

USER'S MANUAL

for INSTALLATION, USE and MAINTENANCE

GATE, GLOBE and CHECK VALVES



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1.0 – GENERAL

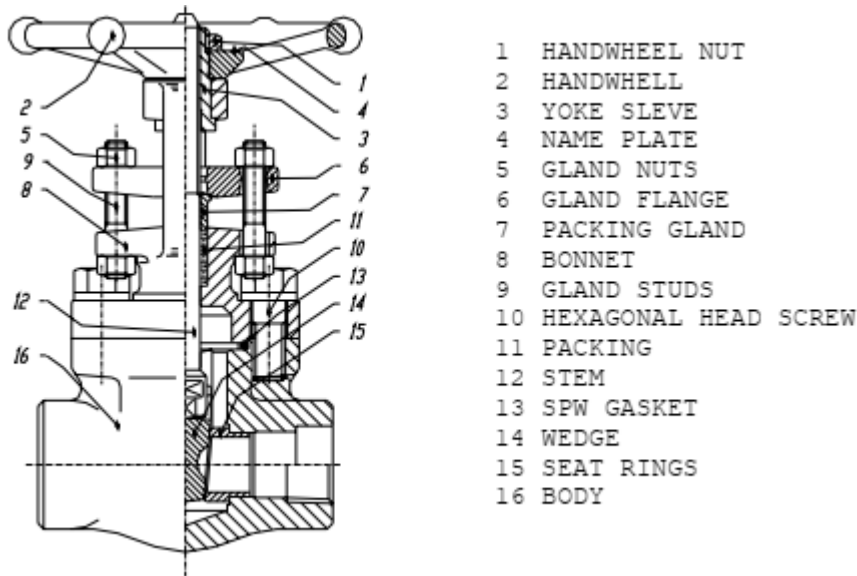
The FROMME. manual is a guide to installation, operation, preservation of FROMME. valves, and a support to all their users in case of further maintenance.

FROMME. do not have the possibility to evaluate all risk that the installation, operation and maintenance can produced, therefore it's very important to respect the indications of this manual to reduce the risk of injuries to people and damage to the valves.

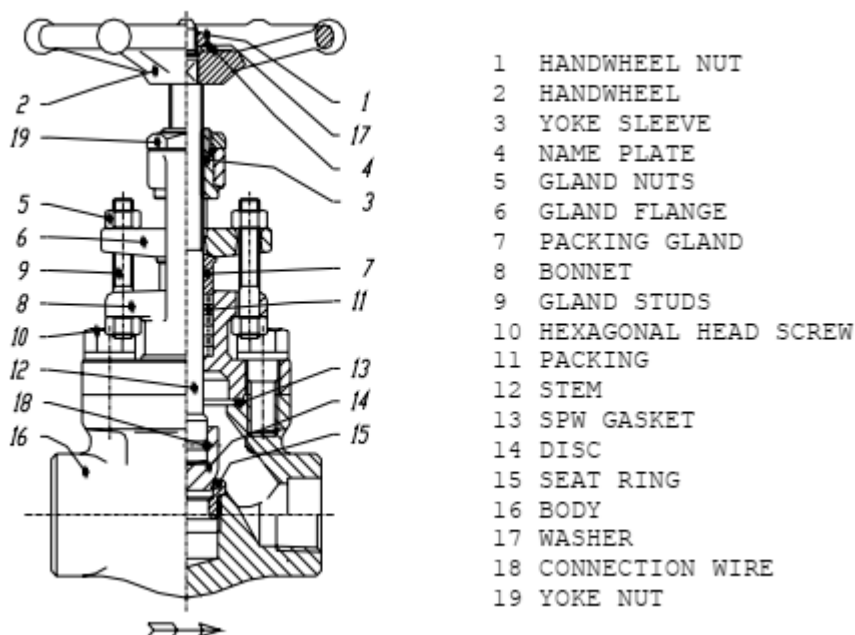
FROMME. disclaim any responsibility related to the misconduct of installation, operation and maintenance instructions. It is the responsibility of valve users to train the selected personnel.

2.1 – VALVE DESCRIPTION AND PARTS

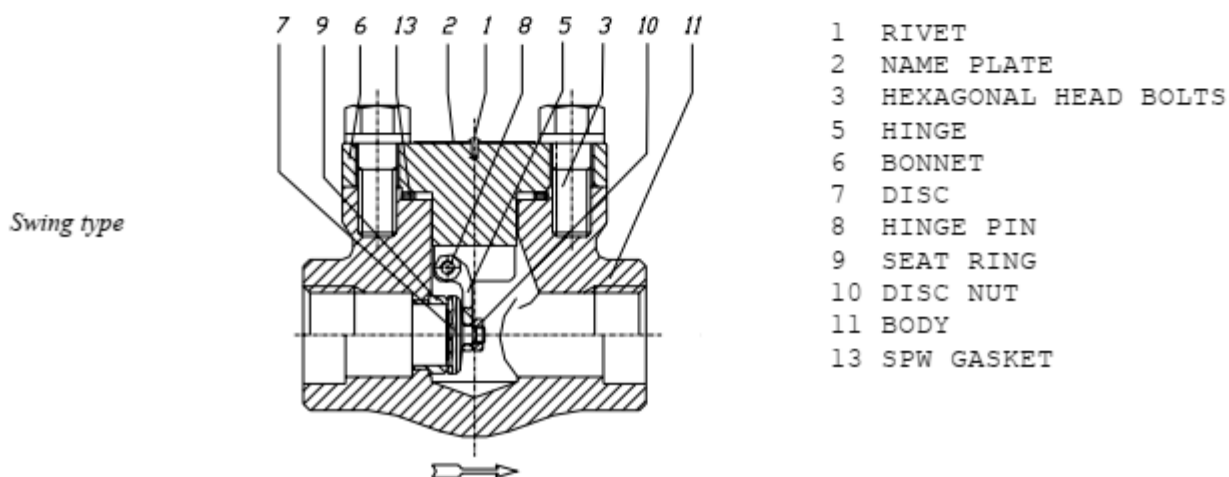
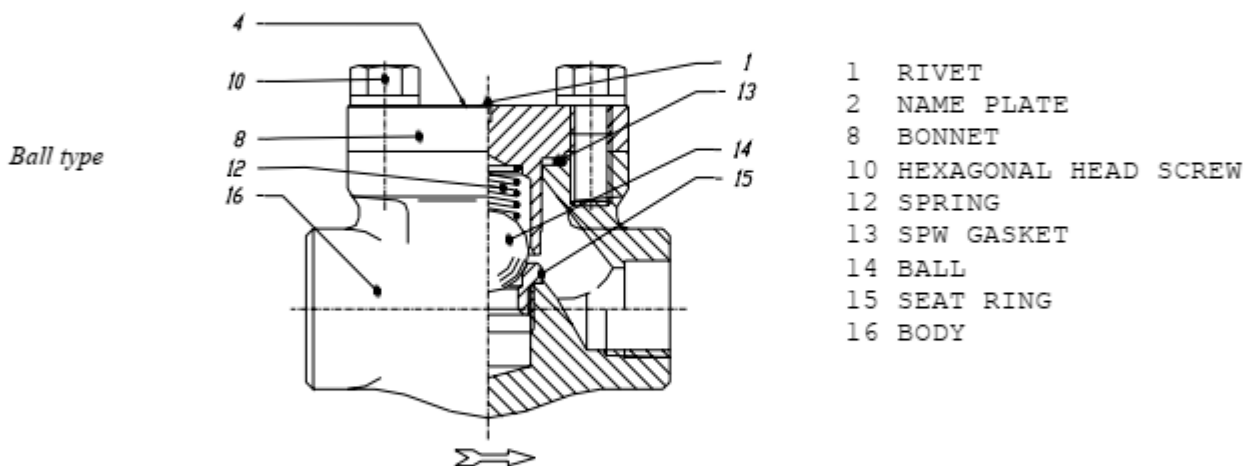
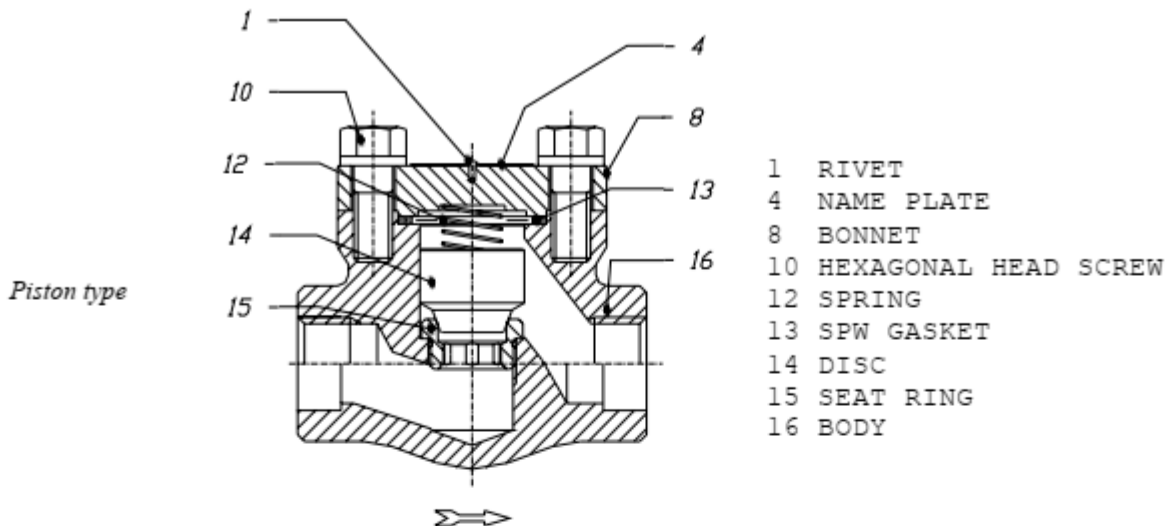
The types of FROMME. valves described on this manual are: Gate valves; which should be used either in the fully open or fully closed position. The standard design features and parts list are shown:



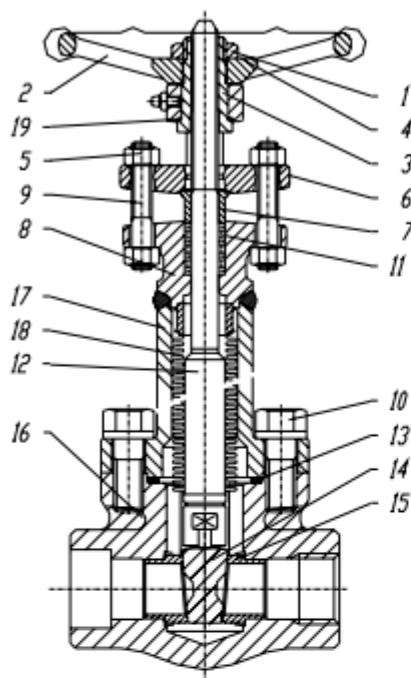
Globe valves; which may be used for throttling control as well as on-off service. The standard design features and parts list are shown:



Check valves; are self-actuated valves and are produced with three type of disc:
Piston, ball and swing type. The standard design features and parts list are shown:

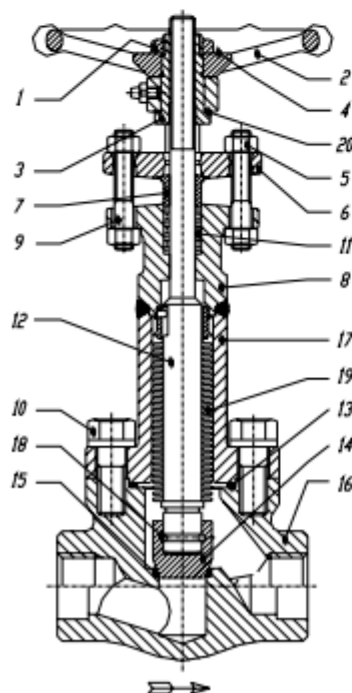


*Bellows seal valves: generally used for critical service and dangerous fluids.
Can be gate or globe type. The standard design features and parts list are shown:*



- 1 HANDWHEEL NUT
- 2 HANDWHEEL
- 3 YOKE SLEEVE
- 4 NAME PLAT
- 5 GLAND NUTS
- 6 GLAND FLANGE
- 7 PACKING GLAND
- 8 BONNET
- 9 GLAND STUDS
- 10 B/B BOLTS
- 11 PACKING
- 12 STEM
- 13 SPW GASKET
- 14 WEDGE
- 15 SEAT RINGS
- 16 BODY
- 17 EXTENSION
- 18 BELLOW
- 19 THRUST WASHER

Gate valve type

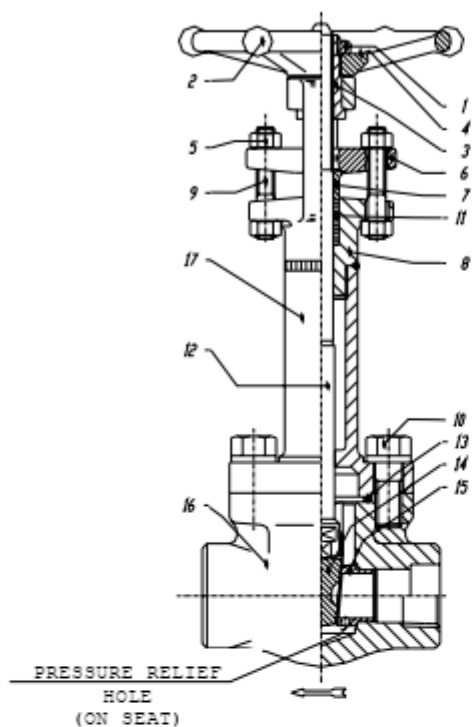


- 1 HANDWHEEL NUT
- 2 HANDWHEEL
- 3 YOKE SLEEVE
- 4 NAME PLATE
- 5 GLAND NUTS
- 6 GLAND FLANGE
- 7 PACKING GLAND
- 8 BONNET
- 9 GLAND STUDS
- 10 B/B BOLTS
- 11 PACKING
- 12 STEM
- 13 B/B GASKET
- 14 DISC
- 15 INTEGRAL SEAT
- 16 BODY
- 17 EXTENSION
- 18 CONNECTION WIRE
- 19 BELLOW
- 20 THRUST WASHER

Globe valve type

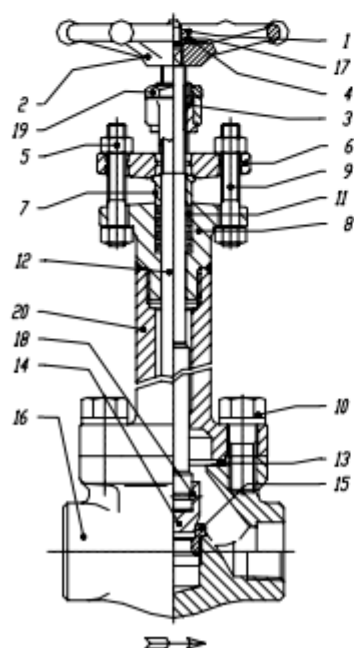
Cryogenic valves; used for cryogenic or low temperature service.

Can be gate or globe type. The standard design features and parts list are shown



- 1 HANDWHEEL NUT
- 2 HANDWHEEL
- 3 YOKE SLEEVE
- 4 NAME PLATE
- 5 GLAND NUTS
- 6 GLAND FLANGE
- 7 PACKING GLAND
- 8 BONNET
- 9 GLAND STUDS
- 10 B/B BOLTS
- 11 PACKING
- 12 STEM
- 13 SPE GASKET
- 14 WEDGE
- 15 SEAT RINGS
- 16 BODY
- 17 EXTENSION

Gate valve type



- 1 HANDWHEEL NUT
- 2 HANDWHEEL
- 3 YOKE SLEEVE
- 4 NAME PLATE
- 5 GLAND NUTS
- 6 GLAND FLANGE
- 7 PACKING GLAND
- 8 BONNET
- 9 GLAND STUDS
- 10 B/B BOLTS
- 11 PACKING
- 12 STEM
- 13 SPW GASKET
- 14 DISC
- 15 SEAT RING
- 16 BODY
- 17 WASHER
- 18 CONNECTION WIRE
- 19 YOKE NUT
- 20 EXTENSION

