Design Features

Online Maintenance

Repair is possible on the line without disassembling from the pipeline, since it is top entry type.

Zero Maintenance

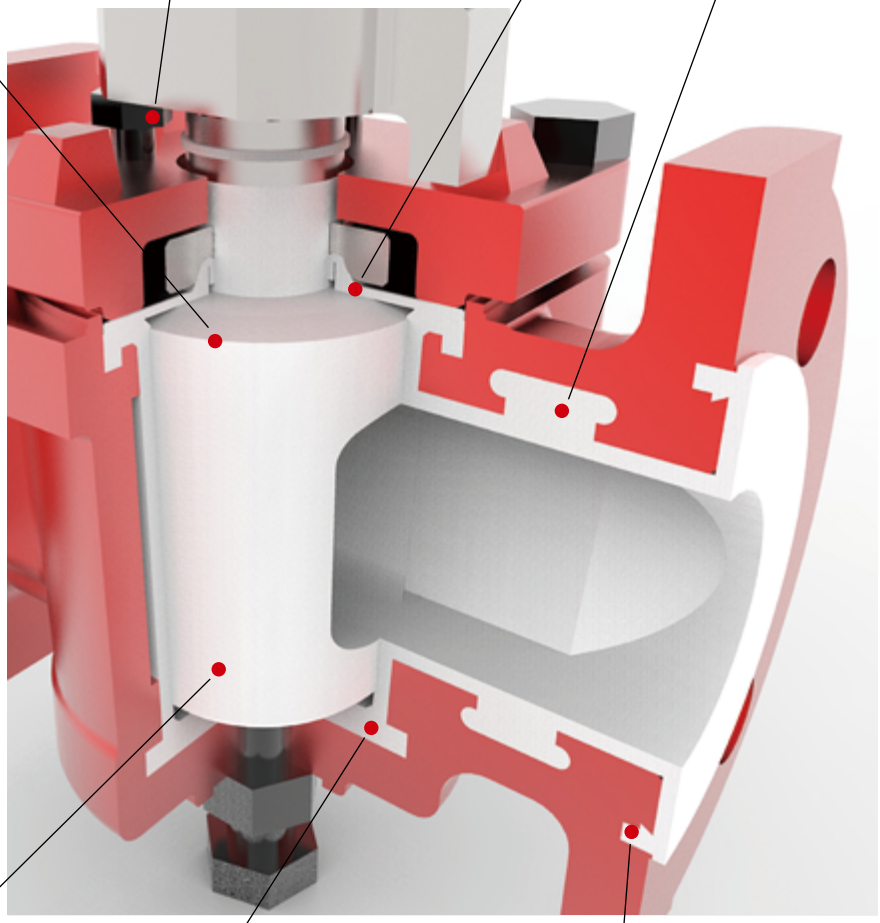
Adjustment bolts make the tight sealing as if it is a brand new.

External Leakage Prevention Design

The zero leakage stem sealing is achieved by a threefold sealing system.

Cast Dovetail & Machined Grooves

The lining materials are firmly fixed into the cast dove tail recesses and machined grooves on internal surfaces of the body and plug.
This feature makes the valve stable be used in high vacuum, pressure and temperature condition.



Zero Leakage

Sealing is established by circumferential surface area of PFA fully molded seal.

Zero dead space

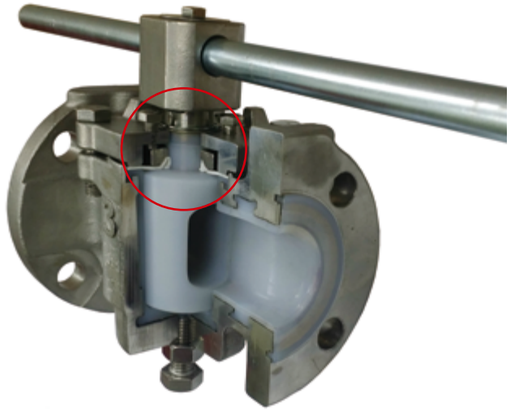
There are no unnecessary cavities in the body

