

FLANGED TWO-PIECE BALL VALVES

INTRODUCTION

This instruction manual includes installation, operation, and maintenance information for FNW flanged split-body ball valves. This manual addresses lever operated ball valves only. Please refer to other FNW manuals for other ball valves, actuated valves, modifications, or accessories.

CAUTION

1. Valve pressure ratings are based on many variables, including valve series and size, as well as body, seat, and bolt material. Verify that the application does not exceed the pressure or temperature rating of the valves.
2. Always depressurize the line with the valve in the open position before disassembly.
3. Wear protective equipment and take appropriate precautions to safeguard against injury caused by the discharge of trapped fluids.
4. Use only FNW recommended spare parts for maintenance.
5. To ensure safety and to maintain warranty, never modify the valve in any way without prior approval from FNW.

STORAGE

ATTENTION: If the valves are not destined for immediate use, the following precautions should be taken:

1. If possible, leave the valves in their packaging cases during the period of storage.
2. Ball valves must remain in the open position while being stored.
3. In order to prevent damage, protective plastic covers on valve ends should not be removed until immediately prior to installation.
4. It is advisable to store valves in waterproof conditions. Ball valves should be protected to safeguard against humidity, moisture, dust, dirt, sand, mud, salt spray, sea water, or other forms of corrosive and erosive environments.
5. Valves with actuators are to be stored in dry conditions.
6. Valves to be stored for long periods of time should be checked by the quality control personnel or designee every six months; every three months when valves are automated. Maintenance during this storage period can include:
 - Internal surface should be inspected to check for dust or other foreign objects.
 - Rust or dust must be removed by cleaning with proper solvent.
 - After cleaning, ball valves must be lubricated with adequate lubricant.
 - Ball valves should be operated for at least two complete cycles before installing or returning to storage.

INSTALLATION

WARNING: To avoid personal injury to your self, fellow workers, or damage to property from release of process fluid, before installation:

- a. Shut off all operating lines to the valve site.
 - b. Isolate the valve site completely from the process.
 - c. Release process pressure.
 - d. Drain the process fluid from the valve site.
1. Note:
 - The ball valves may be installed in any position using standard pipe fitting practices.
 - Pipe must be free of tension both during and after installation.
 - The ball valves are shipped in the full open position to prevent damage of seat and ball surfaces. The valve should be kept in the open position during installation.
 - The ball valves are supplied with end caps for protecting the flange connections and the interior space of the valves. Remove the protective covers only just prior to installation of the valve.

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- There may be residual water from testing trapped between the ball and body. This can be removed by partially opening the valve, exposing the cavity to the through port of the ball.
 - If the valve was supplied with an actuator, secondary support may be necessary. Contact FNW for recommendations.
 - FNW flanged ball valves are designed for mounting between ANSI flanges. It should be taken into account that a valve which is designed for a particular flange standard cannot, under normal situations, be used with flanges from another standard. If pipeline flanges are to be used that are not in accordance with the specifications of the order, the manufacturer should be consulted. All standard flange seals can be used.
 - **ATTENTION:** Do not perform welding near an installed valve. Welding in the vicinity of an installed valve can damage the valve and cause leakage.
 - **CAUTION:** The rotating ball can cause injury. Keep body parts away from the space between ball and body (valve interior).
2. Before installation:
- Inspect the valve body port and associated equipment for any damage that may have occurred and for any foreign matter that may have collected in shipping or storage. Make certain the body interior is clean.
 - Inspect the pipe line and mating flanges, making sure the pipe is free of foreign material that could damage the ball or seat and the flanges are clean and have no burrs or pits that could cause leakage.
 - Cycle the valve at least twice to ensure proper operation.
3. Installing:
- Prior to mounting the valve, flush the pipeline to remove soiling and weld residue.
 - Make sure the protective end caps from the valve are removed.
 - Ensure that the pipe flanges are spread sufficiently to clear valve flanges.
 - With the valve in the open position, insert it, along with appropriate flange gaskets (not included), between the pipeline flanges.
 - Insert appropriate size bolts and heavy hex nuts (not included) as recommended for the flange size and class.
 - Verify proper alignment of all components and then tighten the flange bolts according to gasket manufacturer's recommended practices or standard piping practices of stipulated torque.
 - **ATTENTION:** Do not operate the valve before flushing the pipeline. Keep the valve in the open position until flushing is complete. Residue in the line could cause damage to the seats.

