

TOMOE



Wide Range Rotary
Control Valve

DTM

PAT.NO.4245187

INSTRUCTION MANUAL

TOMOE VALVE CO.,LTD.



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STANDARD SPECIFICATIONS

Valve type	Rotary control butterfly valve
Valve nominal size	80,100,125,150,200,250,300mm
Pressure rating	ASME B16.5 Class150/300
Connected flange	ASME B16.5Class150/300, JIS10/16/20/30K
Body style	Double flanged *1
Face-to-face dimension	IEC 60534-3-2 (JIS B 2005-3-2)
Flow characteristics	Equal Percentage with Optional Linear Characteristic available
Flow direction	Flowing for seat side
Piping Gasket	<ul style="list-style-type: none"> ■ In case of sheet gasket Any standard sheet gasket can be used ■ In case of spiral gasket · For ASME flange---Any standard spiral gaskets with inner/outer rings can be used. · For JIS flange---Use special spiral gasket that is used for TOMOE 300 series.
Actuator	Pneumatic Diaphragm/Pneumatic cylinder/Electrical motor/Manual gear

	With Cavitation Breaker	Without Cavitation Breaker
Rangeability	100 : 1	125 : 1
Max.working Pressure	Close	Class150 : 2MPa Class 300 : 5.1MPa
Differential Pressure in 30% opening	Class 150 : 0.8MPa Class 300 : 2MPa	Class 150 : 0.8MPa Class 300 : 1.4MPa

	Metal seat	Soft seat	
Seat leakage	ANSI B 16.104 ClassV (ANSI/FCI 70-2)	ISO 5208 Rate A (Zero leakage)	
Temperature range	-29 ~ 400 ℃	-10 ~ 230 ℃	
Materials	Body	WCB or CF8M	
	Disc	CF8M + Hard chrome plating / Stellite welding *2 (Option)	
	Stem	630SS	
	Seat	SUS316	RPTFE
	Cavitation breaker E. Protector	SUS316	

※1 In case of double flanged type, the outer diameter and thickness may differ from a standard.

※2 Stellite Welding Disc as an option should be used for superheated steam.

3E Installation direction

3EA	3EB	3EC	3ED

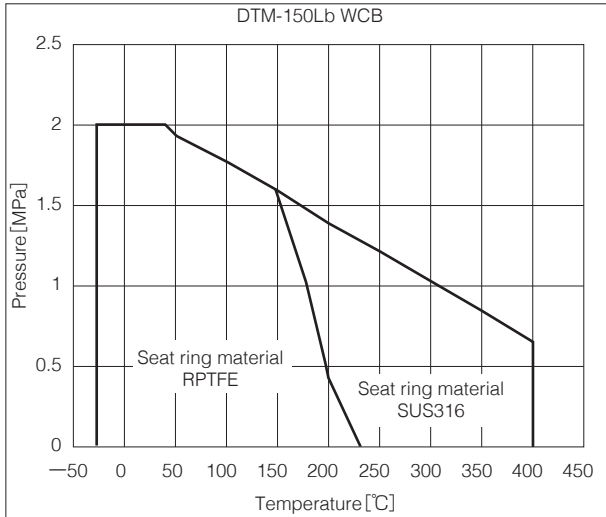
4I Installation direction

4IA	4IB	4IC	4ID

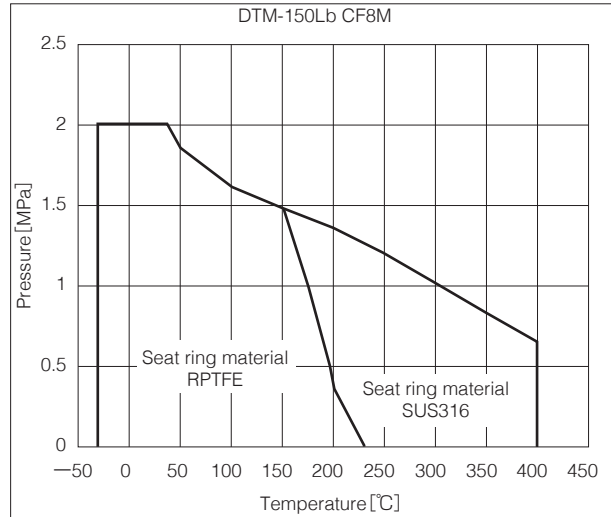
STANDARD SPECIFICATIONS

DTM 150Lb Pressure—Temperature rating

150Lb / Body material : WCB

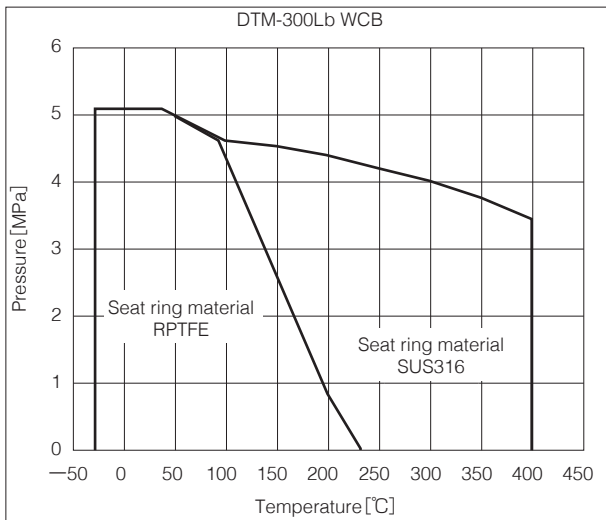


150Lb / Body material : CF8M

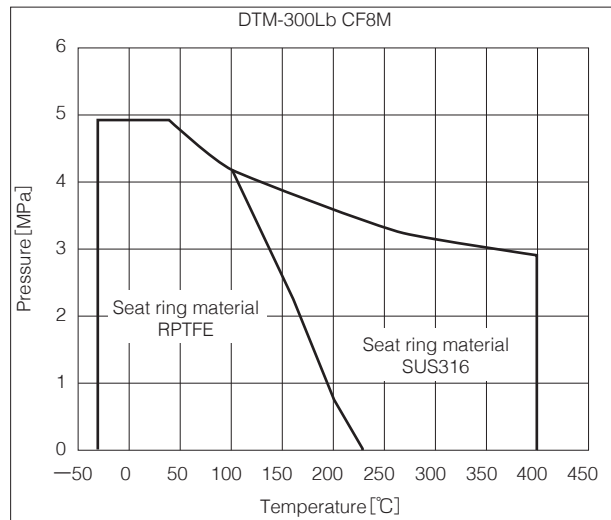


DTM 300Lb Pressure—Temperature rating

300Lb / Body material : WCB



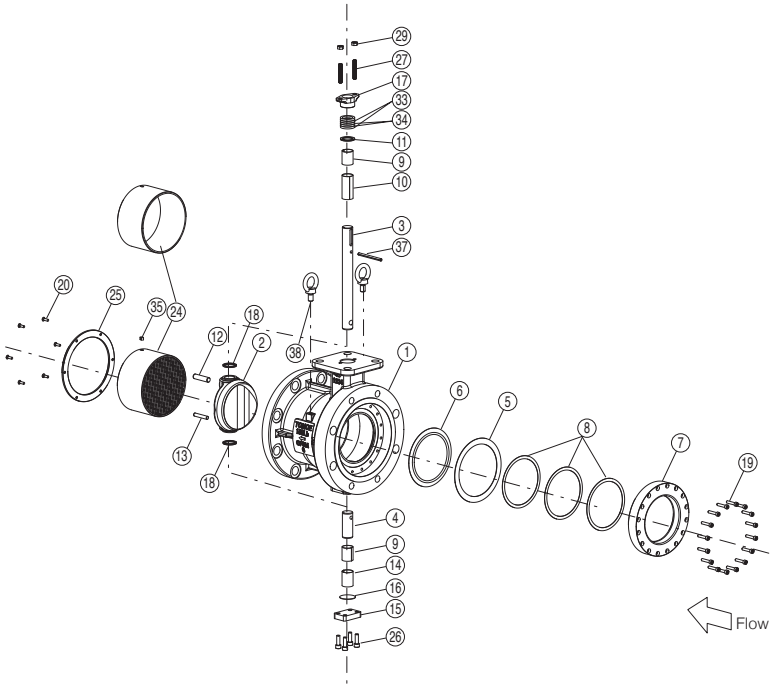
300Lb / Body material : CF8M



EXPANDED VIEW OF DTM VALVE

■ For Pneumatic Cylinder, Electrical Motor, Manual Gear

■ Parts List of DTM Valve



NO.	PARTS NAME	Q'TY	REMARK	METAL SEAT	SOFT SEAT
1	Body	1		○	○
2	Disc	1		○	○
3	Upper Stem	1		○	○
4	Lower Stem	1		○	○
5	Seat Ring	1		○	—
6	Seat Ring Gasket	1		○	—
7	Seat Ring Retainer (For Metal Seat)	1		○	—
	Seat Ring Retainer (For Soft Seat)	1		—	○
8	Backup Spring	2	80A, 100A, 125A	○	—
		3	150A, 200A, 250A	○	—
		4	300A	○	—
9	Bearing A	2	For Lower temperature	○	○
			For higher temperature	○	—
10	Bearing B	1	For Lower temperature	○	○
			For higher temperature	○	—
11	Packing Retainer	1		○	○
12	Upper Taper Pin	1		○	○
13	Lower Taper Pin	1		○	○
14	Bearing Spacer	1		○	○
15	Bottom Cover	1		○	○
16	Bottom Gasket	1		○	○
17	Gland Plate Spigot	1		○	○
18	Space Ring	2	For Lower temperature	○	○
			For higher temperature	○	—
19	Hex.Socket Cap Screw	10	100A		
		12	80A, 125A		
		16	150A	○	○
		20	250A		
		24	200A, 300A		
20	Cross Recessed Countersink Head Screw	4	80A, 100A	○	○
		6	125A, 150A		
		8	200A, 250A, 300A		
24	Cavitation Breaker Or E.Protector	1		○	○
25	C.B.Retainer	1		○	○
26	Hex.Socket Cap Screw	4		○	○
27	Gland Bolt	2		○	○
29	Gland Nut	2		○	○
33	Gland Packing A	3		○	○
34	Gland Packing B	2		○	○
35	Key	1		○	○
37	Spring Pin	1		○	○
38	Eyebolt	2	200A, 250A, 300A	○	○

PACKAGING

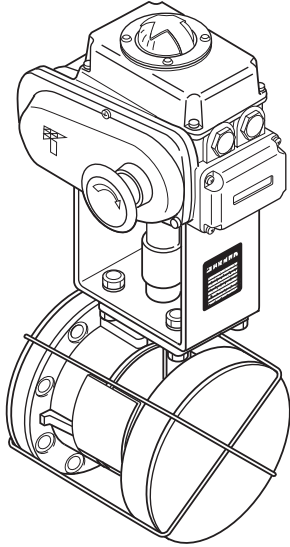


Fig. 1

※Installation Direction in artwork is "B"direction.

