DIXON

The Right Connection®

BV3S-Series Multi-Port Ball Valve

dixonvalve.com

Customer Service
800.789.1718

Table of Contents

Safety

The following signs may be used 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.

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

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

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. May also be used to alert against an unsafe operating or maintenance practice.

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

General Guidelines

- The owner must comply 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. We will be happy to provide further assistance.
- If any modification work is performed on the product by the owner, 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 instructions shall be valid for the entirety of the device's lifespan.
- 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 must be maintained and updated as necessary.
- The operating instructions must be passed on to any subsequent owners or operators of the device.

Safety

Owner Must Ensure...

- The product is used only as authorized.
- The product is used only when it is in fault-free, fully functional condition and the safety equipment is regularly checked to ensure that it is fully functional.
- The product is operated, maintained, and repaired only 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 operated only 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 pressure could occur. 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. Examples of corrosion that can result from improper care are included below.

- 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.
- Never leave rubber mats, fittings, wrenches, or other tools 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.
- Immediately rinse equipment after use with warm water until the rinse water is clear. Clean the equipment (COP or CIP) as soon as possible after rinsing. Corrosion: discoloration, deposits, and pitting. Product deposits often cause pitting beneath the particles.
- Use only recommended cleaning compounds. Purchase chemicals from reputable and responsible chemical manufacturers familiar with stainless steel processing equipment. Ensure they continuously check the effects of their products on stainless steel.
- Use cleaning chemicals exactly as specified by the manufacturer. Do not use excessive concentrations, temperatures, or exposure times. Corrosion: pitting, discoloration, or stress cracks. Permanent damage often occurs from excessive chemical concentrations, temperatures, or exposure times.
- 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.
- 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.
- 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.
- 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% stainless steel reinforced PTFE, 25% carbon reinforced PTFE
- Non-product contact components: refer to BOM for individual component materials

Line Pressure Technical Data
- Maximum product line pressure
  - 1/2" - 2": **1000 PSI**
  - 2-1/2" - 4": **800 PSI**

Surface Finish Technical Data
- Product contact components: Ra ≤ 32
- Optional finishes: electropolished
- Non-product contact components: as cast or Ra ≤ 63

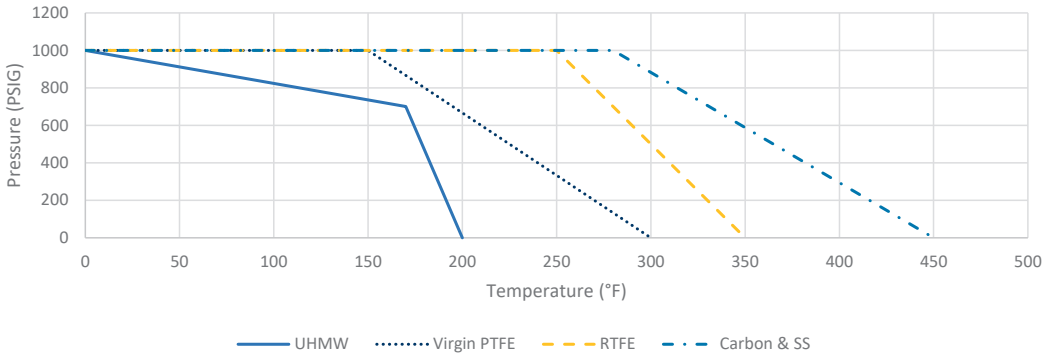
Connections
- Clamp (standard)
- Others available upon request

Cleaning Method
- COP – models: all sizes

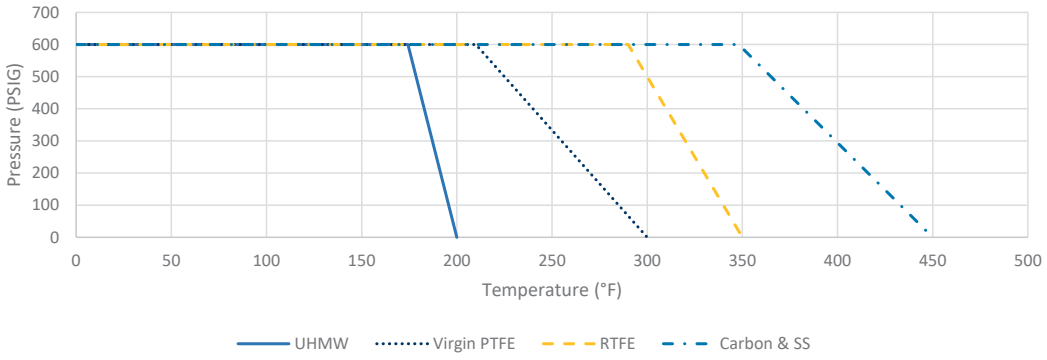
NOTE: Pressure could be limited based on temperature. See Pressure-Temperature Charts on page 7.

Pressure-Temperature Charts

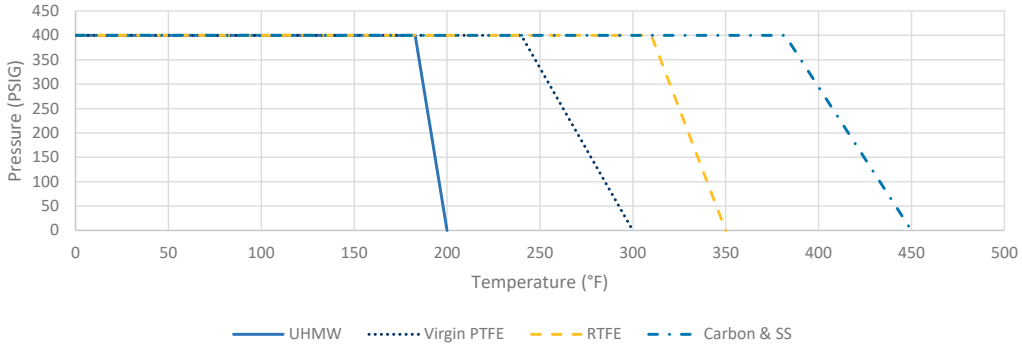
0.50 in & 0.75 in



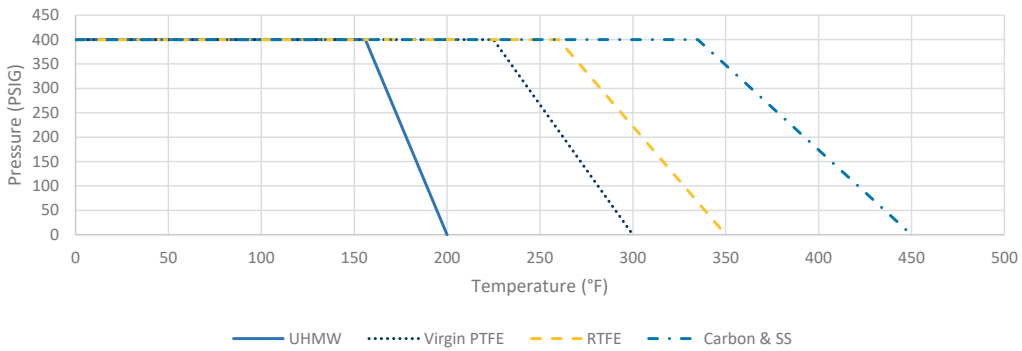
1.00 in



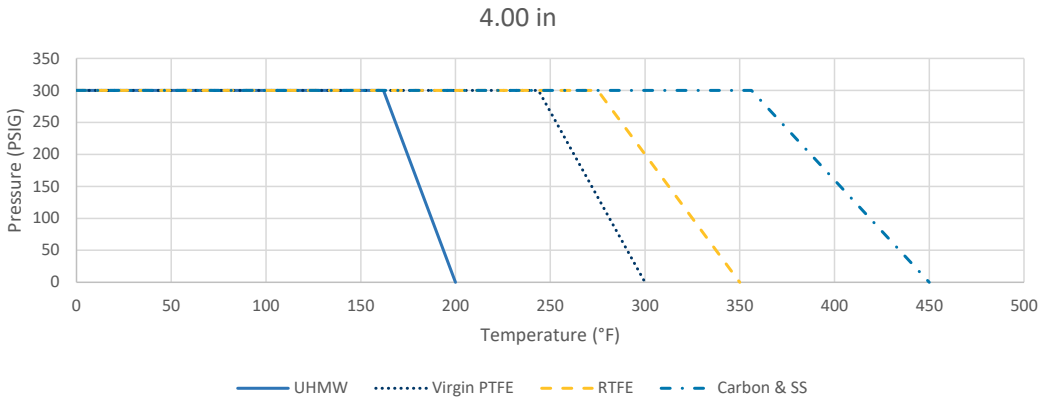
1.50 in & 2.00 in



2.50 in & 3.00 in



Pressure-Temperature Charts



Technical Specifications

Part Number	Size	Base Break Torque (in-lbs)		Flow Coefficient (Cv)			Vacuum Testing (Virgin PTFE seals)		Weight (lbs)
		L	T	L	T (thru)	T (branched)	Body Leakage (atm-cc/sec)	Helium Leak Rate Test	
BV_S_050_	1/2"	48	45	3.5	5.3	3	$1x10^{-9}$	10^{-5} Torr	3.6
BV_S_075_	3/4"	62	62	10	14	8			4.3
BV_S_100	1"	84	79	20	30	14			6.8
BV_S_150_	1-1/2"	315	286	52	80	44			12.6
BV_S_200_	2"	789	595	100	150	83	$1x10^{-7}$	10^{-4} Torr	21.6
BV_S_250_	2-1/2"	833	1090	148	176	108			33.7
BV_S_300	3"	1303	1940	250	380	200			56.4
BV_S_R400	4"	1453	2050	450	680	350			85.4

NOTE: Fill in the blank part number spaces with the seat material code below. Make sure it is the correct material for your application.

