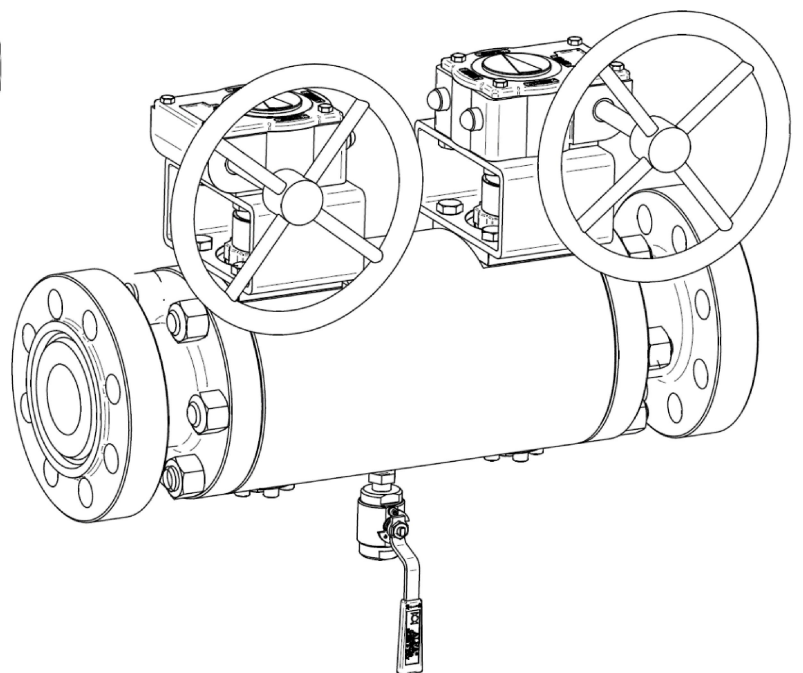
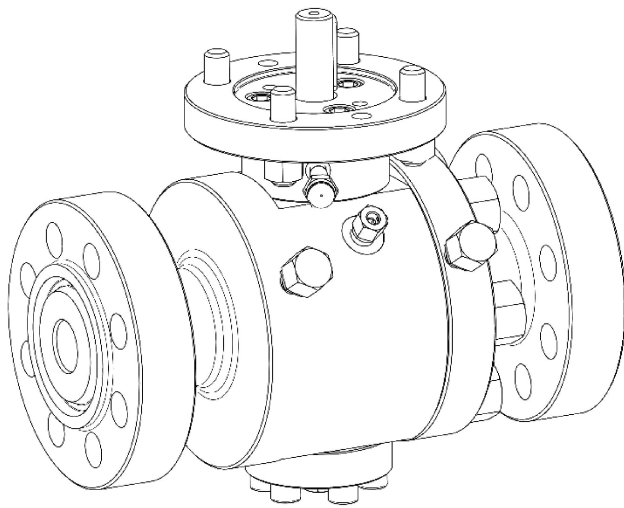


OPERATING AND MAINTENANCE MANUAL
ALFA SPLIT BODY TRUNNION MOUNTED BALL VALVES
Model ALFA T2
(Valid for S.B. valves both for D.B.B. valves)

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0. TECHNICAL DATA

0.1 MANUFACTURER

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0.2 ALLOWED USE AND LIMITS

Operators involved in the storage, mounting, use and/or maintenance of our products are requested to have sufficient skill and experience in such a kind of equipment. It is user responsibility to guarantee this skill is met.

Service: ON-OFF

Fluids: Liquids e gases Group 1 (dangerous), not unstable, according to the European Directive 2014/68/UE “PED”, art. 13 – Category III



Use in potentially explosive atmospheres : II 2 GD c T6 X according to the EC Directive 94/9/EC “ATEX”

Minimum guaranteed tightness limits on brand new valve:

Emissions to atmosphere	on request, according to TA-LUFT and/or ISO 15848-1 requirements
Hydrostatic Body Test	(1,5 x Maximum working pressure at room temperature) Zero Leakage
Hydrostatic Seat Test	(1,1 x Maximum working pressure at room temperature) Zero Leakage
Pneumatic Seat Test	(Air, 6 bar) Zero Leakage

“Fire Safe” features: on request, according to ISO 10497 / API 607 / API 6FA / BS 6755.

Model	ALFA T2(****)												
	PN10-16-25-40 ANSI 150		PN25-40 ANSI 300		PN63-100 ANSI 600		PN160 ANSI 900		PN250 ANSI 1500		PN420 ANSI 2500		
Nominal Diameter	FB	DN 40 - 100 Ø 1½” - 4”		DN 40 - 100 Ø 1½” - 4”		DN 40 - 100 Ø 1½” - 4”		DN 40 - 100 Ø 1½” - 4”		DN 40 - 100 Ø 1½” - 4”		DN 40 - 80 Ø 1½” - 3”	
	RB	DN 50 - 150 Ø 2” x 1½” - 6” x 4”		DN 50 - 150 Ø 2” x 1½” - 6” x 4”		DN 50 - 150 Ø 2” x 1½” - 6” x 4”		DN 50 - 150 Ø 2” x 1½” - 6” x 4”		DN 50 - 150 Ø 2” x 1½” - 6” x 4”		DN 50 - 100 Ø 2” x 1½” - 4” x 3”	
Maximum working pressure at room temperature (bar)	10	PN10	PN25	PN25	64	PN63	160	PN160	250	PN250	420	PN420	
	16	PN16	PN40	PN40	100	PN100							
	20	A.150	51	A.300	102	A.600	152	A.900	255	A.1500	425	A.2500	
Maximum working pressure at maximum temperature (bar)	8	15	A.300	80	A.600	135	A.900	225	A.1500	375	A.2500		
	Pressure values between room temperature and maximum temperature vary depending of characteristics of used seats/seals materials. Please contact ALFA VALVOLE Technical Dept. for more information.												
Maximum working temperature	240°C*		240°C*		240°C*		240°C*		240°C*		240°C*		
Minimum working and room temperature	-29°C*	for carbon steel A105 / A216 WCB valve bodies						with impact test verification when TR** ≤ 21°C					
	-40°C*	for carbon steel A350 LF2 / A352 LCB valve bodies											
	-40°C*	for stainless steel valve bodies						without impact test verification					
	-196°C*	for stainless steel valve bodies						Without impact test verification (valve without O-Ring and with Lip-Seals energized gasket)					
Maximum simultaneous working conditions	Please contact ALFA VALVOLE Technical Dept.												

**TR = design temperature, for impact test verification, according to I.S.P.E.S.L. Code Case M Table M.14.2 and EN 13445 standard.
 The body thickness is assigned so that the design temperature, for impact test verification according to I.S.P.E.S.L. Code Case M Table M.14.2 and EN 13445 standard, are above 21 °C.

* Other restrictions imposed from the material of the seat ring, the gasket material and the nominal diameter of the valve will be indicated on the nameplate attached to the valve body.

*** Includes the D.B.B. models.

Table of nominal dimensions of valves

DN	40	50	65	80	100	150
Ø"	1 ½"	2"	2 ½"	3"	4"	6"

0.3 SPECIFIC DESIGN CHARACTERISTICS

END CONNECTIONS	Flanged to ANSI/DIN/UNI/EN, Butt Welding to ANSI B16.25
BODY THICKNESS	ASME VIII Div.1 – ASME B16.34
BOLTING DESIGN	ASME VIII Div.1 – ASME B16.34
SCREWED CONNECTION DESIGN	Not applicable
FLANGE DESIGN	ASME VIII Div.1
SIMULTANEOUS LOADS	Pressure, Bending, Axial Loads from piping
WIND LOADS	Negligible, according to ASME III Div.1 Subsect. NB
EARTHQUAKE LOADS	Applicable, according to ASME III Div.1 Subsect. NB <i>All valve +actuator assemblies are verified under the effect of earthquake that overload of a maximum of 40% the own weight of actuator and valve bonnet</i>
FATIGUE from On-Off starting cycles	Negligible, according to ASME III Div.1 Subsect. NB (see the maximum number of operating hours)
FATIGUE from service pressure fluctuation	Negligible, according to ASME III Div.1 Subsect. NB (see the maximum number of operating hours)
MAXIMUM LIFE IN SERVICE HOURS	Function of actual simultaneous working conditions and fluids but anyway not longer than : 100.000 (see para 3.1 for recommended periodical inspections); OR (depending on the conditions that happens first)
	50.000 operations of opening/closing of the valve (liquid service)
	5.000 operations of opening/closing of the valve (gas service)
	1.500 pressurization-depressurization cycles (Carbon Steel valves) 13.000 pressurization-depressurization cycles (Stainless Steel Valves)
AVAILABLE CORROSION OVERTHICKNESS	2.0 mm min. (carbon steel valves only)
ANTISTATIC FEATURES	according to API 6D app. B5

The T2 trunnion mounted ball valves family is developed in 3 different designs and drawings, following the chart here below:

SIZE	RATING					
	ANSI 150 PN 10/16	ANSI 300 PN25/40	ANSI 600 PN64-100	ANSI 900 PN160	ANSI 1500 PN250	ANSI 2500 PN420
1 ½" 2" x 1 ½"	A	A	A	A	A	A
2" 3" x 2"	A	A	A	B	B	A
3" 4" x 3"	A	A	A	A – C	C	A
4" 6" x 4"	A – B	A – B	A – B	C	C	---

- Execution "A": External trunnion, stem assembled from the inside of the body, no bolted bonnet.
- Execution "B": External trunnion, stem assembled from the outside of the body, bolted bonnet.
- Execution "C": Internal trunnion plate, bolted bonnet, stem assembled from the outside of the body.

The 3 designs needs to follows different maintenance instruction, as detailed in the para. 3.

1. TRANSPORT, HANDLING AND STORAGE

1.1 TRANSPORT AND HANDLING

Valves must be transported and handled maintaining the ball in the open position.
 DO NOT remove the protection caps from the ends until the valve is to be mounted in line.
 Avoid impacts against obstacles that may damage the stem or the auxiliary connections (drains, sealant injectors, vents).

1.2 STORAGE

Valves with carbon steel or stainless steel bodies must both be stored with ball in the OPEN position and in a location dry and free from fumes, gas or corrosive vapours.

For long storage periods it is advisable to cover the external surface with a layer of protective wax (Tectyl) or close the valves in polythene bags.

2. INSTALLATION INSTRUCTIONS

The installation procedure for ball valves is critical to ensuring both long life and satisfying performance. Valves stored on site awaiting installation should be kept in their original packing, in dry conditions, where damage cannot occur.

Before carrying out the installation, it is important to follow the basic procedures described below:

2.1 General

- Carefully unpack the valve and check valve nameplate for identification of materials.
- Remove all packing materials.
- All valves are bi-directional and supplied ready to use. Valves can be placed with stem oriented to any direction.
- Check the valve for any flow direction indication marks. Appropriate care must be taken, to install the valve for proper flow orientation.
- Inspect the valve interior through the end ports to determine it is clean and free from foreign matter according to ASME G93-03E1.
- Ensure that all auxiliary connections, if any, (lubricators, drains, vents) are free of damage and properly tightened.
- Cycle the valve and inspect any functionally significant features.
- Read all the literature and note any special warning tags or plates attached to the valve.
- Before installation check to insure the ball is in the fully open position in order to prevent possible damage to the ball and seats. The valve performance depends on its original conditions. At any stage do not leave the valve in the partially open position.

2.3 Weld End Valves in-line

- Welding of valves shall be performed by a qualified person according to the ASME Boiler Construction Code Section IX. For valves to be welded within the E.U., refer to the requirements of ESR 3.1.2 of the Pressure Equipment Directive 97/23/EC.
- Valves that will be welded directly to the line must be in the fully open position to protect the ball and seats from excessive temperatures during the welding procedures.
- Protect or remove actuators from weld splatter or arc strikes. Valves in the “Fail Close” position should be cycled to the open position.
- Allow free flow of water through the drain bottom valve and overflow through the vent valve to prevent overheating all through the welding process. **DO NOT** heat the center section over 150° C
- Align valve to pipe line, ensuring proper fit to minimize pipe load. Tack weld only.
- Complete welding in small segments. Allow enough time for cooling between each segment.
- Do not rotate the valve before flushing the line.

