

Electrically Actuated 3-way Ball Valves Type 167-170



General

- **Size:** 3/8"–2"
- **Material:** PVC, CPVC, PROGEF® Standard PP, ABS, SYGEF® Standard PVDF
- **Seat:** PTFE
- **Seals:** EPDM, FPM
- **End Connection:** Solvent cement socket, threaded, flanged, fusion spigot, fusion socket
- **Actuator Housing:** Glass-filled PP
- **Voltage:** 100-230VAC, 24VDC
- **Manual Override:** Integrated
- **Position Indicator:** Optical, integrated

Key Valve Certifications

- **FDA CFR 21 177.1520:** PP and PVDF
- **FDA CFR 21 177.2600:** EPDM and FPM
- **FDA CFR 21 177.1550:** PTFE
- **USP Class VI (physiological non-toxic):** EPDM, FPM, PTFE, PP and PVDF

Sample Specification

The Type 167-170 3-way Ball Valve shall be used in either open/close or modulating applications. The actuator shall be a Type EA25. The ball valve shall be true union and utilize a floating ball design. The ball shall be fully molded and full port with two way blocking capability. The stem shall be blowout proof utilizing a double o-ring seal and a predetermined break point opposite the media side of the stem seals. The seat carrier shall be adjustable and reverse threaded. The valve nut threads shall be of buttress type. Ball seats shall have an elastomeric backing o-ring and all elastomeric seals shall be of like material. ANSI flanged versions shall meet ANSI B16.5 150lb standards. All valves shall be tested in accordance to ISO9393 and designed to ISO16135 standards. All valves shall be manufactured under ISO9001 for Quality and ISO14001 for Environmental Management. Following manual assembly, every valve shall be tested and certified bubble tight exceeding Class VI standards. Following actuated assembly, every valve shall be tested to confirm functionality.

Material Specification

PVC valves shall meet ASTM D1784 cell classification 12454 standards. CPVC valves shall meet ASTM D1784 cell classification 23447-B standards. PP valves shall meet ASTM D5847-14 cell classification PP0510B66851 standards. ABS valves shall meet ASTM D3965 cell classification 42222 standards. PVDF valves shall be type 1, grade 2 according to ASTM D3222 standards. Valves of all materials shall be RoHS compliant.

Key Actuator Certifications

- Machinery Directive 2006/42/EC, Annex II B
- EMV Directive CE 2004/108/CE
- EMV VDE 0843 Section 20
- Low Voltage Directive CE 2006/95/CE
- Vibration Testing EN 60068-2-6
- Interface ISO 5211
- Actuators for Industrial Valves EN 15714-2

Definition of Valve Style



Horizontal



Vertical

Actuator Technical Data

	EA 25
Valve Size	3/8"-2"
Cycle Time	5s/90°
Actuating Angle	Standard set at 90°, max. 355°
Housing Material	Glass-filled PP
Position Feedback	230V, 6 Amp
Rated Voltage	100- 230V, 50/60 Hz 24V, AC/DC, 50/60Hz
Rated Voltage Tolerance	+/- 15%
Rated Output	35VA @ 100-230VAC 40VA @ 24VAC/DC
Duty Cycle	100%
Protection Class	IP 67 per EN 60529 UL/CSA Nema 4X
Overload Protection	Resetting, current-time dependant (1)
Power Connection	Connector plug 3 P+ E per DIN EN 175301-03
Ambient Temperature	14° to 122°F (2)
Allowable Humidity	90% relative humidity, non condensing

(1) Overload protection of the motor is dimensioned so that the motor and the power supply board are protected. As soon as the load is within the torque range, the actuator will begin operating again.

(2) At temperatures below 14°F and if there is condensation, the heating element should be activated.

