Ball Valve

Subsea Series, 2 Way & 3 Way

Internal Pressures to 20,000 psi (1379 bar)
Water Depth to 12,500 ft. (3810m)

Principle of Operation:

Parker Autoclave Engineers subsea ball valves have been designed in accordance with ASME B31.3 Chapter IX High Pressure piping standards to fulfill the ever growing subsea applications in the petroleum industry as well as the need for externally pressurized components in other markets. Utilizing the same design technology as the standard ball valve, the subsea design incorporates the necessary design alterations to provide a reliable externally pressurized valve for the subsea industry.

Parker Autoclave Engineers has the most connection options available and all the associated tubing, fittings and adapters you would need to outfit any application you might have, above or below the surface. Traceability is ensured by use of heat and purchase order codes etched on valve body that also includes model number, pressure rating, and material type references.

Subsea 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
- PEEK seats offer excellent resistance to chemicals, heat, and wear/abrasion
- Full-port flow path minimizes pressure drop
- UNS S31600/S31603 CW 316 Stainless Steel Material as standard. Optional materials available
- Low friction, pressure assisted, graphite filled PTFE stem seal increases cycle life and reduces operating torque
- Buna-N o-ring (Nitrile) standard, -20° to 250°F (-29° to 121°C)
- Additional seals engineered to prevent water and silt ingress to any threaded or rotating parts
- Designed to accept multiple types of tube and pipe end connections

Subsea Ball Valve Applications:

- Subsea Hydraulic Manifolds
- Subsea Control Umbilicals
- Subsea Wellheads and Control Packages

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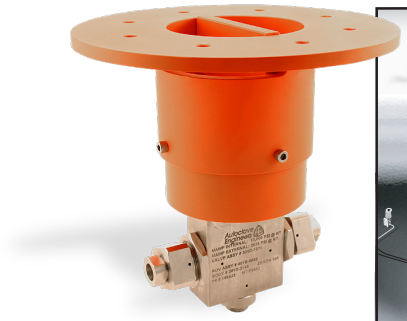
Principle of Subsea Operation and Design:

The Parker Autoclave Engineers ball valves can be utilized to switch or isolate flow. The standard material of construction of the valve is 316 cold worked 316/316L with PEEK seats, graphite filled PTFE stem seal, and o-ring material as required by the process fluid.

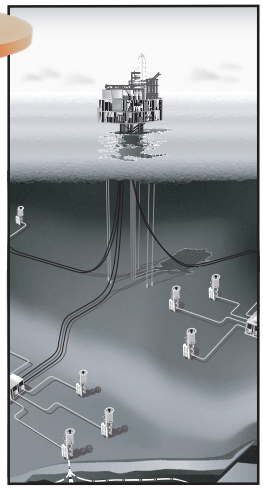
The subsea ball valve design incorporates additional o-ring seals, which prevent the ingress of seawater into the valve which would adversely affect the operation of the valve as well as contaminate the process fluid. A significant feature of the subsea design is a thrust washer positioned under the stem preventing outside sea water from moving the stem from its aligned position.

Subsea ball valves are designed to facilitate operation by a Remote Operated vehicle (ROV). No handle or valve stop is provided as standard in preparation for mating to an ROV acceptable actuator. ROV operator assemblies are used for valve mounting and to provide positive valve stop for precise 90° operation.



Adaptable for Remote Operated Vehicle (ROV) operation by customer.

Note:
Third party actuator shown above is not available from Parker Autoclave Engineers



Various tube and pipe connections with valve bore sizes from 3/16" to 1" are available within a variety of valve configurations capable of up to 12,500' water depth (5,500 psi external pressure).

Contact Parker Autoclave Engineers technical sales support or your local distributor for more information on optional materials of construction, seal materials and valve configurations to fit your application requirements.

Subsea Actuation Torque

2 Way Subsea Ball Valve	Breakout Torque	Running Torque
1/4" Orifice Stem @ 20,000 psi	75 in-lbf (9 Nm)	70 in-lbf (9 Nm)
3/8" Orifice Stem @ 20,000 psi	275 in-lbf (31 Nm)	150 in-lbf (17 Nm)
1/2" Orifice Stem @ 15,000 psi	690 in-lbf (78 Nm)	425 in-lbf (48 Nm)
3/4" Orifice Stem @ 15,000 psi	140 in-lbf (190 Nm)	90 in-lbf (122 Nm)
1" Orifice Stem @ 10,000 psi	200 in-lbf (271 Nm)	150 in-lbf (203 Nm)

3 Way Subsea Ball Valve	Breakout Torque	Running Torque
3/16" Orifice Stem @ 20,000 psi	75 in-lbf (9 Nm)	70 in-lbf (9 Nm)
3/8" Orifice Stem @ 10,000 psi	275 in-lbf (31 Nm)	150 in-lbf (17 Nm)
1/2" Orifice Stem @ 10,000 psi	450 in-lbf (51 Nm)	420 in-lbf (47 Nm)

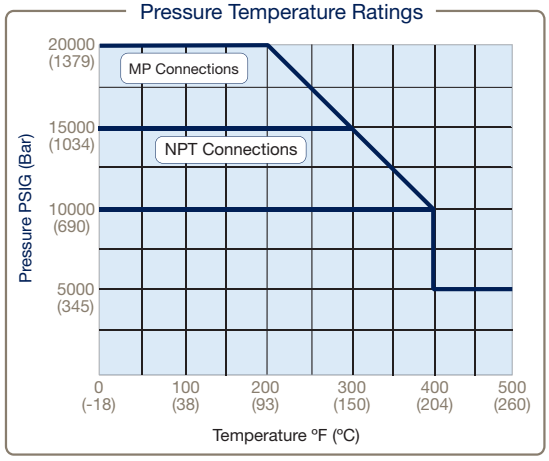
Breakout Torque is torque needed to initially rotate valve when in closed position with full MAWP on one side and 0 psi on the other.

Running Torque is torque needed to rotate the valve at full MAWP

2 Way Subsea Series: 1/4" (6.35mm) Orifice

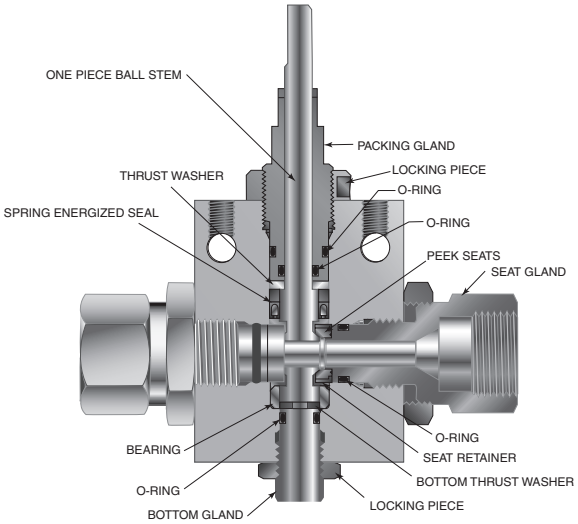
Pressures to 20,000 psi (1379 bar)

Connection Type	MAWP at Room Tmperature	Minimum Orifice Inches (mm)	Rated Cv
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
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



2 Way 1/4" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

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Ordering Guide:

For complete information on available end connections, see previous page. 2-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: S2B4S20M9*

Example Part Number:	S2B	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	
S2B	Subsea 2 Way Ball Valve

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
5	15,000 psi
20	20,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
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"
P4	1/4" FNPT	15,000 psi	1"
P6	3/8" FNPT	15,000 psi	1"
P8	1/2" FNPT	15,000 psi	1.38"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S2B4S

When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S2B4S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

Material of Construction:

Item #	Description	Material
1	Stem Seal	Graphite
2	O-Ring	Buna-N
3	O-Ring	Buna-N
4	Lock Nut	316 SS
5	Seat	PEEK
6	Seat Retainer	316 CW SS
7	Bottom Washer	316 SS
8	Lock Nut	316 SS
9	Lock Nut	316 SS
10	Bottom Gland	316 SS
11	Thrust Washer	AMPCO 45
12	1/4" Ball Valve Stem	316 CW SS
13	Thrust Washer	AMPCO 45
14	Body	316 CW SS
15	Packing Gland	316 CW SS
16	2 Way Seat Gland	316 CW SS

