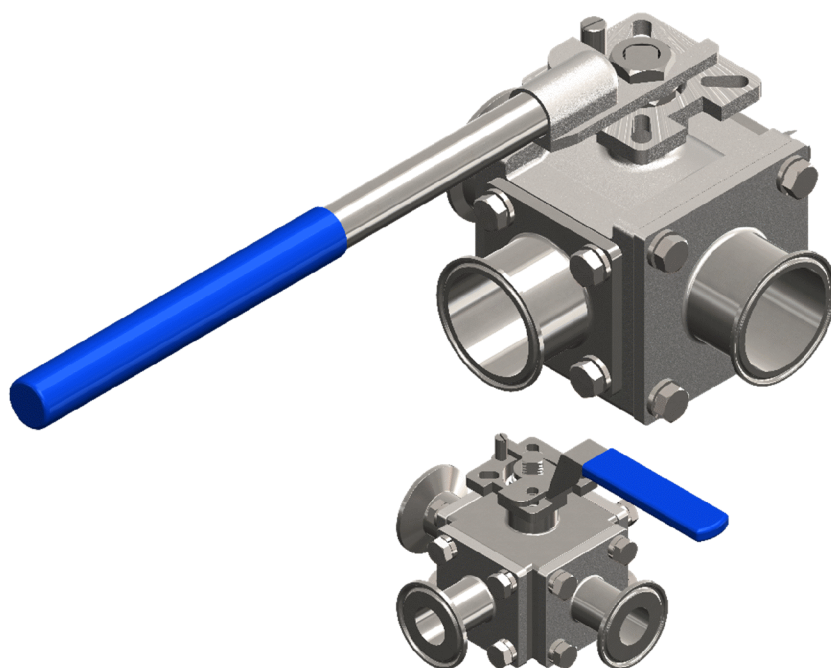


# **Instruction & Operation Manual for BV3S Sanitary Multi-Port Ball Valves**



**Read and understand this manual prior to installing, operating or servicing this equipment.**



*The Right Connection®*

**March 2019**



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## Safety Information

The following DANGER, WARNING and CAUTION signs are contained in this manual. To avoid serious injury and/or possible damage to equipment, pay attention to these messages. Hazards or unsafe practices could result in severe personal injury or death.



DANGER is used in the most extreme cases.



Hazards or unsafe practices which could result in minor or moderate injury. May also be used to alert against an unsafe operating or maintenance practice.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Safety logos, which appear throughout this manual, are used as a reminder that the users should carefully review for the appropriateness of the product for the media, application and environment in which it will be used.

Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are properly matched to the series, model, serial number and revision level of the equipment.

Safety labels are placed on equipment where appropriate. Do not remove any labeling from any piece of equipment. Replace any label that is missing.

DO NOT modify any Dixon Sanitary product. Non-factory modifications could create hazardous conditions and void all warranties. DO NOT attempt to use a Dixon Sanitary product in any application that exceeds the product rating.

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## General Guidelines

- The owner must comply exclusively with these operating instructions and the authorized use of this piece of equipment. Should problems arise that cannot be solved using these operating instructions, please contact Dixon® – Sanitary Division. We will be happy to provide further assistance.
- If any modification work is performed on the product by the owner themselves, Dixon® shall no longer be considered the manufacturer of the device. In such cases, all components must be subjected to a new certification process for any applicable certifications that the equipment holds. Unless agreed to in writing by Dixon®, liability, warranties and guarantees shall immediately be deemed null and void as soon as you:
  - Perform modifications/conversion work on the product.
  - Use the product for unauthorized purposes.
  - Remove or disable safety elements.
  - Process products whose material, form and size do not correspond exactly to the description provided.
  - Make alterations to the original state of the device.
- The operating instructions are regarded as part of the valve.
- The operating and maintenance personnel must always be able to access the operating instructions.
- The safety instructions provided in the operating instructions must be observed.
- The operating instructions shall be valid for the entirety of the device's lifespan.
- The operating instructions must be maintained and updated as necessary.
- The operating instructions must be passed on to any subsequent owners or operators of the device.

## Safety Information

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### Owner Must Ensure

- The product is only used as authorized.
- The product is only used when it is in fault-free, fully functional condition, and that the safety equipment is regularly checked to ensure that it is fully functional.
- The product is only operated, maintained and repaired by personnel with the appropriate qualifications and authorization.
- Checks are made before the product is put into operation to ensure that only the authorized person is in the work area, and no one is in danger of being injured if the product is in operation.
- The product is checked for visual damage prior to commissioning to ensure that it is only operated when free of faults.
- Any defects are reported immediately to the appropriate supervisor.
- All safety and warning notices attached to the equipment are legible and none are removed.
- The operating instructions are always kept close to the product operation site, in a legible and complete state.
- Personnel are regularly instructed on all occupational safety and environmental protection issues, and are familiar with and observe the operating instructions, especially the safety instructions contained herein.
- Personnel are trained and supervised to ensure that they follow safety measures, including the obligatory use of personal protective equipment.
- The product is only connected to pipelines that are depressurized at the time of connection.
- There is no tensile or compressive stress acting on the product connections.
- There is no residual risk at any point where high pressure could occur. High pressure can cause sudden failure in or damage to the lines and connections.
- Warning notices in the documentation for supplier modules are observed and integrated into the risk assessments in the workplace.

## Care of Stainless Steel

The stainless-steel components in Dixon Sanitary equipment are machined, welded and assembled by skilled craftsmen using manufacturing methods that preserve the corrosion-resistant quality of the stainless-steel. Retention of corrosion-resistant qualities under processing conditions requires regular attention to the precautions listed below.

1. Regularly check all electrical devices connected to the equipment for stray currents caused by improper grounding, damaged insulation or other defects. Corrosion: Pitting often occurs when stray currents encounter moist stainless-steel.
2. Never leave rubber mats, fittings, wrenches, etc. in contact with stainless-steel. Corrosion: Pitting or galvanic action. Objects retard complete drying, preventing air from reforming the protective oxide film. Galvanic corrosion occurs when two dissimilar metals touch when wet.
3. Immediately rinse equipment after use with warm water until the rinse water is clear. Clean the equipment (manual or CIP) as soon as possible after rinsing. Corrosion: discoloration, deposits, pitting. Product deposits often cause pitting beneath the particles.
4. Use only recommended cleaning compounds. Purchase chemicals from reputable and responsible chemical manufacturers familiar with stainless-steel processing equipment they continuously check the effects of their products on stainless-steel.
5. Use cleaning chemicals exactly as specified by the manufacturer. Do not use excessive concentrations, temperatures or exposure times. Corrosion: Pitting, discoloration, stress cracks. Permanent damage often occurs from excessive chemical concentrations, temperatures or exposure times.
6. For manual cleaning, use only soft non-metallic brushes, sponges or pads. Brush with the grain on polished surfaces to avoid scratching the surface. Corrosion: Pitting, scratches. Metal brushes or sponges will scratch the surface and promote corrosion over a period of time. Metal particles allowed to remain on a stainless-steel surface will cause pitting.
7. Use chemical bactericides exactly as prescribed by the chemical manufacturer in concurrence with the local health authority. Use the lowest permissible concentration, temperature and exposure time possible. Flush immediately after bacterial treatment. In no case should the solution be in contact with stainless-steel for more than 20 minutes. Corrosion: Protective film destroyed. Chlorine and other halogen bactericides can destroy the protective film. A few degrees increase in temperature greatly increases chemical activity and accelerates corrosion.
8. Regularly inspect the joints in pipelines. Be sure all connections are tight fitting without binding. Corrosion: Crevice corrosion. Small crevices caused by improperly seated gaskets will promote crevice corrosion. Stainless-steel under stress will develop stress cracking, especially in the presence of bactericides containing chlorine.
9. Regularly inspect equipment for surface corrosion (i.e. pitting deposits, stress cracks, etc.). If deposit or color corrosion is detected, remove it immediately using mild scouring powder and detergents. Rinse thoroughly and allow to air dry. Review production and cleaning procedures to determine the cause. Note: If corrosion is not removed, the protective film cannot be restored, and corrosion will continue at an accelerated rate.



## Technical Specifications

### Materials of Construction Technical Data

- product contact components: CF8M
- non-product contact components: refer to BOM for individual component materials

### Sealing Materials Technical Data

- product contact components: Virgin PTFE, 15% Glass reinforced PTFE, UHMW Polyethylene, 50% SS reinforced PTFE, 25% Carbon reinforced PTFE
- non-product contact components: refer to BOM for individual component materials.

### Line Pressure Technical Data

- max product line pressure: ½" – 2" max 1000PSI, 2.5" -4" max 800 PSI\*

### Surface Finish Technical Data

- product contact components: Ra ≤ 32
- optional finishes: electro-polished
- non-product contact components: As cast or Ra ≤ 63

### Connections

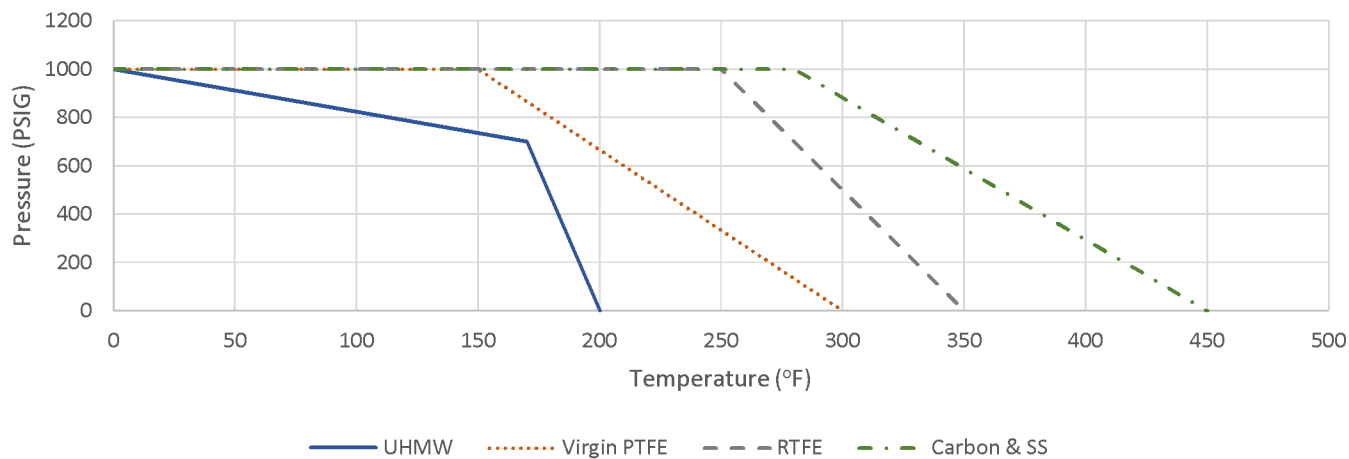
- clamp (Standard)
- others available upon request

