Installation, Operation and Maintenance Manual

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Valve Specialist

ISO 900.1

Certified since July 1990

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2.0	July 95	RUT	RSQ	DG	
2.1	12.04.96	RUT	RSQ	DG	
2.2	31.05.96	RUT	RSQ	DG	added instructions for actuated valves
2.3	06.11.96	RUT	RSQ	DG	added details on bellow valves
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Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

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Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

SECTION 1

DESCRIPTION

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

1 DESCRIPTION

This manual is a guide to all final users of OMB valves, in particular it suggests instructions for a proper installation according safety rules and for a correct operation of the valve itself.
The manual wants to be a support in case of further maintenance.

EXPLANATORY NOTES

Throughout this manual safety sign have been included to communiccate the following messages :

- **DANGER**

Immediate hazards which will result in a severe personal injury or death .

- **WARNING**

Hazards or unsafe practices which could result in severe personal injury or death.

- **CAUTION**

Hazards or unsafe practices which could result in minor personal injury.

- **ATTENTION**

Hazards or unsafe practices which could result in product or property damage .

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SECTION 2

SAFETY NOTICE

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

2 SAFETY NOTICE 

Proper installation, operation and maintenance is essential to the safe and reliable operation of all valves. The procedures described in this manual show effective methods of performing the required activities.

To minimize the risk of personal injury or the possibility of damaging the valve, or render it unsafe, it is important to carefully read this manual and follow the described instruction.
It is also important to note that the "safety messages" are not exhaustive. Due to the broad application of OMB product, OMB can not possibly evaluate all the risk connected to the installation, operation and maintenance of its products.
Should anyone decide to install, operate or maintain OMB products not according to the procedures described in this manual, he must make sure that the procedure will not jeopardize neither personal safety, nor valve safety and that the personnel has the right instruction level to perform the required operations. If not satisfied, contact OMB at the number shown below if there is any question regarding tools or methods.

The installation, operation and maintenance of valves may involve proximity to fluids at extreme high pressure and high temperature. Consequently, every precaution should be taken to prevent injury to personnel during the performance of any procedure.
Due to the various circumstances and conditions, OMB can not possibly evaluate all conditions that might injure personnel or equipment. The safety precautions listed herebelow are for customer information only.

OMB disclaim any responsibility related to the misconduct of installation, operation and maintenance procedures. It is responsibility of the purchaser or user of OMB valves to train all personnel who are to perform such procedures. Prior to working with the valves, personnel should become familiar with this manual and should be made aware of the hazards related to the procedures.

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SECTION 3

SAFETY PRECAUTION

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

3 SAFETY PRECAUTIONS

I. OMB valves are shipped with the packing gland nuts properly tight however ensure that the packing gland nuts are firmly tight before pressurizing a valve.

II. Do not attempt to remove the gland flange nuts while the valve is under pressure.

III. Do not attempt to remove the body-bonnet bolts while the valve is under pressure.

IV. All OMB valves supplied with backseats option are capable of being repacked under pressure. However OMB strongly recommends, due to the inherent dangers involved in working on equipment under pressure, that backseat only be used to prevent the fluid from escaping through the packing chamber.

V. No alteration or modification should be made to any OMB valve, except as sanctioned and/or authorized by OMB.

VI. Extreme care should be taken to ensure that a OMB globe or check valve is installed so that the arrow on the valve body points in the same direction as the normal flow direction of the system.

VII. Never install, or attempt to use, any valve that is not properly identified as to its material and pressure class.

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SECTION 4

DESIGN FEATURES & NOMENCLATURE

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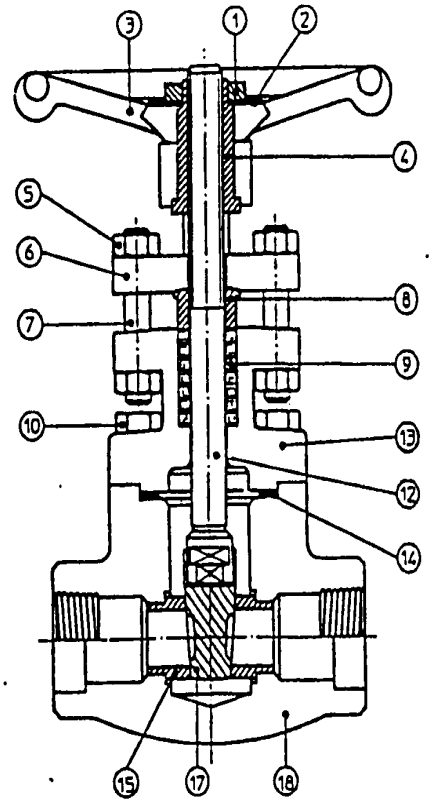
4 DESIGN FEATURES & NOMENCLATURE

GATE VALVES

The main design features and parts of OMB Gate valves are illustrated in the following tables.