- (1) A vinyl protective plate is attached to the flange face on the valve body (piping flange contact surface) in order to protect the seat ring. (Fig. 1)
- (2) The disc is shipped in the fully (or almost fully) closed position.
- (3) The valve has a nameplate with which you can verify information such as the nominal size and material. (Fig. 1)
- (4) The sheet face of the disc has been coated with a slight amount of silicon grease.

TRANSPORT

- (1) Use containers for ocean transport.
- (2) Use a covered vehicle for inland transport. If an uncovered vehicle is used, be sure to cover the valves with a protective tarp.

STORAGE

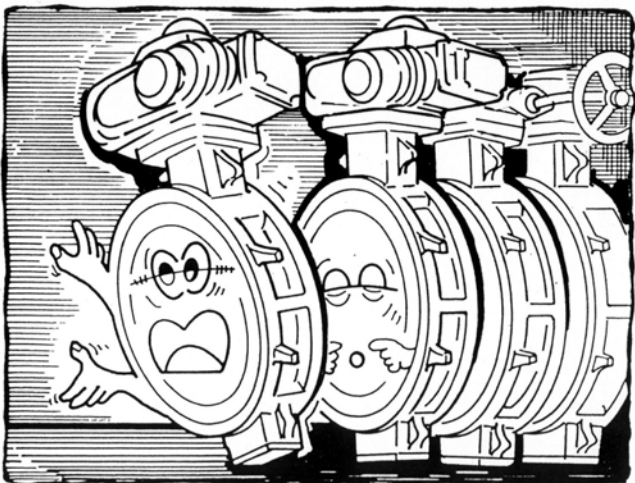


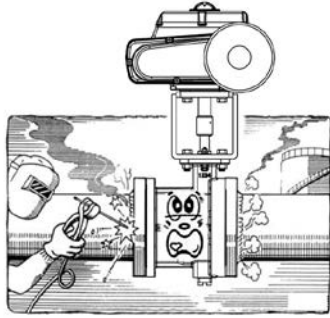
Fig. 2

- (1) When storing valves, keep them indoors in as cool and dark place as possible (temperature: -10 to +60 degrees C, humidity: 70% or less) without removing the protective plate attached to the valve.
- (2) For long periods of storage, apply Ferroguard (use designated product) once per year to the plated parts (bolts, nuts, handle shaft, etc.). (Do not apply silicon grease to a rubber seat ring.)
- (3) Operate the valve once every three months.
- (4) When storing unpackaged butterfly valves, make sure that no unreasonable load is being applied to the valve body and drive member. (Fig. 2)

UNPACKING

- (1) Unpack the valve immediately before installing it into the piping. Do not leave the valve unpacked for long periods of time.

INSTALLATION PRECAUTIONS



※Installation Direction in artwork is "B"direction.

Fig. 3

- (1) Installation of the valve immediately after welding the pipe flange will lead to adverse consequences, such as damage to the seat ring. Make sure that the temperature has cooled sufficiently and that you have removed weld spatter before installing the valve. Never weld when the valve is in the piping. (Fig. 3)
- (2) The seat ring might become damaged or the flange may leak if the flange face that contacts the valve seat ring is as shown in Fig. 4. Also, please confirm that there is no distortion to the flange or that there is no damage, such as scratches, to the flange face.

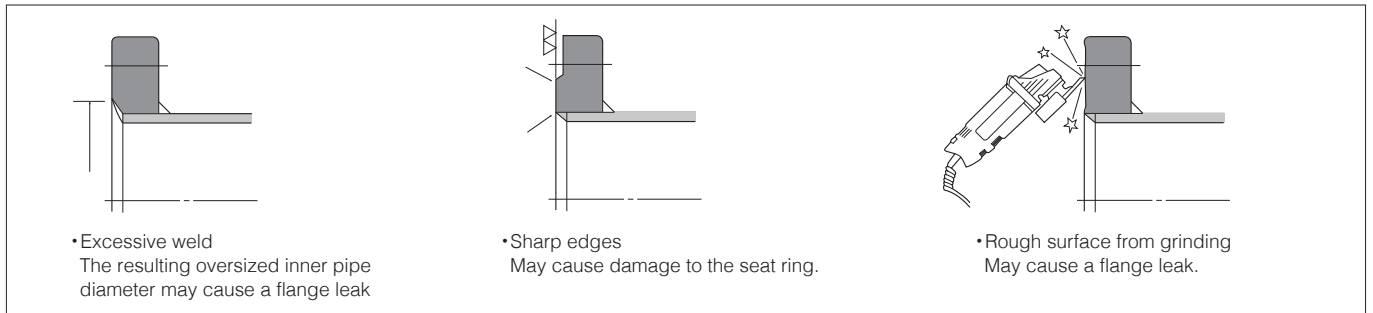


Fig. 4

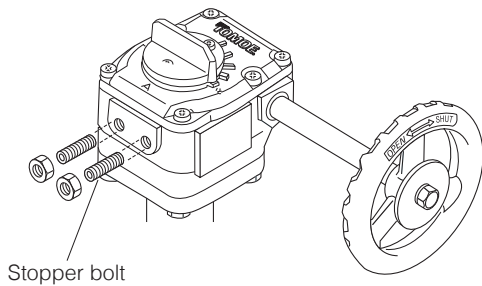
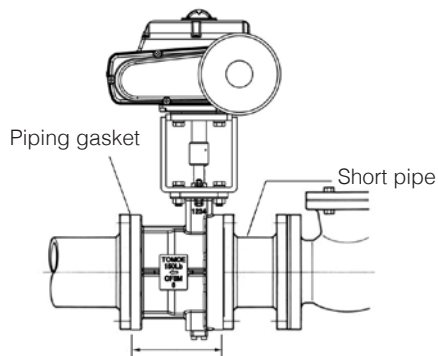


Fig. 5

- (3) Do not apply strong shock such as by throwing the valve and do not put objects or put your weight on the lever or handwheel.
- (4) Do not touch the stopper bolts on the gear box. Changing the valve close position will cause valve seat leakage. (Fig. 5)

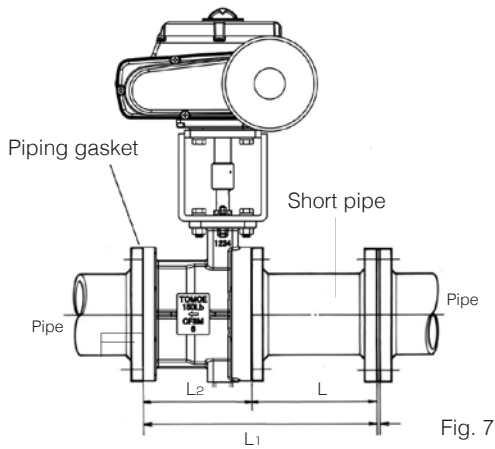


※Installation Direction in artwork is "B"direction.

Fig. 6

- (5) Alignment of the valve to the flange should be done accurately.
- (6) Before tightening the piping bolts, check if the disc does not touch the inside of the flange when the valve is open.
- (7) When installing a non-return valve, pump and DTM, always insert a short pipe in between. Not doing so will cause the disc to hit during operation and lead to faulty operation. (Fig. 6)
- (8) If a Fail Open valve is installed, make sure the disc is in the fully closed position. This is accomplished by temporarily applying pneumatic pressure to the drive member. If a manual handle has been incorporated as an option, use the manual handle to completely close the valve. "OPEN-SHUT" is indicated on the handwheel.

INSTALLATION PRECAUTIONS



※Installation Direction in artwork is "B" direction.

- (9) When replacing a previously installed valve (for example, glove valve) with DTM, since the face-to-face dimension of the previously installed valve will be greater, you must insert a short pipe and adjust to the face-to-face dimension of the original valve pipe flange. Use the equation below when making the short pipe. (Fig. 7)

Length of short pipe (Unit: mm)

$$L=L_1-L_2$$

L : Length of short pipe

L₁: Face-to-face dimension of existing valve

L₂: Face-to-face dimension of DTM

- (10) When installing pump and DTM, make sure the pump pressure does not exceed maximum working pressure: 2MPa for Class 150 body, 5.1MPa for Class 300 body.

- (11) The average velocity in the valve full opening with water must be no over 9 m/sec, and with steam be not exceed 220 m/sec.

- (12) Please establish a straight pipe over 6D in valve front and back by differential flow velocity.

D: The size of valve

- (13) Although it is okay to install a valve in the direction that makes installation easy, please take caution in the following conditions.

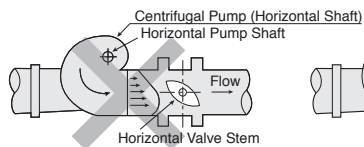
I . When the drive member is a diaphragm, always keep the stem horizontal and the diaphragm facing up.

II . Be careful of the stem direction when piping conditions are as shown in Fig. 8.

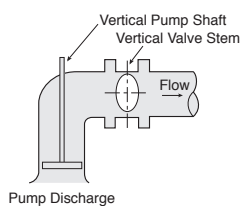
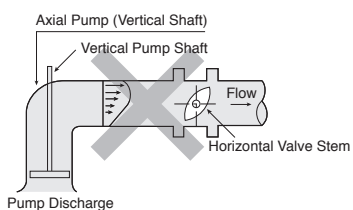
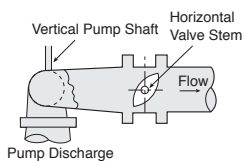
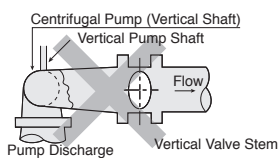
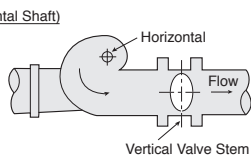
INSTALLATION PRECAUTIONS

Installing a valve at a pump outlet

Incorrect Installation

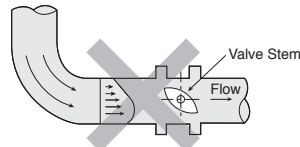


Correct Installation

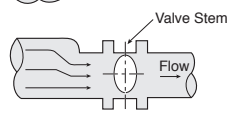
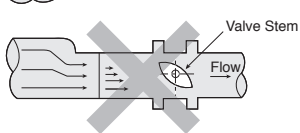
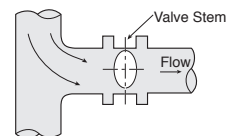
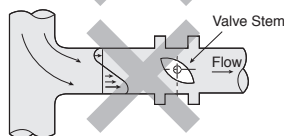
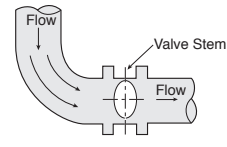


Installing at an elbow or a reducer

Incorrect Installation

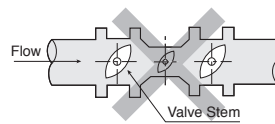


Correct Installation



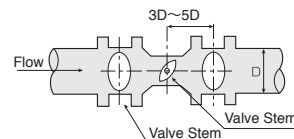
Combination of a control valve and stop valve

Incorrect Installation



All the valve stems have the same orientation.

