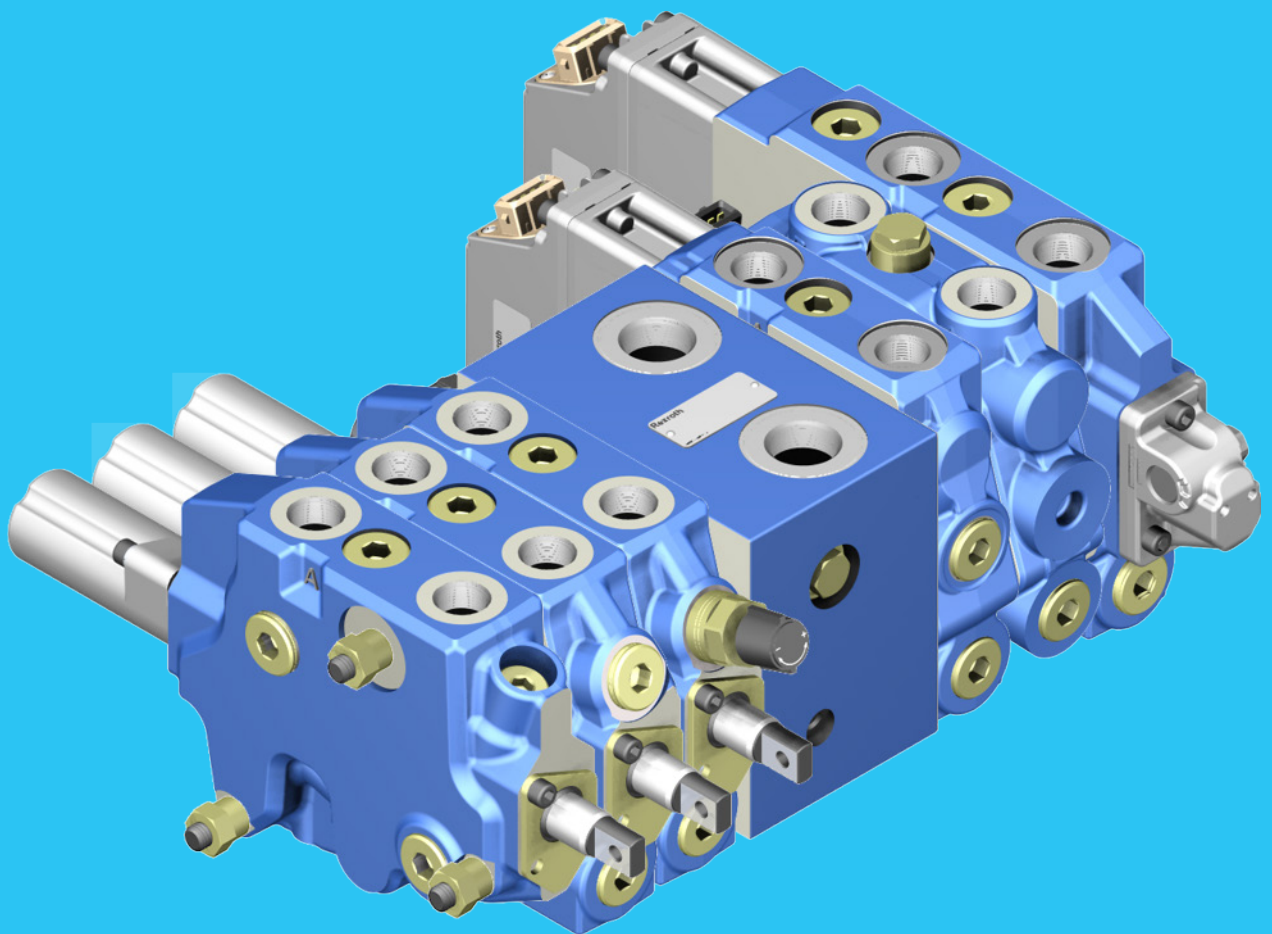


Load-sensing control block SB24/34

for mobile applications



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The data specified within only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

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

The original instruction manual was created in the German language.

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1 About this documentation

1.1 Validity of the documentation

This documentation applies for load-sensing control blocks SB24/34 of

Bosch Rexroth including the following control block segments:

- Connecting plate, central connecting plate, intermediate plate and end plate
- Control valves SB24-M, SB24-EHS and SB34-EHS
- Control valves EHR24-EHS and EHR24-EM2

This documentation applies for all mentioned control blocks and control block segments independent from their manufacturing date until new revision of this document.

This documentation is intended for machine/system manufacturers as well as authorized specialists and dealers.

This documentation contains important information on safe and proper transport, installation and disassembly, commissioning, operation, maintenance and servicing of the product.

- ▶ Read this documentation completely and in particular the chapters 2 "Safety instructions" on page 9 and 3 "General instructions on property damage and product damage" on page 14 before starting to work with the control block/control block segment.

1.2 Required and supplementary documentation


- ▶ Only commission the product if the documentation marked with the book symbol  is available, understood and complied with.

Table 1: Required and supplementary documentation







	Title	Document number	Document type
	<p>Technical data sheet Contains the permissible technical data. Please bear in mind that different technical data sheets apply depending on the version:</p> <p>Load-sensing control block SB24/34</p> <p>Load-sensing directional valves in sandwich plate design SB24-EHS3, SB34-EHS3</p> <p>Load-sensing directional valves in sandwich plate design SB24-EHS4, SB34-EHS4</p> <p>Load-sensing directional valves in sandwich plate design SB24-M Plates SB24, SB34</p> <p>Hitch control valves EHR5, EHR24-EM2, EHR24-EHS</p>	<p>66170</p> <p>66171</p> <p>66174</p> <p>66172</p> <p>66173</p> <p>66126</p>	Data sheet
	<p>Load-sensing control block SB24/34 Contains all information required for control block assembly.</p>	66170-10-R	Assembly instructions
	<p>Order confirmation Contains the order-related technical data of the control block.</p>		Order confirmation
	<p>Offer drawing Contains the outer dimensions, all connections and the hydraulic circuit diagram of the control block.</p>		Offer drawing

Table 1: Required and supplementary documentation

Title	Document number	Document type
 Hydraulic fluids based on mineral oils and related hydrocarbons Describes the requirements for hydraulic fluids on mineral oil basis and related hydrocarbons for operation with Rexroth hydraulic components, and provides support for selection of suitable hydraulic fluids for the hydraulic system.	90220	Data sheet
 Environmentally acceptable hydraulic fluids Describes the requirements for environmentally acceptable hydraulic fluids on mineral oil basis and related hydrocarbons for operation with Rexroth hydraulic components, and provides support for selection of suitable hydraulic fluids for the hydraulic system.	90221	Data sheet



For further documentation on installation and repair, refer to Table 38 on page 82 or visit Rexroth on www.boschrexroth.com/mobile-hydraulics-catalog.

1.3 Representation of information

Standardized 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 Safety instructions





This documentation includes safety instructions in chapters 2.6 "Product-specific safety instructions" on page 11 and 3 "General instructions on property damage and product damage" on page 14, as well as prior to sequences of actions or instructions with risk of injury or property damage. Always follow the measures for danger prevention associated with the use of this product.

Safety instructions are set out as follows:

 SIGNAL WORD
Type and source of danger Consequences of noncompliance ► Measures to prevent danger

- **Warning sign:** draws attention to the danger
- **Signal word:** identifies the degree of the danger
- **Type and source of danger:** indicates the type and source of the danger
- **Consequences:** describes what occurs if safety instructions are disregarded
- **Precautions:** states how the danger can be avoided






Table 2: Hazard classes as defined in ANSI Z535.6

Warning sign, signal word	Meaning
 DANGER	Identifies a dangerous situation that will result in death or serious injury if it is not avoided.
 WARNING	Identifies a dangerous situation that may result in death or serious injury if it is not avoided.
 CAUTION	Identifies a dangerous situation that may result in minor to moderate injury if it is not avoided.
 NOTICE	Property damage: The product or surrounding area may be damaged.

1.3.2 Symbols

The following symbols indicate information that is not safety-relevant but increases understanding of the documentation.

Table 3: 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.
	Black circle with white number: Auxiliary marking for a better understanding.
	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.

1.3.3 Designations

This documentation uses the following designations:

Table 4: Designations

Designation	Meaning
SB24-M	Control valve with mechanical actuation
SB24-EHS/SB34-EHS	Control valve with CAN bus-controlled electrohydraulic actuating unit
EHR24-EHS	Control valve with CAN bus-controlled electrohydraulic actuating unit for electrohydraulic hitch control
EHR24-EM2	Control valve with PWM signal-controlled electrohydraulic hitch control
Control valve	Directional valve type SB
Control valve	Directional valve type EHR
Control spool	Main spool
Actuation	Type of control spool actuation

1.3.4 Abbreviations

This documentation uses the following abbreviations:

Table 5: Abbreviations

Abbreviation	Meaning
AP	Connecting plate
CAN	Controller Area Network
CVL	Connection valve (with LS signaling direction from right to left)
da	Double-acting
PRV	Pressure relief valve
DIN	German Industrial Standard
DMV	Pressure reducing valve
EHR	Electrohydraulic hitch control
EHS	Electrohydraulic actuating unit
EVL	End valve (with LS signaling direction from right to left)
EP	End plate
IPC	Individual pressure compensator
ISO	International Organization for Standardization
PWM	Pulse width modulation
RV	Non-return valve
sa	Single-acting
SPV	Check valve
ZAP	Central connecting plate
ZP	Intermediate plate

2 Safety instructions

2.1 About this chapter

The product has been manufactured in accordance with generally accepted engineering standards. There is still, however, a risk of personal injury or property damage if this chapter and the safety instructions in this documentation are not observed.

- ▶ Read this documentation completely and thoroughly before working with the product.
- ▶ Keep it in a location where it is accessible to all users at all times.
- ▶ Always include the required documentation when passing the product on to third parties.

2.2 Intended use

Control blocks/control block segments are hydraulic components, meaning that in their application area they are classified neither as complete nor as partly completed machinery as defined in the EC Machinery Directive 2006/42/EC. The component is exclusively intended to form partly completed machinery or complete machinery together with other components. The component may only be commissioned after it has been installed in the machine for which it is intended and the safety of the entire system has been established in accordance with the machinery directive.

The control blocks/control block segments have been developed for applications in the working hydraulics of agricultural machinery. Deviating use is only permitted following consultation with Bosch Rexroth.

- ▶ Observe the technical data, the application and operating conditions and the performance limits as specified in the data sheet and in the order confirmation. Information about approved hydraulic fluids can be found in the corresponding data sheet.

Intended use includes having completely read and understood this documentation and particularly chapter 2 "Safety instructions" on page 9.

2.3 Improper use

Any use other than that described as intended use is considered improper. Bosch Rexroth AG is not liable for damages resulting from improper use. The user is solely responsible for any risks arising from improper use.

The following foreseeable forms of faulty usage are also considered improper (this list is not exhaustive):

- Use outside the operating parameters approved in the data sheet or in the order confirmation (unless specifically approved by the customer)
- Use of non-approved fluids, e.g., water or polyurethane components
- Application of the control block/control block segment in potentially explosive environments

2.4 Personnel qualifications

The activities described in this documentation require a basic understanding of mechanics, electricity and hydraulics, as well as familiarity with associated technical terms. For transporting and handling the product, knowledge regarding the use of lifting gear and lifting accessories is required. Skilled personnel refers to persons who possess the professional training, knowledge and experience, as well as the understanding of the regulations relevant to the work to be done that are necessary to recognize possible dangers and take the appropriate safety measures. Skilled personnel must follow the rules relevant to their field and have the necessary hydraulic expert knowledge.

Hydraulic expert knowledge includes:

- Being able to read and fully understand hydraulic circuit diagrams and
- Knowledge regarding the function and interaction of hydraulic components.



Bosch Rexroth offers you measures supporting training in specific areas. For an overview of the training contents, visit our website under:

www.boschrexroth.com/training

2.5 General safety instructions

- Observe applicable accident prevention and environmental protection regulations.
- Observe the safety regulations of the country in which the product is used/operated.
- For Germany, the following applies: Hydraulic machinery/systems are "facilities for handling substances hazardous to water in accordance with the German Federal Water Act (WHG)". Sections 1 and 19 WHG (§19g, 19i, 19l) in particular must be complied with in this respect.
- Use Rexroth products only when they are in good working order.
- Do not install, operate, remove or maintain Rexroth products if under the influence of alcohol, drugs or medication that may affect your reaction time.
- Only use genuine Rexroth accessories and spare parts to ensure there is no risk to personnel from unsuitable spare parts.
- Observe the technical data and ambient conditions specified in the product documentation.
- If unsuitable products are installed or used in applications that are of relevance to safety, unexpected operating conditions may occur in the application, which could result in personal injury or property damage. For this reason, only use the product in safety-relevant applications if this use is expressly indicated and

approved in the product documentation, e.g., in safety-related parts of a control system (functional safety).

- Only commission the product if it has been determined that the end product (e.g., machinery or system) in which the Rexroth products are installed complies with the country-specific provisions, safety regulations and standards for the application.
- Use tools appropriate for the work being performed and wear appropriate protective clothing to prevent punctures and cuts.

2.6 Product-specific safety instructions

The following safety instructions apply for chapters 6 to 14.

WARNING

Danger due to suspended loads!

Risk of death or injury, or property damage!

In the event of inappropriate transport, the control block/control block segment may be dropped and cause injury, e.g. bruises or fractures and/or damage to the product.

- ▶ Make sure that the lifting capacity of the lifting gear is sufficient to safely bear the weight of the control block/control block segment.
- ▶ Never step or grip under suspended loads.
- ▶ Ensure a stable transport position.
- ▶ Use your personal protective equipment (e.g. safety goggles, safety gloves, suitable working clothes, safety shoes).
- ▶ Use suitable lifting gear for transport.
- ▶ Observe the prescribed position of the lifting strap.
- ▶ Observe the national laws and specifications of occupational safety and health and transport.

System/machine under pressure!

Danger to life or risk of injury, severe bodily injury when working on machines which have not been put to a standstill! Property damage!

- ▶ Switch off the entire system and secure it against reactivation according to the parameters provided by the machine/system manufacturer.
- ▶ Ensure that all relevant components of the hydraulic system are depressurized. For this purpose, observe the parameters indicated by the machine/system manufacturer.
- ▶ Please note that the hydraulic system might still be pressurized even after separation from the actual pressure supply.
- ▶ Do not disconnect any line connections, ports or components as long as the hydraulic system is under pressure.

Mechanical detent!

The mechanically operated valves SB24-M with detent remain in their switched, detented position even after the power supply has been switched off.

“Unlocking” requires active access by the operator.

This behavior is a desired design feature to meet practical requirements.

- ▶ Consider this behavior in the overall assessment of the safety of your machine/system.

 **WARNING****Escaping hydraulic fluid mist!**

Risk of explosion and fire hazard, health hazard, risk of environmental pollution!

- ▶ Depressurize the relevant machine/system component and repair the leak.
- ▶ Keep open flames and ignition sources away from the control block/control block segment.
- ▶ If control blocks/control block segments are located in the vicinity of ignition sources or powerful thermal radiators, a shield must be erected to ensure any escaping hydraulic fluid cannot be ignited, and to protect hose lines from premature aging.

Electrical voltage!

Danger to life or risk of injury due to electric shock or property damage!

- ▶ Always disconnect the voltage supply to the relevant machine/system part before installing the product and/or connecting or disconnecting the connector.
- ▶ Protect the machine/system against being re-energized.

Disturbance of control functions due to contamination!

Risk of injury or property damage!

Under certain circumstances, moving parts in control equipment (e.g. control spool) can get stuck in an undefined position due to contamination (e.g. impure hydraulic fluid, abrasion or residual dirt from components). As a result, the activated consumer does no longer respond correctly to the operator's specifications.

- ▶ Comply with the prescribed cleanliness level of the hydraulic fluid in accordance with the data sheet.

Danger caused by pressurized, leaking hydraulic fluid!

Risk of death or injury due to leaking hydraulic fluid streams! Leakage at the control block/control block segment can lead to hydraulic fluid escaping under high pressure.

- ▶ Depressurize the relevant machine/system component and repair the leak.
- ▶ Never attempt to block or seal the leak or hydraulic fluid jet with a cloth.

 **CAUTION****Risk of injury due to sharp edges and rough surfaces!**

When working on and transporting the control block/control block segment, there is a risk of injury, e.g. due to sharp edges at the valve housing, threads or attachments.

- ▶ Wear appropriate personal protective equipment (e.g. safety shoes, safety goggles, safety gloves and suitable working clothes).

Danger of bruising and knocks for limbs!

In the gap between the actuation element and the valve housing, there is a risk of injury

- ▶ Do not move any limbs into the gap between the actuation element/hand lever and the valve housing.

Hot surfaces at control block/control block segment!

Risk of burning!

- ▶ Allow the control block/control block segment to cool down sufficiently before touching it. Be aware that the EHS actuating unit can be up to 15 °C warmer than the control block segment.
- ▶ Protect yourself with heat-resistant protective clothing, e.g. gloves.

Contact with hydraulic fluid!

Danger to health / damage to health, e.g. eye injury, skin damage, toxication in the event of inhalation!

- ▶ Avoid any contact with hydraulic fluids.
- ▶ When handling hydraulic fluids, the safety instructions of the lubricant manufacturer need to be observed at all times.
- ▶ Use your personal protective equipment (e.g. safety goggles, safety gloves, suitable working clothes, safety shoes).
- ▶ Immediately seek medical attention, however, if hydraulic fluid gets into your eyes or blood circuit or if you swallow it accidentally.

Danger from improper handling!

Slip hazard! When using the control block/control block segment as climbing aid, there is a danger of slipping on wet and/or fluid-afflicted surfaces.

- ▶ Do not use the control block/control block segment as handle or step.
- ▶ Check how to safely get on top of the machine/system.

2.7 Personal protective equipment

The personal protective equipment is the responsibility of the user of the control block/control block segment. Observe the safety regulations in your country. All pieces of personal protective equipment should be intact.

3 General instructions on property damage and product damage

The following safety instructions apply for chapters 6 to 14.

NOTICE

Danger from improper handling!

Product can be damaged!

- ▶ Do not expose the product to any mechanical, hydraulic or electric loads under any circumstances.
- ▶ Never use the product as handle or step.
- ▶ During transport, do not lift the control block/control block segment at sensitive attachments (e.g., actuation elements, sensors, solenoids, or valves).
- ▶ Carefully place the control block/control block segment onto the contact surface and secure it against falling to prevent damage.
- ▶ Do not put/place any objects on the product.
- ▶ Do not set/place the control block/control block segment on actuation elements.
- ▶ Do not hit sensitive attachments (e.g. sensors, solenoids or actuation elements).
- ▶ Sealing surfaces must not be damaged.
- ▶ Do not remove the transport protection until actual assembly at the control block/control block segment.
- ▶ Ensure that the electronic components (e.g. sensors) are not electro-statically charged (e.g. during painting operations).

Risk of property damage due to inadequate lubrication!

Product can be damaged or destroyed!

- ▶ When commissioning the control block/control block segment, always ensure that there is enough hydraulic fluid in the system.
- ▶ When commissioning a machine/system, make sure that the housing area and the working lines of the control block/control block segment are filled with hydraulic fluid and remain filled during operation.

Fluids and foreign particles enter due to missing seals and plugs!

Loss of the protection class and danger of short circuit! The plug fulfills the protection class only when closed and locked!

- ▶ Before the assembly and during cleaning and painting operations, ensure that all sealings and locks of the plug-in connection are tight.

NOTICE

Mixing hydraulic fluids!

Product can be damaged!

- ▶ Observe the viscosity and cleanliness level specified in the data sheet for hydraulic fluids.
- ▶ Mixture of different hydraulic fluids can lead to damage at the control block/control block segment due to chemical reactions and changes in properties.
- ▶ Ensure that the different hydraulic fluids are compatible according to manufacturer's specifications.

Contamination of hydraulic fluid!

The cleanliness of the hydraulic fluid has a considerable impact on the service life of the product. Contaminations of the hydraulic fluid may lead to premature wear and malfunctions!

- ▶ Make sure that the working environment at the installation site is fully free of dust and foreign substances in order to prevent foreign particles from getting into the hydraulic lines and causing product wear and malfunctions. The control block/control block segment must be installed in a clean condition.
- ▶ Only use clean ports, hydraulic lines and attachments (e.g. measuring devices).
- ▶ When plugging the ports, no contamination may ingress.
- ▶ Before commissioning, ensure that all hydraulic connections are tight and that all seals and plugs of the plug-in connection are correctly installed and undamaged to prevent fluids and foreign particles from entering the product.

Improper cleaning

Product can be damaged!

- ▶ Plug all openings with suitable protective devices to prevent cleaning agents from entering the product.
- ▶ Never use solvents or aggressive cleaning agents. Use only water and, if necessary, a mild cleaning agent to clean the product.
- ▶ Do not point high-pressure cleaners at sensitive components, e.g. rubber parts, electrical connections (solenoids and sensors), and actuation elements.
- ▶ Use fiber-free cleaning cloths for cleaning.

Environmental pollution due to incorrect disposal!

Careless disposal of the control block/control block segment and its attachments, the hydraulic fluid and the packaging material can cause environmental pollution!

- ▶ Dispose of the control block/control block segment, hydraulic fluid, and packaging in accordance with the national regulations in your country.
- ▶ Dispose of the hydraulic fluid in accordance with the applicable safety data sheet of the hydraulic fluid.

NOTICE

Danger due to chemical or aggressive environmental conditions!

Product can be damaged! If the control block/control block segment is exposed to chemical or aggressive environmental conditions, corrosion and even malfunctions may occur. Leaks may lead to a leakage of hydraulic fluid.

- ▶ Take suitable measures for protection of the control block/control block segment against chemical and aggressive environmental conditions.

Escaping hydraulic fluid!

Environmental pollution and contamination of the ground water!

- ▶ When filling and draining hydraulic fluid, always place a drip tray under the control block/control block segment.
- ▶ Use a suitable binding agent to collect any leaked hydraulic fluid.
- ▶ Observe the parameters in the safety data sheet for the hydraulic fluid and the specifications provided by the machine/system manufacturer.

Danger from hot components!

Adjacent products may be damaged! Due to a heat development in components (e.g. solenoids), adjacent products may be damaged during assembly if no sufficient safety distance is complied with.

- ▶ When installing the control block/control block segment, check the distances to nearby products to prevent any damage.

