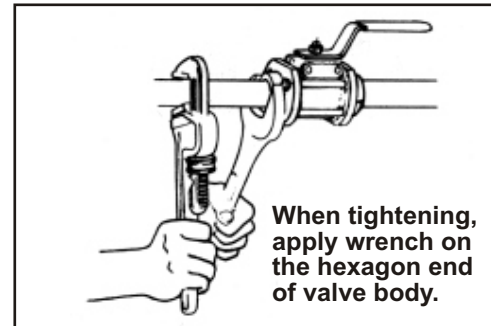


NPT ball valve Installation

Remove end connection protectors (*if applicable*) and inspect the valve bore for foreign matter and clean if necessary. Blow out piping and thoroughly clean before valve installation. Clean male pipe threads with wire brush and rag. If valve threads have been damaged or exposed to weather, running a tap or die over the threads may straighten them. Do not dismantle valves prior to fitting, treat as a single unit. Pipe sealing compound should be applied sparingly on male threads only. Start the connection by turning the valve or pipe by hand as far as possible. Make sure the pipe thread has engaged the valve thread properly. Use wrenches to tighten the valve to the pipe. **When tightening, apply wrench on the hexagon end of valve body to ensure you do not break the "Cap Seal".** Do not over tighten or strip the threads. Strainers should be cleaned after initial startup.



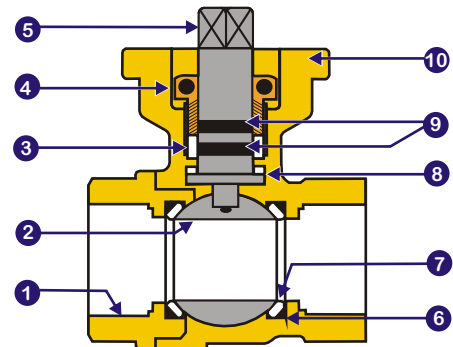
NOTE: For Bronze ball valve assemblies, normal thread engagement between male pipe thread and valve body should be observed. Pipe run that is in too far could damage the control valve. See Table 1 on page 2.

2-Way & 3-Way / Bronze Ball Valve

Performance

Body Rating**	Item	Description	Materials	Item	Description	Materials
600 psi WOG (see 3-way note below)	1	Body	Bronze	6	Seat Backing	EPDM
	2	Ball	Brass/Chrome	7	Ball Seat	PTFE
Steam Rating 15 psi Max.	3	Packing	PTFE	8	Stem Seal	PTFE
	4	Gland	Brass	9	O-Ring	BUNA
Temp. Rating -20°F to 320°F	5	Stem	Brass	10	Namur Mount	Bronze

**Three-way valves rated 600 WOG 1/2"-1 1/4", 1 1/2"-2" 400 WOG
! Max. Temperature is at 0 psi, Steam is Saturated



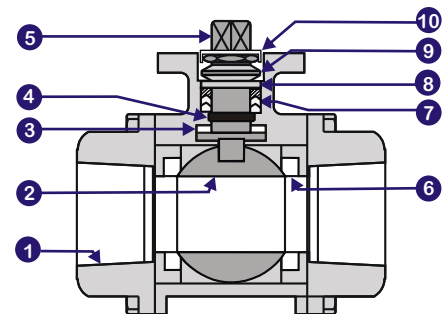
2-Way / 3-Piece All Stainless

Performance

Standard Valve Construction

Body Rating	Item	Description	Materials	Item	Description	Materials
1000 psi WOG	1	Body	Stainless	6	Ball Seat	RTFE
	2	Ball	Stainless	7	Bushing & Packing	PTFE
Steam Rating 150 psi Max.	3	Stem Seal	PTFE	8	Gland	Stainless
	4	O-Ring	Viton	9	Belleville Washer	Stainless
Temp. Rating -20°F to 425°F	5	Stem	Stainless	10	Adjusting Nut & Locking Saddle	Stainless

! Max. Temperature is at 0 psi, Steam is Saturated



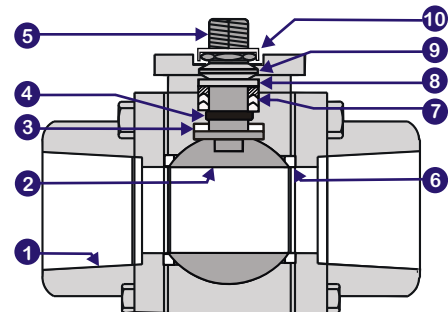
2-Way / 3-Piece Forged Carbon x Stainless