Optional Features

- **Positioner:** Current, voltage
- **Network:** Profibus DP
- **Fail Safe Return:** Battery back up, externally powered board
- **Smart Module:** Cycle monitoring, cycle counter, cycle extension, motor current monitoring
- **Manual Loading Station:** Local control box
- **Seals:** Alternative materials available upon request
- **Seat:** PVDF
- **End Connection:** Alternatives available upon request
- **Cleaned:** Silicone free/oil free

Material Availability

Material	Horizontal	Vertical
PVC	All Sizes	All Sizes
CPVC	All Sizes	-
PP	All Sizes	-
ABS	All Sizes	All Sizes
PVDF	All Sizes	-

Definition of Valve Type

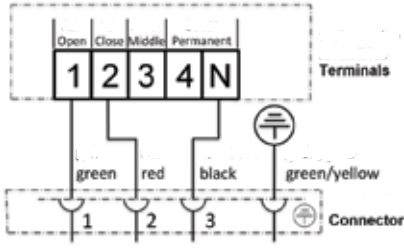
- **Type 167:** PVC/CPVC/ABS horizontal
- **Type 168:** PP horizontal
- **Type 169:** PVDF horizontal
- **Type 170:** PVC/ABS vertical

Components

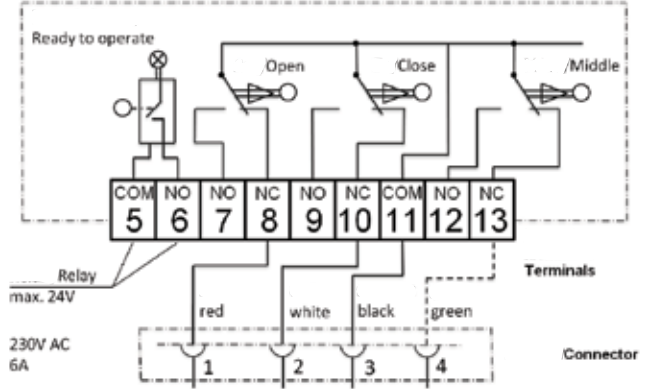


Wiring Diagrams

Control



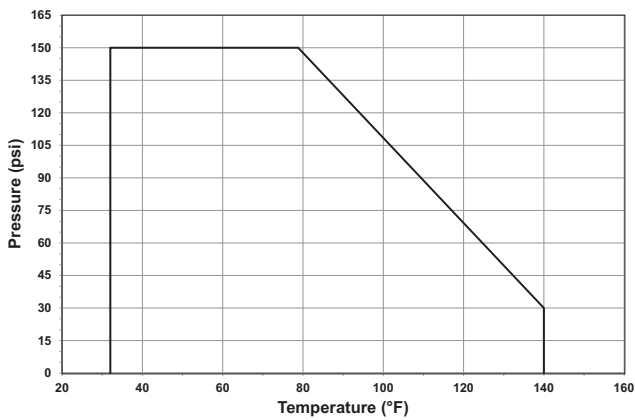
Feedback



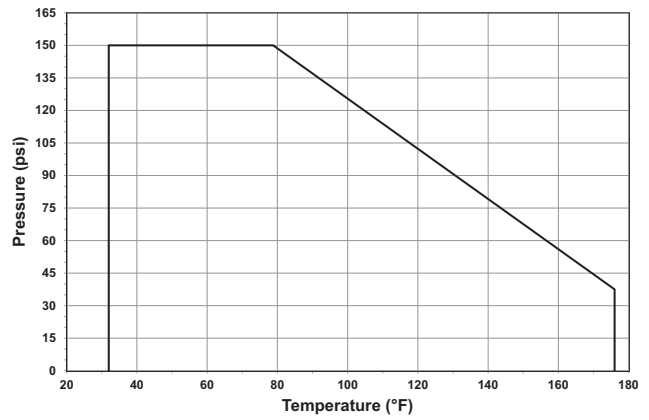
Pressure Temperature Curves

The following graphs are based on a 25 year lifetime water or similar media application

