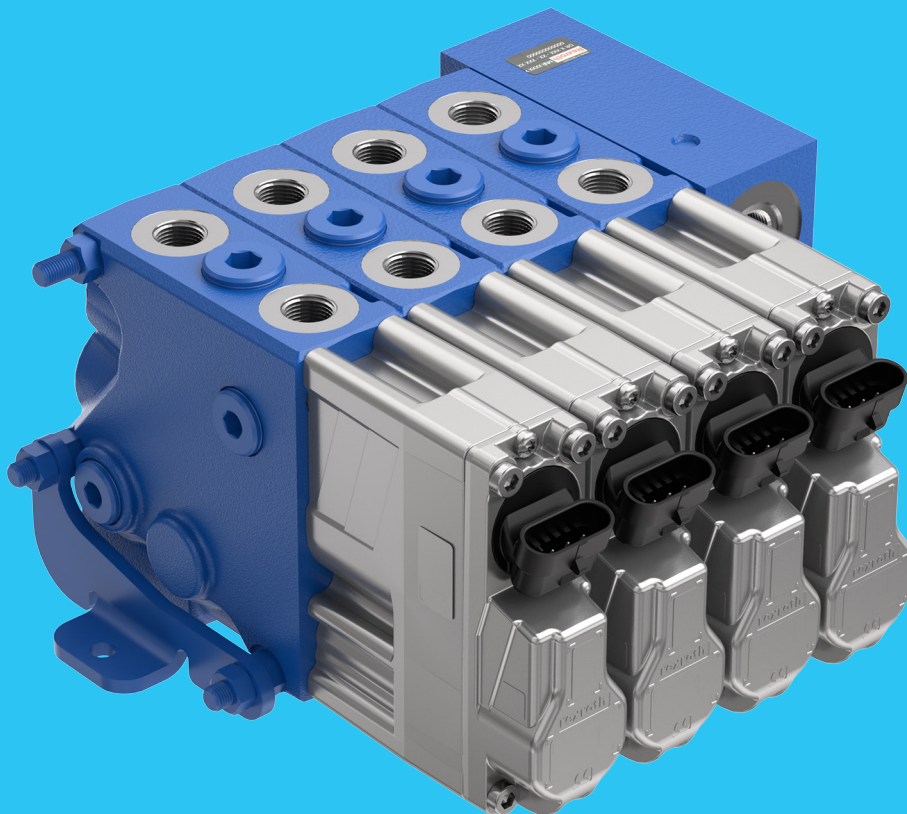


Load-sensing control block in sandwich plate design

SB11



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The cover shows an example application.
The product delivered may differ from the image on the cover.

The original repair manual was created in the German language.

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1 About this documentation

1.1 Validity of the documentation

This documentation applies to load-sensing control blocks SB11 of Bosch Rexroth including the following control block segments:

- Connecting plate, end plate
- Control valves SB11-EHS4
- Hitch control valves EHR11-EHS4

- ▶ Read this documentation completely and, in particular, the chapter 2 "Safety instructions" and the chapter 3 "General instructions on property and product damage" in the related instruction manual 66177-B before you start working with the product.

1.2 Required and supplementary documentation




- ▶ Only commission the product if the documentation marked with the book symbol  is available to you and you have understood and observed it.

Table 1: Required and supplementary documentation

Title	Document number	Document type
 Load-sensing control block SB11 Contains important information on the safe and proper transport, installation, commissioning, maintenance and removal of the SB11 control block.	66177-B	Instruction manual
 Technical data sheet Contains the permissible technical data. Please bear in mind that different technical data sheets apply depending on the version:		Data sheet
Load-sensing control block SB11	66177	
Load-sensing directional valves in sandwich plate design SB11-EHS4	66176	
Plates for load-sensing control block in sandwich plate design SB11	66181	
Hitch control valves EHR	66126	



For related documentation on the assembly and repair, please refer to the above-mentioned manual and, if necessary, to

www.boschrexroth.com/mobile-hydraulics-catalog.


1.3 Representation of information

Uniform safety instructions, symbols, terms and abbreviations are used throughout this documentation to ensure safe and proper use of the product. For clarification, they are explained in the sections below.

1.3.1 Symbols

The following symbols indicate notices that are not safety-relevant but increase understanding of the documentation.

Table 2: Meaning of symbols

Symbol	Meaning
	If this information is disregarded, the product cannot be used and/or operated to its full extent.
▶	Single, independent action
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be completed in order.
❶	Black circle with white number: Auxiliary marking for a better understanding.
①	White circle with black number: Position or assembly group with reference to the parts list and to the graphics within a chapter.
Ⓐ	White circle with black letters: Assembly group with reference to the parts list and to the graphics within a chapter.