Globe valve type

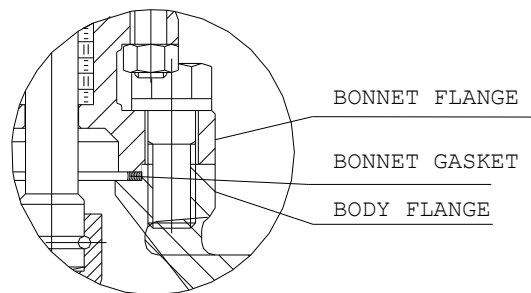
2.1– BODY BONNET CONNECTION

B.F.E. valves are designed with two different body/bonnet connection type:

- Bolted
- Welded

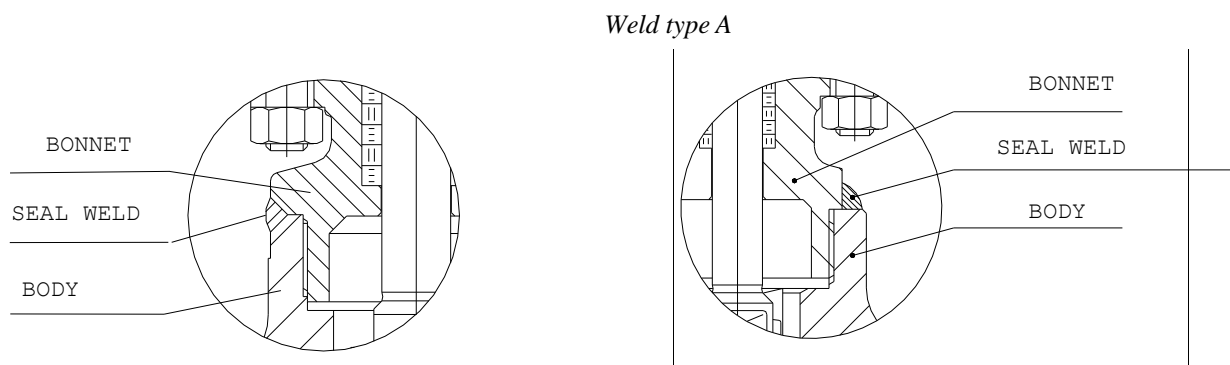
2.1.a – BOLTED

The bolted connection consist of a body bonnet gasket (part nr13) located in its housing between two flanges and compressed by a body/bonnet bolts (part nr10)



2.1.b - WELDED

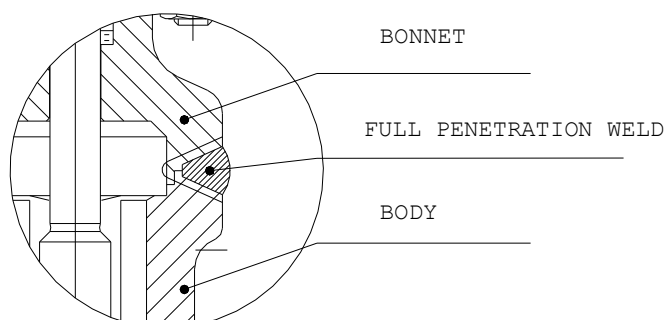
FROMME. welded bonnet valves are designed with two different configurations: A – Screwed and seal weld
B – Full penetration weld



Used for class 800 and 1500 valves

Used for class 2500 and 4500

valves Weld type B



Full penetration weld applicable for all classes and type of valves.

3.0 – SAFETY NOTICE

The correct installation, use and maintenance is fundamental for the safe and reliable operation of valves. The risk evaluation connected with the installation, operation and maintenance is the responsibility of the users. With this manual FROMME. intends to give the correct method to perform all necessary activities. Before starting any activity on the valve, personnel should become familiar with this manual. In the case that the instructions are not satisfactory or the maintenance personnel need more detailed information, contact FROMME. without delay. FROMME. disclaims any responsibility related to incorrect installation, operation and maintenance of its valves. The training of personnel who perform such procedures is the responsibility of the user.

4.0 – PRECAUTIONS

All FROMME. valves are manufactured in conformity with Pressure Equipment Directive 97/23/EC category III module H.

4.1 - VALVE MATERIAL CHOICE

It is client responsibility to choose the material based upon the fluid and operation condition. With a correct choice a long valve life is expected, vice versa corrosion, erosion or other factors can lead to a reduced valve life.

4.2 - CORROSION ALLOWANCE

Valves are designed taking into account a maximum corrosion allowance of 3 mm. Never use the valve with higher corrosion.

4.3 - WORKING PRESSURE AND TEMPERATURE

When using the valve, be sure to work with proper pressure temperature combination within the maximum allowed as per class rating marked on valve nameplate. The rating tables are those of ANSI/ASME B16.34.

For materials not mentioned in ANSI/ASME B16.34 the following shall be applied:

DIN C22.8 / ST E355	group n° 1.1	ASTM B564 UNS N08811	group n° 3.15	DIN X6CrNiMoTi17.1	group n° 2.2
DIN X12CrMo91	group n° 1.14	ASTM B564 UNS N05500	group n° 3.6	DIN X6CrNiTi18.1	group n° 2.4
DIN 13CrMo44	group n° 1.9	ASTM B462 UNS N08028	group n° 3.8	DIN NiCu30Al	group n° 3.4
DIN 10CrMo9.10	group n° 1.11	ASTM A494 UNS N30002	group n° 3.15	ASTM A694 F42	group n° 1.1
ASTM A182 F55	group n° 2.8	ASTM A494 UNS N26625	group n° 3.15	ASTM A757 D1Q1	group n° 1.1
ASTM A182 F317L	group n° 2.2	ASTM A494 UNS N30012	group n° 3.15	ASTM A757 D1Q2	group n° 1.1
ASTM A182 F310MoLN	group n° 2.2	ASTM A494 UNS N30007	group n° 3.15	ASTM B366 WP1925	group n° 3.1
ASTM B381 F2	group n° 2.2	ASTM A494 UNS N26455	group n° 3.15	ASTM B366 WPHC4	group n° 3.15

For aluminium bronze material ASTM B148 UNS C95400 rating table as per BS 5354 series A must be applied.

4.4 - PIPELINE LOAD

The valve has not been designed for support purposes; hence the client must avoid any significant pipeline load concentration at valve interface. If this is the case Fromme. can supply the necessary information to allow the costumer to perform the relevant verification or is able to perform the verification based on client data.

4.5 - CYCLIC LOAD

In the case of significant number of cycles and load variations further stress analysis shall be performed to verify the valve strength. If this is the case FROMME. can supply the necessary information to allow the costumer to perform the relevant verification or is able to perform the verification based on client data.

4.6 - START-UP

For gate valves only, be careful not to heat up the valve in closed position with fluids inside that could over pressure the valve. Valves with actuator have a torque and position switches set in accordance with actuator manufacture's instructions during functional test carried out at Fromme. factory; wrong settings may cause serious damage to actuator and valve.

Attention must be paid to the electrical connections. Wrong connection may cause serious damage to valve stem and seat. Actuator wiring diagram is located on electrical connection compartment.

4.7 – HANDWHEEL TEMPERATURE

When in operation, the gate and globe valve can be hand-operated from open to close or vice versa by the handwheel. Before operating the valve, care must be taken to ensure that the temperature of the handwheel is not too hot or cold to cause injuries to the operator's hands.

4.8 – P.E.D.

According to P.E.D. 97/23/EC the valves are classified in category III (higher possible category) and then can be used with fluid group 1 or 2 including unstable gas.

4.9 - VALVE MODIFICATION

Under no circumstances the user is allowed to modify the geometry or the material of valve components. This action determines the immediate expiring of CE marking.

4.10 – ACTUATOR SETTING

Valves with actuator are set and tested at FROMME. shop before shipment; therefore any setting variation may cause damage to actuator and valve.

4.11 – WELDING

During any weld operations never use the yoke, handwheel or stem for a weld ground.

5.0 – STORAGE

The correct storage of valves must be indoors in a controlled humidity room.

Valves are normally shipped from the manufacturing plant with adequate protection for indoor storage for up three months. Specific procedure for long term storage are available on request.

This protection consists of a rust preventative and plastic valve end protectors.

The valves are shipped in the closed position to protect the seat surfaces during transportation. Upon receipt, the valves should be inspected for shipping damage. If the end protectors are removed for inspection purpose, be sure to re-install them to maintain internal cleanliness.

