Shut-off valves

BOA-SuperCompact
BOA-Compact
BOA-Compact EKB
BOA-W
BOA-H

Non-return valves

BOA-R
BOA-RVK

Strainers

BOA-S

These operating instructions contain important information and precautionary notes. It is imperative that the manual be read prior to installation and commissioning.

The manual shall always be kept close to the valve's location of installation.

TÜV CERT PED 97/23/EC

CE

KSB

1 EC declarations of conformity

EC Declaration of Conformity

Herewith we,

KSB Aktiengesellschaft
Johann-Klein-Str. 9
67227 Frankenthal
Germany

declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of valve types:

Shut-off valves

- BOA-H	JL1040	PN 16	DN 15-300
- BOA-H	JS1025	PN 16	DN 15-350 [1)]
- BOA-H	JS1025	PN 25	DN 15-150 [2)]

[1)] DN15–200 to AD 2000 code
[2)] DN 15–150 to AD 2000 code

Non-return valves

- BOA-R	JL1040	PN 6	DN 15-200
- BOA-R	JL1040	PN 16	DN 15-300
- BOA-R	JS1025	PN 16	DN 15-350

In accordance with harmonised European standards

Shut-off valves / **Non-return valves**	**EN 19**
	EN 12516-3
	EN 12266-1
	EN 13789
	EN 1092-2
Non-return valves	**EN 12334**

And other standards / codes: **DIN 3840 Paras. 1.3 and 4.3 [1)] and [2)] to AD 2000 code**

Suitable for: **Fluids in Groups 1 and 2**

Conformity assessment procedure: **Module H**

Name and address of the notified body responsible for approval and surveillance:

TÜV Süddeutschland
Bau und Betrieb GmbH
Westendstr. 199
80686 München
Germany

Identification number of the notified body: **0036**

Valves of DN ≤ 25 (PN 16/25) fall under Article 3, Section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE marking nor the identification number of a notified body.

Rainer Michalik

Quality Management

(This document has been prepared electronically and is valid without signature.)

EC Declaration of Conformity

Herewith we,	**KSB Aktiengesellschaft** **Johann-Klein-Str. 9** **67227 Frankenthal** **Germany**

declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of valve types:	**Shut-off valves**		
	– BOA-SuperCompact	PN 6/10/16	DN 20-200
	– BOA-Compact	PN 6, 16	DN 15-200
	– BOA-Compact EKB	PN 10/16	DN 15-200
	– BOA-W	PN 6, 16	DN 15-200

In accordance with harmonised European standards	**Shut-off valves**	**EN 19** **EN 12516-3** **EN 12266-1** **EN 13789** **EN 1092-2**

And other standards / codes:	**DIN 3840 Paras. 1.3 and 4.3**
Suitable for:	**Fluids in Group 2**
Conformity assessment procedure:	**Module H**
Name and address of the notified body responsible for approval and surveillance:	**TÜV Süddeutschland** **Bau und Betrieb GmbH** **Westendstr. 199** **80686 München** **Germany**
Identification number of the notified body:	**0036**

Valves of DN ≤ 50 (PN 16), DN ≤ 100 (PN 10) and DN ≤ 150 (PN 6) fall under Article 3, Section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE marking nor the identification number of a notified body.

Rainer Michalik

Quality Management

(This document has been prepared electronically and is valid without signature.)

EC Declaration of Conformity

Herewith we,	**KSB Aktiengesellschaft** **Johann-Klein-Str. 9** **67227 Frankenthal** **Germany**

declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of valve types:	**Non-return valve**		
	– BOA-RVK	PN 6/10/16	DN 15-200
In accordance with harmonised European standards	**EN 12266-1**		
And other standards / codes:	**DIN 3840**		
Suitable for:	**Fluids in Group 2**		
Conformity assessment procedure:	**Module A**		
Name and address of the notified body:	**LRQA GmbH Hamburg** **Mönckebergstraße 27** **20095 Hamburg** **Germany**		

Valves of DN ≤ 50 (PN 16), DN ≤ 100 (PN 10) and DN ≤ 150 (PN 6) fall under Article 3, Section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE marking nor the identification number of a notified body.

Rainer Michalik

Quality Management

(This document has been prepared electronically and is valid without signature.)

EC Declaration of Conformity

Herewith we,	**KSB Aktiengesellschaft** **Johann-Klein-Str. 9** **67227 Frankenthal** **Germany**

declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of valve types:	**Strainers**		
	– BOA-S (JL 1040)	PN 6	DN 15-200
	– BOA-S (JL 1040)	PN 16	DN 15-300
In accordance with harmonised European standards	**EN 1561** **EN 12266-1** **EN 558-1** **EN 1092-2**		
And other standards / codes:	**DIN 3840**		
Suitable for:	**Fluids in Groups 1 and 2**		
Conformity assessment procedure:	**Module H**		
Name and address of the notified body responsible for approval and surveillance:	**Büro Veritas S. A.** **34, rue Rennequin** **75850 Paris Cedex 17** **France**		
Identification number of the notified body:	**0062**		

Valves of DN ≤ 25 (PN 16/25) fall under Article 3, Section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE marking nor the identification number of a notified body.

Rainer Michalik

Quality Management

(This document has been prepared electronically and is valid without signature.)

EC Declaration of Conformity

Herewith we,	**KSB Aktiengesellschaft** **Johann-Klein-Str. 9** **67227 Frankenthal** **Germany**		
declare that the valves listed below satisfy the safety requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).			
Description of valve types:	**Strainers**		
	– BOA-S (JS 1025)	PN 16	DN 15-300
	– BOA-S (JS 1025)	PN 25	DN 15-200
In accordance with harmonised European standards	**Strainers**	**EN 558-1** **EN 12266-1/-2** **EN 1563** **EN 1092-2**	
And other standards / codes:	**DIN 3840**		
Suitable for:	**Fluids in Groups 1 and 2**		
Conformity assessment procedure:	**Module H**		
Name and address of the notified body responsible for approval and surveillance:	**TÜV Süddeutschland** **Bau und Betrieb GmbH** **Westendstr. 199** **80686 München** **Germany**		
Identification number of the notified body:	**0036**		

Valves of DN ≤ 25 (PN 16/25) fall under Article 3, Section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE marking nor the identification number of a notified body.

Rainer Michalik

Quality Management

(This document has been prepared electronically and is valid without signature.)

2 General instructions

These operating instructions apply to KSB valve types BOA-SuperCompact, BOA-Compact, BOA-Compact EKB, BOA-W, BOA-H, BOA-R, BOA-RVK and BOA-S.

Address:
KSB Aktiengesellschaft
Johann-Klein-Straße 9
67227 Frankenthal

The design, manufacture and testing of KSB valves are subject to a QM system to DIN EN ISO 9001 and satisfy the safety requirements put forth in Annex I of the Pressure Equipment Directive 97/23/EG (PED). Certification to the Pressure Equipment Directive 97/23/EC has been obtained in accordance with Module H (BOA-RVK with Module A).

Only correct installation, maintenance or repair will ensure smooth operation of the valves.

The manufacturer shall not accept any liability if the instructions set forth in this manual are not complied with.

Caution The valves must not be operated outside the permissible operating range, especially with regard to pressure and temperature. The limits are indicated on the name plate or in the currently applicable type series booklet (also see section 5.2). The nominal pressure classes only apply up to a temperature of 120°C (exception: BOA-RVK PN 6 see Section 6.2). For temperatures exceeding 120°C refer to the pressure-temperature ratings included in the type series booklets.These ratings must not be exceeded under any circumstances. Operation of the valves outside these conditions may result in overloads which may damage the valves.

The type series booklets can be found at www.ksb.com - product catalogue.