1 WHEELNUT
2 NAMEPLATE
3 HANDWHEEL
4 YOKE NUT
5 GLAND NUT
6 GLAND FLANGE
7 GLAND STUD
8 GLAND
9 PACKING
10 BOLTS
12 STEM
13 BONNET
14 GASKET
15 SEAT
17 WEDGE
18 BODY

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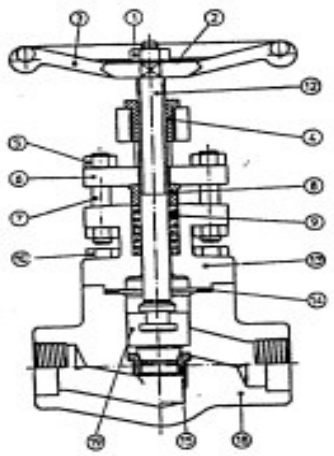
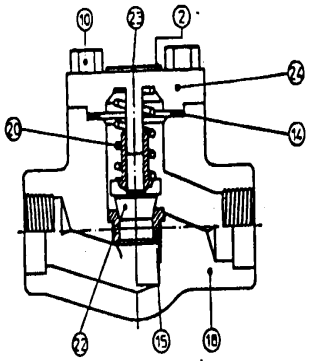
GLOBE AND CHECK VALVES

The principal design features and parts of OMB Globe and check valves are illustrated in the following tables.



1 WHEELNUT
2 NAMEPLATE
3 HANDWHEEL
4 YOKE NUT
5 GLAND NUT
6 GLAND FLANGE
7 GLAND STUD
8 GLAND
9 PACKING
10 BOLTS
12 STEM
13 BONNET
14 GASKET
15 SEAT
18 BODY
19 DISC



2 NAMEPLATE
10 BOLTS
14 GASKET
15 SEAT
18 BODY
20 SPRING
22 PISTON
23 RIVET
24 CAP

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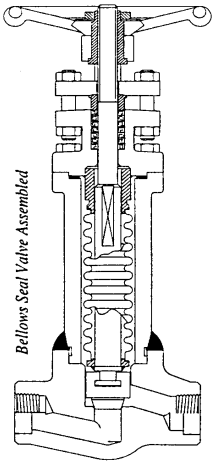
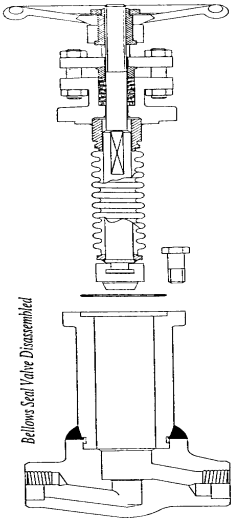
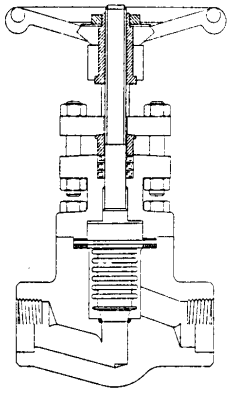
BELLOW SEAL VALVES

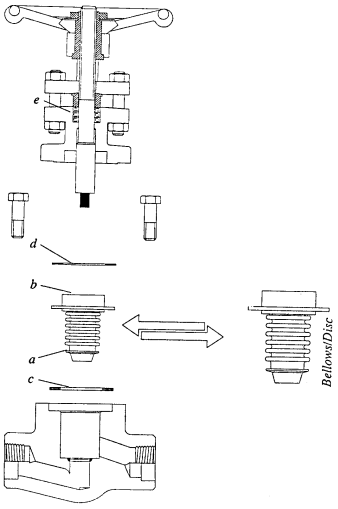
The principal design features and parts of OMB Globe and check valves are illustrated in the following tables.