2.4 Flanged End Valves

- Valves with flanged ends should be treated as a single unit and should not be dismantled when installing to pipeline.
- Before installing the valves, make sure that the flanges on the mating pipe are free from excessive grit, dirt or burrs, and that there is no mechanical damage to the flanges on the pipe.
- When inserting the flange bolts, make sure the bolts are correct size to hold pressure and axial forces.



ATTENTION: When the valve installation has been completed, a full functional test needs to be performed.

The test must verify the valve's ability to open and close completely, whether it is activated manually or with the help of gearboxes or actuators and, if applicable, the correct operation of position indicators and/or other auxiliary devices.

The acceptance criteria will be as follows:

- It must be possible to move the ball between open and closed positions.
- Any position indicator and/or auxiliary devices must indicate the correct position of the ball

For more detailed information about the test performing, refer to the document “IOC 001 – OPERATING INSTRUCTION FOR FINAL TESTING OF BALL VALVES”, para.9 – Functional Testing.

ALFA VALVOLE Ball Valves provide tight shut off when used under normal conditions and in accordance with ALFA VALVOLE published pressure/temperature chart.

Valve operation works by operating the valve handle 90° turn counter-clockwise to open, and 90° turn clockwise to close. All standard valves are bidirectional and as such, can be installed for flow in either direction.

Valves which are unidirectional will have a flow direction arrow welded to the body and separate assembly instructions.

A lubricant is applied through grease fittings on both ends and gland, to assist valve break in. The lubricant, if unacceptable, may be removed by a solvent wash.

If a shut-off valve is installed for end of line service, it must be ensured that it is closed with a blind end connection and the valve is secured against being opened unintentionally.

WARNING: Never look into the valve bore while the valve is in a flow-line. Pressure and fluids could escape from the valve causing injury.

To prevent leakage, malfunctions resulting from internal wear or seal degradation, the user must establish a preventive maintenance and inspection program. This program must include:

- a. Inspection of parts to detect loss of wall thickness which may result in decreased pressure capacity
- b. Routine replacement of seals and inspection for proper operation.

3. MAINTENANCE

3.1 A general control of the valve is advisable every 2 years of functioning or every 5.000 opening and closing cycles.

3.1.1 Remove electric and pneumatic or hydraulic actuators power supplies before removing the valve from piping or before any maintenance or cleaning adjustment.

ATTENTION: check absence of electric and pneumatic or hydraulic actuators power supplies before disconnecting.

The execution of eventual intervention must follow the procedure illustrated at points 3.2 and following.

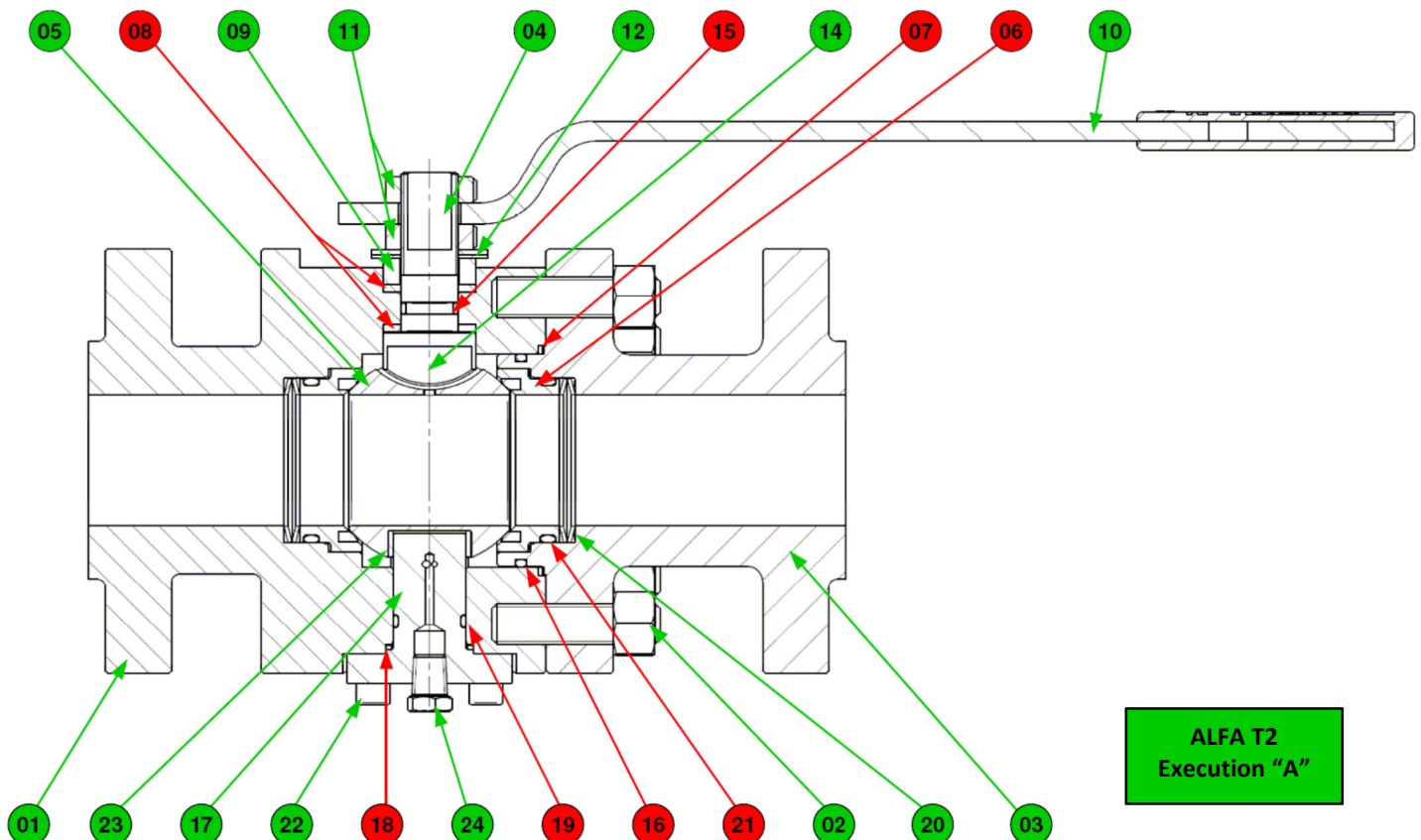
In occurrence of dirty fluids interception, more frequent periodic checks are recommended, please contact ALFA VALVOLE Technical Dept for further information.

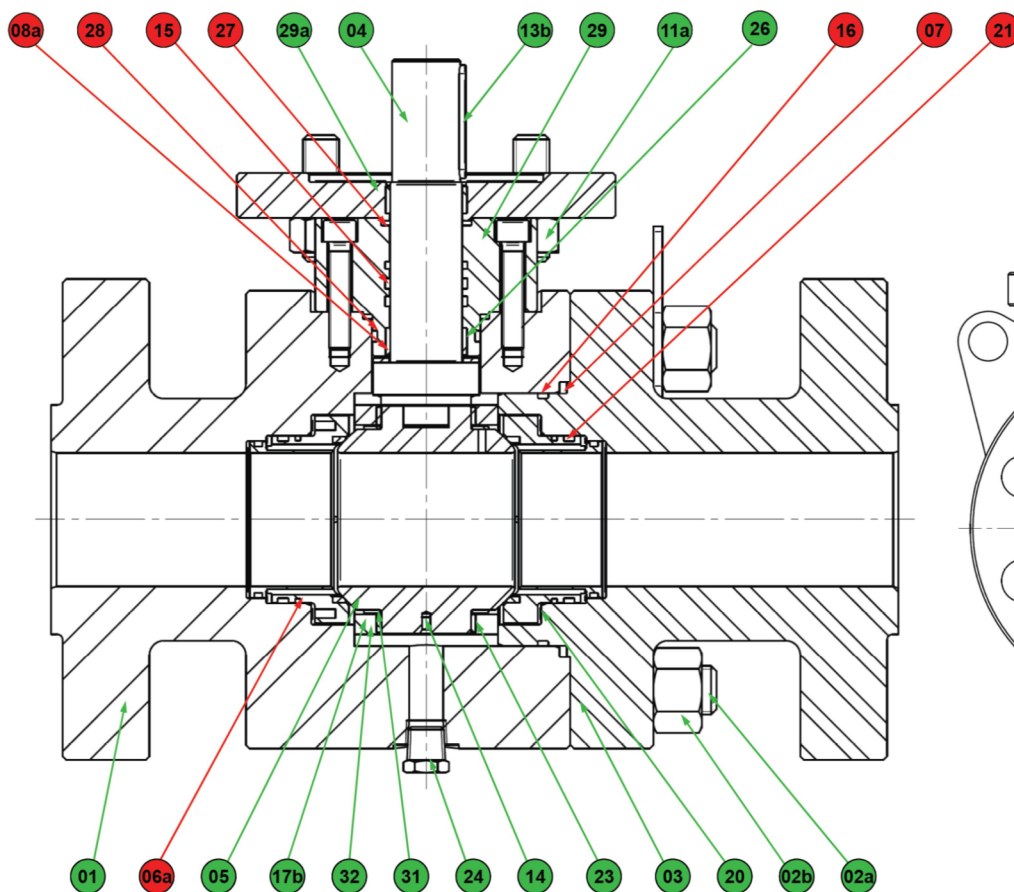
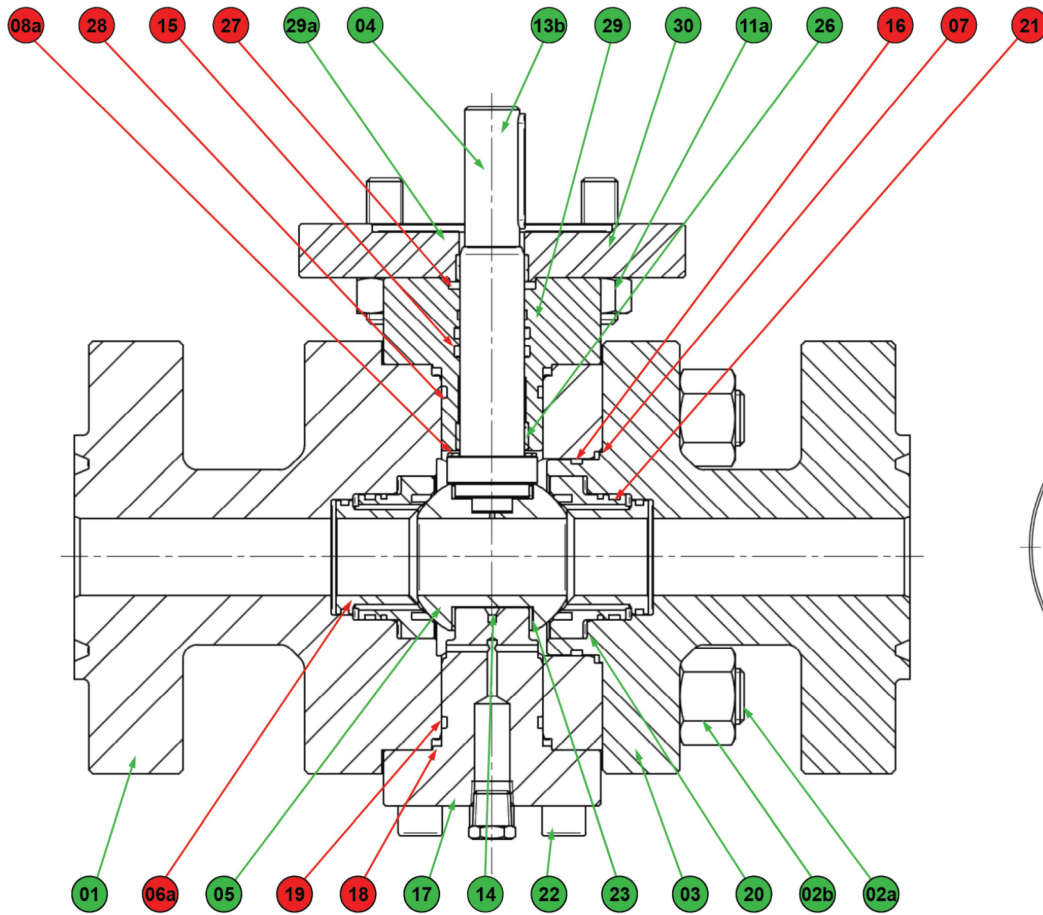


ATTENTION: it's user's responsibility to maintain the safety features of the product and of their components in case of maintenance / repair on their own.

