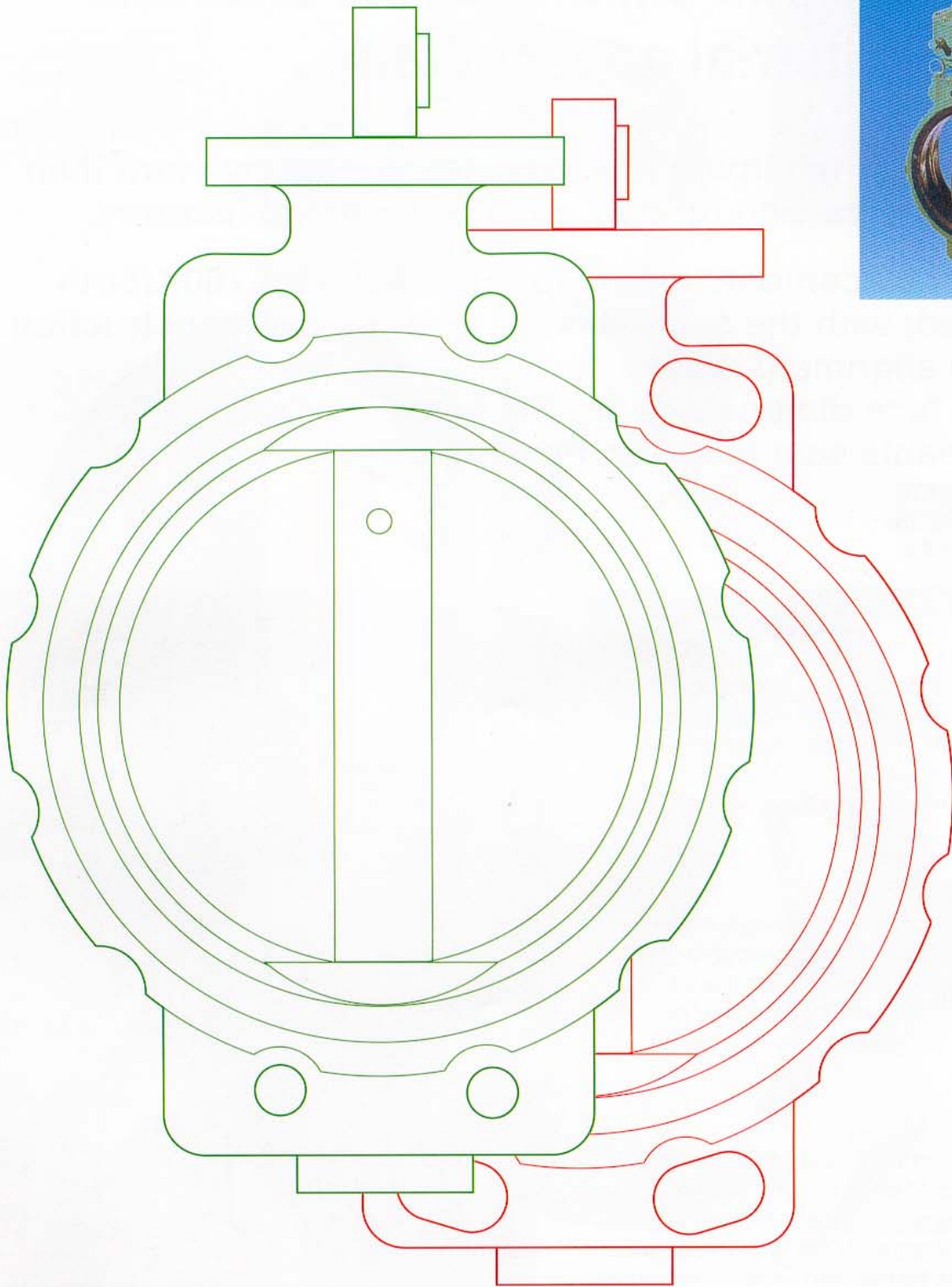


**TOMOE**<sup>®</sup>

RUBBER SEATED BUTTERFLY VALVE 700S SERIES

# 700S



TOMOE VALVE CO.,LTD.

# 700S MARINE VALVE

Trouble free and minimum maintenance proven by more than 30 years in service with reliable construction and features.

Immediate replacements model for FIG.700E and 700K(both discontinued) with the same design features and construction (Other than alignment holes).

The face to face dimensions are the same as 700E/K with interchangeable seat and Disc assembly designs.