Machined Grooves

Design Features / Multiport Valves

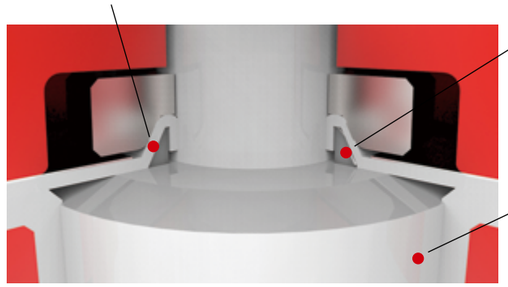
Threefold Sealing System

The zero leakage stem sealing is achieved by a threefold sealing system. The primary seal is provided by the PFA fully molded seal . The secondary and tertiary sealing (top seal package) are provided by Teflon delta ring and Reverse lip



Secondary Seal

The secondary sealing
is provided by Teflon delta ring



Tertiary Seal

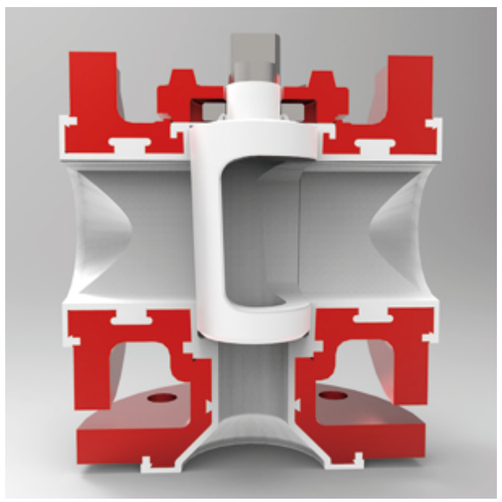
The tertiary sealing is
provided by Teflon Reverse lip

Primary Seal

The primary sealing is provided
by the PFA fully molded seal.

Multiport valves

Multiport valves are used in purpose of blending, diverting and segregation. It is more economical to use only one piece of 3-way valve instead of three pieces of 2-way valves. Multiport valves make piping simple and minimal.



Teflon PFA and Transfer Molding

Teflon PFA is a premium performance resin with good melt processing characteristics and unique melt stability. It offers high temperature strength and stiffness; excellent stress crack resistance; anti - static properties to be classified for explosion proof applications. Its high temperature service rating is 204°C and it resists virtually all chemicals.

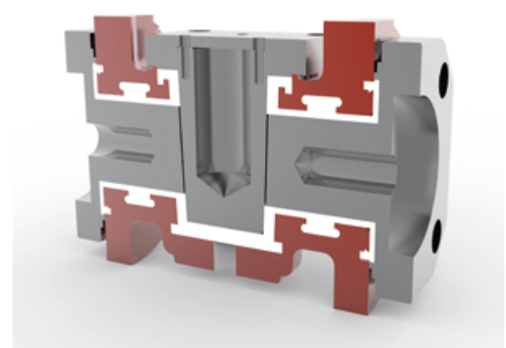
Teflon PFA

Melt-processable fluoropolymer

PFA is widely used in plastics melting process. The material is used extensively by injection, compression, transfer molding and other molding techniques. 3Z lined valves are produced by **transfer molding** with advantages such as no stress cracks, lower permeability.

Molding Method Features

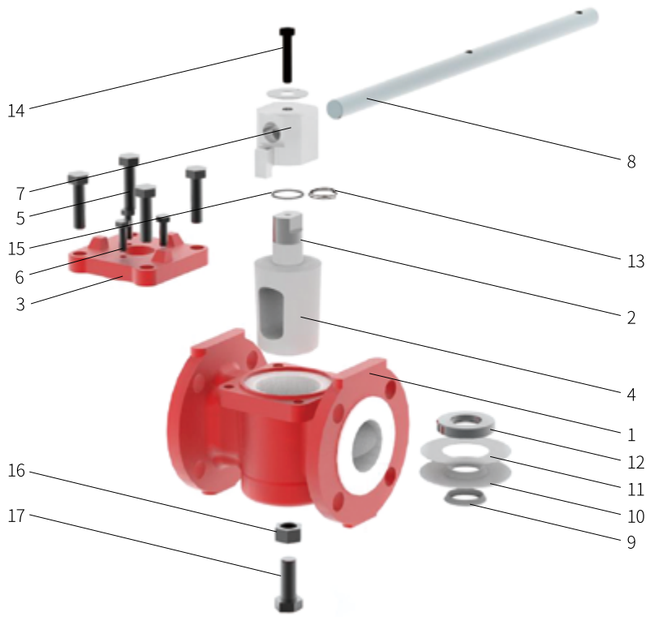
Molding Method	Material	Advantages	Disadvantages
Injection	PFA ETFE PVDF	High productivity	Not suitable for large / medium size due to deformation and crack after molding
Transfer	PFA PVDF	No stress cracks Lower permeability One - shot seamless molding	Low productivity



Parts and Materials

Construction Materials

A variety of materials are available such as carbon steel, stainless steel, duplex stainless steel and special alloys. Materials are subject to change without notice .Other materials and combinations are also available.



