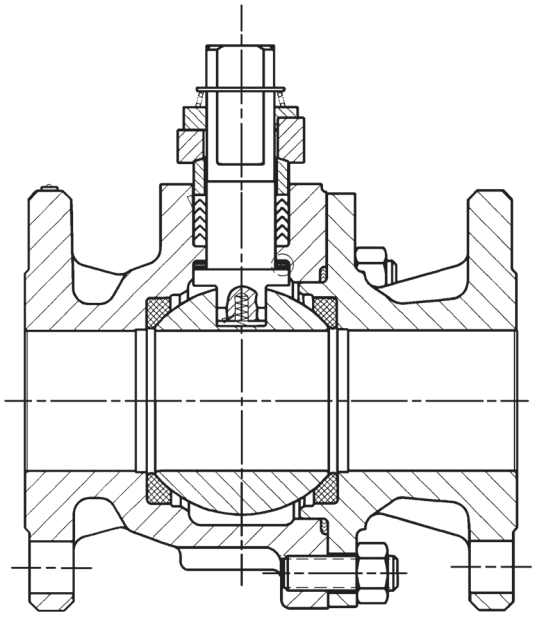
jamesbury

Series 7000 & 9000 Ball Valves
Non-Trunnion

Series 7150 8" (DN 200) Class 150 Standard Bore
Series 9000 2" – 6" (DN 50 – 150) Class 150 Full Bore
Series 9000 2" – 4" (DN 50 – 100) Class 300 Full Bore

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!

Subject to change without notice.

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1. GENERAL

1.1 Scope of the Manual

This instruction manual contains important information regarding the installation, maintenance, and troubleshooting of Jamesbury® Series 7000 8" (DN 200) Class 150 Standard Bore, Series 9000 2" – 6" (DN 50 – 150) Class 150 and 2" – 4" (DN 50 – 100) Class 300 Full Bore Valves. Please read the instructions carefully and save them for future reference.

WARNING:

AS THE USE OF THE VALVE IS APPLICATION SPECIFIC, A NUMBER OF FACTORS SHOULD BE TAKEN INTO ACCOUNT WHEN SELECTING A VALVE FOR A GIVEN APPLICATION. THEREFORE, SOME OF THE SITUATIONS IN WHICH THE VALVES ARE USED ARE OUTSIDE THE SCOPE OF THIS MANUAL.

IF YOU HAVE ANY QUESTIONS CONCERNING THE USE, APPLICATION OR COMPATIBILITY OF THE VALVE WITH THE INTENDED SERVICE, CONTACT METSO FOR MORE INFORMATION.

WARNING:

DOUBLE-SEATED BALL VALVE DESIGNS, LIKE THE SERIES 5000, CAN UNDER CERTAIN CONDITIONS TRAP FLUID IN THE BALL CAVITY. RAISING THE TEMPERATURE OF THE TRAPPED FLUID CAUSES THE INTERNAL VALVE PRESSURE TO RISE. EXTREME TEMPERATURE RISE CAN BUILD UP EXCESSIVE PRESSURE WHICH COULD LEAD TO UNCONTROLLED PRESSURE RELEASE. DAMAGE OR PERSONAL INJURY MAY RESULT.

1.2 Valve Markings

The valve has an identification plate attached to the pipeline flange (see **Figure 1**).

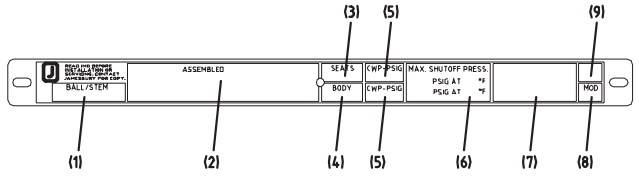


Figure 1 Identification plate

Identification plate markings:

1. Ball/Stem material
2. Valve catalog code
3. Seat Material
4. Body Material
5. Maximum operating pressure
6. Maximum/minimum shut-off pressure/temperature
7. Approvals/Special Service marking
8. Model
9. Assembly date

1.3 Safety Precautions

WARNING:

DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

EXCEEDING THE PRESSURE OR TEMPERATURE LIMITATIONS MARKED ON THE VALVE IDENTIFICATION PLATE MAY CAUSE DAMAGE AND LEAD TO UNCONTROLLED PRESSURE RELEASE. DAMAGE OR PERSONAL INJURY MAY RESULT.

WARNING:

SEAT AND BODY RATINGS!

THE PRACTICAL AND SAFE USE OF THIS PRODUCT IS DETERMINED BY BOTH THE SEAT AND BODY RATINGS. READ THE IDENTIFICATION PLATE 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, AND TEMPERATURE. **DO NOT EXCEED THESE RATINGS!**

WARNING:

BEWARE OF BALL MOVEMENT!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE OPEN FLOW PORT. LEAVE NO FOREIGN OBJECTS INSIDE THE PIPELINE. WHEN THE VALVE IS ACTUATED, THE BALL FUNCTIONS AS A CUTTING DEVICE. DISCONNECT ANY PNEUMATIC SUPPLY LINES, ANY ELECTRICAL POWER SOURCES AND MAKE SURE SPRINGS IN SPRING-RETURN ACTUATORS ARE IN THE FULL EXTENDED/RELAXED STATE BEFORE PERFORMING ANY VALVE MAINTENANCE. FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY!

WARNING:

WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!