### Cleaning Method

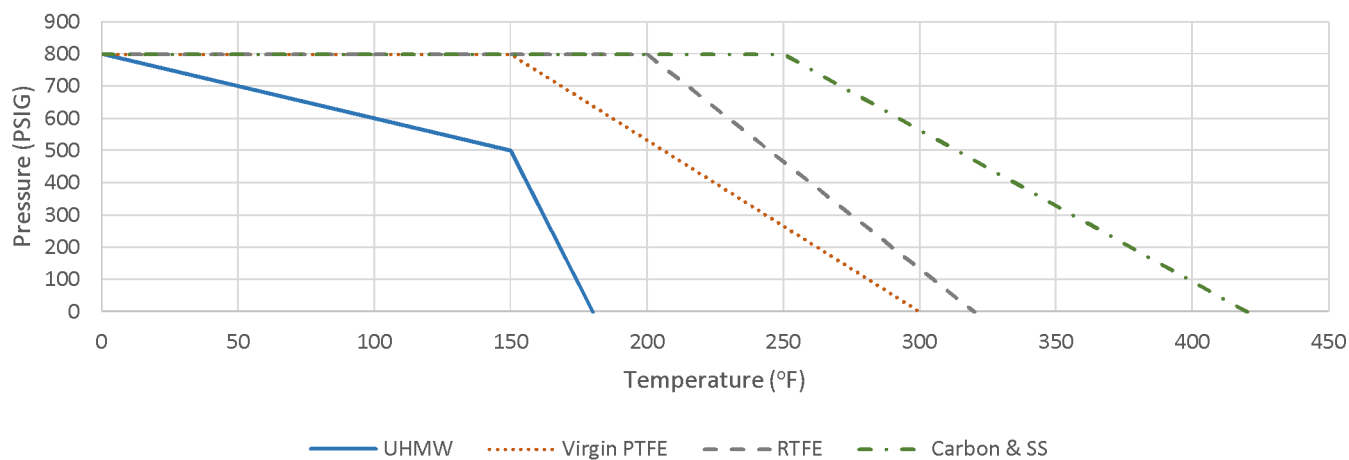
- COP – models: all sizes
  - Pressure could be limited based on temperature. See Pressure-Temperature Charts (Page 7)

## Pressure -Temperature Charts

0.50 in - 2.00 in



2.50 in - 4.00 in



## Technical Specifications

Information supplied based on water media at 68°F

Size	Part #	Weight (lbs.)	Assembly Torque (in. lbs.)	L-Ball Break Torque** (in. lbs.)	T-Ball Break Torque** (in. lbs.)	Flow Coefficient (Cv)		
						L-Ball	T-Thru	T-Branched
½"	BV3S*#F050C-A	3.6	160	62	50	3.5	5.3	3
¾"	BV3S*#F075C-A	4.3	160	75	60	10	14	8
1"	BV3S*#F100C-A	6.8	160	100	80	20	30	14
1½"	BV3S*#F150C-A	12.6	200	262	210	52	80	44
2"	BV3S*#F200C-A	21.6	212	535	425	100	150	83
2½"	BV3S*#F250C-A	33.7	221	1250	1000	148	176	108
3"	BV3S*#F300C-A	56.4	239	1625	1300	250	380	200
4"	BV3S*#R400C-A	85.4	266	1875	1500	450	650	350

\* Refer to seat material codes on page 7.

# L or T for ball configuration.

\*\* Torque is measured at the valve stem with virgin PTFE seats, 100 PSI differential pressure, ambient temperature and fluid with a specific gravity of 1.0. For varying conditions or other seat options, please contact Dixon Sanitary. When the valve is not factory actuated by Dixon Sanitary, an additional safety factor is recommended.

### Vacuum Testing (virgin PTFE seats)

Valve Size	Body Leakage (atm-cc/sec)	Helium Leak Rate Test
½" - 1½"	1 X 10 <sup>-9</sup>	10 <sup>-5</sup> Torr
2" - 4"	1 X 10 <sup>-7</sup>	10 <sup>-4</sup> Torr

### Seat Materials

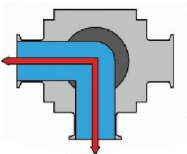
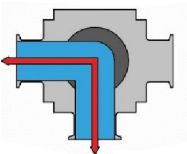
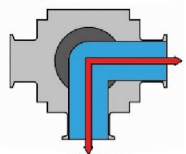
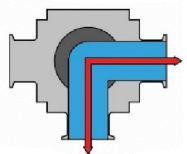
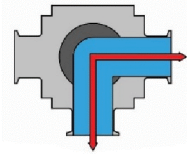
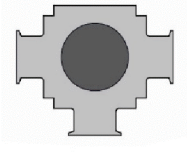
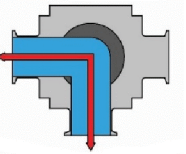
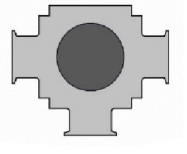
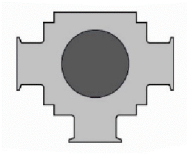
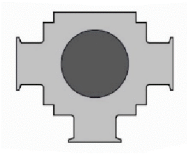
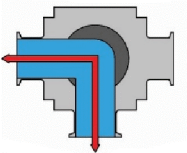
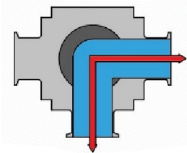
Code	Designation	Material	Applications
V	virgin PTFE	Virgin polytetrafluoroethylene	100% PTFE Our standard seat material. Ideal for most sanitary services. Specified for applications requiring a low co-efficient of friction. <b>Food Grade Material</b>
G	RTFE	15% Glass reinforced tetrafluoroethylene	15% Glass filled + 85% PTFE Slightly higher temperature and pressure rating than PTFE. Specified for applications requiring higher cycle life than PTFE. <b>Food Grade Material</b>
C	25% carbon PTFE	25% Carbon reinforced tetrafluoroethylene	25% Carbon +75% PTFE Specified for higher temperature pressure applications. Ideal for steam and thermal fluid applications. Higher cycle life than
S	stainless steel PTFE	50% Stainless steel filled tetrafluoroethylene	50% Stainless steel + 50% PTFE Specified for higher temperature pressure applications in a sanitary process. <b>Food Grade Material</b>
U	UHMW	Ultra-high molecular weight polyethylene	Specified for its low modulus of abrasion and minimal property degradation when exposed to moderate levels of radiation. Ideal for applications where fluorocarbons are not acceptable. <b>Food Grade Material</b>



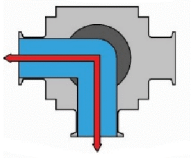
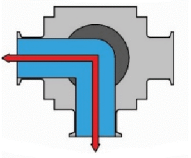
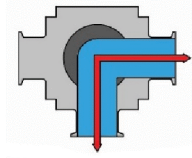
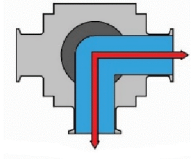
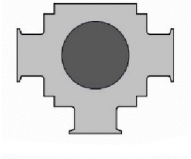
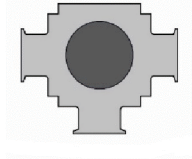
## Flow Path Options

# 2 Position

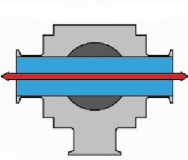
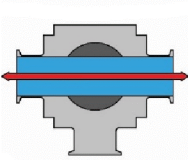
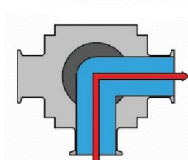
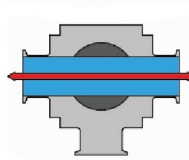
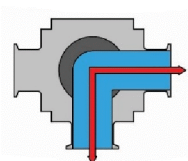
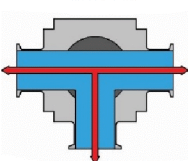
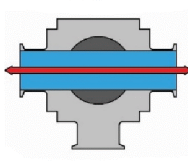
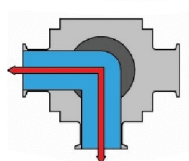
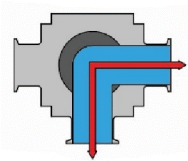
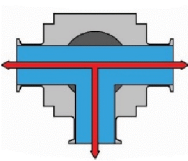
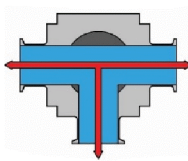
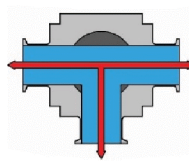
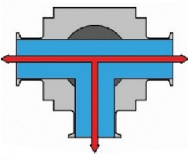
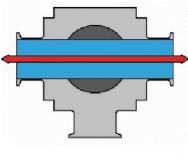
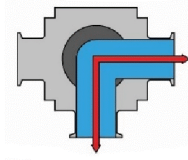
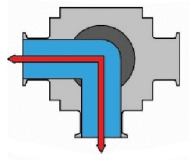
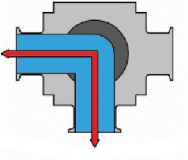
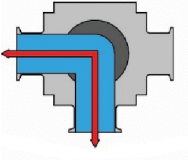
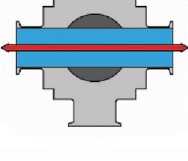
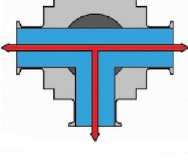
## 3-Way / L-Port / Spring Return Actuator

