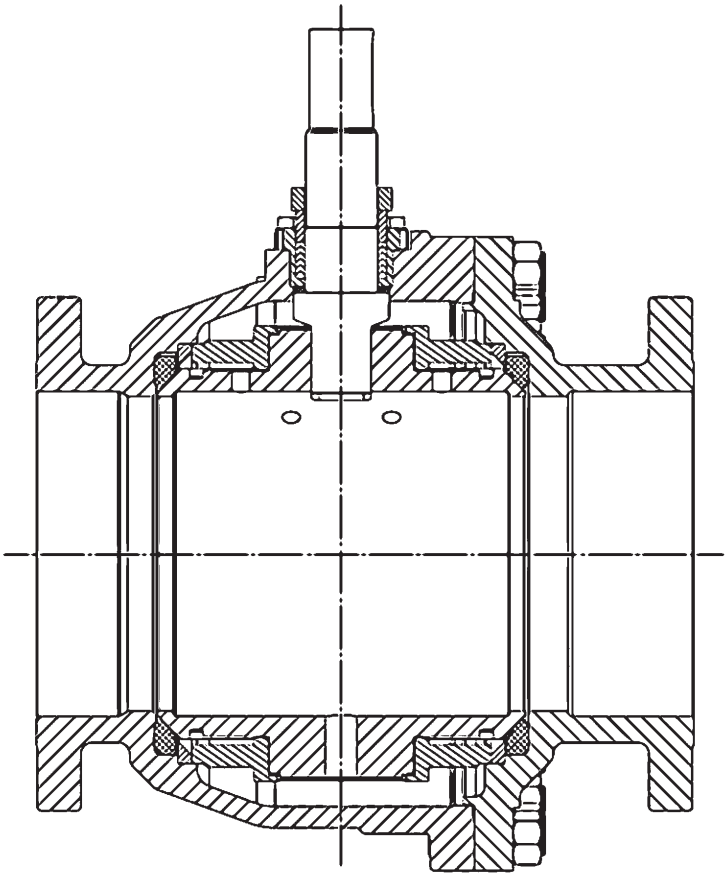
jamesbury

Trunnion-Design Ball Valves

12″ – 20″ (DN 300 – 500) Series 7150
12″ (DN 300) Series 730S
12″ – 20″ (DN 300 – 500) Series 7300
14″ – 24″ (DN 350 – 600) Series 9150
14″ – 24″ (DN 350 – 600) Series 9300

Installation, Maintenance and
Operating Instructions



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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.
If you require additional assistance, please contact the manufacturer or manufacturer's representative.
Addresses and phone numbers are printed on the back cover.
See also www.metso.com/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

1. GENERAL

This instruction manual contains important information regarding the installation, maintenance and troubleshooting of the *Jamesbury* Trunnion-Design Ball Valves. Please read these instructions carefully and save them for future reference.

WARNING

FOR YOUR SAFETY AND PROTECTION, IT IS IMPORTANT THAT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVING THE VALVE FROM SERVICE OR BEFORE ANY DISASSEMBLY OF THE VALVE:

1. AT ALL TIMES DURING THIS ENTIRE PROCEDURE, KEEP HANDS OUT OF THE VALVE. A REMOTELY ACTUATED VALVE COULD CLOSE AT ANY TIME AND RESULT IN SERIOUS INJURY.
2. KNOW WHAT MEDIA IS IN THE LINE. IF THERE IS ANY DOUBT, CHECK WITH THE PROPER AUTHORITY.
3. WEAR ANY PROTECTIVE CLOTHING OR EQUIPMENT NORMALLY REQUIRED WHEN WORKING WITH THE MEDIA INVOLVED.
4. DEPRESSURIZE THE LINE AND VALVE AS FOLLOWS:
   A. OPEN THE VALVE AND DRAIN THE LINE.
   B. CLOSE AND OPEN THE VALVE TO RELIEVE ANY RESIDUAL PRESSURE THAT MAY BE IN THE VALVE PRIOR TO REMOVING THE VALVE FROM SERVICE. LEAVE THE VALVE IN THE OPEN POSITION.
   C. AFTER REMOVAL AND PRIOR TO ANY DISASSEMBLY, DRAIN ANY REMAINING MEDIA BY PLACING THE VALVE IN THE VERTICAL POSITION AND CAREFULLY OPENING AND CLOSING THE VALVE SEVERAL TIMES.
5. SEAT AND BODY RATINGS - THE PRACTICAL AND SAFE USE OF THIS PRODUCT IS DETERMINED BY BOTH THE SEAT AND BODY RATINGS. READ THE NAME TAG AND CHECK BOTH RATINGS. THIS PRODUCT IS AVAILABLE WITH A VARIETY OF SEAT MATERIALS. SOME OF THE SEAT MATERIALS HAVE PRESSURE RATINGS THAT ARE LESS THAN THE BODY RATINGS. ALL OF THE BODY AND SEAT RATINGS ARE DEPENDENT ON VALVE TYPE AND SIZE, SEAT MATERIAL, BOLTING MATERIAL, AND TEMPERATURE. DO NOT EXCEED THESE RATINGS.