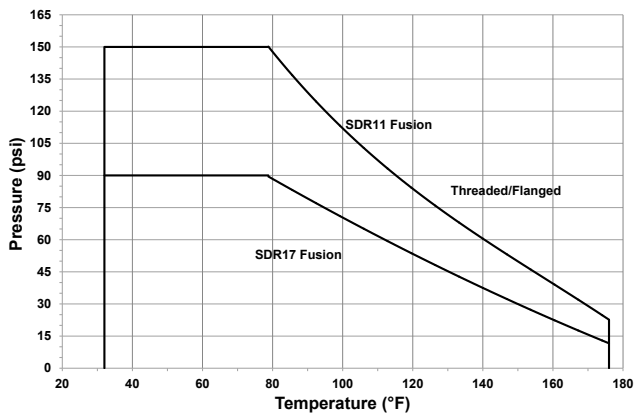
PVC



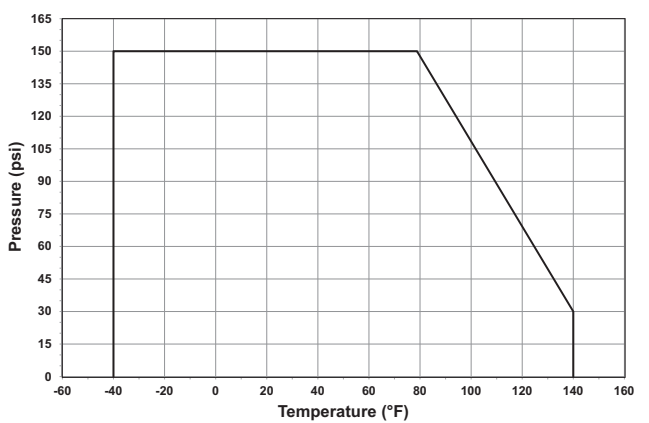
CPVC



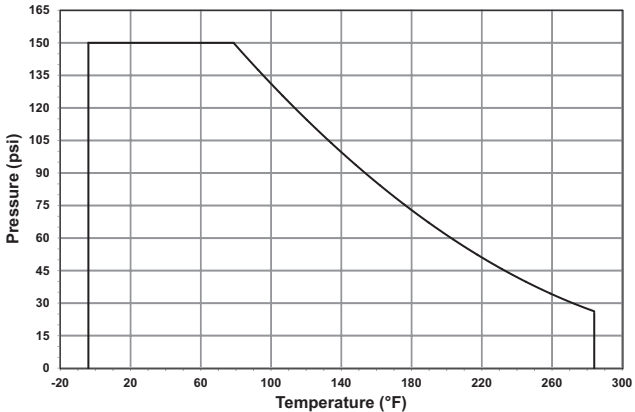
PP



ABS



PVDF



Pressure-Temperature

Material	Temperature Range (°F)	Max Pressure (psi)
PVC	32 to 140	150
CPVC	32 to 176	150
PP	32 to 176	150
ABS	-40 to 140	150
PVDF	-4 to 284	150

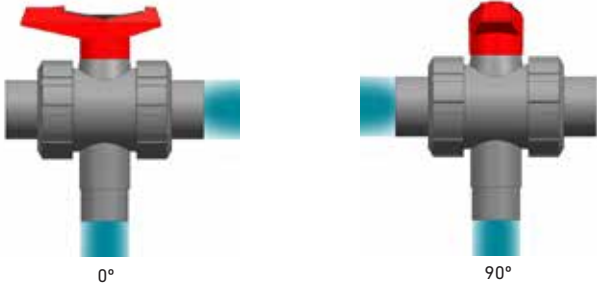
Vacuum Service

The Type 167-170 is rated for full vacuum service. Maximum differential pressure of 15psi at 122°F.

Flow

Porting options shown turning the valve rotating clockwise. Redundant and intermediate positions not shown.

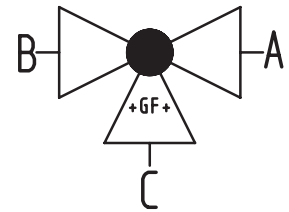
Vertical Diverter



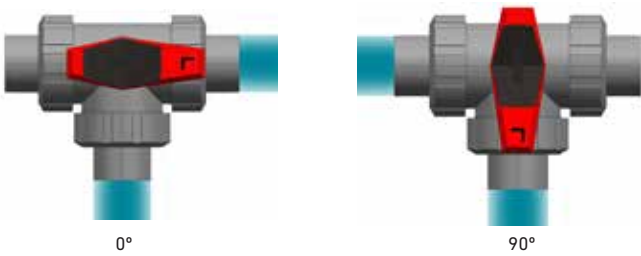
Vertical: Cv Value (gal/min)