## Features

### 1. Raised Seat Ring

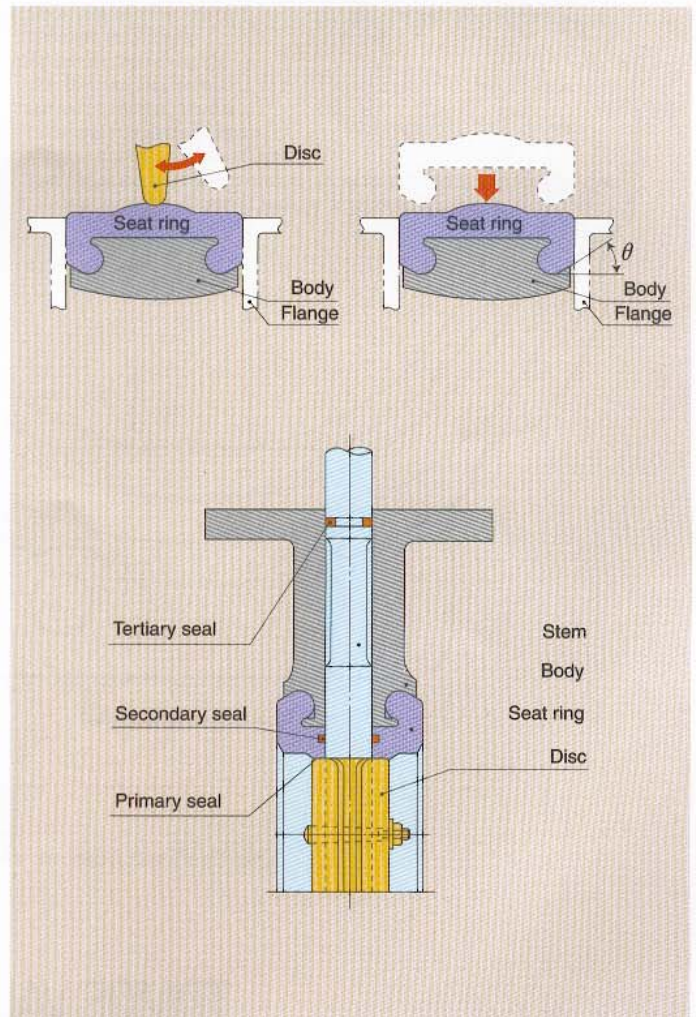
The central part of seat ring is raised so that the disc is thrust into it when the valve is closed, and the resilient force of elastomer maintains bubble-tight shutoff. Various types of material are available for the seat ring to meet with service requirement.

### 2. Rounded Dove-Tail Design

The unique rounded dove-tail design not only makes it easy for replacement of seat ring but also prevents it from stripping off the body. This design eliminates the need of gasket when butterfly valve is installed in between piping flanges.

### 3. Triple Seals

In addition to the primary seal between the seat ring and disc, two O-rings are provided on the top and bottom seat ring glands to form the secondary seal. Another "O"ring on the upper item gland serves as the third seal for prevention of fluid leakage and intrusion of dusts. This triple sealing system ensures non-leakage. The stainless steel housings for "O"rings on the seat ring glands help to stiffen them up and improve wear resistance.





# 700S

# 700E/700K

**STEM**

Stainless steel stem, with its high tensile and torsion strength, can well resist bending and distortion caused by the fluid impact.