Seat Multiplier

Code (Seat Material)	Material Torque Multiplier
U (UHMW)	0.9
V (Virgin PTFE)	1
G (15% glass reinforced RTFE)	1 (4" = 2.0)
C (25% carbon reinforced PTFE)	1.75
S (50% stainless steel reinforced PTFE)	1.75

NOTE: Base Break Torque x Material Torque Multiplier = Material Break Torque.

Flow Path Codes

3-Way L-Port

A	B	C
		

3-Way T-Port

A	B	C	D
			

4-Way L-Port

A	B	C	D
			

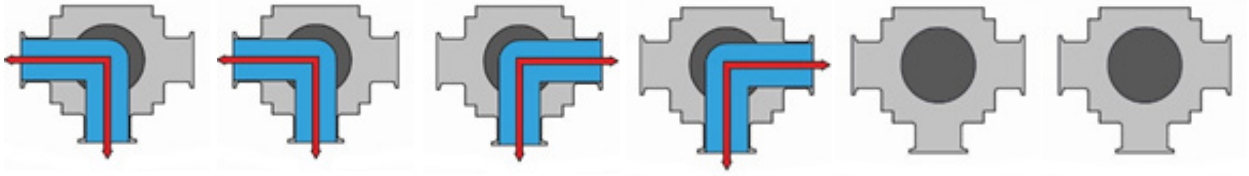
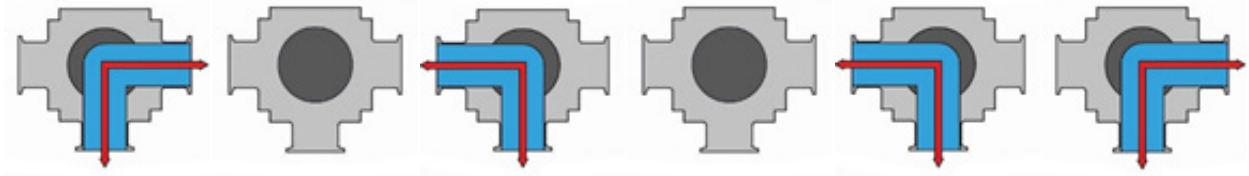
4-Way T-Port

A	B	C	D
			

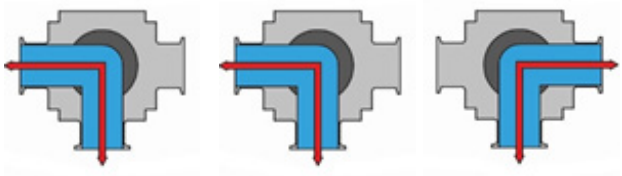
Flow Path Codes

2 Position

3-Way | L-Port | Spring Return

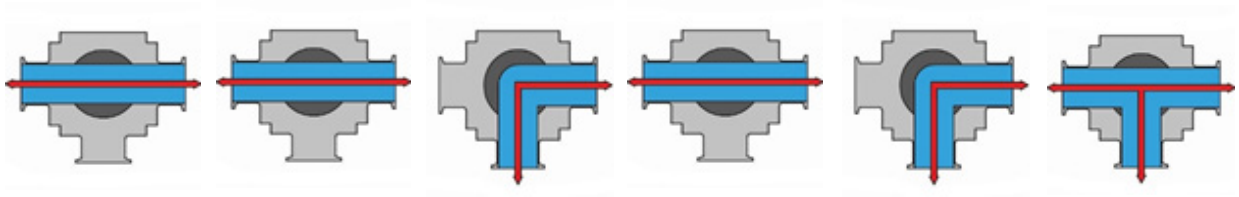
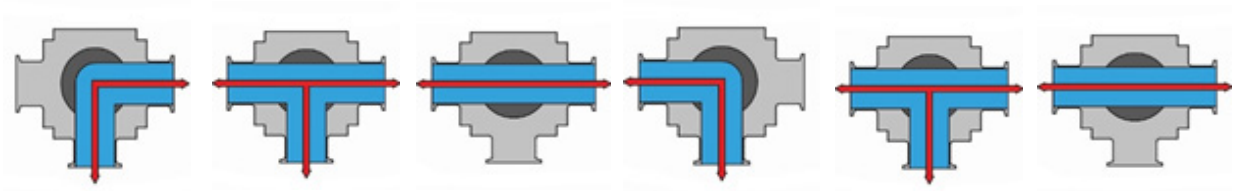
Code	10	16	15	17	18	19
Rotation	90°	90°	90°	90°	90°	90°
Air Rotation Detection	CCW	CW	CW	CCW	CCW	CW
	A	A	B	B	C	C
Rest Position						
	B	C	A	C	A	B
Energize Position						

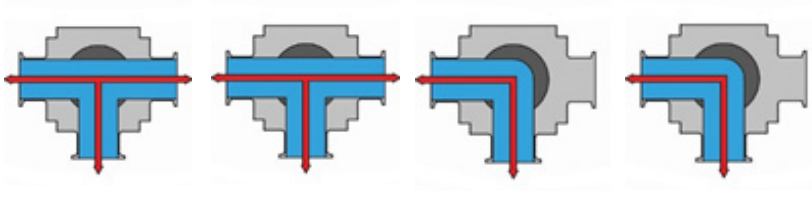
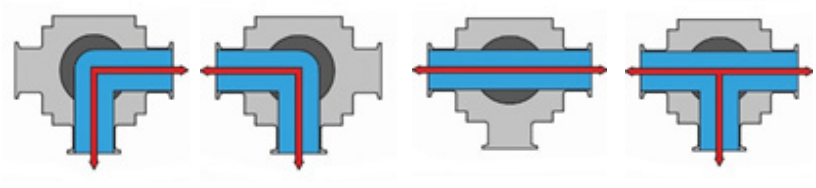
3-Way | L-Port | Double Acting or Electric

Code	12	20	21
Rotation	90°	90°	90°
	A	A	B
Energize Position			
	B	C	C
Energize Position			

Flow Path Codes

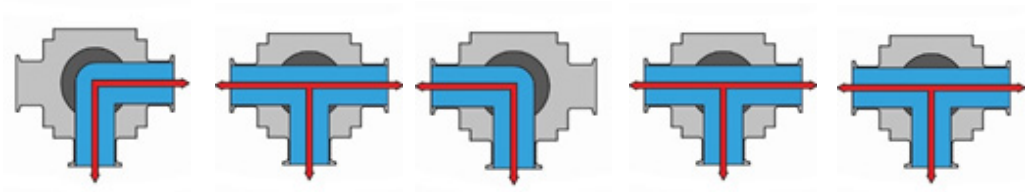
3-Way | T-Port | Spring Return

Code	10	16	15	11	17	18
Rotation	90°	180°	90°	90°	90°	180°
Air Rotation Detection	CW	Either	CCW	CCW	CW	Either
	A	A	B	A	B	C
Rest Position						
	B	C	A	D	C	A
Energize Position						

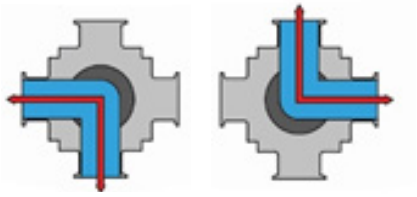
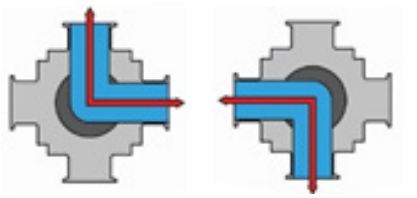
Code	19	22	23	24
Rotation	90°	90°	90°	90°
Air Rotation Detection	CCW	CW	CW	CCW
	C	C	D	D
Rest Position				
	B	D	A	C
Energize Position				

Flow Path Codes

3-Way | T-Port | Double Acting or Electric

Code	12	20	13	21	25
Rotation	90°	180°	90°	90°	90°
	A	A	A	B	D
Energize Position					
	B	C	D	C	C
Energize Position					

4-Way | L-Port | Spring Return

Code	10	16
Rotation	180°	180°
Air Rotation Detection	Either	Either
	A	A
Rest Position		
	B	C
Energize Position		