Bellow Seal Valve





Eco Valve Bolted Bonnet Type

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SECTION 5

HANDLING

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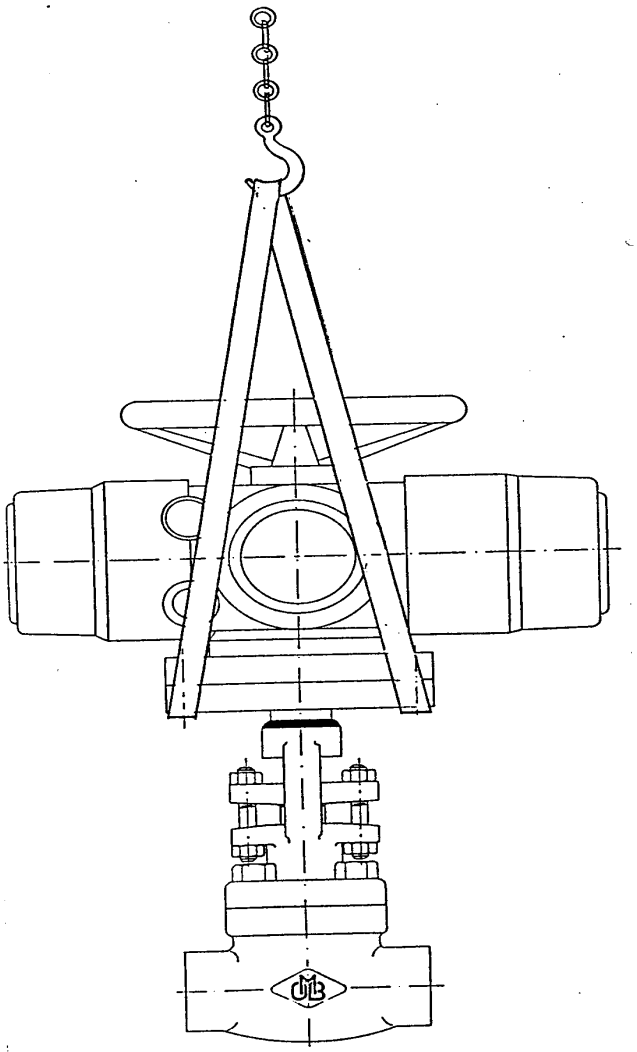
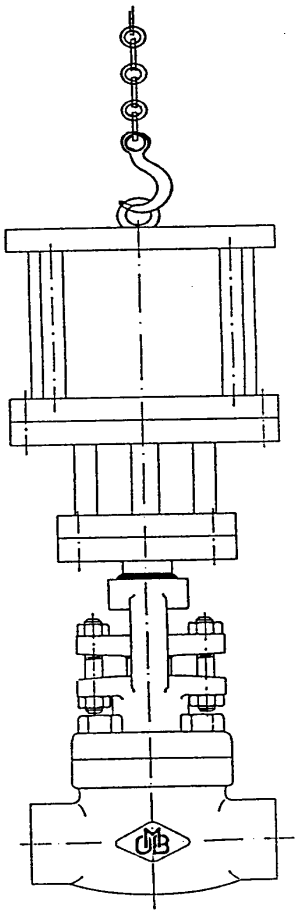
5 HANDLING

OMB valve require no special handling.

Special care for actuated valves, for handling see below mentioned figure.





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SECTION 6

STORAGE

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6 STORAGE

Indoor storage of valves is always recommended. To avoid damage due to humidity, valves should be stored in a humidity controlled storage area and the end caps should not be removed until immediately prior to valve installation.
Long term storage of valves should be done according to OMB's PP019 Procedure (*available on request*).
Special and more stringent procedures apply for handling and storage of the following valves:

A. SV001 Bellows Seal Valves
B. SV002 Hydrogen Service Valves
C. SV003 Oxygen Service Valves
D. SV004 Vacuum Service Valves
E. SV005 Valves with actuator
F. SV006 Chlorine Service Valves
G. SV007 Steam Service Valves

Copies of the above mentioned procedure are available on request.

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SECTION 7

PRE INSTALLATION

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7 PRE-INSTALLATION

Prior to installation the following step should be taken:

1. Remove end caps only when ready for installation.
2. Inspect both ports for obstruction or foreign material.
Clean if necessary.
3. If valves are shipped with gland flanges nuts loose, tighten the nuts before putting the valve in service.

For figures please refer to pages 7 and 8 .

