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INDUSTRIES HOSE COUPLINGS AND VALVES
Web:www.icmhoseind.com

ICM INDUSTRIES CO.,LTD
Add: North of Binhe Road, Shanghe, Jinan, China
Ph:+86-151-6915-4504 TEX:+86-150-9890-9442
Email:sales@icmhoseind.com

Concentric Butterfly Valve TDS

A. Design

Body: GGG40(Ductile iron) according to ASTM A395
Body Finish: epoxy powder coated
Disc:CF8M
Shaft: 420 Stainless Steel
Seat: NBR/EPDM/PTFE
Bushing: PTFE
Pressure:PN16
Face to face acc. to EN 558-1 Serries20
Top Flange acc. to ISO5211

B. Description and Function

Concentric Butterfly Valves are designed and manufactured to have optimal mix of structural stability, flow efficiency and effective seating coupled with advantage of light weight, compact design and ease of operation. Only a quarter turn is needed to fully open or close theses valves.

- Symmetric disc design ensures favorable flow characteristics and low pressure drop
- Concentric shaft ensures low operating torque
- Lining gives a good protection to valve body, and acts as flange gasket
  - Shaft penetrates the valve seat
  - Limited choice of seating materials (Elastomer, only)

Valve types:

1) Wafer type
   - Shipbuilding, water works, heating and ventilation, power plants, oil refinery chemical plants etc.
   - Valve to be installed by long bolts between the flanges of adjacent pipe only
   - Easy handling and light weight.
   - Easy installation, less bolt quantity and low cost.
   - Inconvenient maintenance of adjacent pipe.

2) Lug type
   - general piping system pump outlets, tank drains, ship sides etc.
   - Ring shape bolt hole for bolting with flange of connecting pipe.
   - Keep pressure inside during repairing adjacent the other side pipe.
   - Different flange shape.
   - Possible damage on full face gasket.
   - Hard repairing of corroded bolt.
   - More man-hour for installation and body can be cracked by misaligned thread.
   - Heavy weight.

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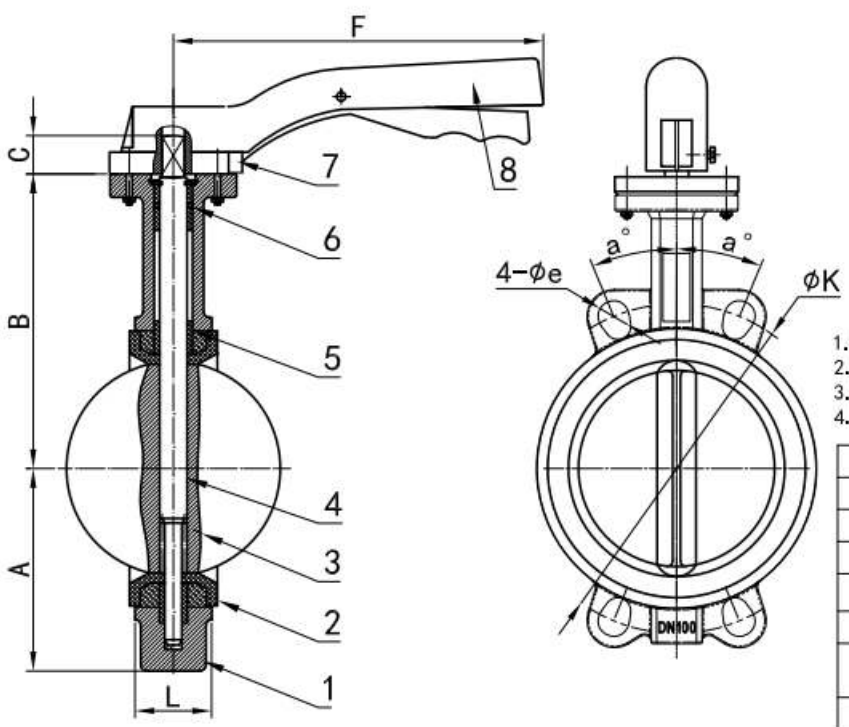
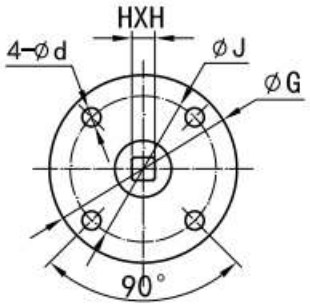
C. Dimensions

