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.

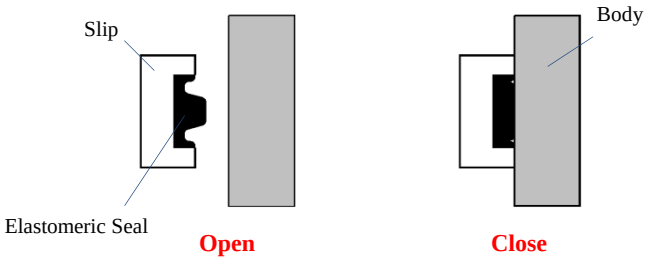
No Abrasion

3Z double block-and-bleed 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

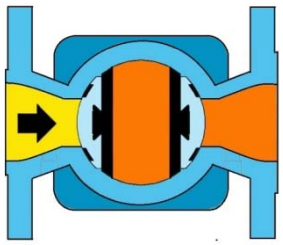
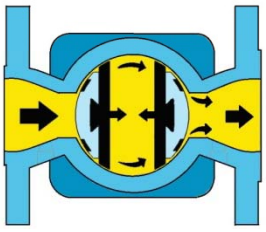
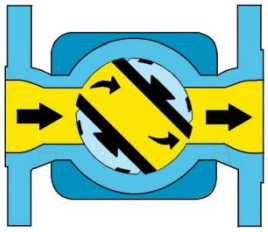
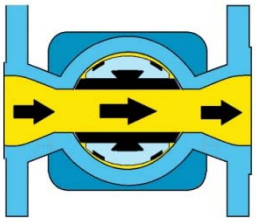
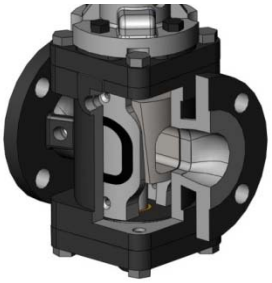
When opening, the plug moves upwards and the slips are pulled away from the body by dove-tail in plug and slip.

3. Rotating

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

4. Opening

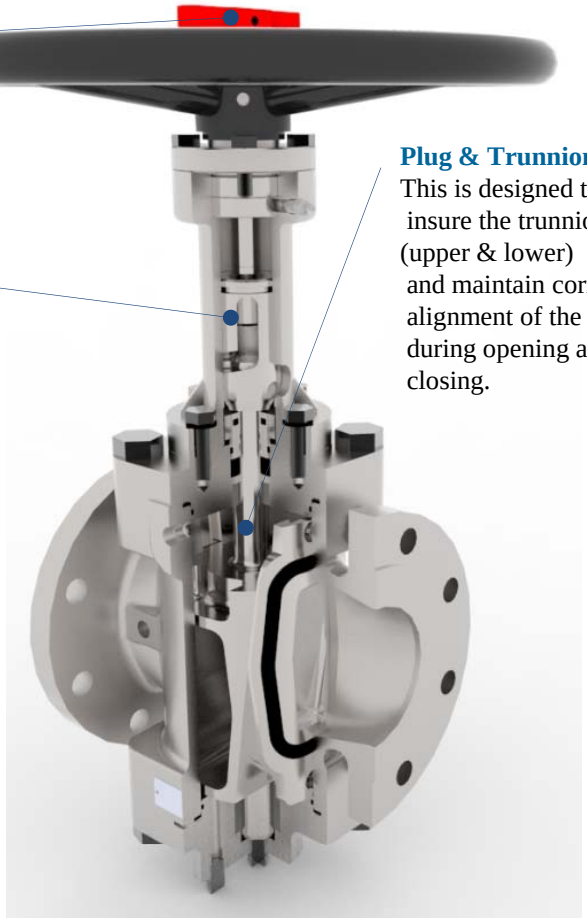
In the full open position, the seals are not contacted with the flow directly. It protects the seals from scraping and rubbing by flow.