Non-observance of this warning may cause personal injury and damage to property, for example:

- injuries resulting from fluid leakage (cold / hot, toxic, under pressure, ...)
- impairment of the valve's function or its destruction.

The descriptions and instructions set forth in this manual refer to the standard models but are also applicable to variants.

Valves with actuator

For actuated valves (electric / pneumatic actuator), the operating manual of the actuator must be adhered to without fail.

These operating instructions do not take into account:

- any eventualities and events which might occur during installation, operation and maintenance.
- local regulations; the operator must ensure that such regulations are strictly observed by all, including the personnel called in for installation.

Caution The valve must only be operated by skilled, properly trained personnel.

All personnel involved in the operation, inspection and installation must be fully aware of the interaction between the valve and the system.

The valves are actuated via the handwheel. The closing direction is marked on the handwheel.
Clockwise = Closing the valve
Counter-clockwise = Opening the valve
(cf. Section 7.1, Actuation)

Valve types BOA-R, BOA-RVK and BOA-S are not fitted with handwheels or other external actuating elements.

Incorrect operation of the valve may have a substantial impact on the entire system, for example:

- leakage of the fluid handled
- system / machine brought to a standstill
- impairment / reduction / increase of the system's / machine's function / effect.

For any queries you may have or in the case of damage, please contact KSB Aktiengesellschaft.

For any queries and repeat orders, in particular for purchasing spare parts, please specify the type series / variant details or the works / serial number, as well as the year of construction, if possible.

The technical data (operating data) of the valves are specified in the technical literature (type series booklet, valve characteristic, chemical resistance chart) of the respective valve (cf. Section 5).

If the valve must be returned, proceed in accordance with Section 4, Transport.

3 Safety

These operating instructions contain important information which must be observed during installation, operation and maintenance. Therefore this operating manual must be read and understood both by the installing personnel and the responsible trained personnel / operators prior to installation and commissioning, and it must always be kept close to the location of operation of the valve for easy access.

In addition to the general safety instructions laid down in this chapter on "Safety", the special safety instructions provided in other sections must also be observed.

3.1 Symbols used in these operating instructions

The safety instructions contained in this manual whose non-observance might cause hazards to persons are specially marked with the general hazard sign, namely

safety sign in accordance with DIN 4844 - W 9.

The electrical danger warning sign is

safety sign in accordance with DIN 4844 – W 8.

The word

Caution

is used to introduce safety instructions whose non-observance may lead to damage to the valve and its accessories and its / their functions.

Instructions attached directly to the valve (e. g. nominal pressure) must always be complied with and be kept in a perfectly legible condition at all times.

3.2 Personnel qualification and training

All personnel involved in operating, maintaining, servicing, inspecting and installing the equipment must be fully qualified to carry out the work involved. Personnel responsibilities, competence and supervision must be clearly defined by the operator. If the personnel in question does not already possess the requisite know-how, appropriate training and instruction must be provided. If required, the operator may commission the manufacturer / supplier to take care of such training. In addition, the operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

3.3 Non-compliance with safety instructions

Non-compliance with safety instructions can jeopardize the safety of personnel, the environment, the valve and / or the system. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claims for damages.

In particular, non-compliance can, for example, result in:

- failure of important valve / system functions,
- failure of prescribed maintenance and servicing practices,
- hazard to persons by electrical, mechanical and chemical effects,
- hazard to the environment due to leakage of hazardous substances.

3.4 Safety awareness

It is imperative to comply with the safety instructions contained in this manual, the relevant national health and safety regulations and the operator's own internal work, operation and safety regulations.

3.5 Safety instructions for the operator / user

- Any hot or cold valve components (e. g. body components or handwheel) that could pose a hazard must be equipped with a guard by the operator.
- Leakages (e.g. at the stem seal) of hazardous fluids (e.g. explosive, toxic, hot) must be contained so as to avoid any danger to persons and the environment. All relevant laws must be heeded.
- Electrical hazards must be eliminated. (For details please refer to VDE regulations and the safety regulations laid down by the local energy supply companies, for instance).

3.6 Safety information for maintenance, inspection and installation work

The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.

Work on the valve must only be carried out after the valve has cooled down and valve pressure has been released. The fluid temperature must be below the vaporisation temperature limit in all areas in contact with the fluid.

For safety reasons, the fitter / qualified personnel must verify whether all measures required for the protection of persons have been taken prior to starting any work.

Valves handling fluids (media) injurious to health must be decontaminated.

Immediately following completion of the work, all safety-relevant and protective devices must be re-installed and / or re-activated. Please observe all instructions set out in Section 7, Commissioning / Start-up, before returning the valve to service.

Work on actuated valves must be carried out only during standstill. The shutdown procedure described in the manual for taking the actuator out of service must be adhered to without fail.

3.7 Unauthorised modification and manufacture of spare parts

The modification or repair of the valve supplied are only permitted after consultation with the manufacturer. Original spare parts supplied by the manufacturer ensure safety. The use of other parts than the original spare parts will lead to forfeiture of the declaration of conformity and will invalidate any liability of the manufacturer for consequential damage.

3.8 Unauthorised modes of operation

The warranty relating to the operating reliability and safety of the valve supplied is only valid if the equipment is used in accordance with its designated use as described in Section 2, General, of this manual. The limits stated in the technical literature (pressure / temperature ratings to DIN EN1092-2 see Section 6.2 and applicable type series booklet) must not be exceeded under any circumstances.

4 Transport and storage

4.1 Transport

The valves are in closed position when supplied and, where required, the line connection ports are capped. The valves are ready for operation upon delivery, the exception being original spare parts which are only ready for operation following assembly / installation and the subsequent shell / pressure / leak tests (cf. Section 7.1).

Caution For transport and interim storage, the valves must always be kept in the closed position, and the line connection ports must be covered with suitable material (e. g. caps, foil) to avoid damage to the seat / disc contact faces.

Caution Valves with plastic coating such as BOA-Compact EKB (EKB = electrostatic plastic coating), shall be transported in such a way that damage to the plastic coating is prevented.

Caution In order to avoid damage or personal injury the valve must never be suspended from the handwheel or actuator, if any, during transport.

Please observe the hoisting instructions on page 18!

For the valve weights refer to the relevant manufacturer documentation (type series booklet --> Section 5.2 Relevant documentation; order confirmation).

After delivery and prior to installation, check the valve for potential damage acquired in transit. Damaged valves must not be installed.

4.2 Storage

Storage / interim storage of the valves must ensure that even after a prolonged period of storage the valves' function is not impaired and damage to the plastic coating (BOA-Compact EKB) is prevented. The following requirements must be met:

- Storage is performed with the valve in closed position (to protect the seat / disc contact faces against damage)
- Measures are taken to protect the valves against dirt (dust, sand, mortar and / or building material), frost and corrosion by using foils or caps, for instance.

When storing valves of the BOA-SuperCompact, BOA-Compact, BOA-Compact EKB, BOA-W series (seat/disc interface and/or stem seal made of elastomers), please observe the guidelines for the storage of elastomers (DIN 7716):

- The storage room shall be dry, free from dust and moderately ventilated. The ambient temperature must not exceed +25°C.
- Stocked valves should be used first to ensure that the periods of storage are as short as possible.
- BOA-SuperCompact, BOA-Compact, BOA-Compact EKB, BOA-W must not be exposed to solvents, lubricants, fuels and chemicals. The EPDM elastomer at the valve disc and stem seal will be impaired by these substances.
  EPDM = ethylene-propylene-diene rubber
- The valves must be stored such that the valve disc is not exposed to sunlight or UV light from other sources.
- As mentioned above, the valves are required to be stored in closed position. However, the valve discs on soft-seated valves must be closed using little force to prevent premature ageing of the elastomer.