Code	BA	BB	BC	BD
Rotation	90 degrees	90 degrees	90 degrees	90 degrees
Air Rotation Direction	Counterclockwise	Clockwise	Clockwise	Counterclockwise
Spring/Fail Position				
Air Position				
Code	BE	BF		
Rotation	90 degrees	90 degrees		
Air Rotation Direction	Counterclockwise	Clockwise		
Spring/Fail Position				
Air Position				

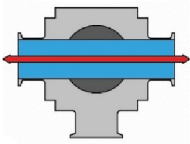
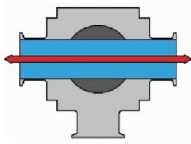
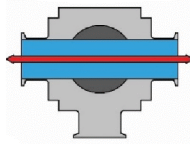
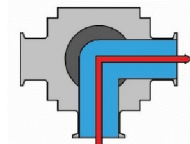
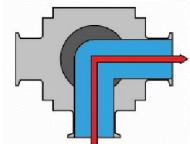
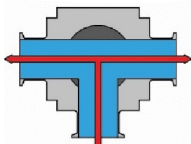
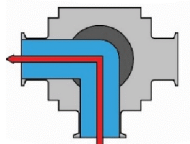
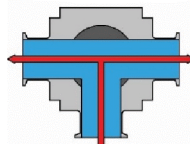
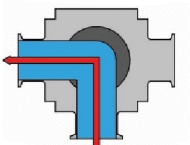
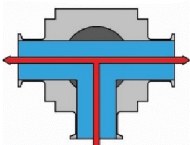
3-Way / L-Port / Double Acting or Electric Actuator

Code	BG	BH	BI
Rotation	90 degrees	90 degrees	90 degrees
Air Position			
Air Position			

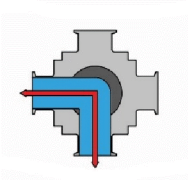
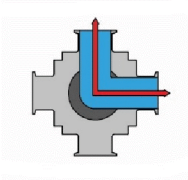
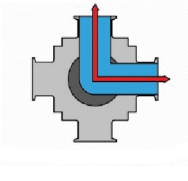
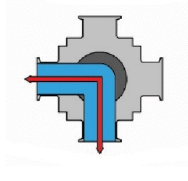
## 3-Way / T-Port / Spring Return Actuator

Code	BJ	BK	BL	BM
Rotation	90 degrees	180 degrees	90 degrees	90 degrees
Air Rotation Direction	Clockwise	Either	Counterclockwise	Counterclockwise
Spring/Fail Position				
Air Position				
Code	BN	BO	BP	BQ
Rotation	90 degrees	180 degrees	90 degrees	90 degrees
Air Rotation Direction	Clockwise	Either	Counterclockwise	Clockwise
Spring/Fail Position				
Air Position				
Code	BR	BS		
Rotation	90 degrees	90 degrees		
Air Rotation Direction	Clockwise	Counterclockwise		
Spring/Fail Position				
Air Position				

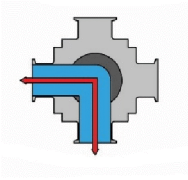
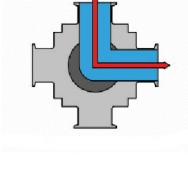
3-Way / T-Port / Double Acting or Electric Actuator

Code	BT	BU	BV	BW
Rotation	90 degrees	180 degrees	90 degrees	90 degrees
Air Position				
Air Position				
Code	BX			
Rotation	90 degrees			
Air Position				
Air Position				

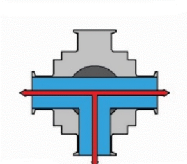
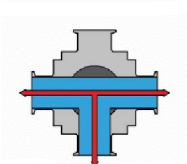
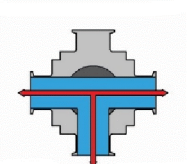
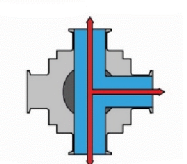
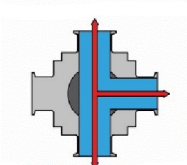
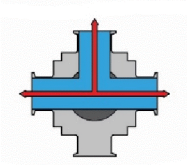
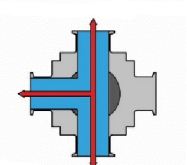
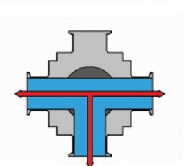
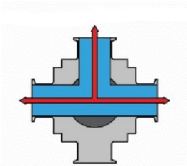
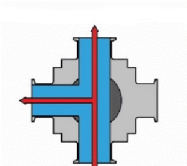
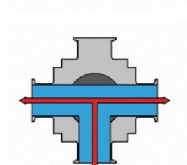
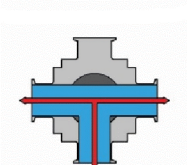
4-Way / L-Port / Spring Return Actuator

Code	BY	BZ
Rotation	180 degrees	180 degrees
Air Rotation Direction	Either	Either
Spring/Fail Position		
Air Position		

4-Way / L-Port / Double Acting or Electric Actuator

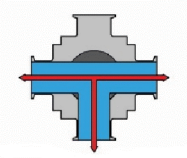
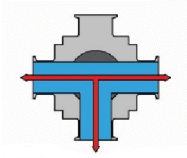
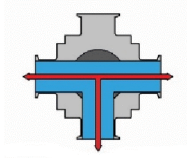
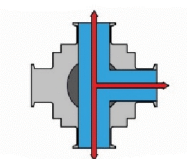
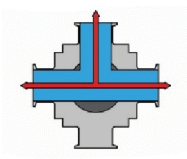
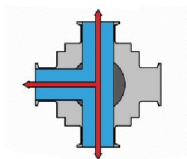
Code	CA
Rotation	180 degrees
Air Position	
Air Position	

4-Way / T-Port / Spring Return Actuator

Code	CB	CC	CD	CE
Rotation	90 degrees	180 degrees	90 degrees	90 degrees
Air Rotation Direction	Counterclockwise	Either	Clockwise	Clockwise
Spring/Fail Position				
Air Position				
Code	CF	CG		
Rotation	180 degrees	90 degrees		
Air Rotation Direction	Either	Counterclockwise		
Spring/Fail Position				
Air Position				

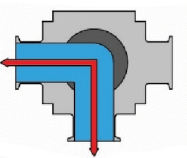
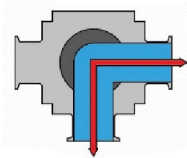
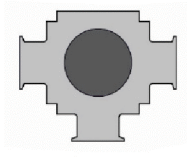
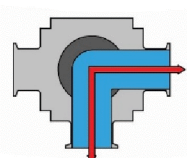
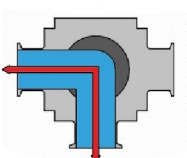
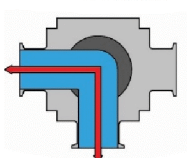
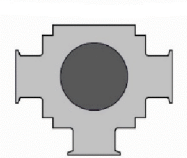
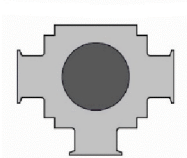
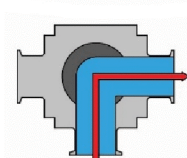


## 4-Way / T-Port / Double Acting or Electric Actuator

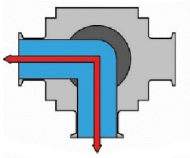
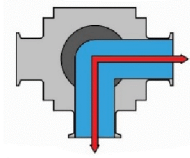
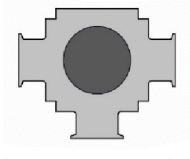
Code	CH	CI	CJ
Rotation	90 degrees	180 degrees	90 degrees
Air Position			
Air Position			

## 3 Position

### 3-Way / L-Port / Spring Return Actuator

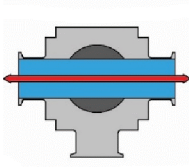
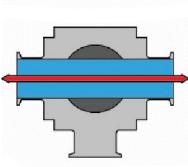
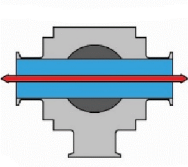
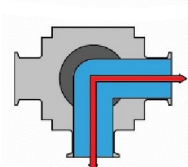
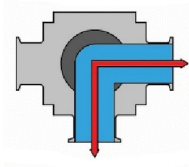
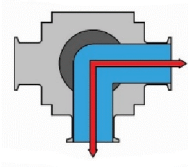
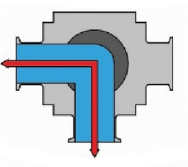
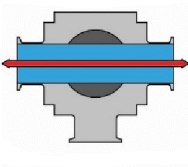
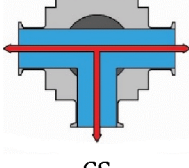
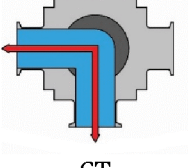
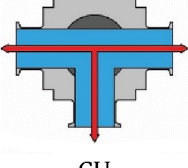
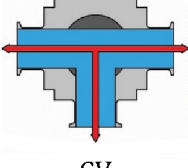
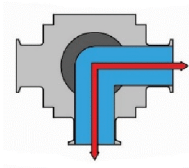
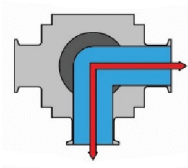
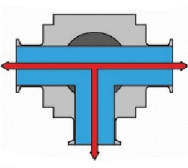
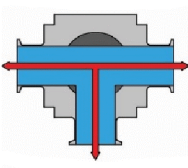
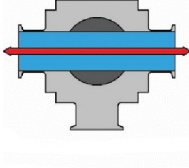
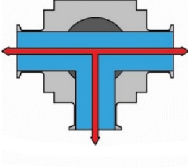
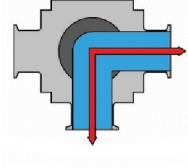
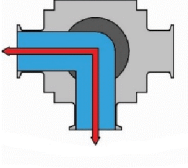
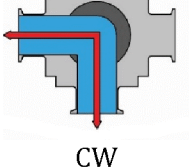
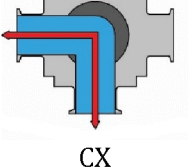
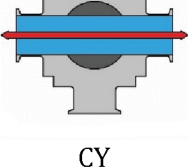
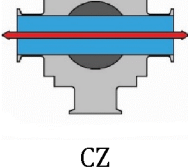
Code	CK	CL	CM
Rotation	180 degrees	180 degrees	180 degrees
Air Rotation	Either	Either	Either
Direction	Either	Either	Either
Return Position	Either	Either	End
Spring/Fail Position			
Air Position			
Air Position			