The warranty exclusively applies to the delivered configuration.

The warranty claim becomes void with

- Faulty installation, commissioning and operation,
- Improper use,
- Removal of the tamper-proof caps and seals (e.g. with pressure settings),
- Control of the settings at the factory,
- Unauthorized conversions and additional installations,
- Opening of the directional valve,
- Improper handling,
- Use of non-original spare parts by Rexroth.

4 Scope of delivery

Included in the scope of delivery:

- Control block or control block segment according to order confirmation

The following parts are also assembled prior to delivery according to version:

- Protective covers
- Protective plugs/threaded plugs

5 About these products

5.1 Performance description

Refer to the data sheet and the order confirmation for the technical data, operating conditions and operating limits of the directional valves.

For the assignments of directional valves to data sheets, refer to chapter 1.2 "Required and supplementary documentation" on page 5.

5.2 Product identification

The product can be identified from the name plate.



The details on the name plate apply to the product as delivered. If modifications have been made to the product in comparison to the delivery state, the name plate information may not apply to the present product.

- ▶ Make sure that the name plates in place are not damaged.
- ▶ Compare the material number of the product on the respective name plate with the details on the offer drawing to verify that this instruction manual refers to the product in question.

If in doubt, please contact Bosch Rexroth.

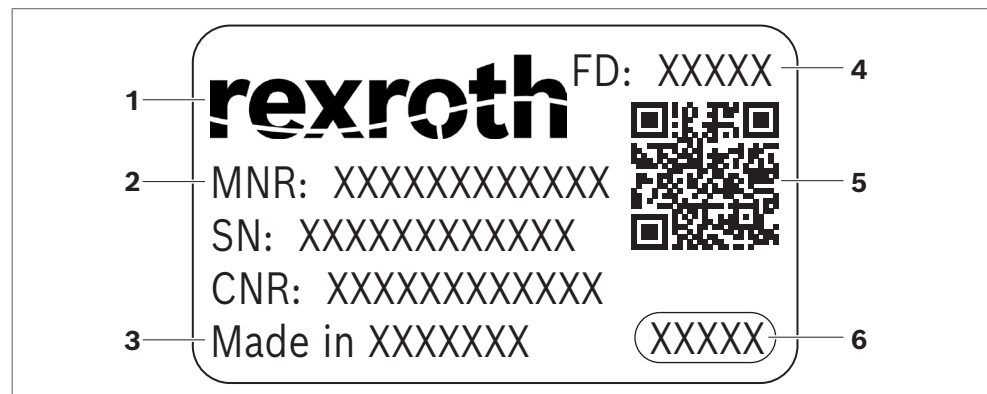


Fig. 1: Name plate (example)

- | | |
|-----------------------------------|---|
| 1 Word mark (manufacturer) | 4 Manufacturing date
JJ w WW = Year w calendar week |
| 2 Material number | 5 Data Matrix code |
| 3 Designation of origin | 6 Range/plant number |



The information on the above name plate may vary depending on order-specific requirements.

Any other labeling on the product is just for Bosch Rexroth-internal purposes.

5.3 Product description

For a description of the layout and function of the control blocks and instructions on configuring individual directional valves, refer to the data sheet.

For the assignments of directional valves to data sheets, refer to Table 1 "Required and supplementary documentation" on page 5.

5.3.1 Definition of control block segments

Control block	Control blocks are parts of hydraulic systems for control of actuators like tractor attachments. The control block includes various control block segments in sandwich plate design. The control block segments have various functions and are structured as follows:
Connecting plate	The connecting plate is equipped with the LS signal output (port Yo.). The connecting plates are usually fitted with tie rod screws to slide on the block segments. The flange surface is always fitted with O-rings in the flange surface (flange surface O-ring side). Connecting plates with inlet port (P.) are further distinguished as follows. <ul style="list-style-type: none"> • Connecting plate for fixed pump • Connecting plate for variable pump
Central connecting plate	The tie rods are screwed on both sides into the central connecting plate on which the block segments are slid.
Control valve EHR24	The EHR control valve serves for electrohydraulic hitch control and is controlled via PWM pilot signal or CAN bus in a circuit with electronic control unit and sensors. The control block is completed by the end valve version of the EHR control valve with LS signaling direction from right to left (EVL).
Control valve SB24/34	The SB24/34 control valve serves for control of various actuators and is controlled mechanically or via CAN bus. The control block is completed by the connection valve (CVL) version of the SB24/34 control valve. It is equipped with the LS signal output (port Yo.). The control block is completed by the end valve version of the SB24/34 control valve with LS signaling direction from right to left (EVL).
Intermediate plate	The intermediate plate does not have any hydraulic functions and serves as spacer.
End plate	The control block is completed by the end plate which can also have other functions. The flange surface is never fitted with O-rings in the flange surface (flange surface O-ring opposite side).



The SB24/34 control block segments illustrated below are described by means of dummies. For a precise overview of all available combinations, refer to the respective data sheet.

For the precise position and designation of external ports, refer to the data sheet or the offer drawing.

5.3.2 Types of actuation

Mechanical actuation For mechanical actuation, the control spool is deflected mechanically.

The following types of actuation are possible:

- Rope pull
- Rod system
- Bearing block with operating lever

CAUTION! The geometry of rope pulls and rod systems is changed by elongation and temperature. This must be taken into consideration in the design to prevent undesired mechanical deflection of the control spool.

Hydraulic actuation In case of hydraulic actuation, the pressure at a hydraulic control port is adjusted for control of a pre-set function.

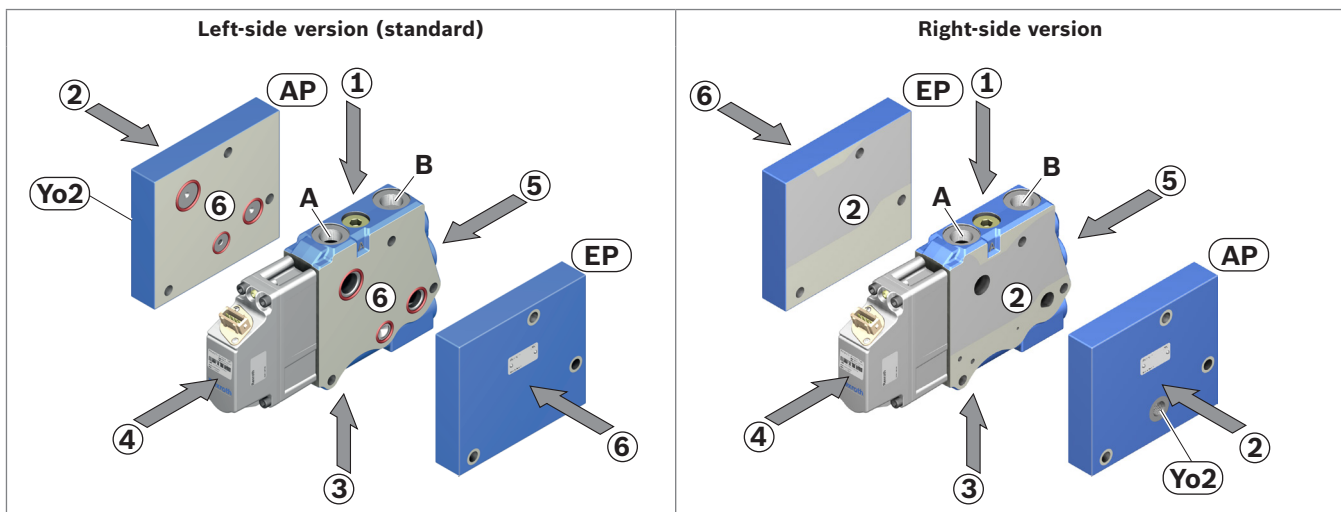
PWM pilot signal By means of the PWM pilot signal, proportional solenoids are controlled. The control valve spool is proportionally actuated by these solenoids by means of respective hitch deflection.

CAN bus control: The CAN bus pilot signal is generated in a control unit according to a fixed protocol. By means of the directional valve on-board electronics, the CAN bus pilot signal is converted in a spool deflection at the directional valve.

5.3.3 Definition of control block segment sides

Independent from the LS direction, the flange surface O-ring side always receives the side designation ⑥.

Depending on the arrangement of the tie rod bores and the flange surface O-ring side ⑥, the block segment sides are designated from ①...⑥.




- Side ①: Consumer port side
 Side ②: Flange surface O-ring opposite side or connecting plate outer side
 Side ③: Lower side
 Side ④: Front face side A (EHS side)
 Side ⑤: Front face side B
 Side ⑥: Flange surface O-ring side or end plate outer side

5.3.4 Port designation



The port designation consists of a letter (e.g. **P**, **R**, **Y**) and the side designation (**1** to **6**). **P1** refers for example to the inlet port on the consumer port side (top).

Table 6: Ports

Denomination	Port for
P	Pump port
A , B	Consumer port
R	Tank, return flow
Rx	EHS pilot oil return flow
a , b , c	Control, signal
PD	Supply pressure diagnosis
X	EHS pilot oil supply
XD	EHS pilot oil supply diagnosis
Yin	LS signal input
Yo	LS signal output
YoD	LS signal output diagnosis
Rc	Coupling relief
1 , 2 , 3	Tie rod
 BL	Block mounting

5.3.5 Flange figure

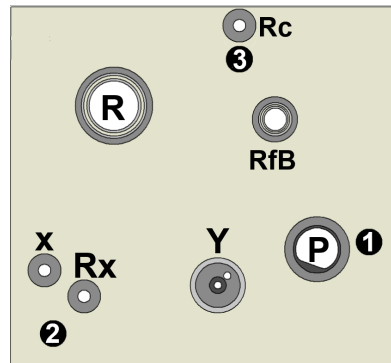


Table 7: Ports in the flange figure

Denomination	Port for	Information
P	Inlet	
R	Block return flow	
RfB	Secondary pressure relief valve return flow (consumer port B) (depressurized)	optional
Y	LS signal	
Rc	Clean oil return flow	optional
Rx	EHS pilot oil return flow	optional
X	EHS pilot oil supply	optional
1 , 2 , 3	Tie rod	

5.3.6 Connecting plate for fixed pump (C2)

Table 8: External ports


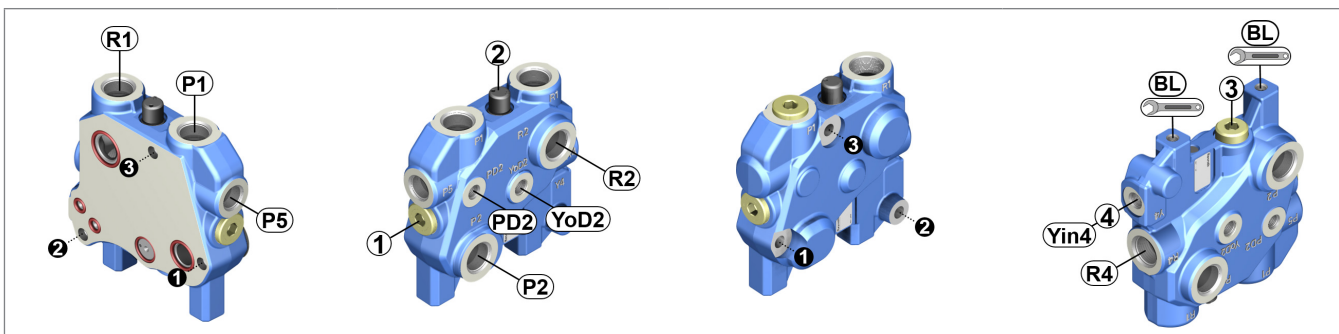
Position	Designation	Information
(P1)	Inlet port	Standard
(P..)	Inlet port	optional: 2, 5
(R1)	Return flow	Standard
(R..)	Return flow	optional: 2, 4
(YoD2)	LS signal diagnosis	optional
(PD2)	Supply pressure diagnosis	optional
(Yin4)	LS signal input	optional
①, ②, ③	Tie rod bore with thread	
①, ②, ③	Tie rod bore, continuous	optional
 (BL)	Block mounting thread	

Table 9: Internal functions

Position	Designation	Information
①	Pressure compensator	
②	LS pressure relief valve	optional
③	Primary pressure relief valve	optional
④	Shuttle valve	optional



Application The **C2** connecting plate is used for SBx4 blocks with or without central connecting plate.

The inlet and return lines of the flow are directed via the **C2** connecting plate.

Internal function **Pressure compensator** ①: Controls the inlet flow to the connected SBx4 valves according to the block-internal LS signal.

LS pressure relief valve ②: Limits the pressure at the inlet port and indirectly also the pressure in the block-internal **P** line by means of the pressure compensator.

Primary pressure relief valve ③: Limits the pressure at the inlet port and indirectly also the pressure in the block-internal **P** line.

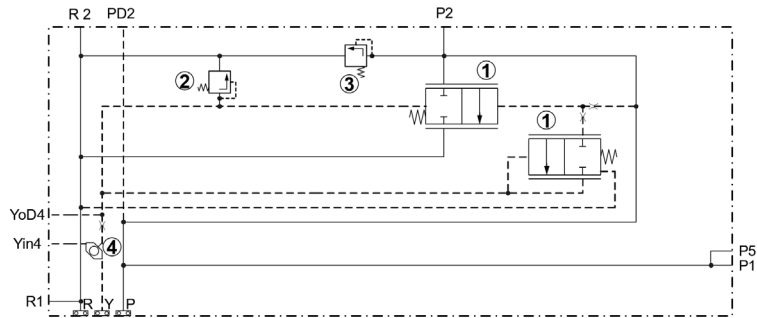
NOTICE! The primary pressure relief valve with its short response time and low flow is applied for limitation of the pressure peaks in the supplied flow.

LS signal input Yin4 : For external control of the pressure compensator.

Operation / actuation

The **C2** connecting plate is not equipped with manual operating elements or external control functions.

Fluid plan



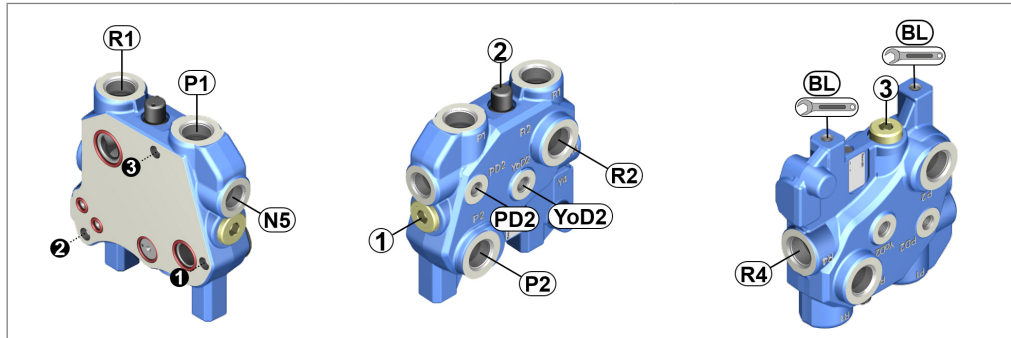
5.3.7 Connecting plate for fixed pump (C4)

Table 10: External ports

Position	Designation	Information
P1	Inlet port	Standard
P.	Inlet port	optional: 2, 5
R1	Return flow	Standard
R.	Return flow	optional: 2, 4
N.	Weiterlauf	
YoD2	LS signal diagnosis	optional
PD2	Supply pressure diagnosis	optional
1, 2, 3	Tie rod bore with thread	
1, 2, 3	Tie rod bore, continuous	optional
BL	Block mounting thread	

Table 11: Internal functions

Position	Designation	Information
1	Pressure compensator	
2	LS pressure relief valve	optional
3	Primary pressure relief valve	optional



Application The **C4** connecting plate is used for SBx4 blocks with or without central connecting plate.
The inlet and return lines of the flow are directed via the **C4** connecting plate.

Internal function **Pressure compensator ①**: Controls the inlet flow to the connected SBx4 valves according to the block-internal LS signal.

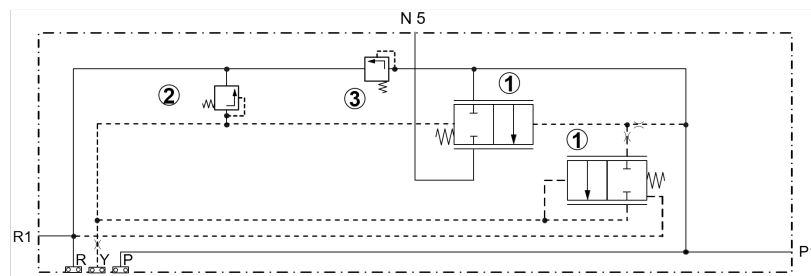
LS pressure relief valve ②: Limits the pressure at the inlet port and indirectly also the pressure in the block-internal **P** line by means of the pressure compensator.

Primary pressure relief valve ③: Limits the pressure at the inlet port and indirectly also the pressure in the block-internal **P** line.

NOTICE! The primary pressure relief valve with its short response time and low flow is applied for limitation of the pressure peaks in the supplied flow.

Operation / actuation The **C4** connecting plate is not equipped with manual operating elements or external control functions.

Fluidplan



5.3.8 Connecting plate (C3)

Table 12: External ports


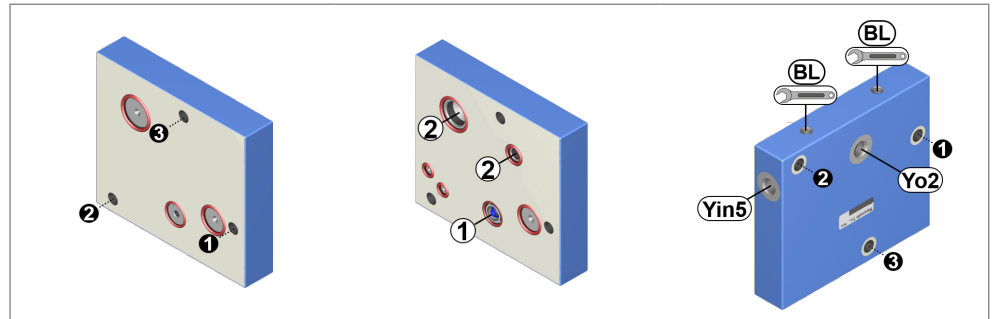
Position	Designation	Information
Yo2	LS signal output	
Yin.	LS signal input	optional: 1, 2, 3, 4, 5
1, 2, 3	Tie rod bore	
 BL	Block mounting thread	

Table 13: Internal functions

Position	Designation	Information
1	Shuttle valve with spring pretension	optional
2	RfB → R bridge	optional



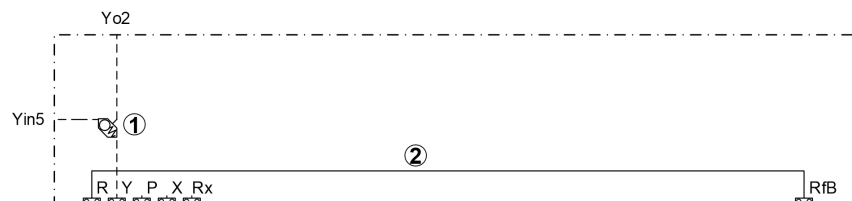
Application The **C3** connecting plate is used for SBx4 blocks with central connecting plate.

Internal function Shuttle valve with spring pretension 1: Discharges the higher LS pressure from the block-internal channel Y and Yin. to port Yo2. The spring pretension prevents pressure build-up in Yin. if port Yin. is not occupied.

RfB-R bridge 2: Relieves the RfB return line for block-internal return flow R.

Operation / actuation The **C3** connecting plate is not equipped with manual operating elements or external control functions.

Fluid plan



5.3.9 Connecting plate for variable pump (C6)

Table 14: External ports


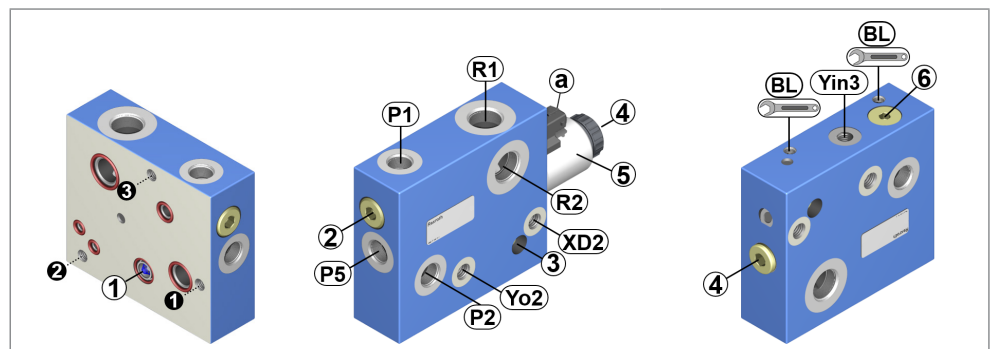
Position	Designation	Information
Ⓐ	Pressure reducing valve control port	optional
⒫	Inlet port	optional
⒱	Return flow	optional
Ⓨ _{in}	LS signal input	optional: 1, 2, 3, 4, 5
Ⓨ _{o2}	LS signal output	
ⓧ _{D2}	EHS pilot oil pressure diagnosis	optional
①, ②, ③	Tie rod bore with thread	
 Ⓑ	Block mounting thread	

Table 15: Internal functions

Position	Designation	Information
①	Shuttle valve with spring pretension	optional
②	Pressure relief valve	optional
③	Rx-R non-return valve	optional
④	Pressure reducing valve	optional
⑤	Pressure reducing valve switchable solenoid	optional
⑥	Threaded plug	optional



Application The C6 connecting plate is used for SBx4 blocks with or without central connecting plate.

Internal function **Shuttle valve with spring pretension** ①: Discharges the higher LS pressure from the block-internal channel Y and Y_{in} to port Y_{o2} . The spring pretension prevents pressure build-up in Y_{in} if port Y_{in} is not occupied.

Pressure relief valve ②: Limits the pressure at port P and indirectly also the pressure in the block-internal P line.

NOTICE! The pressure relief valve with its short response time and low flow is applied for limitation of the pressure peaks in the supplied flow.

Rx-R non-return valve ③: Protects EHS pilot oil return line **Rx** against pressure peaks from block-internal return flow **R**.