Sample Construction of Material

Carbon Steel (PFA)

No	Parts	Specification
1	Body	ASTM A216 WCB
2	Plug	ASTM A216 WCB
3	Cover	ASTM A216 WCB
4	Lining	PFA
5	Cover Bolt	ASTM A193 B7
6	Adjusting Bolt	AISI 304
7	Hub	ASTM A351 CF8
8	Wrench	AISI 1045
9	Delta Ring	RTFE
10	Reverse Lip	RTFE
11	Metal Diaphragm	AISI 304
12	Thrust Collar	AISI 304
13	Anti-static Device	AISI 304
14	Hub Bolt	AISI 304
15	Snap Ring	Alloy Steel
16	BTM Adjusting Nut	AISI 304
17	BTM Adjusting Bolt	AISI 304

316 Stainless (PFA)

No	Specification
1	ASTM A351 CF8M
2	ASTM A351 CF8M
3	ASTM A351 CF8
4	PFA
5	ASTM A193 B8
6	AISI 304
7	ASTM A351 CF8
8	AISI 1045
9	RTFE
10	RTFE
11	AISI 304
12	AISI 304
13	AISI 304
14	AISI 304
15	AISI 304
16	AISI 304
17	AISI 304

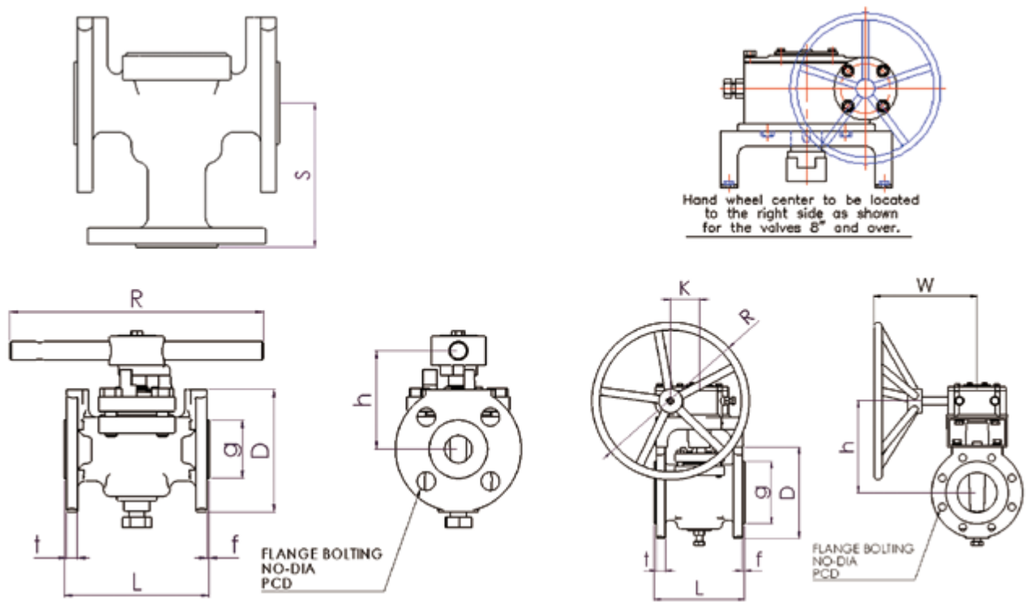
Hastelloy - C (PFA)

No	Specification
1	ASTM A494 CW-12MW
2	ASTM A494 CW-12MW
3	ASTM A494 CW-12MW
4	PFA
5	ASTM A193 B8
6	AISI 304
7	ASTM A351 CF8
8	AISI 1045
9	RTFE
10	RTFE
11	AISI 304
12	AISI 304
13	AISI 304
14	AISI 304
15	AISI 304
16	AISI 304
17	AISI 304

- If additional materials are required, please consult the factory when ordering.

