

Pump safety block

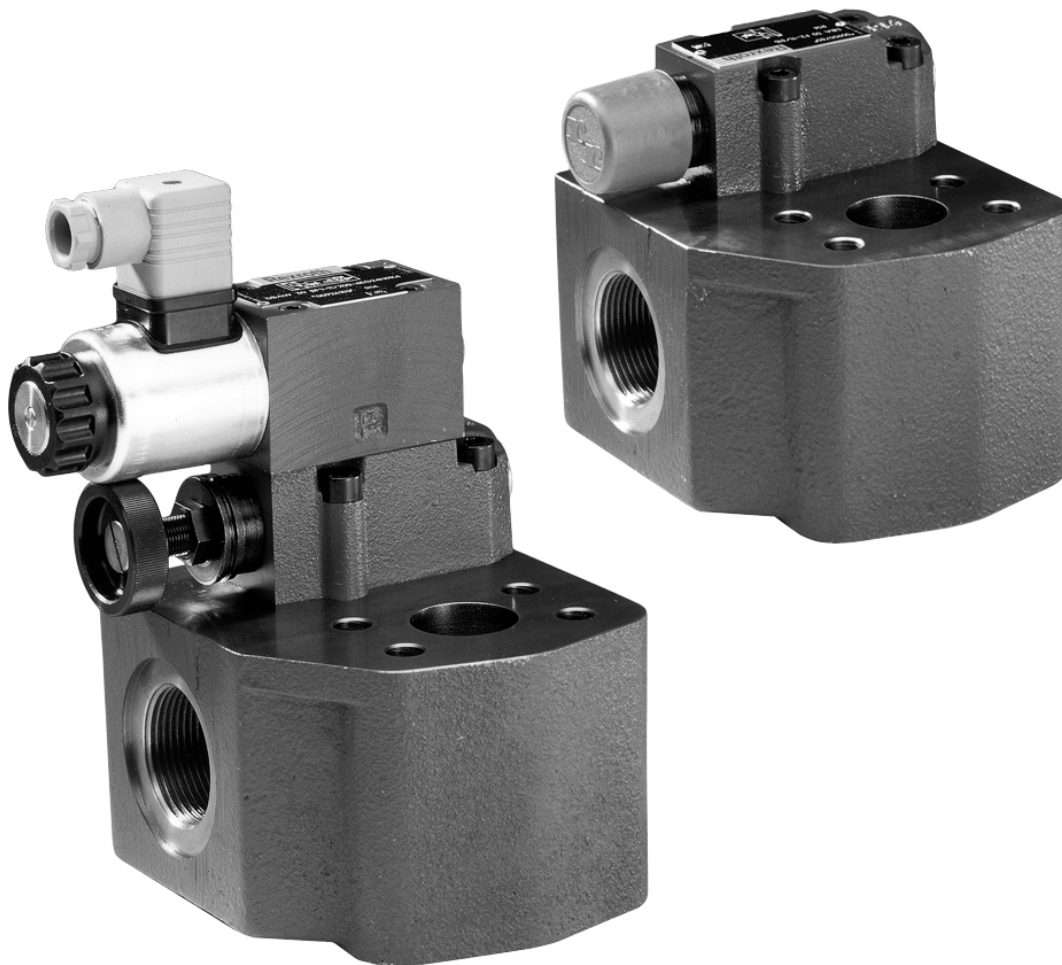
(Safety valve according to Pressure Equipment Directive 2014/68/EU)

Type DBA...1X/...E



Operating instructions
RE 25880-B/10.21

Replaces: 10.18
English
Mat. no. R901557868



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The data specified serves to describe the product. If there is also information on the use, it is only to be regarded as application examples and proposals. Catalog information does not constitute warranted properties. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of wear and aging.

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The cover shows an example configuration. The product supplied may therefore differ from the figure shown.

The original operating instructions were prepared in German.

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1 About this documentation

1.1 Validity of the documentation

This documentation applies to the following products:

- Type-examination tested safety valves according to Pressure Equipment Directive 2014/68/EU type DBA...1X/...E

This documentation is intended for machine manufacturers, assemblers and system end-users.

This documentation contains important information on the safe and proper assembly, transport, commissioning, operation, use, maintenance, disassembly and simple troubleshooting of the product.

- Read this documentation thoroughly and in particular chapter 2 "Safety instructions" and chapter 3 "General information on damage to property and damage to product" before working with the product.



The documentation version with which the product was supplied is valid.

1.2 Necessary and amending documentation







- The product must not be commissioned until you have been provided with the documentation marked with the book symbol  and you have understood and observed it.

Table 1: Necessary and amending documentation

Title	Document number	Document type
 Hydraulic valves for industrial applications	07600-B	Operating instructions
 Pump safety block	25880	Data sheet
 Mating connectors and cable sets for valves and sensors in hydraulics	08006	Data sheet
 Setting certificate	is included in the scope of delivery	Certificate
 EU declaration of conformity	is included in the scope of delivery	Certificate

1.3 Representation of information

Uniform safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product using this documentation. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions




In this documentation, safety instructions are included in chapter 2.6 "Product-specific safety instructions" and in chapter 3 "General information on damage to property and damage to product" and whenever a sequence of actions or instructions is explained which bear the danger of personal injury or damage to property. The measures described for the prevention of dangers must be observed.

Safety instructions are structured as follows:

 SIGNAL WORD
Type and source of danger! Consequences in case of non-compliance <ul style="list-style-type: none"> ▶ Hazard avoidance measures ▶ <Enumeration>

- **Warning sign:** draws attention to the danger
- **Signal word:** identifies the degree of danger
- **Type and source of danger:** specifies the type and source of danger
- **Consequences:** describes the consequences in case of non-compliance
- **Precaution:** specifies how the danger can be prevented


Table 2: Risk classes according to ANSI Z535.6-2011

Warning sign, signal word	Meaning
 DANGER	Indicates a dangerous situation which will cause death or severe injury if not avoided.
 WARNING	Indicates a dangerous situation which may cause death or severe personal injury if not avoided.
 CAUTION	Indicates a dangerous situation which may cause minor or moderate (personal) injury if not avoided.
NOTICE	Damage to property: The product or the environment could be damaged.

1.3.2 Symbols

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

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/or operated optimally.
▶	Individual, independent action
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.3.3 Designations

The following designations are used in this documentation:

Table 4: Designations

Designation	Meaning
AD2000	Rules regarding the application and implementation of the Pressure Equipment Directive

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Table 5: Abbreviations

Abbreviation	Meaning
EN	European Standard
DIN	Deutsche Industrienorm (German Industry Standard)
ISO	International Organization for Standardization
DBA	Pump safety block
EU	European Union
VDMA	German Machinery and Plant Manufacturing Association

2 Safety instructions

2.1 General information on this chapter

The product has been produced according to the rules AD 2000. However, there is still the danger of personal injury and damage to property if you do not observe this chapter and the safety instructions in this documentation.

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

2.2 Intended use

The valves comply with safety category B according to EN ISO 13849-1.

Store the safety valve in a dry and dust-free atmosphere which is free from etching substances and fumes and which is subject to a low degree of humidity and only minor temperature variations. For storage exceeding 12 months, we recommend filling in clean preservation oil, see also DIN 7716.

The corrosion protection applied at the factory is sufficient if the valve is stored under the stated conditions and if no condensate or leakage water may enter the safety valve.

The safety valve may only be operated with the hydraulic fluids stated in "Data sheet 25880".

Please consult us for information on the use of the product with other hydraulic fluids.

The safety valve may only be operated in a technically unobjectionable condition and it may only be stored, operated and maintained according to the technical data, operating and environmental conditions indicated in these operating instructions. Particularly the limit values specified in "*Data sheet 25880*" must not be exceeded. The valve may only be used with other connection, application and performance data than those defined in these operating instructions with the written approval by Bosch Rexroth AG.

Changes at the product are only admissible within the scope specified in these operating instructions.

Any safeguards fitted by Bosch Rexroth AG have to be present, properly installed and fully functional, unless this is not appropriate for setup or maintenance operation. Their position must not be changed; they must not be circumvented or made ineffective.

2.3 Improper use

The safety valve is not suitable for use in potentially explosive environment; it must not be used there.

The safety valve may not be used if the maximum possible flow of the system in all imaginable operating states exceeds the value indicated in the technical data for the relevant valve type as maximum admissible flow. The admissible maximum flow is indicated in "*Data sheet 25880*".

The safety valve must not be used as high-response valve.

The safety valve must not be operated with corrosive operating media or in corrosive atmosphere.

A sealing at the safety valve must not be removed by the machine end-user.

Only persons authorized by accredited testing authorities according to the EU Pressure Equipment Directive may remove the lead seal or re-adjust the response pressure.

The safety valve must not be disassembled to an extent exceeding the one specified in these operating instructions.

Name plates and product identifications may not be lacquered over but must be kept in a readable condition.

2.4 Qualification of personnel

The activities described in this documentation require basic knowledge of mechanics, electrics and hydraulics as well as knowledge of the appropriate technical terms. For transporting and handling the product, additional knowledge of how to handle lifting gear and the necessary attachment devices is required. In order to ensure safe use, these activities may only be carried out by an expert in the respective field or an instructed person under the direction and supervision of an expert.

Experts are those who are able to recognize potential dangers and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules and have the necessary expert knowledge.

Expert knowledge means for example for hydraulic products:

- reading and completely understanding hydraulic schemes,
- in particular, completely understanding the correlations regarding the safety equipment and
- having knowledge of the function and set-up of hydraulic components.