2. INSTALLATION

These valves may be installed for flow in either direction. **IMPORTANT:** The valves should be tightened between flanges using gaskets and fasteners appropriate for the service and in compliance with applicable codes and standards.

3. MAINTENANCE

Although Metso's *Jamesbury* valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Metso recommends inspecting valves at least every five (5) years. The inspection and maintenance frequency depends on the actual application and process condition.

Routine maintenance consists of tightening the bonnet stud nuts (18) periodically to compensate for the wear caused by the stem turning in the resilient stem seals.

NOTE: WHEN AN ACTUATOR IS REMOUNTED ON THE VALVE, IT MAY BE NECESSARY TO READJUST ACTUATOR TRAVEL STOPS TO ENSURE PROPERLY SETTING THE BALL IN THE OPEN AND CLOSED POSITIONS.

Standard Repair kits include T or M seats as specified, stem seals, and a 316 stainless steel/PTFE spiral wound body seal (**see Table 1**).

TABLE 1 – REPAIR KITS

Valve Size	Series	Repair Kit
12" (DN 300)	7150	RKN-57
12" (DN 300)	7300	RKN-58
12" (DN 300)	730S	RKN-58
12" (DN 300)	9150	RKN-59
12" (DN 300)	9300	RKN-60
14" (DN 350)	7150	RKN-57
14" (DN 350)	7300	RKN-58
14" (DN 350)	9150	RKN-74
14" (DN 350)	9300	RKN-53
16" (DN 400)	7150	RKN-59
16" (DN 400)	7300	RKN-60
16" (DN 400)	9150	RKN-62
16" (DN 400)	9300	RKN-65
18" (DN 450)	7150	RKN-74
18" (DN 450)	7300	RKN-53
18" (DN 450)	9150	RKN-93
18" (DN 450)	9300	RKN-86
20" (DN 500)	7150	RKN-62
20" (DN 500)	7300	RKN-65
20" (DN 500)	9150	RKN-73
20" (DN 500)	7300	RKN-94
24" (DN 600)	9150	RKN-136
24" (DN 600)	9300	RKN-136

3.1 DISASSEMBLY

NOTE: If complete disassembly becomes necessary, replacement of all seats and seals is recommended. Refer to the list of repair kits, (**Table 1**).

1. When performing any work on this valve, use normal safety precautions to protect yourself against any residual fluid or trapped pressure in the line.

2. Depressurize and drain the line. Cycle the valve several times before doing any work. This will relieve any pressure still inside the valve.

3. Remove the valve from the line, (note that in the following valves, the ball protrudes beyond the flange: 12" and 16" [DN 300 and 600] Series 730S & 7150 and 12" [DN 300] 7300). Cycle the valve several more times.

4. Place the valve in a vertical position with the body cap (2) facing upward and the ball in the closed position. Refer to the exploded view (**Figure 1**) for part number identification.

5. Remove the bonnet stud nuts (18), drive key (33), compression plate (10), compression ring (11) (if fitted), and four hex head cap screws (35).

6. Remove the stem (5) and the stem retainer (8) as a subassembly. It may be necessary to loosen with a block of wood and hammer.

7. Press down on top of stem (5) to remove it from the stem retainer (8).

8. Remove secondary stem seal (71) and stem bearing (70) from stem. Pry out and discard the upper stem seal set (69) from the stem retainer (8), being careful not to scratch any sealing surfaces.