Table 1 – SPARE PARTS

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Body	11a	Adapter plate bolting	23	Ball bushing (*)
02a	Body stud	12	Spring Washer	24	Drain plug
02b	Body stud nuts	13b	Key	25	Bleed valve
03	Closure	14	Antistatic device	26	Stem washer (*)
04	Stem	15	Stem O-ring (*)	27	Gland plate gasket (*)
05	Ball	16	Body O-ring (*)	28	Gland plate O-ring (*)
06a	Seat ring + insert (*)	17	Trunnion	29	Gland plate
07	Body gasket (*)	18	Trunnion gasket (*)	29a	Adapter plate
08a	Packing / Stem Gasket (*)	19	Trunnion O-ring (*)	30	Adapter plate screw
09	Gland	20	Seat spring	31	Thrust washer
10	Lever	21	Seat O-ring (*)	32	Pin
11	Nut / Lock nut	22	Cup screw	33	Drain Valve





NB: MAINTENANCE FOR DBB VALVES

All the replacement instructions are the same that for a S.B. Valve; the only difference is that with DBB Valve the components for which needs to be checked the status and integrity is exact the double than in the S.B. Valve.

3.2 STEM SEAL MAINTENANCE

This step is void only for valves in execution "B" and "C", where is possible to remove the stem from the valve from the outside, without disassembling the valve from the pipeline.

For valves in execution "A", please follows the step at point 3.3.1.1 and 3.3.2.1

3.2.1 DISASSEMBLY

Ensure that a residual pressure is not in the cavity of the body by performing a complete open-close operation.

Unscrew the DRAIN PLUG (24), very slowly to allow the relieving of any inside pressure.

Remove the actuator or the gearbox.

Remove the STEM KEY (13b).

Unscrew the SCREWS (30)

Remove the ADAPTER PLATE (29a)

Unscrew the SCREWS (11a)

Remove the upper cover – GLANDPLATE FLANGE (29) and change the O-RINGS (15) and (28).

Eliminate the GRAPHITE GASKETS (27) and (08a)

Remove the STEM (4) and the STEM WASHER (26).

3.2.2 ASSEMBLY

Verify all removed parts and more in detail:

- verify stem bearing surfaces are free from damage;
- verify integrity of STEM WASHER (26);

Require any necessary replacement parts as well as seals and stem washer, which must always be replaced anyway.

Mount STEM WASHER (26) on STEM (4), mount and lubricate the O-RINGS (15) and (28) on upper cover – GLANDPLATE FLANGE (29) and insert the stem.

Position GRAPHITE GASKET (27) into the body and mount upper cover tightening the relevant SCREWS (11a).

Insert the GASKETS (15).

Mount the ACTUATOR FLANGE (29a).

Tight the SCREWS (30) according the [table 2](#).

Insert the KEY (13b) on STEM (4).

Operate the valve 2-3 times to verify a free movement and verify no leakage occurs.

3.3 GENERAL MAINTENANCE**3.3.1 DISASSEMBLY****3.3.1.1 Valves referred to drawing A**

Remove the valve from the pipe system

Clean the residual piping product from valve, especially if toxic or harmful.

Operate the valve in order to have the ball in OPEN POSITION

Block the valve in a parallel-jaw vice, with the axis in a vertical position

Unscrew the CAP SCREWS (22) and remove the TRUNNION (17)

Verify the conditions of the TRUNNION GASKET (18) and TRUNNION O-RING (19)

Unscrew the BOLTS (02b) and remove the CLOSURE (03)

Raise and remove the BODY GASKET (07) with an extractor tool.

Remove the SEAT (06) from the CLOSURE (03) taking care not to lose the SEAT SPRINGS (20) and keeping note of their configuration.

Verify the condition of the SEAT O-RINGS (21), carefully degreasing the surface of contact between the seats and the closure and check the housings of the SEAT O-RINGS (21) in the closure.

In the presence of surface defects, eliminate them using grade 400 abrasive paper.

Remove the BALL (5) and verify for surface defects in the area of contact with the seats.

Check the condition of the BALL BUSHING (23).

Remove the SEAT (06) from the BODY (01) together with the SEAT SPRINGS (20).

Carry out the same controls for the other seat.

Unscrew and remove the STEM NUTS (11) from the Stem. Remove in succession the BELLEVILLE SPRINGS (12), the PRESSING BUSH, and the BUSH (09 and 08a). Remove the STEM (04) from its housing extracting it from the inside of the body, with the STEM GASKET (item n°08).

3.3.1.2 Valves referred to drawing B

After the operation of the valve in "OPEN" position, remove it from the piping system.

Clean the residual piping product from valve, especially if toxic or harmful.

Proceed according point 3.1.1.

Unscrew lower cover SCREWS (22) and remove TRUNNION (17).

Position the valve in the vertical position and remove NUTS (02b).

Remove the CLOSURE on the free side (3).

Remove the SEAT (06a) from the CLOSURE (03) taking care of SEAT SPRINGS (20) and keeping note of their configuration.

Verify all O-RINGS (16) and (21) and check any damage on the surface where seat O-rings (21) works

When surface defects are present, eliminate them with abrasive paper grade 400.

Remove the BALL (5) together with the two supports, verify any surface defects, and verify the integrity of BALL BEARINGS (23).

Remove the BODY (1) from second connector and develop same inspections than above.

3.3.1.3 Valves referred to drawing C

After the operation of the valve in "OPEN" position, remove it from the piping system.

Clean the residual piping product from valve, especially if toxic or harmful.

Proceed according to point 3.1.1.

Position the valve in the vertical position and remove NUTS (02b).

Remove the CLOSURE on the free side (3).

Remove the SEAT (06a) from the CLOSURE (03) taking care of SEAT SPRINGS (20) and keeping note of their configuration.

Verify all O-RINGS (16) and (21) and check any damage on the surface where seat O-rings (21) works.

When surface defects are present, eliminate them with abrasive paper grade 400.

Remove the BALL (5) together with the two supports and verify any surface defects.

Remove the BALL SUPPORTS (17a).

Verify integrity of BALL BEARINGS (23) and (31), changing them with ALFA VALVOLE original Spare Parts when necessary.

Remove the BODY (1) from second connector and develop same inspections than above.

Remove the SEAT from second connector.

**INSPECT THE WORN OUT CONDITIONS OF ALL ITEMS AND REPLACE THE DAMAGED ONES.
PARTS THAT NEEDS TO BE REPLACED IF REQUIRED DURING MAINTENANCE
ARE MARKED WITH (*) IN THE TABLE A - SPARE PARTS**

3.3.2 ASSEMBLY

3.3.2.1 Valves referred to drawing A

Position the BODY VALVE (01) with the axis of the port in the vertical position.

Carefully lubricate the housing of the SEATS (06), BODY GASKET (07), BODY O-RING (16), TRUNNION O-RING (19), TRUNNION GASKET (18) and STEM O-RING (15) using the proper grease (AGIP Grease VP2 or equivalent).

Insert SEAT SPRINGS (20) into the body, put the relative SEAT (06) on them and pressing on it to pass the resistance of the O-Ring. Put the STEM O-RING (15) onto the STEM (06) and insert the STEM GASKET (08) into its housing in the body, then insert the STEM from inside the BODY (01): push it until it emerges from stuffing box; then insert the BUSH (08), the PRESSING BUSH, (09), the BELLEVILLE SPRINGS (12), and last the LOCK NUT (11). Tighten without pressing the assembly.

Move the stem to the "OPEN" position, then insert the BALL in the "OPEN" position, so as its slots fits the tang on the stem.

Assemble the second SEAT (06) in the CLOSURE housing (03), repeating the same operations as for the body side seat.

Insert the BODY GASKET (07) in its own groove.

Bring together the CLOSURE with the BODY matching the studs (item n°02a), bolted in to the Body, with the Closure Holes, insert the NUTS (item n°02b) and tighten lightly only using your hands.

Assemble the TRUNNION GASKET (17) and the TRUNNION O-RING (19) in their groove, then insert the TRUNNION PIVOT (17) into the hole and tighten crosswise the CAP SCREWS (22)

Assemble the complete unit, press firmly the valve flange onto a vice and prepare to tighten the NUTS using a proper wrench; proceed gradually and crosswise: arrive to final lock only when all NUTS (4, 8, 12, 16, depending from the valve size) are tightened so as to have the Closure well adherent to Body. At this point screw firmly the LOCK NUT (11) on the STEM.

For the nuts tightening torque please refer to [table 3](#).

Fit the LEVER (10) in position in order that, with the Ball in "open position", the LEVER is aligned with the flow direction: Please note that the Lever rotation from the "open position" to the "closed position" shall be Clockwise.

Assemble the LEVER (item n°10) on the Stem, and tighten it using the LOCK NUT (item n°11).

Operate the valve 2-3 times to ensure that it can be correctly operated without difficulty.

3.3.2.2 Valves referred to drawing B

Place the BODY (1) vertically.

Grease thoroughly the area of seat housing and other areas where the SEALS (7) and O-RING BODY (16) are located.

Put the springs in the housing bore behind the seat.

After putting the O-RING GASKET (21) into its seat slot, place seat in its housing.

Put the ball in the OPEN position.

Mount the second SEAT in the closure (3) repeating the same steps.

Enter the CLOSURE (3) in the body and tighten the Nuts (02b) without exceeding.

Insert the GLANDPLATE FLANGE (29) following the procedure described in section 3.2.2.
 Then insert the lower TRUNNION (17) and tighten the SCREWS (22).
 Move the ball in the closed position and complete the tightening of the NUTS (02b) gradually and in a crossway.
 For the nuts tightening torque please refer to [table 3](#).
 Open and close the valve at least 2-3 times in order to check the operability without difficulty.

3.3.2.3 Valves referred to drawing C

Position one CLOSURE (3) with the port in the vertical position and block it.
 Lubricate the seat O-rings area on seats and on the relevant working surface into both connectors as like as body-closure O-RINGS (16) and GASKETS (7) and their working surfaces into body.
 After the insertion of O-RING (21) in the seats, insert the seats and block the seats into connectors with the use of STOP SCREWS (22a).
 Mount BALL SUPPORTS (17) and WASHERS (31) (bottom part of ball) on the ball and then place it on the seat, in closed position, and match the supports on their PINS (32).
 Insert the BODY (with the rods already assembled), checking that the hole coupling ball / stem is in line with the hollow of the sphere.
 Place the second CLOSURE.
 Tighten alternately and simultaneously the NUTS (02b) on both closures, without pull them stronger.
 Insert the STEM (4) and THRUST WASHER (26) in place.
 Tighten the NUTS (02b) in a gradually strong way, crossing them, on both closures.
 Insert the GLANDPLATE FLANGE (29) following the procedure described in section 3.2.2.
 For the nuts tightening torque please refer to [table 3](#).
 Open and close the valve at least 2-3 times in order to check the operability without difficulty.

TABLE 2		
GLAND & EXTERNAL TRUNNION BOLT TIGHTENING TORQUE (Nm)		
THREAD SIZE	B7 / L7 / B7M / L7M	B8 / B8M
M6	11,5	9
M8	27	21
M10	53	41
M12	92	71
M14	140	105
M16	232	175

TABLE 3		
BODY NUT TIGHTENING TORQUE (Nm)		
THREAD SIZE	B7 / L7 / B7M / L7M	B8 / B8M
M10	53	41
M12	92	71
M16	232	175
M20	471	361
M22	648	497
M24	809	620
M27	1201	920
M30	1628	1248

4. GREASING

Valves with lubricators may be subject to periodic or extraordinary injections of grease to blocking of any losses. Lubricators must be specified by the Purchaser, in the bid request or order.

4.1 GREASING OF SEATS.

The operation must be performed with the valve in closed position.
 Remove the protective caps from seat lubricators (X + Y), positioned on the outside flange diameter on the closure (03), maintaining blocked the body of the lubricator.
 Vent the body cavity through the vent valve (25) in order to reduce the pressure in the body cavity to a value less than or equal to line pressure.
 Close the vent valve (25).

