

**ANSI Globe valves with bellows
ECOLINE GLB 150-600**

**2"-12"
Class 150, 300, 600
As per BS 1873**

Point no.	Description	Page no.	Point no.	Description	Page no.
1	Declaration of conformity	2	7	Commissioning/	8
2	General	3		Decommissioning	
3	Safety	3	7.1	Commissioning	8
3.1	Safety symbol of in this operating instructions	3	7.1.1	General	8
3.2	Qualification of personnel & training	4	7.1.2	Operation	8
3.3	Danger or non-observance of the instructions	4	7.1.3	Functional Check	8
3.4	Safety consciousness	4	7.1.4	Actuated valves	8
3.5	Safety instructions for the user/operator	4	7.2	Decommissioning	8
3.6	Safety instructions for maintenance, inspection and installation work	4	8	Maintenance / Repair	8
3.7	Unauthorized modification and manufacturing of spare parts	4	8.1	Safety Instructions	8
3.8	Inadmissible modes of operation	5	8.1.1	Dismantling of valves	9
4	Transport & interim storage	5	8.1.2	Removing Actuators	9
4.1	Transport	5	8.2	Maintenance	9
4.2	Interim storage	5	8.3	Valve Reassembly	9
5	Description / related documents	5	9	Troubleshooting	9
5.1	Marking for CE requirements	5	9.1	General	9
5.2	Design standards / related documents	5	9.2	Faults & Remedies	9
5.3	Sectional drawing & functional principle	5	10	Valve weights	10
6	Installation	7	Annexure I	Do's & Don'ts	11
6.1	General	7			
6.2	Installation position	7			
6.3	Welding instructions / installation of pipe	7			
6.4	Actuated valves	7			

1 EC Declaration of Conformity

Herewith we,

KSB Aktiengesellschaft
Registered Office:
Johann-Klein-Straße 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

Globe and gate valves with bellows
– ECOLINE GLB 150, 300, 600 2" – 12"

Suitable for
Conformity assessment procedure

Fluids in Groups 1 and 2
Module H

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

HPi Verification Services Ltd.
The Manor House, Howbery Park, Wallingford
OX10 8BA, United Kingdom

Identification number of the notified body
Certificate No.

No. 1521
HPi/222-068-Q-01

Reference standards and codes

BS 1873 – Globe Valve
API 598 – Testing of Valves
ASTM – Material

Valves with a nominal pipe size below and including 1 inch fall under Article 3, section 3, of the Pressure Equipment Directive 97/23/EC. They must bear neither the CE-label nor the number of the notified body.

Mr. Gorden Sheng
Head – Quality Management
Date: July 1st, 2014

Mr. Ganesh Devale
Head – Technical Responsible

(this was prepared electrically and is valid without signature)

2 General

These operating instructions apply to KSB – cast steel globe valve with bellows.

Development and production of KSB valves are subject to a QA system according to DIN/ISO 9001.

Correct installation and maintenance or repair will ensure trouble free operation of the valves.

The manufacturer does not assume any liability for these valves if the operating instructions are not being observed.

Caution The valves are marked to ASME B16.34 if required with an arrow indicating the flow direction, Nominal size, Class, material of body, manufacturer.

The valves must not be operated beyond the limits defined in the operating instructions/contractual documentation/type series booklet. Any use beyond the above conditions will lead to overload which the valves cannot withstand.

 Non-observance of this warning may lead to personal injury or property damage, e.g.:

- Injury caused by escaping fluids (cold/hot, toxic or under pressure.)
- Incorrect operation or destruction of the valve.

The descriptions and instructions in this manual refer to the standard versions but also apply to the related variants.

These operating instructions do not consider:

- incidents which may occur during installation, operation and maintenance.
- the local safety regulations. It is the user's responsibility to ensure that they are observed, also by the installation staff involved.

For actuated valves, the specified connection parameters and the installation and maintenance instructions, including the operating manual for the actuator **must** be observed.

Caution Handling a valve requires skilled and experienced personnel.

The personnel in charge of operation, maintenance and installation of this valve must be aware of the interaction between the valve and the plant.