5 Specification / Relevant documentation

The sectional drawings below provide examples of the general design / configuration of the valves. For illustrations relating to specific valve series and further information please refer to the respective type series booklets.

5.1 Marking

General marking

Nominal size	(DN...)
Nominal pressure class	(PN...)
Manufacturer	KSB
Type series / Model	BOA®-....
Year of construction (2011, 2012, etc.)	(20..)
Material	.....
Flow direction arrow	→
Traceability of the material (from category II PED 97/23/EC)	.....
CE marking (from category I PED 97/23/EC)	CE
Identification number of the notified body: (from category I PED 97/23/EC according to module H)	0036
Marking of 3.1 acceptance test (BOA-H, BOA-R, BOA-S) (shell / pressure and leak test)	
Marking attached to the product at customer's request:	
System / Unit No., etc.	.....

The valve also receives an internal marking:

– Inspector's stamp following successful final inspection and testing of the valves as per inspection and test plan.

The CE marking on the valve means it is in conformity with the European Pressure Equipment Directive 97/23/EC.

In accordance with the Pressure Equipment Directive 97/23/EC, the valves are divided into those

- bearing the CE marking and those
- not bearing the CE marking.

BOA-H, BOA-R and BOA-S for fluids in Groups 1 and 2

PN	DN									
	≤25	32	40	50	65	80	100	125	150	≥200
10	CE	CE								
16										
25										
≥40										

BOA-SuperCompact, BOA-Compact, BOA Compact EKB, BOA-W and BOA-RVK for fluids in Group 2

PN	DN								
	≤32	40	50	65	80	100	125	150	≥200
6	CE	CE							
10									
16									
25									
≥40									

Fluid groups

Group 1 comprises fluids defined as

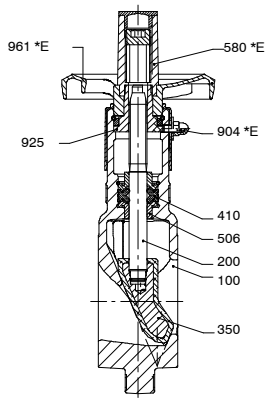
- explosive,
- extremely flammable,
- highly flammable,
- flammable (where the maximum allowable temperature is above flashpoint),
- very toxic,
- toxic,
- oxidizing.

Group 2 comprises all other fluids not referred to in Group 1.

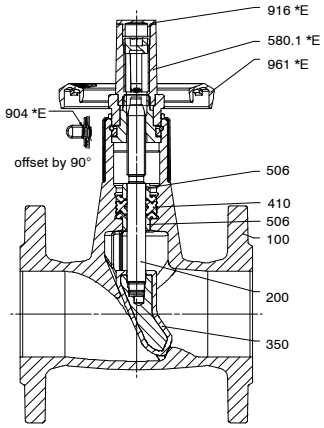
5.2 Drawings / Documentation

Shut-off valves with elastomer stem seal, maintenance-free

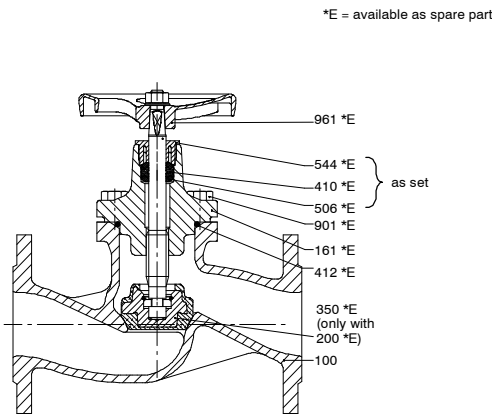
Type	DN	PN	Material	Type series booklet No.
BOA-SuperCompact	20/25-200	6/10/16	EN-JL 1040	7113.1
BOA-Compact	15-200	6, 16	EN-JL 1040	7112.1
BOA-Compact EKB	15-200	10/16	EN-JL 1040	7112.11
BOA-W	15-200	6, 16	EN-JL 1040	7111.1



BOA-SuperCompact



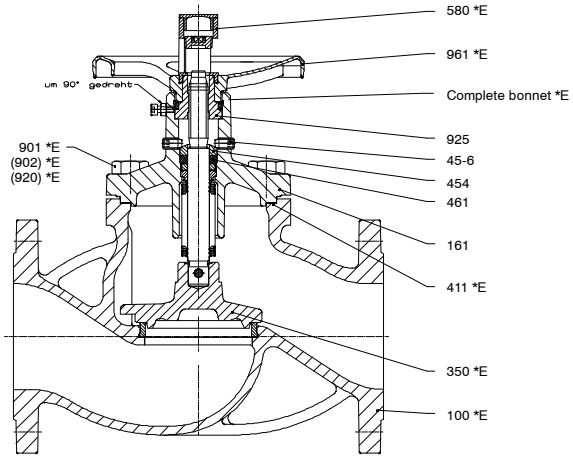
BOA-Compact



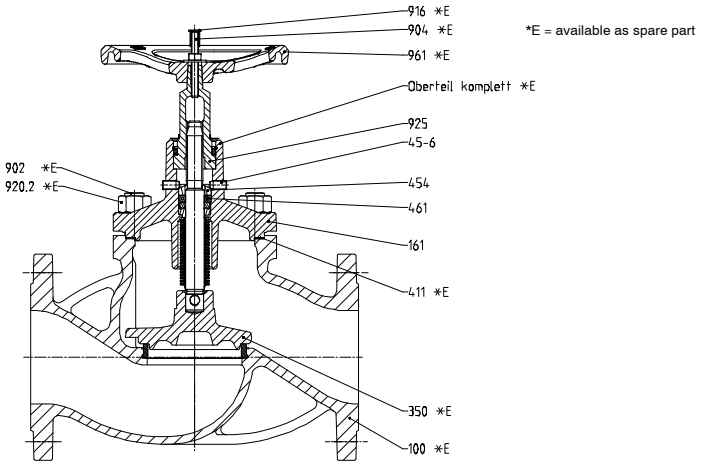
BOA-W

Bellows-type shut-off valves, maintenance-free

Type	DN	PN	Material number	Type series booklet No.
BOA-H	15-300	16	EN-JL 1040	7150.1
	15-350	16	EN-JS 1025	
	15-150	25	EN-JS 1025	



BOA-H (PN 16), JL 1040

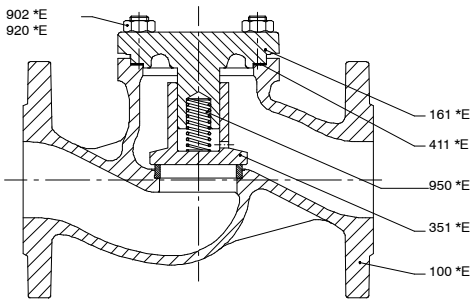


BOA-H (PN 16/25), JS 1025

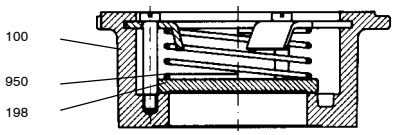
Non-return valves

Type	DN	PN	Material number	Type series booklet No.
BOA-RVK	15-200	6	CuZn39Pb3	7119.1
	15-100	6/10/16		
	15-200	6/10/16	JL 1040	
BOA-R	15-200	6	JL 1040	7117.1
	15-300	16		
	15-350	16	JS 1025	7117.1