Performance

Standard Valve Construction

Body Rating	Item	Description	Materials	Item	Description	Materials
2000 psi WOG	1	Body	Forged Carbon	6	Ball Seat	20% Carbon 5% Graphite
	2	Ball	Stainless	7	Bushing & Packing	Graphite
Steam Rating 300 psi Max.	3	Stem Seal	PTFE	8	Gland	Stainless
	4	O-Ring	Viton	9	Belleville Washer	Stainless
Temp. Rating -58°F to 662°F	5	Stem	Stainless	10	Adjusting Nut & Locking Saddle	Stainless

! Max. Temperature is at 0 psi, Steam is Saturated



2-Piece Body

Automated Operation

•Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response. Five diameters in each direction are recommended. Strainers should be installed to protect valve from debris. For specific details on the actuator refer to "Actuator" Section in catalog.
•Normal pipe thread between male pipe thread and valve body should be observed. Pipe run that is screwed in too far will damage the control valve.

Complies with ANSI B2.1

ANSI External Taper Pipe Thread Engagement Table 1

Valve Size (NPT)	Normal	Valve Size (NPT)	Normal
1/2"	.320	1 1/2"	.420
3/4"	.339	2"	.436
1"	.400	2 1/2"	.682
1 1/4"	.420	3"	.766

Maintenance

!!System Must Be De-Pressurized To Work On Valve!!

Leakage at Stem

2-Way or 3-Way: If leakage from the stem is detected adjust the packing gland as follows. While the valve is still inline and with the actuator attached take a small screwdriver and adjust the packing gland a quarter turn clockwise until leak has stopped (See Below). *NOTE:* Do not over tighten as the valve torque could increase dramatically.

Leakage at Body Joint

Check the tightness in 2-piece valve body. If loose, tighten using standard wrenches. If leakage is still observed, internal seal(s) must be damaged or worn. It will be necessary to replace valve because there are no repair kits available.

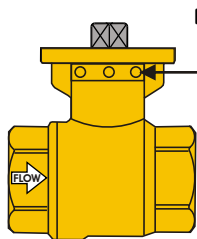
Leakage In - Line

Check that valve is fully closed by looking at the groove on the valve shaft. If the groove is perpendicular and leakage is occurring, it is due to damaged (worn out) seats or ball sealing surface and it will be necessary to replace valve.

Leakage at Pipeline Joint

Test for tightness of screwed thread. If loose, tighten with standard wrenches. If leakage continues, valve housing must have become damaged during installation and valve must be replaced.

Adjustable Packing Gland

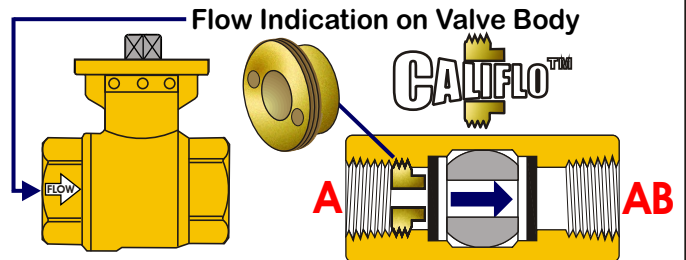


NOTE: Adjustable Packing Gland Should Only Be Used for Emergencies!

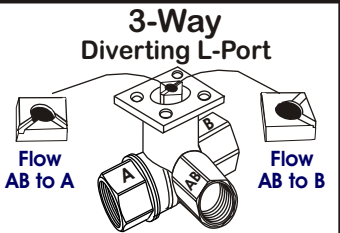
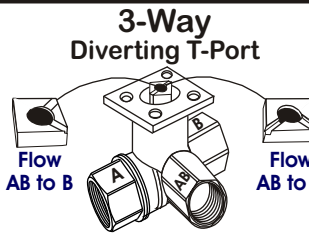
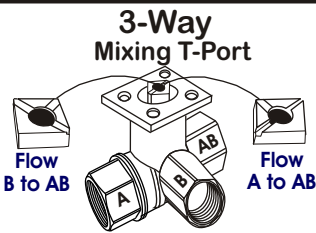
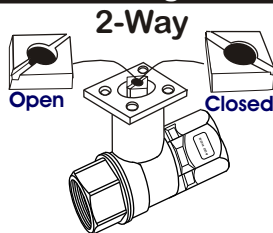
• If a stem leak occurs gently insert a small screwdriver into the holes in the packing gland located under the mount pad. Gently turn the screwdriver clockwise until the leak stops. Do not over tighten or it could damage the operator.