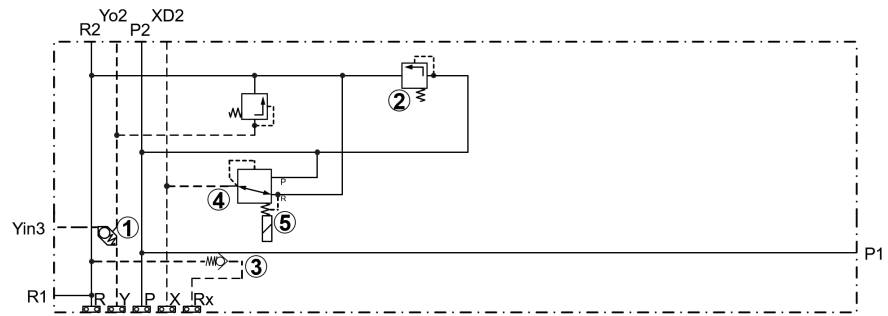
Pressure reducing valve ④: Limits the pressure in the block-internal EHS pilot oil line **X** and supplies this line with the flow from the block-internal line **P**.

Pressure reducing valve switchable solenoid ⑤: Electrical activation and deactivation of the pressure reduction function.

Operation / actuation

The **C6** connecting plate without switchable solenoid (pressure reducing valve) is not equipped with manual operating elements or external control functions. The version with switchable solenoid (pressure reducing valve), the pressure reduction function can be activated by energizing the switchable solenoid. This way, the pressure in the block-internal EHS pilot oil line **X** is increased to the pressure value of the pressure reduction function. If the switchable solenoid is not energized, the block-internal EHS pilot oil line **X** is relieved to the return flow.

Fluid plan



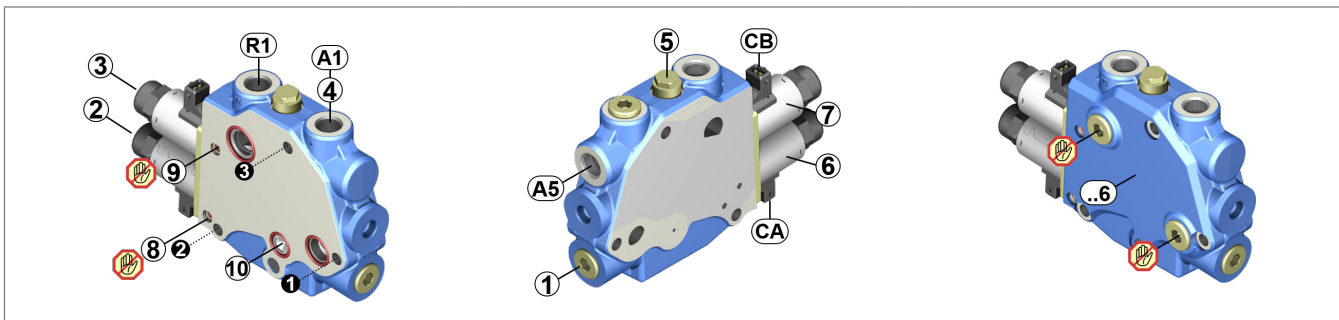
5.3.10 Hitch control valve EHR24-EM2

Table 16: External ports

Position	Designation	Information
CA	Lifting control port	
CB	Lowering control port	
A1	Working port	
A5	Working port	optional
R1	Return port	
..6	End valve closing side	
1, 2, 3	Tie rod bore	

Table 17: Internal functions

Position	Designation	Information
1	Individual pressure compensator	
2	Lifting spool valve axis	
3	Lowering valve cartridge valve axis	
4	Non-return valve	
5	Secondary pressure relief valve	
6	Lifting solenoid A	
7	Lowering solenoid B	
8	Lifting control unit	
9	Lowering control unit	
10	Shuttle valve	



CAUTION! The threaded plugs on the valve side (..6) and the setting screws (8) and (9) must not be adjusted or removed! The threaded bores are not designed for connection fittings.

Internal function **Individual pressure compensator ①**: Controls the valve-internal inlet flow of the block-internal channel **P**.

Lifting spool valve axis ②: Controls the inlet flow to working port **A1** or **A5**.

Lowering valve cartridge valve axis ③: Controls the return flow via return flow port **R1**.

Non-return valve ④: Prevents valve-internal return flow from working port **A1** or **A5**.

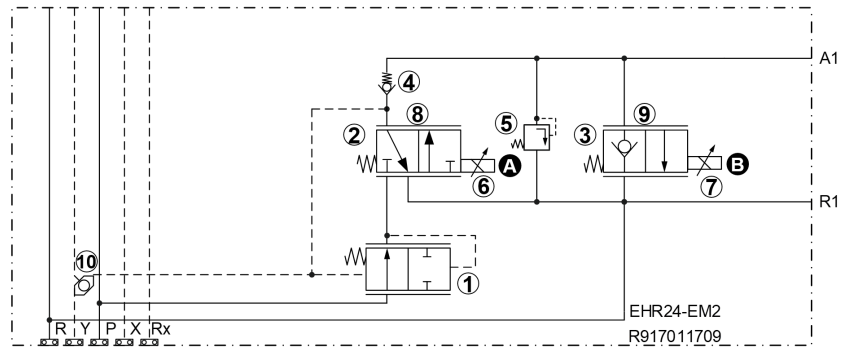
Secondary pressure relief valve ⑤: Secures the operating pressure in working port **A1** or **A5**.

Shuttle valve ⑩: Directs the higher LS pressure through the control block/control block segment.

Operation / actuation It is operated via proportional solenoid coil of lifting solenoid **A** and lowering solenoid **B** by means of PWM pilot signal from the Rexroth controller SRC.

Lifting solenoid **A** and lowering solenoid **B** optionally with manual auxiliary actuation.

Fluid plan



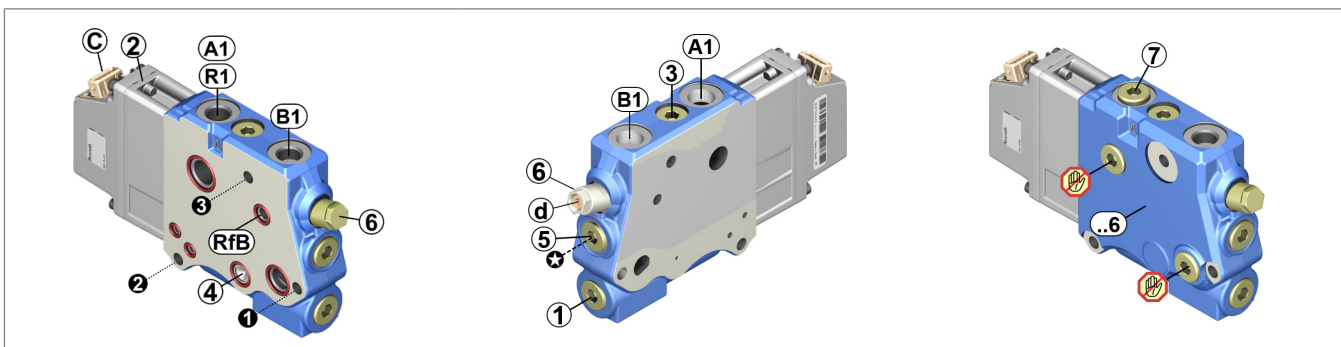
5.3.11 Hitch control valve EHR24-EHS

Table 18: External ports

Position	Designation	Information
Ⓐ	CAN bus connector	
Ⓐ1	Working port	
Ⓑ1	Working port	Double-acting
Ⓡ1	Return port	single-acting
Ⓓ	Manual auxiliary actuation for lowering	via secondary PRV
ⓇfⒷ	Secondary PRV return flow	
..6	End valve closing side	
①, ②, ③	Tie rod bore	

Table 19: Internal functions

Position	Designation	Information
★	Valve axis	
①	Individual pressure compensator with non-return valve function	
②	Electrohydraulic EHS actuating unit	
③	Check valve	
④	Shuttle valve	
⑤	Threaded plug	
⑥	Secondary pressure relief valve	
⑦	Threaded plug	R internal



CAUTION! The threaded plugs on the valve side (..6) and threaded plugs ① and ⑤ must not be removed! The threaded bores are not designed for connection fittings.

Internal function **Individual pressure compensator ①**: Controls the valve-internal inlet flow of the block-internal channel **P**. The integrated non-return valve function prevents the return flow to the block-internal channel **P**.

Electrohydraulic EHS actuating unit ②: Control is realized at port **a** via CAN bus pilot signal. The received CAN bus pilot signals are converted to respective deflection of the control spool.

- Single-acting (sa):

Controls the inlet flow to working port **B1** and return via the return flow port

- Single-acting (sa) with internal return flow:

Controls the inlet flow and return flow via working port **B1**.

Port **A1** is plugged by threaded plug **⑦**.

- Double-acting (da):

Controls the inlet flow and return flow via working ports **A1** and **B1**.

Check valve ③: Prevents valve-internal return flow in working port **B1**.

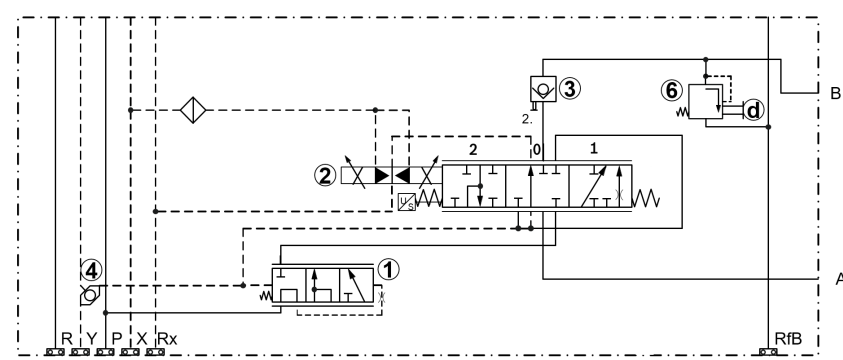
Shuttle valve ④: Directs the higher LS pressure through the control block/control block segment.

Secondary pressure relief valve ⑥: Limits the operating pressure in working port **B1**. The secondary pressure relief valve is unloaded via the additional return flow (**RfB**) in the flange surface.

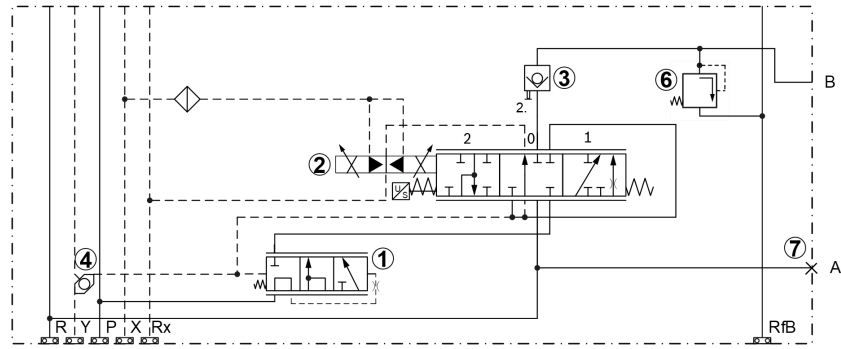
Operation / actuation Control is realized via CAN bus pilot signal **a**.

Secondary pressure relief valve **⑥** optionally with manual auxiliary actuation **d**.

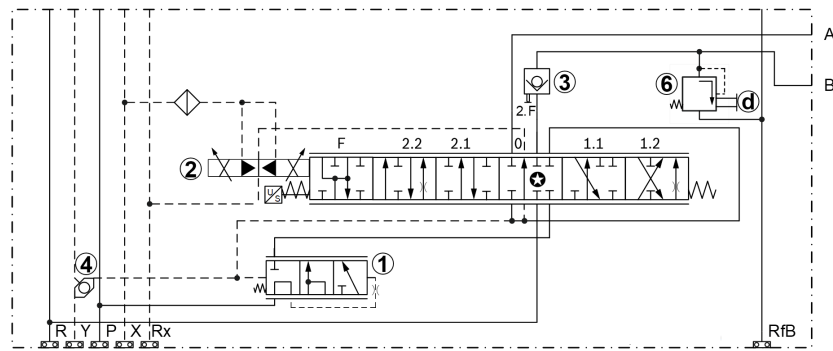
Fluid plan EHR24-EHS sa for external return flow



EHR24-EHS sa with internal return flow



EHR24-EHS da



5.3.12 Control valve SB24-M without individual pressure compensator

Table 20: External ports



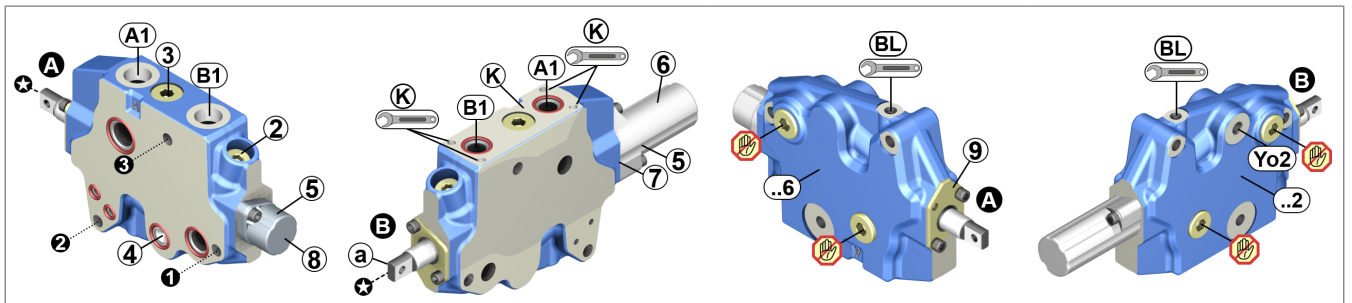
Position	Designation	Information
A	Deflection side A	optional
B	Deflection side B	optional
a	Control spool deflection	
A1	Working port	
B1	Working port	
Yo2	LS signal output	
K	Coupling port	optional
..2	Connection valve port side	
..6	End valve closing side	
1, 2, 3	Tie rod bore	
 BL	Block mounting thread	optional
 K	Coupling mounting thread	

Table 21: Internal functions

Position	Designation	Information
★	Valve axis	
2	Non-return valve	
3	Check valve	optional
3	Check valve with thermal PRV	optional
4	Shuttle valve	
5	Spring assembly	
6	Detent unit	optional
7	Kick-out	optional
8	Spring cap	
9	Cover plate	optional
9	Bearing block	optional



CAUTION! The threaded plugs on the CVL valve side **..2** and EVL valve side **..6** must not be removed! The threaded bores are not designed for connection fittings.

Internal function **Non-return valve ②**: Prevents valve-internal return flow from working port **(A1)** and **(B1)** to the block-internal channel **P**.

Check valve ③: Prevents valve-internal return flow in working port **(B1)**.

Thermal PRV in check valve ③: The thermal PRV is integrated into the check valve and is opened in case of an inadmissible temperature-related pressure increase in the working port. The discharged volume is very low.

Shuttle valve ④: Directs the higher LS pressure through the control block/control block segment.

Spring assembly ⑤: Control spool centering

Detent unit ⑥: Positioning of the control spool is supported by the detent unit. The spring assembly is enclosed by the detent unit housing.

Kick-out ⑦: Disengages the deflected control spool in detent position at a set hydraulic operating pressure from the detent position.

Spring cap ⑧: Encloses the spring assembly

Operation / actuation Control is realized mechanically via control spool deflection **(a)**.

Fluid plan SB24-M, deflection side A

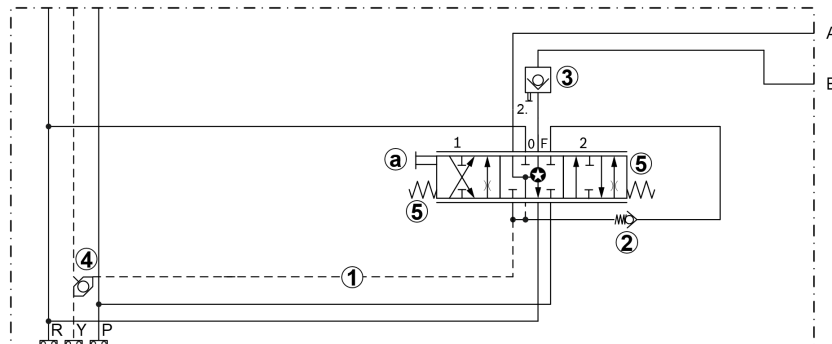
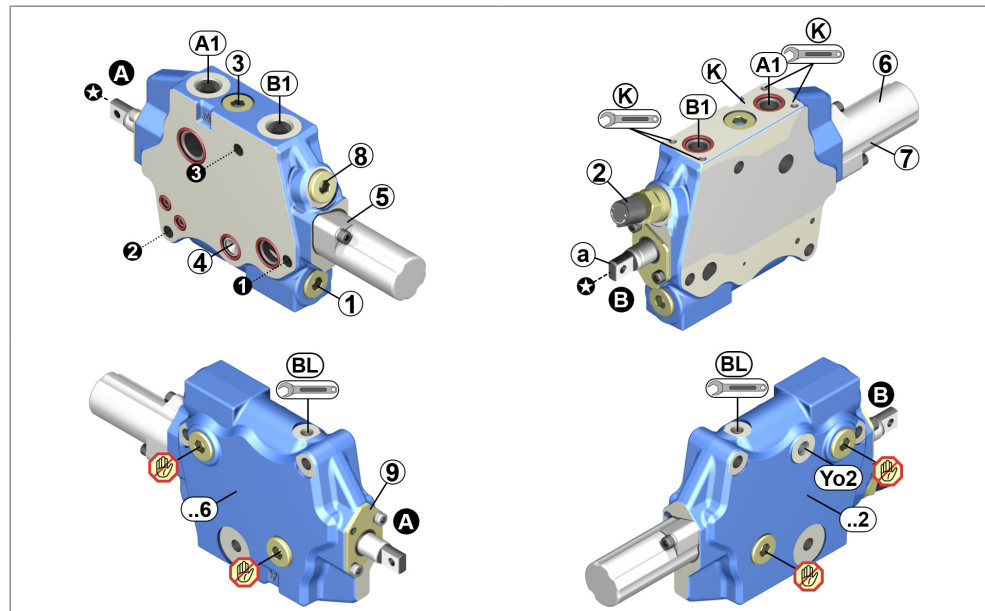


Table 23: Internal functions

Position	Designation	Information
★	Valve axis	
①	Individual pressure compensator with check valve function	
②	Flow controller	
③	Check valve	optional
③	Check valve with thermal PRV	optional
④	Shuttle valve	
⑤	Spring assembly	
⑥	Detent unit with spring assembly or spring cap	
⑦	Kick-out	optional
⑨	Cover plate	optional
⑨	Bearing block	optional



CAUTION! The threaded plugs on the CVL port side **..2**, the EVL closing side **..6** and threaded plug **①** must not be removed! The threaded bores are not designed for connection fittings.

Internal function Individual pressure compensator ①: Controls the valve-internal inlet flow of the block-internal channel **P**. The integrated non-return valve function prevents the return flow to the block-internal channel **P**.

Flow controller ②: Limits the valve-internal inlet flow of the block-internal channel **P**.

Check valve ③: Prevents valve-internal return flow in working port **B1**.

Thermal PRV in check valve ③: The thermal PRV is integrated into the check valve and is opened in case of an inadmissible temperature-related pressure increase in the working port. The discharged volume is very low.

Shuttle valve ④: Directs the higher LS pressure through the control block/control block segment.

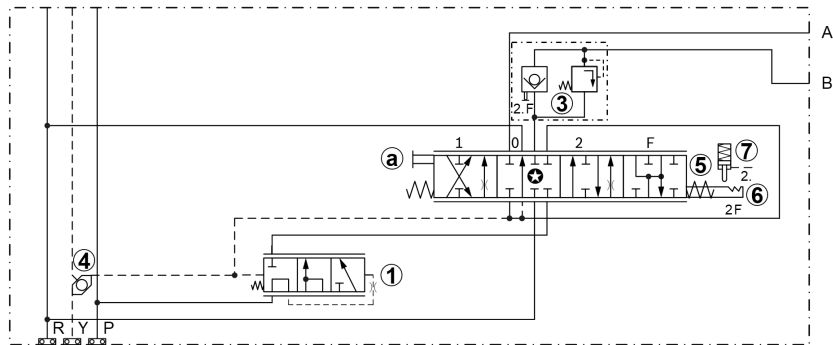
Spring assembly ⑤: Control spool centering.

Detent unit ⑥: Positioning of the control spool is supported by the detent unit. The spring assembly is enclosed by the detent unit housing.

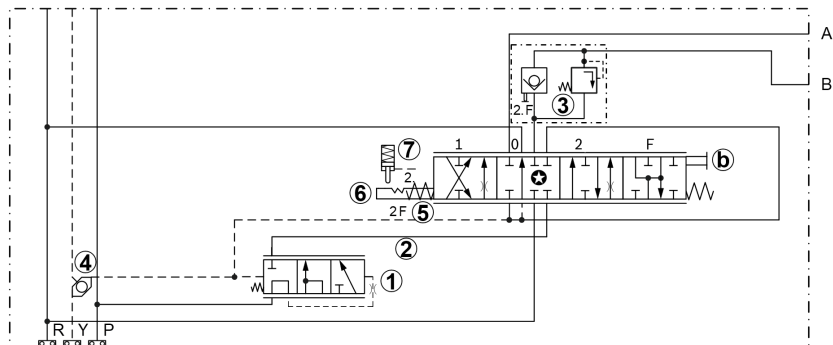
Kick-out ⑦: Disengages the deflected control spool in detent position at a set hydraulic operating pressure from the detent position.

Operation / actuation Control is realized mechanically via control spool deflection ①.