NEVER LIFT THE VALVE OR VALVE/ACTUATOR ASSEMBLY BY THE ACTUATOR, POSITIONER, LIMIT SWITCH OR THEIR PIPING. PLACE LIFTING DEVICES SECURELY AROUND THE VALVE BODY. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE OR PERSONAL INJURY FROM FALLING PARTS (SEE **FIGURE 2**).

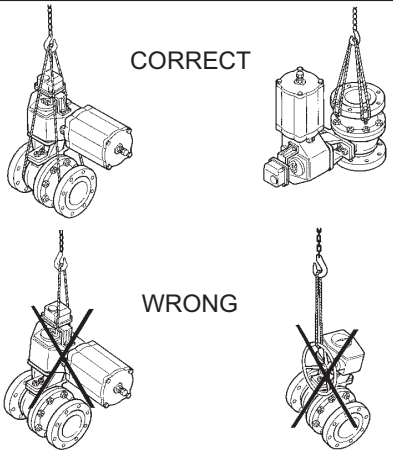


Figure 2 Lifting the valve

2. TRANSPORTATION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

Store the valve carefully. Storage indoors in a dry place is recommended.

Do not remove the flow port protectors until installing the valve.

Move the valve to its intended location just before installation.

The valve is usually delivered in the open position.

3. INSTALLATION

3.1 General

Remove the flow port protectors and check that the valve is clean inside. Clean valve if necessary.

Flush the pipeline carefully before installing the valve. Foreign objects, such as sand or pieces of welding electrodes, will damage the ball and seats.

3.2 Installing in the pipeline

WARNING:

THE VALVE SHOULD BE TIGHTENED BETWEEN FLANGES USING APPROPRIATE GASKETS AND FASTENERS COMPATIBLE WITH THE APPLICATION, AND IN COMPLIANCE WITH APPLICABLE PIPING CODES AND STANDARDS. CENTER THE FLANGE GASKETS CAREFULLY WHEN FITTING THE VALVE BETWEEN FLANGES. DO NOT ATTEMPT TO CORRECT PIPELINE MISALIGNMENT BY MEANS OF FLANGE BOLTING!

The valve may be installed in any position and offers tightness in both directions. It is recommended, however, that the valve be installed with the body cap facing upstream. It is not recommended to install the valve with the stem on the underneath side because dirt in the pipeline may then enter the body cavity and potentially damage the stem packing (see **Figure 3**).

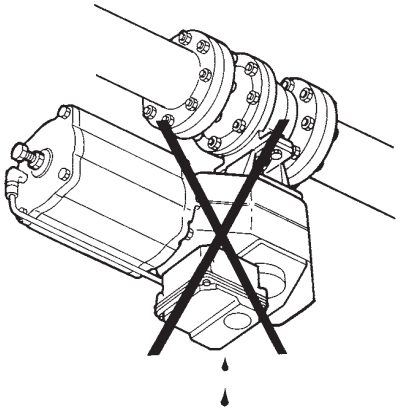


Figure 3 Avoid this mounting position

Refer to the Section 4, **MAINTENANCE** for stem seal adjustment. If there is weepage past the stem seals upon installation, it means the valve may have been subject to wide temperature variations in shipment. Leak-tight performance will be restored by a simple stem seal adjustment described in the **MAINTENANCE** section.

3.3 Valve Insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve (see **Figure 4**).

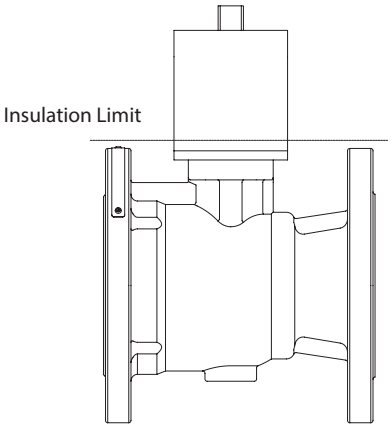


Figure 4 Insulation of the valve

3.4 Actuator

WARNING:

WHEN INSTALLING THE ACTUATOR ON THE VALVE, MAKE SURE THAT THE VALVE ASSEMBLY FUNCTIONS PROPERLY. INFORMATION ON ACTUATOR INSTALLATION IS GIVEN IN SECTION 6 OR IN THE SEPARATE ACTUATOR INSTRUCTIONS.

The actuator should be installed in a manner that allows plenty of room for its removal.

The upright position is recommended for the actuator.

The actuator must not touch the pipeline, because pipeline vibration may interfere with its operation.

In certain cases it may be considered advantageous to provide additional support to the actuator. These cases will normally be associated with large actuators, extended stems, or where severe vibration is present. Please contact Metso for advice.

3.5 Commissioning

Ensure that there is no dirt or foreign objects left inside the valve or pipeline. Flush the pipeline carefully. Make sure that the valve is fully open when flushing.

Ensure that all nuts, fittings, and cables are properly fastened with a suitably sized wrench.

If so equipped, check that the actuator positioner and/or switch are correctly adjusted. Actuator adjustment is explained in **Section 6.7**. To adjust any accompanying device(s) refer to the separate control equipment instruction manuals.

4. MAINTENANCE

4.1 General

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 stud nuts (18) in (**Figure 9**) periodically to compensate for stem seal wear.

Overhaul maintenance consists of replacing seats and seals. A standard repair kit consisting of these parts may be obtained through your authorized Metso Distributor.

NOTE: Repair kits include thrust bearings (70), secondary stem seal (71), seats (7), body seal (65) and stem seals (69). Refer to the Repair Kit chart (see **Table 7**).