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

Design Features

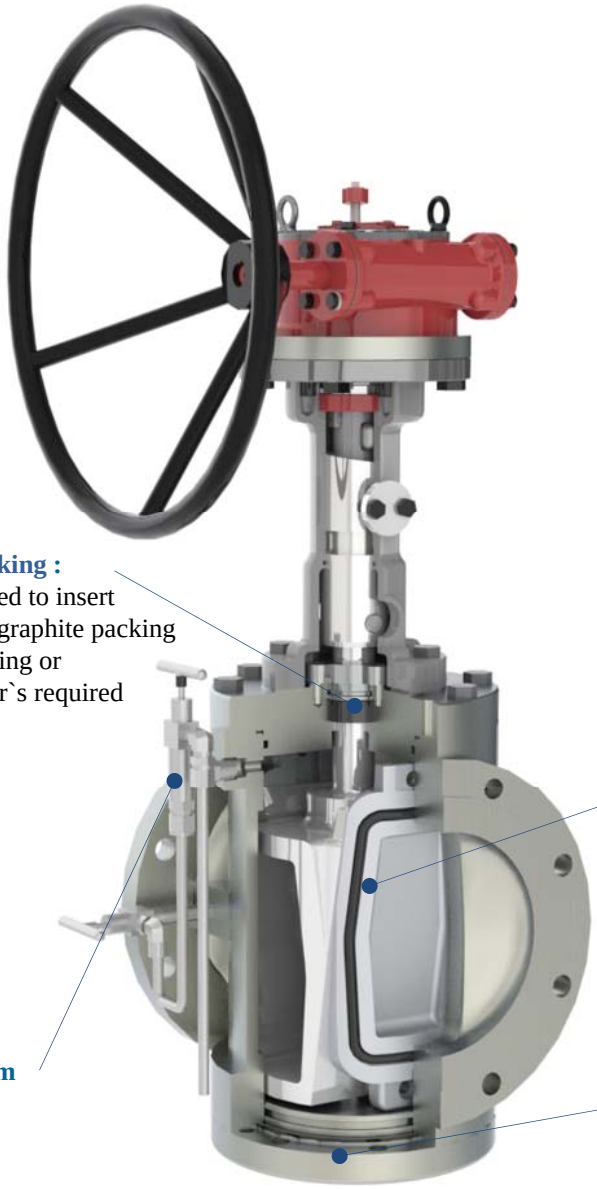
Indicator:
This indicates the direction of the port

Mechanism:
This is designed for easy opening and closing.



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

2” - 4” with S-type Mechanism



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.

Bleed System

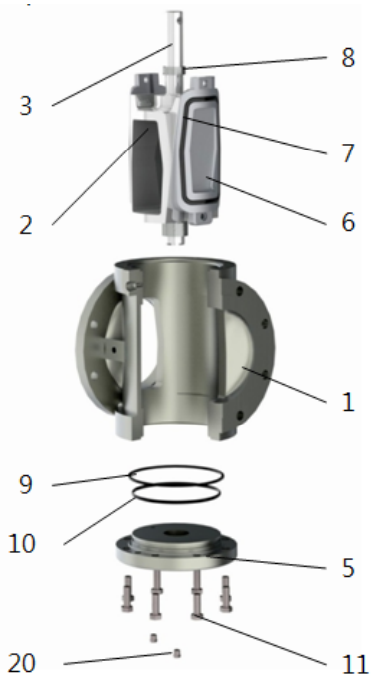
Bottom Cover:
Bolted bottom cover can be disassembled to replace the sealing slips on the pipe line

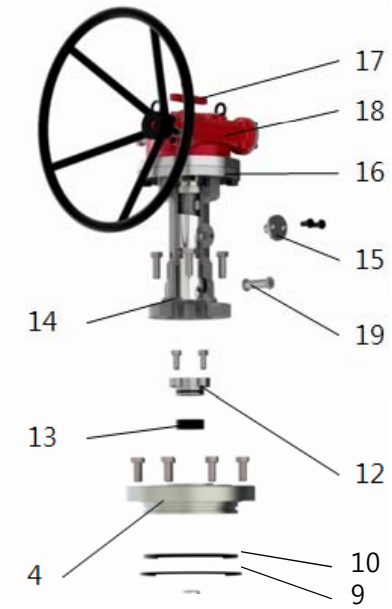
6” - 40” with K-type Mechanism

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	A193 B7
12	Gland	A216 WCB + Zn plated
13	Gland packing	Graphite
14	Housing	A216 WCB
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
7	TEFLON(PFA)
8	A436 Type 2
9	(Graphite+316) SWG
10	As per Client`s request
11	A193 B8
12	A351 CF8M
13	Graphite
14	A216 WCB
15	A322 4140
16	AISI 1045
17	AISI 1020
18	Ductile iron
19	A322 4140
20	AISI 316/316L

