

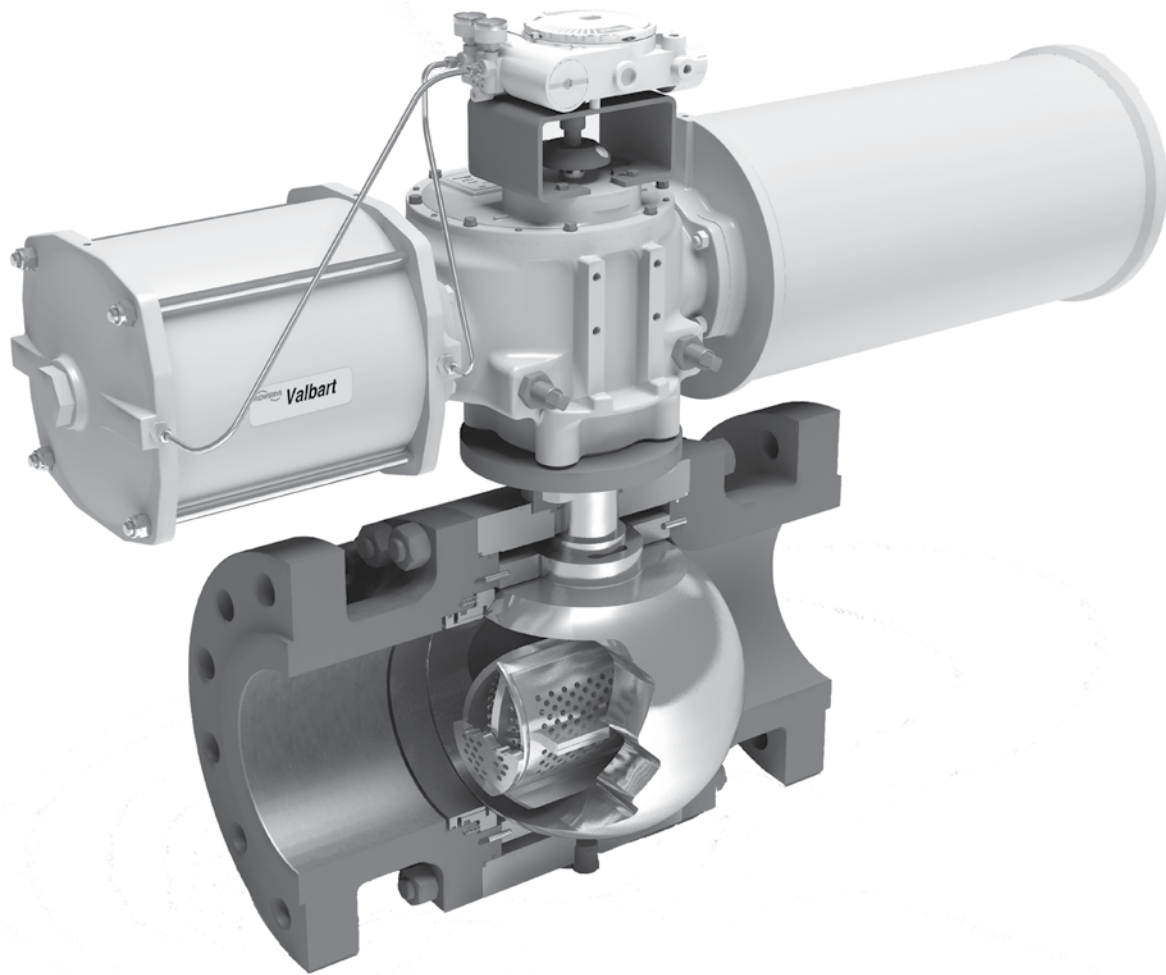


TECHNICAL BULLETIN

Valbart TMCBV

Trunnion-Mounted Control Ball Valve

FCD VBENTB0068-03-AQ 05/14



High range of control with superior flow capacity for severe service applications in a smaller footprint.

The TMCBV leverages technology from the leaders of trunnion-mounted ball valves and control valves for severe service applications. The TMCBV is available in the widest range of sizes and pressure ratings, thanks to its lower operating torques even at very high pressures.

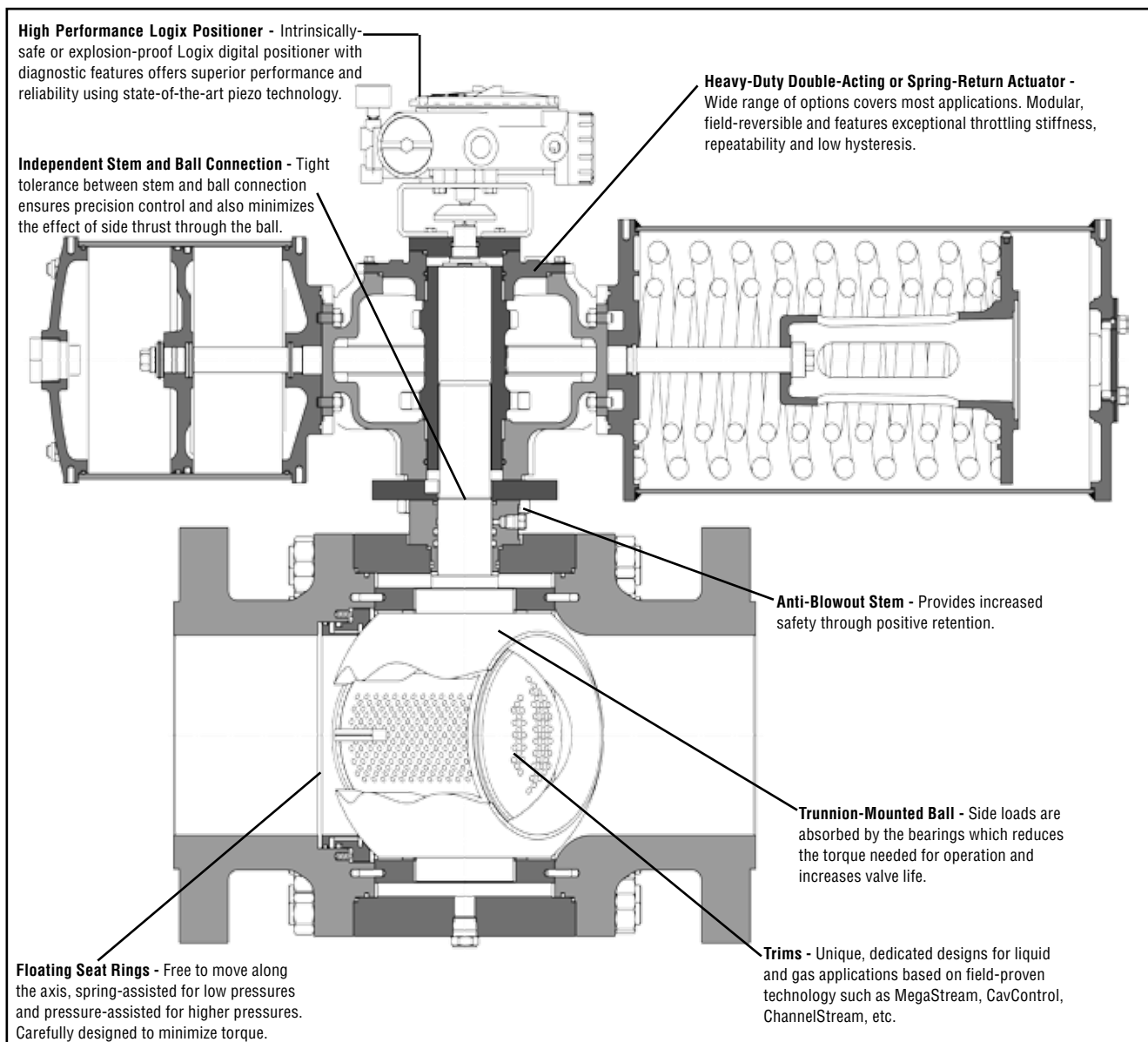
As a result of its inherent higher rangeability combined with its increased flow capacity, the TMCBV can be smaller in size and dimensional envelope for a given process condition, thus becoming the most economical solution when compared with traditional control valve offerings.

Metal-seated TMCBV has tungsten carbide coating on ball and seat, which enhances the life of the valve by ensuring class IV or Class V tight shut-off even after prolonged usage in service.

Carefully designed rotary seals, precision machining, and accurate trunnion guiding, all contribute to zero external leakage ensuring that the TMCBV meets all environmental standards.

The TMCBV has exclusive trims designed for liquid and gas applications based on field-proven technologies such as MegaStream, CavControl, ChannelStream, etc. to ensure that no compromise is made when dealing with unique challenges associated with cavitation control and noise attenuation.

Operated by a heavy-duty pneumatic/hydraulic double-acting or spring-return actuator through a high-performance Logix digital positioner, the TMCBV maintains high positioning accuracy, repeatability, controlled high speed and reliable response. With the advanced diagnostic solutions which can be seamlessly integrated into a host control and/or plant asset management system, the TMCBV is the most economical integrated control valve with state-of-the-art features and performance.



TMCBV Advantages and Features

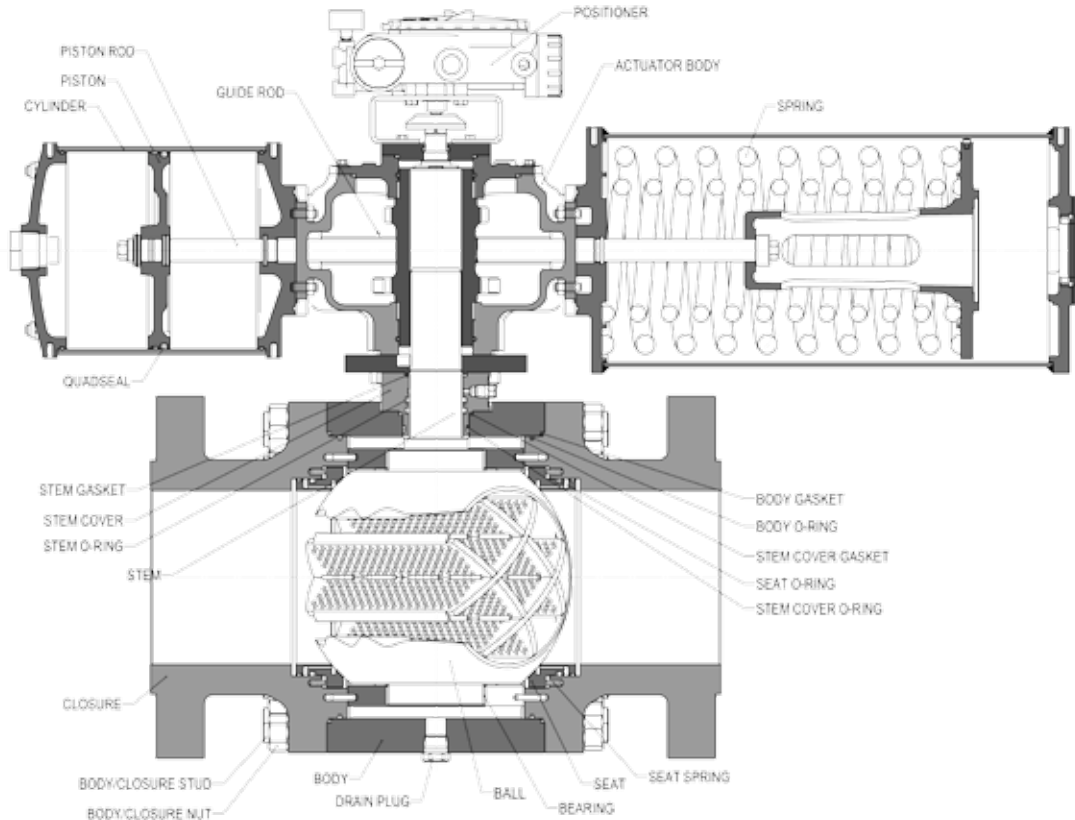
Features	Advantages
Wide range of trim designs based on industry-proven technologies such as MegaStream, CavControl, ChannelStream, Z-trim etc. Trims can be custom-engineered for unique applications.	Effective cavitation control and noise attenuation in the most demanding applications.
Metal to Metal, tungsten carbide-coated seats can provide ANSI FCI 70-2 and IEC 60534-4 class IV and Class V shut-off up to class 2500 and API 10000. Soft seats can achieve class VI shutoff.	Tight shut-off even after prolonged usage.
Compact design.	Higher flow capacity for a given size results in a smaller size valve and actuator, thus leading to significant space, weight and cost savings.
Very high rangeability in excess of 300:1.	Wide range of control.
Accurate machining of stem and bonnet sealing surfaces ensures compliance with the most severe pollution control regulations.	Low emission stem seals.
Geometry allows easier overlay of special alloys on wetted parts including body, seat, ball and seat pockets.	Lower cost on corrosive/erosive applications.
Fewer moving parts.	Higher level of reliability and performance at a lower cost.
Very tight tolerances maintained in stem-to-ball and stem-to-actuator connections.	Precise control.
Actuator has Quad seals and wear rings on piston and also a precisely machined guide bar to withstand lateral loads.	Higher cycle life.
Logix digital positioners are equipped with advanced diagnostics features which can be seamlessly integrated into a host control and/or plant asset management program, thus allowing for predictive and preventive maintenance.	Lower cost of maintenance and decreased downtime.
QUICK-CAL™ button, DIP switches, Jog buttons and variable gain selector allow setup and calibration in minutes.	Shorter commissioning times and costs.

Product Range and Specifications

Size and Class	4" through 56" Class 150, 300, 600
	4" through 48" Class 900, 1500
	4" through 24" Class 2500
	2" through 11" API 3000, 5000, 10000
Design Standard	API 6D, API 6A
Body Design	Side-Entry, Top-Entry, Welded
Body Style	Full Port, Reduced Port
End Connection	Integral Flange, Butt Weld
Face-to-Face	API 6D/ASME B16.10 / API 6A
Flange Facing	Raised Face, RTJ
Bonnet Type	Standard, Extended, Cryogenic
Overlay Options	Seat Pocket and Stem Seal
	All Seal Areas
	All Wetted Parts
Fire-Safe Certification	API 6FA, API 607, ISO 10497

Actuator Type	Double-acting Pneumatic/Hydraulic cylinder, Fail-safe Spring-return, or Electric Modulating
Manual Overrides	Jack screw, Bevel gear, De-clutchable worm gear, hydraulic
Fail Safe Action	Fail-to-open or Fail-to-close (field reversible)
Positioner	Intrinsically-safe, Explosion-proof HART, FOUNDATION Fieldbus <i>(for detailed positioner specification see page 23)</i>
Deadband	<1% full scale
Repeatability	<0.5% full scale
Linearity	<0.5% (rotary), <0.8%, (sliding stem) full scale

Typical Construction and Materials



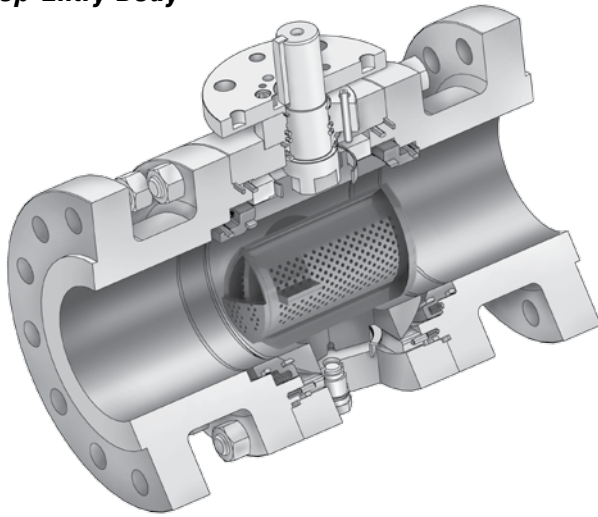
Body and Bonnet	A 350 Gr. LF 2
	A 105
	A 182 Gr. F316/316L
	A 182 Gr. F51 (Duplex)
	ASTM A 351 CF3M/CF8M
	A 182 Gr. F53 (Super-Duplex)
	A 182 Gr. F44 (Super-Austenitic)
	Inconel 625
	AISI 4130 API 6A 60K
	Other
Body Overlay Material	316L SS
	Inconel 625
Seals: Body, Closures and Seats	O-rings (Viton AED, HNBR, others)
	HNBR
	Viton AED
	Lip Seal (PTFE-Elgiloy)
	Graphite
Stem Seals	O-rings (Viton AED, HNBR, others)
	Lip Seals (PTFE-Elgiloy)
	PTFE V-Pack
	Graphite Packing

Bearings	CS + PTFE
	316 SS + PTFE
	Inconel + PTFE
	Inconel (HT)
Body Bolting	B7/2H
	L7/7
	B8/8
	B7M/2HM
	L7M/7M
	B8M/8M
Ball and Seat Ring	A 182 Gr. F316
	A 182 Gr. F316LN
	ASTM A 351 CF3M/CF8M
	A 182 Gr. F51
	A 182 Gr. F53
	Inconel 625
Ball Coating	A 350 Gr. LF2 + 316SS Overlay
	A 350 Gr. LF2 + Inconel Overlay
	Tungsten Carbide Coating (TCC)
Soft Seat	Chromium Carbide Coating (CCC)
	Nylon 6 MoS2
	Nylon PA-12
	Devlon V-API
	PEEK
	RPTFE

Body Designs

Side-Entry Body

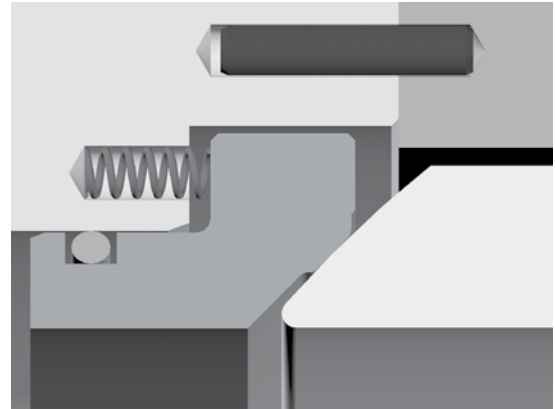
Top-Entry Body



Seat Options

Metal Seated Valves

The metal seat is suitable for a wide range of demanding applications requiring Class IV or Class V tight shut-off. Both the seat surfaces (ball and seat) are coated with tungsten carbide as a standard option.



