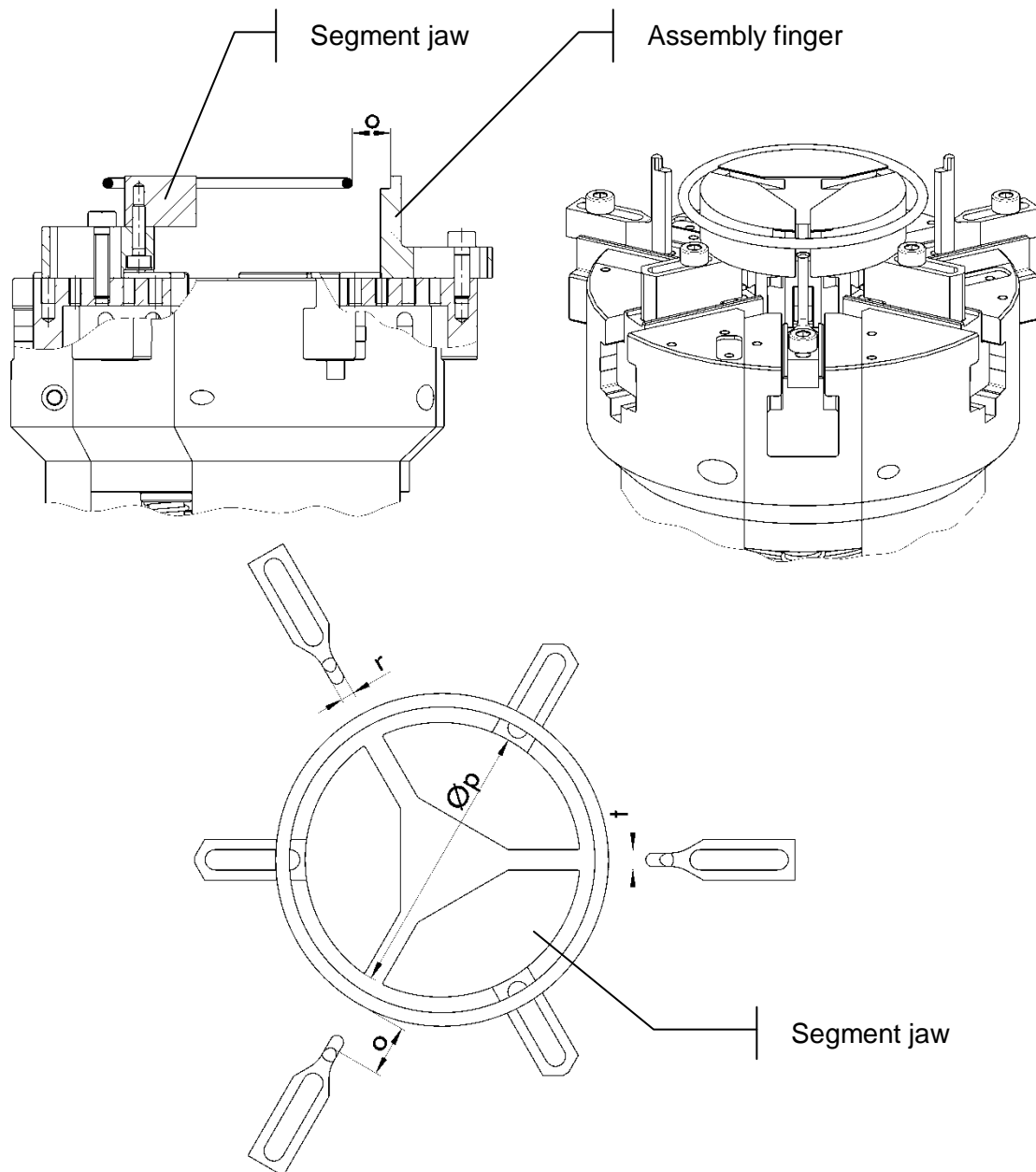


Figure 35: Internal assembly IM_1.3 Figure B, without transfer point

6.6.4 Internal assembly IM_1.4

Triple jaw A can be closed next.

The assembly fingers move radially toward the inside between the segment jaws and mould the seal locally between the segment jaws.

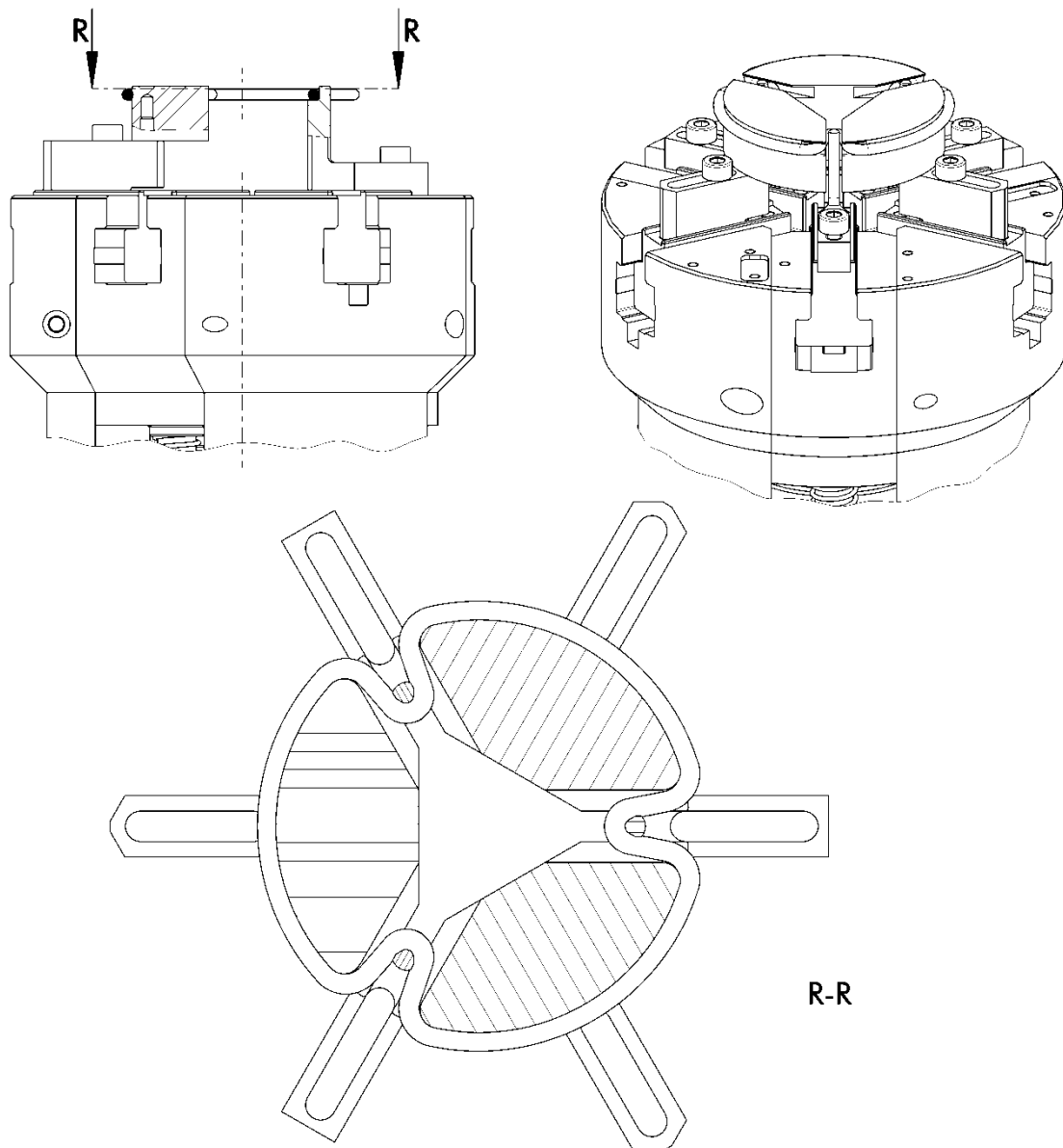


Figure 36: Internal assembly IM_1.4

By moulding the seal between the segment jaws, the assembly fingers and the segment jaws can enter the bore of the workpiece with the moulded seal.

Figure 37 and Figure 38 show how the seal should **not** be redirected:

Figure 37:

- The seal does not rest properly against the segment jaws!
- The seal can collide with the workpiece when entering the bore!
- The assembly fingers have not moved far enough toward the gripper centre!

Figure 38:

- The assembly fingers have moved too far toward the gripper centre!
- The seal is locally overextended!

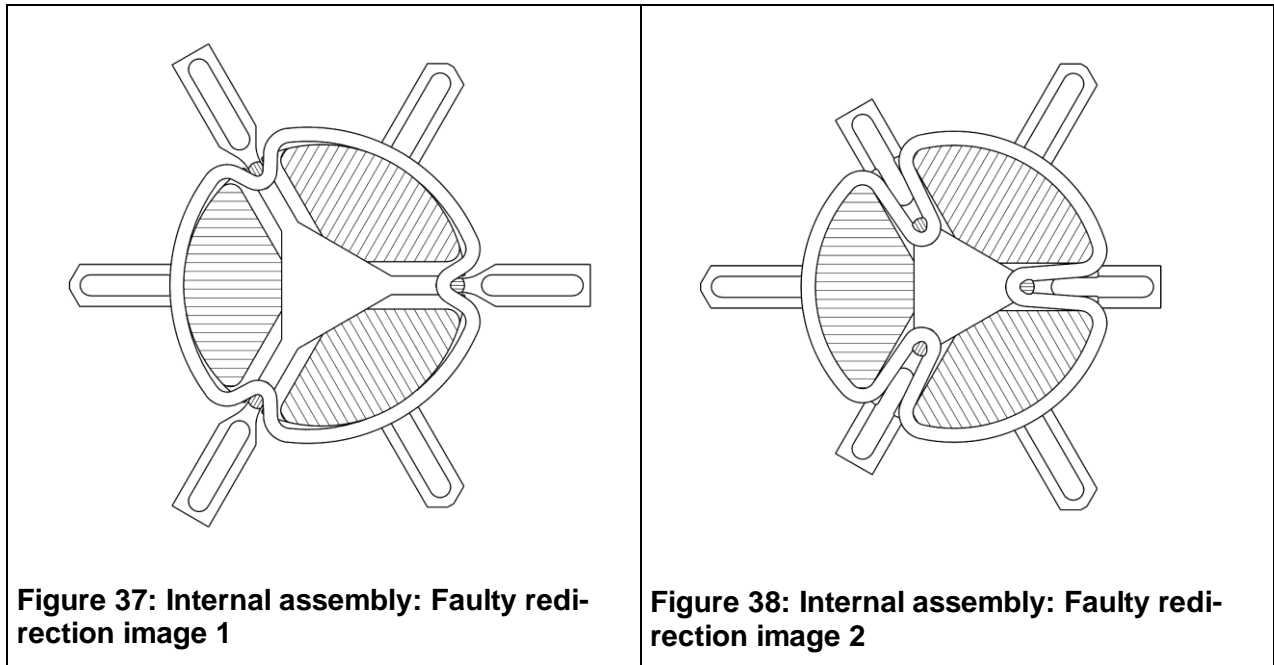


Figure 39 shows what the redirection of the seal must look like. When the triple jaw A is closed, the assembly fingers must have been moved far enough to the inside so that:

- a) the seal properly encloses the segment jaws,
- b) the seal is only slightly extended around the assembly finger tips, i.e. it is not lengthened too much,
- c) the enclosing diameter of the redirected seal is smaller than the bore in the assembly work-piece.