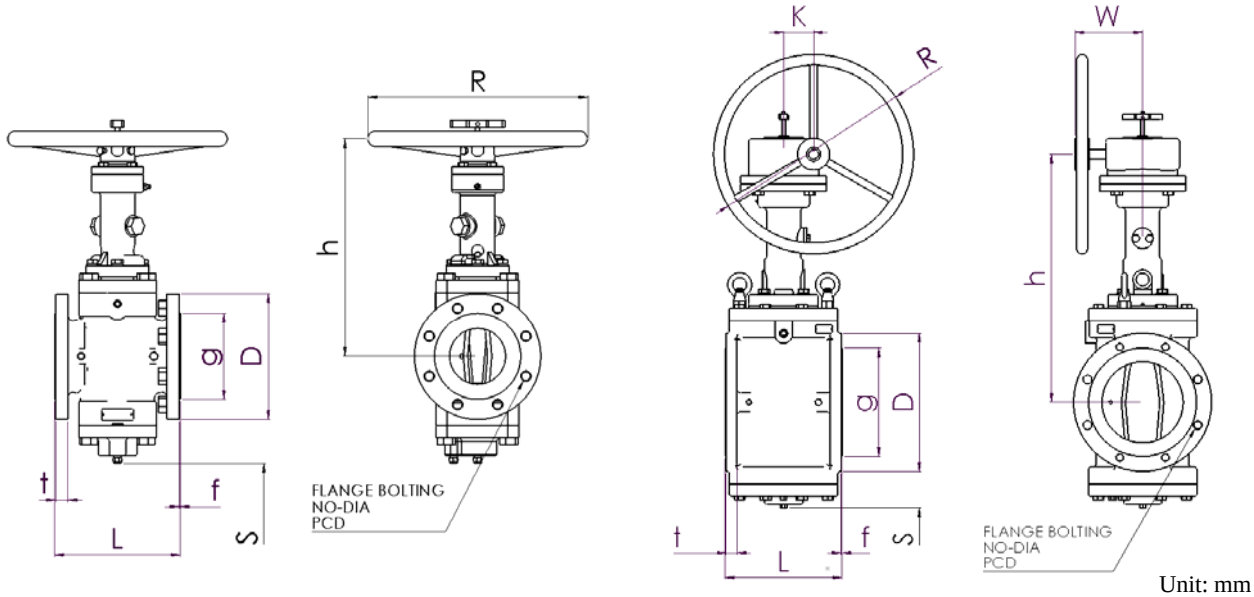
Lower temperature - (NBR)

No	Specification
1	A352 LCB + Cr plated
2	A352 LCB + ENP
3	17-4PH
4	A352 LCB
5	A352 LCB
6	LT-70
7	Low Temp. NBR
8	A436 Type 2
9	(Graphite+316) SWG
10	Low Temp. NBR
11	A320 L7
12	A216 LCB + Zn plated
13	Graphite
14	A216 WCB
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	150	120.7	4	19	92.1	14.3	2	360	300	-	-	250
3	203	190	152.4	4	19	127	17.5	2	380	300	-	-	300
4	229	230	190.5	8	19	157.2	22.3	2	400	400	-	-	350
*6	267	280	241.3	8	22	215.9	23.9	2	500	300	70	230	320
*8	292	345	298.5	8	22	269.9	27.0	2	600	400	83	260	420
**10	330	405	362.0	12	25	323.8	28.6	2	720	500	97	294	470
**12	356	485	431.8	12	25	381.0	30.2	2	760	500	97	294	560
***14	381	535	476.3	12	29	412.8	33.4	2	830	560	112	324	630
***16	406	595	539.8	16	29	469.9	35.0	2	910	560	112	324	740
****18	432	635	577.9	16	32	533.4	38.1	2	1,040	630	112	324	820
20	914	700	635	20	32	584.2	41.3	2	1,170	710	32	413	840
22	++980	750	692.2	20	35	641.4	44.5	2	1,190	710	153	449	880
24	1,067	815	749.3	20	35	692.2	46.1	2	1,230	710	153	449	960
30	++1,270	985	914.4	28	35	857	73.1	2	1,410	800	180	479	1,220
36	++1,500	1,170	1,085.8	32	41	1,022	88.9	2	1,610	900	180	479	1,350
40	++1,700	1,290	1,200.2	36	41	1,124	88.9	2	2,040	900	230	579	1,600