Bonnet Options

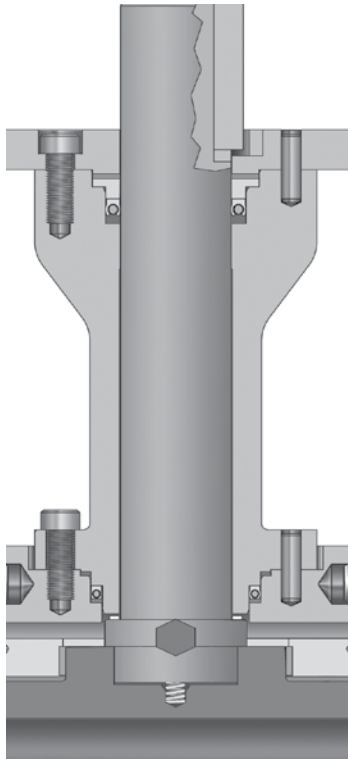
Valve designs are available with bonnet extensions for applications involving extremely low or high temperatures. ORINGS/ PTFE V-Pack or GRAPHITE packing available upon request

Extended Bonnet

Extended bonnets are recommended for service at temperatures down to -50°C (-58°F) or temperatures above 220°C (428°F).

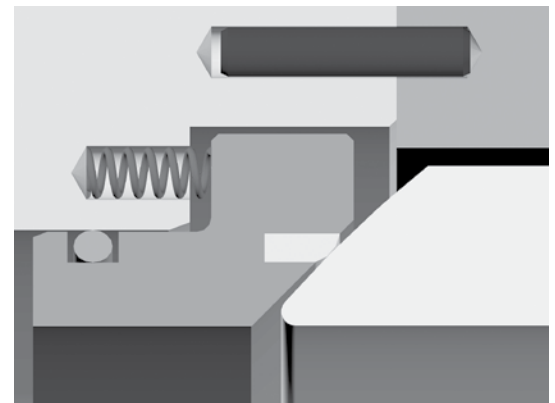
Cryogenic Bonnet Extensions

Cryogenic bonnet extensions are recommended for applications such as LNG service for temperature ranges between -47°C (-52°F) and -196°C (-320°F).



Soft Seated Valves

A resilient material is inserted into the metal seat holder to provide a soft seating action in addition to the metal to metal seating between the ball and the seat rings. Suitable for achieving Class VI tight shut-off. An optional Delta Ring Insert is also available upon request.



TMCBV Noise Reduction Trims

Noise reduction trims, based on the industry-proven MegaStream design, eliminate the problem of control valve noise by dealing effectively with gaseous pressure reduction, and by controlling turbulence carried into the downstream piping. The pressure drop in the trim is distributed so that it occurs not only at the throttling point between the ball and seat, but also at each stage, from the inside of the attenuator to the outside through expansion holes. This pressure drop occurs largely as a result of the sudden expansions and contractions that take place as the flow passes through the trim. Each stage is designed to take a small pressure drop, avoiding the high velocities present in single throttling-point trims. The gradual pressure reduction is achieved by designing sufficient stages to keep the velocity low.

The TMCBV noise reduction trims effectively reduce control valve noise in a range of gas applications. The trim is available in two styles optimized for noise attenuation and flow capacity.

N1 Trim

The N1 trim (Figures 1-3) is a very economical option with two or more stages for noise reduction, up to 20 dBA.

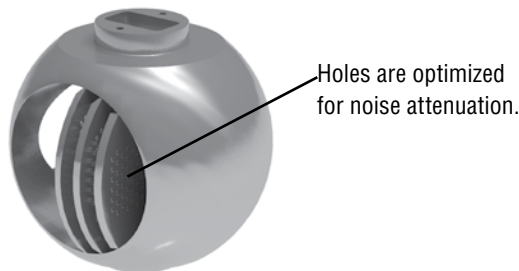


Figure 1: N1 Noise Reduction Trim

Design

A series of straight plates with carefully designed holes are spaced at specific angles between each other. The spacing is designed to meet the inherent feature of a rotary valve. During lower openings where the valve could see higher velocities, almost all of the plates act as pressure reduction stages, thereby providing better noise attenuation. As the valve opens further, flow capacities could become a governing factor and the design allows for straight-through flow, ensuring higher capacity. The design is tolerant of particles and has an inherent self-cleaning feature.



Figure 2: N1 CFD

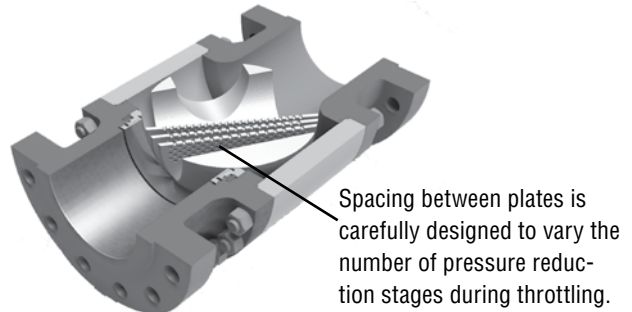


Figure 3: N1 Noise Reduction Trim

N2 Trim

The N2 trim (Figures 4 and 5) is a highly effective multistage (3 or more stages) design for noise reduction up to 30 dBA.

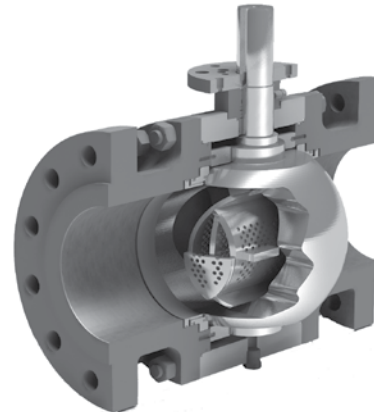


Figure 4: N2 Noise Reduction Trim

Design

A specially-engineered trim comprising of curved plates and closed ends which ensure higher pressure drops across the stages thereby make it ideal for severe noise reduction applications. The fluid enters an annular area in the ball and is forced to go through all the pressure reduction stages. Each stage is designed to take a small pressure drop, avoiding the high velocities present in single throttling point trims. This gradual pressure reduction is achieved by designing sufficient stages to keep the velocity low.

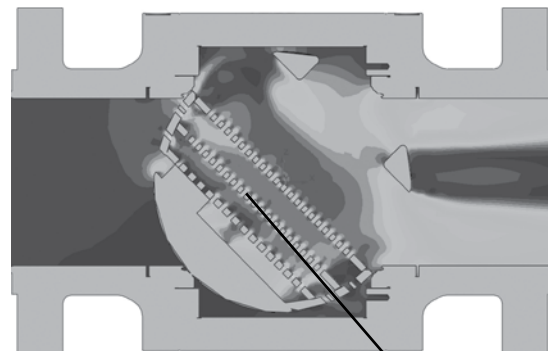


Figure 5: N2 CFD

Staged pressure reduction through carefully designed curved plates with optimized holes.

TMCBV Cavitation Control Trims

TMCBV cavitation control trims, based on the industry-proven CavControl and ChannelStream designs, effectively isolate or eliminate cavitation depending on the application requirements. The trims are available in multiple styles optimized for cavitation control and flow capacity.

C1 Trim

The C1 trim (Figures 6-8), based on the CavControl design, is a very economical trim which minimizes the cavitation damage to valve internals by controlling the location and concentration of cavitation vapor bubble implosion in an area away from the metal parts.

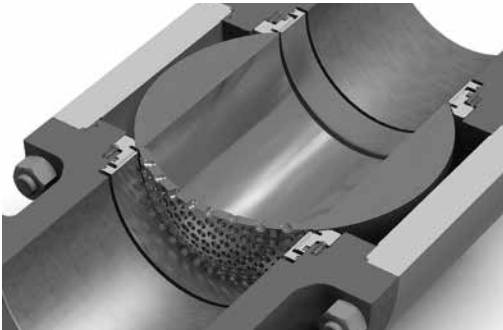


Figure 6: C1 Trim

Design

Small, diametrically-opposed flow nozzles through the ball, suppress the effect of cavitation and also help in reducing the hydrodynamic noise (between 15 and 20 dBA). As the valve opens, each nozzle admits a jet of cavitating liquid which impinges at a common focal point. Nozzles are used to ensure orifice type flow rather than tube type flow through the ball, thus the vena contracta is established externally rather than inside the ball thickness. The impinging fluid jets form a fluid cushion and an area of pressure recovery that cause the collapse of the vapor bubbles in the fluid stream away from the metal parts. The turbulence of the impinging flow promotes the collapse of vapor bubbles at the center of the ball thereby minimizing the damage to the valve trim.

Focal Point

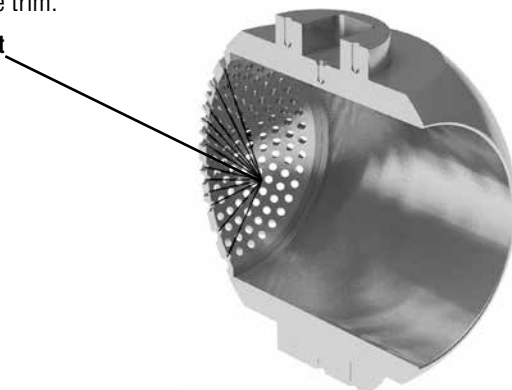


Figure 7: C1 Trim

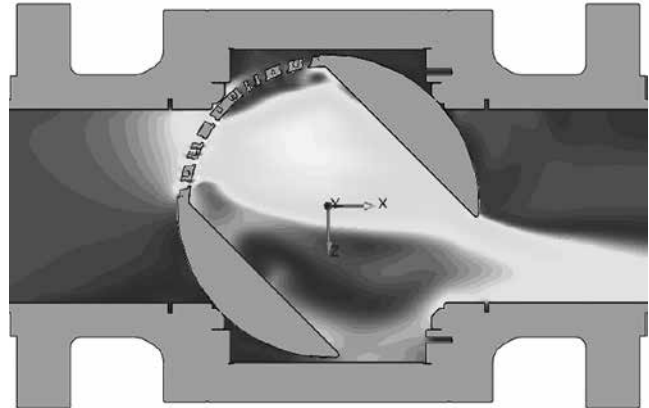


Figure 8: C1 Trim CFD

C2 Trim

The C2 Trim (Figures 9 and 10) is an extension of the C1 trim customized for applications which see cavitation in lower openings but would need more flow capacity at higher openings where there would be no sign of cavitation.

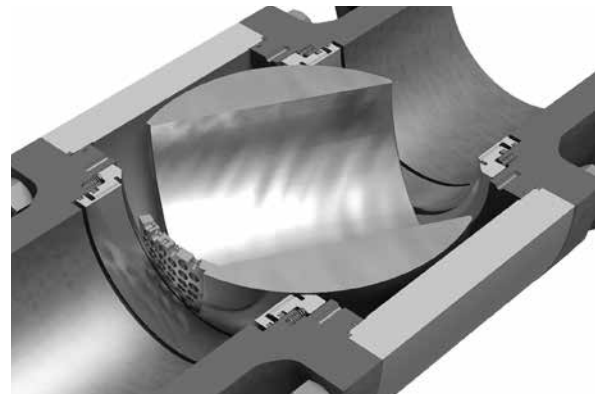


Figure 9: C2 Trim



Figure 10: C2 Trim

C3 Trim

The C3 Trim (Figures 11 and 12), based on the ChannelStream design, is a highly-effective multistage cavitation control design which prevents cavitation from forming and minimizes hydrodynamic noise even under the most severe applications. This unique design not only eliminates cavitation damage, but also provides easy maintenance and long life, even when installed in the most difficult applications.

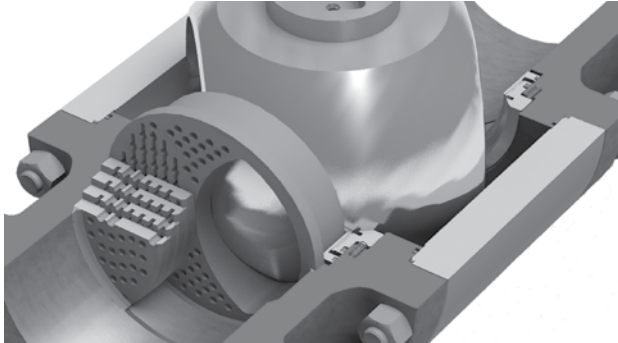


Figure 11: C3 Trim

Design

The cartridge has a series of plates with drilled holes and channels. Rather than acting as a flow restriction, the drilled holes in the cartridge are used as expansion areas for the fluid as it enters from restrictive channels machined in each stage of the cartridge. Successive intersections of the restrictive channels result in additional pressure losses, while expansion holes connected to the channel create a series of expansions and contractions that result in a series of pressure drops. This staged pressure drop eliminates cavitation in many applications and minimizes the energy of cavitation that may still occur in others.

Depending on the applications, C3 can be custom engineered to control severe cavitation associated with higher pressure drops at lower openings, while providing the upper-end flow capacity which could be the governing factor at higher openings.

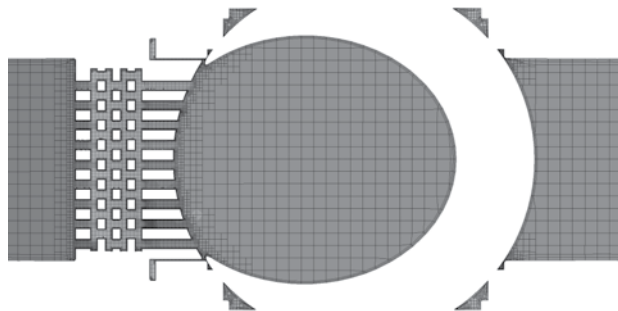


Figure 12: C3 Trim CFD

Z-Trims

Z-Trims combine the benefits of an advanced control valve with the simplicity of a ball valve. Most effective with low- to medium-pressure drops, the Z-trims (Figures 13-15) excel at eliminating noise in high flow services.

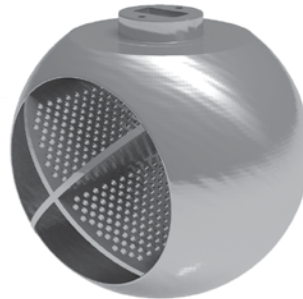


Figure 13: Z1 Trim

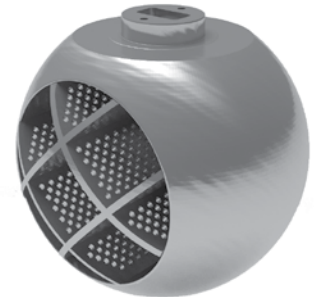


Figure 14: Z2 Trim

The Z-Trims are omnidirectional and self-cleaning. Z1 trim may reduce noise by 17 dB. Z2 trim may give 23 dB. Both are also useful for preventing cavitation at low pressure ratios. The inclined plates give smooth transition as the valve travels, without stair-stepping in the characteristic curve.