1) Wafer Type Dimensions DN50-DN150 (Handle)





1. Working pressure:16bar.
2. F to F DIM. ACC. to EN 558-1 SERIES20.
3. Top-Flange ACC. to ISO5211.
4. Fitting between flanges ASME B16.5 150 .

8	Handle	Al
7	plate	Al
6	O-ring	NBR
5	bushing	PTFE
4	shaft	SS420
3	Disc	CF8M
2	seat	EPDM/NBR/PTFE
1	body	GGG40
NO.	Name	material

DN	Inch	A	B	C	L	F	ASME B16.5 150			ΦG	ΦJ	4-Φf	□H	Top flange
							ΦK	a°	Φe					
50	2"	62	126	32	43	195	120.70	45	Φ19	65	50	7	9	F05
65	2.5"	69	136	32	46	195	139.70	45	Φ19	65	50	7	9	F05
80	3"	77	150	32	46	195	152.40	45	Φ19	65	50	7	9	F05
100	4"	96	170	32	52	205	190.50	22.5	Φ19	65	50	10	11	F05
125	5"	114	180	32	56	275	215.90	22.5	Φ22	90	70	10	14	F07
150	6"	128	200	32	56	275	241.30	22.5	Φ22	90	70	10	14	F07

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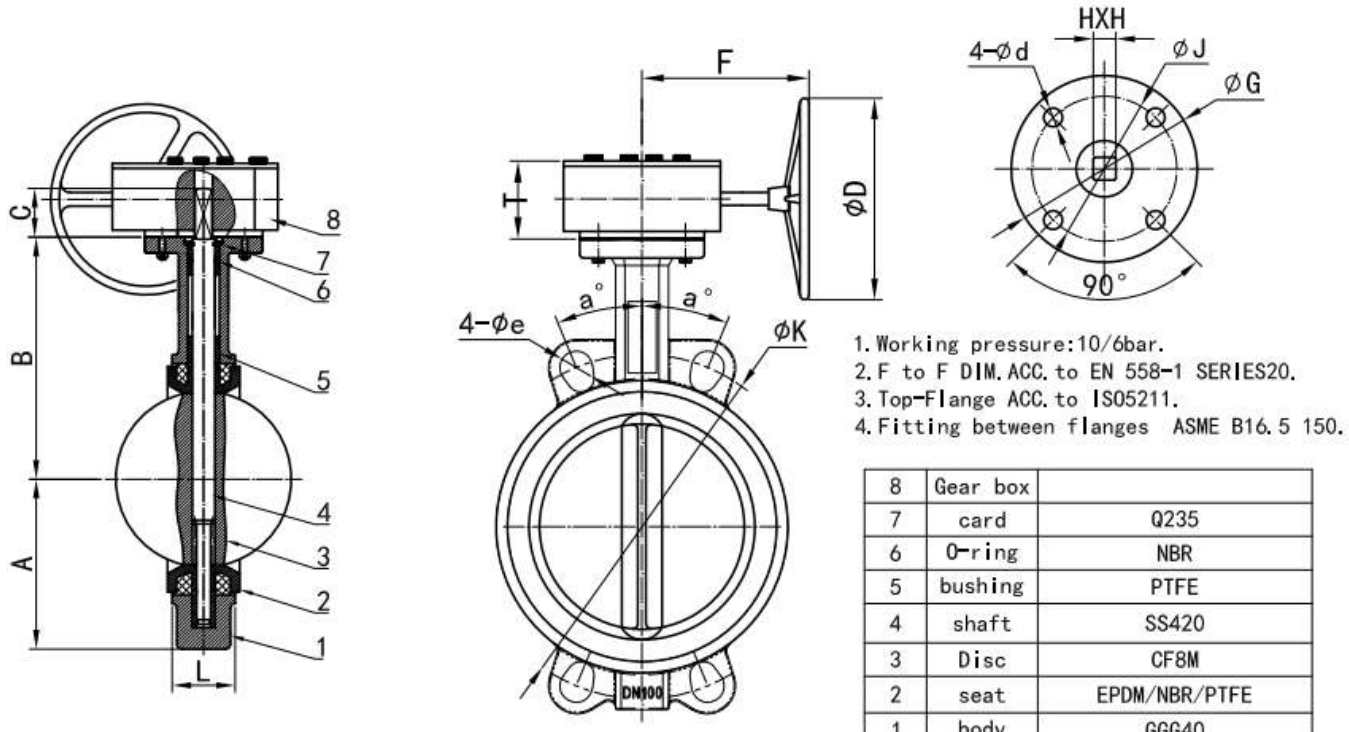
2) Wafer Type Dimensions DN200-DN350 (Gear Box)