Fluid plan SB24-M, deflection side A, with check valve with thermal PRV



SB24-M, deflection side B, with check valve with thermal PRV



5.3.14 Control valve SB24-EHS

Table 24: External ports




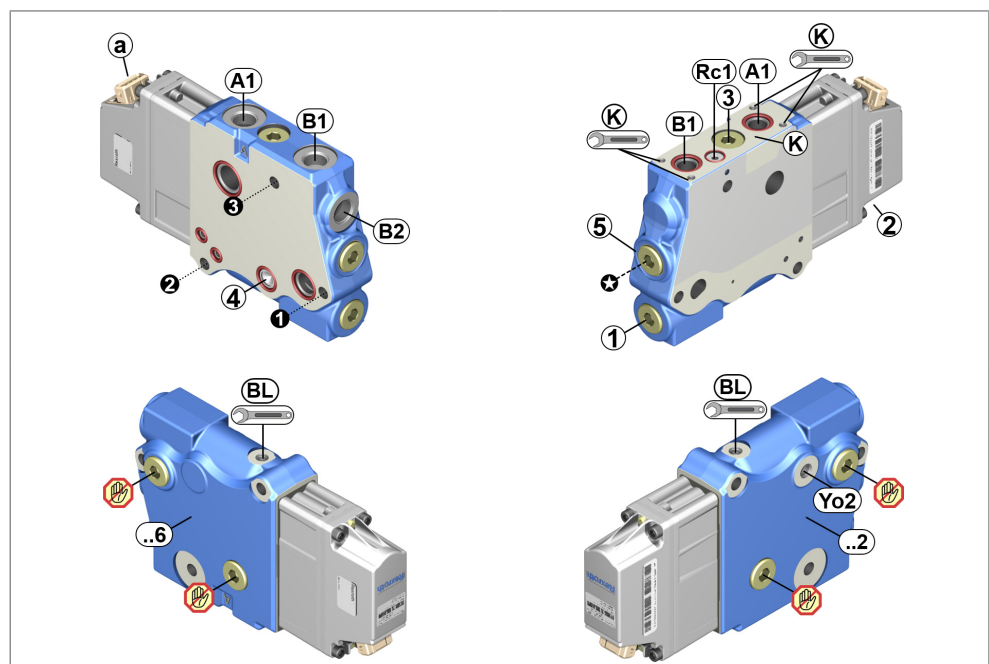
Position	Designation	Information
a	CAN bus connector	
A1	Working port	
B1	Working port	
B2	Working port	optional
K	Coupling port	optional
..2	Connection valve port side	
..6	End valve closing side	
1, 2, 3	Tie rod bore	
 BL	Block mounting thread	optional
 K	Coupling mounting thread	

Table 25: Internal functions

Position	Designation	Information
 ★	Valve axis	
1	Individual pressure compensator with check valve function	
2	Electrohydraulic EHS actuating unit	
3	Check valve	optional
3	Check valve with thermal PRV	optional
4	Shuttle valve	
5	Threaded plug	



CAUTION! The threaded plugs on the CVL port side (②), the EVL closing side (⑥) and threaded plugs ① and ⑤ must not be removed! The threaded bores are not designed for connection fittings.



At versions with working port (B2), working port (B1) is plugged with a threaded plug.

Internal function **Individual pressure compensator ①:** Controls the valve-internal inlet flow of the block-internal channel P. The integrated non-return valve function prevents the return flow to the block-internal channel P.

Electrohydraulic EHS actuating unit ②: Control is realized at port (a) via CAN bus pilot signal. The received CAN bus pilot signals are converted to respective deflection of the control spool.

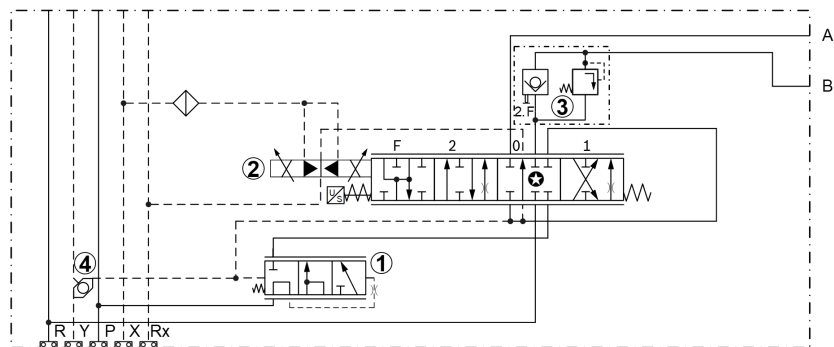
Check valve ③: Prevents valve-internal return flow in working port (B1).

Thermal PRV in check valve ③: The thermal PRV is integrated into the check valve and is opened in case of an inadmissible temperature-related pressure increase in the working port. The discharged volume is very low.

Shuttle valve ④: Directs the higher LS pressure through the control block/control block segment.

Operation / actuation Control is realized via CAN bus pilot signal (a).

Fluid plan SB24-EHS



5.3.15 Control valve SB34-EHS

Table 26: External ports



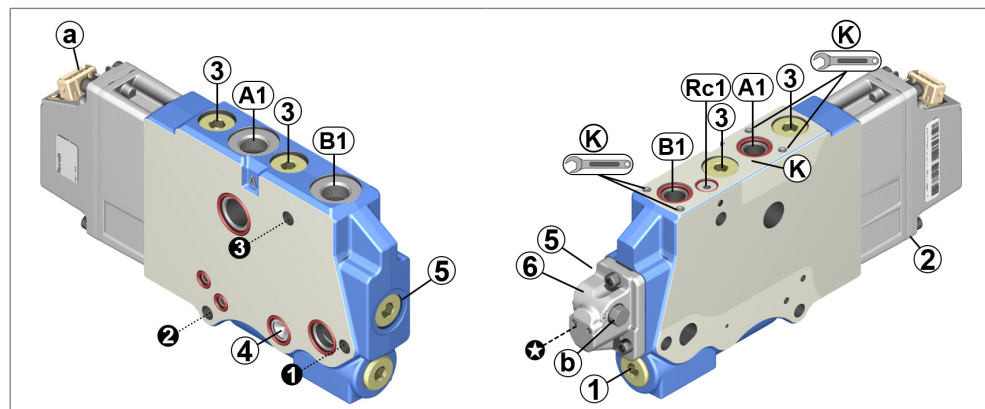
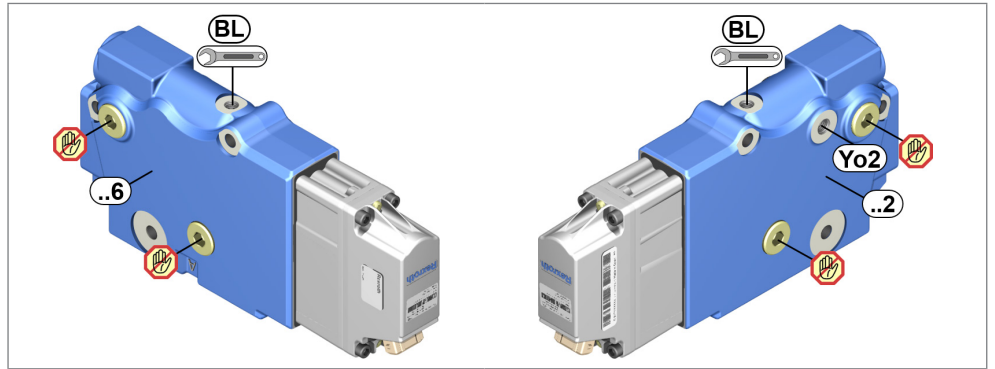
Position	Designation	Information
a	CAN bus connector	
b	Manual auxiliary actuation	optional
A1	Working port	
B1	Working port	
K	Coupling port	optional
..2	Connection valve port side	
..6	End valve closing side	
1, 2, 3	Tie rod bore	
 BL	Block mounting thread	optional
 K	Coupling mounting thread	

Table 27: Internal functions

Position	Designation	Information
★	Valve axis	
1	Individual pressure compensator	
2	Electrohydraulic EHS actuating unit	
3	Check valve	
3	Check valve with thermal PRV	optional
4	Shuttle valve	
5	Threaded plug	
6	Cover cap with manual auxiliary actuation	optional





CAUTION! The threaded plugs on the CVL port side (**..2**), the EVL closing side (**..6**) and threaded plugs **①** and **⑤** must not be removed! The threaded bores are not designed for connection fittings.

Internal function **Individual pressure compensator ①:** Controls the valve-internal inlet flow of the block-internal channel **P**.

Electrohydraulic EHS actuating unit ②: Control is realized at port **ⓐ** via CAN bus pilot signal. The received CAN bus pilot signals are converted to respective deflection of the control spool.

Check valve ③: Prevents valve-internal return flow in working port **Ⓐ1** or **Ⓑ1**.

Thermal PRV in check valve ③: The thermal PRV is integrated into the check valve and is opened in case of an inadmissible temperature-related pressure increase in the working port. The discharged volume is very low.

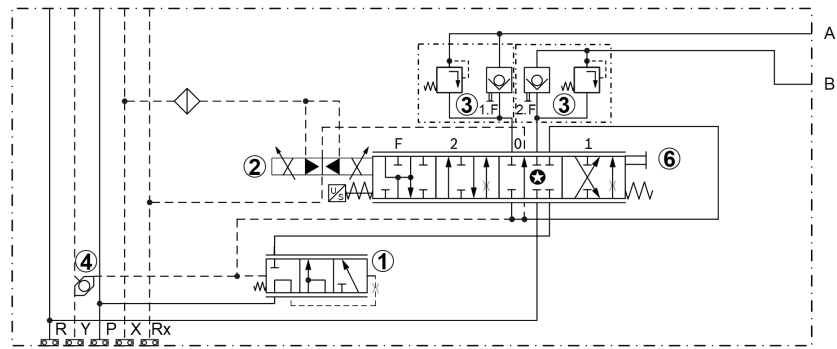
Shuttle valve ④: Directs the higher LS pressure through the control block/control block segment.

Cover cap ⑥: Includes the additional function of manual auxiliary actuation for manual control of the control spool.

CAUTION! During normal operation, the manual auxiliary actuation **ⓑ** must not be locked and tools must not be applied or attached.

Operation / actuation Control is realized via CAN bus pilot signal **ⓐ**.

Fluid plan SB34-EHS



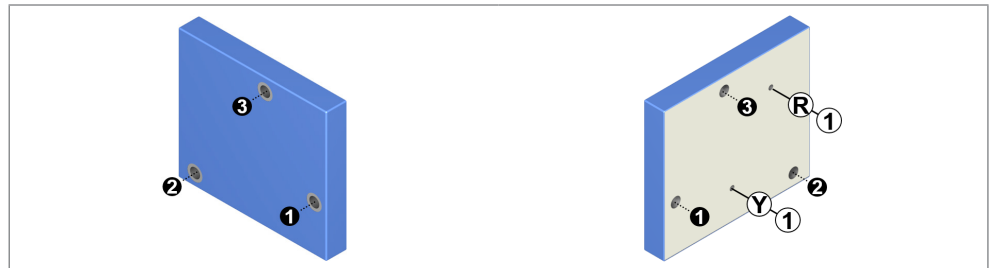
5.3.16 End plate (E1)

Table 28: External ports

Position	Designation	Information
①, ②, ③	Tie rod bore	

Table 29: Internal functions

Position	Designation	Information
①	Connection Y → R	



Fluid plan End plate E1



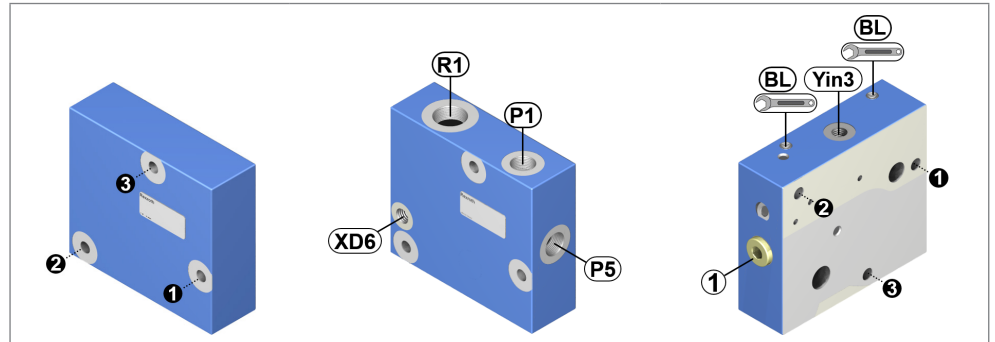
5.3.17 End plate (E2)

Table 30: External ports

Position	Designation	Information
P.	Inlet port	optional
R.	Return flow	optional
Yin.	LS signal input	optional
XD6	EHS pilot oil supply diagnosis	optional
1, 2, 3	Tie rod bore	
BL	Block mounting thread	

Table 31: Internal functions

Position	Designation	Information
1	Threaded plug	optional

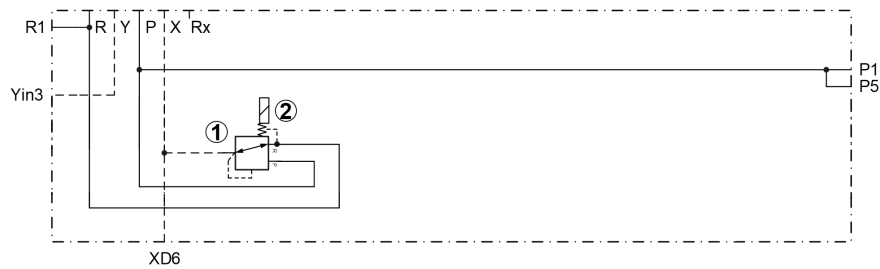


Application End plate **E2** is only installed with connecting plate **C2** or a central connecting plate.

Internal function **Pressure reducing valve 1**: Limits the pressure in the block-internal EHS pilot oil line **X** and supplies this line with the flow from the block-internal line **P**.

Pressure reducing valve switchable solenoid 2: Electrical activation and deactivation of the pressure reduction function.

Operation / actuation The **E2** end plate without switchable solenoid (pressure reducing valve) is not equipped with manual operating elements or external control functions. The version with switchable solenoid (pressure reducing valve), the pressure reduction function can be activated by energizing the switchable solenoid. This way, the pressure in the block-internal EHS pilot oil line **X** is increased to the pressure value of the pressure reduction function. If the switchable solenoid is not energized, the block-internal EHS pilot oil line **X** is relieved to the return flow.

Fluid plan**5.3.18 Central connecting plate****Table 32: External ports**


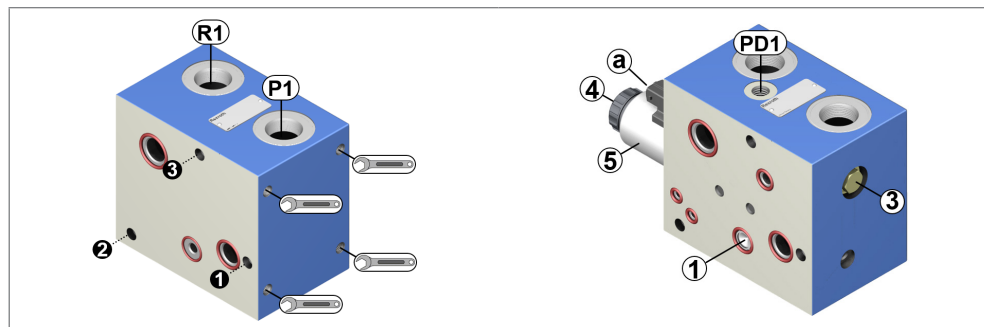
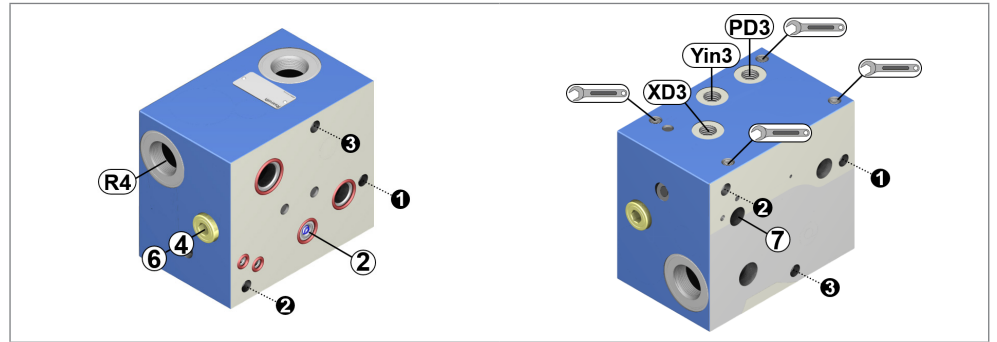
Position	Designation	Information
Ⓐ	Pressure reducing valve control port	optional
⒫	Inlet port	optional
⒫1	Return flow	optional
⒫in.	LS signal input	optional
①, ②, ③	Tie rod bore with thread	
 ⒷL	Block mounting thread	optional

Table 33: Internal functions

Position	Designation	Information
①	Shuttle valve	optional
②	Shuttle valve with spring pretension	optional
③	Pressure relief valve	optional
④	Pressure reducing valve	optional
⑤	Pressure reducing valve switchable solenoid	optional
⑥	Pressure reducing valve threaded plug	optional
⑦	Rx-R non-return valve	optional





Internal function **Shuttle valve ①:** Discharges the higher LS pressure from the block-internal channel **Y** and Yin. to port Yo2 .

Shuttle valve with spring pretension ②: Discharges the higher LS pressure from the block-internal channel **Y** and Yin. to port Yo2 . The spring pretension prevents pressure build-up in Yin. if port Yin. is not occupied.

Pressure relief valve ③: Limits the pressure at port P. and indirectly also the pressure in the block-internal **P** line.

NOTICE! The pressure relief valve with its short response time and low flow is applied for limitation of the pressure peaks in the supplied flow.

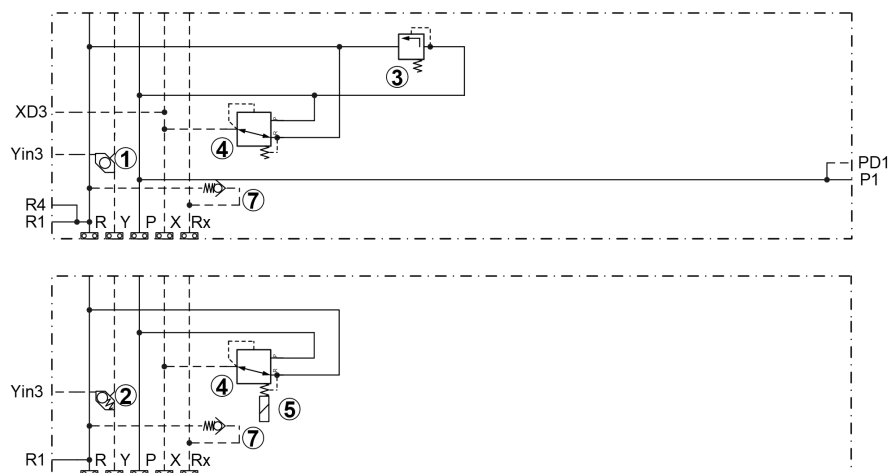
Pressure reducing valve ④: Limits the pressure in the block-internal EHS pilot oil line **X** and supplies this line with the flow from the block-internal line **P**.

Pressure reducing valve switchable solenoid ⑤: Electrical activation and deactivation of the pressure reduction function.

Rx-R non-return valve: Protects EHS pilot oil return line **Rx** against pressure peaks from block-internal return flow **R**.

Operation / actuation The central connecting plate without switchable solenoid (pressure reducing valve) is not equipped with manual operating elements or external control functions. The version with switchable solenoid (pressure reducing valve), the pressure reduction function can be activated by energizing the switchable solenoid. This way, the pressure in the block-internal EHS pilot oil line **X** is increased to the pressure value of the pressure reduction function. If the switchable solenoid is not energized, the block-internal EHS pilot oil line **X** is relieved to the return flow.

Fluid plan Central connecting plate



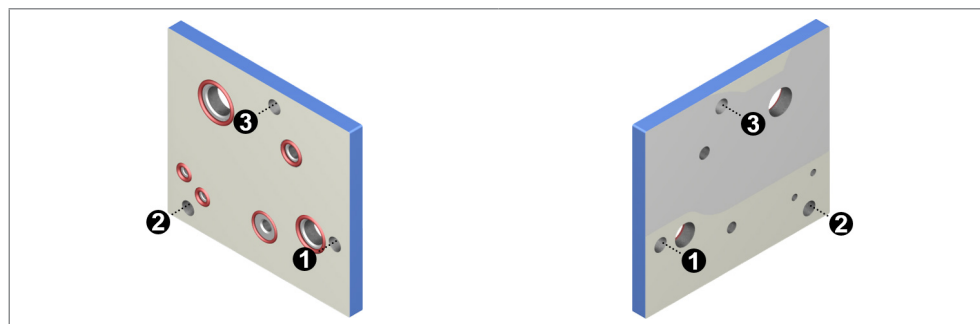
5.3.19 Intermediate plate

Table 34: External ports

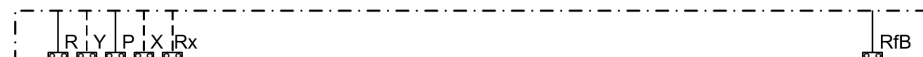
Position	Designation	Information
①, ②, ③	Tie rod bore	



The intermediate plate does not have any internal function and serves as spacer.



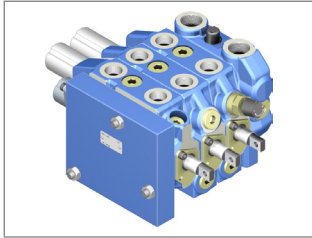
Fluid plan



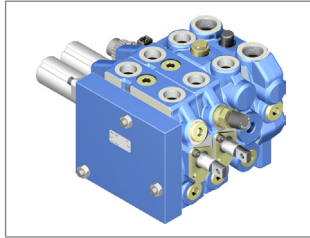
5.4 Control block versions

The flange surfaces between control block segment are uniform and standardized to enable combination of various control block segments.