Standard Type Dimensions - Class 150

Figure No. 121 - Class 150 / Size 0.5”- 14” / Raised Face Flange



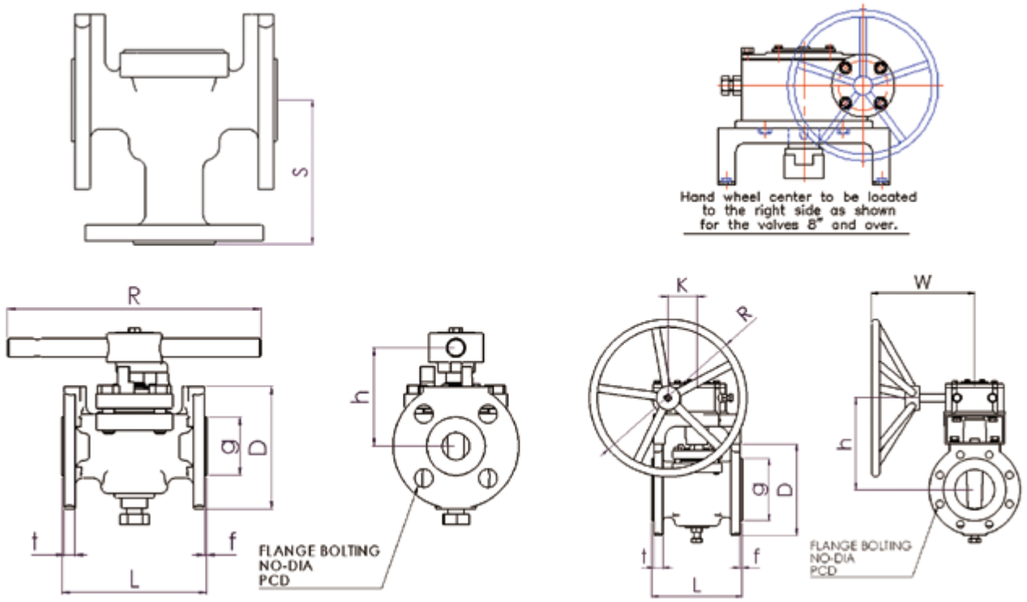
Unit : mm

Size	L	D	PCD	NO	DIA	g	t	* f	h	R	K	W	S (3way)	Weight (kg)
0.5	108	90	60.3	4	16	34.9	8	2.5	115	150	-	-	70	2
0.75	117	100	69.9	4	16	42.9	8.9	2.5	115	150	-	-	73.2	3
1	127	110	79.4	4	16	50.8	9.6	2	90	222	-	-	90	5
1.5	165	125	98.4	4	16	73	12.7	4.6	105	318	-	-	105	9
2	178	150	120.7	4	19	92.1	14.3	2.8	110	458	-	-	114	14
3	203	190	152.4	4	19	*121	17.5	5.6	120	597	-	-	130	20
4	229	230	190.5	8	19	157.2	22.3	5.8	150	746	-	-	156	35
6	267	280	241.3	8	22	216	23.9	3.5	290	400	75	280	191	73
**8	292	345	298.5	8	22	269.9	27	5.9	330	500	95	320	229	133
***10	330	405	362	12	25	323.8	28.6	6.8	400	500	30	320	279	203
***12	356	485	431.8	12	25	381	30.2	4	440	560	45	370	330	287
****14	381	535	476.3	12	29	412.8	33.4	2	510	630	35	440	-	390

- 0.5”~ 4”(Wrench Operated) / 6”~14”(Gear Operated)
* Manufacturing Standard
** 2 top holes in flanges are tapped for 3/4-10UNC (Stud Bolt Length 100mm)
*** 2 top holes in flanges are tapped for 7/8-9UNC (Stud Bolt Length 105mm & 110mm)
**** 2 top holes in flanges are tapped for 1-8UNC (Stud Bolt Length 110mm)
- If additional classes and sizes are required, please consult the factory when ordering.