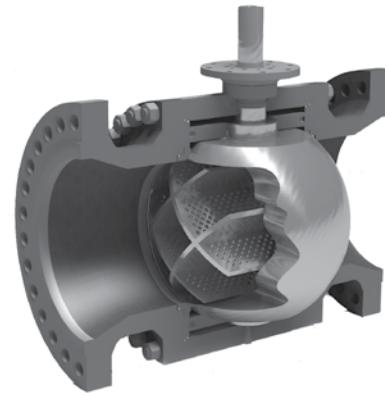


Figure 15: Z2 Trim (shown on a reduced port valve)

Standard Trim

Standard Trim Control Ball Valve is an entry-level solution for noise and cavitation control.

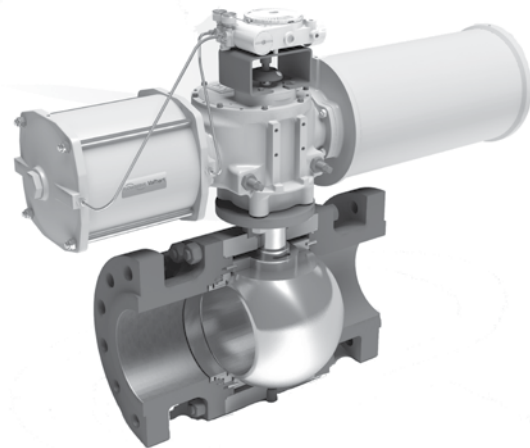
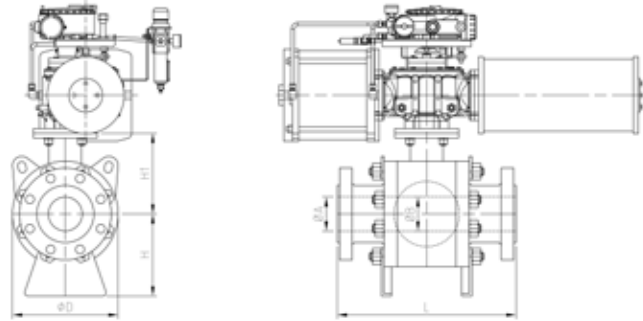


Figure 16: TMCBV with Standard Trim

Dimensions and Weights



ASME CLASS 150# FULL AND REDUCED BORE

ASME CLASS 150 (IMPERIAL)

ASME CLASS 150 (METRIC)

DN (in)	Pressure Class	Side-Entry									DN (mm)	Pressure Class	Side-Entry								
		L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)			L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	150	9.02	-	12.01	3.94	2.91	7.80	5.35	6.06	107	100 x 80	150	229	-	305	100	74	198	136	154	49
4	150	9.02	-	12.01	3.94	3.94	9.65	6.06	7.17	161	100	150	229	-	305	100	100	245	154	182	73
6 x 4	150	15.51	-	17.99	5.91	3.94	9.65	6.06	7.17	220	150 x 100	150	394	-	457	150	100	245	154	182	100
6	150	15.51	-	17.99	5.91	5.91	12.80	8.66	8.94	340	150	150	394	-	457	150	150	325	220	227	154
8 x 6	150	17.99	-	20.51	7.91	5.91	12.80	8.66	8.94	421	200 x 150	150	457	-	521	201	150	325	220	227	191
8	150	17.99	-	20.51	7.91	7.91	15.83	10.43	10.51	564	200	150	457	-	521	201	201	402	265	267	256
10 x 8	150	20.98	-	22.01	9.92	7.91	15.83	10.43	10.51	670	250 x 200	150	533	-	559	252	201	402	265	267	304
10	150	20.98	-	22.01	9.92	9.92	18.58	12.40	11.85	849	250	150	533	-	559	252	252	472	315	301	385
12 x 10	150	24.02	-	25.00	11.93	9.92	18.58	12.40	11.85	1030	300 x 250	150	610	-	635	303	252	472	315	301	467
14 x 10	150	27.01	-	30.00	13.15	9.92	18.58	12.40	11.85	1047	350 x 250	150	686	-	762	334	252	472	315	301	475
12	150	24.02	-	25.00	11.93	11.93	22.87	14.57	14.53	1446	300	150	610	-	635	303	303	581	370	369	656
14 x 12	150	27.01	-	30.00	13.15	11.93	22.87	14.57	14.53	1464	350 x 300	150	686	-	762	334	303	581	370	369	664
16 x 12	150	30.00	-	32.99	15.16	11.93	22.87	14.57	14.53	1839	400 x 300	150	762	-	838	385	303	581	370	369	834
14	150	27.01	-	30.00	13.15	13.15	24.02	14.96	15.08	1598	350	150	686	-	762	334	334	610	380	383	725
16 x 14	150	30.00	-	32.99	15.16	13.15	24.02	14.96	15.08	1969	400 x 350	150	762	-	838	385	334	610	380	383	893
18 x 14	150	34.02	-	35.98	17.17	13.15	24.02	14.96	15.08	2205	450 x 350	150	864	-	914	436	334	610	380	383	1000
16	150	30.00	-	32.99	15.16	15.16	26.93	17.52	16.57	2491	400	150	762	-	838	385	385	684	445	421	1130
18 x 16	150	34.02	-	35.98	17.17	15.16	26.93	17.52	16.57	2729	450 x 400	150	864	-	914	436	385	684	445	421	1238
20 x 16	150	35.98	-	39.02	19.17	15.16	26.93	17.52	16.57	3029	500 x 400	150	914	-	991	487	385	684	445	421	1374
18	150	34.02	-	35.98	17.17	17.17	30.39	18.90	18.39	3444	450	150	864	-	914	436	436	772	480	467	1562
20 x 18	150	35.98	-	39.02	19.17	17.17	30.39	18.90	18.39	3743	500 x 450	150	914	-	991	487	436	772	480	467	1698
20	150	35.98	-	39.02	19.17	19.17	33.31	20.87	19.69	4442	500	150	914	-	991	487	487	846	530	500	2015
24 x 20	150	42.01	-	45.00	23.19	19.17	33.31	20.87	19.69	5223	600 x 500	150	1067	-	1143	589	487	846	530	500	2369
22	150	39.02	-	42.99	21.18	21.18	36.38	23.23	21.46	5606	550	150	991	-	1092	538	538	924	590	545	2543
24	150	42.01	-	45.00	23.19	23.19	39.29	24.41	22.91	6874	600	150	1067	-	1143	589	589	998	620	582	3118
30 x 24	150	50.98	-	55.00	28.94	23.19	39.29	24.41	22.91	8589	750 x 600	150	1295	-	1397	735	589	998	620	582	3896
26	150	45.00	-	49.02	24.92	24.92	43.27	26.38	25.75	9193	650	150	1143	-	1245	633	633	1099	670	654	4170
28	150	49.02	-	52.99	26.93	26.93	46.65	30.31	26.61	11001	700	150	1245	-	1346	684	684	1185	770	676	4990
30	150	50.98	-	55.00	28.94	28.94	49.02	29.92	27.81	12897	750	150	1295	-	1397	735	735	1245	760	707	5850
36 x 30	150	60.00	-	67.99	34.41	28.94	49.02	29.92	27.83	15260	900 x 750	150	1524	-	1727	874	735	1245	760	707	6922
32	150	54.02	-	60.00	30.67	30.67	51.97	31.42	29.29	15293	800	150	1372	-	1524	779	779	1320	798	744	6937
34	150	57.99	-	64.02	32.68	32.68	55.31	33.58	31.73	18664	850	150	1473	-	1626	830	830	1405	853	806	8466
36	150	60.00	-	67.99	34.41	34.41	57.87	34.84	32.99	20995	900	150	1524	-	1727	874	874	1470	885	838	9523
40	150	69.02	-	77.01	38.43	38.43	63.19	38.98	37.40	27690	1000	150	1753	-	1956	976	976	1605	990	950	12560
42	150	70.47	-	82.01	40.16	40.16	66.61	40.35	36.61	30979	1050	150	1790	-	2083	1020	1020	1692	1025	930	14052
48	150	78.54	-	90.08	45.91	45.91	75.59	47.24	42.48	48281	1200	150	1995	-	2288	1166	1166	1920	1200	1079	21900
56	150	97.99	-	97.99	53.54	53.54	89.37	53.94	49.21	75178	1400	150	2489	-	2489	1360	1360	2270	1370	1250	34100

General Notes

(1) Please consult manufacturer

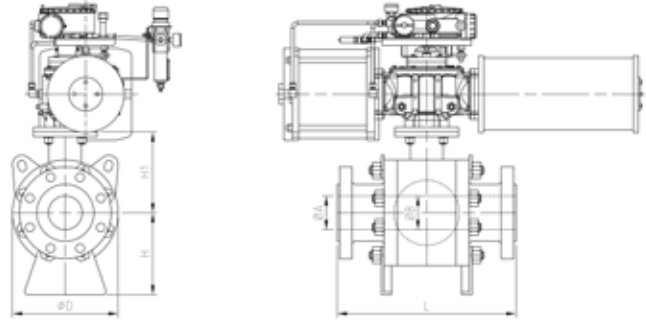
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 300# FULL AND REDUCED BORE

ASME CLASS 300 (IMPERIAL)

ASME CLASS 300 (METRIC)

Side-Entry											Side-Entry										
DN (in)	Pressure Class	L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)	DN (mm)	Pressure Class	L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	300	12.01	-	12.01	3.94	2.91	8.66	5.63	6.57	163	100 x 80	300	305	-	305	100	74	220	143	167	74
4	300	12.01	-	12.01	3.94	3.94	10.00	6.26	7.32	220	100	300	305	-	305	100	100	254	159	186	100
6 x 4	300	15.87	-	16.50	5.91	3.94	10.00	6.26	7.32	304	150 x 100	300	403	-	419	150	100	254	159	186	138
6	300	15.87	-	16.50	5.91	5.91	12.76	9.25	8.94	377	150	300	403	-	419	150	150	324	235	227	171
8 x 6	300	19.76	-	20.51	7.91	5.91	12.76	9.25	8.94	518	200 x 150	300	502	-	521	201	150	324	235	227	235
8	300	19.76	-	20.51	7.91	7.91	15.91	11.02	10.91	688	200	300	502	-	521	201	201	404	280	277	312
10 x 8	300	22.36	-	22.01	9.92	7.91	15.91	11.02	10.91	809	250 x 200	300	568	-	559	252	201	404	280	277	367
10	300	22.36	-	22.01	9.92	9.92	19.57	13.50	12.87	1069	250	300	568	-	559	252	252	497	343	327	485
12 x 10	300	25.51	-	25.00	11.93	9.92	19.57	13.50	12.87	1276	300 x 250	300	648	-	635	303	252	497	343	327	579
14 x 10	300	30.00	-	30.00	13.15	9.92	19.57	13.50	12.87	1495	350 x 250	300	762	-	762	334	252	497	343	327	678
12	300	25.51	-	25.00	11.93	11.93	22.87	14.57	14.53	1594	300	300	648	-	635	303	303	581	370	369	723
14 x 12	300	30.00	-	30.00	13.15	11.93	22.87	14.57	14.53	1812	350 x 300	300	762	-	762	334	303	581	370	369	822
16 x 12	300	32.99	-	32.99	15.16	11.93	22.87	14.57	14.53	2147	400 x 300	300	838	-	838	385	303	581	370	369	974
14	300	30.00	-	30.00	13.15	13.15	24.02	15.35	15.06	2024	350	300	762	-	762	334	334	610	390	383	918
16 x 14	300	32.99	-	32.99	15.16	13.15	24.02	15.35	15.08	2359	400 x 350	300	838	-	838	385	334	610	390	383	1070
18 x 14	300	35.98	-	35.98	17.17	13.15	24.02	15.35	15.08	2732	450 x 350	300	914	-	914	436	334	610	390	383	1239
16	300	32.99	-	32.99	15.16	15.16	27.40	18.03	16.85	2956	400	300	838	-	838	385	385	696	458	428	1341
18 x 16	300	35.98	-	35.98	17.17	15.16	27.40	18.03	16.85	3331	450 x 400	300	914	-	914	436	385	696	458	428	1511
20 x 16	300	39.02	-	39.02	19.17	15.16	27.40	18.03	16.85	3759	500 x 400	300	991	-	991	487	385	696	458	428	1705
18	300	35.98	-	35.98	17.17	17.17	30.63	19.69	18.39	3971	450	300	914	-	914	436	436	778	500	467	1801
20 x 18	300	39.02	-	39.02	19.17	17.17	30.63	19.69	18.39	4398	500 x 450	300	991	-	991	487	436	778	500	467	1995
20	300	39.02	-	39.02	19.17	19.17	34.13	21.06	20.28	5247	500	300	991	-	991	487	487	867	535	515	2380
24 x 20	300	45.00	-	45.00	23.19	19.17	34.13	21.06	20.28	6334	600 x 500	300	1143	-	1143	589	487	867	535	515	2873
22	300	42.99	-	42.99	21.18	21.18	37.13	23.62	21.77	6757	550	300	1092	-	1092	538	538	943	600	553	3065
24	300	45.00	-	45.00	23.19	23.19	40.31	25.00	23.46	8256	600	300	1143	-	1143	589	589	1024	635	596	3745
30 x 24	300	55.00	-	55.00	28.94	23.19	40.31	25.00	23.46	10714	750 x 600	300	1397	-	1397	735	589	1024	635	596	4860
26	300	49.02	-	49.02	24.92	24.92	43.43	28.35	25.83	10648	650	300	1245	-	1245	633	633	1103	720	656	4830
28	300	52.99	-	52.99	26.93	26.93	46.46	30.31	27.26	13056	700	300	1346	-	1346	684	684	1180	770	693	5922
30	300	55.00	-	55.00	28.94	28.94	50.04	30.51	29.15	15388	750	300	1397	-	1397	735	735	1271	775	741	6980
36 x 30	300	67.99	-	67.99	34.41	28.94	50.04	30.51	29.17	19125	900 x 750	300	1727	-	1727	874	735	1271	775	741	8675
32	300	60.00	-	60.00	30.67	30.67	52.76	31.89	29.72	18051	800	300	1524	-	1524	779	779	1340	810	755	8188
34	300	64.02	-	64.02	32.68	32.68	56.30	34.25	30.83	22029	850	300	1626	-	1626	830	830	1430	870	783	9992
36	300	67.99	-	67.99	34.41	34.41	58.90	35.43	32.64	25203	900	300	1727	-	1727	874	874	1496	900	829	11432
40	300	68.90	-	68.90	38.43	38.43	65.35	40.16	37.01	30369	1000	300	1750	-	1750	976	976	1660	1020	940	13775
42	300	70.08	-	70.08	40.16	40.16	67.99	40.94	38.62	34392	1050	300	1780	-	1780	1020	1020	1727	1040	981	15600
48	300	81.50	-	81.50	45.91	45.91	77.17	47.64	42.68	48052	1200	300	2070	-	2070	1166	1166	1960	1210	1084	21796
56	300	101.18	-	101.18	53.54	53.54	91.34	55.51	50.79	84117	1400	300	2570	-	2570	1360	1360	2320	1410	1290	38155

General Notes

(1) Please consult manufacturer

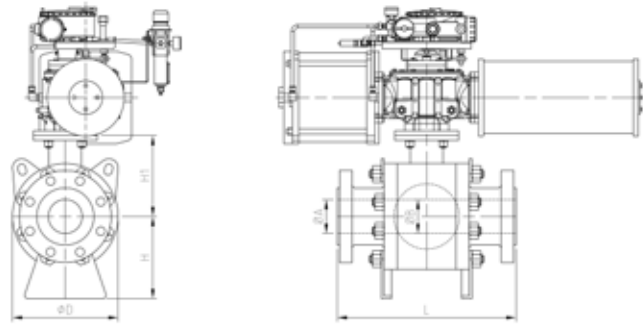
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 600# FULL AND REDUCED BORE

ASME CLASS 600 (IMPERIAL)

ASME CLASS 600 (METRIC)