*E = available as spare part



BOA-R

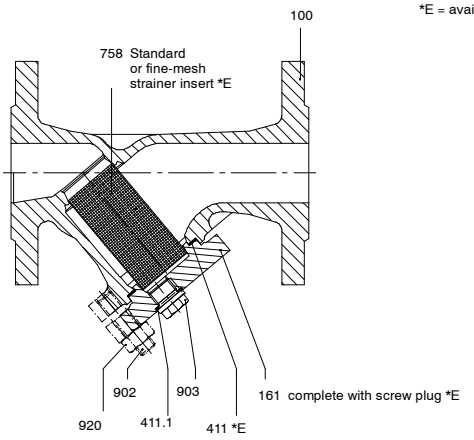


BOA-RVK

Strainers

Type	DN	PN	Material number	Type series booklet No.
BOA-S	15-200	6	JL 1040	7125.1
	15-300	16	JS 1025	
	15-200	16, 25	JS 1025	7125.1

*E = available as spare part



BOA-S

5.3 List of components

Part No.	Description
100	Body
161	Body bonnet / cover
198	Disc
200	Stem
350	Valve disc
351	Check disc
410	Profile joint
411	Joint ring
411.1	Joint ring
454	Stuffing box ring
45-6	Stuffing box screw
461	Packing
506	Retaining ring
580	Cap
758	Strainer insert
901	Hex. head bolt
902	Stud
903	Screw plug
904	Grub screw
920	Hex. nut
925	Stem nut
932	Circlip
950	Spring
961	Handwheel

5.4 Function

Shut-off valves

BOA-SuperCompact, BOA-Compact, BOA-Compact EKB

Shut-off valve types BOA-SuperCompact, BOA-Compact and BOA-Compact EKB have single-piece bodies (100) without separate bonnets (161). The valves are provided with an elastomer stem seal. The functional unit basically consists of the valve disc (350) and the stem (200); the actuating element is a handwheel (961). The stem (200) passage is sealed by a profile ring (412). The stem seal is maintenance-free and does not require re-tightening.

BOA-H

The valves of the BOA-H series consist of the pressure-retaining parts, i. e. body (100) and bonnet (161), the functional unit, i.e. stem and valve disc, and the actuating element (handwheel). Body (100) and bonnet (161) are connected by means of hex. head bolts (901) and hex. nuts (920) (for EN-JL1040) or by means of studs (902) (for EN-JS1025) and sealed towards the outside by a joint ring (411).

The functional unit of the bellows-type valve with back-up gland packing basically consists of the valve disc (350), the stem (200) and the bellows (442); the actuating element is a handwheel (961). The back-up gland packing (461) is tightened by means of 2 stuffing box screws (45-6) at the stuffing box ring (454).

When delivered ex factory, the back-up gland packing is not fully tightened. In the event of a bellows failure, the stuffing box screws (back-up gland packing) must be tightened in order to avoid fluid leakage (cf. Section 3, Safety).

The bellows-type stem seal is maintenance-free.

As a standard, the contact faces of body seat (100) and/or valve disc (350) are made of rust-proof materials or PTFE rings (variant with PTFE disc).

BOA-W

BOA-W shut-off valves consist of a body (100) and bonnet (161). Body (100) and bonnet (161) are connected by hex. head bolts (901), and sealed towards the outside by means of an O-ring (412).

The functional unit basically consists of the valve disc (350) and the stem (200); the actuating element is a handwheel (961). The stem (200) passage is sealed by a profile ring (410).

The stem seal is maintenance-free and does not require re-tightening.

Non-return valves

BOA-R

Non-return valves are spring-loaded check valves which close automatically if fluid flow is reversed.

The valves of the BOA-R series consist of the pressure-retaining parts, i. e. body (100) and cover (161) and the functional unit, i.e. disc with spring. In BOA-R valves, the check disc (351) is guided in or by the body cover (161). The position of the check disc (351) is determined both by the flow conditions and by the spring (950) (standard feature).

BOA-RVK

Non-return valves are spring-loaded check valves which close automatically if fluid flow is reversed.

The valves of the BOA-RVK series consist of a pressure-retaining single-piece body (100) and body cover (161) and the functional unit, i.e. plate with spring. In BOA-RVK valves, the disc (198) is guided in the body (100). The position of the plate (198) is determined both by the flow conditions and by the spring (950) (standard feature).

Strainers

BOA-S

The valves of the BOA-S series consist of the pressure-retaining parts, i. e. body (100) and body cover (161) and strainer insert (758). Actuating elements are not required on this valve type and therefore not supplied.

The body (100) and cover (161) are connected by studs (902) and nuts (920), and the joint is sealed off by the joint ring (411). The strainer insert (standard or fine-mesh) (758) is clamped in the body neck and catches dirt particles depending on the mesh size (see type series booklet).

The strainer requires regular maintenance (cleaning the strainer insert).

6 Installation

6.1 General

Responsibility for positioning and installing the valves always lies with the engineering company, construction company or operator/user. Planning and installation errors may impair the reliable function of the valves and pose a substantial safety hazard. For this reason it is particularly important to observe the following:

Caution The piping must be laid such that detrimental thrust and torsional forces are kept away from the valve body (100) during installation and operation to avoid both leakage and damage to the body.

Caution The caps on the connection ports, if any, shall be removed immediately prior to installation. The mating flange faces must be clean and undamaged.

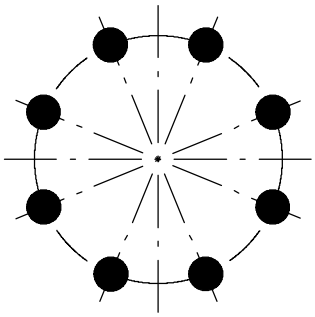
Caution When carrying out welding work near soft-seated valves, make sure that the valve is not heated up beyond the temperature limit specified in the type series booklet, to prevent damage to the seat/disc interface.

The gaskets on the flange faces must be properly centered.

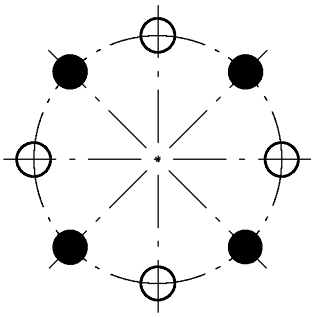
Only fasteners (for ex. to DIN EN 1515-4) and flange gaskets (for ex. to DIN EN 1514) made of materials suitable for the respective valve size may be used. For the flange connection between valve and pipe use all flange bolt holes provided.

For information on the size and the number of connecting elements between piping and valve, refer to the respective type series booklet and/or the KSB "Flange calculator" (Ref. No. 0570.3).

Caution When using steel flanges to DIN EN 1092-1 in conjunction with cast iron valves with flanges machined to DIN EN 1092-2, make sure that for nominal size DN 65 in PN 16 the mating flanges are fitted offset by 22.5° to prevent an oblique position of the valve. This procedure is required by the difference in the number of bolt holes: DIN EN 1092-1 specifies 8 holes for steel, whereas DIN EN 1092-2 specifies only 4 holes for cast iron.



DN 65 PN 16: (Steel/steel) DIN EN 1092-1 with DIN EN 1092-1, Bolts through 8 holes



DN 65 PN 16: (Steel/cast iron) DIN EN 1092-1 with DIN EN 1092-2, Bolt hole circle to DIN EN 1092-1 turned through 22.5°, bolts through 4 holes, 4 holes free

When **BOA-SuperCompact, BOA-Compact, BOA-Compact EKB and BOA-H** are installed outdoors, sufficient weather protection must be provided to prevent corrosion and other damage from penetrating moisture.

When painting pipes or equipment, do not apply paint to the stem (200) and plastic components (valve function will be impaired).

If construction work is still in progress, the valves must be protected against dust, sand and building material (cover with suitable material).

Neither the valve nor its actuating elements (e.g. handwheel, actuator, bonnet) must be subjected to excessive loads (e.g. used as footholds).