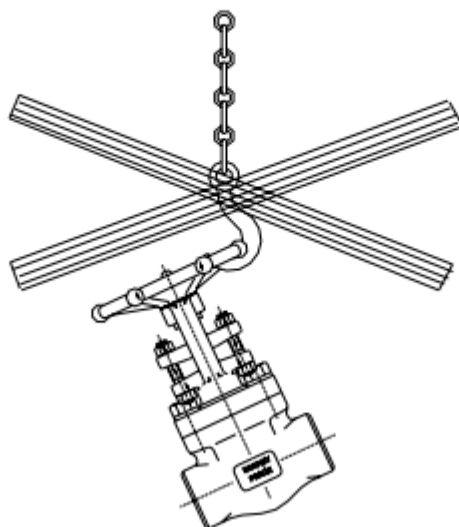
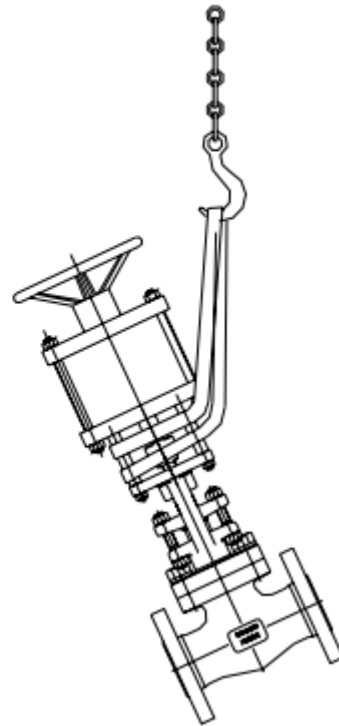
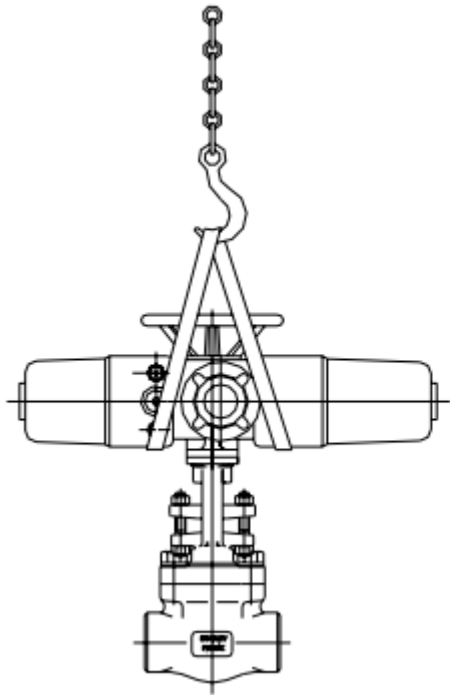
If caps are missing, an inspection of the valve cavity is required. All foreign matter must be removed.

6 – HANDLING

Special procedure to handle Fromme valves are not necessary.

For motor operated valves Fromme. suggests the use of simple precautions to preserve the actuator.

Do not use handwheel as system to handle any type of valves



7.0 – INSTALLATION

Preliminary consideration for installation:

- *use experienced trained personnel.*
- *observe all standard safety precautions.*
- *always use proper tools.*
- *remove the end caps just before installation.*
- *clean both end ports and remove any eventual foreign material.*
- *Tighten packing gland bolts*

7.1 – VALVE CONNECTION TYPE

Depending on valve end configuration, four (4) basic installation procedures are used:

- *SOCKET WELDS in accordance with ANSI B16.11*
- *BUTT WELDS in accordance with ANSI B16.25*
- *SCREWED ENDS in accordance with ANSI B1.20.1 (NPT) female*
- *FLANGED ENDS in accordance with ANSI B16.5*

Valves supplied by FROMME. Spa are manufactured using forged steel bodies and bonnets of carbon, alloy or stainless steel material. These types of materials have excellent welding properties, which allow the valves to be fitted in line by welding. Valves having threaded ends are also suitable for subsequent seal welding should it be needed for sealing purposes.

7.1.1 - BUTT WELDING or SOCKET WELDING ENDS

Proper welding is required to ensure a pressure tight seal and to retain their ability to withstand stress.

Remember that the valve, pipe and weld root must be of compatible materials and the welding be performed by a properly trained welder and approved weld procedures and qualifications.

Be sure to leave 1/16" gap between the end of the pipe and bottom of the valve socket.

This will allow for expansion of the materials as it is welded, since the valve body is compact and has only a short distance from end to end, any extended welding time could cause excessive heat build up on the valve seat area which could cause damage such as loosening of the seat rings, surface distortion etc.

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

To avoid this problem, we suggest allowing the part to cool after each pass of the weld and alternate welding passes from one valve to the next.

For alloy steel valves or when welding specification or service conditions require PWHT, the valve may be ordered with pipe nipples already welded and heat treated in the factory before valve assembly upon specific request.

The specified PWHT must be performed in line only on the welded area and not on the complete body valve.

When welding the valve directly to the line, make sure the valve is not in the fully closed position, but in a slightly open position to allow just the necessary internal gas flow for welding.

Shortly after welding, open and close the valve to check for proper operation to make sure no binding has occurred due to welding heat.

7.1.2 - SCREWED ENDS

Care must also be taken in installing these types of valves.

First inspect all threads before assembly and use a pipe thread compound.

Always apply threading compound to pipe threads, never to valve threads.

Excess compound on pipe threads will be pushed out of the valve allowing removal whereas excess compound on valve threads will be pushed into the valve where it will be difficult to remove.

When installing thread ends valves, do not turn the valve by applying force to the bonnet, yoke or handwheel. Proper spanner or wrench should be used, one engaging the valve and the other engaging the corresponding pipe.

7.1.3. - FLANGED ENDS

Make sure that two like flanges are being fitted together

Usually the proper set-up is either plain face to plain face or raised face to raised face flange. Tighten the flange bolts in a crossover pattern as follows:

A -Slightly torque all bolts using a crossover bolt sequence. Bolts should be tightened evenly to prevent cocking of the flange and uneven gasket loading.

B -Repeat step 'A' using additional torque until all bolts are tightened properly.

This may require several re-torque since as one bolt is tightened it will relieve stress on the adjacent bolts.

C -On high pressure. High temperature applications, it is recommended that the bolts be retightened after 24 hours of operation to compensate for any relaxation or creep that may have occurred.

7.2 - VALVE POSITIONING

Positioning the valve in the pipe run is very important.

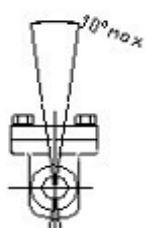
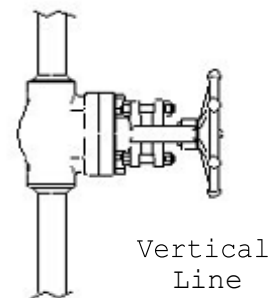
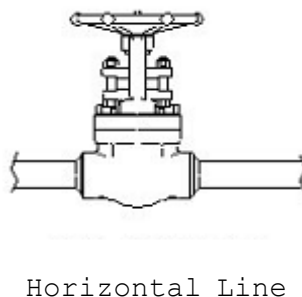
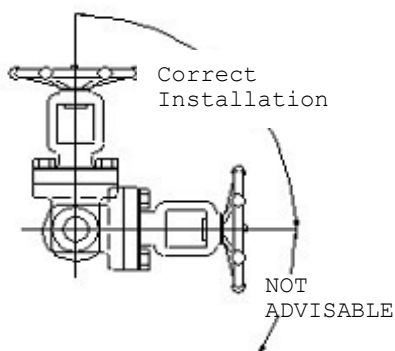
Prior to actual installation, check for clearance around the valve to ensure adequate room for proper operation. Also keep in mind the need for clearance for future maintenance and repair.

Once proper positioning and clearance have been assured the system should be cleaned of all foreign matter.

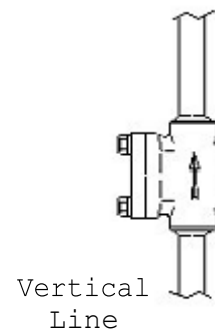
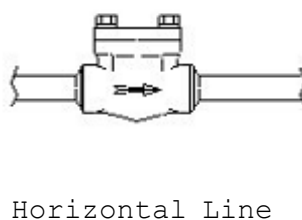
Whenever possible, blow out the pipeline with water to remove grit and dirt.

Also be sure to remove the valve end protectors and again check the valve for cleanliness.

