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ACTUATED 3-WAY BUTTERFLY VALVES

SERIES 1800

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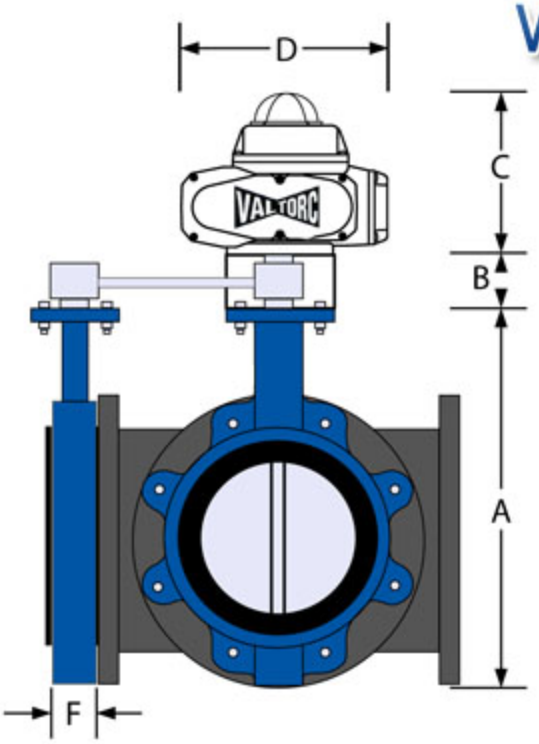
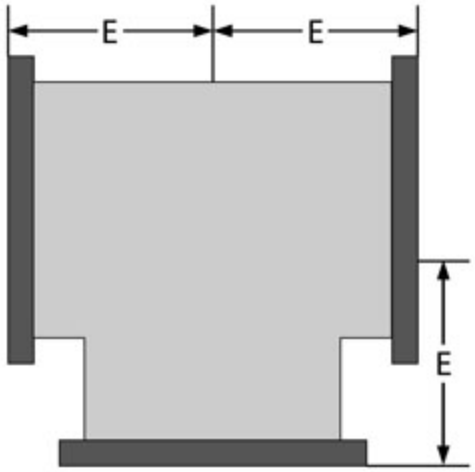
SERIES 1800





NOTES:

1. The valves are rated at 100 PSI pressure differential in the closed position.
2. Standard valves are furnished with lugs tapped as shown, to be used between ANSI 125/150 pound flanges (not for ANSI 250/300 pound flanges).

TEE ARRANGEMENT:

1. 3-Way assemblies are shipped as an assembled complete unit, mounted, tested and ready for field installation.
2. Arrangement of the valves on the assembled tee must be provided with the purchase order.

Valve Size in	A	B	C		D		E	F	Lug Data		
			120V	24V	120V	24V			BHC	# of Holes	Tap Size
2	8.25	2	5.7	6	8.2	12	4.5	1 3/4	4.75	4	5/8-11
2.5	9	2	5.7	6	8.2	12	5	1 3/4	5.5	4	5/8-11
3	9.75	2	5.7	9	8.2	12	5.5	1 7/8	6	4	5/8-11
4	11.13	2	5.7	9	8.2	12	6.5	2 1/8	7.5	8	5/8-11
5	12.19	2	5.7		8.2		7.5	2 1/4	8.5	8	3/4-10
6	13.25	2	5.7		8.2		8	2 1/4	9.5	8	3/4-10
8	16.19	3	6.7		10.1		9	2 1/2	11.75	8	3/4-10
10	19	3	6.7		10.1		11	2 3/4	14.25	12	7/8-9
12	21.63	3	6.7		10.1		12	3 1/8	17	12	7/8-9
14	22.06	3	7.8		11.1		14	3 1/8	18.75	12	1-8
16	24.43	3	7.8		11.1		15	3 1/2	21.25	16	1-8
18	26.87	3	7.8		11.1		16.5	4 1/4	22.75	16	1 1/8-7
20	29.63	3	7.8		11.1		18	5 1/4	25	20	1 1/8-7
24	40.35	3	7.8		11.1		22	6	29.5	20	1 1/4-7
30	48	3	7.8		11.1		25	6.6	36	28	1 1/4-7

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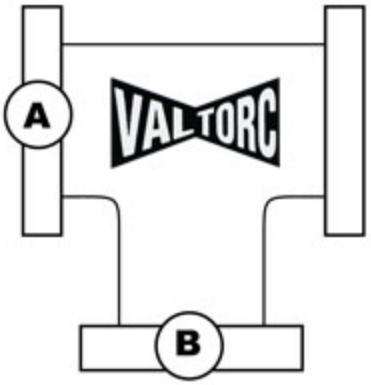
The arrangement illustrated represents the most common layouts.
If these layouts do not cover your requirements, simply provide us with a sketch and details.