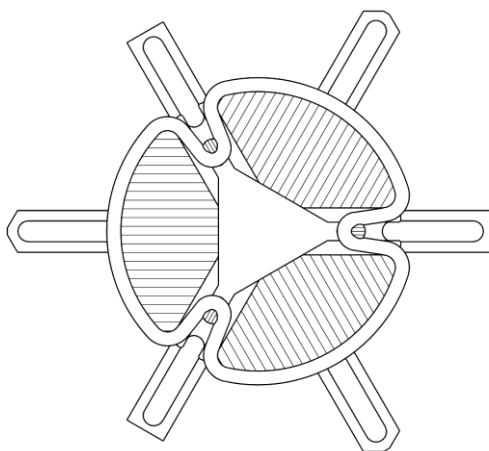


Figure 39: Internal assembly: Correct redirection

6.6.5 Internal assembly IM_1.5

The gripper can then be moved or positioned to the position / level of the seal groove of the bore. The centre axis of the gripper and the bore must be aligned concentrically!

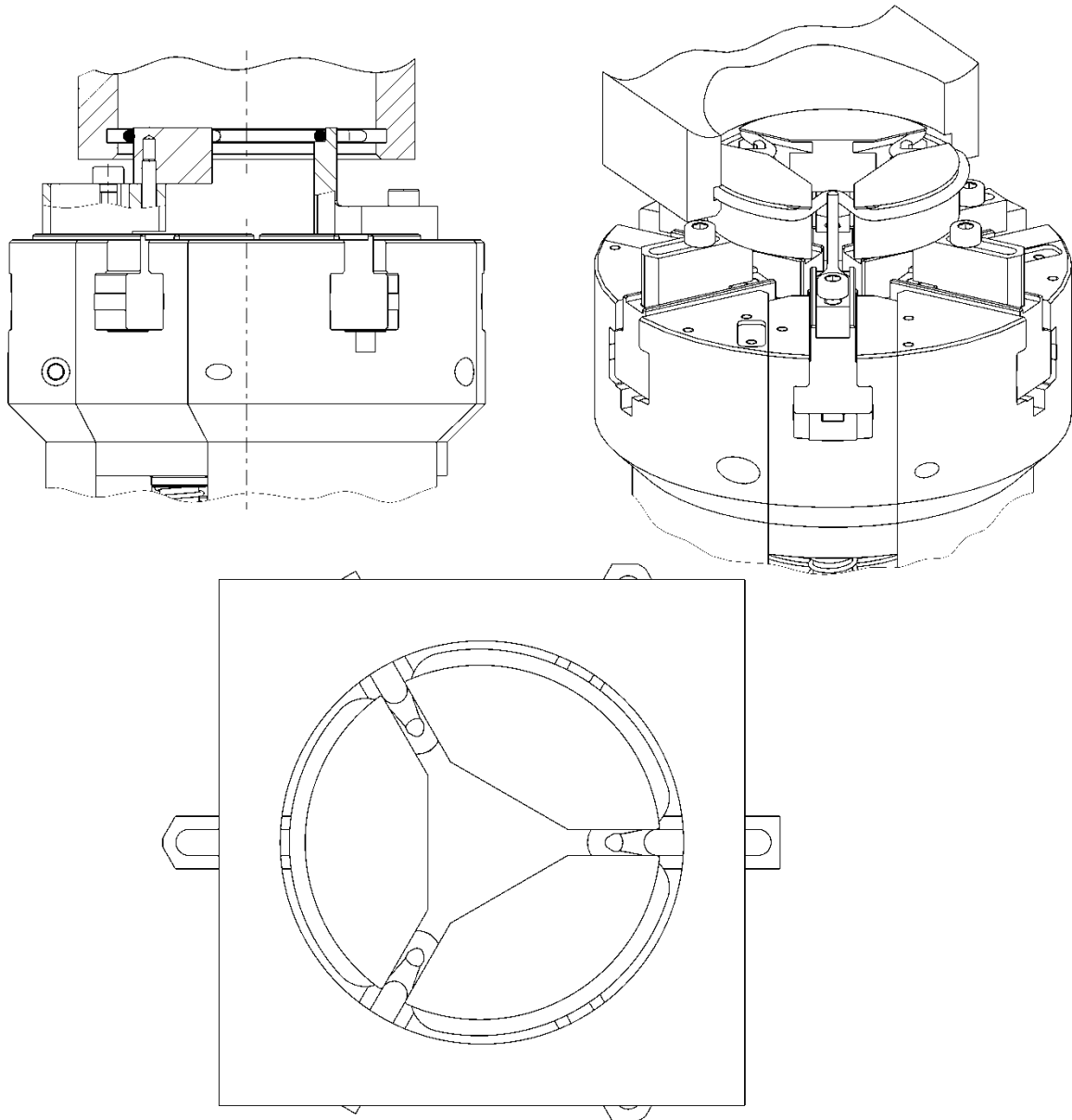


Figure 40: Internal assembly IM_1.5

6.6.6 Internal assembly IM_1.6

After the gripper was moved to the position / level of the seal groove in the workpiece, triple jaw B can be opened. The following pointers must be observed before the triple jaw B can be opened:



The stroke of the triple jaw B must be set as follows: Description given under Figure 41. Also see Chapter 5.2.2, page 9 in this respect!

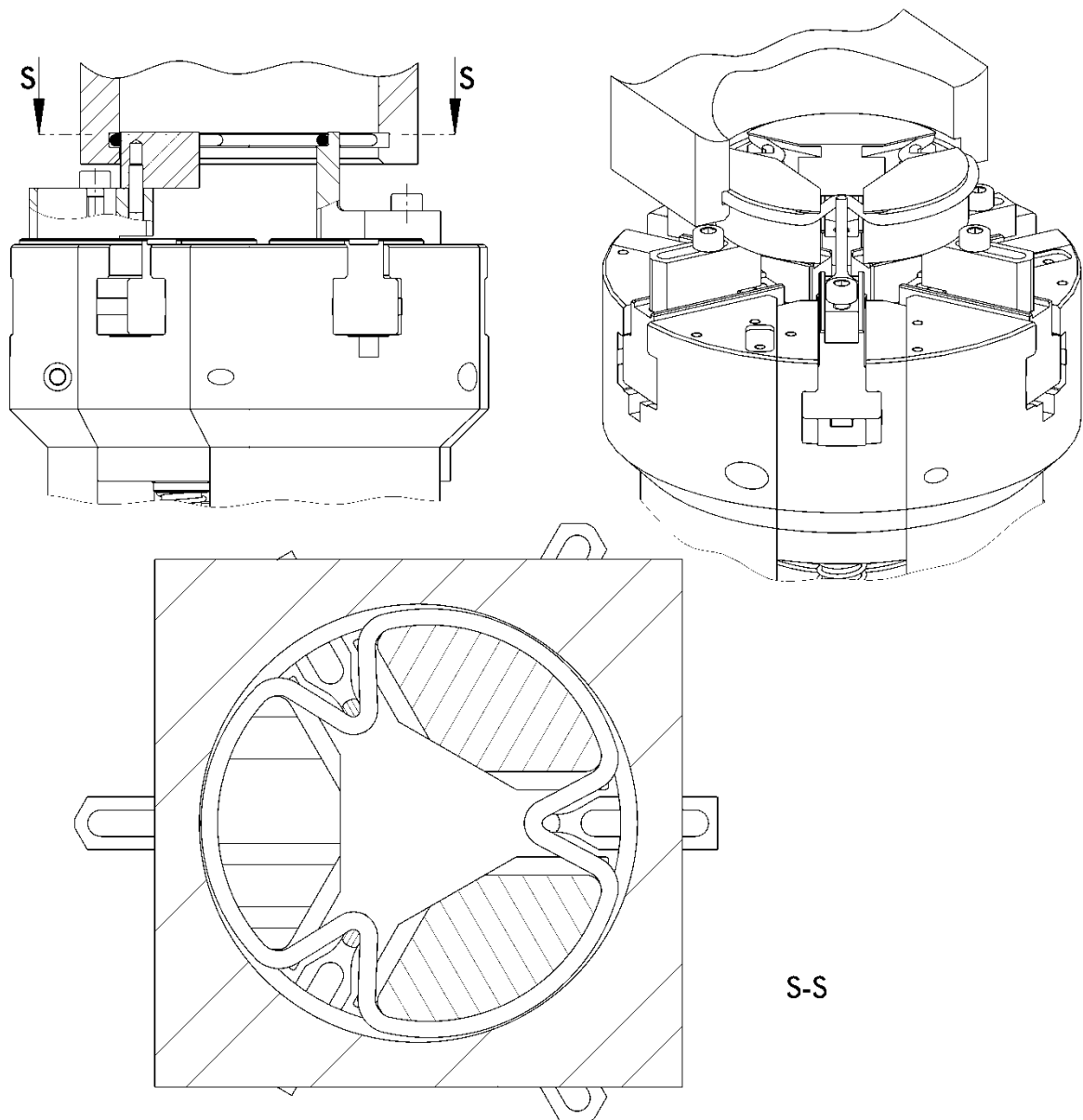


Figure 41: Internal assembly IM_1.6

Triple jaw B to which the segment jaws are attached may only open far enough to press the redirected seal into the groove of the bore. This stroke is usually about as large as the cord strength d_2 of the seal.



The segment jaws must **not** move against the wall of the bore of the workpiece because this could lead to damage on the segment jaws and on the wall of the bore. A safety distance (dimension m) must be set between segment jaw and wall of the bore. Dimension m should thereby be as small as possible. In addition, a distance (dimension n) must be set between the base diameter of the groove and the redirected seal! It should also be as small as possible.

NOTE: The easiest way to set the stroke of triple jaw B is to turn the workpiece on the centre axis of the bore as shown in Figure 42. If the workpiece cannot be turned, then the stroke of triple jaw B has been set too large, i.e. the seal is pressed against the groove of the base diameter.

If the workpiece can be turned with a great deal of play, then the stroke of triple jaw B has been set too small, i.e. the redirected seal is not close enough to the base diameter of the groove (dimension n too large).