WARNING:

FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:

1. WEAR ANY PROTECTIVE CLOTHING OR EQUIPMENT NORMALLY REQUIRED WHEN WORKING WITH THE FLUID INVOLVED.
2. DEPRESSURIZE THE PIPELINE AND CYCLE THE VALVE AS FOLLOWS:
   - A. PLACE THE VALVE IN THE OPEN POSITION AND DRAIN THE PIPELINE.
   - B. CYCLE THE VALVE TO RELIEVE RESIDUAL PRESSURE IN THE BODY CAVITY BEFORE REMOVAL FROM THE PIPELINE.
   - C. AFTER REMOVAL AND BEFORE ANY DISASSEMBLY, CYCLE THE VALVE AGAIN SEVERAL TIMES.

4.2 Actuated Valve

It is generally most convenient to detach the actuator and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire assembly.

NOTE: To ensure proper reassembly, observe the position of the actuator and positioner/limit switch with respect to the valve before detaching the actuator.

WARNING:

ALWAYS DISCONNECT THE ACTUATOR FROM ITS POWER SOURCE, PNEUMATIC, HYDRAULIC OR ELECTRICAL, BEFORE ATTEMPTING TO REMOVE IT FROM THE VALVE!

WARNING:

DO NOT REMOVE A SPRING-RETURN ACTUATOR UNLESS A STOPSCREW IS CARRYING THE SPRING FORCE!

1. Detach the air supply, electrical supply, hydraulic supply and control signal cables or pipes from their connectors.
2. Unscrew the actuator mounting bracket screws.
3. Loosen any coupling fasteners then lift the actuator straight up in line with the valve stem until the coupling between actuator drive and valve stem is completely disengaged.
4. Place actuator in a safe location to avoid damage or personal injury.

4.3 Manual Valve – with Handle

NOTE: If complete disassembly becomes necessary, replacement of all seats, packing and bearings is recommended. (**Refer to Repair Kits, Table 2**.)

1. Follow the steps in all the **WARNING** Sections before performing any work on the valve.
2. Open and close the valve and leave in the closed position.
3. Remove handle screw (35), handle (31), and retaining ring (34) from the top of the stem.
4. Pull off the spring (33) and indicator stop (32).
5. Remove the bonnet stud nuts (18).
6. Remove stop bushings (50) and compression plate (10).

4.4 Disassembly – Bare Stem Valves

1. Mark the body joint flanges to assure correct body (1) and body cap (2) orientation during assembly. Remove body stud nuts (16) and remove body cap (2) using soft metal tools. **BE CAREFUL NOT TO SCRATCH THE BALL**.
2. Remove the body gasket (65) and the seat (7) from the cap.
3. If the ball (3) does not swing free from the body, with the ball in the fully closed position, use a piece of wood or some other soft material to gently tap the ball (from the end opposite the body cap). This should loosen the ball so that it can be pivoted free of the stem (5).
4. Remove the second seat (7) from the body (1).
5. Press the stem (5) from the top into the valve body and remove it through the end of the body.
6. Pry out from the inside the old thrust bearings (70), secondary stem seal (71) and packing (69). **BE CAREFUL NOT TO SCRATCH ANY SEALING SURFACES IN THE BODY.**

7. Remove the spring (36) from the bottom of the stem.
8. If the valve is to be grounded, clean packing bore with crocus cloth or equivalent, to bare-metal surface.

4.5 Checking Parts

1. Clean all disassembled parts.
2. Check the stem (5) and ball (3) for damage. Pay particular attention to the sealing areas.
3. Carefully clean and polish the ball (3) sealing surface: It should be free of all scratches and grooves.
4. Replace any parts that have cracks, gouges or pits that will affect sealing.
5. Replace any fastener where the threads are damaged or have been heated, stretched or corroded.
6. Replace any parts that have cracks, gouges or pits that will affect sealing.

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 (stamped on the valve body),
c. From **Figure 9**, the ballooned part number, part name and quantity required.

4.6 Assembly – Bare Stem Valves

It is advisable to replace seats and seals if complete disassembly and reassembly become necessary. Refer to the Repair Kit chart (see **Table 7**).

1. Clean all valve components if not done previously.
2. Re-inspect all components for damage before reassembling the valve. Look for damage to the seating areas, stem, body and body cap; and look for wear in the bearing areas. Replace any damaged parts.
3. Carefully clean and polish the ball (3) sealing surface: It should be free of all scratches and grooves.
4. If the ball is slightly damaged, it may be possible to smooth the sealing surface with crocus cloth or equivalent. If deep scratches are present, replace the ball.
5. Slide one valve seat (7) sideways into the body (1) to below the stem bore, and tilt it into place so that the proper surface (see **Figure 5**) will be adjacent to the ball (3), being careful not to cut or scratch the seat.

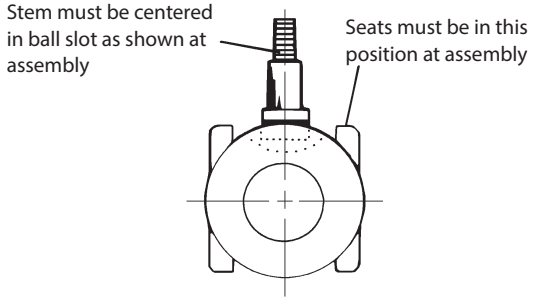


Figure 5 Proper Seat and Ball Orientation

6. From inside the body (1), insert the one thrust bearing (70), the secondary stem seal (71), and the second thrust bearings (70) into the stem bore (see **Figure 6**).
7. Insert the stem (5) through the insert end of the body (1), being careful not to scratch the stem sealing surface; and press it gently up into the stem bore until resistance is felt from the thrust bearing. Holding the stem in place from the bottom and insert the stem seals (69) (see **Figure 7** for proper v-ring orientation), over the stem (5).