**O-RING**

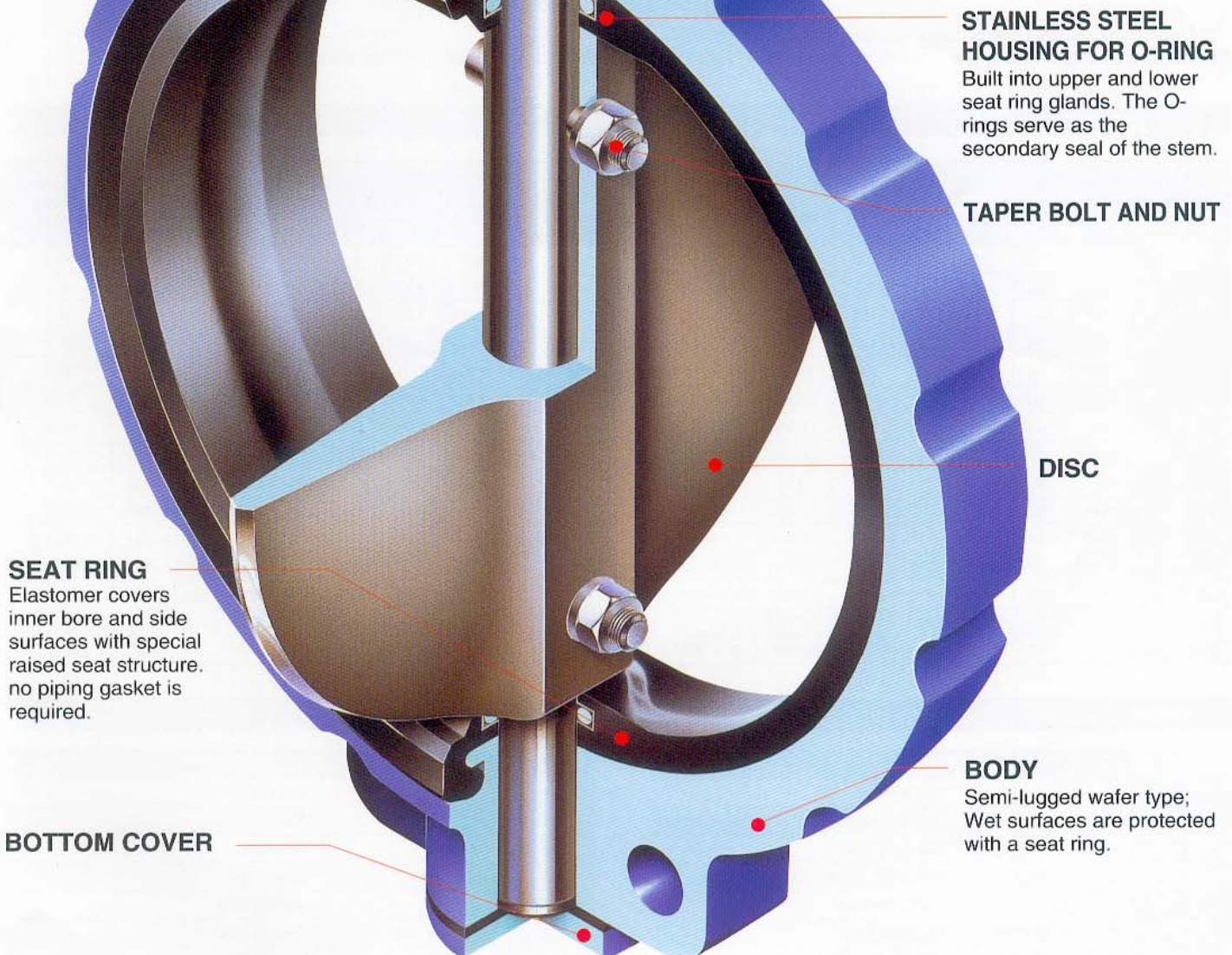
Tertiary stem seal.

**ALIGNMENT HOLES**

Drilled or threaded. (100mm and or over)



**Cast hole**  
(no thread is allowed)



**STAINLESS STEEL HOUSING FOR O-RING**

Built into upper and lower seat ring glands. The O-rings serve as the secondary seal of the stem.

**TAPER BOLT AND NUT**

**DISC**

**SEAT RING**

Elastomer covers inner bore and side surfaces with special raised seat structure. no piping gasket is required.

**BOTTOM COVER**

**BODY**

Semi-lugged wafer type; Wet surfaces are protected with a seat ring.

The above is for 200mm as a typical example.



## Standard Specifications

Valve nominal size	50mm to 600mm	
Applicable flange standard	JIS 5K, 10K, ANSI 125/150, ISO PN10, BS 10E, DIN10K	
Max. working pressure	1.0MPa	
Body shell test (Hydraulic)	1.5MPa	
Seat leak test	1.1MPa	
Working temperature range	NBR (-10°C to 80°C) EPDM (-20°C to 120°C)	
Standard material*1	Body	Cast iron (FC250/A126 Class B)
	Disc*2	Ductile iron (FCD450/A395) with hard chrome plated 304 Stainless steel (SCS13/CF8) Aluminum bronze
	Stem	403 Stainless steel (SUS403)
	Seat	NBR, EPDM
Actuators	Lock lever	50mm to 200mm
	Worm gear	50mm to 600mm
	Pneumatic cylinder	50mm to 600mm
	Moterized	50mm to 600mm
Standard Coating	50mm to 300mm : Epoxy primer (Munsell N7) 350mm to 600mm : Lacquer primer (Munsell N7)	

\*1. Special materials such as cast steel body, aluminum bronze body, stainless steel body, as well as special disc and seat materials are available upon request.

\*2. Clean face disc (split shafts design) is also available as Fig 733S.

\*3. The size 650mm and over are available as 700E(JIS) or 700K(Non-JIS). See "Large Diameter Rubber seat Butterfly valve".