DN (in)	Pressure Class	Side-Entry									DN (mm)	Pressure Class	Side-Entry								
		L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)			L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	600	17.01	17.13	17.01	3.94	2.91	8.50	5.63	6.57	165	100 x 80	600	432	435	432	100	74	216	143	167	75
4	600	17.01	17.13	17.01	3.94	3.94	10.00	6.26	7.32	243	100	600	432	435	432	100	100	254	159	186	110
6 x 4	600	22.01	22.13	22.01	5.91	3.94	10.00	7.01	7.32	353	150 x 100	600	559	562	559	150	100	254	178	186	160
6	600	22.01	22.13	22.01	5.91	5.91	12.95	9.65	8.94	553	150	600	559	562	559	150	150	329	245	227	251
8 x 6	600	25.98	26.14	25.98	7.91	5.91	12.95	9.65	8.94	732	200 x 150	600	660	664	660	201	150	329	245	227	332
8	600	25.98	26.14	25.98	7.91	7.91	15.98	11.02	10.91	895	200	600	660	664	660	201	201	406	280	277	406
10 x 8	600	30.98	31.14	30.98	9.92	7.91	15.98	11.02	10.91	1248	250 x 200	600	787	791	787	252	201	406	280	277	566
10	600	30.98	31.14	30.98	9.92	9.92	20.16	13.50	13.03	1517	250	600	787	791	787	252	252	512	343	331	688
12 x 10	600	32.99	33.11	32.99	11.93	9.92	20.16	13.50	13.03	1739	300 x 250	600	838	841	838	303	252	512	343	331	789
14 x 10	600	35.00	35.12	35.00	13.15	9.92	20.16	13.50	13.03	1964	350 x 250	600	889	892	889	334	252	512	343	331	891
12	600	32.99	33.11	32.99	11.93	11.93	24.02	15.55	15.12	2061	300	600	838	841	838	303	303	610	395	384	935
14 x 12	600	35.00	35.12	35.00	13.15	11.93	24.02	15.55	15.12	2286	350 x 300	600	889	892	889	334	303	610	395	384	1037
16 x 12	600	39.02	39.13	39.02	15.16	11.93	24.02	15.55	15.12	2868	400 x 300	600	991	994	991	385	303	610	395	384	1301
14	600	35.00	35.12	35.00	13.15	13.15	24.49	15.75	15.35	2659	350	600	889	892	889	334	334	622	400	390	1206
16 x 14	600	39.02	39.13	39.02	15.16	13.15	24.49	15.75	15.35	3241	400 x 350	600	991	994	991	385	334	622	400	390	1470
18 x 14	600	42.99	43.11	42.99	17.17	13.15	24.49	15.75	15.35	3882	450 x 350	600	1092	1095	1092	436	334	622	400	390	1761
16	600	39.02	39.13	39.02	15.16	15.16	28.03	18.31	16.85	3860	400	600	991	994	991	385	385	712	465	428	1751
18 x 16	600	42.99	43.11	42.99	17.17	15.16	28.03	18.31	16.85	4502	450 x 400	600	1092	1095	1092	436	385	712	465	428	2042
20 x 16	600	47.01	47.24	47.01	19.17	15.16	28.03	18.31	16.85	5254	500 x 400	600	1194	1200	1194	487	385	712	465	428	2383
18	600	42.99	43.11	42.99	17.17	17.17	31.85	20.28	18.98	5359	450	600	1092	1095	1092	436	436	809	515	482	2431
20 x 18	600	47.01	47.24	47.01	19.17	17.17	31.85	20.28	18.98	6111	500 x 450	600	1194	1200	1194	487	436	809	515	482	2772
20	600	47.01	47.24	47.01	19.17	19.17	35.16	21.65	20.87	7024	500	600	1194	1200	1194	487	487	893	550	530	3186
24 x 20	600	55.00	55.39	55.00	23.19	19.17	35.16	21.65	20.87	9057	600 x 500	600	1397	1407	1397	589	487	893	550	530	4108
22	600	50.98	51.38	50.98	21.18	21.18	38.58	24.41	23.23	9072	550	600	1295	1305	1295	538	538	980	620	590	4115
24	600	55.00	55.39	55.00	23.19	23.19	41.73	25.79	24.80	11356	600	600	1397	1407	1397	589	589	1060	655	630	5151
30 x 24	600	65.00	65.51	65.00	28.94	23.19	41.73	25.79	24.80	14407	750 x 600	600	1651	1664	1651	735	589	1060	655	630	6535
26	600	57.01	57.52	57.01	24.92	24.92	45.20	28.15	26.57	14030	650	600	1448	1461	1448	633	633	1148	715	675	6364
28	600	60.98	61.50	60.98	26.93	26.93	47.83	30.31	28.15	17103	700	600	1549	1562	1549	684	684	1215	770	715	7758
30	600	65.00	65.51	65.00	28.94	28.94	50.39	32.28	30.35	19138	750	600	1651	1664	1651	735	735	1280	820	771	8681
36 x 30	600	82.01	82.64	82.01	34.41	28.94	50.39	32.28	30.35	25724	900 x 750	600	2083	2099	2083	874	735	1280	820	771	11668
32	600	70.00	70.63	70.00	30.67	30.67	55.12	33.46	32.09	24750	800	600	1778	1794	1778	779	779	1400	850	815	11227
34	600	75.98	76.61	75.98	32.68	32.68	58.35	35.43	33.74	29099	850	600	1930	1946	1930	830	830	1482	900	857	13199
36	600	82.01	82.64	82.01	34.41	34.41	60.43	39.17	35.39	33312	900	600	2083	2099	2083	874	874	1535	995	899	15110
40	600	81.89	82.52	81.89	38.43	38.43	67.56	41.26	38.43	40891	1000	600	2080	2096	2080	976	976	1716	1048	976	18548
42	600	85.63	85.63	85.63	40.16	40.16	71.85	45.75	40.59	46083	1050	600	2175	2175	2175	1020	1020	1825	1162	1031	20903
48	600	95.87	95.87	95.87	45.91	45.91	81.69	49.80	46.54	69845	1200	600	2435	2435	2435	1166	1166	2075	1265	1182	31681
56	600	106.69	106.69	106.69	53.54	53.54	93.70	57.09	51.42	103304	1400	600	2710	2710	2710	1360	1360	2380	1450	1306	46858

General Notes

(1) Please consult manufacturer

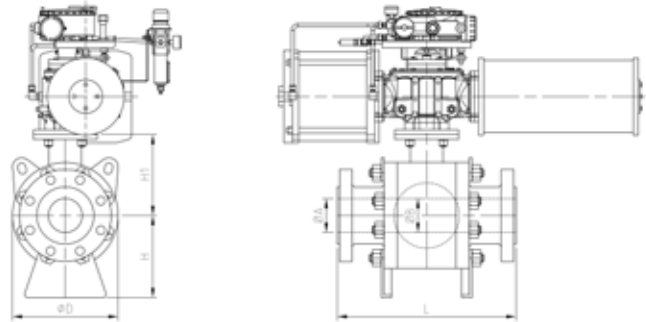
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 900# FULL AND REDUCED BORE

ASME CLASS 900 (IMPERIAL)

ASME CLASS 900 (METRIC)

Side-Entry										Side-Entry											
DN (in)	Pressure Class	L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)	DN (mm)	Pressure Class	L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	900	17.99	18.11	17.99	3.94	2.91	8.46	5.75	6.57	273	100 x 80	900	457	460	457	100	74	215	146	167	124
4	900	17.99	18.11	17.99	3.94	3.94	10.83	6.69	7.83	331	100	900	457	460	457	100	100	275	170	199	150
6 x 4	900	24.02	24.13	24.02	5.91	3.94	10.83	7.50	7.83	472	150 x 100	900	610	613	610	150	100	275	191	199	214
6	900	24.02	24.13	24.02	5.91	5.91	14.17	10.35	9.96	724	150	900	610	613	610	150	150	360	263	253	329
8 x 6	900	29.02	29.13	29.02	7.91	5.91	14.17	10.35	9.96	1027	200 x 150	900	737	740	737	201	150	360	263	253	466
8	900	29.02	29.13	29.02	7.91	7.91	18.50	12.01	12.20	1224	200	900	737	740	737	201	201	470	305	310	555
10 x 8	900	32.99	33.11	32.99	9.92	7.91	18.50	12.01	12.20	1545	250 x 200	900	838	841	838	252	201	470	305	310	701
10	900	32.99	33.11	32.99	9.92	9.92	20.87	14.88	13.35	1769	250	900	838	841	838	252	252	530	378	339	803
12 x 10	900	37.99	38.11	37.99	11.93	9.92	20.87	14.88	13.35	2249	300 x 250	900	965	968	965	303	252	530	378	339	1020
14 x 10	900	40.51	40.87	40.51	12.68	9.92	20.87	14.88	13.35	2690	350 x 250	900	1029	1038	1029	322	252	530	378	339	1220
12	900	37.99	38.11	37.99	11.93	11.93	24.21	15.55	15.24	2701	300	900	965	968	965	303	303	615	395	387	1225
14 x 12	900	40.51	40.87	40.51	12.68	11.93	24.21	15.55	15.24	3142	350 x 300	900	1029	1038	1029	322	303	615	395	387	1425
16 x 12	900	44.49	44.88	44.49	14.69	11.93	24.21	15.55	15.24	3801	400 x 300	900	1130	1140	1130	373	303	615	395	387	1724
14	900	40.51	40.87	40.51	12.68	12.68	25.79	17.05	15.98	3638	350	900	1029	1038	1029	322	322	655	433	406	1650
16 x 14	900	44.49	44.88	44.49	14.69	12.68	25.79	17.05	15.98	4297	400 x 350	900	1130	1140	1130	373	322	655	433	406	1949
18 x 14	900	47.99	48.50	47.99	16.65	12.68	25.79	17.05	15.98	5370	450 x 350	900	1219	1232	1219	423	322	655	433	406	2436
16	900	44.49	44.88	44.49	14.69	14.69	29.53	19.09	17.95	5132	400	900	1130	1140	1130	373	373	750	485	456	2328
18 x 16	900	47.99	48.50	47.99	16.65	14.69	29.53	19.09	17.95	6867	450 x 400	900	1219	1232	1219	423	373	750	485	456	3115
20 x 16	900	52.01	52.52	52.01	18.54	14.69	29.53	19.09	17.95	7414	500 x 400	900	1321	1334	1321	471	373	750	485	456	3363
18	900	47.99	48.50	47.99	16.65	16.65	33.19	21.65	19.88	7326	450	900	1219	1232	1219	423	423	843	550	505	3323
20 x 18	900	52.01	52.52	52.01	18.54	16.65	33.19	21.65	19.88	8534	500 x 450	900	1321	1334	1321	471	423	843	550	505	3871
20	900	52.01	52.52	52.01	18.54	18.54	37.36	23.62	22.72	10163	500	900	1321	1334	1321	471	471	949	600	577	4610
24 x 20	900	60.98	61.73	60.98	22.44	18.54	37.36	23.62	22.72	13358	600 x 500	900	1549	1568	1549	570	471	949	600	577	6059
24	900	60.98	61.73	60.98	22.44	22.44	44.76	27.36	27.32	16184	600	900	1549	1568	1549	570	570	1137	695	694	7341
30 x 24	900	74.02	74.88	74.02	28.03	22.44	44.76	27.36	27.32	18920	750 x 600	900	1880	1902	1880	712	570	1137	695	694	8582
28	900	67.44	67.95	67.44	26.18	26.18	50.47	30.31	29.96	21164	700	900	1713	1726	1713	665	665	1282	770	761	9600
30	900	74.02	74.88	74.02	28.03	28.03	53.54	33.46	33.03	24410	750	900	1880	1902	1880	712	712	1360	850	839	11072
36 x 30	900	90.00	91.14	90.00	33.66	28.03	53.54	33.46	33.03	34912	900 x 750	900	2286	2315	2286	855	712	1360	850	839	15836
32	900	80.00	80.87	80.00	29.92	29.92	54.33	35.43	33.66	33510	800	900	2032	2054	2032	760	760	1380	900	855	15200
34	900	85.00	86.14	85.00	31.81	31.81	58.66	37.40	34.25	37853	850	900	2159	2188	2159	808	808	1490	950	870	17170
36	900	90.00	91.14	90.00	33.66	33.66	63.19	39.37	35.20	42201	900	900	2286	2315	2286	855	855	1605	1000	894	19142

General Notes

(1) Please consult manufacturer

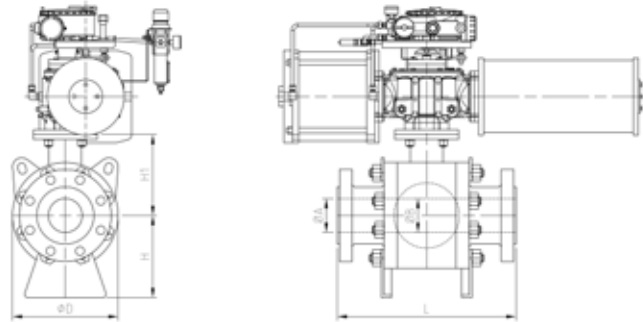
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 1500# FULL AND REDUCED BORE

ASME CLASS 1500 (IMPERIAL)

ASME CLASS 1500 (METRIC)

DN (in)	Pressure Class	Side-Entry								Side-Entry											
		L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)	DN (mm)	Pressure Class	L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	1500	21.50	21.61	21.50	3.94	2.91	8.50	6.12	6.57	309	100 x 80	1500	546	549	546	100	74	216	156	167	140
4	1500	21.50	21.61	21.50	3.94	3.94	10.75	6.65	7.83	441	100	1500	546	549	546	100	100	273	169	199	200
6 x 4	1500	27.76	27.99	27.76	5.67	3.94	10.75	7.76	7.83	683	150 x 100	1500	705	711	705	144	100	273	197	199	310
6	1500	27.76	27.99	27.76	5.67	5.67	16.93	11.61	11.97	1080	150	1500	705	711	705	144	144	430	295	304	490
8 x 6	1500	32.76	33.11	32.76	7.56	5.67	16.93	11.61	11.97	1433	200 x 150	1500	832	841	832	192	144	430	295	304	650
8	1500	32.76	33.11	32.76	7.56	7.56	21.14	13.78	13.35	2110	200	1500	832	841	832	192	192	537	350	339	957
10 x 8	1500	39.02	39.37	39.02	9.41	7.56	21.14	13.78	13.35	2601	250 x 200	1500	991	1000	991	239	192	537	350	339	1180
10	1500	39.02	39.37	39.02	9.41	9.41	23.62	15.75	14.61	3285	250	1500	991	1000	991	239	239	600	400	371	1490
12 x 10	1500	44.49	45.12	44.49	11.30	9.41	23.62	15.75	14.61	4079	300 x 250	1500	1130	1146	1130	287	239	600	400	371	1850
14 x 10	1500	49.49	50.24	49.49	12.40	9.41	23.62	15.75	14.61	4729	350 x 250	1500	1257	1276	1257	315	239	600	400	371	2145
12	1500	44.49	45.12	44.49	11.30	11.30	26.57	17.83	16.18	4777	300	1500	1130	1146	1130	287	287	675	453	411	2167
14 x 12	1500	49.49	50.24	49.49	12.40	11.30	26.57	17.83	16.18	5776	350 x 300	1500	1257	1276	1257	315	287	675	453	411	2620
16 x 12	1500	54.49	55.39	54.49	14.17	11.30	26.57	17.83	16.18	6305	400 x 300	1500	1384	1407	1384	360	287	675	453	411	2860
14	1500	49.49	50.24	49.49	12.40	12.40	29.72	20.28	18.15	6614	350	1500	1257	1276	1257	315	315	755	515	461	3000
16 x 14	1500	54.49	55.39	54.49	14.17	12.40	29.72	20.28	18.15	7606	400 x 350	1500	1384	1407	1384	360	315	755	515	461	3450
18 x 14	1500	60.51	61.38	60.51	15.98	12.40	29.72	20.28	18.15	8378	450 x 350	1500	1537	1559	1537	406	315	755	515	461	3800
16	1500	54.49	55.39	54.49	14.17	14.17	33.86	22.44	20.24	9381	400	1500	1384	1407	1384	360	360	860	570	514	4255
18 x 16	1500	60.51	61.38	60.51	15.98	14.17	33.86	22.44	20.24	10957	450 x 400	1500	1537	1559	1537	406	360	860	570	514	4970
20 x 16	1500	65.51	66.38	65.51	17.87	14.17	33.86	22.44	20.24	11321	500 x 400	1500	1664	1686	1664	454	360	860	570	514	5135
18	1500	60.51	61.38	60.51	15.98	15.98	37.36	24.09	23.11	12158	450	1500	1537	1559	1537	406	406	949	612	587	5515
20 x 18	1500	65.51	66.38	65.51	17.87	15.98	37.36	24.09	23.11	14220	500 x 450	1500	1664	1686	1664	454	406	949	612	587	6450
20	1500	65.51	66.38	65.51	17.87	17.87	42.13	26.77	26.38	16623	500	1500	1664	1686	1664	454	454	1070	680	670	7540
24 x 20	1500	76.50	77.64	76.50	21.50	17.87	42.13	26.77	26.38	23975	600 x 500	1500	1943	1972	1943	546	454	1070	680	670	10875
24	1500	76.50	77.64	76.50	21.50	21.50	51.38	29.53	28.35	32077	600	1500	1943	1972	1943	546	546	1305	750	720	14550