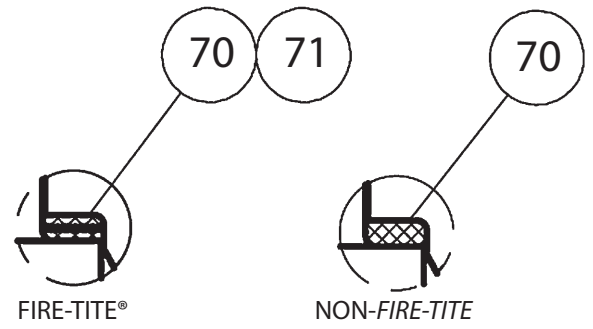


Figure 6 Thrust Bearing Orientations

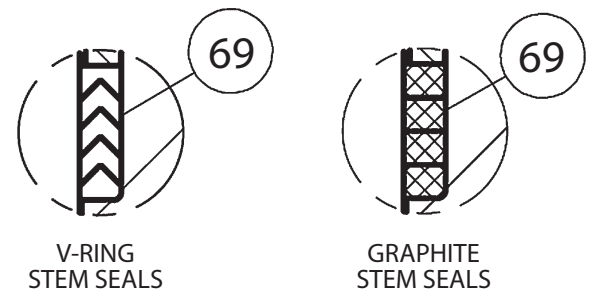


Figure 7 Stem Seal Orientations

8. With a wire brush, clean studs (14) and stud nuts (18) of foreign material, such as paint, thread locker, grime and commodity. Inspect the threads for damage or defects with appropriate ring or plug gauge. Repair any out-of-tolerance threads, or replace in-kind. Check that nut can be run up and down entire usable portion of the threads. (See **Figure 9**)

9. Place compression plate (10) over studs (14). Place two stop bushings (50) over each bonnet stud.

10. Place a stud nut (18) on each stud (14) and tighten nuts alternately so that the compression plate (10) remains parallel with the body. Tighten the stud nuts in accordance with the torque values in **Table 1**.

TABLE 1				
Stud Nut Torque				
Size	**Series**	**FT-LBS**	**IN-LBS**	**N-M**
2	9150/9180	4	48	5.4
2	9300/9380	4	48	5.4
3	9150/9180	4	48	5.4
3	9300/9380	8	96	10.8
4	9150/9180	8	96	10.8
4	9300/9380	11	132	14.9
6	9150/9180	11	132	14.9
8	7150/7180	11	132	14.9

NOTE: Check all fastener threads for damage. Ensure fasteners are not bent or deformed. Assure nuts can be assembled the full length of fastener with no more than finger tight force. Fastener grade markings must be visible after assembly.

11. With a wire brush, clean studs (12) and stud nuts (16) of foreign material, such as paint, thread locker, grime and commodity. Inspect the threads for damage or defects with appropriate ring or plug gauge. Repair any out-of-tolerance threads, or replace in-kind. Check that nut can be run up and down entire usable portion of the threads. (See **Figure 9**)

12. Place the valve in a vertical position, body joint up, on a clean soft surface such as a folded rag or a piece of cardboard. Insert bottom grounding spring (36) into hole at the bottom of the stem (5). Insert the ball (3) rotating it onto the stem (5) in the closed position. If necessary, turn the stem blade to align with the ball slot. Make certain that the stem blade is in the middle of the ball slot; i.e. equal distance from the ends of the slot. Rotate the ball if necessary (see **Figure 5**).

13. Gently place the body gasket (65) into the machined recess of the body (1).

14. Place the remaining seat (7) on top of the ball.

15. Place the body cap (2) over body studs (12) being careful to properly orient body cap and body as originally assembled by matching orientation marks made prior to disassembly. Take care not to damage body gasket (65) or seat (7) during this operation.

16. Lubricate the threads and face of nuts (16) with Never-Seez® or equivalent. Install nuts (16) on body studs (12) and tighten sequentially as shown in the diagram (**Figure 8**), to the recommended torques as shown in the torque chart (**Table 2**).

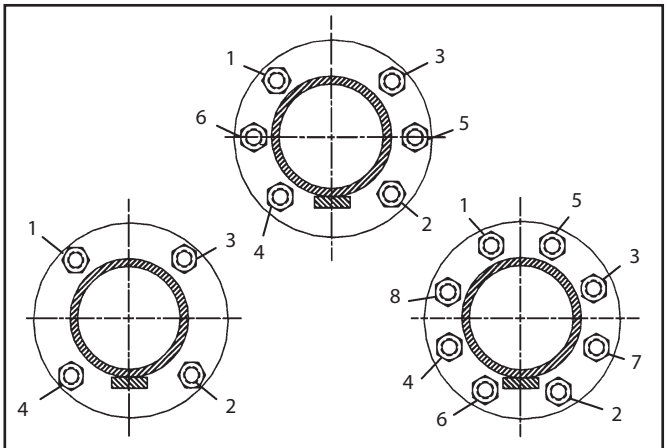


Figure 8 Bolt Tightening Sequence

TABLE 2				
Recommended Torques – FT•LBS (N•m)				
Fastener Size	Fastener Material			
	A193 GR.B7	A193 BR.B8	A193 GR.B7M	A193 GR.B8M
	Fastener Ident. Mark			
	B7	B8	B7M	B8M
1/2" - 13	75 – 85 (102 – 115)	70 – 85 (95 – 115)	55 – 65 (75 – 88)	60 – 75 (81 – 102)
5/8" - 11	160 – 190 (217 – 258)	155 – 180 (210 – 244)	125 – 145 (169 – 197)	135 – 160 (183 – 217)
3/4" - 10	250 – 290 (339 – 393)	235 – 275 (319 – 373)	190 – 220 (258 – 298)	205 – 240 (278 – 325)

4.7 Testing the Valve

WARNING:

WHEN PRESSURE TESTING, EXERCISE CAUTION AND MAKE SURE ALL EQUIPMENT USED IS IN GOOD WORKING CONDITION AND APPROPRIATE FOR THE INTENDED PRESSURE.