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SECTION 8

INSTALLATION

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8 INSTALLATION 

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

8.1 POSITION

Gate and globe valves are normally fitted with stem in the vertical position in horizontal lines as fig. 2A shows. However, if there is restricted access, valves may be installed at any angle between the vertical and the horizontal (fig.2B).

Swing check valves can be fitted in either vertical or horizontal lines, as can piston check or ball check valves, but ensure that the latter two types are spring loaded. If not then these two types must be fitted in horizontal lines only.

Gate and Globe valves should be fitted into line in the fully closed position.

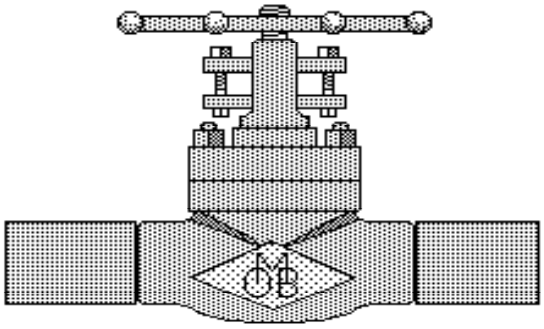

Fig.2A horizontal line,vertical stem

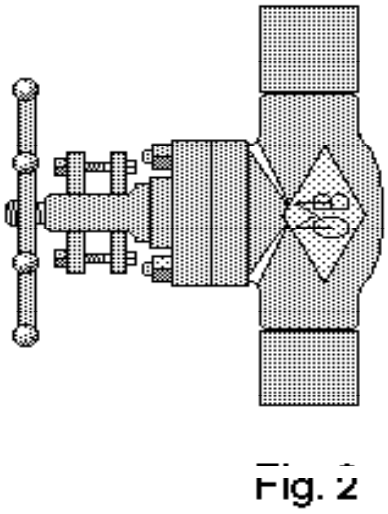

Fig. 2

Fig.2B vertical line, horizontal stem

In case of actuated valves proper fastening for the actuator shall be provided by the user to avoid damages or mis-functioning of the valve-actuator system.
Assembling sequence to the line shall be as follow :

fix the actuator ,
fix the valve to the line ,
link the actuator to the line for feeding .

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8.2 DIRECTION

Check and Globe valves are supplied with an arrow stamped on the body which indicates flow direction.
When fitting ensure inlet end is fitted against line pressure .

Cryogenic gate valves are unidirectional due to hole drilled on upstream side of gate .
These valves are supplied with an arrow stamped on the body which indicates flow direction.
When fitting ensure inlet end is fitted against line pressure .

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8.3 WELDING

Λ

Valves supplied by OMB are manufactured in forged carbon, alloy or stainless steel. The valves are manufactured with screwed ends, socket weld ends (S.W.), butt weld ends or flanged ends.

All steel types used have good welding properties.
When welding S.W. or B.W. end valves into line care must be taken to ensure that the temperature in the seat zone does not exceed 350C° - 400C° even if the material is suitable for a higher service temperature.

The reason for this is that the heating and subsequent expansion is not uniform and may cause leaking between seat and body or damage the uniformity of the valve.

Do not use yoke, handwheel or stem for a weld ground.

The welding has to be performed only by a qualified welder with all necessary equipment in order to obtain the operator safeguard and material integrity.

8.3.1 WELDING PROCEDURE

The work sequence is the following:

1. open the valve in the half position ,
2. carefully clean the area to be welded ,
3. weld avoiding to increase temperature in the seat zone as explained in the previous chapter.

In case of actuated valves before welding please be sure that the actuator is not connected to the electrical or pneumatic line, the valve can be manual operated in accordance with actuator instruction in order to joint the half open position as specified in point 1.

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8.4 THREADED VALVES

For threaded end valves it is important to ensure that the threads are clean and undamaged.

When fitting threaded end valves into line, never hold either the handwheel nor the yoke whilst screwing in and tightening, always hold the body. *(Pos. A. Fig.1) .*

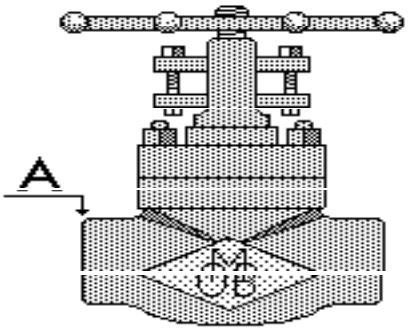

Fig. 1

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

8.5 ACTUATOR SETTING INSTRUCTIONS

In this case take special care to the setting of the torque and end - run micro switches and to the various cabling according to actuator's manufacturer's instructions.