Correct Installation



The orientation of the valve stems is alternating.

Fig. 8

INSTALLATION PROCEDURE

When installing a non-return valve, pump or flexible rubber joint with a butterfly valve, always insert a short pipe in between. Otherwise the disc may hit the other device, resulting in faulty operation.

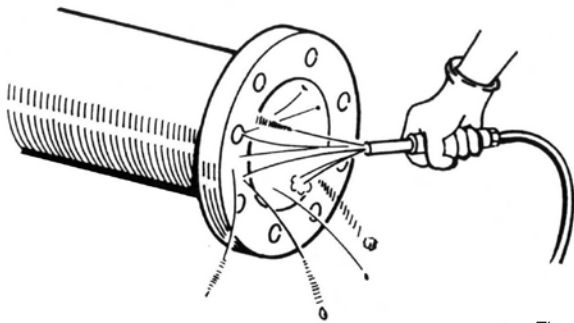


Fig. 9

- (1) Use air purging to clean the flange faces that will contact the valve. If there is rust or some other foreign material sticking to a flange face, clean it with a suitable cleaning fluid (alcohol or neutral detergent, etc.). (Fig. 9)
If possible, install in the piping a short pipe with a face-to-face dimension identical to the butterfly valve and blow into the pipe to completely remove foreign substances.

- (2) Check the valve number and the material of the main component on the nameplate to verify applicability.

- (3) Close the disc completely.

- (4) After aligning the piping, insert a piping bolt into the position in the figure and secure the valve to prevent it from dropping.

※The valves have two drilled setting bolt holes at both the top and bottom of the valve body. Insert piping bolts in the locations shown in the diagram to prevent falling. (Fig. 10) (Fig. 11)

- (5) Place a jack bolt in the position shown in the figure to widen the face-to-face dimension. Push and widen to make the face-to-face dimension 3 to 5 mm greater than the valve width on each side. (Fig. 12)

Without setting bolts holes

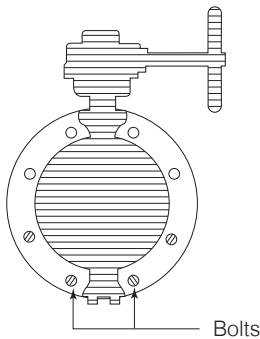


Fig. 10

With setting bolt holes

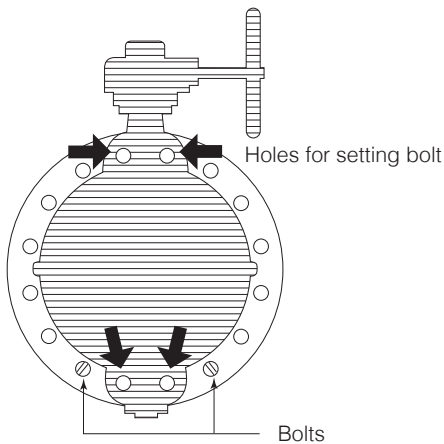


Fig. 11

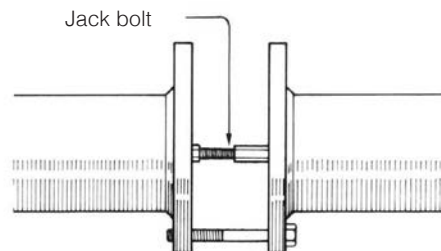
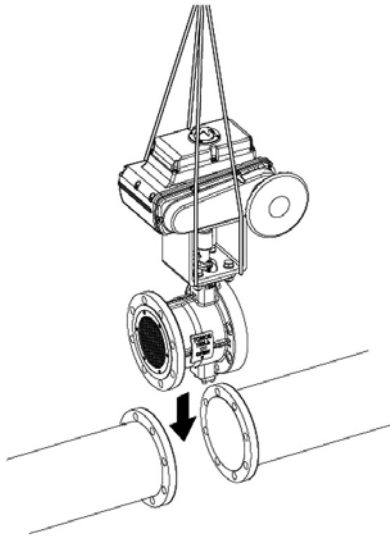


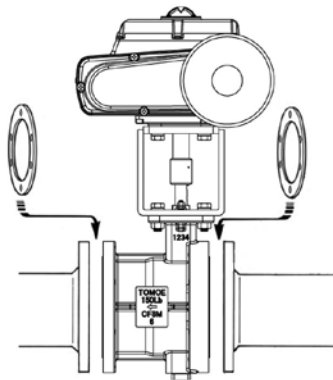
Fig. 12

INSTALLATION PROCEDURE



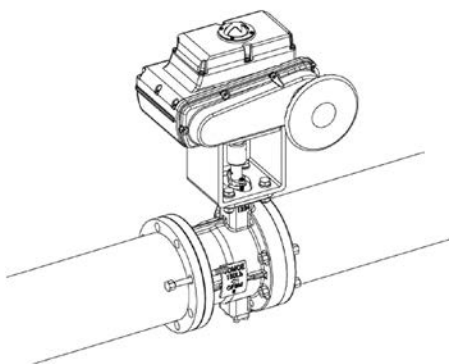
※Installation Direction in artwork is "B"direction.

Fig. 13



※Installation Direction in artwork is "B"direction.

Fig. 14

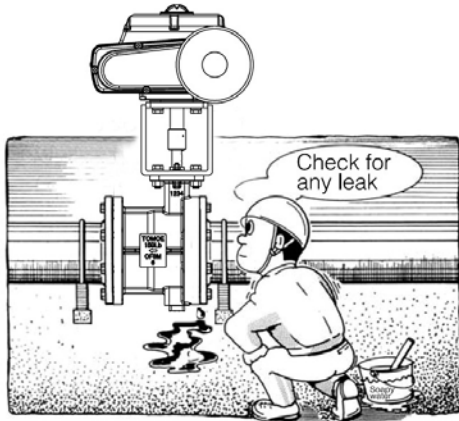


※Installation Direction in artwork is "B"direction.

Fig. 15

- (6) Match the direction of valve pressure to the direction of the arrow indicated on the valve body, and insert the valve taking care not to damage the valve gasket face. (Fig. 13)
- (7) Insert piping gaskets between the pipe flange faces and the end faces of the valve. (Fig. 14)
- (8) Insert piping bolts into the remaining flange bolt holes. After aligning the piping flanges with the valve and the piping gaskets, tighten the hexagon nuts. (Fig. 15)
- (9) To facilitate installation, suspend the valve with a crane or similar while working. When suspending the valve, use nylon string and suspend it from its "neck section" if the valve has no eyebolts. (Fig. 13)
- (10) When tightening the hexagon nuts, alternate diagonally, applying equal strength as you gradually tighten each nut. Be careful not to tighten the nuts on one side too much or too little in order to prevent lopsided tightening.
- (11) After installing, open and close the valve to verify the disc does not hit the piping or piping gaskets.

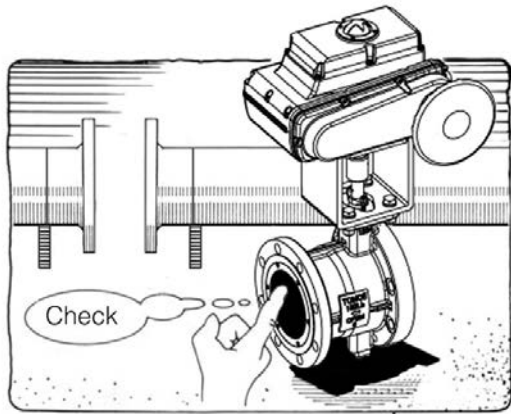
HANDLING PRECAUTIONS AFTER INSTALLATION



※Installation Direction in artwork is "B"direction. Fig. 16

- (1) Before beginning operation, air-purge the outside of the piping and clean the inside of the piping by running water through the piping.
- (2) Prior to operating, increase the internal pressure of the piping and check for possible leakage from the flange gaskets, glands, and bottom cover by employing soapy water or similar.
When doing so, make sure that the internal pressure does not exceed maximum working pressure: 2MPa for Class 150 body, 5.1MPa for Class 300 body. (Fig. 16)
- (3) If leakage is observed from the bottom cover, immediately retighten the bottom cover installation bolts. Alternate and tighten gradually with equal strength to avoid lopsided tightening. If leakage is observed from the flanges or glands, release the internal pressure and remove the valve from the piping. Check if there is nothing wrong with the piping gaskets, and tighten gland-bolts moreover.
- (4) Opening and closing operation of the worm gear type must be done by hand. Do not use a Wilky key on the gear handle. Doing so can damage the handle and break the valve.
- (5) When performing a pressure test, completely open the valve (if using a pressure higher than the rated pressure). Never use a fully closed valve in place of a blind flange. If inserting a blind flange or similar device, take care not to forcibly insert the flange as the flange face may be damaged on the DTM, causing leakage.
- (6) If the system will not be operated for a prolonged period of time after the piping work is finished exercise the valve by opening and closing it once every two weeks.
- (7) The life of the valve will become shorter if the valve is primarily used at an opening less than 20%.

INSPECTION AND MAINTENANCE



※Installation Direction in artwork is "B"direction. Fig. 17

(1) Periodic Inspection

Perform a visual inspection of the valve once a year, checking the valve for corrosion of disc, cavitation breaker, E.Protector, and wearing of the seat ring. The gear box has been designed to be maintenance-free.

(2) Abnormal operation

Abnormal operation is usually caused by accumulation of foreign material or damage to the seat ring. If foreign material has accumulated and the disc is in the fully open position, it can be removed by maintaining the fully open position and flushing it out. If that does not work and if the seat ring is damaged, remove the valve from the piping and inspect it. (Fig. 17)

(3) Lubricants

Use Lithium-base grease to lubricate the cylinder. Use silicon oil to lubricate the disc edge. (Use only the specified greases.)