1.3.2 Designations

This documentation uses the following designations:

Table 3: Designations

Designation	Meaning
SB11-EHS4	Control valve with pilot operated electro-hydraulic actuating unit
EHR11-EHS4	Control valve with CAN bus-controlled electro-hydraulic actuating unit for electrohydraulic hitch control
Control valve	Directional valve type SB
Hitch control valve	Directional valve type EHR

1.3.3 Abbreviations

This documentation uses the following abbreviations:

Table 4: Abbreviations

Abbreviation	Meaning
AP	Connecting plate
EHR	Electrohydraulic hitch control
EHS	Electro-hydraulic actuating unit
EVR	End valve (with LS signaling direction from left to right)
EP	End plate
SVR	Standard valve (with LS signaling direction from left to right)

2 Safety instructions

- ▶ Always follow all safety instructions in the instruction manual 66177-B.

3 General instructions on property damage and product damage

- ▶ Always follow all instructions in the instruction manual 66177-B.

Housing and parts

- Rexroth original spare parts may be used only.
- Replace elastic sealing elements after disassembly.
- The housing and parts must be clean and undamaged.
- Damaged housings and parts may not be used again.
- Reworking threads is not permissible.
- Reworking bores is not permissible.
- Protect bores and threads from any deposition of dirt.

Flange surfaces and sealing surfaces

- During disassembly, adhesion forces might take an effect between the flange surfaces.
- Remove any contamination with a whetstone and clean it with a cleaning cloth.
- Surfaces with imprints or signs of wear in the sealing surface may not be continued to be used.
- Reworking sealing surfaces is not permissible.

Bench vise

- Use protective jaws with hard rubber. Sealing and flange surfaces may not be damaged.

Required tools

- Oil-soaked cleaning cloth
- Whetstone
- Mechanical tools
- Torque wrench

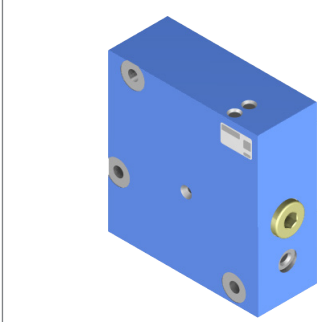
4 About these products



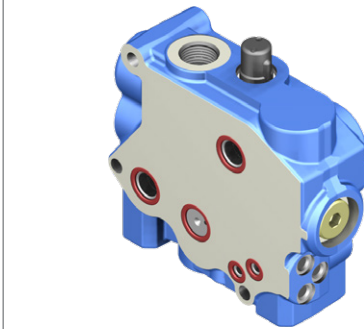
The appearance of the individual control block segments may vary.

4.1 Overview of control block segments

Plates

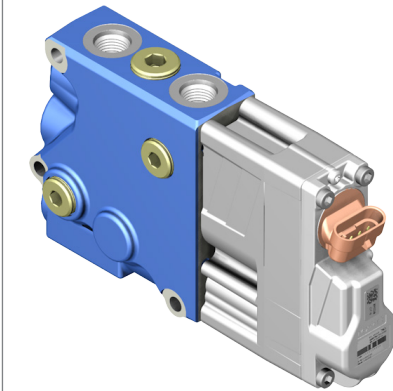


▲ End plate (EP)

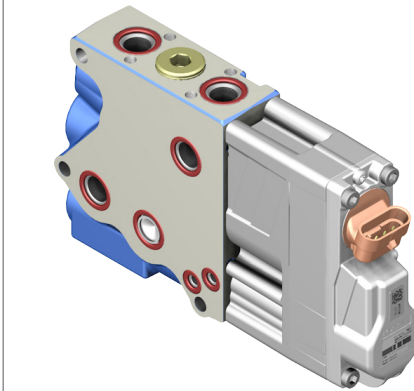


▲ Connecting plate (AP)

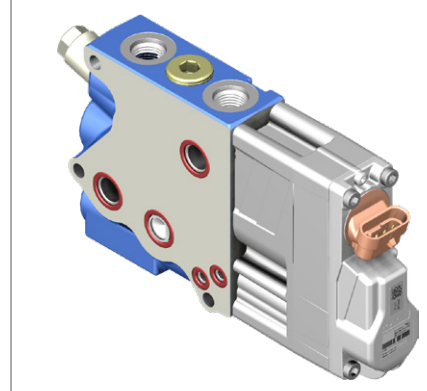
Directional valves



▲ End valve (EVR)



▲ Standard valve (SVR)



▲ Hitch control valve EHR11-EHS4

4.2 Tie rod bores and threads

The control block segments are clamped together by means of tie rods and nuts. For this purpose, the control block is provided with threaded bores at one control block segment and the following control block segments are provided with through bores in the flange surfaces.

At the final control block segment, the tie rods protrude at the end surface. On the protrusion, the tie rod nuts are located.

Example:

	Bore	Bore	Bore	Bore	Thread
Nut	EP / EVR	SVR	SVR	SVR	AP

4.3 Tie rod and nut



Tie rods used by Bosch Rexroth are symmetrical, differentiation of the thread ends is not necessary.