Wrong settings may cause serious damages to the valve or to the actuator.

Refer to actuator instruction for explanation of setting procedure.

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SECTION 9

OPERATING INSTRUCTIONS

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9 OPERATING INSTRUCTIONS

Incorrectly installed valves or valves installed which do not suit the service conditions will have a limited operational life.

Valves in constant use may eventually leak either through the packing or seating surface due to the normal wear.

OMB valves are manufactured to withstand a closure overload which allows for a leaking valve to be closed with the aid of a wrench or lever in the event of an emergency (**references** values from MSS SP 91 std.).

Newly installed valves occasionally leak through the packing, especially if the temperature is a predominant factor. If this happens it will be necessary to either tighten the gland packing or if this does not stop the leak, add an extra ring of packing.
(The cause of this leaking is the settling of the packing).

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SECTION 10

MAINTENANCE

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10 MAINTENANCE

Under normal conditions maintenance is limited to the complete replacement of the packing or of just few packing rings, and gasket replacement during the life of the a valve whenever the same has been disassembled (please refer also to the following chapter) .

However is sometimes necessary to repair or replace valve internals. The instructions below should be sufficient to cover most eventualities.
When ordering spare parts, please indicate the following information to insure receiving the correct replacement parts:

A. Nominal Size
B. Type of valve
C. Pressure/Temperature Class
D. Fig. N. 3 (see Valve Nameplate)

Specify parts required by:

A. Part Name
B. Part Number (if known)
C. Quantity
D. Material

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

10.1 REPLACEMENT OF PACKING

This operation is carried out with valve in fully open position (stem in backseat config.if applicable). Line need not to be closed down if valves are supplied with back seating facility even if our suggestion is to close the line in presence of dangerous fluids.
Remove gland nuts and studs, lift packing gland and flange and remove packing using a screwdriver to lever it out.
Packing rings are usually made from squared braided asbestos cut from a coil, at an angle of 45° to the length required. No overlap or gap must be left between the ends. When more than one ring is required 120° must stagger joints. (See fig. 4)

When packing is inserted tighten packing bolts and allow packing to settle. After sufficient time for packing to settle check to ensure stuffing box is completely filled, if not add additional packing rings.

In case of actuated valve the work sequence should be as follow :
- open the valve in the fully open position,
- disconnect the actuator from electrical/pneumatic line to avoid accidental moving ,
- operate to replace the packing as over specified .

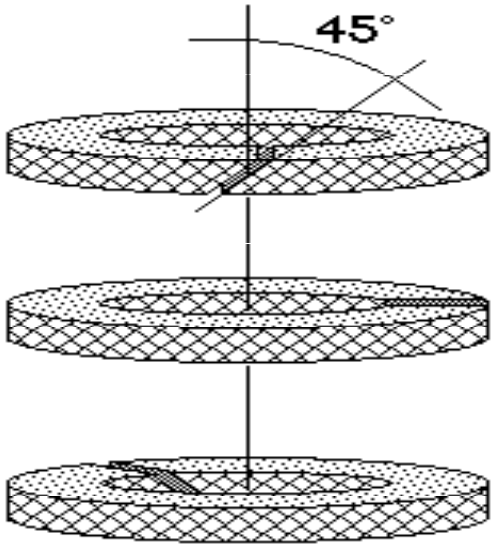

Fig. 4

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

10.2 REPLACEMENT OF BODY BONNET GASKET

When leakage occurs through flanged Body/Bonnet joint this is usually due to the result of gasket wear or damage. The gasket should also be replaced every time the valve is disassembled for whatever reason.
Gasket may be replaced with valve in line but line must be closed down.
Be sure that before opening the valve no pressure is trapped inside ,remove body bonnet studs. On gate and globe valves ensure valve is half open, remove valve bonnet with care ensuring disc/wedge is not damaged.

Remove old gasket and clean gasket contact surface, fit new gasket, replace bonnet into the same position, with care ensuring correct seating onto gasket. Studs must initially be hand tightened ensuring all the time that the body seats correctly onto gasket.
Nuts are finally cross-tightened using proper wrenches.

10.3 REFURBISHING OR REPLACEMENT OF SEAT RINGS ON GLOBE, PISTON OR BALL CHECK VALVES

Valves need not to be removed from line however line must be shut off.