OPERATION

1. Note: this manual only covers the operation of manually operated valves. For operation of automated valves, consult the manufacturer's manual for the actuator.
2. Ensure that the valve materials are compatible with the service and that the operating characteristics are below the valves maximum.
3. Open and close the valve by turning the handle one-quarter turn (90°).
4. Valve is in the open position when the handle is parallel with the pipeline.
5. Valve is in the closed position when the handle is perpendicular to the pipeline.

MAINTENANCE

Before starting maintenance, please read information contained in the **CAUTION** section of this manual.

1. Open and close the ball valve at least once to release the pressure completely from the valve body.
2. Ball valves, if correctly used, normally do not need any internal lubrication and maintenance. However, when necessary, ball, seat, or seals can be replaced by qualified personnel following the instructions of this manual.
3. For further information, refer to the **PARTS LIST** section.
4. Valve Disassembly:

Note: Some models of FNW flanged split-body ball valves may be configured differently than what is indicated below. Specific model number drawings can be obtained at www.fnwvalve.com.

- a. To inspect and/or replace body seals, seats, packing & ball
 - i. Reference parts list for part identification.
 - ii. Valve must be in the open position.

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- iii. Remove valve from line.
- iv. Remove body nuts (18) securing end cap (3) and separate end cap from body (1). Remove body studs (17) from valve body (1).
- v. Close the valve and remove ball (2), seats (4), and body seal (5) being careful not to damage the ball.
- vi. Remove the handle snap ring (9), handle (8), stem snap ring (9), stop plate (9A), gland bolts (13), gland (11), and bearing (7B).
- vii. Push the stem (6) into the body (1). Remove thrust washer (10) and stem bushing (7A) from stem (6).
- viii. Remove packing (7) from valve body (1).
- b. Inspection and replacement
 - i. With the valve completely disassembled, clean and examine all components.
 - ii. The surface of the ball should be free from any defect, pitting, or scratches. If any are found, the ball should be replaced. Using a defective ball will be detrimental to valve performance.
 - iii. It is recommended that the seats and seals be replaced whenever the valve is disassembled.
 - iv. After cleaning, carefully examine all remaining components for wear, corrosion, erosion, and mechanical damage. Replace all defective parts.
 - v. Clean inside of body and stem housing. Light grease, compatible with line fluid, can be used on the ball, seals, and stem surfaces.

Note: Please refer to parts list for part identification. When ordering parts, please specify the specific valve number and size to ensure proper parts are received. FNW does not take responsibility for incorrectly ordered parts.

5. Valve Re-Assembly:

- a. Stem
 - i. Install thrust washer (10) and stem bushing (7A) onto stem (6), and then insert stem from inside the body (1).
 - ii. While supporting stem (6), install stem packing (7), bearing (7B), gland (11), and gland bolts (13). Tighten gland bolts until snug and then an additional one-half turn.
 - iii. Install the stop plate (9A), stem snap ring (9), handle (8), and handle snap ring (9).
- b. Ball, seats, and seals
 - i. Install the first seat (4) in the body (1).
 - ii. Place the stem (6) in the closed position and insert the ball (2), aligning the groove in the ball with the foot of the stem.
 - iii. Position the ball (2) in the open position.
 - iv. Install the body studs (17) onto the valve body (1).
 - v. Insert the second seat (4) and body seal (5) onto the end cap (3). Install the end cap assembly onto the valve body (1), verifying proper alignment on the valve body studs (17).
 - vi. Install and hand tighten all body nuts (18).
 - vii. Tighten body nuts to recommended torque values using the star pattern method with no more than one-quarter turn on each nut before alternating.