If the valve is to be tested prior to returning to service make sure the test pressures are in accordance with an applicable standard.

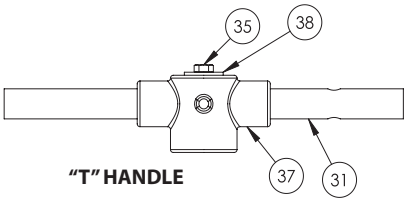
When testing the valve for external tightness, keep the ball in the half open position.

If testing the valve seat tightness, please contact Metso for advice.

WARNING:

WHEN PERFORMING ANY TESTS, NEVER EXCEED THE MAXIMUM OPERATING PRESSURE OR MAXIMUM SHUT-OFF PRESSURE LISTED ON THE IDENTIFICATION PLATE!

EXPLODED VIEW



NOTE 2:
Quantity of studs and nuts required:

Size inches (DN)	Full Bore		Std. Bore
	Class 150	Class 300	Class 150
2 (50)	4	6	-
3 (80)	6	6	-
4 (100)	6	8	-
6 (150)	8	-	-
8 (200)	-	-	8

Material Identification marks to face outward during assembly into body.

PARTS LIST		
ITEM	**PART NAME**	**QTY.**
1	Body	1
2	Body Cap	1
3	Ball	1
5	Stem	1
7	Seat	2
10	Compression Plate	1
12	Stud, Body	See Note 2
14	Stud	2
16	Hexagon Nut	See Note 2
18	Hexagon Nut	2
19	Identification Tag	1
31	Handle	1
32	Indicator Stop	1
33	Spring	1
34	Retaining Ring	1
35	Handle Screw	1
36	Spring	1
37*	"T" Handle Adapter	1
38*	Washer	1
50	Stop Bushing	2
65	Body Gasket	1
69	Packing	1
70	Stem Bearing	2
71	Secondary Stem Seal	1

