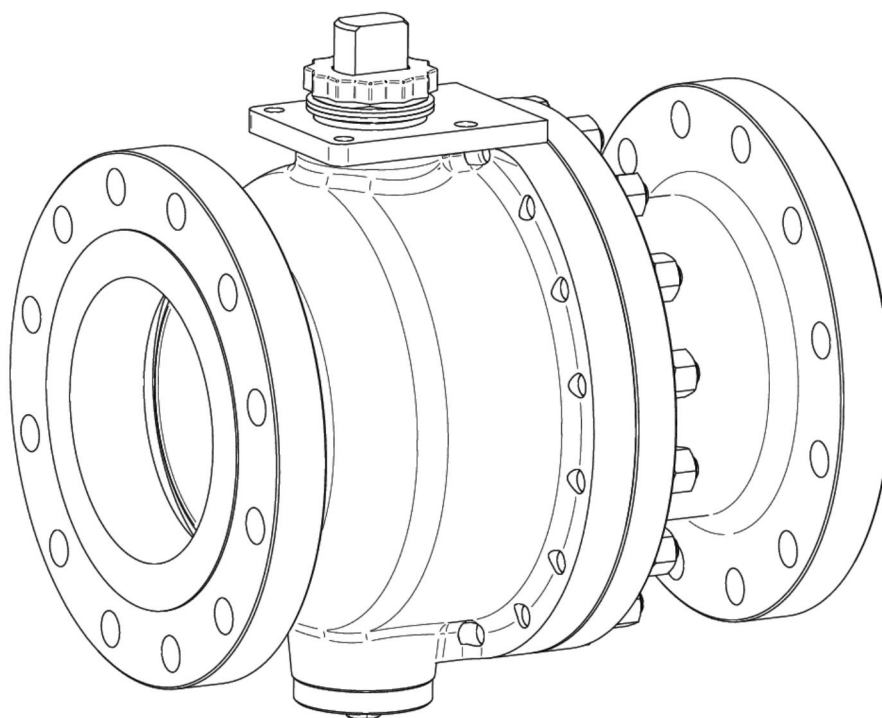


OPERATING AND MAINTENANCE MANUAL
ALFA SPLIT BODY LIGHT TRUNNION BALL VALVES
Models ALFA 60P / 64P / 50P

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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” – Category III



Use in potentially explosive atmospheres: **II2G c IIC TX** according to the EC Directive 2014/34/UE “ATEX”
II2D c IIIC TX

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 / BS 6755.

Model	ALFA 64P		ALFA 60P		ALFA 50P	
Class	PN10-16 ANSI 150		PN25-40 ANSI 300		PN25-40 ANSI 300	
Nominal Diameter	DN 250 - 350 Ø 10" – 14"		DN 200 - 300 Ø 8" – 12"		DN 250 Ø 10" x 8"	
Maximum working pressure at room temperature (bar)	10	PN10	PN25	PN25	PN25	PN25
	16	PN16	PN40	PN40	PN40	PN40
	20	A.150	51	A.300	51	A.300
Maximum working pressure at maximum temperature (bar)	8		8		8	
	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	120°C*		120°C*		120°C*	
Minimum working and room temperature	-29°C*	for carbon steel A105 / A216 WCB valve bodies			with impact test verification when	
	-40°C*	for carbon steel A350 LF2 / A352 LCB valve bodies			TR** ≤ 21°C	
	-40°C*	for stainless steel valve bodies			without impact test verification	
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 the standard EN13445-2 “Unfired Pressure Vessels – Materials”, para 4.1.6 e Annex B. The body thickness is assigned so that the design temperature, for impact test verification according to the standard EN13445-2, are above 21 ° C

Table of nominal dimensions of valves

DN	200	250	300	350
Ø”	8”	10”	12”	14”

0.3 SPECIFIC DESIGN PROCEDURES

END CONNECTIONS	Flanged ANSI/DIN/UNI/EN, BW or Screwed
BODY THICKNESS	ASME VIII Div.1 – ASME B16.34 – EN 12516-1
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	Negligible, according to ASME III Div.1 Subsect.NB
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 happen 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

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 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, please contact ALFA VALVOLE Production Dept. for further information

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

4. TESTING

4.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.

