

**STORAGE, INSTALLATION, OPERATION AND MAINTENANCE MANUAL  
FOR TRUNNION MOUNTED BALL VALVES**

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**1.0 - INTRODUCTION**

**1.1 - General notes**

This manual contains the instructions for the storage, installation, operation and maintenance of the standard range of Dafram trunnion mounted ball valves with bolted joint between body and body connectors produced by DAFRAM in accordance to API 6D. Additional instructions will be provided for fully welded ball valves, ball valves with threaded joint and sealed by welding joint and "specials". All drawings contained within this manual are typical views. The instructions supplied by this manual are relevant to all standard and fire-safe Dafram ball valves, apart from size and rating.

If you need special instructions, please contact your local agent or Dafram directly.

**USE ONLY SPARE PARTS SUPPLIED BY  
DAFRAM.**

**1.2 - Design**

Dafram trunnion mounted ball valves with bolted joint between body and body connectors have three basic patterns. Exploded views of these are shown in the following drawings:

- Pict. 1: flanged valves type S (two piece body, ball guided by trunnion)
- Pict. 2 : flanged valves type P (three piece body, ball guided by bearing retainers)
- Pict. 3: flanged valves type D (two piece body, ball guided by bearing retainers)

**1.3 - Name-plate information (according to API 6D)**

Dafram name-plates are made from stainless steel and contain the following information:

- Pressure Class
- Date of manufacture (month and year)
- Maximum operating pressure at maximum operating temperature
- Maximum operating pressure at minimum operating temperature
- Body, stem, ball and seat materials

- Nominal valve size
- Valve serial number
- TAG number

**1.4 – Compatibility among valve’s materials, intercepted fluid and operating conditions.**

**CAUTION: THE LIABILITY OF EVALUATING THE COMPATIBILITY AMONG VALVE’S MATERIALS, INTERCEPTED FLUID AND OPERATING CONDITIONS IS EXCLUSIVELY IN CHARGE OF THE CLIENT.**

**2.0 - STORAGE**

Those valves not destined to immediate use will be adequately protected and packed before shipping in such a way as to avoid any possible damage during transport and during the subsequent storage period before use.

It is recommended that the valves remain in their own packing cases during the entire period of storage. To prevent damage to the raised faces and accumulation of dirt inside the valve, the end caps must not be removed.

The valves must always remain in the **FULLY OPEN** position. The valves should be stored in weather proof/watertight environment.

Gears and actuators are shipped ready-mated to their respective valves together with associated accessories. Caution must be taken to ensure that caps, plugs etc. protecting against dust, sand, or other foreign particles through the air inlet ports, hydraulic fluids or electric wires, are not removed until installation.

**3.0 – INSTALLATION**

**CAUTION: BEFORE INSTALLATION OF THE VALVES IT IS VITAL THAT ALL CONNECTING PIPING IS COMPLETELY CLEAN AND FREE OF DEBRIS, RESIDUES FROM WELDING, CALAMINES, ETC., WHICH COULD DAMAGE THE BALL AND THE SEATS. THE VALVE MUST BE KEPT IN THE FULLY OPEN POSITION DURING INSTALLATION AND THE PROTECTIVE END CAPS MUST NOT BE REMOVED UNTIL THE LAST MINUTE. THE PIPING MUST BE STRESS FREE TO AVOID REACTION FORCES ON THE VALVE.**

At the shipping stage the valves are usually protected from corrosion with MOBILGREASE HP 222. Please verify grease compatibility with operating conditions and fluids used during plant starting up. On carbon steel valves, some oil can be applied in order to prevent internal parts corrosion: if required, oil and grease can be easily removed before use through a solvent.

The valves must be lifted and handled using the adequate eyebolts, or better, ropes or bands positioned under the valves, close to the two end flanges, according to the schemes 1,2 and 3 of Fig. 1 of the drawing DWG.63-98 rev2. The ways 4 and 5 of the Fig. 2, on the contrary, are to be avoided.

Dafram valves are suitable to support actuator weight when they are installed with stem in vertical position. If the User needs to install actuated valves in a different position, please contact Dafram Technical Department in order to verify

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assembly resistance or please use proper supports for actuators.  
Please note that if bare stem valves are supplied, Dafram cannot be considered responsible for sizing of lifting points and valve supports, in case that these devices are used for the whole actuated valve.

**CAUTION: IT SHOULD BE AVOIDED, DURING THE OPERATIONS, TO EXCEED THE VALVE PRESSURE AND TEMPERATURE'S LIMITS ACCORDING API 6D.**

All trunnion valves are equipped with "self relieving" function, that is, the capacity of relieve automatically a possible overpressure developed inside the body cavity ( for example, due to the temperature's variations of liquids or to the development of ice), through the seat with the lower line pressure acts.

All standard valves are bi-directional. In the case of special unidirectional valves look for the clearly visible arrow placed on the valve body, indicating the flow direction.

Caution must be taken on butt weld-end valves to avoid overheating the seats and seals, although only momentarily, keeping the valve bodies at the correct temperature with the use of cold wet rags or other adequate means.

Moreover you have to work with the sphere kept in FULL OPEN position to avoid possible splash damage to the sphere. If required Dafram s.p.a. valves can be produced with padlock to allow the sphere to be locked in the fully open position.

Gear and actuator stops are set in the factory and should require no further adjustment.

During installation care must be taken to avoid damaging the pipes, pipe fittings, pressure gauges and any other accessory connected to the actuator.

**4.0 - OPERATION**

When in service the valve must only be in the "fully open" or "fully closed" position. Any other position is likely to cause damage to the seats.

If accidental operation of the valve could be dangerous for users, the operation device should be equipped with a padlock or suitable locking device.

Upon request valves can be supplied already equipped with a padlock.

**5.0 - MAINTENANCE**

**IMPORTANT REMARK:** Maintenance work carried out during the warranty period requires the prior permission of DAFRAM. Failure to comply with this will nullify the warranty.

If correctly used, the ball valves do not normally require lubrication and maintenance.