General Notes

(1) Please consult manufacturer

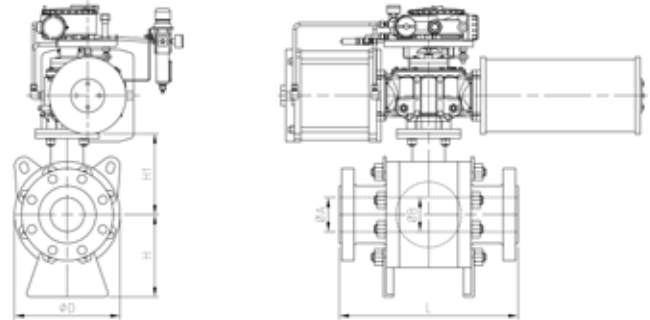
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 2500# FULL AND REDUCED BORE

ASME CLASS 2500 (IMPERIAL)

ASME CLASS 2500 (METRIC)

DN (in)	Pressure Class	Side-Entry									DN (mm)	Pressure Class	Side-Entry								
		L- Face-To-Face (in)			ØA (in)	ØB (in)	ØD (in)	H (in)	H1 (in)	Weight (lb)			L- Face-To-Face (mm)			ØA (mm)	ØB (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		RF	RTJ	BW									RF	RTJ	BW						
4 x 3	2500	26.50	26.89	26.50	3.43	2.44	12.01	7.72	8.62	855	100 x 80	2500	673	683	673	87	62	305	196	219	388
4	2500	26.50	26.89	26.50	3.43	3.43	14.76	8.66	10.71	855	100	2500	673	683	673	87	87	375	220	272	388
6 x 4	2500	35.98	36.50	35.98	5.16	3.43	14.76	9.51	10.71	1543	150 x 100	2500	914	927	914	131	87	375	242	272	700
6	2500	35.98	36.50	35.98	5.16	5.16	20.67	13.39	13.90	2297	150	2500	914	927	914	131	131	525	340	353	1042
8 x 6	2500	40.24	40.87	40.24	7.05	5.16	20.67	13.39	13.90	2712	200 x 150	2500	1022	1038	1022	179	131	525	340	353	1230
8	2500	40.24	40.87	40.24	7.05	7.05	25.59	15.75	16.32	3715	200	2500	1022	1038	1022	179	179	650	400	415	1685
10 x 8	2500	50.00	50.87	50.00	8.78	7.05	25.59	15.75	16.32	5401	250 x 200	2500	1270	1292	1270	223	179	650	400	415	2450
10	2500	50.00	50.87	50.00	8.78	8.78	31.50	19.29	19.25	7134	250	2500	1270	1292	1270	223	223	800	490	489	3236
12 x 10	2500	55.98	56.89	55.98	10.43	8.78	31.50	19.29	19.25	8267	300 x 250	2500	1422	1445	1422	265	223	800	490	489	3750
12	2500	55.98	56.89	55.98	10.43	10.43	34.25	21.85	20.91	9930	300	2500	1422	1445	1422	265	265	870	555	531	4504

General Notes

(1) Please consult manufacturer

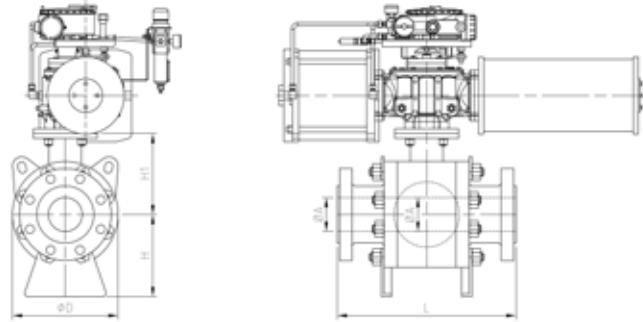
Weight values are relevant to flanged end valves

For dimensions and weights in larger sizes consult the factory

Dimensions D, H, H1 and weights may be subject to change without notice

Face-to-face dimensions not listed in industry standards may be subject to change without notice

Dimensions and Weights (continued)



ASME CLASS 3000, 5000 AND 10000

ASME CLASS 3000 (IMPERIAL)

API 3000 (METRIC)

Side-Entry								Side-Entry							
DN (in)	Pressure Class	Face-to-face (in)	ØA (2) (in)	ØD (in)	H (in)	H1 (in)	Weight (Lbs)	DN (mm)	Pressure Class	L-Face-to-face (mm)	ØA (2) (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		Flanged 6BX								Flanged 6BX					
2" 1/16	3000	14.61	2.07	6.42	4.65	5.35	(1)	50	3000	371	52.5	163	118	136	(1)
2" 9/16	3000	15.12	2.58	8.27	5.63	6.57	(1)	70	3000	384	65.5	210	143	167	(1)
3" 1/8	3000	16.61	3.07	8.27	5.63	6.57	(1)	80	3000	422	78	210	143	167	(1)
4" 1/16	3000	18.11	4.07	10.83	6.69	7.83	(1)	100	3000	460	103.5	275	170	199	(1)
5" 1/8	3000	24.13	5.14	14.17	10.35	9.96	(1)	150	3000	613	130.5	360	263	253	(1)
7" 1/16	3000	29.13	7.07	17.13	12.01	12.20	(1)	200	3000	740	179.5	435	305	310	(1)
9"	3000	39.37	9.02	23.62	15.75	14.61	(1)	250	3000	1000	229	600	400	371	(1)
11"	3000	45.12	11.02	26.57	17.83	16.18	(1)	300	3000	1146	280	675	453	411	(1)

ASME CLASS 5000 (IMPERIAL)

API 5000 (METRIC)

Side-Entry								Side-Entry							
DN (in)	Pressure Class	Face-to-face (in)	ØA (2) (in)	ØD (in)	H (in)	H1 (in)	Weight (Lbs)	DN (mm)	Pressure Class	L-Face-to-face (mm)	ØA (2) (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		Flanged 6BX								Flanged 6BX					
2" 1/16	5000	14.61	2.07	8.19	5.91	6.06	(1)	50	5000	371	52.5	208	150	154	(1)
2" 9/16	5000	18.62	2.58	12.01	7.87	7.87	(1)	70	5000	473	65.5	305	200	200	(1)
3" 1/8	5000	18.62	3.07	14.76	8.62	9.45	(1)	80	5000	473	78	375	219	240	(1)
4" 1/16	5000	21.61	4.07	16.34	11.00	11.65	(1)	100	5000	549	103.5	415	280	296	(1)
5" 1/8	5000	27.99	5.14	17.91	13.39	13.86	(1)	150	5000	711	130.5	455	340	352	(1)
7" 1/16	5000	33.11	7.07	24.80	15.75	15.75	(1)	200	5000	841	179.5	630	400	400	(1)
9"	5000	50.87	9.02	31.50	19.29	19.25	(1)	250	5000	1292	229	800	490	489	(1)
11"	5000	62.99	11.02	34.25	21.85	20.91	(1)	300	5000	1600	280	870	555	531	(1)

ASME CLASS 10000 (IMPERIAL)

API 10000 (METRIC)

Side-Entry								Side-Entry							
DN (in)	Pressure Class	Face-to-face (in)	ØA (2) (in)	ØD (in)	H (in)	H1 (in)	Weight (Lbs)	DN (mm)	Pressure Class	L-Face-to-face (mm)	ØA (2) (mm)	ØD (mm)	H (mm)	H1 (mm)	Weight (Kg)
		Flanged 6BX								Flanged 6BX					
2" 1/16	10000	20.51	2.07	11.81	8.31	8.58	(1)	50	10000	521	52.5	300	211	218	(1)
2" 9/16	10000	22.24	2.58	13.19	9.25	9.72	(1)	70	10000	565	65.5	335	235	247	(1)
3" 1/16	10000	24.37	3.07	17.13	12.20	12.28	(1)	80	10000	619	78	435	310	312	(1)
4" 1/16	10000	26.38	4.07	18.11	12.20	12.83	(1)	100	10000	670	103.5	460	310	326	(1)
5" 1/8	10000	29.02	5.14	22.24	15.35	15.47	(1)	150	10000	737	130.5	565	390	393	(1)
7" 1/16	10000	35.00	7.07	33.15	21.50	21.89	(1)	200	10000	889	179.5	842	546	556	(1)
9"	10000	50.87	9.02	35.43	24.33	23.90	(1)	250	10000	1292	229	900	618	607	(1)
11"	10000	62.99	11.02	41.73	30.47	26.65	(1)	300	10000	1600	280	1060	774	677	(1)

Notes

- (1) Please consult manufacturer.
- (2) Maximum bore. Some bore values may need to be reduced to stay within Face-to-face dimension.

General Notes

For dimensions in larger sizes consult manufacturer.

Dimensions D, H, H1 and weights may be subject to change without notice.

Face-to-face dimensions not listed in industry standards may be subject to change without notice.

Cv Tables

Flow Coefficient (Cv) @ 100% Open - Full Bore TMCBV

Valve Size (in)	Standard Trim				N 1-3 stage				N 2-3 stage				N 2-4 stage			
	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500
4	1850	1800	1700	1100	226	220	208	135	260	253	239	155				
6	4600	4380	3800	2500	563	536	465	306	647	616	535	352	531	505	438	288
8	9000	8500	7400		1101	1040	906	649	1266	1196	1041	746	1038	980	853	611
10	14700	14500	11500	8300	1799	1774	1407	1016	2068	2040	1618	1168	1695	1672	1326	957
12	22500	21100	18000	13000	2753	2582	2203	1591	3165	2969	2532	1829	2595	2434	2076	1499
14	28000	25000	21000		3426	3059	2570		3939	3517	2954		3229	2883	2422	
16	37200	34500	27500		4552	4222	3365		5234	4854	3869		4290	3979	3172	
18	49000	45000	37000		5996	5506	4528		6894	6331	5205		5651	5190	4267	
20	59000	55200	47800		7220	6755	5849		8301	7766	6725		6805	6366	5513	
22	68200				8345				9595				7866			
24	92000	83800	70000		11258	10254	8566		12943	11790	9848		10611	9665	8073	
26	110000				13460				15476				12687			
28	121000	113000			14806	13827			17023	15898			13955	13033		
30	144000	130000			17621	15908			20259	18290			16608	14993		
32	170000	151000			20802	18477			23917	21244			19607	17415		
34	189000				23127				26590				21798			
36	210000	198200			25697	24253			29545	27885			24220	22859		
40	267500				32733				37634				30852			
42	280000				34262				39393				32293			
48	384000				46988				54025				44288			
56	521000				63752				73299				60089			

Flow Coefficient (Cv) @ 100% Open - Full Bore TMCBV

Valve Size (in)	C1				C2-40				Z1				Z2			
	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500
4	84	80	76	46					495	481	454	294	434	422	399	257.983
6	190	181	157	103	663	632	548	361	1230	1171	1016	668	1079	1027	891	586
8	372	351	305	219	1298	1226	1067	764	2406	2272	1978	1417	2111	1994	1736	1243
10	607	599	475	343	2120	2091	1659	1197	3930	3876	3074	2219	3448	3401	2697	1947
12	929	871	743	537	3245	3043	2596	1875	6015	5641	4812	3475	5277	4949	4222	3049
14	1156	1032	867		4038	3606	3029		7485	6683	5614		6567	5863	4925	
16	1536	1424	1135		5365	4976	3966		9945	9223	7352		8725	8091	6450	
18	2023	1858	1527		7067	6490	5336		13099	12030	9891		11492	10554	8678	
20	2435	2279	1973		8509	7961	6894		15773	14757	12779		13837	12946	11211	
22	2815				9836				18232				15995			
24	3798	3459	2889		13268	12086	10096		24595	22403	18713		21577	19654	16417	
26	4541				15864				29407				25798			
28	4995	4664			17451	16297			32347	30209			28378	26502		
30	5944	5366			20768	18749			38496	34753			33772	30489		
32	7017	6233			24518	21778			45447	40367			39870	35414		
34	7802				27258				50526				44326			
36	8668	8181			30287	28585			56140	52985			49251	46484		
40	11042				38579				71512				62737			
42	11558				40382				74853				65668			
48	15851				55381				102656				90060			
56	21506				75140				139281				122190			

Cv Tables (continued)

Flow Coefficient (Cv) @ 100% Open - Reduced Bore TMCBV

Valve Size (in)	Standard Trim				N 1-3 stage				N 2-3 stage				N 2-4 stage			
	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500
4x3	600	590	550	560	110	100	90	55	120	109	98	60				
6x4	790	790	780	745	204	198	187	121	222	216	204	132				
8 X 6	2150	2150	2150	2150	507	482	418	275	552	526	456	300	453	431	374	246
10 X 8	4300	4450	4450	4100	991	936	815	584	1080	1020	888	636	886	836	728	522
12 X 10	7550	8000	9000	7550	1619	1597	1266	914	1764	1740	1380	996	1447	1427	1132	817
14 X 12	14000	12800	13000		2478	2324	1982		2700	2532	2160		2214	2076	1771	
16 X 14	15000	14200	14100		3084	2753	2313		3360	3000	2520		2755	2460	2066	
18 X 16	21000	19200	19000		4097	3799	3029		4464	4140	3300		3661	3395	2706	
20 X 18	28400	25000			5396	4956	4075		5880	5400	4440		4822	4428	3641	
14 X 10	6000	6100	6100		1637	1614	1280		1696	1673	1327		1391	1372	1088	
16 X 12	9100	8900	8900		2505	2350	2005		2596	2434	2077		2128	1996	1703	
20 X 16	15300	13800	12000		4142	3842	3062		4292	3980	3173		3519	3264	2602	
24 X 20	28000	25100	20600		6570	6147	5323		6807	6368	5514		5581	5222	4522	
36x32	87000	69500			18930	16814			19612	17420			16082	14284		
30 X 24	36000	32900			10244	9331			10614	9668			8703	7927		
36 X 30	64000	61500			16035	14476			16613	14997			13622	12298		
42x36	96000				23384				24227				19866			

Flow Coefficient (Cv) @ 100% Open - Reduced Bore TMCBV

Valve Size (in)	C1				Z1				Z2			
	150/300/600	900	1500	2500	150/300/600	900	1500	2500	150/300/600	900	1500	2500
4x3	43	41	39	22	241	219	197	120	211	192	173	106
6x4	79	76	71	43	445	433	409	265	390	380	359	232
8 X 6	178	170	147	97	1107	1054	914	602	971	925	802	528
10 X 8	349	330	287	206	2165	2045	1780	1275	1900	1794	1562	1119
12 X 10	570	563	446	322	3537	3489	2767	1997	3103	3061	2427	1752
14 X 12	873	819	698		5414	5077	4331		4749	4454	3799	
16 X 14	1086	970	815		6737	6015	5053		5910	5277	4433	
18 X 16	1443	1339	1067		8950	8301	6617		7852	7282	5805	
20 X 18	1901	1746	1436		11789	10827	8902		10343	9498	7810	
14 X 10	631	622	494		3576	3527	2798		3137	3095	2454	
16 X 12	966	906	773		5474	5133	4379		4802	4503	3842	
20 X 16	1597	1481	1181		9050	8393	6690		7939	7363	5869	
24 X 20	2533	2370	2052		14353	13429	11628		12592	11781	10202	
36x32	7298	5859			41356	36734			36282	32227		
30 X 24	3949	3597			22381	20386			19635	17885		
36 X 30	6182	5581			35031	31626			30733	27745		
42x36	9015				51087				44819			

NOTE: Please consult the factory for Cv tables and characteristics of trims and stages not listed

Limitorque Heavy-Duty Actuators

LPS actuators provide up to 250kNm (184 000 ft-lb) of heavy-duty torque. Enhanced performance is achieved by using a superior scotch yoke support design that significantly reduces transverse loads. LPS actuators feature modular construction to minimize repair time and initial cost while maximizing process availability.

