



Shut-off Valves
BOACHEM® ZXA-ZYA
BOACHEM® ZXAB-ZYAB

Non-return Valves
BOACHEM® - RXA

Strainers
BOACHEM® - FSA

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Declaration of conformity

The Company:

**KSB Italy S.p.A.
Via M. D'Azeglio, 32
20049 Concorezzo MI
Italy**

Declare that the products are in accordance with the requirements of the European Pressure Equipment Directive 97/23/EC applying the standards of Module H of this directive.

Description of the valve types:

Valves

BOACHEM [®] ZXAB	PN 10-40
BOACHEM [®] ZYAB	PN 10-40
BOACHEM [®] ZXA	PN 10-40
BOACHEM [®] ZYA	PN 10-40
BOACHEM [®] FSA	PN 10-40
BOACHEM [®] RXA	PN 10-40

Reference standards:

**EN – DIN – BS – ISO -- Design
API 598 -- Testing of Valves / Strainers
DIN -- Material**

Types of fluid:

Fluid groups 1 and 2

In accordance with:

Module H

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

**TÜV Industrie Service GMBH
TÜV Sud Gruppe
Dudenstr. 28
D-68167 Mannheim**

Identification number of notified body:

0036

Certificate number:

DG-0036-QS-425-05

The valves having $DN \leq 25$ comply with Directive 97/23/EC Article 3/3 should not be equipped by any marking.

Michele Piccolo
Quality Assurance

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

Declaration for the purpose of EC Directive 94/9/EC dated 23 March 1994 /ATEX)

Herewith, we declare the valves of the series:

BOACHEM®

Without electric or pneumatic actuators, as described in the relevant type series booklets, do not have their own potential source of ignition and are thus not covered by article 1 of the EC Directive 94/9/EC. Components such as electric or pneumatic actuators as well as limit switches are, as a rule, covered by scope of the Directive described in Article 1, 94/9/EC, and shall be subjected to a conformity assessment procedure. Evidence of conformity must be furnished (for ex. EC declaration of conformity).

Applied harmonized standards and EC Directives

EN 13463-1, EN 13463-5, EN 1127-1

EC Directive 97/23/EC

Michele Piccolo
Quality Assurance

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

2 General instructions

These operating instructions apply to all KSB shut-off valves, non-return valves and strainers as described in section 5, unless reference is made to other operating manuals in individual cases.

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.

The design, manufacture and testing of KSB valves are subject to a QM system to DIN EN ISO 9001 as well as the European Pressure Equipment Directive 97/23/EC. Compliance with these requirements, however, is based on normal, static loading, e.g.

- flow velocities typical of the fluid handled
- typical temperature gradients

Such measures may, for example, influence

- material selection
- wall thickness
- seal selection
- protection of valve areas prone to wear
- prevention of excessive pressures and temperatures
- special designs for control operation, etc.

Valves exposed to creep-rupture conditions have a limited service life and have to meet the applicable regulations stipulated in the technical codes. In case of corrosive or erosive action or something else that could thin the thickness of the valves wall, they must be substituted so to avoid the risk of leakage or structural failure.

Caution

The valves must not be operated outside the permissible operating range. The limits are indicated on the name plate or currently applicable type series booklet. The pressure-temperature ratings, in particular, must not be exceeded. Operation of the valves outside the above-mentioned 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.

For actuated valves, 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 qualified personnel.

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 your nearest KSB sales office.

For any queries and repeat orders, in particular for purchasing spare parts, please specify the type series / variant details, the order 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).

3 Safety

These operating instructions contain fundamental information which must be complied with during installation, operation and maintenance.

Not only must the general safety instructions laid down in this chapter on "Safety" be complied with, but also the safety instructions outlined under specific headings.

3.1 Marking of instructions in the manual

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 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 Non-compliance with safety instructions

Non-compliance with safety instructions can jeopardize the safety of personnel, the environment and the valve itself. 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

3.3 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.

3.4 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.

Guards which are fitted to prevent accidental contact with moving parts (e.g. coupling) must not be removed whilst the unit is operating.