Typical spare parts found in Repair Kits

Please reference drawing on Page 5

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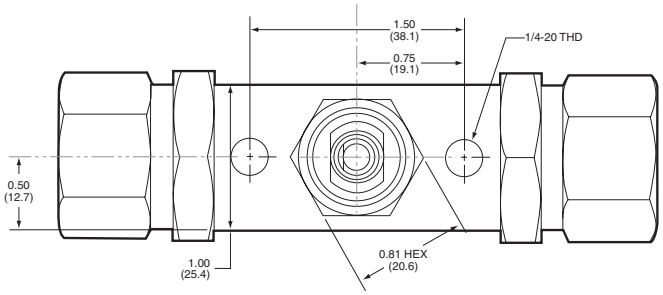
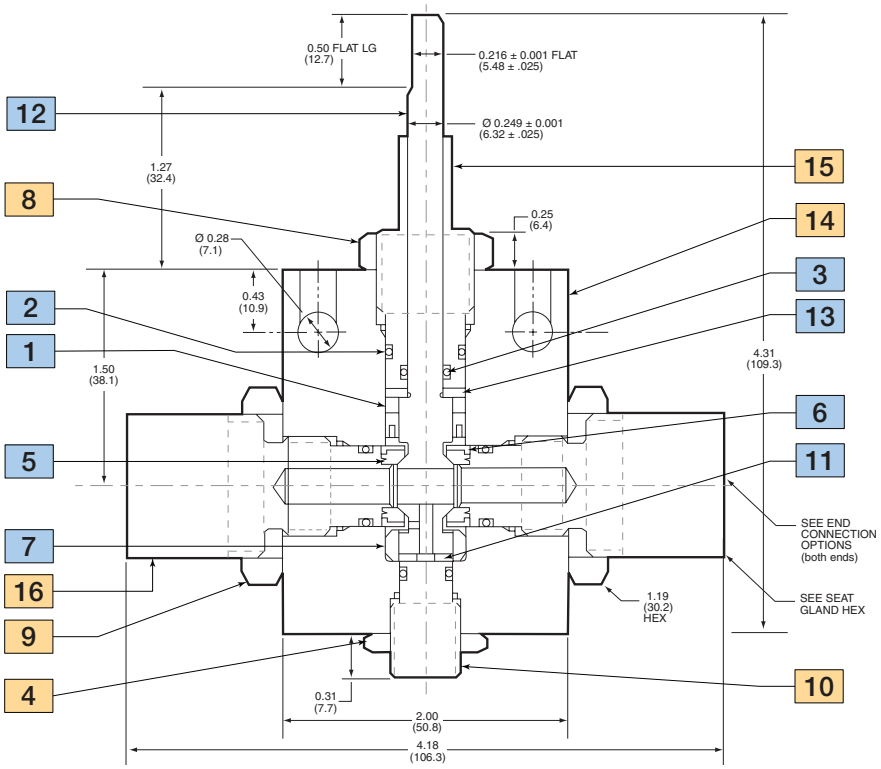
1/4" 2 Way Subsea Ball Valve Dimensions:

1/4" 2 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 12,500 FT (3810 meters)
3. Maximum External Pressure 5,500 psi (379 bar)

Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

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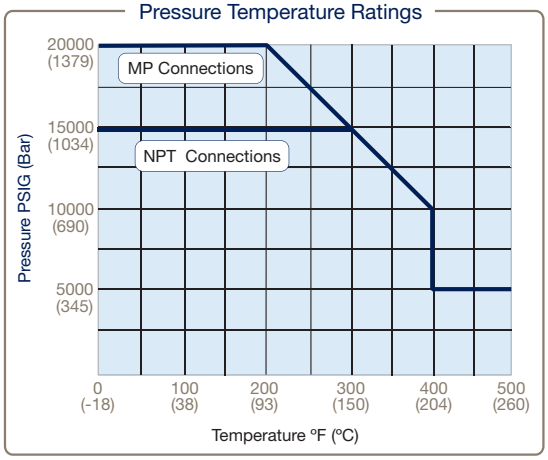
2 Way Subsea Series: 3/8" (9.52mm) Orifice

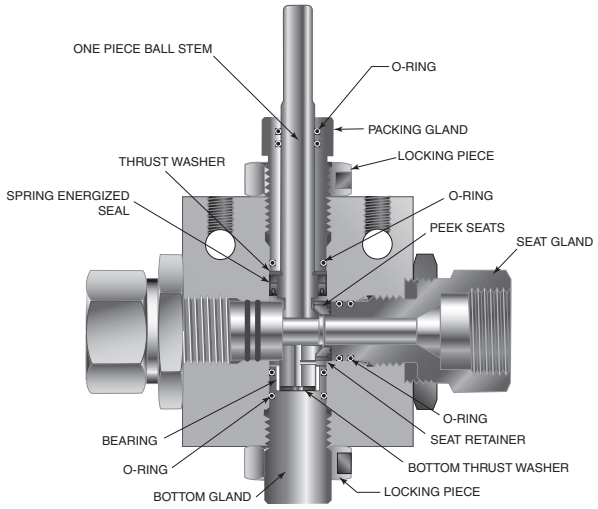
Pressures to 20,000 psi (1379 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SF375CX20	20,000 psi (1379 bar)	0.203 (5.16)	0.94
SF562CX (3/8" MP)	20,000 psi (1379 bar)	0.312 (7.92)	3.3
SF750CX20 (3/4" MP)	20,000 psi (1379 bar)	0.328 (8.33)	3.4
1/4" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.2
3/8" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.2
1/2" FNPT	15,000 psi (1034 bar)	0.375 (9.52)	5.2



2 Way 3/8" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

Ordering Guide:

For complete information on available end connections, see previous page. 2-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: S2B6S20M9*

Example Part Number:	S2B	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	
S2B	Subsea 2 Way Ball Valve

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
5	15,000 psi
20	20,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M6	SF375CX (3/8" MP)	20,000 psi	1.38"
M9	SF562CX20 (9/16" MP)	20,000 psi	1.38"
M12	SF750CX20 (3/4" MP)	20,000 psi	1.38"
P4	1/4" NPT	15,000 psi	1.38"
P6	3/8" NPT	15,000 psi	1.38"
P8	1/2" NPT	15,000 psi	1.38"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S2B6S

When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S2B6S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

Material of Construction:

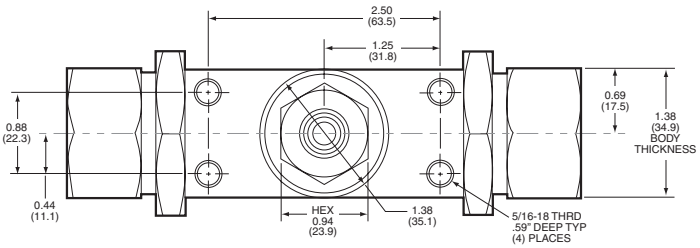
Item #	Description	Material
1	Stem Seal	Graphite
2	O-Ring	Buna-N
3	O-Ring	Buna-N
4	O-Ring	Buna-N
5	Thrust Washer	AMPCO 45
6	Seat	Arlon 1260
7	Seat Retainer	316 CW SS
8	Locking Piece	316 SS
9	Lock Nut	316 SS
10	Bottom Gland	316 SS
11	Thrust Washer	AMPCO 45
12	Bottom Bearing	AMPCO 45
13	Body	316 CW SS
14	Stem	316 CW SS
15	Packing Gland	316 CW SS
16	2 Way Seat Gland	316 CW SS

