Double Block-and-Bleed Plug Valves



Plug Valves Specialists

www.3zvalve.com

Design Features

Zero Leakage

Selection of valve is very important in the petroleum industry. An incorrect selection of valve may cause a loss of income, pollution of environment, and an increase of maintenance costs. 3Z double block-and-bleed valve was designed to withstand frequent cycling and provide a tight seal shutoff, and used in metering stations, tank farms, marine loading docks, air port and blending plants.





No Abrasion

3Z double block-and-bleed plug valve is designed that the seals do not come into contact with the valve body while operating. The seals come into contact with the body at the last moment of closing. This design eliminates abrasion of the seals and extends seal life without leakage.

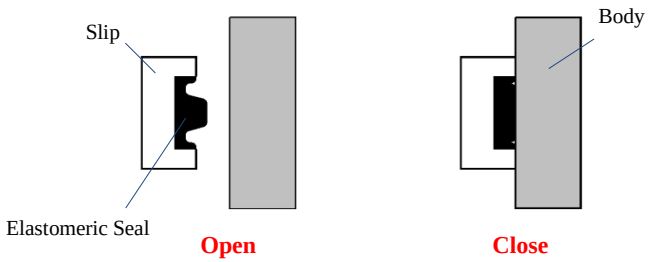




Design Features

High Integrity Shutoff

When the valve is closed, the elastomeric seals on the slips are compressed between the slips and valve body for tight sealing. As for being fire-safe, slips are seated by metal-to-metal with valve body. This results in both an elastomeric and metal-to-metal tight sealing.







In Line Repairability

3Z DBB valve is possible to inspect and replace the sealing slips on the pipe line. Bolted bottom cover can be disassembled to replace the sealing slips on the pipe line.





How the 3Z DBB Plug Valve Works

1. Closing

As the plug down, it force the seating slips outwards, pushing the seals against the body and compressing them within the grooves. With the slips solidly seated against the body, a secondary metal-to metal seat is formed on both sides of each seal, providing double protection.

2. Lifting

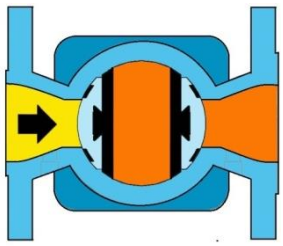
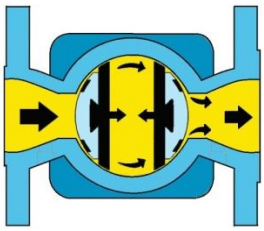
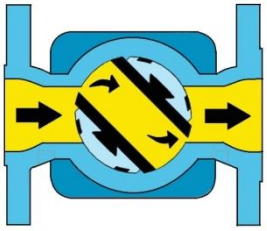
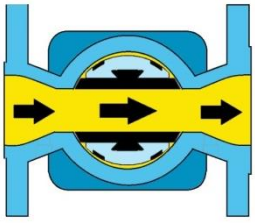
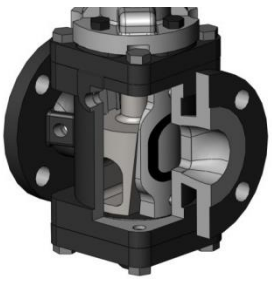
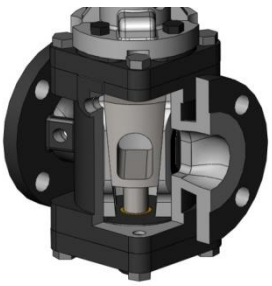
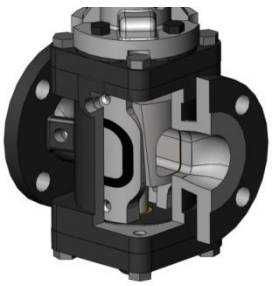
When opening, the plug moves upwards and the slips are pulled away from the body by dove-tail in plug and slip.

3. Rotating

After the slips are pulled away enough from the body, the plug rotate 90 degrees with slip.

4. Opening

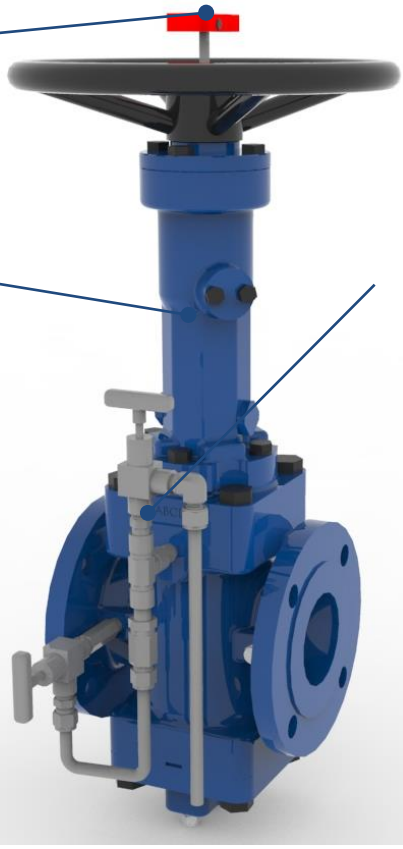
In the full open position, the seals are not contacted with the flow directly. It protects the seals from scraping and rubbing by flow.