RECOMMENDED BODY STUD/NUT TORQUES

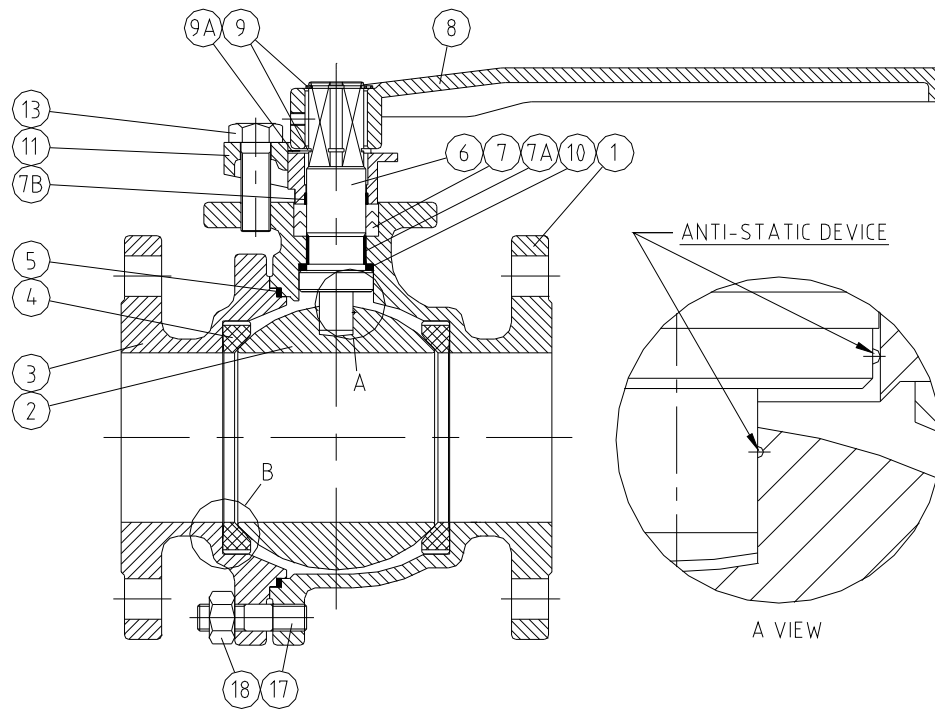
| Size (Inch) | Stud Size (Inch) | Qty | Torque | |
|-------------|------------------|-----|--------|--------|
| | | | In-Lbs | Ft-Lbs |
| 1/2 | 5/16-18 UNC | 4 | 72 | 6 |
| 3/4 | 5/16-18 UNC | 4 | 72 | 6 |
| 1 | 3/8-16 UNC | 4 | 120 | 10 |
| 1-1/4 | 3/8-16 UNC | 4 | 120 | 10 |
| 1-1/2 | 1/2-13 UNC | 4 | 288 | 24 |
| 2 | 1/2-13 UNC | 4 | 288 | 24 |
| 2-1/2 | 1/2-13 UNC | 6 | 288 | 24 |
| 3 | 1/2-13 UNC | 6 | 288 | 24 |
| 4 | 1/2-13 UNC | 8 | 288 | 24 |
| 6 | 5/8-11 UNC | 8 | 576 | 48 |
| 8 | 3/4-10 UNC | 12 | 1032 | 86 |
| 10 | 3/4-10 UNC | 12 | 1032 | 86 |

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6. Testing
 - After completing the re-assembly, check that the valve operates smoothly by opening and closing the valve several times.
 - If the entire valve was removed from the pipeline and if facilities are available, test the ball valve to appropriate specifications.
7. Troubleshooting
 - a. Stem Leakage
 - i. Stem leakage in the packing area may be eliminated by increasing the torque on the packing gland (11). Adjust packing gland bolts (13) in one-quarter turn increments. **Note: Be sure not to tighten only one side of the gland. Doing so can lock the gland to the stem, making it difficult to operate the valve.** If leakage persists, replace stem packing (7).
 - b. Body Seal Leakage
 - i. Check the tightness of the body nuts (18). Tighten if necessary. If leakage persists, replace the body seal (5).
 - c. In Line or Seat Leakage
 - i. Verify that the valve is in the fully closed position. If leakage persists, the valve should be disassembled and damaged parts replaced.