1. Working pressure:10/6bar.
2. F to F DIM. ACC. to EN 558-1 SERIES20.
3. Top-Flange ACC. to ISO5211.
4. Fitting between flanges ASME B16.5 150.

NO.	Name	material
8	Gear box	
7	card	Q235
6	O-ring	NBR
5	bushing	PTFE
4	shaft	SS420
3	Disc	CF8M
2	seat	EPDM/NBR/PTFE
1	body	GGG40

DN	A	B	C	L	T	F	ØD	ASME B16.5 150			ØG	ØJ	4-Øf	□H	Top flange
								ØK	a°	Øe					
200	166	228.5	38	60	68	227	285	298.50	22.5	22	125	102	12	17	F10
250	202	266	44	68	72	227	285	362.00	15	25	150	125	13	22	F12
300	235	292	44	78	72	227	285	431.80	15	25	150	125	13	22	F12
350	368	277	45	78	75	227	285	476.3	15	29	150	125	Ø14	22	F12

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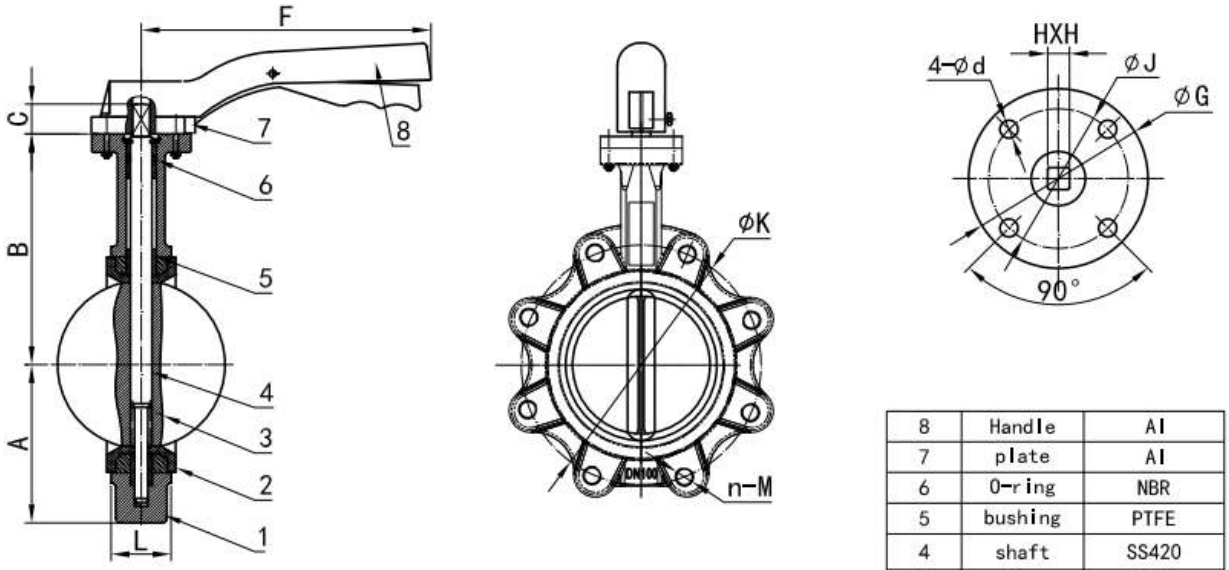
3) Lug Type Dimensions DN50-DN150 (Handle)

