

Series PB

SMARTER MANIFOLD SYSTEMS

BALL VALVES

CHECK VALVES

3-WAY BALL VALVES

THROTTLE BALL VALVES

POPPET DIVERter VALVES

MANIFOLD COMPONENTS



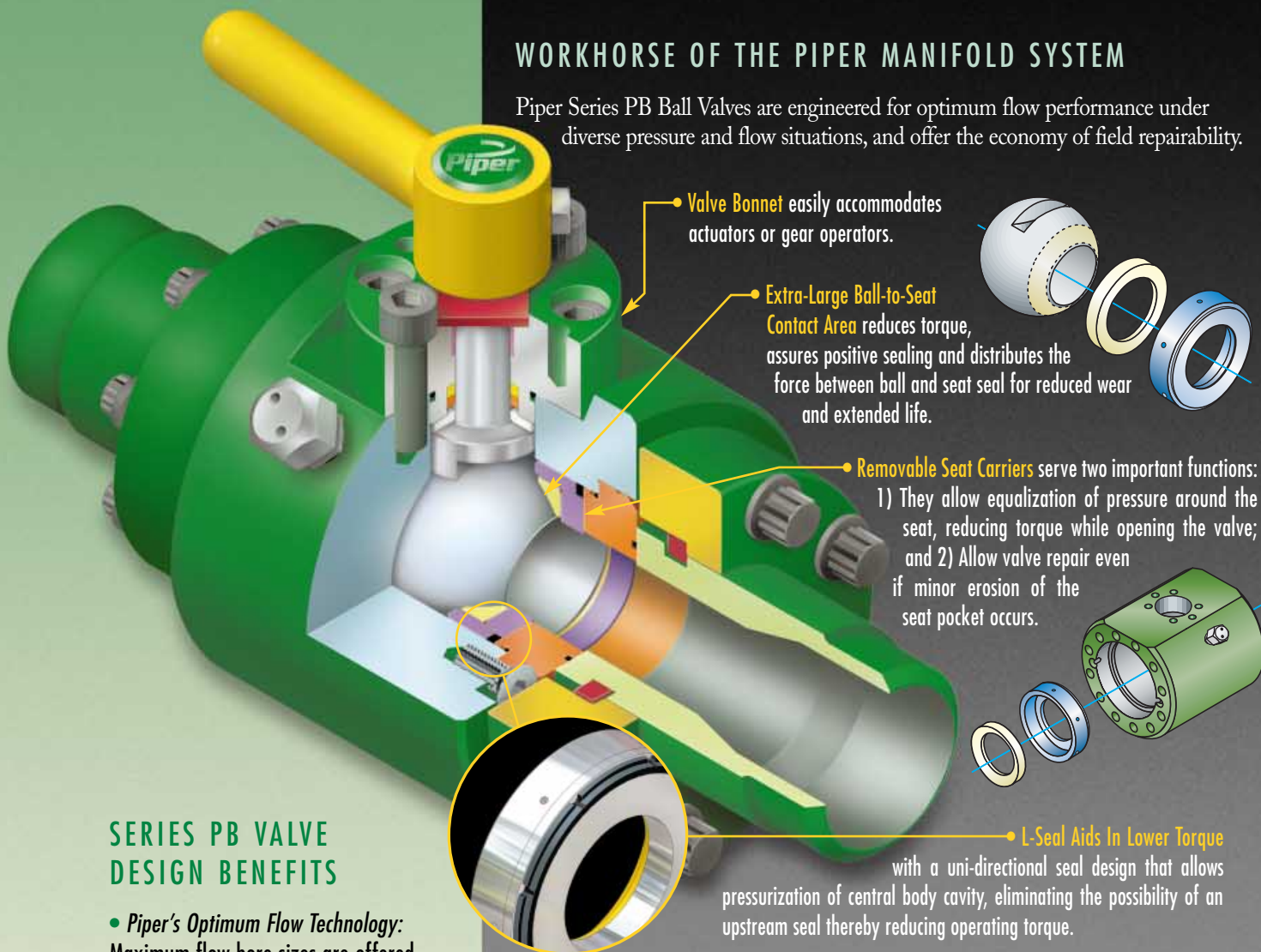
Piper
VALVE SYSTEMS

Series PB Ball Valves

DESIGNED, ENGINEERED AND BUILT FOR PERFORMANCE

WORKHORSE OF THE PIPER MANIFOLD SYSTEM

Piper Series PB Ball Valves are engineered for optimum flow performance under diverse pressure and flow situations, and offer the economy of field repairability.



• **Valve Bonnet** easily accommodates actuators or gear operators.

• **Extra-Large Ball-to-Seat Contact Area** reduces torque, assures positive sealing and distributes the force between ball and seat seal for reduced wear and extended life.

• **Removable Seat Carriers** serve two important functions:
1) They allow equalization of pressure around the seat, reducing torque while opening the valve; and 2) Allow valve repair even if minor erosion of the seat pocket occurs.

• **L-Seal Aids In Lower Torque** with a uni-directional seal design that allows pressurization of central body cavity, eliminating the possibility of an upstream seal thereby reducing operating torque.

SERIES PB VALVE DESIGN BENEFITS

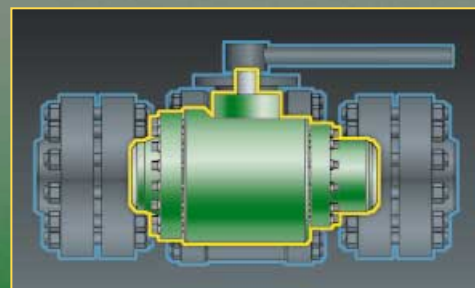
- **Piper's Optimum Flow Technology:** Maximum flow bore sizes are offered that correspond to the inside diameters of ASTM A106 Grade B pipe, reducing or completely eliminating transition areas and thereby minimizing system friction pressure loss.
- Minimal line spread required for easy removal from service.
- Modular 3-Piece design provides unlimited end connection options.
- Compact design occupies up to 40% less space than conventional flanged-end ball valves for skids or manifolds. (See right)

BUILD YOUR MANIFOLD LIGHTER, SMALLER, SMARTER.

Start saving the weight, space and money when building manifold systems. See the illustrated comparison below between a conventional 6" ANSI 1500 full port trunnion ball valve with flanged end connections including companion flanges, and a Piper Series PB ANSI Class 1500 6" nominal valve.

Dimensional and Weight Comparison

- Total weight is 70 % less.
- Total length is 43% less.
- Relative height to bonnet is 28% less.



Series PB Check Valves

POSITIVE, SYSTEM BACKFLOW PREVENTION

Piper Series PB Check Valves are engineered and manufactured for compact size and optimum flow performance capabilities. Economical and field repairable, the Series PB Check Valve is a true performer, offering system-wide positive backflow protection.

- **Body Style** provides short end-to-end dimension and is easily removed from service for repair.

- **Flapper Type Disc Design**

Our Check Valve design utilizes a flapper type disc to provide for a full open flow path and is fully piggable.

- **End Connection Design Offers Versatility**

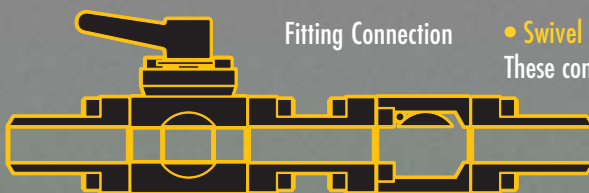
Piper's built-in flange design offers the benefit of more connection options including Fitting Connections, Direct Bolted or Piper's easy-to-install Swivel Flange Connection.

- **Ball/Check Valve Combination Assemblies**
These assemblies offer the shortest overall length available for maximum space savings as illustrated here.

- **Fire-Safe Design** is accomplished utilizing metal-to-metal secondary sealing in critical areas.

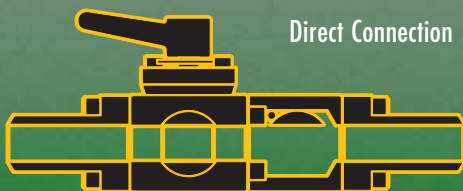
- **Swivel Flange Connections**

These connections offer the benefit of fast, easy installation or removal of all Series PB valves. (See page 10 for more details)

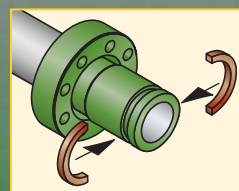


Fitting Connection

For even greater space and weight savings, smaller size check valves can be bolted directly to ball valve body shown here.



Direct Connection



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Specifying Ball Valve Model Numbers



*Manifold assembly prepared
for actuator installation.*

Series PB Ball Valve Construction

Piper's Series PB Ball Valves are manufactured with materials, coatings and processes to ensure durability.

