Ball Valves & Actuators

2 Way, 3 Way, 4 Way Series Ball Valves
Pneumatic & Electric Actuators

Pressures to 20,000 psi (1379 bar)

Principle of Operation:

Parker Autoclave Engineers high-pressure ball valves have been designed to provide superior quality for maximum performance within a variety of valve styles, sizes, and process connections. Some of the more unique design innovations include an integral one-piece trunnion mounted style ball and stem that eliminates the shear failure common in two piece designs, re-torqueable seat glands that result in longer seat life, and a low friction stem seal that reduces actuation torque and enhances cycle life.

These ball valves can also be modified to incorporate the use of special materials, seals for high temperature applications, subsea models as well as pneumatic and electric valve actuators. When it comes to high-pressure applications, these ball valves with the associated high-pressure components, provide the critical performance demanded by the high pressure market.

Universal Ball Valve Features:

- One-piece, trunnion style ball-stem design eliminates shear failure and reduces side loading found in two-piece designs
- Re-torqueable seat glands for longer seat life
- PEEK™ seats offer excellent resistance to chemicals, heat, and wear/abrasion
- Full-port flow path minimizes pressure drop
- UNS S31600 high tensile strength cold worked 316 Stainless Steel construction
- Optional materials available such as 2507 Super Duplex, Inconel 625, Hastelloy C-276, and others. Contact Factory
- Low friction, pressure assisted, graphite filled PTFE stem seal increases cycle life and reduces operating torque
- Temperature Rated 0° to 400°F (-18° to 204°C) with standard FKM (Viton®) o-rings
- Optional seals available for temperatures to 500°F (260°C) maximum
- Special material versions meeting NACE/ISO 15156 requirements are available
- Wide selection of tube or pipe end fittings available
- Electric and pneumatic actuator options are offered

Table of Contents:

Many types of Ball Valves are sized primarily by connection size. Parker Autoclave Engineers offer multiple connection sizes within various bore sizes listed below, providing enhanced flow options. **It is necessary when ordering to state both bore and connection sizes.**

2 Way Quarter Turn Ball Type 1/4" to 1" Bore

Pressures to 20,000 psi (1380 bar)

2B4, 2B6, 2B8, 2B12, 2B16 Series

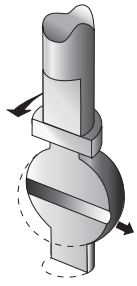
2 Way Ball Valve Features:

- One-piece, trunnion style, micro-finished ball-stem design eliminates shear failure and reduces side loading found in two-piece designs.
- Re-torqueable seat glands for longer seat life.
- PEEK™ seats offer excellent resistance to chemicals, heat, and wear/abrasion.
- Full-port, bi-directional, straight-through flow path minimizes pressure drop.
- Low friction, pressure assisted, graphite filled PTFE stem seal increases cycle life and reduces operating torque.
- Quarter turn (90° actuation) from open to close with positive stop.
- FKM Fluorocarbon (Viton®) O-rings are standard, 0° to 400°F (-18° to 204°C)
- Optional seals available for temperatures to 500°F (260°C) maximum.
- Wide selection of tube and pipe end fittings available.
- 24VDC, 120 & 220VAC Electric and pneumatic actuator options.

2 Way Ball Valve Applications:

- Laboratories
- Test Stands
- Control Panels
- Pilot Plants
- Chemical/Petrochemical
- Oil & Gas Production

Flow Configuration

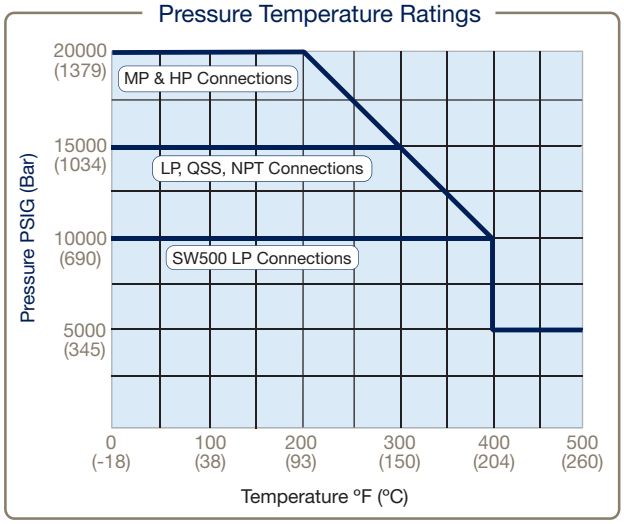


Two-Way Shut-Off

2 Way Series: 1/4" (6.35mm) Orifice - Pressures to 20,000 psi (1379 bar)

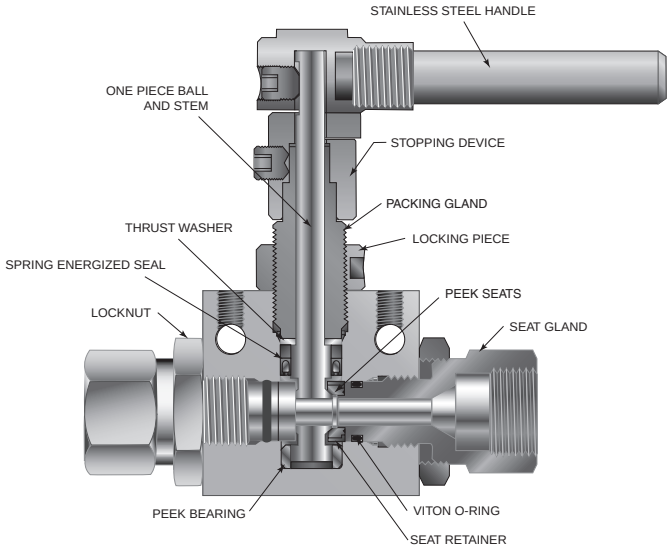
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv*
SW250 (1/4" LP)	15,000 psi (1034 bar)	0.129 (3.28)	0.27
SW375 (3/8" LP)	15,000 psi (1034 bar)	0.250 (6.35)	1.51
SW500 (1/2" LP)	10,000 psi (690 bar)	0.250 (6.35)	1.51
SF250CX20 (1/4" MP)	20,000 psi (1379 bar)	0.109 (2.77)	0.17
SF375CX20 (3/8" MP)	20,000 psi (1379 bar)	0.203 (5.16)	0.94
SF562CX20 (9/16" MP)	20,000 psi (1379 bar)	0.250 (6.35)	1.51
F250C (1/4" HP)	20,000 psi (1379 bar)	0.094 (2.39)	0.12
F375C (3/8" HP)	20,000 psi (1379 bar)	0.125 (3.17)	0.25
F562C (9/16" HP)	20,000 psi (1379 bar)	0.188 (4.77)	0.68
1/4" FNPT	15,000 psi (1034 bar)	0.250 (6.35)	1.51
3/8" FNPT	15,000 psi (1034 bar)	0.250 (6.35)	1.51
1/2" FNPT	15,000 psi (1034 bar)	0.250 (6.35)	1.51
QS250 (1/4" QSS)	15,000 psi (1034 bar)	0.109 (2.77)	0.17
QS375 (3/8" QSS)	15,000 psi (1034 bar)	0.250 (6.35)	1.51
To determine MPa, Multiply Bar by 0.1			

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



2-Way, 1/4" Bore Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium is not recommended and should be evaluated on a case by case basis. Consult factory.

See ball valve actuator section for full description, additional information, and options.additional information, and options.

Ordering Guide:

2-way ball valves are furnished complete with tube or pipe connections. Standard valve uses FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 2B4S20M9***

Example Part Number:	**2B**	**4**	**S**	**20**	**M9**	**–**	**XXX**
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
2B	2 Way Ball Valve

B - Ball Orifice Diameter	
4	1/4" (6.35mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
HC**	Hastelloy C
IN625**	Inconel 625 Wetted Material
IN825**	Inconel 825 Wetted Material
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi (690 bar) (1/2" LP connection)
15	15,000 psi (1034 bar) (LP, NPT, and QSS Connections)
20	20,000 psi (1380 bar) (MP & HP Connections)

Basic Repair Kits: (see page 11 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R2B4S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R2B4S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
L4	SW250 (1/4" LP)	15,000 psi	1"
L6	SW375 (3/8" LP)	15,000 psi	1"
L8	SW500 (1/2" LP)	10,000 psi	1"
M4	SF250CX20 (1/4" MP)	20,000 psi	1"
M6	SF375CX20 (3/8" MP)	20,000 psi	1"
M9	SF562CX20 (9/16" MP)	20,000 psi	1"
H4	F250C (1/4" HP)	20,000 psi	1"
H6	F375C (3/8" HP)	20,000 psi	1"
H9	F562C (9/16" HP)	20,000 psi	1-3/8"
P4	1/4" FNPT	15,000 psi	1"
P6	3/8" FNPT	15,000 psi	1"
P8	1/2" FNPT	15,000 psi	1-3/8"
Q4	QS250 (1/4" QSS)	15,000 psi	1"
Q6	QS375 (3/8" QSS)	15,000 psi	1"

F - Options (Suffix addition)	
BO	O-ring, Buna-N, 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket, (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

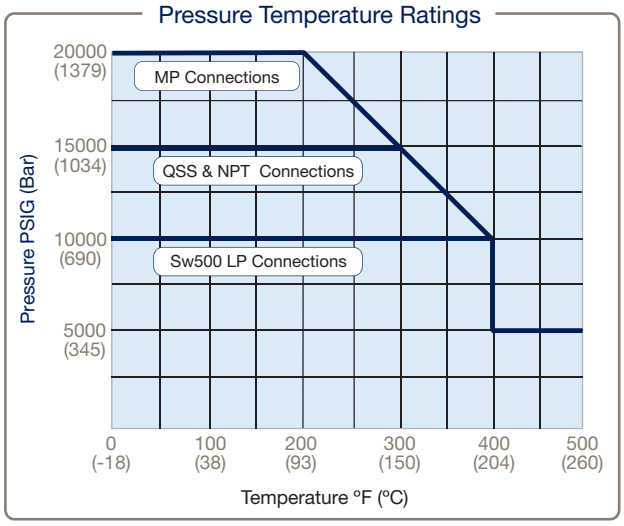
Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	EXP			
AO	Air to Open / Spring to Close	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3**	**EO3X**	24 VDC		

2 Way Series: 3/8" (9.52mm) Orifice - Pressures to 20,000 psi (1379 bar)

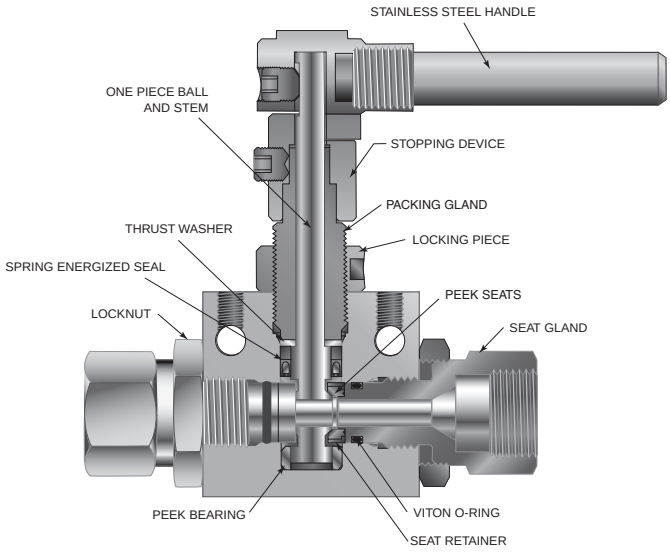
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv*
SW500 (1/2" LP)	10,000 psi (690 bar)	0.375 (9.52)	5.20
SF375CX20 (3/8" MP)	20,000 psi (1379 bar)	0.203 (5.16)	0.94
SF562CX20 (9/16" MP)	20,000 psi (1379 bar)	0.312 (7.92)	3.24
SF750CX10 (3/4" MP)	20,000 psi (1379 bar)	0.328 (8.33)	3.40
1/4" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.20
3/8" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.20
1/2" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.20
QS375 (3/8" QSS)	15,000 psi (1034 bar)	0.250 (6.35)	1.68
QS562 (9/16" QSS)	15,000 psi (1034 bar)	0.359 (9.12)	4.77
To determine MPa, Multiply Bar by 0.1			

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



2 Way 3/8" Bore Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

See ball valve actuator section for full description, additional information, and options.additional information, and options.

Ordering Guide:

2-way ball valves are furnished complete with tube or pipe connections. Standard valve uses FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 2B6S20M9***

Example Part Number:	2B	6	S	20	M9	–	XXX
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
2B	2 Way Ball Valve

B - Ball Orifice Diameter	
6	3/8" (9.52mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
IN625**	Inconel 625 Wetted Material
Optional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi (690 bar) (1/2" LP Connection)
15	15,000 psi (1034 bar) (NPT & QSS Connections)
20	20,000 psi (1080 bar) (MP Connections)
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 11 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R2B6S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R2B6S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
L8	SW500 (1/2" LP)	10,000 psi	1-3/8"
M6	SF375CX20 (3/8"MP)	20,000 psi	1-3/8"
M9	SF562CX20 (9/16"MP)	20,000 psi	1-3/8"
M12	SF750CX10 (3/4"MP)	20,000 psi	1-3/8"
P4	1/4" FNPT	15,000 psi	1-3/8"
P6	3/8" FNPT	15,000 psi	1-3/8"
P8	1/2" FNPT	15,000 psi	1-3/8"
Q4	QS250 (1/4"QSS)	15,000 psi	1-3/8"
Q6	QS375 (3/4"QSS)	15,000 psi	1-3/8"

F - Options (Suffix addition)	
BO	O-ring, Buna-N, 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500°F (260°C)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

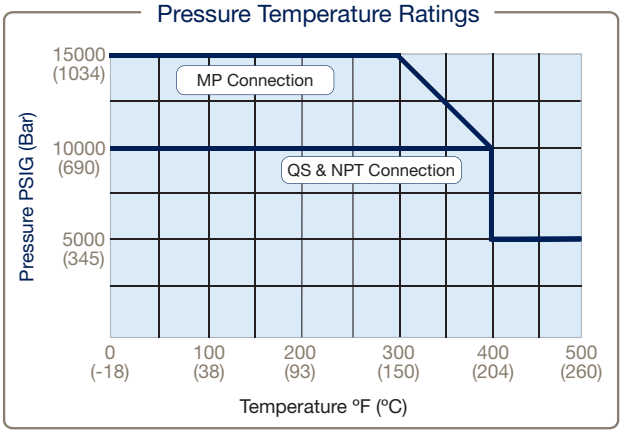
Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	EXP			
AO	Air to Open / Spring to Close	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3**	**EO3X**	24 VDC		

2 Way Series: 1/2" (12.7mm) Orifice - Pressures to 15,000 psi (1034 bar)

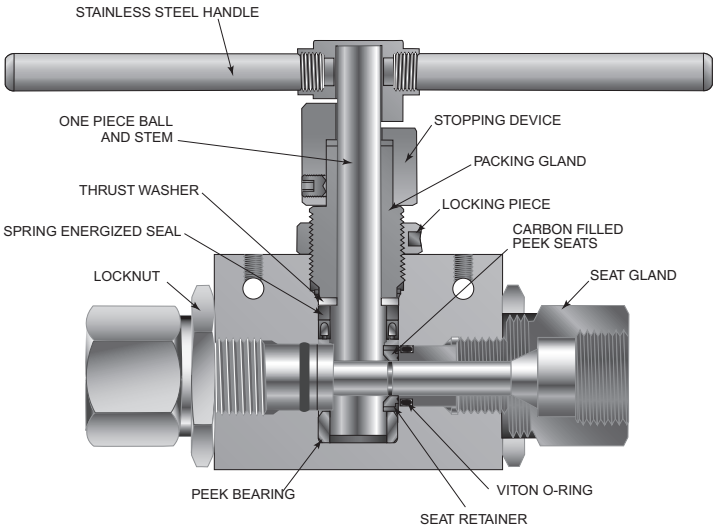
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv*
SF750CX10 (3/4" MP)	15,000 psi (1034 bar)	0.500 (12.70)	10.20
SF1000CX10 (1" MP)	15,000 psi (1034 bar)	0.500 (12.70)	10.20
3/4" FNPT	10,000 psi (690 bar)	0.500 (12.70)	10.20
1" FNPT	10,000 psi (690 bar)	0.500 (12.70)	10.20
QS750 (3/4" QSS)	15,000 psi (1034 bar)	0.500 (12.70)	10.20
QS1000 (1" QSS)	15,000 psi (1034 bar)	0.500 (12.70)	10.20
To determine MPa, Multiply Bar by 0.1			