Operator's errors concerning the valve may have serious consequences for the entire plant, e.g.:

- fluid may escape
- downtime of the plant/machine
- adverse effect/reduction/increase of the efficiency/function of a plant/machine.

For further questions or in case of damage to the valve, please contact your KSB Sales Office.

The specifications (operating data) of the valves are listed in the technical documentation & type series booklet of the related valve (see also section 5).

When returning valves to the manufacturer, please refer to section 4.

Attention The manufacturer is not liable for any claims resulting from a failure to implement or implement properly the instructions contained in these operating instructions or resulting from the actions of a third party.

Attention In particular, the manufacturer is not liable for direct or indirect consequential damage that has occurred for whatever reason.

3 Safety

This manual contains basic instructions to be complied with during operation and maintenance. It is therefore vital for the fitter and the operator/user to read this manual before installing/commissioning the valve. Also, this manual must always be available at the site where the valve is installed. It is not enough to observe the general instructions listed in the section "safety", the specific safety instructions listed in the other sections should also be observed.

3.1 Safety symbol of in this operating instructions

Safety instructions put forth in this instruction manual whose non-observance would involve the risk of personal injury are specially marked with the general hazard symbol:



in accordance with DIN 4844 (safety sign W9), or with the electric voltage warning sign:



In accordance with DIN 4844 (safety sign W 8),

Safety instructions whose non-observance would involve hazard to the valve and jeopardize its operation have been marked with the word

Caution

Instructions directly attached to the valve, (e.g. nominal pressure) must be complied with and maintained in a legible condition.

3.2 Qualification of personnel and training



The personnel for operation, maintenance, Inspection and Installation must be adequately qualified for the work involved. The personnel's responsibilities, competence and supervision must be clearly defined by the user. If the personnel in question is not already in possession of the requisite know-how, appropriate training and instructions must be provided. If deemed necessary, the manufacturer/supplier will provide such training and instructions at the user's request. In addition, the user is responsible for ensuring that the contents of these operating instructions are fully understood by the personnel in question.

3.3 Danger or non-observance of the safety Instructions



Non-observance of the safety instructions may lead to personal injury and also to danger for the environment and the valve itself. Non-observance of these safety instructions will also forfeit the user's warranty. Such noncompliance could, for example, result in:

- failure of essential functions of the valve/plant
- failure of prescribed maintenance and repair practices
- hazard to people by electrical, mechanical or chemical effects
- hazard to the environment due to leakage of hazardous substances

3.4 Safety consciousness

The safety instructions contained in this manual, the applicable national accident prevention regulations and any of the user's own applicable internal work, operation or safety instructions must be fully complied with.

3.5 Safety instructions for the user/operator



Any hot or cold parts of the valve (e.g. body or hand wheel) that could pose a hazard must be protected by the user against accidental contact.

Leakage (e.g. at the stem seal) of hazardous substances (e.g. explosive, toxic, hot) must be drained so as to avoid all danger to people or the environment. All relevant laws must be observed.



Electrical hazards must be effectively prevented. (For details, please refer to the VDE standards and/or the local energy supply utility regulations).

3.6 Safety instructions for maintenance, inspection and installation work



The user is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorized, adequately qualified staff who are thoroughly familiar with this instruction manual. All work on a valve may only be performed when the valve is un-pressurized and has cooled down. This means that the temperature of the medium in all the valve's chambers must be lower than the vaporization point of the medium. All work on actuated valves may only be done after the actuator has been disconnected from its energy supply. The procedure described in the operating instructions to shut down the actuator must be observed. Valves in contact with hazardous media must be decontaminated. Immediately following completion of the work, all safety relevant and protective devices must be reinstalled and/or reenabled. Prior to recommissioning, refer to the points listed under section 7, Commissioning.

3.7 Unauthorised modification and manufacturing of spare parts



The equipment shall not be altered or modified in any way prior to consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer will ensure operational safety. The manufacturer cannot be held responsible for damage resulting from the use of non-genuine parts or accessories.

3.8 Inadmissible modes of operation

Operational safety and reliability of the valve supplied is only warranted for its designated use as defined in section 2 “General” of the operating instructions. The limits stated in the technical documentation must not be exceeded under any circumstances.