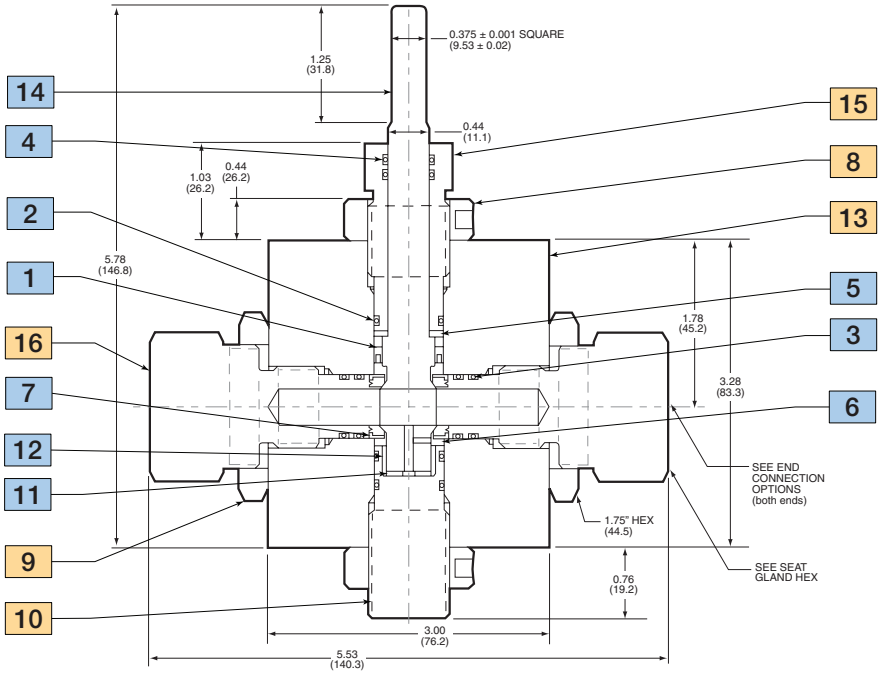
Typical spare parts found in Repair Kits

Please reference drawing on Page 8

3/8" 2 Way Subsea Ball Valve Dimensions:

3/8" 2 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 11,500 FT (3505 meters)
3. Maximum External Pressure 5,500 psi (379 bar)

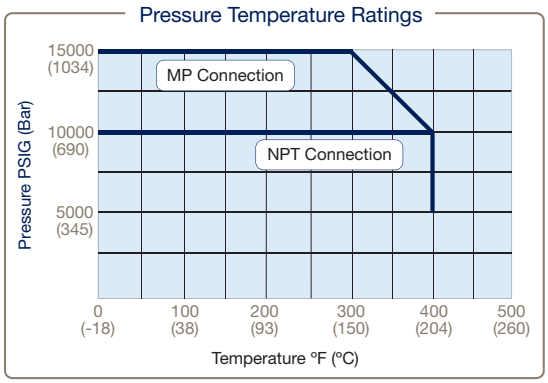
Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

2 Way Subsea Series: 1/2" (12.7mm) Orifice

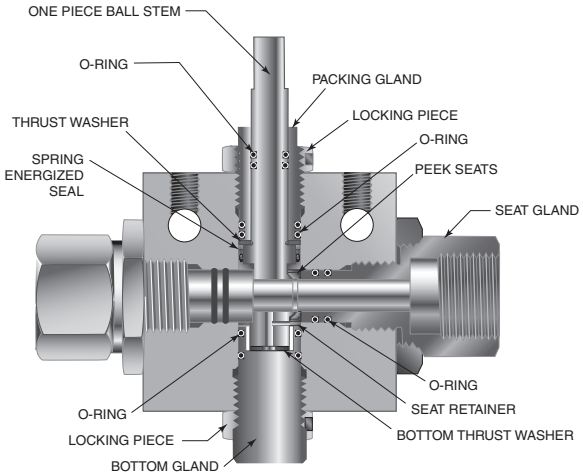
Pressures to 15,000 psi (1034 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SF750CX20 (3/4" MP)	15,000 psi (1034 bar)	0.500 (12.70	10.2
SF1000CX20 (1" MP)	15,000 psi (1034 bar)	0.500 (12.70)	10.2
1/2" FNPT	15,000 psi (1034 bar)	0.500 (12.70)	10.2
3/4" FNPT	10,000 psi (690 bar)	0.500 (12.70)	10.2
1" FNPT	10,000 psi (690 bar)	0.500 (12.70)	10.2



2 Way 1/2" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

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Ordering Guide:

For complete information on available end connections, see previous page. 2-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: ***Example: S2B8S15M16***

Example Part Number:	**S2B**	**8**	**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	
S2B	Subsea 2 Way Ball Valve

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
10	10,000 psi
15	15,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M12	SF750CX20 (3/4" MP)	15,000 psi	1.75"
M16	SF1000CX20 (1" MP)	15,000 psi	1.75"
P8	1/2" NPT	10,000 psi	1.75"
P12	3/4" NPT	10,000 psi	1.75"
P16	1" NPT	10,000 psi	1.75"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S2B8S

When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S2B8S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

Material of Construction:

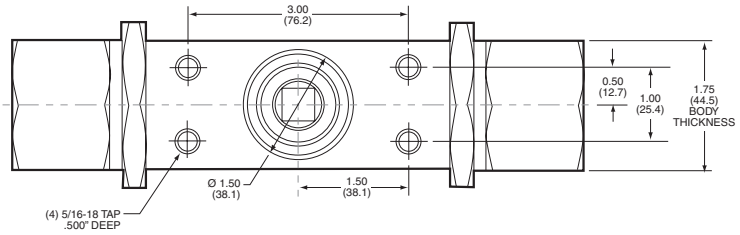
Item #	Description	Material
1	O-Ring	Buna-N
2	O-Ring	Buna-N
3	O-Ring	Buna-N
4	U-Cup Seal Assembly	Graphite/Carbon PTFE
5	Thrust Washer	AMPCO 45
6	Seat	316 CW SS
7	Seat Retainer	316 CW SS
8	Lock Nut	316 SS
9	Packing Gland	316 CW SS
10	Bottom Bearing	AMPCO 45
11	Thrust Washer	AMPCO 45
12	Bottom Gland	316 SS
13	Stem	316 CW SS
14	Locking Piece	316 SS
15	2 Way Seat Gland	316 CW SS
16	Body	316 CW SS

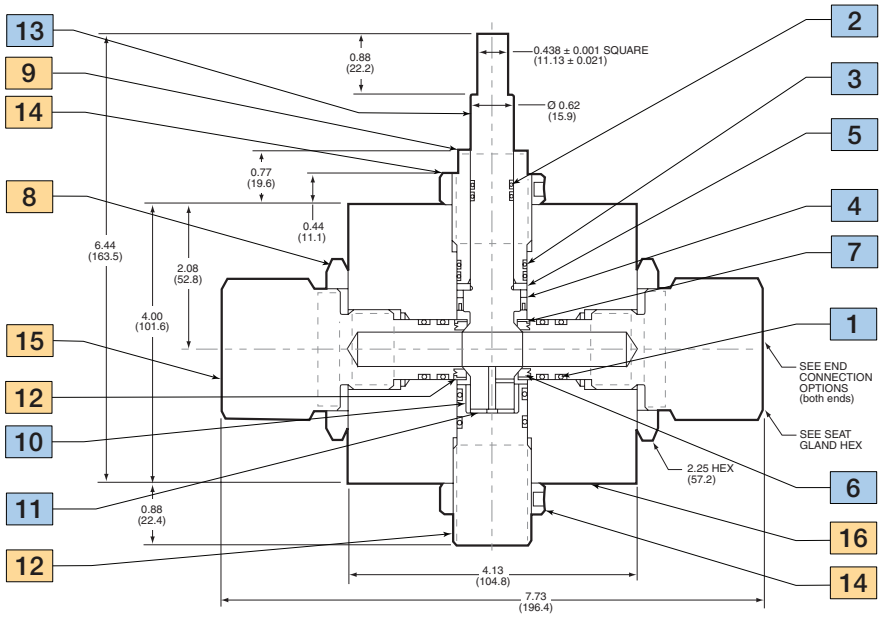
Typical spare parts found in Repair Kits

Please reference drawing on Page 11

1/2" 2 Way Subsea Ball Valve Dimensions:

1/2" 2 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 11,500 FT (3505 meters)
3. Maximum External Pressure 5,500 psi (379 bar)

Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

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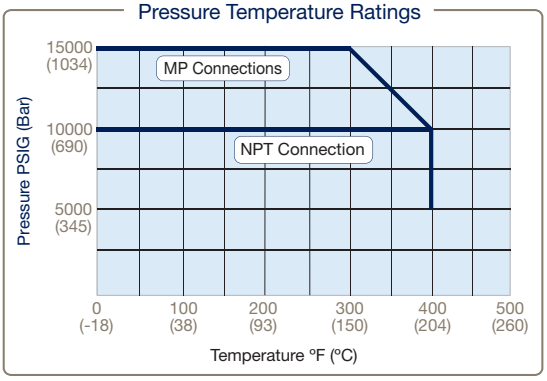
2 Way Subsea Series: 3/4" (19mm) Orifice