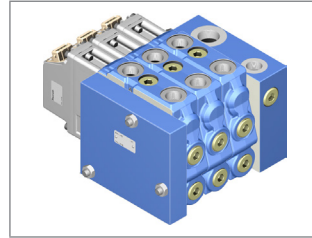
5.4.1 Examples for control blocks with connecting plate, end plate and central connecting plate



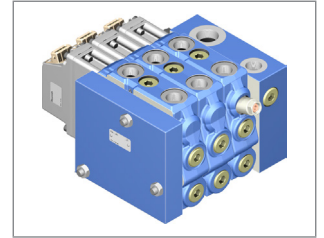
Mechanical control block



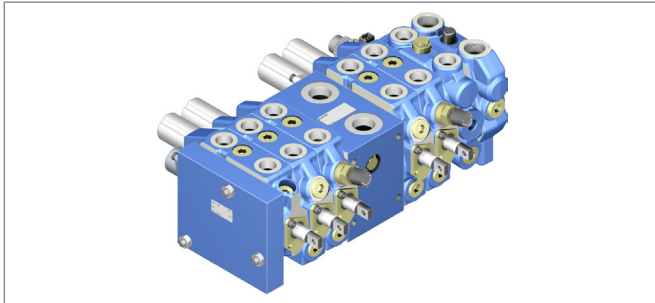
Mechanical control block with EHR24-EM2



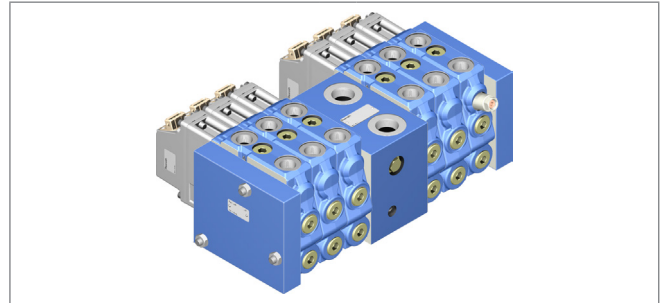
EHS control block



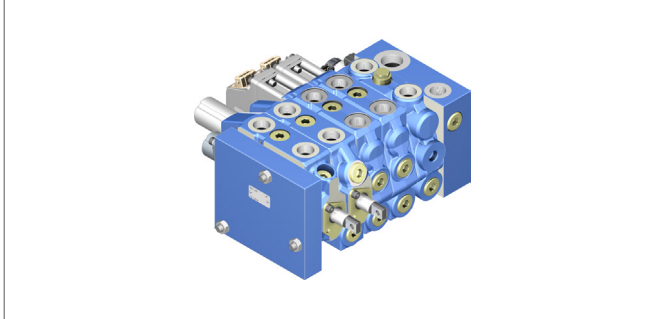
EHS control block with EHR24-EHS



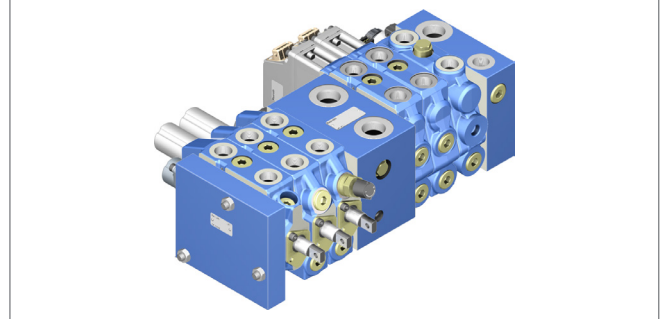
Mechanical control block with electrohydraulic hitch control and central connecting plate



EHS control block with electrohydraulic hitch control and central connecting plate



Mixed control block with EHR24-EM2

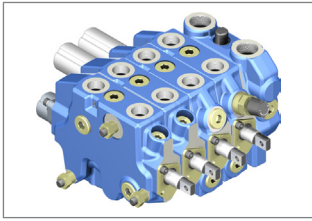


Mixed control block with EHR24-EM2 and central connecting plate

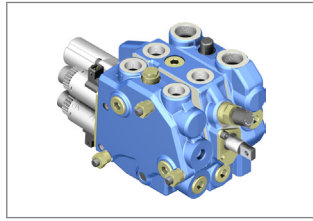


The inlet and return lines of the flow can be directed via the **C6** connecting plate or the central connecting plate.

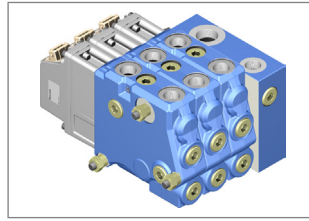
5.4.2 Examples for control blocks with connecting plate or end valve



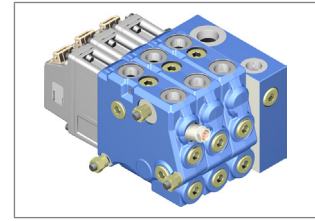
Mechanical control block with EVL



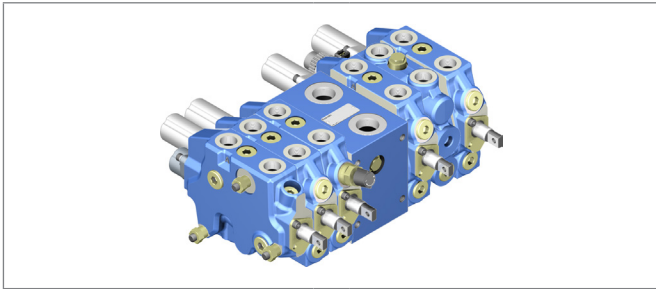
Mechanical control block with EHR24-EM2 EVL



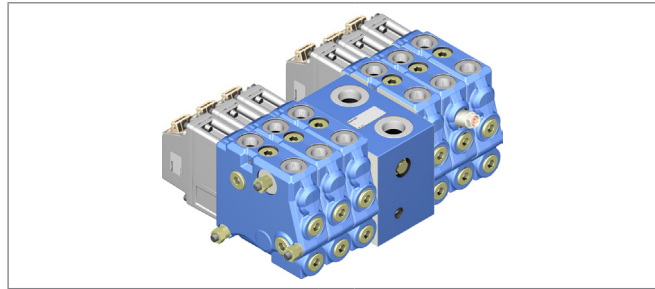
EHS control block with EVL



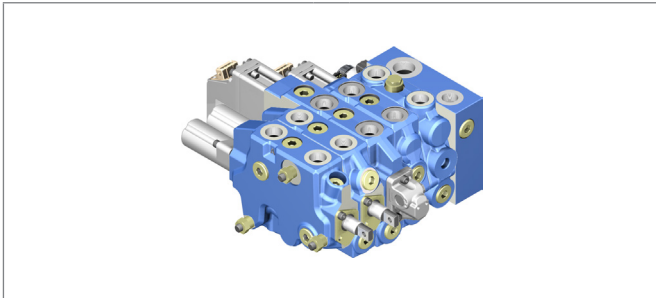
EHS control block with EHR24-EHS with EVL



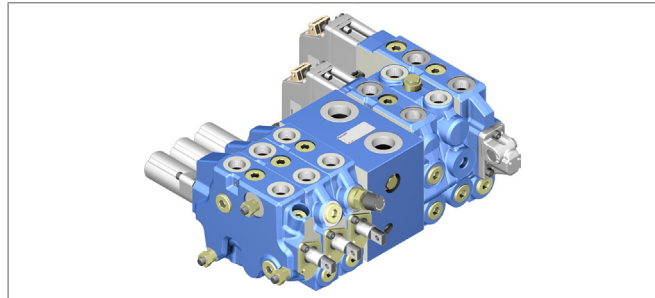
Mechanical control block with EHR-EM2, ZAP, CVL and EVL



EHS control block with EHR-EHS, ZAP, CVL and EVL



Mixed control block with SB24-M, SB24/SB34-EHS, EHR-EM2 and SB24-M EVL



Mixed control block with SB24-M, EHR-EM2, ZAP, SB24-M EVL and SB34-EHS CVL



For detailed combination options of the individual control block segments, refer to chapter 5.5 "Combination options" on page 49.

5.5 Combination options

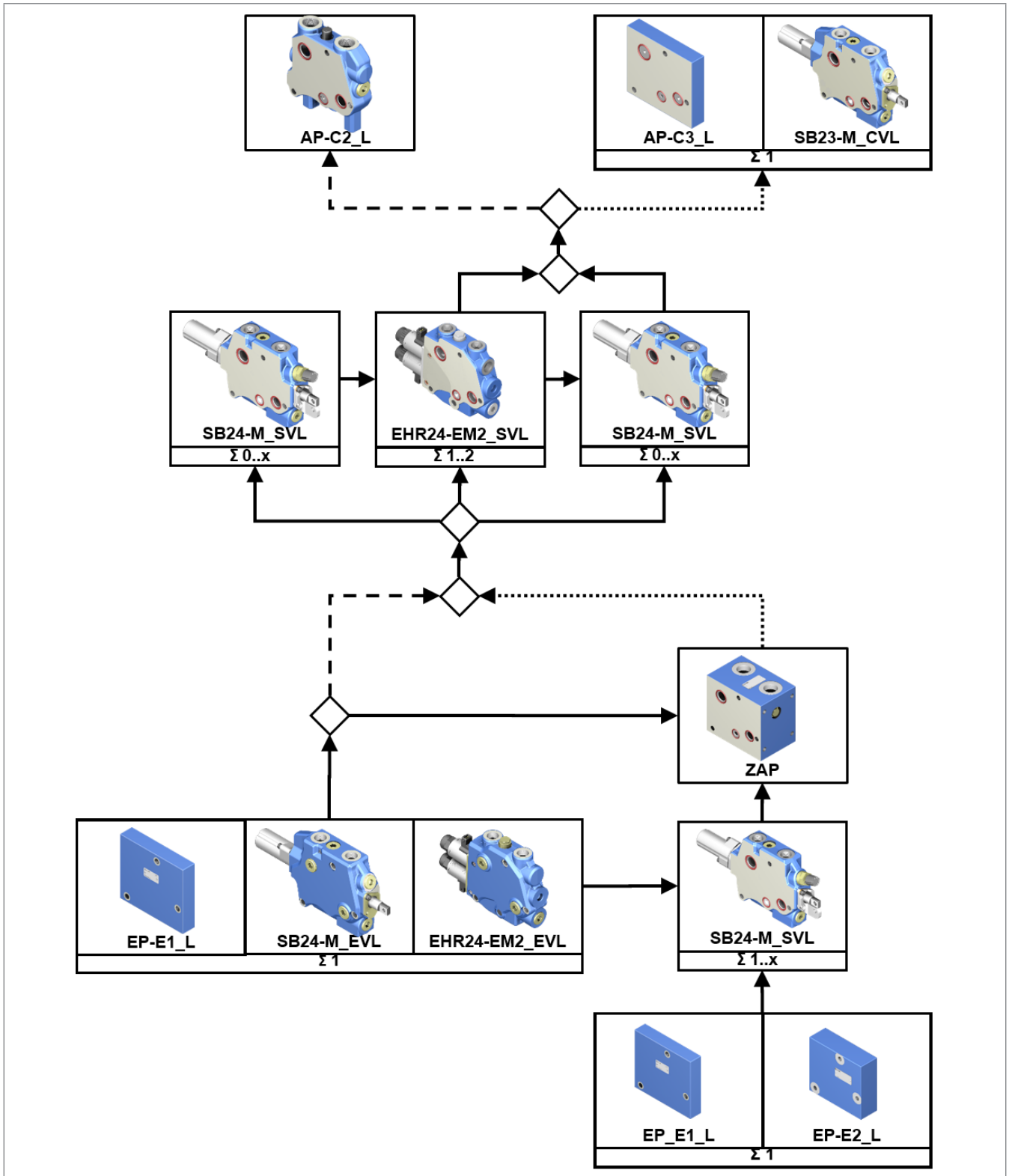


Fig. 2: Combination option of mechanical control block

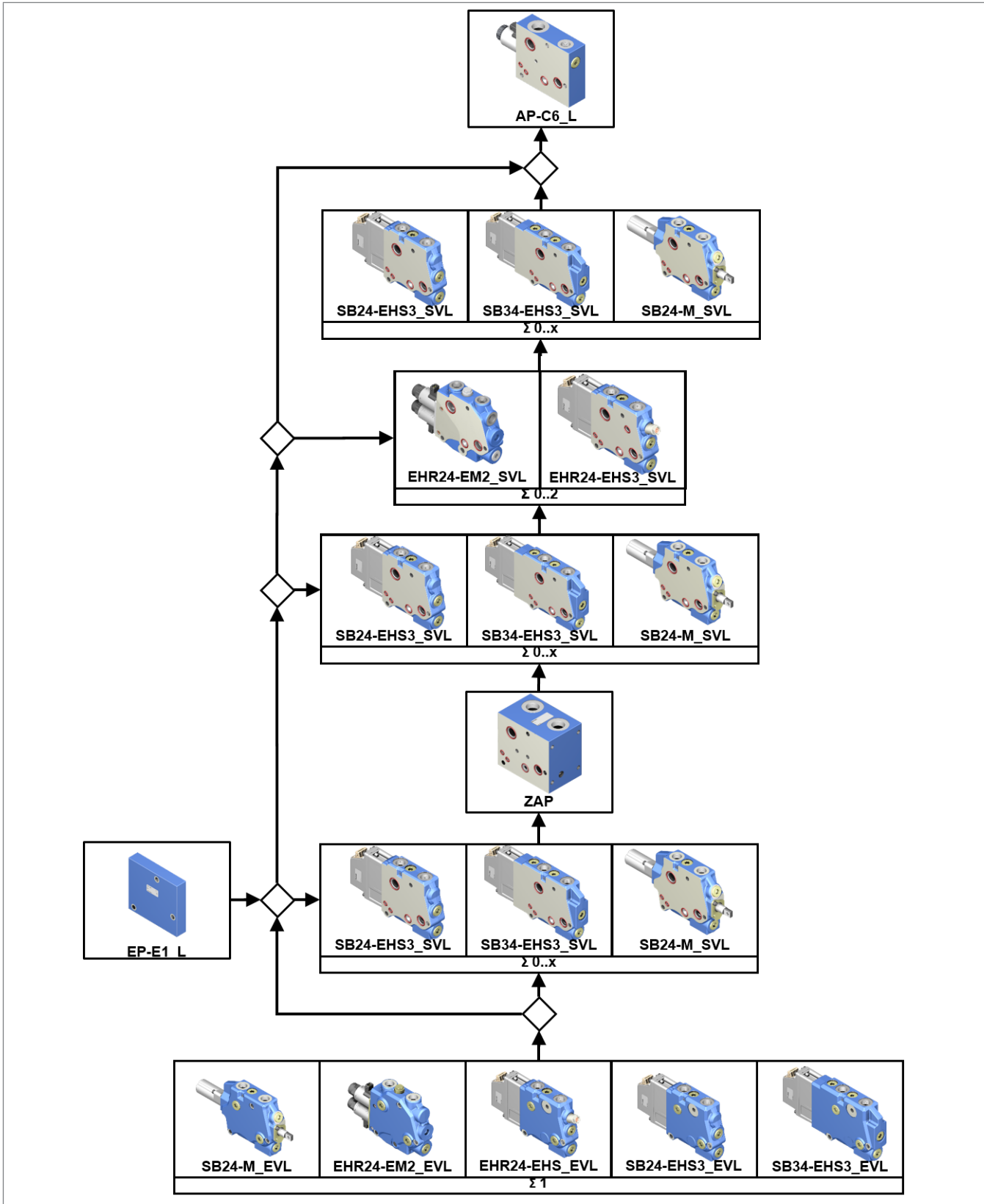


Fig. 3: Combination option of EHS control block with pressure reducing valve in connecting plate

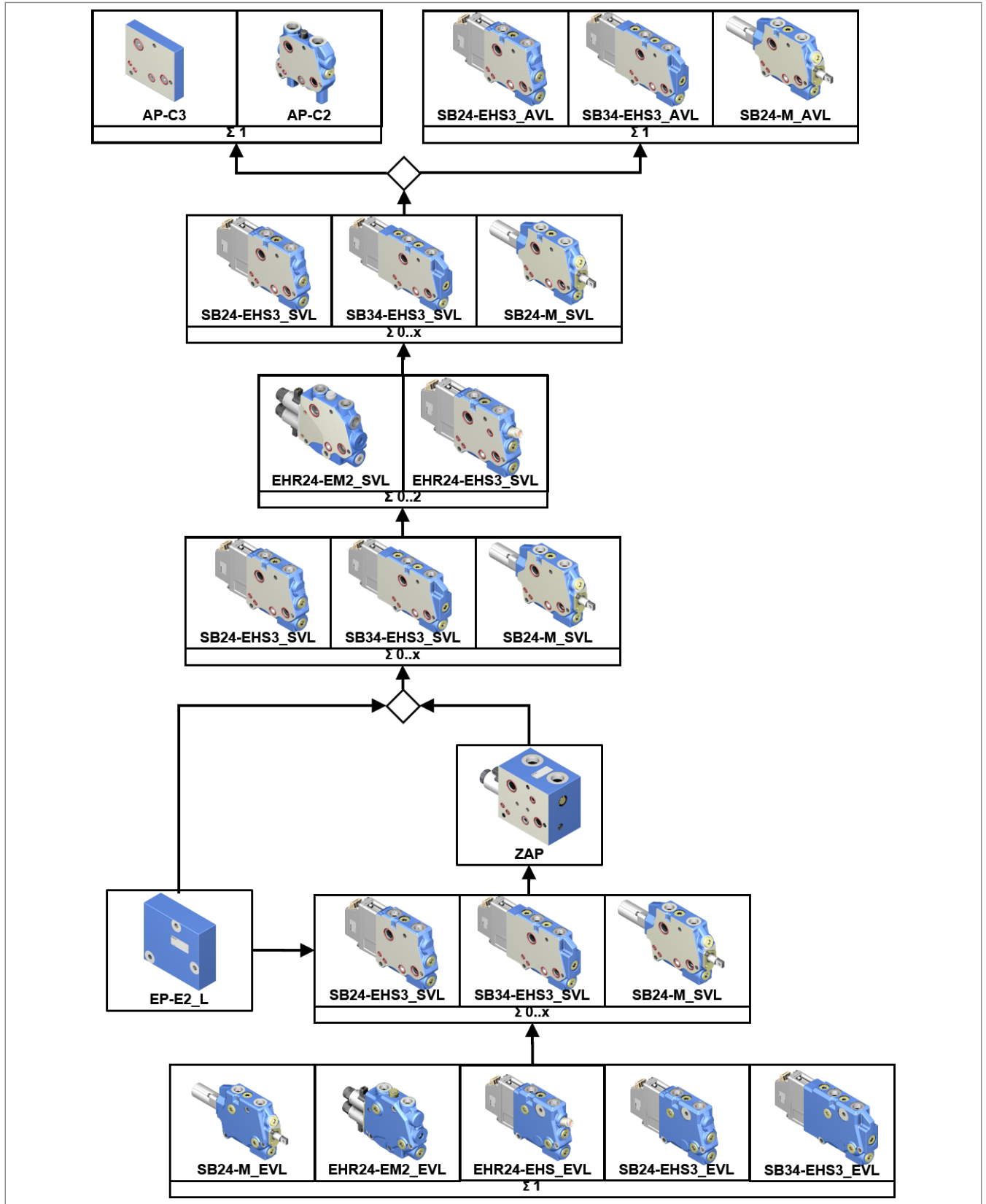


Fig. 4: Combination option of EHS control block with pressure reducing valve in end plate or central connecting plate

6 Transport and storage

- ▶ Always observe the ambient conditions required for transport and storage; see chapter 6.2 "Storage of control block/control block segment" on page 53.



Deviations lead to early aging of components and shortening of service life. Information on unpacking can be found in chapter 7.1 "Unpacking" on page 55.

6.1 Transporting the control block/control block segment

The following optional means of transport can be applied depending on the weight and duration of transport:

- Transport by hand
- Transport with lifting gear (lifting strap)

The dimensions and weights vary by equipment. The values applicable for the control block/control block segment can be found in the offer drawing and the data sheet.

6.1.1 Transport by hand

Up to a specific maximum weight, control blocks/control block segments can be transported by hand for a short distance. Observe the national regulations in your country.

CAUTION! Risk of injury due to heavy loads!

When carrying control blocks/control block segments, there is a risk of injury.

- ▶ Only transport a control block/control block segment by hand for a short time. Observe the national regulations for manual transport.
- ▶ Always use appropriate lifting, lowering and moving techniques.
- ▶ Use your personal protective equipment (e.g. safety goggles, safety gloves, suitable working clothes, safety shoes).

- ▶ During transport, do not lift the control block/control block segment at sensitive attachments (e.g., EHS actuating unit, sensors, solenoid coils).
- ▶ Carefully place the control block/control block segment on the surface to prevent any damage.

6.1.2 Transport with lifting devices

For transport, the control block/control block segment can be attached to the lifting gear by means of a lifting strap.

- ▶ Make sure that the lifting gear is sufficiently dimensioned for transport of the control block/control block segment.
- ▶ Place the lifting strap around the control block/control block segment in such a way that it does not pass over assembled parts (e.g. valves) and that the control block/control block segment is not suspended at attachments.

6.2 Storage of control block/control block segment

Requirements

- The storage areas must be free from corrosive materials, vapors and gases.
 - To prevent damage to the seals, ozone-forming equipment (e.g., mercury-vapor lamps, copiers, printers, high voltage equipment, electric motors, sources of electrical sparks or electrical discharge) must not be operated in storage areas.
 - The storage areas must be dry and free from dust.
 - Ideal storage temperature: +5 °C to +20 °C.
 - Min. storage temperature: –20 °C.
 - Max. storage temperature: +40 °C.
 - UV protection: 100%
Avoid significant exposure to light (e.g. bright windows or direct fluorescent lighting).
 - Relative humidity (no condensation): max. 65%.
 - Do not stack control blocks/control block segments and store them protected against collisions.
 - Do not store the control block/control block segment on sensitive attachments, e.g., actuation elements, sensors, solenoids, or valves.
 - Do not remove protective covers and protective plugs.
- Check the control block/control block segment monthly to ensure proper storage.



The maximum permissible storage time is two years.

After delivery

Delayed commissioning, long freight and storage times or a prolonged shutdown of Rexroth control blocks/control block segments leads to corrosion. Take additional corrosion protection measures to prevent this.



Warranty entitlement will be rendered void if the requirements and storage conditions are not adhered to or after expiration of the maximum storage time.

Recommended procedure after longer storage times:

- 1.** Check the entire control block/control block segment for damage and corrosion prior to installation.
- 2.** Perform a test run to check the control block/control block segment for proper function and leak-tightness.
- 3.** External seals of control blocks/control block segments that have been stored for longer than 12 months are to be checked for damage before installation and may need to be replaced.
- 4.** If the storage period of two years is exceeded, external seals must be replaced.



After expiration of the maximum storage time, we recommend having the control block/control block segment inspected by the responsible Bosch Rexroth service partner.

In case of any questions regarding repair and spare parts, please contact the responsible Bosch Rexroth service partner or the service department of the control block/control block segment manufacturer's plant, see chapter 10.4 "Spare parts" on page 82.

After removal If a control block/control block segment is to be stored after disassembly, preservation for corrosion protection has to be ensured for the full time of storage.



The following instructions only refer to control blocks/control block segments which are operated with a mineral oil-based hydraulic fluid. Other hydraulic fluids require other specific preservation measures. In this case, please contact Bosch Rexroth. For the address, see chapter 10.4 "Spare parts" on page 82.