Rust preventive agents and Lubricants	Product name (manufacturers)	To be applied to:
FELLOW GUARD	FELLOW GUARD #1009	Plated parts (bolts, nuts and handle shaft)
Lithium-base grease	Multinoc grease No.2 (Nippon Oil Corporation)	Pneumatic Actuator T-matic
Grease	M ystik JI-6 (Kyodo yushi)	Gear box
Silicon oil	Shin-Etsu Silicon KF96H (Shin-Etsu Chemical Co., Ltd.)	Disc edge

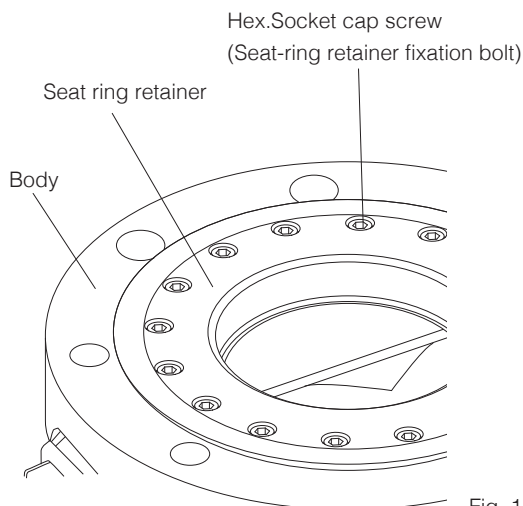
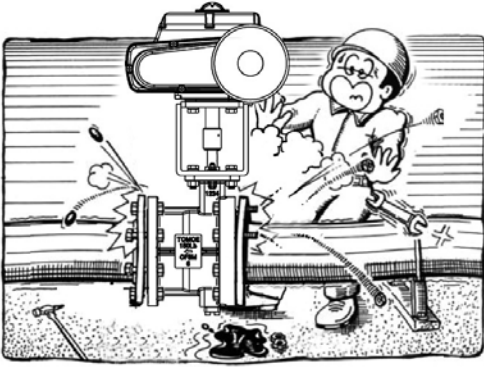


Fig. 18

(4) Please tighten up a seat-ring retainer fixation bolt by predetermined torque before laying pipes in DTM again. Tighten the bolt by the four steps following the specified torque showed on the table with the method of opposite angle, equality operating. (Fig. 18)

Step	Unit:N·m						
	80A	100A	125A	150A	200A	250A	300A
1	2	3	3	3	8	16	16
2	4	6	6	6	16	32	32
3	6	9	9	9	24	48	48
4	7.8	13	13	13	32	65	65
Using	M5	M6	M6	M6	M8	M10	M10
Q'ty of bolt	12	10	12	16	24	20	24

VALVE REMOVAL PROCEDURE



※Installation Direction in artwork is "B"direction.

Fig. 19

(1) When removing the valve from the piping, make sure that the pressure or the temperature inside the piping has dropped completely.

It is very dangerous to loosen any piping bolts while the piping is under pressure. Be very careful. Also, drain off any residual fluid from the piping. (Fig. 19)

(2) With the closed disc, loosen the piping bolts and nuts. Before removing them all, use a support to prevent the fall of the valve.

ASSEMBLING AND DISMANTLING OF VALVE

(1) Refer to the Assembly Instructions of DTM Valve, which you can ask for to our sales dep. In order to dismantle valve, please carry out this task along the Assembly Instructions in inverse process.

(2) If DTM Valve is fitted with a metal seat, please ensure that the seat ring gasket is replaced with a new one, after removing the seat ring retainer.

(3) Please refer to the expanded view of parts for metal seated valve (see figure 20) and soft (PTFE) seated valve as detailed in figure 21.

(4) Please refer to the expanded view of parts (see figure 22) when changing the cavitation breaker and E-protector.

Metal seated Valve Specification

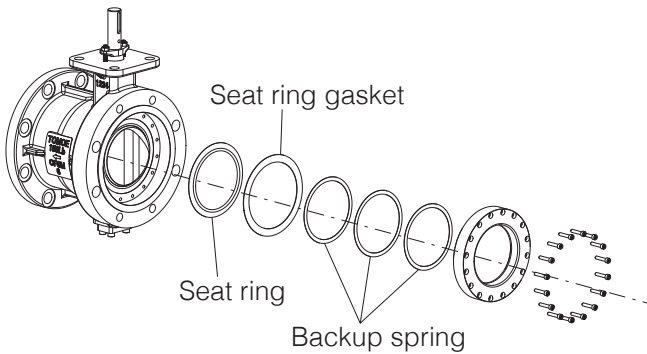


Fig. 20

Soft (PTFE) seated Valve Specification

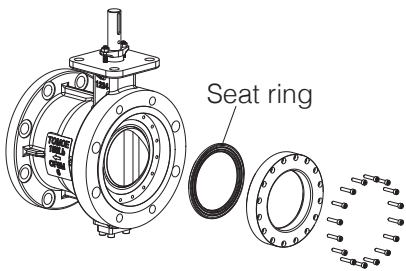


Fig. 21

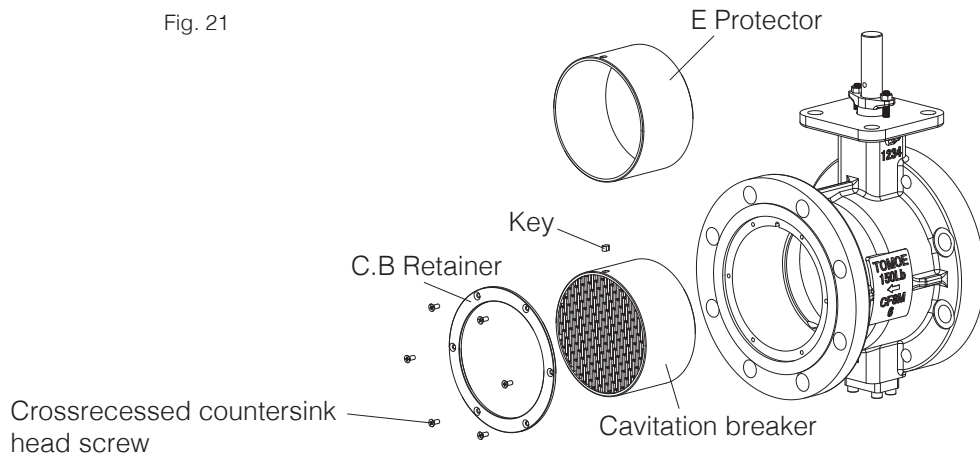
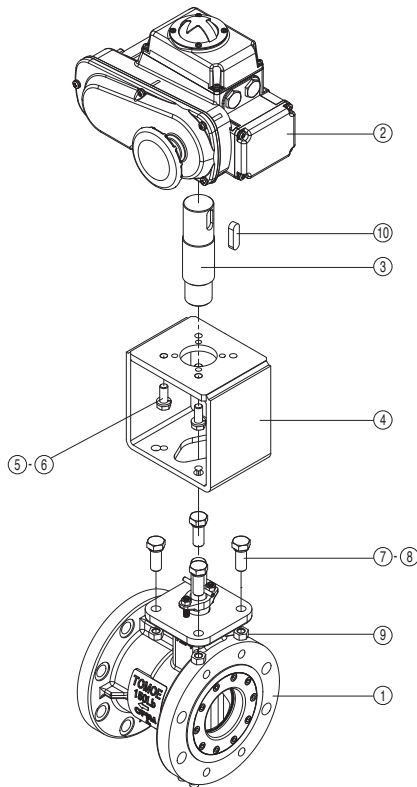


Fig. 22

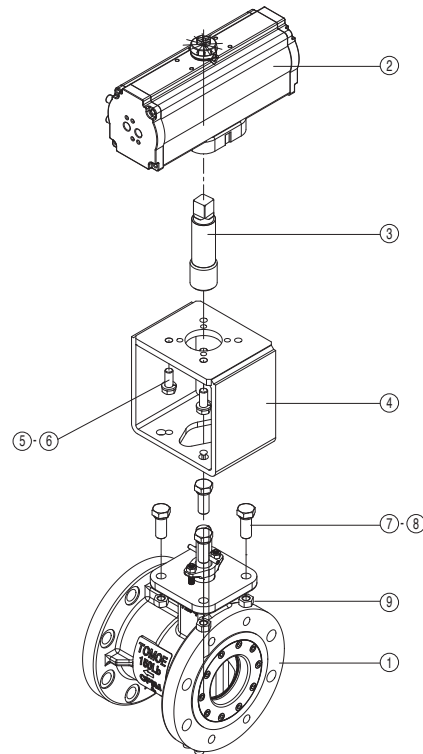
INSTALLING of ELECTRICAL MOTOR, PNEUMATIC CYLINDER and MANUAL GEAR

Jointing of key



※Installation Direction in artwork is "B"direction.

Jointing of square and two width



※Installation Direction in artwork is "A"direction.

- (1) Before dismantling or changing the actuator, please be sure to make a mark on the top flange of body and actuator to indicate the fully closed position.
- (2) After re-assembling or changing the actuator, a leak test must be performed.
- (3) After re-assembling or changing the actuator, a functionality test must be performed.

■ Structure

NO.	PARTS NAME	Q'TY
1	Bear-Shaft	1
2	4I	1
	T-DYNAMO	
	TGA	
	TG-S	
	2U	
	2K	
3	Key Joint	1
	Square Joint	
	Two Width Joint	
4	Column	1
5	Bolt (Actuator side)	4
6	Spring Washer (Actuator side)	4
7	Bolt (Used for fixing body side)	4
8	Spring Washer (Body side)	4
9	Nut (Body side)	4
10	Key (Actuator)	1

■ Type of actuator and joint

ACTUATOR	Key Joint	Square Joint	Two Width Joint	
Electrical Motor	4I-1	○	—	
	4I-2	○	—	
	4I-2.5	○	—	
	4I-3	○	—	
	4I-4	○	—	
Pneumatic Cylinder	TGA-125	○	—	
	TGA-140	○	—	
	TGA-160	○	—	
	TGA-180	○	—	
	TG-10S	—	—	○
	TG-12S	—	—	○
	TG-14S	—	—	○
	TG-20S	—	—	○
	K30	—	—	—
	K70	—	○	—
	K170(S)	—	○	—
	K370(S)	—	○	—
	K700(S)	—	○	—
T35	—	—	—	
T85	—	○	—	
T200	—	○	—	
T380	—	○	—	
T750	—	○	—	
Manual Gear	2U1	—	○	
	2U2	—	○	
	2U3	—	○	
	2U4	○	—	
	2U5	○	—	
	2U6	○	—	
2K03	○	—		

LIMITED AVERAGE VELOCITY

■ Limited average velocity

Water: 9 m/sec

Steam: 220 m/sec

ALLOWANCE DIFFERENTIAL PRESSURE

■ The definition of allowance differential pressure

The definition of allowance differential pressure of DTM Valve, is the differential pressure that occurs at permissible maximum average velocity with the valve fully open, and the maximum working pressure.

[The permissible maximum average velocity of DTM valve when fully open]

- With cavitation breaker : 9m/sec
- Without cavitation breaker : 7m/sec

[The maximum working pressure]

- Class 150 body : 2MPa
- Class 300 body : 5.1MPa

The valve noise is less than 85dBA, if the flow velocity does not exceed the permissible maximum average velocity of DTM valve when fully open.