9. Remove and discard the stem retainer seal (66) from the body.

10. Remove the body nuts (16) and the body cap (2).

11. Remove the body seal (65) and body cap seat (7). It may be necessary to pry the seat from the cap. Do not scratch sealing surfaces.

12. Remove the ring (90) nearest the body cap before removing the ball. Remove the ball (3) and trunnion plates (89) as a subassembly. (The subassembly consists of the ball with a trunnion plate on both ends with their appropriate bearings and spacers.)

13. Pull each trunnion plate away from the ball and remove the bearing spacer (91). Trunnion bearings (92) and spacers (91) are not included in repair kits. Remove the remaining trunnion ring (90) from the body.

14. Remove the body seat (7).

3.2 ASSEMBLY

NOTE: Lubricate seats, seals, and bearings with a lubricant compatible with the media.

1. Place the body (1) in a vertical position with the body cap (2) end facing upward. Assemble a seat (7) in the body with the flat surface of the seat against the body (**see exploded view in Figure 1**). Place a trunnion ring (90) on the seat and into the machined diameter in the body. For 12" and 14" (DN 300 and 350) 7000 align the ring with clearance grooves in the 6:00 and 12:00 position with the stem considered at 12:00.

2. Place a bearing spacer (91) over each ball trunnion.

3. If fitting new trunnion bearings, insert trunnion bearing (92) into each trunnion plate (89) counter bore.

4. Fit a trunnion plate over each ball trunnion until the plate rests against the bearing spacer (91). This operation must be performed with care and without excessive force, or the bearings may be damaged. The plate should be started squarely on the trunnion and evenly tapped with a plastic mallet. With new bearings it may be necessary to tap and rotate the plate all the way on. Lubrication is helpful. Once installed, without cocking, the plate will be snug but can be smoothly rotated with a mallet or block of wood.

5. Align trunnion plates (89) relative to ball port as shown in (**Figure 1**). This will approximate proper position when the ball and trunnion plate subassembly is lowered into the body.

6. Lower the ball/trunnion plate subassembly partially into the body. **NOTE:** For 12" and 14" (DN 300 and 350) 7000 this procedure is critical, and careful attention must be paid to the trunnion plate pilot projection. These projections must properly engage inside the corresponding trunnion ring (90) in the body. Carefully lower the subassembly into the body and guide the trunnion plates (89) for proper seating. When seated, place the second trunnion ring (90) over the trunnion plate machined diameters.

7. Slide the stem bearing (70) over the top of the stem (5) and down to the stem shoulder. Place a secondary stem seal (71) over the stem and down on top of the stem bearing (70).

8. Slide the stem retainer (8) over the stem and down the top of the secondary stem seal (71).

9. Slide the upper stem seal set (69) over the stem and down into the stem retainer. ("V" shape of stem seals must point away from the ball (**see Figure 1**).

10. Slide the compression ring (11) and/or the compression plate (10) over the stem and down to the upper stem seal set (69) in the stem retainer (8). Add the indicator plate as applicable.

11. Place the stem retainer seal (66) in the bonnet groove of the body (1).

12. Slide the stem (5) into the stem bore of the body (1) and engage the ball (3).

13. Align stem retainer (8) flange holes with tapped holes in bonnet. Lubricate the cap screws with Never-Seez® or equivalent. Place the four hex head cap screws (35) through the stem retainer flange and thread into the body (1). Tighten per (**Table 2 and Figure 2**). Install the key on key drive stems per (**Figure 1**).

14. Place the two hex nuts (18) on the gland studs (14), and thread down until contact is made with the compression plate (10).

15. Place the body seal (65) in the body groove.

16. Assemble a seat (7) in the body cap (2) with the flat surface of the seat against the body cap (**see Figure 1**).

If the seat fits loosely in the cap, apply lubricant to the underside to hold it in position. **NOTE:** The ball must be closed before proceeding to Step 17. Do not install body cap (2) with the ball in any other position.

17. Lower the body cap with seat onto the body. Due to seat and seal compression, there may be a 1/8" – 1/4" (3.2 mm – 6.35 mm) gap at the joint when the faces are parallel.

18. Using Never-Seez® or equivalent, lubricate the threads and underside face of each body fastener (12). Tighten the body hex nuts (16) with sequence and torque per (**Table 2 and Figure 2**). For identification of size, compare the fastener to (**Figure 3**).