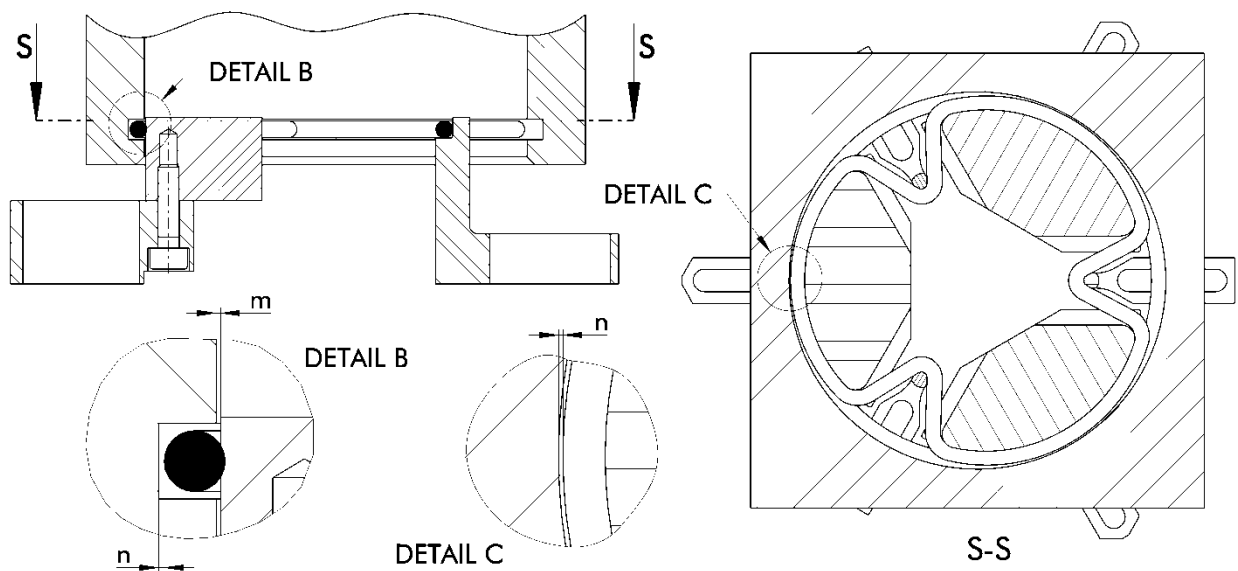


Figure 42: Setting triple jaw B stroke

6.6.7 Internal assembly IM_1.7

The Z-stroke is axially pulled towards the back (pressurise compressed air connection 43).

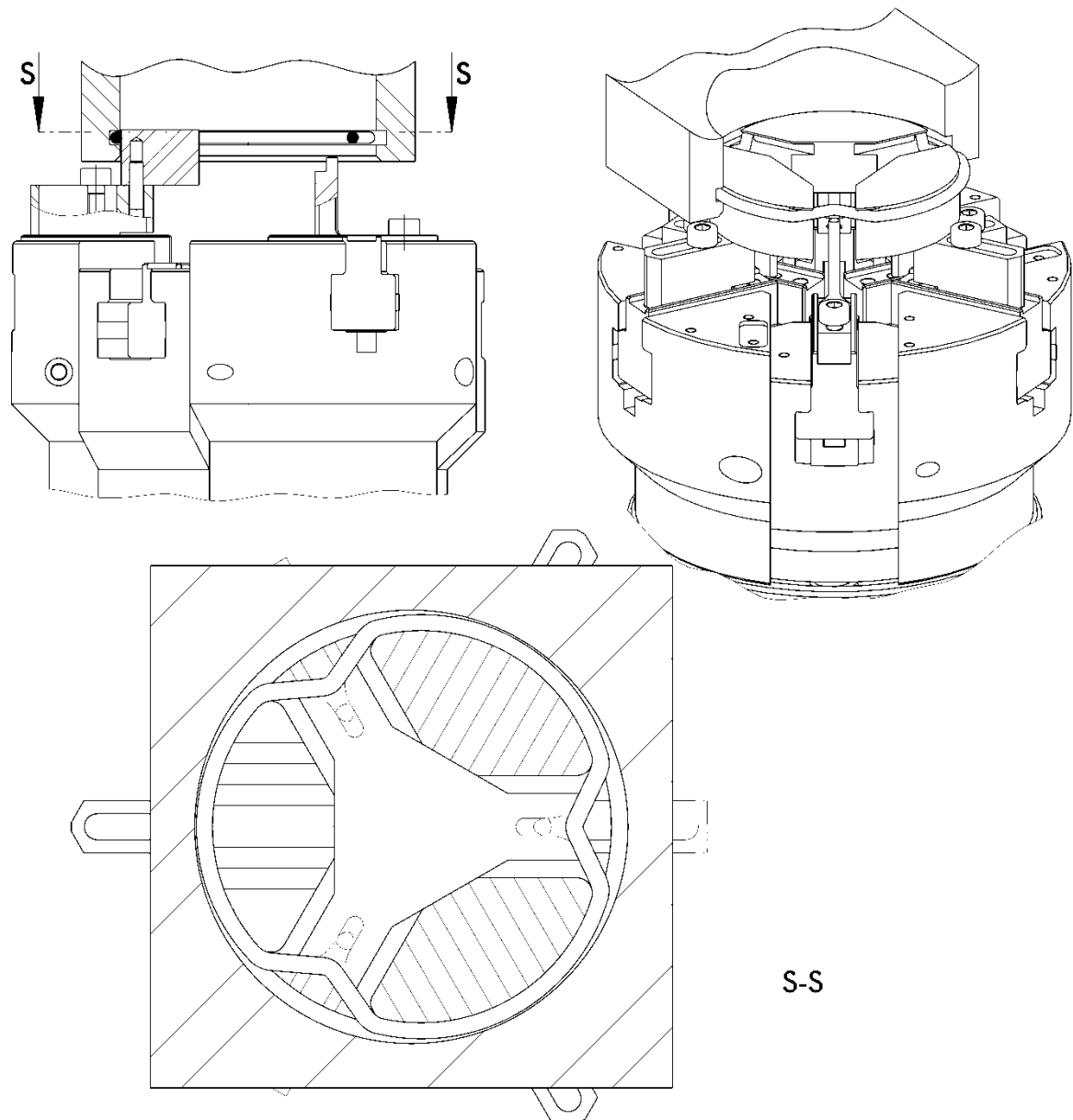


Figure 43: Internal assembly IM_1.7

The assembly finger pulls axially toward the back and the seal relaxes slightly in the direction of the groove in the area of the assembly finger. The local relief of the seal between the segment jaws is absolutely essential to continue with the internal assembly IM_1.8 of the internal assembly procedure.

6.6.8 Internal assembly IM_1.8

After the axial pulling of the Z-stroke towards the back, the Z-stroke is directly moved forward again (do not pressurise compressed air connection 43).

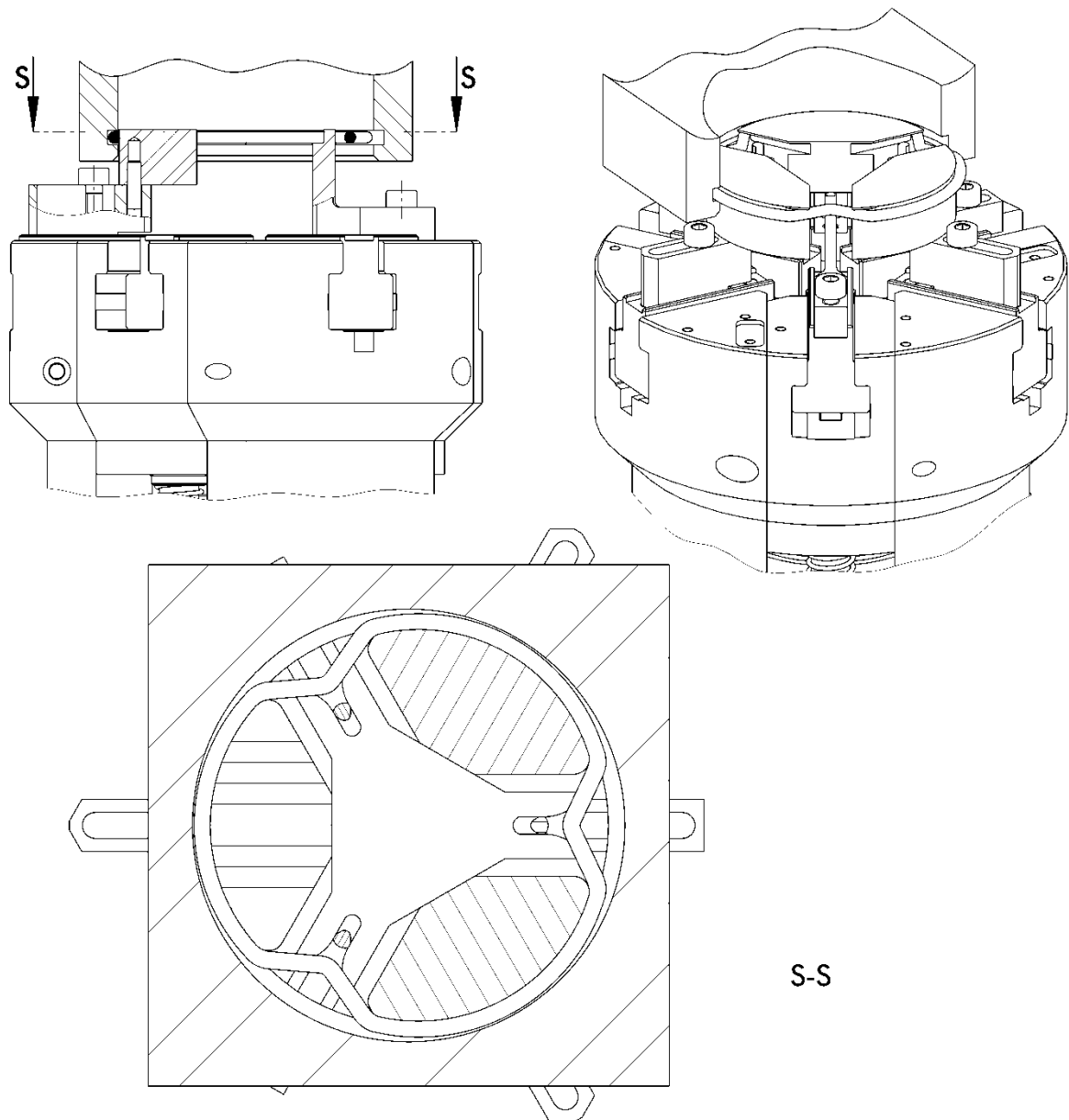



Figure 44: Internal assembly IM_1.8

As shown in Figure 44, the three assembly fingers are now on the inside of the seal.

6.6.9 Internal assembly IM_1.9

 During internal assembly in the range from $d_1=10$ mm to $d_1=15$ mm, or when working with an assembly finger with a width of less than 2 mm, the operating pressure of triple jaw A must be reduced to max. 2.5 bar! If the operating pressure is not reduced, the assembly fingers could be damaged or destroyed.

 **When working with assembly fingers with a longer overhang, the operating pressure of triple jaw A must always be adjusted! This reduced operating pressure depends on the individual version of the assembly fingers!**

The assembly fingers radially open up toward the outside (compressed air connection 40 pressurised).