A. If seats are not severely damaged.

A.I Globe valves. Be sure that before opening the valve no pressure is trapped inside. Remove body/bonnet bolts, remove bonnet, remove handwheel and screw stem down out of bonnet. Add emery paste, for lapping, to seats and using the valve disc/plug carry out the normal grinding operation. Where the disc or plug is the loose type, secure to stem with ordinary insulation tape, which is strong enough to hold in place for the grinding required.
Once seat has been sufficiently ground down, remove the grinding paste reassemble the valve and test.

A.II Check Valves. Be sure before opening the valve that no pressure is trapped inside. Remove bonnet and follow the procedure described above using piston or ball in the grinding operation.

B Where seats are badly damaged
Seat may be removed rotating clockwise by using an allen wrench, and replaced.
When seats are replaced the disc, plug or ball must also be replaced.

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10.4 INTEGRAL STELLITED BODY SEATS

For slightly damaged seats the lapping operation described above may be carried out to repair the seats. For badly damaged seats the valve must be removed from the line and replaced.

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10.5 GATE VALVE SEAT RINGS

Seat rings are pressed in and tollerance are so tight that seats are as good as integral. Replacement is possible, valve must be completely disassembled and body should be held in a vice. Seat rings must be remover using a hammer and punch.
Inserting new seat rings requires use of taper or use the wedge itself brought to the closed position forcing it after checking correct positioning against seats. Screw press to ensure a tight fit force aprox 10/15.000 Kg.Only in extreme circumstances would OMB recommend this operation. OMB would normally recommend replacement of complete valve, in the event of damage to the seats.

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

10.6 SWING CHECK VALVES

Body/Bonnet gasket replacement: procedure exactly as described on point 'IX.II'.
As with gate valves seat ring is pressed in and OMB would recommend replacement of complete valve in the event of damage to the seat.
Only in extreme circumstances would OMB recommend this operation. OMB would normally recommend replacement of complete valve, in the event of damage to the seats.

10.7 BELLOW SEAL VALVES

- ***Bellows Seal Valves up to 2"***

B.S. Gate and Globe Valves : Welded Bonnet Type

Remove the welding between Bonnet and Extension.
Remove the Bonnet from the top taking care not damaging the bellows seal assembly.
In case of need, substitute the complete assembly unit (Bonnet with welded-on bellows).

B.S. Gate and Globe Valves : Bolted Bonnet Type

Remove the bolts between Bonnet and Extension.
Remove the Bonnet from the top taking care not damaging the bellows seal assembly.
In case of need, substitute the complete assembly unit (Bonnet with welded-on bellows) and replace the body gasket.

Caution - only for gate valves -

The Wedge have to remain in the same position as originally assembled: take care not to rotate it 180°. In case of rotating the wedge the valve could leak through the seats.

- ***Eco-L-Valves up to 2"***

Welded Bonnet Type

Maintenance is not possible: the complete valve has to be changed.

Bolted Bonnet Type

Remove the bolts between Bonnet and Body.
Remove the Bonnet and unscrew the Bellows Assembly from the stem.
In case of need substitute the Bellows assembly unit and replace the body gasket.

Caution

When assembling the bellows to the stem, screw completely and then unscrew 1/4 of a turn so the disc remain loose enough to seat properly.

- ***Large Size Bellows Seal Valves (above 2")***

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B.S. Gate and Globe Valves : Bolted Bonnet Type

Remove the bolts between Bonnet and Extension.
Remove the Bonnet from the top taking care at not damaging the bellows seal assembly.
Remove the transition plate-Bellows welding and remove the bellows-stem assembly from the bonnet.
The spare kit is composed of the stem-bellows assembly: the assembly kit has to be welded on the bonnet before to assembly the bonnet to the extension.

It is mandatory to indicate in the request for spare kits the project name and all the information printed on the valve nameplate.

Caution - only for gate valves -

The Wedge have to remain in the same position as originally assembled: take care not to rotate it 180°. In case of rotating the wedge the valve could leak through the seats.

See following examples of typical bellow valves in bolted bonnet version.