19. Tighten the two hex nuts (18) evenly until the stem seal set is fully seated, then tighten the nuts an additional 1/8 to 1/4 turn. Pull on the stem (5) while tightening to assure that the stem bearings are always in contact with the stem retainer.

20. If there is weepage past the packing upon installation, "leak-tight" performance may be restored by a packing adjustment described in the **MAINTENANCE** Section.

21. A. Valve Open Position: Allowable misalignment of the ball port, in relation to the body port should not exceed 1/16" (1.6 mm).

    B. Valve Closed Position: Scribe a pencil mark on the ball as shown in (**Figure 4**). Open the valve and measure Dimension "B" (**see Table 3**). Allowable deviation from the values in (**Table 3**) is ±1/16" (±1.6 mm).

4. REPAIR KITS/SPARE PARTS

We recommend that valves be directed to our service centers for maintenance. The service centers are equipped to provide rapid turn-around at a reasonable cost and offer new valve warranty with all reconditioned valves.

NOTE: When sending goods to the service center for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. Include the material safety datasheet(s) (MSDS) for all media flowing through the valve. Valves sent to the service center without MSDS datasheet(s) will not be accepted.

For further information on spare parts and service or assistance visit our web-site at **www.metso.com/valves**.

NOTE: When ordering spare parts, always include the following information:

a. Valve catalog code from identification plate,

b. If the valve is serialized – the serial number (from identification plate).

c. From **Figure 1**, the ballooned part number, part name and quantity required.

TABLE 2 – FASTENER TORQUES

Fastener Size		Last Digit In Figure Number	1		2		4		5	
		Fastener Material	A193 GR.B7		A193 GR.B8		K Monel		A193 GR. B7M	
		Fastener Identification Mark	B7		B8		K Monel		B7M	
Inches	DN		FT•LBS	N•m	FT•LBS	N•m	FT•LBS	N•m	FT•LBS	N•m
1/2	12.7		75 – 85	102 – 115	70 – 85	90 – 115	65 – 75	88 – 102	55 – 65	75 – 88
9/16	14.3		100 – 115	149 – 156	95 – 100	129 – 149	85 – 100	115 – 136	75 – 90	102 – 122
5/8	15.9		160 – 190	217 – 258	155 – 180	210 – 244	140 – 160	190 – 217	125 – 145	170 – 197
3/4	19.15		250 – 290	339 – 393	235 – 275	319 – 373	210 – 245	285 – 332	190 – 220	258 – 298
7/8	22.22		380 – 445	515 – 603	290 – 340	393 – 461	325 – 380	441 – 515	290 – 340	393 – 461
1	25.4		575 – 630	780 – 854	435 – 510	590 – 692	495 – 540	671 – 732	435 – 510	590 – 692
1-1/8	28.58		850 – 1000	1153 – 1356	526 – 615	713 – 834	690 – 805	936 – 1092	650 – 760	881 – 1031
1-1/4	31.75		1160 – 1360	1573 – 1844	715 – 840	970 – 1139	940 – 1100	1275 – 1492	885 – 1030	1200 – 1397
1-3/8	34.9		1625 – 1900	2203 – 2576	770 – 900	1044 – 1220	1310 – 1540	1776 – 2088	1240 – 1450	1681 – 1966
1-1/2	38.1		2000 – 2360	2712 – 3200	1030 – 1120	1397 – 1519	1630 – 1910	2210 – 2590	1530 – 1800	2075 – 2441
1-5/8	41.3		2600 – 2900	3526 – 3932	1200 – 1400	1627 – 1898	2200 – 2400	2983 – 3254	2100 – 2300	2848 – 3119
1-3/4	44.5		3170 – 3450	4299 – 4678	1510 – 1770	2048 – 2400	2570 – 3000	3485 – 4068	2420 – 2825	3282 – 3831
2	50.8		4700 – 5530	6373 – 7499	2245 – 2635	3044 – 3573	3820 – 4480	5180 – 6075	3590 – 4200	4868 – 5695