All three-way butterfly valve assembly orders should have the arrangement specified.

ARRANGEMENT	ACTUATED VALVE	NORMALLY CLOSED	NORMALLY OPEN
1	VALVE A	VALVE A	VALVE B
2	VALVE A	VALVE A	VALVE C
3	VALVE B	VALVE B	VALVE C
4	VALVE B	VALVE B	VALVE A
5	VALVE C	VALVE C	VALVE B
6	VALVE C	VALVE C	VALVE A

Top View



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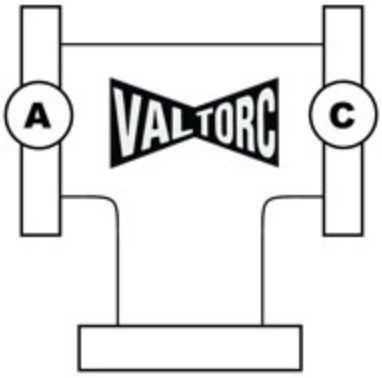

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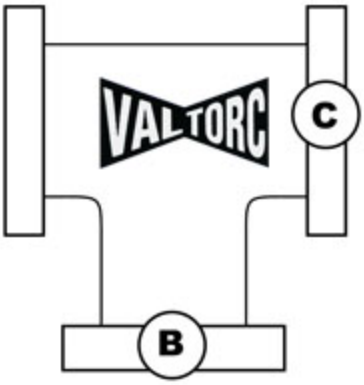

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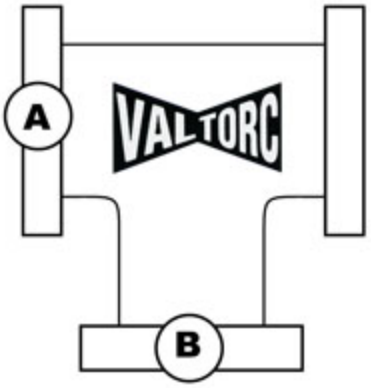

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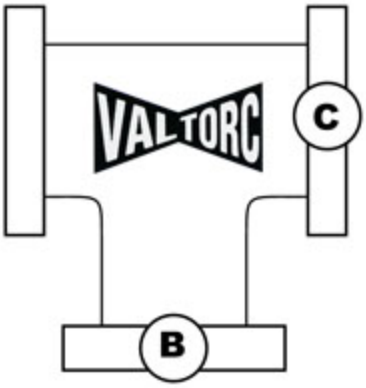

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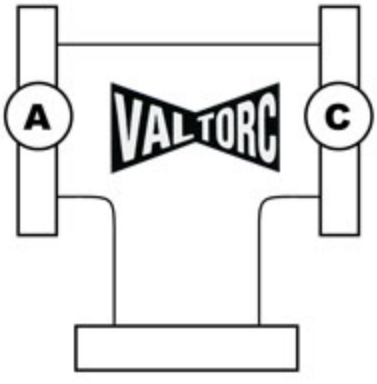