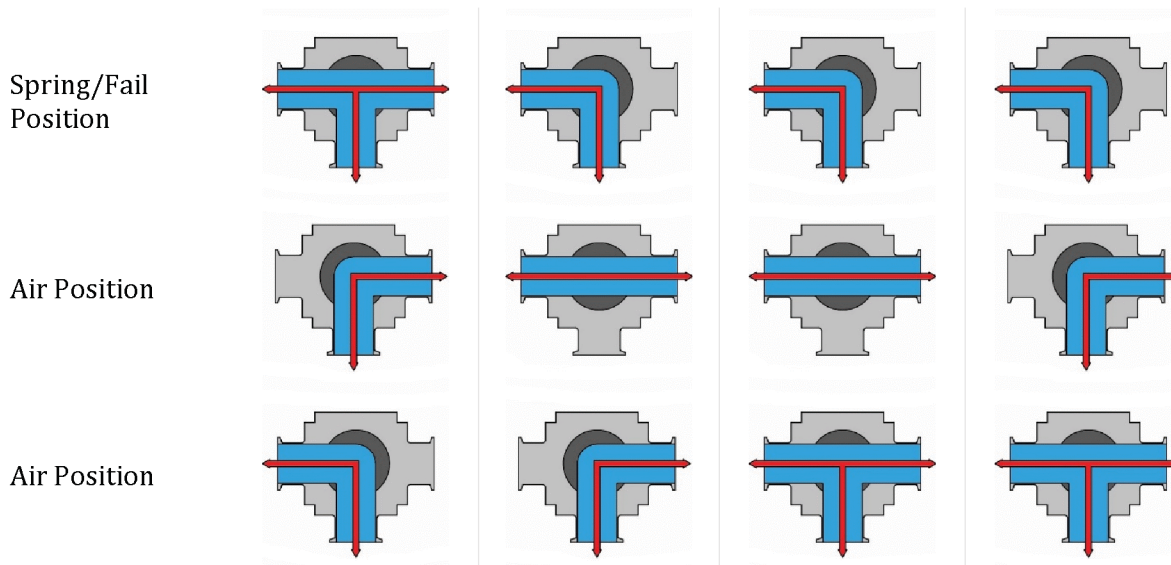
3-Way / L-Port / Double Acting or Electric Actuator

Code	CN
Rotation	180 degrees
Air Position	
Air Position	
Air Position	

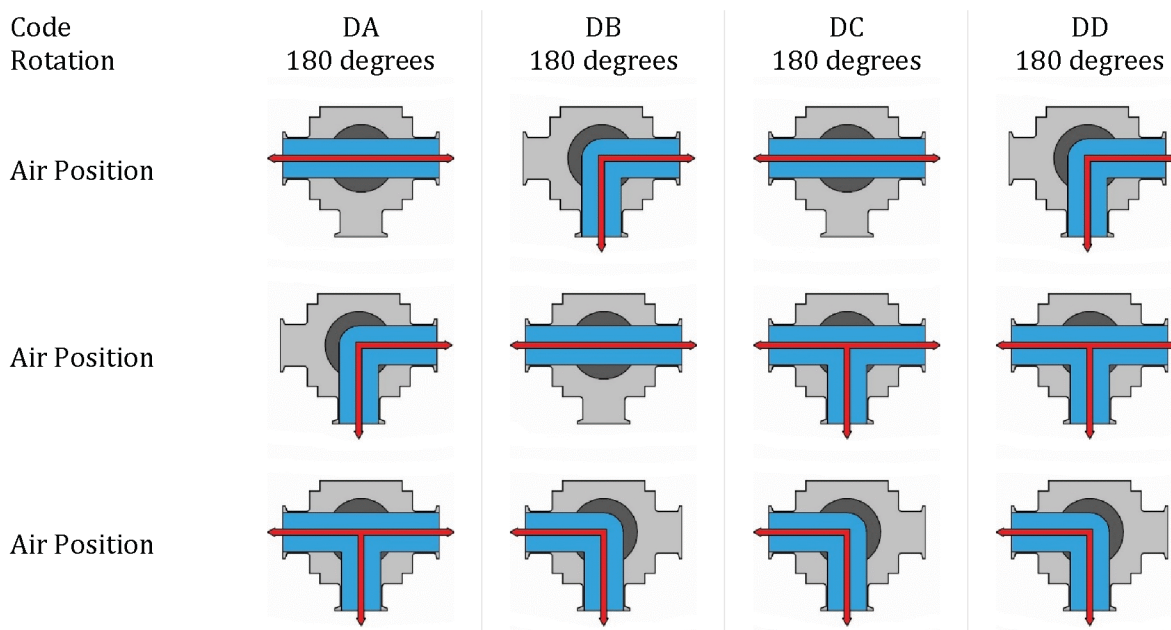


## 3-Way / T-Port / Spring Return Actuator

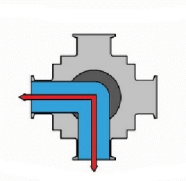
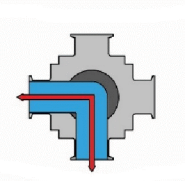
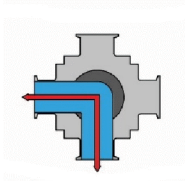
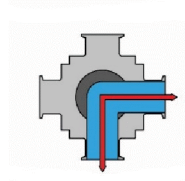
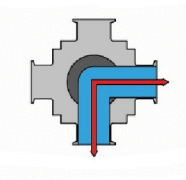
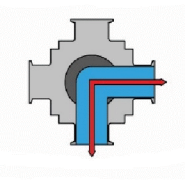
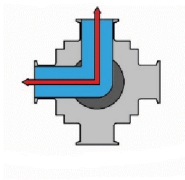
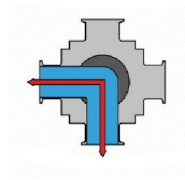
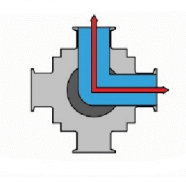
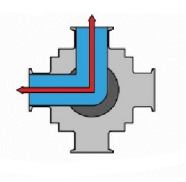
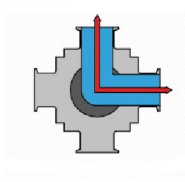
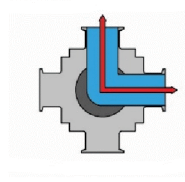
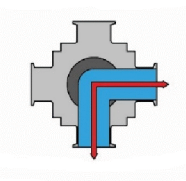
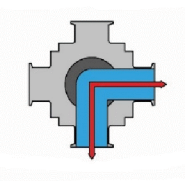
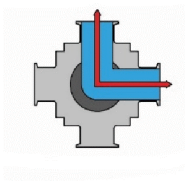
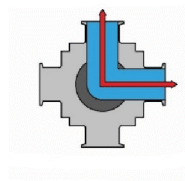
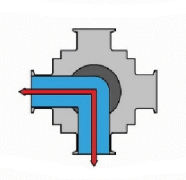
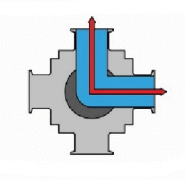
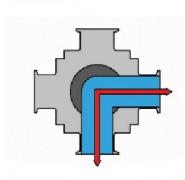
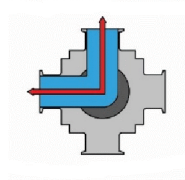
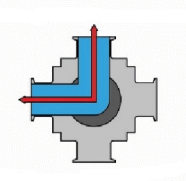
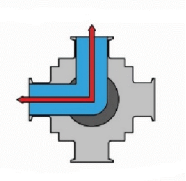
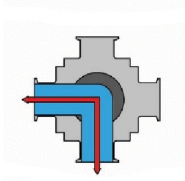
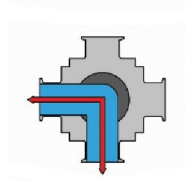
Code	CO	CP	CQ	CR
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Clockwise	Both	Counterclockwise	Both
Direction				
Return Position	End	Center	End	Center
Spring/Fail Position				
Air Position				
Air Position				
Code	CS	CT	CU	CV
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Counterclockwise	Clockwise	Counterclockwise	Clockwise
Direction				
Return Position	End	End	End	End
Spring/Fail Position				
Air Position				
Air Position				
Code	CW	CX	CY	CZ
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Both	Clockwise	Both	Counterclockwise
Direction				
Return Position	Center	End	Center	End



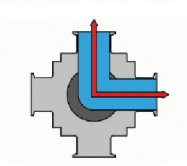
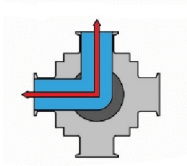
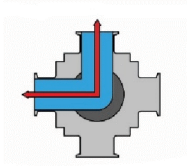
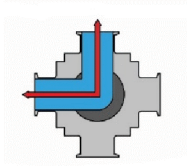
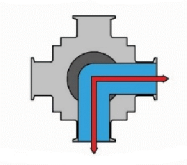
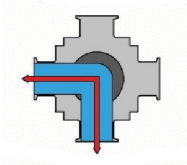
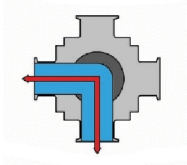
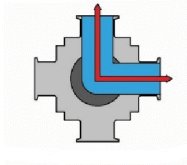
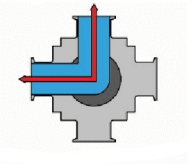
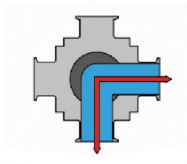
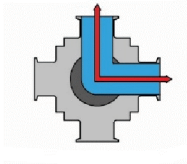
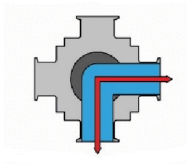
### 3-Way / T-Port / Double Acting or Electric Actuator