Features

- True modular design for maximum flexibility
- Carbon steel construction (stainless steel pneumatic cylinder available on request)
- Straight or canted yoke with enclosed slot for maximum strength
- Center body design and material selection optimized to facilitate field maintenance and provide extended design life
- Optimized yoke bore to accommodate large valve stems
- Suitable for on-off or modulating (control valve) applications
- Single acting spring return configurations: fail open or fail closed
- Double acting configurations: single or double cylinders
- Full range of override options: manual, geared, and hydraulic

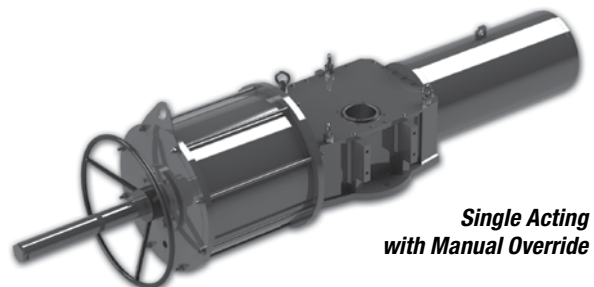
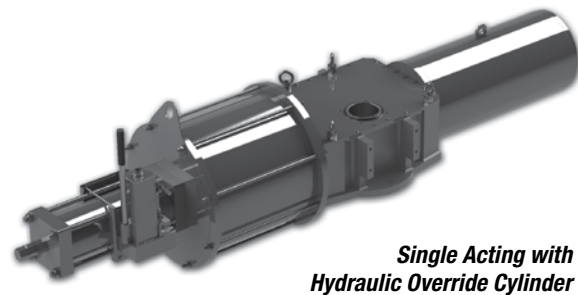
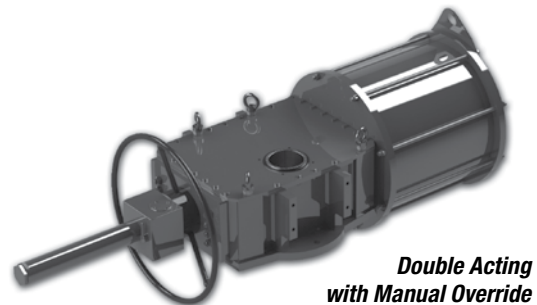
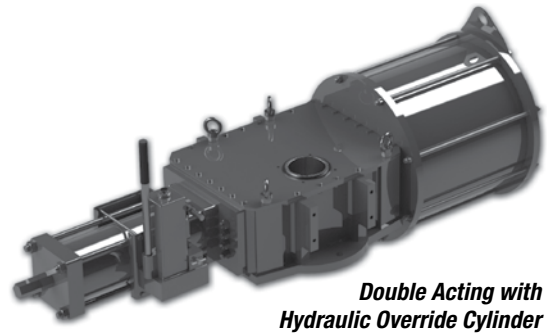
Specifications

- Torque Range
 - Double Acting: Up to 250kNm* (184 000 ft-lb)
 - Single Acting Spring Return: Up to 250kNm (184 000 ft-lb) via pneumatic action and 110kNm (81 000 ft-lb) via spring return action. Higher values are available on request.
- * For sizes up to 800kNm (590 000 ft-lb) please consult the factory
- Pressure Inputs
 - Up to 12 bar (174 psi)
 - Air, nitrogen or sweet gas (for sour gas application please consult the factory)
- Temperature Range
 - -29°C to 100°C (-20°F to 212°F) - standard product
 - Low temperature (to -60°C/-76°F) and high temperature (to 160°C/320°F) configurations available
- 90° ± 5° of travel adjustment for CW and CCW strokes (80° to 100° total)

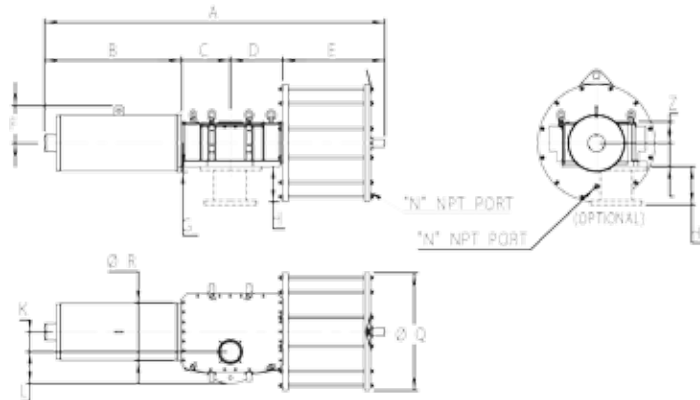
Designed and Manufactured in Accordance with:

- IP66, IP66M, IP67 and IP67M per EN60529 (IP68 upon request)
- NEMA4 and NEMA4X per NEMA 250
- EN 60529
- EN 13906-1
- EN 15714-3
- IEC 60079-0
- IEC 60721-2-1
- IEC 61508
- ISO 9001
- ISO 5211
- ISO 5599
- ISO 12490
- ISO 12944-2

For information regarding product compliance for ATEX, PED, ASME, SIL, and GOST, please contact the factory.

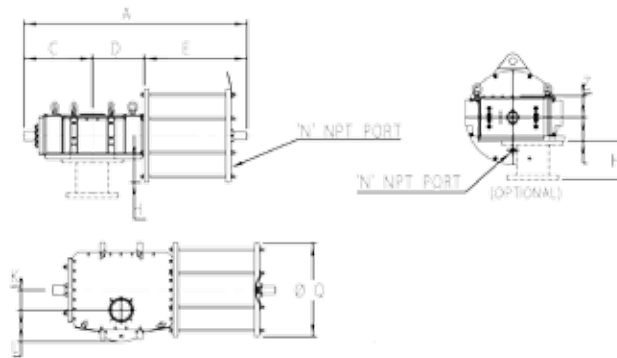


LPS Single Acting Actuator



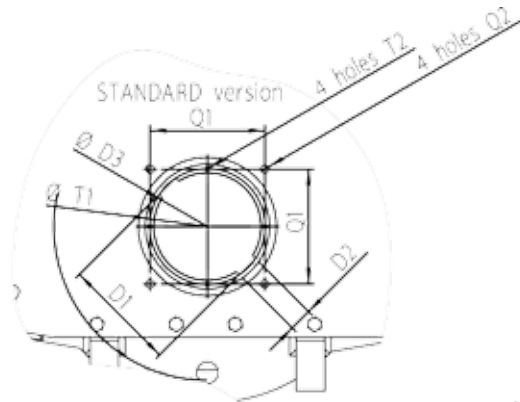
LPS SINGLE ACTING Dimensions in mm (inch)																			
MODEL	A Max	B Max	C	D	F Max	G Max	I	K	L	ØR Max	Z	Q1 (tol.±0.1)	Q2	D1 (tol.+0.2/+0.1)	D2 (tol. D10)	ØD3 (tol. D8)	ØT1 (tol.±0.1)	T2	ISO FLANGE
LPS-15	1304.5 (51,4)	531.5 (20,9)	164 (6,5)	174 (6,9)	222 (8,7)	66.5 (2,6)	95.5 (3,8)	65 (2,6)	120 (4,7)	324 (12,8)	87 (3,4)	130 (5,1)	M12	70.6 (2,8)	10 (0,4)	65 (2,6)	72 (2,8)	M4	F16
LPS-20	1662 (65,4)	684.5 (26,9)	218.5 (8,6)	221.5 (8,7)	250.5 (9,9)	91.5 (3,6)	99 (3,9)	85 (3,3)	150 (5,9)	381 (15)	101 (4)	130 (5,1)	M12	91.6 (3,6)	12 (0,5)	86 (3,4)	94 (3,7)	M5	F25
LPS-25	1973.5 (77,7)	834.5 (32,9)	248.5 (9,8)	266.5 (10,5)	269.5 (10,6)	96.5 (3,8)	113 (4,4)	105 (4,1)	188 (7,4)	419 (16,5)	114 (4,5)	180 (7,1)	M12	108.8 (4,3)	18 (0,7)	100 (3,9)	110 (4,3)	M5	F30
LPS-30	2393.5 (94,2)	974.5 (38,4)	328 (12,9)	348 (13,7)	314 (12,4)	101 (4)	153 (6)	135 (5,3)	268 (10,6)	508 (20)	144 (5,7)	180 (7,1)	M12	138.6 (5,5)	28 (1,1)	130 (5,1)	141 (5,6)	M5	F35
LPS-35	3253 (128,1)	1650 (65)	413 (16,3)	433 (17)	365 (14,4)	125 (4,9)	186 (7,3)	165 (6,5)	260 (10,2)	610 (24)	179 (7)	240 (9,4)	M12	166.8 (6,6)	36 (1,4)	150 (5,9)	172 (6,8)	M6	F40
LPS-40	3934 (154,9)	2150 (84,6)	519 (20,4)	543 (21,4)	365 (14,4)	105 (4,1)	210 (8,3)	200 (7,9)	290 (11,4)	610 (24)	199 (7,8)	240 (9,4)	M12	205.8 (8,1)	45 (1,8)	185 (7,3)	205 (8,1)	M6	F48

LPS Double Acting Actuator

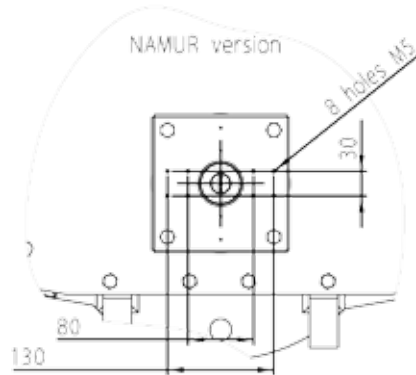


LPS SINGLE ACTING Dimensions in mm (inch)																			
MODEL	A Max	B Max	C	D	F Max	G Max	I	K	L	ØR Max	Z	Q1 (tol.±0.1)	Q2	D1 (tol.+0.2/+0.1)	D2 (tol. D10)	ØD3 (tol. D8)	ØT1 (tol.±0.1)	T2	ISO FLANGE
LPS-15	801 (31,5)	--	192 (7,6)	174 (6,9)	--	--	95.5 (3,8)	65 (2,6)	120 (4,7)	--	87 (3,4)	130 (5,1)	M12	70.6 (2,8)	10 (0,4)	65 (2,6)	72 (2,8)	M4	F16
LPS-20	995.5 (39,2)	--	246.5 (9,7)	221.5 (8,7)	--	--	99 (3,9)	85 (3,3)	150 (5,9)	--	101 (4)	130 (5,1)	M12	91.6 (3,6)	12 (0,5)	86 (3,4)	94 (3,7)	M5	F25
LPS-25	1177 (46,3)	--	286.5 (11,3)	266.5 (10,5)	--	--	113 (4,4)	105 (4,1)	188 (7,4)	--	114 (4,5)	180 (7,1)	M12	108.8 (4,3)	18 (0,7)	100 (3,9)	110 (4,3)	M5	F30
LPS-30	1457 (57,4)	--	366 (14,4)	348 (13,7)	--	--	153 (6)	135 (5,3)	268 (10,6)	--	144 (5,7)	180 (7,1)	M12	138.6 (5,5)	28 (1,1)	130 (5,1)	141 (5,6)	M5	F35
LPS-35	1843 (72,6)	--	471 (18,5)	433 (17)	--	--	186 (7,3)	165 (6,5)	260 (10,2)	--	179 (7)	240 (9,4)	M12	166.8 (6,6)	36 (1,4)	150 (5,9)	172 (6,8)	M6	F40
LPS-40	2321 (91,4)	--	602 (23,7)	543 (21,4)	--	--	210 (8,3)	200 (7,9)	290 (11,4)	--	199 (7,8)	240 (9,4)	M12	205.8 (8,1)	45 (1,8)	185 (7,3)	205 (8,1)	M6	F48