- Seat seals available in Celcon and PEEK® provide a variety of temperature ranges at high operating pressures.
- 17-4PH Stainless Steel stem material for maximum strength and corrosion resistance.
- NACE MRO-17-05 Compliance. 2003 compliant available.
- Fire tested in compliance with API Specification 6FA, 2nd Edition.
- Piper's large ball/seat interface assures reliability even in unprocessed fluids.
- Available in Subsea design.

Body/Bonnet Material

- | | |
|------------------------|--------------------------|
| A • Uncoated Std Matl | 3 • 316 SS |
| 1 • Xylan-Ctd Std Matl | 4 • Low Temp Alloy Steel |
| 2 • 17-4PH SS | 5 • Duplex SS |

Ball Material

- | | |
|--------------------------|-----------------|
| 1 • ENP Carbon Steel | 4 • Nitronic 60 |
| 2 • 17-4PH SS | 5 • Duplex SS |
| 3 • Chrome Plated 316 SS | |

Stem Material

- | | |
|-----------------|----------------|
| 1 • 17-4PH SS | 3 • K500 Monel |
| 2 • Nitronic 60 | 5 • Duplex SS |

Seat Carrier Material

- | | |
|------------------|---------------|
| 1 • Carbon Steel | 3 • 316 SS |
| 2 • 17-4PH SS | 5 • Duplex SS |

Seat Seal Material

- | | |
|------------|-----------|
| 1 • Celcon | 2 • PEEK™ |
|------------|-----------|

Stem Seal Material/O-Ring Material

- | |
|--|
| 1 • PolyMyte-Nitrile/Peroxide-Cured Nitrile |
| 3 • PolyMyte-Nitrile/Low Temperature Nitrile |
| 4 • PolyMyte-Viton®/Viton® |
| 5 • Viton®-Viton®/Viton® |
| 6 • EPDM-EPDM/EPDM |

Fasteners

- | | |
|-------------|--------------|
| 1 • A193-B7 | 3 • A320-L7M |
| 2 • A320-L7 | |

Actuation

- | | |
|---------------------|-------------------|
| 0 • Bare Stem | 2 • Gear Operator |
| 1 • Handle Operated | |

Options

- | | |
|--------------|-----------------------|
| 1 • Standard | 3 • SS Grease Fitting |
|--------------|-----------------------|

Model Number

XXXXXX — XXXXXXXXXX

Consult factory for other trim options.

Series PB Ball Valve Selection Table

Working Pressure — Test Pressure PSI (Bar)	Comparable Pressure Class	Nominal Size		Ball Valve Model	Body Group Shape	Port Diameter		Assembly Ball Valve Body Group Weight		Weight w/Weld End Connections		Companion Check Valve
		in	mm			in	mm	lb	kg	lb	kg	
3,705 CWP (255) — 6,000 Test (414)	API 3000 ANSI 1500	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BAR29	●	1.81	46	32	15	58	26	CCR24
		3	80	BAR33	●	2.06	52	42	19	68	31	CAR32
		3	80	BB209	●	2.56	65	75	34	122	55	CC206
		4	100	BA305	●	3.31	84	108	49	170	77	CC302
		4	100	BA312	●	3.75	95	164	74	242	110	CA310
		6	150	BA503	●	5.19	132	390	177	510	232	CA500
		8	200	BA700	●	7.06	179	780	354	1020	463	CA700
		10	250	BA808	●	8.50	216	1193	542	1560	708	CA808
5,000 CWP (345) — 10,000 Test (690)	API 5000	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BC113	●	1.81	46	32	15	75	34	CC113
		3	80	BB200	●	2.06	52	58	26	75	34	CC206
		3	80	BB209	●	2.56	65	75	34	120	54	CC206
		4	100	BC304	●	3.25	83	180	82	260	118	CC302
		6	150	BC402	●	4.13	105	340	154	540	245	CC401
		6	150	BB503	●	5.19	132	480	218	640	291	CB500
		8	200	BB700	●	7.06	179	780	354	1020	463	CB700
		10	250	BC808	●	8.50	216	1193	542	1560	708	CC808
6,170 CWP (425) — 10,000 Test (690)	ANSI 2500	1	25	BCR13	●	0.81	21	16	7	26	12	CCR13
		2	50	BC108	■	1.50	38	25	11	43	20	CC108
		2	50	BCR24	●	1.50	38	35	16	56	25	CCR24
		2 1/2	65	BC113	●	1.81	46	32	15	58	26	CC113
		3	80	BC204	●	2.25	57	84	38	130	59	CC206
		4	100	BC304	●	3.25	83	180	82	260	118	CC302
		6	150	BC402	●	4.13	105	340	154	540	245	CC401
		6	150	BC412	●	4.75	121	550	250	770	350	CC410
		8	200	BC701	●	7.06	179	780	354	1020	463	CC701
		10	250	BC808	●	8.50	216	1193	542	1560	708	CC808
10,000 CWP (690) — 15,000 Test (1,034)	API 10000	1	25	BDR13	●	0.81	21	12	5	20	9	CDR13
		2	50	BD108	●	1.50	38	52	24	89	40	CD108
		2 1/2	65	BD113	●	1.81	46	60	27	100	45	CD113
		3	80	BD202	●	2.13	54	100	45	160	73	CD201
		3	80	BD210	●	2.63	67	150	68	230	104	CD212
		4	100	BD302	●	3.13	80	200	91	300	136	CD301
		6	150	BD402	●	4.13	105	430	195	650	295	CD401
		6	150	BD502	●	5.13	130	700	318	1101	500	CD500
		8	200	BD701	●	7.06	179	989	449	1627	739	CD701

Series PB Check Valve Construction

Piper's Series PB Check Valves are manufactured with material, coatings and processes to ensure durability.

- Flappers available in a variety of materials for maximum corrosion and erosion resistance.
- Spring material is Inconel X-750 for additional corrosion resistance.
- Teflon® flapper seal promotes positive sealing and extended service life.
- Fire tested in compliance with API specification 6FD, 1st Edition.
- Available in Subsea design.

Specifying Check Valve Model Numbers

Body Material

- | | |
|------------------------|--------------------------|
| A • Uncoated Std Matl | 3 • 316 SS |
| 1 • Xylan-Ctd Std Matl | 4 • Low Temp Alloy Steel |
| 2 • 17-4PH SS | 5 • Duplex SS |

Flapper Material

- | |
|-----------------|
| 1 • 17-4PH SS |
| 2 • Nitronic 60 |
| 3 • 316 SS |

Retainer/Seat Carrier Material

- | | |
|------------------|-----------------|
| 1 • 17-4PH SS | 4 • Alloy Steel |
| 2 • 316 SS | 5 • Duplex SS |
| 3 • Carbon Steel | |

O-Ring Material

- | |
|-----------------------------|
| 1 • Peroxide-Cured Nitrile |
| 3 • Low Temperature Nitrile |
| 4 • Viton® |
| 5 • EPDM |
| 6 • Aflas® |

Check Valve Orientation

- | |
|----------------------------------|
| 1 • Other Than Vertical Downflow |
| 2 • Vertical Downflow |