However valve reliability can be improved with periodic verifications (complete or partial movement cycles: Full or Partial Stroke Test) in order to verify efficiency during valve life. Reliability data, expressed as a function of periodical checks, are reported in doc no. FS 28708246 (Technical Report on testing of Trunnion Mounted Ball Valves) available at DAFRAM upon request.

**Attention !** UPON REQUEST DAFRAM VALVES CAN BE SIL CERTIFIED. TO ASSURE THE GUARANTEED SIL LEVEL, THE VALVE FUNTIONALITY SHALL BE VERIFIED AT PERIODIC INTERVALS WITH 1 FULL STROKE TEST.

**Attention !** IF THE VALVE ISN'T OPERATED FOR LONG PERIODS OF TIME OPERATING TORQUES CAN INCREASE ( BUT IT IS DIFFICULT TO ESTIMATE HOW MUCH THEY WILL INCREASE). IT'S RECOMMENDED TO OPERATE THE VALVE AT LEAST ONCE EVERY 3 MOUNTHS, IF POSSIBLE TO AVOID THIS PROBLEM.

**CAUTION: THE TRUNNION MOUNTED BALL VALVES ARE SOMETIMES EQUIPPED WITH ACCESSORIES CONNECTED TO THE VALVE BODY BY THREADING. THE MOST FREQUENTLY INSTALLED ACCESSORIES ARE:**  
 -DRAIN PLUG [701], USUALLY CONNECTED TO THE VALVE BODY, IN A POSITION DIAMETRICALLY OPPOSITE TO THE STEM  
 -BLEED VALVE [700], USUALLY CONNECTED TO THE VALVE BODY, IN A POSITION NEAR TO THE STEM  
 -FITTINGS FOR STEM AND SEAT SEALANT INJECTION [702]  
 -CALIBRATED SAFETY VALVES.  
**DURING THE OPERATION OF THE VALVE, WITH THE VALVE BODY SUBJECTED TO THE OPERATING PRESSURE, ACCIDENTAL REMOVAL OF THE ABOVE-MENTIONED ACCESSORIES COULD BE VERY DANGEROUS, ESPECIALLY IF THE WORKING FLUID IS OF A GASEOUS NATURE.**

Seat seals and stem bearings are made of a low wear material with excellent low friction qualities. This results in constantly low operating torque requirements over the entire expected life of the valve.

However, in case of valves operated very rarely, to reduce the torque, it is possible to inject some lubricant grease throughout the injection system supplied if required (for more information see 5.1.)

**5.1 - Sealant injection- Secondary seal**

If foreign matter causes damage to the seats, in order to restore or improve seat tightness and stem O-Ring tightness, Dafram valves are equipped with a secondary sealing system whereby the sealant can be injected directly to the seat area and stem O-Ring area.

The injectable fluids are the followings:

**CAUTION: IF NECESSARY CAUTIONS ARE NOT FOLLOWED, INJECTION OF FLUIDS MAY CREATE ANOMALOUS INCREASEMENTS OF THE OPERATION TORQUE AND/OR CAUSE STRUCTURAL DAMAGES TO THE VALVES SO IT IS RECCOMENDED TO FOLLOW THE PROCEDURE FOR THE USE OF THE INJECTION SYSTEM MAI 04001**

-Lubricants designed to protect critical seal faces against corrosion and to reduce operating torques of valves not frequently operated.

-Sealants used to stop or reduce the external leakages trough seats or stem seals.

-Cleaners used to clean seal faces and sealant passages by softening, flushing and removing old sealant.

**CAUTION: THE FITTINGS FOR SEALANT INJECTION HAVE TWO BASIC PATTERNS, SHOWN IN FIGURE 5:**  
 TYPE A, TWO PIECE BODY, DOUBLE BALL  
 TYPE B, SINGLE BALL AND PLUG  
**YOU CAN FIND ALL THE NECESSARY INSTRUCTIONS FOR SEALANT INJECTION UNDER SAFETY CONDITIONS IN FIGURE 5.**

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**5.2 - LEAKAGES**

After a period of time depending on service conditions and type of fluid, the following leakages may however occur:

- 5.2 .1 Stem leakage
- 5.2.2 Body gasket leakage
- 5.2.3 In line or seat leakage

**5.2.1 - Stem leakage**

Positive **anti-blow-out stem design**, on the complete product range, prevents stem removal when valve is installed and under working pressure. This feature allows easy elimination of stem leakages by substitution of all the seals between the body and the top flange (according the instructions at § 5.6) without removing the valve from the line. On request, in order to restore or improve the stem seal, Dafram ball valves can be equipped with a secondary sealing system, whereby sealant can be injected directly to the seal area, according to the instructions given in par. 5.1.

**5.2.2 - Body gasket leakage**

Check the tightness of bolting between body and body connector.

**CAUTION: EXCESSIVE TIGHTENING OF NUTS CAN ONLY CAUSE BREAKAGE OF THE TIE RODS.**

If the leakage continues the valve must be disassembled and the body gaskets [104, 102] replaced.

**5.2.3 - In line or seat leakage**

First check that the valves are in the closed position; otherwise, turn the stem till the ball is in "fully closed" position.

If the valve is provided with the sealant injection system, the tightness can be restored or improved following the instructions given in § 5.1.

Only if the sealant injection is unable to restore a satisfactory tightness will it be necessary to dismantle the valve in order to replace the damaged components (seat insert [501], seat O-Ring [502], seat ring [500], ball [400]), following the instructions given in § 5.6.