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



2 Way 1/2" Bore Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Ordering Guide:

2-way ball valves are furnished complete with tube or pipe connections. Standard valve uses FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 2B8S20M12***

Example Part Number:	2B	8	S	20	M12	–	XXX
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
2B	2 Way Ball Valve

B - Ball Orifice Diameter	
8	1/2" (12.7mm)
12	3/4" (19.05mm)

C - Base Material	
S	316 Cold Worked Stainless Steel* (Not Available - 20Ksi Valves)
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (25-4SMO) Material (needs "**F**" Material Code Suffix) (Not Available - 20Ksi Valves)
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi
15	15,000 psi
20	20,000 psi (presently limited to 2507 Super Duplex material only)
Maximum MAWP based on connection type or material (whichever is lower)	

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M12	SF750CX10 (3/4" MP)	20,000 psi	1-3/4"
M16	SF1000CX10 (1" MP)	20,000 psi	1-3/4"
P12	3/4" FNPT	10,000 psi	1-3/4"
P16	1" FNPT	10,000 psi	1-3/4"

F - Options (Suffix Addition)	
BO	O-ring, Buna-N, 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" material code)

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

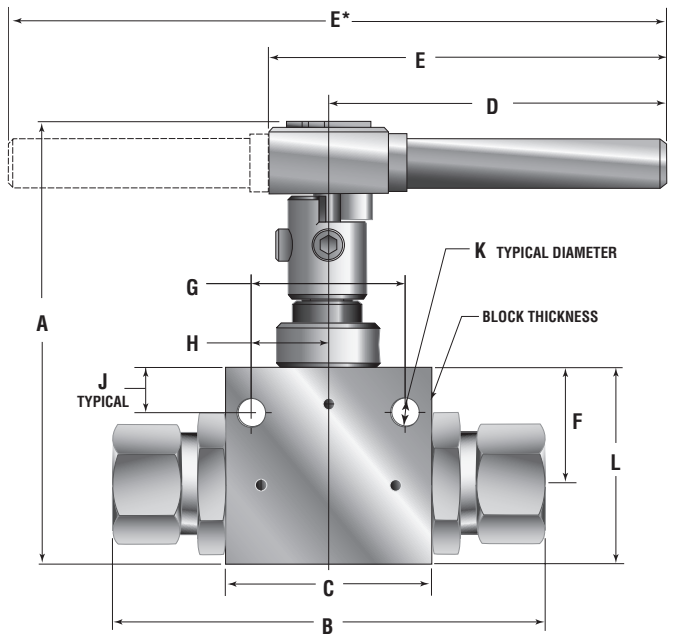
** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	EXP			
AO	Air to Open / Spring to Close	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3**	**EO3X**	24 VDC		

2 Way Ball Valve Dimensions:

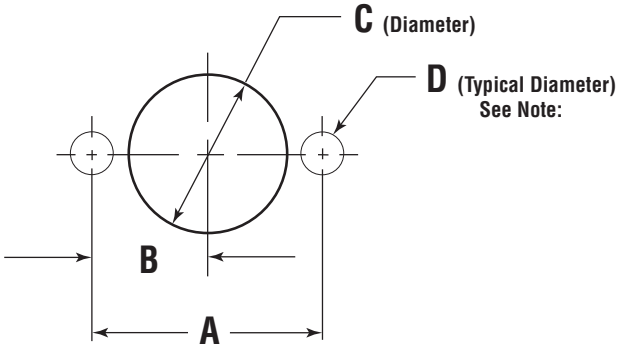
2 Way Ball Valve: 1/2" thru 3/4"



	VALVE MODELS - inches (mm)			
	2B8S-15Ksi	2B8S-20Ksi	2B12S-15Ksi	2B12S-20Ksi
A	5.97 (151.64)	5.97 (151.64)	10.13 (257.3)	10.26 (260.5)
B	7.73 (196.46)	7.73 (196.46)	9.18 (233.2)	9.18 (233.2)
C	4.13 (104.78)	4.13 (104.78)	4.50 (114.3)	4.50 (114.3)
D	5.12 (130.04)	5.12 (130.04)	11.00 (279.4)	11.00 (279.4)
E	10.24* (260.10)	10.25 (260.00)	22.00 (558.8)	22.00 (558.8)
F	1.76 (44.70)	1.76 (44.70)	2.47 (62.7)	2.47 (62.7)
G	3.00 (76.20)	3.00 (76.20)	3.25 (82.6)	3.25 (82.6)
H	1.50 (38.10)	1.50 (38.10)	1.63 (41.4)	1.63 (41.4)
J	0.50 (12.70)	0.50 (12.70)	0.69 (17.5)	0.69 (17.5)
K	0.28 (7.11)	0.28 (7.11)	0.41 (10.4)	0.41 (10.4)
L	3.09 (78.58)	3.09 (78.58)	4.50 (114.3)	4.63 (117.5)
Block Thickness	1.75 (44.45)	2.25 (57.2)	3.00 (76.2)	3.50 (88.9)

Panel Mounting Dimensions:

2 Way Ball Valve Panel Mounting

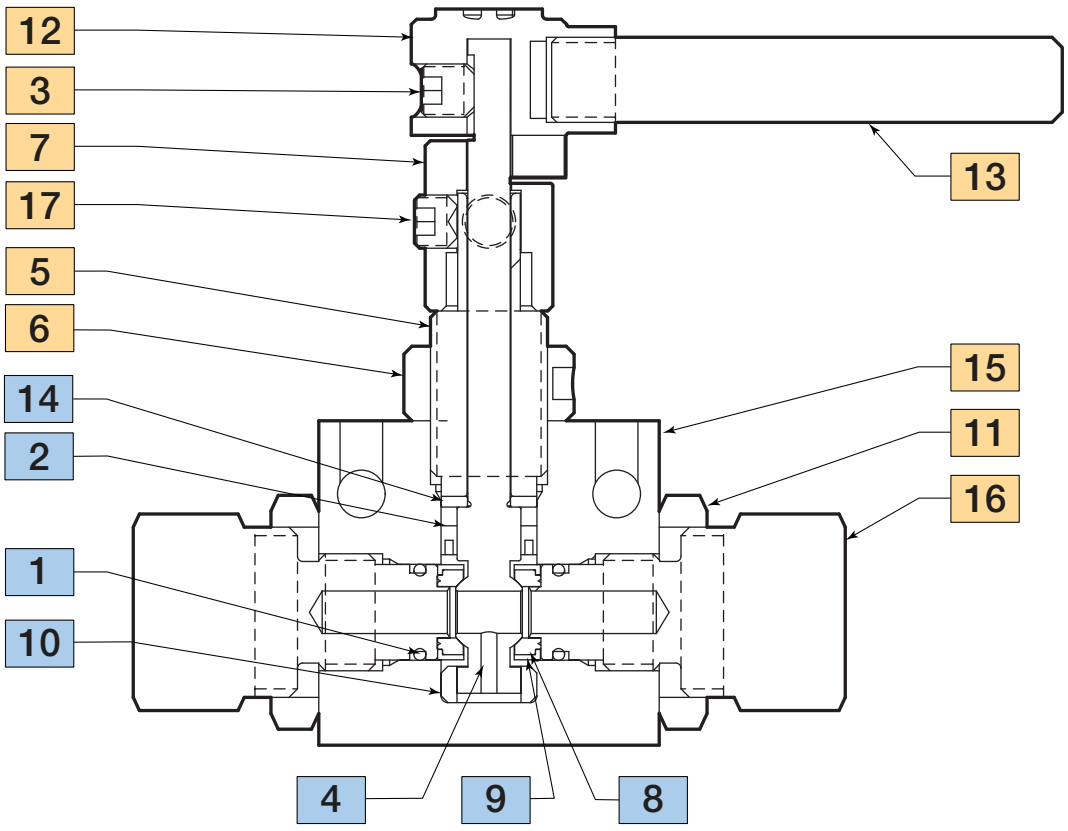


All dimensions are for reference only and are subject to change without notice.

	VALVE MODELS - inches (mm)		
	2B4S	2B6S	2B8S
A	1.50 (38.10)	2.00 (50.80)	3.00 (76.20)
B	0.75 (19.05)	1.00 (25.40)	1.50 (38.10)
C	1.06 (26.92)	1.50 (38.10)	1.88 (47.63)
D	0.28 (7.11)	0.28 (7.11)	0.28 (7.11)

Note: Body Mounting 1/4" - 20 threads

Parts Listing and Material: Typical 1/4", 3/8" and 1/2" - 2 Way Ball Valve Series



Material of Construction:

Item #	Description	Material
1	O-Ring	FKM
2	Stem Seal	Graphite Carbon PTFE
3	Set Screw, 5/16-18	Stainless Steel
4	Stem	316 CS SS
5	Packing Gland	316 CS SS
6	Locking Piece	316 SS
7	Stopping Device	316 CW SS
8	Seat	316 CW SS
9	Seat Retainer	316 CW SS

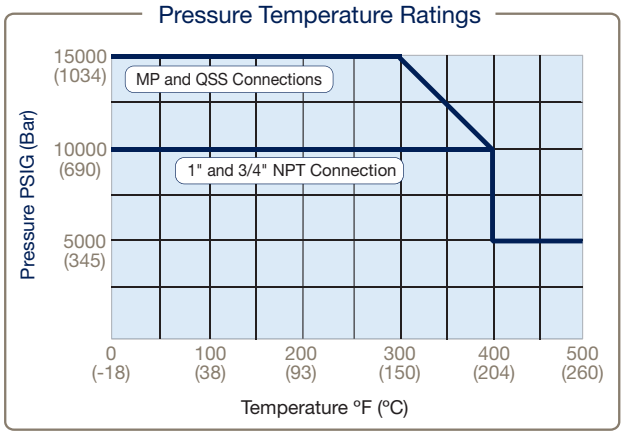
Item #	Description	Material
10	Bottom Bearing	PEEK
11	Locknut	316 SS
12	Handle Hub	316 SS
13	Handle	304 SS
14	Thrust Washer	AMPCO 45
15	Body	316 SS
16	Seat Gland	316 CW SS
17	Set Screw, 5/16-24	Stainless

Typical spare parts found in Repair Kits

2 Way Series: 3/4" (19.05mm) Orifice - Pressures to 15,000 psi (1034 bar)

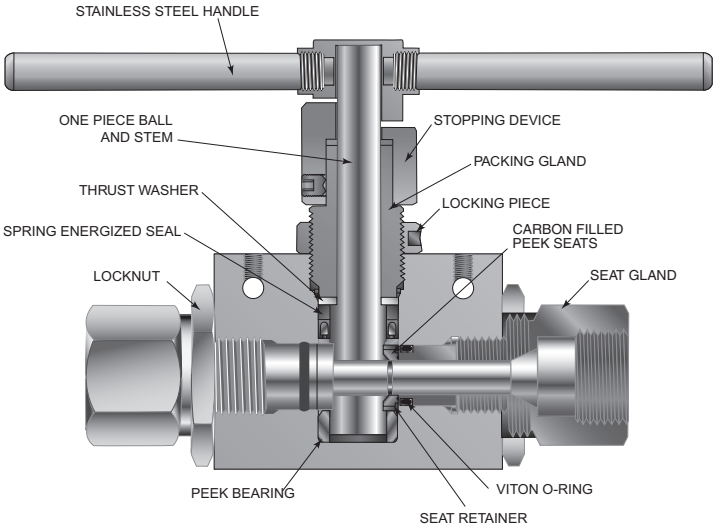
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv*
SF1000CX10 (1" MP)	15,000 psi (1034 bar)	0.688 (17.48)	21.00
3/4" FNPT	10,000 psi (690 bar)	0.750 (19.05)	24.00
1" FNPT	10,000 psi (690 bar)	0.750 (19.05)	24.00
QS1000 (1" QSS)	15,000 psi (1034 bar)	0.688 (17.48)	21.00
To determine MPa, Multiply Bar by 0.1			

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



2 Way 3/4" Bore Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Ordering Guide:

2-way ball valves are furnished complete with tube or pipe connections. Standard valve uses FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 2B12S15M16***

Example Part Number:		2B		12		S		15		M16	–	XXX
Ordering Parameters/Options:		Valve Series		Ball Orifice Diameter		Material		Pressure (x 1000 psi)		End Connection		Options
Table Reference: (see below)		A		B		C		D		E		F

A - Valve Series	
2B	2 Way Ball Valve

B - Ball Orifice Diameter	
12	3/4" (19.05 mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (25-4SMO) Material (needs "**F**" Material Code Suffix))
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi
15	15,000 psi
20	20,000 psi
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 15 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R2B12S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R2B12S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M16	SF1000CX10 (1" MP)	15,000 psi	1-7/8"
P12	3/4" FNPT	10,000 psi	1-7/8"
P16	1" FNPT	10,000 psi	1-7/8"
Q16	QS1000 (1" QSS)	15,000 psi	2" (square)

F - Options (Suffix addition)	
BO	O-ring, Buna-N 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
C	PTFE U-Cup Seal 0° to 500°F max (260°C) (replaces O-rings)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
PM	Panel Mount Hardware
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" Material Code
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

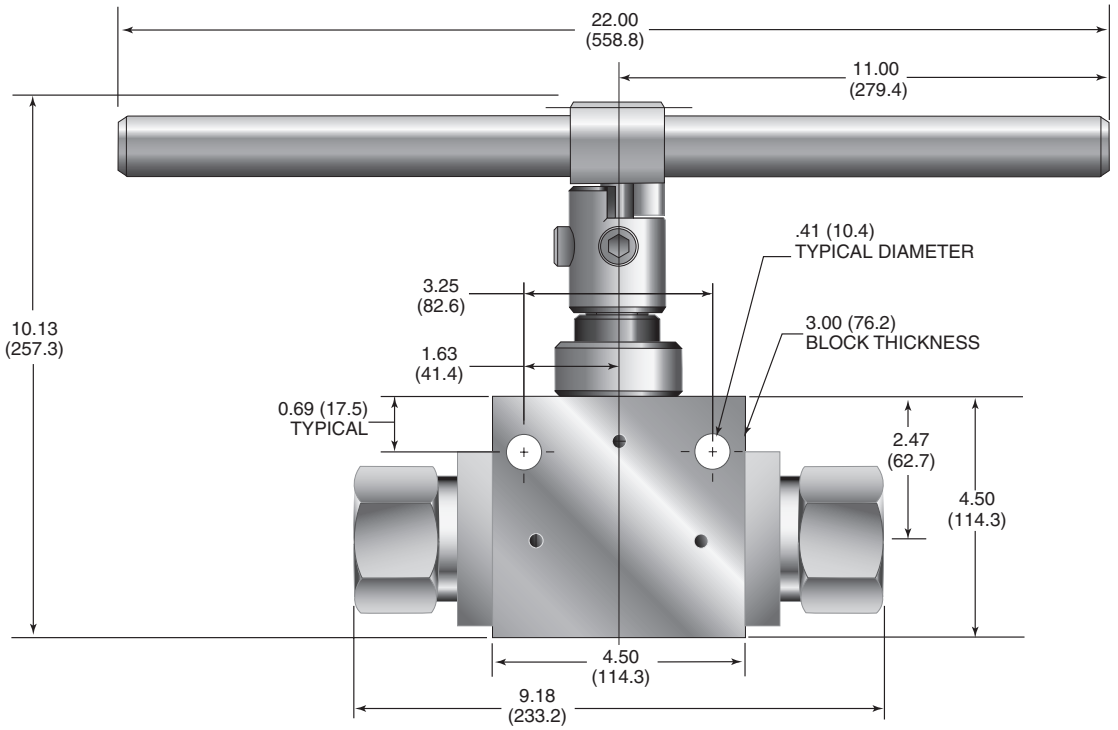
** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	EXP			
AO	Air to Open / Spring to Close	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**N/A**	**N/A**	24 VDC		

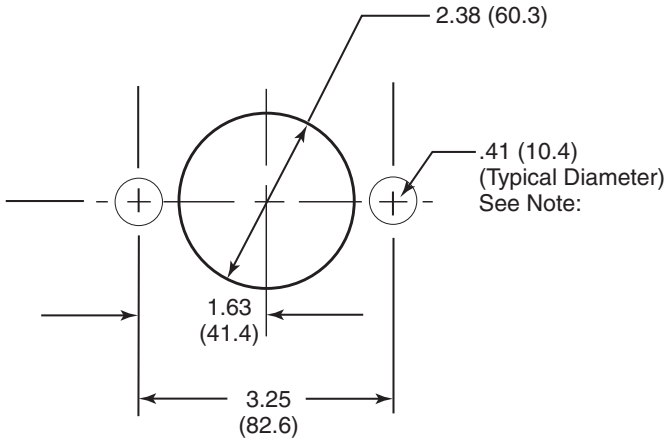
2 Way Ball Valve Dimensions:

3/4" - 2 Way Ball Valve



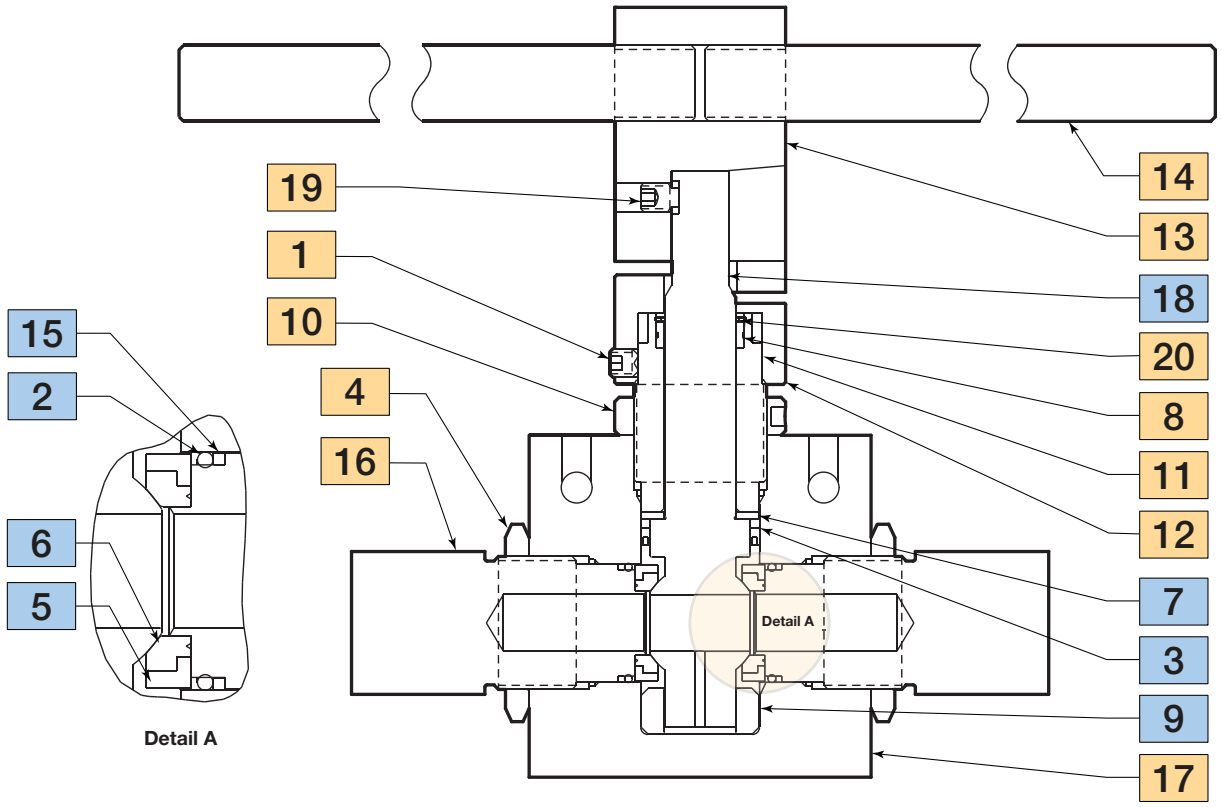
Panel Mounting Dimensions:

3/4" - 2 Way Ball Valve Panel Mounting



All dimensions are for reference only
and are subject to change without notice.
NOTE: Body mounting 3/8”-16 thread

Parts Listing and Material: 3/4" - 2 Way Ball Valve Series



Material of Construction:

Item #	Description	Material
1	Set Screw, 3/8 -16	316 SS
2	O-ring	FKM
3	Stem Seal	PTFE with Graphite
4	Locknut	316 SS
5	Seat	PEEK
6	Seat Retainer	Zeron 100
7	Thrust Washer	AMPCO 45
8	Top Bearing	Virgin PEEK
9	Bottom Bearing	Virgin PEEK
10	Locking Piece	316 SS

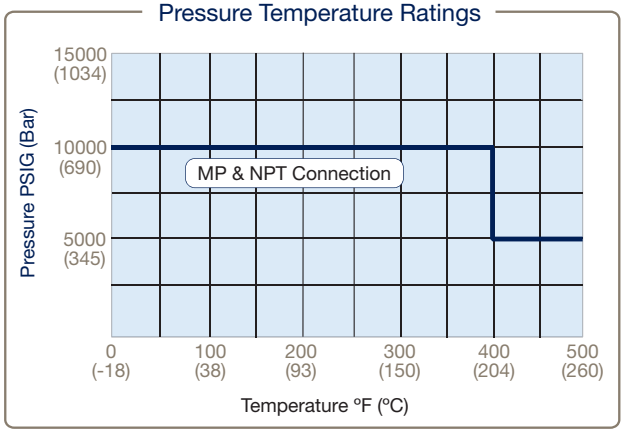
Item #	Description	Material
11	Stopping Device	316 SS
12	Packing Gland	316 SS
13	Hex Handle Hub	316 SS
14	Handle	316 SS
15	O-ring Backup	AMPCO 45
16	Seat Gland	316 CW SS
17	Body	316 CW SS
18	Stem	316 CW SS
19	Set Screw, 3/8-16	316 SS
20	Retaining Ring	302 SS

Typical spare parts found in Repair Kits

2 Way Series: 1" (25.40mm) Orifice - Pressures to 10,000 psi (690 bar)

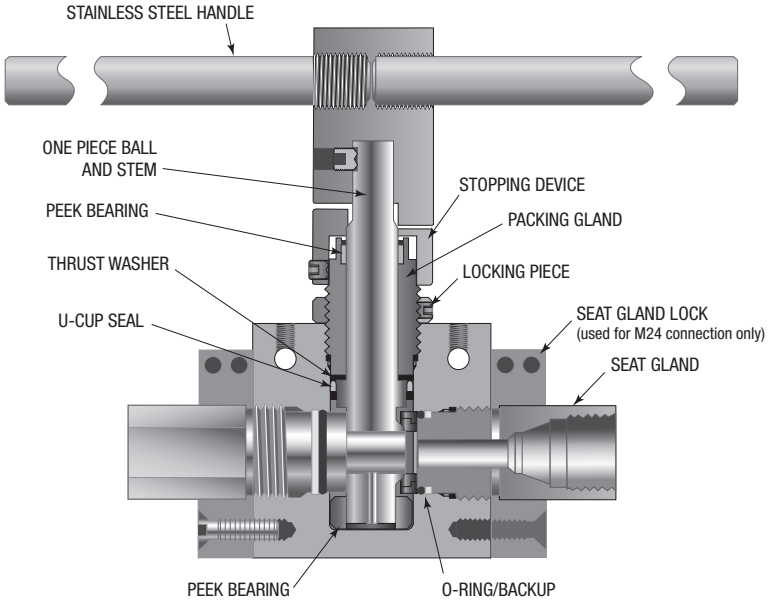
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V*
SF1500CX10 (1.5" MP)	10,000 psi (690 bar)	0.938 (23.83)	34
1" FNPT	10,000 psi (690 bar)	1.00 (25.40)	37.2
To determine MPa, Multiply Bar by 0.1			

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



2 Way 1" Bore Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Ordering Guide:

2-way ball valves are furnished complete with tube or pipe connections. Standard valve uses FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 2B16S10M24***

Example Part Number:	2B	16	S	10	M24	–	XXX
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
2B	2 Way Ball Valve

B - Ball Orifice Diameter	
16	1" (25.4 mm)

C - Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (25-4SMO) Material (needs "**F**" Material Code Suffix)
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi
15	15,000 psi
20	20,000 psi
Maximum MAWP based on connection type or material (whichever is lower)	

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M24	SF1500CX10 (1.5" MP)	10,000 psi	2-1/4"
P16	1" FNPT	10,000 psi	1-7/8"

F - Options (Suffix addition)	
BO	O-Ring, Buna-N 40° to 250°F (121°C)
EPR	O-Ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
C	PTFE U-Cup Seal 0° to 500°F max (260°C) (replaces O-rings)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" material code)
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

Basic Repair Kits: (see page 19 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R2B16S

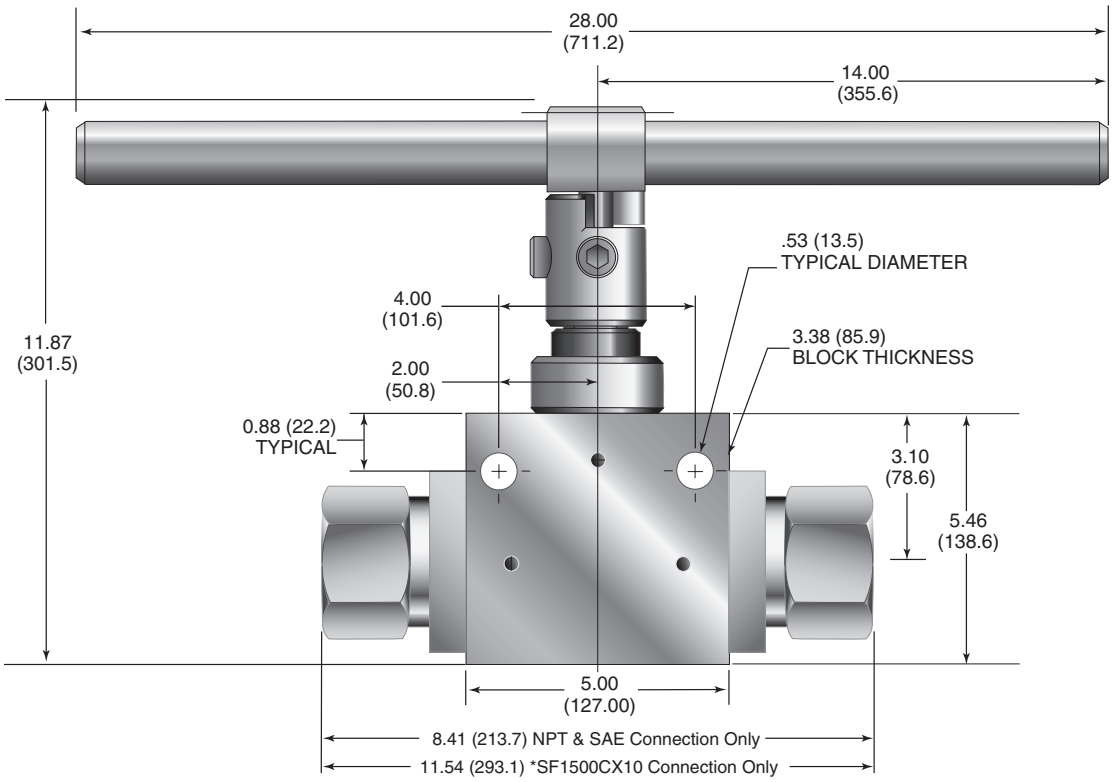
When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R2B16S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	EXP			
AO	Air to Open / Spring to Close	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**N/A**	**N/A**			

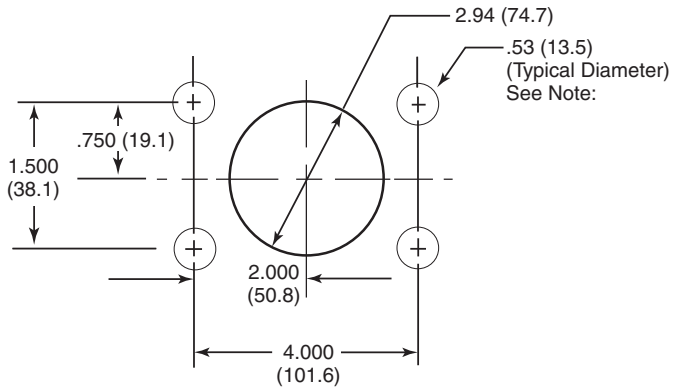
2 Way Ball Valve Dimensions:

1" - 2 Way Ball Valve



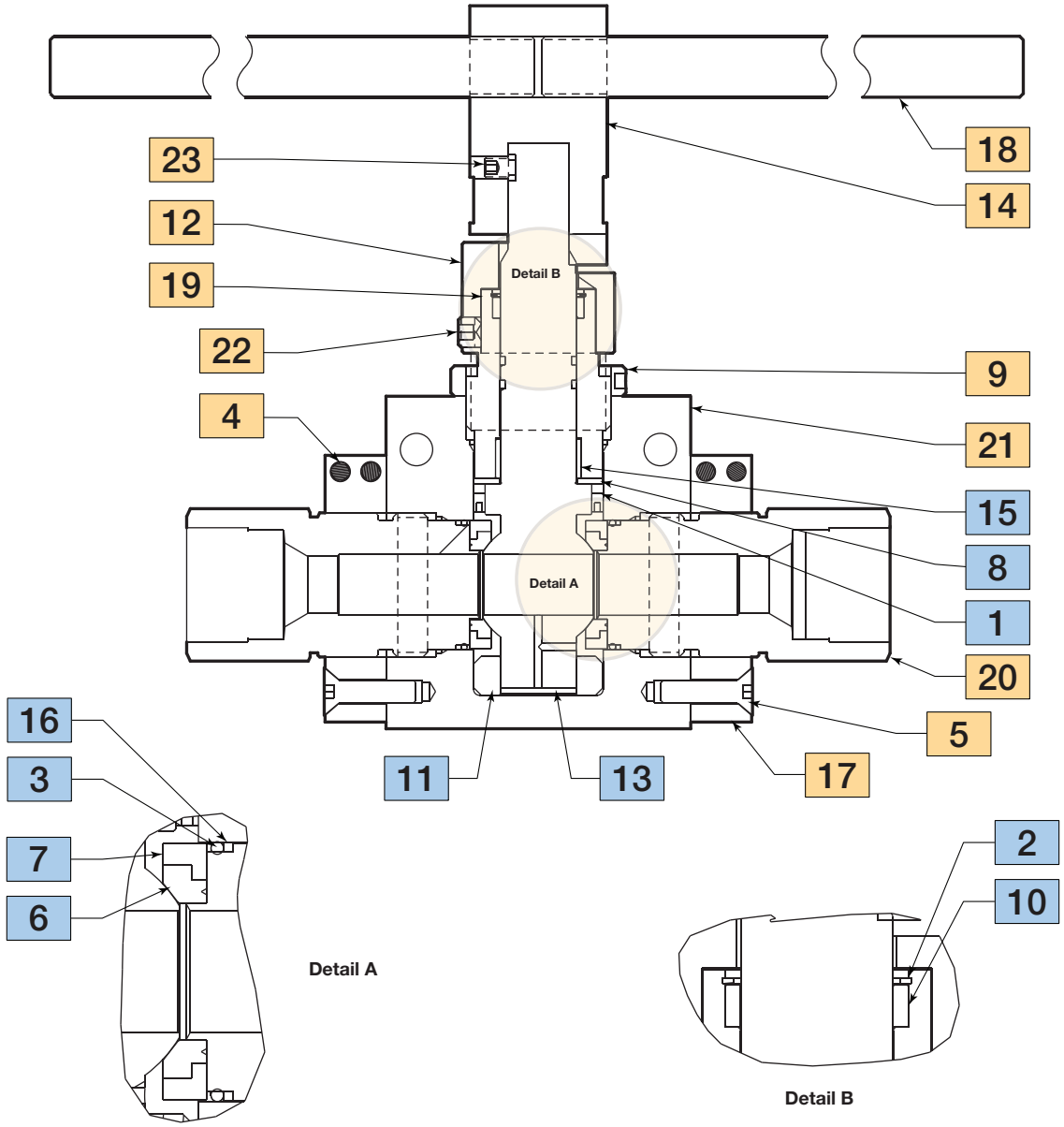
Panel Mounting Dimensions:

1" - 2 Way Ball Valve Panel Mounting



All dimensions are for reference only
and are subject to change without notice.
NOTE: Body mounting 3/8"-16 thread

Parts Listing and Material: 1" - 2 Way Ball Valve Series



Material of Construction:

Item #	Description	Material
1	Stem Seal w/ Spring	PTFE w/ Graphite
2	Retaining Ring	316 SS
3	O-Ring	FKM
4	Hex Cap Screw, 5/16-18	316 SS
5	Flat Head Cap Screw, 3/8-16	316 SS
6	Seat	PEEK
7	Seat Retainer	316 CW SS
8	Thrust Washer	AMPCO 45
9	Locking Piece	316 SS
10	Top Bearing	Virgin PEEK
11	Bottom Bearing	Virgin PEEK
12	Stopping Device	316 SS

Item #	Description	Material
13	Stem	316 CW SS
14	Hex Handle Hub	316 SS
15	Bearing	AMPCO 45
16	O-Ring Backup	AMPCO 45
17	Locking Device	316 SS
18	Handle	316 SS
19	Packing Gland	A286 SS
20	Seat Gland	A286 SS
21	Body	316 CW SS
22	Set Screw, 1/2-13	300 Series SS
23	Hex Set Screw, 3/8-16	316 SS

Typical spare parts found in Repair Kits

3 Way Quarter/180º Turn Ball Type 3/16" to 1/2" Bore

Pressures to 20,000 psi (1380 bar)

3B3/3BD3, 3B6/3BD6, and 3B8/3BD8 Series

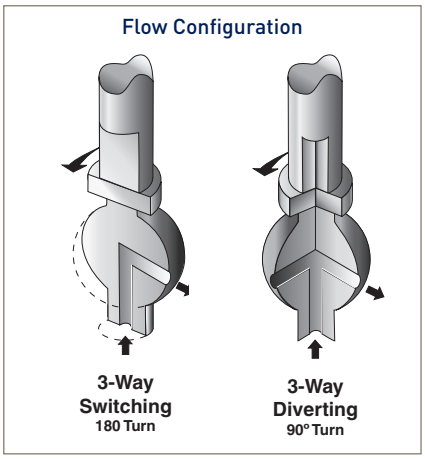
These ball valves can also be modified to incorporate the use of special materials, seals for high temperature applications, subsea models, and valve actuators. When it comes to high-pressure applications, these ball valves with the associated high-pressure components, provide the critical performance demanded by the high pressure market.