Model Number

XXXXXX – XXXXXX

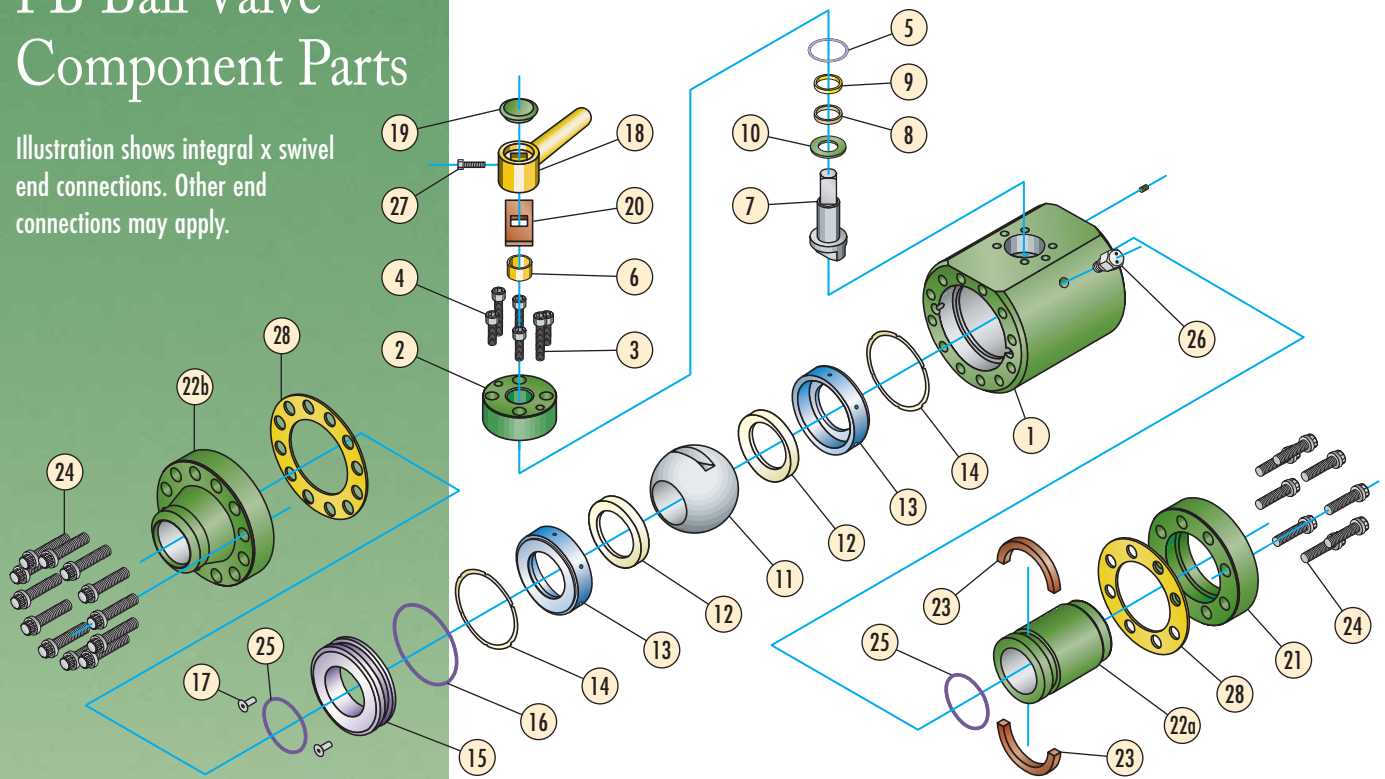
Consult factory for other trim options.

Series PB Check Valve Selection Table

Working Pressure — Test Pressure PSI (Bar)	Comparable Pressure Class	Nominal Size		Check Valve Model	Body Group Shape	Port Diameter		Check Valve Body Group Weight		Assembly Weight w/Weld End Connections		Companion Ball Valve
		in	mm			in	mm	lb	kg	lb	kg	
3,705 CWP (255) — 6,000 Test (414)	API 3000 ANSI 1500	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	69	31	BA113
		3	80	CAR32	●	2.00	51	31	14	56	25	BAR33
		3	80	CC206	●	2.38	60	29	13	65	30	BB209
		4	100	CC302	●	3.31	84	66	30	126	57	BA305
		4	100	CA310	●	3.63	92	62	28	123	56	BA312
		6	150	CA500	●	5.00	127	120	54	220	100	BA503
		8	200	CA700	●	7.06	179	374	170	490	222	BA700
		10	250	CA808	●	8.50	216	689	313	900	409	BA808
5,000 CWP (345) — 10,000 Test (690)	API 5000	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	69	31	BC113
		3	80	CC206	●	2.38	60	29	13	65	30	BB200/209
		4	100	CC302	●	3.31	84	65	30	126	57	BC304
		6	150	CC401	●	4.06	103	300	136	400	182	BC402
		6	150	CB500	●	5.00	127	306	139	400	182	BB503
		8	200	CB700	●	7.06	179	467	212	610	277	BB700
		10	250	CC808	●	8.50	216	727	330	950	431	BC808
6,170 CWP (425) — 10,000 Test (690)	ANSI 2500	1	25	CCR13	●	0.81	21	12	5	26	12	BCR13
		2	50	CC108	■	1.50	38	15	7	29	13	BC108
		2	50	CCR24	●	1.50	38	22	10	42	19	BCR24
		2 1/2	65	CC113	●	1.81	46	35	16	69	31	BC113
		3	80	CC206	●	2.38	60	29	13	65	30	BC204
		4	100	CC302	●	3.13	80	66	30	126	57	BC304
		6	150	CC401	●	4.06	103	200	91	400	182	BC402
		6	150	CC410	●	4.63	118	287	130	375	170	BC412
		8	200	CC701	●	7.06	179	467	212	610	277	BC701
		10	250	CC808	●	8.50	216	727	330	950	431	BC808
10,000 CWP (690) — 15,000 Test (1,034)	API 10000	1	25	CDR13	●	0.81	21	8	4	20	9	BDR13
		2	50	CD108	●	1.50	38	57	26	82	37	BD108
		2 1/2	65	CD113	●	1.81	46	50	23	72	33	BD113
		3	80	CD201	●	2.06	52	46	21	88	40	BD202
		3	80	CD212	●	2.75	70	150	68	190	86	BD210
		4	100	CD301	●	3.06	78	200	91	190	86	BD302
		6	150	CD401	●	4.06	103	280	127	400	182	BD402
		6	150	CD500	●	5.00	127	634	288	828	376	BD502
		8	200	CD701	●	7.06	179	744	338	1350	613	BD701

PB Ball Valve Component Parts

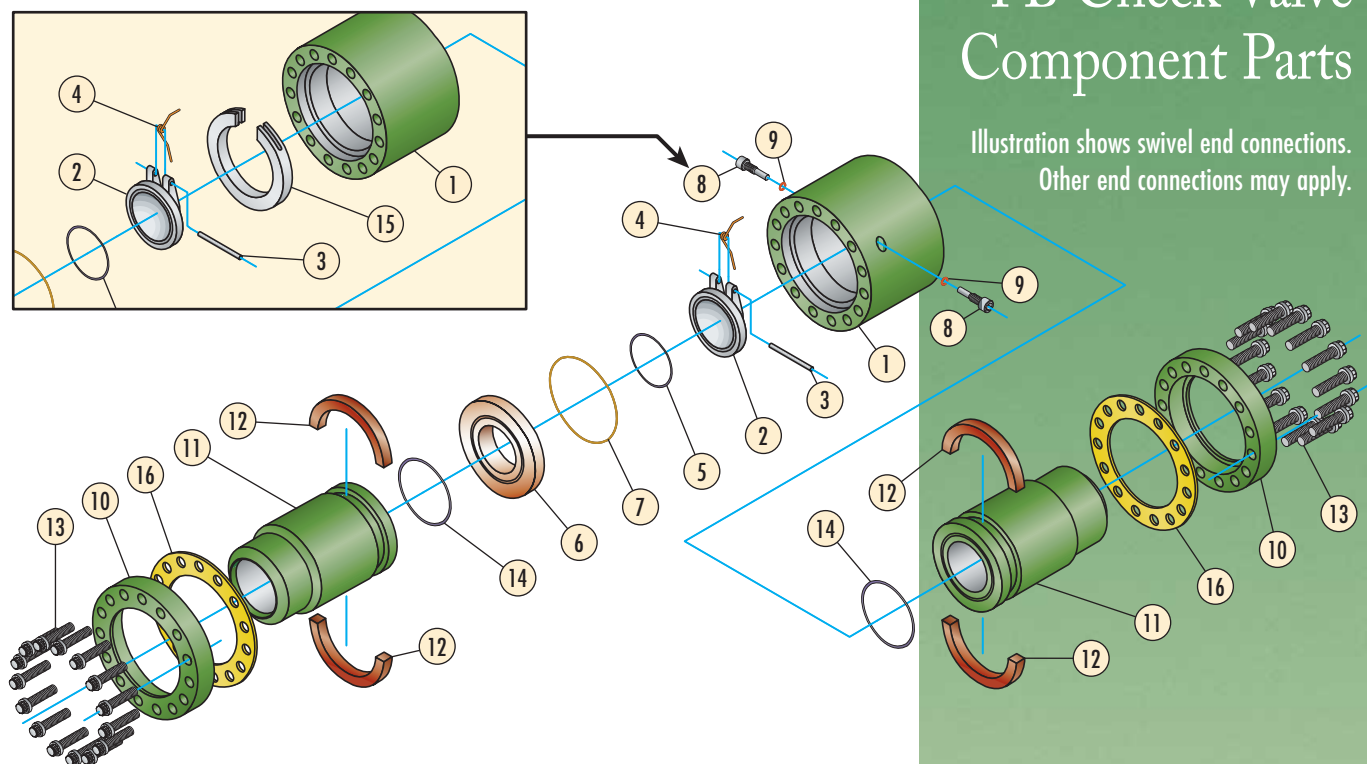
Illustration shows integral x swivel end connections. Other end connections may apply.