ATTENTION: lubricators have a check valve to prevent fluid leakage from valve body. Removal of the protective cover may, however, potentially causes loss of the pressurized fluid contained in the valve to the atmosphere as well as in case of opening of the vent valve (25).



User must provide means of personal protection for operators and the implementation of security procedures that take into account the possible variation of the characteristics of the atmosphere surrounding the valve, including the generation of potentially explosive atmospheres.

Connect the hydraulic hand pump for the injection of grease with lubricator (X + Y).
 Pump the grease up to stop the leak from the seats, acting consecutively on both lubricators.
 Grease loss can be verified through the vent valve (25).
 Repeat 3 times for each lubricator, with 8-10 strokes.
 If there is no pressure inside the valve, perform two complete operations of opening and closing and repeat the greasing.

If the leakage from seats were to continue, stop the operation and perform maintenance and disassembly the valve. In case of leakage from seats, the operation must be repeated after each opening and closing cycle.

In case of greasing for only lubricating purpose, proceed to connect the hydraulic pump for the injection of grease to the lubricator (X + Y). Inject a quantity of grease and execute an opening and closing cycle.
Repeat until the obtainment of improving the fluidity of the action.

At the end, remove the hydraulic hand pump for the injection of the grease and replace the safety cover.
Proceed with the lubrication of the stem.

4.2 GREASING OF STEM

The operation can be performed with the valve in any position (open, closed or intermediate positions). Remove the protective cap from stem lubricator (X), positioned on the outside flange diameter on the closure (03), maintaining blocked the body of the lubricator.

Vent the body cavity through the vent valve (25) in order to reduce the pressure in the body cavity to a value less than or equal to line pressure.

Close the vent valve (25).

ATTENTION: lubricators are fitted with check valve that prevents leakage of fluid within the valve body. The removal of the protective cover may, however, potentially general loss to the atmosphere of the pressurized fluid contained in the valve opening as well as in the case of the vent valve (25).



The user must provide means of personal protection of operators and the implementation of security procedures that take into account the possible variation of the characteristics of the atmosphere surrounding the valve, including the generation of potentially explosive atmospheres.

Connect the hydraulic hand pump for the injection of grease to the lubricator (X).
Pump the grease up to stop the leak from the stem.

If leakage from seats were to continue, stop the operation and perform maintenance and disassembly of the valve.
In case of greasing for only lubricating purpose, proceed to connect the hydraulic pump for the injection of grease to the lubricator (X). Inject a quantity of grease and execute an opening and closing cycle.
Repeat until the obtainment of improving the fluidity of the action.

At the end, remove the hydraulic hand pump for the injection of the grease and replace the safety cover.

4.3 TYPE OF GREASE.

The type grease is function of type fluid inside the valve and of external temperature.
Contact ALFA VALVOLE sales dept. for its proper identification.

5. TESTING

5.1 S.B. VALVES (SINGLE BALL)

5.1.a Before carrying out of any test, to verify there are no problems in the movement of the ball, make at least one complete stroke of opening and closing.

5.1.b The valve must be tested using the following procedure:

- a) Place the ball in a semi-open position
- b) Pressurise the body with water at a pressure of 1,5 times the maximum operating pressure at room temperature indicated in the table found at point 0.2
- c) Verify that there are no leaks from the body seals, the trunnion pivot seals or the stem seals. Should there be any leakage from these seals tighten the stem nuts a little more.
- d) Release the pressure.
- e) Close the valve and unscrew the drain plug (24)
- f) Pressurise the first seat with water at a pressure of 1,1 times the maximum operating pressure at room temperature indicated in the table found at point 0.2
- g) Verify that there are no leaks from the drain hole
- h) Release the pressure
- i) Pressurise the second seat with water at a pressure of 1,1 times the maximum operating pressure at room temperature indicated in the table found at point 0.2

- j) Verify that there are no leaks from the drain hole.
- k) Release the pressure and drain the valve completely of any water through the drain hole
- l) Repeat the tests described in points f) and i) using air at 6 bar verifying that there are no leaks from the side not in communication with pressurized line
- m) Once the testing procedure has been completed, screw the drain plug into its threaded hole.

5.2 DBB VALVES (DOUBLE BALL)

5.2.a Before carrying out of any test, to verify there are no problems in the movement of the ball, make at least one complete stroke of opening and closing with each of the two levers.

5.2.b Valve must be tested using the following procedure:

- a) Place the two balls in a semi-open position, with the drain valve always in closed position.
- b) Pressurise the valve body, by water, with a pressure 1,5 times the maximum operating pressure at room temperature (See table at para 0.2)
- n) Verify that there are no leaks from the body seals, the trunnion pivot seals, the stem seals or from the drain valve. Should there be any leakage from these seals tighten the stem nuts a little more.
- c) Release the pressure
- d) Close the upstream ball, open the upstream ball drain hole removing the threaded plug, maintaining the downstream ball in a semi-open position;
- e) Pressurise from upstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- f) Verify that there are no leaks from the drain hole of the upstream ball (*FIRST UPSTREAM SEAT TESTING*);
- g) Release the pressure.
- h) Pressurise from downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- i) Verify that there are no leaks from the drain hole of the upstream ball (*SECOND UPSTREAM SEAT TESTING*);
- j) Open the upstream ball, close the drain hole of the upstream valve with its threaded plug, then close the downstream ball and open its drain hole removing the downstream threaded plug.
- k) Pressurise from downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- l) Verify that there are no leaks from the drain hole of the downstream ball (*FIRST DOWNSTREAM SEAT TESTING*);
- m) Release the pressure.
- n) Pressurise from upstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- o) Verify that there are no leaks from the drain hole of the upstream ball (*SECOND DOWNSTREAM SEAT TESTING*);
- p) Release the pressure.
- q) Close the downstream ball, and close the downstream drain hole screwing properly its threaded plug
- r) With the 2 ball in closed position and the threaded plug in their holes, open the drain valve.
- s) Pressurise from upstream and downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- t) Verify that there are no leaks from the drain valve (*FIRST UPSTREAM AND DOWNSTREAM SEAT TESTING*).
- u) Release the pressure.
- v) Open the 2 balls, and drain the valve completely of any water through the drain hole between the 2 balls;
- w) Repeat the tests described in points d) and v) using air at 6 bar and verifying that there are no leaks.

Once the testing procedure has been completed, be sure that all the 2 drain plugs are into its threaded holes.



ATTENTION: during the test the valve must be firmly blocked on the test rig so as to avoid possible danger to personnel caused by the pressure.

ALFA VALVOLE declines all responsibility regarding damage to things or people following to tests carried out in accordance with the above procedure.

ATTENTION: although the above information is considered sufficient for ensuring the correct maintenance of the valves, ALFA VALVOLE does not offer any guarantees regarding the results of the operation or the extension of the existing guarantee, unless the operation is carried out in our factory by our own personnel

6. HOW TO ORDER SPARE PARTS

6.1 The user shall identify, when ordering spare parts:

Valve model
Nominal diameter
Pressure class
Identification number or name of the part to be substituted (ref. card attached)
Construction material of the spare parts (or of the original part)
Original order number or serial number of the valve

6.2 Recommended Spare Parts

Parts that needs to be replaced if required during maintenance are marked with (*) in the table A - SPARE PARTS

7. WARNINGS AND USE LIMITATIONS

7.1 Here described valves are intended for use with clean or slightly abrasive fluids (without solid particles).

ATTENTION: their use with abrasive fluids can cause the rapid decay of the sealing characteristics of the valve during operation; Any presence of solids or the use with hardening fluids which harden can cause a quick reduction of the tightness and of the operability.

7.2 User must provide adequate methods to eliminate risks associated with the temperature of the external surface of the valve during operations.



ATTENTION: User must evaluate the valve body surface temperature when the outside ambient has potentially explosive conditions.

It is not possible to identify the body surface temperature in accordance to the Directive 94/9/EC "ATEX" because it is a function of handled fluid temperature (surface temperature of valve body tends to reach the temperature of intercepted fluid).

User must provide appropriate methods to reduce the surface temperature of the valve body when the temperature of the intercepted fluid exceeds T6 limit.

During services with fluids at room temperature and in the presence of repeated manoeuvres, at intervals not greater than 1 operation every 10 seconds, the valves do not exceed 60 ° C (T6 class temperature, according to EN 13463-1).

7.3 Valves must be used within maximum and minimum values of temperature and pressure above indicated or in nameplate. For further details about maximum allowable pressure/temperature combinations please contact ALFA VALVOLE technical department.

ATTENTION: User must provide suitable means against the exceeding of the operating limits.

7.4 Before carrying out of any intervention on ball valve, verify that there is no pressure in the body cavity by carrying out a complete opening and closing cycle.



In case of DBB Valve, perform a complete opening and closing operation and open the central drain to ensure that any residual pressure is inside the body cavity.

7.5 **ATTENTION:** before removing any service connection such as drain plugs, vents, sealant injectors or stem, make sure of the absence of pressure inside the body cavity of the valve.



The removal, even if accidental, of drain plugs, vents or sealant injectors may cause a dangerous sudden discharge of pressure to the atmosphere and the expulsion of the organ itself.

Before carrying out this operation however, we recommend the use of personal safety equipment.


7.6 Before doing any intervention, ensure that no dangerous residue is contained in the valve body. The valves must be completely drained and cleaned in the cavity around the ball before any intervention.



WARNING: any entrapped residue will be expelled from the ends of the valve.



7.7 **ATTENTION:** when installing the valve, User must ensure the same equipotential electrical level between valve and piping system in order to prevent electric shock.

 **7.8 ATTENTION:** when used in a potentially explosive area, for the purposes of Directive 94/9/EC "ATEX", User must provide appropriate means to avoid impacts of metal parts against the valve body during assembly, service time and maintenance.


7.9 Quick closure of the valve against high speed flows can cause overstressing of the seats due to "water hammer", which can determine reduction of valve tightness.

ATTENTION: User must provide suitable means against the effects of "water hammers".

7.10 The maximum number of operating hours can be influenced by the real operating conditions.

ATTENTION: User must evaluate the minimum time between inspections, basing on actual operating conditions, in particular in relation to the degree of corrosion/year used in the piping design with reference to the corrosion over-thickness (see para.0.3 of this manual)

Time between inspections should not be longer than 2 years or 5.000 full open and close strokes.


 **7.11 ATTENTION:** the user must carry out periodic inspections in order to eliminate any accumulation of powder greater than 5 mm in correspondence with the sliding surfaces of the stem/valve body and actuator pinion /actuator body.

7.12 ATTENTION: the functioning of valves complete with actuators is not guaranteed in the event of an earthquake due to possible misalignment of connection between valve stem and actuator pinion.
Valve and actuator assembly is calculated for a maximum earthquake magnitude incrementing 40% the dead weight of actuator and valve cover.

7.13 ATTENTION: assembling of actuators for valve operation different to that supplied is not allowed without previous approval from the manufacturer.

7.14 Actuators, any type, are not suitable to resist against external fire conditions.

ATTENTION: actuators Fire-Safe properties can be obtained by use of fire-protection boxes enabling, to avoid system (valve+actuators) malfunctions.

 **7.15 ATTENTION:** cabling of actuators and electrical accessories should be realized after valve mounting to piping system and according to the specifications showed in the relevant use and maintenance manuals.

7.16 ATTENTION: the user must establish an appropriate control program to verify the integrity of the lubricating grease in the manual gears, if installed.

7.17 ATTENTION: described valves are suitable for resisting to reduce axial forces from piping system.
If necessary, require maximum values of allowed axial loads from ALFA VALVOLE technical department.

7.18 ATTENTION: valves can be used as end-type valves only by specific customer request and for working pressures not exceeding 77% of the stated maximum working pressure at room temperature.