- ▶ Use tie rods M8 × length, property class 10.9.
- ▶ The required tie rod length depends on the number and combination of the control block segments.
- ▶ In the mounted condition, the tie rod must have a minimum protrusion over the nut of 3 mm.
- ▶ Use nuts according to ISO 4032 – M8, property class 10.9.

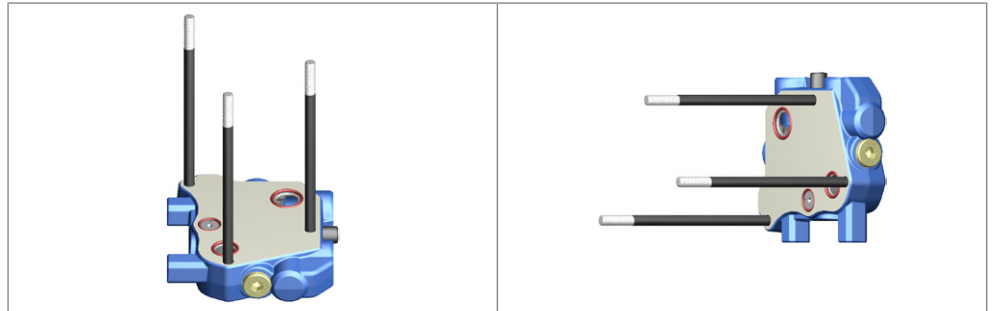
NOTICE! The tie rods must not be deformed during assembly/disassembly of the control block segments!

4.4 Configuring the control block

1. Determine the desired order of the block segments (see chapter 4.2), e.g. starting with the connecting plate.
2. Determine the tie rod length (see chapter 4.3).

4.5 Alignment of the control block on the working surface

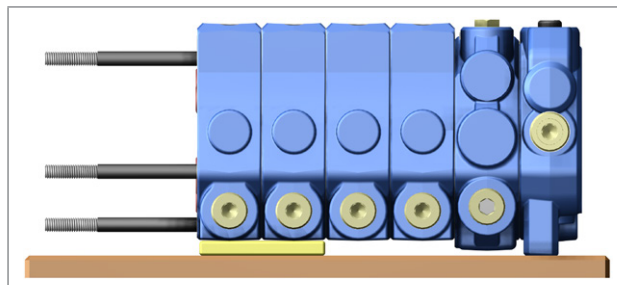
The control block segments can be assembled / disassembled horizontally or vertically.



▲ Vertical assembly

▲ Horizontal assembly

In case of horizontal assembly, the height difference of the individual block segments should be compensated with a suitable underlayer from the fifth control block segment in order to ensure safe orientation of the control block segments to each other.



▲ Compensating height differences

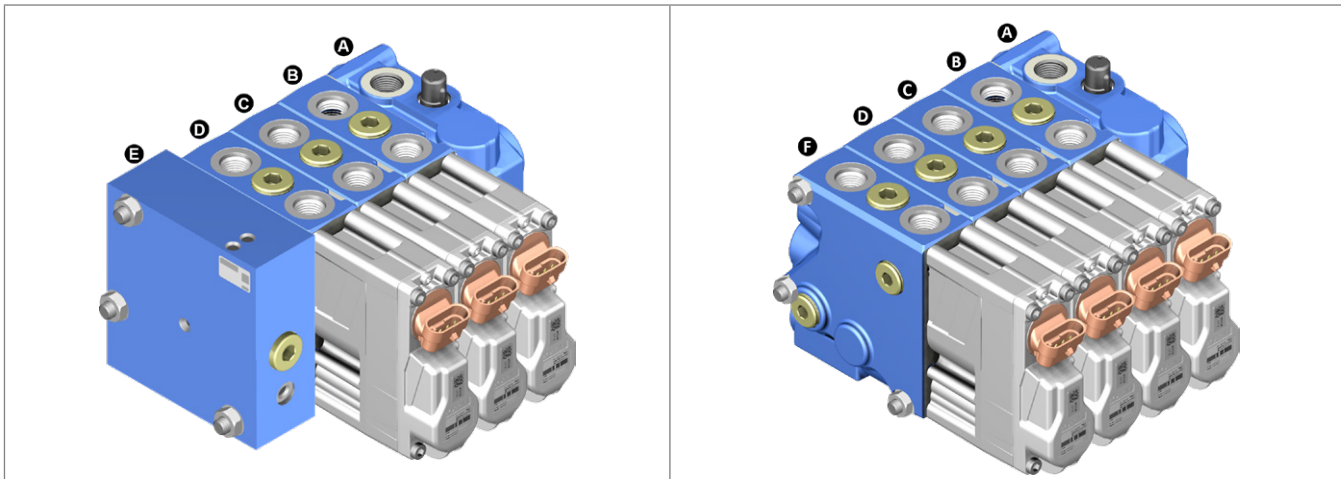
5 Assembly description



The assembly / disassembly is described using a control block with 5 block segments as example. The appearance of the individual control block segments may vary.