KSB recommends that leakages (e.g. at the stem seal) of hazardous fluids (e.g. explosive, toxic, hot) 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).

3.5 Safety instructions for maintenance, inspection and installation work

The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by qualified personnel.

As a rule, 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 vaporization temperature limit in all areas in contact with the fluid.

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

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.

3.6 Unauthorized modification and manufacture of spare parts

Modifications or alterations of the valve supplied are only permitted after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.

3.7 Unauthorized 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 must not be exceeded under any circumstances.

4 Transport and storage

The valves are delivered ready for operation, the obturator is in 'closed' position and the line connection ports are closed with suitable material (caps, plugs, covers).

4.1 Transport

Suitable precautions shall be taken to prevent damage during transport.

Caution

The valves must never be suspended by the handwheel or by the actuator, if any.

For transporting large valves, ropes shall be attached to the yoke arms or to the cover flange.

Valves with actuators shall be transported by means of ropes attached to the connection ports and yoke arms, taking into account the centre of gravity.

Use any lifting lugs provided.

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

After delivery and prior to installation, check the valve for potential damage acquired in transit.

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. The following requirements must be met:

- Storage is performed with the valve in the closed position (to protect the seat / disc contact faces against damage),
- Measures are taken to protect the valves against dirt, humidity, frost and corrosion (e.g. by using foils or caps; indoor storage).

5 Description / Related documents

5.1 Marking

The valves are marked in accordance with the Pressure Equipment Directive 97/23/EC and the pertinent standards on valve types/design, as well as TRD 110 (German Steam Boiler Regulations) and TRB 801 No. 45 (German Pressure Vessel Regulations).

Marking includes as a minimum:

- manufacturer
- year of construction
- type or order no.
- DN
- PN or max. permissible pressure/temperature
- material

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

Class	PN	DN										
		≥25	32	40	50	65	80	100	125	150	≥200	
150	10											
	16											
≥300	25	CE	CE									
	>40											

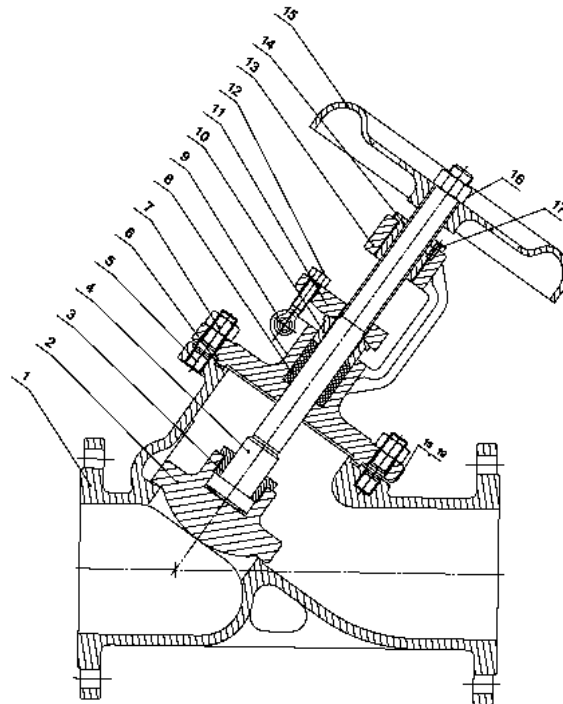
5.2 Drawings / documentation

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.

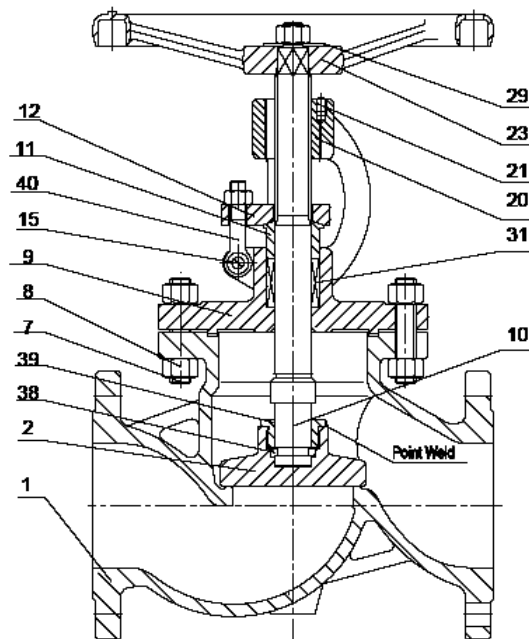
5.2.1 Shut-off valves with gland packing