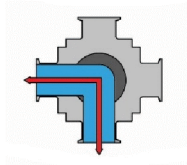
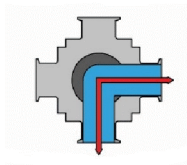
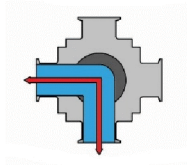
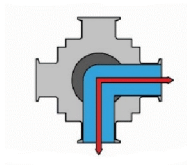
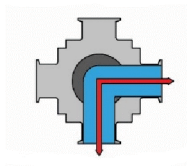
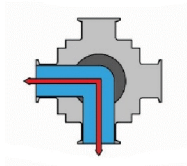
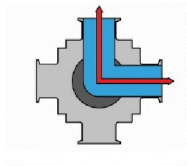
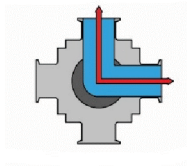
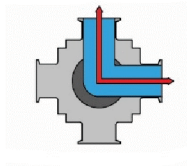
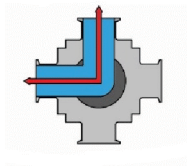
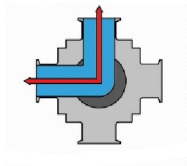
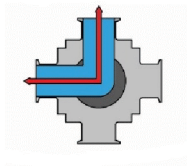
## 4-Way / L-Port / Spring Return Actuator

Code	DE	DF	DG	DH
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Counterclockwise	Both	Clockwise	Both
Direction				
Return Position	End	Center	End	Center
Spring/Fail Position				
Air Position				
Air Position				
Code	DI	DJ	DK	DL
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Clockwise	Counterclockwise	Clockwise	Counterclockwise
Direction				
Return Position	End	End	End	End
Spring/Fail Position				
Air Position				
Air Position				
Code	DM	DN	DO	DP
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Both	Counterclockwise	Both	Clockwise
Direction				
Return Position	Center	End	Center	End



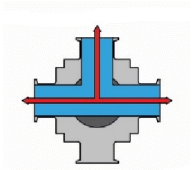
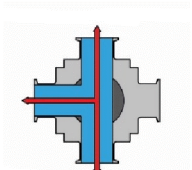
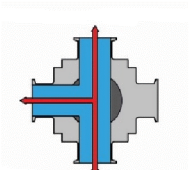
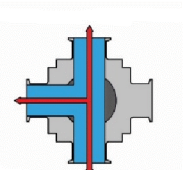
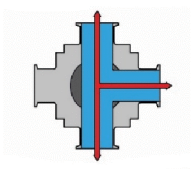
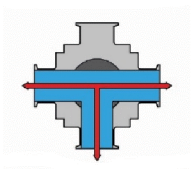
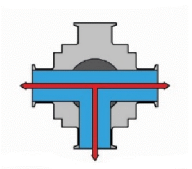
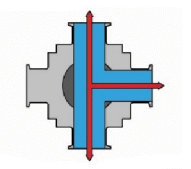
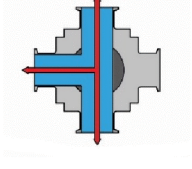
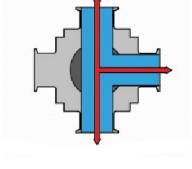
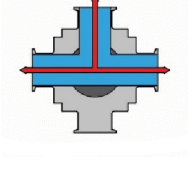
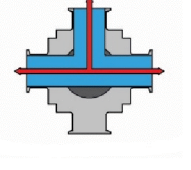
Spring/Fail Position				
Air Position				
Air Position				

4-Way / L-Port / Double Acting or Electric Actuator

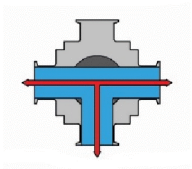
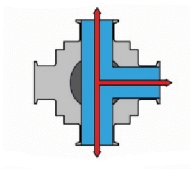
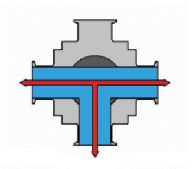
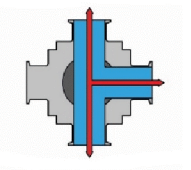
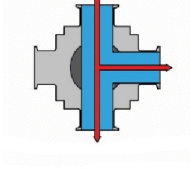
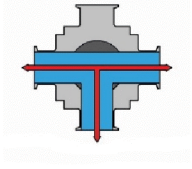
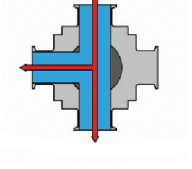
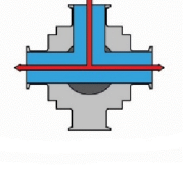
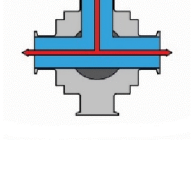
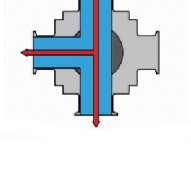
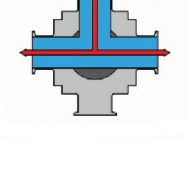
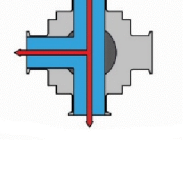
Code Rotation	DQ 180 degrees	DR 180 degrees	DS 180 degrees	DT 180 degrees
Air Position				
Air Position				
Air Position				

## 4-Way / T-Port / Spring Return Actuator

Code	DU	DV	DW	DX
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Counterclockwise	Both	Clockwise	Both
Direction				
Return Position	End	Center	End	Center
Spring/Fail Position				
Air Position				
Air Position				
Code	DY	DZ	CA	CB
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Clockwise	Counterclockwise	Clockwise	Clockwise
Direction				
Return Position	End	End	End	End
Spring/Fail Position				
Air Position				
Air Position				
Code	CC	CD	CE	CF
Rotation	180 degrees	180 degrees	180 degrees	180 degrees
Air Rotation	Both	Counterclockwise	Both	Clockwise
Direction				
Return Position	Center	End	Center	End

Spring/Fail Position				
Air Position				
Air Position				

4-Way / T-Port / Double Acting or Electric Actuator

Code Rotation	CG 180 degrees	CH 180 degrees	CI 180 degrees	CJ 180 degrees
Air Position				
Air Position				
Air Position				

## Installation & Start-Up

The following should be performed upon receiving the product and prior to installation and use of the product. It is important that all the following processes and procedures are carefully followed and adhered to. Dixon® is not responsible for any damage that occurs during the unpacking or installation process.

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### Unpacking

Carefully unpack all the parts of the ball valve and inspect each part for any damage that may have occurred during shipment. Report any damage to the carrier immediately. The ports on the valve are protected with a plastic cover. If any covers are missing or damaged, inspect the ports on the valve thoroughly for any damage. Please add this manual to the plant maintenance files for future use and reference. Additional information for the valve can be found at [dixonvalve.com](http://dixonvalve.com).

The product consists of the following components:

Item #	Description
1	Valve
2	Handle

---

### Tools Needed

The following tools will be required for any maintenance of the product:

- set of metric box wrenches
- Torque wrench
- Jax® PurGel Klear lubricating grease
- O-ring pick tool
- flathead screw driver

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### Welding

- For equipment delivered with weld end connections, any rubber or plastic components MUST be removed from the equipment prior to welding. (See disassembly instructions for proper removal of such components.)
- Follow all necessary safety precautions, check lists and standard procedures prior to performing any welding on the equipment.
- Weld the equipment into the process line, being sure to follow and comply with appropriate industry welding procedures and standards. For equipment used in food, beverage or dairy applications that carries 3A® certification, see 3A® standard 00-01-2018 section E1.1.1 for proper procedure and requirements.
- Re-assemble the equipment per the assembly section of this manual.
- Check the equipment for proper operation and perform leak test if necessary.



## Installation & Start-Up

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### Function Testing

- Check visually to ensure that the equipment is not leaking.
- Any defective seal that could have been damaged during disassembly or assembly must be replaced.
- Check all equipment components for any signs of damage and replace damaged components.
- Ensure that all screw fittings are tight if applicable.
- Ensure that any pneumatic hose connections are free of leaks if applicable.
- Confirm all pipes and fittings connected to the equipment permitted for use are in the intended pressure range.
- Confirm all electrical installations are protected sufficiently and in accordance with appropriate safety standards if applicable.
- Check that the maximum pressure indicated on the equipment or in the specifications section of this manual has been complied with.

---

### Installation Orientation

Equipment must be installed in the proper orientation to ensure proper functionality and cleanability. Please refer to the following instructions below for proper installation.

#### Valve Installation:

- Valves should not be installed between ferrules with damaged faces.
- Tubing should also be checked for proper alignment.
- Ball valves should never be used to align improperly positioned tube.
- The distance between ferrules should be checked to assure proper clearance of valve installation.
- For convenience in packaging and storage, some valves are shipped partially assembled including body assembly and handle assembly. (Refer to assembly and disassembly instructions.)
- The valve should be cycled to assure no binding or interference is taking place.
- Install adequate line supports to prevent strain and stress on fittings, valves, and connections.
- Support straight runs of tubing at least every ten feet.
- Install supports on both sides of valves as close to the connection as possible.
- Install supports at each change of line direction.
- For lines penetrating walls or floors, allow a minimum of 1" clearance for expansion and contraction.
- Align valves and gaskets such that they are centered with the ferrules faces.
- Clamp ends must be parallel in all planes and on centerline.
- **CAUTION:** Failure to insure line ends are parallel and centered could prevent proper sealing. Improperly sealed valves will leak.
- Tighten all standard clamp connections to 25 in-lbs and high pressure bolted clamps to 20 ft-lbs.
- After placement in the line, test the operation of the valve.

#### Valve installation for other end connection types:

- Follow the same guidelines as described above.
- **CAUTION:** Do not attempt to butt-weld a valve into a line without first removing the valve body subassembly. Dissipate heat away from the valve body when welding.