ISO Base Details



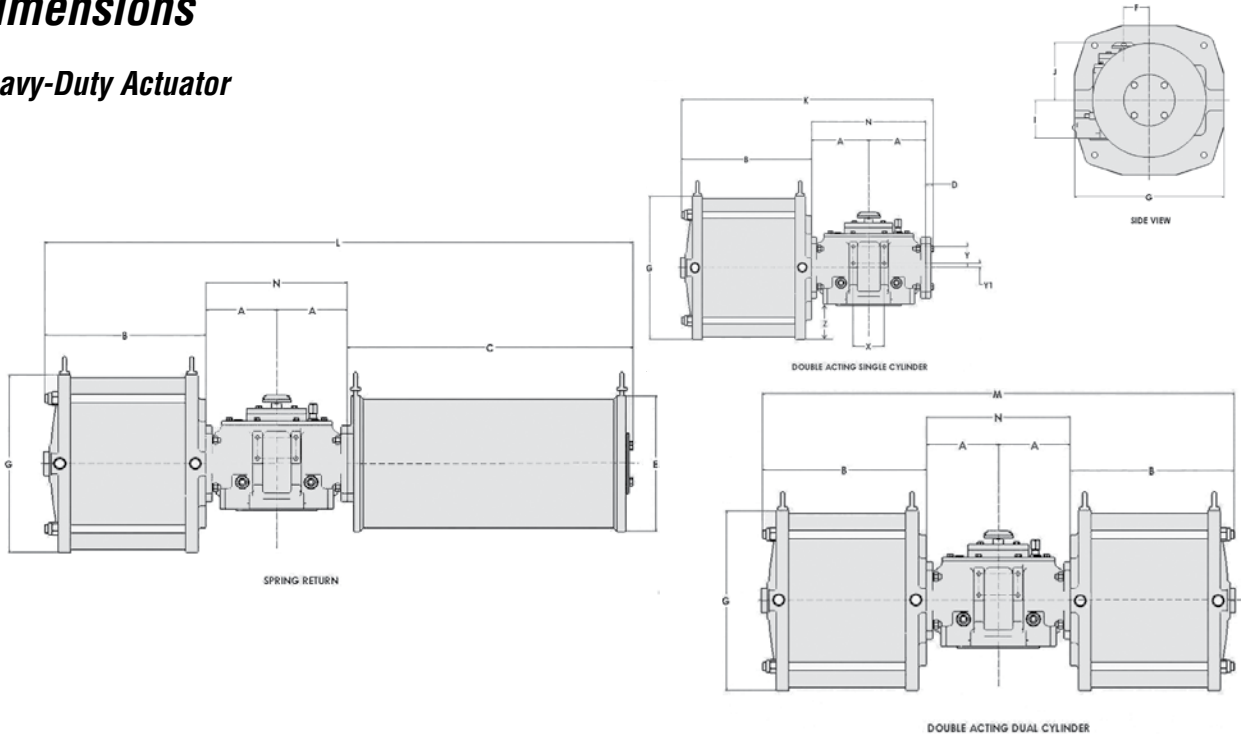
Namur Mounting Details



Dimension "H" mm (inch)																							
MODEL	CYLINDER SIZE																						
	155	175	200	235	255	285	300	335	360	385	435	485	535	585	635	685	735	785	835	885	935	1200	
LPS-15	14.5 (0.6)	14.5 (0.6)	17.5 (0.7)	38 (1.5)	44.5 (1.8)	88 (3.5)	97.5 (3.8)	112 (4.4)	126 (5)	139 (5.5)	--	--	--	--	--	--	--	--	--	--	--	--	
LPS-20	--	--	--	34.5 (1.4)	34.5 (1.4)	84.5 (3.3)	94 (3.7)	108.5 (4.3)	122.5 (4.8)	135.5 (5.3)	164 (6.5)	190 (7.5)	--	--	--	--	--	--	--	--	--	--	
LPS-25	--	--	--	--	--	70.5 (2.8)	80 (3.1)	94.5 (3.7)	108.5 (4.3)	121.5 (4.8)	150 (5.9)	176 (6.9)	202.5 (8)	228.5 (9)	--	--	--	--	--	--	--	--	
LPS-30	--	--	--	--	--	--	--	54.5 (2.1)	68.5 (2.7)	81.5 (3.2)	110 (4.3)	136 (5.4)	162 (6.4)	188.5 (7.4)	219.5 (8.6)	244.5 (9.6)	--	--	--	--	--	--	
LPS-35	--	--	--	--	--	--	--	--	--	258.5 (10.2)	261 (10.3)	263.5 (10.4)	263.5 (10.4)	266 (10.5)	268.5 (10.6)	271 (10.7)	273.5 (10.8)	276 (10.9)	278.5 (11)	281 (11.1)	283.5 (11.2)	--	
LPS-40	--	--	--	--	--	--	--	--	--	--	--	345.5 (13.6)	345.5 (13.6)	348 (13.7)	350.5 (13.8)	353 (13.9)	355.5 (14)	358 (14.1)	363 (14.3)	368 (14.5)	373 (14.7)	378 (14.9)	
Dimension "H1" mm (inch)																							
LPS-15	80 (3.1)	80 (3.1)	80 (3.1)	130 (5.1)	130 (5.1)	130 (5.1)	160 (6.3)	160 (6.3)	160 (6.3)	160 (6.3)	--	--	--	--	--	--	--	--	--	--	--	--	
LPS-20	--	--	--	130 (5.1)	130 (5.1)	130 (5.1)	130 (5.1)	130 (5.1)	210 (8.3)	210 (8.3)	210 (8.3)	210 (8.3)	--	--	--	--	--	--	--	--	--	--	
LPS-25	--	--	--	--	--	140 (5.5)	140 (5.5)	140 (5.5)	140 (5.5)	140 (5.5)	250 (9.8)	250 (9.8)	250 (9.8)	250 (9.8)	--	--	--	--	--	--	--	--	
LPS-30	--	--	--	--	--	--	--	160 (6.3)	160 (6.3)	160 (6.3)	160 (6.3)	160 (6.3)	270 (10.6)	270 (10.6)	270 (10.6)	270 (10.6)	--	--	--	--	--	--	
LPS-35	--	--	--	--	--	--	--	--	--	220 (8.7)	220 (8.7)	220 (8.7)	220 (8.7)	220 (8.7)	220 (8.7)	370 (14.6)	370 (14.6)	370 (14.6)	370 (14.6)	370 (14.6)	370 (14.6)	--	
LPS-40	--	--	--	--	--	--	--	--	--	--	--	190 (7.5)	190 (7.5)	190 (7.5)	190 (7.5)	320 (12.6)	320 (12.6)	320 (12.6)	320 (12.6)	320 (12.6)	490 (19.3)	490 (19.3)	
Dimension "E" mm (inch)																							
LPS-15	425 (16.7)	425 (16.7)	425 (16.7)	425 (16.7)	427 (16.8)	430 (16.9)	430 (16.9)	435 (17.1)	435 (17.1)	435 (17.1)	--	--	--	--	--	--	--	--	--	--	--	--	
LPS-20	--	--	--	507.5 (20)	509.5 (20.1)	512.5 (20.2)	512.5 (20.2)	517.5 (20.4)	517.5 (20.4)	517.5 (20.4)	522.5 (20.6)	527.5 (20.8)	--	--	--	--	--	--	--	--	--	--	
LPS-25	--	--	--	--	--	604 (23.8)	604 (23.8)	609 (24)	609 (24)	609 (24)	614 (24.2)	619 (24.4)	619 (24.4)	624 (24.6)	--	--	--	--	--	--	--	--	
LPS-30	--	--	--	--	--	--	--	718 (28.3)	718 (28.3)	718 (28.3)	723 (28.5)	728 (28.7)	728 (28.7)	733 (28.9)	738 (29.1)	743 (29.3)	--	--	--	--	--	--	
LPS-35	--	--	--	--	--	--	--	--	--	889 (35)	894 (35.2)	899 (35.4)	899 (35.4)	904 (35.6)	909 (35.8)	914 (36)	919 (36.2)	924 (36.4)	929 (36.6)	934 (36.8)	939 (37)	--	
LPS-40	--	--	--	--	--	--	--	--	--	--	--	1111 (43.7)	1111 (43.7)	1116 (43.9)	1121 (44.1)	1126 (44.3)	1131 (44.5)	1136 (44.7)	1146 (45.1)	1156 (45.5)	1166 (45.9)	1176 (46.3)	
Dimensions: "Q" mm (inch); "N" NPT Port																							
Q	230 (9.1)	249 (9.8)	274 (10.8)	310 (12.2)	328 (12.9)	367 (14.4)	386 (15.2)	415 (16.3)	443 (17.4)	469 (18.5)	526 (20.7)	578 (22.8)	630 (24.8)	683 (26.9)	745 (29.3)	795 (31.3)	846 (33.3)	900 (35.4)	945 (37.2)	995 (39.2)	1058 (41.7)	1332 (52.4)	
"N" NPT	½"	½"	½"	½"	½"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	2X 1"	2X 1"	2X 1"	2X 1"	2X 1"	2X 1"

Dimensions

Heavy-Duty Actuator



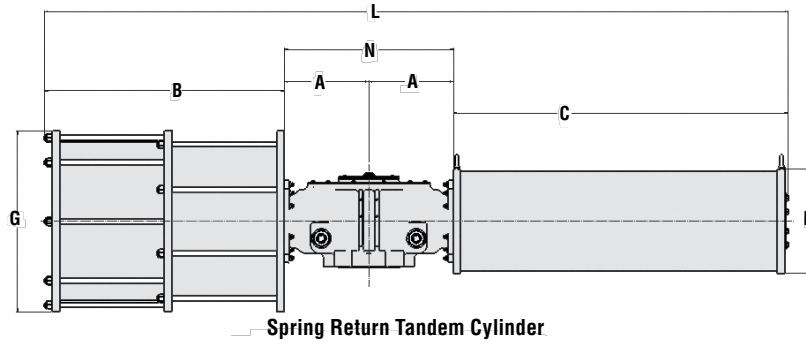
Actuator Dimensions, mm (inch)															
SERIES	A	B	C	D	E	F	I	J	K	L	M	N	X	Y	Y1
RG1	141 (5.55)	310 (12.20)	498 (19.61)	18,5 (0.73)	264 (10.39)	55 (2.17)	99 (3.90)	139 (5.47)	610.5 (24.04)	1090 (42.91)	902 (35.51)	282 (11.10)	68 (2.68)	50 (1.97)	-9 (-0.35)
RG2	162 (6.38)	368 (14.49)	586 (23.07)	20 (0.79)	322 (12.68)	65 (2.56)	116 (4.57)	154 (6.06)	712 (28.03)	1278 (50.31)	1060 (41.73)	324 (12.76)	68 (2.68)	50 (1.97)	8 (0.31)
RG3	175 (6.98)	444 (17.48)	706 (27.80)	23 (0.91)	380 (14.96)	75 (2.95)	111 (4.37)	161 (6.34)	817 (32.17)	1500 (59.06)	1238 (48.74)	350 (13.78)	95 (3.74)	50 (1.97)	15 (0.59)
RG4	243 (9.57)	565 (22.24)	868 (34.17)	23 (0.91)	467 (18.39)	91 (3.58)	145 (5.71)	185 (7.28)	1074 (42.28)	1919 (75.55)	1616 (63.62)	486 (19.13)	95 (3.74)	70 (2.76)	0 (0.00)
RG5	312 (12.28)	716 (28.19)	1008 (39.69)	26 (1.02)	568 (22.36)	145 (5.71)	175.5 (6.91)	199.5 (7.85)	1366 (53.78)	2348 (92.44)	2056 (80.94)	624 (24.57)	95 (3.74)	70 (2.76)	15.5 (0.61)
RG6	394 (15.51)	756 (29.76)	1640 (64.57)	28 (1.10)	600 (23.62)	185 (7.28)	208 (8.19)	228 (8.98)	1572 (61.89)	3184 (125.35)	2300 (90.55)	788 (31.02)	95 (3.74)	70 (2.76)	25.5 (1.00)
RG7	500 (19.69)	810 (31.89)	2030 (79.92)	50 (1.97)	615 (24.21)	220 (8.66)	265 (10.43)	310 (12.20)	1860 (73.23)	3840 (151.18)	2620 (103.15)	1000 (39.37)	266 (10.47)	150 (5.91)	11.5 (0.45)
RG8	665 (26.18)	860 (33.86)	2600 (102.36)	55 (2.17)	680 (26.77)	280 (11.02)	306 (12.05)	365.5 (14.39)	2245 (88.39)	4790 (188.58)	3050 (120.08)	1330 (52.36)	266 (10.47)	200 (7.87)	-21 (-0.83)

Cylinder Size	5"	6"	7"	8"	9"	10"	12"	14"	16"	18"	20"	22"	24"	28"	32"	36"	40"
G	178 (7.01)	178 (7.01)	196 (7.72)	222 (8.74)	248 (9.76)	274 (10.79)	324 (12.76)	375 (14.76)	438 (17.24)	486 (19.13)	532 (20.94)	588 (23.15)	648 (25.51)	865 (34.06)	967 (38.07)	1069 (42.09)	1170 (46.06)
Port Size NPT	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	3/4"	3/4"	3/4"	1"	1"	1"	1"	1 1/2"	1 1/2"	1 1/2"	2"

Dimension Z, mm (inch)																	
SERIES	5"	6"	7"	8"	9"	10"	12"	14"	16"	18"	20"	22"	24"	28"	32"	36"	40"
RG1	10 (0.39)	10 (0.39)	11 (0.04)	12 (0.47)	25 (0.98)	38 (1.50)	63 (2.48)	-	-	-	-	-	-	-	-	-	-
RG2	-	-	-	5 (0.20)	8 (0.31)	21 (0.83)	46 (1.81)	71.5 (2.81)	103 (4.06)	-	-	-	-	-	-	-	-
RG3	-	-	-	-	-	26 (1.02)	51 (2.01)	76.5 (3.01)	108 (4.25)	132 (5.20)	155 (6.10)	-	-	-	-	-	-
RG4	-	-	-	-	-	-	-	42.5 (1.67)	74 (2.91)	98 (3.86)	121 (4.76)	149 (5.87)	179 (7.05)	-	-	-	-
RG5	-	-	-	-	-	-	-	-	43.5 (1.71)	67.5 (2.66)	90.5 (3.56)	118.5 (4.67)	148.5 (5.85)	257 (10.12)	-	-	-
RG6	-	-	-	-	-	-	-	-	-	35 (1.38)	58 (2.28)	86 (3.39)	116 (4.57)	224.5 (8.84)	275.5 (10.85)	326.5 (12.85)	-
RG7	-	-	-	-	-	-	-	-	-	-	-	-	59 (2.32)	167.5 (6.59)	218.5 (8.6)	269.5 (10.61)	320 (12.60)
RG8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	177.5 (6.99)	228.5 (9.00)	279 (10.98)

Dimensions

Heavy-Duty Actuator



Dimensions for Spring Return Tandem Cylinders, mm (inch)							
SERIES	A	B	C	E	G	N	L
RG8 32-32	665 (26.18)	1715 (67.52)	2600 (102.36)	680 (26.77)	1170 (46.06)	1330 (52.36)	5645 (222.24)
RG836-36	665 (26.18)	1740 (68.50)	2600 (102.36)	680 (26.77)	1170 (46.06)	1330 (52.36)	5670 (223.23)

Actuator Weights					
Model	Kg	Lbs	Model	Kg	Lbs
RG1 DA	61	135	RG5 DA	620	1360
RG1 DD	79	174	RG5 DD	786	1734
RG1 SR	148	326	RG5 SR	1409	3106
RG2 DA	113	248	RG6 DA	1211	2671
RG2 DD	135	298	RG6 DD	1379	3041
RG2 SR	275	606	RG6 SR	2714	5985
RG3 DA	210	462	RG7 DA	2290	5049
RG3 DD	247	544	RG7 DD	3046	6716
RG3 SR	466	1028	RG7 SR	4320	9525
RG4 DA	400	883	RG8 DA	3581	7895
RG4 DD	442	974	RG8 DD	5471	12062
RG4 SR	826	1822	RG8 SR	6955	15335

*DA - Double Acting

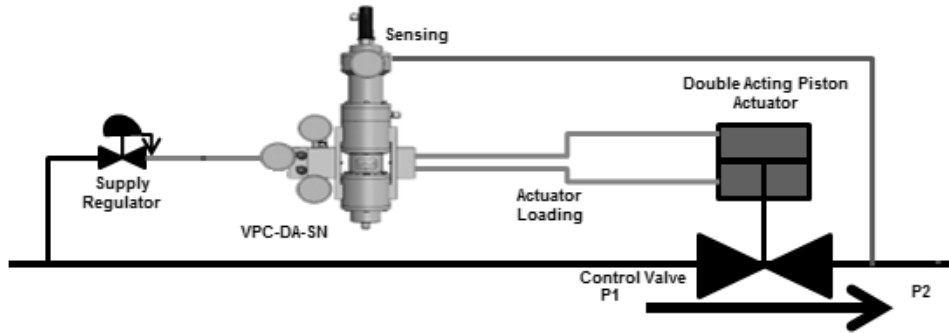
**DD - Dual Cylinder

***Spring Return

VRG - VPC Valve Pilot Controller

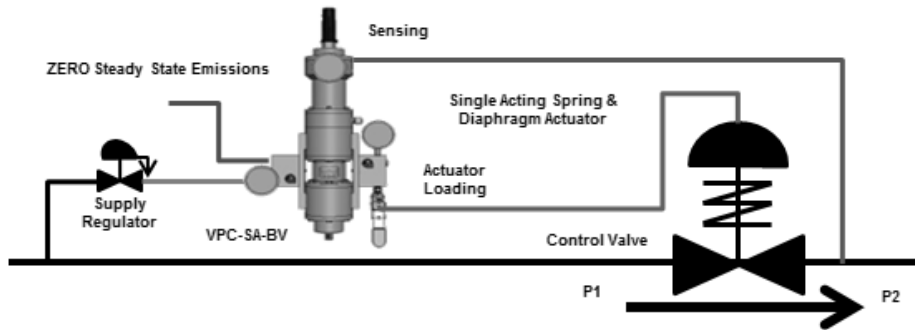
The VPC Controller is designed to provide self-contained pressure control when incorporated with pneumatic control valves in natural gas pipeline installations. The system utilizes pressurized natural gas pipeline installations to operate.

VPC Controller Typical Application Schematics



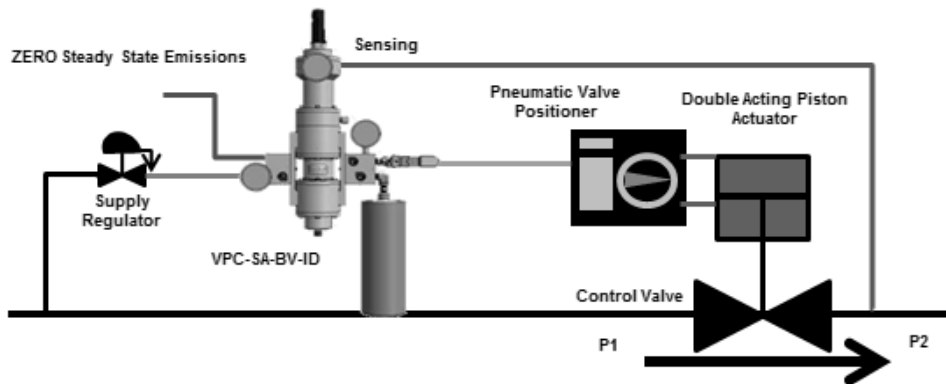
Double Acting VPC Controller

System shows double acting high pressure piston actuated control valve.



Single Acting VPC Controller Exhibits ZERO Steady State Emissions

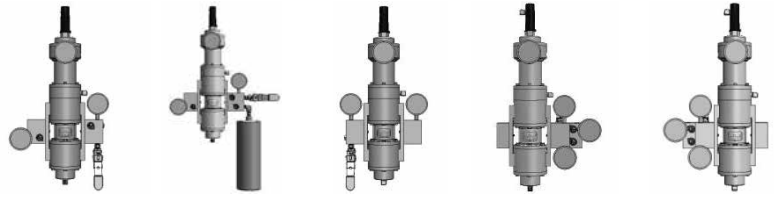
System shows single acting spring and diaphragm actuated control valve configured for active pressure control. Retrofit to existing control valves is simple and eliminates steady-state emissions.



Single Acting VPC "ID" Controller Replaces Pneumatic Pressure Controller

VPC "ID" Controllers can replace "bleeding" pneumatic pressure controllers and eliminate venting gas emissions. Shown with double acting actuated control valve. Compatible with almost any pneumatic positioner driven system.