			
CLOSE	**LIFTING**	**ROTATING**	**OPEN**
			

Design Features

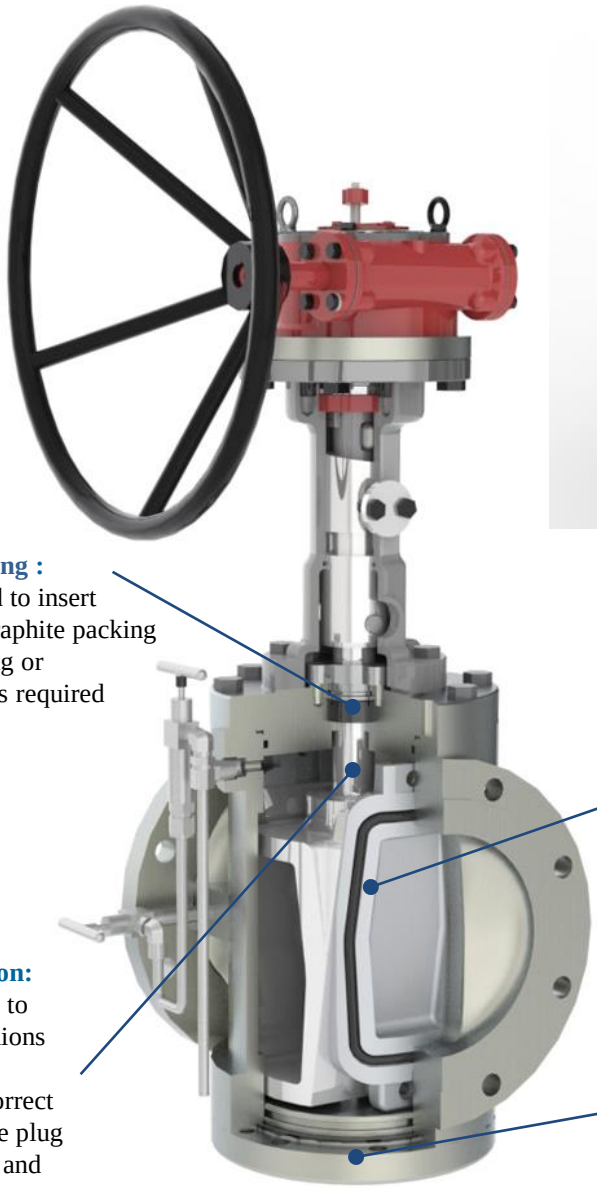
Indicator:
This indicates
the direction of the port

Mechanism:
This is designed for easy opening
and closing.



Bleed System

2” - 4” with hand wheel



Gland & Packing :
This is designed to insert
both fire safe graphite packing
and Viton O-ring or
other customer`s required
material.

Slip & Viton(Teflon) Seal:
The Viton(Teflon) seal within
the slip executes high integrity
shutoff for double block and
bleed valve.

Plug & Trunnion:
This is designed to
insure the trunnions
(upper & lower)
and maintain correct
alignment of the plug
during opening and
closing.

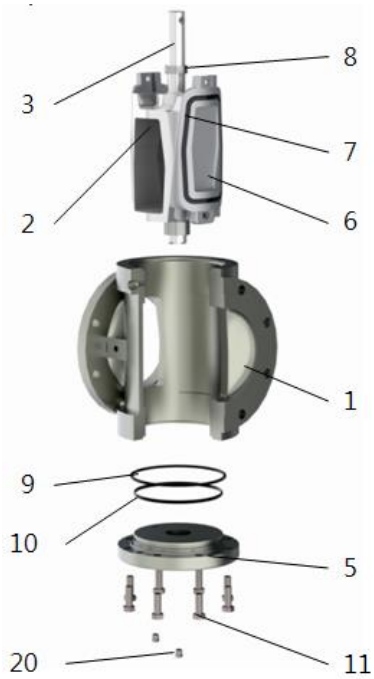
Bottom Cover:
Bolted bottom cover can be
disassembled to replace the sealing
slips on the pipe line

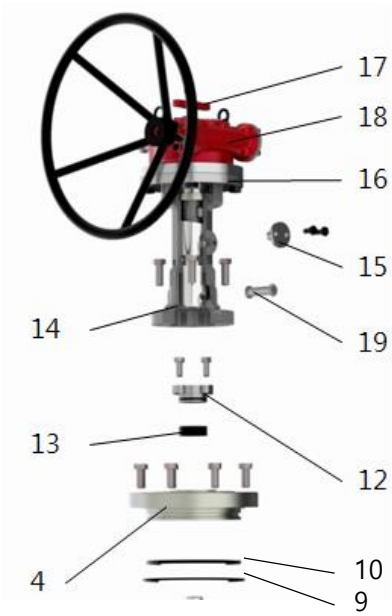
6” - 40” with gear operator

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 (VITON)

No	Parts	Specification
1	Body	A216 WCB + Cr plated
2	Plug	A216 WCB + ENP
3	Stem	17-4PH
4	Top cover	A216 WCB
5	Bottom cover	A216 WCB
6	Slip	A536 65-45-12 + MPC
7	Slip seal	VITON
8	Bushing	A436 Type 2
9	Gasket	(Graphite+316) SWG
10	O-ring	VITON
11	Cover bolt & Nut	A193 B7 & A194 2H
12	Gland	A216 WCB + Zn plated
13	Gland packing	Graphite
14	Housing	A536 65-45-12
15	Guide	A322 4140
16	Housing cover	AISI 1045
17	Indicator	AISI 1020
18	Gear operator	Ductile iron
19	Plug pin	A322 4140
20	Drain plug	AISI 316/316L

316 Stainless (TEFLON)

No	Specification
1	A351 CF8M + Cr plated
2	A351 CF8M + ENP
3	17-4PH
4	A351 CF8M
5	A351 CF8M
6	A439 D-2C + MPC
7	TEFLON(PFA)
8	A436 Type 2
9	(Graphite+316) SWG
10	As per Client`s request
11	A193 B8 & A194 8
12	A351 CF8M
13	Graphite
14	A536 65-45-12
15	A322 4140
16	AISI 1045
17	AISI 1020
18	Ductile iron
19	A322 4140
20	AISI 316/316L