3 Way Ball Valve Features:

- One-piece, trunnion mounted style, stem design eliminates shear failure and reduces the effects of side loading found in two piece designs
- Re-torqueable seat glands for longer seat life
- Carbon filled PEEK seats offer excellent resistance to chemicals, heat, and wear/abrasion
- UNS S31600, 316 cold worked Stainless Steel construction
- Low friction pressure assisted graphite filled PTFE stem seal increases cycle life and reduces operating torque
- Available in 90° turn diverter and 180° turn switching models
- FKM (Viton®) o-rings are standard for operation from 0° to 400°F (-18° to 204°C)
- Optional o-rings available for high-temperature applications to 500°F (260°C)
- Optional wetted materials
- Wide selection of tube and pipe end fittings available
- Electric and pneumatic actuator options

3 Way Ball Valve Applications:

- Laboratories
- Test Stands
- Control Panels
- Pilot Plants
- Actuator Sequencing
- Oil & Gas Production

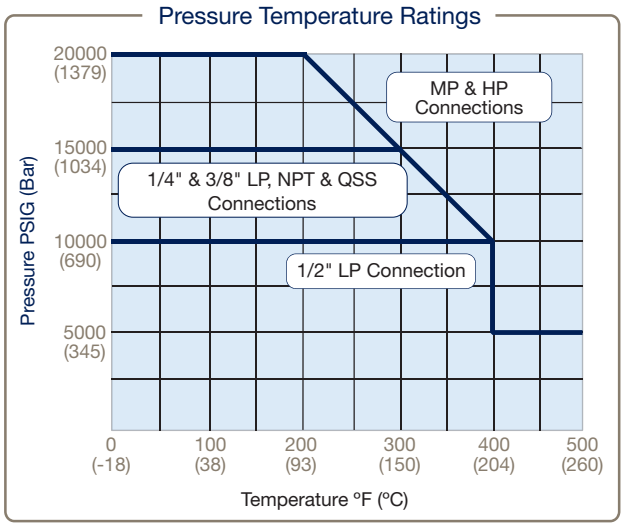


3 Way Series: 3/16" (4.77mm) Orifice - Pressures to 20,000 psi (1379 bar)

Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SW250 (1/4" LP)	15,000 psi (1034 bar)	0.129 (3.28)	0.50
SW375 (3/8" LP)	15,000 psi (1034 bar)	0.188 (4.77)	0.50
SW500 (1/2" LP)	10,000 psi (690 bar)	0.188 (4.77)	0.50
SF250CX20 (1/4" MP)	20,000 psi (1379 bar)	0.109 (2.77)	0.50
SF375CX20 (3/8" MP)	20,000 psi (1379 bar)	0.188 (4.77)	0.50
F250C (1/4" HP)	20,000 psi (1379 bar)	0.094 (2.39)	0.33
F375C (3/8" HP)	20,000 psi (1379 bar)	0.125 (3.17)	0.33
1/4" FNPT	15,000 psi (1034 bar)	0.188 (4.77)	0.50
3/8" FNPT	15,000 psi (1034 bar)	0.188 (4.77)	0.50
QS250 (1/4" QSS)	15,000 psi (1034 bar)	0.157 (3.99	0.50
QS375 (3/8" QSS)	15,000 psi (1034 bar)	0.188 (4.77)	0.50

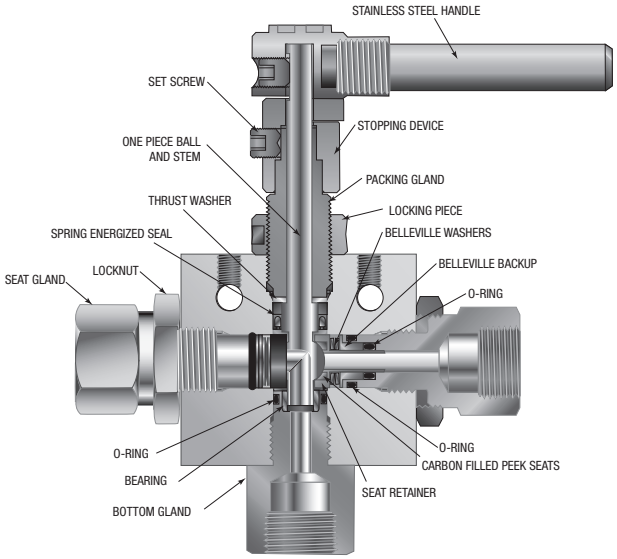
3/16" 3-Way Valve can be used for bi-directional flow, inlet pressure from side ports are limited to 15,000 psi maximum.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



3 Way 3/16" Bore Ball Valve

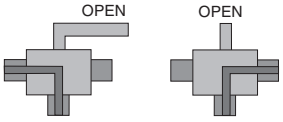
Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



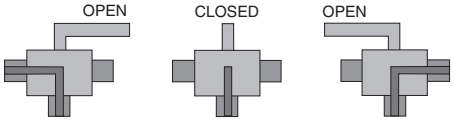
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Diverter Flow Control:



*3-Way Diverter Valve
90° Turn (3BD3 Series)



3-Way Switching Valve
180° Turn (3B3 Series)

*The Diverter Valve design permits inlet flow through the bottom port.
Outlet flow may be diverted to either valve side port with only a 90° turn.

Ordering Guide:

3-way ball valves are furnished complete with tube or pipe connections. Standard valve has FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 3B3S20M6***

Example Part Number:	**3B**	**3**	**S**	**20**	**M6**	**–**	**XXX**
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
3B	3 Way Switching (Selector) Valve (180° Turn)
3BD	3 Way Diverter Valve (90° Turn)

B - Ball Orifice Diameter	
3	3/16" (4.77mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (254-SMO) Material (needs "**F**" Material Code Suffix)
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi (1/2" LP Connection)
15	15,000 psi (LP, NPT, and QS connections)
20	20,000 psi (MP and HP connections)
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 28 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R3B3S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R3B3S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
L4	SW250 (1/4" LP)	15,000 psi	1"
L6	SW375 (3/8" LP)	15,000 psi	1"
L8	SW500 (1/2" LP)	10,000 psi	1"
M4	SF250CX20 (1/4" MP)	20,000 psi	1"
M6	SF375CX20 (3/8" MP)	20,000 psi	1"
H4	F250C (1/4" HP)	20,000 psi	1"
H6	F375C (3/8" HP)	20,000 psi	1"
P4	1/4" FNPT	15,000 psi	1"
P6	3/8" FNPT	15,000 psi	1"

F - Options (Suffix addition)	
BO	O-ring, Buna-N 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" material code)
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	**XP**			
AO	Air to Open / Spring to Close (Diverter Style Only)	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open (Diverter Style Only)	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3***	**EO3X***	24 VDC		
* 24VDC Electric Actuator not available in 180° Actuation option (3B3 Series)						

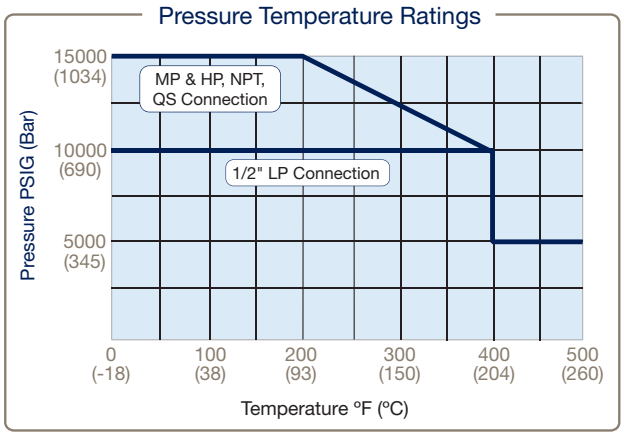
See ball valve actuator section for full description, additional information, and options.additional information, and options.

3 Way Series: 3/8" (9.52mm) Orifice - Pressures to 15,000 psi (1034 bar)

Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SW500 (1/2" LP)	10,000 psi (690 bar)	0.326 (8.28)	2.1
SF562CX20 (9/16" MP)	15,000 psi (1034 bar)	0.312 (7.92)	2.1
SF750CX10 (3/4" MP)	15,000 psi (1034 bar)	0.326 (8.28)	2.1
3/8" FNPT	15,000 psi (1034 bar)	0.326 (8.28)	2.1
1/2" FNPT	15,000 psi (1034 bar)	0.326 (8.28)	2.1
F562C (9/16" HP)	15,000 psi (1034 bar)	0.326 (8.28)	2.1
QS562 (9/16" QSS)	15,000 psi (1034 bar)	0.326 (8.28)	2.1

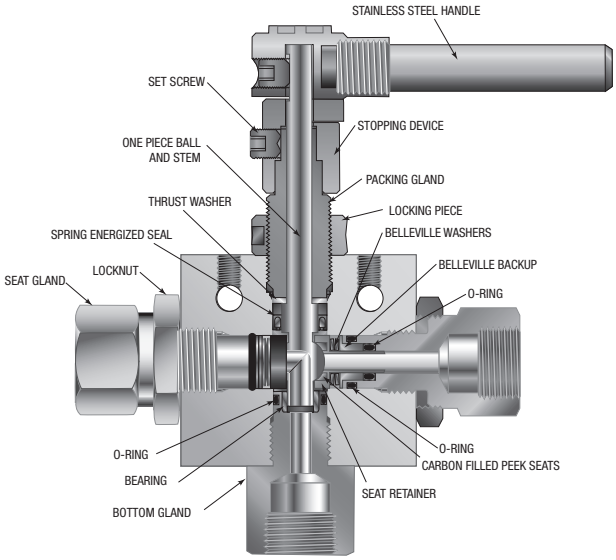
3/8" 3-Way Valve is designed for inlet pressure from bottom inlet position only.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



3 Way 3/8" Bore Ball Valve

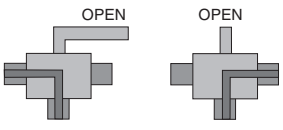
Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



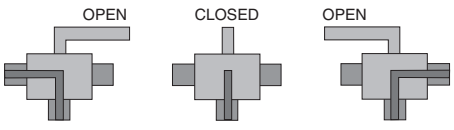
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Diverter Flow Control:



*3-Way Diverter Valve
90° Turn (3BD6 Series)



3-Way Switching Valve
180° Turn (3B6 Series)

*The Diverter Valve design permits inlet flow through the bottom port.
Outlet flow may be diverted to either valve side port with only a 90° turn.

Ordering Guide:

3-way ball valves are furnished complete with tube or pipe connections. Standard valve has FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 3B6S15M9***

Example Part Number:	**3B**	**6**	**S**	**15**	**M9**	–	**XXX**
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
3B	3 Way Switching (Selector) Ball Valve (180° Turn)
3BD	3 Way Diverter Valve (90° Turn)

B - Ball Orifice Diameter	
6	3/8" (9.52mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (254-SMO) Material (needs "**F**" Material Code Suffix)
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi (1/2" LP Connection)
15	15,000 psi
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 28 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R3B6S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R3B6S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
L8	SW500 (1/2" LP)	10,000 psi	1-3/8"
M9	SF562CX20 (9/16" MP)	15,000 psi	1-3/8"
M12	SF750CX10 (3/4" MP)	15,000 psi	1-3/8"
P4	1/4" FNPT	15,000 psi	1-3/8"
P6	3/8" FNPT	15,000 psi	1-3/8"
H9	F562C (9/16" HP)	15,000 psi	1-3/8"

F - Options (Suffix addition)	
BO	O-ring, Buna-N, 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" material code)
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	**XP**			
AO	Air to Open / Spring to Close (Diverter Style Only)	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open (Diverter Style Only)	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3***	**EO3X***	24 VDC		
* 24VDC Electric Actuator not available in 180° Actuation option (3B6 Series)						

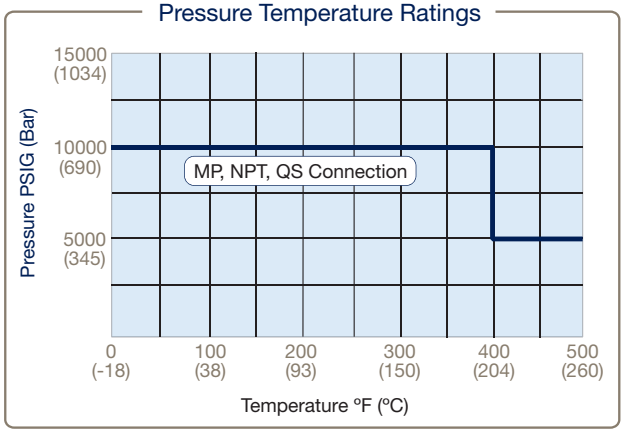
See ball valve actuator section for full description, additional information, and options

3 Way Series: 1/2" (12.7mm) Orifice - Pressures to 10,000 psi (690 bar)

Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv
SF750CX20 (3/4" MP)	10,000 psi (690 bar)	0.500 (12.70)	4.4
SF1000CX20 (1" MP)	10,000 psi (690 bar)	0.500 (12.70)	4.4
3/4" FNPT	10,000 psi (690 bar)	0.500 (12.70)	4.4
1" FNPT	10,000 psi (690 bar)	0.500 (12.70)	4.4
QS750 (3/4" QSS)	10,000 psi (690 bar)	0.500 (12.70)	4.4
QS1000 (1" QSS)	10,000 psi (690 bar)	0.500 (12.70)	4.4

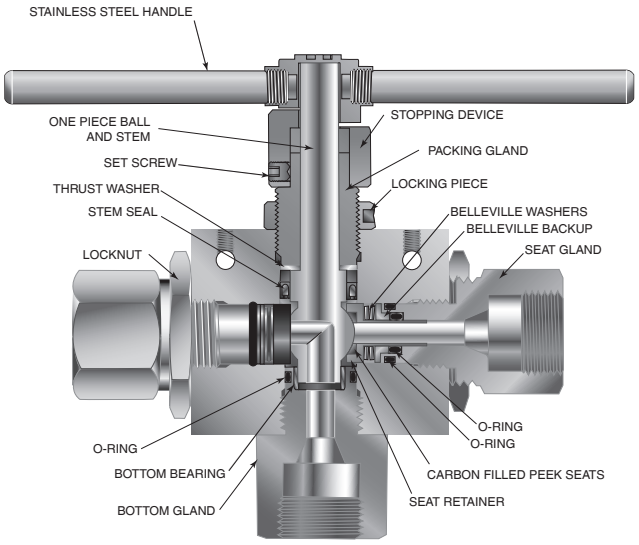
1/2" 3-Way Valve can be used for bi-directional flow, inlet pressure from side ports can be up to 10,000 psi maximum.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



3 Way 1/2" Bore Ball Valve

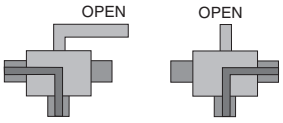
Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



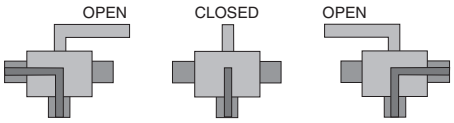
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium are not recommended and should be evaluated on a case by case basis. Consult factory.

Diverter Flow Control:



*3-Way Diverter Valve
90° Turn (3BD8 Series)



3-Way Switching Valve
180° Turn (3B8 Series)

*The Diverter Valve design permits inlet flow through the bottom port.
Outlet flow may be diverted to either valve side port with only a 90° turn.