Size (inch)	d (mm)	A-C or B-C
3/8	16	3.5
1/2	20	5.3
3/4	25	10.5
1	32	19.6
1 1/4	40	33.6
1 1/2	50	43.4
2	63	86.1

Vertical L-port



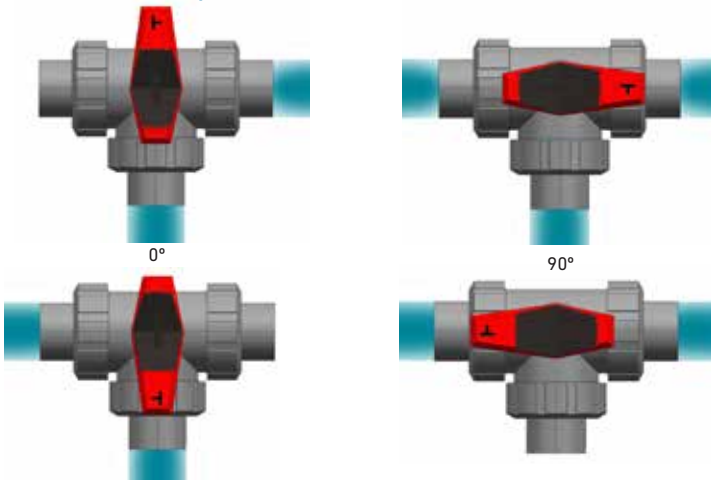
Horizontal L-port



Horizontal L-port: Cv Value (gal/min)

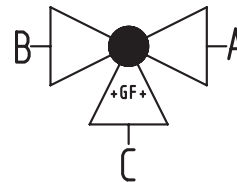
Size (inch)	d (mm)	A-B	C-B or C-A	B-C or A-C
3/8	16	0.7	3.5	3.5
1/2	20	1.1	4.5	4.5
3/4	25	2.1	10.5	10.5
1	32	3.5	19.6	19.6
1 1/4	40	6.3	33.6	33.6
1 1/2	50	7.7	43.4	43.4
2	63	15.4	86.1	86.1

Horizontal T-port



Horizontal T-port: Cv Value (gal/min)

Size (inch)	d (mm)	A-B	C-B or C-A	B-C or A-C
3/8	16	9.8	2.5	2.8
1/2	20	14	3.5	4.9
3/4	25	32.9	9.1	10.5
1	32	55.5	14	17.5
1 1/4	40	90.3	26.6	32.9
1 1/2	50	133.7	32.9	42
2	63	217	62.3	84.7