Bosch Rexroth recommends the following procedure:

1. Clean the control block/control block segment.
2. Plug all ports.
3. Apply mineral oil on the unpainted flange surfaces and external seals of the control block/control block segment.
4. Protect sensitive attachments (e.g. actuation elements, sensors, solenoids or valves) with appropriate measures.
5. When packaging the control block/control block segment, apply appropriate measures for corrosion protection.
6. During storage, protect the control block/control block segment against shocks. For further conditions, refer to section "Requirements" on page 53 in this chapter.
7. If necessary, return the control block/control block segment for repair to Bosch Rexroth.

7 Installation

Prior to installation, the following documents should be to hand:

- Offer drawing (installation drawing) of the control block/control block segment (can be obtained from your contact at Bosch Rexroth)
- Hydraulic circuit diagram of the control block/control block segment (can be found in the offer drawing)
- Hydraulic circuit diagram of the machine (available from the machine/system manufacturer)
- Data sheet of the control block/control block segment (contains permissible technical data)

7.1 Unpacking

CAUTION! Danger due to falling parts!

If the packaging is not opened correctly, parts may fall out and damage the parts or even result in injury.

▶ Place the packaging on a level surface with sufficient load-bearing capacity.

1. Remove any packaging from the product.
2. Check the control block/control block segment for transport damage and completeness, see chapter 4 "Scope of delivery" on page 17.
3. Dispose of the packaging in accordance with the regulations in your country.
4. Return any reusable packaging to Bosch Rexroth.

7.2 Assembly of control block segments to form a control block



Assembly of directional valve discs and plates to form a control block is described in the related documentation 66170-10-R.

7.3 Painting the control block/control block segment

For painting of the control block/control block segment before assembly, proceed as follows:

- ▶ Apply protective plastic plugs at the hydraulic ports for protection against ingress of paints.
- ▶ Screws have to be inserted into the mounting threads to prevent ingress of paint.
- ▶ Protect flange surfaces of control blocks/control block segments against paint.
- ▶ Prevent any paint being applied to the contacts of the electrical connections and make sure that the connectors are not damaged.
- ▶ Prevent liquids from entering the plug of the actuating unit. The plug fulfills the protection class only when closed and locked.
- ▶ When removing the protective plastic plugs after painting, make sure that no paint chips enter the control block/control block segment.
- ▶ Protect name plates against application of paint using a film that can be peeled off after painting.

7.4 Installation conditions

The procedures during installation and commissioning are mainly determined by the installation position (e.g. for air bleeding at the control block/control block segment).

- ▶ Secure the control block/control block segment in such a way that safe transmission of the forces and torques to be expected is guaranteed. The machine/system manufacturer is responsible for dimensioning of fastening elements and threaded connections.
- ▶ Make sure that air bleeding is carried out at the control block/control block segment before commissioning and operation and that it is filled with hydraulic fluid. The hydraulic fluid in the control block/control block segment must not be discharged during standstill.

7.5 Installation position

Select the installation position in compliance with the specifications in the respective data sheet.

7.6 Assembly of the control block/control block segment

7.6.1 Preparation

1. Check the information on the name plate to see if the control block/control block segment is correct.
2. Compare the material number and designation (type code) with the details in the order confirmation.



If the material number of the control block/control block segment does not correspond to the one in the order confirmation, contact Bosch Rexroth for clarification, see chapter 10.4 "Spare parts" on page 82.

7.6.2 Fastening of the control block/control block segment

- The control block/control block segment is equipped with the mounting bores or threads illustrated in the offer drawing and data sheet.
The bore pattern required for assembly (dimensions and tolerances) with mounting bores at the machine can be found in the offer drawing or the data sheet.
- Use cylindrical metric screws (M)
 - Maximum surface roughness RZ max. 63.
- Evenness of the surface 0.1 mm.

- Installation**
1. Observe the requirements for the contact surface in the offer drawing.
 2. Always fasten the control block/control block segment at all dedicated mounting points.
 3. Tighten the mounting bolts clockwise using a torque wrench in accordance with Table 35.

Table 35: Tightening torques

Screw	Tightening torque	Minimum screw-in depth of the thread	Through bore diameter \varnothing
M10	40^{+8} Nm	15 mm	$11^{+0.2}$ mm

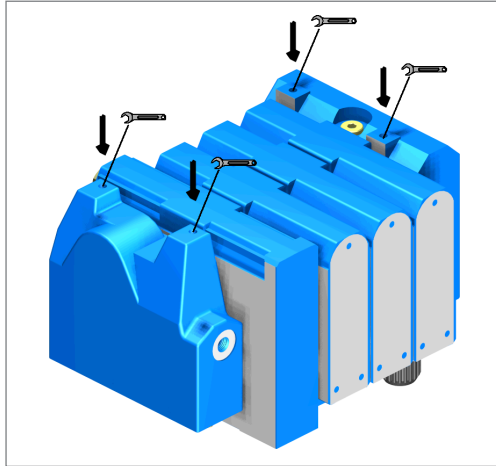


Fig. 5: Control block mounting

7.6.3 Completion of installation

- Remove the transport protection.
If necessary, the control block/control block segment may be delivered with protective covers and protective plugs. They are not pressure-resistant and have to be removed prior to connection.

7.6.4 Mechanical connection of the control block/control block segment

Connection of actuation elements including tolerances is illustrated in the offer drawing. The tightening torques are to be selected according to the actuation elements. There must not occur any radial forces during actuation!

- Procedure** To connect the control block/control block segment to the hydraulic system:
1. Remove the protective plugs or threaded plugs from the ports where the connections should be made according to the hydraulic circuit diagram.
 2. Make sure the sealing surfaces of the hydraulic ports and functional surfaces are not damaged.
 3. Use only clean hydraulic lines or flush them before installation.
 4. Connect the lines according to the offer drawing supplied with the machine diagram. Check whether all ports are piped up or plugged with threaded plugs.
 5. Properly tighten the fittings (observe tightening torques!).

7.6.6 Customer-specific coupling connection

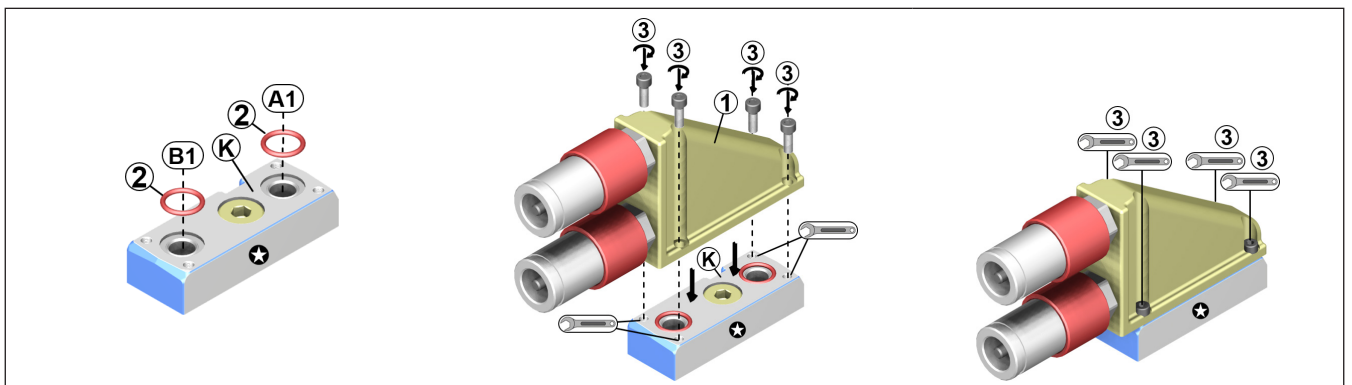
Item	Designation	Use	Information	Number
★	Directional valve			
①	Coupling housing			
②	O-ring	Port A and B	24.5 × 2.15	2
③	Socket-head screw		M6	4



The coupling connections are customer-specific and deviate from the illustration.

Installation of customer-specific coupling flange:

1. Insert the O-rings ② into directional valve ports **A1** and **B1**.
2. Align coupling housing ① with flange surface to the directional valve ★.
3. Align coupling housing ① and the mounting bores with the coupling mounting threads **K** in directional valve ★.
4. Tighten the coupling housing ① with the four socket-head screws ③ at the coupling port **K** of directional valve ★.
5. Tighten socket-head screws ③. Tightening torque $M_A = 11+1 \text{ Nm}$.



7.6.7 Tightening torques for hydraulic ports

Observe the specifications in the standards or the manufacturer's specifications for the threaded plugs, stud end, fittings, and threaded plugs at hydraulic ports. Also note that the tightening torques may also depend on the permissible pressure and temperature range and the application conditions.

Table 36: Recommended tightening torques for stud ends

Metric thread size	Tightening torques
M12 × 1.5	25+3 Nm
M14 × 1.5	45+5 Nm
M16 × 1.5	55+6 Nm
M18 × 1.5	70+7 Nm
M22 × 1.5	125+13 Nm
M27 × 2	180+20 Nm
M33 × 2	310+30 Nm
M42 × 2	450+45 Nm

Table 37: Recommended tightening torques for threaded plugs

Metric thread size	Tightening torques
M10 × 1	11+3.7 Nm
M12 × 1.5	16+5.3 Nm
M14 × 1.5	23.5+8 Nm
M16 × 1.5	29+10 Nm
M18 × 1.5	38+13 Nm
M20 × 1.5	46+15 Nm
M22 × 1.5	67+22 Nm
M24 × 1.5	86+29 Nm
M26 × 1.5	103+34 Nm
M27 × 2	103+34 Nm
M30 × 2	170+57 Nm
M33 × 2	200+67 Nm
M36 × 2	245+82 Nm
M38 × 2	245+82 Nm
M39 × 2	310+103 Nm
M42 × 2	380+127 Nm

7.6.8 Electric connection of the control block/control block segment

NOTICE

Negative effect on function due to incorrect plug-in connections!

Only the plug-in connections specified in the data sheet/offer drawing may be used for electrical connection.

- ▶ Observe the installation specifications of the manufacturer of the plug-in connection.
- ▶ Before commissioning, check to see whether the voltage in the power supply matches the information in the offer drawing and whether the total current to be expected is less than or the same as the load capacity of the power supply.
- ▶ Do not connect live plug-in connections. The assembly process may only be repeated 10 times.

The machine/system manufacturer is responsible for electric control layout. Electrically controlled control blocks/control block segments must be connected in accordance with the electrical circuit diagram of the machine.

For control blocks/control block segments with electrical control and/or mounted sensors, please comply with the details given in the data sheet and the offer drawing, e.g.:

- Permissible voltage range
- Permissible current
- Correct pin assignment

Exact parameters on the correct assignment of the connector, the type of protection and the appropriate mating connector can also be found in the data sheet and the offer drawing. The mating connector is not included in the scope of delivery.

- Procedure** To connect the control block/control block segment to the machine electronics, proceed as follows:
- 1.** Deenergize the plug-in connections at the control block/control block segment.
 - 2.** Before establishing the connection, check the connector and all seals for damage.
 - 3.** Establish the electrical connection of the control block/control block segment.

8 Commissioning

CAUTION

Commissioning an incorrectly installed product!

Mixing up the ports or cable connectors will cause unexpected functions and/or irreparable damage to the control block/control block segment and can cause a risk for personnel and equipment!

- ▶ Make sure that all the electrical connections and hydraulic ports are connected or plugged correctly.
- ▶ Make sure that the cable connectors are correctly assigned to the respective electrical components.

Risk of injury due to jammed spool!

The temperature difference between the control block/control block segment and the hydraulic fluid must not exceed 20 °C. Otherwise, there is a risk of a jammed spool.

- ▶ Avoid temperature shocks.
- ▶ Adjust the temperatures as necessary.

NOTICE

Risk of damage due to entrapped air!

Air bubbles in the housing can considerably compromise the damping function of the directional valve components required for stable function. This means that vibration may occur at moving components (e.g. control spools or pressure compensators) causing heavy impacts at the mechanical limit stops due to high vibration amplitudes.

In this respect, damage or even destruction of components is to be expected.

- ▶ Before commissioning, it must be ensured that any air entrapped in the control block/control block segment is completely removed. This may be realized by application of a low hydraulic fluid flow of $q \leq 20$ l/min in all spool positions.
- ▶ Always observe the instructions for air in the instruction manual of the machine.

8.1 Before initial commissioning

- ▶ Make sure that the tie rod screws of the control block are tightened with the required tightening torque.
- ▶ The control block/control block segments must be installed in the vehicle in compliance with the vehicle specifications. Make sure that the mounting screws are tightened with the required tightening torque.
- ▶ Any electrical connections at the control block/control block segment must be established according to the electrical circuit diagram of the vehicle.
- ▶ The hydraulic connection fittings must be tightened with the specified tightening torque, see Table 36 on page 60.
- ▶ The control block/control block segments must be filled with hydraulic fluid to the maximum level.
- ▶ Supply and control connections must be established according to the fluid plan of the vehicle.

- ▶ Only use hydraulic fluid in compliance with the data sheet:
 - Permissible hydraulic fluid
 - Hydraulic fluid temperature range
 - Viscosity range
 - Maximum admissible degree of contamination of hydraulic fluid



The control block/control block segments must be within a temperature range of 20 to 80 °C.

The temperature of the hydraulic fluid must be in a temperature range of 20 to 80 °C. The temperature difference between the control block/control block segment and the hydraulic fluid must not exceed 20 °C.

8.2 Initial commissioning

For initial commissioning of the control block/control block segment, proceed as follows:

- 1.** Reduce the first flow to a minimum to prevent a pressure surge.
- 2.** Slowly increase the flow.
- 3.** Apply air bleeding at the control block/control block segment, see chapter 8.3 on page 64.
 - Bosch Rexroth recommends separate air bleeding at the individual directional valves.
 - Also observe the information on air bleeding in the instruction manual of the machine.
- 4.** Perform a leak test.

Make sure that there is no hydraulic fluid leakage at the control block/control block segment during operation. In case of hydraulic fluid leakage, refer to Table 39 "Malfunction table" on page 86.
- 5.** Perform a functional test.

The functional test must be carried out according to machine/system manufacturer specifications.
- 6.** Check the pressure setting
Check the maximum pressure at the PRV of the connecting plate or central connecting plate and at the EHR control valve. In case of malfunctions, refer to chapter 14 "Troubleshooting" on page 85.

8.3 Air bleeding

8.3.1 Air bleeding at control block/control block segment

NOTICE! Short circuits may only be established at working ports at the same directional valve. Rinsing of the hydraulic lines in the housing is only possible by establishing short circuits.

- ▶ Start air bleeding with the directional valve with the maximum distance to port **P**.
 - For SB control valves SB, refer to chapter 8.3.2
 - For control valves SB with EHS, refer to chapter 8.3.3
 - For hitch control valves EHR, refer to chapter 8.3.4
 - For hitch control valves EHR with EHS, refer to chapter 8.3.5

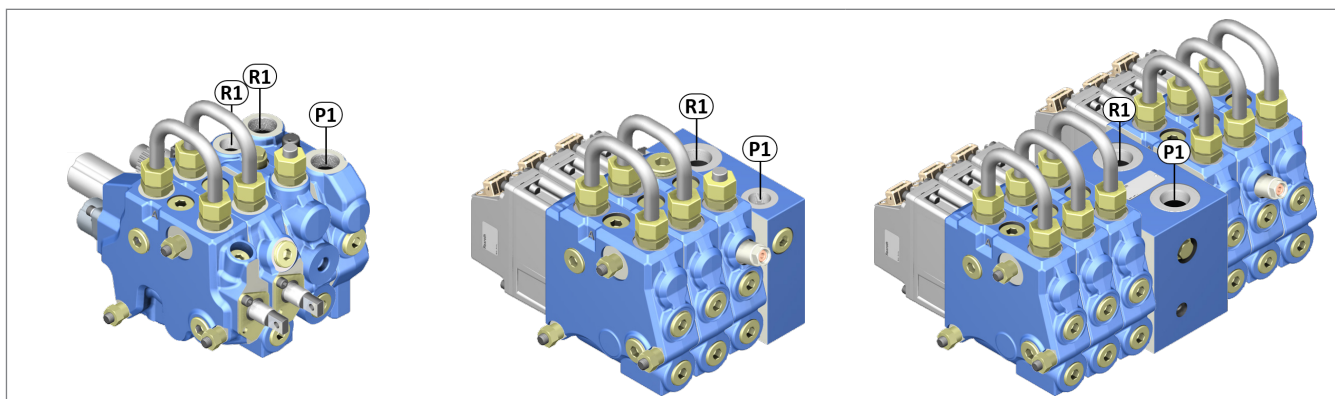


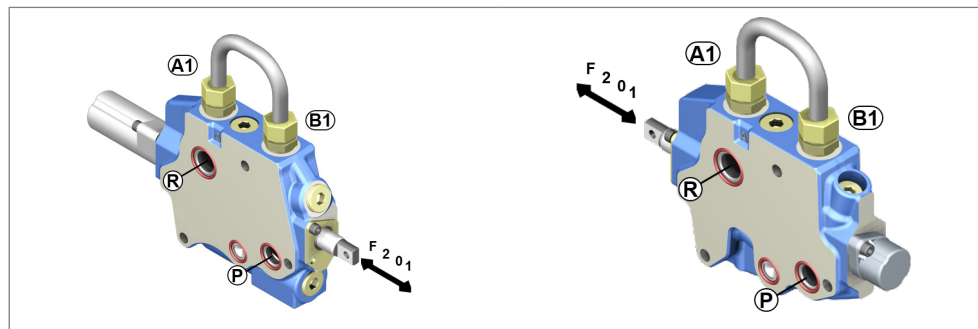
Fig. 6: Control block examples with threaded port and hydraulic line

8.3.2 Air bleeding at SB control valves



The hydraulic fluid flow via ports **P** and **R** must be applied. The two consumer ports **A1** and **B1** must be connected, e.g. by means of a hydraulic line.

1. Move the control spool from **0** or neutral position to the fine control range and apply a small flow ($q < 20$ l/min) through the directional valve for at least 20 seconds. This procedure must be carried out for spool positions **1** and **2**.
2. Repeat this process several times. Only when it has been ensured that there is no more air in the directional valve housing may the control valve be switched with the maximum permissible flow.
3. Switch spool positions **1** and **2** several times to maximum position.



8.3.3 Air bleeding at SB control valves with EHS

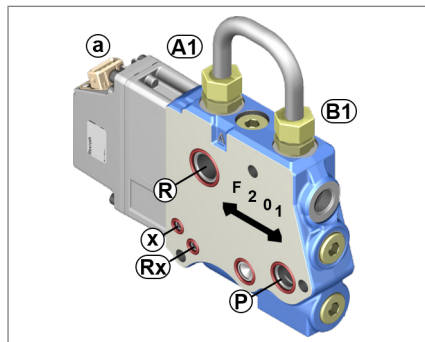


The hydraulic fluid flow via ports **P** and **R** must be applied. The two consumer ports **A1** and **B1** must be connected, e.g. by means of a hydraulic line.

NOTICE! Air inside the actuating unit can lead to vibrations at the control spool in control position and an actuating time exceeding the programmed diagnosis limit. The effect this exceeded time depends on the vehicle.

NOTICE! In the installation positions permitted with restrictions, increased air bleeding effort must be expected. To completely bleed the actuator chambers, step 3 of the bleeding procedure must be repeated several times.

1. Move the control spool from **0** or neutral position to the fine control range and apply a small flow ($q < 20$ l/min) through the directional valve for at least 20 seconds. This procedure must be carried out for spool positions **1** and **2**.
2. Repeat this process several times. Only when it has been ensured that there is no more air in the directional valve housing may the control valve be switched with the maximum permissible flow.
3. Switch the directional valve at least 20 times with a frequency of 2 Hz between 100% lifting (spool position **1**) and floating (spool position **F**). Control valves without floating position are switched between 100% lifting (spool position **1**) and 100% lowering (spool position **2**).



8.3.4 Air bleeding at EHR hitch control valves



The hydraulic fluid flow via ports **P** and **R** must be applied.

Option 1

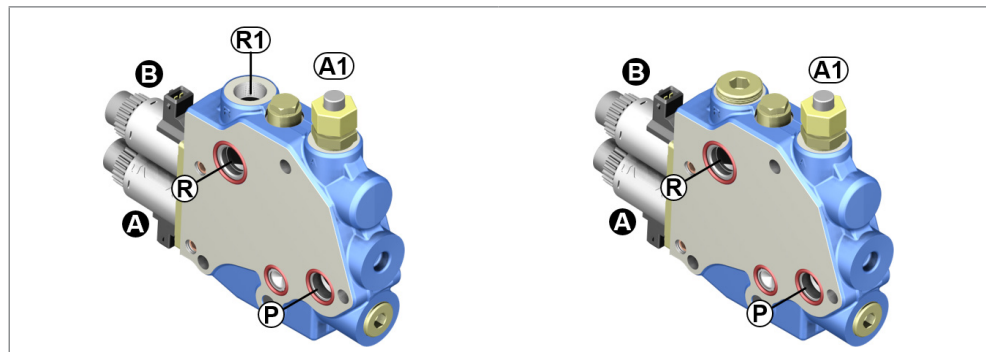
Bleeding of the hitch control valve with connected cylinder:

1. Move the control spool from **0** or neutral position to the fine control range and raise the hitch completely with a small flow ($q < 20$ l/min). Then lower the hitch completely.
2. Repeat this process several times. Only when it has been ensured that there is no more air in the directional valve housing may the hitch control valve be switched with the maximum permissible flow.

Option 2

Bleeding of the hitch control valve with the working port closed:

1. Close working port **A1**.
2. Connect hitch control valves with external return flow port **R1** to the tank.
3. Apply a small flow ($q < 20$ l/min) through the hitch control valve for at least 20 seconds and actuate lifting solenoid **A** at 50% (approx. 1.4 A) and the lowering solenoid **B** at 100% (max. 3.3 A).



8.3.5 Air bleeding at EHR hitch control valves with EHS

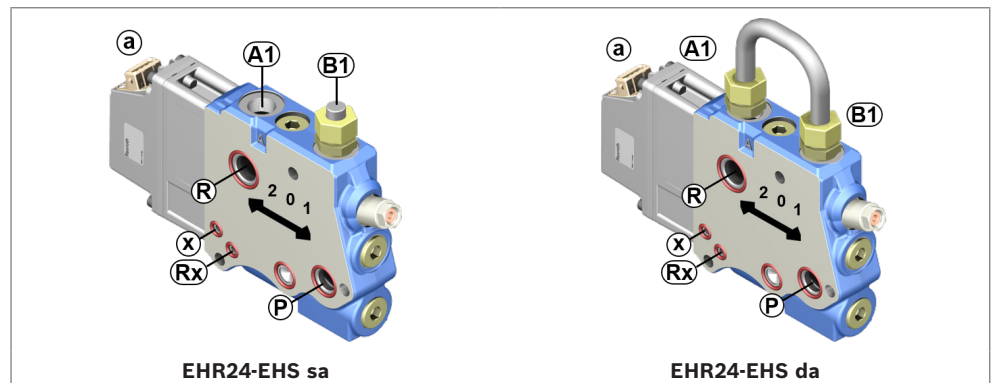


The hydraulic fluid flow via ports **P** and **R** must be applied. Hitch control valves with EHS are bled with cylinders connected.