## General Maintenance

To ensure proper operation of your Dixon® equipment, proper maintenance must be performed at regular intervals. To prevent damage, check all fitting connections and screw connections for any loosening of the connections during equipment operation. Maintain adequate spare parts stock for all replacement components on the piece of equipment. Please refer to the repair kits section of the manual for complete component part numbers and kit part numbers.

---

### Servicing Intervals

Recommended intervals for one shift operation would be 3 months. However, only the user/owner can determine the appropriate service intervals as the length between service intervals is dependent on the following parameters:

- duration of use per day – number of cycles
- type of product
- product temperature
- product viscosity
- cleaning agent
- type of cleaning (CIP/SIP/COP)

---

### Lubrication

Please use the following chart below for proper grease type for varying component materials. DO NOT use mineral or animal-product-based greases. Check all visible seals for any signs of damage and replace as necessary. For sliding surfaces, use Jax® PurGel Klear food grade grease. If a different grease is used other than what is specified in this manual, there is risk of damaging the seals. Lubrication is only required when the equipment is being reassembled after servicing.

Seal Material	Grease Type
PTFE	JAX® PurGel Klear
25% Carbon PTFE	JAX® PurGel Klear
50% SS PTFE	JAX® PurGel Klear
15% Glass PTFE	JAX® PurGel Klear
UHMW	Do not grease

## General Maintenance

### Inspection

Inspection of the components listed below should be done during regular servicing intervals. Before removing the equipment from the process line, please take care to do the following:

- Clean the process line completely to remove any product that may be harmful if contacting a person.
- Prior to loosening the ferrule clamp bolts (with valve in the open position):
  - WARNING**

 To prevent personal injury:
    - Depressurize the piping at the valve.
    - Drain tubing run as much as possible.
    - Cycle the valve to drain any trapped fluid from the body cavity. The valve should be left fully open or fully closed.
    - Vent line to relieve any pressure.
- Close valve, then:
  - WARNING**

 To prevent personal injury:
- Disconnect all air and electrical power from the actuator, solenoid valve, and switch box, (if applicable) and tag for reinstallation.
- Remove the actuator, solenoid valve, and switch box, if any.
- Loosen clamps to decompress valve gasket seals.
- Secure necessary lifting equipment to valve assembly if necessary
- Remove clamps and valve from between ferrule.
- Close any isolation valves on either side of the equipment being serviced.
- Once the equipment has been removed from the line, cap the lines that were connected to the piece of equipment being serviced to prevent any foreign material from entering the line.

#### Components to be inspected:

- item 1 **Valve seats and seals**
- item 2 **Valve ball**
- item 3 **Valve ends**

Any components that show signs of severe wear or damage should be replaced during the scheduled maintenance time for the equipment. Please refer to the assembly and disassembly section of this manual for proper instructions on removing and replacing any worn or damaged components. Replacement components and repair kits can be found in the BOM or repair kits section of this manual.

### Cleaning

**IMPORTANT:** Before operating the equipment during formal production, please follow the guidelines listed below to ensure that your equipment is clean and ready for service.

- Ensure that the equipment is installed in a proper orientation to allow the equipment to be cleaned and drained properly. Reference the installation and startup section of the manual for orientation guidelines.
- Flush the equipment with an appropriate cleaning agent to remove any residue that may be on the equipment from shipping.

**IMPORTANT: DO NOT** use cleaning agents that will attack stainless-steel or the elastomers that were supplied with the valve. If you are unsure what elastomer is used in the valve, reference the part number key in this manual to make the determination.
- Follow any MSDS instructions for proper use or handling of cleaning agents. 

**WARNING**
- Flush the equipment sufficiently to remove any soiling from the product contact components. Depending on the process, there may be varying amounts of soiling. Cleaning times and cleaning agent concentrations will vary depending on the product being processed. It is the responsibility of the operator to determine and adjust these cleaning specification:

- The equipment should not be allowed to sit with product present in it for extended periods of time. Equipment should be cleaned immediately after processing is complete.
- 

### **Manual Cleaning (COP)**

1. Refer to the disassembly section of the manual and follow instructions to remove all product contact components.
  2. Inspect the product contact components of the equipment for any signs of possible damage. Replace components as necessary. (See the equipment BOM in this manual for replacement component part numbers.)
  3. Clean all surfaces of the product contact components by manually brushing in a bath of cleaning solution (acid detergents or simple alkaline soda type detergents).
  4. After cleaning, rinse all components thoroughly with water.
  5. Refer to the assembly section of the manual and follow instructions to properly reassemble the equipment.
-

## Assembly and Disassembly

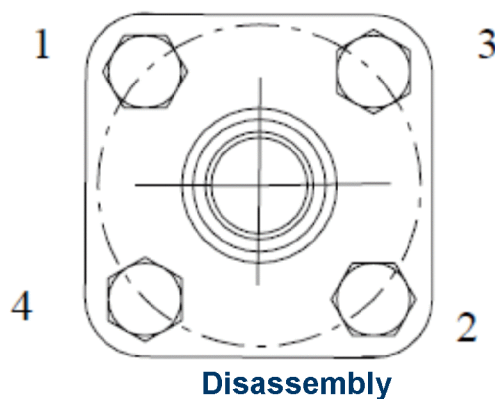
To ensure quality operation of your Dixon® equipment, the equipment must be disassembled and assembled properly to prevent equipment damage during operation. Please follow the instructions contained in this manual carefully and be sure to follow any safety warnings contained herein. If any questions should arise during the assembly or disassembly process that are not addressed in this manual, please feel free to contact Dixon® – Sanitary Division at 800.789.1718.

### Assembly

1. Before reassembling the valve, examine the parts and repair or replace damaged or worn parts. **Dixon** recommends using new seats and seals at each assembly.
2. Insert the stem #13 (with O-ring #7) and PTFE thrust washer #6 into the body #1 and through the stem bore in the body.
3. Install PTFE stem packing rings #8 over the stem and into the body bore.
4. Install the gland ring #9 and two spring washers #10 such that the lower washer's concave side is facing upward and the top washer is opposite.
5. Lubricate the gland nut threads #17 with appropriate food grade anti-seize. Install and tighten the gland to compress the packing. The gland should be tightened just until snug.
6. Lubricate the stem threads with an anti-galling lubricant.
7. Install the 3<sup>rd</sup> washer #10 over the stem (concave side is facing upward). Place the handle (#14 or #14 A, B) on the stem such that the handle is parallel to a line on the top of the valve stem..
8. Install the handle nut #12.
9. Position the stem tang parallel to the large openings in the body (#1). Insert the ball #3 into the body. Slide the stem tang into the ball slot, being careful not to nick or scratch the ball.
10. Rotate the stem 90 degrees.
11. Install valve seats #4, #19 and #5 body seals into the body.
12. Place #20 plug into the #4 seat..
13. For valves with Clamp end caps, insert the end caps (#2 and 2A) and cover plate (#18) onto the body.
14. For valves with end caps welded into piping, spring end caps outward and slide body between them. Release spring force from end caps to allow end cap flanges to sit flush against the body.
15. Install bolts #16 with washers #15. Install and hand-tighten bolts.
16. Before tightening bolts make sure the ball ports, seats and ends are all in alignment.
17. Wrench tighten bolts in sequence shown on (Page 14) until assembly torque (Page 8) is reached.
18. Remove the handle and finish tightening the gland nut until break torque (Page 8) is reached. Measure stem breakaway torque for several cycles to verify repeatability. (Over-tightening significantly raises stem torque.) Re-assemble handle.
19. If the valve has Clamp end caps, reinstall the valve into the piping using appropriate gaskets and clamps.
20. If practical, leak test the seats, gaskets, and packing.
21. Dixon Sanitary recommends replacement of any valve exposed to fire.

### TABLE 1: TIGHTENING PROCEDURE FOR END CONNECTIONS

1. Hand-tighten fasteners.
2. Wrench-tighten each fastener in the sequence illustrated until lock washers begin to compress.
3. Continue tightening bolts 1/8 turn until recommended assembly torque value (Page 8 ) is achieved.
4. Confirm valve torque at stem.



For valves with Clamp end connections:

1. Loosen and remove the clamps connecting the valve to the piping. Then, remove the valve and gaskets.
2. Loosen and remove the hex bolts and lock washers (#16 and #15)..
3. Pull the end caps (#2, 2A) and cover plate (#18) free from the body.

For valves with welded end connections:

4. The valve can be disassembled with the body subassembly lifted out from the end fittings.
5. Remove the body seats #14, #19, #5 body seals and plug #20.
6. Turn the stem to swing the ball #3 out of the large port in body #1, taking care not to nick or scratch the ball.
7. Loosen and remove the handle nut #12 from the stem. Remove the handle (#14, #14A, #14B and washer #10.
8. Unscrew and remove the gland nut #17 and two spring washers #10.
9. Push the stem into the body and out an open end of the body. Remove stem O-ring #7 and thrust washer #6.
10. Remove the gland ring #9 and PTFE stem packing rings #8.
11. Remove the stopper #11 from the body.