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

\+ Minimum Clearance for installation, repair and replacement

++ Manufacturing Standard

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

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

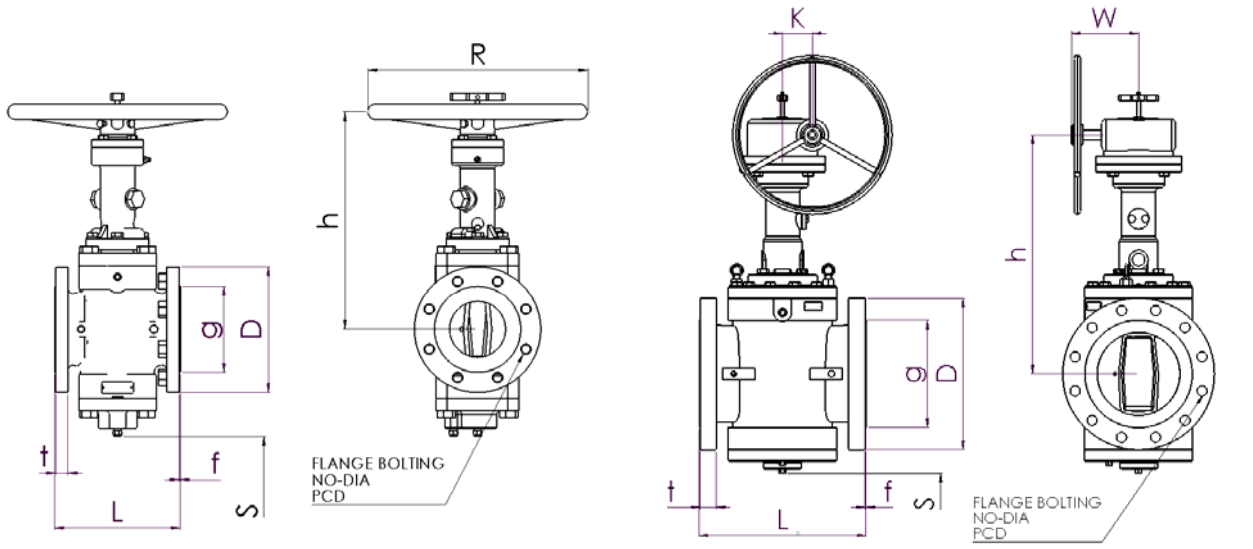
*** 14” 2 top and bottom holes / 16” 4 Top and bottom holes in flanges are tapped for 1-8UNC

**** 4 top and bottom holes in flanges are tapped for 1.1/8-8UNC

- 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	92.1	20.7	2	350	300	-	-	200
3	282	210	168.3	8	22	127.0	27.0	2	360	300	-	-	220
4	305	255	200.0	8	22	157.2	30.2	2	380	400	-	-	250
6	403	320	269.9	12	22	215.9	35.0	2	500	300	70	230	320
8	419	380	330.2	12	25	269.9	39.7	2	600	400	83	260	420
*10	457	445	387.4	16	29	323.8	46.1	2	720	500	97	294	470
**12	502	520	450.8	16	32	381.0	49.3	2	810	560	112	324	560
14	762	585	514.4	20	32	412.8	52.4	2	930	630	112	373	630
16	838	650	571.5	20	35	469.9	55.6	2	1,100	710	153	370	700
18	914	710	628.6	24	35	533.4	58.8	2	1,200	710	153	370	800
20	991	775	685.8	24	35	584.2	62.0	2	1,310	800	180	479	870
24	1,143	915	812.8	24	41	692.2	68.3	2	1,420	800	180	479	1,050
28	1,346	1,035	939.8	28	45	800	84.2	2	1,560	800	230	579	1,200
30	1,397	1,090	997.0	28	48	857	90.5	2	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