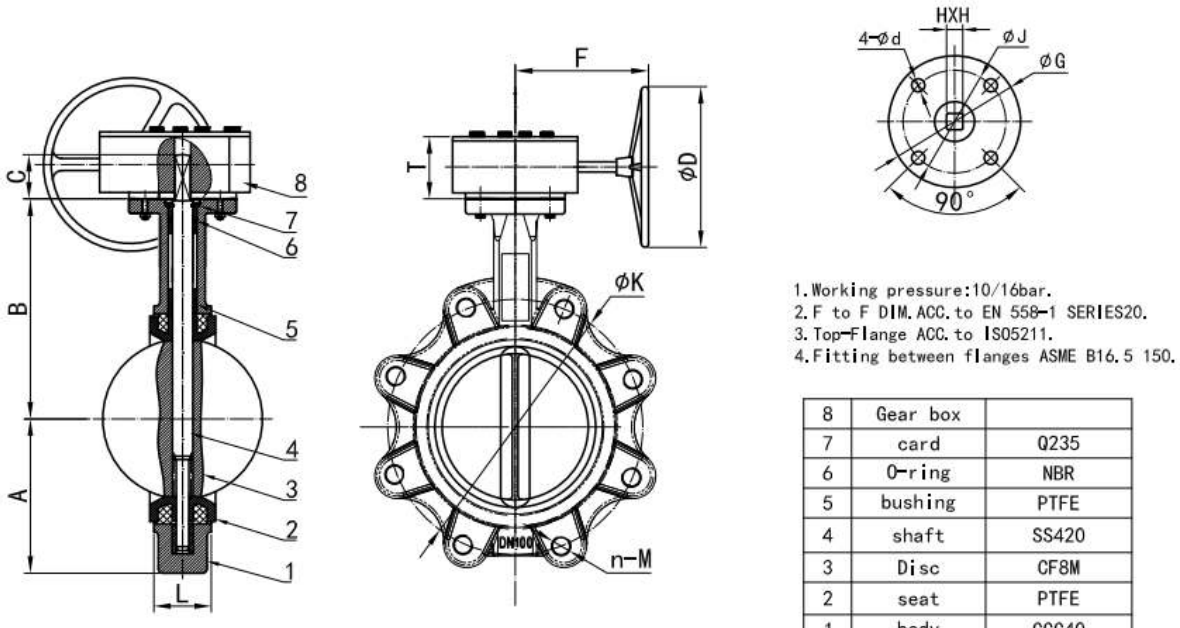


1. Working pressure:10/16bar.
2. F to F DIM. ACC. to EN 558-1 SERIES20.
3. Top-Flange ACC. to ISO5211.
4. Fitting between flanges ASME B16.5 150.