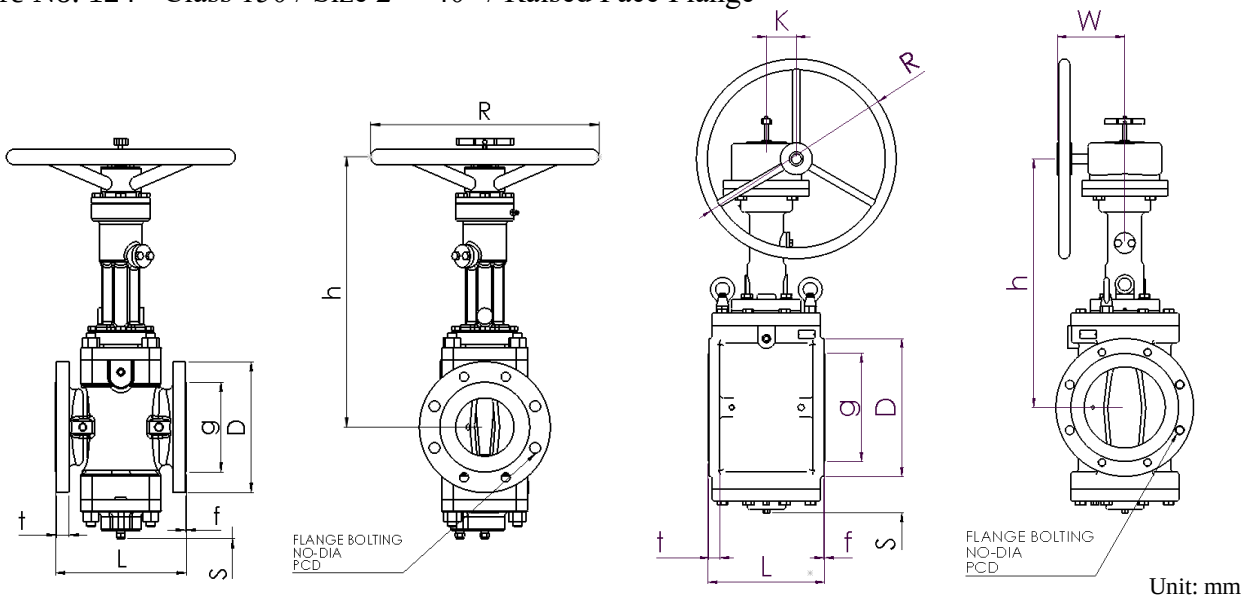
Lower temperature - (NBR)

No	Specification
1	A352 LCB + Cr plated
2	A352 LCB + ENP
3	17-4PH
4	A352 LCB
5	A352 LCB
6	LT-70 + MPC
7	Low Temp. NBR
8	A436 Type 2
9	(Graphite+316) SWG
10	Low Temp. NBR
11	A320 L7 & A194 7
12	A352 LCB + Zn plated
13	Graphite
14	A536 65-45-12
15	A322 4140
16	AISI 1045
17	AISI 1020
18	Ductile iron
19	A322 4140
20	AISI 316/316L

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

Standard Type Dimensions – Class 150

Figure No. 124 - Class 150 / Size 2” - 40” / Raised Face Flange



Unit: mm

Size	L	D	PCD	NO	DIA	g	t	f	h	R	K	W	+ S
2	178	152	120.6	4	19	91.9	14.2	1.5	420	300	-	-	250
3	203	190	152.4	4	19	127	17.5	1.5	440	300	-	-	300
4(1)	229	229	190.5	8	19	157.2	22.4	1.5	470	400	-	-	350
6(2)	267	279	241.3	8	22	215.9	23.9	1.5	485	300	70	230	320
8(2)	292	343	298.4	8	22	269.7	26.9	1.5	600	400	83	260	420
10(3)	330	406	362.0	12	25	323.8	28.4	1.5	710	500	97	294	470
12(3)	356	483	431.8	12	25	381.0	30.2	1.5	750	500	97	294	560
14(4)	381	533	476.2	12	29	412.8	33.3	1.5	830	560	112	324	630
16(4)	406	597	539.8	16	29	469.9	35.1	1.5	905	560	112	324	740
18(5)	432	635	577.8	16	32	533.4	38.1	1.5	1,035	610	112	324	820
20	914	698	635	20	32	584.2	41.1	1.5	1,160	710	32	413	840
22	++980	749	692.2	20	35	641.4	44.4	1.5	1,175	710	153	449	880
24	1,067	813	749.3	20	35	692.2	46.0	1.5	1,215	710	153	449	960
30	++1,270	984	914.4	28	35	857	73.2	1.5	1,400	800	180	479	1,220
36	++1,500	1,168	1,085.8	32	41	1,022	88.9	1.5	1,595	900	180	479	1,350
40	++1,700	1,289	1,200.2	36	41	1,124	88.9	1.5	2,025	900	230	579	1,600

- 2”~ 4”(Handle Operated) / 6”~40”(Gear Operated)