## Dimensions

Nominal size		Dimension (mm)					Flange Standard								Approx. weight (kg)
							ANSI 125 Lbs, 150 Lbs		BS 4504 NP10		JIS 5K		JIS 10K		
mm	inch	d	L	D	H <sub>1</sub>	H <sub>2</sub>	C	Bolt	C	Bolt	C	Bolt	C	Bolt	
50	2	55	45	90	65	105	4-3/4"	4-3/4"-U5/8	125	4-18-M16	105	4-15-M12	120	4-19-M16	2.5
65	2 1/2	70	45	108	80	115	5-1/2"	4-3/4"-U5/8	145	4-18-M16	130	4-15-M12	140	4-19-M16	3.0
80	3	80	50	125	85	135	6"	4-3/4"-U5/8	160	8-18-M16	145	4-19-M16	150	8-19-M16	3.9
100	4	104	50	158	107	150	7-1/2"	8-3/4"-U5/8	180	8-18-M16	165	8-19-M16	175	8-19-M16	7.0
125	5	129	55	193	132	165	8-1/2"	8-7/8"-U3/4	210	8-18-M16	200	8-19-M16	210	8-23-M20	12.0
150	6	154	60	224	145	180	9-1/2"	8-7/8"-U3/4	240	8-22-M20	230	8-19-M16	240	8-23-M20	19.0
200	8	194	65	272	181	210	11-3/4"	8-7/8"-U3/4	295	8-22-M20	280	8-23-M20	290	12-23-M20	21.0
250	10	250	80	332	221	250	14-1/4"	12-1"-U7/8	350	12-22-M20	345	12-23-M20	355	12-25-M22	33.0
300	12	296	90	383	261	280	17"	12-1"-U7/8	400	12-22-M20	390	12-23-M20	400	16-25-M22	45.0
350	14	334	100	425	297	320	18-3/4"	12-1-1/8"-U1	460	16-22-M20	435	12-25-M22	445	16-25-M22	65.0
400	16	384	110	486	333	360	21-1/4"	16-1-1/8"-U1	515	16-26-M24	495	16-25-M22	510	16-27-M24	88.0
450	18	435	120	544	355	390	22-3/4"	16-1-1/4"-U1-1/8	565	20-26-M24	555	16-25-M22	565	20-27-M24	110.0
500	20	482	140	596	381	420	25"	20-1-1/4"-U1-1/8	620	20-26-M24	605	20-25-M22	620	20-27-M24	150.0
550	22	531	150	653	417	460	—	—	—	—	665	20-27-M24	680	20-33-M30	191.0
600	24	581	160	710	475	490	29-1/2"	20-1-3/8"-U1-1/4	725	20-30-M27	715	20-27-M24	730	24-33-M30	227.0

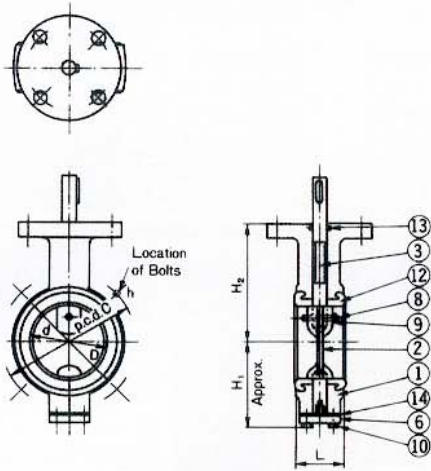
## Parts

No.	Parts	Materials
1	Body	Cast Iron
2	Disc	Cast Stainless Steel, or Ductile Cast Iron
3	Stem	Stainless Steel
6	Bottom Cover	Mild Steel, or Cast Iron
8	Taper Bolt	Stainless Steel
9	Nut and SP.Washer	Stainless Steel
10	Bolt and SP.Washer	Mild Steel, or High Carbon Steel

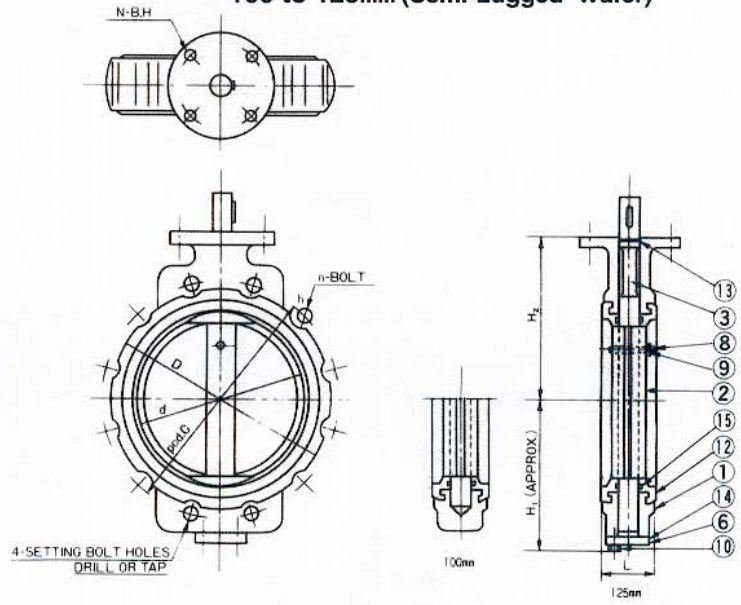
No.	Parts	Materials
12	Seat Ring	Elastomer
13	O-Ring	Elastomer
14	Gasket	Asbestos
15	O-Ring	Elastomer
16	Ball	Bearing Steel
17	Hollow Bolt	Carbon Steel
18	Lock Nut	Mild Steel
19	Eye Bolt	Carbon Steel