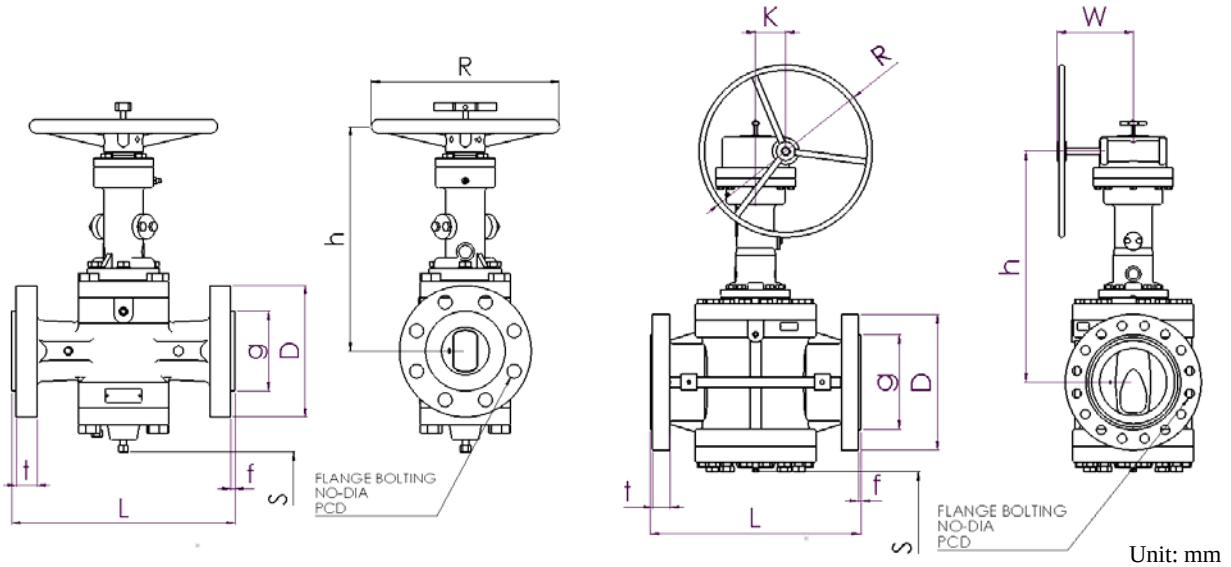
** 2 top and bottom holes in flanges are tapped for 1.1/8-8UNC

- 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	92.1	25.4	7	350	400	-	-	220
	3	356	210	168.3	8	22	127.0	31.8	7	370	400	-	-	240
	4	432	275	215.9	8	25	157.2	38.1	7	460	300	70	230	260
	6	559	355	292.1	12	29	215.9	47.7	7	700	500	97	294	400
	8	660	420	349.2	12	32	269.9	55.6	7	780	560	112	324	470
	10	787	510	431.8	16	35	323.8	63.5	7	870	630	112	324	550
	12	838	560	489.0	20	35	381.0	66.7	7	1,070	710	153	370	620
	16	991	685	603.2	20	41	469.9	76.2	7	1,190	800	59	443	760
	20	1,194	815	723.9	24	45	584.2	88.9	7	1,300	800	180	479	900
	24	1,397	940	838.2	24	51	692.2	101.6	7	1,500	900	230	579	1,050
900	4	457	290	235	8	32	157.2	44.5	7	540	400	83	260	290
	6	610	380	317.5	12	32	215.9	55.6	7	750	560	112	324	480
	8	737	470	393.7	12	38	269.9	63.5	7	840	630	43	349	560
	10	838	545	469.9	16	38	323.8	69.9	7	1,030	710	32	413	640
	12	965	610	533.4	20	38	381.0	79.4	7	1,180	800	59	443	790

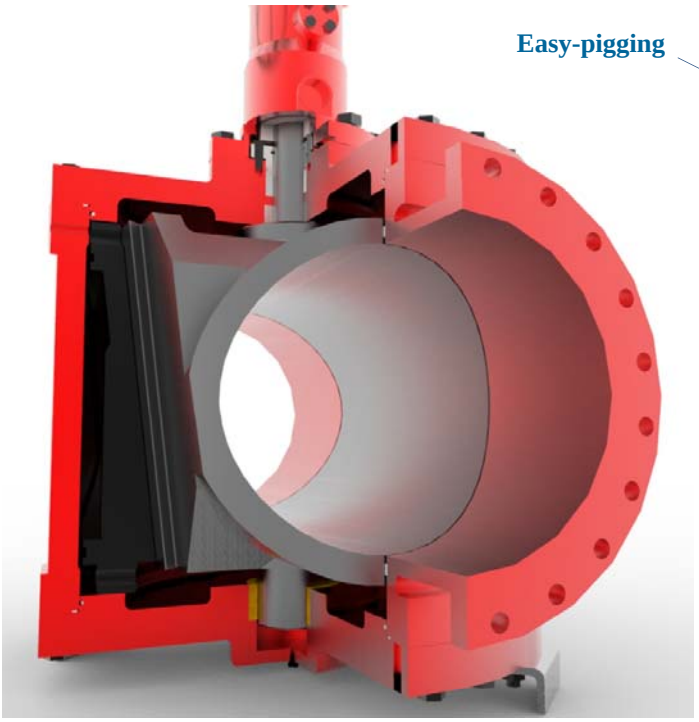
- 2”~ 3”(Handle Operated) / 4”~24”(Gear Operated)