**5.3 - Safety precautions before removing the valve from the line**

**CAUTION: AS THE CONTENTS OF THE PIPING MAY BE TOXIC, INFLAMMABLE, CORROSIVE ETC, IT IS ADVISABLE TO TAKE THE FOLLOWING PRECAUTIONS DURING THE REPAIRING/MAINTENANCE OF THE VALVES:**

- 1 BEFORE REMOVING THE VALVE FROM LINE ENSURE IT IS NOT UNDER PRESSURE. FULLY OPEN AND FULLY CLOSE THE VALVE TO RELIEVE THE BODY PRESSURE. OPEN THE BLEED VALVE [700] SLOWLY OR SCREW THE DRAIN PLUG [701] CAREFULLY.**
- 2 USE GLASSES OR PROTECTIVE EYE MASKS**
- 3 USE GLOVES, OVERALLS AND SUITABLE FOOTWEAR.**
- 4 ENSURE THAT RUNNING WATER AND A FIRE EXTINGUISHER ARE AVAILABLE AT ALL TIMES.**

**5.4 - Disassembly procedure.**

**5.4.1 Valves type S. Picture 1.**

5.4.1.1 Relieve the body pressure by opening the bleed valve [700]. Turn the ball to open position.

5.4.1.2 Remove gear box or lever, stem keys [606] and remove the screws [204], then the top flange [200] with O-rings [201][602], the top flange secondary gasket [203], the upper stem bush [612] and the upper stem gasket [604].

5.4.1.3 Remove the screws [304], the trunnion [300] with O-ring [301] and the trunnion secondary gasket [303].

5.4.1.4 Pull the stem [600] towards the outside of the valve, until the stem end comes out of the proper housing on the bottom of the ball slot.

5.4.1.5 With valve held in vertical position and body connector facing upwards, unbolt and remove nuts [106] and the body connector [101] with seat ring [500]. Take care that seat ring, together with seat springs [505], do not fall out during removal as this may cause damage to the ball and other components.

5.4.1.6 Carefully remove ball from body; take care that ball surface doesn't strike against metallic components.

5.4.1.7 Remove the stem driving it through the body.

5.4.1.8 Remove the second seat ring [500] from valve body [100].

5.4.1.9 The valve is now dismantled. Clean and inspect all components for damage or wear. It is recommended that all O-Rings and seals are replaced as a matter of course, together with any defective components.

**NOTE:** Do not remove trunnion and lower stem bushes [305] [613] unless damaged.

**5.4.2 Valves type P. Picture 2.**

5.4.2.1 Relieve the body pressure by opening the bleed valve [700]. Turn the ball to closed position.

5.4.2.2 Remove the gear box or lever, stem keys [606], the screws [207] and ,then, the adapter flange [206]. Remove the screws [204] and the top flange [200] with the upper stem seal [604], O-rings [201] [602] and the top flange secondary gasket [203].

5.4.2.3 With valve held in the vertical position and body connector facing upwards, unbolt and remove the nuts [106] and the body connector [101] with seat rings [500]. Take care that seat ring, together with seat springs [505], do not fall out during removal as this may cause damage to the ball and other components.

5.4.2.4 Carefully remove the ball from body valve together with the two bearing retainers [402], with the use of bands.

5.4.2.5 Remove the stem [600], driving it through the body.

5.4.2.6 Remove the second body connector from the valve body [100].

5.4.2.7 Remove the seat ring from the second body connector.

5.4.2.8 The valve is now dismantled. Clean and inspect all components for damage or wear. It is recommended that all O-Rings and seals are replaced as a matter of course, together with any defective components.

**NOTE:** Do not remove the two dry ball bearings [401] unless damaged.

**5.4.3 Valves type D. Picture 3.**

5.4.3.1 Relieve the body pressure by opening the bleed valve [700]. Turn ball to open position.

5.4.3.2 Remove gear box or lever, stem keys [606] and the screws [207] and the adapter flange [206], then , the screws [204] and the top flange [200] with O-rings [201][602], the top flange secondary gasket [203] and upper stem gasket [604].

5.4.3.3 With valve held in vertical position and body connector facing upwards, unbolt and remove nuts [106] and the body connector [101] with seat ring [500]. Take care that seat ring, together with seat springs, do not fall out during removal as this may cause damage to the ball and other components.

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5.4.3.4 Carefully remove the ball from body together with the two bearing retainers [402], with the use of bands.

5.4.3.5 Remove the stem [600], driving it through the body.

5.4.3.6 Remove the second seat ring from valve body.

5.4.3.7 The valve is now dismantled. Clean and inspect all components for damage or wear. It is recommended that all O-Rings and seals are replaced as a matter of course, together with any defective components.

**NOTE:** Do not remove the two dry ball bearings [401] unless damaged.

### 5.5 Inspection

**Surface of the ball:** particularly in seating area the presence of nicks, gouges, pits or other surface defects indicates a new ball is required.

**O-rings:** replacement of all broken, nicked, frayed, stretched or swollen O-rings is necessary. Hardness or brittleness of the O-ring shows incompatibility with the service conditions; in this case consult the Dafram s.p.a.

**Stem seals and body gasket:** replacement of all stem seals and body gaskets is in any case recommended.

### 5.6 Assembly procedures

**CAUTION: IN THE METAL-TO-METAL SEATED BALL VALVES EVERY METAL SEAT IS ADJUSTED TO THE BALL , WHEREON IT SHALL WORK WHEN THE VALVE IS IN THE CLOSED POSITION. THEREFORE EACH BALL SHALL BE MARKED WITH A UNIQUE CODE WHICH SHALL ALSO BE MARKED ON THE METAL SEAT FITTED WITH IT SO THAT THEY CAN BE MATCHED TOGETHER WHEN REASSEMBLED.**

**WORKERS WHO ASSEMBLY THE VALVE AND THE OPERATION EQUIPMENT (WRENCH, GEAR OR ACTUATOR) SHALL PAY ATTENTION TO THE FACT THAT, WHEN THE VALVE IS IN THE CLOSED POSITION, THE SEAT AND THE BALL THAT COME INTO CONTACT WITH EACH OTHER HAVE THE SAME CODE.**

#### 5.6.1 Valves type S. Picture 1.

5.6.1.1 Ensure all "O" rings are properly installed in their housing and greased to facilitate the assembly of the components. Dafram's recommended grease is MOBILGREASE HP 222.

5.6.1.2 Insert springs [505] into retaining holes and insert seat rings [500] into the valve body [100] and the body connector [101].

5.6.1.3 Fit stem [600] with the lower seal [601], from inside of the valve, into stem housing.

5.6.1.4 Pull the stem towards the outside of the valve and insert ball in open position.

5.6.1.5 Install body connector and tighten all nuts.

5.6.1.6 Push stem towards the ball.

5.6.1.7 Insert trunnion [300], if necessary by gently tapping with non-metallic tools, or make the ball rotate using the stem and push the trunnion towards the ball by the other hand. Tighten the screws [304].