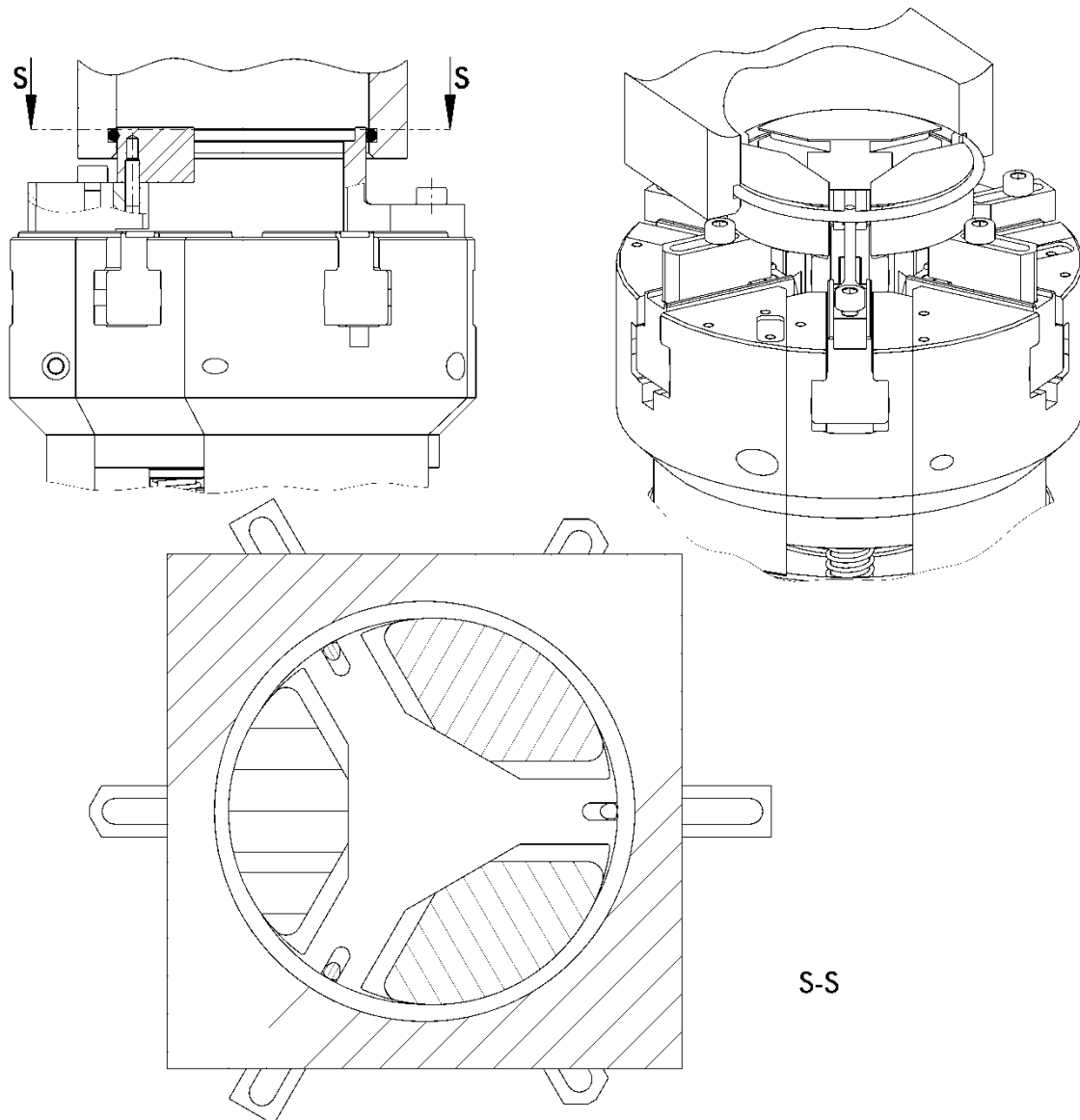


Figure 45: Internal assembly IM_1.9

The seal is pushed into the groove at the remaining three locations.



The position of the assembly fingers in the step Internal assembly IM_1.9 is **not** monitored!

6.6.10 Internal assembly IM_1.10

In the final step, the assembly fingers and the segment jaws are moved toward the inside, i.e. the gripper, triple jaw A and triple jaw B are closed (compressed air connection 41 pressurised, compressed air connection 42 not pressurised).

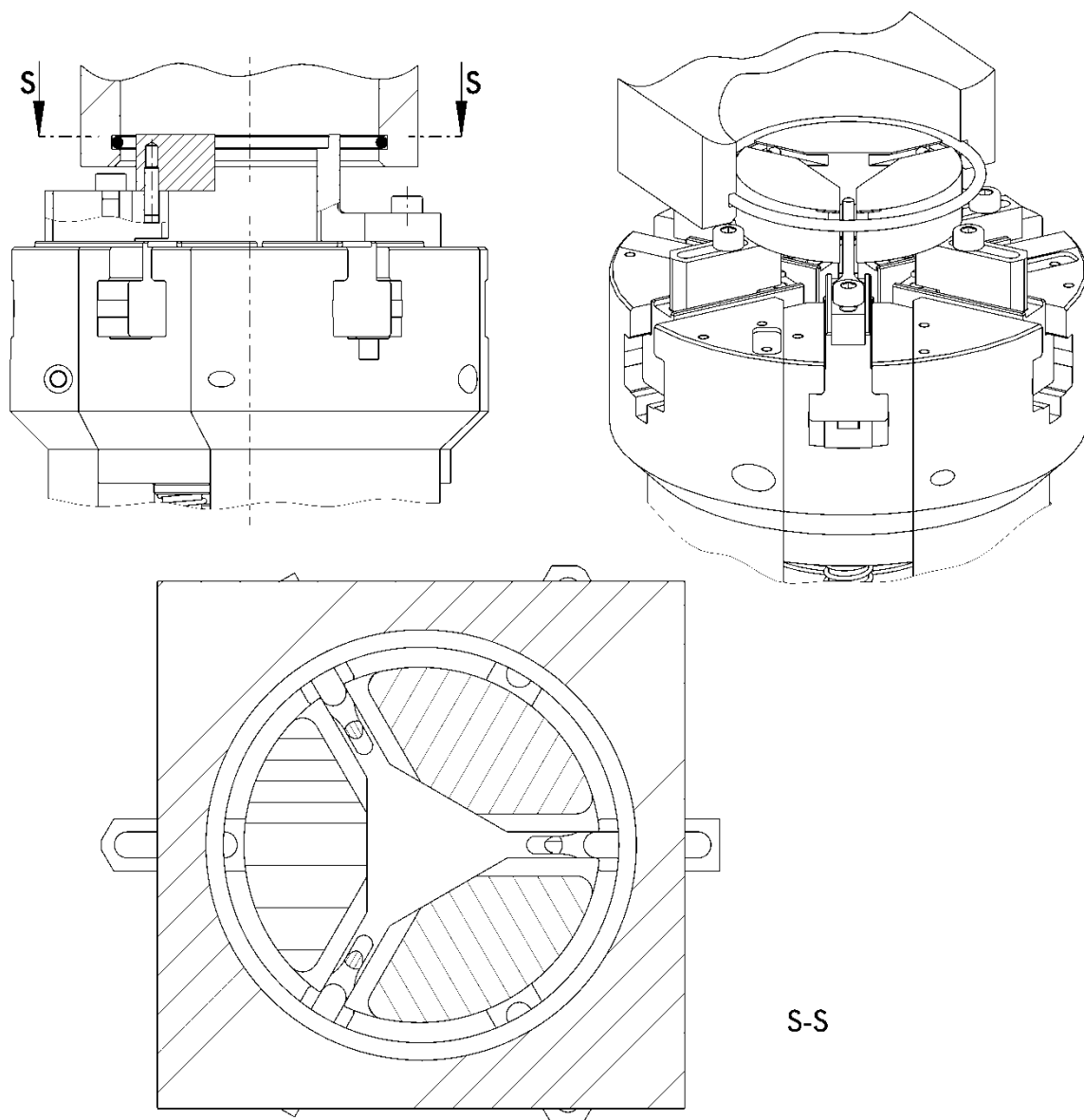


Figure 46: Internal assembly IM_1.10

The internal assembly cycle is completed and the gripper can subsequently be moved out of the assembly bore.

7 Maintenance and Care

(Item No. see Chapter 9, page 59.)

7.1 Notes



It is essential to observe the safety notes in Chapter 1.4, page 4.

The base jaws and the guides in the housing are aligned with each other. To replace these parts, send the complete gripper to SCHUNK together with a repair order.

Please observe the following notes to ensure correct functioning of the gripper:

- Standard for quality of the compressed air according to ISO 8573-1: **6 4 4**
- Pressurizing medium: Compressed air filtered (10 µm), dry, lubricated or non-lubricated.
- The operating pressure is min. 2 bar and max 8 bar.
- Bare external steel parts must be oiled or greased.
- If no other regulations apply, all screws and nuts must be secured with adhesive (see Table 8, page 51) and tightened with a tightening torque in compliance with DIN (see Table 9, page 52).
Perform maintenance on the gripper after the intervals specified in Chapter 7.3, page 52.
- All metallic slides must be treated with GP303P or a comparable lubricant.
- The piston bores as well as all seals are treated with Renolit HTL 2 or a comparable lubricant.

7.2 Utensils required for maintenance

Tools / Grease / Adhesive	ORG 85
Torque wrench	✓
Renolit HLT2	✓
GP303P	✓
Adhesive from Weicon 302-41	Pos. 40 – 43 Item 63 Item 64

Table 8: Utensils required for maintenance

Comparable greases and adhesives from different manufacturers may also be used.

7.3 Maintenance and servicing intervals

Carry out maintenance on the gripper once every 2 million cycles. During the maintenance work, certain parts must be installed with oil or grease (basic greasing). All seals of the gripper must be replaced during each maintenance (see list of seal sets, Chapter 9.1 page 60). The complete seal set is available from SCHUNK.

Environmental temperatures of more than 60 °C/ 140 °F can harden the used lubricants faster. Therefore, lubrication and maintenance works have to be carried out more often.

7.4 Screw tightening torques

Type	Item 40	Item 41	Item 42	Item 43	Item 80
ORG 85	0.8 Nm	2.7 Nm	5.8 Nm	3.1 Nm	0.1 Nm

Table 9: Screw tightening torques

7.5 Gripper design

The ORG 85 consists of three assembly groups (also see Figure 47, page 52):

No.	Assembly group ORG
Assembly group 1	Triple jaw A unit
Assembly group 2	Triple jaw B unit
Assembly group 3	Drive unit triple jaw B

Table 10: Gripper design

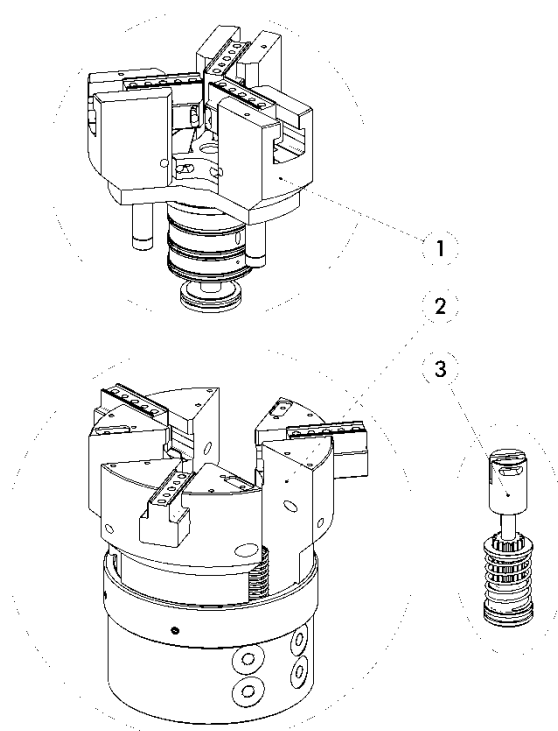


Figure 47: Gripper design

7.6 Disassembling the gripper



It is essential to observe the safety notes in Chapter 1.4, page 4 and the instructions in Chapter 7.1, page 51.



The power supply must be switched off during assembly or disassembly of the gripper. Please also observe the safety notes in Chapter 1.4, page 4.

Assembly group 1, triple jaw unit A (cf. Figure 47) must be disassembled first:



Remove all compressed air connections (40, 41 and 43) from the gripper, except for compressed air connection 42. You must make sure that **only compressed air connection 42** remains connected!