Table 5: Control block segments

Position	Designation	Abbreviation
A	Connecting plate	AP
B	Directional valve EHR	SVR
C, D	Directional valve SB	SVR
E	End plate	EP
F	End valve	EVR



▲ Example with end plate

▲ Example with end valve

5.1 Control block assembly

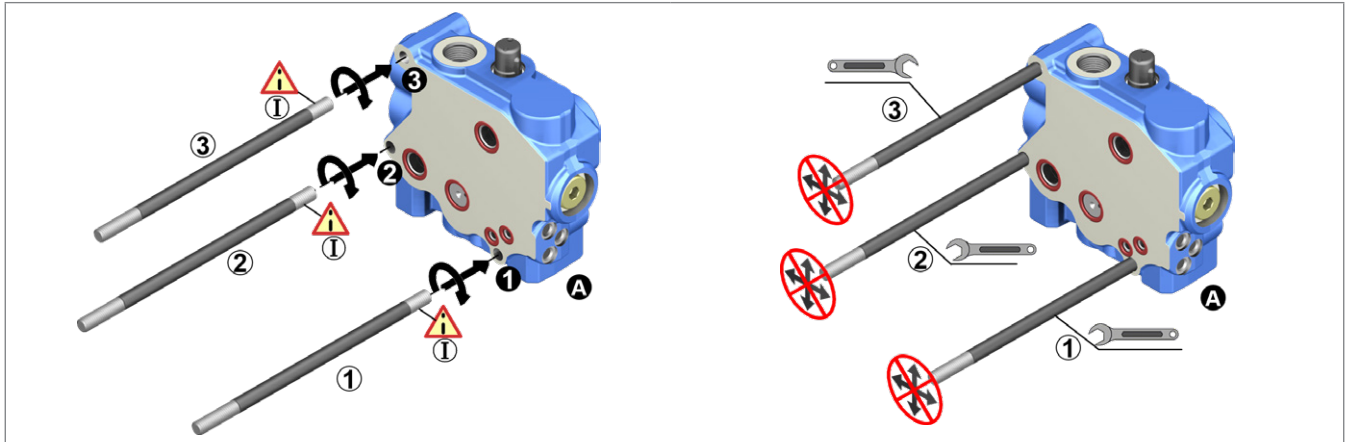
5.1.1 Preparation of the block segments for the assembly

Prepare the flange surface O-ring side of the block segments as follows:

- Block segments with shuttle valve:
Assemble the shuttle valve according to chapter 6.2 "Repairing the shuttle valve".
- Assemble the sealing elements according to chapter 6.1 "Sealing elements for control block segments".

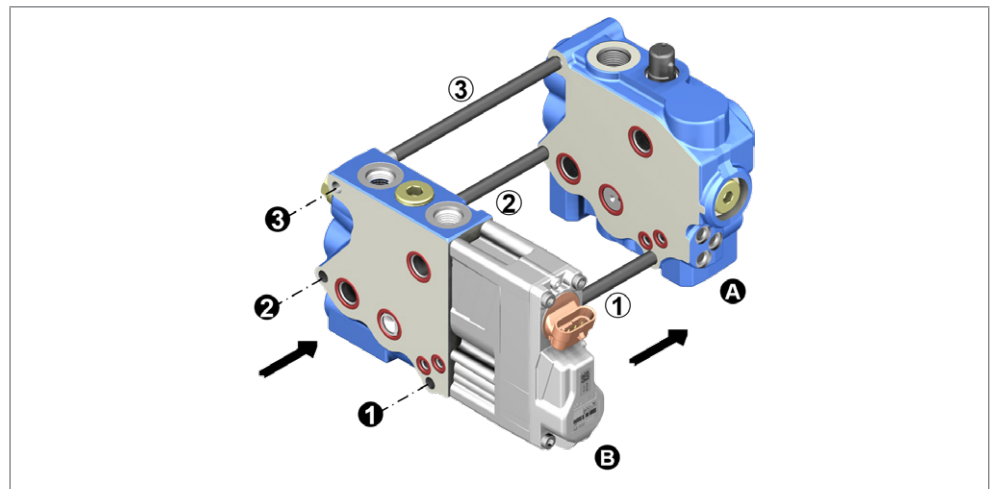
5.1.2 Assembly, connecting plate **A**

1. Manually screw-in the three tie rod screws ①...③ with the thread side ① into the tie rod thread bores ①...③ of the connecting plate **A** in a clockwise direction and tighten them. Tightening torque $M_A = 25.5+2.5$ Nm