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3-WAY BUTTERFLY VALVE

SERIES 1800

VALVE SPECS

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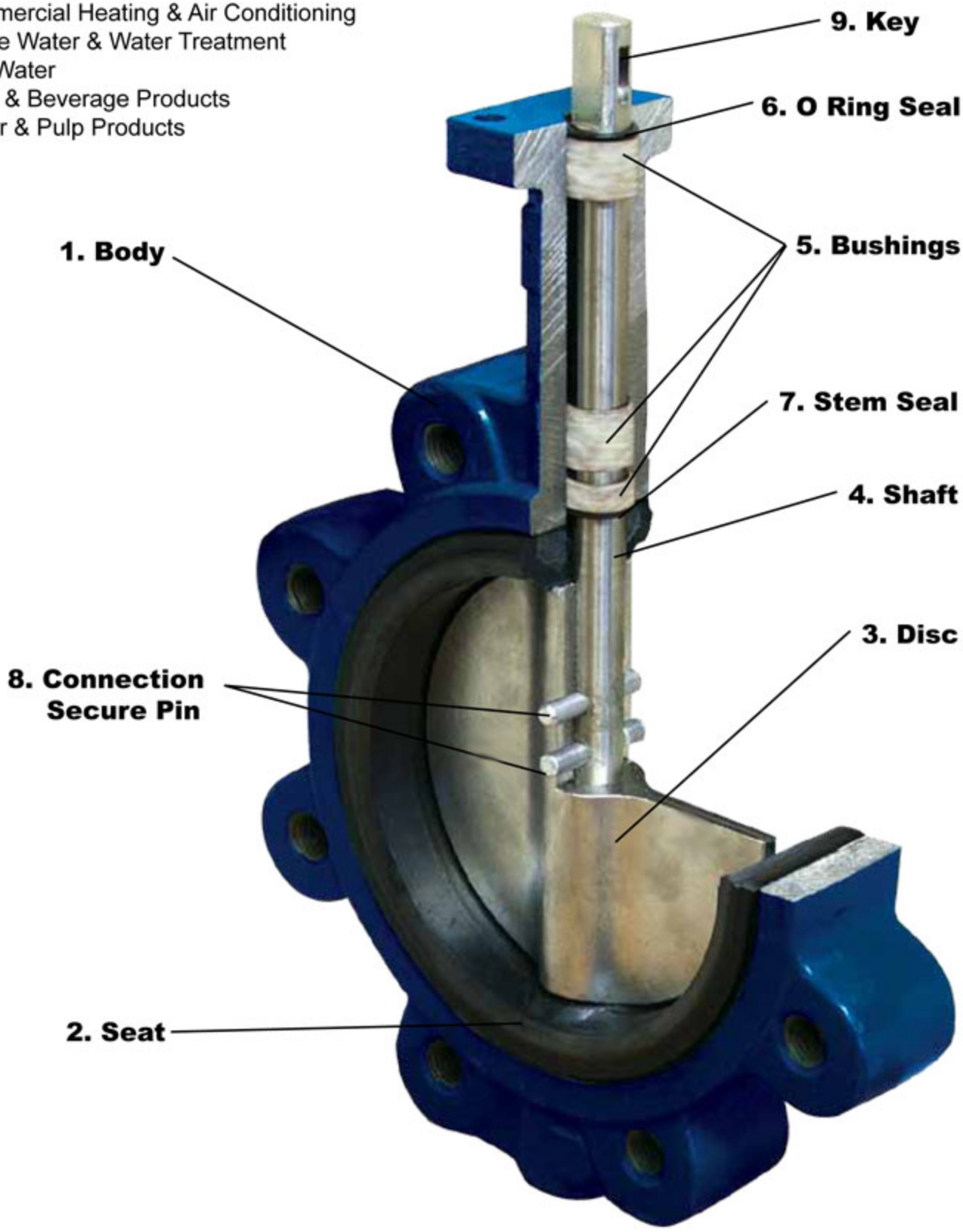
APPLICATIONS:

- Commercial Heating & Air Conditioning
- Waste Water & Water Treatment
- Sea Water
- Food & Beverage Products
- Paper & Pulp Products



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MATERIALS SELECTION

2" - 30" (50mm - 750mm)

1. BODY:
- Epoxy Coated Ductile Iron*
- Epoxy Coated Cast Iron
- Stainless Steel

2. SEAT:
- EPDM*
- Neoprene
- Hypalon
- Viton
- High Temp Viton
- PTFE
- Buna-N

3. DISC:
- 304 Stainless Steel*
- 316 Stainless Steel
- Aluminum Bronze
- Ductile Iron
- Nylon Coated Ductile Iron

4. SHAFT:
- 416 Stainless Steel*
- 316 Stainless Steel
- Monel

5. BUSHINGS:
- PTFE*
- Luberized Bronze

6 & 7. O RINGS and STEM SEAL:
- Buna-N

8. CONNECTION SECURE PIN:
- 316 Stainless Steel*
- Monel

9. KEY:
- Carbon Steel

NOTE: Items marked with * are the standard offerings.

DESIGN CHARACTERISTICS

STEM DESIGN:
Double "D" shaft connection for valves 2" - 30" allows for easy mounting of handles, gear operators or actuators.

MOUNTING BONNET:
Confirms to ISO 5211 for the mounting of actuators, handles and gear operators.

ONE PIECE SHAFT:
Maintains disk position.

RESILIENT SEAT SURFACE:
Eliminates the need for gaskets on flanges.

CONNECTION SECURE PIN:
Enables a vibration free connection between the shaft and the disc.

UNI-DIRECTIONAL SECURED SEAT:
Phenolic backed seat is field replaceable and blow out proof.

O RING SEAL:
Provides a seal to interior stem and bushings.

BUSHINGS:
Provide correct alignment of shaft through the body and reduces torque.

STEM SEAL:
Positive seal in both directions to prevent leakage.

DISC EDGE:
Smooth finished disc edge provides superior seal, reduces valve torque and provides bubble tight shutoff.