Bosch Rexroth offers measures supporting the training in specific fields. Please find an overview of the training contents on the Internet at:

<http://www.boschrexroth.de/didactic>

2.5 General safety instructions

- Observe the valid regulations on accident prevention and environmental protection.
- Observe the safety regulations and provisions of the country in which the product is used/applied.
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notices on the product.
- Persons assembling, operating, disassembling or maintaining Rexroth products must not be under the influence of alcohol, other drugs or medications influencing the ability to react.
- Only use original Rexroth accessories and spare parts in order to exclude hazards to persons due to unsuitable spare parts.
- Comply with the technical data and environmental conditions indicated in the product documentation.
- The installation or use of inappropriate products in safety-relevant applications could result in unintended operating conditions when being used which in turn could cause personal injuries and/or damage to property. Therefore, only use a product for safety-relevant applications if this use is expressly specified and permitted in the documentation of the product, e.g. in explosion protection zones or in safety-related parts of control systems (functional safety).
- Do not commission the product until you can be sure that the end product (for example a machine or system) in which the Rexroth product is installed complies with the country-specific provisions, safety regulations and standards of application.

2.6 Product-specific safety instructions

The following safety instructions apply to chapters 6 to 14.



WARNING

Pressurized system parts and leaking hydraulic fluid!

When working at hydraulic systems with stored pressure energy (accumulator or cylinders working under gravity), valves may even be pressurized after the pressure supply has been switched off. During assembly and disassembly works, the safety valve or parts may fly around and cause personal injuries and/or damage to property. There is moreover the danger of serious injury caused by a leaking hydraulic fluid jet.

- ▶ Ensure before working at the safety valve that the hydraulic system is depressurized and the electrical control de-energized.
- ▶ Completely unload the pressure at machines and systems before working at valves.

Non-compliance with functional safety!

Hydraulic valves control movements in machines or systems. In case of mechanical and electric faults, e.g. failure of the energy supply, persons may be caught by the system, kicked away or bruised.

- ▶ When setting up your circuit, observe functional safety e.g. according to EN ISO 13849.

Faulty mounting!

Mounting of the safety valve with valve mounting screws of reduced stability or insufficient mounting at installation surfaces (pump) with insufficient stability may cause the safety valve to become loose and fall down. Consequently, hydraulic fluid may leak and lead to personal injuries and/or damage to property. Safety valves with high weight may bruise or kill persons. Special care must be taken with safety valves with suspended installation.

- ▶ Completely assemble the safety valve according to the assembly specifications by means of suitable assembly aids.
- ▶ Only assemble the safety valve at valve installation surfaces suitable for the weight of the valves.
- ▶ Comply with tightening torques and screw stabilities.

Easily inflammable hydraulic fluid!

In connection with fire or other heat sources, leaking hydraulic fluid mist may lead to fire or explosions due to defective or incompletely mounted safety valves and their connections.

- ▶ Do not use the safety valve in areas with open fire and only at a sufficient distance to hot heat sources.

WARNING

High weight and sharp edges of the safety valve!

The described safety valve may be very heavy. In case of improper handling, it may fall down and cause serious injuries and/or crush injuries as the safety valve may e.g. be sharp-edged, heavy, oily, loose or bulky.

- ▶ If necessary, transport the safety valve to the intended places using suitable lifting gear.
- ▶ Provide for a stable position during transport to the place of installation.
- ▶ Wear personal protective equipment while transporting and assembling the safety valve.
- ▶ Comply with the national laws and regulations regarding occupational health and safety for the transport.

Hot surface!

Risk of burning!

- ▶ Provide for a suitable touch guard.
- ▶ During operation, only touch the safety valve with heat-protective gloves. Allow the safety valve to cool down to room temperature before touching it directly with your hands during maintenance works.

CAUTION

Contaminated hydraulic fluid!

Contamination in the hydraulic fluid may cause functional failures of the safety valve. In the worst case, this may result in unexpected system movements and thus constitute a risk of injury for persons.

- ▶ Ensure adequate hydraulic fluid cleanliness according to the cleanliness classes of the safety valve over the entire operating range.

Exceedance of the maximum temperatures!

Use of the safety valve outside the temperature intended for that purpose may lead to functional failures.

- ▶ Only use the safety valve within the environmental and fluid temperatures intended for that purpose.

Leakage in case of incorrect working temperatures!

Use of the safety valve outside the temperature intended for that purpose may lead to permanent leakage at the safety valve. Thus, hydraulic fluid in the form of a leaking hydraulic fluid jet may injure persons, lead to damage to property and endanger the environment.

- ▶ Only use the safety valve within the environmental and fluid temperatures intended for that purpose.
- ▶ In case of leakage, immediately exchange damaged seals or the safety valve.



Contact with salt water leads to increased corrosion at the safety valve. Thus, mounting screws and plug screws as well as movable components may be chemically corroded and damaged. So take suitable corrosion protection measures.

2.7 Personal protective equipment

The machine end-user must provide the personal protective equipment (such as gloves, working shoes, safety goggles, working clothes, etc.).

2.8 Obligations of the machine end-user

The machine end-user of the Bosch Rexroth safety valve is responsible that

- the safety valve is only used according to the intended use as defined in these operating instructions.
- the operating personnel are instructed at regular intervals.
- a danger zone is marked, if required.
- the safety measures for their specific area of application of the safety valve are complied with.
- the safety valve is only stored, operated and maintained according to the technical data, operating and environmental conditions indicated in these operating instructions, in particular that the limit values indicated in the technical data are not exceeded.

If leakage at the valve can lead to water or soil contamination, the valve must be put into a suitable collecting pan.

IT-Security The operation of installations, systems and machines basically requires the implementation of a holistic IT security concept which is state-of-the-art in terms of technology. Accordingly, Bosch Rexroth products and their properties must be considered as components of installations, systems and machines for their holistic IT security concept.

Unless otherwise documented, Bosch Rexroth products are designed for operation in local, physically and logically secured networks with access restrictions for authorized persons, and they are not classified according to IEC 62443-4-2.

3 General information on damage to property and damage to product

The warranty only applies to the supplied configuration.

- The claim to warranty expires if the product is assembled, commissioned and operated incorrectly, not used as intended and/or handled improperly.
- The following safety instructions apply to chapters 6 to 14.

NOTICE

Inadmissible mechanical movement!

Impact or shock forces on the safety valve may damage or even destroy it.

- ▶ Never use the safety valve as handle or step. Do not place / put any objects on top of it.

Dirt and foreign particles in hydraulic components!

Penetrating dirt and foreign particles lead to wear and malfunctions. Safe function of the safety valve is therefore no longer ensured.

- ▶ During installation, ensure utmost cleanliness in order to prevent foreign particles such as welding beads or metal chips from getting into the hydraulic lines.
- ▶ Do not use linting fabric for cleaning.
- ▶ Ensure that no cleaning agents are able to penetrate the hydraulic system.

Hydraulic fluid harmful to the environment!

Leaking hydraulic fluid leads to environmental pollution.

- ▶ Immediately remedy possible leakage.
- ▶ Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country.

Wear!

Wear may lead to malfunctions.

- ▶ Carry out the prescribed maintenance works.

4 Scope of delivery

The scope of delivery includes:

- Type-examination tested safety valve
- Operating instructions including declaration of conformity
- Setting certificate
- Declaration of conformity

- ▶ Check the scope of delivery for completeness.
- ▶ Check the scope of delivery for possible transport damage, see chapter 6 "Transport and storage".



In case of complaints, please contact Bosch Rexroth AG, see section 14.2 "List of addresses".

Accessories such as valve mounting screws are not included in the scope of delivery; they can, however, be ordered separately. (See chap. 7.5 "Accessories").

5 Product information



For information on the performance and product description please refer to "*Data sheet 25880*" of your valve.

5.1 Product identification

5.1.1 Name plate of type DBA...1X/...E

With valves of type **DBA...1X/...E**, the name plate is attached to the housing part in which the adjustment element is installed.

The name plate comprises the following information:

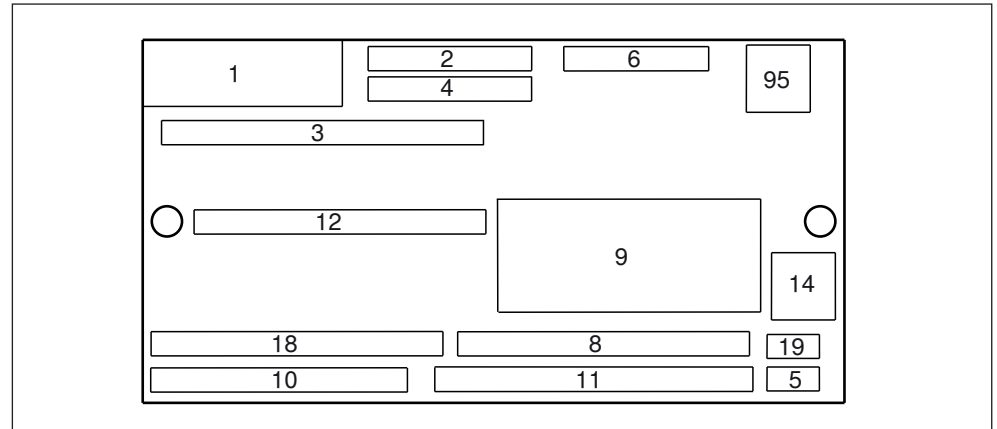


Fig. 1: Name plate DBA...1X/...E

No.	Type of information
1	Manufacturer's logo
2	Material no. of the valve (= order no.)
3	Type designation of the complete valve
4	Valve serial number ¹⁾
5	Manufacturer's factory number
6	Date of manufacture (year and week, abbreviated representation according to EN 28601)
7	---
8	---
9	Hydraulic symbol according to ISO 1219 (for pressure relief valve)
10	Designation of origin
11	Name and address of the manufacturer
12	Customer's or production order number ²⁾
14	CE mark ³⁾
18	Component marking
19	Reference number of the testing authority
95	Rexroth QR code

¹⁾ Consecutively assigned code number for valves from a production order.