ALLOWANCE DIFFERENTIAL PRESSURE

■ Allowance differential pressure 150Lb Specification. [With cavitation breaker]

unit : MPa

Size		Allowance differential pressure table										
mm	inch	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
80	3	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
100	4	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
125	5	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
150	6	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
200	8	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
250	10	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72
300	12	2.00	1.68	1.40	1.20	1.04	0.92	0.80	0.78	0.76	0.74	0.72

Size		Allowance differential pressure table									
mm	inch	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
80	3	0.70	0.68	0.66	0.66	0.60	0.52	0.45	0.41	0.38	0.37
100	4	0.70	0.68	0.66	0.65	0.57	0.49	0.43	0.37	0.33	0.31
125	5	0.70	0.68	0.66	0.65	0.59	0.53	0.50	0.47	0.45	0.44
150	6	0.70	0.68	0.66	0.62	0.52	0.44	0.39	0.35	0.33	0.32
200	8	0.70	0.68	0.66	0.66	0.65	0.58	0.53	0.50	0.48	0.49
250	10	0.70	0.68	0.66	0.66	0.58	0.51	0.46	0.41	0.38	0.35
300	12	0.70	0.68	0.66	0.66	0.56	0.48	0.41	0.36	0.31	0.28

[Without cavitation breaker]

unit : MPa

Size		Allowance differential pressure table										
mm	inch	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
80	3	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.70	0.68
100	4	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.70	0.70
125	5	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.65	0.60
150	6	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.65	0.60
200	8	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.65	0.60
250	10	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.65	0.60
300	12	2.00	1.60	1.32	1.16	0.96	0.80	0.80	0.78	0.76	0.65	0.60

Size		Allowance differential pressure table									
mm	inch	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
80	3	0.64	0.50	0.40	0.32	0.25	0.20	0.17	0.14	0.12	0.08
100	4	0.65	0.46	0.37	0.30	0.24	0.19	0.15	0.12	0.10	0.08
125	5	0.55	0.42	0.33	0.26	0.22	0.18	0.16	0.14	0.13	0.11
150	6	0.55	0.48	0.36	0.27	0.20	0.16	0.12	0.10	0.09	0.08
200	8	0.68	0.55	0.45	0.39	0.30	0.24	0.20	0.18	0.16	0.12
250	10	0.55	0.51	0.38	0.29	0.23	0.18	0.14	0.12	0.10	0.08
300	12	0.55	0.52	0.40	0.31	0.24	0.18	0.14	0.11	0.08	0.07

ALLOWANCE DIFFERENTIAL PRESSURE

■ Allowance differential pressure 300Lb Specification. [With cavitation breaker]

unit : MPa

Size		Allowance differential pressure table										
mm	inch	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
80	3	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
100	4	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
125	5	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
150	6	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
200	8	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
250	10	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30
300	12	5.10	4.20	3.50	3.00	2.60	2.30	2.00	1.80	1.62	1.45	1.30

Size		Allowance differential pressure table										
mm	inch	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%	
80	3	1.15	1.15	0.96	0.79	0.66	0.56	0.48	0.42	0.39	0.37	
100	4	1.15	1.11	0.91	0.75	0.63	0.53	0.45	0.38	0.34	0.31	
125	5	1.15	1.06	0.86	0.73	0.63	0.56	0.52	0.48	0.46	0.44	
150	6	1.15	1.15	0.89	0.70	0.56	0.46	0.40	0.36	0.34	0.32	
200	8	1.20	1.15	1.11	0.89	0.73	0.63	0.56	0.52	0.49	0.49	
250	10	1.20	1.15	0.97	0.77	0.64	0.54	0.47	0.42	0.39	0.35	
300	12	1.20	1.15	0.97	0.78	0.62	0.51	0.43	0.36	0.31	0.28	

[Without cavitation breaker]

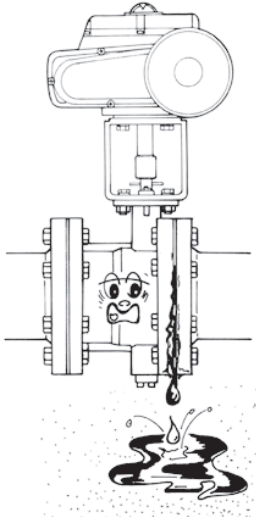
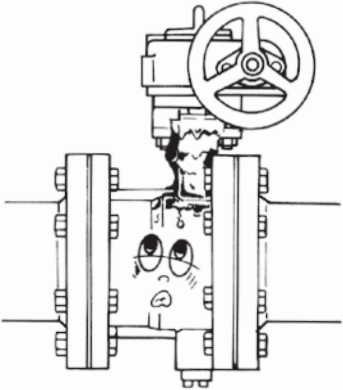
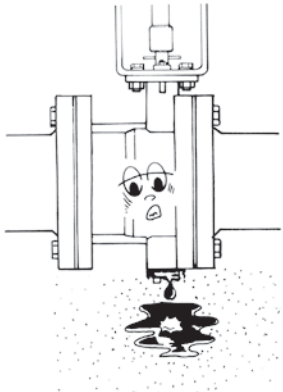
unit : MPa

Size		Allowane differential pressure table										
mm	inch	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
80	3	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.70	0.70
100	4	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.70	0.70
125	5	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.25	0.95	0.65	0.60
150	6	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.65	0.60
200	8	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.75	0.70
250	10	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.70	0.65
300	12	5.10	3.80	3.30	2.80	2.30	1.80	1.40	1.30	1.00	0.70	0.65

Size		Allowance differential pressure table										
mm	inch	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%	
80	3	0.65	0.58	0.44	0.34	0.27	0.21	0.17	0.14	0.12	0.08	
100	4	0.65	0.54	0.41	0.32	0.26	0.20	0.16	0.12	0.10	0.08	
125	5	0.55	0.48	0.36	0.28	0.23	0.19	0.17	0.15	0.13	0.11	
150	6	0.55	0.56	0.40	0.29	0.21	0.16	0.13	0.11	0.09	0.08	
200	8	0.70	0.65	0.58	0.42	0.32	0.25	0.21	0.18	0.17	0.12	
250	10	0.63	0.59	0.42	0.31	0.24	0.18	0.15	0.12	0.10	0.08	
300	12	0.63	0.61	0.45	0.34	0.25	0.19	0.15	0.11	0.08	0.07	

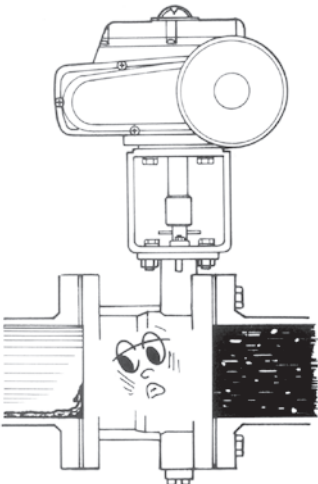
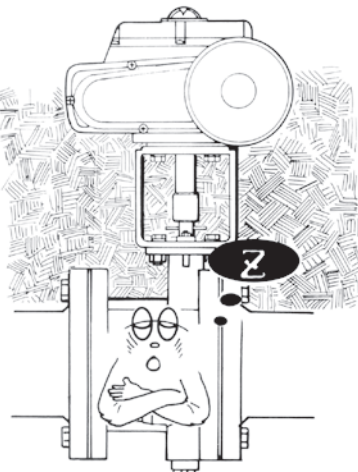
TROUBLESHOOTING

Please refer to the following when there is a problem with a valve.

Problem	Cause	Countermeasure
<p>There is leakage from the gasket between the valve body and pipe flange faces.</p>  <p>※Installation Direction in artwork is "B"direction.</p>	<p>The piping bolts are loose or they were not tightened evenly.</p> <p>The valve is misaligned.</p> <p>The wrong piping gasket was selected.</p>	<p>Retighten piping bolts.</p> <p>Loosen the bolts and realign the valve correctly.</p> <p>Refer to 「DTM piping gasket」.</p>
<p>There is a leak from the gland.</p>  <p>※Installation Direction in artwork is "B"direction.</p>	<p>The gland bolts are loose.</p> <p>The gland packing is worn away, or deterioration.</p>	<p>Re-tighten the gland nut.</p> <p>Replace the gland packing.</p>
<p>There is a leak from the bottom cover.</p>  <p>※Installation Direction in artwork is "B"direction.</p>	<p>The bottom cover bolts are loose.</p>	<p>Re-tighten the bottom cover bolts.</p>

TROUBLESHOOTING

(Continue)

Problem	Cause	Countermeasure
<p>There is leakage from the valve seat and the amount of leakage increases.</p>  <p>※Installation Direction in artwork is "B" direction.</p>	<p>The wrong material was selected for the fluid application. (Parts are being corroded.)</p>	<p>Change the material. Please inquire with us regarding selection.</p>
	<p>There is damage to the disc seal or seat ring due to the presence of foreign matter inside the piping.</p>	<p>Replace the seat ring.</p>
	<p>Movement of disc in the fully closed position.</p>	<p>Adjust the fully closed position of the disc.</p>
	<p>Fluid specification is not compatible with valve specification. (Specifications have been exceeded.)</p>	<p>Re-check the specifications.</p>
	<p>There is torsion of stem due to an unusual increase in opening/ closing torque.</p>	<p>Re-check the specifications.</p>
	<p>Movement of disc in fully closed position due to loose actuator installation bolts.</p>	<p>Re-adjust the fully closed position of disc by re-tightening the installation bolts.</p>
	<p>The valve has been installed in reverse orientation to the direction of flow (direction of pressure).</p>	<p>Install the valve in the correct orientation relative to the flow.</p>
<p>Faulty operation (The valve does not work.)</p>  <p>※Installation Direction in artwork is "B" direction.</p>	<p>Prescribed air pressure or voltage of actuator is not supplied.</p>	<p>Check by using a pressure gauge, tester, etc.</p>
	<p>For pneumatic cylinder type, the diaphragm of speed controller is stuck in the fully closed position.</p>	<p>Open the diaphragm of the speed controller.</p>
	<p>By-pass valve is in the open position.</p>	<p>Close the bypass valve.</p>
	<p>Increased torque due to presence of foreign matter in the piping.</p>	<p>Keep valve in the fully opened position and flush out the foreign material.</p>
	<p>Twisted or damaged stem and joint.</p>	<p>Replace the valve body assembly and joint. Re-check the specifications.</p>