UNI-DIRECTIONAL BODY & SEAT DESIGN:
Rated for 100psi standard.

BACKED SEAT SUPPORT:
Prevents stem leakage and allows for dead end service.

Cv Values - Valve Sizing Coefficients (US - GPM @ 1ΔP)

Valve Size		Position of Disc								
DIN	Inch	10°	20°	30°	40°	50°	60°	70°	80°	90°
50	2	0.06	3	7	14	26	42	67	101	111
65	2.5	0.10	6	12	24	43	72	114	171	188
80	3	0.19	9	17	38	67	112	176	263	290
100	4	0.29	16	35	75	134	195	350	525	577
125	5	0.48	28	59	128	228	377	596	894	983
150	6	0.77	43	91	197	352	582	921	1382	1518
200	8	1.92	86	181	389	699	1156	1830	2744	3015
250	10	2.88	145	308	667	1189	1968	3115	4672	5135
300	12	3.85	225	476	1031	1838	3040	4813	7218	7933
350	14	5.77	325	688	1489	2655	4392	6952	10427	11459
400	16	7.69	446	945	2048	3651	6040	9560	14339	15758
450	18	10.58	591	1252	2713	4835	8000	12662	18992	20870
500	20	13.46	761	1584	3488	6216	10287	16280	24419	26835
600	24	21.15	1175	2488	5390	9605	15892	25151	37727	41458
750	30	35.58	2000	4237	9179	16356	27064	42832	64248	70602

Cv is the number of gallons of water @ 60° F that can flow through a valve opening in one minute when there is a pressure differential across the valve of 1 pound per square inch(psi).

Seat Temperature Ratings

Material	Temperature Ratings °C (°F)
EPDM (2" - 16")	-34 to 107 (-30 to 225)
EPDM (18" & Larger)	-34 to 107 (-30 to 225)
PTFE	4 to 121 (40 to 250)
Buna-N	-12 to 82 (10 to 180)
Neoprene	-6 to 93 (20 to 200)
Hypalon	-17 to 135 (0 to 275)
Viton ®	-12 to 135 (10 to 275)
High Temp. Viton ®	-12 to 204 (10 to 400)

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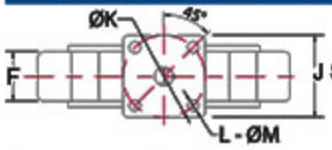
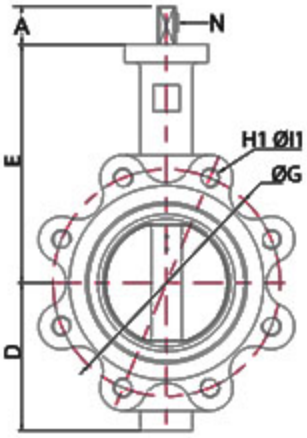
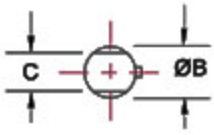
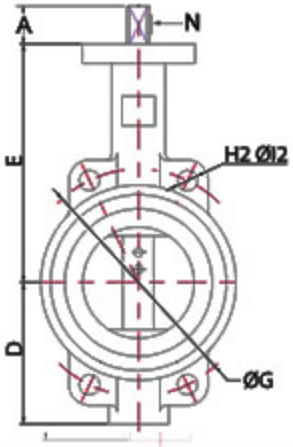
VALVE DIMENSIONS 2" - 30"