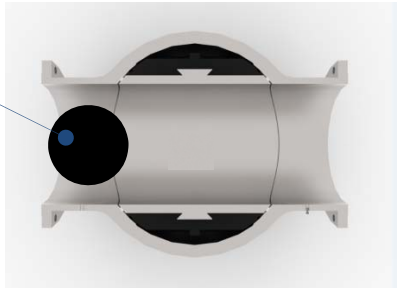
+ Minimum Clearance for installation, repair and replacement

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

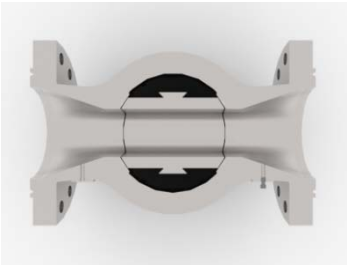
Full Port DBB Plug Valves

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

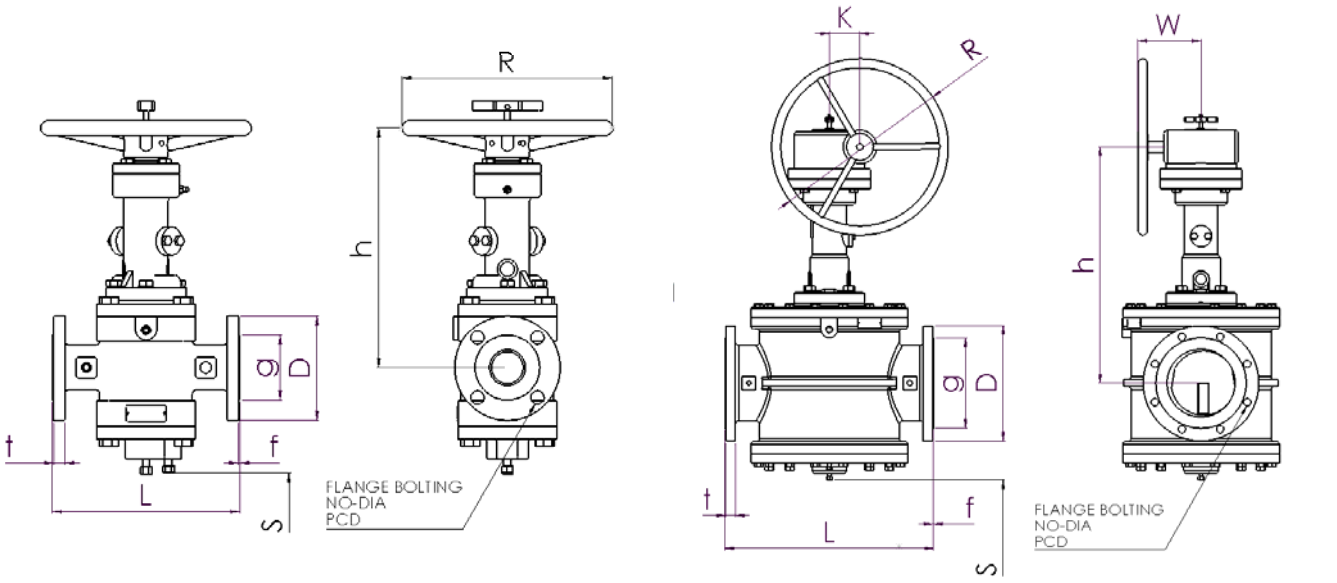


50~70% Reduced bore

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	150	120.7	4	19	92.1	14.3	2	350	300	-	-	190
3	343	190	152.4	4	19	127.0	17.5	2	460	300	70	230	230
4	432	230	190.5	8	19	157.2	22.3	2	470	300	70	230	280
6	*533	280	241.3	8	22	215.9	23.9	2	580	400	83	260	350
8	622	345	298.5	8	22	269.9	27.0	2	710	500	97	294	460
10	660	405	362.0	12	25	323.8	28.6	2	790	560	112	324	520
12	762	485	431.8	12	25	381.0	30.2	2	830	560	112	324	680
14	*864	535	476.3	12	29	412.8	33.4	2	920	630	112	324	710
16	*889	595	539.8	16	29	469.9	35.0	2	1,130	710	153	370	740
18	*1,219	635	577.9	16	32	533.4	38.1	2	1,220	800	180	400	880
20	*1,219	700	635.0	20	32	584.2	41.3	2	1,250	800	180	400	940
24	*1,524	815	749.3	20	35	692.2	46.1	2	1,340	800	180	479	1,020