\+ Minimum Clearance for installation, repair and replacement

++ Manufacturing Standard

(1) 2 top and bottom holes in flanges are tapped for 5/8-11UNC

(2) 2 top and bottom holes in flanges are tapped for 3/4-10UNC

(3) 2 top and bottom holes in flanges are tapped for 7/8-9UNC

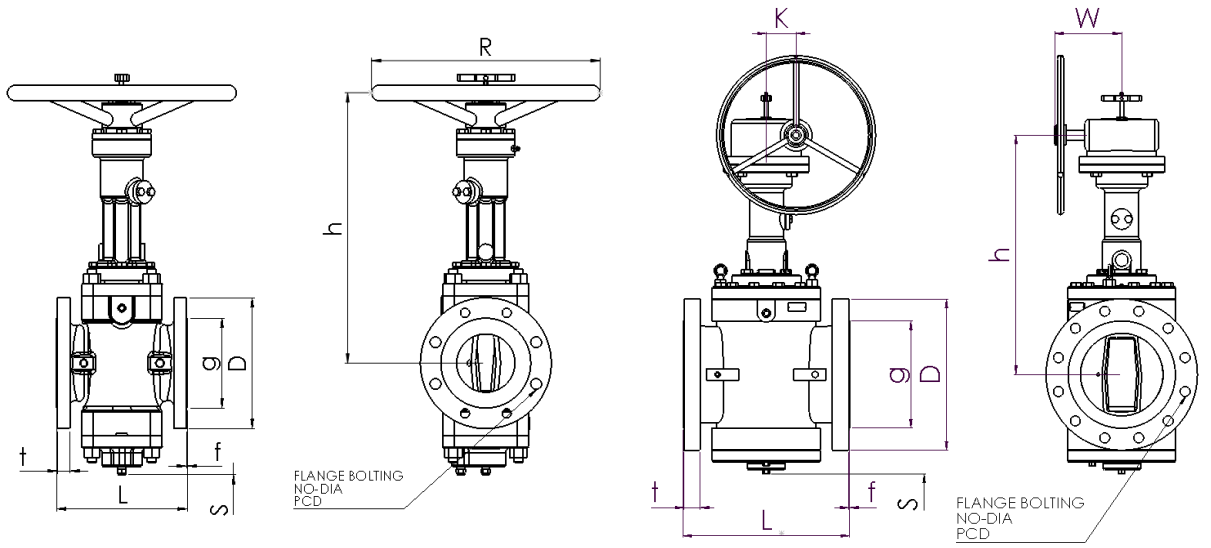
(4) 14” 2 top and bottom holes / 16” 4 Top and bottom holes in flanges are tapped for 1-8UNC

(5) 4 top and bottom holes in flanges are tapped for 1.1/8-8UN

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

Standard Type Dimensions – Class 300

Figure No. 324 - Class 300 / Size 2” - 30” / Raised Face Flange



Unit: mm

Size	L	D	PCD	NO	DIA	g	t	f	h	R	K	W	+ S
2	216	165	127.0	8	19	91.9	20.6	1.5	410	300	-	-	200
3	282	210	168.1	8	22	127.0	26.9	1.5	420	300	-	-	220
4	305	254	200.2	8	22	157.2	30.2	1.5	450	400	-	-	250
6	403	318	269.7	12	22	215.9	35.1	1.5	485	300	70	230	320
8	419	381	330.2	12	25	269.7	39.6	1.5	600	400	83	260	420
*10	457	444	387.4	16	29	323.8	46.0	1.5	710	500	97	294	470
**12	502	521	450.8	16	32	381.0	49.3	1.5	805	560	112	324	560
14	762	584	514.4	20	32	412.8	52.3	1.5	925	610	43	349	630
16	838	648	571.5	20	35	469.9	55.6	1.5	1,090	710	32	413	700
18	914	711	628.6	24	35	533.4	58.7	1.5	1,200	710	153	370	800
20	991	775	685.8	24	35	584.2	62.0	1.5	1,265	800	59	443	950
24	1,143	914	812.8	24	41	692.2	68.3	1.5	1,410	800	180	479	1,050
28	1,346	1,035	939.8	28	45	800	84.3	1.5	1,560	800	230	579	1,200
30	1,397	1,092	997.0	28	48	857	90.7	1.5	1,720	900	281	634	1,350

- 2”~ 4”(Handle Operated) / 6”~30”(Gear Operated)

\+ Minimum Clearance for installation, repair and replacement

++ Manufacturing Standard

* 2 top and bottom holes in flanges are tapped for 1-8UNC

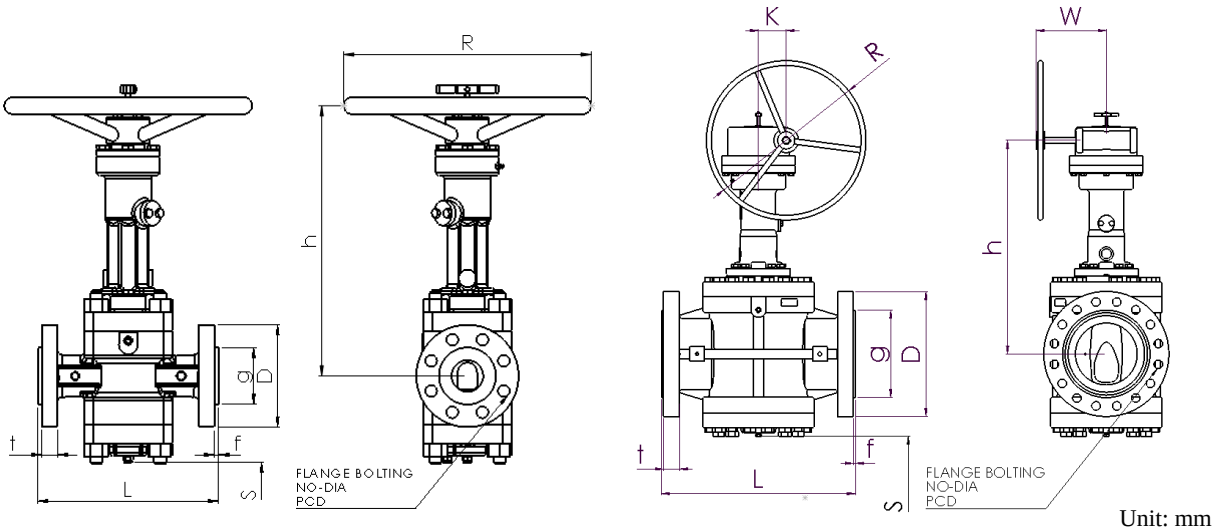
** 2 top and bottom holes in flanges are tapped for 1.1/8-8UN