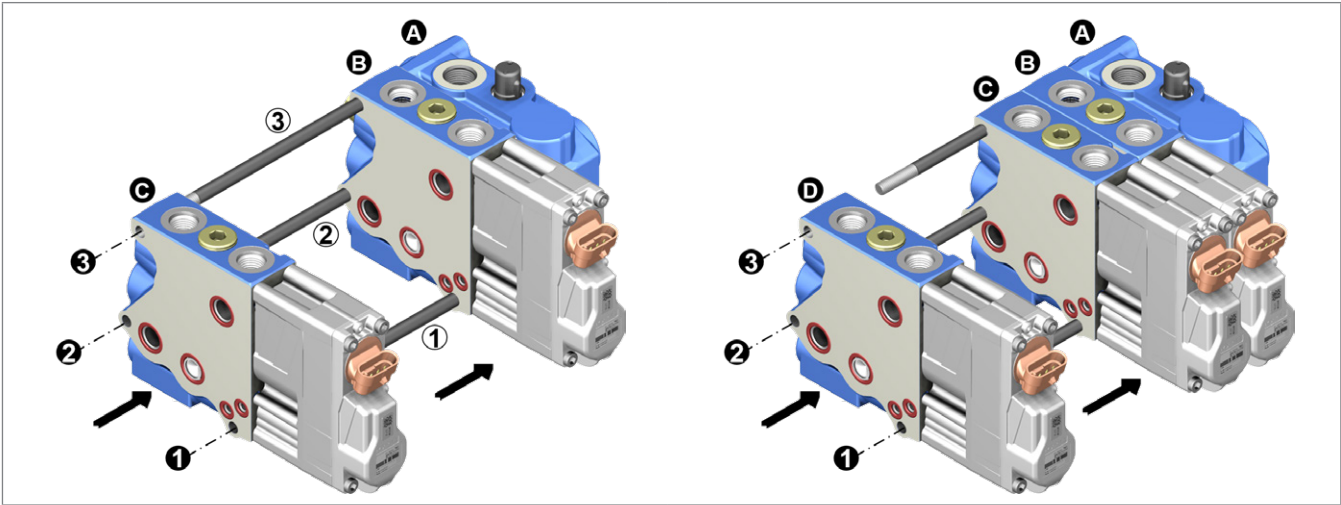
5.1.3 Assembly, directional valve section **B**

- Orientate the control block segment **B** with the flange surface of the opposite O-ring side to the connecting plate **A** and slide it via the tie rod screws ①...③ to the stop at the connecting plate **A**.



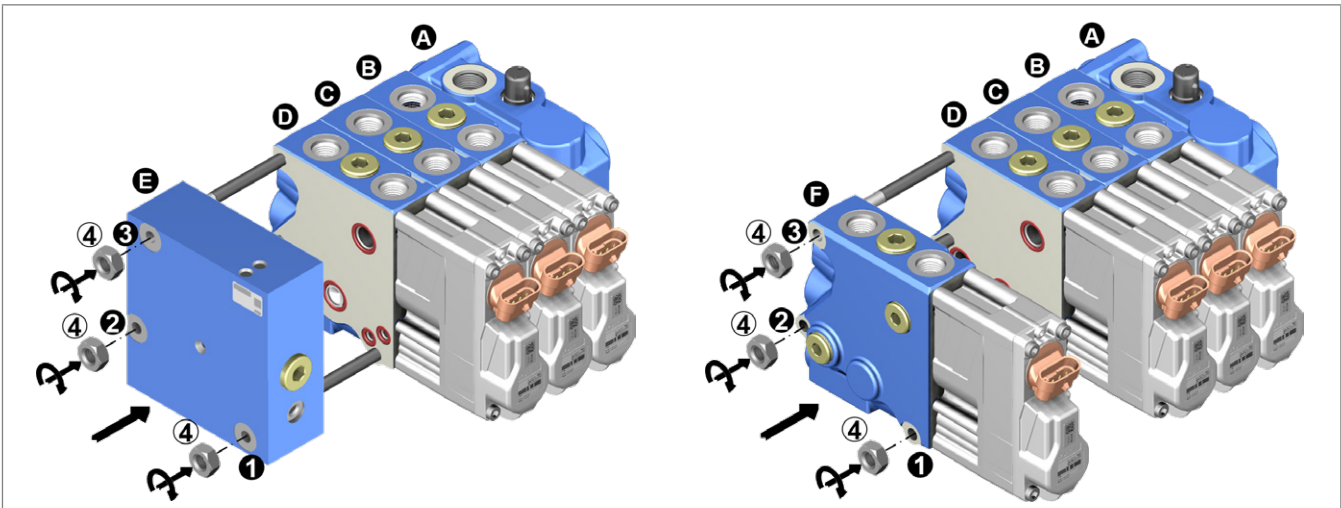
5.1.4 Assembly, directional valve section C and D

- ▶ Orientate the control block segments C, D with the flange surface of the opposite O-ring side to the already mounted control block segment and slide on one after the other via the tie rod screws ①...③ to the stop.