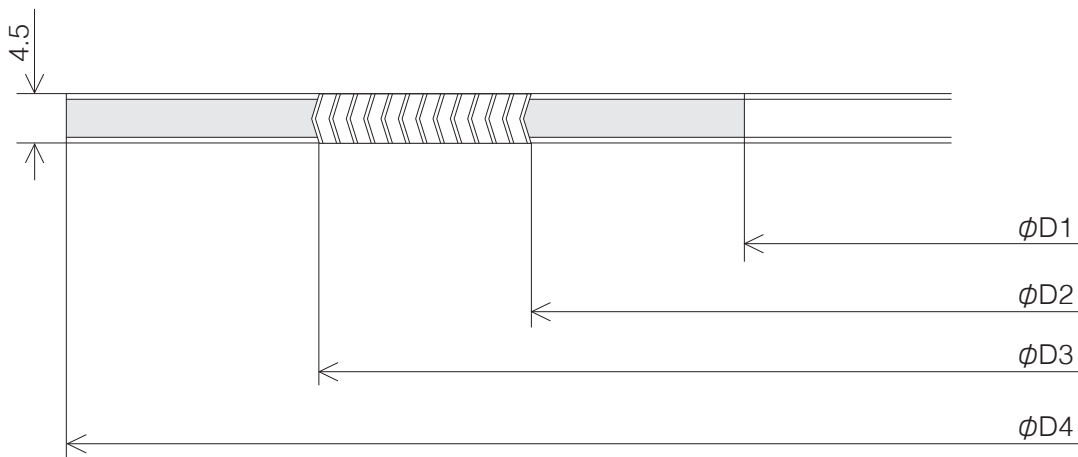
PIPING GASKET

■Spiral gasket

●For JIS flange

Nominal size		JIS 10K/16K/20K/30K			JIS 10K	JIS 16K	JIS 20K	JIS 30K
mm	inch	D1	D2	D3	D4			
80	3	89	97	120	134	140	140	150
100	4	115	124	146	159	165	165	172
125	5	140	151	177	190	202	202	207
150	6	166	178	207	220	237	237	249
200	8	217	227	257	270	282	282	294
250	10	268	282	318	332	354	354	360
300	12	319	331	362	377	404	404	418

※ Except for JIS 30K flange, dimensions of the gasket designed for the TOMOE300 series



●For ANSI flange

Any standard gaskets with inner/outer ring can be used.

■Sheet gasket

●For JIS flange

Any standard can be used.

●For ANSI flange

Any standard can be used.

APPLICABLE FLANGE STANDARD

■150Lb body

Nominal size		ASME		JIS			
mm	inch	300Lb	150Lb	10K	16K	20K	30K
80	3	×	D	D+T	×	×	×
100	4	×	D+T	D+T	D+T	D+T	×
125	5	×	D+T	D+T	×	×	×
150	6	×	D+T	D+T	×	×	×
200	8	×	D+T	D+T	×	×	×
250	10	×	D+T	D+T	×	×	×
300	12	×	D+T	D+T	D+T	D+T	×

■300Lb body

Nominal size		ASME		JIS			
mm	inch	300Lb	150Lb	10K	16K	20K	30K
80	3	D+T	×	×	D+T	D+T	D+T
100	4	D+T	×	×	×	×	D+T
125	5	D+T	×	×	D+T	D+T	D+T
150	6	D+T	×	×	D+T	D+T	D+T
200	8	D+T	×	×	D+T	D+T	D+T
250	10	D+T	×	×	D+T	D+T	D+T
300	12	D+T	×	×	×	×	D+T

<Mark>

D : With drill hole

T : With tapping

× : Not enabled

CAUTION!

Because outer diameter and the thickness of the flange are different from a standard size, please be careful.
Diameter of bolt circle and bolt hole, bolting number and size follow a standard.

PIPING BOLTS AND NUTS

2.150Lb Double flanged body style

2.1 ASME / JPI Class 150

Nominal size		ASME B16.5 150Lb, JPI-7S-15 150Lb		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	—	8-5/8-11UNC × 80	8
100	4	4-5/8-11UNC × 75 (13 × 8)	12-5/8-11UNC × 80	16
125	5	4-3/4-10UNC × 95 (17 × 11)	12-3/4-10UNC × 95	16
150	6	4-3/4-10UNC × 95 (17 × 11)	12-3/4-10UNC × 100	16
200	8	4-3/4-10UNC × 95 (17 × 11)	12-3/4-10UNC × 110	16
250	10	4-7/8- 9UNC × 110 (19 × 12)	20-7/8- 9UNC × 115	24
300	12	4-7/8- 9UNC × 110 (19 × 12)	20-7/8- 9UNC × 115	24

*Bolt / nut material — SNB7 / S45C

*Please use a nut with a height that is 100% of the screw diameter.

*The bolt length calculation is based on use of a 4.5mm thick spiral gasket.

*The flange thickness calculation is based on the standard steel flange thickness.

*Quantities shown are for one set of valve.

[Examples]

Setting bolts : 4 - 3/4 - 10UNC × 85 (17×11)

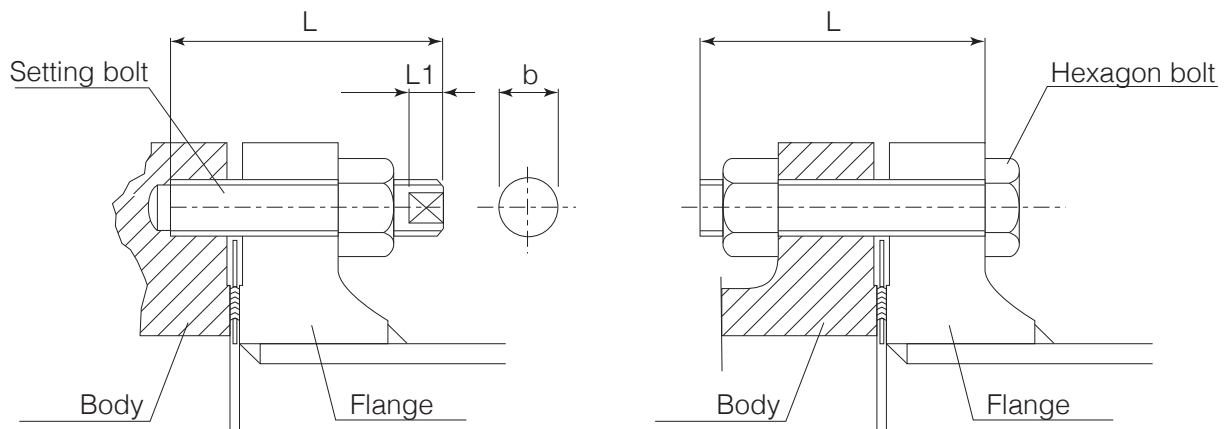
Q'TY Bolt length(L)

Nominal bolt diameter (width across bolt(b) × Length across bolt (L1))

Hexagon bolts : 12 - 3/4 - 10UNC × 95

Q'TY Bolt length(L)

Nominal bolt diameter



PIPING BOLTS AND NUTS

2.2 JIS 10K

Nominal size		ASME B16.5 150Lb, JPI-7S-15 150Lb		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	4-M16×70(13× 8)	12-M16× 80	16
100	4	4-M16×70(13× 8)	12-M16× 80	16
125	5	4-M20×90(17×11)	12-M20× 95	16
150	6	4-M20×90(17×11)	12-M20×100	16
200	8	4-M20×90(17×11)	20-M20×100	24
250	10	4-M22×100(19×12)	20-M22×110	24
300	12	4-M22×100(19×12)	28-M22×110	32

2.3 JIS 16K

Nominal size		JIS16K		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
100	4	4-M20× 90(17×11)	12-M20× 90	16
300	12	4-M24×115(19×12)	28-M24×130	32

2.3 JIS 20K

Nominal size		JIS20K		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
100	4	4-M20× 90(17×11)	12-M20× 90	16
300	12	4-M24×125(19×12)	28-M24×130	32

*Bolt / nut material – SNB7 / S45C

*Please use a nut with a height that is 100% of the screw diameter.

*The bolt length calculation is based on use of a 4.5mm thick spiral gasket.

*The flange thickness calculation is based on the standard steel flange thickness.

*Quantities shown are for one set of valve.

PIPING BOLTS AND NUTS

1.300Lb body

1.1 ASME / JPI Class 300

Nominal size		ASME B16.5 300Lb, JPI-7S-15 300Lb		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	4-3/4-10UNC×95 (17×11)	12-3/4-10UNC×95	16
100	4	4-3/4-10UNC×110 (17×11)	12-3/4-10UNC×100	16
125	5	4-3/4-10UNC×110 (17×11)	12-3/4-10UNC×110	16
150	6	4-3/4-10UNC×110 (17×11)	20-3/4-10UNC×110	24
200	8	4-7/8-9UNC×120 (19×12)	20-7/8-9UNC×125	24
250	10	4-1-8UNC×140 (21×14)	28-1-8UNC×140	32
300	12	4-1 1/8-8UN×150 (24×16)	28-1 1/8-8UN×150	32

*Bolt / nut material – SNB7 / S45C

*Please use a nut with a height that is 100% of the screw diameter.

*The bolt length calculation is based on use of a 4.5mm thick spiral gasket.

*The flange thickness calculation is based on the standard steel flange thickness.

*Quantities shown are for one set of valve.

[Examples]

Setting bolts : 4 - 3/4 - 10UNC × 85 (17×11)

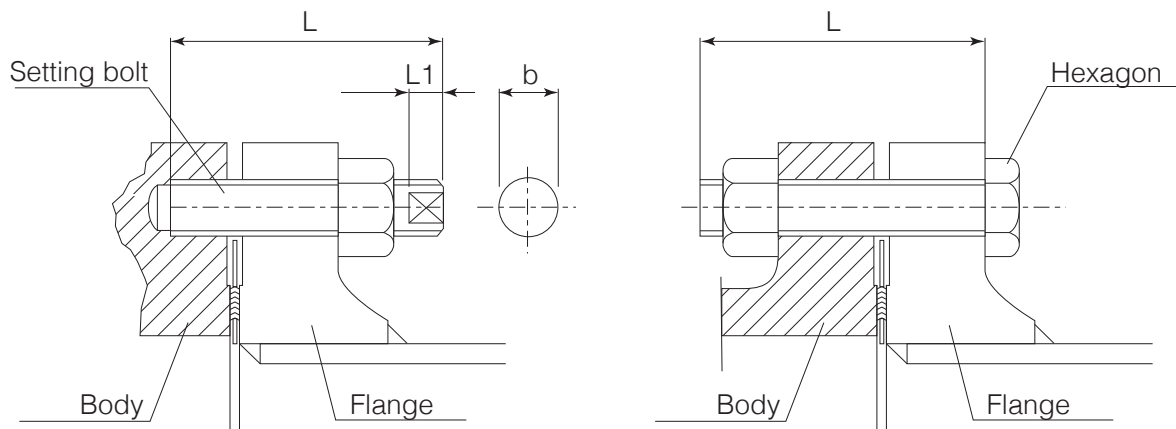
Q'TY Bolt length(L)