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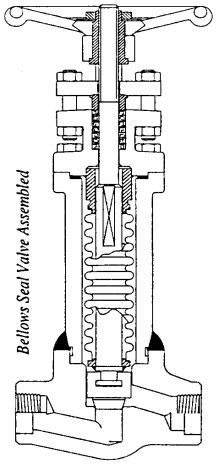
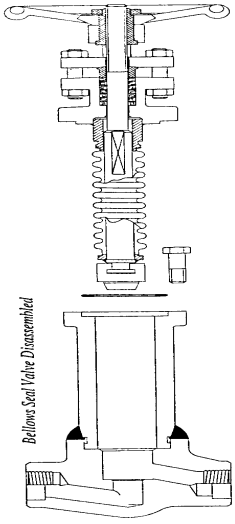
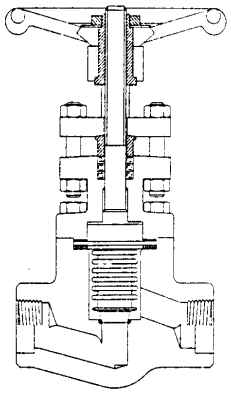
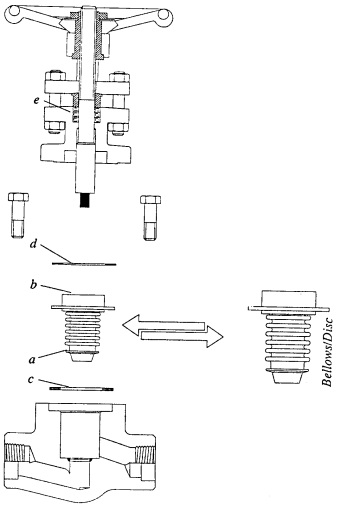




Bellow Seal Valve





Eco Valve Bolted Bonnet Type

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10.8 SPECIAL TOOLS

Normal wrenches are used in maintenance

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SECTION 11

LUBRICATION

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11 LUBRICATION

The valve are supplied with the stem threads engaging the yoke nut greased with BLASOLUBE 301.
Said parts should be kept constantly lubricated applying the grease directly on the stem, when the valve is totaly opened, or through the grease injector in the yoke nut when provided.

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SECTION 12

UTILITIES

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12 UTILITIES

CHECK VALVE SECTION

Check valves are uni-directional valves which automatically open with forward flow and close against reverse flow.
They are supplied to meet wide variety of applications with the closing element in the piston, ball or swing type. Piston check valves are normally supplied by OMB with the addition of a spring which allows both the vertical and horizzontal installation.

GLOBE VALVE SECTION

Globe valve are closing-down valves in which the closure member is moved squarely on and of the seat. In this way the opening of the port is directly proportional to the travel of the disc. This proportional relationship is ideally suited for buties requiring regulation the disc element can be avaible in the parabolic, needle, veeport types. Furthermore the short travel of the disc between the open and closed frequently. Globe valves are unidirectional valves and are installed so that fluid pressure is under the disc. They are supplied in various models to cover the different services.

GATE VALVE SECTION

Gate valve are bi-directional valves ideally suited for on-of duties. These valves have a very low resistance to flow, which in the case of parallel gate valves approaches that of a straight pipe. They are used for duties with high pressure fluids due to the fact that upstream pressure helps the sealing between gate and seat. OMB takes great care to study finish of seating surfaces to guarantee their minimum wear under high pressures. Gate valves are supplied in various models to cover the most different and delicate service.

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SECTION 13

DEMOLITION

Installation, Operation and Maintenance Manual for Gate,Globe,Bellows and Check Valves

13 DEMOLITION

This operation shall be completed only by qualified personnel in electrical or mechanical field. Before starting with demolition phase please be sure to have enough space to freely operate and proceed as follow :

- disconnect the actuator (if any) from electrical/pneumatic line to avoid accidental moving ,
- follow the instructions indicated in chapter IX for valve disassembling,
- for actuator disassembling (if any) please follow actuator's manufacturer instructions and require (if necessary) technical assistance,
- segregate different parts in accordance to their nature (metal, graphite,plastic,electrical, etc.) and follow, for getting rig, the country existing laws and regulations.

OMB valve's components are in non dangerous materials and no particular care shall be used during valve disassembling .
Body, bonnets, wedges of OMB valves are in forged steel material, remaining components such as
stems, seats, bolts are obtained from steel bars.
Gaskets and packings are composed using asbestos free materials.
Standard gaskets used in bolted bonnet valves are of the spiral-wound type in stainless steel 316 and pure graphite .

Standard packing is composed by a series of rings of pure graphite. The sets can be closed with two rings, top and bottom, anti-extrusion, manufactured in braided graphite. Both internal and external rings are treaded with corrosion inhibitor.