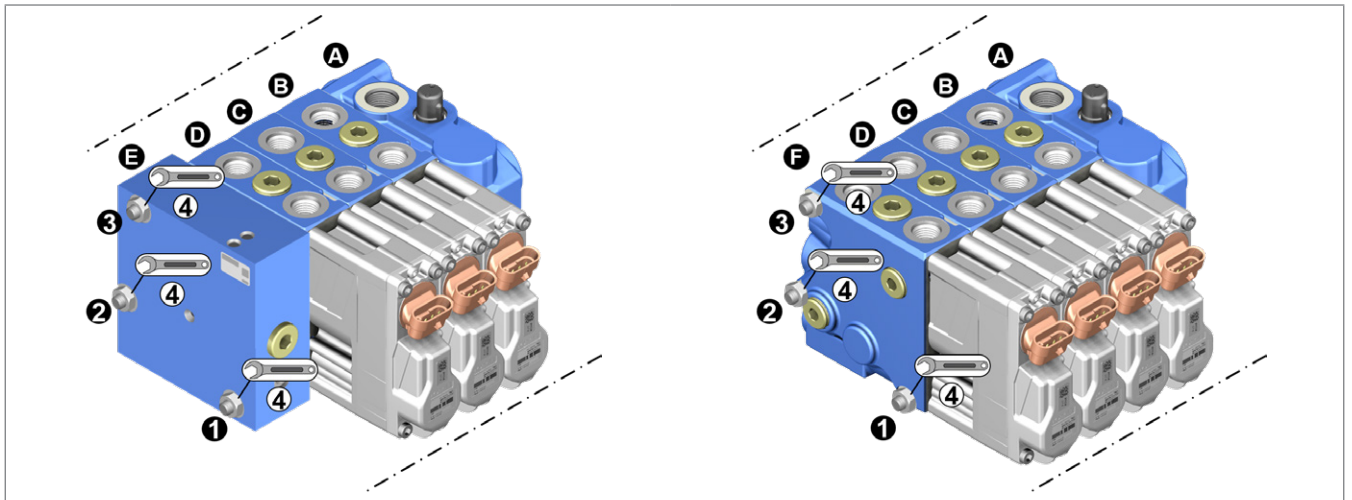


5.1.5 Assembly, end plate E / end valve F

1. Orientate the end plate E / end valve F with the flange surface of the opposite O-ring side to the already mounted control block segment and slide on via the tie rod screws ①...③ to the stop.
2. Screw the nuts ④ onto the tie rods ①...③ without using any washers or locking washers.



3. Align the control block segments to each other and pre-tension the nuts ④ in the order ① → ② → ③ with a torque of approx. 5+1 Nm.
4. Tighten the nuts ④ in the order ① → ② → ③.
Tightening torque $M_A = 25.5+2.5$ Nm



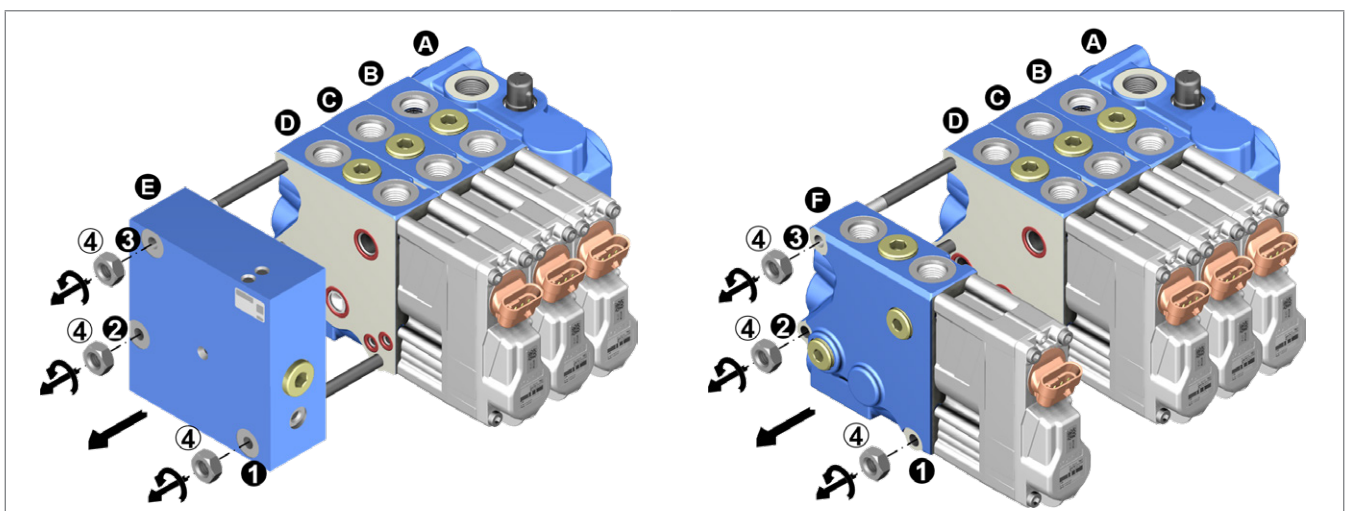
5.2 Control block disassembly

5.2.1 Preparation for disassembly

- ▶ Dismount the control block according to the parameters provided by the machine manufacturer and place it on a clean and stable underlayer.
- ▶ The sealing and flange surfaces must not be damaged.
- ▶ The control block segments are to be numbered individually.