EXPLODED VIEW

VALVE PARTS		
ITEM	**PART NAME**	**QTY.**
1	Body	1
2	Body Cap	1
3	Ball	1
5	Stem	1
7	Seat	2
8	Stem Retainer	1
10	Compression Plate	1
11	Compression Ring	1
12	Stud	See Table 4
14	Stud	2
16	Hex. Nut	See Table 4
18	Hex. Nut	2
19	Identification Tag	1
23	Pop Rivet	3
33	Key	1
35	Hex. Head Cap Screw	4
65	Body Seal	1
66	Stem Retainer Seal	1
69	Stem Seal	1 (Set)
70	Stem Bearing	1
71	Secondary Stem Seal	1
89	Trunnion Plate	2
90	Trunnion Ring	2
91	Bearing Spacer	2
92	Trunnion Bearing	2

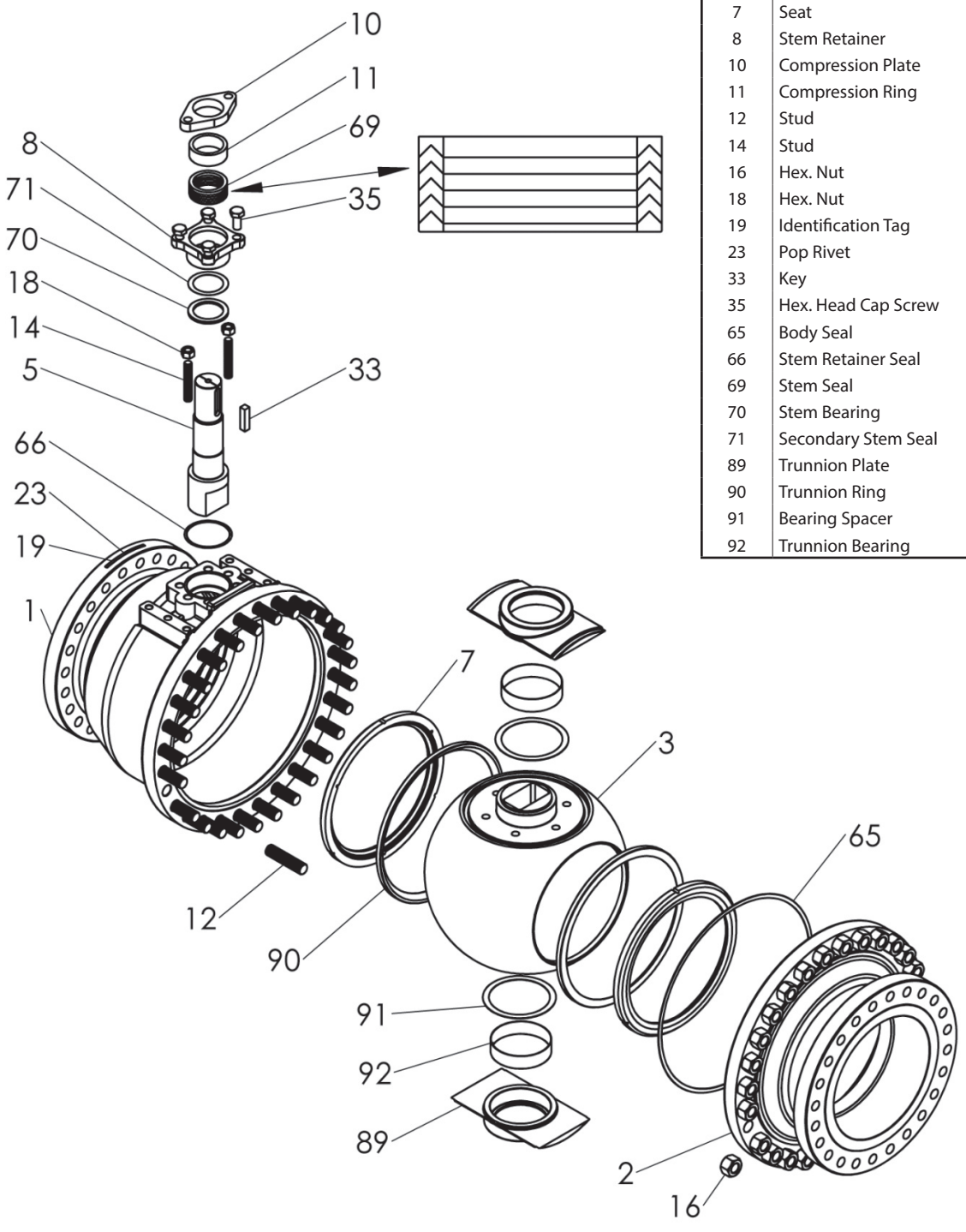
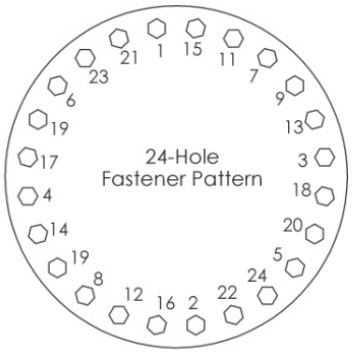