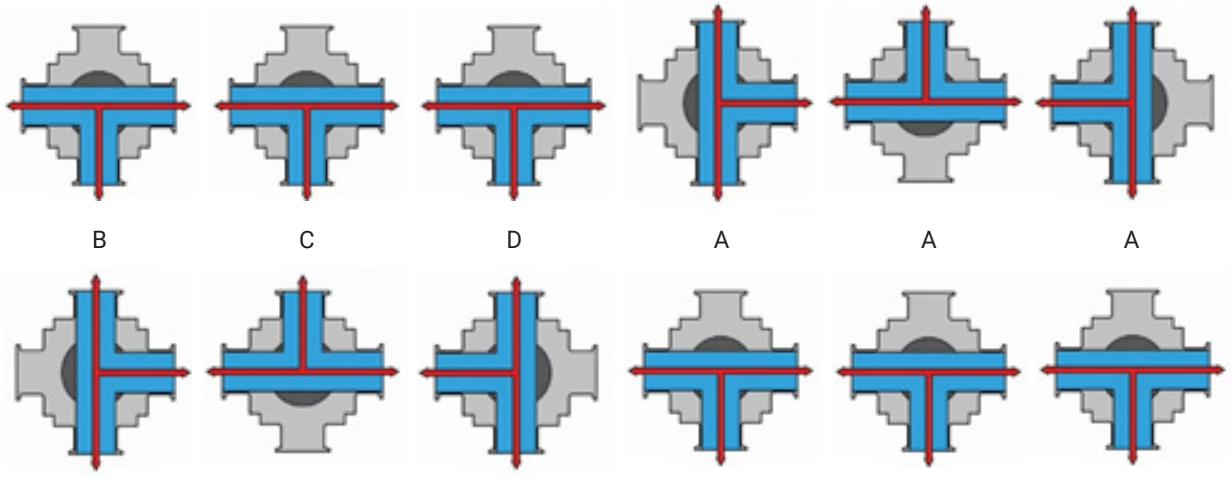
4-Way | L-Port | Double Acting or Electric

Code	12
Rotation	180°
	A
Energize Position	
	B
Energize Position	

Flow Path Codes

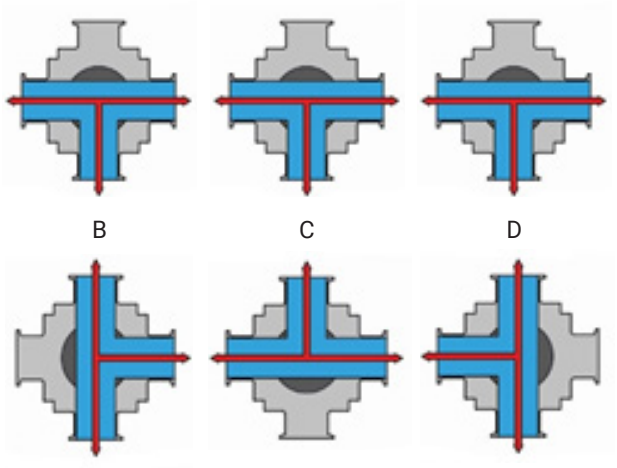
4-Way | T-Port | Spring Return

Code	10	16	11	15	18	23
Rotation	90°	180°	90°	90°	90°	180°
Air Rotation Detection	CCW	Either	CW	CW	Either	CCW
Rest Position	A	A	A	B	C	D
Energize Position	B	C	D	A	A	A



4-Way | T-Port | Double Acting or Electric

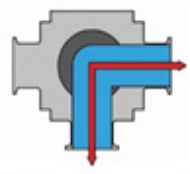
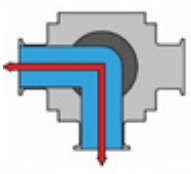
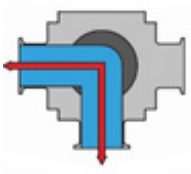
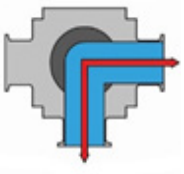
Code	12	20	13
Rotation	90°	180°	90°
Energize Position	A	A	A
Energize Position	B	C	D



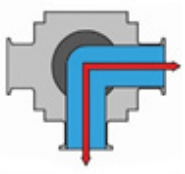
Flow Path Codes

3 Position

3-Way | L-Port | Spring Return

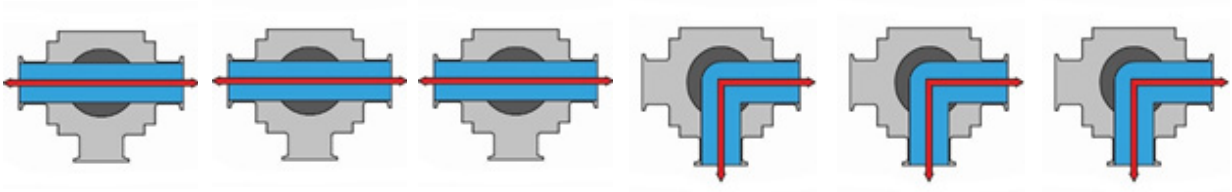
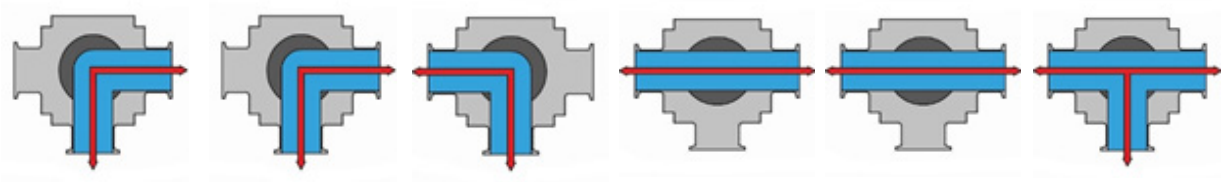
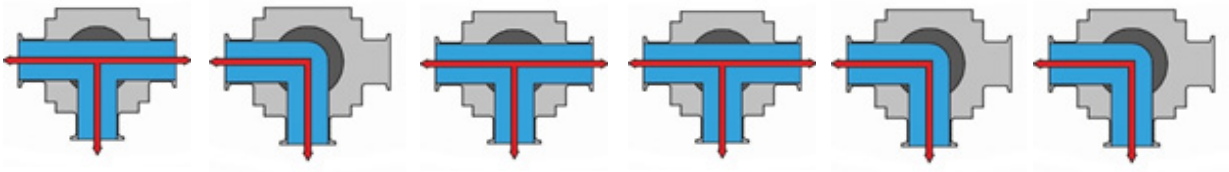
Code	26	28	29
Rotation	180°	180°	180°
Air Rotation Detection	Either	Either	Either
Return	Either	Either	End
	A	B	C
Rest Position	 B	 A	 A
Energize Position	 C	 C	 B
Energize Position			

3-Way | L-Port | Double Acting or Electric

Code	30
Rotation	180°
	A
Energize Position	 B
Energize Position	 C
Energize Position	

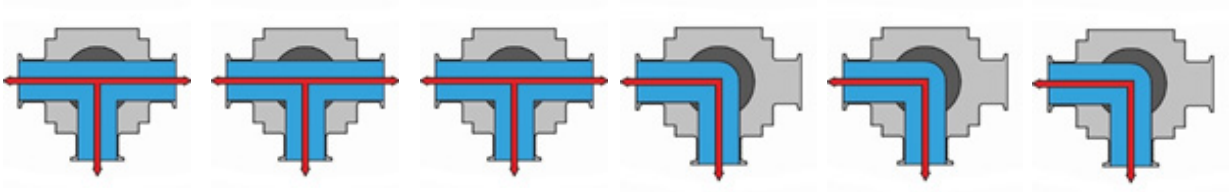
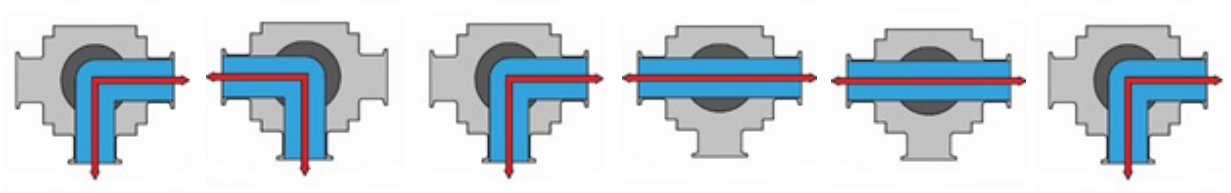
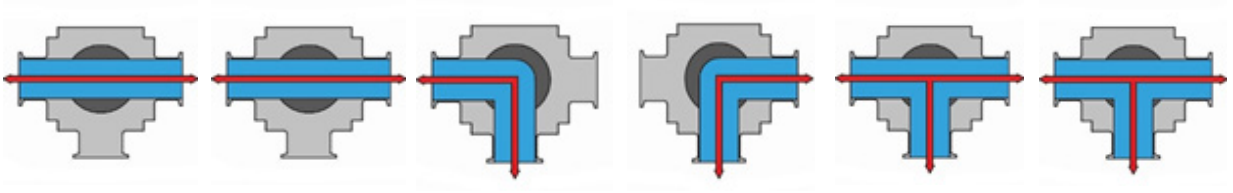
Flow Path Codes

3-Way | T-Port | Spring Return

Code	26	27	31	28	14	32
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CW	Both	CCW	Both	CCW	CW
Return	End	Center	End	Center	End	End
	A	A	A	B	B	B
Rest Position						
	B	B	D	A	A	C
Energize Position						
	C	D	C	C	D	D
Energize Position						