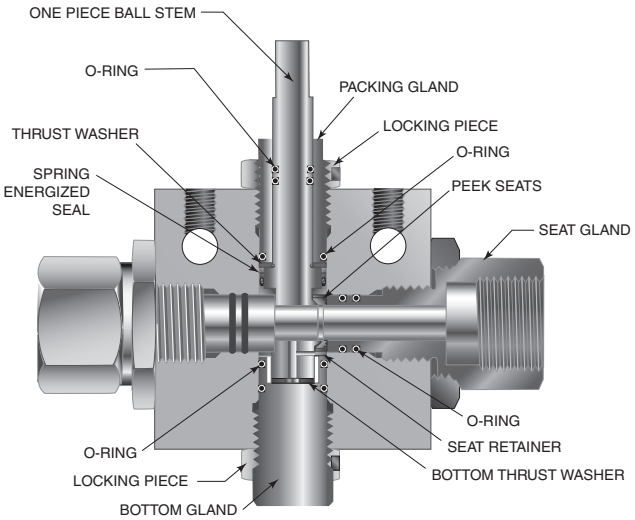
Pressures to 15,000 psi (1034 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SF1000CX10 (1" MP)	15,000 psi (1034 bar)	0.688 (17.48)	21
3/4" FNPT	10,000 psi (690 bar)	0.750 (19.05)	24
1" FNPT	10,000 psi (690 bar)	0.750 (19.05)	24



2 Way 3/4" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

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Ordering Guide:

For complete information on available end connections, see previous page. 2-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: ***Example: S2B12S15M12***

Example Part Number:	S2B	12	S	15	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	
S2B	Subsea 2 Way Ball Valve

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
10	10,000 psi
15	15,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M16	SF1000CX20 (1" MP)	15,000 psi	1.88"
P12	3/4" NPT	10,000 psi	1.88"
P16	1" NPT	10,000 psi	1.88"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S2B12S

When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S2B12S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

Material of Construction:

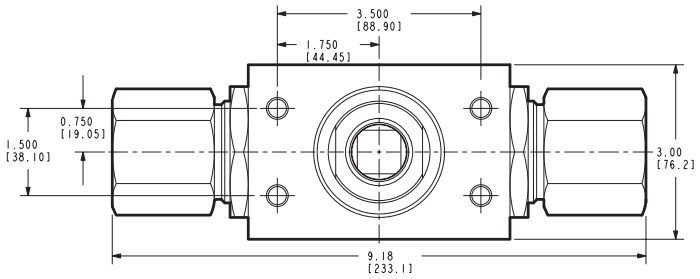
Item #	Description	Material
1	Stem Seal	Graphite
2	O-Ring	Buna-N
3	O-Ring	Buna-N
4	Retaining Ring	316 SS
5	Retaining Ring	316 SS
6	Locknut	316 SS
7	Seat	30% Carbon Filled Peek
8	Seat Retainer	Super Duplex Zeron 100
9	Thrust Washer	AMPCO 45
10	Top Bearing	316 SS
11	Locking Piece	316 SS
12	O-Ring Backup	AMPCO 45
13	Thrust Washer	AMPCO 45
14	Bottom Bearing	AMPCO 45
15	Stem	316 CW SS
16	O-Ring Backup	AMPCO 45
17	Seat Gland	316 CW SS
18	Bottom Gland	316 SS
19	Packing Gland	316 SS
20	Body	316 CW SS

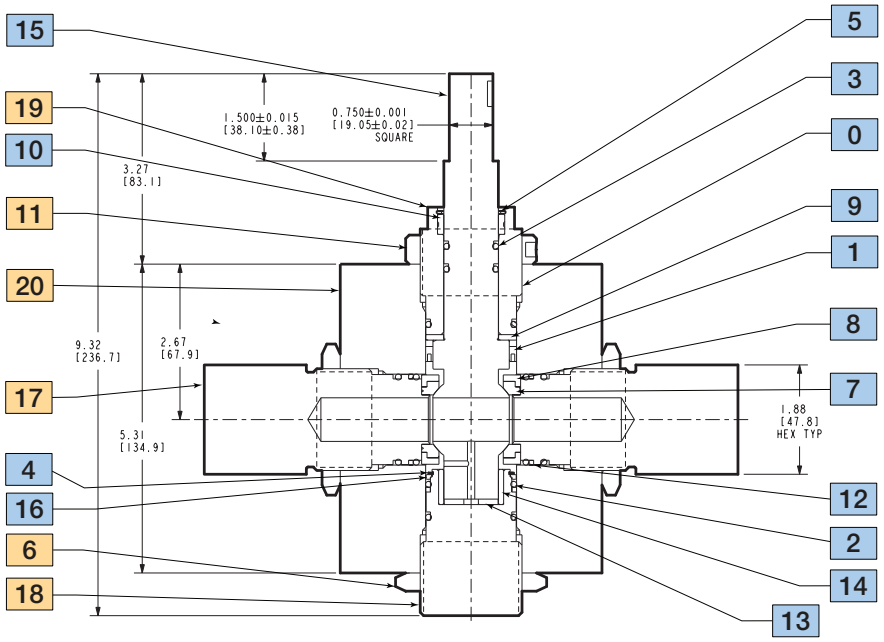
Typical spare parts found in Repair Kits

Please reference drawing on Page 14

3/4" 2 Way Subsea Ball Valve Dimensions:

3/4" 2 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 11,500 FT (3505 meters)
3. Maximum External Pressure 5,000 psi (379 bar)

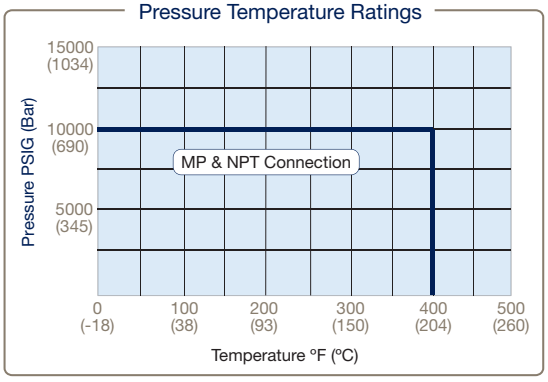
Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

2 Way Subsea Series: 1" (15.4mm) Orifice

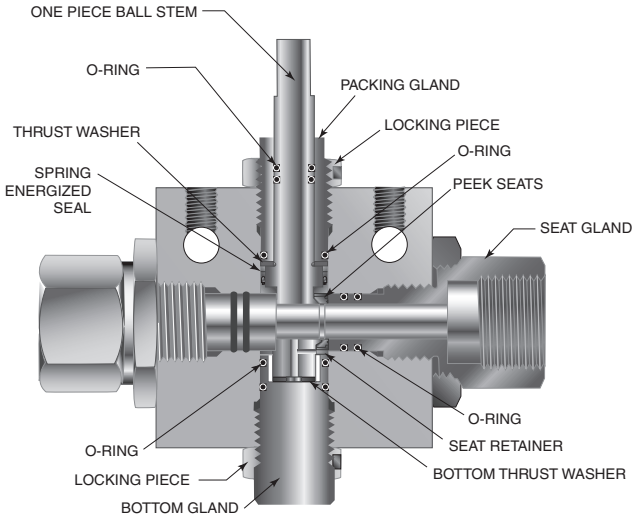
Pressures to 10,000 psi (690 bar)

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" NPT	10,000 psi (690 bar)	1.00 (25.40)	37.2



2 Way 1" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring material.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

Ordering Guide:

For complete information on available end connections, see previous page. 2-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: S2B16S10P16*

Example Part Number:	S2B	16	S	10	P16	–	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	
S2B	Subsea 2 Way Ball Valve

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
10	10,000 psi

E - End Connection			
	Connection	MAWO @ RT	Seat Gland Hex
M24	SF1500CX (1-1/2" MP)	10,000 psi	2.75"
P16	1" NPT	10,000 psi	2.75"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S2B16S

When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S2B16S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

Material of Construction:

Item #	Description	Material
1	Body	316 CW SS
2	Bottom Bearing	AMPCO 45
3	Bottom Gland	A286 SS
4	Cap Screw	316 SS
5	Locking Device	316 SS
6	Locking Piece	316 SS
7	O-Ring Backup	Carbon Filled Peek
8	O-Ring Backup	AMPCO 45
9	O-Ring	Buna-N
10	O-Ring	Buna-N
11	Packing Gland	A286 SS
12	Retaining Ring	316 SS
13	Retaining Ring	302 SS
14	Seat	Carbon Filled Peek
15	Seat Gland	316 SS
16	Seat Retainer	316 CW SS
17	Cap Screw	316 SS
18	Stem Seal w/ Spring	PTFE w/ Graphite
19	Stem	316 CW SS
20	Thrust Washer	AMPCO 45
21	Thrust Washer	AMPCO 45
22	Top Bearing	Virgin Peek

Typical spare parts found in Repair Kits

Please reference drawing on Page 17

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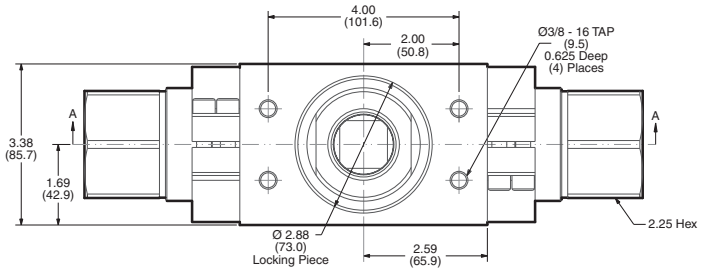
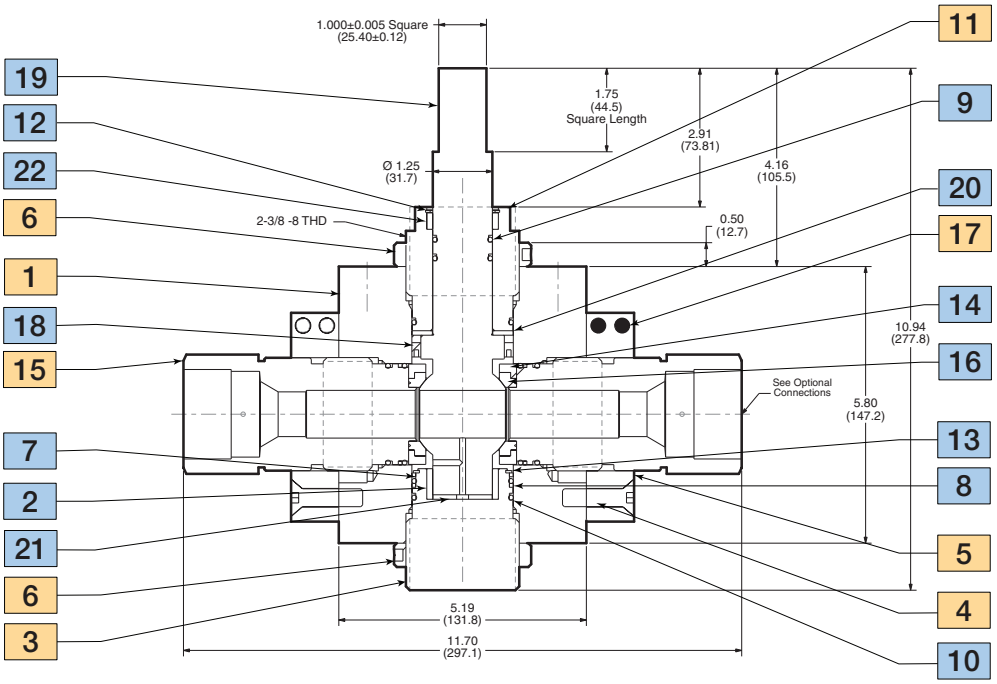
1" 2 Way Subsea Ball Valve Dimensions:

1" 2 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 11,150 FT (3400 meters)
3. Maximum External Pressure 5,000 psi (345 bar)

Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

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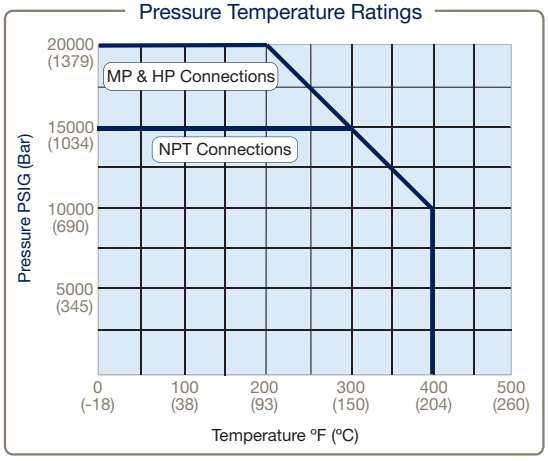
3 Way Subsea Series: 3/16" (4.77mm) Orifice

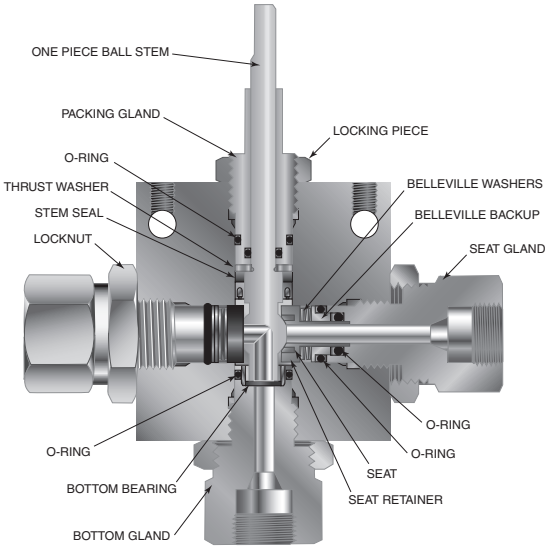
Pressures to 20,000 psi (1379 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SF250CX (1/4" MP)	20,000 psi (1379 bar)	0.109 (2.77)	0.26
SF375CX (3/8" MP)	20,000 psi (1379 bar)	0.188 (4.77)	0.5
SF562CX (9/16" MP)	20,000 psi (1379 bar)	0.188 (4.77)	0.5
F250C (1/4" HP)	20,000 psi (1379 bar)	0.094 (2.39)	0.18
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



3 Way 3/16" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring or PEEK seat material
Note: Side inlet pressure not recommended. Bottom inlet pressure only.
PAE Ball Valves are designed to be used in fully open or fully closed position.
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.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

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

Ordering Guide:

For complete information on available end connections, see previous page. 3-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: S3B3S20M6*

Example Part Number:	S3B	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	
S3B	3 Way Subsea Switching Valve (180° Handle Turn)
S3BD	3 Way Subsea Diverter Valve (90° Turn)

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
15	15,000 psi
20	20,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
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	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar, gland and packing gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

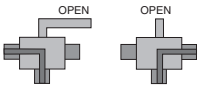
Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above).
Example: **R**S3B3S

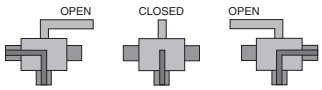
When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above).
Example: **R**S3B3S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

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.