NO.	Name	material
8	Handle	Al
7	plate	Al
6	O-ring	NBR
5	bushing	PTFE
4	shaft	SS420
3	Disc	CF8M
2	seat	PTFE
1	body	GGG40

DN	Inch	A	B	C	L	F	ASME B16.5 150		ØG	ØJ	4-Øf	□H	Top flange
							ØK	n-M					
50	2"	62	126	32	43	195	120.70	4-5/8"-11	65	50	7	9	F05
65	2.5"	69	136	32	46	195	139.70	4-5/8"-11	65	50	7	9	F05
80	3"	77	150	32	46	195	152.40	4-5/8"-11	65	50	7	9	F05
100	4"	96	170	32	52	205	190.50	8-5/8"-11	65	50	10	11	F05
125	5"	114	180	32	56	275	215.90	8-3/4"-10	90	70	10	14	F07
150	6"	128	200	32	56	275	241.30	8-3/4"-10	90	70	10	14	F07

4) Lug Type Dimensions DN200-DN350 (Gear Box)



1. Working pressure:10/16bar.
2. F to F DIM. ACC. to EN 558-1 SERIES20.
3. Top-Flange ACC. to ISO5211.
4. Fitting between flanges ASME B16.5 150.

NO.	Name	material
8	Gear box	
7	card	Q235
6	O-ring	NBR
5	bushing	PTFE
4	shaft	SS420
3	Disc	CF8M
2	seat	PTFE
1	body	GGG40

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DN	A	B	C	L	T	F	ØD	ASME B16.5 150		ØG	ØJ	4-Øf	□H	Top flange
								ØK	n-M					
200	166	228.5	38	60	68	227	285	298.5	8-3/4"-10	125	102	12	17	F10
250	202	266	44	68	72	227	285	362.0	12-7/8"-9	150	125	13	22	F12
300	235	292	44	78	72	227	285	431.8	12-7/8"-9	150	125	13	22	F12

D. Opening pressure (Torques)

Size	NBR/EPDM/PTFE Butterfly Valve	
DN/NPS	PN16	PN10
50/2”	11	9
65/2.5”	20	16
80/3”	22	21
100/4”	44	21
125/5”	77	60
150/6”	110	100
200/8”	157	145
250/10”	163	160
300/12”	390	360
350/14”	710	680

Tightness: Leak rate according to: DIN EN 12266 or API 598

E. Pressure Test

Butterfly Valve Size		Keeping Pressure Min Time (s)	
		Shell	Sealing
≤2 ″	≤DN50	15	15
2.5 ″ -6 ″	DN150	60	60
8 ″ -12 ″	DN200-DN300	120	120
≥14 ″	≥DN350	300	120

According to Standard: API598
Shell: 1.5 times of Working Pressure
Sealing: 1.1 times of Working Pressure
Requests:
Test requirements: 100% inspection of the valve, the medium is water or air under room temperature
The leakage rate of the valve seat: in the shortest duration, leakage rate is zero,
Leakage rate of the valve body: no leakage is allowed.

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F. Media & Temperature data sheet

Material		Temperature scope	Media and the applicability											Feature
			Fresh water	Sea water	Alkali	Weak base	Strong Acid	Weak Acid	Alcohol	Air	Steam	Oil	Food	
Seat	NBR	-23~93℃	A	A	B	A	D	B	C	A	D	A	B	Resistant oil
	EPDM	-46~135℃	A	A	A	A	C	A	B	A	A	C	A	Anti-aging
	NR	-20~85℃	A	A	A	A	C	B	C	A	B	B	B	High elasticity
	CR	-29~99℃	A	B	A	A	D	C	C	A	D	D	B	Wear-resistance, anti-aging
	SI	-55~180℃	A	B	D	B	D	B	B	A	A	C	C	Resistant to high temperature
	EPM	-23~200℃	A	A	C	A	C	A	C	A	A	A	A	Anti-Corrosion, anti-high temperature
	PTFE	-20~180℃	A	A	A	A	A	A	A	A	A	A	A	Anticorrosive all chemical media
Disc	Plated ductile iron	-30~350℃	A	C	D	C	D	C	A	B	B	A	C	Thermal
	PA	-30~100℃	A	A	A	A	D	A	C	A	D	A	A	Anti-corrosion, anti-alkaline
	PCR	-30~140℃	A	A	A	A	A	A	A	A	C	A	A	Corrosion, acid-fast
	PTFE	-30~350℃	A	A	A	A	A	A	A	A	A	A	A	Corrosion, all chemicals
	PFA	-20~180℃	A	A	A	A	B	A	A	A	A	A	A	Anti-Corrosion, anti-high temperature
	SS	-252~316℃	A	C	C	B	C	B	A	A	A	A	A	Anti-Corrosion, anti-high temperature
	AL Bronze	-212~232℃	A	C	C	C	D	C	A	A	A	A	C	Heat resistance, resistance unusual temperature
	Titanium	196-500℃	A	A	A	A	C	B	A	A	A	A	B	Anti-Corrosion, anti-high temperature