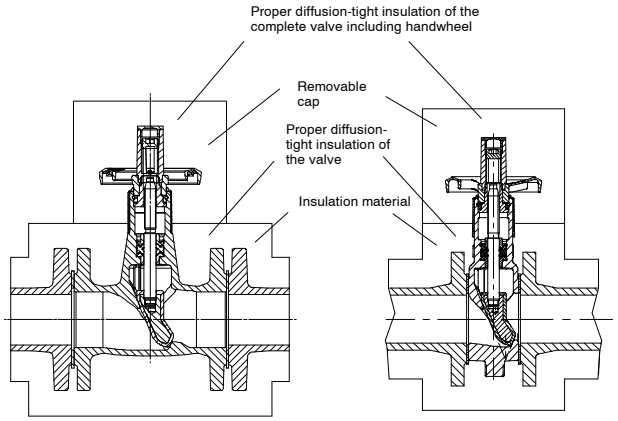
Caution Valves with bodies (100) made of cast iron JL1040 (body is marked JL1040 – or GG-25 on older bodies) must not be subjected to any sudden impacts (using tools, for example) on either body and bonnet / cover (161) as they could be destroyed.

For safety reasons, valves and piping systems operated at high (> 50°C) or low (< 0°C) temperatures must be insulated, or a warning sign must point out the risk of personal injury involved when touching the hot or cold components.

Caution If there is a risk of condensation water or ice formation, for example in air-conditioning, cooling and refrigerating systems, it is important to ensure that the complete valve including handwheel, if required, is provided with a proper diffusion-tight insulation. The formation of ice introduces the risk of valve actuator blocking. See sketch.

With reference to the EnEV (Energieeinsparverordnung) we recommend to isolate those valves that are used for warm or hot medium flow, for the save of energy. The lifetime of plastic coated valves (BOA-Compact EKB) will be extended if the valves are isolated.

Proper diffusion-tight insulation (schematic)



6.2 Fields of application / Operating data / Installation instructions

The valves are installed such that the flow direction of the fluid handled corresponds to the direction shown by the arrow cast on the valve body. General information on the individual valve series, fields of application, permissible operating data, installation instructions and piping connections are given below.

The following maximum operating pressures must not be exceeded; refer to Section 3.8 as well as to the identical information in the respective type series booklets.

Max. permissible operating pressure in bar (static load)

Valve types BOA-SuperCompact, BOA-Compact, BOA-Compact EKB [1]), BOA-W

in material **EN-GJL-250 (JL 1040),** data as per DIN EN 1092-2

PN	-10 to 120 °C
6, 10, 16	16.0

[1]) up to +80 °C

Valve types BOA-H, BOA-R, BOA-S

in material **EN-GJL-250 (JL 1040),** data as per DIN EN 1092-2

PN	-10 to 120 °C	150 °C	180 °C	200 °C	230 °C	250 °C	300 °C
6	6.0	5.4	5.0	4.8	4.4	4.2	3.6
10	10.0	9.0	8.4	8.0	7.4	7.0	6.0
16	16.0	14.4	13.4	12.8	11.8	11.2	9.6

Valve types BOA-H, BOA-R, BOA-S

in material **EN-GJS-400-18-LT (JS1025),** data as per DIN EN 1092-2

PN	-10 to 120 °C	150 °C	200 °C	250 °C	300 °C	350 °C
16	16.0	15.5	14.7	13.9	12.8	11.2
25	25.0	24.3	23.0	21.8	20.0	17.5

Valve type BOA-RVK

in material **CuZn39Pb3**

PN	50 °C	80 °C	100 °C	120 °C	250 °C
6	6.0	4.0	2.0	-	-
6/10/16	16.0	16.0	16.0	16.0	13.0

Valve type BOA-RVK

in material **EN-GJL-250 (JL1040)** product-specific data (DN 125 to 200)

PN	50 °C	80 °C	100 °C	120 °C	250 °C
6/10/16	16.0	16.0	16.0	16.0	11.2

The below data is an excerpt of the type series booklets:

BOA-SuperCompact

Applications

Hot-water heating systems up to 120 °C
Air-conditioning systems
Not suitable for fluids containing mineral oils, steam or fluids liable to attack EPDM and cast iron (JL1040).

Operating data

Temperature range: -10 to +120 °C (continuous)
Pressure range: up to Δp = 6, 10 and 16 bar

Installation instructions

Flow through BOA-SuperCompact shut-off valves should be in the direction of the embossed arrow on the valve body.

An alternating direction of flow is permissible, however.

Mating dimensions - Standards

Face-to-face lengths:	DN length Nom. size = Face-to-face length (DN20/25 to DN150) DN 200 Face-to-face length as per EN 558-1/14
Design:	suitable for installation between flanges to DIN EN 1092-2 DN 200 Flanges to DIN EN 1092-2 Flange type 21
Flange facing:	DIN EN 1092-2, type B

BOA-Compact

Applications

Hot-water heating systems up to 120 °C
Air-conditioning systems
Not suitable for fluids containing mineral oils, steam or fluids liable to attack EPDM and cast iron (JL1040).

Operating data

Temperature range: -10 to +120 °C (continuous)
Pressure range: up to Δp = 6 and 16 bar

Installation instructions

Flow through BOA-Compact shut-off valves should be in the direction of the embossed arrow on the valve body.

An alternating direction of flow is permissible, however.

Mating dimensions - Standards

Face-to-face lengths:	EN 558-1/14, ISO 5752/14
Flanges	DIN EN 1092-2, flange type 21
Flange facing:	DIN EN 1092-2, type B

BOA-Compact EKB

Applications

Water supply systems, drinking water
Air-conditioning systems
Cooling circuits
Not suitable for fluids containing mineral oils, steam or fluids liable to attack EPDM and cast iron (JL1040).
For installation in copper pipelines the installation instructions given below must be complied with.
Not suitable for steam or fluids liable to attack EPDM and the electrostatic plastic coating (EKB).

Operating data

Temperature range:	-10 to +80 °C
Pressure range:	up to Δp = 10 bar (DVGW version, German Association of the Gas and Water Sector) up to Δp = 16 bar

Installation instructions

Flow through BOA-Compact EKB shut-off valves should be in the direction of the embossed arrow on the valve body.
An alternating direction of flow is permissible, however.

When the valve is installed in copper pipes, fabric-reinforced rubber gaskets (sealing elements to DIN EN 1514) must be fitted between the valves flanges and the pipe flanges, and insulating bushes with centering collar made of polyamide (e.g. Korrex insulating bushes, available from fastener suppliers) must be fitted between the bolts and bolt holes (to avoid metal-to-metal contact between the valve and the pipe if the coating should be damaged). Sealing elements and insulating bushes must be ordered from specialist suppliers.

Mating dimensions - Standards

Face-to-face lengths:	EN 558-1/14, ISO 5752/14
Flanges:	DIN EN 1092-2, flange type 21
Flange facing:	DIN EN 1092-2, type B

BOA-W

Applications

Hot-water heating systems up to 120 °C
Air-conditioning systems
Not suitable for fluids containing mineral oils, steam or fluids liable to attack EPDM and cast iron (EN-JL1040).

Operating data

Temperature range: -10 to +120 °C.
Pressure range: up to Δp = 6 and 16 bar

Installation instructions

Flow through BOA-W shut-off valves should be in the direction of the embossed arrow on the valve body. An alternating direction of flow is permissible. For DN 200 valves, however, alternating flow is only permitted up to a differential pressure of 12 bar. For higher differential pressures BOA-H shut-off valves with pilot plug (see type series booklet 7150.1) shall be used.

Mating dimensions - Standards

Face-to-face lengths:	EN 558-1/1, ISO 5752/1
Flanges:	DIN EN 1092-2, flange type 21
Flange facing:	DIN EN 1092-2, type B

BOA-H

Applications

Hot-water heating systems
High-temperature hot water heating systems
Heat transfer systems
Pressure vessel equipment to AD 2000 [1)]
[1)] The limits given in the technical codes shall be complied with.