To be able to dismantle assembly group 1, triple jaw B must be completely open. The end position must therefore be set so that triple jaw B is completely open (see Chapter 5.2.2, page 9).



Assembly group 1, triple jaw A unit is spring loaded!

- Load compressed air connection 42 with compressed air (triple jaw B must open completely).
- Loosen countersunk head screw (item 40) from the piston Z-stroke (item 3).
- You can now pull assembly group 1 together with the compression springs (item 25) toward the top and out of the gripper.



Turn off the compressed air supply for all compressed air connections and detach all compressed air lines from the gripper!

- Now continue with Chapter 7.6.1.

7.6.1 Disassembling assembly group 1 (Triple jaw unit A)

- Mark the assembly position of the base jaws (item 16) in the base bodies triple jaw A (item 5).
- Detach the three cylindrical pins (item 60) which connect the base jaws (item 16) with the angle levers triple jaw A (item 17).
- Pull the base jaws (item 16) radially out of the base body triple jaw A (item 5).
- Detach the three cylindrical pins (item 69) which connect the fork head (item 14) with the angle levers triple jaw A (item 17).
Detach the three cylindrical pins (item 60) supporting the angle levers triple jaw A (item 17) in the base body triple jaw A (item 5).
The three angle levers triple jaw A (item 17) can be removed.
- Unscrew the three screws (item 42) with the spacer sleeves (item 6).
Remove the three base body triple jaws A (item 5) toward the top from the flange (item 10).
- Detach the six cylindrical pins (item 61) from the flange (item 10).
- Detach the cylindrical bushing (item 8) from the flange (item 10).
- Loosen the screw (item 40) connecting the piston rod (item 9) with the triple jaw A piston (item 15).
- Pull the fork head (item 14) toward the top out of the flange (item 10).
- Turn the piston rod (item 9) upward out of the fork head (item 14).
- Clean all parts thoroughly and check them for damage and wear.
- Replace the seals: (item 31) and (item 35) on the cylindrical bushing (item 8), (item 36) on the piston rod (item 9), (item 37) on the fork head (item 14) and (item 38) on the piston triple jaw A (item 15), in accordance with the sealing kit list Chapter 9.1 page 60.



Assembly is carried out in reverse order whereby the following notes need to be observed for the assembly of assembly group 1:

- Please observe Chapters 7.1 and 7.2 as well as the screw tightening torques in Chapter 7.4!
- The base jaws (item 16) must be assigned to the base bodies triple jaw A (item 5) which were marked earlier!
- All nine cylindrical pins (items 60 and 69) must be positioned in the centre of angle lever triple jaw A (item 17)!

7.6.2 Disassembling assembly group 2 (Triple jaw unit B)



Turn off the compressed air supply for all compressed air connections and detach all compressed air lines (40, 41, 42 and 43) from the gripper!



To disassemble assembly group 2, the stroke of triple jaw B must be completely opened! Therefore set the end position so that triple jaw B is completely opened (see Chapter 5.2.2, page 9).

- Mark the assembly position of the base bodies triple jaw B (item 12) on the housing (item 1).



The base body triple jaws B (item 12) and the stroke adjustment ring (item 7) are spring loaded!

- Loosen the six screws (item 43).
- Pull the three base body triple jaws B (item 12) with the stroke adjustment ring (item 7) axially toward the top and out of the housing (item 1).
- Push three base body triple jaws B (item 12) with the drive units triple jaw B radially towards the centre axis to disassemble the stroke adjustment ring (item 7).
- Loosen the two set screws (item 65) from the stroke adjustment ring.



The base body triple jaw B (item 12) must now be separated from the drive unit triple jaw B.

- Use a vice, for example, to press the base body triple jaw B (item 12) and the drive unit triple jaw B together (see **Figure 48**).

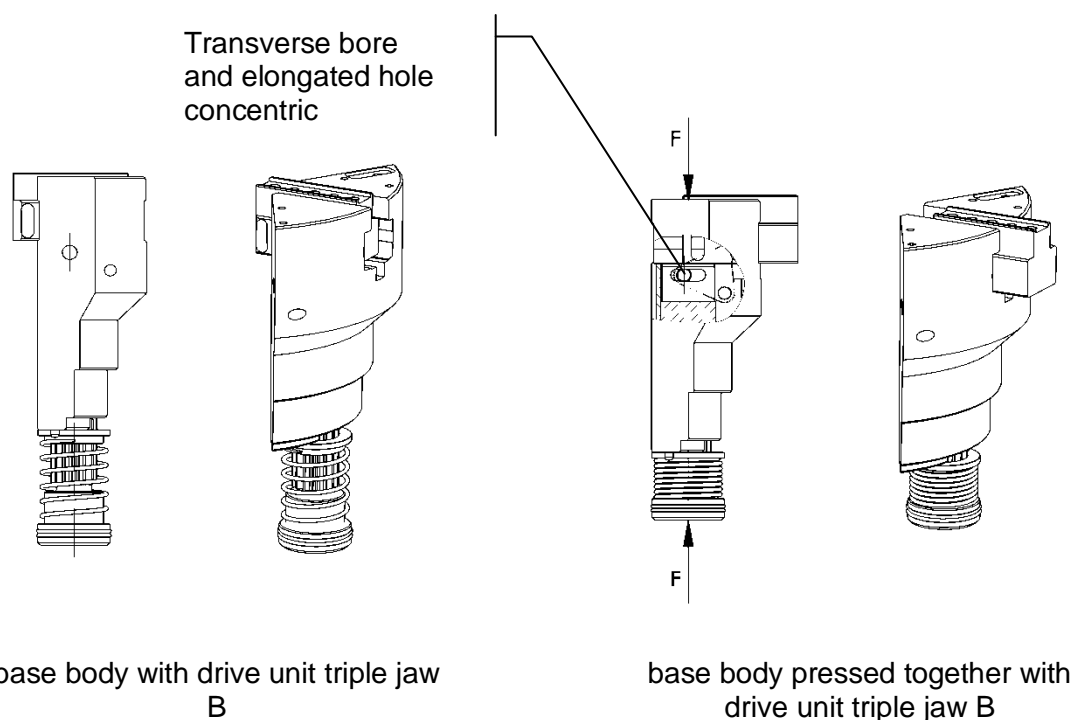


Figure 48: Disassembly of base body with drive unit triple jaw B

- By pressing the unit together, the transverse bore in the base body triple jaw B (item 12) is concentric with the elongated hole in the pressure pin (item 11).
- You can detach the three cylindrical pins (item 13) connecting the angle levers of triple jaw B (item 18) with the pressure pin (item 11) only now.
- Detach the three cylindrical pins (item 60) supporting the angle levers of triple jaw B (item 18) in base body triple jaw A (item 12).
- Pull the base jaws (item 16) radially out of the base body triple jaw B (item 12). (Note: angle lever triple jaw B (item 18) must be turned into the base jaw (item 16) for this purpose.)
- Detach the three cylindrical pins (item 60) connecting the angle levers of triple jaw B (item 18) with the base jaws (item 16).
- Loosen the three screws (item 40) from the housing cover (item 2) and pull it and the piston Z-stroke (item 3) toward the back out of the housing (item 1).
- Detach the six cylindrical pins (item 62) from the housing (item 1).
- Clean all parts thoroughly and check them for damage and wear.
- Replace the seals: (item 30) and (item 31) on the housing cover (item 2), (item 33) on the piston Z-stroke and (item 32) on the housing (item 1) in accordance with the sealing kit list Chapter 9.1 page 60.



Assembly is carried out in reverse order whereby the following notes need to be observed for the assembly of assembly group 2:

- Please observe the Chapters 7.1 and 7.2 as well as the screw tightening torques in Chapter 7.4!
- The three cylindrical pins (item 13) must be pressed **into the centre of** the angle lever triple jaw B (item 18) with an assembly rod, see Figure 49. Please observe the exact assembly dimension and the exact assembly position of the cylindrical pins (item 13).

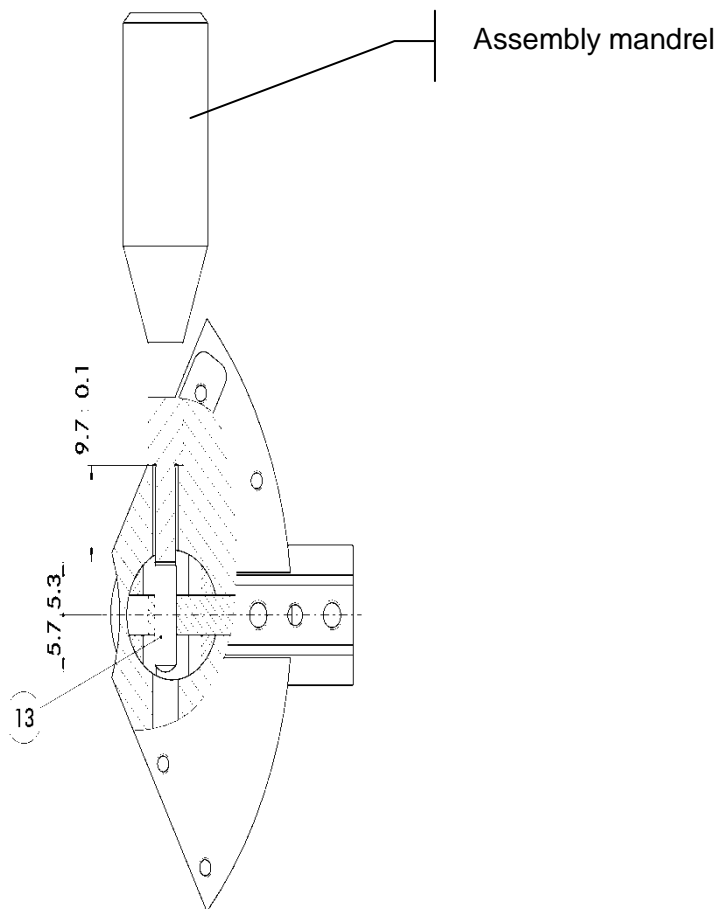


Figure 49: Assembly of cylindrical pins (item 13)

- All other cylindrical pins (item 60) connecting the base jaws (item 16) with the angle levers triple jaw B (item 18) must also be positioned in the centre!
- The base jaws triple jaw B (item 12) must be fastened on the previously marked positions on the housing (item 1)!

7.6.3 Disassembly of assembly group 3 (Drive unit triple jaw B)

- Loosen the set screw (item 63) from the drive piston triple jaw B (item 4).
- Unscrew the screw (item 41).
- Unscrew the pressure pin (item 11) toward the top out of the drive piston of triple jaw B (item 4).
- Clean all parts thoroughly and check them for damage and wear.
- Replace the seals (item 34) on the drive piston triple jaw B (item 4) in accordance with the sealing kit list Chapter 9.1, Seite 60.



Assembly is carried out in reverse order whereby the following notes need to be observed for the assembly of assembly group 3:

- Please observe Chapters 7.1 and 7.2 and the screw tightening torques in Chapter 7.4!
- Check after assembling items: (item 4), (item 41), (item 66) and (item 11) whether pressure pin (item 11) can be easily turned by hand! It must be easily turned along the entire adjustment range of 12 mm!
- The pressure pin (item 11) must be completely unscrewed before the assembly can be continued! This means that the distance between the face side of the diameter 13 mm of the pressure pin (item 11) and end face of the drive piston triple jaw B (item 4) must be 12 mm!