Index	Qty	Description	Standard Materials	Optional Materials ¹
1	1	Body	Carbon Steel ² , Alloy Steel ³	316 SS, 17-4PH SS, Duplex SS
2	1	Bonnet	Carbon Steel	316 SS, 17-4PH SS, Duplex SS
3	2	Stop Cap Screw	A193-B7 (Xylan)	A320-L7 (Xylan), A320-L7M (Xylan)
4	4	Bonnet Cap Screw	A193-B7 (Xylan)	A320-L7 (Xylan), A320-L7M (Xylan)
5	1	Bonnet Seal	Peroxide-Cured Nitrile	Viton® A, Low Temp Nitrile, Aflas®, EPDM
6	1	Stem Bearing	Garlock DU	
7	1	Stem	17-4PH SS	Nitronic 60, Duplex SS
8	1	Stem Seal	PolyMyte/Peroxide-Cured Nitrile	Polymyte/Viton® & Viton®/Viton®
9	1	Stem Backup Ring	Glass Filled Teflon®	
10	1	Thrust Bearing	Alloy Steel (Xylan)	Xylan-Coated Nitronic 60
11	1	Ball	ENP Carbon Steel	316 SS, Nitronic 60, Duplex SS
12	2	Seat	Celcon	PEEK™
13	2	Seat Carrier	Carbon Steel, (SBN-QPQ)	316 SS, 17-4PH SS, Duplex SS
14	2	L-Seal	Peroxide-Cured Nitrile	Viton® A, Low Temp Nitrile, Aflas®, EPDM
15	1	Retainer	Carbon Steel	316 SS, 17-4PH SS, Duplex SS
16	1	Retainer Seal	Peroxide-Cured Nitrile	Viton® A, Low Temp Nitrile, Aflas®, EPDM
17	2	Retainer Screw	Carbon Steel, Plated	
18	1	Handle	Carbon Steel	
19	1	Handle Cap	Plastic	
20	1	Stop Plate	Carbon Steel	
21	2	Swivel Flange	Carbon Steel	
22a	2	Bevel for Weld Nipple	Carbon Steel, Alloy Steel	316L SS, Duplex SS
22b	2	Integral Flange	Carbon Steel, Alloy Steel	316L SS, Duplex SS
23	2	Half Ring	Alloy Steel	
24	Varies	End Connection Cap Screw	A193-B7 (Xylan)	A320-L7 (Xylan), A320-L7M (Xylan)
25	2	End Connection Seal	Peroxide-Cured Nitrile	Viton® A, Low Temp Nitrile, Aflas®, EPDM
26	1	Body Grease Fitting	Alloy/Inconel	316 SS/Inconel
27	1	Handle Bolt	Stainless Steel	
28	2	Corrosion Gasket	EPDM	

• ¹ Consult factory for other material. • ² Employed up to and including 6,170 CWP valves. • ³ Employed on 10,000 psi CWP valves.

Horseshoe Pin Support Ring Design Is Utilized for Models CC108, CCR24 and CAR32.



Index	Qty	Description	Standard Materials	Optional Materials ¹
1	1	Body	Carbon Steel ² , Alloy Steel ³	316 SS, 17-4PH SS, Duplex SS
2	1	Flapper	17-4PH SS, Nitronic 60, 316 SS ⁴	316 SS, Nitronic 60, Duplex SS ⁴
3	1	Pivot Pin	17-4PH SS	
4	1	Spring	Inconel X-750	
5	1	Seat Seal	Glass Filled Teflon [®]	
6	1	Retainer	Carbon Steel	316 SS, Duplex SS
7	1	Carrier/Retainer Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile, Aflas [®] , EPDM
8	2/1	Pin Support Plugs/ Pin Support Ring*	Stainless Steel	
9	2	Support Plug Seal*	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile, Aflas [®] , EPDM
10	2	Swivel Flange	Carbon Steel	316 SS
11	2	Bevel for Weld Nipple	Carbon Steel, Alloy Steel	316-L
12	4	Half Ring	Alloy Steel	
13	Varies	End Connection Cap Screw	A193-B7 (Xylan)	A320-L7 (Xylan), A320-L7M (Xylan)
14	2	End Connection Seal	Peroxide-Cured Nitrile	Viton [®] A, Low Temp Nitrile, Aflas [®] , EPDM
15	1	Horseshoe Pin Support Ring*	17-4PH SS	
16	2	Corrosion Gasket	EPDM	

• ¹ Consult factory for other material. • ² Employed up to and including 6,170 CWP valves.

• ³ Employed on 10,000 psi CWP valves. • ⁴ Standard Flapper material varies with bore size and working pressure.

* Horse Shoe Pin Support Ring Design is utilized on CC108, CCR24 and CAR32.

Horse Shoe Pin Support Ring Design does not require part no. 8 or 9.

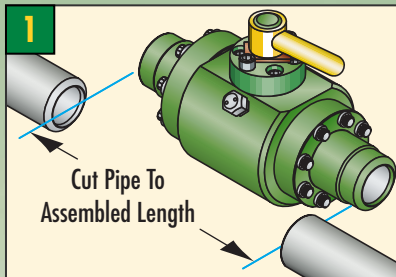
Piper's Swivel Flange Connection

Most Piper Series PB valves and block fittings utilize swivel flange and half-ring connections.

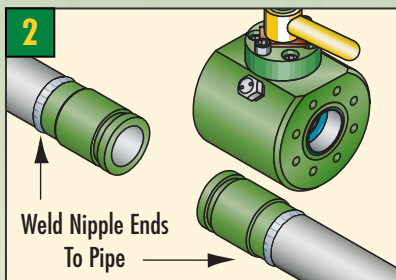
A convenient feature of the Series PB manifold system, this connection consists of the swivel flange, a nipple (or tube) with a half-ring groove, and two half-rings. The nipple-end can be a weld-end, male-threaded, hub-type, or other possible end configuration including a second half-ring groove to connect another swivel flange.

The versatility of Piper's Swivel Flange Connection results in lower cost for manufacturing and the end user.

See The Steps Below
Illustrating The Ease of Installation



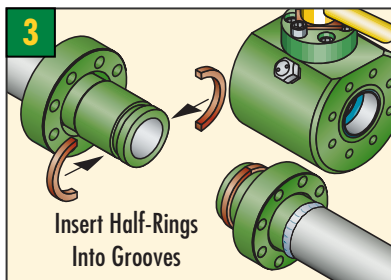
1. Measure assembled valve or component and cut pipe to appropriate length.



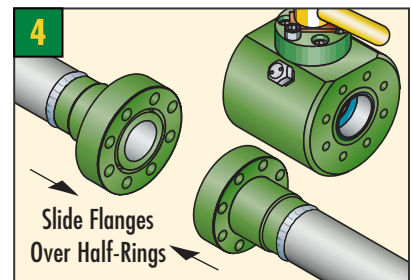
2. Disassemble valve ends and weld the beveled-for-weld nipples to the pipe.

SWIVEL FLANGE DESIGN BENEFITS

- Faster, easier installations.
- Minimal line spread required for easy removal of valves from service.
- Unlimited end connection options.
- Ends match bore sizes to maximize *Piper's Optimum Flow Technology*.

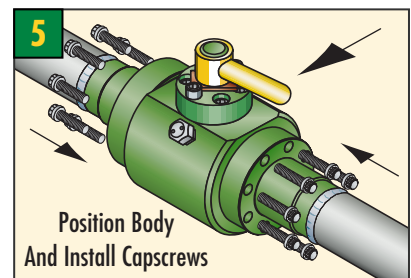


3. Slide Swivel Flanges onto nipples and insert half-rings into grooves.



4. Slide Swivel Flanges over half-rings to lock flanges into place.

5. Install valve body between flanges, rotating flanges as necessary, and secure with 12-point capscrews.



Series PB End Connection Kits

This End Connection Kit Order Code Number Chart is for Series PB Ball and Check Valves, and is available to assist users in accurately ordering end connections.

Specifying End Connection Kit Numbers

Valve Model No.
See Pages 5 & 7

E X - X X X X X - X X X X X X

Connection Type

Used with 2nd digit of suffix code titled "Pipe Schedule, Flange Pressure Class,..."

A • ANSI Raised Face K • Socket Weld Flange U • Hammer Union
F • Female Threaded Ends M • Male Threaded Ends W • Weld Ends
J • ANSI Ring Type Joint R • API RTJ

Nominal Pipe or Flange Size

A • 1"	D • 2"	G • 4"	N • 10"
B • 1 1/4"	E • 2 1/2"	J • 6"	4 • 1 1/2"
C • 1 1/2"	F • 3"	L • 8"	6 • 3/4"

Pipe Schedule, Flange Pressure Class, Thread Type or Union Class

Pipe Schedule-Weld Ends (Connection Type W)

A • Sch 40	C • Sch 120	E • XXH
B • Sch 80	D • Sch 160	H • Special Wall

Pressure Class-Flanged Ends (Connection Type A, J and R)

A • API 2000 (R)	J • ANSI 300 (A & J)	C • ANSI 1200 (A & J)
B • API 3000 (R)	K • ANSI 600 (A & J)	G • ANSI 1500 (A & J)
C • API 5000 (R)	F • ANSI 900 (A & J)	H • ANSI 2500 (A & J)
D • API 10,000 (R)		
E • API 15,000 (R)		

Thread Type-Threaded Ends (Connection Type F and M)

A • NPT B • 8-Round

Pressure Class-Hammer Union Ends (Connection Type U)

NOTE: Retainer-end listed first.