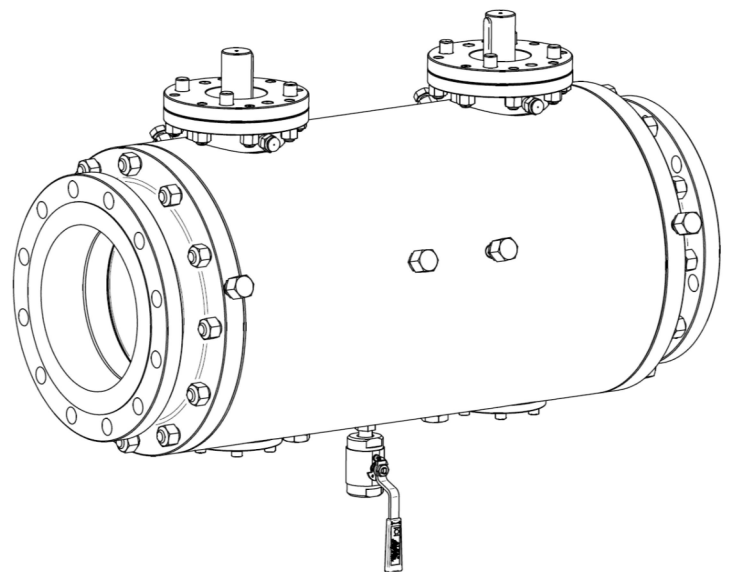
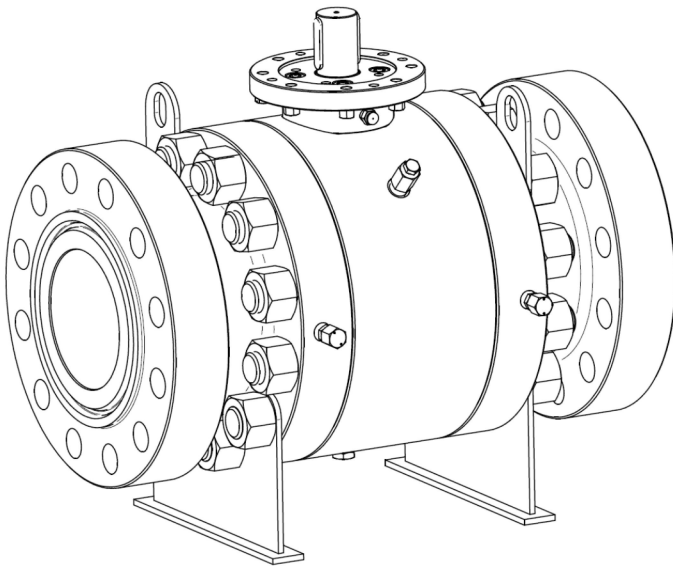
7.19 ATTENTION: reduced bore valves have a concentration of erosion in the area of reduction of the bore hole in the body. The user must carry out periodic controls to verify the entity of erosion in this area.

8. TROUBLE SHOOTING

MALFUNCTION	POSSIBLE CAUSE	ACTION
Leakage through the valve	Ball surface damage	Replace the ball
	Seat damage	Replace the seats or try with injection of sealant grease
	Not complete closure	Check Open/Close limits and settings
Ball movement not regular (actuated valves)	Dirt between ball and seats	Flush the inside, operating the valve 5 times
	Dirt between ball and body cavities	Flush the inside, operating the valve 5 times
	Not sufficient air supply flow	Confirm working conditions are as per request
	Not sufficient air discharge	Include quick exhaust valve
Valve torque too high	Seat damage	Replace the seats
	Dirt between ball and seats	Flush the inside operating the valve 5 times
	Dirt between ball and body cavities	Flush the inside operating the valve 5 times
	Excessive Pressure or Temperature	Confirm working conditions are as per request
Stem leakage	Stem nuts loose	Tighten stem nuts
	Damaged stem seal surfaces	Replace stem
	Damaged stem seals	Replace stem seal or try with injection of sealant grease
Body seal leakage	Gasket damage	Replace gaskets
	Excessive Pressure or Temperature	Confirm working conditions are as per request
	Excessive load from piping system	Verify piping system architecture
Excessive valve noise	Error in valve sizing	Confirm valve sizing
	Not complete opening	Check Open/Close limits and settings
Fail in valve movement after electrical input (actuated valves)	Solenoid valve fail	Confirm power supply Replace the solenoid
Fail in limit switch signal	Un-correct settings	Check Open/Close settings
	Limit switch is broken	Replace limit switch
	Un-correct power supply	Confirm working conditions are as per request

OPERATING AND MAINTENANCE MANUAL
ALFA SPLIT BODY TRUNNION BALL VALVES
Model ALFA T3
(Valid for S.B. valves both for D.B.B. valves)

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0. TECHNICAL DATA

0.1 MANUFACTURER

ALFA VALVOLE S.r.l.

V.le del Lavoro 19 - 20010 CASOREZZO (MI) – ITALY

Ph. +39-0290296206

Fax. +39-0290296292

e-mail alfavalvole@alfavalvole.it

0.2 ALLOWED USE AND LIMITS

Operators involved in the storage, mounting, use and/or maintenance of our products are requested to have sufficient skill and experience in such a kind of equipment. It is user responsibility to guarantee this skill is met.

Service : ON-OFF

Fluids : Liquids e gases Group 1 (dangerous), not unstable, according to the European Directive 2014/68/UE “PED”, art. 13 – Category III



Use in potentially explosive atmospheres : II 2 GD c T6 X according to the EC Directive 94/9/EC “ATEX”

Minimum guaranteed tightness limits on brand new valve:

Emissions to atmosphere

on request, according to TA-LUFT and/or ISO 15848-1 requirements

Hydrostatic Body Test

(1, 5 x Maximum working pressure at room temperature) Zero Leakage

Hydrostatic Seat Test

(1, 1 x Maximum working pressure at room temperature) Zero Leakage

Pneumatic Seat Test

(Air, 6 bar) Zero Leakage

“Fire Safe” features: on request, according to ISO 10497 / API 607 / API 6FA / BS 6755.

Model	ALFA T3 (***)											
	PN10-16-25-40 ANSI 150		PN25-40 ANSI 300		PN63-100 ANSI 600		PN160 ANSI 900		PN250 ANSI 1500		PN420 ANSI 2500	
Diametri Nominali FB RB	DN 150 - 1000 Ø 6 - 40		DN 150 - 1000 Ø 6 - 40		DN 150 - 1000 Ø 6 - 40		DN 150 - 750 Ø 6 - 30		DN 150 - 500 Ø 6 - 20		DN 100 - 250 Ø 6 - 10	
	DN 200 - 900 Ø 8 x 6 - 36 x 30		DN 200 - 900 Ø 8 x 6 - 36 x 30		DN 200 - 900 Ø 8 x 6 - 36 x 30		DN 200 - 900 Ø 8 x 6 - 36 x 30		DN 200 - 900 Ø 8 x 6 - 24 x 20		DN 150 - 300 Ø 8 x 6 - 12 x 10	
Maximum working pressure at room temperature (bar)	10	PN10	PN25	PN25	64	PN63	160	PN160	250	PN250	420	PN420
	16	PN16	PN40	PN40	100	PN100						
	20	A.150	51	A.300	102	A.600	152	A.900	255	A.1500	425	A.2500
Maximum working pressure at maximum temperature (bar)	8		15	A.300	80	A.600	135	A.900	225	A.1500	375	A.2500
	Pressure values between room temperature and maximum temperature vary depending of characteristics of used seats/seals materials. Please contact ALFA VALVOLE Technical Dept. for more information.											
Maximum working temperature	240°C*		240°C*		240°C*		240°C*		240°C*		240°C*	
Minimum working and room temperature	-29°C*		for carbon steel A105 / A216 WCB valve bodies						with impact test verification when TR** ≤ 21°C			
	-40°C*		for carbon steel A350 LF2 / A352 LCB valve bodies									
	-40°C*		for stainless steel valve bodies						without impact test verification			
	-70°C*		for stainless steel valve bodies						Without impact test verification (valve without O-Ring and with Lip-Seals energized gasket)			
Maximum simultaneous working conditions	Please contact ALFA VALVOLE Technical Dept.											

* Other restrictions imposed from the material of the seat ring, the gasket material and the nominal diameter of the valve will be indicated on the nameplate attached to the valve body.

**TR = design temperature, for impact test verification, according to I.S.P.E.S.L. Code Case M Table M.14.2 and EN 13445 standard.

The body thickness is assigned so that the design temperature, for impact test verification according EN 13445 standard, is above 21 °C.

*** Includes D.B.B. models

Table of nominal dimensions of valves

DN	150	200	250	300	350	400	450	500	550	600	650	700	750	1000
Ø"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	40"

0.3 SPECIFIC DESIGN PROCEDURES

END CONNECTIONS	Flanged to ANSI/DIN/UNI/EN, Butt Welding to ANSI B16.25
BODY THICKNESS	ASME VIII Div.1 – ASME B16.34
BOLTING DESIGN	ASME VIII Div.1 – ASME B16.34
SCREWED CONNECTION DESIGN	Not applicable
FLANGE DESIGN	ASME VIII Div.1
SIMULTANEOUS LOADS	Pressure, Bending, Axial Loads from piping
WIND LOADS	Negligible, according to ASME III Div.1 Subsect. NB
EARTHQUAKE LOADS	Applicable, according to ASME III Div.1 Subsect. NB <i>All valve +actuator assemblies are verified under the effect of earthquake that overload of a maximum of 40% the own weight of actuator and valve bonnet</i>
FATIGUE from On-Off starting cycles	Negligible, according to ASME III Div.1 Subsect. NB (see the maximum number of operating hours)
FATIGUE from service pressure fluctuation	Negligible, according to ASME III Div.1 Subsect. NB (see the maximum number of operating hours)
MAXIMUM LIFE IN SERVICE HOURS	Function of actual simultaneous working conditions and fluids but anyway not longer than : 100.000 (see para 3.1 for recommended periodical inspections); OR (depending on the conditions that happens first)
	50.000 operations of opening/closing of the valve (liquid service)
	5.000 operations of opening/closing of the valve (gas service)
	1.500 pressurization-depressurization cycles (Carbon Steel valves) 13.000 pressurization-depressurization cycles (Stainless Steel Valves)
AVAILABLE CORROSION OVERTHICKNESS	2.0 mm min. (carbon steel valves only)
ANTISTATIC FEATURES	according to API 6D app. B5

1. TRANSPORT, HANDLING AND STORAGE

1.1 TRANSPORT AND HANDLING

Valves must be transported and handled maintaining the ball in the open position.
 DO NOT remove the protection caps from the ends until the valve is to be mounted in line.
 Avoid impacts against obstacles that may damage the stem or the auxiliary connections (drains, sealant injectors, vents).

1.2 STORAGE

Valves with carbon steel or stainless steel bodies must both be stored with ball in the OPEN position and in a location dry and free from fumes, gas or corrosive vapours.
 For long storage periods, it is advisable to cover the external surface with a layer of protective wax (Tectyl) or close the valves in polythene bags.

2. INSTALLATION INSTRUCTIONS

The installation procedure for ball valves is critical to ensuring both long life and satisfying performance. Valves stored on site awaiting installation should be kept in their original packing, in dry conditions, where damage cannot occur.
 Before carrying out the installation, it is important to follow the basic procedures described below:

2.1 General

- Carefully unpack the valve and check valve nameplate for identification of materials.
- Remove all packing materials.
- All valves are bi-directional and supplied ready to use. Valves can be placed with stem oriented to any direction.
- Check the valve for any flow direction indication marks. Appropriate care must be taken, to install the valve for proper flow orientation.
- Inspect the valve interior through the end ports to determine it is clean and free from foreign matter according to ASME G93-03E1.
- Ensure that all auxiliary connections, if any, (lubricators, drains, vents) are free of damage and properly tightened.
- Cycle the valve and inspect any functionally significant features.

- Read all the literature and note any special warning tags or plates attached to the valve.
- Before installation check to insure the ball is in the fully open position in order to prevent possible damage to the ball and seats. The valve performance depends on its original conditions. At any stage do not leave the valve in the partially open position.

2.2 Threaded End Valves

- Valves with threaded ends should be treated as a single unit and should not be dismantled when installing to pipeline.
- Before installing the valves, make sure that the threads on the mating pipe are free from excessive grit, dirt or burrs.
- When tightening the valve, apply a pipe wrench or spanner to the end connector closest to the pipe being worked, using standard piping practices.
- Use appropriate joining sealants material in correct quantities.