Nominal bolt diameter (width across bolt(b)× Length across bolt (L1))

Hexagon bolts : 12 - 3/4 - 10UNC × 95

Q'TY Bolt length(L)

Nominal bolt diameter



PIPING BOLTS AND NUTS

1.2 JIS 16K

Nominal size		JIS16K		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	4-M20× 90(17×11)	12-M20× 90	16
125	5	4-M22×100(19×12)	12-M22×100	16
150	6	4-M22×110(19×12)	20-M22×105	24
200	8	4-M22×110(19×12)	20-M22×110	24
250	10	4-M24×115(19×12)	20-M24×125	24

1.3 JIS 20K

Nominal size		JIS20K		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	4-M20× 90(17×11)	12-M20× 90	16
125	5	4-M22×110(19×12)	12-M22×105	16
150	6	4-M22×110(19×12)	20-M22×110	24
200	8	4-M22×110(19×12)	20-M22×115	24
250	10	4-M24×125(19×12)	20-M24×130	24

1.4 JIS 30K

Nominal size		JIS30K		
mm	inch	Setting bolts	Hexagon bolts	Q'TY of Nuts
80	3	4-M20× 95(17×11)	12-M20× 95	16
100	4	4-M22×110(19×12)	12-M22×105	16
125	5	4-M22×115(19×12)	12-M22×115	16
150	6	4-M24×125(19×12)	20-M24×125	24
200	8	4-M24×125(19×12)	20-M24×130	24
250	10	4-M30(P=3)×145(21×14)	20-M30(P=3)×145	24
300	12	4-M30(P=3)×155(24×16)	28-M30(P=3)×155	32

*Bolt / nut material – SNB7 / S45C

*Please use a nut with a height that is 100% of the screw diameter.

*The bolt length calculation is based on use of a 4.5mm thick spiral gasket.

*The flange thickness calculation is based on the standard steel flange thickness.

*Quantities shown are for one set of valve.

APPLICABLE PIPE AND MINIMUM INTERNAL DIAMETER OF PIPING

1.Applicable pipe

Mark ◎ The bump between piping and the valve is expected and a low noise can be expected most in the case of 2mm or less.

Mark ○ There are bump from 2 to 8mm in piping and the valve. It is possible to use it though some are influenced to the flow characteristic according to the bump.

■150Lb body (-29~230°C)

Nominal size		STPG (JIS G 3454)				
mm	inch	Sch20	Sch30	Sch40	Sch60	Sch80
80	3	◎		◎	◎	◎
100	4	○		◎	◎	◎
125	5	○		◎	◎	◎
150	6	○		◎	◎	◎
200	8	○	○	○	○	◎
250	10	○	○	○	◎	◎
300	12	○	○	◎	○	○

■300Lb body (-29~230°C)

Nominal size		STPG (JIS G 3454)		
mm	inch	Sch40	Sch60	Sch80
80	3	◎	◎	◎
100	4	◎	◎	◎
125	5	◎	◎	◎
150	6	◎	◎	◎
200	8	○	○	◎
250	10	○	◎	◎
300	12	◎	○	○

■150Lb body (230~400°C)

Nominal size		STPT (JIS G 3456)				
mm	inch	Sch20	Sch30	Sch40	Sch60	Sch80
80	3	◎		◎	◎	◎
100	4	○		◎	◎	◎
125	5	○		◎	◎	◎
150	6	○		◎	◎	◎
200	8	○	○	○	○	◎
250	10	○	○	○	◎	◎
300	12	○	○	◎	○	○

APPLICABLE PIPE AND MINIMUM INTERNAL DIAMETER OF PIPING

(Continue)

■300Lb body (230~400°C)

Nominal size		STPT (JIS G 3456)		
mm	inch	Sch40	Sch60	Sch80
80	3	◎	◎	◎
100	4	◎	◎	◎
125	5	◎	◎	◎
150	6	◎	◎	◎
200	8	○	○	◎
250	10	○	◎	◎
300	12	◎	○	○

2. Minimum internal diameters of piping

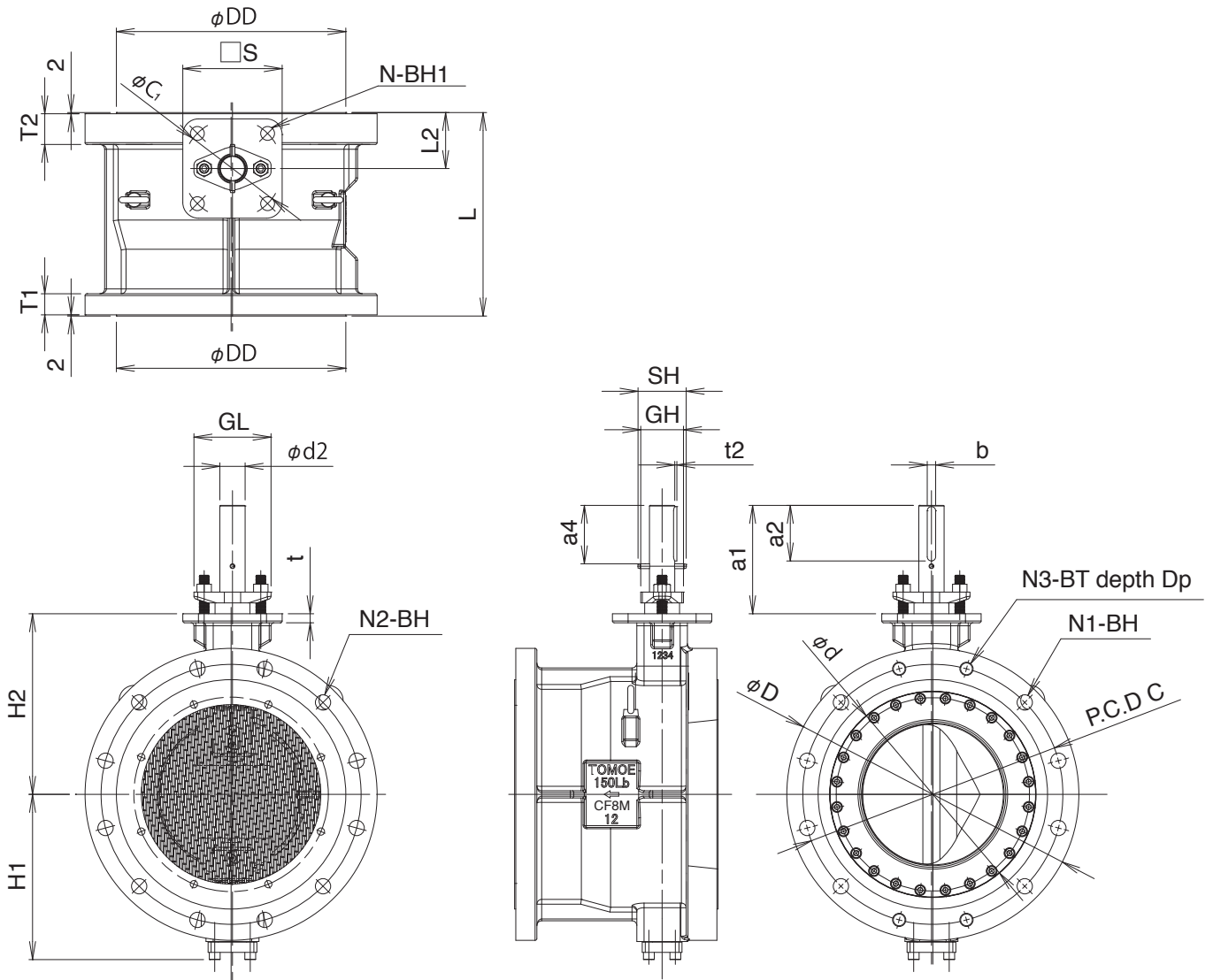
The disc interferes with piping if the internal diameter of piping is smaller than the minimum internal diameters of piping shown below.

Nominal size		Minimum Internal Diameters of piping
mm	inch	
80	3	0
100	4	0
125	5	0
150	6	65
200	8	95
250	10	130
300	12	185

DIMENSIONS AND MASS

1. Bare-shaft

■ Drawing



DIMENSIONS AND MASS

Dimension of bare-shaft

SIZE		ϕd	ϕD	L	L2	H1	H2	a1	a2	a4	$\phi d2$	b	t2	t	GL	GH	SH	FLANGE JOINT
mm	inch																	
80	3	111	190	165	49	118	140	85	37.3	43	20	6	2.5	15	68.6	37	80	10K
			210			128												150Lb
																		16K/20K
																		30K
																		300Lb
100	4	132	230	194	54	139	162.5	84.5	37.3	43	22	8	3.0	15	68.6	37	80	10K
			255			151												150Lb
																		16K/20K
																		30K
																		300Lb
125	5	160	255	213	58	152	175	101	47	60	26	8	3.0	15	68.6	37	80	10K
			280			164												150Lb
																		16K/20K
																		30K
																		300Lb
150	6	188	280	229	61	163	195	101	47	60	26	8	3.0	15	68.6	37	80	10K
			320			183												150Lb
																		16K/20K
																		30K
																		300Lb
200	8	234	345	243	68	199	225	127	57	62	32	10	3.0	15	96	54	80	10K
			380			216												150Lb
																		16K/20K
																		30K
																		300Lb
250	10	286	405	297	85	233	255	165	77	82	37	12	3.0	15	96	54	80	10K
			445			252								18				150Lb
																		16K/20K
																		30K
																		300Lb
300	12	342	485	338	93	274	300	180	92	97	42	14	3.5	15	128	71	80	10K
			520			292								22				150Lb
																		16K/20K
																		30K
																		300Lb

DIMENSIONS AND MASS

(Continue)