These points must be observed with all three drive units of triple jaw B!

8 Assembly drawing

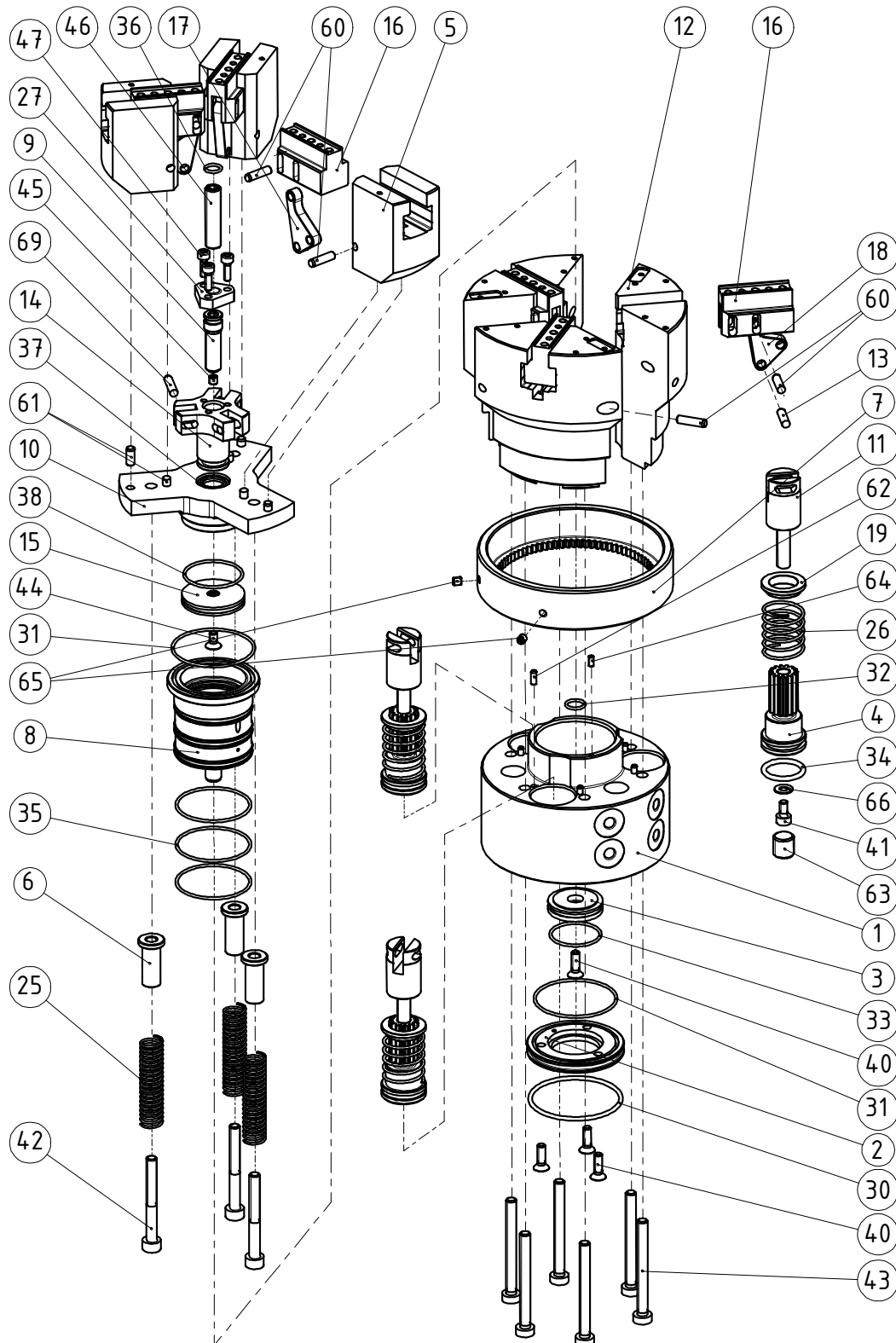


Figure 50: Exploded view ORG 85



9 Bill of materials ORG 85

Item	ID No.	Quantity	Description	Wearing part?	Notes
1	5515695	1	Housing		
2	5515696	1	Housing cover		
3	5515697	1	Piston Z-stroke		
4	5515698	3	Drive piston triple jaw B		
6	5515700	3	Spacer sleeve Z-stroke		
7	5515701	1	Stroke adjustment ring		
8	5515702	1	Cylinder bushing		
9	5515703	1	Piston rod		
10	5515704	1	Flange		
11	5515705	3	Pressure pin		
13	5515982	3	Cylindrical pin		
14	5515708	1	Fork head		
15	5515710	1	Piston triple jaw A		
17	5515713	3	Angle lever triple jaw A		
18	5515849	3	Angle lever triple jaw B		
19	5516066	3	Centralizer bushing spring		
25	9942186	3	Compressing spring Z-stroke		
26	9942187	3	Compression spring drive triple jaw B		
27	5518948	1	Plate for secure triple jaw A		
30	9942184	1	O-ring 33 x 1.50	Yes	
31	9611059	2	O-ring 30 x 1	Yes	
32	9611044	1	O-ring 7 x 1	Yes	
33	9938463	1	O-ring 18 x 1	Yes	
34	9942185	3	O-ring 13.2 x 1.8	Yes	
35	9938739	3	O-ring 27 x 1	Yes	
36	9611227	1	O-ring 5 x 1	Yes	
37	9610111	1	Quad ring 8.2 x 1.78	Yes	
38	9935785	1	O-ring 21 x 1	Yes	
40	9664010	5	Countersunk screw M3 x 10		
41	9682132	3	Screw M3 x 6		
42	9935472	3	Screw M4 x 35		
43	9907539	6	Screw M4 x 40		
44	9938292	1	Countersunk screw M3 x 6		
45	9942018	1	Set screw M3 x3		
46	9907478	1	Set screw M6 x25		
47	9660408	3	Screw M2,5 x 8		
50*	5515715	3	Base body with base jaw triple jaw A		
51*	5515709	3	Base body with base jaw triple jaw B		
60	9682052	12	Cylindrical pin 3m6 x 12		
61	9682006	6	Cylindrical pin 3m6 x 8		
62	9682048	6	Cylindrical pin 2m6 x 6		
63	9936424	3	Set screw M8 x 8		
64	9938926	1	Set screw M2 x 4		
65	9938801	2	Set screw M3 x 3		
66	9936005	3	Washer 3.2		
69	9682074	3	Cylindrical pin 3m6 x 14		



Item	ID No.	Quantity	Description	Wearing part?	Notes
70	9939379	3	Guide sleeve dia. 10		

Table 11: Bill of materials ORG 85

*Individual parts have been designed to work together and cannot be replaced by the user.

9.1 5516224 Sealing kit list

Item	ID No.	Quantity	Description
30	9942184	1	O-ring 33 x 1.50
31	9611059	2	O-ring 30 x 1
32	9611044	1	O-ring 7 x 1
33	9938463	1	O-ring 18 x 1
34	9942185	3	O-ring 13.2 x 1.8
35	9938739	3	O-ring 27 x 1
36	9611227	1	O-ring 5 x 1
37	9610111	1	Quad ring 8.2 x 1.78
38	9935785	1	O-ring 21 x 1

Table 12: Seal set ORG 85

10 Accessories

10.1 Proximity switches

NOTE:

The proximity switches are accessories and must be ordered separately. SCHUNK has prepared the gripper for the use of type **IN 3-S-M8-PNP (ID No. 301 466)** proximity switches.

NOTE:

Ensure that proximity switches are handled correctly:

- Do not pull on the cable and do not let the sensor swing from the cable.
- Tighten the mounting screws or mounting clips with a maximum of 0.1 Nm.
- Permitted bending radius of cable = 15 x cable diameter.
- Ensure that proximity switches do not come into contact with hard objects or chemicals, particularly nitric, chromic and sulfuric acids.

These inductive proximity switches have reverse polarity protection and are short circuit proof.



Important!

The inductive proximity switches are electronic components that may react sensitively to high-frequency interference or electromagnetic fields. Check the attachment and installation of the cable. Sufficient distance must be maintained from sources of high-frequency interference and their supply cables. Several sensor outputs of the same type (nnp, npn) may be switched in parallel, but this does not increase the permitted load current. In addition, please bear in mind that the leakage current of the individual sensors (approx. 2 mA) adds up.

If you would like more information on the operation of sensors, please contact your SCHUNK representative. Information is also available for download at www.schunk.com>Products>Automation>Accessories

10.2 Assembly of mounting kit

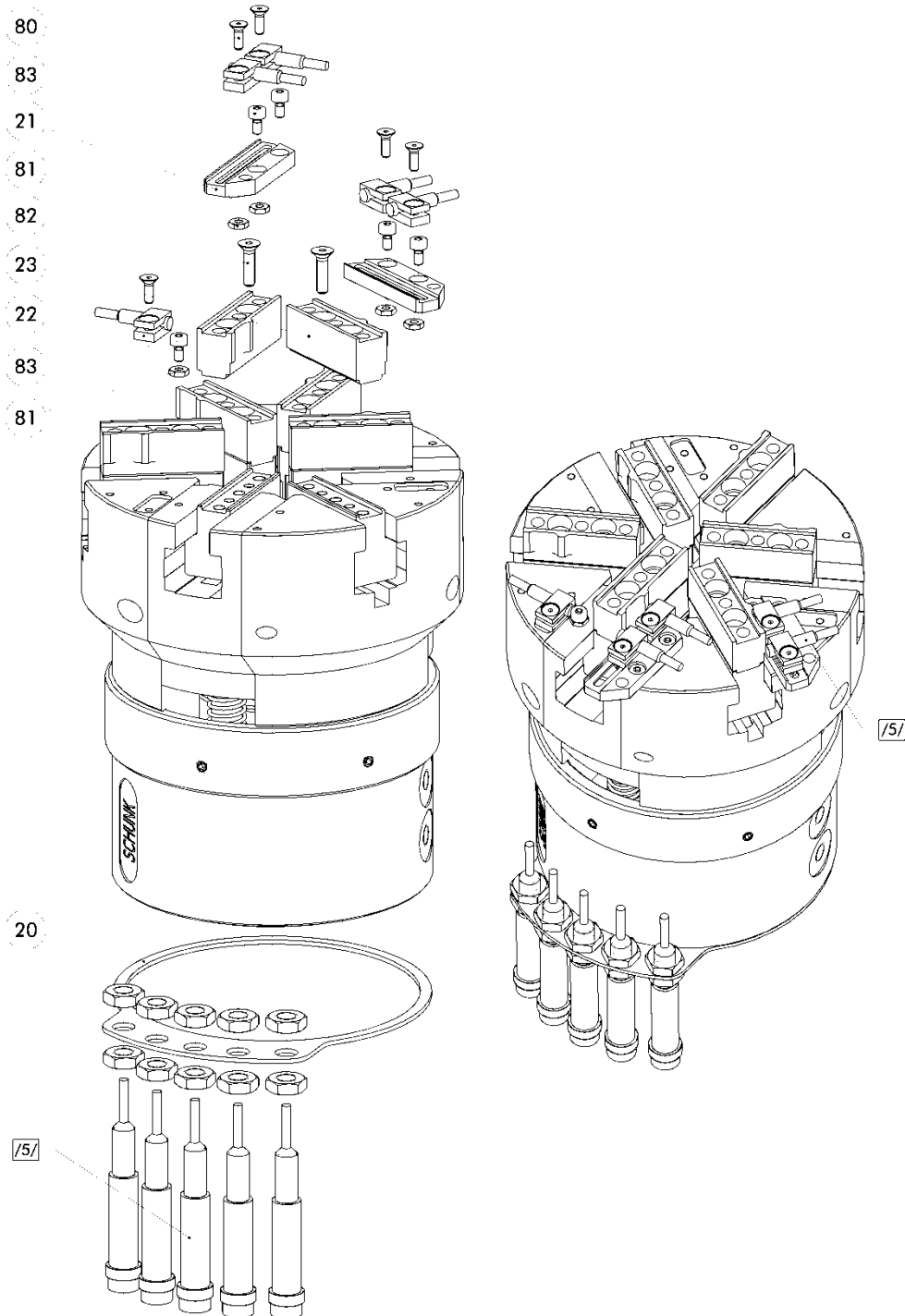


Figure 51: Mounting kit in exploded view

No.	Description
/5/	Proximity switch 301 466

Table 13: Proximity switch in exploded view mounting kit

Note: The mounting kit list is on page 72, Table 14.