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

\+ Minimum Clearance for installation, repair and replacement

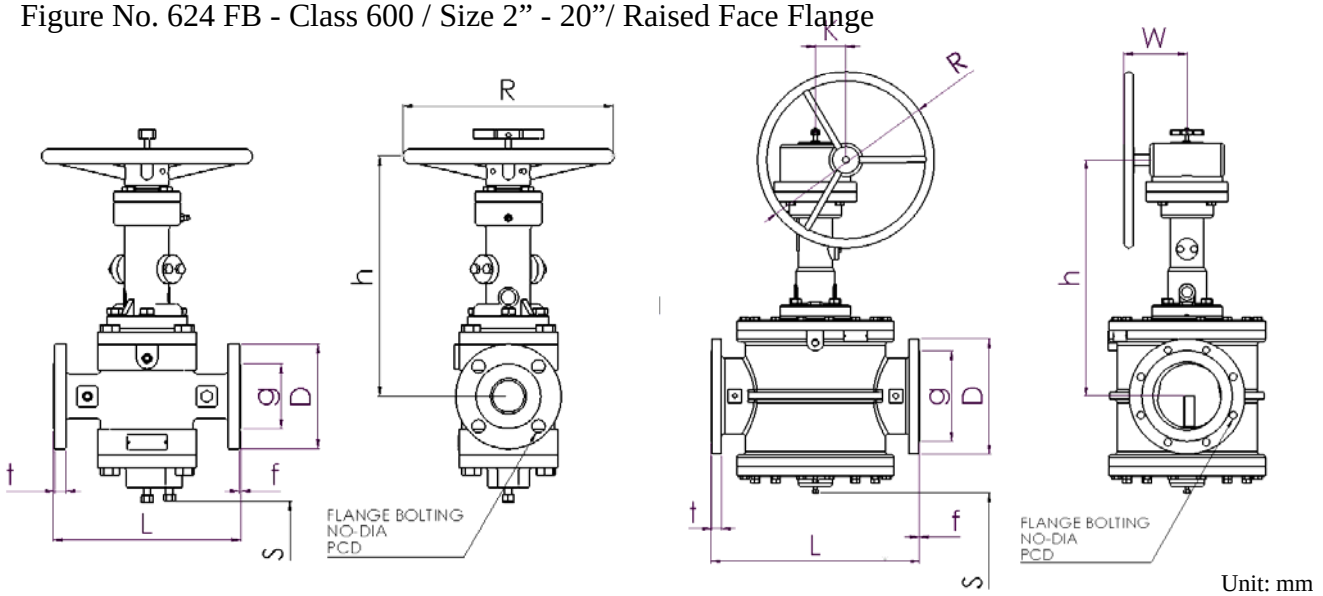
* Manufacturing Standard

- 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” - 20”/ 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	92.1	20.7	2	350	300	-	-	190
	3	387	210	168.3	8	22	127.0	27.0	2	460	300	70	230	230
	4	457	255	200.0	8	22	157.2	30.2	2	470	300	70	230	280
	6	559	320	269.9	12	22	215.9	35.0	2	600	400	83	260	350
	8	686	380	330.2	12	25	269.9	39.7	2	720	500	97	294	460
	10	826	445	387.4	16	29	323.8	46.1	2	790	560	112	324	540
	12	965	520	450.8	16	32	381.0	49.3	2	940	560	112	324	680
	14	*864	585	514.4	20	32	412.8	52.4	2	1080	710	32	413	710
	16	*1,042	650	571.5	20	35	469.9	55.6	2	1,190	800	59	443	740
	18	*1,219	710	628.6	24	35	533.4	58.8	2	1,290	800	180	400	900
	20	*1,219	775	685.8	24	35	584.2	62.0	2	1,350	800	180	479	970
	24	*1,524	915	812.8	24	41	692.2	68.3	2	1,420	900	230	579	1,060
600	4	508	275	215.9	8	25	157.2	38.1	7	540	400	83	260	300
	6	660	355	292.1	12	29	215.9	47.7	7	690	560	112	324	380
	8	794	420	349.2	12	32	269.9	55.6	7	820	630	112	324	490
	10	940	510	431.8	16	35	323.8	63.5	7	940	800	180	479	580
	12	1,067	560	489	20	35	381	66.7	7	1,040	800	180	479	700
	16	*1,200	685	603.2	20	41	469.9	76.2	7	1420	900	180	479	760
	20	*1,500	815	723.9	24	45	584.2	88.9	7	1,580	1,000	230	579	900