GATE, GLOBE, THROUGH CONDUIT and API6A GATE VALVES



CORRECT INSTALLATION FOR CHECK VALVES



7.2.1 - CHECK VALVES

These valves must be fitted in horizontal pipe runs with the cover facing vertically upward. Variance to either side of the vertical axis must not exceed 5 degrees.

Swing check valves and spring loaded check valve design allow for additional position, such as vertical upwards flow.

Valves must not be installed in vertical downward flow pipe runs or in horizontal pipe runs with the cover not in vertical up position.

Always install valves in the direction indicated by the flow arrow stamped on the body. Stop check valves should be fitted similarly to check valves.

7.2.2 - GATE, GLOBE, THROUGH CONDUIT and API6A GATE VALVES

Gate and globe valves should be installed with the stem in an upward position on horizontal lines. However, an alternate stem position is at an angle between the vertical and horizontal axis that will allow complete drainage.

If installed with the stem below the horizontal axis, complete drainage is not possible and solids may accumulate in the valve bonnet, which will greatly affect the valve operation and service life.

A gate valve can be installed in line with disregard to flow direction.

Globe valves can also operate in either direction of flow but it is recommended that the pressure always acts under the disc. In the case of actuated valve, if the axis of stem is not in a vertical position, it is necessary to fasten the actuator by the user to avoid damages or incorrect working of valve-actuator system.

Cryogenic gate valves have a unidirectional flow.

Valves shall be installed in the direction indicated by the flow arrow stamped on the body.

For through conduit and API6A gate valves we suggest to install with the stem in an upward position on horizontal lines.

7.2.3 - PURGING AND TESTING OF LINE

Once the valve is in line, open the valve and flush or blow out the line again to remove any dirt or foreign objects that may have collected during installation.

Check for tightness of body/bonnet bolts and for proper packing gland adjustment. Operate the valve to make sure of proper operation.

Pressure test the valve to ensure the integrity of all joints.

8.0 - MAINTENANCE INSTRUCTION

Before performing any maintenance activities, ensure, for the sake of safety, that the pressure is completely removed from the line.

With proper care and regular maintenance you can expect long life and good performance from FROMME. valves. It is important to note that maintenance and repairs are sometimes needed and can be performed in the field.

If major repairs become necessary, it is recommended that the valve be returned to the factory for inspection and possible re-work. If cleaning of the valve is required care must be taken as to the type of solvents used, particularly if the valve is to be connected to the line by welding.

The maintenance and repair of FROMME. valves is usually limited to the adjustment of the packing gland and the lubrication of yoke sleeve as previously stated.

Should you require other repairs the following information should be used as a guide in your repairs. For through conduit valves see para 8.9.

8.1 – STEM PAKING

If the gland has run out of travel or excessive tightening does not stop the leakage, isolate and de-pressurize the valve for repacking.

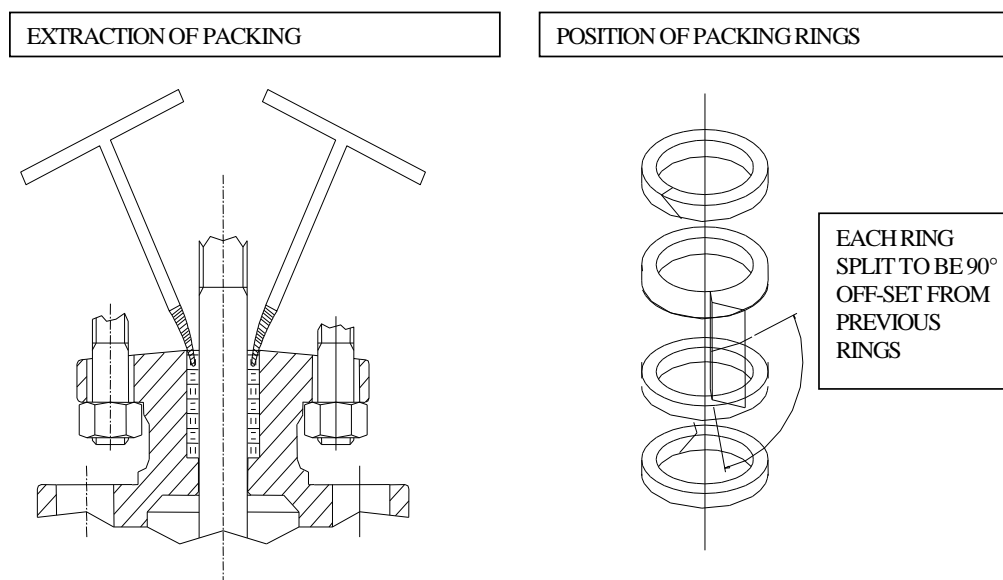
The valve need not be taken out of line for simple repacking, however, repacking is not recommended while the valve is in service. To extract packing, remove the gland nuts and studs, lift the gland flange and gland out of the stuffing box.

Remove old packing, use an extractor tool of the correct size.

Any remains of old packing must be removed from the stuffing box and the stem.

Clean the stem and stuffing box and examine it for damage.

Install new packing rings, one at a time, with the diagonal cut in each ring 90 degree away from the cut in the ring previously installed.



Each ring should be firmly compressed into position before the next ring is added. Rings should fit snugly into the stuffing box.

Install the gland and the gland flange and secure with the gland nuts, tighten the nuts uniformly and only to the extent needed to prevent leakage.

When graphite packing is to be installed, their replacement may be made by cutting the preformed rings in two halves, or by a single cut and carefully open the ring to allow its insertion into the stuffing box.

Procedure to insert is then the same as stated for normal packing.

GLAND BOLTS TORQUE for CLASS 150÷2500					
DIAMETER	CLASS (lbs)	TORQUE (Nm)	DIAMETER	CLASS (lbs)	TORQUE (Nm)
3/8"	150 ÷ 800	4 ÷ 6	3/8"	1500 ÷ 2500	12÷14
1/2"	150 ÷ 800	5÷8	1/2"	1500 ÷ 2500	12÷14
3/4"	150 ÷ 800	6÷8	3/4"	1500 ÷ 2500	16÷18
1"	150 ÷ 800	8÷10	1"	1500 ÷ 2500	20÷22
1.1/4"	150 ÷ 800	10÷14	1.1/4"	1500 ÷ 2500	20÷22
1.1/2"	150 ÷ 800	12÷16	1.1/2"	1500 ÷ 2500	22÷24
2"	150 ÷ 800	12÷16	2"	1500 ÷ 2500	22÷26

GLAND BOLTS TORQUE for CLASS 4500					
PACKING	CLASS (lbs)	TORQUE (Nm)	PACKING	CLASS (lbs)	TORQUE (Nm)
BH2	4500	20÷24	2B3	4500	28÷30
BH3	4500	20÷24	2B4/A	4500	28÷30
BH4	4500	24÷28	2B5	4500	45÷60
BH5	4500	28÷30	2B8	4500	36÷40
BH6/A	4500	28÷30	25B8	4500	44÷46
BH8	4500	62÷68	4B8	4500	100÷120
BY5	4500	28÷30	9B8-5A	4500	100÷110
BY7	4500	50÷60			

GLAND BOLTS TORQUE with GARLOCK PACKING					
PACKING	SPACER RING	TORQUE (Nm)	PACKING	SPACER RING	TORQUE (Nm)
BH2	7 mm	4	9BE5	-	18
BH3	4,5 mm	4	9B8/A	6 mm	12
BH4	N° 2 x 4,5 mm	5	2B3	N°3 x 4,5 mm	6
BH5	4,5 mm	5	2B4/A	7 mm	6
BY5/A	-	5	2B5	8,5 mm	8
BH6/A	-	6	2B8	12 mm	10
BY7	-	7	4B8	N°2 x 8 mm	20
BH8	-	8	25B8	N° 2 x 7 mm	15

8.2 – BODY / BONNET DISASSEMBLY - TORQUE VALUES

FOR BOLTS Complete disassembly procedures are listed below.

However, it is recommended that disassembly be limited only to the extent required to carry out repairs.

- 1 - Isolate and de-pressurize the system and operate the valve to its full open position.
- 2 - Match mark the body and bonnet, the wedge and body to maintain their relation upon reassemble.
- 3 - Remove the body bolts and lift up the entire bonnet assembly, taking care not to damage the wedge.

To avoid bolts over stressing in valve reassembly the following chart indicates the maximum values allowed for each size (for spiral wound gaskets and ring joint gaskets).