It is imperative to observe the safety notes in Chapter 1.4, page 4 and the notes in Chapter 7.1, page 51.



The power supply must be switched off during assembly. Please also observe the safety notes in Chapter 1.4, page 4 in this respect.



Avoid faulty settings of the proximity switches since they may otherwise be damaged or destroyed through collisions!



Note: Measure the distances A and B between the rear edge of the base jaws (item 16) and the top jaws and write down these values **before** loosening the top jaws from the base jaws (item 16) (see Figure 52).

If you have not yet adjusted top jaws on the base jaws (item 16), the distances A and B do not need to be measured.



Before the proximity switches can be adjusted, the intermediate jaws (item 23) must be mounted on the base jaws (item 16). The top jaws previously set must therefore again be detached from the base jaws (item 16) and remounted on the intermediate jaws after adjusting the proximity switches (item 23).

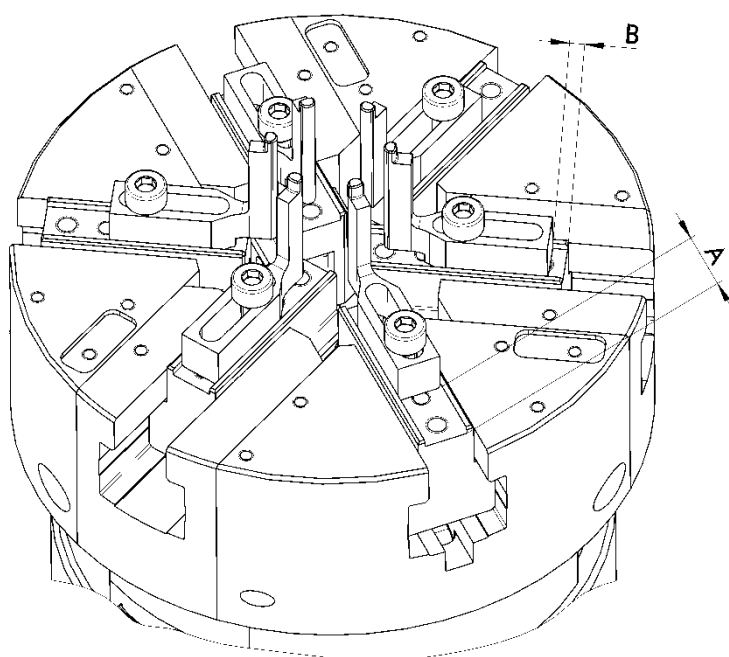


Figure 52: Distances assembly finger to base jaw



Dismantle all top jaws positioned on the base jaws (item 16)! Mount the six intermediate jaws (item 23) on the base jaws (item 16) by tightening the screws (item 82).
NOTE: Pay attention that the cams of the intermediate jaws point outward!



Notes on mounting the brackets (item 22) together with the proximity switches:
The max. tightening torque of the M2 mounting screws (item 80) is 0.1 Nm! If the screws are tightened too much, the sensor may become damaged and no longer send a signal! Observe Chapters 7.1 and 7.2 as well as the screw tightening torques in Chapter 7.4!

10.2.1 Mounting proximity switches for Z-stroke monitoring

- Screw a nut (item 81) onto the screw (item 84)
- Fasten the screw (item 84) with the nut (item 81) in one of the three base body triple jaws A (item 5).
- Slide the proximity switch into the bracket (item 22).
- Tighten a screw (item 80) to fasten the bracket (item 22) in the cut-out pocket on the base body triple jaw B (item 12) (observe the max. tightening torque of 0.1 Nm, cf. note on page 65).
(The bracket (item 22) with the proximity switch must be fastened directly next to the screw (item 84) fastened in the first step.)
- Set the screw (item 84) so that its head dampens proximity switch S5. Secure the axial position of the screw (item 84) by countering the nut (item 81). Note that the screw (item 84) may no longer be dampened when the Z-stroke is pulled!

10.2.2 Mounting the mounting kit for triple jaw A and B monitoring

- Insert two nuts (item 81) into the elongated hole in the retaining plate for the monitoring of triple jaws A and B (item 21).
- Slide the proximity switch into the bracket (item 22).
- Mount the two brackets (item 22) onto the retaining plate (item 21) by tightening the screw (item 80) with the nuts previously inserted (item 81).
- Mount the retaining plate (item 21) by tightening two screws (item 83) on the base body of triple jaw A (item 5) or triple jaw B (item 12).

NOTE:

The retaining plate (item 21) must be fastened directly next to the Z-stroke monitoring or the triple jaw A monitoring so as to make routing the cable easier (cf. Figure 51).



For positions and designations of the proximity switches on the gripper see page 22, Figure 19.

10.3 Setting the proximity switches



The proximity switches can only be set after the stroke of triple jaws A and B required for the seal assembly has been set!

This means, the positions of the top jaws on the base jaws, depending on the assembly scenario, as well as the strokes of triple jaws A and B required for the assembly, must first be set. Only after this can you continue with Chapter 10.3.1!

10.3.1 Setting proximity switches for Z-stroke monitoring



The proximity switch must be set so that the distance between the sensor and the screw head (item 84) is approximately 0.2 - 0.4 mm.

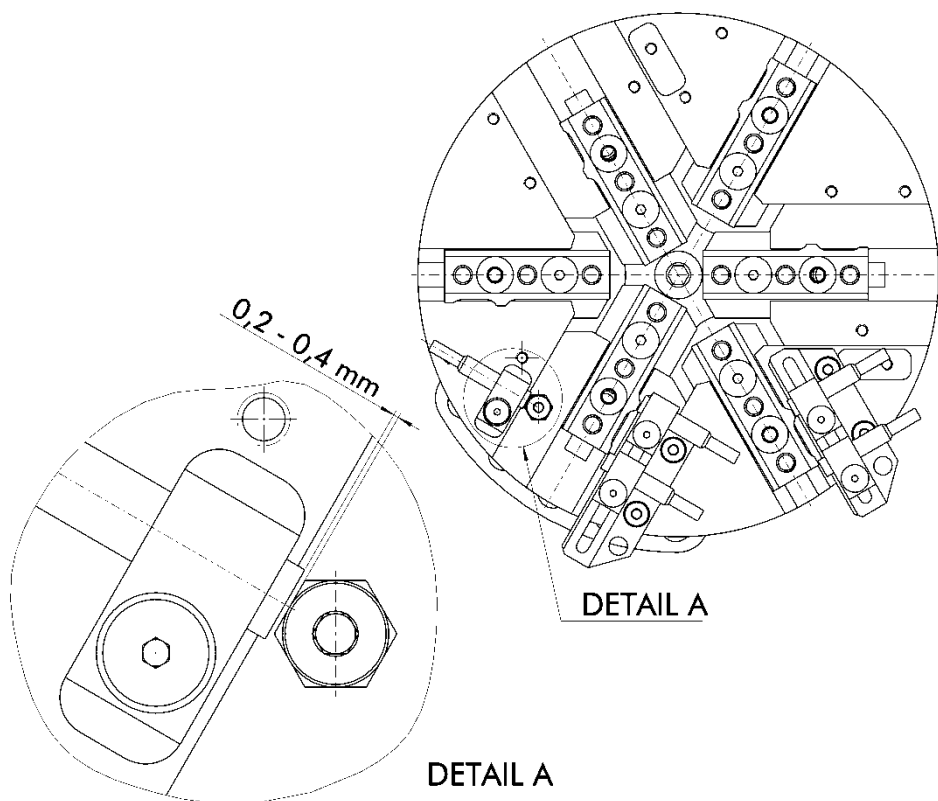


Figure 53: Z-stroke monitoring

- The proximity switch is only dampened by the screw (item 84) if the Z-stroke is in the end position (Z-stroke "up", compressed air connection 43 not pressurised).

10.3.2 Setting proximity switches for triple jaw A and triple jaw B



The proximity switches must be set so that the distance between the sensor and the intermediate jaw cam (item 23) is approximately 0.2 - 0.4 mm.

Step 1.0 (Example: gripper closed, 0 mm "OPEN")

- Proximity switch S1 only monitors the position "gripper closed". It must therefore be set so that it is dampened by cam 1 (1 mm high) when in the "gripper closed" position (see Figure 54).
- Proximity switch S2 monitors the position gripper open. It must be set so that it is not dampened by cam 2 (0.5 mm high) when in the "gripper closed" position (Figure 54).

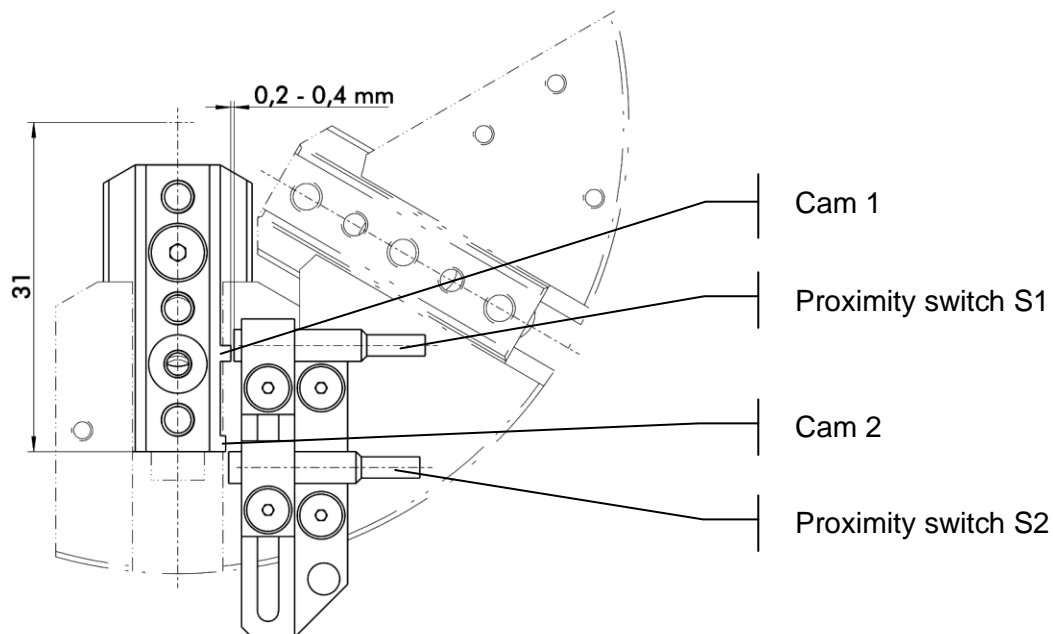


Figure 54: Step 1.0 Setting of proximity switch



Pay attention that proximity switches S2 and S4 are not damaged or destroyed by cam 1 because of faulty stroke settings (opening stroke too long)!