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

- a) Place the ball in a semi-open 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)
- c) Verify that there are no leaks from the body seals

- d) Release the pressure
- e) Close the valve
- f) Pressurise the first seat with water at a pressure 1,1 times the maximum operating pressure at room temperature (See table at para 0.2)
- g) Verify that there are no leaks from the end opposite to that pressurised
- h) Release the pressure
- i) Pressurise the second seat (if present) with water at a pressure 1,1 times the maximum operating pressure at room temperature (see table at para 0.2)
- j) Verify that there are no leaks from the end opposite to that pressurised
- k) Release the pressure and drain the valve completely of any water
- l) Repeat the tests described in points f) and i) using air at 6 bar and verifying that there are no leaks from the end opposite to that pressurised



WARNING: during the test, valve must be firmly blocked on the test rig to avoid any 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 : while considering the above information sufficient for proper execution of the maintenance of the valve, ALFA VALVOLE not give any warranty on the outcome of the intervention, not extended warranty, unless the action is performed by ALFA VALVOLE personnel at its workshops.

5. HOW TO ORDER SPARE PARTS

5.1 User must specifies, when ordering spare parts:

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

6. WARNINGS AND USE LIMITATIONS

6.1 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.

6.2 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 2014/34/UE "ATEX" because it is a function of handled fluid temperature (surface temperature of valve body tends to reach the temperature of intercepted fluid).

For that reason the valve marking will be **TX**, giving all information as indicated at paragraph 7.

The end user shall make an assessment about the temperature conditions (ambient and process) and evaluate by itself the maximum valve surface temperature.

6.3 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.

6.4 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.



- 6.5 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.

- 6.6** 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.

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



- 6.8 ATTENTION :** when used in a potentially explosive area, for the purposes of Directive 2014/34/UE "ATEX", User must provide appropriate means to avoid impacts of metal parts against the valve body during assembly, service time and maintenance.



- 6.9** 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".

- 6.10** 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 overthickness (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.

- 6.11 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.



- 6.12 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.

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

- 6.14** 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.

- 6.15 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.



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

- 6.17 ATTENTION:** split body type valves are suitable for resisting to reduced axial forces from piping system.
If necessary, require maximum values of allowed axial loads from ALFA VALVOLE technical department.

- 6.18 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.

- 6.19 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.

7. "X" – SPECIAL CONDITIONS FOR SAFE USE

Due to the fact that the actual maximum surface temperature depends not on the valve itself, but mainly on operating conditions a single temperature class or temperature cannot be marked by the manufacturer.

A reference to this situation shall be included in the marking by using a TX marking and the relevant information shall be given as follows:

- 1) Admitted ambient temperature range: $T_{min} \leq T_{amb} \leq 85^{\circ}\text{C}$
 (For the minimum ambient temperature T_{min} , please refer to the table at 0.2 - Minimum working and room temperature)
- 2) Admitted process temperature range: $-70^{\circ}\text{C} \leq T_{process} \leq 200^{\circ}\text{C}$
- 3) The maximum surface temperature has been obtained following the rule :

$$T_{Max} [^{\circ}\text{C}] = 10[^{\circ}\text{C}] + (T_{amb, Max}[^{\circ}\text{C}] \text{ or } T_{air/process, Max} [^{\circ}\text{C}]), \text{ whichever is greater}$$

The value to be reported on nameplate must be determined as in the following (clause 8.2 of EN13463-1):

If $T_{Max} [^{\circ}\text{C}] \leq 195^{\circ}\text{C}$ then $T_{Sup} [^{\circ}\text{C}] = T_{Max} [^{\circ}\text{C}] + 5^{\circ}\text{C}$

If $T_{Max} [^{\circ}\text{C}] > 195^{\circ}\text{C}$ then $T_{Sup} [^{\circ}\text{C}] = T_{Max} [^{\circ}\text{C}] + 10^{\circ}\text{C}$

For gas, vapour, mist marking only the following switch case can be adopted to select the correct symbol:

Temperature class	Maximum surface temperature °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