5.6.1.8 Fit the top flange [200] and insert the upper stem bush [612] on the stem

5.6.1.9. After complete reassembly check the manoeuvrability of the valve making sure ball and stem rotate freely.

5.6.2.10. Always maintain valve cleanliness during assembly procedure.

5.6.1.11. The valve is now ready for testing.

#### 5.6.2 Valves type P. Picture 2.

5.6.2.1 Ensure all "O" rings are properly installed in their housing and greased to facilitate the assembly of the

components. Dafram's recommended grease is MOBILGREASE HP 222.

5.6.2.2 Insert springs [505] into retaining holes and insert seat rings [500] into both body connectors.

5.6.2.3 Put the bearing retainer pins [403] into their body connector housing holes. They will fit on the bearing retainers [402].

5.6.2.4 Put the valve body [100] on the first body connector [101].

5.6.2.5 Fit stem [600] with the lower seal [601], from inside of the valve, into stem housing.

5.6.2.6 Assemble the two bearing retainers [402] to the ball [400].

5.6.2.7 Insert the ball in the closed position together with the two bearing retainers [402] pushing the stem enough to enable the ball to fit in.

5.6.2.8 Fit the second body connector onto valve body and tighten.

5.6.2.9 Fit the top flange [200] with O-rings [201,602], the top flange secondary gasket [203] and the upper stem seal [604] then the adapter flange [206] tightening the screws [207].

5.6.2.10. After complete reassembly, check the operation of the valve using momentary operation of the gear or actuator to make sure ball and stem rotate freely.

5.6.2.11. Always maintain valve cleanliness during assembly procedure.

5.6.2.12. The valve is now ready for testing.

#### 5.6.3 Valves type D. Picture 3.

5.6.3.1 Ensure all "O" rings are properly installed in their housing and greased to facilitate the assembly of the components. Dafram's recommended grease is MOBILGREASE HP 222.

5.6.3.2 Insert the springs [505] into retaining holes and insert seat rings [500] into the valve body [100] and the body connector [101].

5.6.3.3 Put the bearing retainer pins [403] into their body connector housing holes. They will fit on the bearing retainers [402].

5.6.3.4. Fit stem [600] with the lower seal [601], from inside of the valve, into stem housing.

5.6.3.5. Insert ball in the closed position together with the two bearing retainers [402].

5.6.3.6 Fit body connector [101] onto valve body and tighten.

5.6.3.7 Fit the top flange [200] with O-rings [201,602], the top flange secondary gasket [203] and the upper stem seal [604] then the adapter flange [206] tightening the screws [207].

5.6.3.8 After complete reassembly, check the operation of the valve using momentary operation of the gear or actuator to make sure ball and stem rotate freely.

5.6.3.9. Always maintain valve cleanliness during assembly procedure.

5.8.3.10. The valve is now ready for testing.

### 6.0 - TESTING

Test the valve according to appropriate specifications (See Table 6.0).

### 7.0 - GEARS AND ACTUATORS

This manual contains only general instructions for the storage and installation of gears, electric and pneumatic actuators. A detailed manual specifically for gears and actuators will provide suitable operation and maintenance instructions.

Only at the end of all the tests, should gears or actuators be reinstalled on gear operated or actuated valves (assembly of gears or actuators before testing will not allow possible stem leakages to be detected). If necessary reset the stops.

First set the "OPEN" stop so that the ball is fully open; the "CLOSED" stop is then set 90 degrees from the "OPEN" position adjusting as necessary, for the best closure.

**TABLE 6.0**  
Each valve should be tested at the pressure indicated (API 6D)

<b>Hydrostatic shell test</b> (Valve half open)	1.5 times the working pressure indicated on the valve plate
<b>Hydrostatic seat test</b> (Test both seats)	1.1 times the working pressure indicated on the valve plate
<b>Air set test</b> (Valve vertical, cover ball & seats with water and test both seats)	5,5 Bar (80 Psig)

**Duration of tests**

Valve DN (size)	Shell test (minutes)	Seat test (minutes)
25 to 100 (2" through 4")	2	2
150 to 250 (6" through 10")	5	5
300 to 450 (12" through 18")	15	5
500 and over (>= 20")	30	5