Material of Construction:

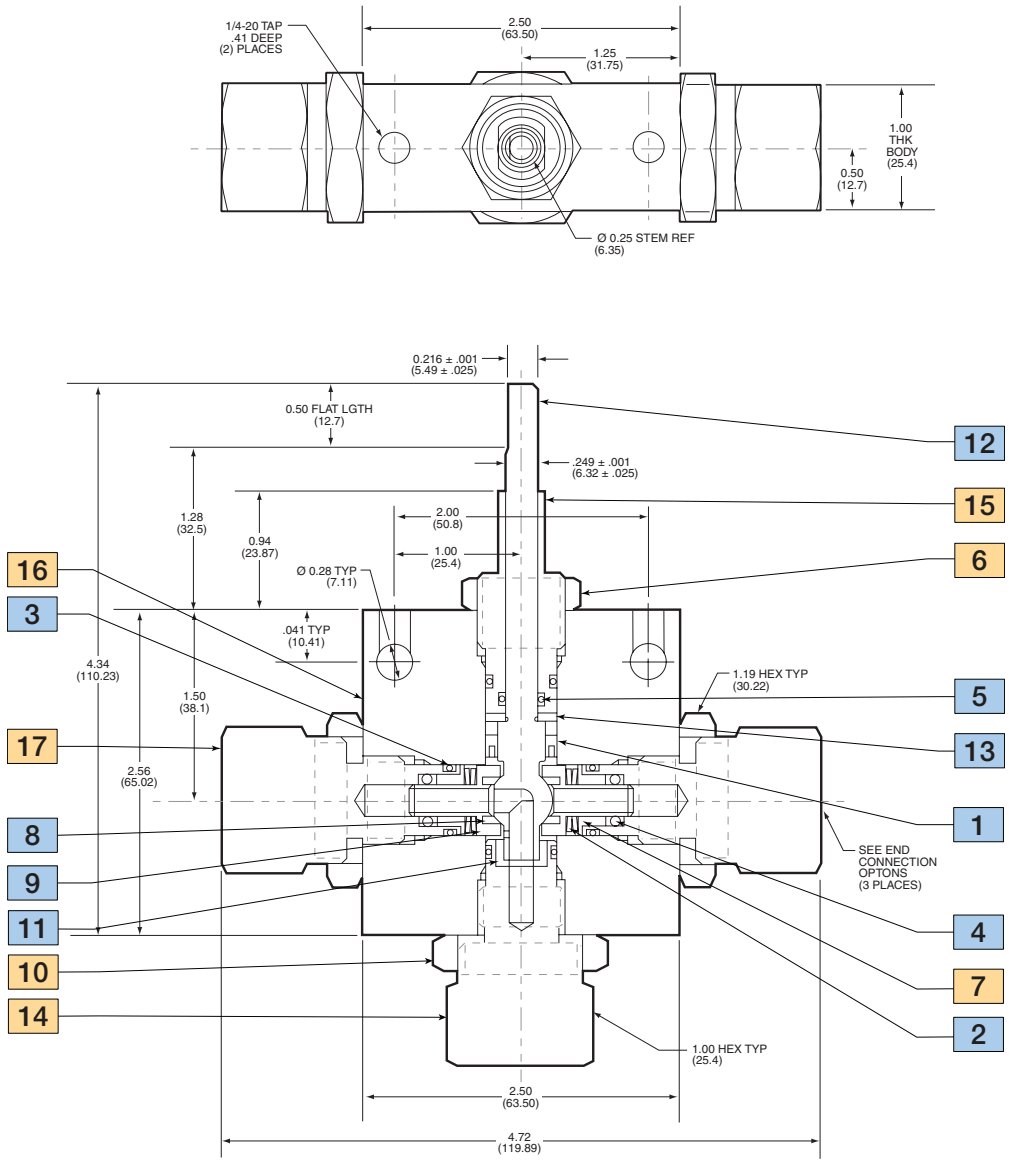
Item #	Description	Material
1	Stem Seal w/ Spring	PTFE w/ Graphite
2	Belleville Washer	302 SS
3	O-Ring	Buna-N
4	O-Ring	Buna-N
5	O-Ring	Buna-N
6	Locking Nut	316 SS
7	Belleville Washer Backup	316 CW SS
8	Seat	ARLON 1260
9	Seat Retainer	Nitronic 50 HS
10	Locknut	316 SS
11	Bottom Bearing	AMPCO 45
12	Stem	316 CW SS
13	Thrust Washer	AMPCO 45
14	Bottom Gland	316 CW SS
15	Packing Gland	316 CW SS
16	Body	316 CW SS
17	Seat Gland	316 CW SS

Typical spare parts found in Repair Kits

Please reference drawing on Page 20

3/16" 3 Way Subsea Ball Valve Dimensions:

3/16" 3 Way Subsea Ball Valve



NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 10,300 FT (3140 meters)
3. Maximum External Pressure 4,500 psi (310 bar)

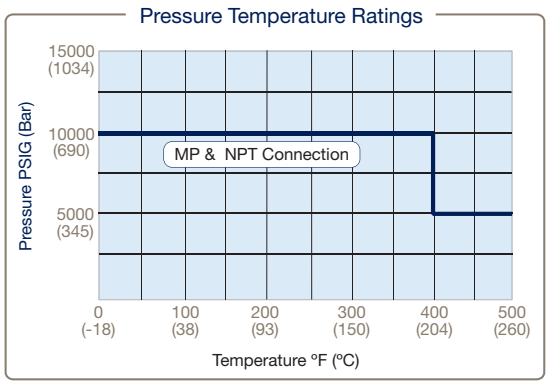
Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

3 Way Subsea Series: 3/8" (8.33mm) Orifice

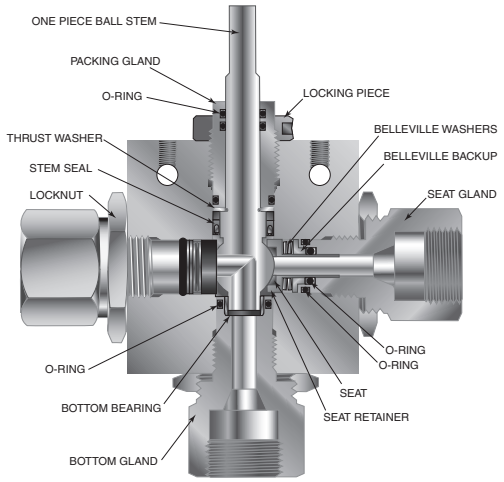
Pressures to 10,000 psi (690 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
SF562CX20 (9/16" MP)	10,000 psi (690 bar)	0.312 (7.92)	2.0
SF750CX20 (3/4" MP)	10,000 psi (690 bar)	0.326 (8.28)	2.1
1/4" FNPT	10,000 psi (690 bar)	0.326 (8.28)	2.1
3/8" FNPT	10,000 psi (690 bar)	0.326 (8.28)	2.1
1/2" FNPT	10,000 psi (690 bar)	0.326 (8.28)	2.1



3 Way 3/8" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring or PEEK seat material
Note: Side inlet pressure not recommended. Bottom inlet pressure only.
PAE Ball Valves are designed to be used in fully open or fully closed position.
NPT connections are limited to 400°F max due to PTFE Sealant.



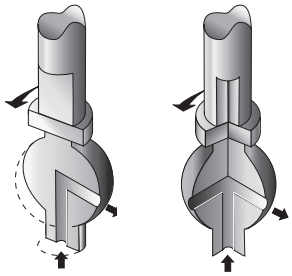
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium should be evaluated on a case by case basis. Consult factory.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

Flow Configuration



3-Way Switching
180 Turn

3-Way Diverting
90° Turn

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

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Ordering Guide:

For complete information on available end connections, see previous page. 3-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: S3B6S10M9*

Example Part Number:	S3B	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		F

A - Valve Series	
S3B	3 Way Subsea Ball Valve
S3BD	3 Way Subsea Diverter

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
10	10,000 psi

E - End Connection			
	Connection	MAWO @ RT	Seat Gland Hex
M9	SF562CX20 (9/16" MP)	10,000 psi	1.38"
M12	SF750CX20 (3/4" MP)	10,000 psi	1.38"
P4	1/4" NPT	10,000 psi	1.38"
P6	3/8" NPT	10,000 psi	1.38"
P8	1/2" NPT	10,000 psi	1.38"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

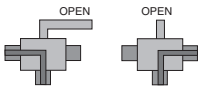
Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above).
Example: **R**S3B6S

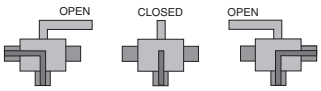
When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above).
Example: **R**S3B6S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

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.