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

Standard Type Dimensions – Class 600/900

Figure No. 624 - Class 600 / Size 2” - 24”/ Raised Face Flange

Figure No. 924 - Class 900 / Size 4” - 12”/ Raised Face Flange



Unit: mm

Class	Size	L	D	PCD	NO	DIA	g	t	f	h	R	K	W	+ S
600	2	292	165	127.0	8	19	91.9	25.4	6.4	435	400	-	-	220
	3	356	210	168.1	8	22	127.0	31.8	6.4	440	400	-	-	240
	4	432	273	215.9	8	25	157.2	38.1	6.4	460	300	70	230	260
	6	559	356	292.1	12	29	215.9	47.8	6.4	685	500	97	294	400
	8	660	419	349.2	12	32	269.7	55.6	6.4	775	560	112	324	470
	10	787	508	431.8	16	35	323.8	63.5	6.4	865	610	43	349	550
	12	838	559	489.0	20	35	381.0	66.5	6.4	1,050	710	32	413	620
	14	889	603	527	20	38	421.8	69.8	6.4	1,100	710	153	449	700
	16	991	686	603.2	20	41	469.9	76.2	6.4	1,180	800	180	479	760
	18	1,092	743	654	20	45	533.4	82.6	6.4	1,335	800	59	443	880
	*20	1,194	813	723.9	24	45	584.2	88.9	6.4	1,400	800	202	499	900
	24	1,397	940	838.2	24	51	692.2	101.6	6.4	1,500	900	230	579	1,050
900	4	457	292	235	8	32	157.2	44.5	6.4	535	400	83	260	290
	6	610	381	317.5	12	32	215.9	55.6	6.4	745	560	112	324	480
	8	737	470	393.7	12	38	269.7	63.5	6.4	835	610	43	349	560
	10	838	546	469.9	16	38	323.8	69.8	6.4	1,020	710	32	413	640
	12	965	610	533.4	20	38	381.0	79.2	6.4	1,170	800	59	443	790

- 2”~ 3”(Handle Operated) / 4”~24”(Gear Operated)

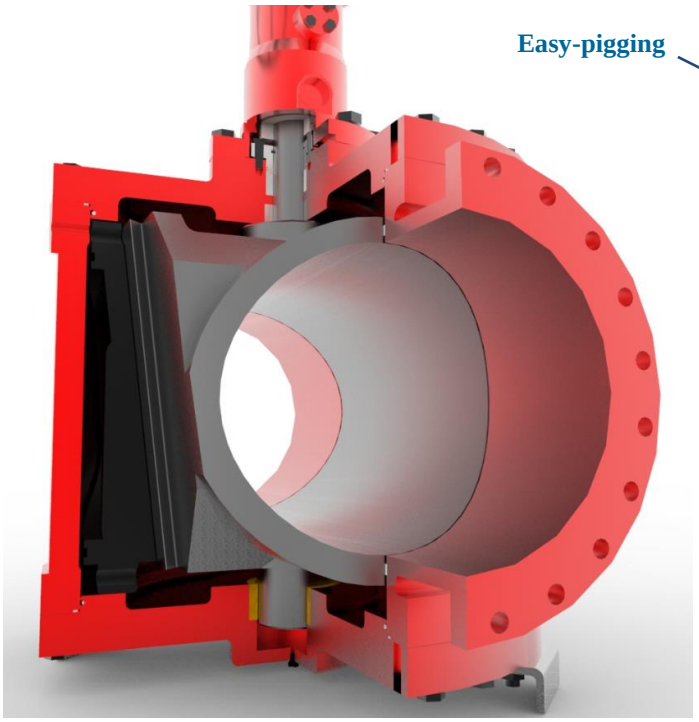
+ Minimum Clearance for installation, repair and replacement

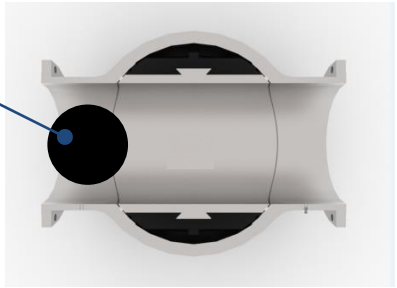
- If additional classes and sizes are required, please consult the factory when ordering.

- * Port type : Reduced Round Port

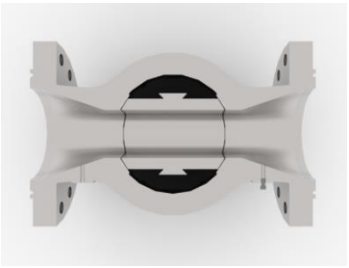
Full Port DBB Plug Valves

Feature: There is no diminished flow with the full bore port, and also easy to pigging. For application such as high viscosity condensable media, high efficiency is demonstrated with full bore port.