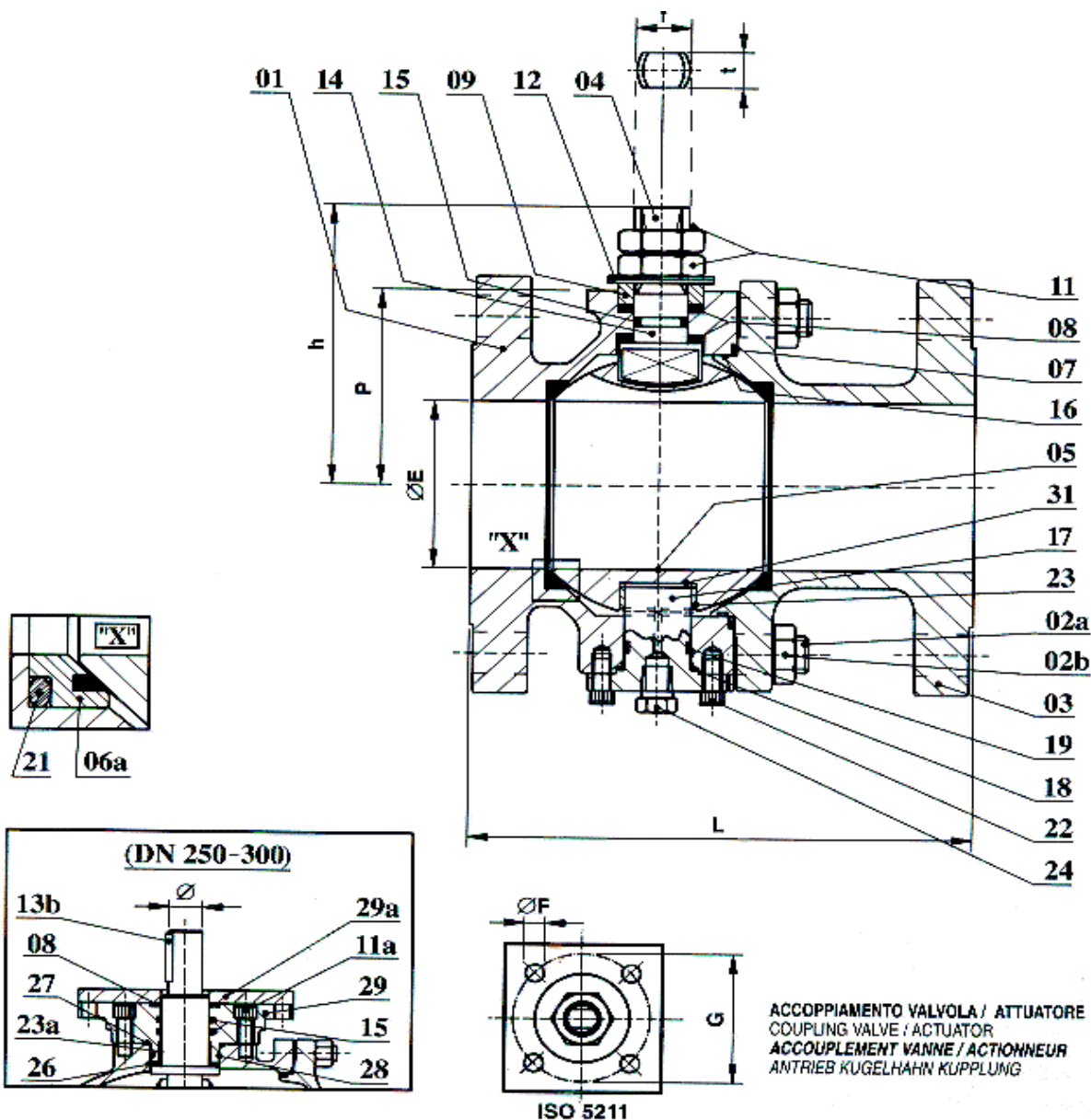
For dust marking report the symbol "T" followed by the effective values of T_{sup} in $[^{\circ}\text{C}]$.

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

MAINTENANCE CARD

ALFA 50P / 60P



REPLACEMENT INSTRUCTIONS FOR WORN OUT PARTS VALID FOR A60P DN 200 AND A50P DN250x200

VALVE DISASSEMBLY

- The valve may only be removed from the piping system after having manoeuvred the ball to the OPEN position.
- Place the valve with flow axis in vertical position.
- Unscrew the bolts, or screws (22) and remove the trunnion (17).
- Verify the condition of the plain gasket (18) and O-ring (19).
- Unscrew and remove the stud nuts (02a-b) and remove the closure (03).
- Separate the seat (06 a) from the closure (03).
- Verify the conditions of the O-rings (21), carefully degreasing the surface of contact between the seats and the closure and check the housing of the seat O-ring (21).

- In the presence of surface defects, signs of sticking, etc. eliminate them using grade 400 abrasive paper.
- Remove the ball (05) and verify for surface defects in the area of contact with the seats.
- Verify the integrity of ball bushing (23).
- Remove the seat (06 a) from body and O-ring (21).
- Carry out the same controls as for the seat on the closure.
- Unscrew the stem lock nuts (11) and remove the hand lever, then you can extract the stem (04) from its housing, from inside of body.
- After removed the spring washers (12) and gland (09), check the wear conditions of O-ring (15) and of gaskets (08).

