

Pneumatically Actuated 3-way Ball Valves

Type 285-288



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
- **Seat:** PTFE
- **Seals:** EPDM or FPM
- **Actuator Housing:** Glass-filled PP
- **Mounting:** Stainless steel threaded inserts (horizontal only)
- **Action:** Fail open, fail closed, and double acting
- **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
- **ABS:** All materials
- **NSF 61:** PVC and CPVC
- **USP Class VI (physiological non-toxic):** EPDM, FPM, PTFE, PP and PVDF

+GF+

Sample Specification

The Type 285-288 3-way Ball Valve shall be available in horizontal and vertical body types. The ball shall be fully molded and full port with blocking capability when in the OFF position. 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 handle shall double as a seat carrier adjustment or removal tool. Horizontal versions shall utilize a true union connection with a seat carrier on all three ports. Vertical versions shall utilize a true union connection and seat on the two main ports only. The branch connection on vertical versions shall be metric spigot and a metric-ASTM coupling shall be provided. 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. 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 assembly, every valve shall be certified bubble tight.

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.

Definition of Valve Style



Horizontal



Vertical

Definition of Valve Type

- **Type 285:** PVC/CPVC/ABS horizontal
- **Type 286:** PP horizontal
- **Type 287:** PVDF horizontal
- **Type 288:** PVC/ABS vertical

Material Availability

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

Actuator Type by Valve Size

	3/8" - 1"	1 1/4" - 2"
Fail-safe Close (FC)	PA 11	PA 21
Fail-safe Open (FO)	PA 11	PA 21
Double Acting (DA)	PA 11	PA 21

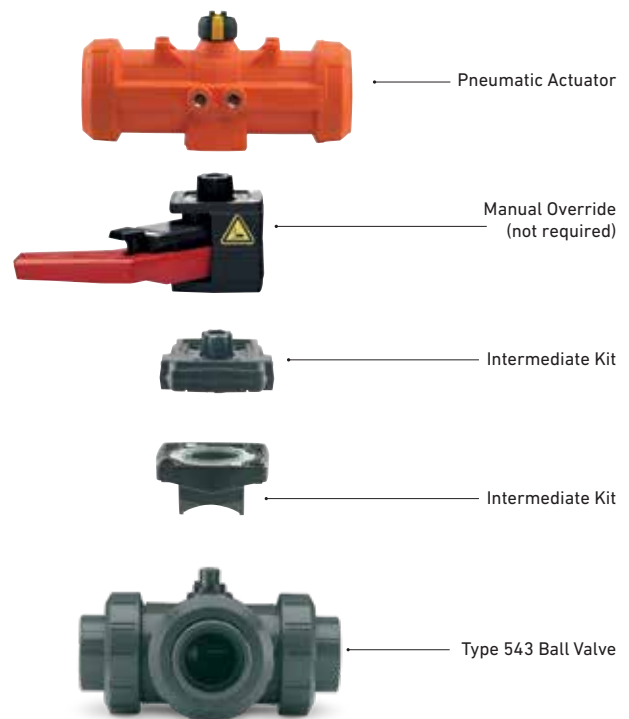
Actuator Technical Data

	PA 11/21
Control Media	Neutral, non aggressive gases (max. 104°F)
Operating Pressure	60 psi
Max. Allowable Operating Pressure	100 psi
Pneumatic Connection	1/8" BSP (NPT adapter supplied with assemblies)
Cycle Time	1-2 seconds
Actuation Angle	90°
Action	Fail-safe close (FC) Fail-safe open (FO) Double acting (DA)
Operating Temperature	14°F - 122°F
Permissible Humidity	0-100%
Position Indicator	Visual
Housing Material	PP-glass filled

Optional Features

- **Pilot Valve:** 24VAC/DC, 110VAC, 230VAC
- **Positioner:** Digital electro-pneumatic
- **Limit Switches:** Mechanical, inductive
- **Actuator Housing:** Alternative materials available upon request
- **Stroke Limiter:** 45°
- **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