100% Full bore



50~70% Reduced bore

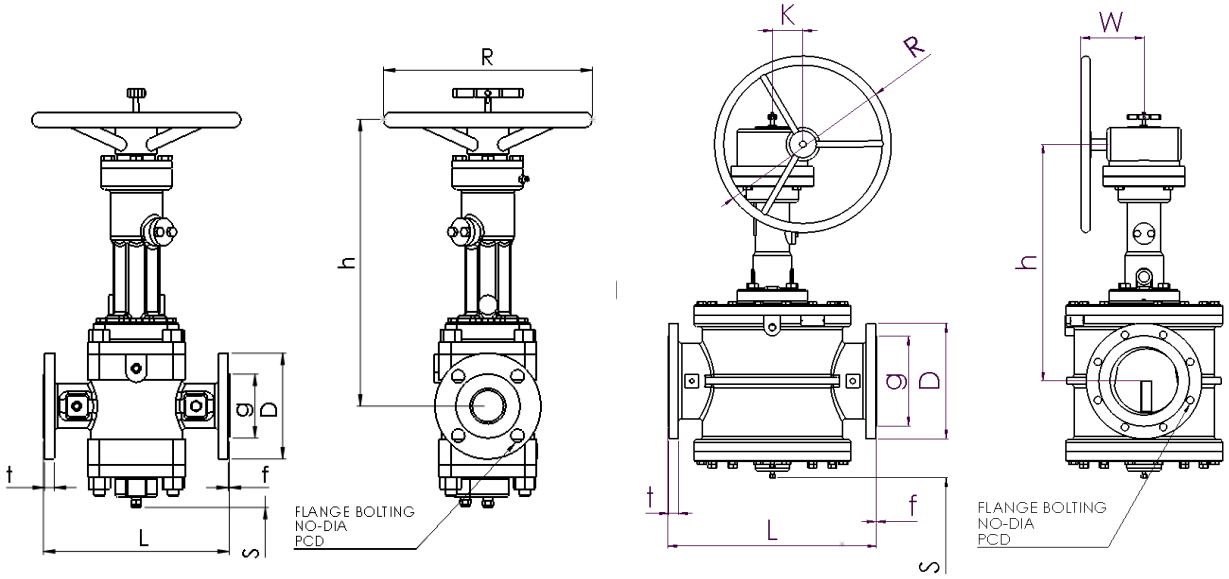
3Z double block-and-bleed full bore valves are designed to meet the requirement to minimize pressure drop in oil and gas transmission, loading, unloading, and especially metering skid.





Full Port Type Dimensions – Class 150

Figure No. 124 FB - Class 150 / Size 2” - 24” / Raised Face Flange



Unit: mm

Size	L	D	PCD	NO	DIA	g	t	f	h	R	K	W	+ S
2	267	152	120.6	4	19	91.9	14.2	1.5	410	300	-	-	190
3	343	190	152.4	4	19	127.0	17.5	1.5	445	300	70	230	230
4	432	229	190.5	8	19	157.2	22.4	1.5	460	300	70	230	280
6	*533	279	241.3	8	22	215.9	23.9	1.5	575	400	83	260	350
8	622	343	298.4	8	22	269.7	26.9	1.5	700	500	97	294	460
10	660	406	362.0	12	25	323.8	28.4	1.5	780	560	112	324	520
12	762	483	431.8	12	25	381.0	30.2	1.5	820	560	112	324	680
14	*864	533	476.2	12	29	412.8	33.3	1.5	910	610	112	324	710
16	*889	597	539.8	16	29	469.9	35.1	1.5	1,115	710	32	413	740
18	*1,219	635	577.8	16	32	533.4	38.1	1.5	1,150	710	32	413	880
20	*1,219	698	635.0	20	32	584.2	41.1	1.5	1,245	800	59	443	940
24	*1,524	813	749.3	20	35	692.2	46.0	1.5	1,325	800	180	479	1,020

- 2”(Handle Operated) / 3”~24”(Gear Operated)