Valves shown are mainly referred to joints using spiral wound gaskets and including valves.(the same valves may be used on bonnets with ring joint gaskets).

To guarantee a perfect tightness the gasket must be compressed to an established amount.

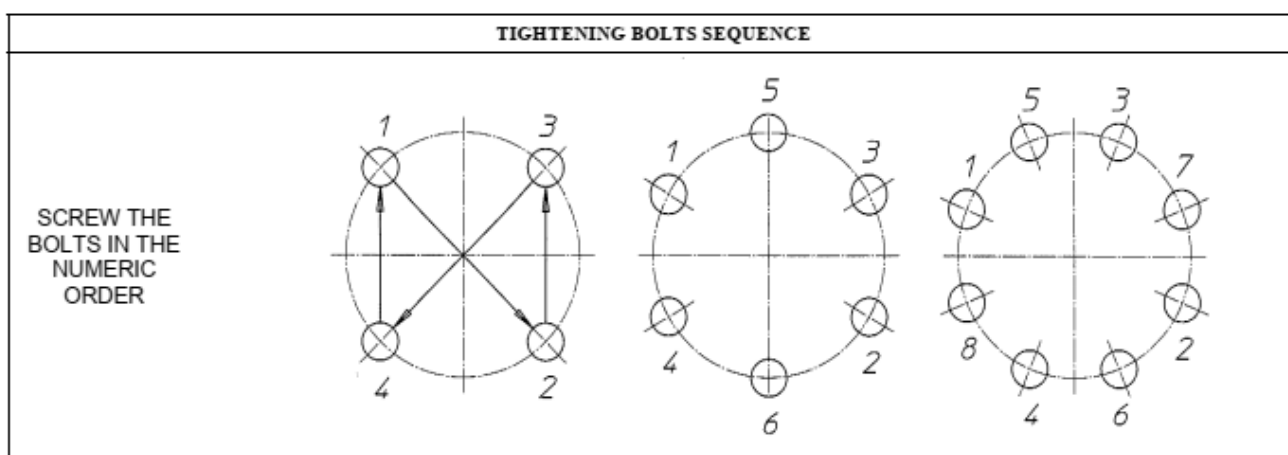
For this reason, in case of spiral wound gaskets, the depth of female groove on the body, the height of raised face on to the bonnet and thickness of gasket itself must be kept within close tolerance to obtain the required gasket compression once the two mating flanges come into contact.

Great importance is given to gasket construction, especially for the tension applied to metal strip in coiling operation. Once the two flanges come into contact, a sudden increase of torque force is perceived.

No further torque is then required, even if the value is lower than the one listed on the chart.

If the joint is leaking, a re-check of gasket contact surfaces and the gasket itself has to be made. Maximum torque allowed for bolted bolting (values shown are referred to un-lubricated cap screws).

BODY/BONNET BOLTS TORQUE								
BOLTS DIAMETER	METRIC	M10	M12	M14	M16	M20	M22	M24
	UNC	3/8"	1/2"	9/16"	5/8"	3/4"	7/8"	1"
TORQUE Nm	B7-B16-L7-F51-F53-F55-GR660	60 to 70	80 to 90	140 to 160	220 to 250	300 to 350	550 to 600	800 to 900
	B7M-B8-B8M-L7M-B348 GR2-F44 MONEL K500- HASTELLOY B2 – GR80	45 to 50	60 to 70	100 to 120	160 to 180	220 to 260	400 to 450	600 to 670
	X5CrNi18.10 (A2-70) 24CrMo5 (G) 21CrMoV57 (GA)	45	75	120	185	260	450	670



8.3 - GASKET REPLACEMENT

Examine the gasket-seating surface of the body and the bonnet for evidence of wear damage or deterioration. Discard the old gasket.

Replace or repair all damaged parts, then clean seating surfaces to remove all rust, gasket residue and other debris. Next polish gasket-seating surfaces using a fine emery cloth.

Remove any radial scratches or other damage, taking care that the emery cloth does not remain in the valve. A radial scratch across the seating surface may allow for a leakage path.

To affect a good seat, the gasket-seating surface must be flat and should have a finish between 1,6 and 3,2 Ra μm . Clean the surface again to remove all polishing residue.

Install a new gasket and reassemble the valve.

No gasket-sealing compound should be used when installing the gasket.

Care should be taken to insure that the wedge does not contact the seats during reassembly and bolt tightening. Re-tighten the bolts as previously stated in paragraph 7.2

8.4 - SEATING ON GATE VALVES

The valve and seat ring design and the method of seat ring installation are such that the valve must be removed from the line when seat ring repair is necessary.

Therefore, we recommend that the valve be replaced or returned to the factory for seat replacement.

8.4.1 – REPAIR

Seat rings for gate valves if not too badly damaged, may be repaired in the body by lapping.

The seats can be lapped in the body, using a flat lapping plate 1/4" thick with the OD 1/16" larger than that of the seat and having a 1/4" high boss on one side 1/32" small in diameter than ID of seat.

The plate must have a square hole in the centre for attachment to a square end tool.

Use a square tool of suitable size and length with one end to fit a brace and the other end attached to the plate.

Valve seats can then be hand lapped by using a grinding compound.

Wedges can be lapped on any surface plate but care should be taken to maintain the correct wedge angle.

As noted previously, we recommend that the valves be replaced or returned to the factory for seat ring replacement.

8.5 – SEATING ON GLOBE AND CHECK VALVES

These items are available with either threaded-in seat rings or an integral seat both of which may be repaired (or for threaded in seats, replaced) while the valve is in line.

8.5.1 - REPAIR

Prior to lapping the disc of the globe valves may require refinishing.

When defects are found on the stem/disc assembly-seating surface, it becomes convenient to place the stem/disc assembly into a lathe spindle and check the disc diameter, without taking the assembly apart.

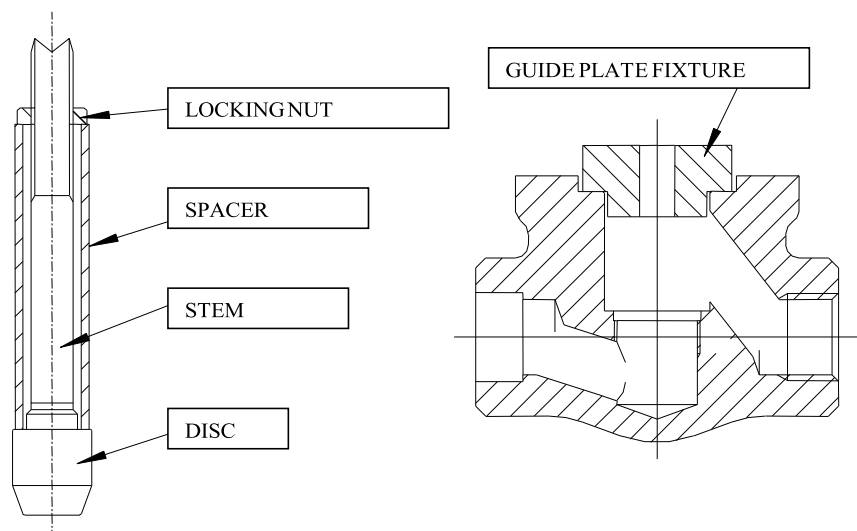
When surface damage is minor, the seats may be repaired by a lapping operation by placing a small quantity of lapping compound between the seat and the disc surfaces.

It is important that not too much pressure be applied to the disc and seat.

With the lapping compound in place between the matching surface, the disc should be reciprocally rotated, the strokes should be light and the disc should be lifted frequently and turned to a new position, circularly around the valve body, so the lapping will take place over a new area.

Continue lapping until all defects are removed, and then final finish with a fine compound.

It is recommended that the face of the disc be blued to check for contact of seating surface after final lapping. The globe valve stem/disc assembly may be used in the lapping operation.



However, due to its loose disc design, it is necessary to prevent the disc from rotating on the stem. The valve handwheel can then be re-attached to the stem and used as a convenient handle when re-lapping the seats. Globe and piston check valves require a fixture to maintain alignment during the lapping operation. This fixture can be made to fit into the gasket area of the body. The section of the fixture extending into the body is to be made 1/64" less than the body bore. A hole in the centre of the fixture is required for the stem. This hole should be 1/64" larger than the shank of the stem or OD of spacer. On ball check valves the rolling action of the ball retains seating surfaces in good condition until ball size or ball guide is worn and replacement parts needed. Valves having renewable (threaded-in) seats may have the seat ring replaced while the valve is in line. The inside area of the seat ring has a hexagonal shape, except needle type valve which have a cross-slotted head seat ring and a circular inside area. In the first case a hexagonal shape tool may be inserted in the second case a proper cross wrench has to be used.