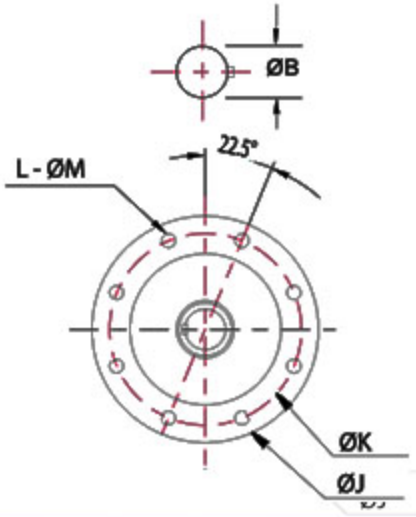




For 2" - 24" Valves



For 30" Valve



mm/ inches	A	ØB	C	D	E	F	ØG - BC	H1*	ØI1*	H2*	ØI2*	J	ØK - BC	L*	ØM	N
50 2"	32 1 1/4	12.6 1/2	10 0.39	85 3.35	161 6.34	43 1.69	120.65 4.75	4	5/8-11	4	19.05 3/4	90 3.54	70 2.76	4	10 3/8	Woodruff #3
65 2.5"	32 1 1/4	12.6 1/2	10 0.39	93 3.66	175 6.89	46 1.81	139.7 5.5	4	5/8-11	4	19.05 3/4	90 3.54	70 2.76	4	10 3/8	Woodruff #3
75 3"	32 1 1/4	12.6 1/2	10 0.39	99 3.9	181 7.13	46 1.81	152.4 6	4	5/8-11	4	19.05 3/4	90 3.54	70 2.76	4	10 3/8	Woodruff #3
100 4"	32 1 1/4	15.77 5/8	12 0.47	116 4.57	200 7.87	52 2.05	190.5 7.5	8	5/8-11	4	19.05 3/4	90 3.54	70 2.76	4	10 3/8	Woodruff #3
125 5"	32 1 1/4	18.92 3/4	14 0.55	130 5.12	213 8.39	56 2.20	215.9 8.5	8	3/4-10	4	22.23 7/8	90 3.54	70 2.76	4	10 3/8	Woodruff #9
150 6"	32 1 1/4	18.92 3/4	14 0.55	144 5.67	226 8.90	56 2.20	241.3 9.5	8	3/4-10	4	22.23 7/8	90 3.54	70 2.76	4	10 3/8	Woodruff #9
200 8"	45 1 3/4	22.1 7/8	17 0.67	177 6.97	260 10.24	60 2.36	298.5 11.75	8	3/4-10	4	22.23 7/8	125 4.92	102 4.02	4	12 7/16	Woodruff #9
250 10"	45 1 3/4	28.45 1 1/8	22 0.87	202 7.95	292 11.50	68 2.68	362 14.25	12	7/8-9	4	25.4 1	125 4.92	102 4.02	4	12 7/16	Woodruff #15
300 12"	45 1 3/4	31.6 1 1/4	24 0.95	241 9.49	337 13.27	78 3.07	431.8 18.75	12	7/8-9	4	25.4 1	125 4.92	102 4.02	4	12 7/16	Woodruff #15
350 14"	45 1 3/4	31.6 1 1/4	24 0.95	280 11.02	368 14.49	78 3.07	476.3 18.75	12	1-8	4	28.58 1 1/8	125 4.92	102 4.02	4	12 7/16	Woodruff #15
400 16"	51 2	33.2 1 5/16	27 1.06	315 12.4	401 15.79	86 3.39	539.8 21.25	16	1-8	4	28.58 1 1/8	210 8.27	165 6.5	4	23 7/8	5/16 Sq x 1 3/4
450 18"	51 2	38 1 1/2	27 1.06	333 13.11	422 16.61	105 4.13	577.9 22.75	16	1 1/8-7	4	31.75 1 1/4	210 8.27	165 6.5	4	23 7/8	3/8 Sq x 1 1/2
500 20"	64 2 1/2	41 1 5/8	32 1.26	365 14.37	479 18.86	130 5.12	635 25	20	1 1/8-7	4	31.75 1 1/4	210 8.27	165 6.5	4	23 7/8	3/8 Sq x 1 3/4
600 24"	70 2 3/4	50.6 2	36 1.42	463 18.23	562 22.13	152 5.98	749.3 29.5	20	1 1/4-7	4	34.93 1 3/8	210 8.27	165 6.5	4	23 7/8	1/2 Sq x 2 1/4
750 30"	70 2 3/4	63.3 2 1/2	-	555 21.85	648 25.51	167 6.57	914 36	28	1 1/4-7	4	1 1/4-7	300 11.81	254 10	8	18 1/2	5/8 Sq x 2 5/8

H1* and ØI1* refer to lug style body types, H2* and ØI2* refer to wafer style bodies. Dimension F is the face to face of the valve body. This does not account for the valve seat. Approximately 1/8" additional spacing is required for proper seating with the pipe flanges. The installation does not require gaskets, as the valve seat creates the seal against the mounting flange.