Type	DN	PN	Material	Type series booklet No.
Boachem® ZYA	15-200	10/40	1.4408	623083/1-10
Boachem® ZXA	15-300	10/40	1.4408	623082/1-10

Sectional drawings (shut-off valves with gland packing)



BOACHEM® ZYA

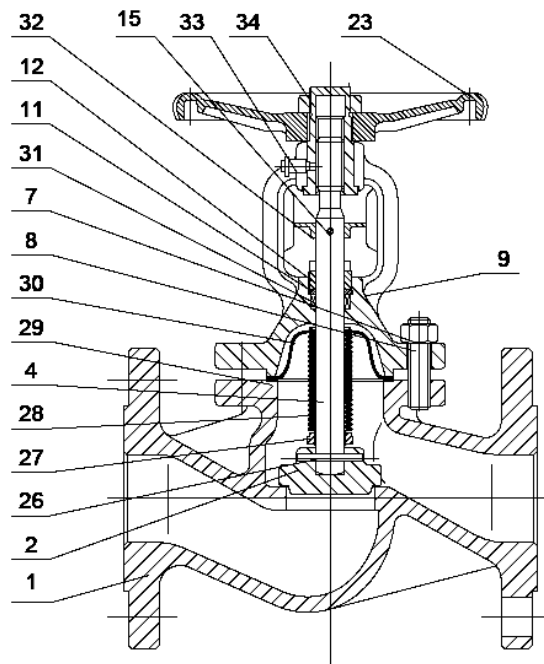


BOACHEM® ZXA

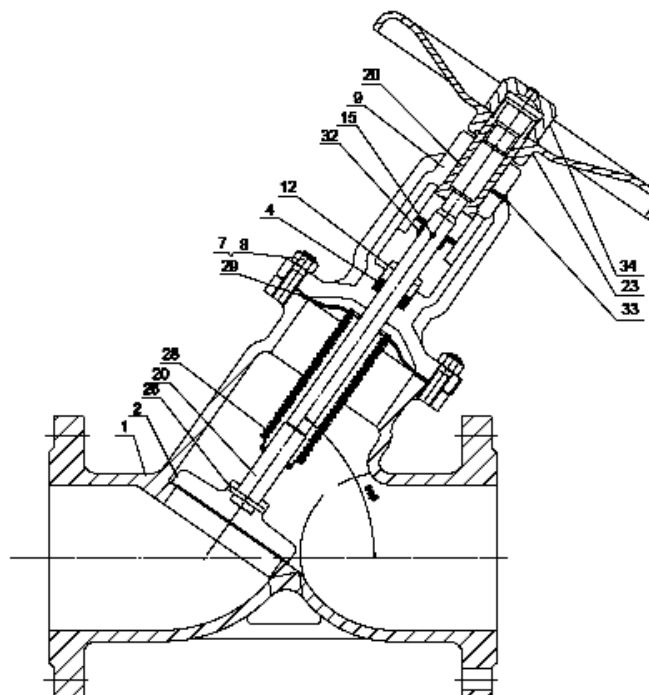
5.2.2 Shut-off valves with bellows

Type	DN	PN	Material	Type series booklet No.
Boachem® ZYAB	15-200	10/40	1.4408	623081/1-10
Boachem® ZXAB	15-200	10/40	1.4408	623080/5-10

Sectional drawings (shut-off valves with bellows)