4 Transport & interim storage

4.1 Transport

The valves in the as-supplied condition are ready for operation.

For transport and storage, the valves must always be maintained in the closed position and the connection ends must be plugged using suitable means (e.g. covers, plastic sheets, etc.) to prevent damage to the seats.

Caution

To prevent damage, do not suspend the valve by its handwheel or the actuator.

For valve weights, please refer to Section 10.

After delivery or prior to installation, the valve should be checked for damage during transit.

4.2 Interim storage

The valves must be stored in such a way that correct operation is assured even after prolonged storage. This comprises:

- Storing in the closed position (to protect the seats from damage).
- Suitable measures against contamination, frost and corrosion (e.g. by using plastic sheets or end covers).

5 Description / Related Documents

The sectional drawings shown as below are examples for the general design of KSB valves. For drawings and other information pertaining to a specific valve series, please refer to the relevant type series booklet.

5.1 Marking - for CE requirements

The valves are marked to PED 97/23/EC

In particular the marking contains at least following

- Manufacturer
- Year of production

- Valves type model or order no.

- NPS (DN) / (Inch)

- Pressure class

Class	<1"	1 ¼"	1 ½"	2"	>2"
	25	32	40	50	>50
150	CE				
>300					

5.2 Design standards/related documents

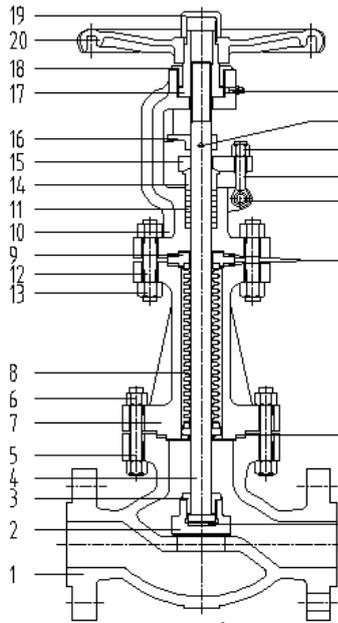
All valves have been designed according to BS 1873, ASME B 16.34 and MSS SP-117. The end flanges for class 150, 300, 600 are designed as per ASME B16.5. The face to face dimensions of class 150, 300, 600 are in accordance with ASME B16.10.

Related documents:

Type	Size	Class	Leaflet No.
ECOLINE GLB 150-600	2" – 12"	150	7366.1
	2" – 12"	300	
	2" – 8"	600	

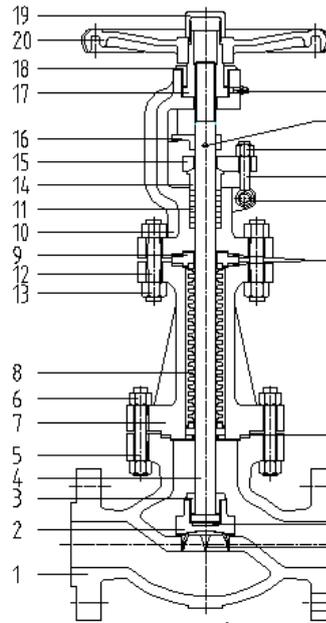
5.3 Sectional drawings and functional principle

The illustration below is merely an example of specific designs of these valves. Order-specific designs are shown in documentation drawings, if applicable.



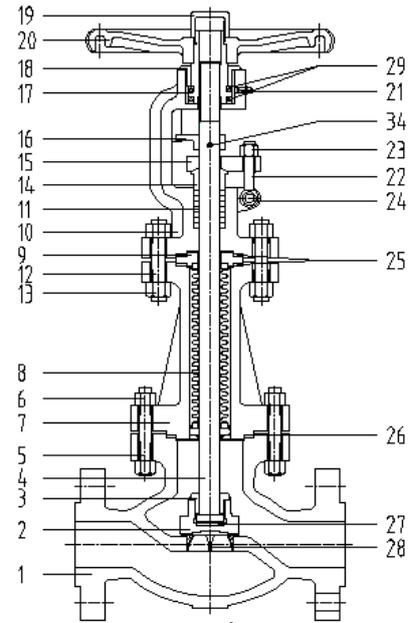
flow direction

class 150: 2" ~ 4"
class 300: 2" ~ 4"
class 600: 2" ~ 3"