Components

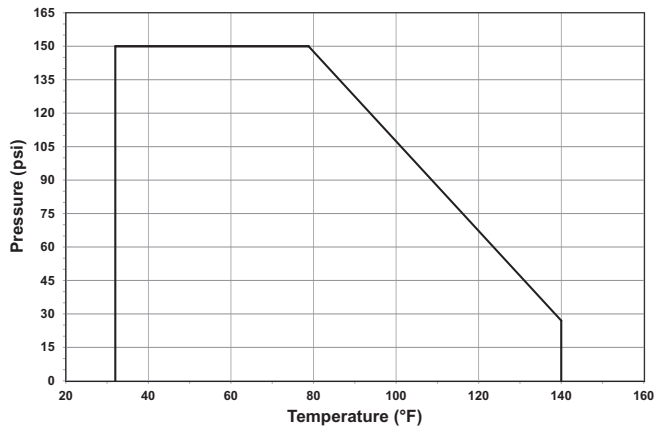


Technical Data

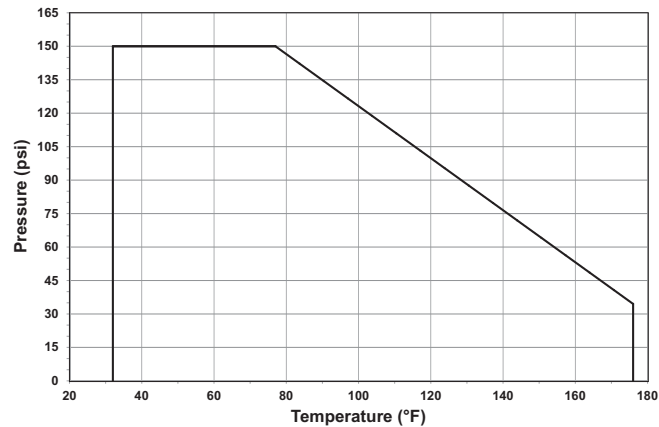
Pressure Temperature Curves

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

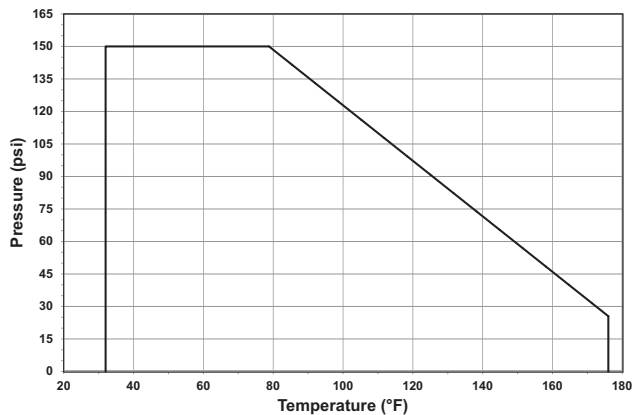
PVC



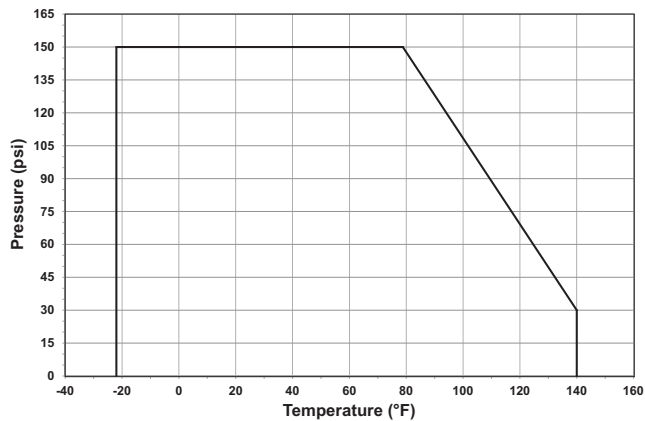
CPVC



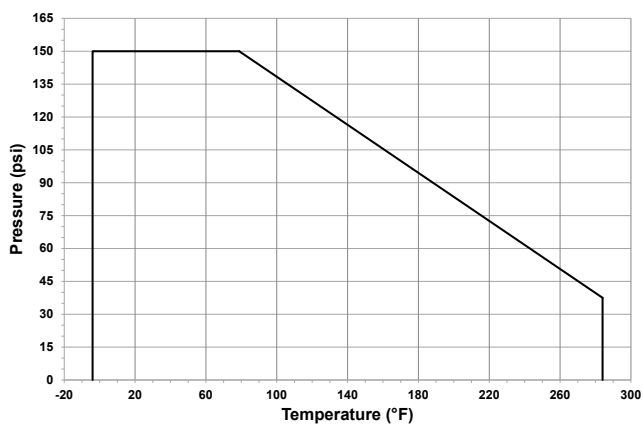
PP



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 285-288 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



0°



90°

Vertical Diverter: 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

Horizontal L-port



