

Railroad Ball Valves Series 5REB3 4" (DN 100)

Installation, Maintenance and
Operating Instructions

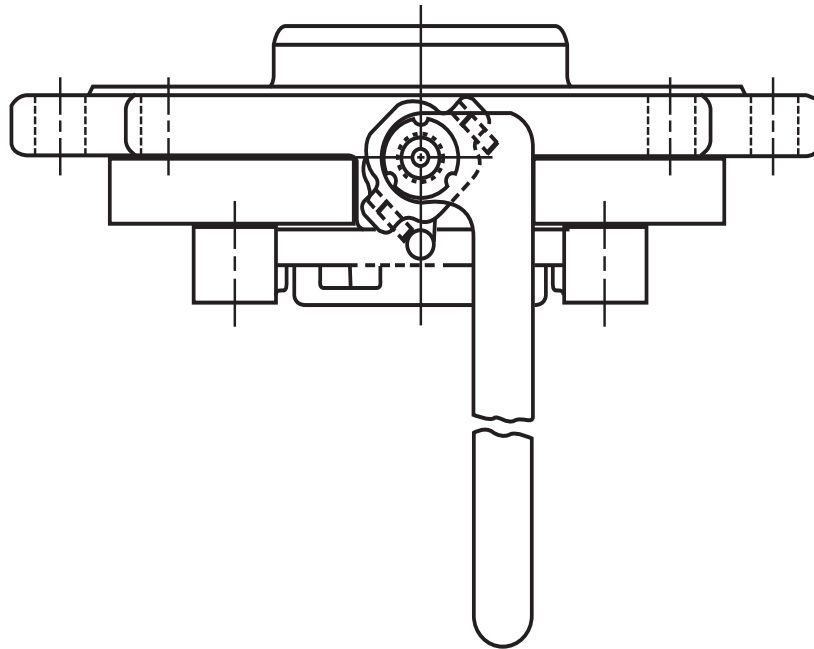


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READ THESE INSTRUCTIONS FIRST!

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

1.1 Scope of the Manual

This instruction manual contains important information regarding the installation, operation and maintenance of the Jamesbury® 4" (DN 100) Series 5REB3 Railroad Ball Valves. Please read these 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.

1.2 Valve Markings

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

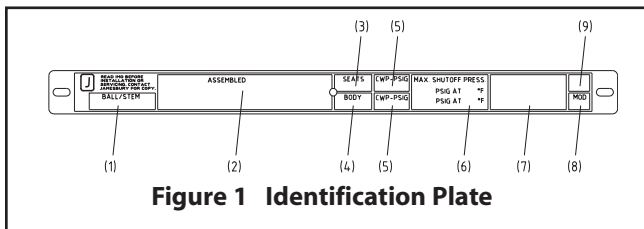


Figure 1 Identification Plate

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 TANK CAR. WHEN THE VALVE IS ACTUATED, THE BALL FUNCTIONS AS A CUTTING DEVICE. FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY!

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.

If the valve(s) will be stored for a long period, follow the recommendations in IMO-S1 to maintain the valve's integrity.

3 INSTALLATION

3.1 General

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

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

3.2 Installing on the Tank car

WARNING

THE VALVE SHOULD BE TIGHTENED ON 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 ON FLANGES. DO NOT ATTEMPT TO CORRECT ANY MISALIGNMENT BY MEANS OF FLANGE BOLTING!

Open the valve

The valve offers tightness in both directions; however, the large diameter flange must be installed towards the tank car.

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 Commissioning

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

Ensure that all nuts, fittings, and cables are properly fastened.

3.4 Steam Jacket connections

The steam-jacketed valve should be firmly attached to the tank car prior to fitting and welding of steam jacket connections. See **Section 3.2**.

The valve does not need to be disassembled prior to fitting or welding of steam jacket connections; however the valve must be in either the fully open or fully closed position.

Carefully fit the steam lines to the valve's steam jacket connections. There should be no side loads on the valve's steam jacket connections due to misalignment of the steam line piping.

Welded connections should only be made by ASME, Section IX qualified welders. Additional AAR welder qualifications may apply.