Standard Type Dimensions - Class 300

Figure No. 321 - Class 300 / Size 0.5” - 8” / Raised Face Flange



Unit : mm

Size	L	D	PCD	NO	DIA	g	t	* f	h	R	K	W	S (3way)	Weight (kg)
0.5	140	95	66.7	4	16	34.9	12.7	2.5	115	150	-	-	73	3
0.75	152	115	82.6	4	19	42.9	14.3	2.5	115	150	-	-	85	3
1	165	125	88.9	4	19	50.8	15.9	2.0	90	222	-	-	95	8
1.5	190	155	114.3	4	22	73	19.1	4.6	105	318	-	-	111	13
2	216	165	127	8	19	92.1	20.7	2.8	110	458	-	-	121	17
3	282	210	168.3	8	22	127	27	5	120	597	-	-	160	29
4	305	255	200	8	22	157.2	30.2	5.8	150	746	-	-	171	46
6	403	320	269.9	12	22	215.9	35	5.8	290	400	75	280	216	104
8	419	380	330.2	12	25	269.9	39.7	5.9	330	500	95	320	270	172

- 0.5”~ 4”(Wrench Operated) / 6”~8”(Gear Operated)
* Manufacturing Standard
- If additional classes and sizes are required, please consult the factory when ordering.

Lined Ball Check Valves

Fully Lined Ball Check Valves

The valve body is fully lined with PFA Teflon material. An RTFE ball and PFA molded disc freely moves internally on the spacer, and it makes valve open and close by flow direction. Backflow makes ball block the port.

3Z Fig 181 Lined Swing Check Valve

Wafer type corrosion-resistant check valve
To be mounted horizontally or vertically with upward flow.
Class 150, 2” – 12”

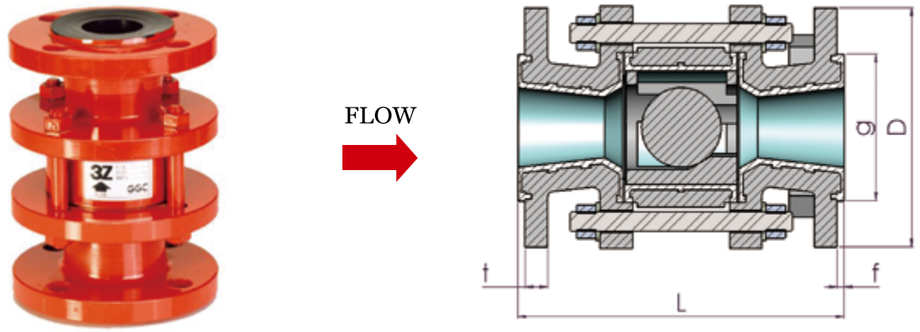


Figure No. 171 - Class 150 / Size 0.5” - 8” / Raised Face Flange

Unit : mm

SIZE	L *	D	PCD	NO	DIA	g	t	f *	Weight (kg)
0.5	152	90	60.3	4	16	35	*12.3	3.2	2
0.75	152	100	69.9	4	16	42.9	* 12.7	3.2	2
1	152	110	79.4	4	16	50.8	* 13.5	3.8	3
1.5	177.8	125	98.4	4	16	73	* 14.3	3.8	5
2	203	150	120.7	4	19	92.1	14.3	4.4	9
3	242	190	152.4	4	19	* 121	17.5	5	14.
4	292	230	190.5	8	19	* 147	22.3	5.3	20.
6	394	280	241.3	8	22	* 206	23.9	5.8	35
8	482	345	298.5	8	22	* 264	* 30.1	6.8	49

* Manufacturing Standard
- If additional classes and sizes are required, please consult the factory when ordering.

Pressure-temperature Ratings

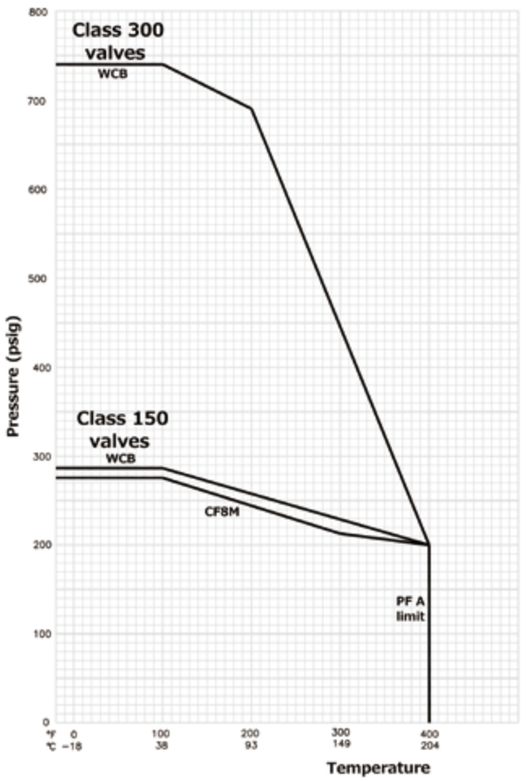
Pressure-temperature Ratings

3Z lined plug valves are in accordance with ASME B16.34 standards, which request pressure-temperature rating for shell material. And according to ASME B16.34 and API 599, seals parts, such as PFA and diaphragms may be used in limited pressures and temperature range.