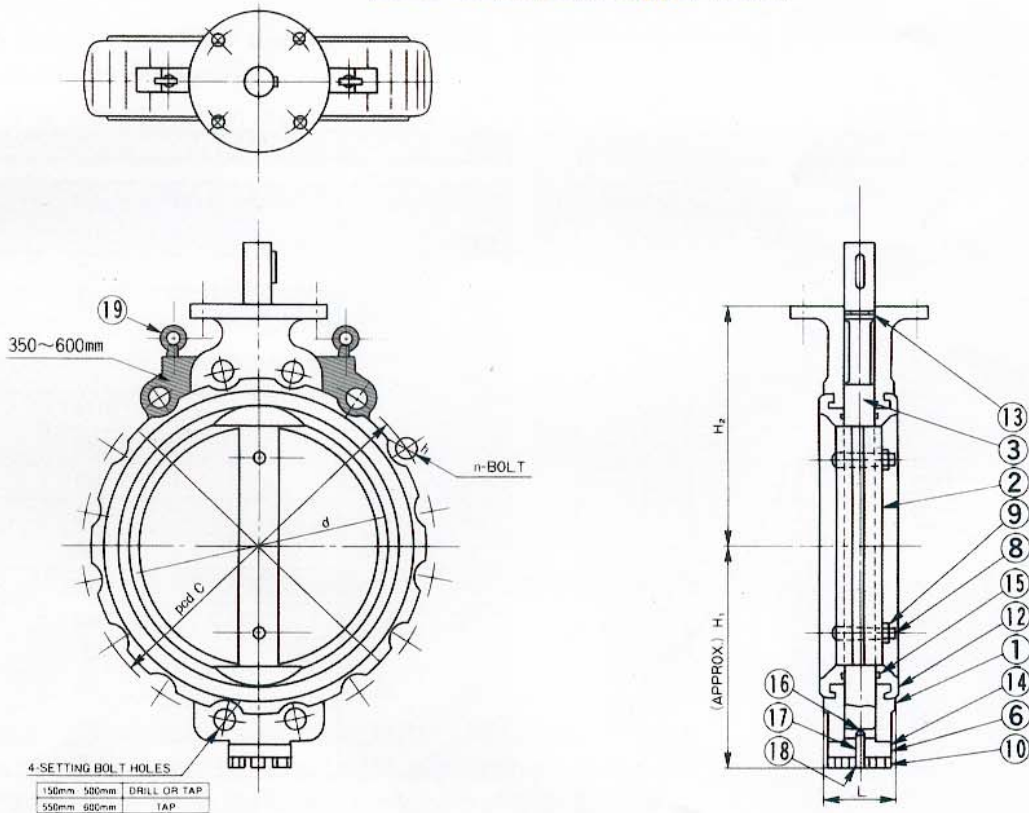
50 to 80mm (Wafer)



100 to 125mm (Semi-Lugged Wafer)

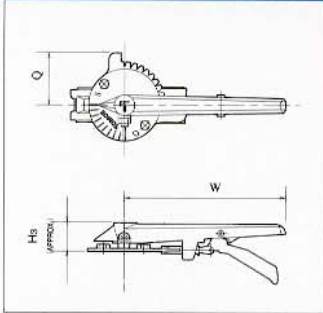


150 to 600mm (Semi-Lugged Wafer)



## Body Constructions and Dimensions

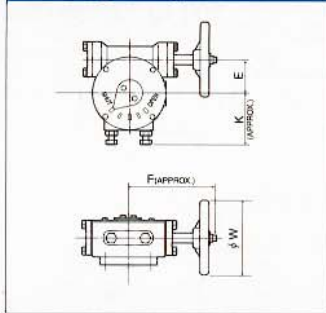
### Lock lever type 1L



Dimension list

Nominal size	Dimension (mm)			Approx. weight (kg)
	mm	inch	H3	
50	2			1.5
65	2½	45	75	1.5
80	3			1.5
100	4			1.5
125	5	51	87.5	1.8
150	6			1.8
200	8	53	102.5	2.0