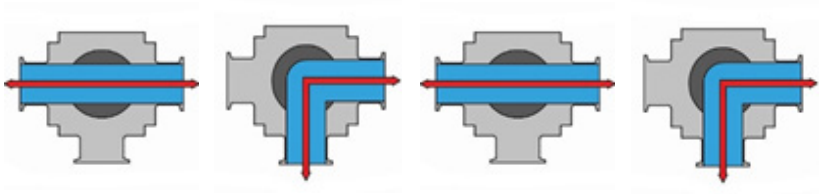
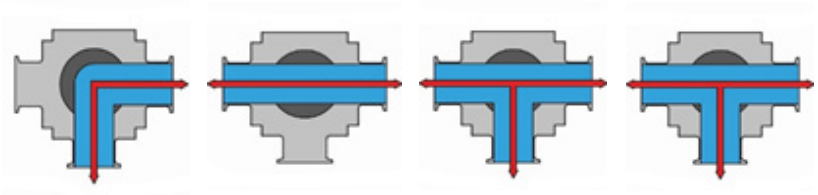
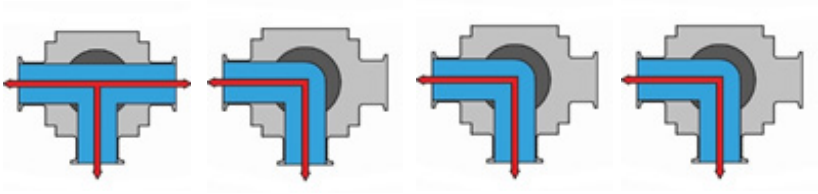
Flow Path Codes

3-Way | T-Port | Spring Return

Code	33	34	35	36	37	38
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CCW	CW	Both	CW	Both	CCW
Return	End	End	Center	End	Center	End
	C	C	C	D	D	D
Rest Position						
	B	D	B	A	A	B
Energize Position						
	A	A	D	B	C	C
Energize Position						

Flow Path Codes

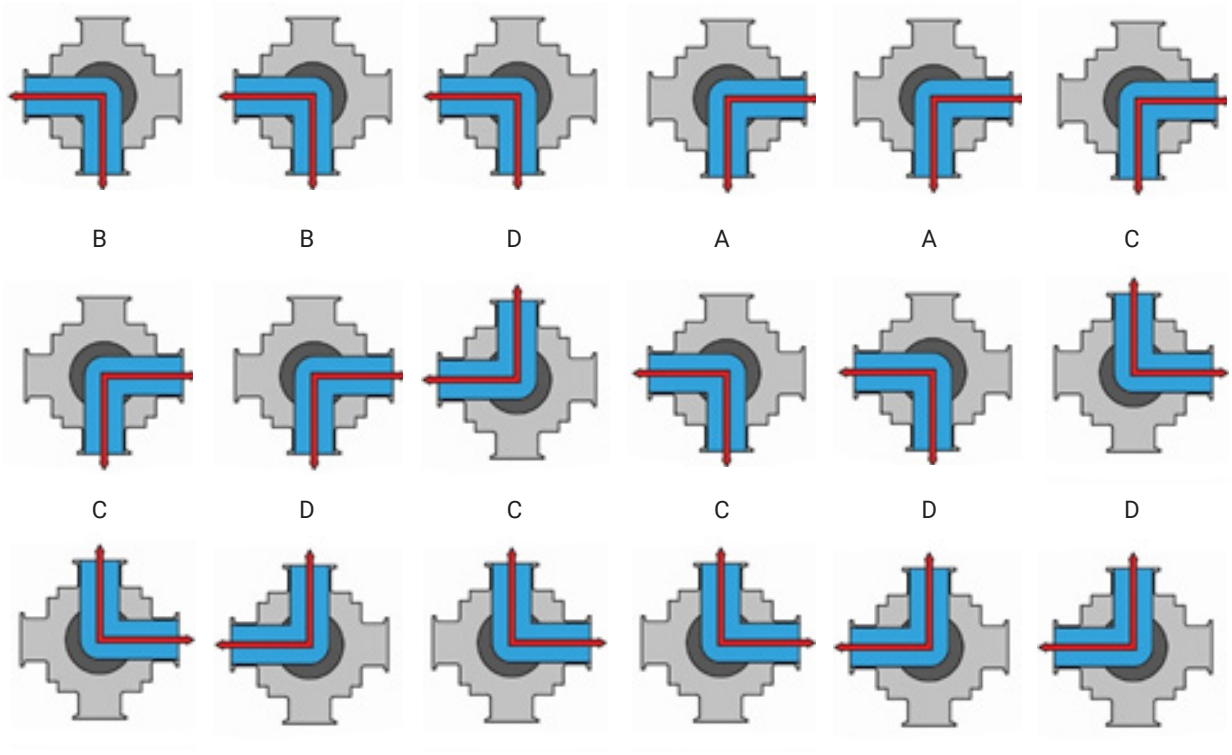
3-Way | T-Port | Double Acting or Electric

Code	30	39	40	41
Rotation	180°	180°	180°	180°
	A	B	A	B
Energize Position				
	B	A	C	C
Energize Position				
	C	D	D	D
Energize Position				

Flow Path Codes

4-Way | L-Port | Spring Return

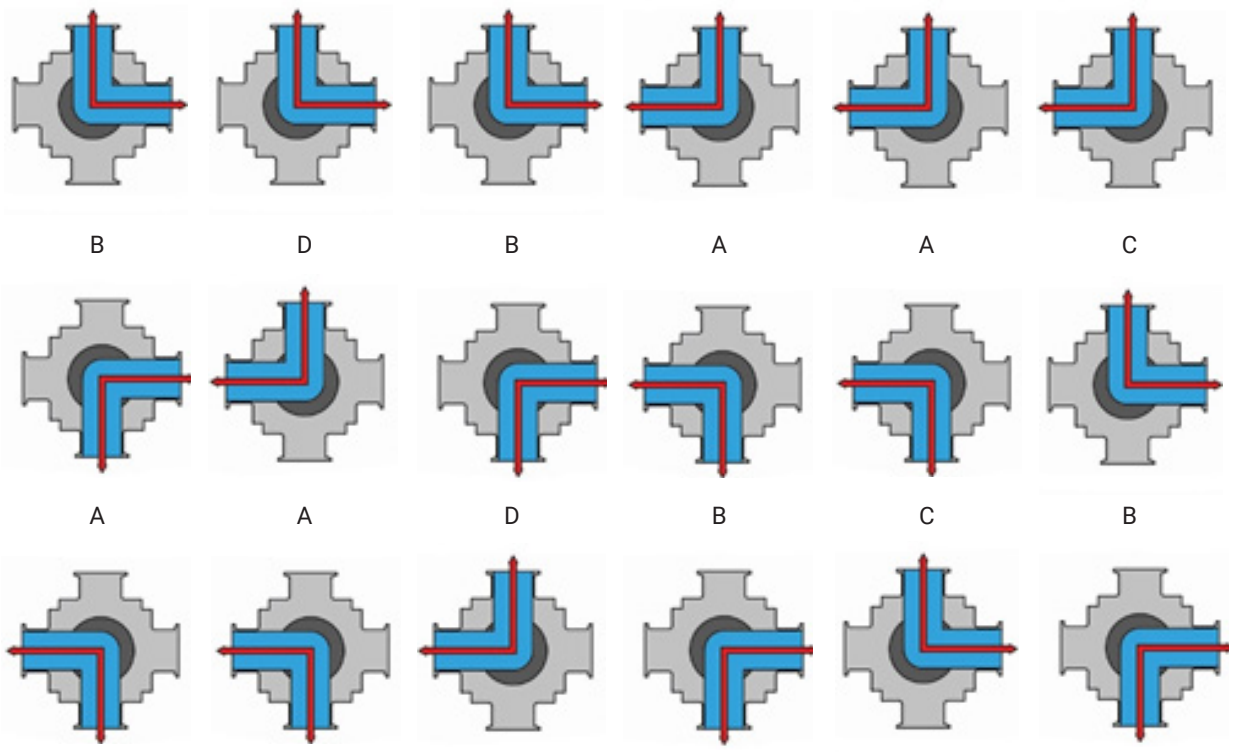
Code	26	27	31	28	14	32
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CCW	Both	CW	Both	CW	CCW
Return	End	Center	End	Center	End	End
Rest Position	A	A	A	B	B	B
Energize Position	B	B	D	A	A	C
Energize Position	C	D	C	C	D	D