²⁾ Consecutively assigned number. This number is identical with the valve no. in the related certificate regarding the setting of safety valves (setting certificate) and thus allows for the unambiguous assignment of the valve to this setting certificate. If one production order comprises several identical safety valves, the same number may be assigned to all valves from this production order. The related setting certificate will then apply to all identical valves of this production order and to the customer's or production order number specified in the setting certificate, the total number x of the valves will be added in the form /1 – x.

³⁾ Alternatively, the CE mark may also be embossed at the valve body.

5.1.2 Name plate of type DBAW...1X/..6E..E

With valves of type DBAW...1X/..6E..E (pressure relief valves with attached directional spool valve), the name plate for the entire unit is attached on top of the directional spool valve.

The name plate comprises the following information:

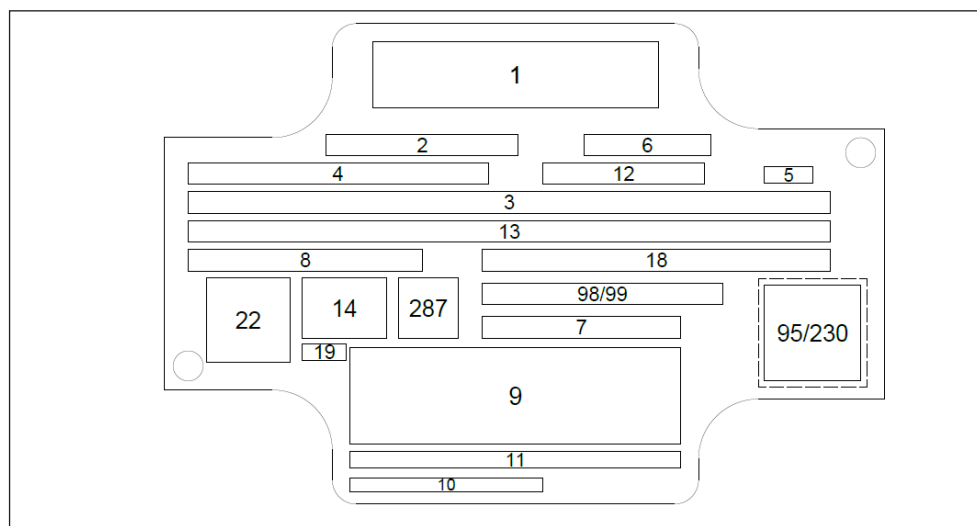


Fig. 2: Name plate DBAW...1X/..6E..E

No.	Type of information
1	Manufacturer's logo
2	Material no. of the valve (= order no.)
3	Type designation of the complete valve
4	Valve serial number ¹⁾
5	Manufacturer's factory number
6	Date of manufacture (year and week, abbreviated representation according to EN 28601)
7	---
8	---
9	Hydraulic symbol according to ISO 1219 (for pressure relief valve with directional valve)
10	Designation of origin
11	Name and address of the manufacturer
12	Customer's or production order number ²⁾
14	CE mark ³⁾
18	Component marking
19	Reference number of the testing authority
22	---
95	Rexroth QR code
98	Rated values of switching current and switching voltage (alternating current)
99	Rated values of switching current and switching voltage (direct current)
287	---

¹⁾ Consecutively assigned code number for valves from a production order.

²⁾ Consecutively assigned number. This number is identical with the valve no. in the related certificate regarding the setting of safety valves (setting certificate) and thus allows for the unambiguous assignment of the valve to this setting certificate. If one production order comprises several identical safety valves, the same number may be assigned to all valves from this production order. The related setting certificate will then apply to all identical valves of this

production order and to the customer's or production order number specified in the setting certificate, the total number x of the valves will be added in the form /1 – x.

³⁾ Alternatively, the CE mark may also be embossed at the valve body.

5.1.3 Name plate of type DBAW...1X/..6SM..E

With valves of type **DBAW...1X/..6SM..E** (pressure relief valves with attached directional seat valve), the name plate for the entire unit is attached to the directional seat valve.

The name plate comprises the following information:

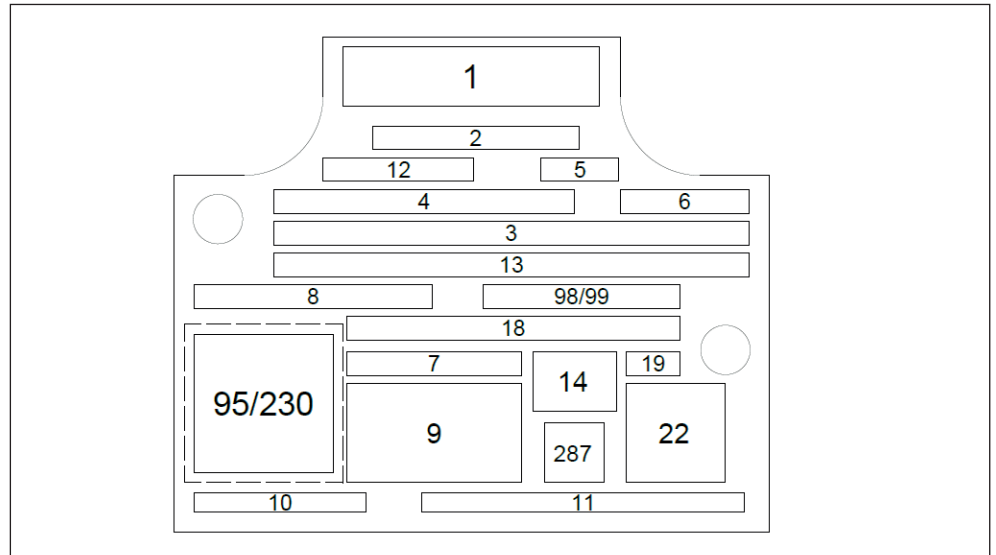


Fig. 3: Name plate DBAW...1X/..6SM..E

No.	Type of information
1	Manufacturer's logo
2	Material no. of the valve (= order no.)
3	Type designation of the complete valve
4	Valve serial number ¹⁾
5	Manufacturer's factory number
6	Date of manufacture (year and week, abbreviated representation according to EN 28601)
7	---
8	---
9	Hydraulic symbol according to ISO 1219 (for pressure relief valve with directional valve)
10	Designation of origin
11	Name and address of the manufacturer
12	Customer's or production order number ²⁾
13	---
14	CE mark ³⁾
18	Component marking
19	Reference number of the testing authority
22	---
95	Rexroth QR code
98	Rated values of switching current and switching voltage (alternating current)
99	Rated values of switching current and switching voltage (direct current)
287	---

¹⁾ Consecutively assigned code number for valves from a production order.

²⁾ Consecutively assigned number. This number is identical with the valve no. in the related certificate regarding the setting of safety valves (setting certificate) and thus allows for the

unambiguous assignment of the valve to this setting certificate. If one production order comprises several identical safety valves, the same number may be assigned to all valves from this production order. The related setting certificate will then apply to all identical valves of this production order and to the customer's or production order number specified in the setting certificate, the total number x of the valves will be added in the form /1 – x.

³⁾ Alternatively, the CE mark may also be embossed at the valve body.

5.2
Component marking

Type-examination tested safety valves bear a coded component marking. The component marking always comprises the identical elements, the meaning of which is shown in the following example:

Table 6: Example of component marking

TÜV.	SV.	—	1150.	22.	F.	G.	p
							Set response pressure in bar
							Maximum admissible flow in l/min without counter pressure in the discharge line ¹⁾
					Fluid		
							Smallest flow diameter in front of the valve seat in mm
							Number of the component marking assigned by VdTÜV
							Last digit of the year of the last extension of the validity of the component marking
							Safety valve
							Mark of the notified body which has carried out the type-examination procedure

¹⁾ The flow specified in the component marking can only be used in case of operation within the identical pressure range (also when opening the valve using a directional valve attached to the main stage), see "Data sheet 25880".

5.3
Limitations of use

The safety valves may only be operated within certain limitations of use, see "Data sheet 25880". The maximum admissible flow in l/min can always been seen from the last but one figure of the component marking.



In the plant, the response pressure specified in the component marking is set with a flow of 11 l/min.

The component marking is located on the name plate.

The maximum admissible flow stated in the component marking must not be exceeded.

It applies to:

- **External** pilot oil return (=Y in the type code) **without counter pressure** in the **discharge line Y**, admissible counter pressure in the discharge line (port T) < 10 bar
- **Internal** pilot oil return (= no code in the type code). The maximum admissible flow is only admissible **without counter pressure** in the **discharge line** (port T).

With internal pilot oil return, the system pressure increases by the counter pressure in the discharge line (port T) with increasing flow.

In this connection, observe the rules AD2000 - data sheet A2, point 6.3!

To ensure that this increase in system pressure caused by the flow does not exceed 10% of the set response pressure, the admissible flow has to be reduced

dependent on the counter pressure in the discharge line (port T) see "Data sheet 25880".

6 Transport and storage

6.1 Transporting the product



Bosch Rexroth hydraulic valves are high-quality products. In order to prevent damage at the safety valve, transport the safety valves in the original packaging or with equivalent transport protection.

CAUTION

Unsecured safety valves toppling over or falling down!

Unsecured safety valves may topple over or fall down and bruise or kill persons if they are heavy.

- ▶ Use the original packaging for transport.
- ▶ Provide for a stable position during transport to the place of installation.
- ▶ Use only suitable lifting gear for transport.
- ▶ Wear your personal protective equipment.
- ▶ Comply with the national laws and regulations regarding occupational health and safety and transport.

Heavy components!

When lifting a safety valve with high weight, there is the danger of health hazards.