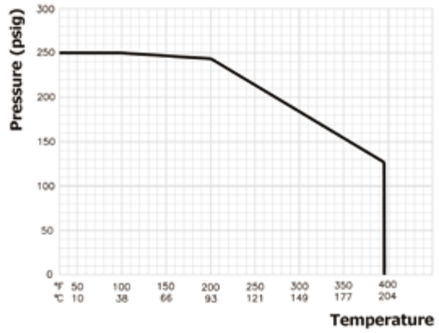
Valve maximum pressure at maximum high temperature

Standard Valves 121/321	Lined piping accessories 171/181
200 psig	130 psig
204°C	204°C

Standard Valves 121/321



Lined Piping Accessories

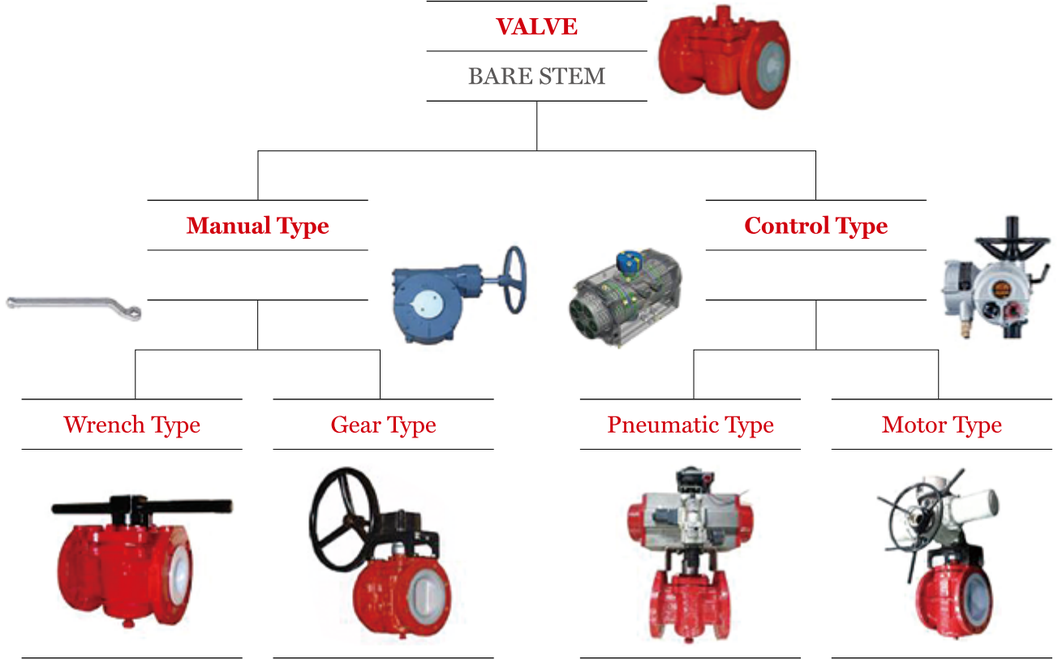


Steam Cold Water Cycling Test

Operator & Technical Data

3Z Operation

3Z lined plug valves are designed to operate by wrench, handle, gear or actuator. 3Z valves can supply variable operators as per customer`s requirements.