BOACHEM® ZXAB

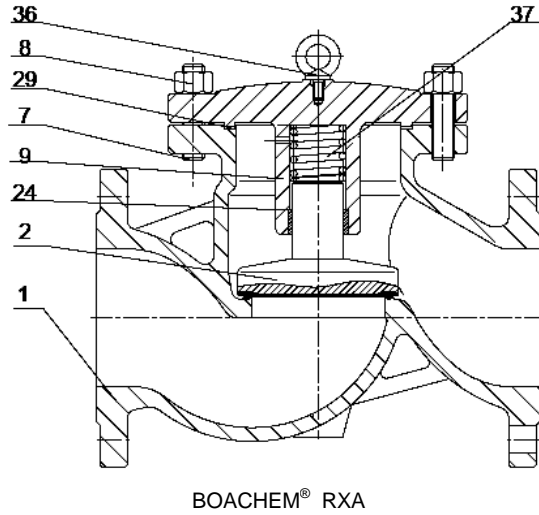


BOACHEM® ZYAB

5.2.4 Non-return valves

Type	DN	PN	Material	Type series booklet No.
Boachem® RXA	15-300	10/40	1.4408	623084/1-10

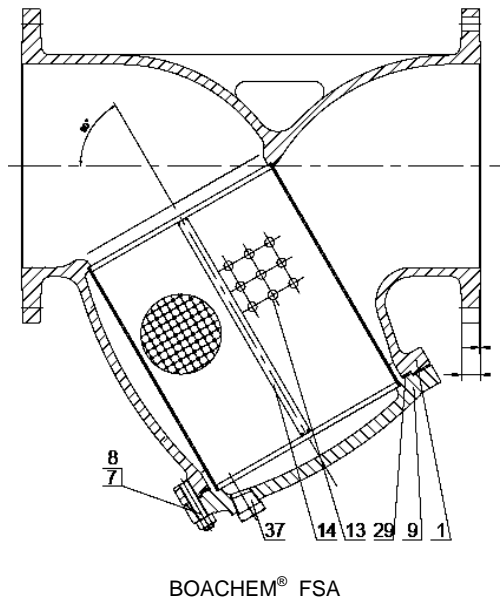
Sectional drawings (non-return valves)



5.2.5 Strainers

Type	DN	PN	Material	Type series booklet No.
Boachem® FSA	15-400	10/40	1.4408	623085/1-10

Sectional drawing (strainer)



5.3 List of components

Part No.	Description
1	Body
2	Disc
3	Sleve
4	Stem
5	Leader Board
6	Spiral Wound Gasket
7	Bolt
8	Nut
9	Bonnet
10	Stem Packing
11	Gland
12	Gland Flange
13	Filter
14	Framework
15	Pin
16	Yoke
17	Orientation Block
18	Inner Hexed Angle Bolt
19	Bearing
20	Stem Nut
21	Screw
22	Lock Nut
23	Handwheel
24	Bearing Gland
25	Grease Nipple
26	Taper Pin
27	Welded Ring
28	Bellow
29	Gasket
30	Bowl Board
31	Packing
32	Stop Plate
33	Nipple
34	Screwed Sleeve
35	Plug
36	Lifting Eye
37	Spring
38	Half Ring
39	Disc Cape
40	Eye Bolt

On shut-off valves with bellows and back-up gland, the trim mainly consists of the valve disc (2), stem (4), and bellows (28); the actuating element is a handwheel (23) or actuator.

The passage of the stem (4) in the yoke (16) or bonnet (9) is sealed off by the bellows (28) in accordance with the German clean air regulations. The back-up gland packing (31) is tightened by means of two nuts (8) at the gland cover.

The bellows-type stem seal is maintenance-free.

The contact faces of body (1) and/or valve disc (2) are made of rust-proof materials.

5.4.2 Non-return valves

Non-return valves are check valves which close automatically if fluid flow is reversed. Non-return valves with separate cover consist of the pressure-retaining components of body (1) and cover (9), as well as the functional unit.

The body (1) and cover (9) are connected by studs (7) and nuts (8), and the joint is sealed off by the joint ring (29).

The high-pressure non-return valve RGS is in pressure seal design. It is sealed by the bonnet (9), joint ring (29) and segmental ring (9). The joint ring is pre-loaded via the nuts (8).

The check valve disc (2) is guided in the cover (9) or bonnet (9). The position of the check valve disc (2) is determined both by the flow conditions and by the spring (37), if any.