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Valve Weights kg/lb

Size	50 2"	65 2.5"	75 3"	100 4"	125 5"	150 6"	200 8"	250 10"	300 12"	350 14"	400 16"	450 18"	500 20"	600 24"	750 30"
Lug	4 8.84	4 8.84	5 11.05	8 17.68	11 24.31	13 28.73	19 41.99	30 66.3	41 90.61	55 121.55	85 187.85	113 249.73	164 362.44	241 532.61	440 972.4
Wafer	3 6.63	3 6.63	4 8.84	5 11.05	7 15.47	9 19.89	14 30.94	21 46.41	31 68.51	47 103.87	65 143.65	75 165.75	111 245.31	187 413.27	335 740.35

Valve Torque Chart

Valve Size		Full Rated Disc						Undercut Disc*	
DIN	Inch	6 bar (87psi)		10 bar (145psi)		16 bar (232psi)		7 bar (100psi)	
		Nm	in/lb	Nm	in/lb	Nm	in/lb	Nm	in/lb
50	2	10	89	11	97	11	97	10	92
65	2.5	16	142	17	150	18	159	16	142
80	3	21	186	31	274	23	204	22	191
100	4	31	274	34	301	37	327	32	281
125	5	46	407	52	460	57	504	47	418
150	6	66	584	75	664	84	743	68	601
200	8	114	1009	126	1115	137	1213	97	860
250	10	180	1593	199	1761	219	1938	74	654
300	12	268	2372	290	2567	312	2761	171	1517
350	14	347	3071	395	3496	931	8240	273	2415
400	16	551	4877	621	5496	1225	10842	424	3750
450	18	818	7240	927	8205	1645	14559	652	5775
500	20	1037	9178	1130	10001	2310	20445	795	7035
600	24	1900	16816	2056	18197	3710	32836	1435	12705
750	30	3323	29411	2339	31500	6782	60026	2503	22155

* Standard offering for actuated valves

Torque values were achieved using water @ 25°C. For deriving torque values for dry gases please multiply by 1.7.

There is no safety factor included in the above numbers. For actuator sizing in a 2-way configuration, please use a safety factor of 1.2. For actuator sizing for a 3-way assembly, please use a safety factor of 1.5.

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Description

The direct-coupled, spring return electronic damper actuators provide modulating, two-position, three-position and electronic tandem control of building HVAC dampers.

Product Number	Operating Voltage			Control				Cables		Built-in Control Options				Electric Tandem Control	
	24 Vac + 20%	24 Vdc + 10%	120 Vac + 10%	0 to 10 Vdc	2 to 10 Vdc	3-position	2-position	Standard	Plenum	Position Feedback	Dual Auxiliary Switches	Signal Inversion	Offset 0 to 5 Vdc Span 2 to 30 Vdc	Master	Slave
VT1800-11U	•	•					•	•							
VT1800-11P	•	•					•		•						
VT1800-12U	•	•					•	•			•				
VT1800-12P	•	•					•		•		•				
VT1800-13U			•				•	•							
VT1800-14U			•				•	•			•				
VT1800-15U	•	•				•		•							
VT1800-15P	•	•				•			•						
VT1800-16P	•	•				•			•	•					
VT1800-17U	•	•				•		•		•					
VT1800-17P	•	•				•			•		•				
VT1800-18U	•	•				•		•			•				
VT1800-19U	•	•			•			•		•		•			
VT1800-19P	•	•			•				•	•		•			
VT1800-20U	•	•			•			•		•	•	•			
VT1800-20P	•	•			•				•	•	•	•			
VT1800-21U	•			•				•		•					
VT1800-21P	•			•					•	•					
VT1800-22U	•			•				•		•			•		
VT1800-22P	•			•					•	•			•		
VT1800-23U	•			•				•		•	•		•		
VT1800-23P	•			•					•	•	•		•		
VT1800-24U	•			•				•		•	•				
VT1800-24P	•			•					•	•	•				
VT1800/VTS	•			•					•	•				•	
VT1800/VTS	•			•					•	•	•		•	•	
VT1800/VTP	•								•						•

Features

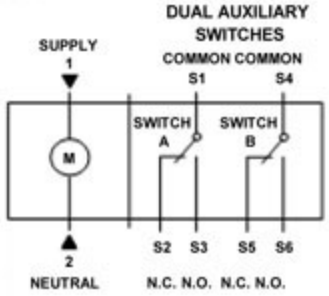
- Brushless DC motor technology with stall protection
- Bi-directional fail-safe spring return
- Unique self-centering shaft coupling
- Models available with dual independently adjustable auxiliary switches
- All modulating models offer built-in feedback
- Floating control models available with feedback potentiometer
- All metal housing
- Manual override
- 5° preload as shipped from factory
- Mechanical range adjustment capability by moving shaft coupling to desired position
- Easily visible position indicator
- Precabled