Flow Path Codes

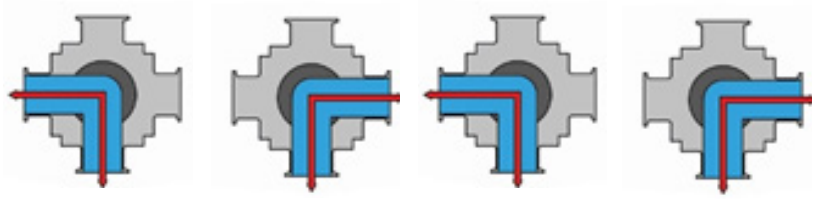
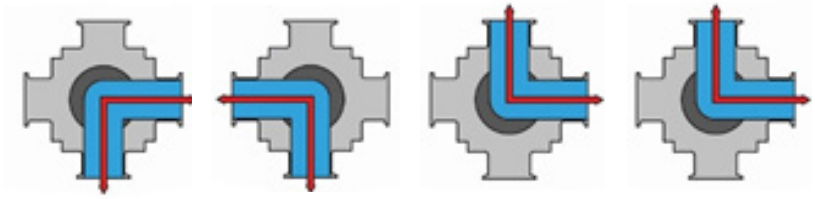
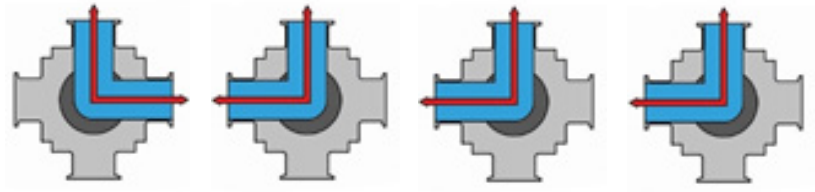
4-Way | L-Port | Spring Return

Code	33	34	35	36	37	42
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CW	CCW	Both	CCW	Both	CW
Return	End	End	Center	End	Center	End
Rest Position	C	C	C	D	D	D
Energize Position	B	D	B	A	A	C
Energize Position	A	A	D	B	C	B



Flow Path Codes

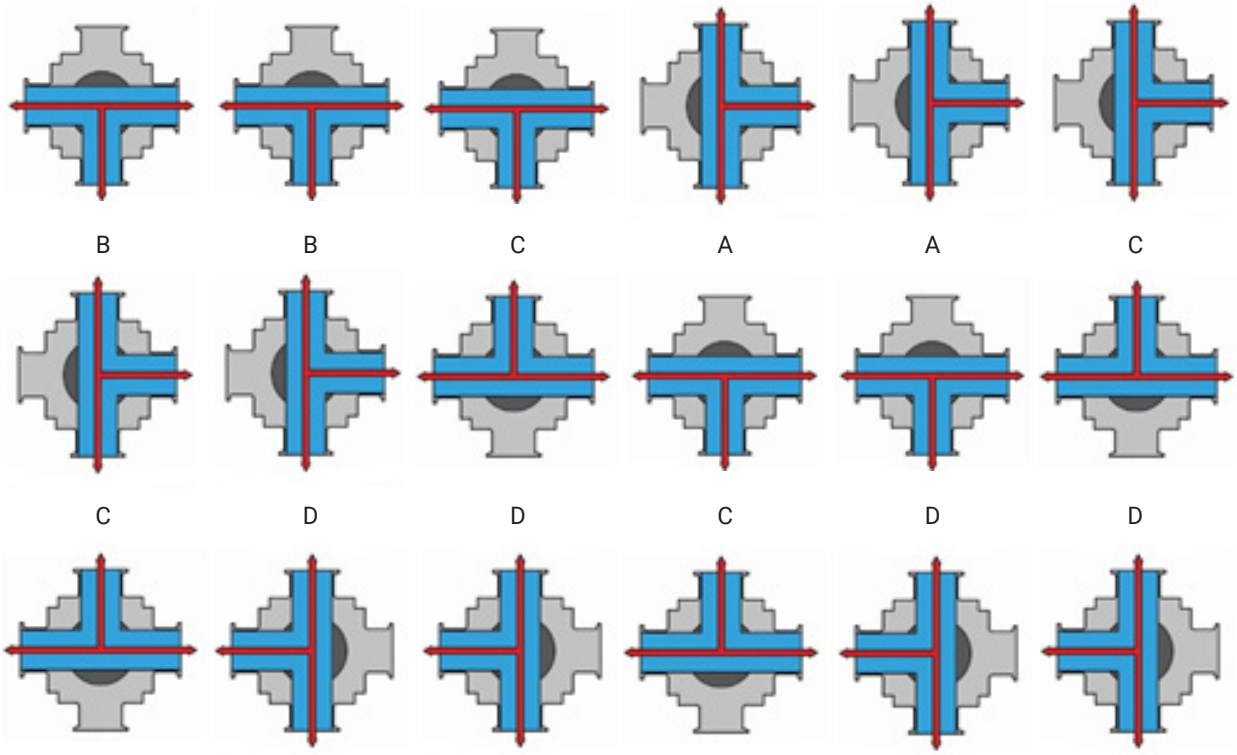
4-Way | L-Port | Double Acting or Electric

Code	30	39	40	41
Rotation	180°	180°	180°	180°
	A	B	A	B
Energize Position				
	B	A	C	C
Energize Position				
	C	D	D	D
Energize Position				

Flow Path Codes

4-Way | T-Port | Spring Return

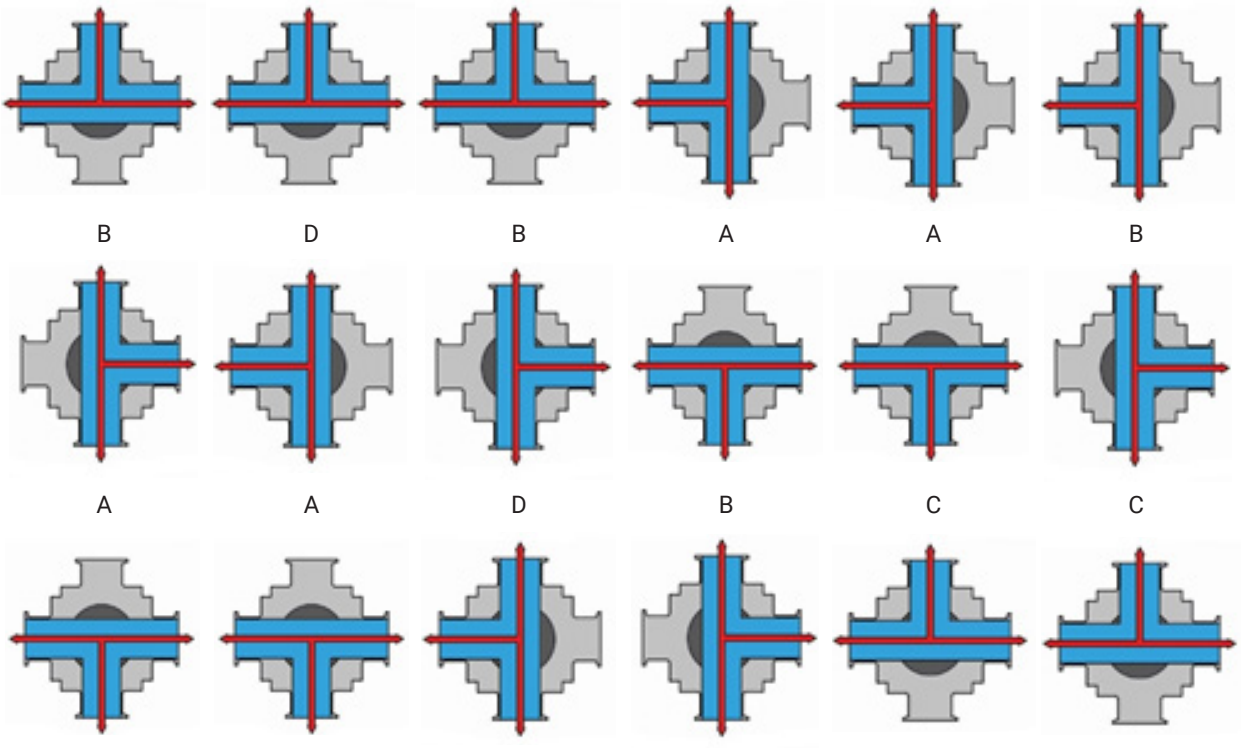
Code	26	43	27	28	14	32
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CCW	Both	CW	Both	CW	CCW
Return	End	Center	End	Center	End	End
Rest Position	A	A	A	B	B	B
Energize Position	B	B	C	A	A	C
Energize Position	C	D	D	C	D	D