An AAR certified welding inspector should inspect the steam jacket connection welds prior to pressure testing.

Following approval of the welds, pneumatically test the pressure tightness of the steam jacket connections at 90 - 100psig (6.2 - 6.9barg). Cover the welds with a leak detection fluid and observe for three (3) minutes. Any indication of leakage is cause for rejection.

4 MAINTENANCE

4.1 General

Good operating procedure requires periodic observation to ensure that the valve is functioning well. The frequency of observation will depend on the application. Routine maintenance consists of tightening the lower stem nut (item 15 in **Figure 3**) periodically to compensate for stem seal wear.

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

NOTE: Service kits include stem seals (8), secondary stem seal (7), seats (5), and body seal (6).

WARNING

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

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

4.2 Disassembly

NOTE: If complete disassembly becomes necessary; it is recommended to replace all seats and seals. Refer to the Service Kit information in **Section 5, SERVICE KITS**.

NOTE: Always use original OEM parts to make sure that the valve functions properly.

1. Follow the steps in all the **WARNING** sections above before performing any work on the valve.
2. Open and close the valve and leave in the closed position. Valve needs to be raised above the working surface slightly because the ball protrudes slightly from either end of the valve when in the closed position. **BE CAREFUL NOT TO SCRATCH THE BALL.**

3. Remove the outer stem nut (15) and handle (17).
4. Remove the lower stem nut (15) and indicator stop (12).

WARNING

INDICATOR STOP ADJUSTMENTS ARE FACTORY SET. THEREFORE, THE INDICATOR STOPS ARE NOT INTERCHANGEABLE BETWEEN DIFFERENT VALVES. REPLACE THE SAME INDICATOR STOP TO THE VALVE IT WAS REMOVED FROM. FAILURE TO DO SO MAY RESULT IN UNCONTROLLED PRESSURE RELEASE. DAMAGE OR PERSONAL INJURY MAY RESULT.

5. Remove the compression ring (21).
6. Mark the body joint flanges to assure correct body (1) and body cap (2) orientation during assembly. Remove body bolts (10) and remove body cap (2). **BE CAREFUL NOT TO SCRATCH THE BALL.**
7. Remove the body seal (6) and the first seat (5) from the body cap.
8. 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 (4).
9. Carefully remove the bottom seat (5) out of the body, **BEING CAREFUL NOT TO SCRATCH THE BODY SEALING SURFACE BEHIND THE SEAT.**
10. Press the stem (4) from the top into the valve body and remove it through the body cap end of the body.
11. Remove and discard the bottom stem seal (8) and secondary stem seal (7), **BEING CAREFUL NOT TO SCRATCH ANY SEALING SURFACES IN THE BODY.**
12. Remove the top stem seals (8) for Model 'A' version or V-ring set (24) for Model 'B' version, **BEING CAREFUL NOT TO SCRATCH ANY SEALING SURFACE INSIDE THE STEM BORE.**

NOTE: Refer to **Section 2, Valve Markings**. Your valve's mode version will be found in area "8" on the identification plate.

4.3 Checking Parts

NOTE: For detailed instructions on visual inspection of critical components, refer to IMO-R26.

1. Clean all disassembled parts.
2. Check the stem (4) and ball (3) for damage. Pay particular attention to the sealing areas.
3. Check all sealing and gasket surfaces of the body (1) and body cap (2).

4. Replace any damaged parts.

NOTE: When ordering spare parts not included in the spare part set, always include the following information:

- a. Valve catalog code from Identification plate.
- b. If the valve is serialized – the serial number (stamped on the identification plate).
- c. From **Figure 3**, the ballooned part number, part name and quantity required.

4.4 Assembly

It is advisable to replace seats and seals if complete disassembly and reassembly become necessary. Service Kits can be found in **Section 5**.

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 sealing areas of the 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. The valve needs to be raised above the working surface slightly because the ball protrudes slightly from either end of the valve when in the closed position. With the body cap side facing up, slide one valve seat (5) sideways into the body (1) to below the stem bore, and tilt it into place so that the proper surface (see **Figure 2**) will be adjacent to the ball (3), being careful not to cut or scratch the seat.