Patented Feature Available on 2-Way and 3-Way Valves

Flow Arrangement



Stem Arrangement



Three-way Flow Pattern / Default

All configurations are bi-directional close off. The mixing and diverting T-Port valves through port is equal percentage and the by-pass port is equal percentage and yields 80% of the flow of Port A.

•T-Port Default / Chrome Trim

Non-Spring: Assemblies are set up B to AB Open at 0 VDC and will fail in last position, on loss of power

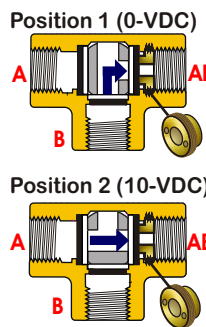
Spring: Assemblies are set up B to AB Open at 0 VDC and will fail B to AB Open, on loss of power

•L-Port Default / Chrome Trim

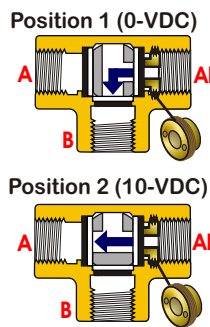
Non-Spring: Assemblies are set up AB to A open at 0 VDC and will fail in last position, on loss of power

Spring: Assemblies are set up AB to A Open at 0 VDC and fail AB and A Open, on loss of power

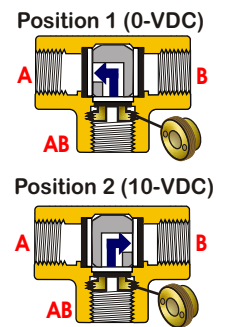
Mixing T-Port



Diverting T-Port



Diverting L-Port



Letters on Valve Body Indicate Flow Pattern

Unless specified position of valve versus Volts DC is set up as above

2-Piece Body

Automated Operation

Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response. Five diameters in each direction are recommended. Strainers should be installed to protect valve from debris. For specific details on the actuator refer to "Actuator" Section in catalog.

Maintenance !!System Must Be De-Pressurized To Work On Valve!!

Leakage at Stem

If leakage from the stem is detected, there are no repair kits available. Valve must be replaced.

Leakage at Body Joint

Check the tightness in 2-piece valve body. If loose, tighten using standard wrenches. If leakage is still observed, internal seal(s) must be damaged or worn out. It will be necessary to replace valve because there are no repair kits available.

Leakage In - Line

Check that valve is fully closed by looking at the groove on the valve shaft. If the groove is perpendicular and leakage is occurring, it is due to damaged (worn out) seats or ball sealing surface. In these cases, it will be necessary to replace valve.

Leakage at Pipeline Joint

Test for tightness of screwed thread. If loose, tighten with standard wrenches. If leakage continues, valve housing must have become damaged during installation and valve must be replaced.

Stem Arrangement

Valves are bi-directional 100% close off ANSI Class VI



3-Piece Body

Automated Operation

Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response. Five diameters in each direction are recommended. Strainers should be installed to protect valve from debris. For specific details on the actuator refer to "Actuator" Section in catalog.

Maintenance !!System Must Be De-Pressurized To Work On Valve!!

Leakage at Stem

Belleville washers are used in the stem design for automatic wear compensation. If leakage from the stem is detected, damaged components must be replaced within stem housing. Maintenance of parts can be performed with valve installed in the line and de-pressurized. To replace damaged components within stem housing, remove one body bolt and loosen the other three so that the valve body can be swung outward. Rotate stem so that the valve is in closed position. Remove the locking saddle and adjusting nut from the top of stem. Remove the ball and withdraw stem through body cavity. The bushing and packing can now be removed from the top of the stem. Examine and replace damaged or worn parts as necessary. Repair kit contains all soft goods.