- ▶ Use a suitable lifting, putting down and moving technique.
- ▶ Products >15 kg are usually provided with lifting eyes for transport by means of lifting gear. Use these lifting eyes.
- ▶ Transport the safety valve complying with the safety instructions and using a forklift or suitable lifting gear. Make sure that the lifting capacity of the lifting gear is sufficient.
- ▶ Observe the weight of the safety valve, the center of gravity and the intended mounting and attachment points when transporting the valve.
- ▶ During transport, secure the safety valve against toppling over.
- ▶ Do not jam the safety valve.
- ▶ Put the safety valve carefully onto the contact surface in order not to damage it.

Sharp edges!

Danger of cut injuries.

- ▶ Wear suitable protective equipment when transporting the safety valve.
- ▶ Secure the transported goods and the means of transport by means of suitable measures.

6.1.1 Transport using lifting gear

In transport, consider the following aspects:

- Properties of the load (e.g. weight, center of gravity, mounting and attachment points).
- Type of attachment or pick-up of the load
- Ensure that the lifting gear's lifting capacity is sufficient in order to transport the safety valve in a risk-free manner.
- Use textile attachment devices according to DIN EN 1492-2.



More information regarding the transport is available from Bosch Rexroth. More information regarding the transport using chain hoists is also available in the data sheet 07600-B, chapter 6 "Transport and storage".



Notify your responsible sales contact person transport damage within one week. The addresses of the sales subsidiaries can be found on the Internet at: <http://www.boschrexroth.com/adressen>

6.2 Storing the safety valve

Safety valves are delivered in an unobjectionable state.



For transportation and storage of the product, always observe the environmental conditions specified in "*Data sheet 25880*". Improper storage may damage the safety valve.

Safety valves can be stored for up to 12 months under the following conditions:

- ▶ Ensure a storage temperature range of +5...+40°C.
- ▶ The relative air humidity may not exceed 65%.
- ▶ The storage rooms must provide 100% UV protection.
- ▶ No ozone formation may occur near the storage facility.
- ▶ The storage facilities must be free from etching substances and gases.
- ▶ Do not store the safety valve outdoors but in a well-ventilated room.
- ▶ Protect the safety valve against humidity, particularly ground humidity. Store the safety valve on a shelf or on a pallet.
- ▶ Store the safety valve protected against impacts and sliding and do not stack it.
- ▶ Safety valves may be very heavy. In this connection observe the admissible load-bearing capacities of your storage system.
- ▶ Store the safety valve in the original packaging or comparable packaging in order to protect it from dust and dirt.
- ▶ All ports at the safety valve must be closed with closing elements.
- ▶ After opening the transport packaging, it must be closed properly again for the storage. Use the original packaging for storage

Procedure after the expiration of the maximum storage time of 12 months

After expiry of the maximum storage time, we recommend having the safety valve checked by your competent Rexroth service. In case of questions regarding spare parts, please contact the Rexroth service responsible for your safety valve, see chapter 14.2 "List of addresses".

7 Assembly

CAUTION

High pressure!

Risk of injury due to parts shooting out during works at hydraulic accumulators which have not been unloaded.

- ▶ Carry out any work at the safety valve only after the system has been depressurized.
- ▶ Unload accumulators which may have been mounted at the system.
- ▶ Check the system with test pressure according to ISO 4413.
- ▶ Assembly and commissioning may only be carried out by specialists.

Leaking hydraulic fluid!

Slip hazard!

- ▶ Do not remove the protective covers until assembly.
- ▶ Immediately remove leaking oil.

Insufficient assembly space!

Danger of jamming and bruising! Danger of component damage! Insufficient installation space may lead to jamming or abrasions in case of actuation or adjustment works at the safety valve. Components cannot be properly mounted or might be damaged.

- ▶ Make sure that the assembly space is sufficient.

NOTICE

Penetrating humidity!

The housing of the valve electronics is closed. however, according to the applicable protection class, fluids may enter and lead to faults and short-circuit. Safe function of the safety valve is therefore no longer ensured.

- ▶ When working at the safety valve, always ensure that no fluid can enter the electronics.

Major potential differences!

Danger of destruction of the valve electronics by connecting or disconnecting plug-in connectors under voltage.

- ▶ De-energize the relevant system part before assembling the device or when connecting and disconnecting connectors.

7.1 Unpacking



CAUTION

Parts falling out!

Risk of injury! If the packaging is opened improperly, parts may fall out and cause injuries or damage of the parts.

- ▶ Put the packaging on level, bearing ground.
- ▶ Only open the packaging from the top.

The response pressure has been set by the manufacturer and secured by means of lead seal and/or safety cap.

- ▶ Ensure that the sealing is intact.

Dispose of the packaging in accordance with the national conditions of your country.

7.2 Installation conditions

- ▶ For installing the product, always observe the environmental conditions demanded in "Data sheet 25880".
- ▶ It is imperative to provide for absolute cleanliness. The safety valve must be protected from dirt during installation. Contamination of the hydraulic fluid may considerably reduce the life cycle of the safety valve.

7.2.1 Installation position

The installation position is not relevant.

7.3 Painting the valve housing

- ▶ Completely protect the hydraulic ports against paint application by screwing-in plastic screw-in plugs.
- ▶ Protect the mounting bores against paint application.
- ▶ Mask the flange surfaces carefully before painting so that no dirt or paint may enter.
- ▶ Protect the name plate against paint application.
- ▶ Protect existing information signs against paint application.
- ▶ When removing the paint protection and the plastic screw-in plugs make sure that no paint chips or other foreign particles enter the safety valve.

7.4 Necessary tools

In order to assemble the safety valve, you need standard tools only. Apart from that, you need a manual torque wrench to tighten the valve mounting screws.

7.5 Accessories

Mating connectors

For connection of the control line to safety valves of **type DBAW...1X/...E**, mating connectors according to EN 175301-803, optionally with and without circuitry, are available. For more details, refer to "Data sheet 08006".

Table 7: Mating connectors for valves type DBAW...1X/...E

Color	Material number			
	without circuitry	with indicator light 12...240 V	with rectifier 12...240 V	with indicator light and Zener diode suppression circuit 24 V
gray	R901017010	-	-	-
black	R901017011	R901017022	R901017025	R901017026

Valve mounting screws

Table 8: Valve mounting screws for standard flanges types DBA...F and DBAR...F

Size	Type	Dimensions	Material number
32	DBA	M10 x 120	R913015560
	DBAR	M10 x 125	R913015561
40	DBA	M12 x 135	R913015592
	DBAR	M12 x 140	R913015593

Table 9: Valve mounting screws for high-pressure flanges types DBA...H and DBAR...H

Size	Type	Dimensions	Material number
32	DBA	M14 x 135	R913024230
	DBAR	M14 x 145	R913024233
40	DBA	M16 x 155	R913024234
	DBAR	M16 x 160	R913015647



For more details on the valve mounting screws, refer to chapter 7.7 "Assembly of the safety valve".

7.6 Prior to assembly



WARNING

Faulty assembly of valve mounting screws!

Improperly mounted valve mounting screws may become loose during subsequent operation and fly around due to the pressure and thus cause serious injuries.

- ▶ Only pressurize your system after all valve mounting screws have been completely and properly mounted according to the specifications.



CAUTION

Leaking hydraulic fluid!

Hydraulic fluid may leak during assembly and disassembly of safety valves. Consequently, persons may slip or fall.

- ▶ Immediately remove hydraulic fluid that has leaked out.

Sharp edges!

Safety valves may have sharp edges at the valve openings. During transport or assembly/disassembly, cutting or abrasive injuries may result.

- ▶ Wear corresponding protective clothing during transport.
- ▶ Do not reach into valve openings!

NOTICE

Wear, tear and malfunctions!

The cleanliness of the hydraulic fluid has a considerable impact on the cleanliness and life cycle of the safety valve. Any contamination of the hydraulic fluid will result in wear and malfunctions. Particularly foreign particles may damage the safety valve.

- ▶ Always ensure absolute cleanliness.
- ▶ Install the safety valve free from any pollution.
- ▶ Make sure that all connections, hydraulic lines and attachment parts are clean.
- ▶ When sealing the connections, make sure that no contamination can get into the system.
- ▶ Ensure that no cleaning agents are able to penetrate the hydraulic system.



Have sufficiently dimensioned collecting containers, non-linting cloth and medium-binding materials ready in order to collect or bind leaking hydraulic fluid.

- ▶ Check the scope of delivery for completeness and transport damage.
- ▶ Compare the material number and the designation (type code) with the details in the order confirmation. If the material number of the safety valve does not match the number in the order confirmation, contact the Rexroth service for clarification; for the address see chapter 14.2 "List of addresses".



- ▶ Check whether the information in the setting certificate and in the declaration of conformity correspond to the data indicated at the safety valve and whether they comply with the requirements of the system.
- ▶ Check whether the response pressure indicated at the safety valve (last number of the component marking) and the maximum flow (second to last number of the component marking), if indicated, comply with the requirements of the system.
- ▶ The value for the maximum admissible flow which is specified for the relevant safety valve in the technical data must always be higher than the maximum possible flow of the system at the selected response pressure. See also "Data sheet 25880".

7.7 Assembly of the safety valve

7.7.1 Assembly of ports P and P1



WARNING

Faulty fastening of the safety valve!

Mounting of the safety valve using valve mounting screws of reduced stability may cause the safety valve to become loose and lead to damage to persons and property!

- ▶ For reasons of stability, only valve mounting screws according to table 10 and table 11 or of comparable quality (dimensions, property class) may be used. Screw dimensions, property classes and tightening torques depend on the valve type and the size.
- ▶ Mount valves with flange connection in a way that ensures that reaction forces which act on the valve (e.g. due to vibration, shock) and hydraulic forces which act on the connection lines are absorbed by the fixation in a risk-free manner.

Faulty assembly!

In case of faulty assembly due to a mix up of the hydraulic ports, the safety valve loses its safety function!