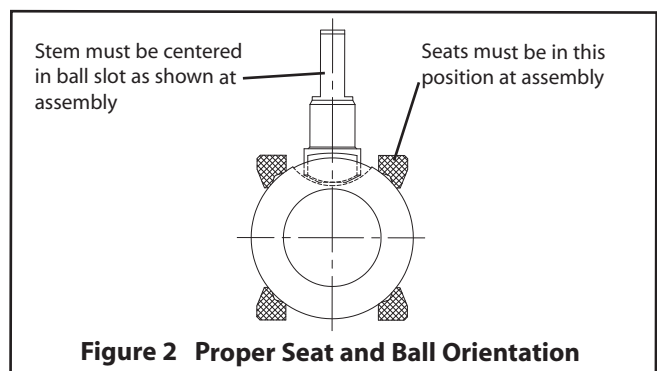


Figure 2 Proper Seat and Ball Orientation

6. From inside the body (1), insert the secondary stem seal (7) and the bottom stem seal (8) into the body (see **Figure 3**).

7. Insert the stem (4) through the body cap 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 bottom stem seal (8).
8. Hold the stem in place from the bottom and insert the top stem seals (8), for Model 'A' version, or (24) for Model 'B' version (see **Figure 3** for proper v-ring orientation), over the stem (4).
9. Place compression ring (21) and indicator stop (12) over stem (4).

NOTE: Make sure that the side of the indicator stop (12) marked "BOTTOM" is towards the compression ring (21).

10. Place the lower stem nut (15) on the stem (4).

NOTE: Make sure that the side of the stem nut (15) marked "TOP" is facing away from the indicator stop (12).

11. Tighten the stem nut (15) until the stem seal(s) are fully seated. Then tighten an additional 1/8 to 1/4 turn.
12. Insert the ball (3) rotating it onto the stem (4) 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 2**).

WARNING

THE BALL WILL PROTRUDE FROM THE VALVE IN THE CLOSED POSITION. CARE MUST BE TAKEN TO PREVENT DAMAGING THE BALL SEALING SURFACE.

13. Gently place the body seal (6) into the machined recess of the body (1).
14. Place the second seat (5) into the body cap (2) with the proper surface adjacent to the ball, (see **Figure 2**).
15. Place the body cap (2) in the body (1) 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 seal (6) or seat (5) during this operation.
16. Lubricate the threads of body bolts (10) with NeverSeez® or equivalent. Install body bolts (10) and tighten sequentially as shown in the diagram in (**Figure 3**), to the recommended values as shown in the "**BODY BOLT TORQUES**" chart in (**Figure 3**).
17. Aligning the slot in the handle with drive on the stem, lower handle (17) straight down in line with the valve stem (4) until it is completely engaged. Place the second stem nut (15) on the stem (4).

NOTE: Make sure that the side of the stem nut (15) marked "TOP" is facing away from the handle (17).

18. Tighten the stem nut (15).

19. Cycle the valve slowly with a gentle back and forth motion building gradually to the full quarter turn. By cycling slowly, the seat lips will seat against the ball. Take care to avoid scratching the ball O.D.

4.5 Pressure 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!

5 SERVICE KITS

Service kits contain one pair of seats, a body seal, stem seals and a secondary stem seal. When ordering service kits for your 5REB3 valve order RKN-80TT or RKN-80MT depending on your valve's seat material. Refer to **Section 1.2, Valve Markings** and check area "3" on your valve's identification plate to determine the correct seat material for your valve.

6 SERVICE / SPARE PART

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

NOTE: When ordering spare parts not included in the spare part set, 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 3**, the ballooned part number, part name and quantity required.

7 HOW TO ORDER 5REB3 BALL VALVES

Carbon steel body with 316 stainless steel trim:

4" 5REB322HBTT

4" 5REB3SJ22HBTT

316 stainless steel body and trim:

4" 5REB336HBTT

4" 5REB3SJ36HBTT

'SJ' signifies valve with integral steam jacket.