Note: A=Perfect suitable; B=Suitable; C=Limited application; D=Not applicable.

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G. Flow Coefficient (Cv Value)

Kv values in m3/h, Cv=1,156 Kv

Angle of Aperture	20°	30°	40°	50°	60°	70°	80°	90°
DN/NPS	Kv	Kv	Kv	Kv	Kv	Kv	Kv	Kv
40/1.5”	3	6	13	21	30	52	81	93
50/2”	9	10	21	32	64	84	128	157
65/2.5”	12	17	31	51	99	128	195	244
80/3”	17	27	45	75	151	191	290	360
100/4”	31	48	82	133	267	348	539	626
125/5”	67	100	174	284	557	708	1137	1276
150/6”	111	162	284	464	911	1172	1873	2216
200/8”	191	284	476	795	1479	1989	3097	3695
250/10”	296	441	754	1311	2436	3132	4930	5684
300/12”	429	626	1102	1821	3538	4582	6902	8526
350/14”	522	870	1508	2564	4733	6508	9370	12992
400/16”	742	1044	1995	3236	5800	8874	12493	14964
450/18”	847	1450	2662	4292	8178	10649	16124	20300
500/20”	1056	1850	3306	5371	9976	13340	20346	25984
600/24”	1450	2656	4640	7064	14500	19140	27364	32828
700/28”	1929	4086	8851	14615	23242	35359	54403	68087
750/30”	2218	4689	9445	15256	23677	36222	55172	73460
800/32”	2769	5558	10134	15994	23911	36418	55816	79170
850/34”	3129	6280	11452	18073	27020	41152	63072	89463
900/36”	3504	7033	12824	20241	30260	46088	70638	100195
1000/40”	4852	9738	17756	28024	41953	63897	97933	138910
1050/42”	5337	10713	19532	30827	46148	70287	107727	152801
1200/48”	6938	13921	25392	40076	59993	91373	140044	198642

Cv table as Q function of angle of openness

Kv corresponds to the flow in m^3/h passes through the valve creating a pressure drop of bar at temperature of ℃. Applied formula is

$$Q=KV\sqrt{\frac{\Delta p \cdot 1000}{D}}$$

Q=flow in m^3/h

Δ p= pressure drop through the valve in bar

1000=Conversion factor for fluids in relation to water

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H. Operating instructions

1. Appropriate use in accordance to designed capabilities

The concentric butterfly valve has been designed for the requirements and applications of piping. As flow rate is effectively controlled, it has less cavitation, noise, corrosion, or vibration relatively within allowable pressure and temperature limits (see data sheet) and to be installed in a pipe system only. They are only to be used with media, which the material and the seals are resistant to. They are not suitable for media with solid components.

2. Safety advices

General safety advices

The safety advices for the pipe system, in which the valves are to be mounted, are to be followed. The same applies to the dual plate check valves.

Demands on the user

In pipe systems, where our concentric butterfly valves are to be used, the planning/installing person and the operator are responsible for the following issues:

- The concentric butterfly valves is to be used according to the instructions.
- The pipe system is to be installed correctly and its operation is to be checked regularly.
- The concentric butterfly valves is to be mounted, removed and repaired by qualified personnel only. The staff is to be regularly instructed according to all relevant regulations concerning working safety and environmental protection, especially in the field of pipes under pressure.
- These staff members have to be informed about the manual and the advices included.