A • Fig. 602 M x F	C • Fig. 1002 M x F	E • Fig. 1502 M x F
B • Fig. 602 F x M	D • Fig. 1002 F x M	F • Fig. 1502 F x M

End Connection Material

Other materials available upon request.

1 • Standard	4 • Low Temp Alloy Steel
2 • 17-4PH SS	5 • Duplex SS(2205)
3 • 316 SS or 316-L SS	

Fasteners

1 • 12-Point, A193-B7
A • 12-Point, A320-L7
B • 12-Point, A320-L7M

Corrosion Gasket

Suggested for highly corrosive environments.

0 • Not Included 1 • Included

O-Ring Seals

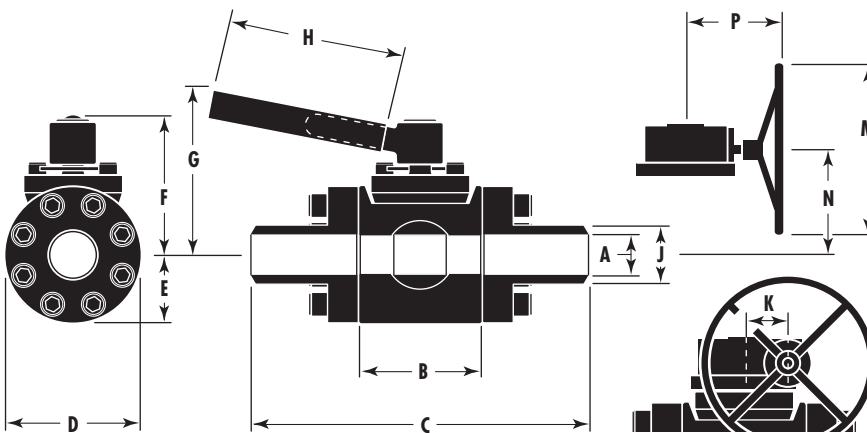
Required only on some threaded connections for Models BC108 or CC108.

0 • O-Rings Not Required	4 • Low Temperature Nitrile
1 • Peroxide-Cured Nitrile	5 • EPDM
3 • Viton®	

Consult factory for other configurations.

PB Ball Valve Dimensional Data

(Pressures are in PSI)
(Dimensions are in inches)

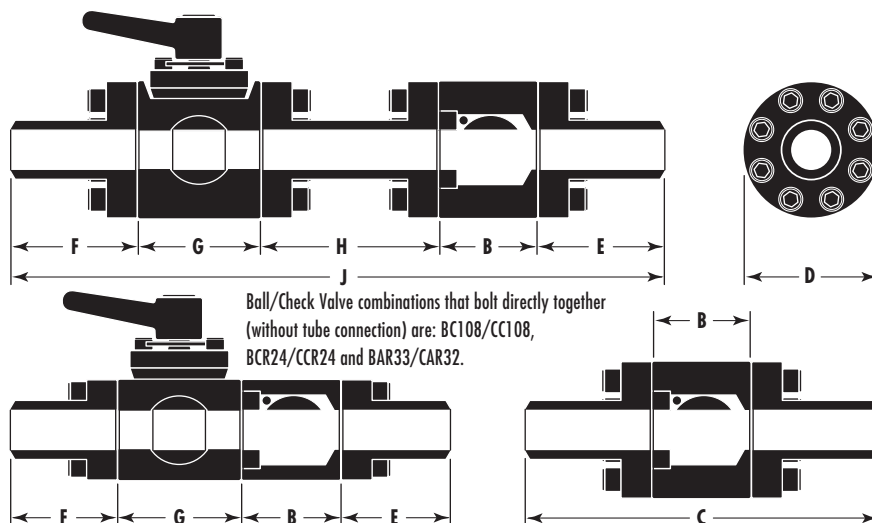


Working Pressure PSI	Nominal Size	Ball Valve Model	A Ball Port Diameter	B Body Grp Length	C Length of Weld Ends	D Body Width	E Height Below CL	F Height Above CL	G Height of Std Extens	H Length of Std Extens	J Nipple Max OD	K GOP Shaft Offset	M Hdwl Diameter	N CLVlv to CL Hdw	P CLVlv to Hdw Face	End* Connections
ANSI 1500 — 3,705 PSI CWP	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	S X S
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	S X S
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	S X S
	2 1/2	BAR29	1.81	5.00	15.50	5.50	2.75	5.75	11.25	16	2.88	—	—	—	—	S X S
	3	BAR33	2.06	5.00	16.50	6.25	3.13	6.02	11.25	16	3.49	—	—	—	—	S X S
	3	BB209	2.56	7.00	18.50	8.00	4.00	8.35	12.50	24	3.74	—	—	—	—	S X S
	4	BA305	3.31	8.00	21.00	9.00	4.50	8.83	13.00	24	4.99	3.40	14.00	7.76	10.25	W X S
	4	BA312	3.75	10.00	21.50	10.00	5.00	9.56	14.63	32	4.99	3.40	16.00	8.66	11.45	W X S
	6	BA503	5.19	12.00	23.50	13.00	6.50	11.80	19.50	48	6.99	5.12	24.00	11.25	14.25	W X S
	8	BA700	7.06	15.00	29.00	16.25	8.13	—	—	—	9.74	8.31	24.00	12.98	16.70	W X S
API 5000 — 5,000 PSI CWP	10	BA808	8.50	17.00	32.00	20.00	10.00	—	—	—	12.75	10.36	24.00	14.50	18.70	W X S
	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	S X S
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	S X S
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	S X S
	2 1/2	BC113	1.81	5.50	16.00	6.00	3.00	6.00	11.25	16	2.99	—	—	—	—	S X S
	3	BB200	2.06	5.50	17.00	6.25	3.13	7.50	12.00	24	3.74	—	—	—	—	S X S
	3	BB209	2.56	7.00	18.50	8.00	4.00	8.35	12.50	24	3.74	—	—	—	—	S X S
	4	BC304	3.25	10.00	21.50	10.00	5.00	9.45	5.00	32	4.99	3.40	24.00	8.54	10.85	W X S
	6	BC402	4.13	11.00	24.00	11.88	5.94	11.33	19.75	48	7.49	5.12	24.00	11.00	14.25	W X S
	6	BB503	5.19	13.00	26.00	13.00	6.50	11.81	20.13	48	7.49	5.12	24.00	11.50	14.25	W X S
ANSI 2500 — 6,170 PSI CWP	8	BB700	7.06	15.00	29.00	16.25	8.13	—	—	—	9.75	8.31	24.00	12.98	16.70	W X S
	10	BC808	8.50	17.00	32.00	20.00	10.00	—	—	—	10.75	10.36	36.00	14.33	17.28	W X S
	1	BCR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	S X S
	2	BC108	1.50	5.00	15.50	4.00	2.00	5.75	9.50	16	2.49	—	—	—	—	S X S
	2	BCR24	1.50	5.00	15.50	5.50	2.75	5.75	9.50	16	2.49	—	—	—	—	S X S
	2 1/2	BC113	1.81	5.50	16.00	6.00	3.00	6.00	11.25	16	2.99	—	—	—	—	S X S
	3	BC204	2.25	7.00	19.50	8.00	4.00	8.32	12.50	24	3.74	—	—	—	—	S X S
	4	BC304	3.25	10.00	21.50	10.00	5.00	9.45	5.00	32	4.99	3.40	24.00	8.54	10.85	W X S
	6	BC402	4.13	11.00	24.00	11.88	5.94	11.33	19.75	48	7.49	5.12	24.00	11.00	14.25	W X S
	6	BC412	4.75	13.00	26.00	13.00	6.50	11.75	19.50	48	7.49	5.12	24.00	11.50	14.25	W X S
API 10000 — 10,000 PSI CWP	8	BC701	6.81	15.00	29.00	16.25	8.13	—	—	—	8.63	10.63	24.00	13.58	18.70	W X S
	10	BC808	8.50	17.00	32.00	20.00	10.00	—	—	—	10.75	10.36	36.00	14.33	17.28	W X S
	1	BDR13	0.81	4.00	12.00	4.13	2.06	5.31	7.88	12	1.63	—	—	—	—	S X S
	2	BD108	1.50	5.50	16.00	6.13	3.06	6.09	11.63	16	2.99	—	—	—	—	S X S
	2 1/2	BD113	1.81	5.50	16.00	6.63	3.31	6.32	11.88	16	2.99	—	—	—	—	S X S
	3	BD202	2.13	7.00	16.50	7.88	3.94	8.50	12.63	24	3.50	—	—	—	—	W X W
	3	BD210	2.63	8.00	18.00	9.00	4.50	9.25	14.25	32	5.00	—	—	—	—	W X W
	4	BD302	3.13	9.00	19.50	9.88	4.94	9.50	14.69	32	5.75	3.39	24.00	8.71	10.85	W X W
	6	BD402	4.13	12.00	24.50	12.75	6.38	11.75	19.38	48	7.00	5.12	24.00	11.50	14.25	W X S
	6	BD502	5.13	15.00	29.00	15.75	7.88	—	—	—	7.50	10.36	24.00	13.10	18.70	W X S
	8	BD701	7.06	18.00	35.00	21.00	11.00	—	—	—	10.13	10.36	24.00	16.35	18.70	W X S

*End Connections Description: S = Swivel Flange. W = Integral Weldneck Flange.