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PARTS LIST



| Ref. No. | Description | Material | Qty |
|----------|---------------|---|-------|
| 1 | Body | ASTM A216 Gr. WCB or ASTM A351 Gr. CF8M | 1 |
| 2 | Ball | 316SS | 1 |
| 3 | End Cap | ASTM A216 Gr. WCB or ASTM A351 Gr. CF8M | 1 |
| 4 | Seat | RTFE (PTFE+15% G.F.) | 2 |
| 5 | Body Seal | PTFE | 1 |
| 6 | Stem | 316SS | 1 |
| 7 | Stem Packing | PTFE | 1 Set |
| 7A | Stem Bushing | PTFE | 1 |
| 7B | Bearing | PTFE | 1 |
| 8 | Handle | FCD45 | 1 |
| 9 | Snap Ring | 304SS | 2 |
| 9A | Stop Plate | 304SS | 1 |
| 10 | Thrust Washer | PTFE | 1 |
| 11 | Gland | 304SS | 1 |
| 13 | Gland Bolt | 304SS | 2 |
| 17 | Body Stud | ASTM A193 Gr. B8 | 4-12 |
| 18 | Body Nut | ASTM A194 Gr. 8 | 4-12 |

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WARRANTY

- 1. LIMITED WARRANTY:** Subject to the limitations expressed herein, Seller warrants that products manufactured by Seller shall be free from defects in design, material and workmanship under normal use for a period of one (1) year from installation but in no case shall the warranty period extend longer than eighteen months from the date of sale. This warranty is void for any damage caused by misuse, abuse, neglect, acts of God, or improper installation. For the purpose of this section, "Normal Use" means in strict accordance with the installation, operation and maintenance manual. The warranty for all other products is provided by the original equipment manufacturer.
- 2. REMEDIES:** Seller shall repair or replace, at its option, any non-conforming or otherwise defective product, upon receipt of notice from Buyer during the Manufacturer's warranty period at no additional charge. SELLER HEREBY DISCLAIMS ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OR FITNESS FOR A PARTICULAR PURPOSE.
- 3. LIMITATION OF LIABILITY:** UNDER NO CIRCUMSTANCES SHALL EITHER PARTY BE LIABLE TO THE OTHER FOR INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. BUYER HEREBY ACKNOWLEDGES AND AGREES THAT UNDER NO CIRCUMSTANCES, AND IN NO EVENT, SHALL SELLER'S LIABILITY, IF ANY, EXCEED THE NET SALES PRICE OF THE DEFECTIVE PRODUCT(S) PURCHASED DURING THE PREVIOUS CONTRACT YEAR.
- 4. LABOR ALLOWANCE:** Seller makes NO ADDITIONAL ALLOWANCE FOR THE LABOR OR EXPENSE OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS OR WORKMANSHIP OR DAMAGE RESULTING FROM THE SAME.
- 5. RECOMMENDATIONS BY SELLER:** Seller may assist Buyer in selection decisions by providing information regarding products that it manufactures and those manufactured by others. However, Buyer acknowledges that Buyer ultimately chooses the product's suitability for its particular use, as normally signified by the signature of Buyer's technical representative. Any recommendations made by Seller concerning the use, design, application or operation of the products shall not be construed as representations or warranties, expressed or implied. Failure by Seller to make recommendations or give advice to Buyer shall not impose any liability upon Seller.
- 6. EXCUSED PERFORMANCE:** Seller will make a good faith effort to complete delivery of the products as indicated by Seller in writing, but Seller assumes no responsibility or liability and will accept no back-charge for loss or damage due to delay or inability to deliver, caused by acts of God, war, labor difficulties, accidents, inability to obtain materials, delays of carriers, contractors or suppliers or any other causes of any kind whatever beyond the control of Seller. Under no circumstances shall Seller be liable for any special, consequential, incidental, or indirect damages, losses, or expense (whether or not based on negligence) arising directly or indirectly from delays or failure to give notice of delay.