Ordering Guide:

3-way ball valves are furnished complete with tube or pipe connections. Standard valve has FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 3B8S10M12***

Example Part Number:	**3B**	**8**	**S**	**10**	**M12**	–	**XXX**
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		F

A - Valve Series	
3B	3 Way Switching (Selector) Valve, 180° Turn
3BD	3 Way Diverter Valve (90° Turn)

B - Ball Orifice Diameter	
8	1/2" (12.7mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
S	2507 Super Duplex Wetted Material (needs "**F**" Material Code Suffix)
S	6 Moly (254-SMO) Material (needs "**F**" Material Code Suffix)
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 28 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R3B8S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R3B8S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M12	SF750CX10 (3/4" MP)	10,000 psi	1-3/4"
M16	SF1000CX10 (1" MP)	10,000 psi	1-3/4"
P12	3/4" FNPT	10,000 psi	1-3/4"
P16	1" FNPT	10,000 psi	1-3/4"

F - Options (Suffix addition)	
BO	O-ring, Buna-N 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfuoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
2507**	2507 Super Duplex (20,000 psi max.) used with "**S**" Material Code
25-4MO**	6 Moly (25-4SMO) Material (used with "**S**" material code)
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

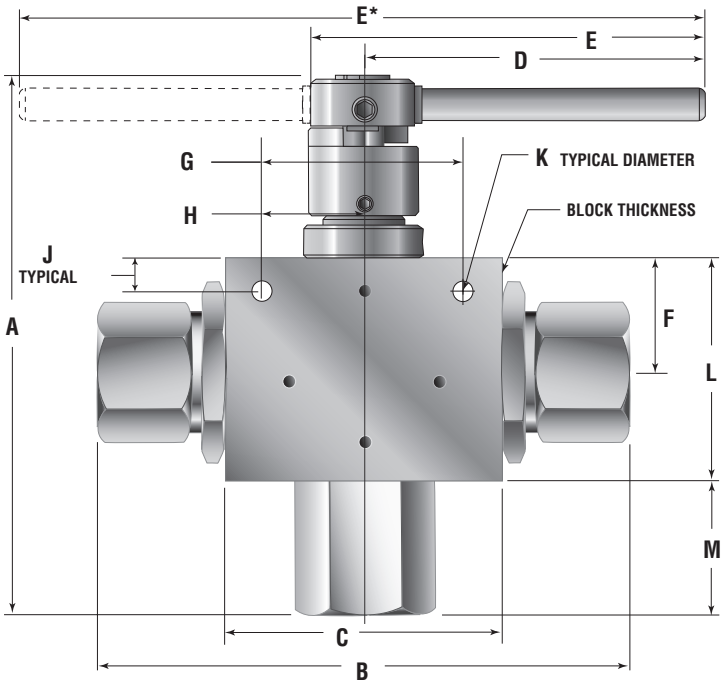
Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	**XP**			
AO	Air to Open / Spring to Close (Diverter Style Only)	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open (Diverter Style Only)	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3***	**EO3X***	24 VDC		
* 24VDC Electric Actuator not available in 180° Actuation option (3B8 Series)						

See ball valve actuator section for full description, additional information, and options

3 Way Ball Valve Dimensions:

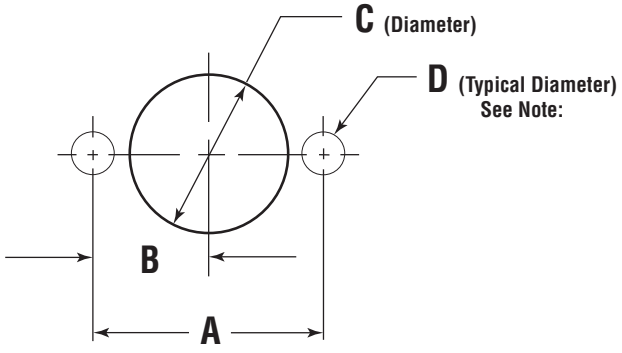
3 Way Ball Valve



	VALVE MODELS - inches (mm)		
	3B3S / 3BD3S	3B6S / 3BD6S	3B8S / 3BD8S
A	5.66 (143.76)	6.55 (166.37)	7.82 (198.63)
B	4.72 (119.94)	5.74 (145.79)	7.77 (197.36)
C	2.50 (63.50)	3.00 (76.20)	4.13 (104.78)
D	3.37 (85.55)	4.99 (126.82)	5.09 (129.29)
E	3.90 (99.02)	5.52 (140.32)	10.18* (258.57)
F	1.13 (28.58)	1.38 (34.92)	1.66 (42.16)
G	1.50 (38.10)	2.00 (50.80)	3.00 (76.20)
H	0.75 (19.05)	1.00 (25.40)	1.50 (38.10)
J	0.43 (10.92)	0.41 (10.31)	0.50 (12.70)
K	0.28 (7.11)	0.28 (7.11)	0.28 (7.11)
L	2.26 (57.40)	2.88 (73.03)	3.34 (84.94)
M	0.97 (24.64)	1.19 (30.22)	1.69 (42.93)
Block Thickness	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

Panel Mounting Dimensions:

3 Way Ball Valve Panel Mounting

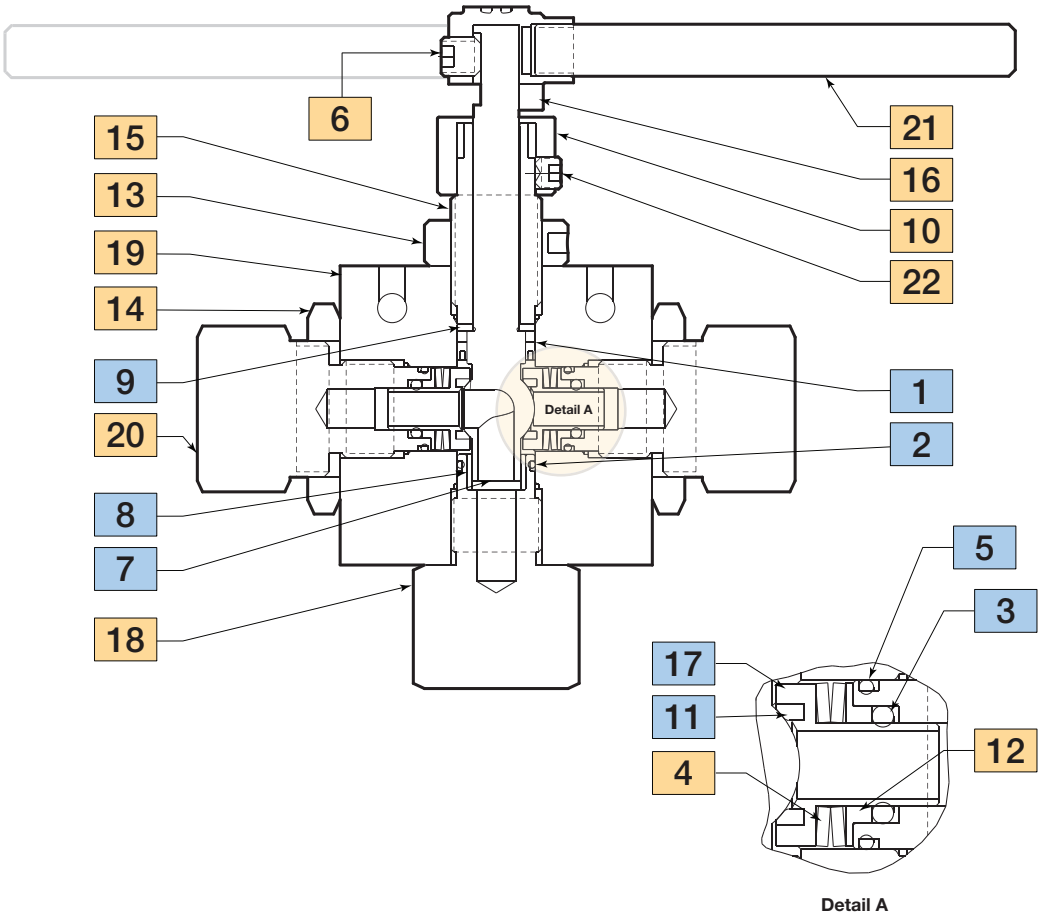


All dimensions are for reference only and are subject to change without notice.

	VALVE MODELS - inches (mm)		
	3B3S / 3BD3S	3B6S / 3BD6S	3B8S / 3BD8S
A	1.50 (38.10)	2.00 (50.80)	3.00 (76.20)
B	0.75 (19.05)	1.00 (25.40)	1.50 (38.10)
C	1.06 (26.92)	1.50 (38.10)	1.88 (47.63)
D	0.28 (7.11)	0.28 (7.11)	0.28 (7.11)

Note: Body Mounting 1/4" - 20 threads

Parts Listing and Material: Typical 3 Way Ball Valve Series



Detail A

Material of Construction:

Item #	Description	Material
1	Stem Seal w/ Spring	PTFE w/ Graphite
2	O-Ring	FKM
3	O-Ring	FKM
4	Belleville Washer	17-7PH
5	O-Ring	90 Duro FKM
6	Set Screw, 3/8-16	316 CW SS
7	Stem	316 CW SS
8	Bottom Bearing	AMPCO 45
9	Thrust Washer	AMPCO 45
10	Stopping Device	316 SS
11	Seat Retainer	15-5 PH

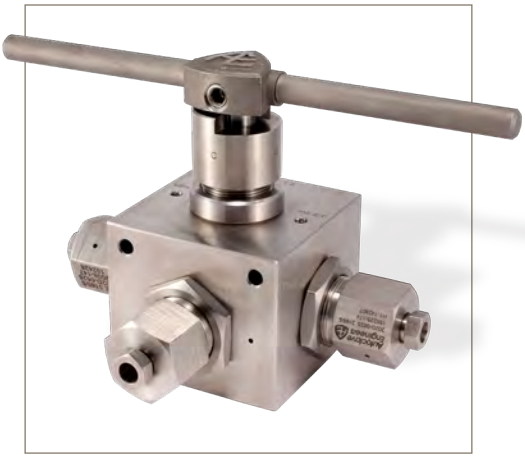
Item #	Description	Material
12	Belleville Washer Backup	316 CW SS
13	Locking Piece	316 SS
14	Locknut	316 SS
15	Packing Gland	316 CW SS
16	Handle Hub	316 SS
17	Seat	PEEK
18	Bottom Gland	316 CW SS
19	Body	316 CW SS
20	Seat Gland	316 CW SS
21	Handle	304 SS
22	Set Screw, 5/16-24	Stainless

Typical spare parts found in Repair Kits

4 Way Quarter/180º Turn Ball Type 3/8" Bore

Pressures to 10,000 psi (690 bar)

4B6 and 4BS6 Series



These ball valves can also be modified to incorporate the use of special materials, seals for high temperature applications, subsea models, and valve actuators. When it comes to high-pressure applications, these ball valves with the associated high-pressure components, provide the critical performance demanded by the high pressure market.

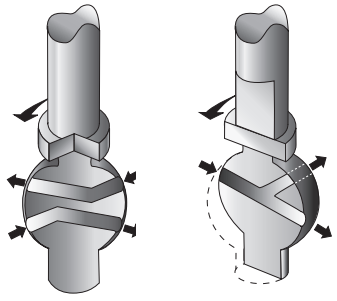
4 Way Ball Valve Features:

- One-piece, trunnion mounted style, stem design eliminates shear failure and reduces the effects of side loading found in two piece designs
- Re-torqueable seat glands for longer seat life
- Carbon filled PEEK seats offer excellent resistance to chemicals, heat, and wear/abrasion
- UNS S31600, 316 cold worked Stainless Steel construction
- Low friction pressure assisted graphite filled PTFE stem seal increases cycle life and reduces operating torque
- Quarter turn crossover, and 180° turn four way switching models available
- FKM (Viton®) o-rings are standard for operation from 0° to 400°F (-18° to 204°C)
- Optional o-rings available for high-temperature applications to 500°F (260°C)
- Optional wetted materials
- Electric and pneumatic actuator options

4 Way Ball Valve Applications:

- Laboratories
- Test Stands
- Control Panels
- Pilot Plants
- Chemical/Petrochemical
- Oil & Gas Production

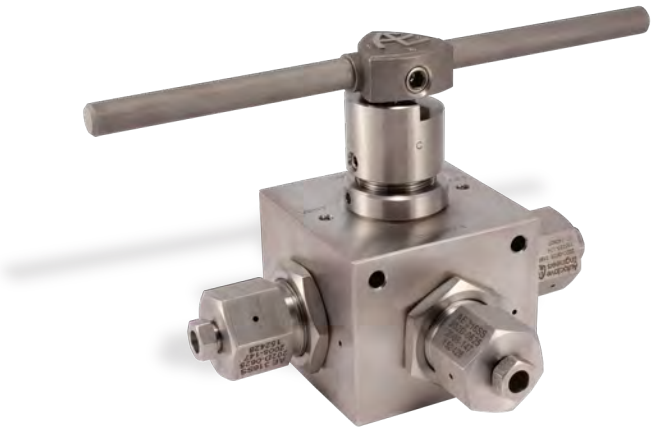
Flow Configuration



4-Way Crossover 90° Turn

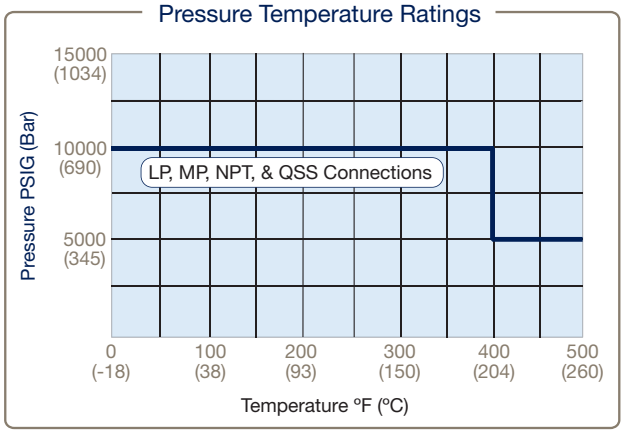
4-Way Switching 180° Turn

4 Way Series: 3/8" (9.52mm) Orifice - Pressures to 10,000 psi (690 bar)



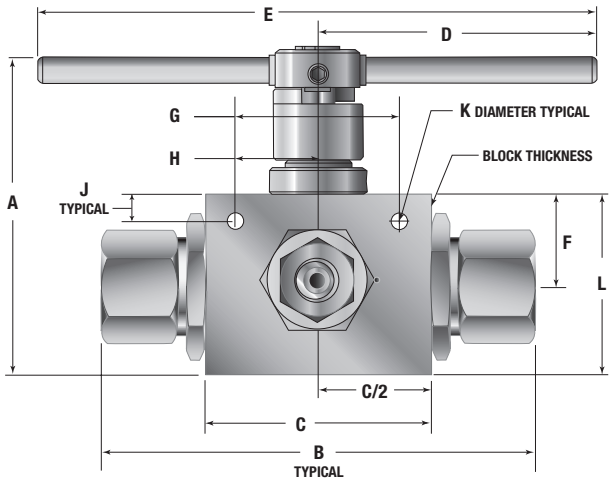
Connection Type	MAWP** at Room Temperature	Minimum Orifice Inches (mm)	Rated Cv*
SW500 (1/2" LP)	10,000 psi (690 bar)	0.375 (9.52)	2.5
SF375CX20 (3/8" MP)	10,000 psi (690 bar)	0.203 (5.16)	1.6
SF562CX20 (9/16" MP)	10,000 psi (690 bar)	0.312 (7.92)	2.4
SF750CX10 (3/4" MP)	10,000 psi (690 bar)	0.375 (9.52)	2.5
3/8 FNPT	10,000 psi (690 bar)	0.375 (9.52)	2.5
1/2 FNPT	10,000 psi (690 bar)	0.375 (9.52)	2.5
QS562 (9/16" QSS)	10,000 psi (690 bar)	0.359 (9.12)	2.5

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance



4 Way 3/8" Bore Ball Valve

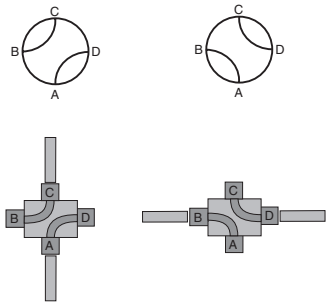
Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material (see following description)
NPT connections are limited to 400°F max due to PTFE Sealant.



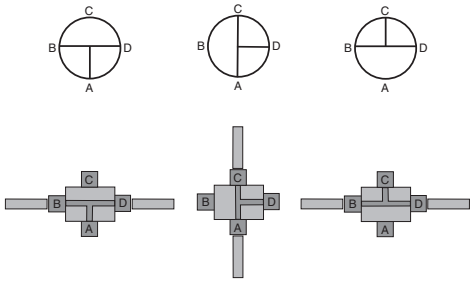
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium should be evaluated on a case by case basis. Consult factory.