0°

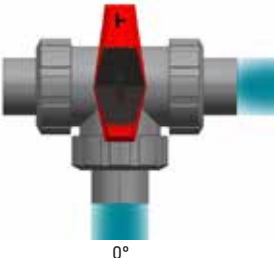


90°

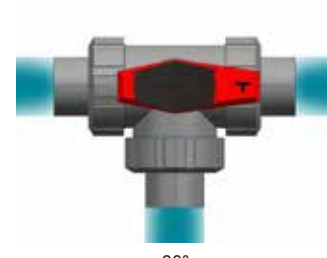
Horizontal L-port: Cv Value (gal/min)

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



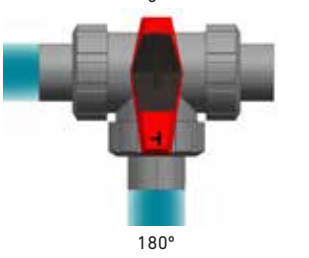
0°



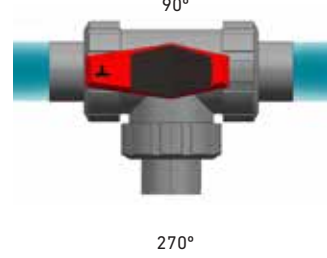
90°

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

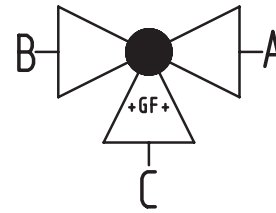
Size (inch)	d (mm)	A-B	C-B or C-A	B-C or A-C
3/8	16	9.8	2.5	2.8
1/2	20	14	3.5	4.9
3/4	25	32.9	9.1	10.5
1	32	55.5	14	17.5
1 1/4	40	90.3	26.6	32.9
1 1/2	50	133.7	32.9	42
2	63	217	62.3	84.7



