SEGMENTED BALL VALVES

MODEL 920: KEYED SHAFT, MODEL 940: DIRECT MOUNT

1. INTRODUCTION

This instruction manual includes installation, operation and maintenance information for FNW segmented ball valves.

2. CAUTION/IMPORTANT SAFETY WARNINGS

- 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 valve.
- Always depressurize the line with the valve in the open position before disassembly.
- Wear protective equipment and take appropriate precautions to safeguard against injury caused by the discharge of trapped fluids.
- Use only FNW recommended spare parts for maintenance.
- To ensure safety and maintain warranty, never modify the valve in any way without prior approval from FNW.

3. STORAGE

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

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

4. INSTALLATION

ATTENTION: To avoid personal injury to yourself, fellow workers, or damage to property from release of process fluid, before installation:

- Shut off all operating lines to the valve site.
- Isolate the valve site completely from the process.
- Release process pressure.
- Drain the process fluid from the valve site.

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NOTE:

- The valves may be installed in any position using standard pipe fitting practices.
- Pipe must be free of tension both during and after installation.
- The 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.
- For valve assemblies with large size actuators, secondary support may be necessary. Contact FNW for recommendations.
- FNW flanged and wafer valves are designed for mounting between ANSI flanges. It should be noted 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.
- Use standard nonmetallic flat gaskets per ASME B16.21. Spiral wound metallic gaskets per ASME B16.20 are not recommended.
- **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).

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 during shipping or storage. Make certain the body interior is clean.
- Inspect the pipeline 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.

Installing

- Prior to mounting the valve, flush the pipeline to remove debris 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.

5. OPERATION

- **NOTE:** This manual only covers the details of the segmented valves. For operation of automated valves, consult the manufacturer's manual for the actuator.
- Ensure that the valve materials are compatible with the service and that the operating characteristics are below the valve's maximum.

6. MAINTENANCE

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

ATTENTION: Prior to starting work on an automated valve assembly, it is critical to isolate pneumatic or electric supply to the valve's actuator. Technicians must follow site requirements for lockout/tagout and for equipment decontamination.

- Segmented 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.
- For further information, refer to the PARTS LIST section.

Valve Disassembly

NOTE: Some models of FNW segmented valves may be configured differently than what is indicated below. For additional support, contact FNW.

- Inspect and/or replace body seals, seats, packing & ball:
  - Reference parts list for part identification
  - **IMPORTANT**: Valve must be in the open position prior to removing from the pipeline.
  - Remove valve from pipeline.
  - Remove actuator from the valve.
  - Remove retainer bolts, then remove the retainer, retainer gasket, seat seal, seat, seat spring and inner seat seal.
  - Remove gland bolts, bellville washers, packing gland, packing retainer, packing and upper bearing.
  - Remove the bottom cover bolts, bottom cover, gasket and lower bearing.
  - Use a wrench to remove the threaded shaft screws.
  - Push the valve stem from the top and remove the lower shaft. Remove the upper shaft. Remove the segment.
  - Clean all parts carefully and inspect thoroughly for wear or damage.

Refer to the parts list for identification. It is not recommended to repair pressure retaining parts. When ordering parts, please specify the valve model, pressure class and size to ensure proper parts are received. FNW does not take responsibility for incorrectly ordered parts.

Valve Reassembly

- For reassembly of the valve, follow disassembly procedure in reverse order.

CAUTION:

During reassembly, testing and operation, the valve should never be over-stroked. Over-stroking the valve will cause damage to the seat sealing surface.

- After completing reassembly of the valve, check that the valve operates smoothly by opening and closing several times.
- Install the actuator onto the valve, following the instructions outlined in the actuator operating manual.
- Test the valve to appropriate standards for leakage.

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Recommended Packing Gland Bolt Torques

Valve Size	Class Size	Bolt Size	Torque (ft-lb)
1" – 4"	150	M8	7 – 15
6" – 10"	150	M10	11 – 18
12"	150	M12	18 – 29
1" – 3"	300	M8	7 – 15
4" – 6"	300	M10	11 – 18
8" – 10"	300	M12	18 – 29
12"	300	M16	44 – 55

Recommended Seat Retainer Bolt Torques

Valve Size	Class Size	Bolt Size	Torque (ft-lb)
1" – 4"	150	M6	4 – 7
6" – 10"	150	M8	7 – 11
12"	150	M8	9 – 13
1" – 4"	300	M6	4 – 7
6" – 10"	300	M8	7 – 11
12"	300	M16	9 – 13

7. TROUBLESHOOTING

Excessive Leakage Through Seat

- Damage to valve seat or segment. Replace with new.
- Valve is not fully closed. Use full-close indicator on top of valve stem to align properly.
- Damaged seat spring. Replace with new.

Stem Leakage

- Gland bolts are loose. Tighten bolts gradually and evenly. Do not over-tighten.
- Packing is worn or over-compressed. Replace packing.

Excessive Torque

- Media temperature or viscosity too high. Review compatibility with valve material.
- Actuator is undersized. Review process conditions versus sizing requirements.