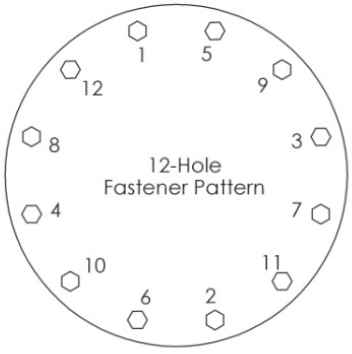
Figure 1

BOLT SEQUENCE CHART

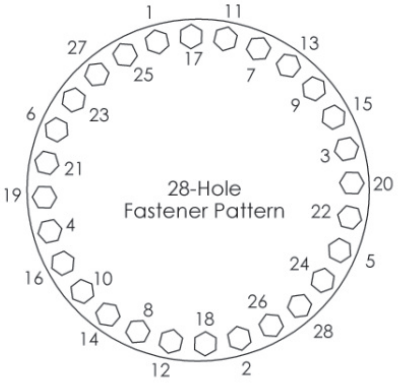
Stem Retainer



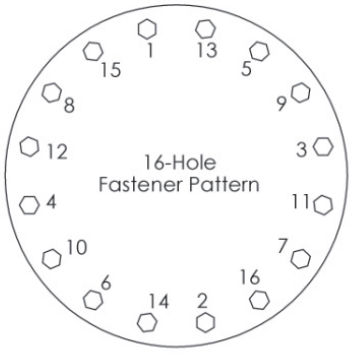
16" (DN 400) 900, 18" (DN 450) 9150,
20" (DN 500) 7300



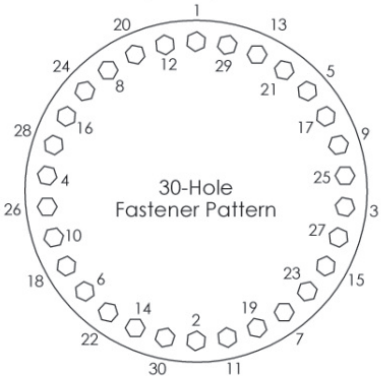
12" & 14" (DN 300 - 350) 7150,
14" (DN 350) 9150, 14" (DN 350) 7300



18" (DN 450) 9300



12"(DN 300) 730s/7300, 14" (DN 350) 9300,
16" - 20" (DN 400-500) 7150,
16" (400) 9150



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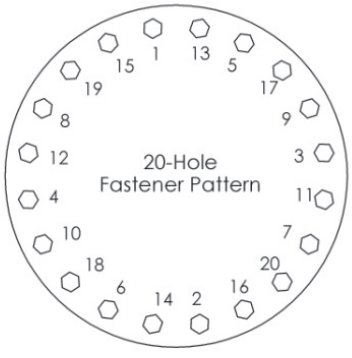
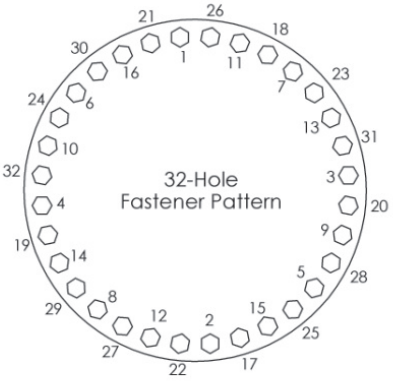