- ▶ Check whether the pressure to be limited is connected to port P and the discharge line is connected to port T.

Insufficient design of the connection surfaces!

The safe pressure relief function does no longer work if material and dimensions of the connection surfaces have been incorrectly designed.

- ▶ Material and dimensions of the connection surfaces are to be selected so that sufficient safety is provided for all imaginable operating conditions. This for example applies to pressure resistance, the resistance to stripping of the connection threads and the resistance to stripping of the threads of the valve mounting screws.



The work steps in this sub-chapter describe the procedure of connecting the flange (incl. connection line) **(P1)** to the safety valve as well as the safety valve to the pump **(P)**.

For information on the required valve mounting screws, refer to table 10 and table 11.

The connection surfaces of the valve, the valve installation surface and the flange surface must be clean and free from hydraulic fluid.

► Use non-linting fabric for cleaning the valve connection surfaces.

1. Remove the protective covers from the valve.
2. Prior to assembly, check whether the seals are placed into the connection counterbores of the safety valve and are not damaged. If required, retrofit any missing seals.
3. Carefully place the valve on the valve installation surface. Also refer to *"Data sheet 25880, unit dimensions, port P"*. Observe the porting pattern.
4. Mount the connection line at the valve. See also *"Data sheet 25880, unit dimensions, port P1"*. Observe the porting pattern. Ensure that the flange seal is correctly put onto the flange and intact.
5. Ensure that the valve mounting screws are tightened using the specified tightening torque. Tighten them crosswise using a suitable manual torque wrench. For the tightening torques, please refer to the tables below.
6. Please note that the tightening torques may change if other screw types are used.

Table 10: Information on valve mounting screws for standard flanges types DBA...F and DBAR...F

NG	Type	Ports P and P1	4 Valve mounting screws ISO 4762-10.9 ¹⁾	Tightening torque M _A in Nm ²⁾
32	DBA	SAE 1 1/4"	M10 x 120	52
	DBAR		M10 x 125	
40	DBA	SAE 1 1/2"	M12 x 135	77
	DBAR		M12 x 140	

¹⁾ Valve mounting screws ISO 4762-10.9-fLZn-240h-L (at friction coefficient $\mu_{\text{total}} = 0.09...0.14$)

²⁾ The tightening torques are guidelines for the specified friction coefficients and when using a manual torque wrench (tolerance $\pm 10\%$).


Table 11: Information on valve mounting screws for high-pressure flanges types DBA...H and DBAR...H

NG	Type	Ports P and P1	4 Valve mounting screws ISO 4762-10.9 ¹⁾	Tightening torque M _A in Nm ²⁾
32	DBA	SAE 1 1/4"	M14 x 135	113
	DBAR		M14 x 145	
40	DBA	SAE 1 1/2"	M16 x 155	184
	DBAR		M16 x 160	

¹⁾ Valve mounting screws ISO 4762-10.9-fLZn-240h-L (at friction coefficient $\mu_{\text{total}} = 0.09...0.14$)

²⁾ The tightening torques are guidelines for the specified friction coefficients and when using a manual torque wrench (tolerance $\pm 10\%$).

7.7.2 Assembly of port T

**WARNING**

Faulty assembly!

In case of faulty assembly due to a mix up of the hydraulic ports, the safety valve loses its safety function!

- Check whether the pressure to be limited is connected to port P and the discharge line is connected to port T.

The connection surfaces of the valve and the valve installation surface must be clean and free from hydraulic fluid.

- Use non-linting fabric for cleaning the valve installation surface.

1. Tighten pipe fittings which are screwed directly into the safety valve. Observe the tightening torque information by the pipe fitting manufacturer.

Table 12: Type of pipe fitting

Valve type + size Component marking	DBA30...1X/...E 1150	DBA40...1X/...E 1150
Fitting with pipe thread according to EN ISO 228 Part 1	G 1 1/4	G 1 1/2

7.8
Additional M port

Safety valves are equipped with an additional connection port in the P channel. In the state as delivered, the port is closed by a plug screw. When the plug screw is removed, a pressure gauge for pressure indication can be connected to the M port.



Always use the tightening torque specified by the pressure gauge manufacturer to install the pressure gauge.

To seal the port again using the plug screw, the screw must be tightened using the tightening torque specified in table 13.

Table 13: M port, information on the plug screw

Valve type + size Component marking	DBA30...1X/...E 1150	DBA40...1X/...E 1150
Fitting of hydraulic connections, valves with pipe thread according to EN ISO 228 Part 1	G 1/4	G 1/4
Tightening torque ¹⁾ , related to the max. operating pressure	30 ± 3 Nm	30 ± 3 Nm

¹⁾ Friction coefficient μ = 0.09 to 0.14

7.9 Connecting the power supply (only with type DBAW...1X/...E)

WARNING

High electrical voltage due to incorrect connection!

Danger to life, risk of injury by electric shock!

- ▶ The safety valve type **DBAW...1X/..E** must only be connected by a specialized electrician or under supervision of the same.
- ▶ Switch off the voltage supply before all maintenance, repair or installation works and secure it against restarting.
- ▶ Provide for proper, safe PE connection.

Overheating!

A wrongly dimensioned fuse protection may lead to overheating during operation of the safety valve.

- ▶ A fuse appropriate for the solenoid's rated current (max. $3 \times I_{\text{rated}}$ according to DIN 41571 and/or IEC 60127) or a protective motor switch with short-circuit protection and thermal instantaneous tripping (setting to rated current) must be connected to each directional valve solenoid as short-circuit protection. The shut-off threshold of this fuse has to be equal to or greater than the possible short-circuit current of the supply voltage source. The fuse may be accommodated in the related supply unit or must be separately connected upstream.

Missing equipotential bonding!

Electrostatic processes, an incorrect earthing concept or missing equipotential bonding may lead to malfunctions or uncontrolled movements at the machine and thus cause injuries.

- ▶ Provide for correct earthing and provide for proper equipotential bonding.

Penetrating water and humidity!

In case of use in humid or wet environments, water or humidity may penetrate at electrical plug-in connectors or the valve electronics. This case may lead to malfunctions at the safety valve and to unexpected movements in the hydraulic system which may result in personal injury and damage to property.

- ▶ Only use the safety valve within the intended IP protection class or lower.
- ▶ Ensure before the assembly that all seals and caps of the plug-in connections are tight and intact.

NOTICE

Uncontrolled disconnection and connection of plug-in connectors!

Device might be destroyed!

- ▶ Before installation works, separate the device from the mains or from the voltage source or de-energize it.
- ▶ Do not plug in or pull the electric plug-in connector as long as the voltage supply is activated.

- ▶ The lines used have to be suitable for operating temperatures of $-20\text{ °C} \dots +100\text{ °C}$.
- ▶ Make sure that the voltage supply is switched off.
- ▶ Connect the protective earthing conductor and the earthing correctly.
- ▶ Ensure that there are no bends in the connection line and litz wires to avoid short-circuits and interruptions.
- ▶ Only assemble the cable and line entry according to the assembly instructions.
- ▶ During the assembly, ensure leak-tightness between cable and cable and line entry.
- ▶ Route the connection line(s) in a pull-relieved form. The first mounting point must be within 15 cm of the cable entry.
- ▶ Use only lines satisfying the requirements on the terminal areas of the connection terminals according to the data sheet.

8 Commissioning



WARNING

Faulty assembly, leaking hydraulic fluid!

Carelessly or incorrectly fastened safety valves may become loose during operation, fall down and cause serious injuries. A hydraulic fluid jet may leak at incompletely mounted hydraulic connections and connection lines and cause serious injuries.

- ▶ Only commission the system after all hydraulic connections and the safety valve have been completely and properly mounted according to the specifications.
- ▶ Look out for defective sealing points and exchange defective seals immediately.
- ▶ Wear personal protective equipment during the initial commissioning.

Personal injury and damage to property!

Commissioning of the safety valve requires basic hydraulic knowledge.

- ▶ Only qualified personnel (see chap. 2.4 "Qualification of personnel") is authorized to commission the safety valve.

- ▶ Make sure that all hydraulic ports are closed.
- ▶ Commission the safety valve only if it is completely installed.
- ▶ Immediately depressurize the system if hydraulic fluid still leaks despite proper assembly and continue with chapter 14 "Troubleshooting".

Information on the hydraulic fluid

- The released operating media and limitations of operation for your safety valve are contained in "*Data sheet 25880*".
- Bosch Rexroth offers the suitable seal designs for the hydraulic fluid used.

Bleeding the hydraulic system

Observe the operating instructions of the system into which the valve is installed.

1. Switch the valve several times under operating pressure before placing it into full operation. This will expel any remaining air from the valve. Mechanical damage due to inadmissibly high acceleration of the hydraulic fluid and the control spool is thus avoided and the valve's life cycle is increased.



You can also achieve the switching movement of the valve spool necessary for the bleeding procedure by manually actuating the manual override. For further information, see chapter 9.4 "Operating the optional manual override at the directional valve".

Leak test

Check whether during operation hydraulic fluid leaks at the safety valve and at the connections.

9 Operation



WARNING

Incorrect area of application!

The approval according to Pressure Equipment Directive and thus the safe pressure relief function are no longer applicable if the safety valve is used incorrectly or outside its area of application.

- ▶ Do **not** use the safety valve as high-response valve!
- ▶ Possible unloading via the directional valve must not be applied for safety-relevant functions!
- ▶ If unloading is required for safety-relevant functions, an additional unloading valve must be installed.



For information on the operation, please refer to the operating instructions for the hydraulic system into which the safety valve is installed.

If errors occur, refer to chapter 14 "Troubleshooting".

9.1 General information on the operation

It must be ensured that

- Discharge lines of safety valves end in a risk-free manner.
- No fluid can accumulate in the discharge lines.
- No more valves, shut-off cocks, etc. are installed in the discharge lines.
- The pressure chamber of the solenoid is always filled with hydraulic fluid.