5.4.3 Strainers

Strainers feature the same pressure-retaining components and sealing design as non-return valves with separate cover (9)

The strainer insert (13) is clamped between the body seat and the cover, where it removes particles from the flow, depending on the mesh size selected.

5.4 Function

5.4.1 Shut-off valves with bolted bonnet

The valves consist of the pressure-retaining parts, i.e. body (1) and yoke (16) or bonnet (9), and the functional unit.

The body (1) and yoke (16) or bonnet (9) are connected by nuts (8), and the joint is sealed off by the joint ring.

On shut-off valves with gland packing, the trim mainly consists of the valve disc (2), stem (4) or throttling disc stem (2); the actuating element is a handwheel (23) or actuator.

The stem (4) passage in the yoke (16) is sealed by the gland packing (10), which is tightened by means of two nuts (8) at the gland cover.

The contact faces of body (1) and/or valve disc (2) are made of rust-proof materials.

6 Installation


6.1 General

As a rule, the engineering contractor, construction company or operator/user are responsible for the positioning and installation of the valves.


Planning and installation errors may impair the reliable function of the valves and pose a substantial safety hazard. Compliance with the following requirements is of particular importance:

Caution The piping must be laid such that detrimental thrust and torsional forces are kept away from the valve body (1) during installation and operation to avoid both leakage and damage to the body.


Caution The caps on the connection ports shall be removed immediately prior to installation.

 When painting the pipelines and valves, do not apply paint to the bolts, stems 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).

Do not use valve handwheels as footholds.

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

Valves with external moving elements must be fitted with protective covers, or other suitable measures must be taken to prevent accidents.

 Valves used as dead-end valves in a pipeline should be protected against unauthorized or unintentional opening, to prevent damage to property and/or personal injury.

6.2 Installation position

The valve bodies are marked with an arrow indicating flow direction, if necessary. The valves must be installed such that the flow direction of the fluid corresponds to the direction shown by the arrow cast on the valve body. If no directional arrow is cast on the valve body, the valve can be installed in any position.

6.2.1 Shut-off valves

Shut-off valves can be installed in any position. However, the best installation position is with the stem pointing vertically upwards. Valves with bellows should not be installed with the stem pointing downwards, if possible, to prevent dirt deposits between the folds of the bellows.

Shut-off valves must be installed in the line so as to ensure that the fluid enters the valve beneath the disc and flows out above the disc. However, they can also be installed in lines with alternating flow. If the valves are to be used for throttling applications, a throttling valve disc must be used. For flow incidence on throttling valve discs please refer to the respective type series booklets. If in doubt, please contact the KSB factory.

6.2.2 Non-return valves

To ensure proper operation, non-return valves must always be installed in such a way that the fluid enters the valve beneath the check valve disc (2). When equipped with a spring (37), they can be used in both pipes with upward flow and pipes with downward flow.

Non-return valves without closing spring (37) shall only be installed in horizontal position with the cover pointing upwards in horizontal pipes.

6.2.3 Strainers

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).

We recommend to fit shut-off valves in the pipeline on both sides of the strainer, so that the strainer can be replaced or cleaned without having to drain the entire system. Strainers shall be installed with sufficient clearance for removing the strainer insert. 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 essential. On strainers with magnetic insert we recommend to remove the entire cover to clean the magnet.

Please note: When replacing the strainer insert make sure that the weld of the insert is not located in the strainer outlet port, so as to attain an optimum (high) Kv value.

6.2.4 Special designs

Valves with separate throttling valve disc shall always be installed in such a way that the pressure to be sealed off lies beneath the disc, to ensure a reliable throttling effect.

For higher differential pressures integral throttling valve disc-stem connections are required. In such cases we recommend to install the

Valves so that the pressure lies above the disc.

If you have questions concerning optimum valve selection or permissible differential pressures for valves with throttling discs, please contact the valve manufacturer.

Drainage, vent or manual start-up pipes are normally fitted with valve combinations consisting of a shut-off valve (pressure beneath the disc)

and a throttling valve (integral throttling disc—stem connection, pressure above the disc).


Valves with pilot plug are always installed so that the pressure to be sealed off lies above the plug.