180°



270°



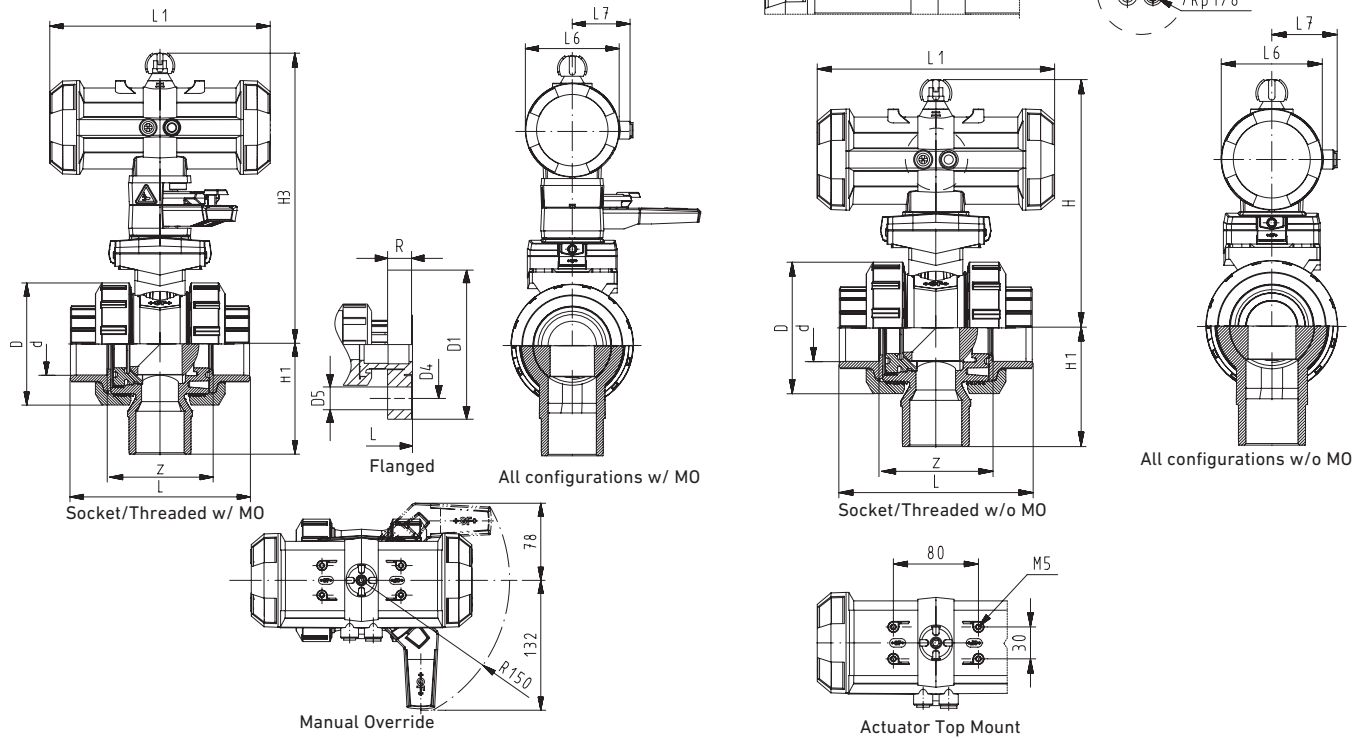
Spring Return Actuator Selection

Base Valve Type	Energized Position	Fail Position	Actuator Action	Build Type*
Vertical Diverter	0° (A-C)	90° (B-C)	FC	Standard build
Vertical Diverter	90° (B-C)	0° (A-C)	FO	Standard build
Horizontal L-port	0° (A-C)	90° (B-C)	FC	Standard build
Horizontal L-port	90° (B-C)	0° (A-C)	FO	Standard build
Horizontal T-port	0° (A-C)	90° (A-B-C)	FC	Custom
Horizontal T-port	90° (A-B-C)	0° (A-C)	FO	Custom
Horizontal T-port	90° (A-B-C)	180° (B-C)	FC	Standard build
Horizontal T-port	180° (B-C)	90° (A-B-C)	FO	Standard build
Horizontal T-port	180° (B-C)	270° (A-B)	FC	Custom
Horizontal T-port	270° (A-B)	180° (A-C)	FO	Custom
Horizontal T-port	270° (A-B)	0° (A-C)	FC	Custom
Horizontal T-port	0° (A-C)	270° (A-B)	FO	Custom

*Standard build defined as the porting configuration achieved per the standard assembly procedure utilizing either the FO or FC actuator as called out above. All custom assemblies require the manipulation of assembly subcomponents.

Dimensions

The following tables are shown in millimeters unless otherwise specified



Type 288: All Materials

Size (inch)	d (mm)	D	H	H1	H3	L1	L6	L7
3/8	16	50	159	62	230	194	76	48
1/2	20	50	159	62	230	194	76	48
3/4	25	58	168	72	239	194	76	48
1	32	68	168	77	239	194	76	48
1 1/4	40	84	203	87	271	224	95	59
1 1/2	50	97	203	97	271	224	95	59
2	63	124	225	112	293	224	95	59