Diverter Flow Control:



4 Way Crossover
90° Turn (4B6 Series)



4-Way Switching
180° Turn (4BS6 Series)
(supplied with "D" port plugged)

Ordering Guide:

4-way ball valves are furnished complete with tube or pipe connections. Standard valve has FKM o-rings [400ºF (204ºC) maximum].

Building a Part Number: ***Example: 4B6S10M9***

Example Part Number:	4B	6	S	10	M9	–	XXX
Ordering Parameters/Options:	Valve Series	Ball Orifice Diameter	Material	Pressure (x 1000 psi)	End Connection		Options
Table Reference: (see below)	A	B	C	D	E		E

A - Valve Series	
4B	4 Way Ball Valve Crossover (90° Turn)
4BS	4 Way Ball Valve Switching (1800° Turn)

B - Ball Orifice Diameter	
6	3/8" (9.52mm)

C - Base Material	
S	316 Cold Worked (non-NACE) Stainless Steel
Additional Material Available, please contact factory.	

D - Pressure (x 1000 psi)	
10	10,000 psi
Maximum MAWP based on connection type or material (whichever is lower)	

Basic Repair Kits: (see page 33 for kit contents)
When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: R4B6S

When ordering with "**F-Options**" add an "**R**" prefix before model codes A, B, C and F (see above). Example: R4BS6S-EPR Contact your Parker Autoclave Engineers Sales Representative with any questions or refer to the Operation & Maintenance manuals (found online at www.Autoclave.com) for proper maintenance procedures.

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
L8	SW500 (1/2" LP)	10,000 psi	1-3/8"
M6	SF375CX20 (3/8" MP)	10,000 psi	1-3/8"
M9	SF562CX20 (9/16"MP)	10,000 psi	1-3/8"
M12	SF750CX10 (3/4"MP)	10,000 psi	1-3/8"
P6	3/8" FNPT	10,000 psi	1-3/8"
P8	1/2" FNPT	10,000 psi	1-3/8"

F - Options (Suffix addition)	
BO	O-ring, Buna-N 40° to 250°F (121°C)
EPR	O-ring, Ethylene Propylene Rubber, 0° to 250°F (121°C)
HT	O-ring, Perfluoroelastomer (Parofluor®) FFKM 30° to 500ºF (260ºC)
K	Antivibration Gland Fitting (Cone & Thread Only)
L	Lockout Bracket (see page 43 for detail)
SOG*	ALL Parts NACE material, hardness Check, NACE Certification
PM	Panel Mount Hardware
For Ball Valve Actuator Options see chart below	

Notes:
316 SS Valve bodies are cold worked and not suitable for use in NACE/ISO 15156 applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS body material to Annealed 316 SS suitable for NACE service. Contact factory for pressure reduction.

** Special materials often have reduced MAWP ratings, see Technical brochure for assistance.

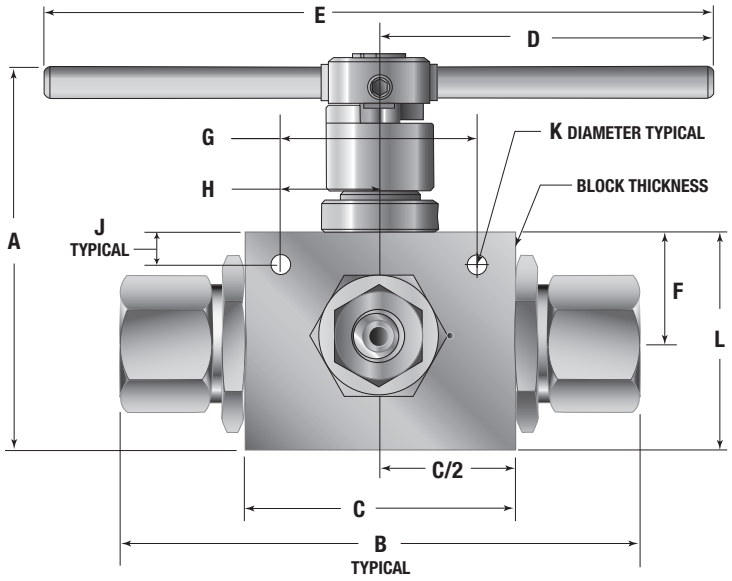
Ball Valve Actuator Suffix options: For Detailed Actuator Information please see pages 34-42

Pneumatic Actuator		Electric Actuator			Actuator Operating Temperature	
		WP	**XP**			
AO	Air to Open / Spring to Close (Diverter Style Only)	**EO1**	**EO1X**	120 volt AC 50/60 Hz	**Pneumatic**	-10ºF to 176ºF (-23ºC to 80ºC)
AC	Air to Close / Spring to Open (Diverter Style Only)	**EO2**	**EO2X**	220 volt AC 50/60 Hz	**Electric**	0ºF to 160ºF (-17ºC to 71ºC)
AOC	Air to Open and Close (Double Action)	**EO3***	**EO3X***	24 VDC		
* 24VDC Electric Actuator not available in 180° Actuation option (4B8 Series)						

See ball valve actuator section for full description, additional information, and options.

4 Way Ball Valve Dimensions:

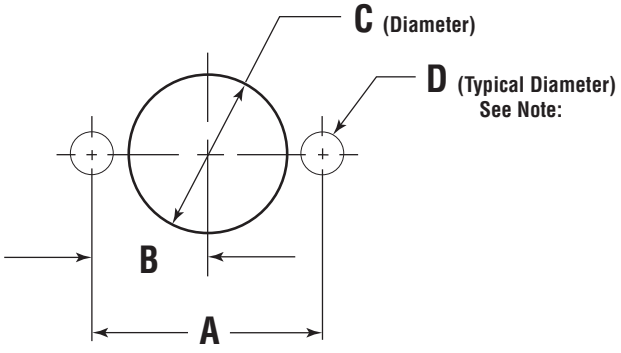
4 Way Ball Valve



	VALVE MODELS inches (mm)
	4B6S / 4BS6S
A	5.81 (147.57)
B	6.79 (172.47)
C	3.50 (88.90)
D	5.12 (130.05)
E	10.24 (260.10)
F	1.63 (41.23)
G	2.63 (66.68)
H	1.31 (33.27)
J	0.41 (10.32)
K	0.28 (7.11)
L	2.97 (75.39)
Block Thickness	3.50 (88.90)

Panel Mounting Dimensions:

4 Way Ball Valve Panel Mounting

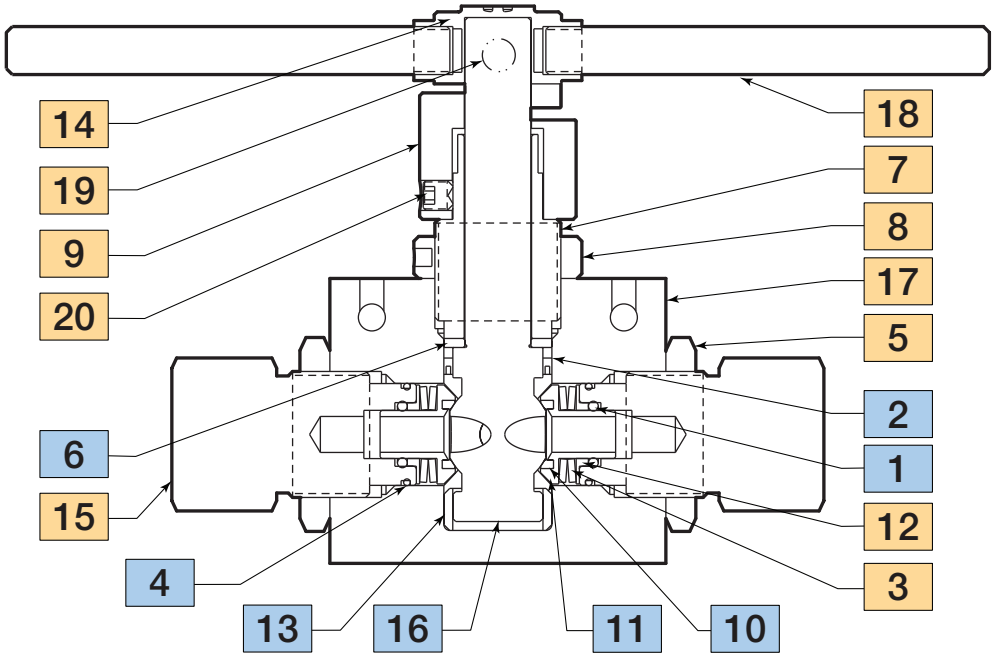


All dimensions are for reference only and are subject to change without notice.

	VALVE MODELS inches (mm)
	4B6S / 4BS6S
A	2.63 (66.68)
B	1.31 (33.34)
C	1.88 (47.63)
D	0.28 (7.11)

Note: Body Mounting 1/4" - 20 threads

Parts Listing and Material: Typical 4 Way Ball Valve Series



Material of Construction:

Item #	Description	Material
1	O-Ring	FKM
2	Stem Seal w/ Spring	PTFE with Graphite
3	Belleville Washer	17-7PH
4	O-Ring	FKM
5	Locknut	316 SS
6	Thrust Washer	AMPCO 45
7	Packing Gland	316 CW SS
8	Locking Piece	316 SS
9	Stopping Device	316 SS
10	Seat	ARLON 1260

Item #	Description	Material
11	Seat Retainer	Nitronic 50 HC
12	Belleville Washer Backup	316 CW SS
13	Bottom Bearing	AMPCO 45
14	Handle Hub	316 SS
15	Seat Gland	316 CW SS
16	Stem	316 CW SS
17	Body	316 CW SS
18	Handle	304 SS
19	Hex Set Screw, 1/2-13	Stainless
20	Set Screw, 5/16-18	Stainless

Typical spare parts found in Repair Kits

Ball Valve Actuators

Pneumatic and Electric

Single and Double Acting Pneumatic
24VDC, 120 and 220 VAC Electric

Principle of Operation:

Pneumatic and Electric Actuators

Pneumatic ball valve actuators found on pages 35-42 and are available for every bore/size option we offer (90° or 180° as needed). Our standard weather-proof housing is corrosion resistant anodized aluminum, Stainless Steel materials are available. CE Marked and SIL3 rated.

Parker Autoclave Engineers offers an ISO 5211 compliant pneumatic actuator with mounting configuration for NAMUR solenoid valves, limit switches or positioner as standard. Electric actuators (pages 37-42) are available in Weather-proof or Explosion-proof styles depending on location. Both varieties come standard with two (15 amp SPDT) position switches (SPDT). Explosionproof version includes an external handwheel for manual operation.

Ball Valve Actuators Features:

Pneumatic

- Temperature Range of 0° to 176°F (-18° to 80°C)with Buna-N Nitrile Seals
- Air-to-open/spring-to-close
- Air-to-close/spring-to-open
- Air-to-open and close (double acting)
- Visual Postion Indication as Standard, Limit switches
- Anodized Aluminum Weather-proof housing as standard
- Stainless steel housing for corrosive atmoshperes can be ordered
- NAMUR type Solenoid Valve (3-way or 4-way) Dual Coil, Side Mounted option available
- Extended Temperature operation with Silicone Seals from 0° to 300°F (-18° to 150°C)
- CE Marked, SIL_3 Rated

Electric

- Interface with control systems for automated operation and monitoring
- Weather-Proof NEMA 4X Polyester Housing Standard, 0° to 160°F (-18° to 70°C)
- 120 & 220 VAC, 50/60 Hz standard
- 24VDC
- Explosion-Proof, NEMA 7X Enclosure available
- CE mark available

Actuators: Pneumatic Operated Ball Valves (AO and AC)

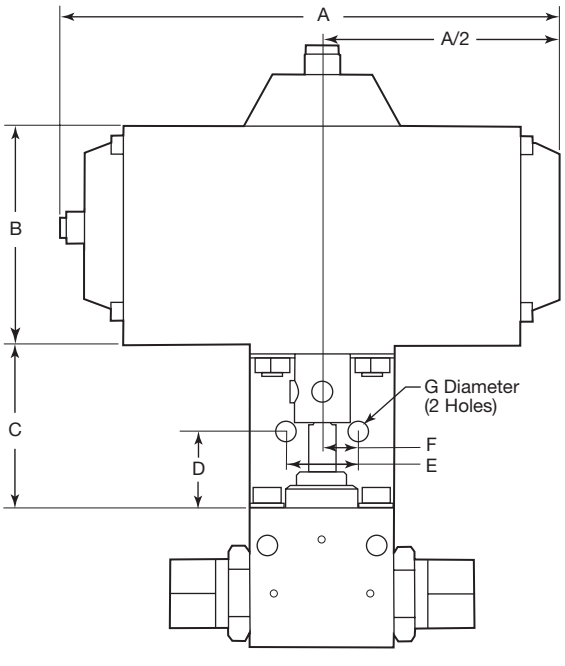
90° Actuation/Spring Return

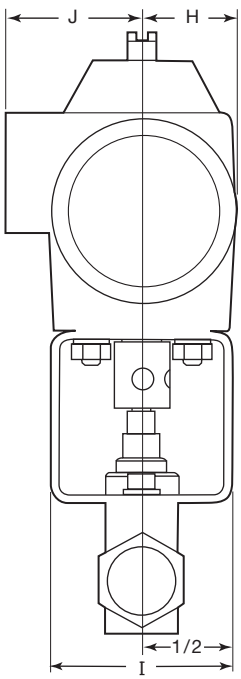
Valve Series*	Dimension Data - Inches (mm)										Actuator Weight .lbs	Air Usage
	A	B	C	D	E	F	G	H	I	J		Turn Time/90°
2B4-AO/AC	6.85 (173.99)	3.20 (81.28)	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	1.30 (33.02)	2.50 (63.50)	1.88 (47.75)	3.94	11.2 in³ / 0.5 sec
2B6-AO/AC	7.28 (184.91)	3.86 (98.04)	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.63)	1.59 (40.39)	3.00 (76.20)	2.10 (53.54)	6.0	18.1 in³ / 1.0 sec
2B8-AO/AC	9.38 (238.25)	4.62 (117.35)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	2.00 (50.80)	3.00 (76.20)	2.48 (62.99)	10.7	40.6 in³ / 1.0 sec
2B12-AO/AC	17.30 (439.42)	8.00 (203.20)	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	3.54 (89.92)	5.00 (127.00)	3.57 (90.68)	53.8	256.3 in³ / 3.0 sec
2B16-AO/AC	17.30 (439.42)	8.00 (203.20)	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	3.54 (89.92)	5.00 (127.00)	3.57 (90.68)	53.8	11.2 in³ / 3.0 sec
3BD3-AO/AC	6.85 (173.99)	3.20 (81.28)	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	1.30 (33.02)	2.50 (63.50)	1.88 (47.75)	3.94	18.1 in³ / 0.5 sec
3BD6-AO/AC	7.28 (184.91)	3.86 (98.04)	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.63)	1.59 (40.39)	3.00 (76.20)	2.10 (53.54)	6.0	18.1 in³ / 1.0 sec
3BD8-AO/AC	9.38 (238.25)	4.62 (117.35)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	2.00 (50.80)	3.00 (76.20)	2.48 (62.99)	10.7	40.6 in³ / 1.5 sec
4B6-AO/AC	9.38 (238.25)	4.62 (117.35)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	2.00 (50.80)	3.00 (76.20)	2.48 (62.99)	10.7	40.6 in³ / 1.5 sec

* Add the suffix **-AO** or **-AC** to the appropriate valve catalog number for a complete valve assembly.
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- Control Air Pressure: 80 to 150 psi (6 to 10 bar)
- 1/4" NPT female air connector
- **AO**: Air to open/spring to close
- **AC**: Air to close/spring to open
- Actuators operating temperature: -10°F to 176°F (-23°C to 80°C)
- High temperature actuator option available, consult factory
- Stainless steel housing actuator models available, consult factory
- Actuators available with limit switches and visual indicators.
- Corrosion resistant anodized aluminum housing.
- Meets ISO 5211 Solenoid Mounting dimensions
- Solenoids availabe, direct or nipple mount.
- CE Marked, SIL3 Rated





Actuators: Pneumatic Operated Ball Valves (AOC - Double Acting)