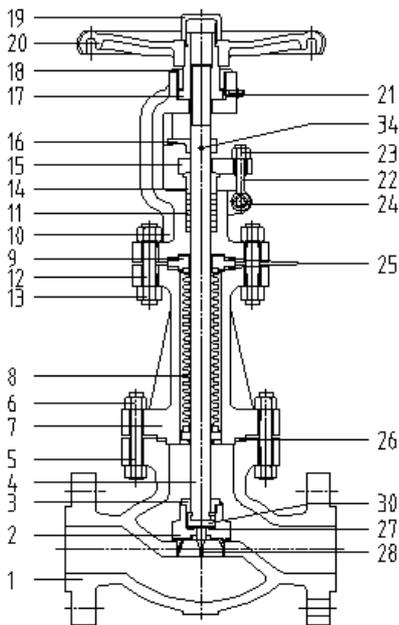
flow direction

class 150: 6"



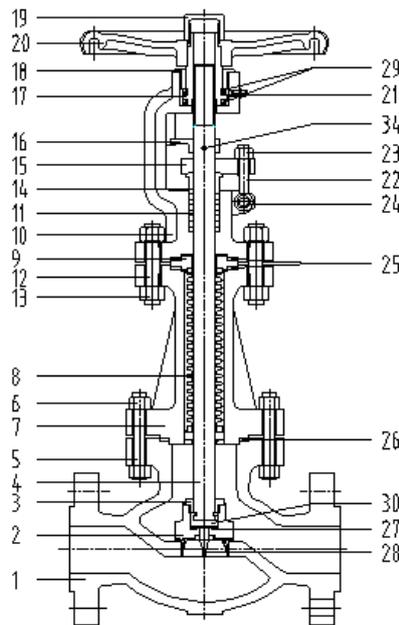
flow direction

class 150: 8"



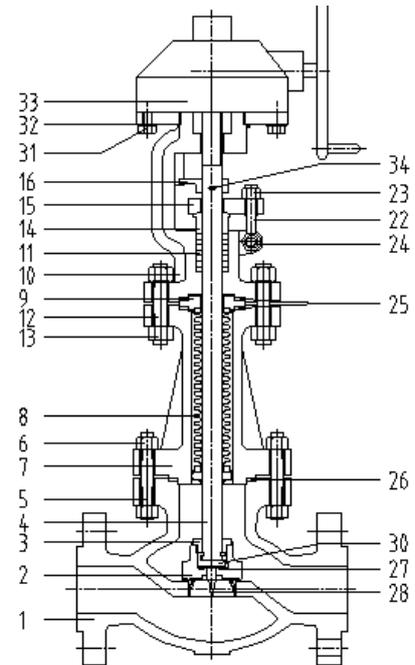
flow direction

class 300: 6"
class 600: 4"



flow direction

class 300: 8"
class 600: 6"



flow direction

class 150: 10" ~ 12"
class 300: 10" ~ 12"
class 600: 8"

Part no.	Name	Part no.	Name
1	Body	9*	End plate
2	Disc	10	Yoke
3	Disc nut	11*	Packing
4*	Stem	12	Yoke-stud
5	Bonnet-stud	13	Yoke-nut
6	Bonnet-nut	14	Gland
7	Bonnet	15	Gland flange
8*	Bellows	16*	Anti-rotating block

17	Stem nut	26*	Bonnet-gasket
18	Yoke retainer	27	Thrust plate
19	Dust-proof nut	28	Disc guiding
20	Handwheel	29	Bearing
21	Grease fitting	30	Pilot disc
22	Eyebolt	31	Bolt
23	Eyebolt nut	32	Washer
24	Pin	33	Gearbox
25*	Yoke-gasket	34*	Pin

Note: components with “*” are spare parts.

The globe valve has been designed according to the following standards and specifications: ASME B16.34, BS 1873 and MSS SP-117.

The globe valve with bellows mainly consists of the pressure-retaining parts, i.e. body (1), bonnet (7) and yoke (10) and the functional unit.