PB Check Valve Dimensional Data

(Pressures are in PSI)
(Dimensions are in inches)



Working Pressure PSI	Nominal Size	Check Valve Model	A	B	C	D	E	F	G	H	J	Matching Ball Valve
			Seat Diameter	Body Group Length	Length of Weld Ends	Body Width	Check Nipple Length	Ball Nipple Length	Ball Body Grp Length	Tube/Spool Length	Ball/Check Assy Length	
ANSI 1500 — 3,705 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.50	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.00	7.00	28.00	BA113
	3	CAR32	2.00	4.50	16.00	6.25	5.75	5.75	5.00	N/A	21.00	BAR33
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BB209
	4	CC302	3.13	6.50	19.50	8.00	6.50	6.50	8.00	8.00	35.50	BA305
	4	CA310	3.63	7.00	20.00	8.00	6.50	5.00	10.00	8.50	37.00	BA312
	6	CA500	5.00	9.00	22.00	10.00	6.50	5.00	12.00	9.00	41.50	BA503
	8	CA700	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BA700
API 5000 — 5,000 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.50	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BC113
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BB209
	4	CC302	3.13	6.50	19.50	8.00	6.50	5.00	10.00	8.00	36.00	BC304
	6	CC401	4.06	10.00	23.00	11.50	6.50	6.50	11.00	12.00	46.00	BC402
	6	CB500	5.00	10.00	23.00	11.50	6.50	6.50	13.00	12.00	48.00	BB503
	8	CB700	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BB700
	10	CC808	8.50	15.00	30.00	16.25	7.50	7.50	17.00	12.00	59.00	BC808
ANSI 2500 — 6,170 PSI CWP	1	CCR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BCR13
	2	CC108*	1.50	4.00	14.50	4.00	5.25	5.25	5.00	N/A	19.50	BC108
	2	CCR24	1.50	4.00	14.50	5.50	5.25	5.25	5.50	N/A	19.50	BCR24
	2 1/2	CC113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BC113
	3	CC206	2.38	5.00	16.50	6.25	5.75	5.75	7.00	8.00	31.50	BC204
	4	CC302	3.13	6.50	19.50	8.00	6.50	5.00	10.00	8.00	36.00	BC304
	6	CC401	4.06	10.00	23.00	11.50	6.50	6.50	11.00	12.00	46.00	BC402
	6	CC410	4.63	10.00	23.00	11.50	6.50	6.50	13.00	12.00	48.00	BC412
	8	CC701	7.06	12.00	26.00	14.25	7.00	7.00	15.00	12.00	53.00	BC701
	10	CC808	8.50	15.00	30.00	16.25	7.50	7.50	17.00	12.00	59.00	BC808
API 10000 — 10,000 PSI CWP	1	CDR13	0.81	4.00	12.00	4.13	4.00	4.00	4.00	6.00	22.00	BDR13
	2	CD108	1.50	5.50	16.00	6.13	5.25	5.25	5.50	7.50	29.00	BD108
	2 1/2	CD113	1.81	5.50	16.00	5.75	5.25	5.25	5.50	7.50	29.00	BD113
	3	CD201	2.06	5.50	16.00	6.88	5.25	4.75	7.00	9.00	31.50	BD202
	3	CD212	2.75	8.00	18.00	8.75	5.00	5.00	8.00	9.00	35.00	BD210
	4	CD301	3.06	8.00	18.00	8.75	5.00	5.50	9.00	9.50	37.00	BD302
	6	CD401	4.06	10.00	23.00	11.50	6.50	6.25	12.00	13.00	47.75	BD402
	8	CD701	7.06	16.50	33.50	18.25	8.50	8.50	18.00	17.00	68.50	BD701

*Square body design.

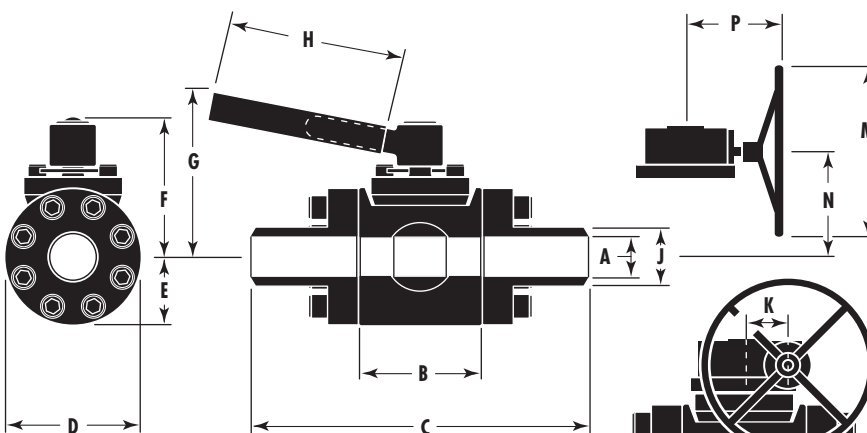
PB Ball Valve

Dimensional Data

Metric

(Pressures are in BAR)

(Dimensions are in millimeters)



Working Pressure PSI	Nominal Size	Ball Valve Model	A Ball Port Diameter	B Body Grp Length	C Length of Weld Ends	D Body Width	E Height Below CL	F Height Above CL	G Height of Std Extens	H Length of Std Extens	J Nipple Max OD	K GOP Shaft Offset	M Hdwl Diameter	N CLVlv to CL Hdwl	P CLVlv to Hdwl Face	End* Connections
ANSI 1500 — 255 Bar CWP	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BAR29	46	127	394	140	70	146	286	406	73	—	—	—	—	S X S
	76	BAR33	52	127	419	159	79	153	286	406	89	—	—	—	—	S X S
	76	BB209	65	178	470	203	102	212	318	610	95	—	—	—	—	S X S
	102	BA305	84	203	533	229	114	224	330	610	127	86	356	197	260	W X S
	102	BA312	95	254	546	254	127	243	372	813	127	86	406	220	291	W X S
	152	BA503	132	305	597	330	165	300	495	1219	178	130	610	286	362	W X S
	203	BA700	179	381	737	413	207	—	—	—	247	211	610	330	424	W X S
API 5000 — 345 Bar CWP	254	BA808	216	432	813	508	254	—	—	—	324	263	610	368	475	W X S
	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BC113	46	140	406	152	76	152	286	406	76	—	—	—	—	S X S
	76	BB200	52	140	432	159	80	191	305	610	95	—	—	—	—	S X S
	76	BB209	65	178	470	203	102	212	318	610	95	—	—	—	—	S X S
	102	BC304	83	254	546	254	127	240	127	813	127	86	610	217	276	W X S
	152	BC402	105	279	610	302	151	288	502	1219	190	130	610	279	362	W X S
	152	BB503	132	330	660	330	165	300	511	1219	190	130	610	292	362	W X S
ANSI 2500 — 425 Bar CWP	203	BB700	179	381	737	413	207	—	—	—	248	211	610	330	424	W X S
	254	BC808	216	432	813	508	254	—	—	—	273	263	914	364	439	W X S
	25	BCR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BC108	38	127	394	102	51	146	241	406	63	—	—	—	—	S X S
	51	BCR24	38	127	394	140	70	146	241	406	63	—	—	—	—	S X S
	64	BC113	46	140	406	152	76	152	286	406	76	—	—	—	—	S X S
	76	BC204	57	178	495	203	102	211	318	610	95	—	—	—	—	S X S
	102	BC304	83	254	546	254	127	240	127	813	127	86	610	217	276	W X S
	152	BC402	105	279	610	302	151	288	502	1219	190	130	610	279	362	W X S
	152	BC412	121	330	660	330	165	298	495	1219	190	130	610	292	362	W X S
API 10000 — 690 Bar CWP	203	BC701	173	381	737	413	207	—	—	—	219	270	610	345	475	W X S
	254	BC808	216	432	813	508	254	—	—	—	273	263	914	364	439	W X S
	25	BDR13	21	102	305	105	52	135	200	305	41	—	—	—	—	S X S
	51	BD108	38	140	406	156	78	155	295	406	76	—	—	—	—	S X S
	64	BD113	46	140	406	168	84	161	302	406	76	—	—	—	—	S X S
	76	BD202	54	178	419	200	100	216	321	610	89	—	—	—	—	W X W
	76	BD210	67	203	457	229	114	235	362	813	127	—	—	—	—	W X W
	102	BD302	80	229	495	251	125	241	373	813	146	86	610	221	276	W X W
	152	BD402	105	305	622	324	162	298	492	1219	178	130	610	292	362	W X S
	152	BD502	130	381	737	400	200	—	—	—	191	263	610	333	475	W X S
	203	BD701	179	457	889	533	279	—	—	—	257	263	610	415	475	W X S