Technical Specifications



VPC Model	VPC-SA-BV	VPC-SA-BV-ID	VPC-SA-BV-GAP	VPC-DA-BV	VPC-DA-SN
Type	Variable	Variable	Discrete (On-Off)	Variable	Variable
Outputs	Single Acting (1)		Double Acting (2)		
Internal Valve Logic	NC Balanced Valve ¹				NO Seat and Nozzle ¹
Setpoint Range	1.25 - 1500 psig (9.0 - 10,342 kPa)				
Temperature Range	-20°F to +160°F (-29°C to +71°C)				
Consumption					
Steady State Control	ZERO ²		<10 scfh ³	≈100 scfh ³	
Full Open	ZERO		ZERO ⁴		
Full Closed	ZERO		ZERO ⁴		
ZERO Emissions	ZERO Atmospheric Emissions May Be Achieved When "Vent to Pressure System" Feature Utilized				
EPA Specifications	Exceeds EPA Ruling, EPA-HQ-OAR-2010-0505, requiring <6 SCFH bleed rate by October 2013.				
Pneumatic					
Supply Gas Quality	Dry, Filtered @ 10μ Natural Gas or Air				
Max Supply Gas Pressure	400 psig (2758 kPa)				
Min Supply Gas Pressure	20 psig				
Max Discharge ΔP	150 psig (1034 kPa)				
Min Discharge ΔP	20 psig (138 kPa)				
Connections	All Ports ¼ FNPT				
Construction					
External Parts	VRG Military Grade Aluminum Alloy with "Stealth System" Corrosion Protection 304 SS – Optional Construction				
Internal Parts	316 SS				
Diaphragms	Nylon Reinforced Buna-N				
O-Rings	Buna-N				
Control Springs	Painted Alloy Steel				
Gauges	2.5 in. Liquid-Filled SS Case and Body				
Weight	20 lbs. (9.0 kg)				
Approx. Dimensions	22 in 12 in X 7 in (559 mm X 305 mm X 178 mm)				
Compatible Actuators and Control Valves					
SA Spring and Diaphragm Act.	■	■	■		
SA Spring and Piston Act.	■	■	■		
Double Acting Piston Act.	■ ⁵	■ ⁵	■ ⁵	■	■
"Jet" Regulator	■	■	■		
Pneumatic Positioner		■			
Volume Booster	■	■			■

Notes:

1. NC Balanced Valves and NO Seat and Nozzle internal components may be exchange/converted to meet application requirements
2. ZERO Steady State emissions achieved when VPC properly adjusted to exhibit factory advised deadband setting
3. Consumption is approximate and based upon 100 psig Supply Gas. Atmosphere emissions may be completely eliminated when Discharge to Pressure System incorporated.
4. Double acting VPC's require addition of No-Vent Device to achieve ZERO emissions at full open and full closed
5. Double Acting Piston Actuators Equipped with Single Acting VPC requires additional interface instrumentation such as pneumatic positioner or pilot-operated trigger valve (GAP).

VPC Controller Spring Ranges and Performance Specifications

VPC Pressure Series	Control Range	Spring Color	Setpoint Change Per Rev.	Setpoint Accuracy ¹	Maximum "Gap" Setpoint Range ²	Control Spring Part No.
VPC-225 Pressure Series	1.25 - 14 psig (9 - 97 kPa)	Black	0.5 psig (3.2 kPa)	±0.1 psig (±0.7 kPa)	0.1 - 0.5 psig (0.7 - 3.4 kPa)	CS-0100
	5 - 53 psig (55 - 365 kPa)	Brown	2.1 psig (14 kPa)	±0.1 psig (±0.7 kPa)	0.2 - 2 psig (1.4 - 14 kPa)	CS-0110
	16 - 100 psig (110 - 689 kPa)	Grey	5 psig (34 kPa)	±0.2 psig (1.0 kPa)	0.5 - 5 psig (3.4 - 35 kPa)	CS-0120
	40 - 170 psig (276 - 1172 kPa)	Orange	12 psig (83 kPa)	±0.4 psig (±2.6 kPa)	1 - 12 psig (6.9 - 83 kPa)	CS-0130
	65 - 205 psig (448 - 1413 kPa)	White	19.5 psig (134 kPa)	±0.6 psig (±4.2 kPa)	2 - 19 psig (14 - 131 kPa)	CS-0135
	100 - 225 psig (689 - 1551 kPa)	Purple	26.5 psig (181 kPa)	±0.8 psig (±5.6 kPa)	3 - 26 psig (21 - 179 kPa)	CS-0400
VPC-700 Pressure Series	6 - 45 psig (41 - 310 kPa)	Black	2.4 psig (17 kPa)	±0.5 psig (±3.4 kPa)	0.5 - 2.4 psig (3.4 - 17 kPa)	CS-0100
	30 - 160 psig (241 - 1103 kPa)	Brown	10.6 psig (73 kPa)	±0.7 psig (±4.5 kPa)	1.5 - 10 psig (10 - 69 kPa)	CS-0110
	75 - 310 psig (517 - 2137 kPa)	Grey	25.4 psig (175 kPa)	±1.6 psig (±10 kPa)	3 - 25 psig (21 - 172 kPa)	CS-0120
	150 - 520 psig (1034 - 3585 kPa)	Orange	61.4 psig (423 kPa)	±3.8 psig (±26 kPa)	5 - 61 psig (35 - 421 kPa)	CS-0130
	240 - 635 psig (1655 - 4378 kPa)	White	100 psig (687 kPa)	±6.2 psig (±43 kPa)	6 - 100 psig (41 - 690 kPa)	CS-0135
	350 - 700 psig (2413 - 4826 kPa)	Purple	134 psig (926 kPa)	±8.3 psig (±57 kPa)	8 - 134 psig (69 - 345 kPa)	CS-0400
VPC-1500 Pressure Series	30 - 90 psig (207 - 620 kPa)	Black	4.9 psig (34 kPa)	±5.0 psig (±34 kPa)	N/A3	CS-0100
	50 - 335 psig (345 - 2309 kPa)	Brown	21.7 psig (149 kPa)	±5.0 psig (±34 kPa)	N/A3	CS-0110
	100 - 640 psig (689 - 4412 kPa)	Grey	52.3 psig (361 kPa)	±5.0 psig (±34 kPa)	10 - 50 psig (69 - 345 kPa)	CS-0120
	265 - 1070 psig (1827 - 7377 kPa)	Orange	126 psig (870 kPa)	±7.8 psig (±54 kPa)	10 - 125 psig (69 - 862 kPa)	CS-0130
	400 - 1300 psig (2758 - 8962 kPa)	White	204 psig (870 kPa)	±13 psig (±88 kPa)	15 - 204 psig (103 - 1407 kPa)	CS-0135
	625 - 1500 psig (4309 - 10341 kPa)	Purple	276 psig (1904 kPa)	±17 psig (±118 kPa)	20 - 276 psig (138 - 1903 kPa)	CS-0400

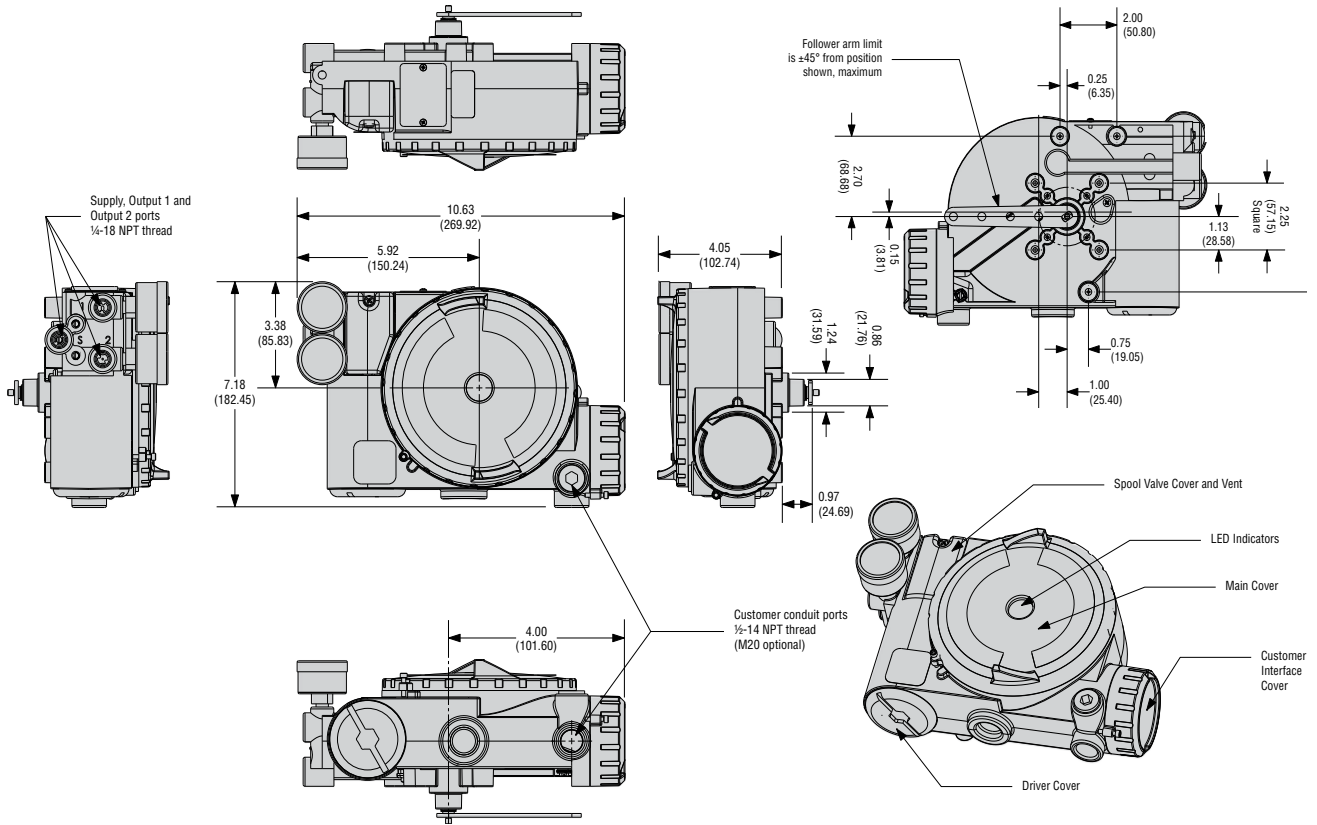
Notes:

1. Setpoint Accuracy based upon proper maintenance of VPC Controller and adjustment to specification following VPC Controller Technical Manual.
2. Maximum "GAP" Setpoint Range applicable only to VPC-GAP Controller Configurations. The "GAP" relates to bracketed high-low trigger points for discrete on-off control logic.
3. Control Spring and VPC Series Combination not recommended for GAP control applications.

Dimensions

High Performance Logix Digital Positioner

NOTE: Dimensions in inches (mm)



Electrical Specifications Logix 3200MD	
Power Supply	Two-wire, 4-20 mA 10.0 to 30.0 VDC
Compliance Voltage	10.0 VDC @ 20 mA
Effective Resistance	495 Ω @ 20 mA Typical Add 20 Ω when HART communication active
Communications	HART Protocol ITK 5,6
Minimum Operating Current	3.6 mA without AO board 3.7 mA with AO board
Maximum Voltage	30.0 VDC

Environmental Conditions Logix 3200MD		
Operating Temperature Range	Standard	-4° to 176°F (-20° to 80°C)
	Low	-40° to 176°F (-40° to 80°C)
Transport and Storage Temperature Range	-40° to 176°F (-40° to 80°C)	
Operating Humidity	0 - 100% non-condensing	
<i>Note: The air supply must conform to ISA Standard ISA 7.0.01 (a dew point at least 18 degrees Fahrenheit below ambient temperature, particle size below five microns—one micron recommended—and oil content not to exceed one part per million).</i>		

Electrical Specifications Logix 3400MD	
Power Supply	Two-wire, 9-32 VDC FF compatible
IS	Fisco compliant
Communications	FF Protocol ITK 4.6x, 5.0
Operating Current	23 mA
Maximum Voltage	36.0 VDC

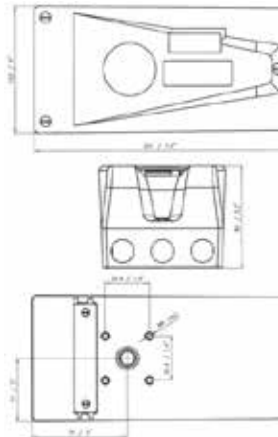
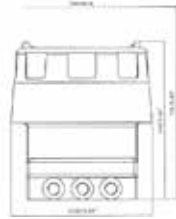
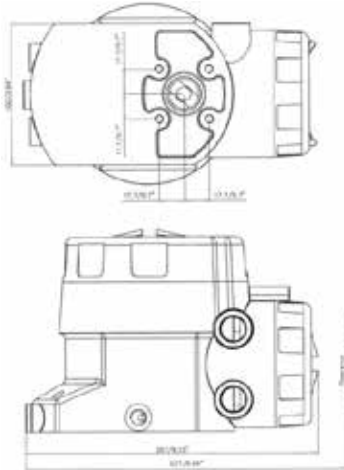
Environmental Conditions Logix 3400MD		
Operating Temperature Range	Standard	-40° to 176°F
		(-40° to 80°C)
Transport and Storage Temperature Range	-40° to 176°F (-40° to 80°C)	
Operating Humidity	0 - 100% non-condensing	
<i>Note: The air supply must conform to ISA Standard ISA 7.0.01 (a dew point at least 18 degrees Fahrenheit below ambient temperature, particle size below five microns—one micron recommended—and oil content not to exceed one part per million).</i>		

Other Specifications	
Weight	8.3 pounds (3.9 kg) aluminum
	20.5 pounds (9.3 kg) stainless steel
Air Consumption	<0.3 SCFM (0.5 Nm ³ /hr) @ 60 psi (4 bar)
Air Supply	30-150 psig (ISA 7.0.0.1 compliant)
Air Delivery	12 SCFM @ 60 psi (0.27 Cv)

Dimensions

PMV D3 Digital Positioner

NOTE: Dimensions in inches (mm)



D3 Intrinsic Safe



D3 Explosion Proof

Electrical Specifications D3 Intrinsic Safe	
Power Supply	4-20 mA
Compliance Voltage	17V @ 20 mA
Effective Resistance	400-500 Ohm (dep. on pcb)
Communications	4 – 20 mA, HART, Profibus PA Foundation Fieldbus
Minimum Operating Current	3,8 mA
Maximum Voltage	19 V

Electrical Specifications D3 Explosion Proof	
Power Supply	4-20 mA
Compliance Voltage	11 V @ 20 mA
Effective Resistance	400 – 505 Ohm (dep. on pcb)
Communications	4 – 20 mA, HART, Profibus PA Foundation Fieldbus
Minimum Operating Current	3,8 mA
Maximum Voltage	19 V

Optional Features

Steady State Zero Bleed

The zero bleed pneumatic relay offers savings due to very low air consumption. It only consumes air while positioning. The Piezo valves completely shut off the air consumption and pulse the air during positioning with remarkable precision.

Feedback + Alarm plug in module

Optional plug in feedback modules offer limit switch function; select between mechanical or proximity SPDT switches or P+F inductive sensors. A 4-20 mA position feedback sensor is available as well as an alarm function for deviation, limit and temperature.

Limit Switches

Optional plug-in modules offers limit switches, both mechanical, proximity and P+F inductive, 4-20 mA feedback and alarm with output function.

Environmental Conditions D3 Explosion Proof/D3 Intrinsic Safe		
Operating Temperature Range	Standard	- 30 to +80 ° C
		- 20 to +176 ° C
Transport and Storage Temperature Range	Dry cool, 15 – 26 ° C / 59 – 79° C	
Operating Humidity	IP 66/ NEMA 4X	

Other Specifications	
Weight	X and IS, 1,4 Kg / (3 lbs.)
	EX 3 Kg / (6,6 lbs.)
Air Consumption	< 0,3 nI/ min (0,01 scfm)
Air Supply	2 – 7 bar, 30 – 105 psi
Air Delivery	350 nI/ min (13,8 scfm)

Fail Freeze

This special version offers the unique feature of upon loss of input signal the D3 will fail in last position, a function that is highly valued for dampers or other critical applications.



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