The body (1) and bonnet (7) are connected by stud (5) and nut (6) and sealed by gasket (26).

The bonnet (7) and yoke (10) are connected by stud (12) and nut (13) and sealed by gasket (25).

The trim mainly consists of disc (2), pilot disc (30), stem (4), disc nut (3), thrust plate (27) and bellows assembly (i.e. bellows (8) welded with end plate (9)), the actuating element is a hand wheel (20) or actuator.

The passage of the stem (4) in the bonnet (7) and yoke (10) is sealed by the bellows assembly. The back-up gland packing (11) is tightened by means of eyebolt (22) and eyebolt nut (23) at the gland flange (15). The bellows type stem seal is maintenance free.

The contact faces of body (1) seating (integral with body) and disc (2) and pilot disc (30) are made of rust-proof materials.

The hand wheel (20) is connected to the stem nut (17) by a square or hex head and secured with a dust-proof nut (19).

6 Installation

6.1 General

Caution To avoid leakage, deformation or rupture of the body, the piping should be laid out in such a way that no thrust or bending forces act on valve body when they are installed and operational.

Caution Only remove the covers from the connection ends just before installation. The sealing faces of the flanges must be clean and undamaged.

 The gaskets at the connecting flanges must be precisely entered. Use only joints and gaskets of approved materials. All holes provided in the flanges must be used for the flange connection.

 When painting the pipes, do not apply paint to bolts and stem (200). If construction work is still in progress, the valves must be protected against dust, sand and building material etc. (cover with suitable means). Do not use valve hand-wheels as footholds!

 Valves and pipes used for high (>50°C) or low (<0°C) temperatures must either be fitted with a protective insulation, or there must be warning signs installed showing that it is dangerous to touch these valves.

 If a valve is used as end-valve in a pipe, this valve should be protected against unauthorized or unintentional opening to prevent personal injury or damage to property.

6.2 Installation position

The valve bodies are marked with an arrow indicating the flow direction. Valves should always be installed in such a way that the actual flow direction of the medium matches the arrow on the body.

Flow may pass a globe valve in either direction if not indicated otherwise. When installing a globe valve in a horizontal stem position (e.g. in a vertical pipe) is also possible, in this case, however, the actuator must be supported by some suitable means.

6.3 Welding instructions / installation of pipe

Responsibility for welding the pipes lies with the piping installation contractor.

Caution When welding valves on to the piping or when welding pipes after the valves have been installed, the welder must make sure that no foreign particles, e.g. weld beads, enter the valve body and remain there, because these will cause damage to the valve seats and or the valve stem.

Caution When welding these valves, use adequate precautions, e.g. welding in several steps, to make sure that the temperature in the middle of the body does not rise above 80 °C to 100°C. Globe valves must be in open position during welding to prevent the sealing elements from contacting body sealing surface otherwise the seats may be welded together.

Caution Do not attach the welding cables (opposite pole) to the moveable parts of the valve, otherwise these parts may be scorched.

6.4 Actuated valves

Caution Read the instruction manual of the actuator before installation.



Electrical cables may only be connected by qualified personnel.



The applicable electrical regulations (e.g. VDE), also for equipment in hazardous locations, must be observed.

All electrical equipment such as actuator, switchboard, magnetic valve drive, limit switch etc. must be installed in floodproof dry locations.

Voltage and frequency must match the valves stated on the name plate.

7 Commissioning / Decommissioning

7.1 Commissioning

7.1.1 General

Prior to commissioning the valve, the pressure, temperature and material data stated on the valve should be compared to the actual operating conditions in the piping system to check whether the valve can withstand the loads occurring in the system.



Possible pressure surges (water hammer) must not be exceeded the highest admissible pressure.

Adequate precautions should be taken.

In new pipe systems and especially after repair work, the system should be flushed with the valves fully open to remove solids, e.g. weld beads, which may damage the seats.

7.1.2 Operation

The valves are closed by turning the handwheel in the clockwise direction (top view) and opened in the counter clockwise direction.



Using additional levers when turning the handwheel is not admissible, because excess

force may damage the valve.