NOTE 2: * 4" (DN 100) 9300, 6" (DN 150) 9150, & 8" (DN 200) 7150 Only

ORIENTATION OF V-RING PACKING FOR GROUNDED VALVES

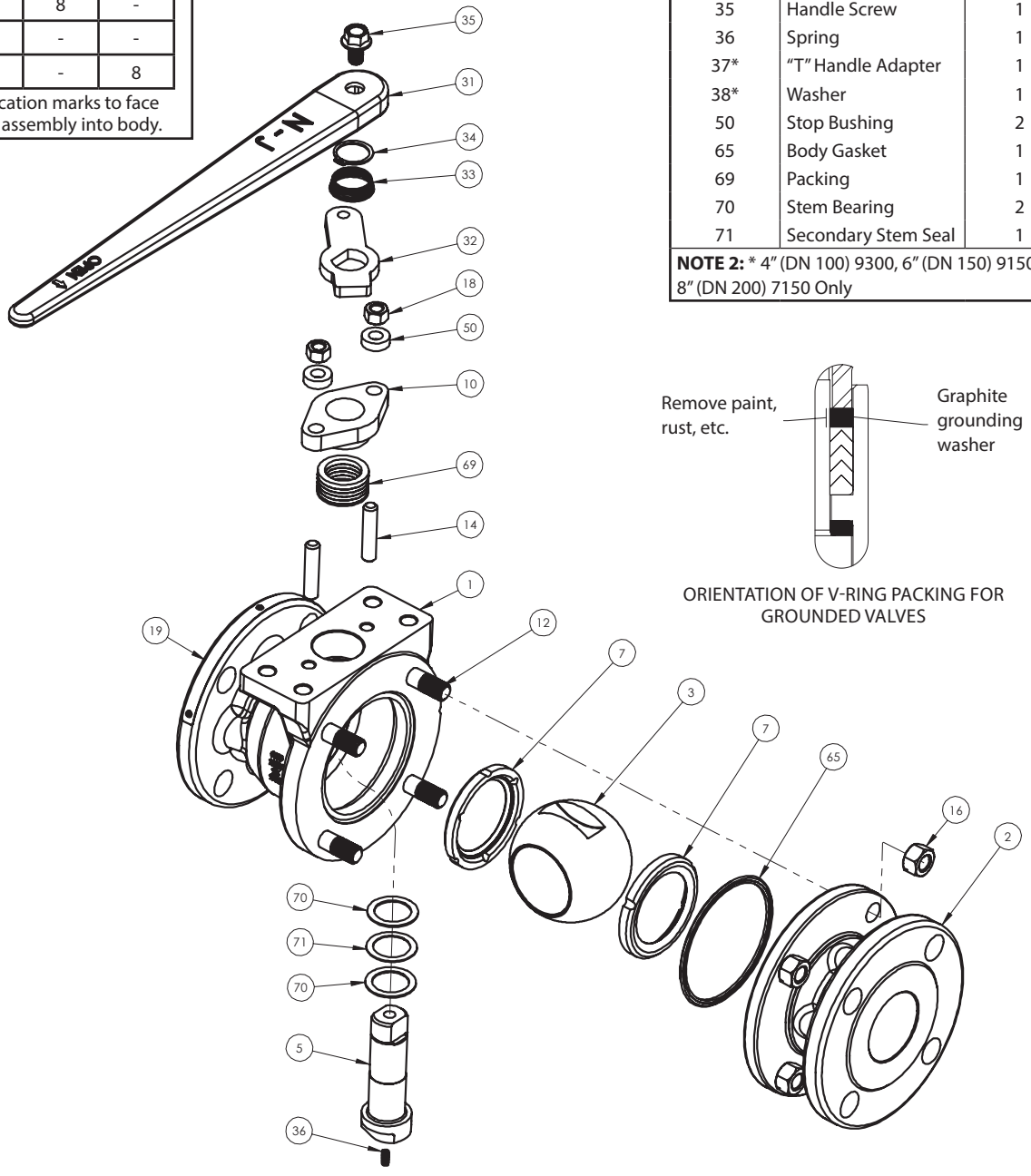


Figure 9

5. HANDLE MOUNTING

1. Place the indicator stop (32) with "bottom" facing down over the stem so that the longer part is over the body.
2. Place the spring (33) over the stem (5) with the larger diameter contacting the indicator stop (32).
3. Compress the spring (33) and hold down by putting the retaining ring (34) in the groove in the stem (5).
4. If the valve is to be grounded, test as follows:
   a. Use an ohmmeter accurate to within +/-10%.
   b. Check continually between top of stem and body base metal, also check between ball and body base metal. Precaution should be taken to prevent scratching the ball O.D.
   c. Resistance in either the open, half open or closed position shall not exceed 10 ohms using a source not exceeding 12 volts.

6. ACTUATOR MOUNTING

When these valves are equipped with an actuator, and the actuator is removed to service the valve, proper alignment of the actuator driver and valve stem is essential when the actuator is remounted.

6.1 General

These actuator mounting instructions describe the steps required to assemble the *Jamesbury* 2" – 6" series 9000 and 8" series 7000 valves to actuators. Linkage kits that are needed to mount specific *Jamesbury* actuators to different types and sizes of *Jamesbury* valves can be identified by Metso or your authorized *Jamesbury* distributor.

WARNING:

FOR YOUR SAFETY IT IS IMPORTANT THAT THE FOLLOWING PRECAUTIONS BE TAKEN!

BEFORE INSTALLING THE VALVE AND ACTUATOR, BE SURE THE INDICATOR POINTER ON TOP OF THE ACTUATOR IS CORRECTLY INDICATING THE VALVE'S POSITION. FAILURE TO ASSEMBLE THESE TO INDICATE THE CORRECT VALVE POSITION COULD RESULT IN DAMAGE OR PERSONAL INJURY!

WHEN INSTALLING A LINKAGE KIT OR SERVICING THE VALVE/ ACTUATOR ASSEMBLY, THE BEST PRACTICE IS TO REMOVE THE ENTIRE ASSEMBLY FROM SERVICE!

AN ACTUATOR SHOULD BE REMOUNTED ON THE SAME VALVE FROM WHICH IT WAS REMOVED. THE ACTUATOR MUST BE ADJUSTED FOR THE PROPER "OPEN" AND "CLOSE" POSITIONS EACH TIME IT IS REMOVED!

THE LINKAGE KITS HAVE BEEN DESIGNED TO SUPPORT THE WEIGHT OF THE METSO ACTUATOR AND RECOMMENDED ACCESSORIES. USE OF THE LINKAGE TO SUPPORT ADDITIONAL EQUIPMENT OR ADDITIONAL WEIGHT SUCH AS PEOPLE, LADDERS, ETC., MAY RESULT IN THE FAILURE OF THE LINKAGE, VALVE, OR ACTUATOR; AND MAY CAUSE DAMAGE OR PERSONAL INJURY!

6.2 Valve Preparation

1. With the valve removed from the pipeline, turn the valve to the closed position.
2. On valves with handles, remove the handle, retaining ring, spring, indicator stop and any accessories that may be attached to the bonnet surface. DO NOT loosen the bonnet stud nuts (18), see (**Figure 9**).

6.3 Bracket Attachment to Valve

1. Lower the bracket on the valve bonnet.
2. Align the four bracket mounting screw holes with the tapped holes on the valve bonnet.
3. Insert the four hex head cap screws and lock washers into the tapped holes. Tighten to values in **TABLE 3**.
4. Inspect the coupling and locate the end that will engage the stem.
5. Insert the stem end of the coupling onto the stem (5).

6.4 Actuator versus Valve Position

IMPORTANT: The actuator and valve position must agree before further assembly.

Since the valve has already been set in the closed position (Step 1 under Valve Preparation), make sure that the actuator is also in the closed position. **EXCEPTION: If mounting a spring-return actuator for "spring-to- open" operation; cycle the valve to the open position and proceed with the actuator AND valve in the open position.**

6.5 Coupling to Actuator

Key Drive Actuators: Install the key into the key slot of the coupling. The key should be filed to closely fit into coupling and actuator keyway. If the fit is loose, apply Loctite® Keyfit or equivalent. Place the coupling/key assembly into the actuator drive.

One-piece Slip-on Coupling: No coupling prep required. Place the coupling onto the stem of the valve.

Two-piece Clamped Type Couplings: Loosely assemble the two coupling halves using the four socket head cap screws and four crown lock nuts. Place the coupling assembly onto the stem of the valve with a loose fit.