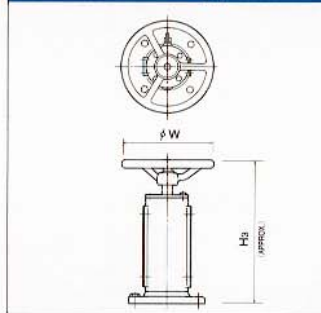
### Worm gear type 2S



Dimension list

Nominal size	Dimension (mm)				Approx. weight (kg)
	mm	inch	K	E	
50	2				5.9
65	2½				5.9
80	3	93	58	144	5.9
100	4			130	5.9
125	5				6.3
150	6			156	6.3
200	8				14.2
250	10	126	85	229	14.2
300	12			200	14.2
350	14				29.1
400	16			325	29.1
450	18	164	117		32.0
500	20			335	32.0
550	22				55.0
600	24	198	140	400	55.0

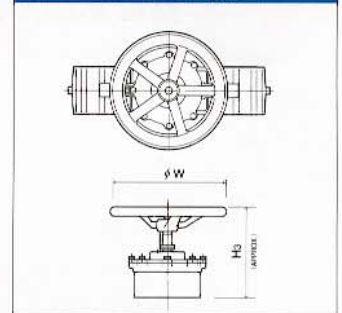
### Center handle type 2C



Dimension list

Nominal size	Dimension (mm)		Approx. weight (kg)
	mm	inch	
50	2		4.5
65	2½	220	4.5
80	3		4.5
100	4		4.5
125	5	260	9.5
150	6		9.5
200	8		16.0
250	10	295	16.0
300	12		16.0

### Center handle type 2R



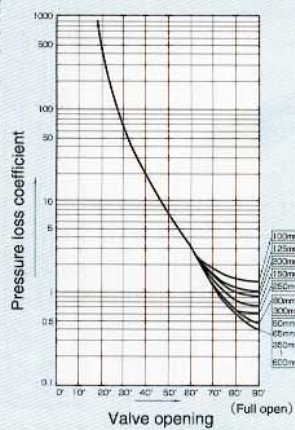
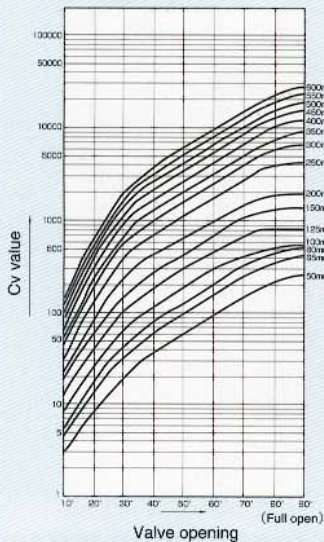
Dimension list

Nominal size	Dimension (mm)		Approx. weight (kg)
	mm	inch	
350	14		24.0
400	16	279	24.0
450	18		24.0
500	20		24.0
550	22	343	56.0
600	24	450	56.0

## Cv value/pressure loss coefficient

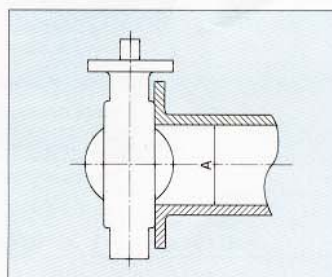
Cv value

Pressure loss coefficient



## Minimum internal diameters of piping

Nominal size	Minimum internal diameters of piping A(mm)	
	mm	inch
	700S	
50	2	37
65	2½	59
80	3	67
100	4	91
125	5	118
150	6	143
200	8	187
250	10	240
300	12	286
350	14	322
400	16	372
450	18	421
500	20	463
550	22	509
600	24	566



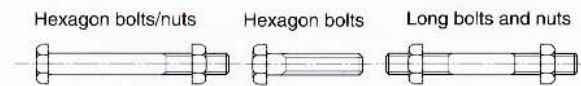


700S

Nominal size		JIS 5K		JIS 10K		ANSI 125Lb/150Lb, JPI 150Lb	
mm	inch	Hexagon bolts/nuts	Hexagon bolts	Hexagon bolts/nuts	Hexagon bolts	Long bolts and nuts	Hexagon bolts
50	2	4 -M12× 90×30	————	4 -M16×100×40	————	4 -U 5/8×130×35	————
65	2½	4 -M12× 90×30	————	4 -M16×100×30	————	4 -U 5/8×135×40	————
80	3	4 -M16×100×40	————	4 -M16×110×40	————	4 -U 5/8×145×40	————
100	4	8 (4) -M16×100×40	(8-M16×40×38)	8 (4) -M16×110×40	(8-M16×40×38)	8 (4) -U 5/8×145×40	(8-U 5/8×45×38)
125	5	8 (4) -M16×110×40	(8-M16×40×38)	8 (4) -M20×120×50	(8-M20×45×45)	8 (4) -U 3/4×155×45	(8-U 3/4×50×44)
150	6	8 (4) -M16×120×40	(8-M16×40×38)	8 (4) -M20×130×50	(8-M20×50×46)	8 (4) -U 3/4×165×45	(8-U 3/4×55×44)
200	8	8 (4) -M20×130×50	(8-M20×50×46)	12 (8) -M20×135×50	(8-M20×50×46)	8 (4) -U 3/4×175×50	(8-U 3/4×55×44)
250	10	12 (8) -M20×150×50	(8-M20×50×46)	12 (8) -M22×160×60	(8-M22×55×50)	12 (8) -U7/8×200×55	(8-U 7/8×65×50)
300	12	12 (8) -M20×160×50	(8-M20×50×46)	16 (12) -M22×170×60	(8-M22×55×50)	12 (8) -U7/8×215×55	(8-U 7/8×65×50)