The seat ring may then be removed by un-threading in an anti-clockwise direction. The seat threads in the valve body should be carefully inspected to make sure they are in a usable condition. When installing new seats, the seats should be screwed tightly into the valve body, then unscrewed to make sure they are making continuous contact for a tight seal.

8.6 - BELLOWS SEAL

The procedure for replacing body / bonnet gasket is the same as indicated in par.8.3. For seat surface repair, proceed as indicated in par.8.4.1 or 8.5.1 taking care not to damage the bellows seal assembly. The two bellows bushing are welded to the stem and the bonnet. The replacement of bellows unit requires replacement of the stem too; in case of globe valve type connected to stem there is the disc also. Considering that the bellows seal valves are generally used for critical service, FROMME suggests that the bellows replacement to be made in its factory. Any dismantling of bellows valves is cause of immediate expiring of CE marking.

8.7- LIST OF TOOLS

No special tools are required for standard maintenance.

8.8- LUBRICATION AND GENERAL MAINTENANCE

FROMME valves are made from selected materials to give long and trouble free service when properly installed in the correct applications. Proper care and maintenance in the field can contribute to extended performance of the valve. The general maintenance operation on a valve usually consists of lubrication and packing. The valve yoke sleeve should be lubricated periodically based on cycle and service conditions, but not less than once a year or 100 cycles maximum. FROMME valves are supplied with the stem threads and yoke sleeve greased with AGIP MU EP2 type or equivalent. Exposed stem threads should be kept clean and should be lubricated. Because a tacky lubricant on exposed stem threads can attract abrasive particles from the atmosphere the use of dry lubricants is recommended. Graphite powder can be applied by spraying or (if no suitable means are available) by the use of a normal brush. Leakage through the stuffing box does not always indicate a defective valve, the valve may simply require the packing to be tightened. Excessive tightening may cause difficult operation of the valve and possible damage to the stem.

8.9- MAINTENANCE INSTRUCTION FOR THROUGH CONDUIT VALVES

8.9.1- GLAND PACKING DISASSEMBLY

- 8.9.1.1 *Before performing any maintenance activities, ensure, for the sake of safety, that the pressure is completely removed from the line. In this case the drain valve situated on the bottom of the valve body shall be opened, otherwise if it is not possible the vent plug (24) shall be opened carefully.*
- 8.9.1.2 *For the window on the yoke (19) it is possible to unscrew the nuts (5) from the gland bolts (9), lift up the gland plate (6), verify that the upper part of the gland (7) is cleaned and free of rust, otherwise it must be removed by means of a smooth sandpaper.*
- 8.9.1.3 *Inspect the stuffing box on the bonnet (8) with a lamp to verify absence of rust or dirty; if it is necessary clean out the area with a degreaser.*
- 8.9.1.4 *Lift up the gland (7) and by means of a packing tool remove the packing rings (11) from the stuffing box. If the valve is provided with a lantern ring, it is possible to lift up the same with flexible packing tool screwed in the lantern hole and then to remove the lower packing rings.*

8.9.2- GLAND PACKING REASSEMBLY

Insert the new packing rings, the gland (7) and the gland plate (6). Position the gland plate through the gland bolting (9) and tighten the nuts (5) evenly.

8.9.3- VALVE DISASSEMBLY

Before performing any maintenance activities, ensure, for the sake of safety, that the pressure is completely removed from the line.

- 8.9.3.1 *Identify with a marker the position of the possible gear operator or actuator on the yoke flange.*
- 8.9.3.2 *Place the valve in closed position so that when the gear operator and/or actuator is disassembled, only the length of stem shall be governed while the slab remains on the bottom of the valve in safety condition (contrary on valve with reverse action).*
- 8.9.3.3 *Repeat all the operations necessary to remove the packing ring (as described on para 8.9.1)*
- 8.9.3.4 *Before unscrewing the nuts (10) identify with a marker the position of the yoke (19) on the bonnet (8).*
- 8.9.3.5 *Lift up the yoke (19) from the stem (12); be careful to avoid any damage of the same, lift up the gland flange (6) and the gland (7). All metallic parts (stud, nuts rod etc.) that need a cleaning shall be put in a box containing degreaser.*
- 8.9.3.6 *Before unscrewing the nuts (10), identify with a marker the body flange with the bonnet (8), lift up the same taking care to avoid any damage of the stem, place the bonnet in a clean area and in a position to be able to turn it.*

8.9.4- BONNET DISASSEMBLY

- 8.9.4.1 *For the parts located in the stuffing box refer to para 8.9.1.*
- 8.9.4.2 *Overturn the bonnet and verify that backseat is not damaged. Any possible rust can be removed by means a smooth sandpaper. If the backseat is damaged it is better to repair it.*
- 8.9.4.3 *To remove the stem (12) from its pocket in the slab, it is enough to move it sideways and lift it up, being careful to avoid any damage, place it in a clean area verify that there are no damage in the packing area. If there is a little damage on the surface, remove it, with a very smooth sandpaper grade 400 to 600. verify also that it is straight and thread not sizing; check besides the backseat area and if it is necessary clean it carefully.*

8.9.5- SLAB DISASSEMBLY

To perform this operation it is important to provide with the necessary equipment to withdraw the seats (15) This equipment is supplied as optional upon request.

Normally they are built in steel plates that are placed in the special pocket located on the body. Using the seat lifter tool it is possible to withdraw the seats in the recess enough to lift up the slab. Clean carefully this area to find the threading hole.

Lift the slab taking care not to damage the seats, place it in a very clean area supported by wooden tools with soft plastic on top. Verify accordingly that there are no abrasions or seizing in the seat area; do not upset in the area where is located the stem head; verify very well that the bevel on the bore is not damaged and it is necessary clean it with a very smooth sandpaper.

8.9.5.1 *Remove the body bonnet gasket (13) from its pocket on valve body and verify very well that the seating area on the body and bonnet are not damaged. Clean carefully this area and if it is necessary clean with sandpaper to remove any possible*

presence of rust. Usually this gasket shall be replaced, but however it will be care of the maintenance operator to decide the suitability it is better to change it.

8.9.5.2 *Remove the lifter tool equipment used to withdraw the seats.*

8.9.5.3 *It is not difficult to disassemble the seats, but more attention shall be paid to remove it from the pocket area not loose the spring seat (18), because if it falls down on the bottom of the valve it will be difficult from the pocket area to get them back. Once the seats have been removed from the valve place them in a clean area (on soft paper) and check that the contact surfaces of them with the slab are not damaged and that the soft seat seals in good condition. If the seats have not to be replaced, it is better not to recover the seats with machining if these are not approved from FROMME Engineers.*

8.9.5.4 *With the help of a screwdriver to remove the "O ring / Lip seal" seat gasket (17, 20) without damaging it, clean it with a degreaser wetted cloth (if possible do not use thinner). Verify very well that on the entire "O ring / Lip seal" ring surface along the entire circumference there are no marks. In the affirmative case the same shall be changed.*

8.9.6- VALVE REASSEMBLY

NOTE: *Before starting any assembly, check with the part list of the material that there are all the components, verify that the received spare parts are suitable by means of a virtual pre-assembly with the part of the valve on which shall be mounted.*

If it is possible perform all preassembly operation to make practice with the parts.

On all parts of the valve where is located the gasket verify very well that there are no damages, dirt or rust otherwise it must be removed.