## Repair Kits

To ensure proper operation of your Dixon® equipment, proper maintenance must be performed at regular intervals. To prevent damage and improper operation, use only genuine replacement parts and kits offered by Dixon® to maintain the integrity of the equipment. Make sure the parts are properly matched to the series, model, serial number and revision level of the equipment. Please see the list of kits below offered for this piece of equipment:

Repair Kit contains:

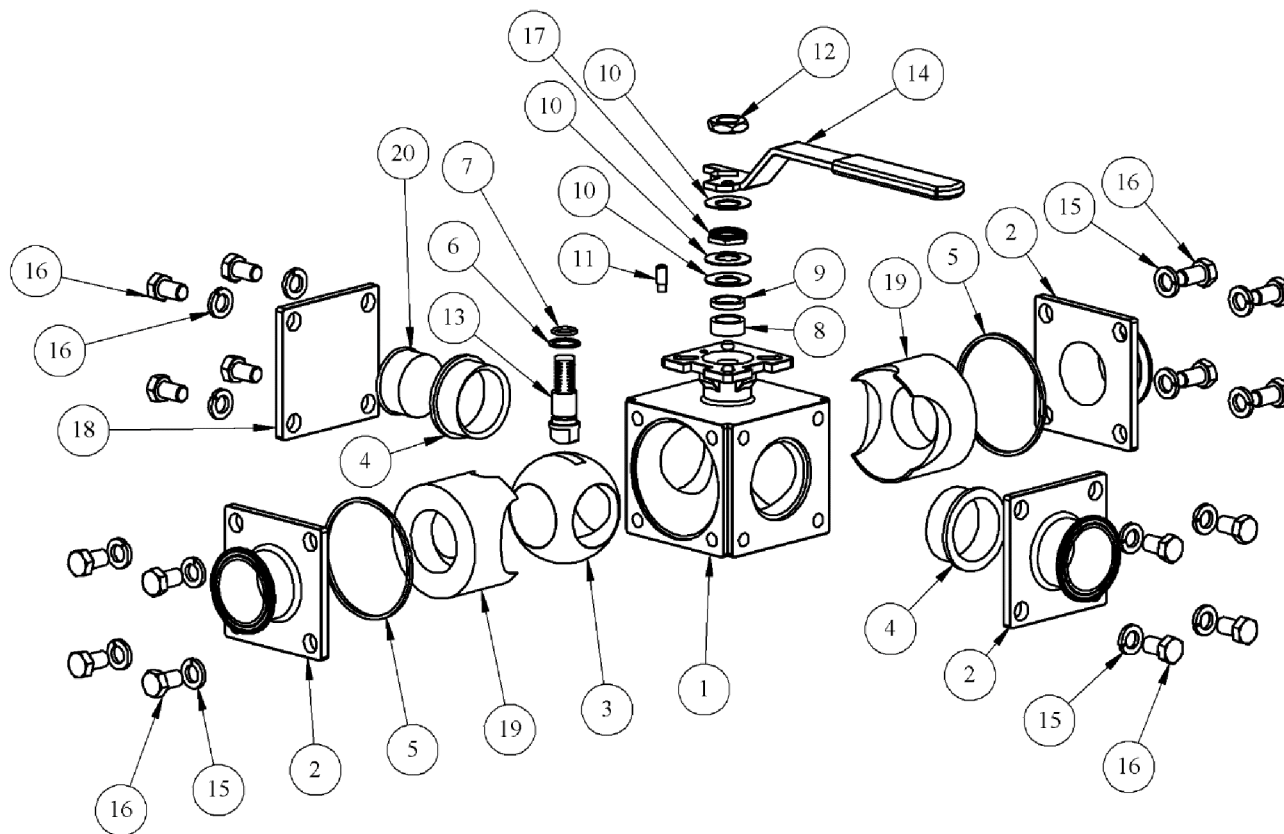
#19 (2) seats (encapsulated)  
#4 (2) seats (encapsulated)  
#20 (1) plug  
#6 (1) thrust washer  
#7 (1) O-ring  
#8 (3) stem packings (1 for ½" valve and 2 for ¾" valve)  
#5 (2) body seals

Valve Size	Repair Kit Part #
½"	BV-3S*RK050
¾"	BV-3S*RK075
1"	BV-3S*RK100
1½"	BV-3S*RK150
2"	BV-3S*RK200
2½"	BV-3S*RK250
3"	BV-3S*RK300
4"	BV-3S*RK400

Code *	Description
V	virgin PTFE
G	RTFE
C	25% carbon PTFE
S	stainless rein. PTFE
U	UHMW

## Bill of Materials

**1/2" to 2"**

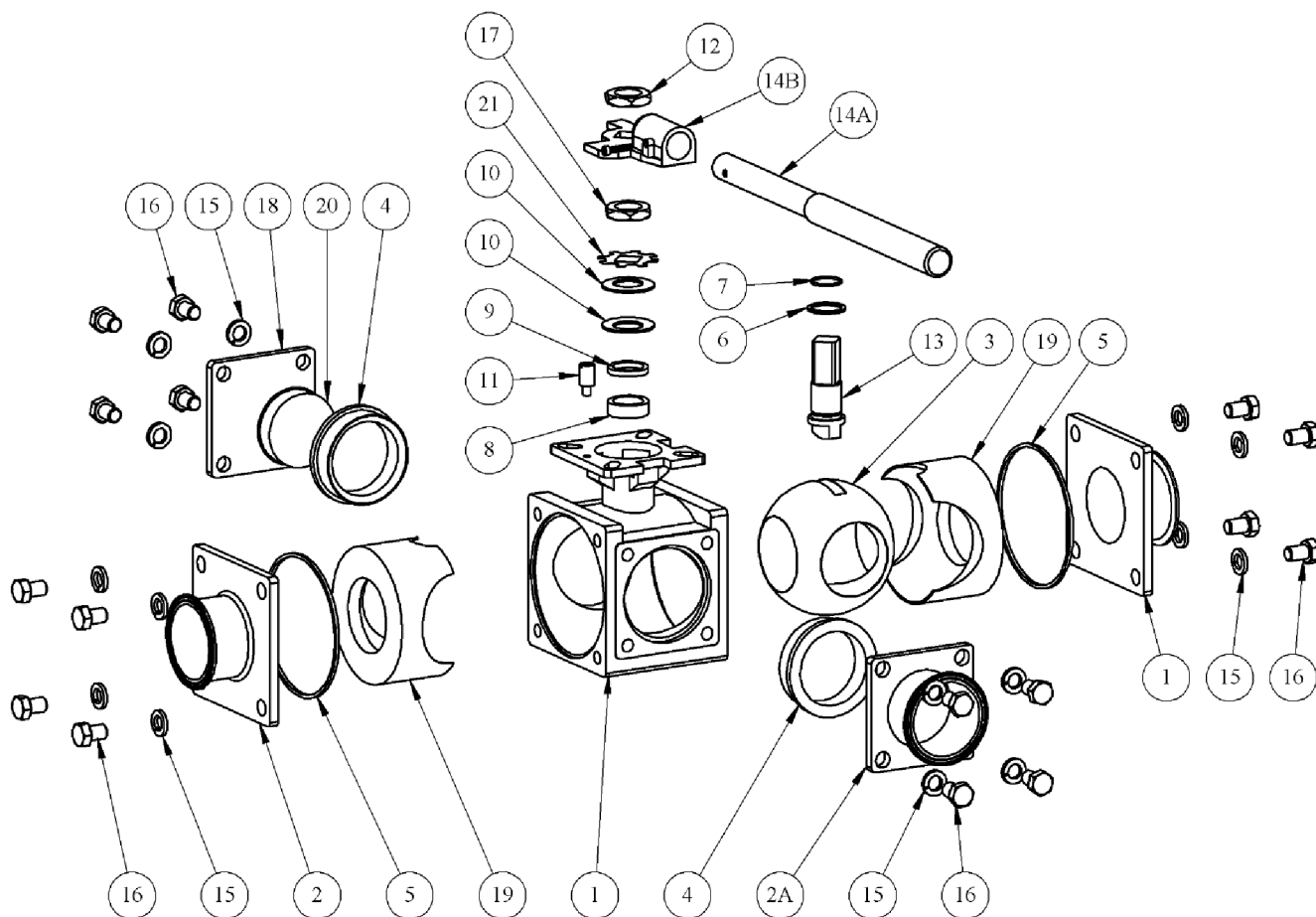


Item	BV2C Size	Part Number	Description	Material	Quantity	
					L-Port	T-Port
1	0.5"	BV3S-1050	body	CF8M	1	1
	0.75"	BV3S-1075	body	CF8M	1	1
	1"	BV3S-1100	body	CF8M	1	1
	1.5"	BV3S-1150	body	CF8M	1	1
	2"	BV23S-1200	body	CF8M	1	1
2	0.5"	BV-3SVFCE050	triclamp end	CF8M	3	3
	0.75"	BV-3SVFCE075	triclamp end	CF8M	3	3
	1"	BV-3SVFCE100	triclamp end	CF8M	3	3
	1.5"	BV-3SVFCE150	triclamp end	CF8M	3	3
	2"	BV-3SVFCE200	triclamp end	CF8M	3	3
3	0.5"	BV-3SVFLB050	L-port ball	CF8M	1	-
		BV-3SVFTB050	T-port ball	CF8M	-	1
	0.75"	BV-3SVFLB075	L-port ball	CF8M	1	-
		BV-3SVFTB075	T-port ball	CF8M	-	1
	1"	BV-3SVFLB100	L-port ball	CF8M	1	-
		BV-3SVFTB100	T-port ball	CF8M	-	1
	1.5"	BV-3SVFLB150	L-port ball	CF8M		

		BV-3SVFTB150	T-port ball	CF8M	-	1
	2"	BV-3SVFLB200	L-port ball	CF8M	1	-
		BV-3SVFTB200	T-port ball	CF8M	-	1
4	all	-see repair kits-	small encapsulated seat	-see repair kits-	2	2
5	all	-see repair kits-	body seal	-see repair kits-	2	2
6	all	-see repair kits-	thrust washer	-see repair kits-	1	1
7	all	-see repair kits-	stem O-ring	FKM	1	1
8	all	-see repair kits-	stem packing	-see repair kits-	3	3
9	all	-see repair kits-	gland ring	316 SS	1	1
10	all	-see repair kits-	bevel washer	301 SS	3	3
11	all	-see repair kits-	stop pin	304 SS	1	1
12	all	-see repair kits-	nut	304 SS	1	1
13	all	-see repair kits-	stem	304 SS	1	1
14	all	-see repair kits-	handle	304 SS / Vinyl	1	1
15	all	-see repair kits-	lockwasher	304 SS	16	16
16	all	-see repair kits-	bolt	304 SS	16	16
17	0.5"	BV-3SVF17050	stem packing nut	304 SS	1	1
	0.75"	BV-3SVF17075	stem packing nut	304 SS	1	1
	1"	BV-3SVF17100	stem packing nut	304 SS	1	1
	1.5"	BV-3SVF17150	stem packing nut	304 SS	1	1
	2"	BV-3SVF17200	stem packing nut	304 SS	1	1
18	0.5"	BV-3SVRCP050	cover plate	CF8M	1	1
	0.75"	BV-3SVRCP075	cover plate	CF8M	1	1
	1"	BV-3SVRCP100	cover plate	CF8M	1	1
	1.5"	BV-3SVRCP150	cover plate	CF8M	1	1
	2"	BV-3SVRCP200	cover plate	CF8M	1	1
19	all	-see repair kits-	large encapsulated seat	-see repair kits-	2	2
20	all	-see repair kits-	plug	-see repair kits-	1	1