If the valves are to be used as dead-end valves, double shut-off should be ensured for safety reasons.

6.3 Installation instructions

6.3.1 Flanged valves

The mating flange faces must be clean and undamaged.

 The gaskets on the mating flanges must be properly centered. Only fasteners and sealing elements made of approved

materials shall be used. For the flange connection between valve and pipe use all flange bolt holes provided.

Use suitable tools to tighten the bolts evenly and crosswise at the permissible torques.

6.3.2 Welding instructions

Responsibility for welding the valves into the piping and for any heat treatment required lies with the respective contractor or the plant operator.

Caution When welding valves with butt or socket weld ends into the piping or when performing welding jobs on a

pipeline after the valves have been installed (pipeline installation) make sure that no contamination enters the valve body and stays there, to prevent damage to the seat/disc interface or stem guiding elements.

Caution When welding the valve into the pipeline, take special precautions e.g. welding in several steps, so that the

temperature rise in the middle of the valve body does not exceed the max. permissible operating temperature. The valve must be in 'open' position during welding.

Caution The welding cable (opposite pole) must not be attached to functional valve elements, to prevent scorching.

On valves with socket weld ends, the insertion depth given in the applicable technical code must be complied with. A gap between the pipe end and the socket base will prevent impermissible stresses in the weld.

6.4 Valves with actuator

Valves with transmission gear and/or actuators must be installed with the stem in vertical position, if possible. If this requirement cannot be met, adequately support the actuator on site or consult the manufacturer.



Electrical connection shall be effected by suitably trained personnel only. Only Boachem® ZXAB and Boachem® ZYAB can be supplied with the electric or pneumatic actuator.

6.5 Insulation

If the valve is to be insulated, make sure that the insulation does not impair the function of the valve. KSB recommends to make sure that the sealing areas at the cover joints and at the stem passage (gland packing) are easily accessible and visible.

7 Commissioning / start-up / shutdown

(Please also refer to section 6 Installation)

7.1 Commissioning / start-up

7.1.1 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.



Surge pressure (water hammer), which might occur, must not exceed the max. permissible pressure. Safety measures are required to be taken.

In new systems and particularly after repair, the complete piping system 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.

If the piping system is cleaned by means of a pickling procedure, responsibility for the compatibility of the pickling media used and the pickling procedure itself lies with the pickling company.

Venting the valve by undoing the bonnet/cover bolting or removing the gland packing is dangerous and therefore not permitted.

To prevent damage to the valve material or joint seals, the usual start-up and shutdown velocities must be adhered to.

7.1.2 Valve actuation

The valves are closed by turning the handwheel in clockwise direction and opened by turning it in counter-clockwise direction (top view direction symbols are found on the top of the handwheel).

Caution

Valves with handwheels may only be actuated by hand. As the valve can be damaged by applying excessive forces, it is not allowed to use additional levers to move the handwheel.

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

For control functions in continuous operation, throttling disc should be fitted.

Caution

Performing throttling operations without a throttling disc may result in an excessive noise level, excessive wear or even destruction of the valve by cavitation.

7.1.3 Functional test

KSB recommends to check the following functions:

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

Check the gland packing for leakage when it is subjected to full operating pressure and temperature for the first time. Re-tighten the nuts (8) at the gland cover eventually, if necessary.

On valves in pressure seal design, the hex. head bolts (7) pre-loading the bonnet (9) and the joint ring must always be tightened under operating conditions such that leakage at the bonnet/cover, which might be caused by the bonnet (9) sinking as a result of low pressure inside the body (1), is avoided.

The bonnet/cover bolting (7) with the joint ring shall be gradually tightened crosswise, evenly and in clockwise direction after the first loading or heating up of the valves and in the event of leakage at the joint ring. For tightening torques please contact the manufacturer, if necessary.

Caution

Open the valve by two full handwheel turns before re-tightening nuts (8), to prevent jamming of the seat.

Re-tightening the nuts (8) of the bonnet/cover bolting is particularly

important for valves installed in heat transfer systems to DIN 4754.

7.1.4 Valves with actuator

On valves with electric / pneumatic /hydraulic actuators, the strokes / actuating forces must be limited.