2.3 Weld End Valves in-line

- Welding of valves shall be performed by a qualified person according to the ASME Boiler Construction Code Section IX. For valves to be welded within the E.U., refer to the requirements of ESR 3.1.2 of the Pressure Equipment Directive 97/23/EC.
- Valves that will be welded directly to the line must be in the fully open position to protect the ball and seats from excessive temperatures during the welding procedures.
- Protect or remove actuators from weld splatter or arc strikes. Valves in the "Fail Close" position should be cycled to the open position.
- Allow free flow of water through the drain bottom valve and overflow through the vent valve to prevent overheating all through the welding process. **DO NOT** heat the center section over 150°C
- Align valve to pipe line, ensuring proper fit to minimize pipe load. Tack weld only.
- Complete welding in small segments. Allow enough time for cooling between each segment.
- Do not rotate the valve before flushing the line.

2.4 Flanged End Valves

- Valves with flanged ends should be treated as a single unit and should not be dismantled when installing to pipeline.
- Before installing the valves, make sure that the flanges on the mating pipe are free from excessive grit, dirt or burrs, and that there is no mechanical damage to the flanges on the pipe.
- When inserting the flange bolts, make sure the bolts are correct size to hold pressure and axial forces.



ATTENTION: When the valve installation has been completed, a full functional test needs to be performed.

The test must verify the valve's ability to open and close completely, whether it is activated manually or with the help of gearboxes or actuators and, if applicable, the correct operation of position indicators and/or other auxiliary devices.

The acceptance criteria will be as follows:

- It must be possible to move the ball between open and closed positions.
- Any position indicator and/or auxiliary devices must indicate the correct position of the ball

For more detailed information about the test performing, refer to the document "IOC 001 – OPERATING INSTRUCTION FOR FINAL TESTING OF BALL VALVES", para.9 – Functional Testing.

ALFA VALVOLE Ball Valves provide tight shut off when used under normal conditions and in accordance with ALFA VALVOLE published pressure/temperature chart.

Valve operation works by operating the valve handle 90°turn counter-clockwise to open, and 90°turn clockwise to close. All standard valves are bidirectional and as such, can be installed for flow in either direction.

Valves which are unidirectional will have a flow direction arrow welded to the body and separate assembly instructions.

A lubricant is applied through grease fittings on both ends and gland, to assist valve break in. The lubricant, if unacceptable, may be removed by a solvent wash.

If a shut-off valve is installed for end of line service, it must be ensured that it is closed with a blind end connection and the valve is secured against being opened unintentionally.

WARNING: Never look into the valve bore while the valve is in a flow-line. Pressure and fluids could escape from the valve causing injury. To prevent leakage, malfunctions resulting from internal wear or seal degradation, the user must establish a preventive maintenance and inspection program. This program must include:

- a. Inspection of parts to detect loss of wall thickness which may result in decreased pressure capacity
- b. Routine replacement of seals and inspection for proper operation.

3. MAINTENANCE

A general control of the valve is advisable every 2 years of functioning or every 5.000 opening and closing cycles.

Remove electric and pneumatic or hydraulic actuators power supplies before removing the valve from piping or before any maintenance or cleaning adjustment.

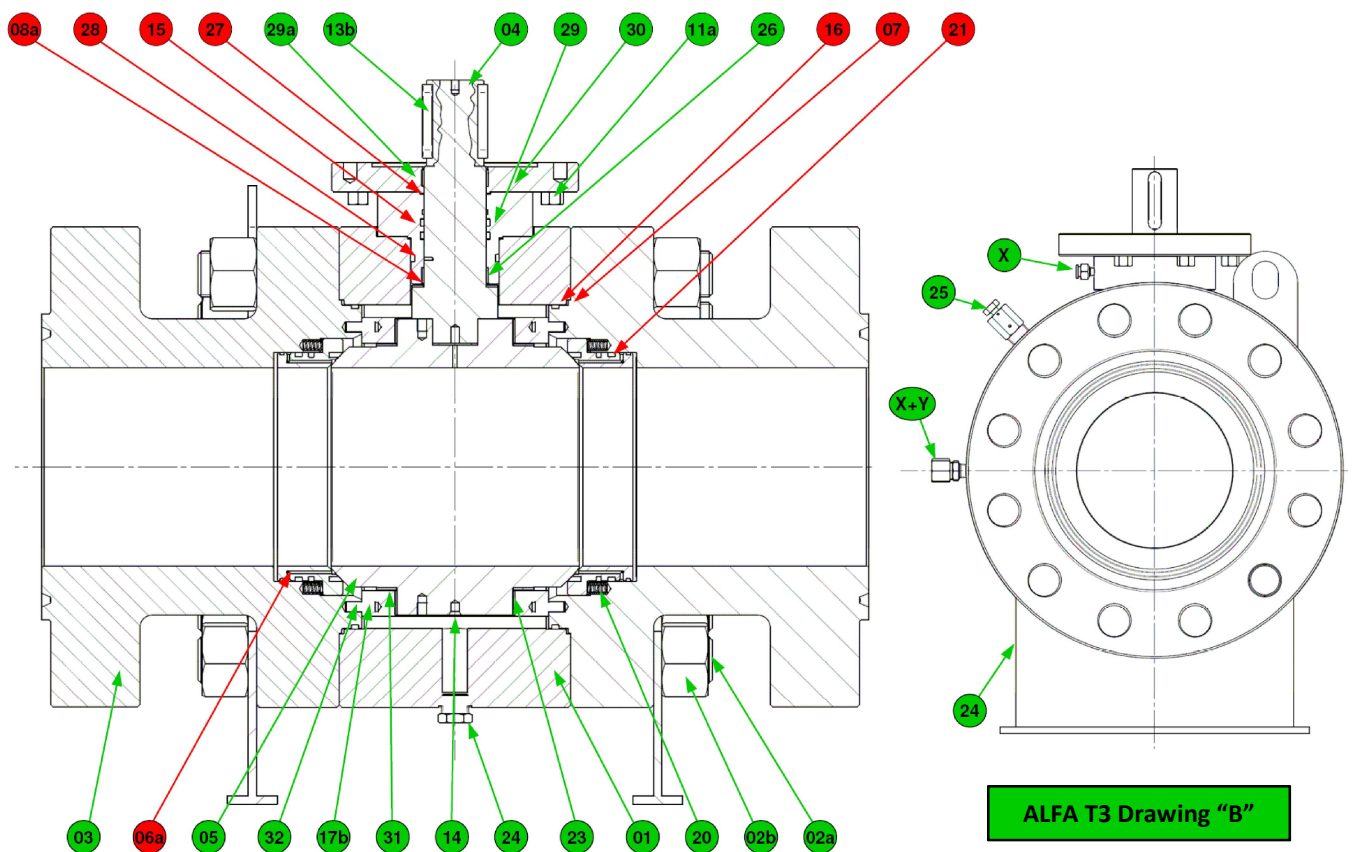
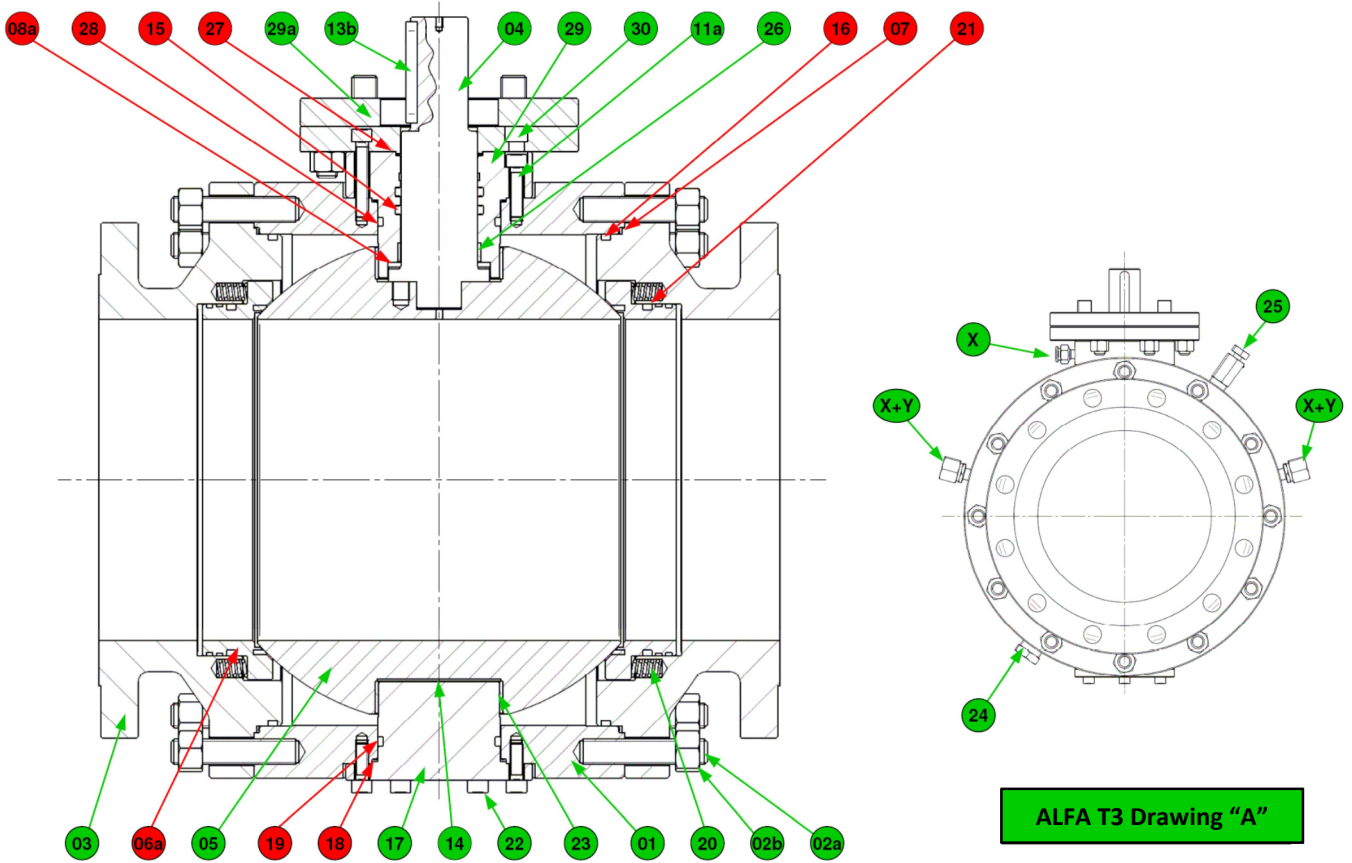
ATTENTION: check absence of electric and pneumatic or hydraulic actuators power supplies before disconnecting.