Pressure peaks in the joint return line of more than one valve may cause unintended spool movements and thus unintended switching processes. It is recommended to use separate return lines.

9.2 Setting the valve to a low response pressure

- When setting the valve, please ensure that the attached name plate is not damaged or torn off.

You can set safety valves which have been provided with a hand wheel or rotary knob to a lower response pressure without damaging the lead seal. To do this, the system into which the safety valve is installed needs to be equipped with a pressure gauge which indicates the pressure at port P or a pressure gauge has to be connected temporarily to the additional M port, which is normally closed by a plug screw.

The response pressure of a safety valve may only be within the specified pressure range due to the installed compression spring. The maximum flow indicated by the component marking can only be utilized within this pressure range.

1. Temporarily deactivate or remove any other pressure relief devices which are installed in the system and have an impact on channel P and seal any openings which were caused by this.
2. For systems without a pressure gauge installed in channel P, connect a pressure gauge at the additional M port.
3. Unload the valve spring as described in chapter 10.2.4 "Unloading the safety valve", screw in the adjustment spindle again as far as possible but do not tighten the lock nut yet after unloading the spring.
4. Switch on the system and wait until the system pressure has built up.
5. Set the desired **lower** response pressure:
Screw out the adjustment spindle so far that the pressure gauge indicates the desired pressure. When you screw out the valve spindle, the safety valve opens and limits the system pressure.
6. Tighten the lock nut clockwise using a manual torque wrench with an accuracy of $\pm 10\%$ and the tightening torque indicated in the table.

Table 14: Information on the lock nut

Valve type	DBA...1X/...E
Wrench size	17
Tightening torque	10 +5 Nm

7. Switch off the system, let the pressure decrease, depressurize any provided pressure accumulators, if applicable. Remove the temporarily installed pressure gauge and seal the additional M port using the plug screw. Tightening torques, see table 13.
8. Return any other pressure relief devices which are installed in the system and have an impact on channel P and which you have deactivated or removed before to the normal operating state.

As an alternative to the procedure described above, the safety valve may also be removed and set to the desired lower response pressure on a test stand.

9.3 Operation with counter pressure in the discharge line

In principle, the safety valve should be operated without counter pressure in the discharge line, if possible.

The following applies to valves with external pilot oil discharge (i.e. valves **with** Y port) without counter pressure in pilot oil return line:

Admissible counter pressure in the discharge line (port T) < 10 bar.

The following applies to valves with internal pilot oil discharge (i.e. valves **without** Y port) without counter pressure in the discharge line (port T):

With internal pilot oil return, the system pressure increases by the counter pressure in the discharge line (port T) with increasing flow (observe AD2000 - data sheet A2 - item 6.3).

To ensure that this increase in system pressure caused by the flow does not exceed 10% of the set response pressure, the admissible flow has to be reduced dependent on the counter pressure in the discharge line (port T).

9.3.1 Counter pressure diagram DBA30...1X/...E

Diagram for determining the maximum admissible counter pressure p_T in the discharge line at tank port T of the valve dependent on the flow q_{Vmax} for valves **DBA30...1X/...E** with different response pressures p_A with internal pilot oil discharge.

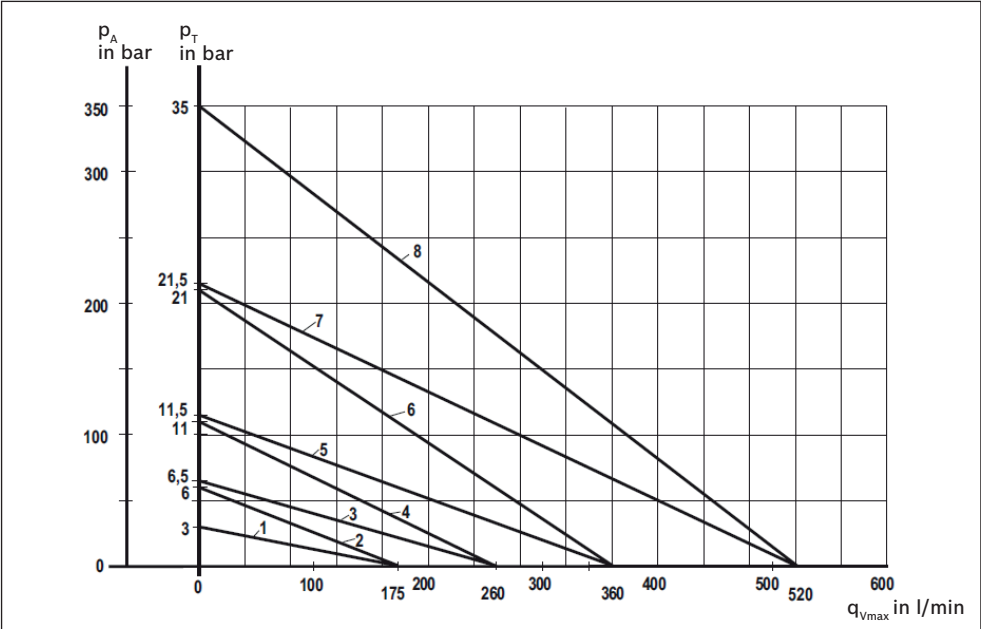


Table 15: Counter pressure diagram DBA30...1X/...E

- p_A response pressure in bar
- p_T maximum admissible counter pressure in the discharge line (port T) in bar
- q_{Vmax} maximum flow in l/min
- p_{Tmax} 10 % x p_A (with $q_V = 0$ l/min)

Table 16: Assignment characteristic curve - response pressure p_A

Characteristic curve	Response pressure p_A in bar
1	30
2	60
3	65
4	110
5	115
6	210
7	215
8	350

9.3.2 Counter pressure diagram DBA40...1X/...E

Diagram for determining the maximum admissible counter pressure p_T in the discharge line at tank port T of the valve dependent on the flow q_{Vmax} for valves **DBA40...1X/...E** with different response pressures p_A with internal pilot oil discharge.

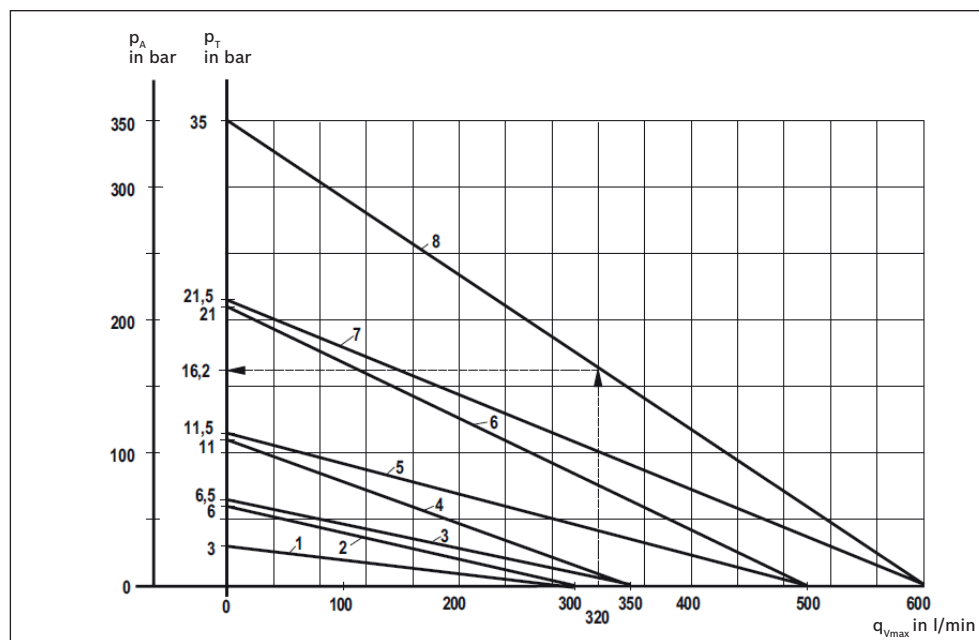


Table 17: Counter pressure diagram DBA40...1X/...E

p_A	response pressure in bar
p_T	maximum admissible counter pressure in the discharge line (port T) in bar
q_{Vmax}	maximum flow in l/min
p_{Tmax}	10 % x p_A (with $q_V = 0$ l/min)

Table 18: Assignment characteristic curve - response pressure p_A

Characteristic curve	Response pressure p_A in bar
1	30
2	60
3	65
4	110
5	115
6	210
7	215
8	350



Example with already existing characteristic curve (DBA40...1X/...E)

Characteristic curves for intermediate values can be generated by interpolation.

Flow of the system / accumulator to be secured: $q_{Vmax} = 320$ l/min

Safety valve set to: $p_A = 350$ bar

See arrows in diagram:

p_T (320 l/min; 350 bar) = 16.2 bar

9.4 Operating the optional manual override at the directional valve

Valves of type **DBAW**, i.e. valves with directional valve, are provided with a manual override which is concealed by a protective cap. Using this manual override, the switching function of the directional valve can also be triggered if the solenoid is not energized.

The manual override is only intended for manual operation.

The manual override is located at the side of the solenoid coil facing away from the solenoid coil.

CAUTION

Incorrect operation of the manual override!

There is the risk of damaging the valve and/or incorrect operation may result in dangerous movements of the connected actuators.

- ▶ Only operate the manual override if it is ensured that this will not trigger any dangerous working movement of the connected actuator.
- ▶ Do not use sharp-edged tools to operate the manual override. There is the danger of damaging sealing surfaces at the solenoid.

The manual override is only intended for short-time manual operation and must not be brought into a certain spool position for a longer period or permanently by means of mechanical devices.

The manual override is not suitable for frequently recurring manual operations!

1. Remove the protective cap.
2. Use a rounded tool with a maximum diameter of 5 mm to push the manual override in the direction of the valve housing.
3. Re-attach the protective cap.