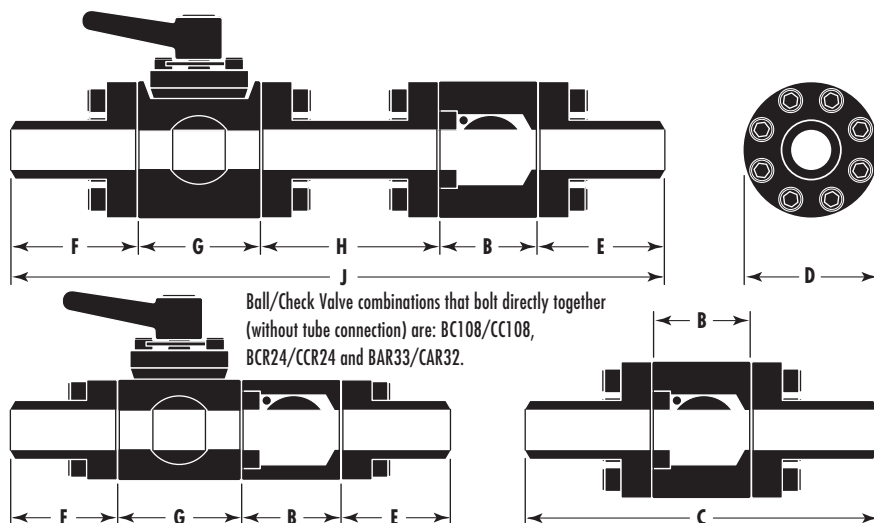
*End Connections Description: S = Swivel Flange. W = Integral Weldneck Flange.

PB Check Valve Dimensional Data

Metric

(Pressures are in BAR)

(Dimensions are in millimeters)



Working Pressure PSI	Nominal Size	Check Valve Model	A	B	C	D	E	F	G	H	J	Matching Ball Valve
			Seat Diameter	Body Group Length	Length of Weld Ends	Body Width	Check Nipple Length	Ball Nipple Length	Ball Body Grp Length	Tube/Spool Length	Ball/Check Assy Length	
ANSI 1500 — 255 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	140	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	127	178	711	BA113
	76	CAR32	51	114	406	159	146	146	127	N/A	533	BAR33
	76	CC206	60	127	419	159	146	146	178	203	800	BB209
	102	CC302	80	165	495	203	165	165	203	203	902	BA305
	102	CA310	92	178	508	203	165	127	254	216	940	BA312
	152	CA500	127	229	559	254	165	127	305	229	1054	BA503
	203	CA700	179	305	660	362	178	178	381	305	1346	BA700
API 5000 — 345 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	140	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	140	191	737	BC113
	76	CC206	60	127	419	159	146	146	178	203	800	BB209
	102	CC302	80	165	495	203	165	127	254	203	914	BC304
	152	CC401	103	254	584	292	165	165	279	305	1168	BC402
	152	CB500	127	254	584	292	165	165	330	305	1219	BB503
	203	CB700	179	305	660	362	178	178	381	305	1346	BB700
	254	CC808	216	381	762	413	191	191	432	305	1499	BC808
ANSI 2500 — 425 Bar CWP	25	CCR13	21	102	305	105	102	102	102	152	559	BCR13
	51	CC108*	38	102	368	102	133	133	127	N/A	495	BC108
	51	CCR24	38	102	368	140	133	133	140	N/A	495	BCR24
	64	CC113	46	140	406	146	133	133	140	191	737	BC113
	76	CC206	60	127	419	159	146	146	178	203	800	BC204
	102	CC302	80	165	495	203	165	127	254	203	914	BC304
	152	CC401	103	254	584	292	165	165	279	305	1168	BC402
	152	CC410	118	254	584	292	165	165	330	305	1219	BC412
	203	CC701	179	305	660	362	178	178	381	305	1346	BC701
	254	CC808	216	381	762	413	191	191	432	305	1499	BC808
API 10000 — 690 Bar CWP	25	CDR13	21	102	305	105	102	102	102	152	559	BDR13
	51	CD108	38	140	406	156	133	133	140	191	737	BD108
	64	CD113	46	140	406	146	133	133	140	191	737	BD113
	76	CD201	52	140	406	175	133	121	178	229	800	BD202
	76	CD212	70	203	457	222	127	127	203	229	889	BD210
	102	CD301	78	203	457	222	127	140	229	241	940	BD302
	152	CD401	103	254	584	292	165	159	305	330	1213	BD402
	203	CD701	179	419	851	464	216	216	457	432	1740	BD701

*Square body design

Series PB Manifold Systems

MANIFOLDS SYSTEMS BUILT FOR VERSATILITY

MANIFOLD VERSATILITY

Our building block design allows your manifold to be custom designed to fit almost any application, while maximizing space utilization.

Piper manifolds offer superior flow efficiency by using valve bores that are sized to closely or identically match the manifold piping, with virtually no transition areas.

In addition to our welded manifolds, Piper also offers components for weld-free manifold construction.

SYSTEM COMPONENTS

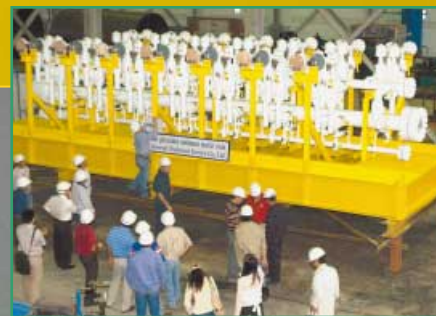
- Ball Valves
- Check Valves
- Three-Way Ball Valves
- Throttle Ball Valves
- Poppet Diverter Valves
- Tube Connectors
- 3-Way Blocks
- 4-Way Blocks
- 5-Way Blocks

Piper Compact Manifolds

AN ENTIRE SYSTEM TO THE VERY LAST BOLT

Piper offers complete design and turn-key services to custom build a manifold system to your specifications, complete and ready for installation. Our team of designers, engineers and customer service representatives can assist you when specifying your manifold project.

Piper also offers a complete line of production and injection manifold systems for on and offshore applications. Contact your Piper representative to learn more.



MANIFOLD SYSTEM FEATURES

- Most Piper compact manifold systems are half the size and weight of API 6D manifolds, saving project cost and valuable space.
- Smallest line spread distance for quick and easy valve removal.
- Designed for service in unprocessed produced fluids.