8.9.6.1 *Before placing the seats (15) in their pocket on the body carry out pre-assembly placing the "O ring / Lip seal" rings in the suitable groove.*

8.9.6.2 *Use the special lifter tool to withdraw the seats (15).*

8.9.6.3 *Reassembly the slab (14) in the body. More attention shall be paid to avoid any damage on the seats previously positioned.*

8.9.6.4 *Before removing the lifter tool used to withdraw the seats in the pocket and permit to the slab to move in, verify, if it is possible, if the bore is perpendicular to it.*

8.9.6.5 *Place the gasket in its groove.*

8.9.6.6 *Place the stem head (12) in its groove in the center of the slab.*

- 8.9.6.7 Place the bonnet (8) on the body taking care to find all the reference marked before disassembly and verify that the body studs (10) are tightly screwed in. Take care not to damage the stem previously positioned.
- 8.9.6.8 Screw the nuts (10) without shutting them tightly.
- 8.9.6.9 Place all stems sealing part located in the stuffing box area (as described on para 8.9.2).
- 8.9.6.10 Place the yoke (19) in the same position taking in consideration all marks indicated on it. Screw the bolts (23) and shut them tightly.
- 8.9.6.11 Shut with dynamometric key the body nuts (10) to avoid any damage on the bonnet gasket (12). For torque bolts value see the table in para 8.2.
- 8.9.6.12 Position possible gear operator and/or actuator on the stem.
- 8.9.6.13 Turn the hand wheel of the actuator so that the slab lift is up and if it is possible verify if the bore of the slab are perfectly in line with the bore of the valve body. Check with a marker, if it is possible, the length of the run with the valve supplied on the data sheet.

9.0 - SPARE PARTS

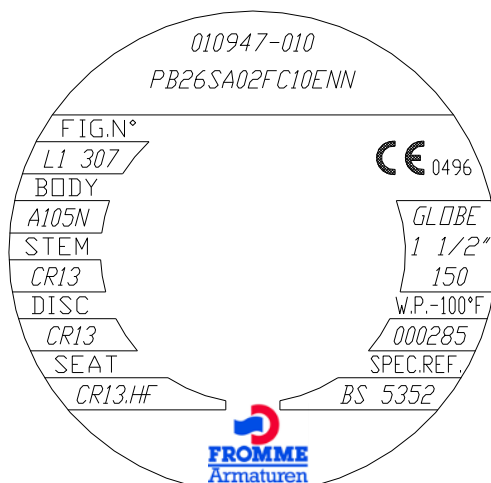
9.1- LIST OF SPARE PARTS

For standard maintenance of valves the only components suitable to be substituted are: Stuffing box packing – part 11 show on drawings on par.2.0

Body/bonnet gasket – part 13 show on drawings on par.2.0

For special case of maintenance other components are available as spare parts.

If any spare parts are required, it is necessary to refer to FROMME. internal shop order indicated on top of name plate as shown below (i.e. 010947-010) and part number indicated on drawing at par.2.0.



10 – PROBLEMS SOLUTION

10.1 - LEAKAGE THROUGH THE PACKING

In the case of small leakage proceed with a re-tightening of the packing bolts.

In the case the leakage persists or in the case of wide leakage through the packing, the valve must be put in the fully open position (backseat position), and the packing substituted in accordance with indication of par.8.1.

The valve need not be removed from the line, but repacking is not recommended while the valve is in service. If the problem persists contact FROMME. for further instructions.

10.2 – LEAKAGE THROUGH THE BODY/BONNET GASKET

In the case of leakage, stop and de-pressurize the pipeline section on which the valve is installed and proceed with gasket substitution as described on par.8.3.

If the problem persists contact FROMME. for further instructions.

10.3 – SEAT LEAKAGE

If a leakage is detected when the valve is closed, for some reason the seat and or the closure member are damaged. To repair(if possible) the seat surface proceed as indicated in par. 8.4.1. or 8.5.1.

For through conduit see par. 8.9

11.0 - EXPLOSIVE ATMOSPHERES (ATEX)

Valves may be used in potentially explosive atmospheres. Where the customer require valves in conformity to ATEX 94/9/EC,

FROMME. can supply valves in conformity to Zone II category 2.

In accordance with the Directive 94/9/EC. in this manual FROMME gives some indications to the valve users on how to operate in safety conditions.

- *The following potential cause of explosion have been identified:*
- *Leakage from packing*
- *Leakage from body-bonnet connection*
- *Not adequate lubrication*
- *Not adequate electric continuity*
- *Not adequate thermal insulation*
- *Electric components.*

11.1 – LEAKAGE FROM PACKING

Check frequently the condition of packing and keep monitored the amount of emission by the use of suitable means (i.e. sniffers); in the case of significant leakage level, proceed as described in par. 8.1 of this manual.

If a low emission level is allowed, FROMME. suggests to use valves with live loading packing that, by the use of loading springs, guaranty a better and stable packing compression with less frequent need to tighten the bolts.

If any emission level is not allowed, it is necessary to use bellows seal valves that guaranty the perfect stem sealing during valve life.

11.2 – LEAKAGE FROM BODY/BONNET CONNECTION

In the case of valve leakage through body-bonnet joint, it is necessary to substitute the gasket as described in par. 8.2 of this manual.

If the ambient conditions do not allow for any leakage, FROMME. suggests to use valves with welded body-bonnet design as described in par. 2.1 of this manual.

There are two types of weld design:

A - Body and bonnet screwed to contain the pressure force and an additional fluid seal weld.

B - Body and bonnet assembled together with a full penetration weld.

In the case of a dangerous fluid or severe working conditions (temperature or pressure), FROMME. suggests the use of full penetration weld connection.

11.3 – NOT ADEQUATE LUBRICATION

In the case of long and frequent operations, the friction between stem, yoke sleeve and bonnet, can cause a local increase of the temperature.

Therefore FROMME. recommends to lubricate all the parts involved as described in par. 8.8 of this manual.

11.4 – NOT ADEQUATE ELECTRIC CONTINUITY

FROMME. valves are made with steel components always in contact a full electric continuity is guaranteed. In case the connection to the pipeline does not guaranty the metal continuity (i.e. flanged connection with fully or partially non metallic gasket) FROMME. suggests to adopt equipotential devices.

11.5 – NOT ADEQUATE THERMAL INSULATION

Valves can be used at any temperature allowed by the relevant rating table; the high temperature of external surfaces can be a potential cause of explosion.

In this case it is a good practice to insulate the valves when used in hot conditions with similar devices as adopted for the rest of the pipeline.

In the case of external part of valves that can not be insulated could reach unacceptable temperature, FROMME. suggests the use of a extended bonnet valve type that can be used for cold or high temperature service.

The bonnet extension can be insulated adequately to reduce the problem.

Anyway, the temperature of the fluid conveyed in the inner part has to be compared with the minimum temperature for priming of explosive atmosphere in order to check the compatibility.

Since the insulations usually realized are not sealed they do not ensure sufficient insulation.

11.6 – ELECTRIC COMPONENTS

In the case that valves are required with any electric equipment mounted on, check if the Ex certificates of the electric components are for the protection level required by the site conditions.

In the case that these certificates are missing, do not hesitate to ask for them from the FROMME. Quality department.

11.7 – PRESENCE OF POWDERS THAT MAY TRIGGER EXPLOSIONS

The valves FROMME are built up in such a way that possible powders in the surrounding environment cannot enter the valve itself. Nevertheless it is recommended to check at regular intervals the fastening of the stuffing box in order to prevent the infiltration of these powders, which, after the contact with the inner fluid/gas, might trigger explosions. During the cleaning of the external valve surfaces, it is recommended to use wet clothes to prevent electrostatic effects, which may trigger explosions, if in contact with the powders themselves.

12 – ENVIRONMENTAL PRECAUTIONS

Hereinafter are reported the indications for the good practices to be adopted during the life cycle of the product for a correct use also in order to protect the environment and prevent pollution.

12.1 – ASSEMBLY

When installing the valve, the materials for packing and protection have to be removed and disposed according to the following prescriptions

- *DO NOT THROW AWAY*
- *DO NOT BURN IN UNCONTROLLED WAY*
- *DISPOSE ACCORDING TO THE NATIONAL RULES IN FORCE*
- *BLY RECYCLE – ALL THE USED METALS ARE RECYCLABLE*
- *PREFERABLY RECYCLE – ALL THE USED PACKING MATERIALS ARE RECYCLABLE*

12.2 – OPERATION AND MAINTENANCE

- *Observe the indications contained in this manual to prevent leaks of products that are harmful for the environment due to improper use.*
- *The material used to realise the packings is free from asbestos fibres, use products with the same features when replacing*
- *Maintenance shall be in accordance with the indications of this manual*

12.3 – DISPOSAL

When the valve life has come to end it becomes waste and it shall be disposed according to the following indications

- *DO NOT THROW AWAY*
- *DISPOSE ACCORDING TO THE NATIONAL RULES IN FORCE*
- *TEMPER WHEN THE VALVE WAS IN CONTACT WITH HARMFUL PRODUCT*

Notes:



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