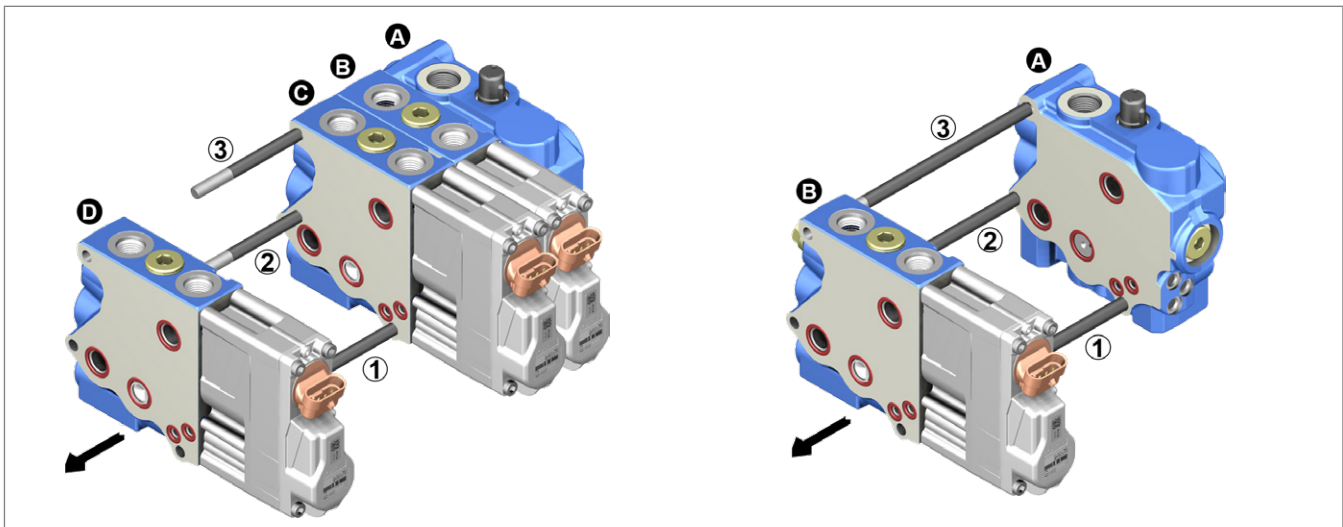
5.2.2 Disassembly, end plate E / end valve F

1. Loosen the nuts ④ by turning them counterclockwise and remove them from the tie rods ①...③.
2. Remove the end plate E / end valve F via the tie rods ①...③ without jamming.



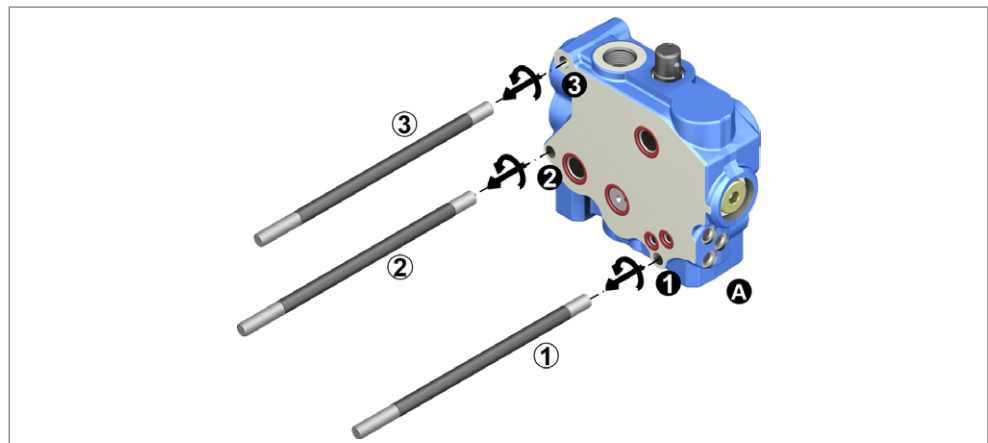
5.2.3 Disassembly, directional valve section B, C and D

- ▶ Remove the control block segments D, C, B one after another via the tie rods ①...③.



5.2.4 Disassembly, connecting plate A

- ▶ Loosen the three tie rods ①...③ by turning them counterclockwise and unscrew them from the connecting plate A.