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

\+ Minimum Clearance for installation, repair and replacement

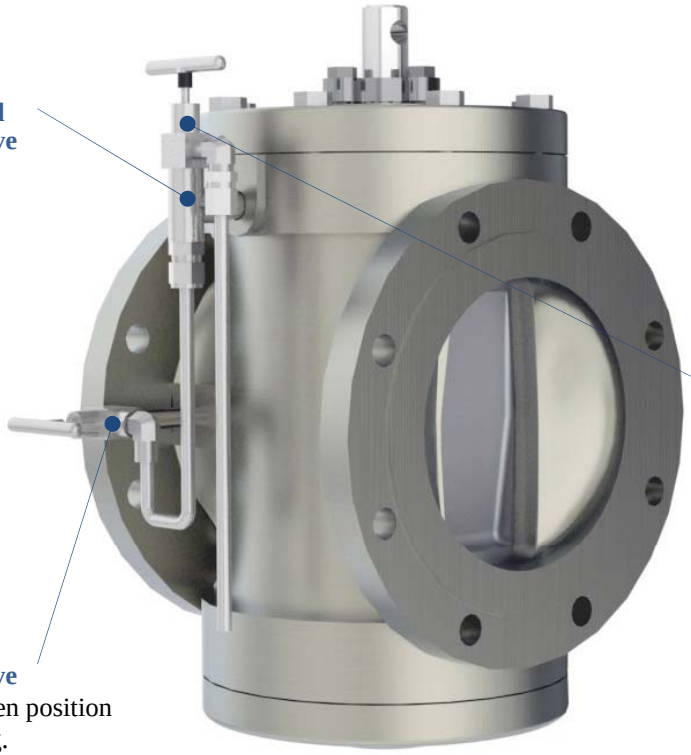
* Manufacturing Standard

- 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)

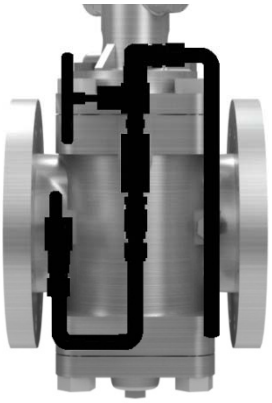
The check valve is automatically operated by the device that installed on mechanism during the valve is closing.

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 with approach sensor are available as per customer`s requirement.

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	-	-	-	-	-
3	260	220	300	-	1,100	1,100	-	-	300	-	-
4	620	600	500	500	2,100	2,100	2,000	-	600	600	600
6	1,400	1,200	1,300	1,300	5,000	5,000	4,900	-	1,200	1,200	1,200
8	2,500	2,000	2,100	2,500	9,700	9,700	9,600	-	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
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	-	-	28,000	28,000	-	-	-	-	-
16	7,000	8,500	7,400	-	35,000	35,000	34,000	8,800	8,800	8,800	-
18	10,000	10,000	13,000	-	47,000	47,000	-	-	-	-	-
20	15,900	12,000	20,000	-	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	34	39	-	70	75	-	-	-	-	-
3	42	42	60	-	80	85	-	-	240	290	-
4	50	60	100	150	130	160	270	-	470	450	600
6	100	140	320	430	240	310	480	-	510	680	760
8	180	240	520	820	450	560	820	-	1,000	1,300	1,500
10	250	320	820	1,200	650	820	1,200	-	1,600	1,700	1,900
12	400	510	1,200	2,300	820	1,400	2,000	1,600	1,600	1,900	-
14	490	880	-	-	1,400	1,700	-	-	-	-	-
16	650	1,200	2,100	-	1,900	2,500	3,400	2,600	2,600	3,600	-
18	790	1,700	-	-	3,200	3,200	-	-	-	-	-
20	1,600	2,100	3,700	-	3,600	4,500	7,500	4,000	4,000	-	-
22	1,750	-	-	-	-	-	-	-	-	-	-
24	2,050	3,300	7,200	-	5,100	7,100	-	-	-	-	-
28	-	5,400	-	-	-	-	-	-	-	-	-
30	4,170	8,000	-	-	-	-	-	-	-	-	-
36	6,520	-	-	-	-	-	-	-	-	-	-
40	10,500	-	-	-	-	-	-	-	-	-	-

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.