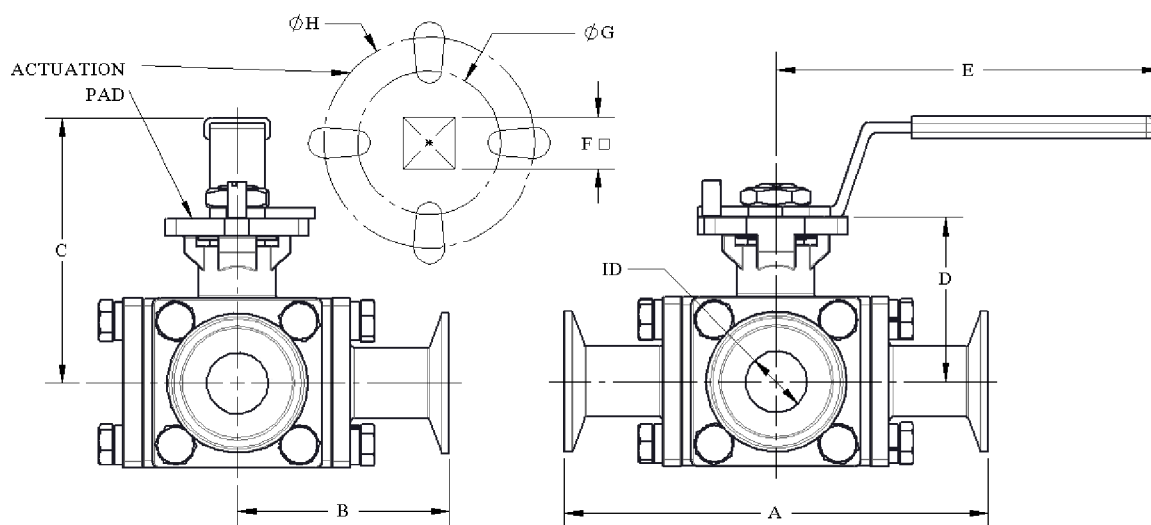
## 2.5" to 4"



Item	BV2C Size	Part Number	Description	Material	Quantity	
					L-Port	T-Port
1	2.5"	BV3S-1250	body	CF8M	1	1
	3"	BV3S-1300	body	CF8M	1	1
	4"	BV3S-1400	body	CF8M	1	1
2	2.5"	BV-3SVFCL250	triclamp end	CF8M	2	2
	3"	BV-3SVFCL300	triclamp end	CF8M	2	2
	4"	BV-3SVFCL400	triclamp end	CF8M	2	2
2A	2.5"	BV-3SVFCS250	triclamp end	CF8M	1	1
	3"	BV-3SVFCS300	triclamp end	CF8M	1	1
	4"	BV-3SVFCS400	triclamp end	CF8M	1	1
3	2.5"	BV-3SVFLB300	L-port ball	CF8M	1	-
		BV-3SVFTB300	T-port ball	CF8M	-	1
	3"	BV-3SVFLB300	L-port ball	CF8M	1	-
		BV-3SVFTB300	T-port ball	CF8M	-	1
	4"	BV-3SVRLB400	L-port ball	CF8M	1	-
		BV-3SVRTB400	T-port ball	CF8M	-	1
4	all	-see repair kits-	small encapsulated seat	-see repair kits-	-	-

5	all	-see repair kits-	body seal	-see repair kits-	2	2
6	all	-see repair kits-	thrust washer	-see repair kits-	1	1
7	all	-see repair kits-	stem O-ring	FKM	1	1
8	all	-see repair kits-	stem packing	-see repair kits-	3	3
9	all	-see repair kits-	gland ring	316 SS	1	1
10	all	-see repair kits-	bevel washer	301 SS	3	3
11	all	-see repair kits-	stop pin	304 SS	1	1
12	all	-see repair kits-	nut	304 SS	1	1
13	all	-see repair kits-	stem	304 SS	1	1
14A/B	all	-see repair kits-	handle	304 SS / Vinyl	1	1
15	all	-see repair kits-	lockwasher	304 SS	16	16
16	all	-see repair kits-	bolt	304 SS	16	16
17	2.5"	BV-3SVF17250	stem packing nut	304 SS	1	1
	3"	BV-3SVF17300	stem packing nut	304 SS	1	1
	4"	BV-3SVF17400	stem packing nut	304 SS	1	1
18	2.5"	BV-3SVFCP250	cover plate	CF8M	1	1
	3"	BV-3SVFCP300	cover plate	CF8M	1	1
	4"	BV-3SVRCP400	cover plate	CF8M	1	1
19	all	-see repair kits-	large encapsulated seat	-see repair kits-	2	2
20	all	-see repair kits-	plug	-see repair kits-	1	1

## Dimensions



SIZE	A	B	C	D	E	ID	F	G	H
	IN	IN	IN	IN	IN	IN	MM	MM	MM
1/2"	4.6	2.3	3.3	1.7	4.9	0.37	9	36	42
3/4"	5.0	2.5	3.5	1.9	4.9	0.62	9	36	42
1"	6.0	3.0	3.8	2.3	5.4	0.87	11	42	50
1-1/2"	6.9	3.4	4.5	2.9	9.3	1.37	14	50	70
2"	7.5	3.7	4.9	3.2	9.3	1.87	14	50	70
2-1/2"	8.4	4.5	5.3	3.9	18.0	2.37	17	70	102
3"	9.6	5.1	6.5	4.9	18.3	2.87	22	102	125
4"	11.4	6.3	7.0	5.4	18.3	3.83	22	102	125

All dimensions are in inches, unless noted. Dimensions are approximate.  
Engineering dimensions are available upon request. Specifications are subject to change without notice.

## Part Number Key

To ensure proper specification of your Dixon® BV3S-Series valve, below is the complete valve part number key to configure the valve with the options that meet your specific requirements. If you require an option that is not listed in this key, please feel free to contact Dixon®— Sanitary Division at 800.789.1718.

Dixon Multi-Port Sanitary Stainless Steel Ball Valve Part Number Key		Valve Series	Valve	Seat Material	Ball Configuration	Port Size	Valve Size	Connection End		Handle
Seat	Code	BV	3	V	T	F	050	C	-	A
— Encapsulated	3S									
— Non-Encapsulated	4S									
Seat Material	Code									
— Virgin PTFE (Standard)	V									
— RTFE	G									
— 25% Carbon PTFE	C									
— 50% SS PTFE	S									
— UHMW	U									
Ball Configuration	Code									
— T Port	T									
— L Port	L									
Port Size	Code									
— Full Port	F									
— Reduced Port (4" Only)	R									
Valve Size	Code									
— 0.50"	050									
— 0.75"	075									
— 1.0"	100									
— 1.5"	150									
— 2.0"	200									
— 2.5"	250									
— 3.0"	300									
— 4.0"	400									
Connection End	Code									
— Clamp (Standard)	C									
— Buttweld	B									
— Female I-Line	F									
— Male I-Line	M									
— Threaded Bevel	T									
— Plain Bevel	P									
— Q-Line	Q									
— John Perry Plain	J									
— John Perry Threaded	H									
— Extended Weld	E									
— Female NPT	1									
— Male NPT	2									
— Socket Weld	3									
Handle	Code									
— Manual Handle (Standard)	A									

## Troubleshooting

Problem	Possible Cause	Suggested Action
Valve will not open/close	Obstructions in process line	Remove valve and clear line.
	Seat is damaged	Replace seats and seals.
	Process pressure / Temperature exceeds seat limits	Change seat to proper material.
		Remove the valve if process exceeds all seat ratings.
	Stem torque is too high.	Check process pressure and temperature to ensure it is below limits.
		Check stem torque and adjust gland nut.
Valve is leaking	Process pressure / temperature exceeds seat limits	Change seat to proper material.
		Remove the valve if process exceeds all seat ratings.
	Seats are damaged	Replace seats
		Replace stem packing.

## Limited Warranty

DIXON VALVE AND COUPLING COMPANY (herein called "Dixon") warrants the products described herein and manufactured by Dixon to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Dixon under normal use and service. Its sole obligation under this warranty being limited to repairing or replacing, as hereinafter provided, at its option any product found to Dixon's satisfaction to be defective upon examination by it, provided that such product shall be returned for inspection to Dixon's factory within three (3) months after discovery of the defect. The repair or replacement of defective products will be made without charge for parts or labor. This warranty shall not apply to: (a) parts or products not manufactured by Dixon, the warranty of such items being limited to the actual warranty extended to Dixon by its supplier; (b) any product that has been subject to abuse, negligence, accident, or misapplication; (c) any product altered or repaired by others than Dixon; and (d) to normal maintenance services and the replacement of service items (such as washers, gaskets and lubricants) made in connection with such services. To the extent permitted by law, this limited warranty shall extend only to the buyer and any other person reasonably expected to use or consume the goods who is injured in person by any breach of the warranty. No action may be brought against Dixon for an alleged breach of warranty unless such action is instituted within one (1) year from the date the cause of action accrues. This limited warranty shall be construed and enforced to the fullest extent allowable by applicable law.

Other than the obligation of Dixon set forth herein, Dixon disclaims all warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, and any other obligation or liability. The foregoing constitutes Dixon's sole obligation with respect to damages, whether direct, incidental or consequential, resulting from the use or performance of the product.

Some products and sizes may be discontinued when stock is depleted or may require a minimum quantity for ordering

Dixon, founded in 1916, is a premier manufacturer and supplier of hose couplings, valves, dry-disconnects, swivels, and other fluid transfer and control products. The company's global reach includes a wide range of products for numerous industries including petroleum exploration, refining, transportation, chemical processing, food & beverage, steel, fire protection, construction, mining and manufacturing. Dixon's strategic objective is to create solutions that make products safer, leak-free, longer lasting, and always available.



*The Right Connection®*

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