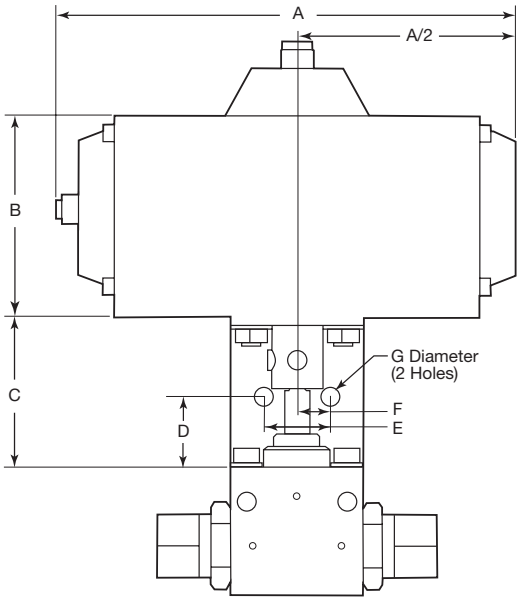
90° and 180° Actuation - No Spring

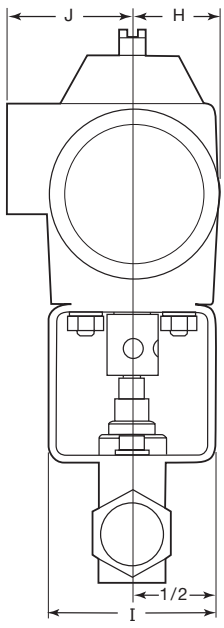
Valve Series*	Dimension Data - Inches (mm)										Actuator Weight .lbs	Air Usage
	A	B	C	D	E	F	G	H	I	J		Turn Time/90°
2B4-AOC	6.85 (173.99)	3.20 (81.28)	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	1.30 (33.02)	2.50 (63.50)	1.88 (47.75)	3.52	25.6 in³ / 0.5 sec
2B6-AOC	6.85 (173.99	3.20 (81.28)	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.63)	1.30 (33.02)	2.50 (63.50)	1.88 (47.75)	5.17	44.4 in³ / 05. sec
2B8-AOC	7.28 (184.91)	3.86 (98.04)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	1.59 (40.39)	3.00 (76.20)	2.10 (53.34)	9.13	88.9 in³ / 1.0 sec
2B12-AOC	11.82 (300.23)	6.10 (154.94)	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	2.55 (64.77)	5.00 (127.00)	2.55 (64.77)	44.1	565.5 in³ / 2.5 sec
2B16-AOC	13.98 (355.09)	6.56 (166.62)	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	2.86 (72.64)	5.00 (127.00)	2.95 (74.93)	44.1	565.5 in³ / 2.5 sec
3B3-AOC	9.50 (241.30)	3.59 (91.19)	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	1.37 (34.80)	2.50 (63.50)	1.98 (50.29)	3.52	42.5 in³ / 1.0 sec
3B6-AOC	9.50 (241.30)	3.59 (90.19)	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.63)	1.36 (34.54)	3.00 (76.20)	1.99 (50.55)	5.17	77.3 in³ / 1.0 sec
3B8-AOC	10.21 (259.33)	4.47 (113.54)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	1.67 (42.42)	3.00 (76.20)	2.10 (53.34)	9.13	150.0 in³ / 2.0 sec
3BD3-AOC	6.85 (173.99)	3.20 (81.28)	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	1.30 (33.02)	2.50 (63.50)	1.88 (47.75)	3.53	25.6 in³ / 0.5 sec
3BD6-AOC	6.85 (173.99)	3.20 (81.28)	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.63)	1.30 (33.02)	3.00 (76.20)	1.88 (47.75)	5.17	44.4 in³ / 0.5 sec
3BD8-AOC	7.28 (184.91)	3.86 (98.04)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	1.59 (40.39)	3.00 (76.20)	2.10 (53.34)	9.13	88.9 in³ / 1.0 sec
4B6-AOC	7.28 (184.91)	3.86 (98.04)	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	1.59 (40.39)	3.00 (76.20)	2.10 (53.34)	9.13	88.9 in³ / 1.0 sec

* Add the suffix **-AOC** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- Control Air Pressure: 80 to 150 psi (6 to 10 bar)
- 1/4" NPT female air connector
- **AOC**: Air to open/Air to close (double acting)
- Actuators operating temperature: -10°F to 176°F (-23°C to 80°C)
- Corrosion resistant anodized aluminum housing
- Stainless steel housing actuator models available, consult factory
- Actuators available with limit switches and visual indicators.
- Solenoids availabe, direct or nipple mount.
- High temperature actuator option available, consult factory
- CE Marked, SIL3 Rated





Actuators: Electric Operated Ball Valves (EO1, EO2, EO3)

Weather-proof, NEMA 4, 4X Watertight Enclosure

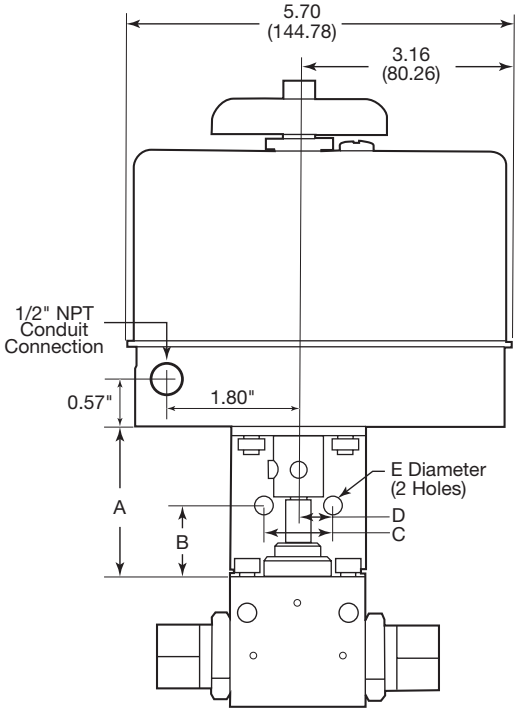
90° and 180° Actuation (No Spring Return)

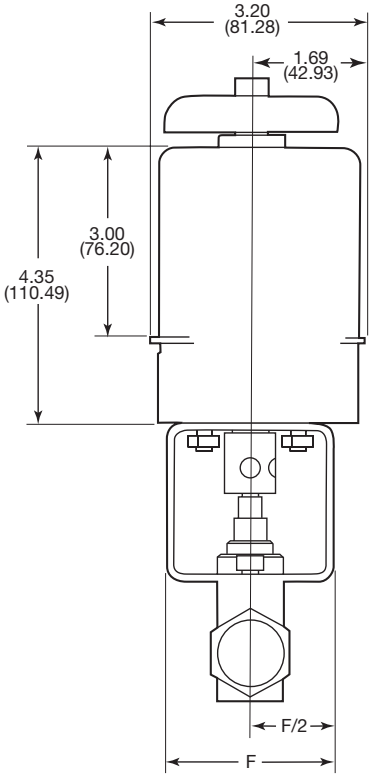
Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds
	A	B	C	D	E	F		
2B4-EO1	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	2.50 (63.50)	120 VAC	3
2B4-EO2							240 VAC	3
2B4-EO3							24 VDC	3
2B6-EO1	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	034 (8.64)	3.00 (76.20)	120 VAC	7
2B6-EO2							240 VAC	7
2B6-EO3							24 VDC	5
3B3-EO1	2.50 (63.50)	1.25 (31.75)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	2.50 (63.50)	120 VAC	3
3B3-EO2							240 VAC	3
3B6-EO1	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.64)	3.00 (76.20)	120 VAC	7
3B6-EO2							240 VAC	7
3BD3-EO1	2.50 (63.50)	1.25 (31.75	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	2.50 (63.50)	120 VAC	3
3BD3-EO2							240 VAC	3
3BD3-EO32							24 VDC	3
3BD6-EO1	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	034 (8.64)	3.00 (76.20)	120 VAC	7
3BD6-EO2							240 VAC	7
3BD6-EO3							24 VDC	5

* Add the suffix **-EO1**, **-EO2** or **-EO3** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- 1/2" NPT female conduit connection
- Manual Override
- Powder coated aluminum housing
- CE & CSA approved
- Weight (all models): 5 lbs.
- 120 & 240 Volt are 50/60 Hz, for other voltages consult factory
- Actuator operating temperature: 0°F to 160°F (-17°C to 71°C)
- 15 amp SPDT Limit Switches (standard)
- For other options consult factory





Actuators: Electric Operated Ball Valves (E01, E02, E03)

Weather-proof, NEMA 4, 4X Watertight Enclosure

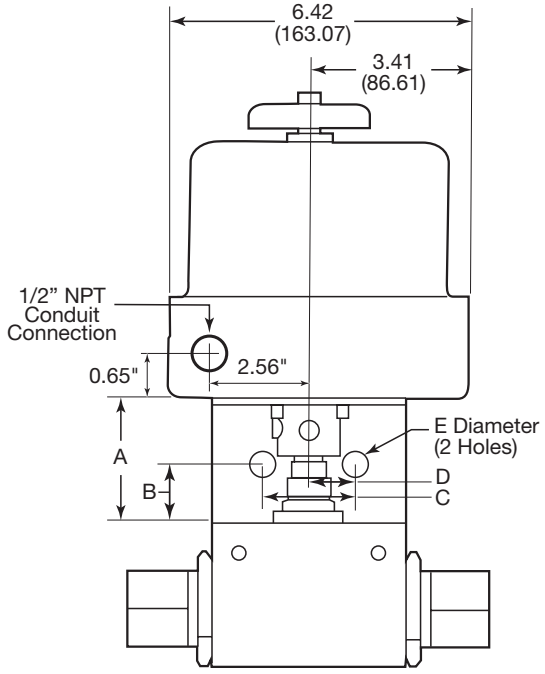
90° and 180° Actuation

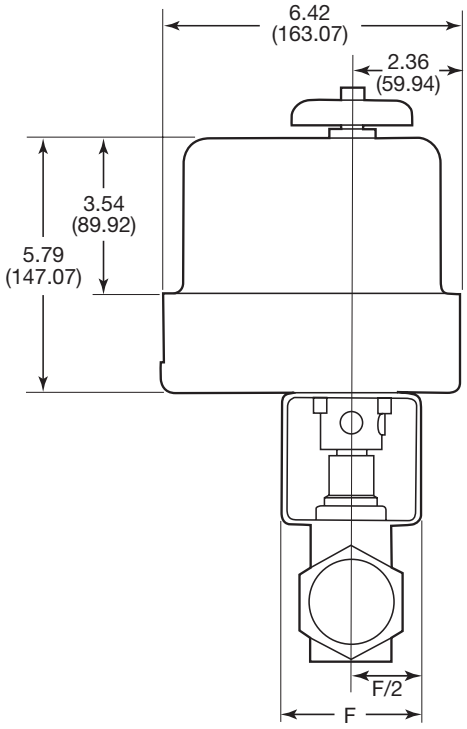
Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds
	A	B	C	D	E	F		
2B8-EO1	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	3.00 (76.20)	120 VAC	5
2B8-EO2							240 VAC	5
2B8-EO3							24 VDC	5
3B8-EO1	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	3.00 (76.20)	120 VAC	5
3B8-EO2							240 VAC	5
3BD8-EO1	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.53 (13.46)	3.00 (76.20)	120 VAC	5
3BD8-EO2							240 VAC	5
3BD8-EO3							24 VDC	5
4B6-EO1	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.64)	3.00 (76.20)	120 VAC	5
4B6-EO2							240 VAC	5
4B6-EO3							24 VDC	5
4BS6-EO1	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	034 (8.64)	3.00 (76.20)	120 VAC	5
4BS6-EO2							240 VAC	5
4BS6-EO3							24 VDC	5

* Add the suffix **-EO1**, **-EO2** or **-EO3** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- **EO1**: Electric 120 VAC
- **EO2**: Electric 240 VAC
- **EO3**: Electric 24 VDC
- Actuator operating temperature: 0°F to 160°F (-18°C to 71°C)
- Weight (all models): 9 lbs.
- For other options consult factory
- Powder coated aluminum housing
- CE & CSA approved for NEMA 4 & 4X
- Manual Override (wrench required)
- 1/2" NPT female conduit connection
- 15 amp SPDT Limit Switches (standard)





Actuators: Electric Operated Ball Valves (EO1, EO2)

Weather-proof, NEMA 4, 4X Watertight Enclosure

90° Actuation only

Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds	Weight lbs.	Figure
	A	B	C	D	E	F				
2B12-EO1	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.400)	0.53 (13.46)	5.00 (127.00)	120 VAC	10	50.5	1
2B12-EO2							240 VAC	10		
2B16-EO1	6.00 (152.40)	3.00 (76.20)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	6.00 (152.40	120 VAC	10	64.0	2
2B16-EO2							240 VAC	10		

* Add the suffix **-EO1**, **-EO2** or **-EO3** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- **EO1**: Electric 120 VAC
- **EO2**: Electric 240 VAC
- Manual Override (wrench required)
- Weatherproof enclosure, IP67, Type 4, 4X,
- For other options consult factory
- 3/4" NPT female conduit connection
- CE & CSA approved for NEMA 4 and 4X
- Actuator operating temperature: -4°F to 158°F (20°C to 70°C)
- Powder coated aluminum housing

Figure 1

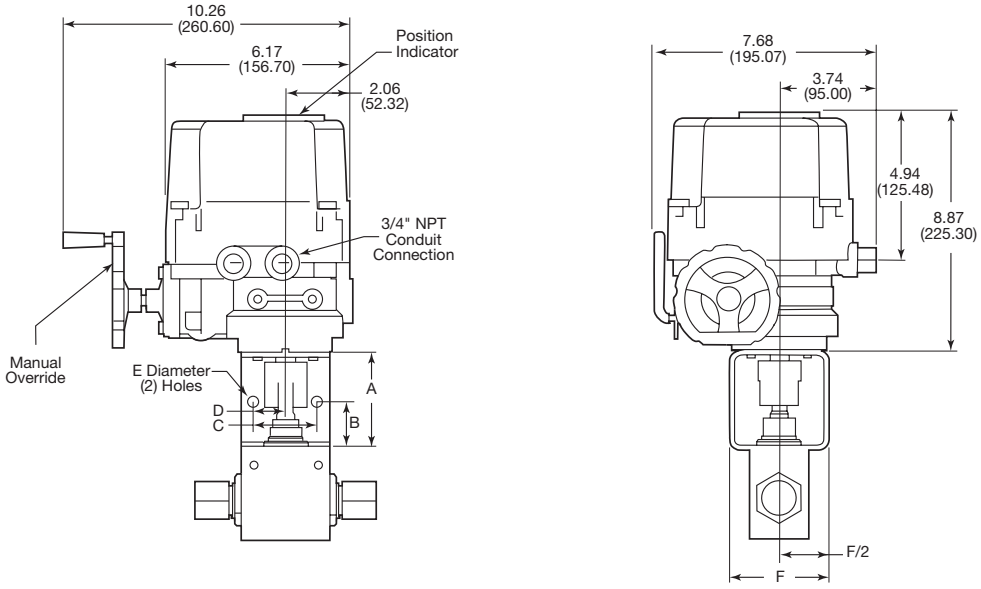
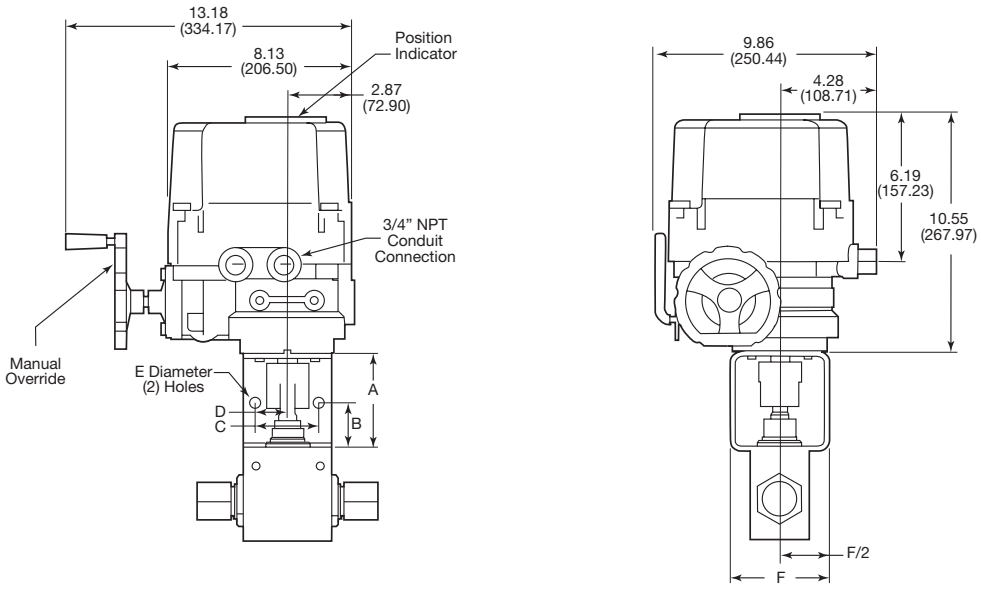