6.6 Bracket Attachment to Actuator

1. Place the actuator onto the valve and bracket assembly aligning the holes in the bracket with the holes in the actuator, and aligning the actuator/stem drive with the coupling. Install the four hex head cap screws and four lock washers through the bracket and into the actuator. Apply slightly more than finger- tightness to these fasteners, but **DO NOT TIGHTEN**.

TABLE 3			
Bolt size	Torque to Cast/ Ductile Body Actuators No Lubrication to Screws		
	FT·LBS	IN·LBS	N·m
1/4	8	96	10.8
5/16	16	192	21.7
3/8	27	324	37
7/16	45	540	61
1/2	67	804	91
9/16	100	1200	136
5/8	135	1620	183
3/4	225	2700	305
7/8	335	4020	454
1	520	6240	705
1-1/8	700	8400	949
1-1/4	990	11880	1342
M6	7	84	9.5
M8	14	168	19.0
M10	28	336	38
M12	48	576	65
M16	115	1380	156
M20	225	2700	305
M30	783	9396	1062
M36	1347	16164	1826

2. If assembly has a two-piece clamped coupling, tighten coupling fasteners to values in **Table 3**.

3. Cycle the actuator a couple of times, allowing the assembly to position itself for proper actuator-drive to valve-drive alignment. Tighten the four hex head cap screws securing the bracket to the actuator using the values in **Table 3 or 4** as applicable.

WARNING:

BEWARE OF BALL MOVEMENT!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE OPEN FLOW PORT. LEAVE NO FOREIGN OBJECTS INSIDE THE VALVE. WHEN THE VALVE IS ACTUATED, THE BALL FUNCTIONS AS A CUTTING DEVICE.

6.7 Open/Close Position Adjustment

NOTE: Refer to the appropriate Installation, Maintenance, and Operating Instructions (IMO) for specific directions on how to adjust the actuator travel stops or limit switch (see **Table 5**).

The actuator travel stops should be adjusted so that there is proper ball position in the full open and full close valve position. Use the following procedures to determine correct ball position.

Valve Open Position: With the valve in the open position (actuator is against the "OPEN" travel stop), The maximum allowable misalignment of the ball port in relation to the body port is 1/16 inch (1.6 mm) on either side of the ball. Do not use the seat ID to measure misalignment since, in many cases; it is larger than the ball or body port.

Valve Close Position: With the valve in the closed position (actuator is against the "CLOSE" travel stop), make a pencil mark on the ball at the 9:00 o'clock and 3:00 o'clock locations as shown in (**Figure 10**). Open the valve part way, and measure dimension "A". This measurement should deviate no more than ± 1/16 inch (± 1.6 mm) from the value given in (**Table 6**) for all valve.

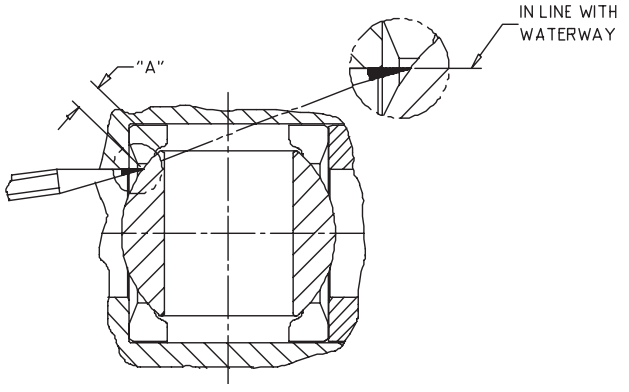


Figure 10 Correct Ball Position

TABLE 4			
Bracket Bolting Torques for GR. 5 Hex Cap Screws to Actuator Bodies			
Bolt size	Torque to Aluminum Body Actuators No Lubrication to Screws		
	FT·LBS	IN·LBS	N·m
1/4	6	72	8.1
5/16	12	144	16.3
3/8	20	240	27
7/16	30	360	41
1/2	50	600	68
9/16	70	840	95
5/8	90	1080	122
3/4	160	1920	217
7/8	250	3000	339
1	360	4320	488
1-1/8	520	6240	705
1-1/4	700	8400	949
M6	5	60	6.8
M8	11	132	14.9
M10	22	264	30
M12	38	456	52
M16	90	1080	122
M20	170	2040	230
M30	570	6840	773
M36	950	11400	1288

TABLE 5	
Actuator Installation, Maintenance and Operating Instructions	
Actuator	**IMO**
QPX	215
VPVL	553
B1C	6 BC 71
B1J	6 BJ 71
BCH	6 BCH 70
M	549
ADC	I4400, I4500 or I4600
ESR	I7016
I	I6500, I6600 or I6700
LCR	I1262
LCU	I1263
Q6	I1227 or I1383
QX	I3000
V	I1200, I2475, I2500, I2700 or I5500
TORQ-HANDLE®	71
Contact your authorized Metso Distributor for copies of these instructions	

TABLE 6	
Dimension "A" for Valve Closed Position Adjustment	
Valve Size	**Dimension "A" - inch (mm)**
2" (DN50)	0.34 (8.6)
3" (DN80)	0.50 (12.7)
4" (DN100)	0.75 (19.1)
6" (DN150)	1.09 (27.7)
8" (DN200)	1.09 (27.7)

7. SERVICE / SPARE PART

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 9**, the ballooned part number, part name and quantity required.