**BOLT TIGHTENING TORQUES VALUES (Nm)**

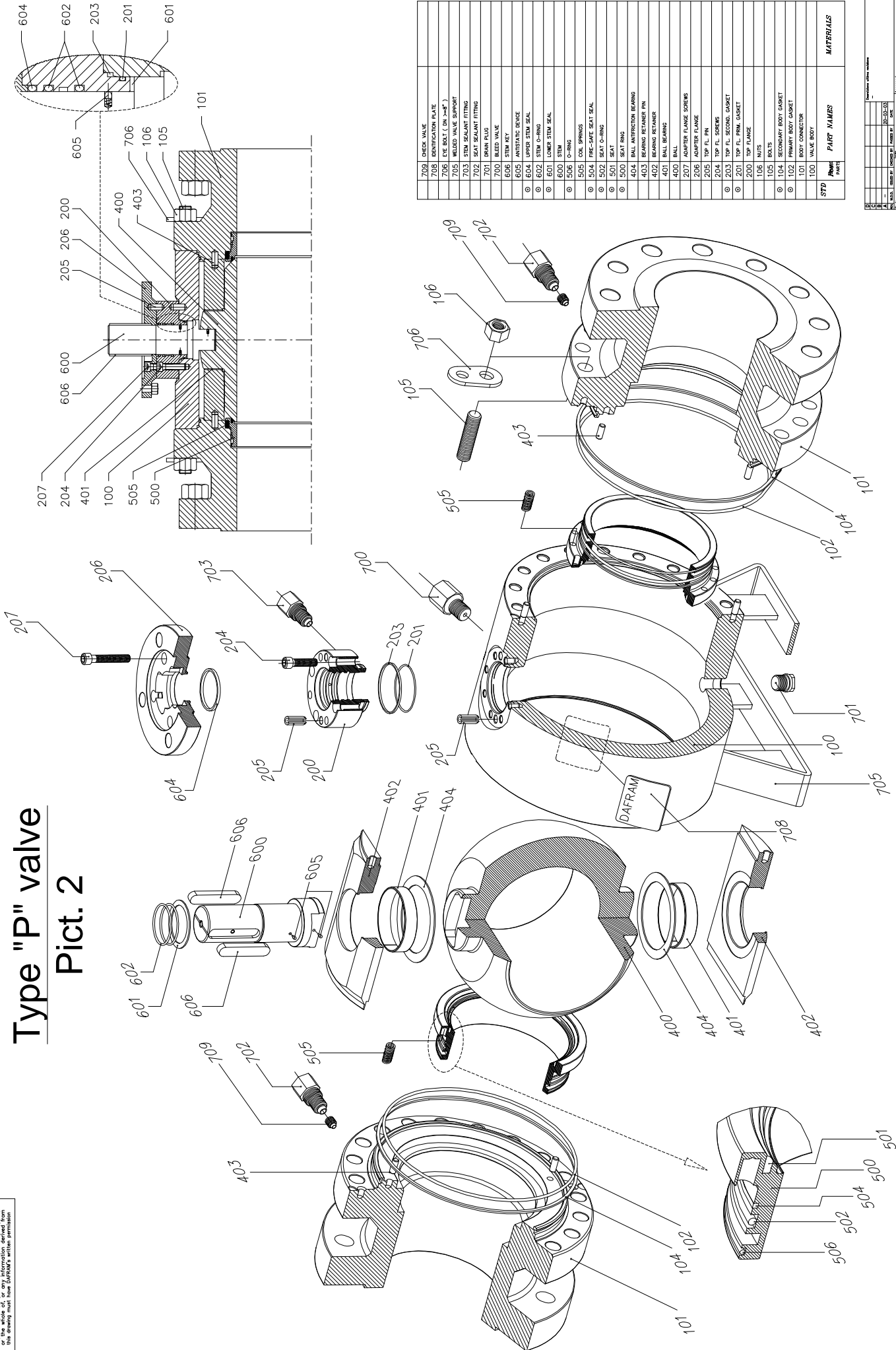
Type	DN thread Inches - mm	Bolt material		
		B8 – B8M A4-70 (from M22 to M30) A2-70 (from M22 to M30)	B7M A4-70 (up to M20) A2-70 (up to M20)	8.8 B7 – L7
UNC - METRIC	¼ – M6	3	9	10
	5/16 – M8	7	18	21
	3/8 – M10	12	31	36
	7/16	19	50	58
	½ – M12	29	76	89
	9/16 – M14	41	109	127
	5/8 – M16	57	152	177
	¾ – M18	100	268	312
	7/8 – M22	162	433	504
8UN - METRIC	1 – M24	242	650	756
	1 1/8 – M27	356	954	1110
	1 ¼ – M30/33	500	1340	1560
	1 3/8 – M36	677	1817	2115
	1 ½ – M39	895	2401	2794
	1 5/8 – M42	1156	3101	3609
	1 ¾ – M45	1455	3904	4543
	1 7/8 – M48	1807	4847	5640
	2 – M52	2215	5942	6914
	2 ¼ – M56	3202	8592	9998
	2 ½ – M60	4438	11907	13856
	2 ¾	5969	16015	18635
	3	7807	20947	24374
	3 ¼	9990	26804	31190
	3 ½	12537	33637	39141
3 ¾	15501	41588	48393	
4	18884	50664	58955	