Operating data

Temperature range:	-10 to + 300 °C for JL1040 -10 to + 350 °C for JS1025
Pressure range:	up to Δp = 16 bar JL1040 (DN15-300) and JS1025 (DN15-350) up to Δp = 25 bar JS1025 (DN 15-150)

Installation instructions

Flow through BOA-H shut-off valves should be in the direction of the embossed arrow on the valve body. An alternating direction of flow is permissible for valves with standard disc, but not for valves fitted with pilot plug. If the following differential pressures are exceeded on BOA-H valves with standard discs from DN 200 upwards, a pilot plug design is required.

	DN	150	200	250	300/350
PN 16	Δp bar	-	12	9	6
PN 25		21 *)			

*) No pilot plug.

The pilot plug only takes effect if the pressure to be sealed off lies above the valve disc. Therefore, flow through valves with pilot plug must be reversed (flow-indicating arrow is reversed).

The valves should not be installed with the stem (200) pointing downwards to prevent dirt deposits between the folds of the bellows (442) which might cause valve failure. In steam service, the valve must not be installed with the stem (200) pointing downwards (risk of steam hammer due to condensate collecting in the valve neck). Shut-off valves must be installed in the line so that the fluid enters the valve beneath the valve disc (350) and flows out above the valve disc. However, they can also be installed in lines with alternating flow. If the valves are to be used for throttling applications, a throttling valvedisc (standard variant DN 50-100) must be used. In valves with pilot plug, the flow direction must correspond to the direction indicated by the arrow on the valve. Valves with pilot plug must always be installed so that the pressure to be sealed off lies above the plug. If in doubt please contact a KSB sales office.

Mating dimensions - Standards

Flanges:	DIN EN 1092-2, flange type 21
Flange facing:	DIN EN 1092-2, type B
Face-to-face lengths:	
Straight-way pattern	EN 558-1/1, ISO 5752/1
Angle pattern	EN 558-1/8, ISO 5752/8

For temperatures > 200 °C and uninsulated valves please use the valve variant with high-temperature resistant paint.

BOA-R

Applications

Hot-water heating systems
High-temperature hot water heating systems
Heat transfer systems

Operating data

Temperature range:	-10 to + 300 °C JL1040
	-10 to +350 °C for JS1025
Pressure range:	Straight-way pattern: up to Δp = 6 or 16 bar
	Angle pattern: up to Δp = 16 bar

Installation instructions

The flow direction must correspond to the arrow indicated on the valve body. A minimum pressure is required for opening. If this minimum pressure is not reached, the spring can be dismantled. Without spring, the valve shall only be installed in upright position in horizontal pipes.

Minimum opening pressures (mbar)

DN	15-50	65-150	200-350
with spring	250	200	150
without spring	25	16	22

To ensure proper operation, non-return valves must always be installed in such a way that the fluid enters the valve beneath the check disc (351). When equipped with a spring (950), they can be used in both pipes with upward flow and pipes with downward flow. Non-return valves without spring (950) shall only be installed in horizontal position with the cover (161) pointing upwards in horizontal pipes (cf. notes in Section 6.2 BOA®-R).

Mating dimensions - Standards

Flanges:	DIN EN 1092-2, flange type 21
Flange facing:	DIN EN 1092-2, type B
Face-to-face lengths:	
Straight-way pattern:	EN 558-1/1, ISO 5752/1
Angle pattern:	EN 558-1/8, ISO 5752/8

BOA-RVK

Applications

Industrial and heating systems
Liquids, gases and steams
Hot-water heating systems
High-temperature hot water heating systems
Heat transfer systems
Any limits given in the technical codes shall be complied with.
Not suitable for fluids aggressive toward the valve materials.

Operating data

Temperature range:	PN 6: -30 *) to 100 °C
	PN 6/10/16: -30 *) to 250 °C
	*) for DN 125-200 (JL-1040) down to -10 °C
Pressure range:	up to Δp = 6 or 16 bar

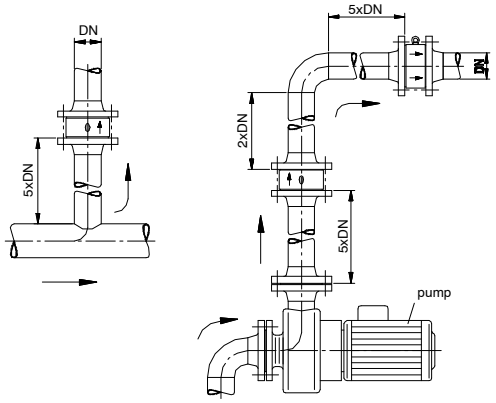
Opening pressures (pö)
depending on flow direction

DN	$p_{ö}$ in mbar			
	↔	↓	↑	↑ without spring
15	20	16	24	4
20	20	16	24	4
25	20	16	24	4
32	20	16	24	4
40	20	15.5	24.5	4.5
50	20	15	25	5
65	20	14.5	25.5	5.5
80	20	13.5	26.5	6.5
100	20	13.5	26.5	6.5
125	20		34	14
150	20		33	13
200	20		32	12

Installation instructions

The flow direction of the fluid must correspond to the direction shown by the arrow on the valve body.

Minimum upstream stabilisation distances



The following straight minimum upstream stabilisation distances free from any source of potential interference must be provided irrespective of the installation position:

- At least 5x DN between BOA-RVK and single source of interference such as 90° bends, branches or open shut-off valves.
- At least 5x DN between BOA-RVK and turbulence-producing elements such as pumps or control valves
- At least 2x DN downstream of BOA-RVK

Valves of the BOA-RVK series are clamped between the two mating flanges of the pipeline and centered by the flange bolting. A minimum pressure is required for opening BOA-RVK valves. If this minimum pressure is not reached, the spring (950) can be dismantled. Valves without spring shall only be installed in vertical pipes with upward flow.

Mating dimensions - Standards

Face-to-face lengths:	EN 558-1/49
Can be installed between flanges	DIN EN 1092-1 PN 6-16,
to:	DIN EN 1092-2 PN 6-16,
:	ANSI B 16.1 25/125,
:	BS 4504 PN 6-16

BOA-S

Applications

Hot and high-temperature hot water, steam, fluids containing mineral oils and organic heat transfer media in systems or system components without special technical codes
Hot water heating systems
High-temperature hot water heating systems
Heat transfer systems

Operating data

Temperature range: -10 to +300 °C for JL1040
-10 to +350 °C for JS1025
Pressure range: up to Δp = 6, 16 or 25 bar

Installation instructions

Compliance with the flow direction arrow is of paramount importance. If the strainer is installed incorrectly – with fluid flow opposite to the directional arrow – its function will be impaired. In both horizontal and vertical pipes, we recommend to install the strainer with the strainer insert hanging downwards to facilitate cleaning. Compliance with the directional arrow is important.

⚠ Strainers shall always be installed in such a way that the fluid flows through the strainer insert from the inside towards the outside (cage effect of the strainer insert). In horizontal pipes, the strainer insert is normally located below the pipe axis.

Note: To ensure an optimum (i.e. high) Kv value, make sure when replacing the strainer insert that the new insert is not installed with the weld seam pointing towards the strainer outlet port.

Mating dimensions - Standards

Face-to-face lengths: EN 558-1/1 ISO 5752/1
Flanges: DIN EN 1092-2, flange type 21
Flange facing: DIN EN 1092-2, type B

7 Operation / commissioning, start-up / shutdown

(Please also refer to Section 6, Installation)

7.1 Operation / commissiong / start-up

General

Prior to commissioning / start-up compare the material, pressure and temperature data on the valves with the operating conditions of the piping to check the material's chemical resistance and stability under load.