Nominal size		JIS 5K		JIS 10K		ANSI 125Lb/150Lb, JPI 150Lb	
mm	inch	Long bolts and nuts	Hexagon bolts	Long bolts and nuts	Hexagon bolts	Long bolts and nuts	Hexagon bolts
350	14	12 (8) -M22×205×45	(8-M22×60×50)	16 (12) -M22×205×45	(8-M22×60×50)	12 (8) -U 1 X240×60	(8-U 1 X75×57)
400	16	16 (12) -M22×215×45	(8-M22×60×50)	16 (12) -M24×230×50	(8-M24×70×54)	16 (12) -U 1 X250×60	(8-U 1 X75×57)
450	18	16 (12) -M22×225×45	(8-M22×60×50)	20 (16) -M24×245×50	(8-M24×70×54)	16 (12) -U 1 1/8×275×65	(8-U 1 1/8×85×63)
500	20	20 (16) -M22×245×45	(8-M22×60×50)	20 (16) -M24×265×50	(8-M24×70×54)	20 (16) -U 1 1/8×300×70	(8-U 1 1/8×90×63)
550	22	16 -M24×265×50	8-M24×65×54	16 -M30×290×60	8-M30×80×66	————	————
600	24	16 -M24×275×50	8-M24×65×54	20 -M30×300×60	8-M30×80×66	16 -U 1 1/4×335×80	(8-U 1 1/4×100×70)

- ( ) Shows numbers of threaded bolt holes
- 1. No positioning bolt on 80mm and below.
- 2. The height of nut shall be 80% of nominal bolt diameter (100% for ANSI).
- 3. Unify thread over one inch shall be eight thread per inch.
- 4. Above data is for mild steel (SS400).



Dead-End Service

Model 700S Can be used for dead-end service with precautions as following:

1. A butterfly valve of 700S can be installed at an end of a pipeline, using threaded holes, as case may be, on the semi lugs for bolting. (Refer Fig. 1 through Fig. 3 .)
2. The dead-end service should only be a tentative and short-term arrangement such as for temporary piping, with a reduced shutoff pressure in accordance with Table 1.

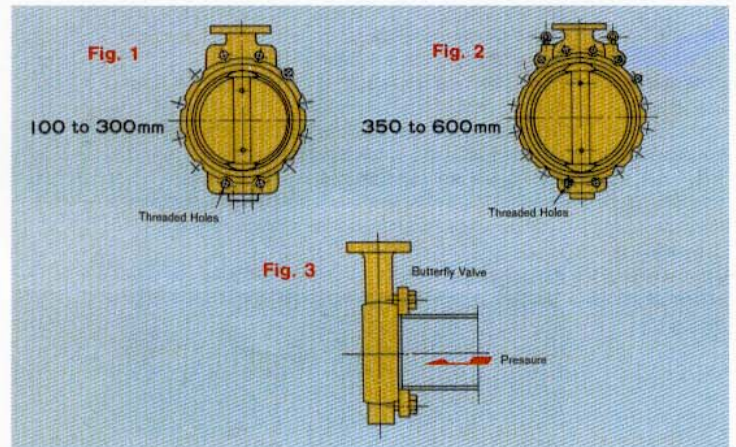


Table 1 Max. Allowable Shutoff Pressure for Dead-End Service

Nominal size (mm)	100 to 350	400 and 450	500 to 600
Pressure (MPa)	0.58	0.49	0.39

3. In case dead-end service is anticipated to continue over a long period, it is recommended to put an extra pipe flange on the outer end of butterfly valve to be tightened up together with through bolts. (Refer Fig. 4.)