Inspect the worn out conditions of all items and replace the damaged ones.

The standard spare parts kit (parts that is recommended to replace during every valve disassembly) is composed by:

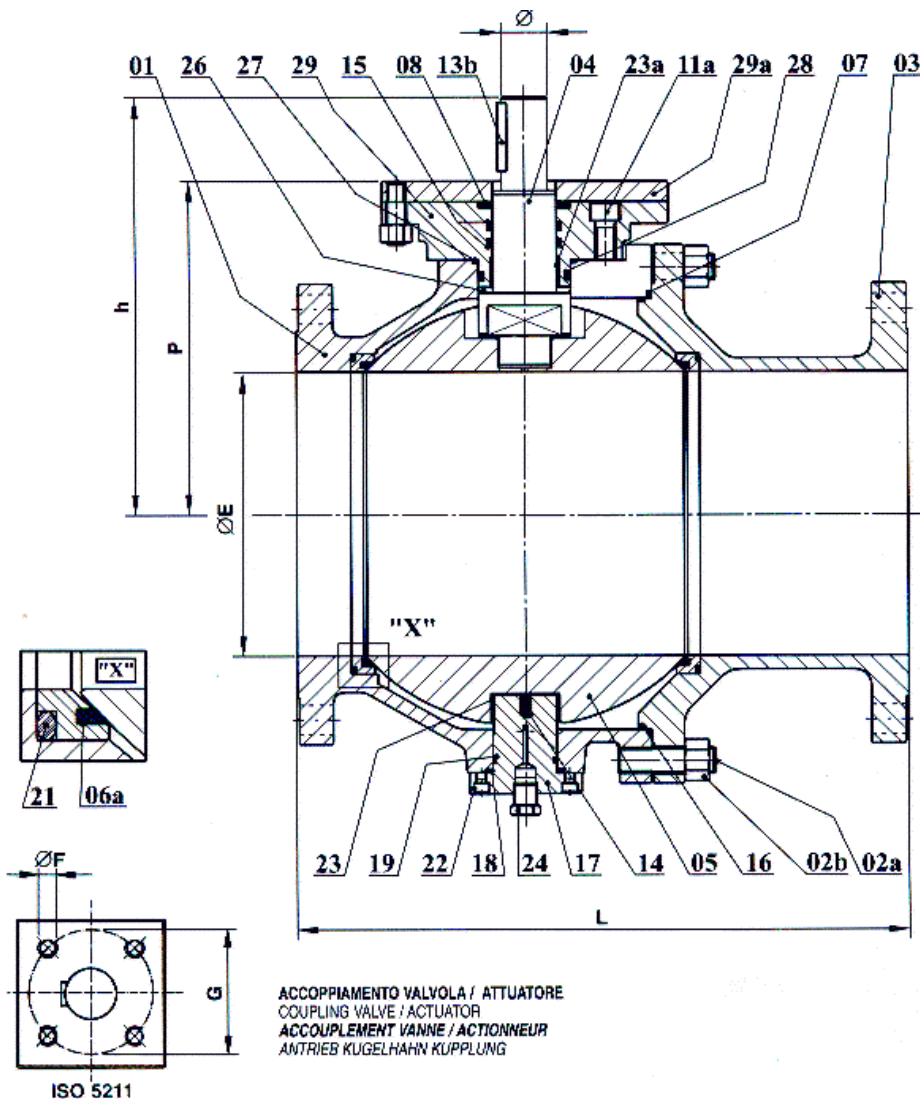
BODY GASKET (item n°07) – 1 pc.
BODY O-RING (item n°16) – 1 pc.
SEATS (item n°06) – 2 pcs.
BELLEVILLE SPRINGS (item n° 12) – 2 pc.
STEM WASHER (item n°08) – 2 pcs.
PRESSING BUSH (item n°09) – 1 pc.
STEM O-RING (item n°15) – 1 pc.

VALVE RE-ASSEMBLY

- Place the body (01) with flow axis in vertical position.
- Carefully lubricate the seat housing and the other zones where gaskets (07) are placed and the body O-ring (16) and stem O-ring (15).
- Insert the seat O-ring on the body and the seat; compress the seat in such way to contrast the O-ring resistance.
- After having inserted the O-ring (15) on the stem and the gasket (08) on the corresponding housing into the body, the stem can be inserted from body inside.
- Mount the plain gasket (08) from outside of body, the gland (09), and the spring washer in opposite conditions, the first screw nut, the hand lever and the second screw nut.
- Tighten the lower screw nut with stem blocked from inside and then tighten the upper nut.
- Move the stem in OPEN position.
- Insert the ball in OPEN position.
- Mount the second seat into the closure (03), repeating the same operations executed for the body seat.
- Insert the closure (03) into the body and screw the stud nuts (02 a-b), without over-tightening.
- Insert the lower trunnion (17) and tighten the screws.
- Operate the ball in CLOSED position and complete the tightening of stud nuts (02 a-b) gradually and cross wise.
- Operate the valve 2-3 times to ensure that it can be correctly operated without difficulties.