Material of Construction:

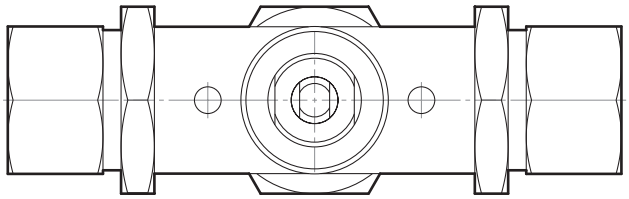
Item #	Description	Material
1	Stem Seal w/ Spring	PTFE w/ Graphite
2	Belleville Washer	302 SS
3	O-Ring	Buna-N
4	O-Ring	Buna-N
5	O-Ring	Buna-N
6	O-Ring	Buna-N
7	Thrust Washer	AMPCO 45
8	Seat Retainer	Nitronic 50 HS
9	Belleville Washer Backup	316 CW SS
10	Locking Piece	316 SS
11	Locknut	316 SS
12	Stem	316 CW SS
13	Bottom Bearing	AMPCO 45
14	Seat	Carbon Filled Peek
15	Bottom Gland	316 CW SS
16	Body	316 CW SS
17	Packing Gland	316 CW SS
18	Seat Gland	316 CW SS

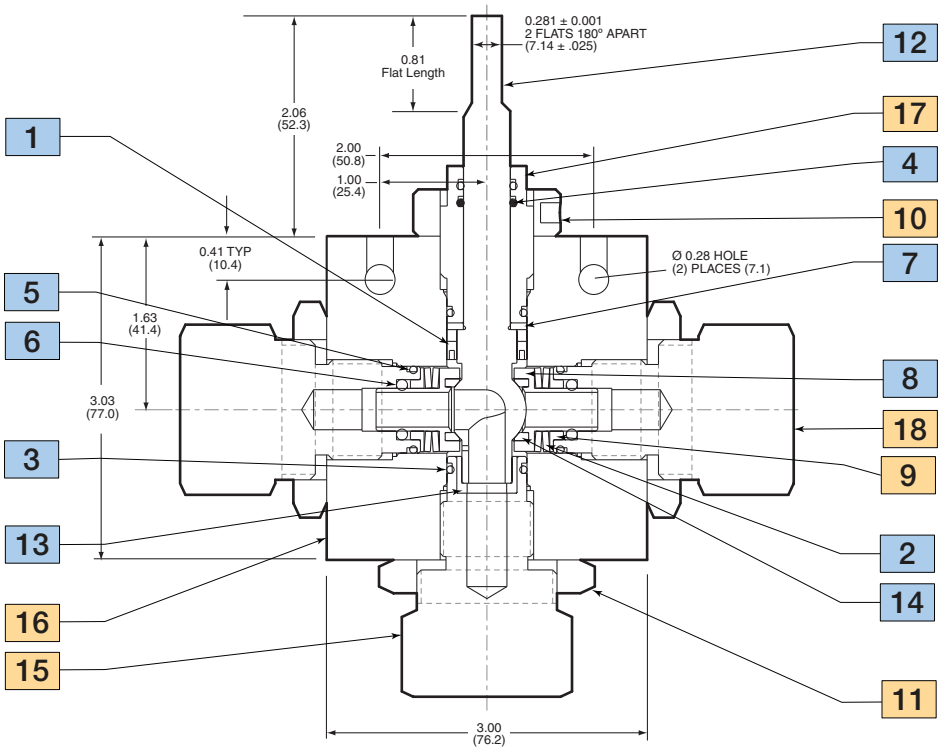
Typical spare parts found in Repair Kits

Please reference drawing on Page 23

3/8" 3 Way Subsea Ball Valve Dimensions:

3/8" 3 Way Subsea Ball Valve





NOTE:
1. MAWP (See Table)
2. Maximum Sea Depth 11,500 FT (3505 meters)
3. Maximum External Pressure 5,000 psi (345 bar)

Dimensions for reference only and subject to change.

NOTE:
Valve Stem has no stop supplied as standard.
Stem will rotate 360° unless used with Subsea Actuator or Handle/Stop is ordered.

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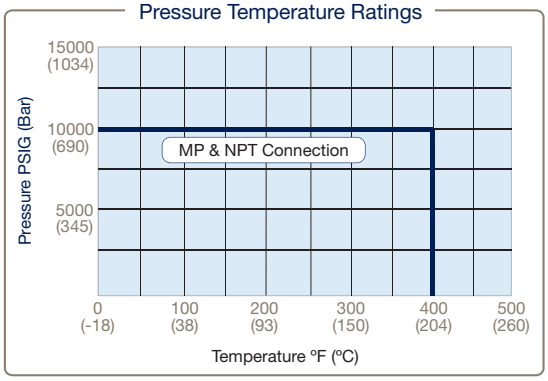
3 Way Subsea Series: 1/2" (12.7mm) Orifice

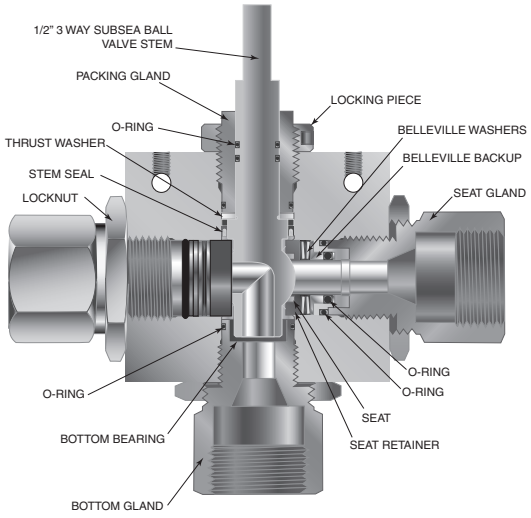
Pressures to 10,000 psi (690 bar)

Connection Type	MAWP at Room Temperature	Minimum Orifice Inches (mm)	Rated C_V
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



3 Way 1/2" Bore Subsea Ball Valve

Pressure Ratings are determined by the end connections chosen, see chart.
Maximum Temperature rating is determined by the o-ring or PEEK seat material
Note: Side inlet pressure not recommended. Bottom inlet pressure only.
PAE Ball Valves are designed to be used in fully open or fully closed position.
NPT connections are limited to 400°F max due to PTFE Sealant.



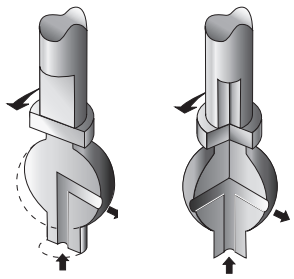
To ensure proper fit use Parker Autoclave tubing

NOTE: Critical gas applications such as Hydrogen or Helium should be evaluated on a case by case basis. Consult factory.
Ball Valves are designed to be operated in fully open or fully closed position

Ball Valve O-ring Options:

V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Propylene Rubber: -20° to 250°F (-29° to 121°C)

Flow Configuration



3-Way Switching
180 Turn

3-Way Diverting
90° Turn

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

Ordering Guide:

For complete information on available end connections, see previous page. 3-way ball valves are furnished complete with tube or pipe connections. Standard valve has Buna-N o-rings [250°F (121°C) maximum].

Building a Part Number: *Example: 3B8S10M12*

Example Part Number:	S3B	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	
S3B	3 Way Subsea Switching Valve (180° Handle Turn)
S3BD	3 Way Subsea Diverter Valve (90° Handle Turn)

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

C - Base Material	
S	UNS S31600/S31603 CW 316 SS (options, contact factory)
IN625	IN625 UNS N06625, Inconel 625

D - Pressure (x 1000 psi)	
10	10,000 psi

E - End Connection			
	Connection	MAWP @ RT	Seat Gland Hex
M12	SF750CX20 (3/4" MP)	10,000 psi	1.75"
M16	SF1000CX20 (1" MP)	10,000 psi	1.75"
P12	3/4" NPT	10,000 psi	1.75"
P16	1" NPT	10,000 psi	1.75"

F - Options	
V	FKM material: 0° to 400°F (-18° to 204°C)
EPR	Ethylene Propylene Rubber: -20° to 250°F (-29° to 121°C)
SOG	NACE Material, Hardness Verification/Certificate
IN625	UNS N06625 Inconel 625 Materials
AP	All Parts (including collar and gland) optional to use with special materials
K	Antivibration Gland Fitting (Cone and Thread Connections only)
H	Handle/Handle Stop

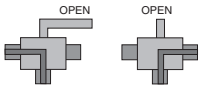
Basic Repair Kits:

When ordering a basic repair kit add an "**R**" prefix before product model codes A, B, and C (see above). Example: **R**S3B8S

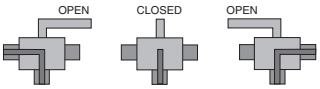
When ordering with "F-Options" add an "**R**" prefix before model codes A, B, C and F (see above). Example: **R**S3B8S-EPR

Contact your Parker Autoclave Engineers Sales Representative with any questions.