NOTICE! Air inside the actuating unit can lead to vibrations at the control spool in control position and an actuating time exceeding the programmed diagnosis limit. The effect this exceeded time depends on the vehicle.

NOTICE! In the installation positions permitted with restrictions, increased air bleeding effort must be expected. To completely bleed the actuator chambers, step 3 of the bleeding procedure must be repeated several times.

1. Move the control spool from **0** or neutral position to the fine control range and raise the hitch completely with a small flow ($q < 20$ l/min). Then lower the hitch completely.
2. Repeat this process several times. Only when it has been ensured that there is no more air in the directional valve housing may the hitch control valve be switched with the maximum permissible flow.
3. Switch the hitch control valve at least 20 times with a frequency of 2 Hz between 100% lifting (spool position **1**) and 100% lowering (spool position **2**).



8.4 Recommissioning after standstill

Recommissioning is necessary if the control block/control block segments

- have been decommissioned for more than 12 months
- have been disassembled
- have been repaired
- have been drained from hydraulic fluid or if hydraulic fluid was changed.

- For recommissioning, proceed as described in chapter 8.2 "Initial commissioning" on page 63.

9 Operation

Use the product only within the performance range specified in the technical data. The machine/system manufacturer is responsible for proper project planning of the hydraulic system and its control.

9.1 Operation via EHS software

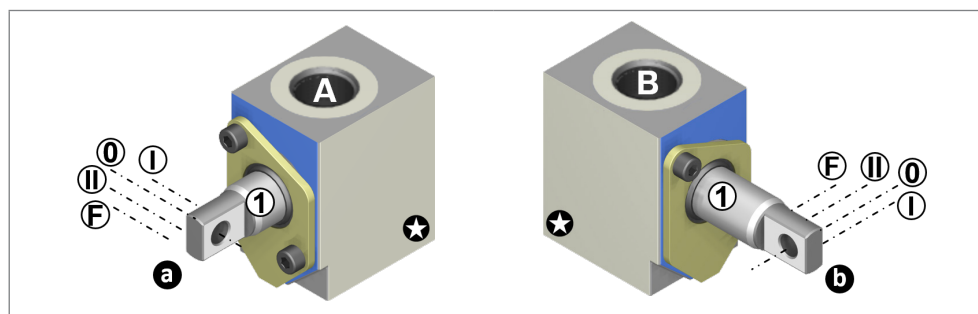
Communication and diagnosis with the electro-hydraulic actuating unit can be realized via the CAN interface by means of conventional tools like VECTOR CANoe.



The features of the EHS software like parameterizability, diagnosis functions and monitoring limits are available on request from the technical customer information RA70777275.

9.2 Operation of the mechanical actuation on the SB24-M

Item	Designation
①	Control spool
a	Clevis A side
b	Clevis B side
★	Valve housing



Depending on the SB24-M version, operation is realized via the front side of the **A**-side port or **B**-side port.

The following control spool positions are defined:

Position	Port
Neutral	① and ② closed
Lifting	Activation ②
Lowering	Activation ①
Float mode	① and ② connected and open in addition to the return flow

Function Via the control spool ① position, the hydraulic ports **A** and **B** are activated and/or deactivated.

When the lifting and lowering function is activated, the respective hydraulic port is supplied with hydraulic fluid from the pump. The flow is proportional to the corresponding end position ① or ② to the control spool deflection. During deactivation, the flow supply of the pump is interrupted for the active hydraulic port.



During activation, the actuating force is influenced by the hydraulic fluid pressure. Flow integrity depends on the viscosity, temperature and pressure of the hydraulic fluid.

Lifting function:

- The maximum flow is limited by an internal control spool stop.
- Lifting depends on pump pressure and pump flow.
- The pump pressure must be higher than the load pressure.

Neutral position:

- The dead path is crossed before the activation of the lifting and lowering function.

The maximum actuating force at the control spool ① for the lifting ① and lowering ② positions is 200 N.

The maximum actuating force at the control spool ① for the float mode position ③ is 340 N.

Detent unit **WARNING!** The mechanically operated valves SB24-M with detent remain in their switched, detented position even after the power supply has been switched off. “Unlocking” requires active access by the operator.

The SB24-M with detent unit has noticeable detent lockings in different combinations, depending on the version for the positions lifting ①, lowering ② and float mode ③. In order to release the control spool ① from the detent locking, an additional actuating force is required.

Control spool deflection on port side A

Activating the port ② (lifting function)

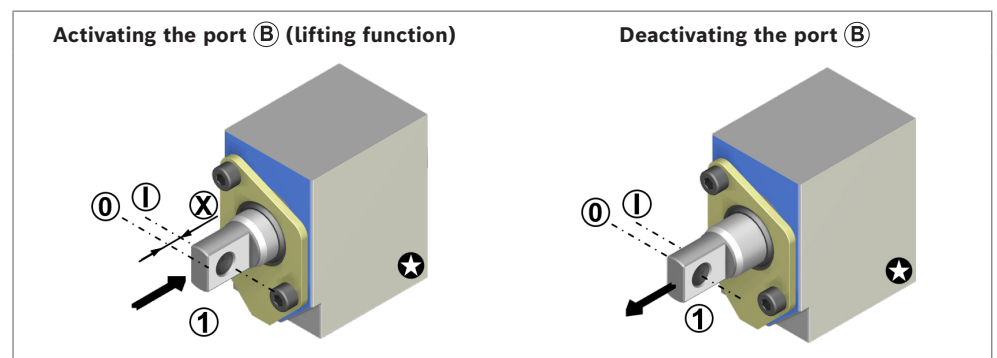
- ▶ Push the control spool ① from the neutral position (position ①) axially in the direction of the lifting position ①.
- ▶ For maximum flow, push the control spool ① axially to the lifting position ①.



The maximum stroke \times is approx. 7 mm.

Deactivating the port ②

- ▶ Move the control spool ① axially back into the neutral position (position ①).



Activating the port $\text{\textcircled{A}}$ (lowering function)

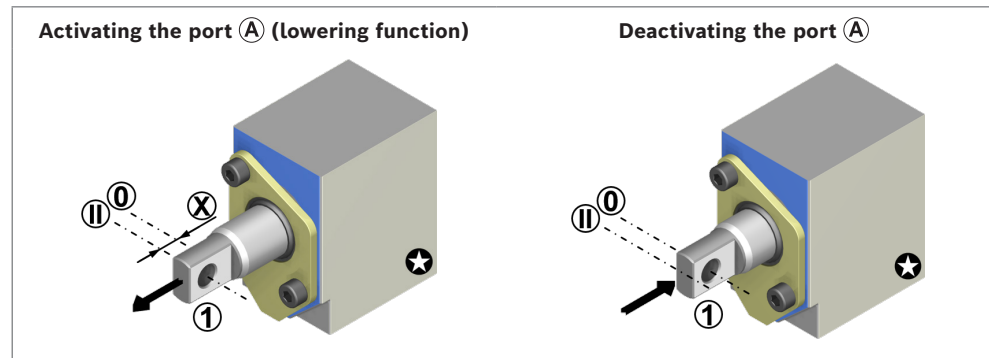
- ▶ Pull the control spool $\text{\textcircled{1}}$ from the neutral position (position $\text{\textcircled{0}}$) axially in the direction of the lowering position $\text{\textcircled{II}}$.
- ▶ For maximum flow, pull the control spool $\text{\textcircled{1}}$ axially to the lowering position $\text{\textcircled{II}}$.



The maximum stroke $\text{\textcircled{X}}$ is approx. 7 mm.

Deactivating the port $\text{\textcircled{A}}$

- ▶ Move the control spool $\text{\textcircled{1}}$ axially back into the neutral position (position $\text{\textcircled{0}}$).



Activating the float mode function (only with detent unit with float mode function version)

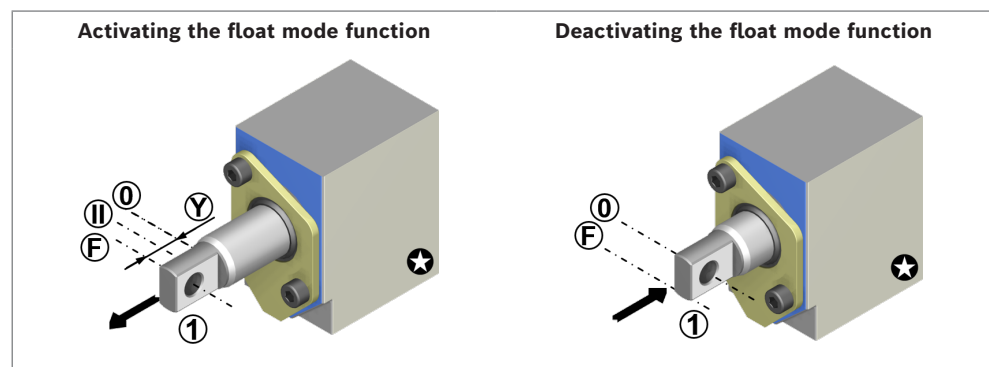
- ▶ Pull the control spool $\text{\textcircled{1}}$ from the neutral position (position $\text{\textcircled{0}}$) axially via the lowering position $\text{\textcircled{II}}$ to the float mode position $\text{\textcircled{F}}$.



The maximum stroke $\text{\textcircled{Y}}$ to the float mode position $\text{\textcircled{F}}$ is approx. 12 mm.

Deactivating the float mode function

- ▶ Move the control spool $\text{\textcircled{1}}$ axially back into the neutral position (position $\text{\textcircled{0}}$).



Control spool deflection on port side B

Activating the port [Ⓑ] (lifting function)

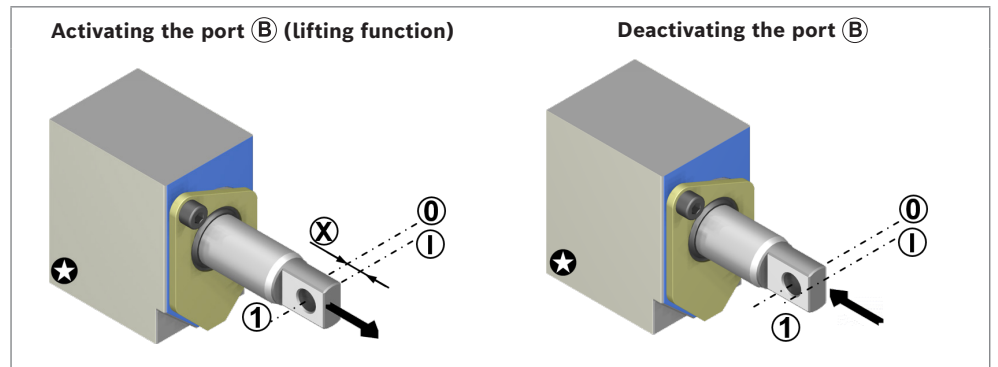
- ▶ Pull the control spool ^① from the neutral position (position ^⓪) axially in the direction of the lifting position [Ⓛ].
- ▶ For maximum flow, pull the control spool ^① axially to the lifting position [Ⓛ].



The maximum stroke [ⓧ] is approx. 7 mm.

Deactivating the port [Ⓑ]

- ▶ Move the control spool ^① axially back into the neutral position (position ^⓪).



Activating the port [Ⓐ] (lowering function)

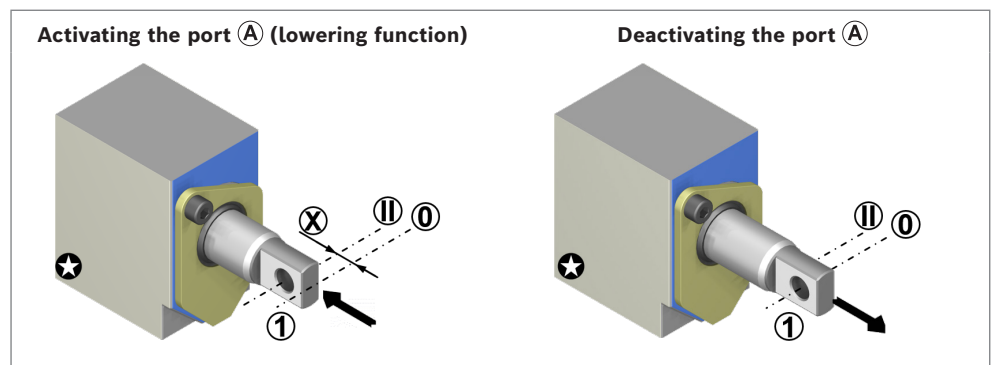
- ▶ Push the control spool ^① from the neutral position (position ^⓪) axially in the direction of the lowering position [Ⓜ].
- ▶ For maximum flow, push the control spool ^① axially to the lowering position [Ⓜ].



The maximum stroke [ⓧ] is approx. 7 mm.

Deactivating the port [Ⓐ]

- ▶ Move the control spool ^① axially back into the neutral position (position ^⓪).



Activating the float mode function (only with detent unit with float mode function version)

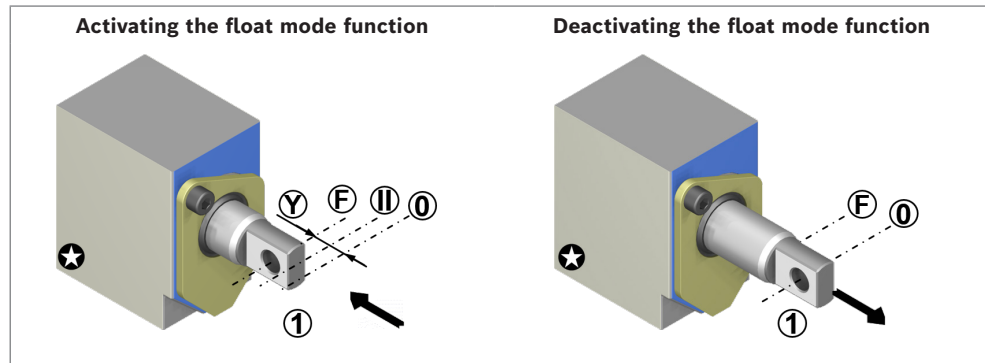
- ▶ Push the control spool ① from the neutral position (position ①) axially via the lowering position ② to the float mode position ③.



The maximum stroke ④ to the float mode position ③ is approx. 12 mm.

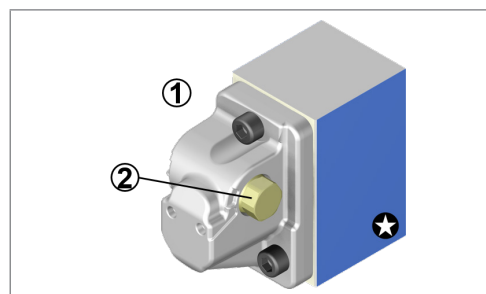
Deactivating the float mode function

- ▶ Move the control spool ① axially back into the neutral position (position ①).



9.3 Operation of the cover cap with manual auxiliary actuation on the SB34-EHS

Item	Designation
①	Cover cap with manual auxiliary actuation
②	Setting shaft
★	Valve housing



The setting shaft ② must be variable and must not be locked.

Function

The manual auxiliary actuation is operated via the external hexagon of the setting shaft ②.

- ▶ Counterclockwise rotation activates the lifting function.
- ▶ Clockwise rotation activates the lowering function and float mode function.



During activation of the lifting function or lowering function, the flow is changed proportionally to the angle of rotation of the setting shaft ②. During activation, the actuating force is influenced by the hydraulic fluid pressure. Flow integrity depends on the viscosity, temperature and pressure of the hydraulic fluid.

For the lifting function, the flow is limited by a stop. Upon actuation from the neutral position, the dead path is crossed before activation of the respective function.

The housing of the cover cap ① has markings for the positions:

Neutral	⓪
Lifting	Ⓛ
Lowering	Ⓜ
Float mode	ⓕ

For orientation purposes, the setting shaft ② has a wider chamfer Ⓜ on the external hexagon.

- Preparation** ▶ Mark the wider external hexagon chamfer Ⓜ on the setting shaft ② with a pencil.



The maximum torque at the setting shaft ② is 10.5 Nm.

Lifting function **Activating the lifting function**

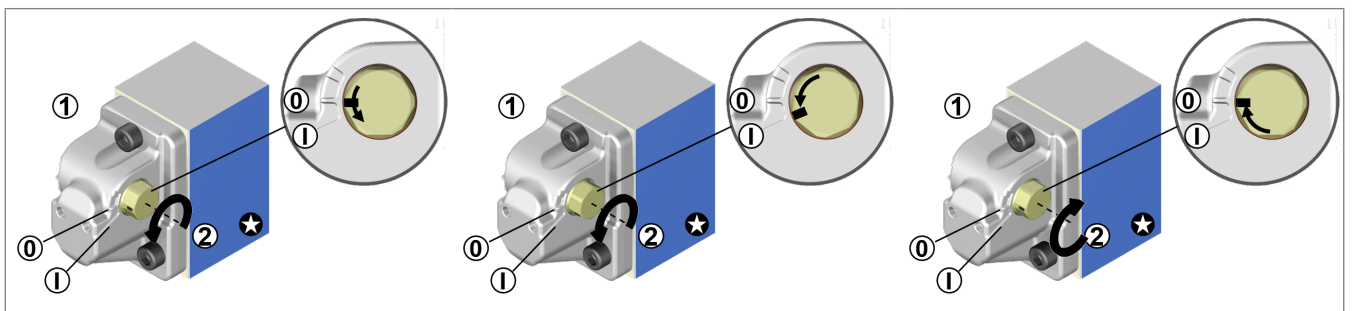
- ▶ Slowly turn the setting shaft ② with the marking Ⓜ counterclockwise from the neutral position (position ⓪) in the direction of the lifting position Ⓛ.
- ▶ For maximum flow, turn to the lifting position Ⓛ up to the stop.



Lifting depends on the pump pressure. The pump pressure must be higher than the load pressure.

Deactivating the lifting function

- ▶ Slowly turn the setting shaft ② with the marking Ⓜ clockwise back to the neutral position ⓪.

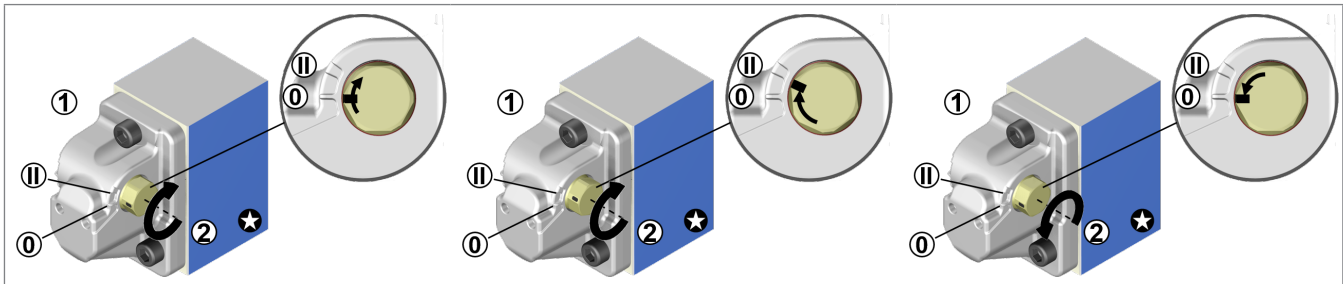


Lowering function Activating the lowering function

- ▶ Slowly turn the setting shaft ② with the marking **m** clockwise from the neutral position (position ①) in the direction of the lowering position ②.
- ▶ For maximum flow, turn to the lowering position ② up to the stop.

Deactivating the lowering function

- ▶ Slowly turn the setting shaft ② with the marking **m** counterclockwise back to the neutral position ①.

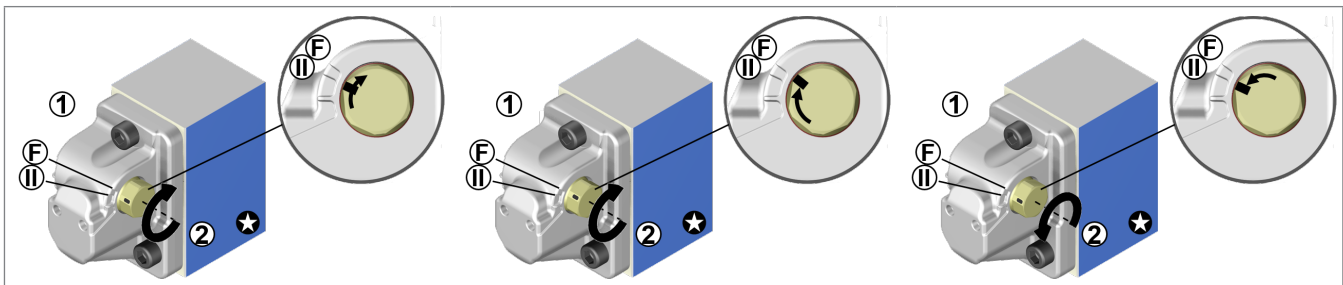


Float mode function Activating the float mode function

- ▶ Slowly turn the setting shaft ② with the marking **m** clockwise from the neutral position (position ①) via the lowering position ② to float mode position ③.

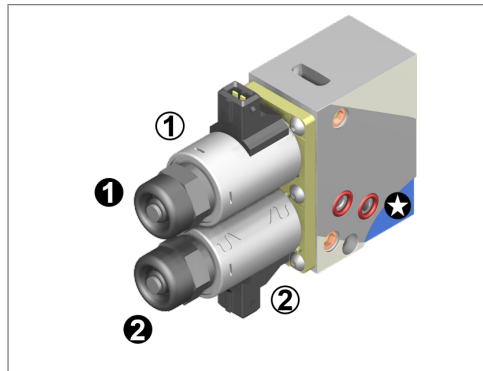
Deactivating the float mode function

- ▶ Slowly turn the setting shaft ② with the marking **m** counterclockwise via the lowering position ② back to the neutral position ①.