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# Type "P" valve

## Pict. 2



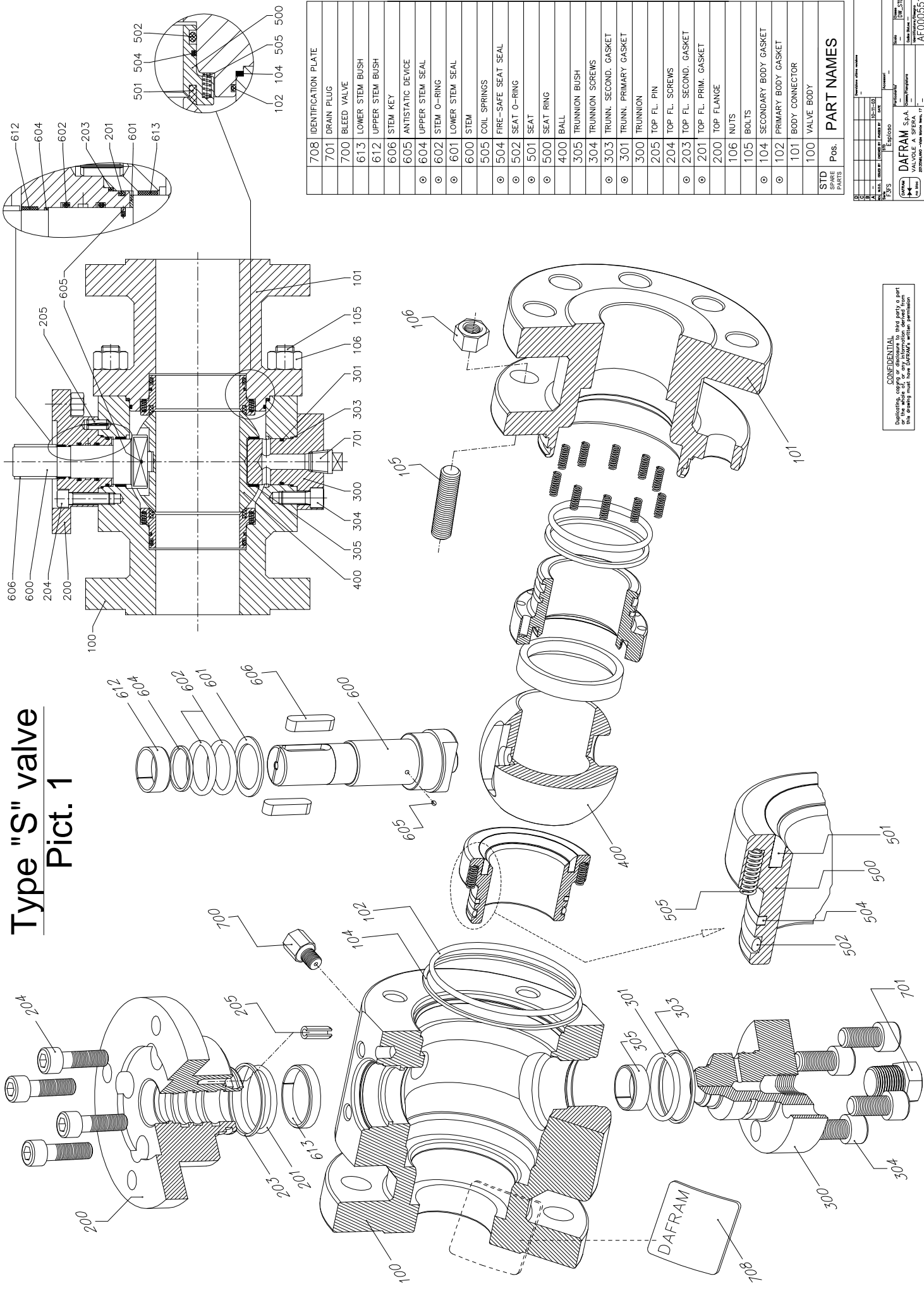
STP	Part	PART NAMES	MATERIALS
700	DEEP VALVE		
708	IDENTIFICATION PLATE		
706	EYE BOLT (Ø IN "M")		
705	WELDED VALVE SUPPORT		
703	STEM SEAMANT FITTING		
702	SEAT SEAMANT FITTING		
701	DRAIN PLUG		
700	BLEED VALVE		
606	STEM KEY		
605	ANISSTATIC BEVGE		
604	UPPER STEM SEAL		
602	STEM O-RING		
601	LOWER STEM SEAL		
600	STEM		
506	O-RING		
505	COIL SPRINGS		
504	FIRE-SAFE SEAT SEAL		
502	SEAT O-RING		
501	SEAT		
500	SEAT RING		
404	BALL INTERLOCK BEARING		
403	BEARING RETAINER PIN		
402	BEARING RETAINER		
401	BALL BEARING		
400	BALL		
207	ADAPTER FLANGE SCREWS		
206	ADAPTER FLANGE		
205	TOP FL. PIN		
204	TOP FL. SCREWS		
203	TOP FL. SECOND GASKET		
201	TOP FL. PINAL GASKET		
200	TOP FLANGE		
108	NUTS		
105	BOLTS		
104	SECONDARY BODY GASKET		
102	PRIMARY BODY GASKET		
101	BODY CONNECTOR		
100	VALVE BODY		

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# Type "S" valve Pict. 1



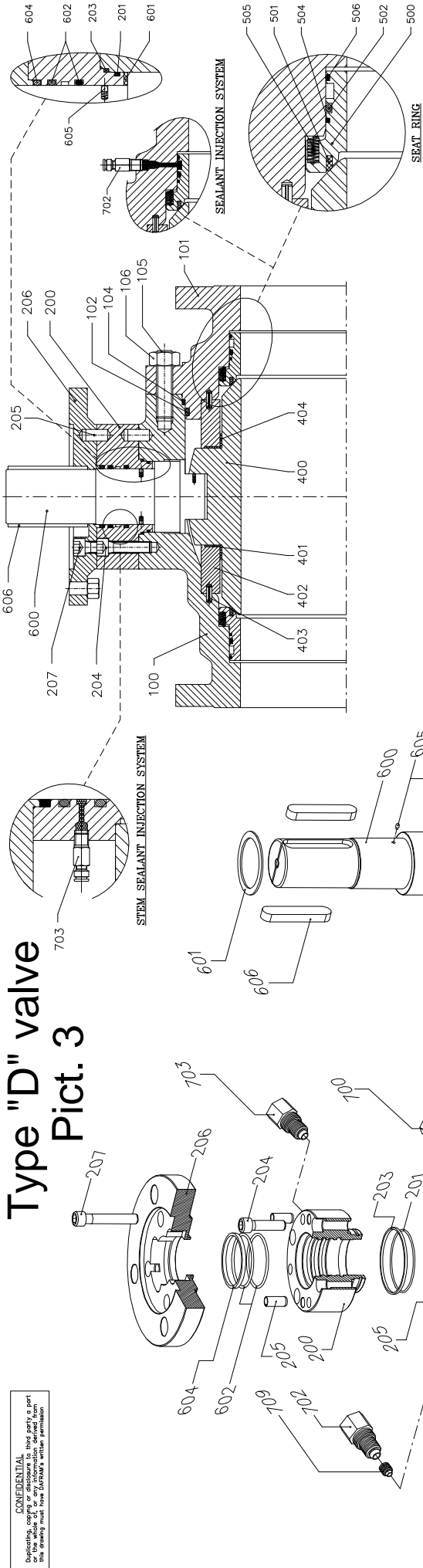
Pos.	PART NAMES
708	IDENTIFICATION PLATE
701	DRAIN PLUG
700	BLEED VALVE
613	LOWER STEM BUSH
612	UPPER STEM BUSH
606	STEM KEY
605	ANTISTATIC DEVICE
604	UPPER STEM SEAL
602	STEM O-RING
601	LOWER STEM SEAL
600	STEM
505	COIL SPRINGS
504	FIRE-SAFE SEAT SEAL
502	SEAT O-RING
501	SEAT
500	SEAT RING
400	BALL
305	TRUNNION BUSH
304	TRUNNION SCREWS
303	TRUNN. SECOND. GASKET
301	TRUNN. PRIMARY GASKET
300	TRUNNION
205	TOP FL. PIN
204	TOP FL. SCREWS
203	TOP FL. SECOND. GASKET
201	TOP FL. PRIM. GASKET
200	TOP FLANGE
106	NUTS
105	BOLTS
104	SECONDARY BODY GASKET
102	PRIMARY BODY GASKET
101	BODY CONNECTOR
100	VALVE BODY