Figure 2



Actuators: Electric Explosion Proof Operated Ball Valves (E01X, E02X, E03X)

Explosion-proof, NEMA 7 Enclosure, ATEX Ex d IIb T4, IP67

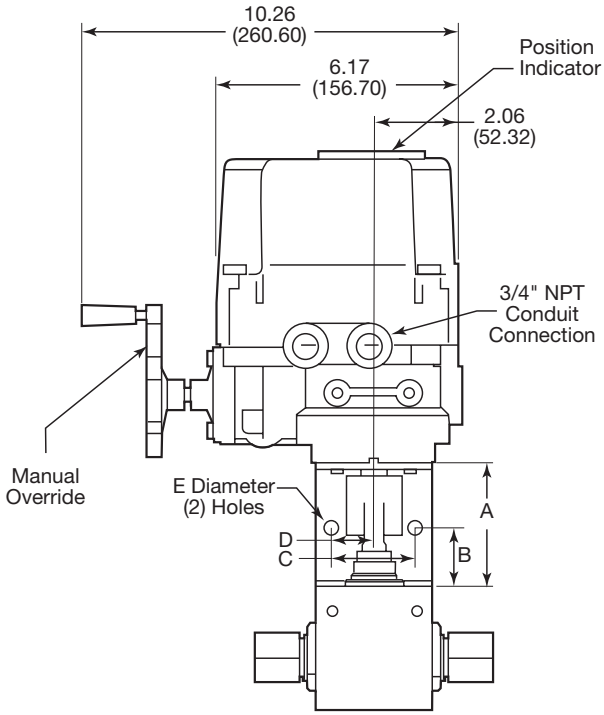
90° Actuation only

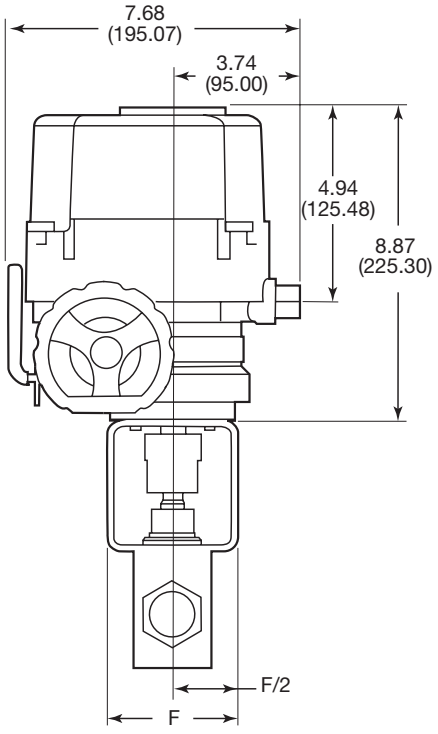
Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds
	A	B	C	D	E	F		
2B4-EO1X	3.00 (76.20)	1.50 (38.10)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	3.00 (76.20)	120 VAC	7
2B4-EO2X							240 VAC	
2B4-EO3X							24 VDC	
2B6-EO1X	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.64)	3.00 (76.20)	120 VAC	7
2B6-EO2X							240 VAC	
2B6-EO3X							24 VDC	
3BD3-EO1X	3.00 (76.20)	1.50 (38.10)	1.00 (25.40)	0.50 (12.70)	0.28 (7.11)	3.00 (76.20)	120 VAC	7
3BD3-EO2X							240 VAC	
3BD3-EO3X							24 VDC	
3BD6-EO1X	3.00 (76.20)	1.50 (38.10)	1.50 (38.10)	0.75 (19.05)	0.34 (8.64)	3.00 (76.20)	120 VAC	7
3BD6-EO2X							240 VAC	
3BD6-EO3X							24 VDC	

* Add the suffix **-EO1X**, **-EO2X** or **-EO3X** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- 3/4" NPT female conduit connection
- Manual Override
- Powder coated aluminum housing
- CE & CSA approved
- ATEX Explosion-Proof enclosure II 2 G, E Ex d IIB T4, IP67
- Limit switches (SPDT) as standard
- 120 & 240 Volt are 50/60 Hz, for other voltages consult factory
- Actuator operating temperature: -4°F to 158°F (-20°C to 70°C)
- Weight (all models): 16.4 lbs.
- Designed to comply with NEMA 7 Explosion Proof
- Watertight enclosure (IP68 10M 72HR)
- For other options consult factory





Actuators: Electric Explosion Proof Operated Ball Valves (E01X, E02X, E03X)

Explosion-proof, NEMA 7 Enclosure, ATEX Ex d IIb T4, IP67

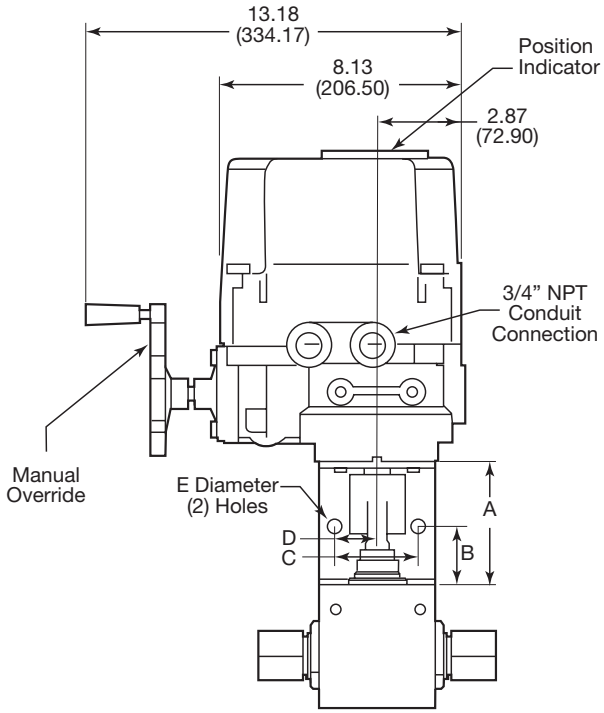
90° Actuation only

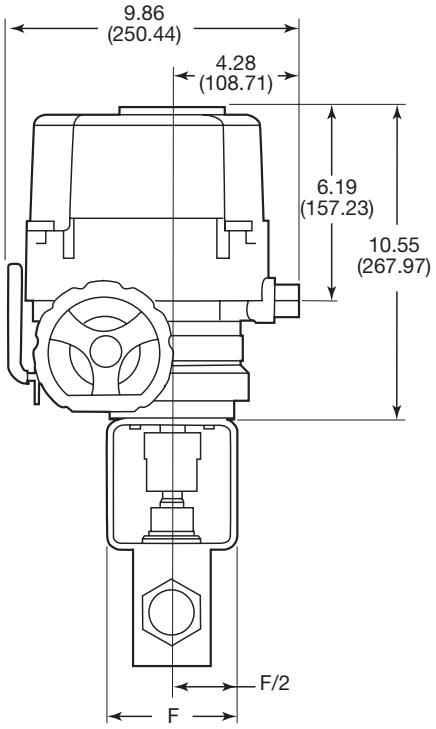
Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds
	A	B	C	D	E	F		
2B8-EO1X	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.56 (14.22)	3.00 (76.20)	120 VAC	7
2B8-EO2X							240 VAC	
2B8-EO3X							24 VDC	
3BD8-EO1X	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.56 (14.22)	3.00 (76.20)	120 VAC	7
3BD8-EO2X							240 VAC	
3BD8-EO3X							24 VDC	
4B6-EO1X	3.00 (76.20)	1.50 (38.10)	2.00 (50.80)	1.00 (25.40)	0.56 (14.22)	3.00 (76.20)	120 VAC	7
4B6-EO2X							240 VAC	
4B6-EO3X							24 VDC	

* Add the suffix **-EO1X**, **-EO2X** or **-EO3X** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- 3/4" NPT female conduit connection
- Manual Override
- Powder coated aluminum housing
- CE & CSA approved
- ATEX Explosion-Proof enclosure II 2 G, E Ex d IIB T4, IP67
- Limit switches (SPDT) as standard
- 120 & 240 Volt are 50/60 Hz, for other voltages consult factory
- Actuator operating temperature: -4°F to 158°F (-20°C to 70°C)
- Weight (all models): 36.7 lbs.
- Designed to comply with NEMA 7 Explosion Proof
- Watertight enclosure (IP68 10M 72HR)
- For other options consult factory





Actuators: Electric Explosion Proof Operated Ball Valves (E01X, E02X)

Explosion-proof, NEMA 7 Enclosure, ATEX Ex d IIb T4, IP67

90° Actuation only

Valve Series*	Dimension Data - Inches (mm)						Voltage	Time to Turn 90° Seconds	Weight lbs.	Figure
	A	B	C	D	E	F				
2B12-EO1X	5.00 (127.00)	2.50 (63.50)	3.25 (82.55)	1.63 (41.400)	0.53 (13.46)	5.00 (127.00)	120 VAC	8.5	50.8	1
2B12-EO2X							240 VAC			
2B16-EO1X	6.00 (152.40)	3.00 (76.20)	3.25 (82.55)	1.63 (41.40)	0.53 (13.46)	6.00 (152.40	120 VAC	10.5	64.0	2
2B16-EO2X							240 VAC			

* Add the suffix **-EO1X**, or **-EO2X** to the appropriate valve catalog number for a complete valve assembly
Actuators do not have repair kits and must be returned to factory for repair.

SPECIFICATIONS:

- **EO1**: Electric 120 VAC
- **EO2**: Electric 240 VAC
- Manual Override
- Designed to comply with NEMA 7 Explosion Proof
- Watertight enclosure (IP68 10M 72HR)
- Limit switches (SPDT) as standard
- 3/4" NPT female conduit connection
- CE & CSA approved for NEMA 4 and 4X
- Actuator operating temperature: -4°F to 158°F (20°C to 70°C)
- Powder coated aluminum housing
- ATEX Explosion-Proof enclosure II 2 G, E Ex d IIB, T4, IP67
- For other options consult factory

Figure 1

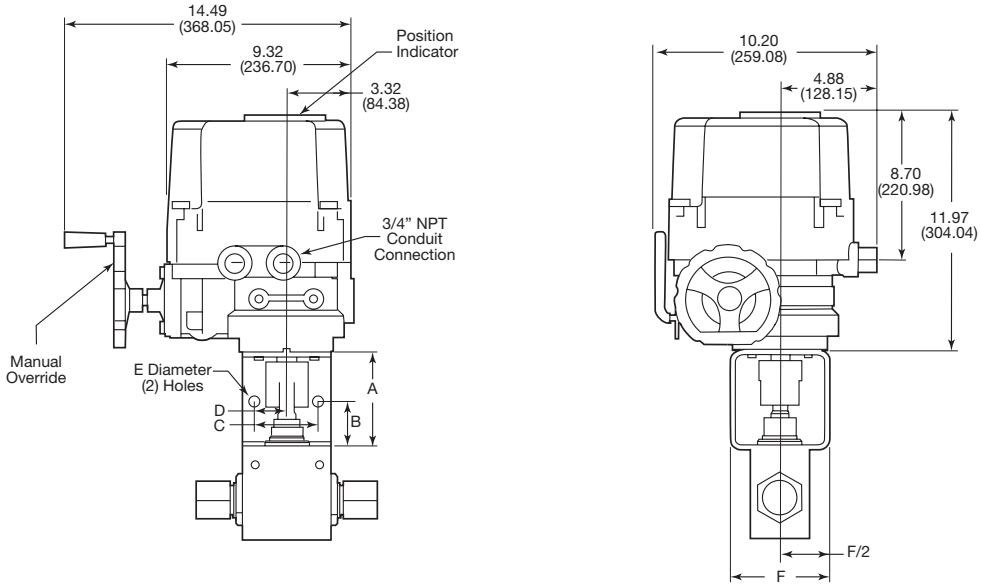
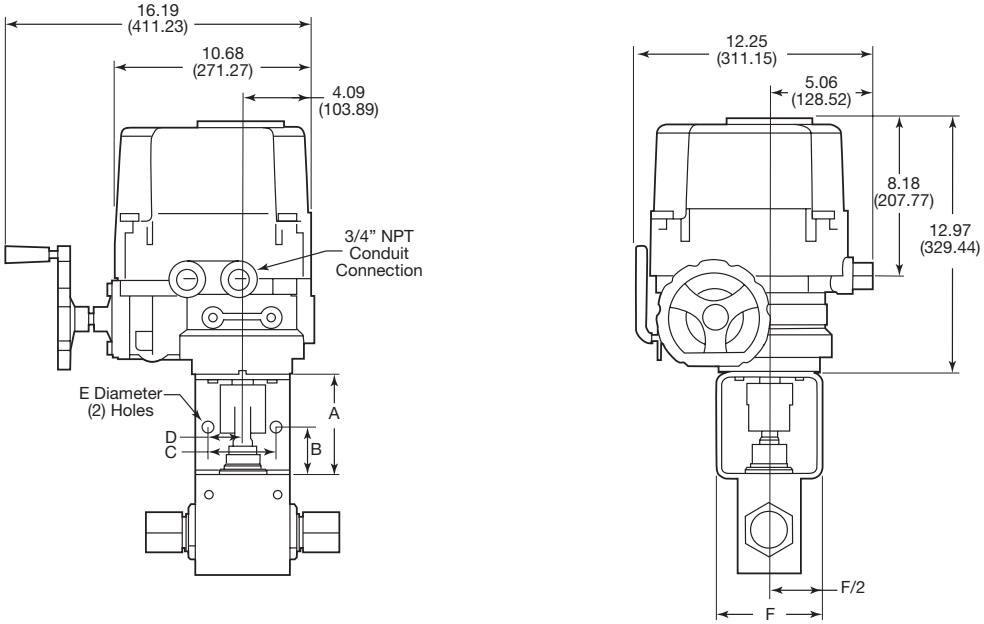
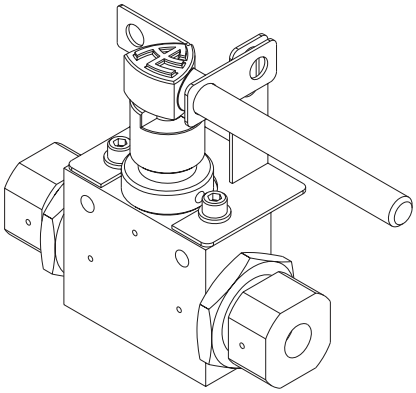


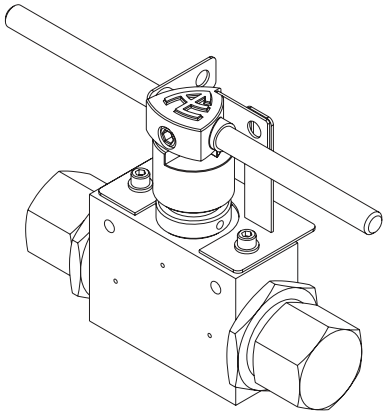
Figure 2



Lock-out Options: Ball Valves (2B4, 2B6, 2B8, 2B12, 2B16, 3BD3, 3DB6, 3DB8)



Versions: 2B4, 2B6, 3BD3, 3BD6



Versions: 2B8, 2B12, 2B16, 3BD8

-L Suffix option

Using the "**-L**" suffix option delivers the bolt-on Stainless Steel locking bracket shown above for the following Ball Valve Sizes:

All 2-Way Ball Valves
All 3BD (90° rotation) Series Ball Valves

We do not offer a metal lockout bracket for the 3-way 180° handle rotation ball valves (3B3, 3B6, 3B8). Nor do we offer any metal lockout bracket for the 4-way ball valve. To upgrade valves already in operation, order mounting kits using these part numbers: (includes bolting hardware, and modified handle, but does not include lock)

2B4-L For all 2B4 valves
2B6-L For all 2B6 valves
2B8-L For all 2B8 valves
2B12-L For all 2B12 valves
2B16-L For all 2B16 valves
3BD3-L For all 3BD3 valves
3BD6-L For all 3BD6 valves
3BD8-L For all 3BD8 valves

Ball Valve Clam Shell Handle Lock-Out:

(ordered separately, lock not included)

Clam Shell Design covers ball valve handle to prevent unauthorized access during any Lock-Out, Tag-Out maintenance or emergency situation. This clamshell design is available in four (4) sizes dependent on handle length:

P/N AE004855 - 1" to 2.5" handle length
P/N 90088 – 2.5" to 5.0" handle length
P/N 90194 – 6.5" to 10" handle length
P/N AE004350 - 8" to 13" handle length

This product is optional for all ball valve sizes but necessary for all 3-way (3B series) Ball Valves that have a 180° handle turn and both 4-way (4B and 4BS Series) Ball Valves. We do not offer a metal bracket lock-out option for these valves at this time.

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