9.4 Operation of the manual auxiliary actuation for the lifting and lowering function at the EHR24-EM2

Item	Designation
①	Lowering solenoid
②	Lifting solenoid
①	Lowering solenoid rubber cap
②	Lifting solenoid rubber cap
★	Valve housing



- Function** The function is operated by means of a pushbutton on the respective rubber cap.
- ▶ The lowering function is activated via the rubber cap ①.
 - ▶ The lifting function is activated via the rubber cap ②.

Operation is carried out by pressing the pushbutton on the rubber cap.
The maximum stroke is approx. 5 mm.

NOTICE! Do not actuate the pushbutton with a sharp or pointed tool or object.
Do not loosen or tighten the rubber cap on the external hexagon.



During activation of the lifting function or lowering function, the flow is changed proportionally to the stroke of the solenoid plunger.

During activation, the operating force is influenced by the hydraulic fluid pressure.

Flow integrity depends on the viscosity, temperature and pressure of the hydraulic fluid.

The maximum flow is limited by a stop.

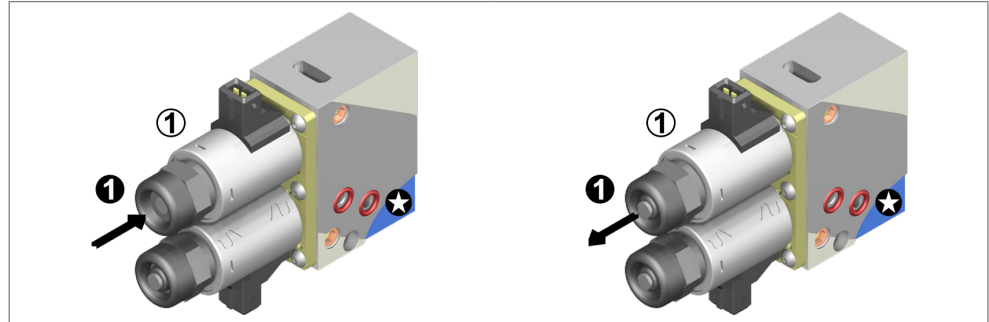
When the rubber cap is actuated, the dead path is crossed before activation of the respective function.

Manual auxiliary actuation **Activating the lowering function**

- ▶ Slowly press the pushbutton on the rubber cap ① at the lowering solenoid ①.

Deactivating the lowering function

- ▶ Slowly release the pushbutton on the rubber cap ① at the lowering solenoid ①.



Activating the lifting function

- ▶ Slowly press the pushbutton on the rubber cap ② at the lifting solenoid ②.

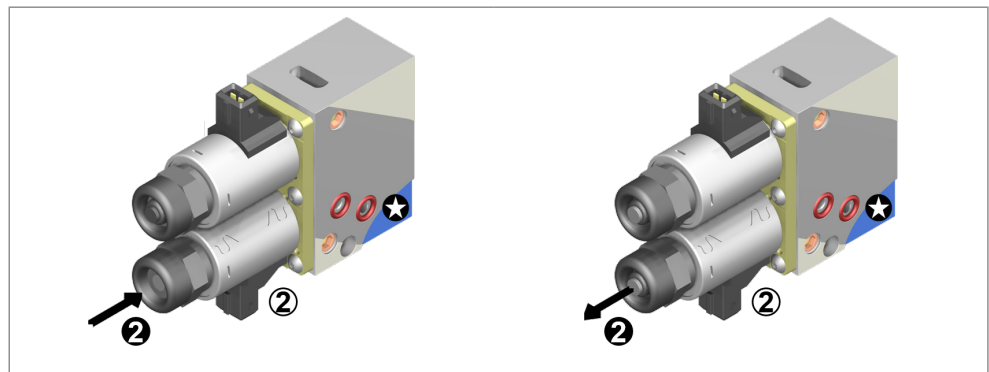


Lifting depends on the pump pressure.

The pump pressure must be higher than the load pressure.

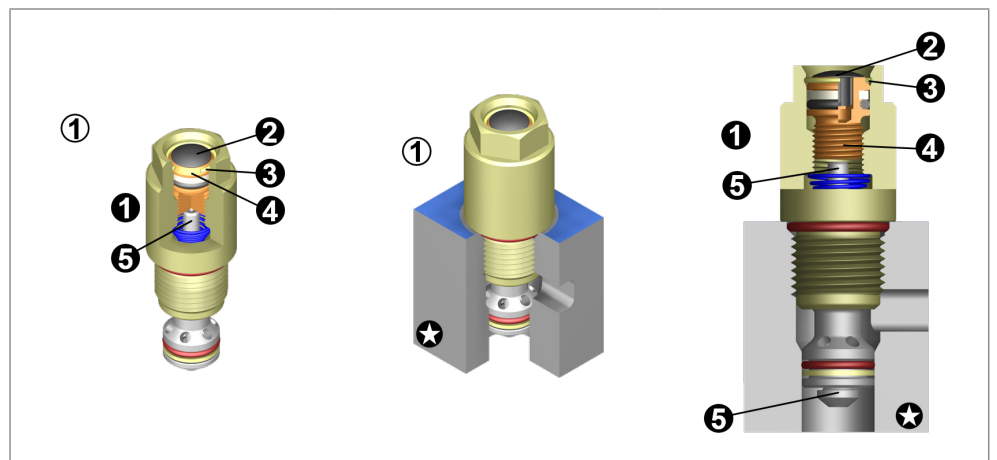
Deactivating the lifting function

- ▶ Slowly release the pushbutton on the rubber cap ② at the lifting solenoid ②.



9.5 Operation of the auxiliary lowering function at the pressure relief valve on the EHR24-EHS

Item	Designation
①	Pressure relief valve
❶	Valve housing
❷	Protective cap
❸	Snap ring
❹	Auxiliary lowering screw
❺	Valve plunger
★	Valve housing



- Function** The auxiliary lowering screw ❹ is operated with a hexagon socket wrench.
- ▶ Turning counterclockwise closes the auxiliary lowering function.
 - ▶ Turning clockwise activates the auxiliary lowering function.



During activation of the auxiliary lowering function, the flow is changed proportionally to the stroke of the valve plunger ❺.

During activation, the operating force is influenced by the hydraulic fluid pressure.

Flow integrity depends on the viscosity, temperature and pressure of the hydraulic fluid.

The maximum flow is limited by a stop.

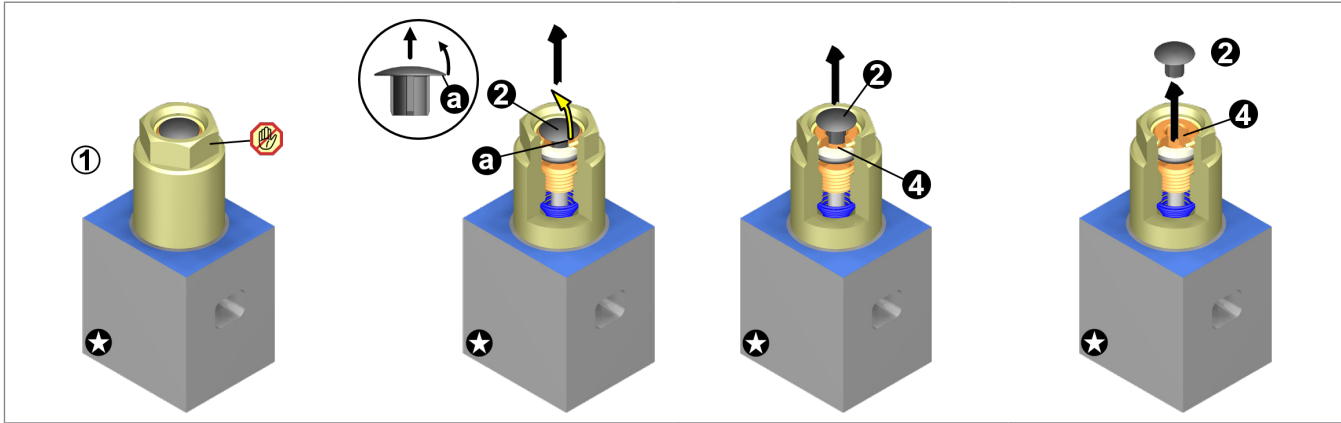
The maximum torque for:

- ▶ Counterclockwise rotation is 5.3+1.3 Nm
- ▶ Clockwise rotation is 10 Nm

NOTICE! Turning further beyond the stops will damage the pressure relief valve ①.

Removing the protective cap

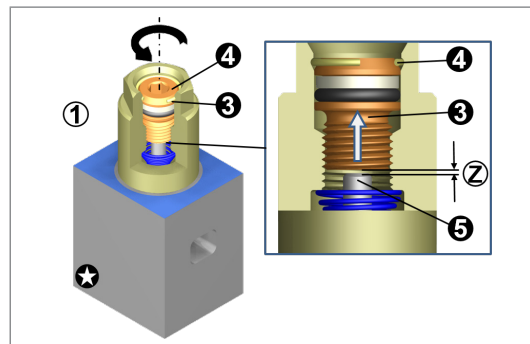
1. Use a narrow tool to slightly lift the protective cap ② at the contact surface edge ①.
2. Push the tool under the contact surface ① for approx. 2 to 3 mm.
3. Carefully lift the protective cap ② without damaging the contact surface ①.
4. Remove the protective cap ② from the hexagon socket bore of the auxiliary lowering screw ④.



Auxiliary lowering function

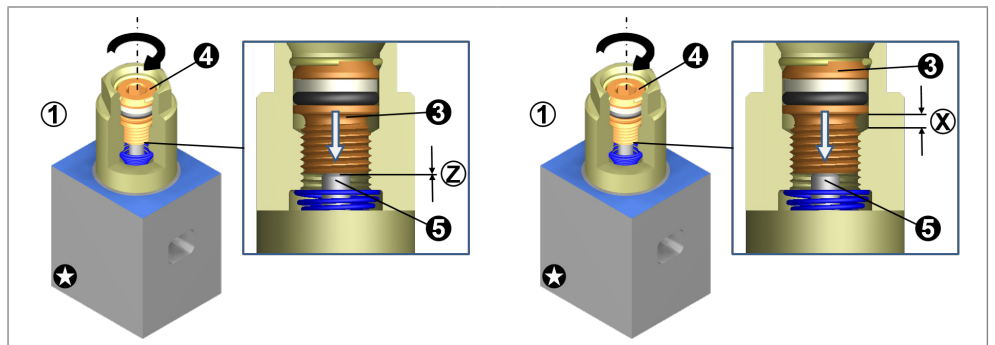
Initial position

- Using a hexagon socket screwdriver, manually turn the auxiliary lowering screw ④ counterclockwise to the stop at the snap ring ③.
 - The auxiliary lowering function is deactivated.
 - The safety distance ②, which depends on the tolerance, is now the maximum.



Activating the auxiliary lowering function

1. Using a hexagon socket screwdriver, manually turn the auxiliary lowering screw ④ clockwise to the noticeable resistance at the valve plunger ⑤.
 - The safety distance ② is now zero.
2. Using a hexagon socket screwdriver, continue to manually turn the auxiliary lowering screw ④ clockwise against the noticeable resistance at the valve plunger ⑤.
 - The further you turn in clockwise direction, the more the auxiliary lowering valve is opened and the greater the flow.
 - Do not turn the auxiliary lowering screw ④ any longer clockwise if it is in contact with the noticeable stop in the valve housing ①.
 - The distance ⑩ determines the maximum stroke of the valve plunger ⑤.

**Deactivating the auxiliary lowering function**

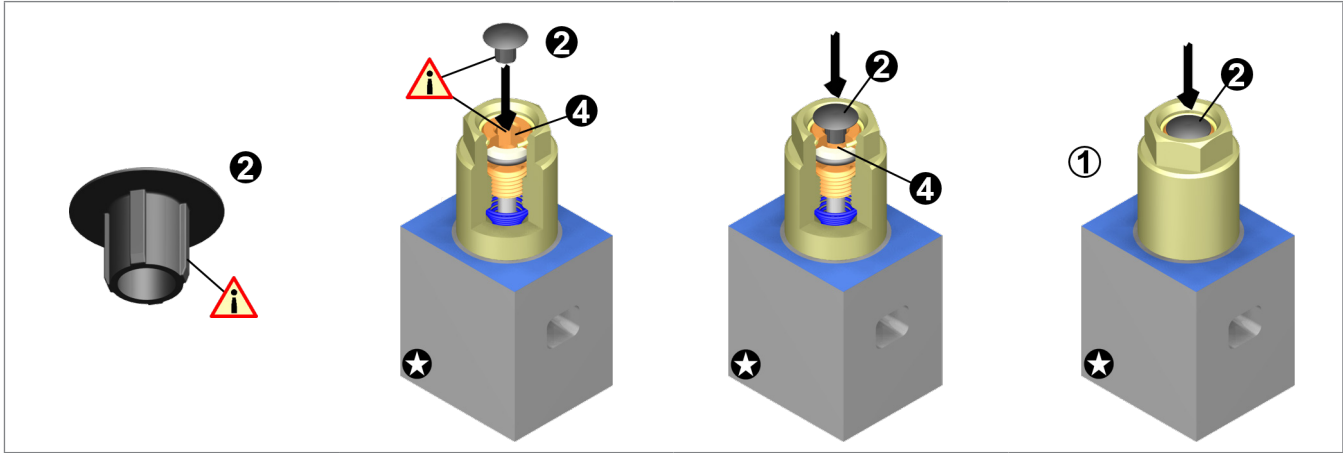
1. Using a hexagon socket screwdriver, manually turn the auxiliary lowering screw ④ counterclockwise to the stop at the snap ring ③.

NOTICE! Turning further with greater force application will damage the pressure relief valve ①!

2. Tighten the auxiliary lowering screw ④ to the specified tightening torque against the snap ring ③. Tightening torque $M_A = 5.3+1.3 \text{ Nm}$.
 - The auxiliary lowering function is deactivated.
 - The safety distance ② is now again the maximum.

Installing the protective cap

1. Check the tension bars on the protective cap shaft. They must not be damaged.
2. Align the protective cap ② with the shaft axially to the hexagon socket bore of the auxiliary lowering screw ④ and insert it.
3. Press in the protective cap ② to the stop of the contact surface ① at the auxiliary lowering screw. ④



10 Maintenance and repair

10.1 Cleaning and care

NOTICE

Damage to the hydraulic system and the seals!

The jet of a high-pressure cleaner can damage the seals and electrical system of the control block/control block segment!

- ▶ Do not point high-pressure cleaners at sensitive components like electrical connections and components.

For cleaning and care of the control block/control block segment, observe the following:

- ▶ Check whether all the seals and fittings on the plug-in connections are securely connected to ensure that no moisture can penetrate into the control block/control block segment during cleaning.
- ▶ Use only water and, if necessary, a mild cleaning agent to clean the control block/control block segment. Never use solvents or aggressive cleaning agents.
- ▶ Remove major external contamination and keep clean sensitive and important components, such as solenoids, valves, indicators and sensors.

10.2 Inspection and maintenance

During inspection and maintenance, the following points have to be checked:

- Compliance with operating conditions
- Compliance of requirements for hydraulic fluids according to technical data sheet
- Block mounting, connections and leak-tightness

The interval depends on the machine and its application condition.

10.3 Repair

Bosch Rexroth offers a comprehensive range of services for the repair of Rexroth control blocks/control block segments.

Repairs at the control block/control block segment may only be performed by service centers certified by Bosch Rexroth or the machine/system manufacturer.

In case of any questions regarding repair, please contact the responsible Bosch Rexroth service partner or the service department of the control block/control block segment manufacturer's plant, see chapter 10.4 "Spare parts" on page 82.

For detailed instructions on installation, assembly and removal of block segments and repair, please refer to the following documentations:

Table 38: Related documentations

Valve type	Document number	
	Installation	Repair Valve
SB24/34-EHS, EHR24-EHS	66170-10-R	66170-20-R
SB24-M		66170-21-R
EHR24-EM2		66170-30-R
Plates		66170-50-R*

*in preparation

10.4 Spare parts

CAUTION

Use of unsuitable spare parts!

Spare parts that do not meet the technical requirements specified by Bosch Rexroth can cause injury and property damage!

- Only use original spare parts from Rexroth to repair the Rexroth control block/control block segment. Otherwise, the functional reliability of the control block/control block segment cannot be guaranteed and the warranty will be voided.

Spare parts lists are available from your responsible Bosch Rexroth service partner. When ordering spare parts, quote the material and serial number of the control block/control block segment as well as the material numbers of the spare parts. Address all queries about spare parts to your responsible Bosch Rexroth service partner or the service department of the control block/control block segment manufacturer.

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www.boschrexroth.com/spc

Addresses of our country representatives can be found at
<https://addresses.boschrexroth.com>

11 Removal and replacement

11.1 Required tools

- Suitable tools for mounting as specified on the offer drawing
- Collecting pan to collect any leaking hydraulic fluid.

11.2 Preparing for removal

1. Take the entire machine out of service as described in the instruction manual for the machine.
 - Relieve pressure in the hydraulic system according to the instructions of the machine/system manufacturer.
 - Make sure the relevant system components are depressurized and deenergized.
2. Secure the overall system according to the instructions of the manufacturer.

11.3 Removal of control block/control block segment from machine

For disassembly of the control block/control block segment, proceed as follows:

1. Remove the control block/control block segment in accordance with the specifications of the machine/system manufacturer.
2. Place the product on a clean surface with sufficient load-bearing capacity.
3. Plug all openings.

11.4 Preparing the components for storage or further use

- ▶ Proceed as described in chapter 6.2 "Storage of control block/control block segment", section "After removal" on page 54.

12 Disposal

CAUTION

Spring-loaded components!

Risk of injury due to ejected components during disassembly of the valve into its individual parts!

- ▶ Loosen screwed-in and spring-loaded components slowly and keep secured until the compression spring is relieved.

Careless disposal of the control block/control block segment, the hydraulic fluid and the packaging material may lead to environmental pollution!

For disposal of the control block/control block segment, observe the following points:

1. Drain the control block/control block segment completely.
2. Dispose of the control block/control block segment and the packaging in accordance with the national regulations of your country.
3. Dispose of the hydraulic fluid in accordance with the regulations of your country.
4. Disassemble the control block/control block segment into its individual parts and recycle them.
5. For example, separate the parts into:
 - Metals
 - Electronic waste
 - Plastic

13 Extension and conversion

For specific applications, retrofitting or conversion of the control block/control block segment can be required. The EHS electrohydraulic actuating unit is excluded from this and must not be opened or converted. The warranty exclusively applies to the delivered configuration. After a conversion or an extension, the warranty becomes void.

- ▶ Please contact Bosch Rexroth for coordination.



Possible retrofitting or conversion of the control block/control block segment is described in the specific data sheet.

Before retrofitting or conversion of, it has to be ensured that the modification does not cause any impairment or malfunction at the application.

Optional accessories

Available accessories can be found in the respective data sheet.

Accessories are available from your Rexroth specialist dealer. Addresses of our country representatives can be found under

<https://addresses.boschrexroth.com>.

14 Troubleshooting

Table 39 is intended to support troubleshooting. This table is not exhaustive. Issues may occur in practice that are not listed here.

Only authorized personnel may perform troubleshooting inside a safety area designated by the machine manufacturer.

14.1 How to proceed for troubleshooting

- ▶ Use a systematic and targeted approach, even when pressed for time. Random and imprudent removal and changing of settings could result in the inability to ascertain the original error cause.
- ▶ First, get a general overview of how the control block/control block segment works in conjunction with the entire system.
- ▶ Find out whether or not the control block/control block segment was working as required in the entire system before the fault occurred.
- ▶ Try to determine any changes to the entire system in which the control block/control block segment is installed:
 - Have there been any changes to the application conditions or operating range of the product?
 - Has maintenance work recently been carried out? Is there an inspection or maintenance log?
 - Have any changes (e.g., upgrades) or repairs been made to the overall system (machine, electrics, control) or to the product? If yes: What changes?
 - Has the hydraulic fluid been changed?
 - Has the product or machine been used as intended?
 - How does the malfunction appear?
- ▶ Document the work carried out.
- ▶ If the fault cannot be corrected, please refer to one of the contract addresses under:
<https://addresses.boschrexroth.com> or in chapter 10.4 "Spare part".

14.2 Malfunction table

Within the admissible operating conditions, no malfunctions occur at the control block/control block segment.

Table 39: Malfunction table

Fault number Fault	Origin and/or location of the fault	Remedy
F1 Hydraulic fluid leaks from the control block segment	Damaged sealing element	Replace sealing element
	Control block segment housing damaged	Replace the control block segment
F2 Hydraulic fluid is leaking at the supply line and/or port to the control block segment	Sealing element damaged	Replace sealing element
	Pipe or hose lines damaged	Replace pipe or hose lines
	Loose pipe or hose lines	Tighten the fittings
	Control block segment housing damaged	Replace the control block segment
F3 Hydraulic fluid is leaking between the control block segments	Dirt or foreign particles	Clean the flange surface
	Sealing element damaged	Replace sealing element
	Loose tie rod screws	Check the tightening torques
	Damaged flange surface	Replace the control block segment
F4 Fluctuations in pressure and flow	Pressure oscillations in the system	Ventilate the control block segments
		Ventilate the hydraulic system
	Dirt or foreign particles in the control block segment	Clean the inside of the control block segments
		Ensure prescribed cleanliness of hydraulic fluids
F5 Excessive temperature at the control block segment	Excessive ambient temperature	System-related/remedy by external measure
	Hydraulic fluid temperature too high	Lower hydraulic fluid temperature
	Excessive flow	Reduce flow
F10 No function	Control block segments connected incorrectly	Correct hydraulic ports
	Electric components connected incorrectly	Correct electric ports
	No hydraulic fluid	Ensure hydraulic fluid supply
	Dirt or foreign particles in the control block segment	Clean the inside of the control block segments
		Ensure prescribed cleanliness of hydraulic fluids

In case of malfunctions caused by contamination, it is essential to check and possibly improve the quality of the hydraulic fluid through appropriate measures, such as purging, exchange or additional installation of filters in addition to carrying out repairs.

15 Technical data

The permissible values of the technical data of the control blocks/control block segments can be found in the corresponding data sheet. For the assignment of the control blocks/control block segments to the data sheets, refer to Table 1 "Required and supplementary documentation" on page 5.



The data sheets can be found in the online product catalog under www.boschrexroth.com/p-SB24-34

The order-related technical data of your control block/control block segment can be found in the order confirmation.

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