Flow Path Codes

4-Way | T-Port | Spring Return

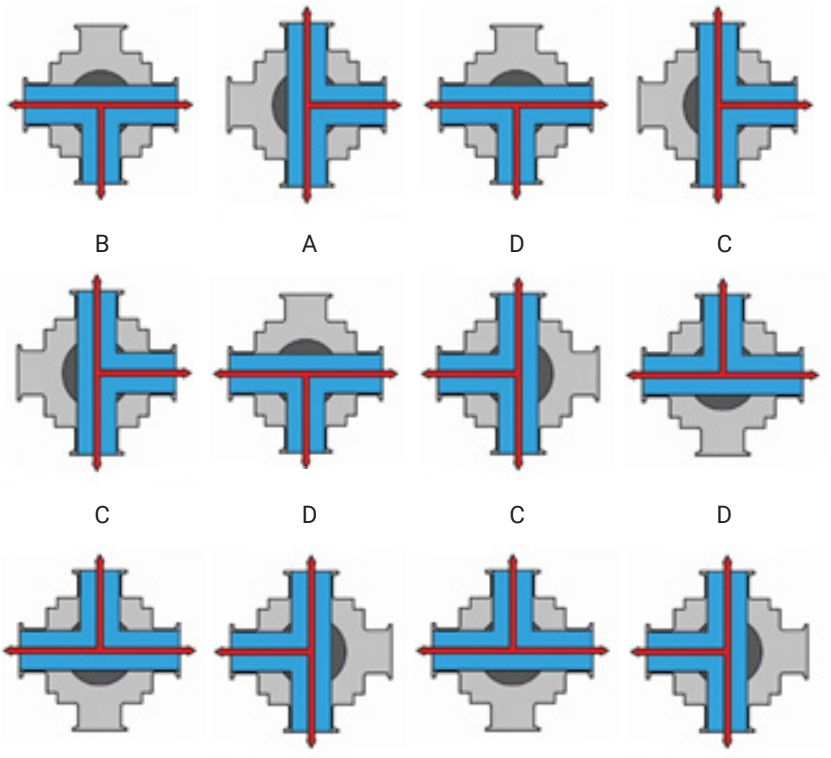
Code	33	34	35	36	37	38
Rotation	180°	180°	180°	180°	180°	180°
Air Rotation Detection	CW	CCW	Both	CCW	Both	CW
Return	End	End	Center	End	Center	End
Rest Position	C	C	C	D	D	D
Energize Position	B	D	B	A	A	B
Energize Position	A	A	D	B	C	C



Flow Path Codes

4-Way | T-Port | Double Acting or Electric

Code	30	39	40	41
Rotation	180°	180°	180°	180°
Energize Position	A	B	A	B
Energize Position	B	A	D	C
Energize Position	C	D	C	D



Installation and 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 occurrs during the unpacking or installation process.

Unpacking

Carefully unpack all 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.

The product consists of the following components:

Item 1: valve

Item 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

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.
- Reassemble the equipment as per the assembly section of this manual.
- Check the equipment for proper operation and perform a leak test if necessary.

Installation and Start Up

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 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:
- Valve 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 ensure 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 valve 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 so that they are centered with the ferrules faces.
- Clamp ends must be parallel in all planes and on centerline.
- CAUTION: Failure to ensure 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 buttweld 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 three 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 types 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 good 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% stainless steel 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 make sure 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):
  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 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 the 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 equipmet 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 kit 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.
- Flush the equipment 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 specifications as necessary.
- 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

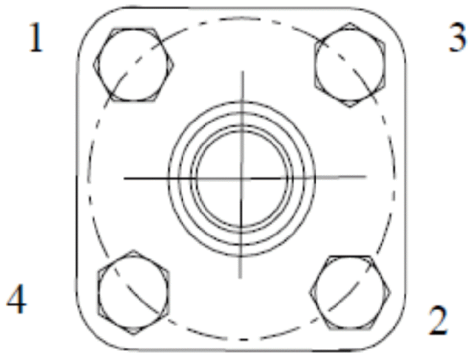
To ensure quality operation of your Dixon® equipment, the equipment must be disassembled and assembled properly to prevent equipment damage during operation. Please follow the instructions contained in this manual carefully and be sure to follow any safety warnings contained herein. If any questions should arise during the assembly or disassembly process that are not addressed in this manual, please feel free to contact Dixon Sanitary 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 (**item 13**) with O-ring (**item 7**) and PTFE thrust washer (**item 6**) into the body (**item 1**) and through the stem bore in the body.
3. Install PTFE stem packing rings (**item 8**) over the stem and into the body bore.
4. Install the gland ring (**item 9**) and two bevel washers (**item 10**) so that the lower washer's concave side is facing upward and the top washer is opposite.
5. Lubricate the gland nut threads (**item 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 third bevel washer (**item 10**) over the stem making sure that the concave side is facing upward. Place the handle (**item 14**, **14A,** or **14B**) on the stem so that the handle is parallel to a line on the top of the valve stem.
8. Install the handle nut (**item 12**).
9. Position the stem tang parallel to the large openings in the body (**item 1**). Insert the ball (**item 3**) into the body. Slide the stem tang into the ball slot, being careful not to knick or scratch the ball.
10. Rotate the stem 90 degrees.
11. Install valve seats (**item 4** and **19**) and body seals (**item 5**) into the body.
12. Place plug (**item 20**) into the seat (**item 4**).
13. For valves with clamp end caps, insert the end caps (**item 2** and **2A**) and cover plate (**item 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 (**item 16**) with washers (**item 15**). Install and hand tighten bolts.
16. Before tightening the bolts, make sure the ball ports, seats, and ends are all in alignment.
17. Wrench tighten the bolts in the sequence shown below until assembly torque is reached.
18. Remove the handle and finish tightening the gland nut until break torque is reached. Measure stem breakaway torque for several cycles to verify repeatability. (Overtightening significantly raises stem torque.) Reassemble 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 that is exposed to fire.

Tightening procedure for end connections:

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



Disassembly

For valves with clamp end connections:

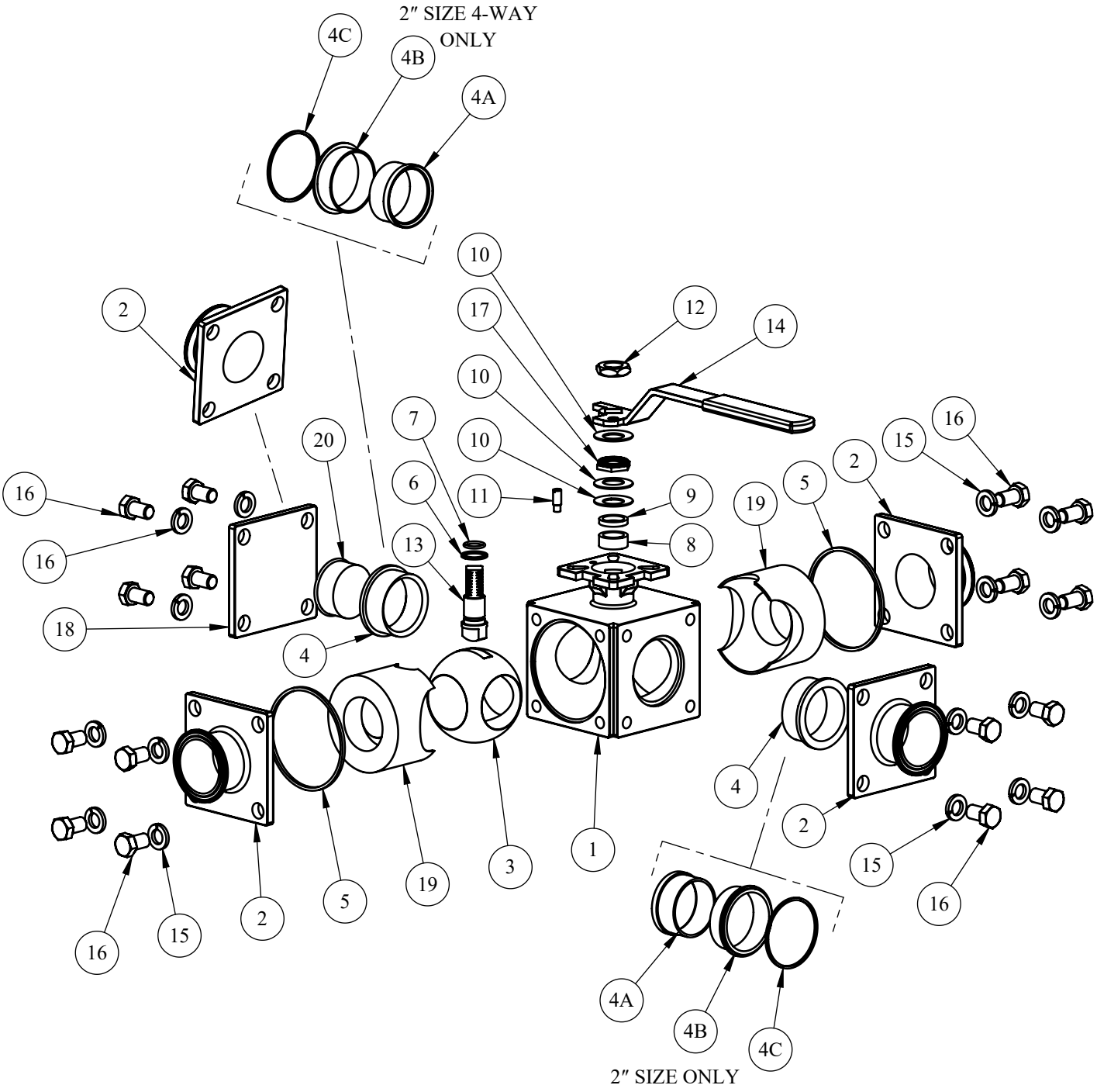
1. Loosen and remove the clamps connecting the valve to the piping. Then, remove the valve and gaskets.
2. Loosen and remove the hex bolts and lock washers (**item 16** and **15**).
3. Pull the end caps (**item 2**, **2A**) and cover plate (**item 18**) free from the body.