10 Maintenance and repair

10.1 Cleaning and care

NOTICE

Solvents and aggressive cleaning agents!

Aggressive cleaning agents may damage the seals of the safety valve and accelerate aging.

- ▶ Never use solvents or aggressive cleaning agents.

Damage to the hydraulic system and seals!

The water pressure of a high-pressure washer may damage the hydraulic system and the seals of the safety valve.

- ▶ Do not use a high-pressure washer for cleaning.

For cleaning and care of the safety valve, observe the following:

- ▶ Remove external coarse dirt and keep sensitive and important parts clean.
- ▶ Only clean the safety valve using a damp, non-linting cloth. Only use water and a mild cleaning agent, if necessary, to do so.

10.2 Inspection and maintenance

NOTICE

Dirt and foreign particles in the safety valve!

Penetrating dirt and foreign particles in the safety valve lead to wear and malfunctions. Safe function of the safety valve is therefore no longer ensured.

- ▶ During all works at the safety valve, provide for absolute cleanliness in order to prevent foreign particles like e.g. welding beads or metal chips from getting into the hydraulic lines.
- ▶ Do not use linting fabric for cleaning.
- ▶ Ensure that no cleaning agents are able to penetrate the hydraulic system.
- ▶ Flush the hydraulic system if necessary. Replace the fluid filter or the hydraulic fluid.

10.2.1 General maintenance instructions

- ▶ Remove coarse dirt from the exterior.
- ▶ Check all external fittings for completeness and tight seat.
- ▶ Check the safety valve for external leakage, replace the seals if necessary, see chapter 10.3 "Repair".
- ▶ Check the safety valve for corrosion. Corrosion is an indication of leakage. Remove the safety valve and have it repaired if there is any visible corrosion.

10.2.2 Maintenance interval for all safety valves of type DBA...1X/...E

For ensuring the function, the safety valves have to be made to respond on a suitable test stand **at regular intervals**. It has to be checked whether the response pressure complies with the information on the name plate. The time intervals depend on the functional use of the safety valve and/or on the maintenance intervals of the overall system.

Within the scope of this test, we recommend replacing the seals intended for exchange by new ones. For order details regarding the seal kits, refer to chapter 10.4 "Spare parts".

If used as intended, Rexroth safety valves are designed for durability.

10.2.3 Maintenance interval for safety valves of type DBAW...1X/...E

We recommend replacing the seals between main and directional valve which are intended for exchange by new ones **at regular intervals**. To this end, main and directional valve must be separated from each other. Observe the tightening torques for the valve mounting screws which are to be complied with in the case of re-assembly after seal exchange, see table 20.

For more information regarding the assembly and the tightening torques of mounting screws and pipe fittings refer to chapter 7 "Assembly".

10.2.4 Unloading the safety valve

The safety valve should preferably be unloaded on a separate test stand with suitable hydraulic fluid which corresponds to the specifications given in "*Data sheet 25880*". The safety valve can, however, also be unloaded in the installed condition in the system.



WARNING

Improper unloading of the safety valve!

Improper unloading of the safety valve **in the system** may cause hazards or faults.

- ▶ Only qualified personnel (see chapter 2.4 "Qualification of personnel") is authorized to unload the safety valve.
- ▶ Observe the operating instructions and/or the functional set-up of the system.
- ▶ After unloading, the rotating spindle must be brought back into the initial position by means of the rotary knob. This is the only way to guarantee that the valve will still work with the response pressure pre-set by Bosch Rexroth.

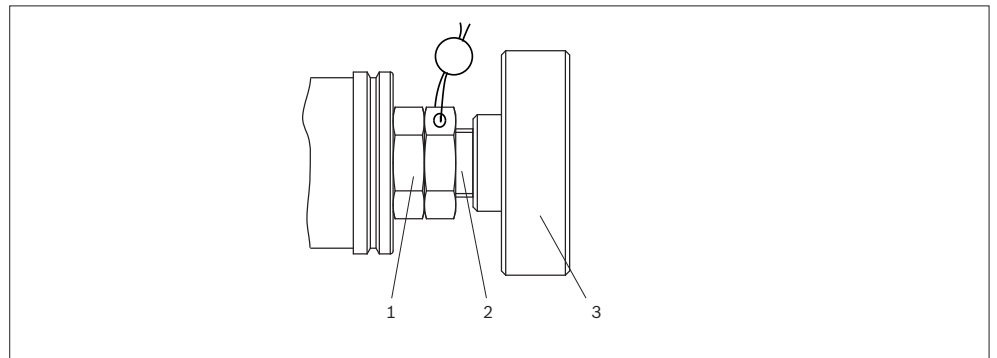


Fig. 4: Loosening the locking

**Unloading the valve on
a separate test stand
(recommended)**

1. Depressurize the system, verify the depressurized condition by means of a pressure gauge so that the valve can be removed in a risk-free manner.
2. Remove the valve from the system and assemble it on a suitable test stand considering the necessary tightening torques.
3. Release the locking of the adjustment spindle **(2)**:
Release the lock nut **(1)** by means of an open-end wrench by rotating it counterclockwise.
4. Purging the safety valve:
Screw out the adjustment spindle **(2)** to the stop by rotating the rotary knob **(3)** counterclockwise. Now allow free flow through the safety valve for approx. 5...10 seconds so that dirt particles that might exist at the valve seat are removed by the flow.
5. Screw in the adjustment spindle **(2)** by rotating the rotary knob **(3)** clockwise so that the lock nut **(1)** rests against the valve body without any play. If the response pressure is to be newly set, rotate the adjustment spindle so that at a suitable, calibrated pressure gauge with the largest accuracy possible, the original response pressure known from the valve component marking is displayed.
6. Hold the rotary knob **(3)** and tighten the lock nut **(1)** by means of a manual torque wrench applying the specified tightening torque by rotating it clockwise.
7. Depressurize the test stand (verify by means of pressure gauge) so that the valve can be removed in a risk-free manner.
8. Remove the valve from the test stand and assemble it on the system considering the necessary tightening torques.


Unloading the valve while it remains in the system

1. Release the locking of the adjustment spindle **(2)**:
Release the lock nut **(1)** by means of an open-end wrench by rotating it counterclockwise.
2. Purging the safety valve:
Screw out the adjustment spindle **(2)** to the stop by rotating the rotary knob **(3)** counterclockwise. Now allow free flow through the safety valve for approx. 5...10 seconds so that dirt particles that might exist at the valve seat are removed by the flow.
3. Screw in the adjustment spindle **(2)** by rotating the rotary knob **(3)** clockwise so that the lock nut **(1)** rests against the valve body without any play.
4. Hold the rotary knob **(3)** and tighten the lock nut **(1)** by means of a manual torque wrench applying the specified tightening torque by rotating it clockwise.

Table 19: Information on the lock nut

Valve type	DBA...1X/...E
Wrench size	17
Tightening torque	10 +5 Nm

10.3 Repair


WARNING

Damage to persons and property caused by improper repair!

In case of improper repair, the safety function of the safety valve is no longer given in subsequent operation.

- Only repair measures listed in chapter 10 "Maintenance and repair" are admissible.
- Only qualified personnel (see chapter 2.4 "Qualification of personnel") is authorized to repair the safety valve.
- The sealing and/or the safety cap must not be removed.

Correcting external leakage at the safety valve

- The seals of hydraulic valves are subject to a natural process of wear and aging. We thus recommend replacing them at appropriate time intervals. The intervals are mainly determined by the operating conditions and the cleanliness of the hydraulic fluid.
- Regularly check the safety valve for leak-tightness!
 - As a precaution, exchange seals at reasonable time intervals.

If hydraulic fluid continues to leak after re-installation of the safety valve, the safety valve itself is defective. In this case, send the safety valve to the manufacturer for repair.

10.3.1 Mounting screws for connection of main housing to attached valve elements at type DBAW...1X/...E

During exchange of the seals between main housings and attached valve elements, the mounting screws of the attached valve elements have to be loosened.

Regarding the re-assembly after seal exchange, please note that for the assembly, you may only use the original mounting screws or screws of the specification given in table 20. Observe the specified tightening torque!

Table 20: Mounting screws for connection of main housing to attached valve elements at type DBAW...1X/...E

Valve type	Screw type, Tightening torque M_A ¹⁾
DBAW...1X/...6E...E	4 hexagon socket head cap screws, ISO 4762 - M5 x 50-10.9 $M_A = 7 \pm 0.7 \text{ Nm}$ ¹⁾²⁾
DBAW...1X/...6SM...E	4 hexagon socket head cap screws, ISO 4762 - M5 x 85-10.9 $M_A = 7 \pm 0.7 \text{ Nm}$ ¹⁾²⁾
DBA.R...1X/...E	2 cheese head screws, ISO 1580 - M4 x 10-4.8 $M_A = \text{hand-tight}$

¹⁾ Friction coefficient $\mu = 0.09$ to 0.14

²⁾ Tighten using a manual torque wrench with accuracy $\pm 10\%$

10.4 Spare parts

When ordering spare parts, please indicate their material numbers.

Seal kit for the valve connection surface

Table 21: Seal kit for the valve connection surface

Valve type	NBR	FKM
DBA...1X/...E	R961005172	R961005173



The spare parts are available from the address specified in chapter 14.2 "List of addresses".

11 Disassembly and replacement



WARNING

Pressurized and energized system parts!

When working on pressurized and energized system parts, there is the danger of injury by leaking hydraulic fluid or electric shock.

- Ensure that the hydraulic system is depressurized and the electrical control de-energized before the disassembly.



CAUTION

Incompletely mounted valve components falling down!

Incompletely disassembled valve components may fall down and cause injuries.

- During the disassembly, secure the safety valves against falling down.