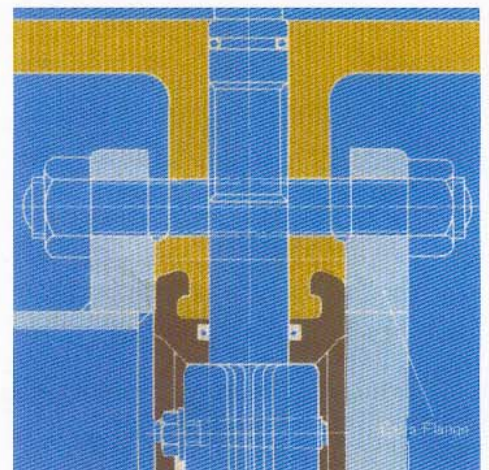


Fig. 4 Dead-End Service with Extra Flange



### Storage conditions

- To protect the seat rings, do not unpack valves until you are ready to install them. If a valve remains unpacked for a long period of time, dust or other particles may enter the valve and cause seat leakage.
- For temporary storage before installing or for long-term storage, keep valves in the vinyl bag in which they came and store them indoors in a cool, well-ventilated location (temperature of -10 to 60° and humidity of 70% or less). Keep the valve away from dusty locations and take care in protecting the valve and actuator from bearing excessive weights.

### Piping instructions

- Verify the materials of the seat ring and disc of the valve before installation.
- When installing a butterfly valve directly to a check valve or pump, install an extension or spacer to prevent the disc of the butterfly valve from contacting the check valve or pump.
- Install the valve only after completing all welding operations around the valve to prevent damage caused by the solder and other welding materials.
- After welding is performed on a flange, wait until it has sufficiently cooled before installing the valve. Never perform welding on a flange with the valve installed.
- In the surrounding piping, make sure that no welding remains, pipe wastes, scaling, or dust remain in the pipe. Clean the inside of the pipes if necessary prior to installation.
- Before blowing air to remove any foreign matter in the piping, install an extension tube with face-to-face dimensions equal to that of the valve in place of the valve. Do not blow air with the valve installed in the pipe, for this may damage the seat ring.
- Clean the mating surface of the flange with compressed air before installation. Remove rust or foreign particles with a cleaning alcohol or neutral detergent.
- With a zinc plated flange, attention must be paid to avoid flange leakage due to an uneven surface of the flange.
- Make sure that there is no warpage in the flange, misalignment, or damage to the mating surface of the flange.
- Be sure to properly align the valve and mounting flanges.
- Install the jack bolts taking care not to damage the seat ring of the valve and adjust the face-to-face dimensions. The face-to-face dimensions should be such that the piping must be spread open 3 to 5mm to allow the valve to be inserted. (A jack bolt is available on request.)
- If possible, avoid mounting the actuator with it facing downward. Especially for valve sizes of 350mm or larger, where the lower portion of the valve stem bears thrust loads, never install the actuator facing downward.
- After centering the pipes, insert bolts at the proper locations so that the bottom of the valve can rest upon them to prevent the valve from falling through.

- Before tightening the installation bolts, make sure that the disc of the valve does not contact any portion of the flange when it is fully opened.
- Tighten the installation bolts to a torque of no more than 60Nm
- The installation bolts should be tightened evenly and in the proper sequence. Tighten one bolt a small amount, and then proceed to another bolt that is located on the other side. Proceed tightening each bolt a little at a time by crisscrossing across the flange to insure well-balanced tightening.
- On the completion of the installation, fully open and close the valve to once again make sure that the disc does not touch the piping or gasket.

### Operational instructions

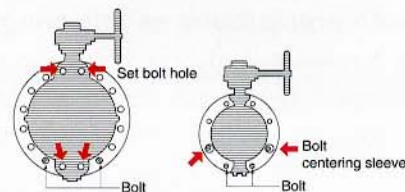
- Prior to operation, clean the outside of the piping with compressed air, and the inside of the piping with running water.
- If the valve is to be used at an opening angle of 30° or under for flow constriction, consult us in advance.

### Others

- After installation, open and close the valve once every two weeks if the valve is not used for a long period of time, and open and close the valve a few times before starting actual operation.
- For pressure tests of the piping (where pressures exceed the rated pressure), always keep the valve fully open. Never fully close the valve or use it as a blind flange.
- If the actuator is a manual gear, pneumatic cylinder, electric motor, or diaphragm, or other similar type, and the ambient temperature is extremely high, it may be necessary to change the O-rings and other rubber components using special materials or change the motor or solenoids to those with higher insulation levels, so be sure to consult us in advance.
- Always operated lock lever, worm gear, or center handle type actuators by hand. Never use an extension bar on the lever or a wheel key on the gear handle, for they might damage the handle or lever. Unlike gate valves or globe valves, tightening with a high torque is unnecessary.
- Do not loosen the installation bolts or other bolted components before relieving the system pressure.

### Installation instructions

- Insert bolts to support the upper rib of the valve when 3/4 of the valve is inserted between the flanges.
- To center the piping for JIS 10K flanges, insert centering sleeves on the bolts and install the bolts to support the valve at the bottom and prevent it from falling through (only for 100, 125, and 150mm sizes).
- Use the provided centering sleeves to facilitate the operation.



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