For filled PTFE seats, simply substitute 'MT' for 'TT'

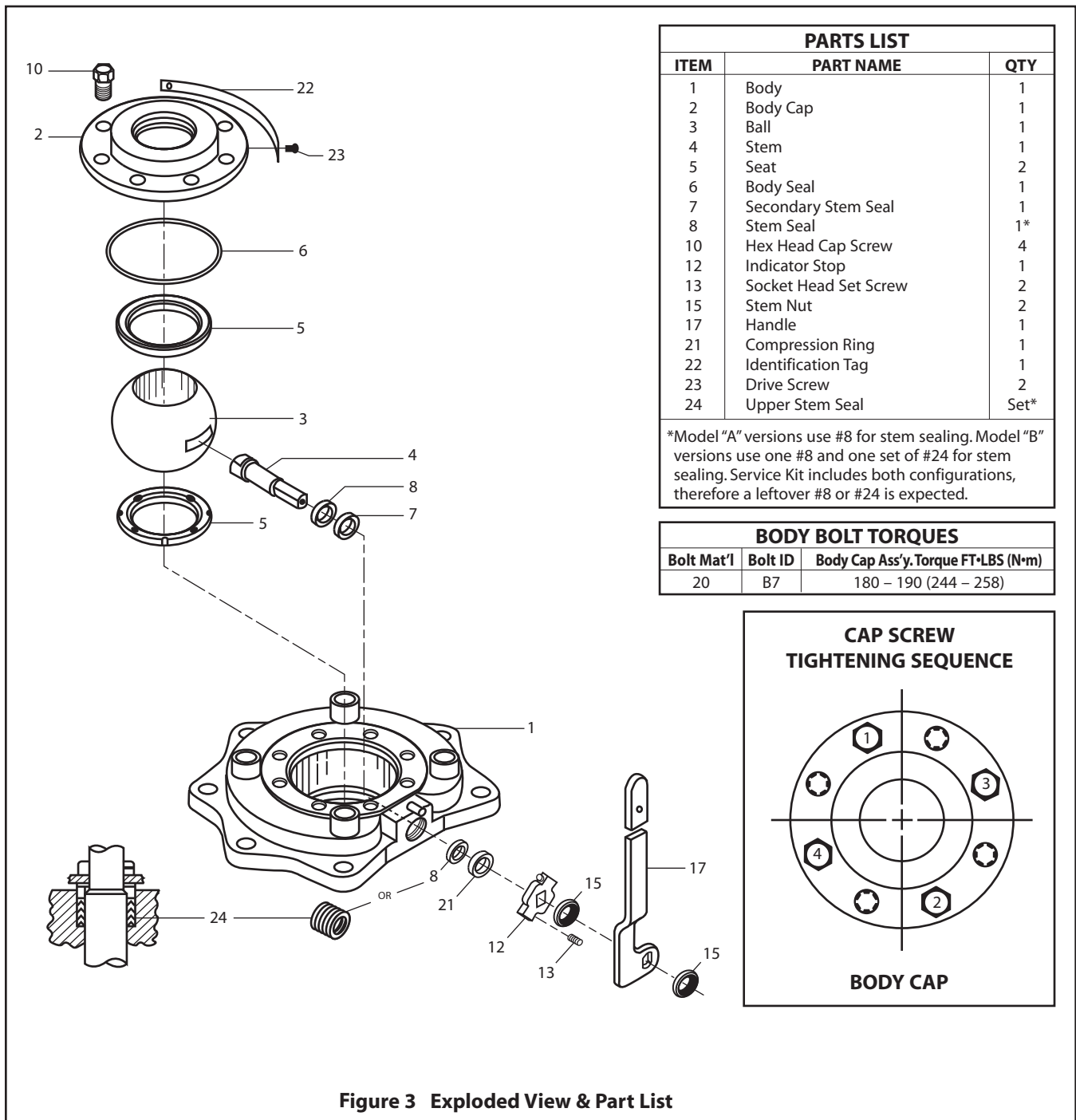


Figure 3 Exploded View & Part List

Subject to change without prior notice.

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