Valve Ceases To Turn

- Debris on the valve sealing surface. Remove debris and check parts for damage.
- Failure of internal valve parts due to erosion or chemical attack. Check parts for damage.
- Loss of air supply or power to the actuator. Confirm supply.

Contact FNW for help with additional troubleshooting.

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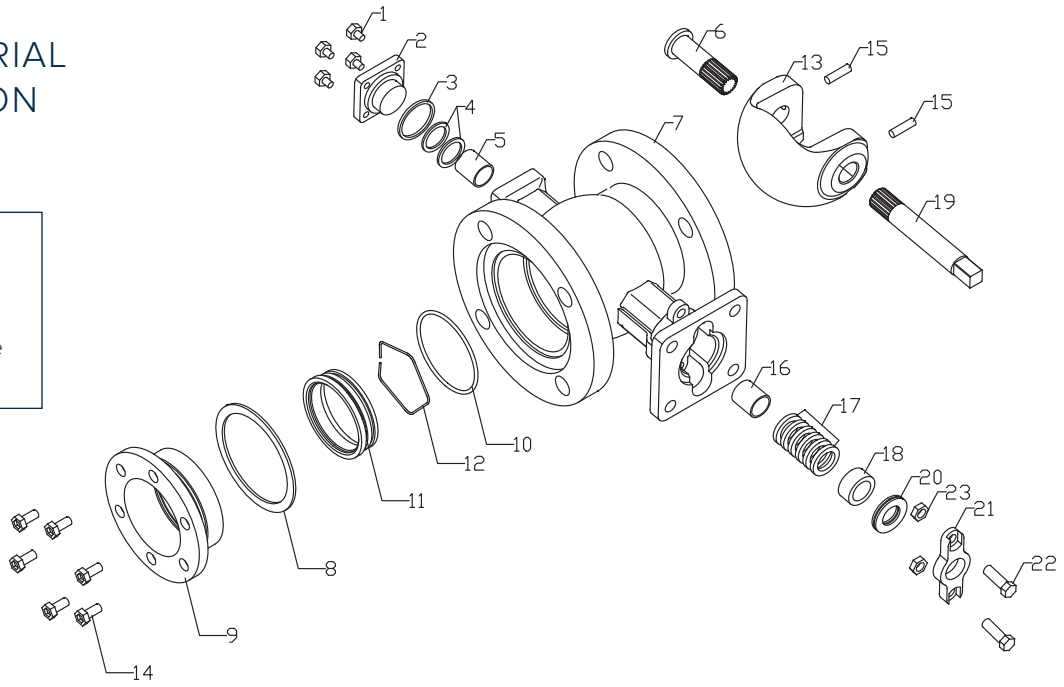
8. STANDARD MATERIAL OF CONSTRUCTION

NOTES:
Additional materials are available on request.
Contact your FNW representative for available options.



No	Description	Quantity	Stainless Steel Body Valves	Carbon Steel Body Valves
1	Bottom Cover Bolt	4	A193 B8M	A193 B8M
2	Bottom Cover	1	CF8M	CF8
3	Bottom Cover Gasket	1	Graphite + 316SS	Graphite + 316SS
4	Gasket	2	TFM-1600 / Graphite	TFM-1600 / Graphite
5	Lower Bearing	1	316SS+PTFE / 316SS+Stellite	316SS+PTFE / 316SS+Stellite
6	Lower Shaft	1	17-4 PH / XM-19	17-4 PH / XM-19
7	Body	1	CF8M	WCB
8	Seat Retainer Gasket	1	Graphite + 316SS	Graphite + 316SS
9	Seat Retainer	1	CF8M	WCB
10	Seat Seal	1	Aflas® / Graphite	Aflas® / Graphite
11	Seat	1	316SS+Stellite / Devlon®	316SS+Stellite / Devlon®
12	Seat Spring	1	Inconel X-750	17-7 PH
13	Segmented Ball	1	CF8M + Chrome	CF8M + Chrome
14	Retainer Bolts	6	A193 B8M	A4-70
15	Shaft Screws	2	316SS	316SS
16	Upper Bearing	1	316SS+PTFE / 316SS+Stellite	316SS+PTFE / 316SS+Stellite
17	Stem Packing	6	TFM-1600 / Graphite	TFM-1600 / Graphite
18	Packing Retainer	1	316SS	304SS
19	Upper Shaft	1	17-4 PH / XM-19	17-4 PH / XM-19
20	Bellville Washers	2-4	17-7 PH	17-7 PH
21	Packing Gland	1	CF8M	CF8
22	Gland Bolts	2	A193 B8M	A193 B8M
23	Gland Nuts	2	A194 8M	A194 8M

9. LIMITED WARRANTY

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 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.

Claim Process and 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.

In order to file a claim under the terms of this Warranty, a claimant must promptly notify FNW that a Product may be defective within 30 days of the suspected failure or defect via the telephone number, mail or website listed below and may be required to submit proof of purchase and/or photographs.

- Telephone: 1-800-221-3379
- Mailing Address: 751 Lakefront Commons, Newport News, VA 23606
- Website: fnw.com

All Products alleged to be defective must be sent to FNW for inspection and testing for determination of the cause of the alleged defect or failure.

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.

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.

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.

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.