Step 2.0 (Example: gripper open, 1 mm "OPEN")

- Proximity switch S1 is no longer dampened by cam 1 (1 mm high).
- Proximity switch S2 is now dampened by cam 2 (0.5 mm high).

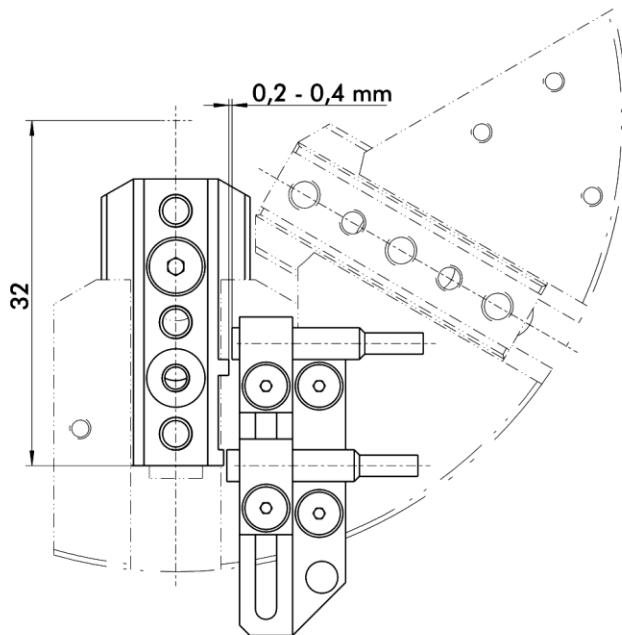


Figure 55: Step 2.0 Setting of proximity switch

Step 3.0 (Example: gripper open, approx. 9 mm "OPEN")

- Proximity switch S1 is not dampened.
- Proximity switch S2 is dampened by cam 2 (0.5 mm high).

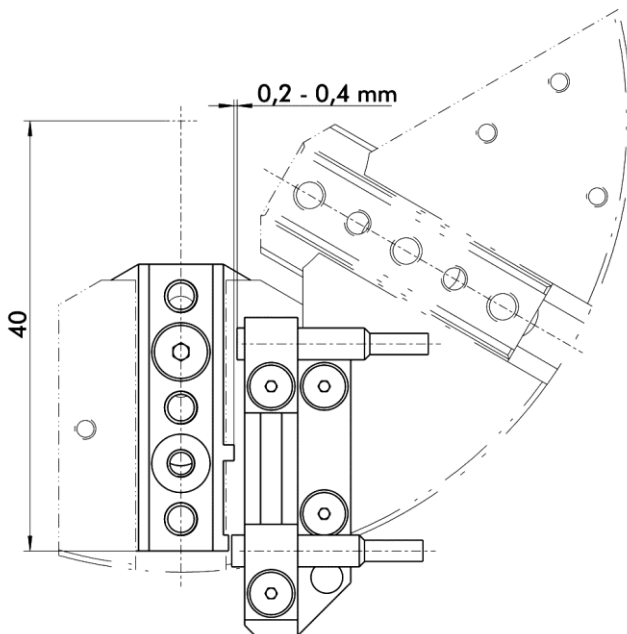


Figure 56: Step 3.0 Setting of proximity switch

- The position of the proximity switch S2 cannot be radially adjusted further to the outside on the retaining plate (item 21).
To monitor additional positions "gripper OPEN", the proximity switch must be released from the bracket (item 22). The bracket (item 22) must be turned by 180° before the proximity switch is fastened in the bracket again (see Figure 57).

Step 4.0 (Example: gripper open, approx. 9 mm "OPEN", bracket turned by 180°)

- Proximity switch S1 is not dampened.
- Proximity switch S2 is dampened by cam 2 (0.5 mm high).

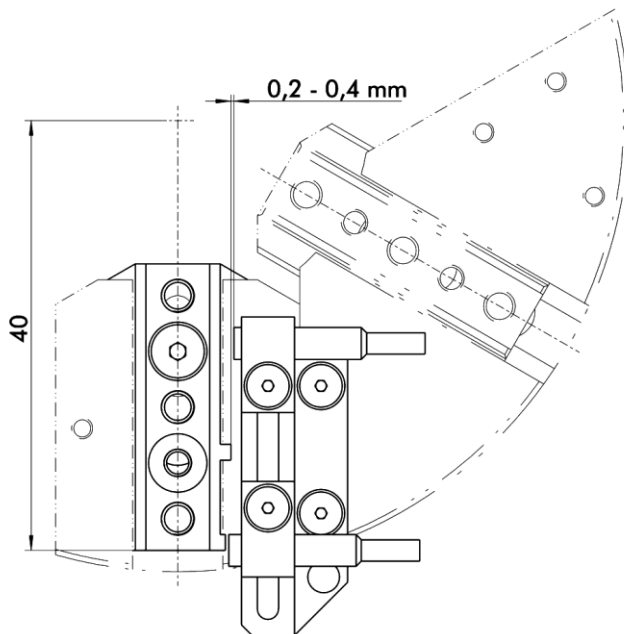


Figure 57: Step 4.0 Setting of proximity switch

Step 5.0 (Example: gripper open, approx. 17 mm "OPEN", bracket turned by 180°)

- Proximity switch S1 is not dampened.
- Proximity switch S2 is dampened by cam 2 (0.5 mm high).

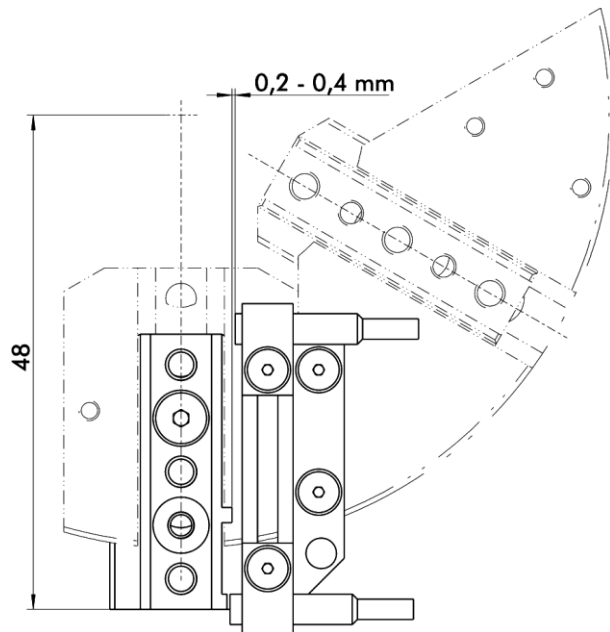


Figure 58: Step 5.0 Setting of proximity switch

- The position of the proximity switch S2 cannot be radially adjusted further to the outside on the retaining plate (item 21).
To monitor additional positions "gripper OPEN", the proximity switch S2 must now be set so that, just like proximity switch S1, it is also dampened by cam 1 (1 mm high) (see Figure 59).

Step 6.0 (Example: gripper "OPEN" approx. 21 mm, bracket turned by 180°)

- Proximity switch S1 is not dampened.
- Proximity switch S2 is dampened by cam 1 (1 mm high).

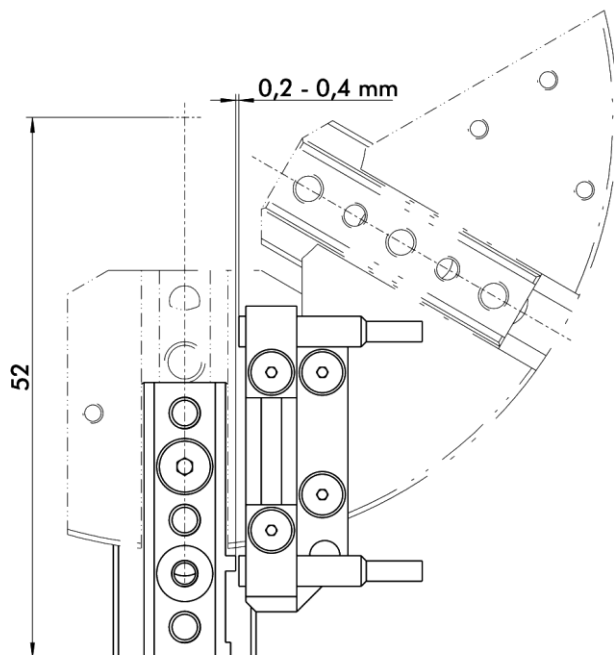


Figure 59: Step 6.0 Setting of proximity switch

Mount the top jaws on the intermediate jaws after setting the proximity switches (item 23).

The position of the top jaws on the intermediate jaws (item 23) can be set through previously measured distances A and B!

If you have not, or could not, measure distances A and B, proceed with Chapters 5.5, page 11 or 5.7, page 16.

10.4 Mounting options for sensor cable

The proximity switches can be mounted on the retaining ring (item 20). You have two options to do this:

- You can fasten the terminal of the proximity switch directly to the retaining ring (item 20) using the two nuts M5x0.5 included in the scope of delivery (cf. Figure 51).
- You can guide the head of the proximity switch through the holes in the retaining ring (item 20) and fasten it there with a cable tie.



10.5 304 129 Mounting kit list for proximity switches

Item	ID No.	Quantity	Description
20	551636 1	1	Retaining plate NHS cable
21	551623 2	2	Retaining plate triple jaws A and B monitoring
22	551623 3	5	Bracket
23	551623 4	6	Intermediate jaw
80	994164 2	5	Countersunk screw M2 x 6
81	969001 0	5	Nut M2
82	968280 3	6	Countersunk screw M2.5 x 10
83	993891 0	5	Screw M2 x 4

Table 14: Mounting kit list for proximity switches



11 EC declaration of incorporation

In terms of the EC Machinery Directive 2006/42/EC, annex II B

Manufacturer/
distributor SCHUNK GmbH & Co. KG.
 Spann- und Greiftechnik
 Bahnhofstr. 106 – 134
 74348 Lauffen/Neckar, Germany

We hereby declare that the following product:

Product designation Special Gripper, O-Ring Assembly Gripper
Type designation: ORG 85
ID number: 0304120

meets the applicable basic requirements of the Directive **Machinery (2006/42/EC)**.

The incomplete machine may not be put into operation until conformity of the machine into which the incomplete machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.


Applied harmonized standards, especially:

EN ISO 12100-1 Safety of machines - Basic concepts, general principles for design -- Part 1:
 Basic terminology, methodology
EN ISO 12100-2 Safety of machines - Basic concepts, general principles for design -- Part 2:
 Technical principles

The manufacturer agrees to forward on demand the special technical documents for the incomplete machine to state offices.

The special technical documents according to Annex VII, Part B, belonging to the incomplete machine have been created.

Person responsible for documentation: Mr. Michael Eckert, Tel.: +49(0)7133/103-2204

Location, date/signature: Lauffen, Germany,
 January 2010 p.p. 

Title of the signatory Director for Development

12 Contact



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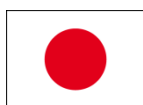
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