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.

Material of Construction:

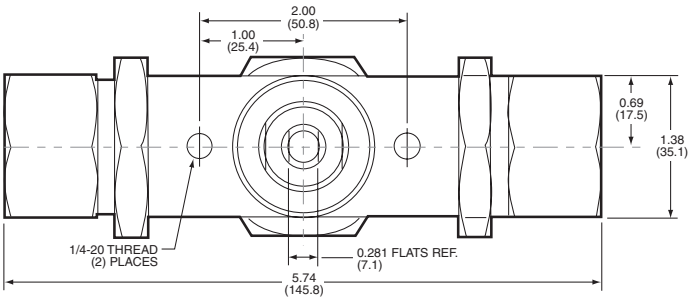
Item #	Description	Material
1	Stem Seal w/ Spring	PTFE w/ Graphite
2	Belleville Washer	302 SS
3	O-Ring	Buna-N
4	O-Ring	Buna-N
5	O-Ring	Buna-N
6	O-Ring	Buna-N
7	Thrust Washer	AMPCO 45
8	Locking Piece	316 SS
9	Locknut	316 SS
10	Seat	Carbon Filled Peek
11	Seat Retainer	Nitronic 50 HC
12	Belleville Washer Backup	316 CW SS
13	Bottom Bearing	AMPCO 45
14	Stem	316 CW SS
15	Packing Gland	316 CW SS
16	Bottom Gland	316 CW SS
17	Body	316 CW SS
18	Seat Gland	316 CW SS

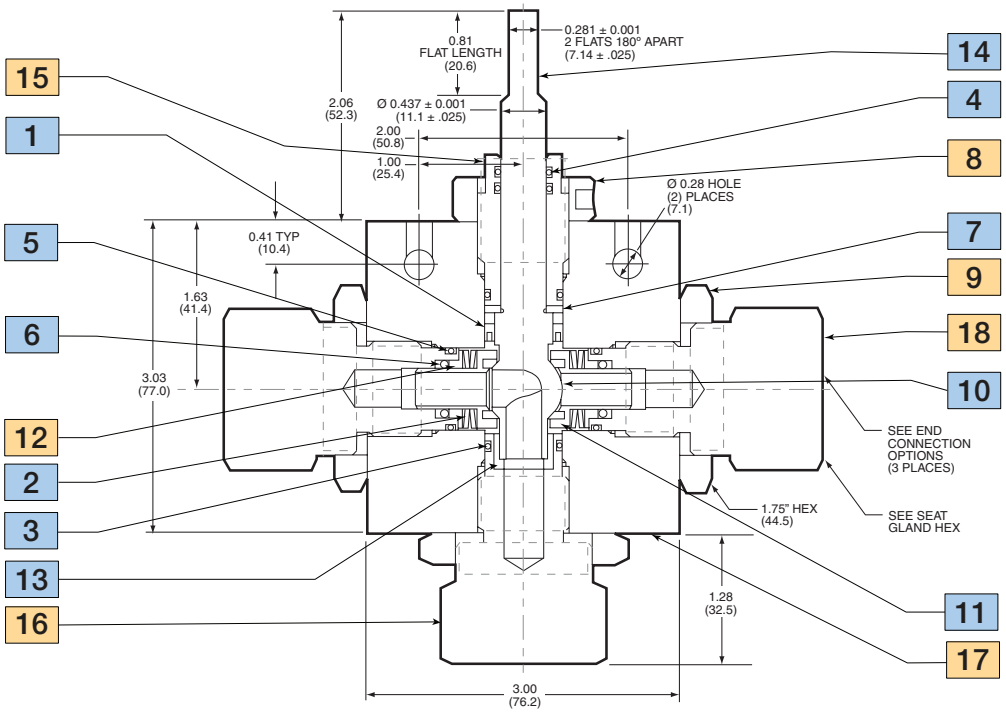
Typical spare parts found in Repair Kits

Please reference drawing on Page 26

1/2" 3 Way Subsea Ball Valve Dimensions:

1/2" 3 Way Subsea Ball Valve





NOTE:
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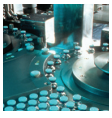
Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further information call 1-800-C-Parker.

MARKET	KEY MARKETS		KEY PRODUCTS	
 **AEROSPACE**	Aircraft Engines Commercial Commerical Transports Military Aircraft Regional Transports	Business and General Aviation Land-Based Weapons Systems Missiles and Launch Vehicles Unmanned Aerial Vehicles	Flight Control Systems & Components Fluid Conveyance Systems Fluid Metering Delivery & Atomization Devices Fuel Systems & Components	Hydraulic Systems & Components Inert Nitrogen Generating Systems Pneumatic Systems & Components Wheels & Brakes
 **CLIMATE CONTROL**	Agriculture Food, Beverage and Dairy Precision Cooling Transportation	Air Conditioning Life Sciences & Medical Processing	Co2 Controls Electronic Controllers Filter Driers Hand Shut-Off Valves Hose & Fittings	Pressure Regulating Valves Refrigerant Distributors Safety Relief Valves Solenoid Valves Thermostatic Expansion Valves
 **ELECTRO-MECHANICAL**	Aerospace Life Science & Medical Packaging Machinery Plastics Machinery & Converting Semiconductor & Electronics Factory Automation	Machine Tools Paper Machinery Primary Metals Textile Wire & Cable	AC/DC Drives & Systems Electric Actuators, Gantry Robots & Slides Electrohydrostatic Actuation Systems Electromechanical Actuation Systems Human Machine Interface	Linear Motors Stepper Motors, Servo Motors Drives & Controls Structural Extrusions
 **FILTRATION**	Food & Beverage Life Sciences Mobile Equipment Power Generation Transportation	Industrial Machinery Marine Oil & Gas Process	Analytical Gas Generators Compressed Air & Gas Filters Condition Monitoring Engine Air, Fuel & Oil Filtration & Systems	Hydraulic, Lubrication & Coolant Filters Process, Chemical, Water Microfiltration Filters Nitrogen, Hydrogen & Zero Air Generators
 **FLUID and GAS HANDLING**	Aerospace Agriculture Bulk Chemical Handling Construction Machinery Food & Beverage Fuel & Gas Delivery	Industrial Machinery Mobile Oil & Gas Transportation Welding	Brass Fittings & Valves Diagnostic Equipment Fluid Conveyance Systems Industrial Hose	PTFE & PFA Hose, Tubing & Plastic Fittings Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
 **HYDRAULICS**	Aerospace Aerial lift Agriculture Construction Machinery Forestry	Industrial Machinery Mining Oil & Gas Power Generation & Energy Truck Hydraulics	Diagnostic Equipment Hydraulic Cylinders & Accumulators Hydraulic Motors & Pumps Hydraulic Systems Hydraulic Valves & Controls	Power Take-Offs Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
 **PNEUMATICS**	Aerospace Conveyor & Material Handling Factory Automation Life Science & Medical	Machine Tools Packaging Machinery Transportation & Automotive	Air Preparation Brass Fittings & Valves Manifolds Pneumatic Accessories Pneumatic Actuators & Grippers Pneumatic Valves & Controls	Quick Disconnects Rotary Actuators Rubber & Thermoplastic Hose & Couplings Structural Extrusions Thermoplastic Tubing & Fittings Vacuum Generators, Cups & Sensors
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 **SEALING and SHIELDING**	Aerospace Chemical Processing Consumer Energy, Oil & Gas Fluid Power General Industrial	Information Technology Life Sciences Military Semiconductor Transportation	Dynamic Seals Elastomeric O-Rings Emi Shielding Extruded & Precision-Cut, Fabricated Elastomeric Seals	Homogeneous & Inserted Elastomeric Shapes High Temperature Metal Seals Metal & Plastic Retained Composite Seals Thermal Management

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! CAUTION !

Do not mix or interchange component parts or tubing with those of other manufacturers. Doing so is unsafe and will void warranty.

Parker Autoclave Engineers Valves, Fittings, and Tools are not designed to interface with common commercial instrument tubing and are designed to only connect with tubing manufactured to Parker Autoclave Engineers AES specifications. Failure to do so is unsafe and will void warranty.

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Literature #: 02-0108SE March 2018

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