⚠ Any surge pressures (waterhammer) must not exceed the max. permissible pressure (see pressure / temperature ratings in Section 6.2). Safety measures are required to be taken. Venting the valve by undoing the bonnet / cover bolting or removing the gland packing is dangerous and therefore not permitted.

It is generally not allowed to use lamellar graphite cast iron (JL1040) in systems where surge pressures might develop, since this material does not withstand pressure surges and, therefore, the valves may be damaged or destroyed. In such cases valves made of nodular cast iron (JS1025) or steel shall be used.

In new systems and particularly after repair, the complete piping must be thoroughly flushed with the valves fully opened so that particles and / or welding beads that might damage the seat/disc interface are removed.

Valve actuation

Viewed from above, the valve is closed with a clockwise turn of the handwheel, and opened with a counter clockwise turn. Direction symbols are found on the top of the handwheel.

Caution As the valve can be damaged by applying excessive forces, it is not allowed to use additional levers to move the handwheels of nom. valve sizes up to and including DN 125. This is of particular importantance for soft-seated valves types (BOA-Compact, BOA-SuperCompact, BOA-Compact EKB, BOA-W) but also applies to metal-seated valves (BOA-H). On all nominal sizes greater than DN 125, suitable additional levers may be used up to the following torque limits:

BOA-Compact, BOA-SuperCompact, BOA-Compact EKB

DN	150	200
M_t [Nm]	120	140
Hex. head WAF	36	65

BOA-H

DN	150	200	250	300	350
M_t [Nm]	120	200	200	200	200
Hex. head WAF	36	46	46	46	46

The above values do not apply in the event of foreign matter or fluid deposits in the seat/disc interface.

Shut-off valves are normally used in such a way that they are either fully open or fully closed.

For control duties, variants with throttling plug should be fitted, unless throttling plugs are installed as a standard feature (e.g. BOA-SuperCompact, BOA-Compact, BOA-Compact EKB).

Caution Performing throttling operations without a throttling plug or V-port plug may result in an excessive noise level, excessive wear or even destruction of the valve by cavitation.

Functional test

The following functions must be checked:

Check the shut-off function of the installed valve prior to commissioning / start-up by opening and closing it several times.

The bonnet / cover bolting (902/920 or 901) on BOA-H, BOA-R, BOA-W and BOA-S with the joint ring (411) or O-ring (412) shall be checked for tightness after the first loading or heating up of the valves (also applies to maintenance-free valves!). If required, the bonnet bolting (902/920 or 901) must be gradually re-tightened cross-wise and evenly in a clockwise direction (see Section 8.4).

Caution Before tightening the bonnet bolting open the valve by approximately two full turns of the handwheel to avoid stress or distortion.

Re-tightening the bonnet / cover bolting is particularly important for valves installed in heat transfer systems (see Section 8.4).

Valves with actuator

For valves with (electric / pneumatic) actuators please refer to the separate operating manual supplied.

7.2 Shutdown

In the event of prolonged shutdowns, fluids handled which change their physical condition due to changes in concentration, polymerisation, crystallisation, solidification, etc. must be drained from the piping system. If required, flush the piping with the valves fully opened.

8 Servicing / maintenance

8.1 Safety instructions

Repair and maintenance work must only be performed by skilled, properly trained personnel.

It is imperative that the below safety instructions and the general information on safety as per Section 3, "Safety", be observed for all servicing and maintenance work to be performed.

Caution Always use suitable original spare parts and tools - even if sudden emergencies arise - to ensure proper functioning of the valve.

Valve dismantling

Before removing the complete valve from the pipeline or before repair or maintenance work to the valve itself, i.e.

- before undoing the flange bolting between valve and pipe,
- before undoing the bonnet bolting (902/920 or 901),
- before undoing the stuffing box screw (45-6) at the stuffing box ring (454),
- if the bellows is defective or there is fluid leakage in this area,
- before removing any drain, opening or vent plugs,

⚠ valve pressure must be released and the valve must be allowed to cool down such that the temperature is below the fluid's vaporisation temperature in all areas in contact with the fluid in order to effectively prevent any risk of scalding. Before removing the valve from the piping, make sure that the pipe has been released for repair / maintenance work.

⚠ **Never open a valve under pressure (danger to life!)**

If toxic or easily inflammable fluids were handled, or fluids whose residues may cause corrosion in conjunction with humidity, drain the valve and flush or vent it.

If required, wear safety clothing and a protective mask!

Depending on the installation position, fluid residues may be left in the valve; these must be collected and properly disposed of.

Prior to any transport, flush and drain the valve thoroughly.

For any queries please contact the nearest KSB sales branch.

Removing actuators

If actuators powered by an external source of energy (electric, pneumatic, hydraulic) need to be removed from the valves or dismantled, the energy supply must be shut down prior to starting any work and the instructions in Sections 3, 8.1 and the operating manual of the actuator must be observed.

Actuators with integrated spring mechanism cannot be dismantled.

Caution Pre-loaded springs!

For any queries please contact the nearest KSB sales branch.

8.2 Maintenance

All valve components have been designed to be largely maintenance-free. The materials of the moving parts have been selected for minimum wear. To ensure operating reliability and to reduce repair costs, all valves should however be checked regularly, i. e. they should be actuated (opened / closed) at least once or twice a year, in particular those valves which are rarely used or difficult to access.

The operator / user is responsible for fixing appropriate inspection and servicing intervals as required by the service conditions of the valves.

The service life of valves, no matter whether they require maintenance or not, can be prolonged by:

- Lubricating the moving parts such as stem (200) and stem nut (925) using standardized lubricants to DIN 51825.
- Replacing the bonnet / cover sealing element (411/412) by a new one in due time.

The safety instructions in Sections 3, 8.1 and the instructions in Section 9 must be complied with.

8.3 Testing overhauled valves

After re-assembly (using original spare parts) and prior to commissioning / start-up, the overhauled valves must be subjected to shell / pressure and leak tests (BOA-S only shell test) to DIN EN 12266-1.

8.4 (Re-)Tightening the bonnet/cover bolting

Provided all safety instructions set forth in Sections 3 and 8.1 are complied with, it is possible and permitted to replace the bonnets or bonnet gaskets of BOA-H and BOA-W valves, or clean the strainer insert and replace the cover gasket of the BOA-S strainer.

Any work at the bonnet-body joint shall be performed by authorised and qualified personnel only (see Section 3.6).

All safety measures and precautions must be adhered to without fail.

Always prevent any fluids from escaping as this would pose an additional hazard (see Section 8.1).

After maintenance or repair work has been completed, all bolting in the bonnet/cover area must be re-tightened so as to restore full functionality of the valve.

The bolts must not be re-tightened with the valves in fully closed position, however, but two full handwheel turns short of the closed position (see Section 7.1).

Always comply with the tightening torques indicated for the individual type series in the table below when tightening or re-tightening the bonnet/cover bolting. The materials of the individual valves must also be taken into account.

The tightening torques must not be exceeded. The table shows the maximum torques [Nm].

Excessive tightening may damage or break components and must, therefore, be avoided.

If components should break, immediately take all measures required to minimise or prevent any hazard.

Make sure to tighten the bonnet/cover bolting evenly (tighten bolts crosswise, do not tighten the individual bolts to maximum torque at once).