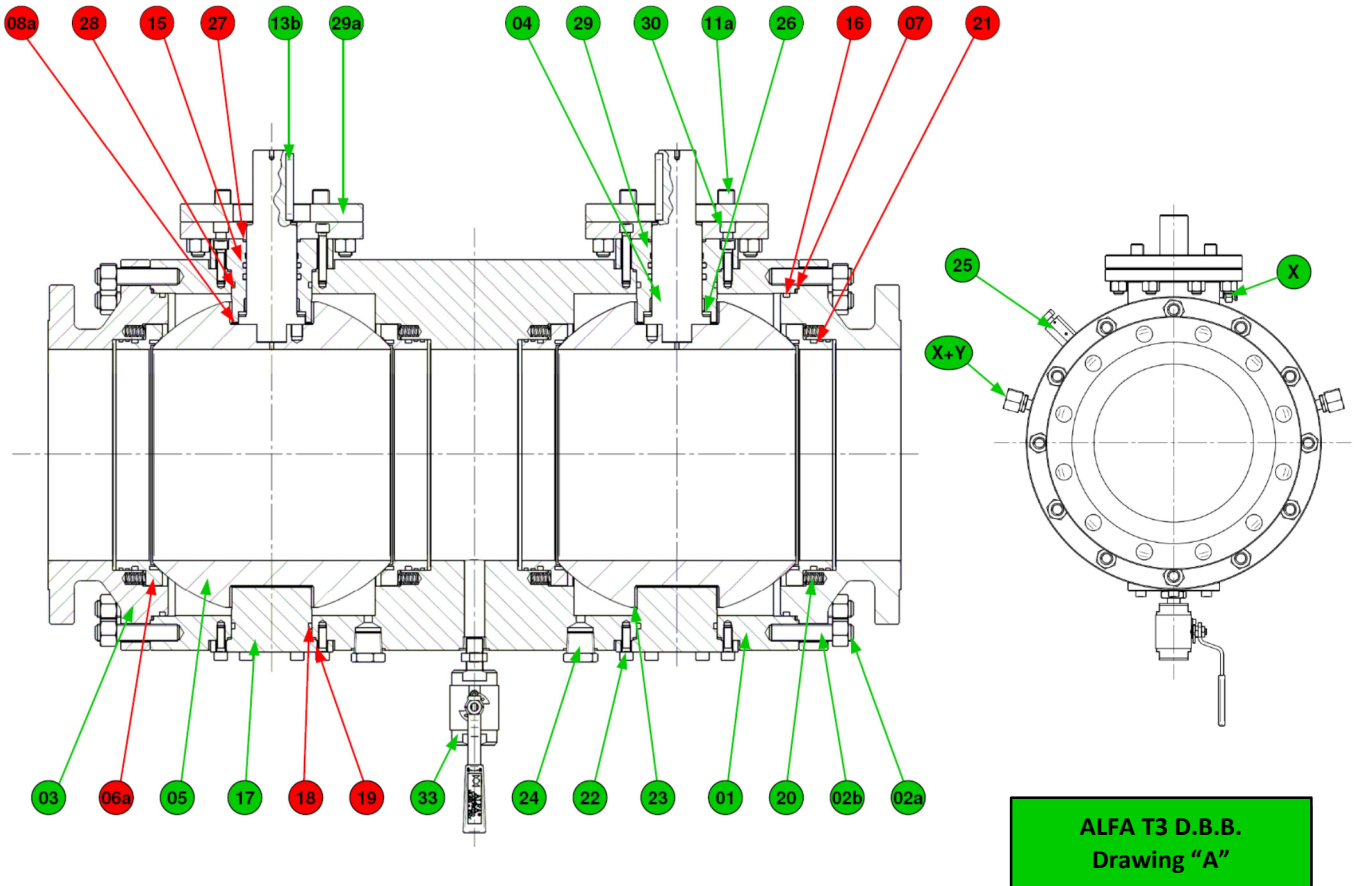
The execution of eventual intervention must follow the procedure illustrated on the attached card.

In occurrence of dirty fluids interception, more frequent periodic checks are recommended, please contact ALFA VALVOLE Technical Dept. for further information.



ATTENTION: it is user's responsibility to maintain the safety features of the product and of their components in case of maintenance / repair on their own.





ALFA T3 D.B.B.
Drawing "A"

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Body	14	Antistatic device	24	Drain plug
02a	Body stud	15	Stem O-ring (*)	25	Bleed valve
02b	Body stud nuts	16	Body O-ring (*)	26	Stem washer (*)
03	Closure	17	Trunnion	27	Gland plate gasket (*)
04	Stem	17a	Ball trunnion	28	Gland plate O-ring (*)
05	Ball	18	Trunnion gasket (*)	29	Gland plate
06a	Seat ring + insert (*)	19	Trunnion O-ring (*)	29a	Adapter plate
07	Body gasket (*)	20	Seat spring	30	Adapter plate screw
08a	Packing (*)	21	Seat O-ring (*)	31	Thrust washer
11a	Adapter plate bolting	22	Cup screw	32	Pin
13b	Key	23	Ball bushing (*)	33	Drain Valve

The components that needs to be replaced if required during maintenance are marked with (*) in the table.

The two different trunnion mounting design and drawing follows the chart here below:

SIZE	RATING					
	150	300	600	900	1500	2500
4"	-	-	-	-	-	B
6"	A	A	A	B	B	B
8"	A	A	A	B	B	B
10"	A	A	A	B	B	B
12"	B	B	B	B	B	B
14"	B	B	B	B	B	-
16"	B	B	B	B	B	-
18"	B	B	B	B	B	-
20"	B	B	B	B	B	-
22"	B	B	B	B	-	-
24"	B	B	B	B	-	-
26"	B	B	B	B	-	-
28"	B	B	B	B	-	-
30"	B	B	B	B	-	-
32"	B	B	B	-	-	-
36"	B	B	B	-	-	-
40"	B	B	B	-	-	-

NB: MAINTENANCE FOR DBB VALVES



All the replacement instructions are the same that for a S.B. Valve; the only difference is that with DBB Valve the components for which needs to be checked the status and integrity is exact the double than in the S.B. Valve.

3.1 STEM SEAL MAINTENANCE

3.1.1 DISASSEMBLY

Ensure that a residual pressure is not in the cavity of the body by performing a complete open-close operation.
Unscrew the DRAIN PLUG (24), very slowly to allow the relieving of any inside pressure.
Remove the actuator or the gearbox.
Remove the STEM KEY (13b).
Unscrew the SCREWS (30)
Remove the ADAPTER PLATE (29a)
Unscrew the SCREWS (11a)
Remove the upper cover – GLANDPLATE FLANGE (29) and change the O-RINGS (15) and (28).
Eliminate the GRAPHITE GASKETS (27) and (08a)
Remove the STEM (4) and the STEM WASHER (26).

3.1.2 ASSEMBLY

Verify all removed parts and more in detail:

- verify stem bearing surfaces are free from damage;
- verify integrity of STEM WASHER (26);

Require any necessary replacement parts as well as seals and stem washer, which must always be replaced anyway.

Mount STEM WASHER (26) on STEM (4), mount and lubricate the O-RINGS (15) and (28) on upper cover – GLANDPLATE FLANGE (29) and insert the stem.

Position GRAPHITE GASKET (27) into the body and mount upper cover tightening the relevant SCREWS (11a).

Insert the GASKETS (15).

Mount the ACTUATOR FLANGE (29a).

Tight the SCREWS (30).

Insert the KEY (13b) on STEM (4).

Operate the valve 2-3 times to verify a free movement and verify no leakage occurs.

3.2 GENERAL MAINTENANCE

3.2.1 DISASSEMBLY

3.2.1.1 Valves referred to drawing A

After the operation of the valve in “OPEN” position, remove it from the piping system.

Proceed according point 3.1.1.

Unscrew lower cover SCREWS (22) and remove TRUNNION (17).

Position the valve in the vertical position and remove NUTS (02b).

Remove the CLOSURE on the free side (3).

Remove the SEAT (06a) from the CLOSURE (03) taking care of SEAT SPRINGS (20) and keeping note of their configuration.

Verify all O-RINGS (16) and (21) and check any damage on the surface where seat O-rings (21) works

When surface defects are present, eliminate them with abrasive paper grade 400.

Remove the BALL (5) together with the two supports, verify any surface defects, and verify the integrity of BALL BEARINGS (23).

Remove the BODY (1) from second connector and develop same inspections than above.

3.2.1.2 Valves referred to drawing B

After the operation of the valve in “OPEN” position, remove it from the piping system.

Proceed according to point 3.1.1.

Position the valve in the vertical position and remove NUTS (02b).

Remove the CLOSURE on the free side (3).

Remove the SEAT (06a) from the CLOSURE (03) taking care of SEAT SPRINGS (20) and keeping note of their configuration.

Verify all O-RINGS (16) and (21) and check any damage on the surface where seat O-rings (21) works.

When surface defects are present, eliminate them with abrasive paper grade 400.

Remove the BALL (5) together with the two supports and verify any surface defects.

Remove the BALL SUPPORTS (17a).

Verify integrity of BALL BEARINGS (23) and (31), changing them with ALFA VALVOLE original Spare Parts when necessary.

Remove the BODY (1) from second connector and develop same inspections than above.
Remove the SEAT from second connector.

3.2.2 ASSEMBLY

3.2.2.1 Valves referred to drawing A

Place the BODY (1) vertically.
Grease thoroughly the area of seat housing and other areas where the SEALS (7) and O-RING BODY (16) are located.
Put the springs in the housing bore behind the seat.
After putting the O-RING GASKET (21) into its seat slot, place seat in its housing.
Put the ball in the OPEN position.
Mount the second SEAT in the closure (3) repeating the same steps.
Enter the CLOSURE (3) in the body and tighten the Nuts (02b) without exceeding.
Insert the GLANDPLATE FLANGE (29) following the procedure described in section 3.2.2.
Then insert the lower TRUNNION (17) and tighten the SCREWS (22).
Move the ball in the closed position and complete the tightening of the NUTS (02b) gradually and in a crossway.
Open and close the valve at least 2-3 times in order to check the operability without difficulty.

3.2.2.2 Valves referred to drawing B

Position one CLOSURE (3) with the port in the vertical position and block it.
Lubricate the seat O-rings area on seats and on the relevant working surface into both connectors as like as body-closure O-RINGS (16) and GASKETS (7) and their working surfaces into body.
After the insertion of O-RING (21) in the seats, insert the seats and block the seats into connectors with the use of STOP SCREWS (22a).
Mount BALL SUPPORTS (17) and WASHERS (31) (bottom part of ball) on the ball and then place it on the seat, in closed position, and match the supports on their PINS (32).
Insert the BODY (with the rods already assembled), checking that the hole coupling ball / stem is in line with the hollow of the sphere.
Place the second CLOSURE.
Tighten alternately and simultaneously the NUTS (02b) on both closures, without pull them stronger.
Insert the STEM (4) and THRUST WASHER (26) in place.
Tighten the NUTS (02b) in a gradually strong way, crossing them, on both closures.
Insert the GLANDPLATE FLANGE (29) following the procedure described in section 3.2.2.
Open and close the valve at least 2-3 times in order to check the operability without difficulty.

4. GREASING

Valves with lubricators may be subject to periodic or extraordinary injections of grease to blocking of any losses.
Lubricators must be specified by the Purchaser, in the bid request or order.

4.1 GREASING OF SEATS.

The operation must be performed with the valve in closed position.
Remove the protective caps from seat lubricators (X + Y), positioned on the outside flange diameter on the closure (03), maintaining blocked the body of the lubricator.
Vent the body cavity through the vent valve (25) in order to reduce the pressure in the body cavity to a value less than or equal to line pressure.
Close the vent valve (25).

ATTENTION: lubricators have a check valve to prevent fluid leakage from valve body. Removal of the protective cover may, however, potentially causes loss of the pressurized fluid contained in the valve to the atmosphere as well as in case of opening of the vent valve (25).



User must provide means of personal protection for operators and the implementation of security procedures that take into account the possible variation of the characteristics of the atmosphere surrounding the valve, including the generation of potentially explosive atmospheres.

Connect the hydraulic hand pump for the injection of grease with lubricator (X + Y).
Pump the grease up to stop the leak from the seats, acting consecutively on both lubricators.
Grease loss can be verified through the vent valve (25).
Repeat 3 times for each lubricator, with 8-10 strokes.
If there is no pressure inside the valve, perform two complete operations of opening and closing and repeat the greasing.

If the leakage from seats were to continue, stop the operation and perform maintenance and disassembly the valve. In case of leakage from seats, the operation must be repeated after each opening and closing cycle.

In case of greasing for only lubricating purpose, proceed to connect the hydraulic pump for the injection of grease to the lubricator (X + Y). Inject a quantity of grease and execute an opening and closing cycle. Repeat until the obtainment of improving the fluidity of the action.

At the end, remove the hydraulic hand pump for the injection of the grease and replace the safety cover. Proceed with the lubrication of the stem.

4.2 GREASING OF STEM

The operation can be performed with the valve in any position (open, closed or intermediate positions). Remove the protective cap from stem lubricator (X), positioned on the outside flange diameter on the closure (03), maintaining blocked the body of the lubricator. Vent the body cavity through the vent valve (25) in order to reduce the pressure in the body cavity to a value less than or equal to line pressure. Close the vent valve (25).

ATTENTION: lubricators are fitted with check valve that prevents leakage of fluid within the valve body. The removal of the protective cover may, however, potentially general loss to the atmosphere of the pressurized fluid contained in the valve opening as well as in the case of the vent valve (25).