7.1.3 Functional Check

The following functions should be checked:

Before commissioning, the shut-off-function of the valves should be checked by repeated opening and closing.

The gland packing (8) should be checked when it is subjected to the full operating pressure and temperature for

the first time. If necessary, retighten the nuts (13) at the gland flange (12) evenly.

The bonnet bolts (7) and the gasket (5) should be checked for tightness after the first temperature rise at the valves. In case of leakage at the gasket (5), the connection should be tightened crosswise, evenly and in a clockwise direction.



Open the valve by one or two turns of the handwheel prior to retightening the bolts (7) to prevent jamming of the seat.

Retightening of the bolts (7) of the cover bolting especially applies to valves used in heat transfer systems to DIN 4754. For tightening torques please contact the manufacturer, if necessary.

7.1.4 Actuated valves

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

Electric actuators should be wired as follows:

Always use suitable spare parts and tools, even in emergencies, because otherwise correct operation of the valves cannot be assured.



Switches are factory set. Do not tamper with settings. To readjust settings refer instruction

manual of actuator manufacturer and / or contact your nearest KSB office.

For setting of actuator, please refer instruction manual which will be kept in the wiring side compartment/cover of actuator.

7.2 Decommissioning

During extended shutdowns periods, liquids liable to change their condition due to polymerization, crystallization, solidification etc. must be drained from the piping system. If necessary, the piping system should be flushed with the valves fully open.

8 Maintenance/Repair

8.1 Safety Instructions

Maintenance and repair work may only be carried out by skilled and qualified personnel.

For all maintenance and repair work, the safety instructions listed below and also the general notes in section 3 must be observed.

Always use suitable spare parts and tools, even in emergencies, because otherwise correct operation of the valves cannot be assured.

8.1.1 Dismantling of valves

Before remove the complete valve from the pipe or before repair or maintenance work on the valve itself, i.e.

- before remove cover or bonnet from the body
- before remove the gland flange and packing gland to replace packing rings
- before removing an actuator bolted directly to the yoke head



The entire valve must be unpressurized and must have cooled down sufficiently so that the temperature of the medium in all the valve's chambers is lower than the vaporization point of the medium, to prevent scalding.



Opening pressurized valves will cause danger to life and limb!

If toxic or highly inflammable substances or liquids whose residues may cause corrosion by interaction with the air humidity were handled by the valve, then the valve should be drained and flushed or vented.

If necessary, wear safety clothing and a face guard/mask. Depending on the installation position, any liquid remaining in the valve may have to be removed.

Prior to possible transport, the valves must be flushed and drained carefully.

If you have any questions, please contact your KSB Sales Office.

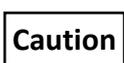
8.1.2 Removing Actuators



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 repair work and the instructions in the sections 3, 8.1.1 and the operating instructions of the actuator must be observed.



Valve actuators with integrated spring-loading feature cannot be removed.



Springs under tension!

If you have any questions, please contact your KSB Sales Office.

8.2 Maintenance

Our valves are largely maintenance free, materials of sliding parts were selected to keep wear to a minimum. To ensure reliable operation and to reduce repair costs, all valves - especially those which are seldom operated or where access is difficult - should be checked periodically.

The user is responsible for defining appropriate intervals for checks and maintenance, depending on the application of the valve.

The service life of non-maintenance-free valves can be extended by:

- lubricating movable parts such as stem and gland bolts (not for oxygen valves) and provided in the case of gate valve using suitable lubricants to DIN 51825 / equivalent
- timely changing of the packing rings
- timely replacing of the bonnet gasket

The safety instructions in sections 3, 8.1 and the notes in section 9 must be observed.

8.3 Valve Reassembly

Valve reassembly shall be effected in reverse order to dismantling.

To maintain functional reliability, new gaskets and gland packing 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 3I, or API 598 and ASME B16.34 Section 8.

9 Troubleshooting

9.1 General

All repair and service work must be carried out by qualified personnel using suitable tools and genuine spare parts. The safety instructions in sections 3 and 8 must be observed.