\+ Minimum Clearance for installation, repair and replacement

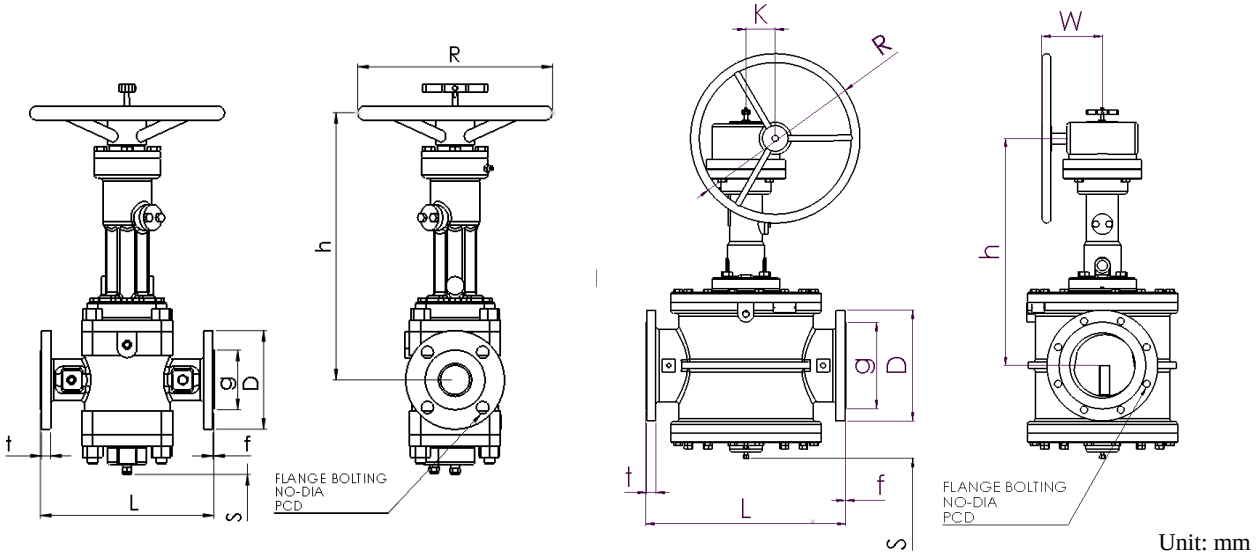
* Manufacturing Standard

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

Full Port Type Dimensions – Class 300/600

Figure No. 324 FB - Class 300 / Size 2” - 24”/ Raised Face Flange

Figure No. 624 FB - Class 600 / Size 2” - 20”/ Raised Face Flange



Unit: mm

Class	Size	L	D	PCD	NO	DIA	g	T	f	h	R	K	W	+ S
300	2	282	165	127.0	8	19	91.9	20.6	1.5	350	300	-	-	190
	3	387	210	168.1	8	22	127.0	26.9	1.5	445	300	70	230	230
	4	457	254	200.2	8	22	157.2	30.2	1.5	490	300	70	230	320
	6	559	318	269.7	12	22	215.9	35.1	1.5	610	400	83	260	410
	8	686	381	330.2	12	25	269.7	39.6	1.5	715	500	97	294	500
	10	826	444	387.4	16	29	323.8	46.0	1.5	780	560	112	324	540
	12	965	521	450.8	16	32	381.0	49.3	1.5	940	610	32	413	680
	14	*864	584	514.4	20	32	412.8	52.3	1.5	1080	710	32	413	710
	16	*1,042	648	571.5	20	35	469.9	55.6	1.5	1,190	710	59	443	740
	18	*1,219	711	628.6	24	35	533.4	58.7	1.5	1,290	800	180	400	900
	20	*1,219	775	685.8	24	35	584.2	62.0	1.5	1,390	800	180	479	1,170
	24	*1,524	914	812.8	24	41	692.2	68.3	1.5	1,420	900	230	579	1,350
600	2	330	165	127.0	8	19	91.9	25.4	6.4	430	300	70	230	230
	3	444	210	168.1	8	22	127.0	31.8	6.4	480	300	70	230	300
	4	508	273	215.9	8	25	157.2	38.1	6.4	570	400	83	260	340
	6	660	356	292.1	12	29	215.9	47.8	6.4	755	560	112	324	435
	8	794	419	349.2	12	32	269.7	55.6	6.4	850	610	43	349	515
	10	940	508	431.8	16	35	323.8	63.5	6.4	1050	710	32	413	640
	12	1,067	559	489.0	20	35	381.0	66.5	6.4	1,140	800	59	443	700
	16	*1,200	686	603.2	20	41	469.9	76.2	6.4	1,400	800	202	499	760
	20	*1,500	813	723.9	24	45	584.2	88.9	6.4	1,580	1,000	230	579	900

- 2”(Handle Operated) / 3”~24”(Gear Operated)

\+ Minimum Clearance for installation, repair and replacement

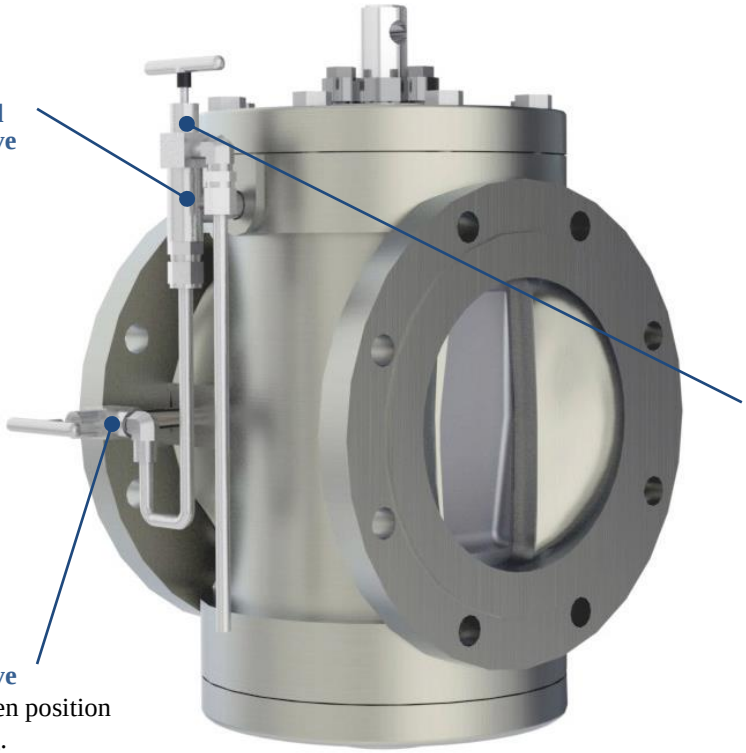
* Manufacturing Standard

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

Bleeding System

The bleeding system is designed to relieve any excess rise of pressure in the body cavity, due to thermal expansion of the liquid when the valve is closed. The relief valve is set to open at 25 psi or above and bleeds excess pressure to the upstream side.

Note : The system performs a function when the valve is closed and the isolation valve is opened



Automatic Body Bleed Valve to Atmosphere or Upstream

(Customer Option)

The check valve is automatically operated by the device that installed on mechanism during the valve is closing.

This system removes human intervention and incorporates a complete automatic system.



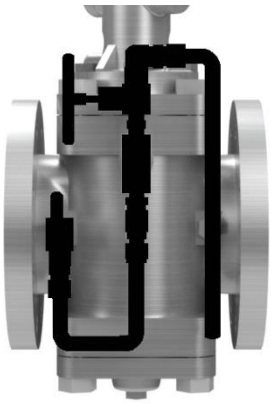
Bleeding System Options



Manual Bleed Valve
The simplest structure in bleed system. When the valve is closed, line leakage can be checked by bleed valve.



Thermal Relief to Body
When the valve is closed, the thermal relief valve releases thermal expansion inside the body to the line.



Manual Bleed Valve with Thermal Relief
When the valve is closed, line leakage can be checked by bleed valve. And thermal relief valve releases thermal expansion inside the body to the line.



Thermal Relief Valve with Gauge
A thermal relief valve releases thermal expansion inside the body to the line. It is combined with a gauge to check the pressure inside body.



Automatic Body Bleed Valve
The check valve is automatically operated by the device that installed on mechanism during the valve is closing. This system removes human intervention and incorporates a complete automatic system.



Manual Bleed Valve with Gauge
A manual bleed valve is combined with a gauge. When the valve is closed, line leakage and pressure inside the body can be checked by bleed valve and gauge.

Operators

3Z Operation: 3Z double block-and-bleed plug valves are designed to operate by hand wheel, gear or actuator. 3Z valves can supply variable operators as per customer`s requirements.





Long Stem with Pneumatic Operator:
3Z DBB valve with long stem and pneumatic operator has been installed in loading arm of LNG terminal, in the Middle East. The 3Z special long stem is available as per customer`s requirement.