For valves with welded end connections:

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

Bill of Materials

1/2" to 2"



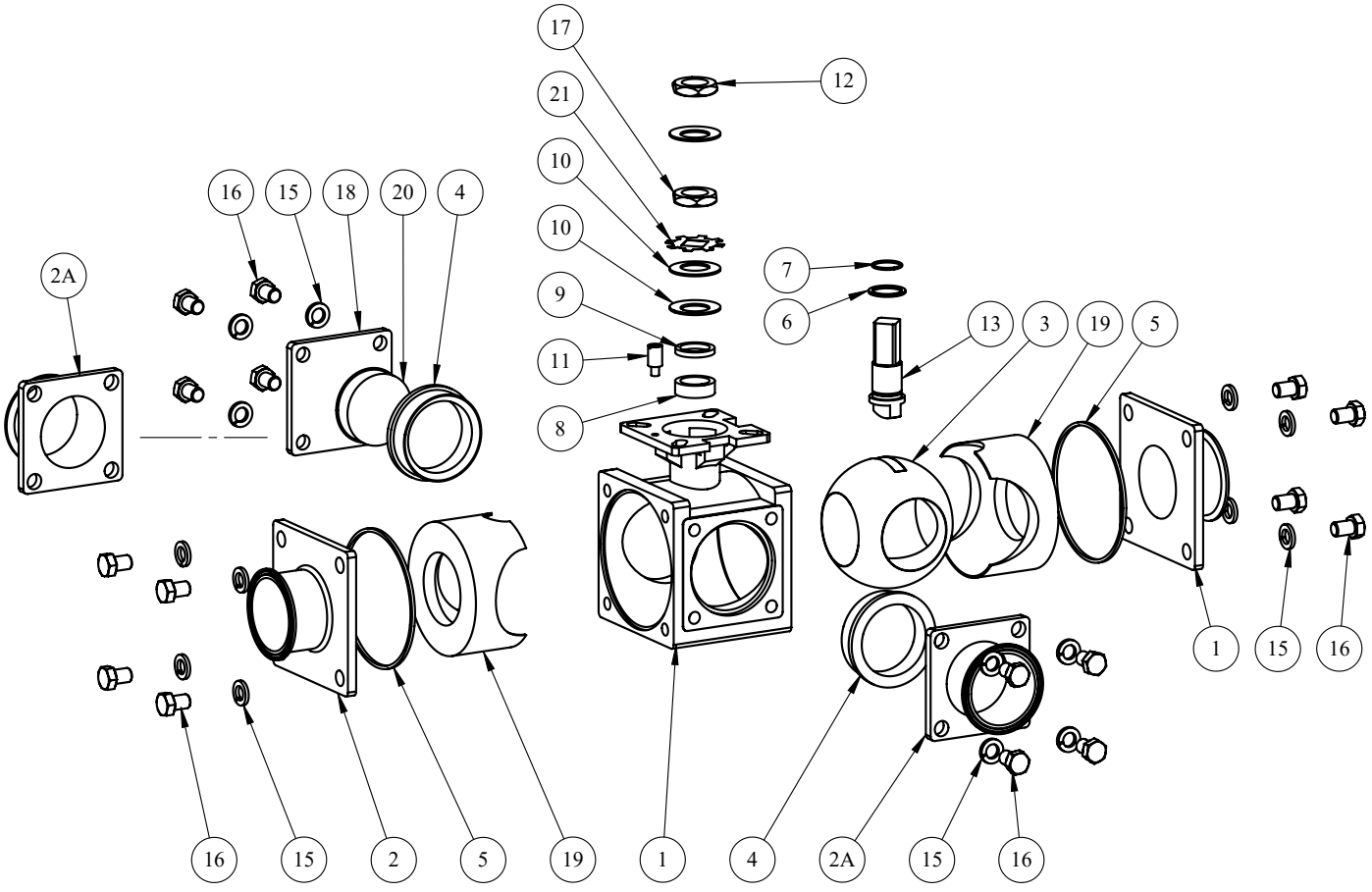
Bill of Materials

1/2" to 2"

Item	Size	Part Number	Description	Material	Quantity	
					L-Port	T-Port
1	1/2"	BV3S-1050	body	CF8M	1	1
	3/4"	BV3S-1075	body	CF8M	1	1
	1"	BV3S-1100	body	CF8M	1	1
	1-1/2"	BV3S-1150	body	CF8M	1	1
	2"	BV23S-1200	body	CF8M	1	1
2	1/2"	BV-3SVFCE050	triclamp end	CF8M	3	3
	3/4"	BV-3SVFCE075	triclamp end	CF8M	3	3
	1"	BV-3SVFCE100	triclamp end	CF8M	3	3
	1-1/2"	BV-3SVFCE150	triclamp end	CF8M	3	3
	2"	BV-3SVFCE200	triclamp end	CF8M	3	3
3	1/2"	BV-3SVFLB050	L-port ball	CF8M	1	-
		BV-3SVFTB050	T-port ball	CF8M	-	1
	3/4"	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
	1-1/2"	BV-3SVFLB150	L-port ball	CF8M	1	-
		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 kit	small encapsulated seat	see repair kit	2	2
5	all	see repair kit	body seal	see repair kit	2	2
6	all	see repair kit	thrust washer	see repair kit	1	1
7	all	see repair kit	stem O-ring	FKM	1	1
8	all	see repair kit	stem packing	see repair kit	3	3
9	all	see repair kit	gland ring	316 SS	1	1
10	all	see repair kit	bevel washer	301 SS	3	3
11	all	see repair kit	stop pin	304 SS	1	1
12	all	see repair kit	nut	304 SS	1	1
13	all	see repair kit	stem	304 SS	1	1
14	all	see repair kit	handle	304 SS/Vinyl	1	1
15	all	see repair kit	lock washer	304 SS	16	16
16	all	see repair kit	bolt	304 SS	16	16
17	1/2"	BV-3SVF17050	stem packing nut	304 SS	1	1
	3/4"	BV-3SVF17075	stem packing nut	304 SS	1	1
	1"	BV-3SVF17100	stem packing nut	304 SS	1	1
	1-1/2"	BV-3SVF17150	stem packing nut	304 SS	1	1
	2"	BV-3SVF17200	stem packing nut	304 SS	1	1
18	1/2"	BV-3SVRCP050	cover plate	CF8M	1	1
	3/4"	BV-3SVRCP075	cover plate	CF8M	1	1
	1"	BV-3SVRCP100	cover plate	CF8M	1	1
	1-1/2"	BV-3SVRCP150	cover plate	CF8M	1	1
	2"	BV-3SVRCP200	cover plate	CF8M	1	1
19	all	see repair kit	large encapsulated seat	see repair kit	2	2
20	all	see repair kit	plug	see repair kit	1	1

Bill of Materials

2-1/2" to 4"

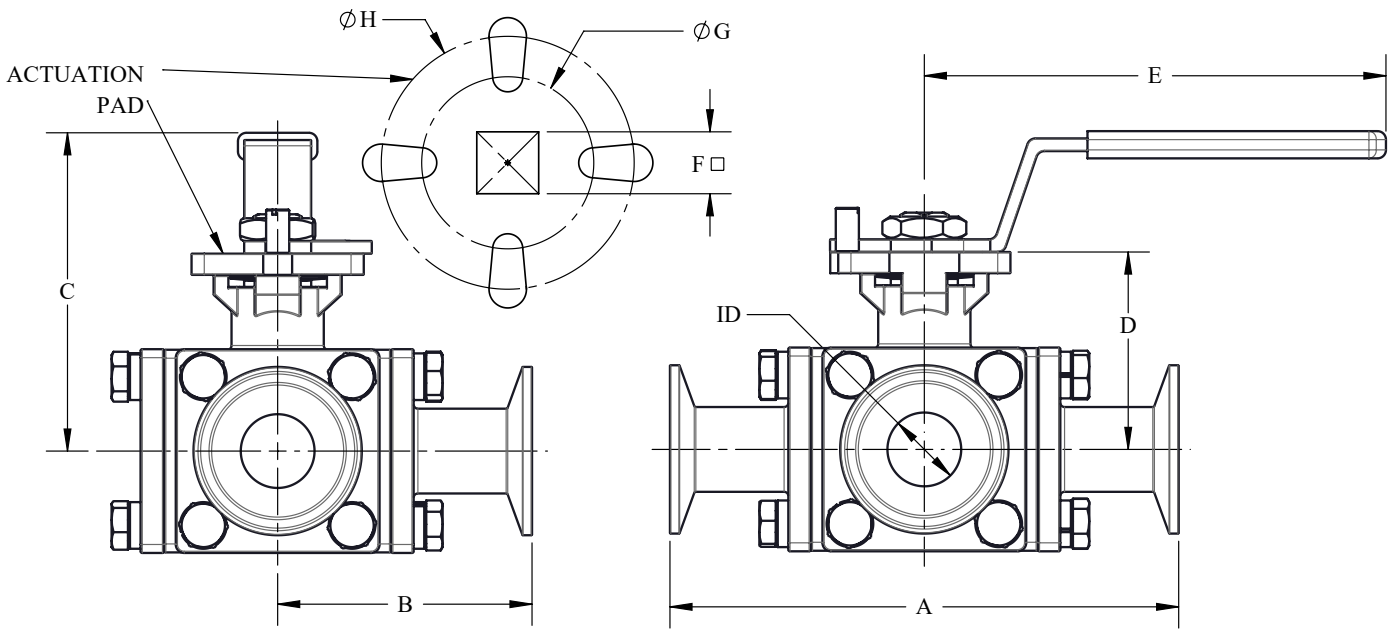


Bill of Materials

2-1/2" to 4"