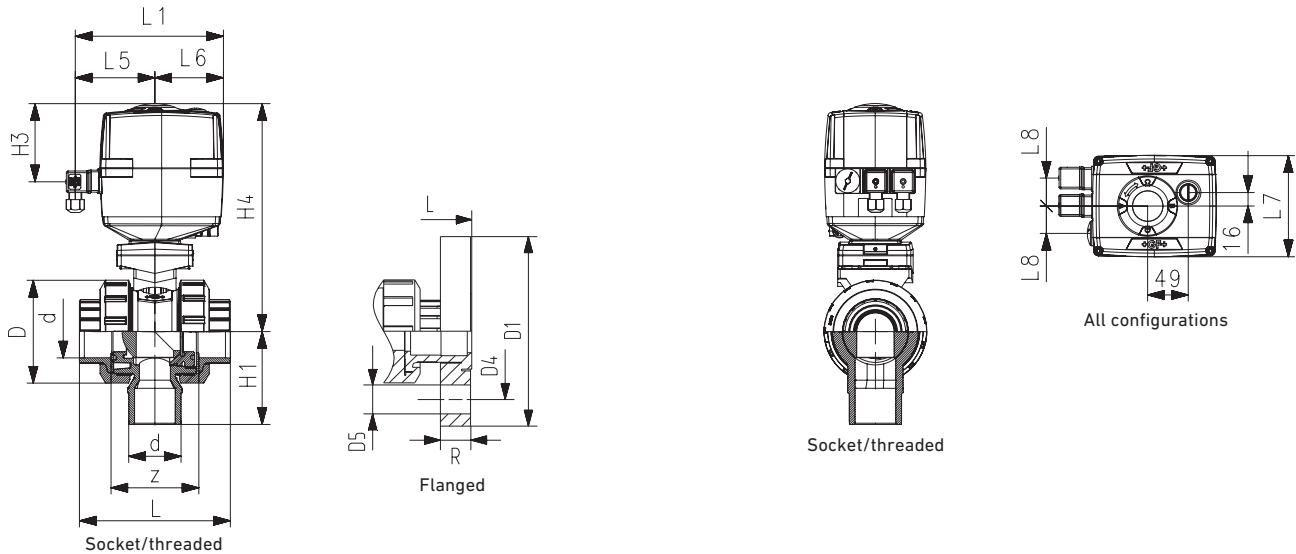


Key Design Feature: Middle Position

Type 167-170 Valves offer the ability to program a middle position standard. The middle position is any point between the open and close end positions and is specifically useful with 3-way valves because an operator can utilize three porting positions instead of two. The Type 167-170 also offers feedback for the middle position standard so an operator can also program the actuator to send a feedback signal at a desired point (ie nearly closed, nearly open, etc) even if that point is not being used as a control end position.

Dimensions

The following tables are shown in millimeters unless otherwise specified



Type 170: All Configurations

Size (inch)	d (mm)	D	H	H2	H1	H3	L1	L4	L5	L6	L7	L9	M
3/8	16	50	231	62	28	94	180	25	97	83	122	33	M6
1/2	20	50	231	62	28	94	180	25	97	83	122	33	M6
3/4	25	58	240	71	32	94	180	25	97	83	122	33	M6
1	32	68	240	71	36	94	180	25	97	83	122	33	M6
1 1/4	40	84	251	84	45	94	180	45	97	83	122	33	M8
1 1/2	50	97	251	84	51	94	180	45	97	83	122	33	M8
2	63	124	273	106	65	94	180	45	97	83	122	33	M8

Type 170: PVC

Size (inch)	IPS Socket		Threaded NPT	
	L	z	L	z
3/8	106	67	98	70
1/2	105	61	98	64
3/4	121	70	112	76
1	133	76	127	83
1 1/4	152	90	146	99
1 1/2	165	94	157	111
2	183	107	183	135

Type 170: ABS

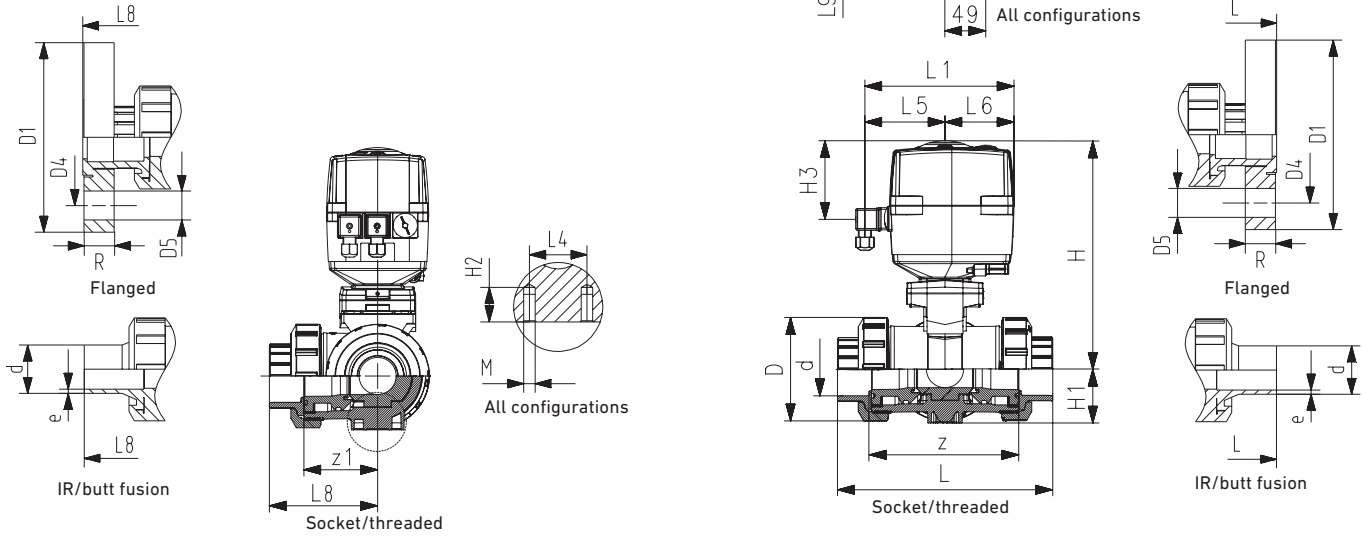
d (mm)	Metric Socket	
	L	z
16	92	64
20	95	64
25	111	74
32	123	79
40	146	95
50	157	95
63	183	107