Have sufficiently dimensioned collecting containers, non-linting cloth and medium-binding materials ready in order to collect or bind leaking hydraulic fluid.

1. Switch off your system, de-energize and depressurize the system and secure the system against restarting before all disassembly works.
2. Unload the hydraulic accumulators, if applicable.
3. Provide for a clean environment during the disassembly.
4. Prepare a container or a pan for collecting the leaking hydraulic fluid.
5. Detach the safety valve from the pipelines, flange connections or the valve installation surface using appropriate tools; collect any hydraulic fluid that might leak in the provided tank. Dispose of the hydraulic fluid properly.

WARNING! Heavy components! When lifting safety valves or components with high weight, there is the danger of damage to property and personal injuries.

- Please observe the safety instructions in chapter 6 "Transport and storage".

6. If the device is to be returned to the manufacturer for repair, please close the ports using the transport protection or protect it using equivalent packaging in order to avoid contamination and damage.
7. Close the connection bore or threaded connections of the valve installation surface in order to avoid contamination of the system.



In case of new installation and/or exchange of the safety valve, the following steps are analog to chapter 7 "Assembly".

12 Disposal

12.1 Environmental protection

Careless disposal of the safety valve and the hydraulic fluid could lead to environmental pollution.

- ▶ Thus, dispose of the product and the hydraulic fluid in accordance with the currently applicable national regulations in your country.
- ▶ Dispose of hydraulic fluid residues according to the applicable safety data sheets for these hydraulic fluids.
- ▶ Please observe the following information for the environmentally-friendly disposal of the safety valve.

12.2 Return to Bosch Rexroth AG

The hydraulic products manufactured by us can be returned to us for disposal purposes free of charge. There must be no inappropriate foreign substances or third-party components when products are returned. Safety valves have to be drained before being returned. The components have to be sent free to the door to the following address:

Bosch Rexroth AG
 Service Industriegydraulik [Industrial Hydraulics Service]
 Bürgermeister-Dr.-Nebel-Straße 8
 97816 Lohr am Main
 Germany

12.3 Packaging

Upon request, reusable systems can be used for regular deliveries.

The materials for disposable packaging are mostly cardboard, wood, and polystyrene. They can be recycled without any problems. Due to ecological reasons, disposable packaging should not be used for returning products to Bosch Rexroth. The screw-in cartridge valve is delivered in a plastic packaging.

12.4 Materials used

Hydraulic components from Bosch Rexroth do not contain any hazardous materials that could be released during intended use. In the normal case, no negative effects on human beings and on the environment have to be expected.

The safety valves basically comprise of:

- Cast iron
- Steel
- Aluminum
- Plastics
- Elastomers

12.5 Recycling

Due to the high metal share, hydraulic products can mostly be recycled. In order to achieve an ideal metal recovery, disassembly into individual assemblies is required.

13 Extension and modification

Do **not** retrofit the safety valve.

14 Troubleshooting

14.1 How to proceed for troubleshooting

- ▶ Always work systematically and purposefully, even when under time pressure. Random and imprudent disassembly and readjustment of settings can, in the worst-case scenario, result in the inability to determine the original cause of error.
- ▶ First, get a general idea of how the safety valve works in conjunction with the overall system.
- ▶ Try to find out whether the safety valve has worked properly in conjunction with the overall system before the error occurred first.
- ▶ Try to determine any changes of the overall system in which the safety valve is integrated:
 - Were there any changes to the safety valve's application conditions or area of application?
 - Have changes (refittings) or repair works been carried out at the overall system (machine/system, electrical systems, control) or at the safety valve? If so: What were they?
 - Was the safety valve or machine used as intended?
 - How did the fault become apparent?
- ▶ Try to get a clear idea of the cause of the error. If necessary, ask the actual (machine) operator.

Fault table The safety valve is not sensitive to faults as long as the specified application conditions are complied with, in particular the oil quality and the operating temperature.

Table 22: Fault table

Fault	Possible cause	Remedy
The response pressure indicated on the component marking is not reached during testing at the test stand.	A valve with unsuitable response pressure has been installed.	Check the specified response pressure of the valve by means of the last figure of the component marking at the valve or name plate. Select and order a valve with suitable response pressure.
The response pressure indicated on the component marking is not exceeded during testing at the test stand.	The safety valve is damaged and blocked internally.	Replace the safety valve.
If the response pressure is exceeded, the system pressure increases excessively even though the safety valve responds. During bleeding, the system pressure exceeds the 10% limit above the maximum admissible pressure (see EC Pressure Equipment Directive 2014/68/EU, Appendix I, chap. 7.3).	A safety valve with insufficiently dimensioned flow was installed.	Select and order a safety valve with suitable specified flow.
	The T port of the safety valve is connected via a line with excessive flow resistance.	Use larger discharge pipes (increase outlet diameters), avoid a deflection of flow, observe the maximum admissible counter pressure in the discharge line, see chapter 9.3 "Operation with counter pressure in the discharge line".
	The viscosity of the hydraulic fluid is outside the valve specification.	Check whether a suitable hydraulic fluid can be used in the system and exchange the hydraulic fluid.
Safety valve response pressure is too low.	A safety valve with unsuitable response pressure has been installed.	Check the specified response pressure of the safety valve by means of the last figure of the component marking at the safety valve or name plate. Select and order a safety valve with suitable response pressure.
	The difference between operating pressure and response pressure of the safety valve is too small.	Check whether the system can be operated at lower operating pressure or select and order a safety valve with suitable response pressure.

Fault	Possible cause	Remedy
Safety valve is permanently flown through.	A safety valve with unsuitable response pressure has been installed.	Check the specified response pressure of the safety valve by means of the last figure of the component marking at the safety valve or name plate. Select and order a safety valve with suitable response pressure.
	The difference between operating pressure and response pressure of the safety valve is too small.	Check whether the system can be operated at lower operating pressure or select and order a safety valve with suitable response pressure.
	Dirt prevents the closing of the safety valve.	Establish oil cleanliness by means of suitable measures.
		Type DBA...1../...E : Flush the safety valve; to do so, unload the safety valve at the adjustment device, see chap. 10.2.4.
		Type DBA...2../...E : Make the safety valve respond on a separate, suitable test stand in order to flush the dirt out of the gap between valve seat and poppet. If you are not successful, replace the safety valve.
Safety valve oscillates.	Together with other components, the safety valve constitutes an oscillating system in which there are regulating oscillations.	A safety valve may not be used as a high-response valve.
Sealing is damaged or missing.	The lead seal has been destroyed by the operating personnel or mechanical influence.	The safety valve may not be re-sealed or repaired. Otherwise the approval according to PED will no longer apply. Replace the safety valve.
External leakage (leakage at the pilot control valve or at the main stage)	The seal of the adjustment device is worn.	Replace the safety valve.
	Plug screw at Y port is leaking; seal ring at the plug screw is worn.	Replace seal ring; make sure the sealing surface is intact. Screw-in the plug screw and tighten it using the specified tightening torque, see "Data sheet 25880".
	The valve is leaking between the housing and the pump, the housing and the flange connection or at the tank port. The R-ring in the housing connection surface is worn, see "Data sheet 25880".	Replace seal kit or R-rings. Screw-in the valve mounting screws and tighten them using the specified tightening torque, see also 7.7 "Assembly of the safety valve".

Fault	Possible cause	Remedy
External leakage (leakage at the directional valve or at the switching shock damping plate)	The seals at the connection surface(s) between pilot control valve and directional valve, between directional valve and switching shock damping plate or between switching shock damping plate and pilot control valve are defective.	Disassemble the directional valve, switching shock damping plate; check the seal ring recesses on the valve connection surface for cleanliness and damage. Assemble the new seals, see table 20.
Name plate is missing or cannot be completely read.		Replace the safety valve.
Setting certificate of the testing authority is missing.		Request the setting certificate from the Bosch Rexroth Quality Assurance, see chapter 14.2 "List of addresses".
Other leakage at the directional valve or at the switching shock damping valve	Directional valve /switching shock damping valve defective	Send valve to the authorized facility for repair. Please contact your regional Bosch Rexroth representative.
Rotary handle is destroyed	Transport damage, improper handling	Send valve to the authorized facility for repair. Please contact your regional Bosch Rexroth representative.
Valve does not switch in case of electric control	Electr. connection interrupted, no current continuity	Cable break: Replace the connection cable
	Directional valve spool is jammed due to contamination	Electrical defect in the coil: Remove directional valve and have it repaired. If possible, try to release the directional valve spool by manually actuating the manual override. See also 9.4 "Operating the optional manual override at the directional valve"

Following faults due to contamination, it is moreover essential to check the quality of the hydraulic fluid and to improve it, if necessary, by suitable measures such as flushing or the additional installation of filters.

14.2 List of addresses

Contacts for service and spare parts

Bosch Rexroth AG
Bürgermeister-Dr.-Nebel-Straße 8
97816 Lohr am Main
Germany

Phone +49 (0) 9352/40 50 60
Email service@boschrexroth.de

Headquarters

Bosch Rexroth AG
Zum Eisengießer 1
97816 Lohr am Main
Germany

Phone +49 (0) 9352/40 30 20
Email my.support@boschrexroth.de

The addresses of our sales and service network and sales organizations can be found at www.boschrexroth.com/adressen

Ordering address for setting certificate

A possibly missing setting certificate can be requested from the Rexroth Quality Assurance at the following address:

Bosch Rexroth AG
Department LoP1/QMM7
Zum Eisengießer 1
97816 Lohr am Main

Phone +49 (9352) 18 - 3631 / 3447
Email LoP1QMM7.Abstellungspostfach@boschrexroth.de
Internet www.boschrexroth.de

In your request, please specify the production number, the date of manufacture and the type designation of your safety valve. All these specifications are indicated on the name plate of the safety valve, see chap. "Product identification".

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