System Fittings

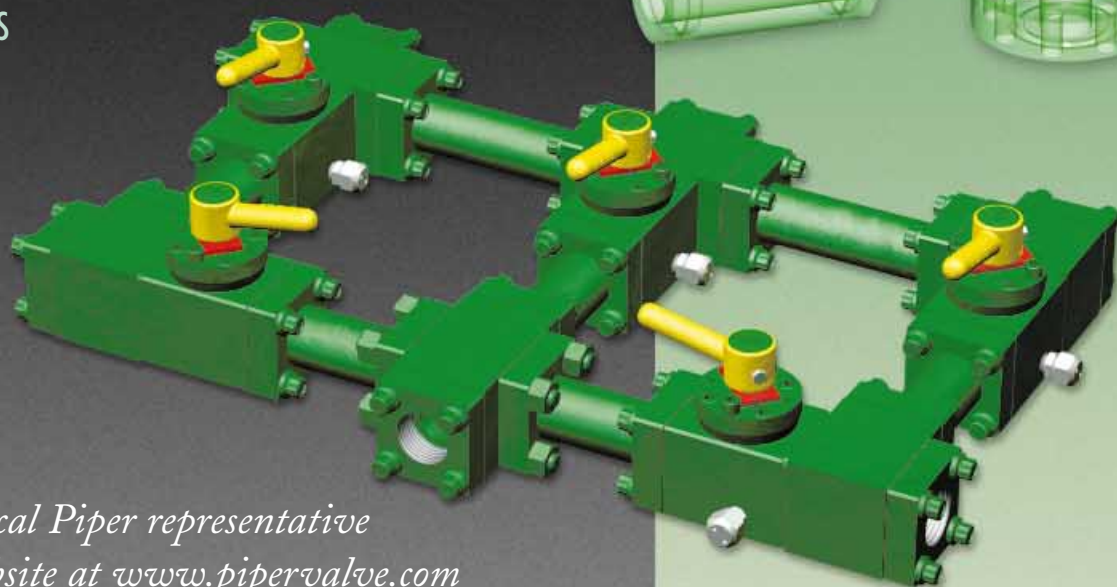
Weld-Free Manifold Construction

A TRULY MODULAR SYSTEM

In addition to our welded manifolds, we also offer components for weld-free manifold construction. This design is useful where material construction makes welding difficult, or for installations on producing locations where welding is prohibited.

SYSTEM FITTINGS

- Tees
- Crosses
- Elbows
- Swivel Flange Tubes
- Adapter Nipples
- Adapter Flanges
- Hub Connection



*Contact your local Piper representative
or visit our website at www.pipervalve.com
to learn more about quality Piper products.*

Quality Commitment

DEDICATED TO YOUR SUCCESS

Piper Certification

At Piper Valve Systems, we continually update our certification programs to comply with our industry's leading qualifying authorities. Piper products are designed and manufactured to conform to many international qualifying authorities, as well as our own stringent Quality Assurance Procedures.

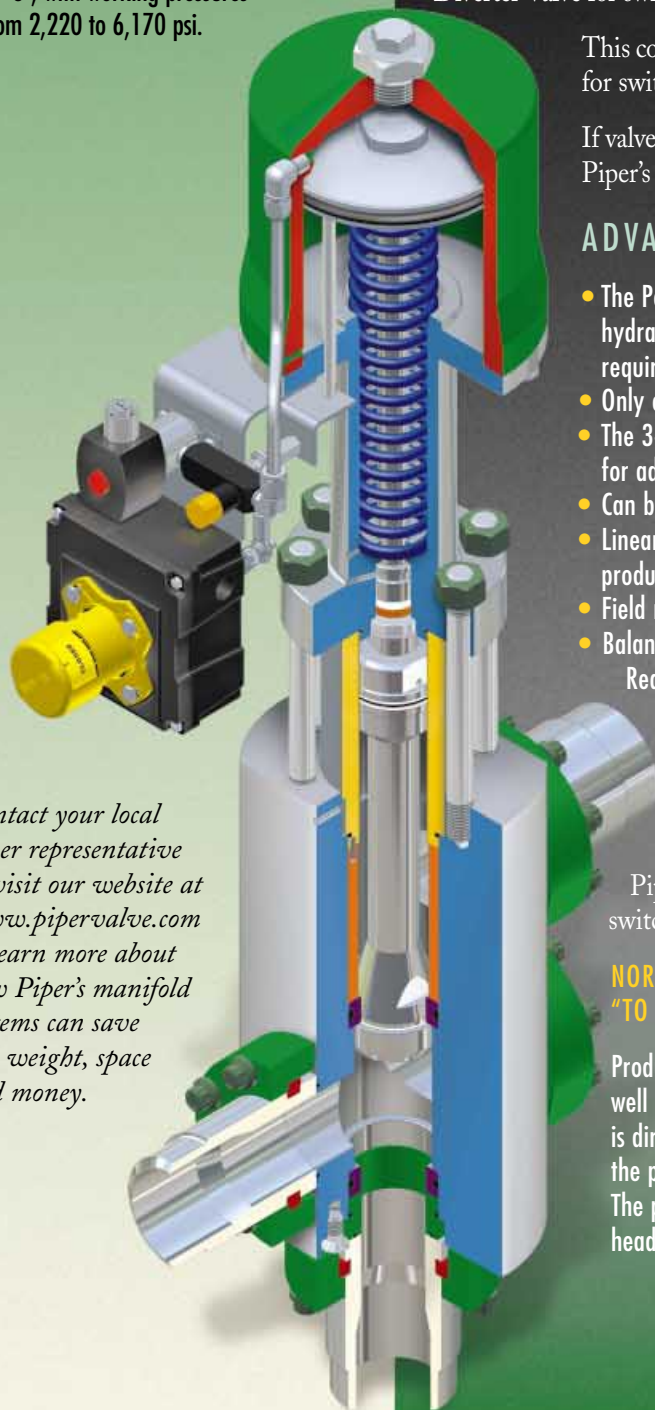
We know when your projects are successful, we're successful. This is the goal we work for everyday, quality products that make your success, ours.



Series PB Poppet Diverter Valve

TOTAL SYSTEM OPTIMIZATION

- Valve Sizes Available:
2 - 6", with working pressures
from 2,220 to 6,170 psi.



Contact your local
Piper representative
or visit our website at
www.pipervalve.com
to learn more about
how Piper's manifold
systems can save
you weight, space
and money.

Piper's Poppet 3-Way Diverter Valve

SWITCH FROM PRODUCTION TO TEST HEADER EASILY

For total optimization of Piper's compact manifold systems, use the Poppet 3-Way Diverter Valve for switching each well from the production header to the test header.

This compact valve replaces two ball valves, pipe and fittings necessary for switching between headers on conventional API 6D manifolds.

If valve automation is required, the space and weight saved by utilizing Piper's Poppet Diverter Valve are even greater.

ADVANTAGES

- The Poppet Diverter Valve comes complete with a spring return hydraulic/pneumatic actuator. Conventional two-valve switching systems require two actuators.
- Only one instrumentation line required.
- The 3-way flow pattern of the Poppet Diverter Valve eliminates the need for additional weld fittings.
- Can be manually operated.
- Linear operation of valve is more resistant to seat damage in unprocessed production applications.
- Field repairable with no line spread required for removal.
- Balanced design allows for switching with minimal operating pressure. Requires as little as 80 psi pneumatic pressure to operate the valve at 6,170 psi well pressure.

POPPET OPERATION

Piper's Poppet 3-way Diverter Valve is the easiest way to switch wells from production to test headers.

NORMAL POSITION "TO PRODUCTION HEADER"

Production flow from the well enters the inlet and is directed downward to the production header. The path to the test header is sealed off.



ACTUATED POSITION "TO TEST HEADER"

When actuated, the Poppet strokes downward to seal off the production header and flow is directed to the test header, via the annular space between the Poppet and the body inside diameter.



On & Offshore Ball Valves

Piper's Double Ball Valve Solutions

DOUBLE BALL, (DOUBLE BLOCK & BLEED) VALVES

For valve applications requiring double barrier safety, Piper offers a full range of double ball valves for umbilicals, risers, flow lines and manifold applications.

Ask your Piper representative for more information.

- Available in 1" thru 10" sizes.
- Pressures up to 10,000 psi C.W.P.
- Other sizes available on request.
- Variety of materials available to suit your specific application.



Don't wait to start gaining the benefits of using quality Piper valve products.

Call now and start saving more space, weight and money today!

405.670.4456

Piper's Series DC Ball Valves

LARGE BORE SOLUTIONS

Piper offers a large bore series for your 12" thru 18" applications. These valves are also designed with Piper's Optimum Flow Technology to keep your entire system flowing efficiently.

- Available in 12" thru 18" sizes.
- ANSI Class 300, 600, 900 and 1500.
- Wide range of materials available to suit your application requirements.
- Valve bores designed to closely match receiving pipe schedule.



Pipers Subsea Valves

OPTIMUM FLOW TECHNOLOGY BELOW THE SURFACE



All valves are hyperbaric tested to simulated water depths of 10,000 feet.

CONTACTING PIPER

You can contact your local Piper Valve Systems representative below or visit our website at www.pipervalue.com for additional product information 24 hours a day.

Your Local Piper Representative



Optimize Your System Below The Surface With Piper Subsea Valves

TEMPORARY AND PERMANENT SERVICE VALVES

Piper Valve Systems offers a full line of reliable Subsea valves designed for temporary and permanent service. Contact your Piper representative for more information.

- Available in all sizes and classes.
- Temporary service valves (five years).
- Permanent service valves (twenty years).
- 100% external pressure tested to 10,000 feet.
- Subsea gear operation, ROV Operation or Hydraulic Actuated
- Optional API 17D ROV interfaces available.



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