Special risks

Before the concentric butterfly valves is being removed, pressure must be completely taken off the plant to avoid media escaping from the pipe. Fluid being left in the pipe must be drained off. Fluid, which has remained in the valve and comes out during removal, is to be collected. If hazardous fluids or gases are left in the valves, the safety measurements required must be taken.

3. Installation instructions, start-up

Like any other valves, the butterfly valve must be installed carefully at first according to the following cautions to use it for many years without malfunction.

- Check whether there are any foreign substances in the body. If you find foreign substances, remove them before starting installation.
- Blow off all foreign substances including welding chips in the pipes before starting installation.
- Install valves in the direction of arrow marked on the body.
- When assembling the flange-type valve, you should use a specified gasket, and install it in parallel with the other flange. Also, you are recommended to fasten the bolts in several parts in a balanced manner sequentially in diagonal direction. (See Fig 3.1)

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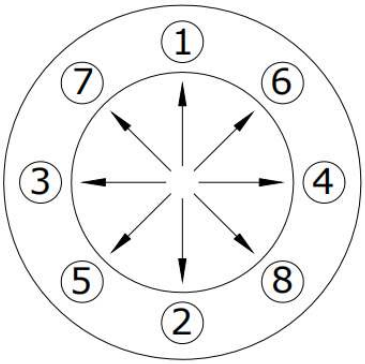

Fig 3.1 Procedure for Fastening Flange Bolts

• Install the valve at right angle to the ground as much as possible. If this is impossible, attach a support to the valve before installing it. (See Fig 3.2 and 3.3)

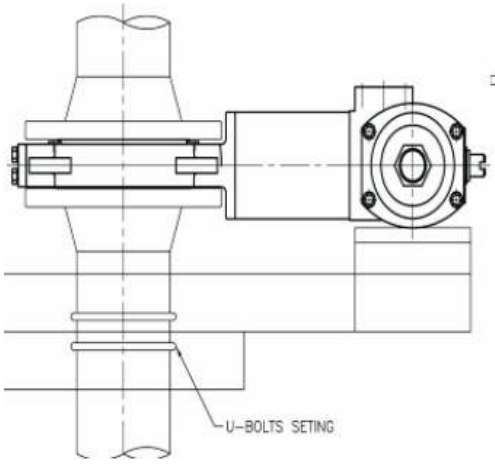

Fig 3.2 Installing Support

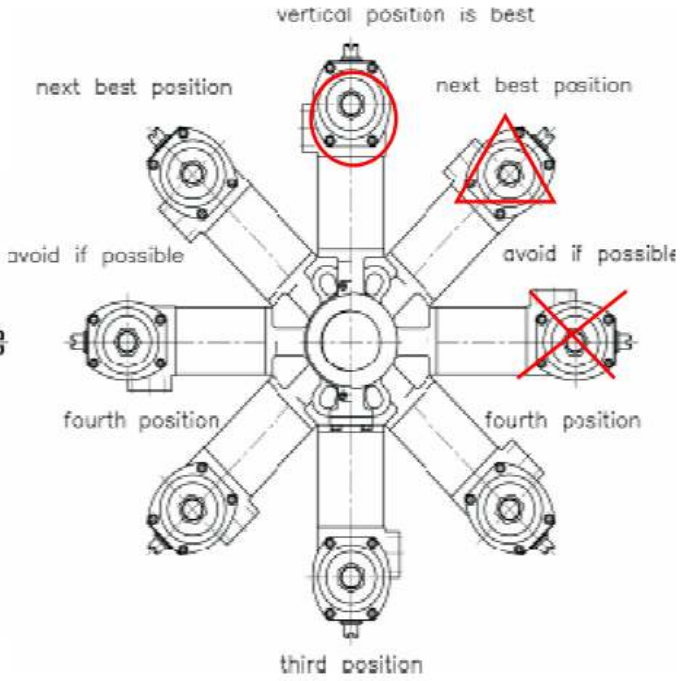

Fig 3.3 Installation Location of Actuator

♣ CAUTIONS

- **Avoid horizontal piping if possible because it may adversely affect the function and performance of valves during operation.**
- **When moving butterfly valves, you should handle them carefully so that the components and air piping will not be damaged. Otherwise, the electronic and electric parts such as solenoid valve, positioner, and limit switch may get damaged or the valve travel may change.**
- **Be careful not to damage the sealing surface of valve flange.**