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Emissione... Modificato... Approvato...		ATO00551

# Type "D" valve Pict. 3

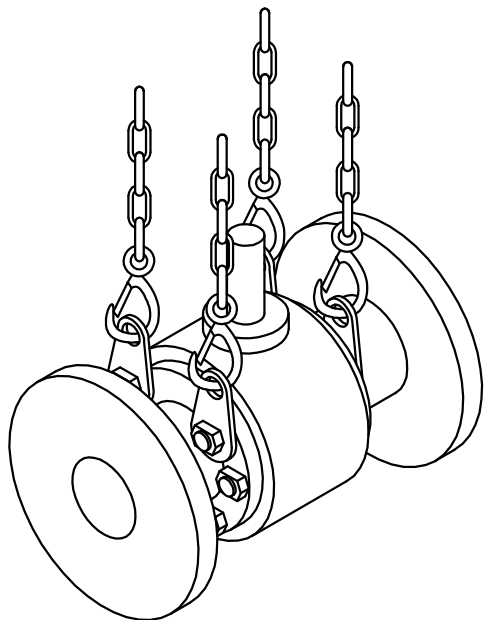
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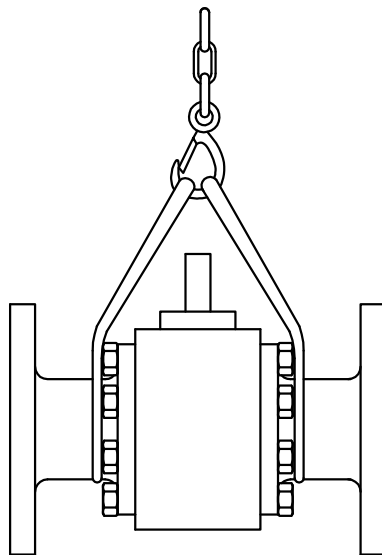
Pos.	PART NAMES
708	IDENTIFICATION PLATE
703	STEM SEALANT FITTING
702	SEAT SEALANT FITTING
701	DRAIN PLUG
700	BLEED VALVE
606	STEM KEY
605	ANTISTATIC DEVICE
604	UPPER STEM SEAL
602	STEM O-RING
601	LOWER STEM SEAL
600	STEM
506	SEAT O-RING
505	COIL SPRINGS
504	FIRE SAFE SEAT SEAL
502	SEAT O-RING
501	SEAT INSERT
500	SEAT RING
404	BALL ANTI-FRICTION BEARING
403	BEARING RETAINER PIN
402	BEARING RETAINER
401	BALL BEARING
400	BALL
207	ADAPTER FLANGE SCREWS
206	ADAPTER FLANGE
205	TOP FLANGE PINS
204	TOP FL. SCREWS
203	COARINIZ. SECOND. GRASSERIA SUP.
201	COARINIZ. PRIM. GRASSERIA SUP.
200	TOP FLANGE
106	NUTS
105	BOLTS
104	SECONDARY BODY GASKET
102	PRIMARY BODY GASKET
101	BODY CONNECTOR
100	VALVE BODY

Pos.	PART NAMES
604	UPPER STEM SEAL
602	STEM O-RING
203	COARINIZ. SECOND. GRASSERIA SUP.
201	COARINIZ. PRIM. GRASSERIA SUP.
605	ANTISTATIC DEVICE
501	SEAT INSERT
504	FIRE SAFE SEAT SEAL
506	SEAT O-RING
404	BALL ANTI-FRICTION BEARING
403	BEARING RETAINER PIN
402	BEARING RETAINER
401	BALL BEARING
400	BALL
207	ADAPTER FLANGE SCREWS
206	ADAPTER FLANGE
205	TOP FLANGE PINS
204	TOP FL. SCREWS
203	COARINIZ. SECOND. GRASSERIA SUP.
201	COARINIZ. PRIM. GRASSERIA SUP.
200	TOP FLANGE
106	NUTS
105	BOLTS
104	SECONDARY BODY GASKET
102	PRIMARY BODY GASKET
101	BODY CONNECTOR
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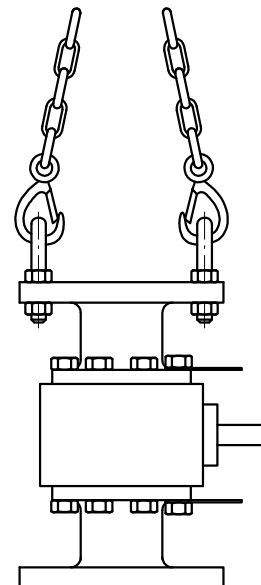