Electrical actuators are factory-set ready for operation. They shall be wired as follows:

Globe valve "CLOSE" torque-dependent

Globe valve "OPEN" travel-dependent

The wiring diagrams are given in the terminal boxes.

For pneumatic/hydraulic actuators, the control pressures specified in the order shall be complied with. Non-observance may damage the actuator.

Closing and opening torques or actuating forces shall be enquired from the manufacturer, if necessary.

7.2 Shutdown

In the event of prolonged shutdowns, KSB recommends to drain fluids which change their physical condition due to changes in concentration, polymerization, crystallization, solidification, etc., from the piping. 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 qualified personnel taking into account the relevant health and safety regulations.

It is imperative that the below safety instructions and the general information on safety as per section 2, Safety, be observed for all servicing and maintenance work to be performed.

Caution

Always use suitable spare parts and tools, even in emergencies, to ensure proper functioning of the valves.

8.1.1 Valve dismantling

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

- prior to undoing the flange bolting between valve and pipe
- prior to undoing the cover/yoke or pressure seal bonnet/cover from the body
- prior to removing any drain or vent plugs
- prior to undoing the gland cover to replace packing rings
- prior to removing an actuator bolted directly to the yoke head
- prior to opening the yoke head for maintenance work to the bearing and threaded bush



Valve pressure must be released and the valve must be allowed to cool down such that the temperature is below the fluid's

vaporization temperature in all areas in contact with the fluid in order to effectively prevent any risk of scalding.



Danger of death when opening a valve under pressure!
If toxic or easily inflammable fluids were handled, or fluids whose residues may cause corrosion in conjunction with air 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.

If you have any questions please contact the manufacturer.

8.1.2 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 instruction in sections 3, 8.1.1 and the operating manual of the actuator must be observed.



Actuators with integrated spring mechanism contain pre-loaded springs. They shall only be dismantled with extreme care, using the requisite locking devices.

If you have any questions please contact the manufacturer.

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.

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 can be prolonged by:

- _ actuating the valve (open-close) at least once or twice a year
- _ lubricating the movable parts such as stem (4) and gland bolts (not for oxygen valves) with standardized lubricants to DIN 51825,
- _ adding or changing packing rings in the gland packing (31) in time,
- _ re-tightening or replacing the cover gasket (29) in time.

The safety instructions in sections 3, 8 and the instructions in sections 9 must be complied with.

8.3 Valve reassembly

Valve reassembly shall be effected in reverse order to dismantling.

To maintain functional reliability, new gaskets and gland packings shall be used whenever the valve is reassembled.

After reassembly and prior to commissioning / start-up, the valves shall be subjected to a leak test in accordance with DIN 3230, Part 3.

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 qualified 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 > Remedy

- Leakage at the seat

Possible causes:

- contaminations/solids in the fluid
- erosion, corrosion, abrasion
- excessive loads from pipeline forces or thermal stresses

> Rework the seat / disc contact faces at the valve disc and body using a suitable reseating tool after the valve has been dismantled. The re-seating process of the seat / disc contact faces shall be continued until the contact faces exhibit a uniform bright surface.

- Leakage at the cover gasket

Possible causes:

- gasket has settled as a result of high temperature fluctuations
- impermissible pressure loads
- poor maintenance
- poor gasket resistance to temperature and fluid handled

• Bolted bonnet/cover

> Re-tighten the bonnet/cover bolting (19) - (9)

> Replace the gasket (29)

after having removed the bonnet/cover bolting (9). Clean the sealing surfaces carefully before inserting a new gasket.

- Leakage at the gland packing

Possible causes:

- worn packing material
- poor maintenance
- poor packing resistance to temperature and fluid handled

> Re-tighten the gland packing at the nuts (8) of the gland cover (9). Make sure that the friction forces at the stem do not increase too much.

> Replace the packing rings of the gland packing (31): Undo the nuts (8) and lift off the gland cover (9).

Clean the gland packing chamber carefully before inserting new packing rings. Split packing rings shall be inserted in such a way that the cut edges are offset by 120°-180°.

Caution

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

If you have any questions please contact the manufacturer.