Operating Torque (N.M)

Class 150 & 300 / 2-way - Standard Type

Fig	Size	Break	Running	Seating
121 / 321	0.5	23	18	21
121 / 321	0.75	23	18	21
121 / 321	1	54	43	49
121 / 321	1.5	74	60	67
121 / 321	2	125	100	110
121 / 321	3	160	125	140
121 / 321	4	270	215	240
121 / 321	6	650	520	580
121 / 321	8	1,500	1,200	1,300
121	10	2,000	1,600	1,800
121	12	2,800	2,300	2,600
121	14	3,600	2,900	3,200

CV Factor

Class 150 & 300 / 2-way - Standard Type

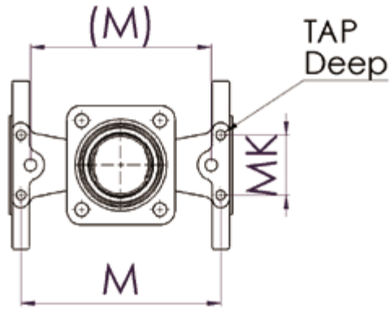
Fig	Size	CV Factor
121 / 321	0.5	10
121 / 321	0.75	10
121 / 321	1	30
121 / 321	1.5	50
121 / 321	2	130
121 / 321	3	220
121 / 321	4	320
121 / 321	6	690
121 / 321	8	1,300
121	10	1,750
121	12	2,400
121	14	2,600

Actuator Mounting Hole Configurations

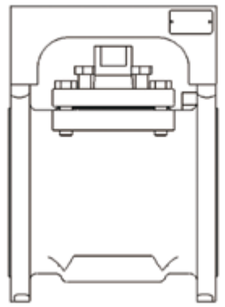
Mounting Hole Dimensions (mm)

Class 150 2-way - Standard

Fig	Size	M	MK	NO	TAP	Deep
121	0.5	92	-	2	M8	12
121	0.75	95.3	-	2	M8	12
121	1	106.5	44.5	4	M6	10
121	1.5	143	44.5	4	M8	12
121	2	157.2	57.2	4	M8	12
121	3	175	88.9	4	M10	14
121	4	200.2	101.6	4	M12	16
121	6	239.8	101.6	4	M12	16
121	8	258.8	152.4	4	M12	16
121	10	293.6	152.4	4	M12	16
121	12	318.3	152.4	4	M16	20
121	14	337	171.4	4	M20	25



2 - 4 Hole Actuator Mounting

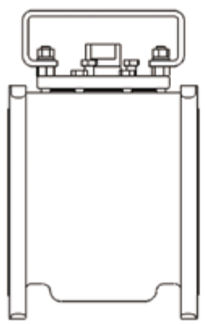


Flange Mounting Type

Mounting Hole Dimensions (mm)

Class 300 2-way - Standard

Fig	Size	M	MK	NO	TAP	Deep
321	0.5	118	-	2	M8	12
321	0.75	128	-	2	M8	12
321	1	140.4	44.5	4	M8	12
321	1.5	162.4	44.5	4	M8	12
321	2	185.3	57.2	4	M8	12
321	3	249	88.9	4	M10	14
321	4	271.5	101.6	4	M12	16
321	6	355.6	101.6	4	M12	16
321	8	371.6	152.4	4	M12	16



Cover Mounting Type

How to Order

FIG

121 Class 150 2-way Lined Valve
321 Class 300 2-way Lined Valve
131 Class 150 3-way Lined Valve
331 Class 300 3-way Lined Valve
121 FB Class 150 2-way Full Bore Lined Valve
321 FB Class 300 2-way Full Bore Lined Valve
171 Class 150 Lined Ball Check Valve
181 Class 150 Lined Swing Check Valve

CODE

ANSI / JIS / DIN

JACKET

FJ Full Jacket
PJ Partial Jacket

BODY

WCB ASTM A216 WCB
CF8M ASTM A351 CF8M
CF8 ASTM A351 CF8
CF3M ASTM A351 CF3M
LCB ASTM A352 LCB

PLUG

WCB ASTM A216 WCB
CF8M ASTM A351 CF8M
CF8 ASTM A351 CF8
LCB ASTM A352 LCB

LONG STEM

L100 Long Stem 100mm
L150 Long Stem 150mm
L2000 Long Stem 2000mm

121 — DIN — AX — FJ — FF — LL — WR — L100 — LD — NACE — WCB — WCB — PFA

PORT

AX / A

END CONNECTION

RF Raised Face
FF Flat Face

OPTION

LL Live Loaded Type

OPERATOR

WR Wrench
GR Worm Gear
BA Bare Stem
CV Pneumatic Control Valve
MOV Motor Operated Valve

LOCKING DEVICE

LD Locking Device

SERVICE

NACE NACE MR0175/0103
VACUUM Vacuum Service
OXYGEN Oxygen Service

SEAT

PFA Original

- If additional information is required, please consult the factory when ordering.