Item	Size	Part Number	Description	Material	Quantity			
					3-Way		4-Way	
					L-Port	T-Port	L-Port	T-Port
1	2-1/2"	BV3S-1250	body	CF8M	1	1	1	1
	3"	BV3S-1300	body	CF8M	1	1	1	1
	4"	BV3S-1400	body	CF8M	1	1	1	1
2	2-1/2"	BV-3SVFCL250	large triclamp end	CF8M	2	2	2	2
	3"	BV-3SVFCL300	large triclamp end	CF8M	2	2	2	2
	4"	BV-3SVFCL400	large triclamp end	CF8M	2	2	2	2
2A	2-1/2"	BV-3SVFCS250	small triclamp end	CF8M	1	1	2	2
	3"	BV-3SVFCS300	small triclamp end	CF8M	1	1	2	2
	4"	BV-3SVFCS400	small triclamp end	CF8M	1	1	2	2
3	2-1/2"	BV-3SVFLB250	L-port ball	CF8M	1	-	1	-
		BV-3SVFTB250	T-port ball	CF8M	-	1	-	1
	3"	BV-3SVFLB300	L-port ball	CF8M	1	-	1	-
		BV-3SVFTB300	T-port ball	CF8M	-	1	-	1
	4"	BV-3SVFLB400	L-port ball	CF8M	1	-	1	-
		BV-3SVFTB400	T-port ball	CF8M	-	1	-	1
4	all	see repair kit	small encapsulated seat	see repair kit	2	2	2	2
5	all	see repair kit	body seal	see repair kit	2	2	2	2
6	all	see repair kit	thrust washer	see repair kit	1	1	1	1
7	all	see repair kit	stem O-ring	FKM	1	1	1	1
8	all	see repair kit	stem packing	see repair kit	3	3	3	3
9	all	see repair kit	gland ring	316 SS	1	1	1	1
10	all	see repair kit	bevel washer	301 SS	3	3	3	3
11	all	see repair kit	stop pin	304 SS	1	1	1	1
12	all	see repair kit	nut	304 SS	1	1	1	1
13	all	see repair kit	stem	304 SS	1	1	1	1
14	all	see repair kit	handle	304 SS/Vinyl	1	1	1	1
15	all	see repair kit	lock washer	304 SS	16	16	16	16
16	all	see repair kit	bolt	304 SS	16	16	16	16
17	2-1/2"	BV-3SVF17250	stem packing nut	304 SS	1	1	1	1
	3"	BV-3SVF17300	stem packing nut	304 SS	1	1	1	1
	4"	BV-3SVF17400	stem packing nut	304 SS	1	1	1	1
18	2-1/2"	BV-3SVRCP250	cover plate	CF8M	1	1	0	0
	3"	BV-3SVRCP300	cover plate	CF8M	1	1	0	0
	4"	BV-3SVRCP400	cover plate	CF8M	1	1	0	0
19	all	see repair kit	see repair kit	see repair kit	2	2	2	2
20	all	see repair kit	see repair kit	see repair kit	1	1	1	1
21	2-1/2"	BV-3SVF21250	lock washer	304 SS	1	1	1	1
	3"	BV-3SVF213040	lock washer	304 SS	1	1	1	1
	4"							

Dimensions



Size	A (in)	B (in)	C (in)	D (in)	E (in)	ID (in)	F (mm)	G (ISO 5211)	H (ISO 5211)
1/2"	4.6"	2.3"	3.3"	1.7"	4.9"	0.37"	9	F03	F04
3/4"	5.0"	2.5"	3.5"	1.9"	4.9"	0.62"	9	F03	F04
1"	6.0"	3.0"	3.8"	2.3"	5.4"	0.87"	11	F04	F05
1-1/2"	6.9"	3.4"	4.5"	2.9"	9.3"	1.37"	14	F05	F07
2"	7.5"	3.7"	4.9"	3.2"	9.3"	1.87"	14	F05	F07
2-1/2"	8.4"	4.5"	5.3"	3.9"	18.0"	2.37"	17	F07	F10
3"	9.6"	5.1"	6.5"	4.9"	18.3"	2.87"	22	F10	F12
4"	11.4"	6.3"	7.0"	5.4"	18.3"	3.83"	22	F10	F12

Part Number Key

BV3S/4S-Series Sanitary Ball Valve Part Number Key Example: BV2SVTF050C-A		Valve Style	Seat Material	Ball Configuration	Port Size	Size	Connections		Handle	Surface Finish
		BV3S	V	T	F	050	C	-	A	
Valve Style	**Code**									
3-way	BV3S									
4-way	BV4S									
Seat Material	**Code**									
Virgin PTFE	V									
15% glass reinforced PTFE	G									
25% carbon reinforced PTFE	C									
50% stainless steel reinforced PTFE	S									
Ultra high molecular weight polyethylene	U									
Ball Configuration	**Code**									
T-Port	T									
L-Port	L									
Port Size	**Code**									
Full port	F									
Reduced port (4" only)	R									
Size	**Code**									
1/2"	050									
3/4"	075									
1"	100									
1-1/2"	150									
2"	200									
2-1/2"	250									
3"	300									
4"	400									
Connections	**Code**									
Clamp (standard)	C									
Weld	B									
Female I-Line	F									
Male I-Line	M									
Threaded bevel	T									
Plain bevel with nut	P									
Q-Line	Q									
John Perry plain with nut	J									
John Perry threaded	H									
Handle	**Code**									
Manual handle	A									
Surface Finish	**Code**									
32 Ra I.D.	blank									
25 Ra I.D.	-2									
20 Ra I.D.	-1									
15 Ra I.D.	-4									
10 Ra I.D.	-7									

Repair Kits

To ensure quality operation of your Dixon® equipment, proper maintenance must be performed at regular intervals. To prevent damage and improper operation, only use 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.

Seat Kits

Size	Material				
	Virgin PTFE	RTFE	25% Carbon PTFE	50% Stainless Steel PTFE	UHMW
1/2"	BV-3SVFRK050	BV-3SGRK050	BV-3SCRK050	BV-3SSRK050	BV-3SURK050
3/4"	BV-3SVFRK075	BV-3SGRK075	BV-3SCRK075	BV-3SSRK075	BV-3SURK075
1"	BV-3SVFRK100	BV-3SGRK100	BV-3SCRK100	BV-3SSRK100	BV-3SURK100
1-1/2"	BV-3SVFRK150	BV-3SGRK150	BV-3SCRK150	BV-3SSRK150	BV-3SURK150
2"	BV-3SVFRK200	BV-3SGRK200	BV-3SCRK200	BV-3SSRK200	BV-3SURK200
2-1/2"	BV-3SVFRK250	BV-3SGRK250	BV-3SCRK250	BV-3SSRK250	BV-3SURK250
3"	BV-3SVFRK300	BV-3SGRK300	BV-3SCRK300	BV-3SSRK300	BV-3SURK300
4"	BV-3SVRRK400	BV-3SGRK400	BV-3SCRK400	BV-3SSRK400	BV-3SURK400

Seat kits contain: (2) encapsulated seats (item 19), 2 encapsulated seats (item 4), (1) plug (item 20), (1) thrust washer (item 6), (1) O-ring (item 7), (3) stem packing (item 8), (2) body seals (item 5).

NOTE: Quantity of 1 for 1/2", quantity of 2 for 3/4", and quantity of 3 for 1" to 4".

Handle Kits

Size	Part Number	Contains	
		Item Number	Description
1/2"	BV-23-HA050-075	10	bevel washer
3/4"		11	stop pin
1"	BV-23-HA100	12	nut
1-1/2"	BV-23-HA150-200	14	handle
2"			
2-1/2"	BV-23-HA17		
3"	BV-23-HA-22		
4"			

Stem Kits

Size	Part Number		Contains	
	L Port	T Port	Item Number	Description
1/2"	BV3SV-SML-050	BV3SV-SMT-050	6	thrust washer
3/4"	BV3SV-SML-075	BV3SV-SMT-075	7	O-ring
1"	BV3SV-SML-100	BV3SV-SMT-100	8	stem packing
1-1/2"	BV3SV-SML-150	BV3SV-SMT-150	9	gland ring
2"	BV3SV-SML-200	BV3SV-SMT-200	10	spring washer
2-1/2"	BV3SV-SML-250	BV3SV-SMT-250	13	stem
3"	BV3SV-SML-300	BV3SV-SMT-300	17	stem packing nut
4"	BV3SV-SML-400	BV3SV-SMT-400	21*	lock washer

*Only included in stem kit sizes 2-1/2" to 4".

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.

Notes

Limited Warranty

DIXON VALVE AND COUPLING COMPANY, LLC (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.

The Right Connection®

Dixon Sanitary

N25 W23040 Paul Road
Pewaukee, WI 53072
Phone: 800.789.1718
Email: sanitarysales@dixonvalve.com

connect with us on

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