6 Repairing the flange surface

6.1 Sealing elements for control block segments

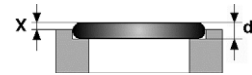
Table 6: Sealing elements

Position	Designation	Use		Dimension	Quantity
①	O-ring	Reservoir, return flow	R	18 × 2.5	1
②	O-ring	Inlet	P	18 × 2.5	1
③	O-ring	LS signal	Y	18 × 2.5	1
④	O-ring	Pilot oil supply	X	9 × 2.5	1
⑤	O-ring	Pilot oil return	Rx	9 × 2.5	1

Flange surfaces O-ring protrusion

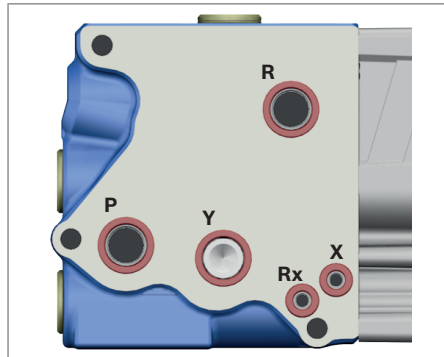
Table 7: O-ring thickness - Flange surface protrusion

O-ring \varnothing d	Protrusion X
1.5 mm	0.3 to 0.4 mm
2 mm	0.4 to 0.5 mm
2.5 mm	0.5 to 0.7 mm
3 mm	0.6 to 0.9 mm



Disassembly/assembly, sealing elements

1. Remove the O-rings from the ports **P**, **R**, **Y**, **Rx** and **X**.
2. Insert new O-rings into the ports **P**, **R**, **Y**, **Rx** and **X** in the flange surface.



▲ Flange surface

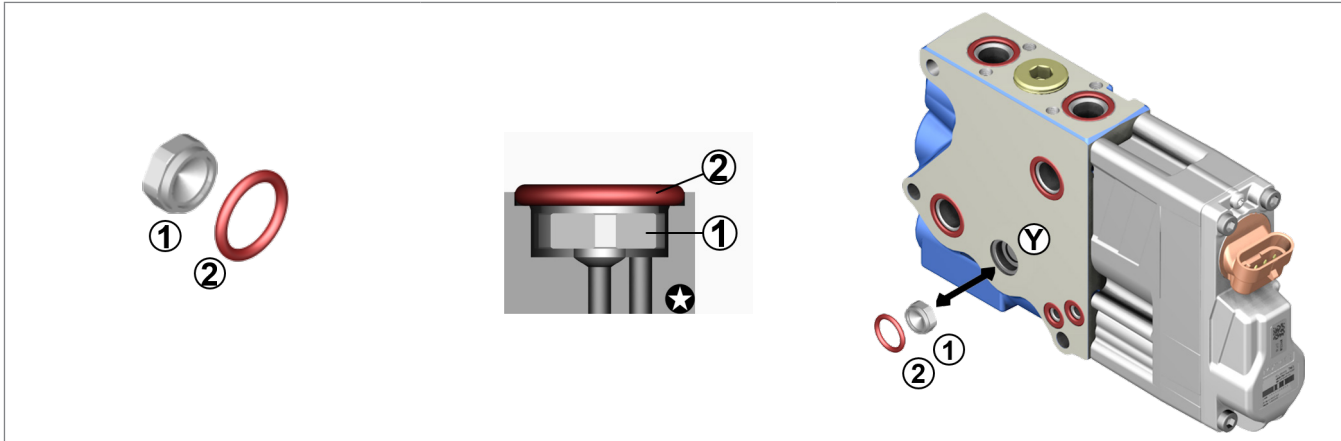


Control block segments with a recess for an O-ring for **X** (without continuous bore through the valve housing) must also be equipped with O-rings.

6.2 Repairing the shuttle valve

Table 8: Parts list

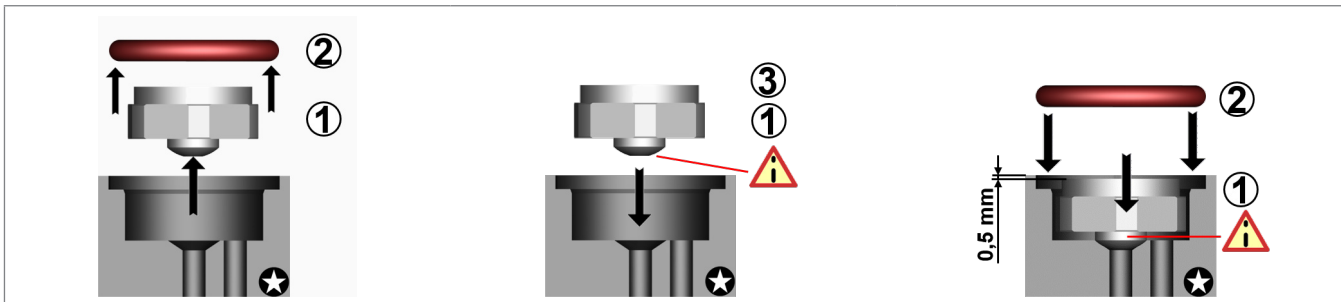
Position	Designation
①	Shuttle valve
②	O-ring



Disassembly/assembly, shuttle valve

1. Remove the O-ring ② from port Y.
2. Remove the shuttle valve ① from port Y.
3. Align the shuttle valve ① with the spherical sealing cup to port Y and insert without jamming.
4. Check the distance dimension 0.5 mm from the flange surface of the control block segment to the upper edge of the inserted shuttle valve.
5. Insert a new O-ring ② into port Y.

NOTICE! The shuttle valve ① must remain freely movable within the O-ring ②.



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