Type 288: 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 288: ABS

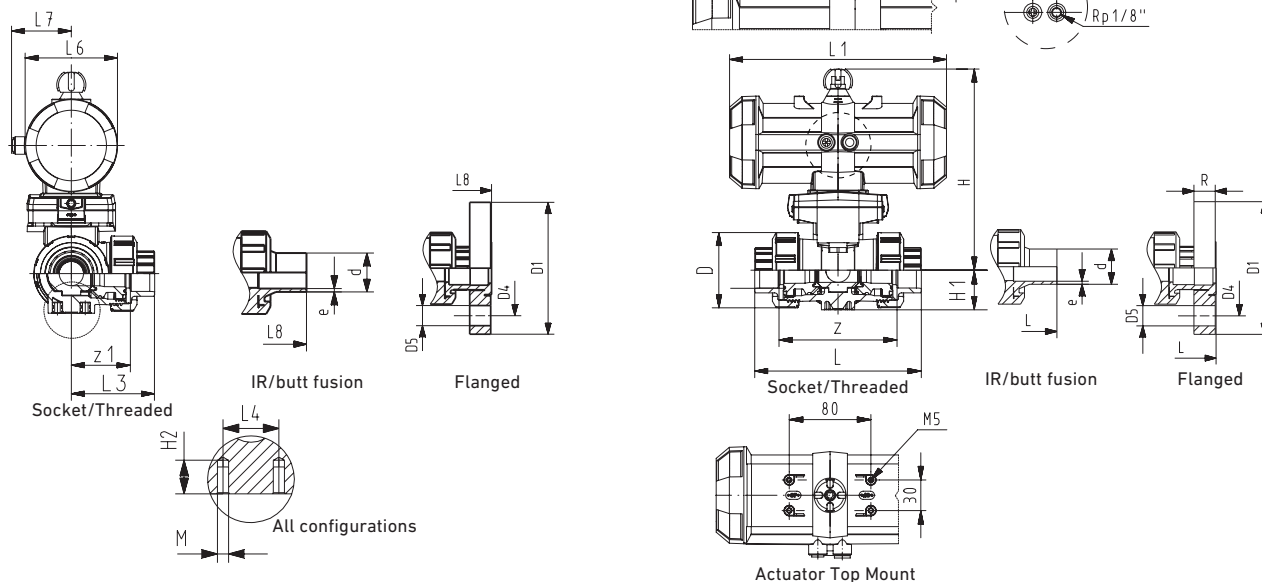
d (mm)	Metric Socket	
	L	z
16	92	64
20	95	64
25	111	74
32	123	79
40	146	95
50	157	95
63	183	107

Type 288: PVC

Size (inch)	ANSI Flanged				
	L	D1 (inch)	D4 (inch)	D5 (inch)	R (inch)
1/2	149	3.5	2.38	0.56	0.57
3/4	165	3.88	2.75	0.63	0.58
1	184	4.25	3.13	0.63	0.66
1 1/4	206	4.63	3.5	0.56	0.69
1 1/2	221	5	3.88	0.56	0.76
2	251	6	4.75	0.75	0.82

Dimensions

The following tables are shown in millimeters unless otherwise specified



Type 285-287: All Materials

Size (inch)	d (mm)	D	H	H1	H2	L1	L4	L6	L7	M
3/8	16	50	167	27	62	194	25	76	48	M6
1/2	20	50	167	27	62	194	25	76	48	M6
3/4	25	58	176	30	71	194	25	76	48	M6
1	32	68	176	36	71	194	25	76	48	M6
1 1/4	40	84	210	44	84	224	45	95	59	M8
1 1/2	50	97	210	51	84	224	45	95	59	M8
2	63	124	232	64	106	224	45	95	59	M8

Type 285: ABS

d (mm)	Metric Socket			
	L	L8	z	z1
16	108	54	81	40
20	112	56	81	40
25	129	65	94	47
32	151	75	107	54
40	181	90	130	65
50	205	103	143	72
63	261	130	185	92

Type 285: PVC/CPVC

Size (inch)	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	0.56	0.57
3/4	141	71	92	46	131	66	96	48	182	91	3.88	2.75	0.63	0.58
1	161	81	105	53	155	78	111	56	208	104	4.25	3.13	0.63	0.66
1 1/4	187	93	126	63	181	90	134	67	238	119	4.63	3.5	0.56	0.69
1 1/2	213	107	143	72	205	103	159	80	265	133	5	3.88	0.56	0.76
2	261	130	185	92	261	130	213	106	323	161	6	4.75	0.75	0.82

Type 286-287: 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