Type 170: PVC

Size (inch)	ANSI Flanged				
	L	D1 (inch)	D4 (inch)	D5 (inch)	R (inch)
1/2	149	3.5	2.38	0.57	0.57
3/4	165	3.88	2.75	0.58	0.58
1	184	4.25	3.13	0.66	0.66
1 1/4	206	4.63	3.5	0.69	0.69
1 1/2	221	5	3.88	0.76	0.76
2	251	6	4.75	0.82	0.82

Dimensions

The following tables are shown in millimeters unless otherwise specified



Type 167-169: All Configurations

Size (inch)	d (mm)	D	H	H2	H1	H3	L1	L4	L5	L6	L7	L9	M
3/8	16	50	231	62	28	94	180	25	97	83	122	33	M6
1/2	20	50	231	62	28	94	180	25	97	83	122	33	M6
3/4	25	58	240	71	32	94	180	25	97	83	122	33	M6
1	32	68	240	71	36	94	180	25	97	83	122	33	M6
1 1/4	40	84	251	84	45	94	180	45	97	83	122	33	M8
1 1/2	50	97	251	84	51	94	180	45	97	83	122	33	M8
2	63	124	273	106	65	94	180	45	97	83	122	33	M8

Type 167: ABS

d (mm)	Metric Socket			
	L	L8	z	z1
16	108	54	80	40
20	112	56	80	40
25	129	65	95	48
32	151	75	109	54
40	181	90	129	64
50	205	103	149	75
63	261	130	193	96

Type 167: PVC/CPVC

Size	IPS Socket				Threaded NPT				Flanged					
	L	L8	z	z1	L	L8	z	z1	L	L1	D1 (inch)	D4 (inch)	D5 (inch)	R (inch)
3/8	123	61	85	42	115	57	87	43	-	-	-	-	-	-
1/2	122	61	77	38	114	57	81	40	161	80	3.5	2.38	0.57	0.57
3/4	141	71	92	46	131	66	96	48	182	91	3.88	2.75	0.58	0.58
1	161	81	105	53	155	78	111	56	208	104	4.25	3.13	0.66	0.66
1 1/4	187	93	126	63	181	90	134	67	238	119	4.63	3.5	0.69	0.69
1 1/2	213	107	143	72	205	103	159	80	265	133	5	3.88	0.76	0.76
2	261	130	185	92	261	130	213	106	323	161	6	4.75	0.82	0.82

Type 168-169: PP/PVDF

d (mm)	Metric Socket				Metric IR/Butt				Threaded NPT			
	L	L8	z	z1	L	L8	e (PP)	e (PVDF)	L	L8	z	z1
16	110	55	82	41	-	-	-	-	112	56	86	43
20	112	56	82	41	146	73	1.9	1.9	114	57	80	40
25	129	65	97	49	163	82	2.3	1.9	131	66	95	48
32	146	73	110	55	178	89	2.9	2.4	154	77	110	55
40	170	85	132	66	204	102	3.7	2.4	180	90	132	66
50	193	98	151	76	237	120	4.6	3.0	203	103	157	79
63	244	123	188	94	296	149	5.8	3.0	258	130	210	105