SCHEME 1



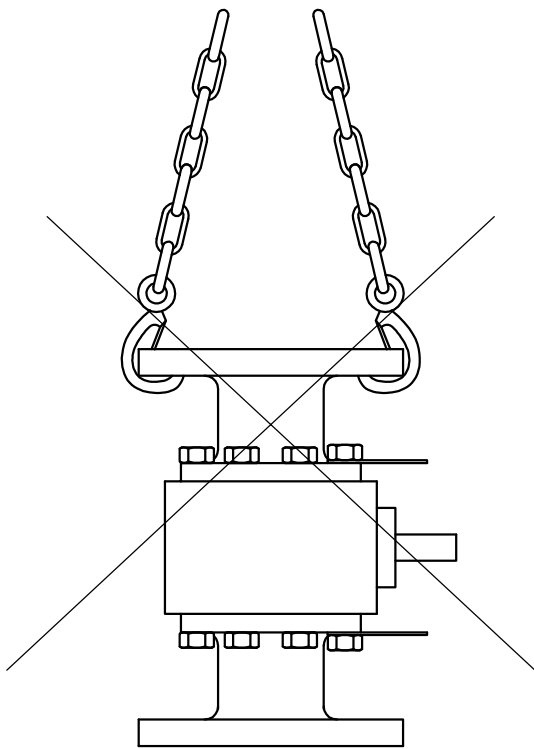
SCHEME 2



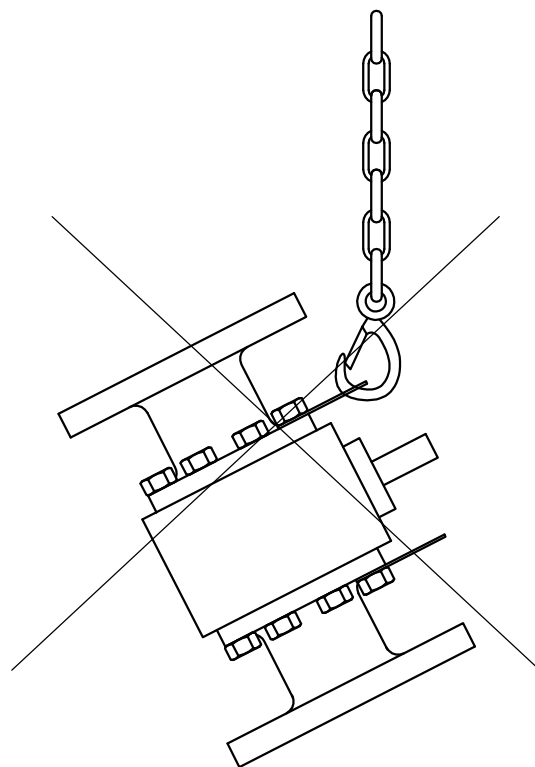
SCHEME 3

Correct lifting.

FIG. 1



SCHEME 4

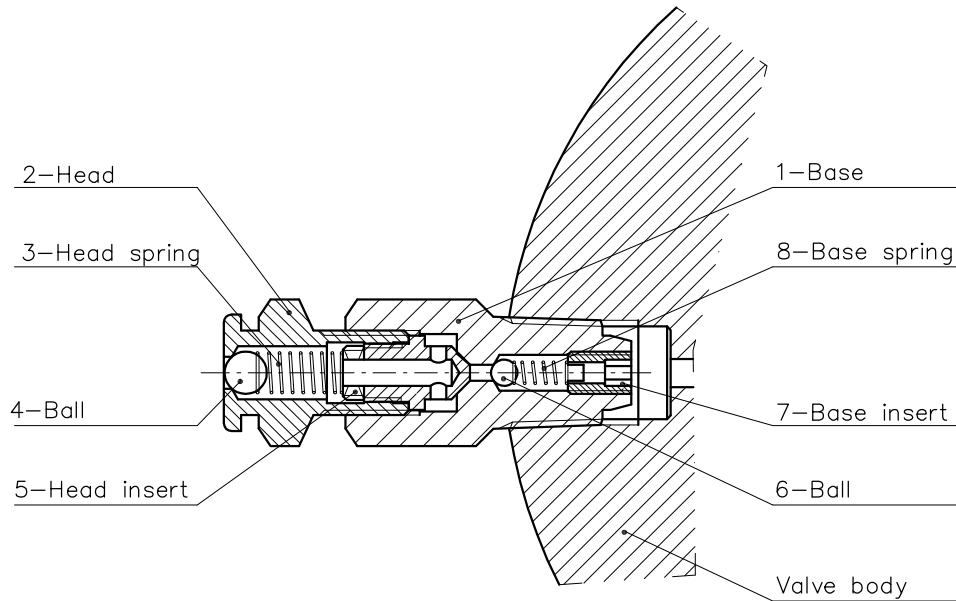


SCHEME 5

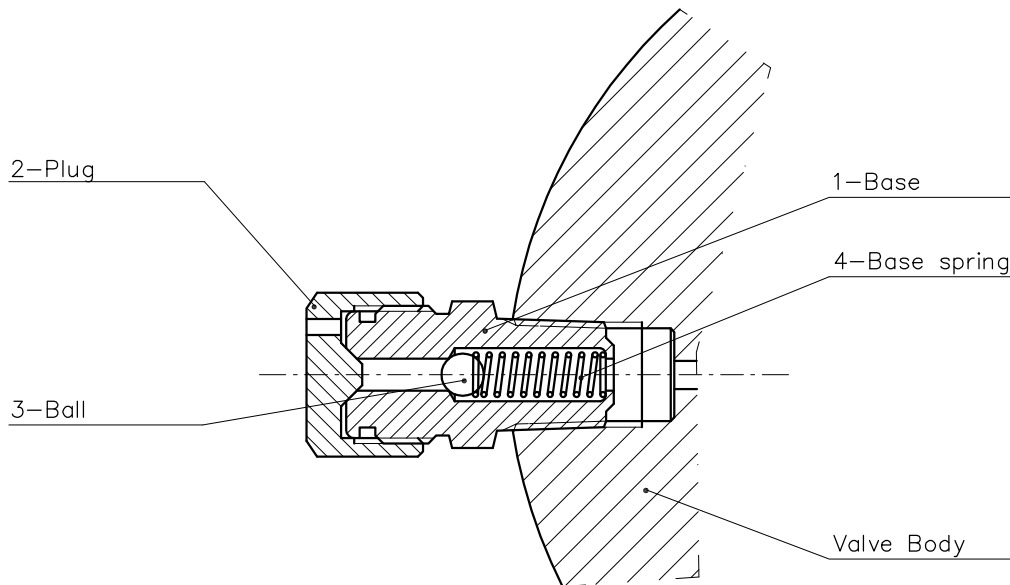
Uncorrect lifting.

FIG. 2

## Type A— ( two piece body, double ball)



## Type B— (single ball, with plug)



**CAUTION:** Sealant injection into the valve body subjected to the working pressure could be dangerous, if you don't observe the following precautions:

In order to inject sealant through a fitting Type A, unscrew the head (2) for one turn only, keeping still the base(1), screwed on the valve body, with a spanner.

**In order to inject sealant through a fitting Type B, unscrew and remove the plug(2), keeping still the base (1) of the fitting, screwed on the valve body, with a spanner.**

The base (1) is locked with a proper locking putty to avoid accidental unscrewing ; but, it's very important to check carefully that the base is not accidentally unscrewed and removed from the valve body: it could be very dangerous for the operator.

Connect the head of the pressure gun and press the lever until an increase on the pressure gauge indicates that sealant channel has been filled.

Pict. 5

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