16" (DN 400) 7300



20" (DN 500) 9300, 24" (DN 600) 9300

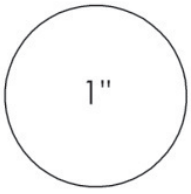
Figure 2

FASTENER SIZING CHART

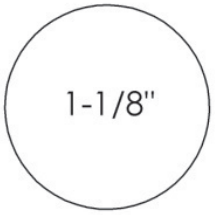
Stem Retainer Bolts

Body Bolts

16" (DN 400) 7150



12" & 14" (DN 300 - 350)
7150, 12" (DN 300) 9150



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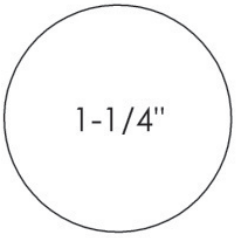
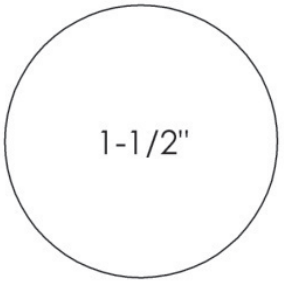
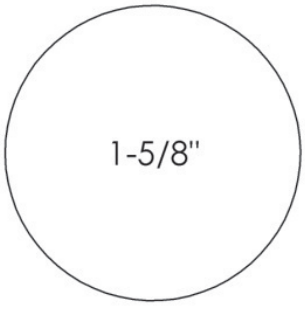


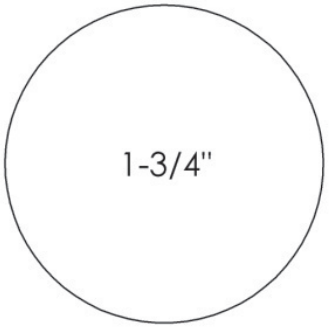
12" (DN 300) 9300
14" (DN 350) 7300 & 9150,
16" (DN 400) 7300 & 9150,
18" (DN 450) 7150 & 9150,
20" (DN 500) 7150 & 9150



14" - 16" (DN 350 - 400) 9300,
18" (DN 450) 7300 & 9300,
20" (DN 500) 7300,
24" (DN 600) 9150



20" (DN 500) 9300



24" (DN 600) 9300

Figure 3

TABLE 3	
Ball Port	**Dimension "B"**
12″ (DN 300) – 7000 14"" (DN 350) – 7000	1-9/16″ (39.7 mm)
12″ (DN 300) – 9000 16″ (DN 400) – 7000	1-13/16″ (46 mm)
14″ (DN 350) – 9000 18″ (DN 450) – 7000	1-3/4″ (44.4 mm)
16″ (DN 400) – 9000 20″ (DN 500) – 7000	1-15/16″ (24.6 mm)
18″ (DN 450) – 9000	2-1/4″ (57.2 mm)
20″ (DN 500) – 9000	2-9/16″ (65.1 mm)

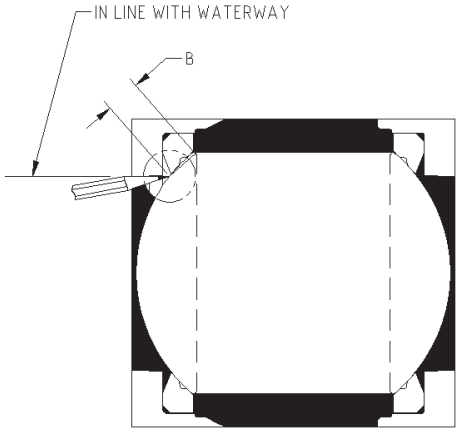


Figure 4

TABLE 4				
Valve Size		**Type**	**Body Bolt Size**	**Quantity**
Inches	**DN**			
12	300	7150	1	12
12	300	730S	1-1/8	16
12	300	7300	1-1/8	16
12	300	9150	1	12
12	300	9300	1-1/4	16
14	350	7150	1	12
14	350	7300	1-1/4	12
14	350	9150	1-1/4	12
14	350	9300	1-1/2	16
16	400	7150	7/8	16
16	400	7300	1-1/4	20
16	400	9150	1-1/4	16
16	400	9300	1-1/2	24
18	450	7150	1-1/4	16
18	450	9150	1-1/4	24
18	450	9300	1-1/2	28
20	500	7150	1-1/4	16
20	500	7300	1-1/2	24
20	500	9150	1-1/4	30
20	500	9300	1-5/8	32
24	600	9150	1-1/2	28
24	600	9300	1-3/4	32

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