Leakage at Body Joint

Check the tightness in the body connector bolts. If loose, tighten body bolts with standard wrenches. Excessive force is not necessary, as it might cause the bolts to be damaged. If leakage is still observed, the Body seal(s) will need to be replaced. To replace damaged component, remove one body bolt and loosen the other three so that the valve body can be swung outward. Remove the body seal(s) and inspect. Replace worn or damaged soft goods. Repair kit contains all soft goods.

Leakage In - Line

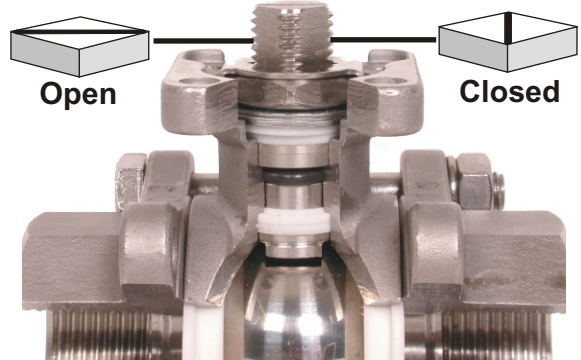
Check that valve is fully closed by looking at the groove on the valve shaft. If the groove is perpendicular and leakage is occurring, it is due to damaged (worn out) seats or ball sealing surface. In these cases, it will be necessary to replace damaged components. To replace damaged components, remove one body bolt and loosen the other three so that the valve body can be swung outward. Remove the body seat(s) and the ball seat(s) and inspect. Replace if worn or damaged.

Leakage at Pipeline Joint

Test for tightness of screwed thread. If loose, tighten with standard wrenches. If leakage continues, valve housing must have become damaged during installation and valve must be replaced.

Stem Arrangement

Valves are bi-directional 100% close off ANSI Class VI



3-Piece Body

Automated Operation

Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response. Five diameters in each direction are recommended. Strainers should be installed to protect valve from debris. For specific details on the actuator refer to "Actuator" Section in catalog.

Maintenance

!!System Must Be De-Pressurized To Work On Valve!!

Leakage at Stem

Belleville washers are used in the stem design for automatic wear compensation. If leakage from the stem is detected, damaged components must be replaced within stem housing. Maintenance of parts can be performed with valve installed in the line and de-pressurized. To replace damaged components within stem housing, remove body bolts from valve housing and remove middle section of valve containing ball and stem. Remove the locking saddle and adjusting nut from the top of stem. Remove spring washers, gland follower and packing ring from top of valve body. Remove the ball and withdraw stem along with thrust washer through body cavity. Examine and replace damaged or worn parts as necessary.

Leakage at Body Joint

Check the tightness in the body connector bolts. If loose, tighten body bolts with standard wrenches. Excessive force is not necessary, as it might cause the bolts to be damaged. If leakage is still observed, the Body seat(s) will need to be replaced. To replace damaged component, remove the body bolts from the valve housing and remove middle section of valve containing ball and stem. Remove the body seal(s) and inspect. Replace worn or damaged soft goods. Repair kit contains all soft goods.

Leakage In - Line

Check that valve is fully closed by looking at the flats on the valve shaft. If the flats is perpendicular to valve body and leakage is occurring, it is due to damaged (worn out) seats or ball sealing surface. In these cases, it will be necessary to replace damaged components. To replace damaged components, remove the body bolts from valve body and remove middle section of valve containing ball and stem. Remove the body seal(s), seat(s) and seat ring(s) and inspect. Replace if worn or damaged.

Leakage at Pipeline Joint

Test for tightness of screwed thread. If loose, tighten with standard wrenches. If leakage continues, valve housing must have become damaged during installation and valve must be replaced.

Exploded View

Valves are bi-directional 100% close off ANSI Class VI

Part NO.	Part Name	Material
1	Locking Nut	C.S. Zinc plated
2	Spring Washer	S.S. 302
3	Gland Follower	S.S. 316
4	Packing Ring	Graphite
5	Stem O-Ring	Viton
6	Thrust Washer	Reinforced PTFE
7	Antistatic Stem	S.S. 316
8	Ball	S.S. 316
9	Body Seal	Reinforced PTFE
10	Body Seal	Graphite
11	Seats (PTFE filled)	20% C. 5%Graphite
12	Seat Ring	Reinforced PTFE
13	End Connection	ASTM A105
14	Body Bolts	ASTM A193 B7M
15	Stop Washer	S.S. 316

Stainless Bodies Available