The user must provide means of personal protection of operators and the implementation of security procedures that take into account the possible variation of the characteristics of the atmosphere surrounding the valve, including the generation of potentially explosive atmospheres.

Connect the hydraulic hand pump for the injection of grease to the lubricator (X). Pump the grease up to stop the leak from the stem.

If leakage from seats were to continue, stop the operation and perform maintenance and disassembly of the valve. In case of greasing for only lubricating purpose, proceed to connect the hydraulic pump for the injection of grease to the lubricator (X). Inject a quantity of grease and execute an opening and closing cycle. Repeat until the obtainment of improving the fluidity of the action.

At the end, remove the hydraulic hand pump for the injection of the grease and replace the safety cover.

4.3 TYPE OF GREASE.

The type grease is function of type fluid inside the valve and of external temperature. Contact ALFA VALVOLE sales dept. for its proper identification.

5. TESTING

5.1 S.B. VALVES (SINGLE BALL)

5.1.a Before carrying out of any test, to verify there are no problems in the movement of the ball, make at least one complete stroke of opening and closing.

5.1.b The valve must be tested using the following procedure:

- a) Place the ball in a semi-open position
- b) Pressurise the body with water at a pressure of 1,5 times the maximum operating pressure at room temperature indicated in the table found at point 0.2
- c) Verify that there are no leaks from the body seals, the trunnion pivot seals (if the valve is type "drawing A") or the stem seals. Should there be any leakage from these seals tighten the stem nuts a little more.
- d) Release the pressure.
- e) Close the valve and unscrew the drain plug (24)
- f) Pressurise the first seat with water at a pressure of 1,1 times the maximum operating pressure at room temperature indicated in the table found at point 0.2
- g) Verify that there are no leaks from the drain hole
- h) Release the pressure
- i) Pressurise the second seat with water at a pressure of 1,1 times the maximum operating pressure at room temperature indicated in the table found at point 0.2
- j) Verify that there are no leaks from the drain hole.

- k) Release the pressure and drain the valve completely of any water through the drain hole
- l) Repeat the tests described in points f) and i) using air at 6 bar verifying that there are no leaks from the side not in communication with pressurized line
- m) Once the testing procedure has been completed, screw the drain plug into its threaded hole.

5.2 DBB VALVES (DOUBLE BALL)

5.2.a Before carrying out of any test, to verify there are no problems in the movement of the ball, make at least one complete stroke of opening and closing with each of the two levers.

5.2.b Valve must be tested using the following procedure:

- a) Place the two balls in a semi-open position, with the drain valve always in closed position.
- b) Pressurise the valve body, by water, with a pressure 1,5 times the maximum operating pressure at room temperature (See table at para 0.2)
- n) Verify that there are no leaks from the body seals, the trunnion pivot seals (if the valve is type “drawing A”), and the stem seals or from the drain valve. Should there be any leakage from these seals tighten the stem nuts a little more.
- c) Release the pressure
- d) Close the upstream ball, open the the upstream ball drain hole removing the threaded plug, maintaining the downstream ball in a semi-open position;
- e) Pressurise from upstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- f) Verify that there are no leaks from the drain hole of the upstream ball (*FIRST UPSTREAM SEAT TESTING*);
- g) Release the pressure.
- h) Pressurise from downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- i) Verify that there are no leaks from the drain hole of the upstream ball (*SECOND UPSTREAM SEAT TESTING*);
- j) Open the upstream ball, close the drain hole of the upstream valve with its threaded plug, then close the downstream ball and open its drain hole removing the downstream threaded plug.
- k) Pressurise from downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- l) Verify that there are no leaks from the drain hole of the downstream ball (*FIRST DOWNSTREAM SEAT TESTING*);
- m) Release the pressure.
- n) Pressurise from upstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- o) Verify that there are no leaks from the drain hole of the upstream ball (*SECOND DOWNSTREAM SEAT TESTING*);
- p) Release the pressure.
- q) Close the downstream ball, and close the downstream drain hole screwing properly its threaded plug
- r) With the 2 ball in closed position and the threaded plug in their holes, open the drain valve.
- s) Pressurise from upstream and downstream with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2).
- t) Verify that there are no leaks from the drain valve (*FIRST UPSTREAM AND DOWNSTREAM SEAT TESTING*).
- u) Release the pressure.
- v) Open the 2 balls, and drain the valve completely of any water through the drain hole between the 2 balls;
- w) Repeat the the tests described in points d) and v) using air at 6 bar and verifying that there are no leaks.

Once the testing procedure has been completed, be sure that all the 2 drain plugs are into its threaded holes.



ATTENTION: During the test, the valve must be firmly blocked on the test rig to avoid possible danger to personnel caused by the pressure.

ALFA VALVOLE declines all responsibility regarding damage to things or people following to tests carried out in accordance with the above procedure.

ATTENTION: although the above information is considered sufficient for ensuring the correct maintenance of the valves, ALFA VALVOLE does not offer any guarantees regarding the results of the operation or the extension of the existing guarantee, unless our own personnel carry out the operation in our factory

6. HOW TO ORDER SPARE PARTS

6.1 The user shall identify, when ordering spare parts:

Valve model
Nominal diameter
Pressure class
Identification number or name of the part to be substituted (ref. card attached)
Construction material of the spare part (or of the original part)
Original order number or serial number of the valve

6.2 Recommended Spare Parts for :

6.2.1 STEM SEAL MAINTENANCE

- stem o-ring (15)
- gland o-ring (28)
- stem washer (26)
- stem gasket (08a)
- gland gasket (27)

6.2.2 GENERAL MAINTENANCE

- stem o-ring (15)
- trunnion o-ring (19) and gland o-ring (28)
- stem gasket (08a)
- trunnion gasket (18) and gland gasket (27)
- bushing (23)
- stem washers (26) and ball washers (31)
- seat o-ring (21)
- body o-ring (16)
- body gasket (7)
- seats (06a)
- seats (06) and o-ring (21)

The components that needs to be replaced if required are marked with (*) in the table.

7. WARNINGS AND USE LIMITATIONS

7.1 Here described valves are intended for use with clean or slightly abrasive fluids (without solid particles).

ATTENTION: their use with abrasive fluids can cause the rapid decay of the sealing characteristics of the valve during operation; Any presence of solids or the use with hardening fluids, which harden, can cause a quick reduction of the tightness and of the operability.

7.2 User must provide adequate methods to eliminate risks associated with the temperature of the external surface of the valve during operations.



ATTENTION: User must evaluate the body surface temperature when the outside ambient has potentially explosive conditions.

It is not possible to identify the body surface temperature in accordance to the Directive 94/9/EC "ATEX" because it is a function of handled fluid temperature, (surface temperature of valve body tends to reach the temperature of intercepted fluid).

User must provide appropriate methods to reduce the surface temperature of the valve body when the temperature of the intercepted fluid exceeds T6 limit.

During services with fluids at room temperature and in the presence of repeated maneuvers, at intervals not greater than 1 operation every 10 seconds, the valves do not exceed 60 ° C (T6 class temperature, according to EN 13463-1).

7.3 Valves must be used within maximum and minimum values of temperature and pressure above indicated or in nameplate. For further details about maximum allowable pressure/temperature, combinations please contact ALFA VALVOLE technical department.

ATTENTION: User must provide suitable means against the exceeding of the operating limits.

- 7.4** Before carrying out of any intervention on ball valve, verify that there is no pressure in the body cavity by carrying out a complete opening and closing cycle.



- 7.5 ATTENTION:** before removing any service connection such as drain plugs, vents, sealant injectors or stem, make sure of the absence of pressure inside the body cavity of the valve.



The removal, even if accidental, of drain plugs, vents or sealant injectors may cause a dangerous sudden discharge of pressure to the atmosphere and the expulsion of the organ itself.

Before carrying out this operation however, we recommend the use of personal safety equipment.

- 7.6** Before doing any intervention, ensure that no dangerous residue is contained in the valve body.
The valves must be completely drained and cleaned in the cavity around the ball before any intervention.



WARNING: any entrapped residue will be expelled from the ends of the valve.

- 7.7 ATTENTION:** when installing the valve, User must ensure the same equipotential electrical level between valve and piping system in order to prevent electric shock.



- 7.8 ATTENTION:** when used in a potentially explosive area, for the purposes of Directive 94/9/EC "ATEX", User must provide appropriate means to avoid impacts of metal parts against the valve body during assembly, service time and maintenance.



- 7.9** Quick closure of the valve against high-speed flows can cause overstressing of the seats due to "water hammer", which can determine reduction of valve tightness.

ATTENTION: User must provide suitable means against the effects of "water hammers".

- 7.10** The maximum number of operating hours can be influenced by the real operating conditions.

ATTENTION: User must evaluate the minimum time between inspections, basing on actual operating conditions, in particular in relation to the degree of corrosion/year used in the piping design with reference to the corrosion over-thickness (see para.0.3 of this manual).

Time between inspections should not be longer than 2 years or 5.000 full open and close strokes.

- 7.11 ATTENTION:** the user must carry out periodic inspections in order to eliminate any accumulation of powder greater than 5 mm in correspondence with the sliding surfaces of the stem/valve body and actuator pinion /actuator body.



- 7.12 ATTENTION:** the functioning of valves complete with actuators is not guaranteed in the event of an earthquake due to possible misalignment of connection between valve stem and actuator pinion.
Valve and actuator assembly is calculated for a maximum earthquake magnitude incrementing 40% the dead weight of actuator and valve cover.

- 7.13 ATTENTION:** assembling of actuators for valve operation different to that supplied is not allowed without previous approval from the manufacturer.

- 7.14** Actuators, any type, are not suitable to resist against external fire conditions.

ATTENTION: actuators fire-safe properties can be obtained by use of fire-protection boxes enabling, to avoid system (valve + actuators) malfunctions.

- 7.15 ATTENTION:** cabling of actuators and electrical accessories should be realized after valve mounting to piping system and according to the specifications showed in the relevant use and maintenance manuals.



- 7.16 ATTENTION:** the user must establish an appropriate control program to verify the integrity of the lubricating grease in the manual gears, if installed.

- 7.17 ATTENTION:** described valves are suitable for resisting reducing axial forces from piping system.
If necessary, require maximum values of allowed axial loads from ALFA VALVOLE technical department.

- 7.18 ATTENTION:** valves can be used as end-type valves only by specific customer request and for working pressures not exceeding 77% of the stated maximum working pressure at room temperature.

7.19 ATTENTION: reduced bore valves have a concentration of erosion in the area of reduction of the bore hole in the body. The user must carry out periodic controls to verify the entity of erosion in this area.

8. TROUBLE SHOOTING

MALFUNCTION	POSSIBLE CAUSE	ACTION
Leakage through the valve	Ball surface damage	Replace the ball
	Seat damage	Replace the seats or try with injection of sealant grease (trunnion mounted construction only)
	Not complete closure	Check Open/Close limits and settings
Ball movement not regular (actuated valves)	Dirt between ball and seats	Flush the inside, operating the valve 5 times
	Dirt between ball and body cavities	Flush the inside, operating the valve 5 times
	Not sufficient air supply flow	Confirm working conditions are as per request
	Not sufficient air discharge	Include quick exhaust valve
Valve torque too high	Seat damage	Replace the seats
	Dirt between ball and seats	Flush the inside operating the valve 5 times
	Dirt between ball and body cavities	Flush the inside operating the valve 5 times
	Excessive Pressure or Temperature	Confirm working conditions are as per request
Stem leakage	Stem nuts loose	Tighten stem nuts
	Damaged stem seal surfaces	Replace stem
	Damaged stem seals	Replace stem seal or try with injection of sealant grease (trunnion mounted construction only)
Body seal leakage	Gasket damage	Replace gaskets
	Excessive Pressure or Temperature	Confirm working conditions are as per request
	Excessive load from piping system	Verify piping system architecture
Excessive valve noise	Error in valve sizing	Confirm valve sizing
	Not complete opening	Check Open/Close limits and settings
Fail in valve movement after electrical input (actuated valves)	Solenoid valve fail	Confirm power supply Replace the solenoid
Fail in limit switch signal	Incorrect settings	Check Open/Close settings
	Limit switch is broken	Replace limit switch
	Incorrect power supply	Confirm working conditions are as per request