Limit Switch :
3Z DBB valves are available in all types including proximity and mechanical switch types, etc depending on customer requirements..



Technical Data

Approx CV Factor (GPM)

Class 150 - 900

2-way Standard Type, Full Bore Type, 4-way - Diverter Type

Class	150	300	600	900	150	300	600	150	300	600	900
Fig / Size	124	324	624	924	124 FB	324 FB	624 FB	144	344	644	944
2	200	200	280	-	525	525	525	-	-	-	-
3	260	220	300	-	1,100	1,100	1,100	-	-	-	400
4	620	600	500	500	2,100	2,100	2,000	600	600	600	600
6	1,100	1,200	1,300	1,300	5,000	5,000	4,900	1,200	1,200	1,200	1,200
8	2,500	2,000	2,100	2,500	9,300	9,700	9,600	2,200	2,200	2,200	2,200
10	3,700	3,100	3,300	3,300	14,600	14,600	14,000	4,200	4,200	4,200	4,200
12	4,200	3,700	4,800	5,000	21,500	21,500	21,000	5,100	5,100	5,100	-
14	5,600	5,000	6,000	-	28,000	28,000	-	-	-	-	-
16	7,000	8,300	7,400	-	35,000	35,000	34,000	8,800	8,800	8,800	-
18	7,000	10,000	10,000	-	47,000	47,000	-	-	-	-	-
20	15,900	13,000	18,000	-	59,000	59,000	58,000	14,000	14,000	-	-
22	19,000	-	-	-	-	-	-	-	-	-	-
24	23,000	18,000	-	-	85,000	85,000	-	-	-	-	-
28	-	29,000	-	-	-	-	-	-	-	-	-
30	37,000	33,000	-	-	-	-	-	-	-	-	-
36	53,000	-	-	-	-	-	-	-	-	-	-
40	65,600	-	-	-	-	-	-	-	-	-	-

Approx Weight (kg)

Class 150 - 900

2-way - Standard Type, Full Bore Type, 4-way - Diverter Type

Class	150	300	600	900	150	300	600	150	300	600	900
Fig / Size	124	324	624	924	124 FB	324 FB	624 FB	144	344	644	944
2	30	35	50	-	40	50	80	-	-	-	-
3	40	50	60	-	90	100	145	-	-	-	650
4	55	65	130	170	125	170	235	350	360	535	680
6	120	150	355	570	255	345	550	555	580	750	850
8	195	240	575	770	485	655	935	1,130	1,150	1,420	1,700
10	285	350	900	1,270	720	910	1,740	1,660	1,700	2,310	2,100
12	405	530	1,260	2,520	920	1,740	2,580	1,750	1,790	2,420	-
14	585	960	1,750	-	1,460	2,500	-	-	-	-	-
16	680	1,350	2,320	-	2,090	2,910	4,540	2,900	2,990	3,970	-
18	875	1,800	3,260	-	3,330	4,210	-	-	-	-	-
20	1,810	2,450	4,720	-	4,080	4,820	7,680	5,050	5,220	-	-
22	1,980	-	-	-	-	-	-	-	-	-	-
24	2,310	3,640	7,900	-	5,360	8,220	-	-	-	-	-
28	-	5,900	-	-	-	-	-	-	-	-	-
30	4,500	8,800	-	-	-	-	-	-	-	-	-
36	7,200	-	-	-	-	-	-	-	-	-	-
40	11,300	-	-	-	-	-	-	-	-	-	-

How to Order

FIG

124: Class 150 2-way Double block-&-bleed valve
324: Class 300 2-way Double block-&-bleed valve
624: Class 600 2-way Double block-&-bleed valve
924: Class 900 2-way Double block-&-bleed valve
144: Class 150 4-way Diverter valve
344: Class 300 4-way Diverter valve
644: Class 600 4-way Diverter valve
944: Class 900 4-way Diverter valve
124 FB: Class 150 2-way Full bore DBB valve
324 FB: Class 300 2-way Full bore DBB valve
624 FB: Class 600 2-way Full bore DBB valve

CODE

ANSI / JIS / DIN

BLEED OPTION

DTR + UP/S
DTR + DOWN/S
MANUAL
DTR + UP/S + GAUGE
DTR + DOWN/S + GAUGE
ABBV
FLANGE
4-WAY

LONG STEM

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

BODY

WCB: A216 WCB + Cr plated
WCC: A216 WCC + Cr plated
CF8 A351 CF8 + Cr plated
CF3M: A351 CF3M + Cr plated
LCB: A352 LCB + Cr plated

SLIP

DI: A536 Gr 65-45-12 + MPC
D2: A439 D2 + MPC

124 - DIN - RTJ - ABBV - WR – L100 - LD - NACE - WCB – CF8M – DI - VITON

END CONNECTION

RF: Raised Face
RTJ: Ring Type Joint

OPERATOR

WR: Wrench
GR: Worm Gear
BA: Bare Stem
AOV: Air Operated Valve
MOV: Motor Operated Valve

LOCKING DEVICE

LD: Locking Device

SERVICE

NACE: NACE MR0175/0103

PLUG

WCB: A216 WCB + ENP
WCC: A216 WCC + ENP
CF8: A351 CF8 + ENP
CF3M: A351 CF3M + ENP
LCB: A352 LCB + ENP

SEAT

VITON
TEFLON(PFA)
NBR
HNBR
LOW TEMPERATURE NBR

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



#1 Plant (3Z Manufacturing & Assembly) :
254, Sihwa Venture-Ro, Siheung-City, Gyeonggi-Do, Korea

#2 Plant (3Z Foundry) :
117, Hwanggeum 2-ro, Yangchon-eup Gimpo-city in Gyeonggi-Do, Korea

Sales Office
Tel : +82.31.8084.1600
Fax : +82.31.499.9119
Homepage : www.3zvalve.com

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