TABLE 7 - REPAIR KITS*							
Seat Material	Valve Size						
	2" (DN 50) 9150/9300	3" (DN 80) 9150	3" (DN 80) 9300	4" (DN 100) 9150	4" (DN 100) 9300	6" (DN 150) 9150	8" (DN 200) 7150
PTFE (T)	RKN-168TTT	RKN-183TTT	RKN-169TTT	RKN-184TTT	RKN-170TTT	RKN-185TTT	RKN-185TTT
FILLED PTFE (M)	RKN-168MTT	RKN-183MTT	RKN-169MTT	RKN-184MTT	RKN-170MTT	RKN-185MTT	RKN-185MTT
PFEP	RKN-168FTT	RKN-183FTT	RKN-169FTT	RKN-184FTT	RKN-170FTT	RKN-185FTT	-
PFA SEATS & SEALS	RKN-168BPT	RKN-183BPT	RKN-169BPT	RKN-184BPT	RKN-170BPT	RKN-185BPT	-
XTREME®	RKN-168XTZ	RKN-183XTZ	RKN-169XTZ	RKN-184XTZ	RKN-170XTZ	RKN-185XTZ	RKN-185XTZ

* For grounded valves, grounding washers listed below are also needed when ordering. (One per valve)					
	2" (DN 50)	**3" (DN 80)**	**4" (DN 100)**	**6" (DN 150)**	**8" (DN 200)**
9150	004 0847 60	004 0847 60	004 0848 60	004 0849 60	-
9300	004 0847 60	044 0848 60	004 0849 60	-	-
7150	-	-	-	-	004 0849 60

JAMESBURY 7000 & 9000 SERIES BALL VALVES

1	2	3	4	5	6	7	8	9
2	**9150**	**-**	**31**	**22**	**36**	**XTZ**	**1**	**A**

1. sign	VALVE SIZE (inch / mm)
INCHES	2, 3, 4, 6, 8
DN	50, 80, 100, 150, 200

2. sign	VALVE SERIES & STYLE
7150	Standard Bore Class 150
7180	Standard Bore Class 150*
9150	Full Bore Class 150
9180*	Full Bore Class 150*
9300	Full Bore Class 300
9380*	Full Bore Class 300*

* Metric unit on nameplate. Valves are CE marked.

3. sign	CONSTRUCTION / SPECIAL SERVICE
-	Standard (no entry)
C	Chlorine
N	NACE MR0103-2003
O	Oxygen
STG	Static Grounded
V	High Vacuum
VC	High Vacuum Certified
DT	125 RMS Flange Finish
DBB	Double Block and Bleed

4. sign	END CONNECTION CONSTRUCTION
11	Raised Face Non-*Fire-Tite* Non-Trunnion
31	Raised Face *Fire-Tite* Non-Trunnion

5. sign	BODY MATERIAL
22	Carbon Steel (WCB)
35	Alloy 20 (CN7M)
36	Stainless Steel (CF8M)
71	Monel (M-35-1)
28	Carbon Steel (LCC)

Other materials available on application

6. sign	BALL AND STEM MATERIAL*	SIZE RANGE
35	Alloy 20	All
36	316 Stainless Steel	All
71	Monel	All
73	Hastelloy	All
HB	316 SS, 17-4 PH	All
00	Same as body	All (Carbon steel not available)

* Other materials available on application

7. sign	BALL AND STEM MATERIAL*	SIZE RANGE
XTZ	*Xtreme*/PTFE/PTFE	All
TTT	PTFE/PTFE/PTFE	All
BTT	PFA/PTFE/PTFE	All
LGG † 1 2	PEEK/Graphite/Graphite	All
UUU 1	UHMW/UHMW/UHMW	All
MBT 1 2	Barrier-filled PTFE	4" - 6" (DN 100 - 150)

† Requires 17-4PH Stem

Note 1: Non-*Fire-Tite* only

Note 2: Not a self relieving seat design

8. sign	BOLTS	NUTS
1	ASTM A193 Gr B7	ASTM A194 Gr 2H
2	ASTM A193 Gr B8, B8C, B8M or B8T (Class 2)	ASTM A194 Gr 8B, 8CB, 8MB, 8TB, or 8FB
5**	ASTM A193 Gr B7M	ASTM A194 Gr 2HM

** Required for compliance to NACE MR0103-2003

9. sign	MODEL
A	8" 7150/7180 2" - 6" 9150/9180
B	2" - 4" 9300/9380

Subject to change without prior notice.

Metso Flow Control Inc.

Europe, Vanha Porvoontie 229, P.O. Box 304, FI-01301 Vantaa, Finland. Tel. +358 20 483 150. Fax +358 20 483 151
North America, 44 Bowditch Drive, P.O. Box 8044, Shrewsbury, M A 01545, USA. Tel. +1 508 852 0200. Fax +1 508 852 8172
South America, Av. Independéncia, 2500-Iporanga, 18087-101, Sorocaba-São Paulo, Brazil. Tel. +55 15 2102 9700. Fax +55 15 2102 9748
Asia Pacific, 238B Thomson Road, #17-01 Novena Square Tower B, Singapore 307685. Tel. +65 6511 1011. Fax +65 6250 0830
China, 11/F, China Youth Plaza, No.19 North Rd of East 3rd Ring Rd, Chaoyang District, Beijing 100020, China. Tel. +86 10 6566 6600. Fax +86 10 6566 2583
Middle East, Roundabout 8, Unit AB-07, P.O. Box 17175, Jebel Ali Freezone, Dubai, United Arab Emirates. Tel. +971 4 883 6974. Fax +971 4 883 6836
www.metso.com/valves

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