The following aspects are to be considered during the installation of concentric butterfly valves:

• Possible damages to the concentric butterfly valves and O-rings are to be checked prior to installation. Check if the valve can be moved. Damaged parts must not be installed.

• Make sure that only those concentric butterfly valves are being installed, that meet the operational requirements regarding pressure category, chemical resistance, connection and

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dimensions.

- Complete welding of flanges with no valve fitted.
- Clean the inside of pipe first and install valves at 10~20% opened position.
- Operate with caution to find any jam of disc
- Avoid pulsation and pressure impact.

After the installation is finished, check the tightness of the connections by a pressure check.

4. Storage

- Be careful not to get a scratch on Disc edge and Seat ring.

The openings must be protected by plywood or other things when carrying valve.

- Valve must not be shocked and shaken too much.

It may cause the crack of neck, lever, handle and body

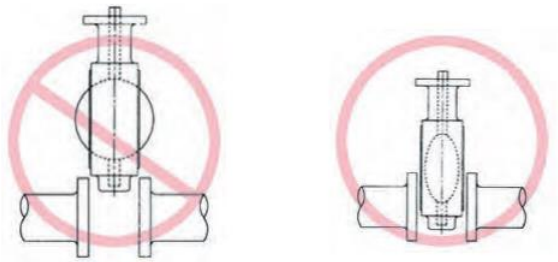
- Valve must be protected from sunlight.
- Valve to be kept and transported under partially opened. Do not throw, drop, trip or drag butterfly valves when transporting them
- Keep all parts of the butterfly valve in a well-ventilated place protected from fire, rain and wind.

- Store the valve at a temperature between - 29℃ (-20℉) and 48℃ (120℉).
- The storage area must be protected from flooding.

- Operate the elastomer (rubber) of the pneumatic actuator at least once every six months to prevent their functional degeneration. Operate it to the full stroke even under general operation conditions at least three times a month.

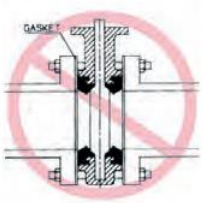
5. The photos showing what is right and what is wrong

Centering & Flanging of Valve



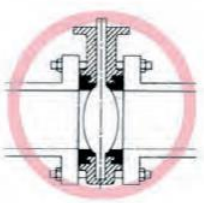
WRONG ▲ CORRECT ▲

Aligning of Flange Gaskets



WRONG ▲

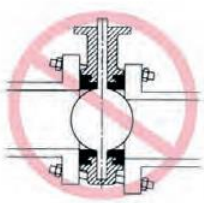
Disc in closed position:gaskets used:Results-Seat distorted and over compressed causing high initial unseating torque problems



CORRECT ▲

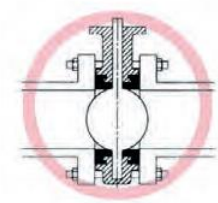
Bolts spanned, disc edge with in body face-to-face.
No disc edge damage,proper sealing allowed

Aligning of Flange bolts



WRONG ▲

Piping misaligned:Result-Disc O.D. touches pipe I.D. causing disc edge damage. Increased torque & leakage. Seat face, seals improperly without engagement



CORRECT ▲

Piping aligned properly when bolts tightened, disc in full open position :Result-disc clears adjacent pipe I.D., seat face seals properly, no excessive initial torque.