Technical Data

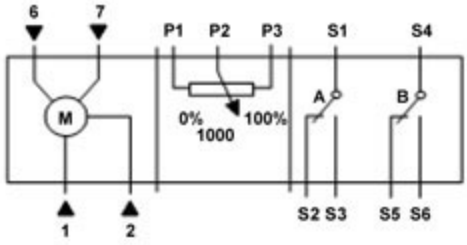
24 Vac, 120 Vac Torque:	142 lb-in (16 Nm) running and spring return <360 lb-in (40 Nm) maximum
24 Vdc Torque	106 lb-in (12 Nm) running and spring return
Runtime for 90°:	90 sec. operating, 15 sec. typical (30 sec. max.) closing on power loss
Frequency:	50/60 Hz
Power consumption: Running:	8 VA/6W 9 VA/7W 9 VA 9 VA
Power consumption: Holding	3 VA/3W 5 VA/4W 5 VA 9 VA
Equipment rating (24V):	Class 2
Noise level:	<45 dBA (running)
Angle of rotation:	90° nominal, 95° max.
Shaft dimensions:	3/8-in to 1-in (8 to 25,6 mm) dia. 1/4-in to 3/4-in (6 to 18 mm) sq. 3/4-in (20 mm) min. length
Operating temperature:	-25°F to 130°F (-32°C to 55°C)
Storage temperature:	-40°F to 158°F (-40°C to 70°C)
Ambient humidity:	95% rh (non-condensing)
Pre-cabled connection:	18 AWG, 3 ft (0,9 m) long
Enclosure:	NEMA 2, IP40
Material:	Die cast aluminum alloy
Gear Lubrication:	Silicone-free
Weight:	4.85 lb (2.2 kg)
Dimensions:	11-13/16 in (300 mm) H 4-3/4 in (120 mm) W 2-7/8 in (72 mm) D

Wiring Diagrams

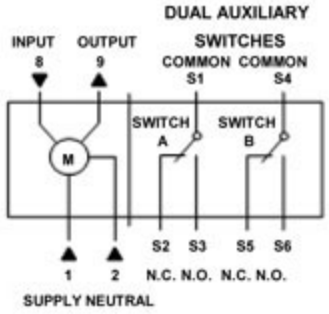
2-Position, 24 Vac/dc:



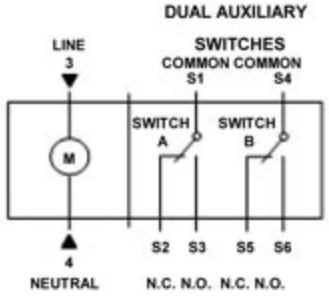
3-Position, 24 Vac/dc:



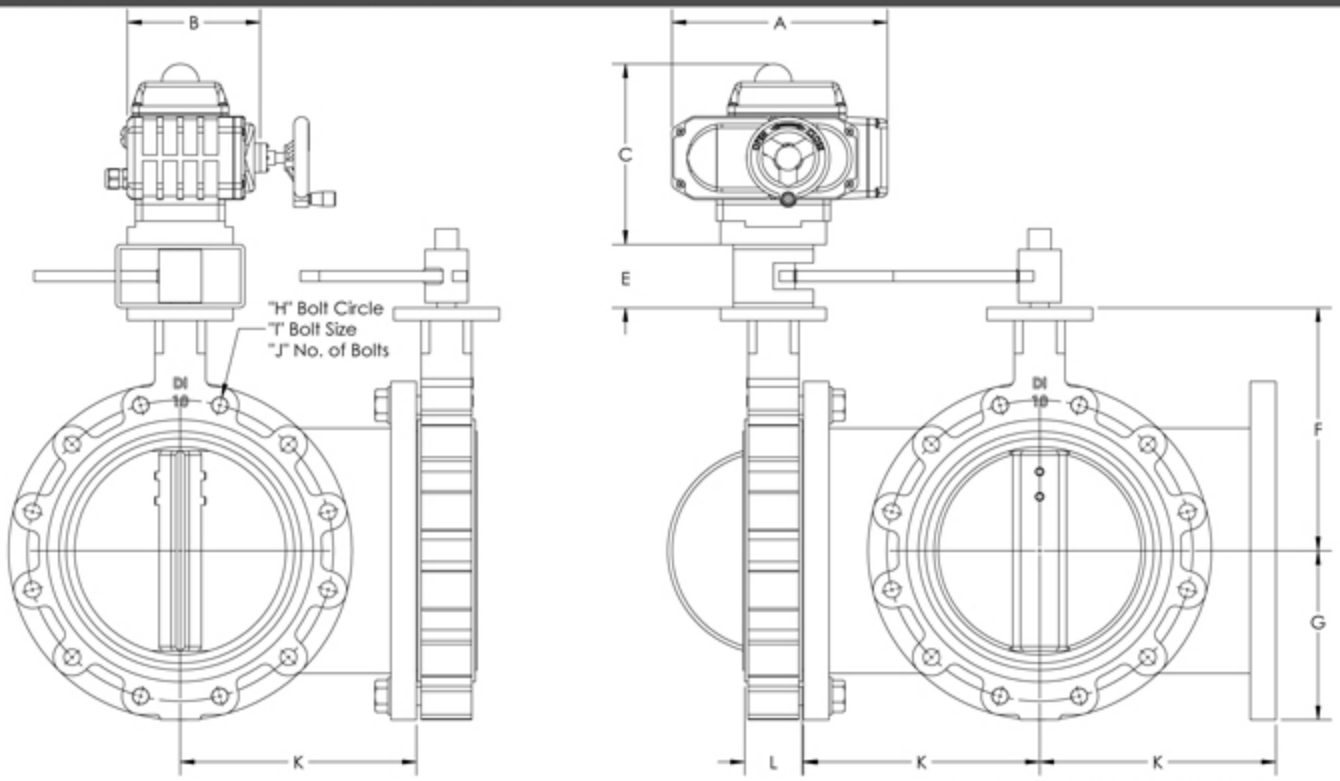
0 to 10 Vdc, 24 Vac;
2 to 10 Vdc, 24 Vac/dc:



2-Position, 120 Vac:



DIMENSIONAL INFORMATION



DIMENSIONS: MM (INCHES)

PSI	VALVE SIZE INCH	VALVE SIZE DN	A	B	C	E	F	G	H	J x I	K	L
100 PSI	2	50	160 (6.30)	112 (4.41)	160.5 (6.32)	50.8 (2.00)	161 (6.34)	80 (3.15)	4.75	4 x 5/8 - 11	114.3 (4.50)	43 (1.69)
	2.5	65	160 (6.30)	112 (4.41)	160.5 (6.32)	50.8 (2.00)	175 (6.89)	89 (3.50)	5.5	4 x 5/8 - 11	127 (5.00)	46 (1.81)
	3	75	160 (6.30)	112 (4.41)	160.5 (6.32)	50.8 (2.00)	181 (7.13)	95 (3.74)	6	4 x 5/8 - 11	139.7 (5.50)	46 (1.81)
	4	100	160 (6.30)	112 (4.41)	160.5 (6.32)	50.8 (2.00)	200 (7.87)	114 (4.49)	7.5	8 x 5/8 - 11	165.1 (6.50)	52 (2.05)
	5	125	160 (6.30)	112 (4.41)	160.5 (6.32)	50.8 (2.00)	213 (8.39)	127 (5.00)	8.5	8 x 3/4 - 10	190.5 (7.50)	56 (2.20)
	6	150	196 (7.72)	121 (4.76)	181 (7.13)	50.8 (2.00)	226 (8.90)	139 (5.47)	9.5	8 x 3/4 - 10	203.2 (8.00)	56 (2.20)
	8	200	255 (10.04)	158 (6.22)	218 (8.58)	50.8 (2.00)	260 (10.24)	175 (6.89)	11.75	8 x 3/4 - 10	228.6 (9.00)	60 (2.36)
	10	250	255 (10.04)	158 (6.22)	218 (8.58)	50.8 (2.00)	292 (11.50)	203 (7.99)	14.25	12 x 7/8 - 9	279.4 (11.00)	68 (2.68)
	12	300	255 (10.04)	158 (6.22)	218 (8.58)	50.8 (2.00)	337 (13.27)	242 (9.53)	17	12 x 7/8 - 9	304.8 (12.00)	78 (3.07)
	14	350	255 (10.04)	158 (6.22)	218 (8.58)	50.8 (2.00)	368 (14.49)	267 (10.51)	18.75	12 x 1 - 8	355.6 (14.00)	78 (3.07)
	16	400	310 (12.20)	217 (8.54)	244 (9.61)	76.2 (3.00)	400 (15.75)	297 (11.69)	21.25	16 x 1 - 8	381 (15.00)	102 (4.02)
	18	450	310 (12.20)	217 (8.54)	244 (9.61)	76.2 (3.00)	422 (16.61)	318 (12.52)	22.75	16 x 1 1/8 - 7	419.1 (16.50)	114 (4.49)
	20	500	310 (12.20)	217 (8.54)	244 (9.61)	76.2 (3.00)	480 (18.90)	348 (13.70)	25	20 x 1 1/8 - 7	457.2 (18.00)	127 (5.00)
	24	600	310 (12.20)	217 (8.54)	244 (9.61)	76.2 (3.00)	562 (22.13)	444 (17.48)	29.5	20 x 1 1/4 - 7	558.8 (22.00)	154 (6.06)