Bolt tightening torques by type series (Nm)

			Nominal sizes														
Type series	**Nominal pressure**	**Material**	**15**	**20**	**25**	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**
BOA-H	PN 16	JL 1040	20	20	20	30	30	30	80	80	150	150	150	150	260	260	-
	PN 16	JS 1025	20	20	20	35	35	35	90	90	170	170	170	170	290	290	290
	PN 25	JS 1025	20	20	20	35	35	35	90	90	170	170	170	-	-	-	-
BOA-R	PN 6	JL 1040	20	20	20	30	30	30	80	80	150	150	150	150	260	260	-
	PN 16	JL 1040	20	20	20	30	30	30	80	80	150	150	150	150	260	260	-
	PN 16	JS 1025	20	20	20	35	35	35	90	90	170	170	170	170	290	290	-
BOA-W	PN 6	JL 1040	10	10	20	20	30	30	30	80	80	80	80	80	-	-	-
	PN 16	JL 1040	10	10	20	20	30	30	30	80	80	150	150	150	-	-	-
BOA-S	PN 6	JL 1040	10	10	20	20	20	20	30	30	30	30	30	80	-	-	-
	PN 16	JL 1040	20	20	20	20	30	30	80	80	80	80	80	80	150	150	-
	PN 16	JS 1025	20	20	20	20	35	35	90	90	170	170	170	170	290	290	-
	PN 25	JS 1025	20	20	20	20	35	35	90	90	90	90	90	90	-	-	-

Bolt tightening torques by thread size (Nm)

	Body material / Bolt material	
Thread size	**JL 1040 5.6 / 8.8**	**JS 1025 CE35E / 1.7709**
M 8	10	-
M 10	20	20
M 12	30	35
M 16	80	90
M 20	150	170
M 24	260	290

9 Trouble-shooting

9.1 General

KSB valves are robust in design. Nevertheless, malfunctions e.g. caused by maloperation, lack of maintenance or improper use cannot be ruled out completely.

All repair and maintenance work shall be performed by skilled, properly trained personnel using suitable tools and original spare parts. We recommend to have this work performed by our service personnel.

The safety instructions in Sections 3 and 8 must be complied with.

9.2 Faults / malfunctions > Remedies

• **Leakage at the seat/disc interface**

Valve types BOA-SuperCompact, BOA-Compact, BOA-Compact EKB:

> Rework not possible, replace valve.

Valve types BOA-H, BOA-R:

> The seat/disc contact faces on the body and valve disc can be reworked using a suitable reseating tool after the bonnet bolting (902/920/901) has been undone. Re-grind the seat/disc contact faces until they are consistently smooth and even (continuous ground surface).

Valve types BOA-H (variant: PFTE disc), BOA-W:

> Replace the sealing ring at the valve disc (350) (BOA-H) or the complete valve disc – in combination with stem as spare part only – (BOA-W) after having removed the bonnet bolting (902/920 or 901). 901).

• **Leakage at bonnet / body joint**

Valve types BOA-H, BOA-R, BOA-S and BOA-W:

> Re-tighten the bonnet / cover bolting (902/920 or 901). Observe the tightening torques given in Section 8.4.

> Fit new joint ring (411) or O-ring (412) after having removed the bonnet / cover bolting (902/920 or 901). Clean the sealing surfaces carefully before inserting a new joint ring or O-ring. Observe the tightening torques given in Section 8.4.

Caution Do not use additional sealing agents for non-asbestos joint rings. With anti-adhesive coatings, only use agents explicitly recommended by the sealing element manufacturer.

For any queries please contact the nearest KSB sales branch.

Hoisting the valve for installation into horizontal pipeline (Examples)

Fig. 1, 2
Straps 1 and 2 must be tied around the valve body. To hold the valve in the position shown below and to avoid tilting, both straps should be routed to the lifting hook between the handwheel arms.
Fig. 3, 4
Straps 1 and 2 must be tied around the valve body. The third strap serves to keep the valve in horizontal position.

Valves must not be lifted using the handwheel.

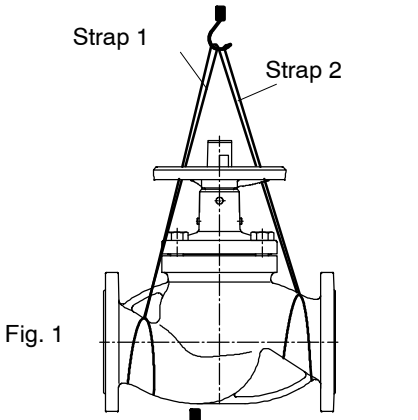


Fig. 1

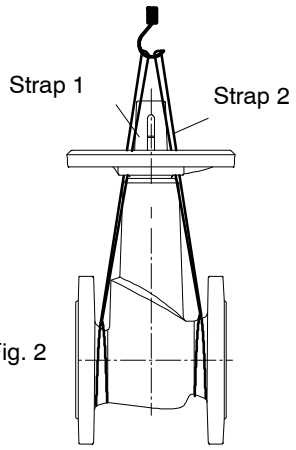


Fig. 2

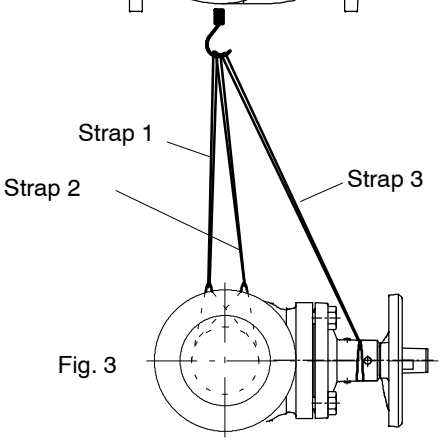


Fig. 3

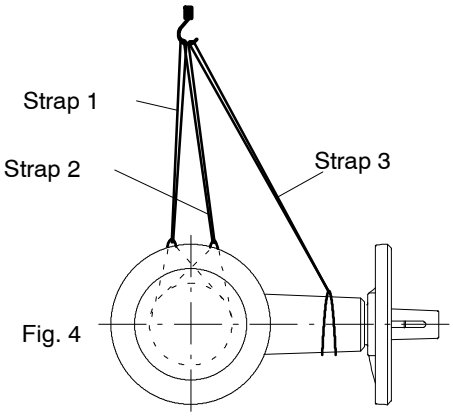


Fig. 4

Hoisting the valve for installation into vertical pipeline (Examples)

Fig. 5, 6
Straps 1 and 2 must be tied around the valve body. The third strap serves to keep the valve in horizontal position.

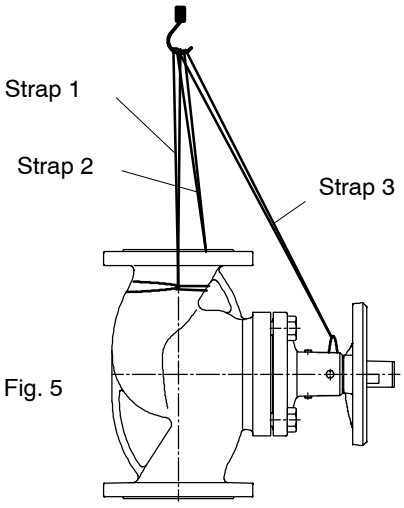


Fig. 5

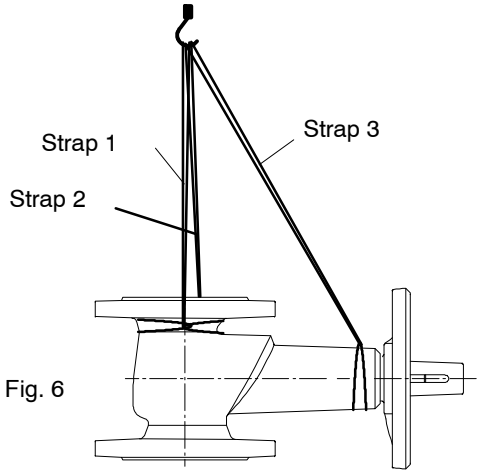


Fig. 6

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