MAINTENANCE CARD

ALFA 64P / 60P



REPLACEMENT INSTRUCTIONS FOR WORN OUT PARTS VALID FOR A60P DN 250-300 AND A64P ALL DN

STEM SEAL MAINTENANCE

DISASSEMBLY

- Ensure that no pressure is left in the body cavity by completely opening and closing the valve.
- Remove the operator device from the valve.
- Remove the key (13b)
- Unscrew the adaptor plate screws
- Withdraw the adaptor plate (29a)
- Unscrew and remove the adaptor plate bolting (11a)
- Withdraw the gland plate (29) from its housing on the body and remove the O-Rings (15 and 28)
- Eliminate the gaskets (27 and 08) from their housings
- Remove the stem (4) and the stem washer (26)

REASSEMBLY

- Verify the condition of all of the parts removed, in particular:
 - the absence of sticking on the sliding surface of the stem;
 - the integrity of the stem washer (26);

Request any replacement parts that may be necessary in addition to the gaskets and the stem washer, which must always be replaced. Slide the stem washer (26) onto the stem (4), assemble and lubricate the gland plate (29) O-Rings (15 and 28) and assemble the stem. Insert the gaskets (27) in its housing on the body and mount the gland plate tightening the screws (11a).

Insert the gaskets (15)

Insert the adaptor plate (29a)

Screw on the adaptor plate screws

Insert the key (13b) on the stem (4)

On completion of the above, open and close the valve at least 2-3 times and check that there are no leaks.

GENERAL MAINTENANCE

DISASSEMBLY

The valve may only be removed from the piping system after having manoeuvred the ball to the OPEN position.

Ensure that no pressure is left in the body cavity by completely opening and closing the valve.

Remove the operator device from the valve.

Remove the key (13b)

Unscrew the adaptor plate screws

Remove the adaptor plate (29a)

Unscrew and remove the adaptor plate bolting (11a)

Remove the gland plate (29) from its housing on the body and remove the O-Rings (15 and 28)

Eliminate the gaskets (27 and 08) from their housings

Remove the stem (4) and the stem washer (26)

Place the valve with flow axis in vertical position.

Unscrew the bolts, or screws (22) and remove the trunnion (17).

Verify the condition of the plan gasket (18) and O-ring (19).

Unscrew and remove the stud nuts (02a-b) and remove the closure (03).

Separate the seat (06 a) from the closure (03).

Verify the conditions of the O-ring (21), carefully degreasing the surface of contact between the seats and the closure and check the housing of the seat O-ring (21).

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

Remove the ball (05) and verify for surface defects in the area of contact with the seats.

Verify the integrity of ball bushing (23).

Remove the seat (06 a) from body and O-ring (21).

Carry out the same controls as for the seat on the closure.

REASSEMBLY

Place the body (01) with flow axis in vertical position.

Carefully lubricate the body seat housing (01).

Insert the seat O-ring (21) in the body and the seat; compress the seat in such way to contrast the O-ring resistance.

Mount the ball bushing (23) to the ball (05).

Mount the plain gasket (18) and O-ring (19) on the lower trunnion (17).

Carefully lubricate the seat housing into the closure (03) and the other zones where gaskets (07) and body O-ring (16) are placed.

Mount the second seat into the closure (03), repeating the same operations executed for the body seat.

Insert the ball (05) in OPEN position inside the body (01).

Insert the closure (03) into the body and screw the stud nuts (02 a-b), without over-tightening.

Insert the lower trunnion (17) and tighten the screws (22); pay attention to place it into the corresponding ball housing.

Slide the stem washer (26) onto the stem (4), assemble and lubricate the gland plate (29) O-Rings (15 and 28) and assemble the stem.

Insert the gaskets (27) in its housing on the body.

Insert the gaskets (15).

Insert the stem (04) and stem washer (26) into its housing.

Mount the gland tightening the screws (11a)

Insert the adapter plate (29 a).

Screw the plate screws.

Insert the key (13 b) on the stem (04).

Complete the tightening of stud nuts (02 a-b) gradually and cross wise on both closure.

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