9.2 Faults & Remedies

Fault - Leakage at the seat

Caution *Remedy* – Re-machine the seat on wedge/disc and body using suitable regrinding equipment after dismantling the valve. Regrinding of body and cone seats should be continued until the seats show a smooth and even ring.

Fault - Leakage at the bonnet and/or yoke gasket

Remedy - Retighten the bonnet/yoke flange connection

Remedy - Replace the gasket after remove the bonnet/yoke stud and nut. Clean the surfaces carefully before inserting a new gasket.

Caution

On asbestos-free gaskets, no additional sealing agents may be used. When using anti

adhesive coatings, use sealing agents explicitly recommended by the manufacturer of the sealing material.

If you have any further questions please contact nearest KSB Sales office.

Fault - Leakage at gland packing

Remedy – dismantling yoke from completed valve, check the condition of bellow assembly, if damaged, replace bellow assembly and stem and then re-assembly valve. If not damaged, go to next two steps.

Remedy - Retighten the stuffing box with the eyebolt nut at the gland flange. Make sure that the friction forces at the stem do not increase too much.

Remedy - Replace the packing rings of the stuffing box; Unscrew the eyebolt nut and lift the gland flange. Clean the stuffing box chamber thoroughly before inserting new packing rings. Split packing rings should be inserted in such a way that the slots are offset by 120° to 180°.



Do not replace packing while the valve is pressurized. The back seat bushing is not intended to maintain a seal during replacement.

Remedy – dismantling the valves and check if bellow assembly and welding area between stem and bellow assembly have defects, after then change good condition parts or fix defects to re-assembly valves and re-test the valve.

Fault – Handwheel and/or disc disfunction on movement

- Stem is bent

Remedy:

- Adjust the indicator
- Adjust packing gland
- Disassemble and repair thread or remove dirty
- Change stem nut
- Adjust stem

Possible causes:

- The indicator is not balance
- The packing gland is oblique
- Stem thread is damaged or attached by dirty
- Thread of stem nut is seriously damaged or broken

10 Valve weights (Kg)

Size	End	150LB	300LB	600LB
2"	RF	23	31	49
2.5"	RF	31	44	65
3"	RF	45	62	80
4"	RF	63	84	134
6"	RF	115	182	310
8"	RF	204	300	620
10"	RF	351	541	-
12"	RF	534	725	-

Annexure I

DO.s

1. Observe the safety instructions.
2. Employ skilled, trained and experienced personnel to handle the valve.
3. Align the pipe correctly in position before mounting a valve on line.
4. Use a correct type of flange gasket.
5. Ensure the correct direction of flow on the valve.
6. Ensure the valve is un-pressurised before any work is carried out.
7. Decontaminate the valves in contact with hazardous fluids, before any work is carried out.
8. Lubricate the valves periodically.
9. Protect the threads with a metal/leather jacket if the working conditions are abrasive.
10. Allow clearance for raising stem type valve to open fully.
11. Flush the valves in fully open condition to remove foreign material like welding flux, spatter, slag, dust etc. to avoid damage of seats.
12. Check shut-off function by repeatedly opening and closing before commissioning.
13. Check the frequency and voltage of actuators to match with the line voltage and frequency.
14. If gasket leak is observed, tighten gasket bolts crosswise evenly in a clock wise direction.
15. After attaining the full operating pressure and temperature, check and if necessary, tighten the gland nut / Body –bonnet nuts.
16. During storage position the valve such that the stem is upright.
17. For globe valve follow the instructions carefully for direction of installation.

DON'Ts

1. Don't expose the valves to dust, sand, building material etc. during storage.
2. Don't use unauthorised spares.
3. Don't remove end protective covers before installation.
4. Don't use valve hand-wheels as foot holds.
5. Don't exceed the limits stated in technical documentation.
6. Don't store the valve in open condition.
7. Don't attempt to dismantle the pressurised valve.
8. Don't use a valve to pull an unsupported and badly aligned pipes into position.
9. Don't use a flat disc globe valve for start-up / vent application.
10. Once the valve is installed and commissioned do not tamper the torque & limit switches in case of valve with electrical actuator.



KSB Aktiengesellschaft

Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0 • Fax +49 6233 86-3476
E-Mail: valves@ksb.com • www.ksb.com