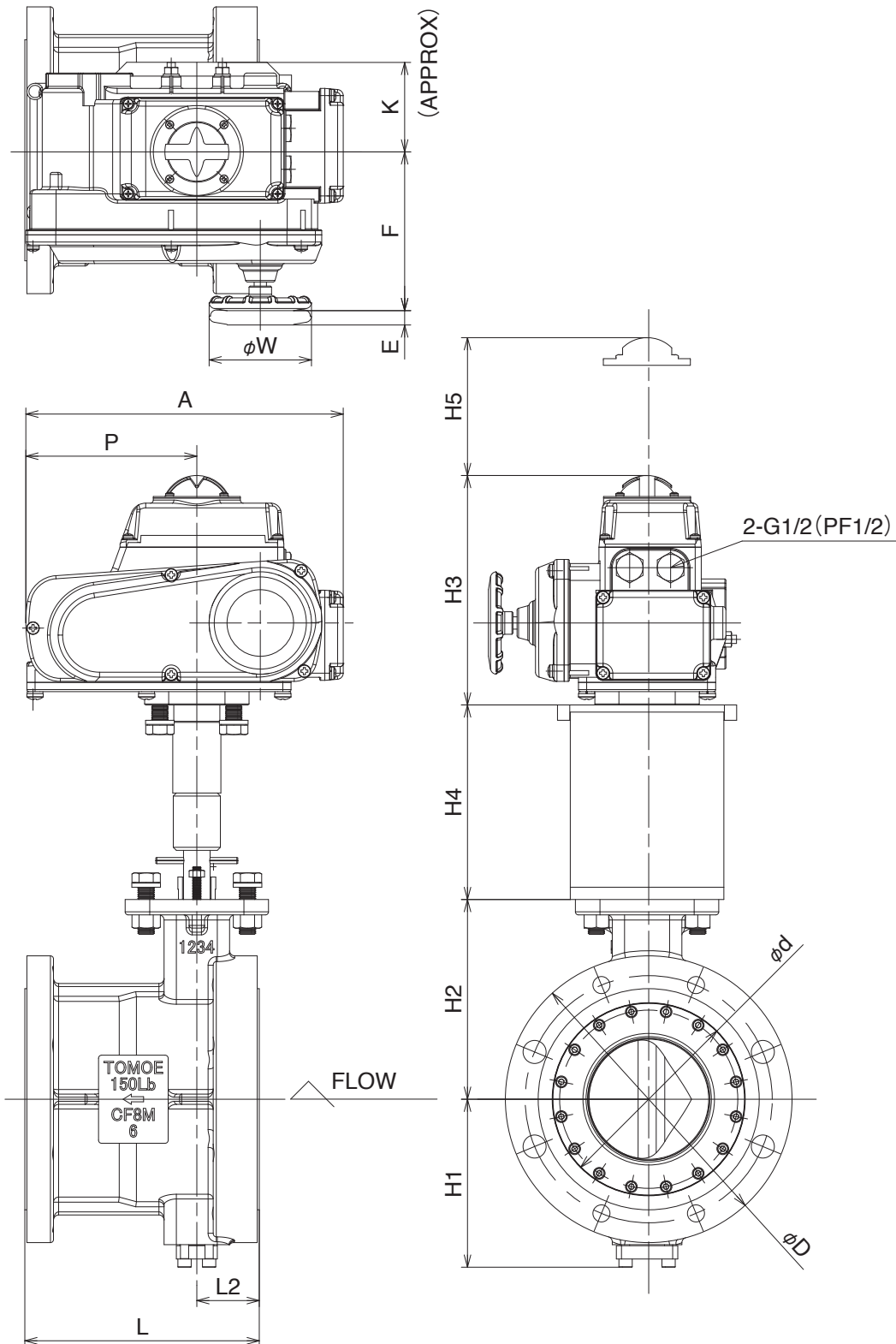
SIZE		TOP FLANGE TYPE	T2	T1	DD	FLANGE JOINT	P.C.D C	N1	N2	BH	N3	BT	DP	WEIGHT APPROX. (kgf)
mm	inch													
80	3	F10	32	25	127.0	10K	150	4	8	19	4	M16	18	25
						150Lb	152.4	4	4	20	-	-	-	
			35	29		16K/20K	160	4	8	23	4	M20	24	30
						30K	170	4	8	23	4	M20	24	
					300Lb	168.3	4	8	23	4	3/4-10 UNC	24		
100	4	F12	27	25	157.2	10K	175	4	8	19	4	M16	18	35
						150Lb	190.5	4	8	20	4	5/8-11 UNC	18	
			38	32		16K/20K	185	4	8	23	4	M20	24	45
						30K	195	4	8	25	4	M22	30	
					300Lb	200	4	8	23	4	3/4-10 UNC	27		
125	5	F12	40	25	185.7	10K	210	4	8	23	4	M20	27	50
						150Lb	215.9	4	8	23	4	3/4-10 UNC	27	
			42	35		16K/20K	225	4	8	25	4	M22	32	61
						30K	230	4	8	25	4	M22	32	
					300Lb	235	4	8	23	4	3/4-10 UNC	32		
150	6	F14	43	26	215.9	10K	240	4	8	23	4	M20	27	58
						150Lb	241.3	4	8	23	4	3/4-10 UNC	27	
			45	37		16K/20K	260	8	12	25	4	M22	34	74
						30K	275	8	12	27	4	M24	34	
					300Lb	269.9	8	12	23	4	3/4-10 UNC	34		
200	8	F14	45	31	269.9	10K	290	8	12	23	4	M20	25	88
						150Lb	298.5	4	8	23	4	3/4-10 UNC	29	
			47	43		16K/20K	305	8	12	25	4	M22	36	107
						30K	320	8	12	27	4	M24	36	
					300Lb	330.2	8	12	26	4	7/8-9 UNC	36		
250	10	F16	47	33	323.8	10K	355	8	12	25	4	M22	30	132
						150Lb	362	8	12	26	4	7/8-9 UNC	35	
			52	48		16K/20K	380	8	12	27	4	M24	38	166
						30K	390	8	12	33	4	M30x3	42	
					300Lb	387.4	12	16	29	4	1-8 UNC	42		
300	12	F16	51	35	381.0	10K	400	12	16	25	4	M22	30	200
						150Lb	431.8	8	12	26	4	7/8-9 UNC	35	
			55	51		16K/20K	430	12	16	27	4	M24	38	240
						30K	450	12	16	33	4	M30x3	44	
					300Lb	450.8	12	16	32	4	1 1/8-8 UN	44		

FLANGE TYPE	□S	φC1	N	BH1
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

DIMENSIONS AND MASS

2. Electrical motor DTM-4I

■ Drawing



※Installation Direction in artwork is "B" direction.

DIMENSIONS AND MASS

Dimension of DTM-4I

Flange joint:150Lb/300Lb/JIS10K/JIS30K

SIZE		DIMENSION (mm)																	MOTOR	WEIGHT
mm	inch	φd	φD	L	L2	H1	H2	SELECTION CRITERIA	FLANGE JOINT	H3	H5	H4	A	P	F	K	E	φW	TYPE	APPROX. (kgf)
80	3	111	190	165	49	118	140	LA, LB, HA	150Lb, JIS10K	165	100	175	252	138	126	65	12	70	4I-1	39
			210					LA, LB, LC LD, HA	300Lb, JIS30K	(191)										44
			190					HB	150Lb, JIS10K	198										44
			210					LE, HB, HC HD, HE	300Lb, JIS30K	(224)										49
100	4	132	230	194	54	139	162.5	LA, LB	150Lb, JIS10K	165	100	175	252	138	126	65	12	70	4I-1	49
			255					LA, LB	300Lb, JIS30K	(191)										60
			230					HA, HB	150Lb, JIS10K	198										54
			255					LC, LD, LE HA, HB	300Lb, JIS30K	(224)										64
								HC, HD, HE		(224)										65
			125					5	160	255										213
280	LA, LB	300Lb, JIS30K		(224)	84															
255	HA, HB	150Lb, JIS10K		198	74															
280	LC, LD, LE HA, HB	300Lb, JIS30K		(224)	85															
	HC, HD, HE			(255)	96															
150	6	188		280	229	61	163			195	LA	150Lb, JIS10K	198	100	190	310	167	154	85	
			320	LA				300Lb, JIS30K	(224)		97									
			280	LB, HA				150Lb, JIS10K	198		82									
			320	LB, HA				300Lb, JIS30K	(224)		98									
			280	HB				150Lb, JIS10K	230		93									
			320	LC, LD, LE HB, HC, HD, HE				300Lb, JIS30K	(255)		109									
200	8	234	345	243	68	199	225	LA	150Lb, JIS10K	198	100	190	310	167	154	85	14	100	4I-2.5	112
			380					LA	300Lb, JIS30K	(224)										131
			345					LB, HA, HB	150Lb, JIS10K	230										123
			380					LB, LC, LD, LE HA, HB, HC	300Lb, JIS30K	(255)										142
								HD, HE		(255)										147
			250					10	286	405										297
445	LA, LB, LC HA	300Lb, JIS30K		(255)	207															
405	HB	150Lb, JIS10K		230	178															
445	LD, LE HB, HC, HD	300Lb, JIS30K		(255)	212															
300	12	342	485	338	93	274	300	LA	150Lb, JIS10K	230	100	232	388	223	246	136	23	200	4I-3	241
			520					LA	300Lb, JIS30K	(255)										281
			485					LB, HA	150Lb, JIS10K	230										246
			520					LC, LD	300Lb, JIS30K	(255)										286

※The () dimensions in H3 are specifications with servo unit or microcomputer unit.

※ For selection, please refer to [DTM APPLICABLE FLANGE STANDARD] and [DTM ACTUATOR SELECTION].

DIMENSIONS AND MASS

Dimension of DTM-4I

Flange joint: JIS16K/JIS20K

SIZE		DIMENSION (mm)																MOTOR TYPE	WEIGHT APPROX. (kgf)
mm	inch	ϕd	ϕD	L	L2	H1	H2	SELECTION CRITERIA	FLANGE JOINT	H3	H4	A	P	F	K	E	ϕW		
80	3	111	210	165	49	128	140	LA, LB, HA	JIS16K	165 (191)	175	252	138	126	65	12	70	4I-1	44
								HB	JIS20K	198 (224)								4I-2	49
100	4	132	230	194	54	139	162.5	LA, LB	JIS16K	165 (191)	175	252	138	126	65	12	70	4I-1	49
								HA, HB	JIS20K	198 (224)								4I-2	54
125	5	160	280	213	58	164	175	LA, LB	JIS16K	198 (224)	190	310	167	154	85	14	100	4I-2	84
								HA, HB	JIS20K	198 (224)								4I-2.5	85
150	6	188	320	229	61	183	195	LA	JIS16K	198 (224)	190	310	167	154	85	14	100	4I-2	97
								LB, HA	JIS20K	198 (224)								4I-2.5	98
								HB		230 (255)								4I-3	109
200	8	234	380	243	68	216	225	LA	JIS16K	198 (224)	190	310	167	154	85	14	100	4I-2.5	131
								LB, HA, HB	JIS20K	230 (255)								4I-3	142
250	10	286	445	297	85	252	255	LA, LB, HA	JIS16K	230 (255)	232	388	223	246	136	23	200	4I-3	207
								HB	JIS20K	230 (255)								4I-4	212
300	12	342	485	338	93	274	300	LA	JIS16K	230 (255)	232	388	223	246	136	23	200	4I-3	241
								LB, HA	JIS20K	230 (255)								4I-4	246

※1 The () dimensions in H3 are specifications with servo unit or microcomputer unit.

※2 For selection, please refer to 「DTM APPLICABLE FLANGE STANDARD」and 「DTM ACTUATOR SELECTION」.

Before Placing an Order

General Product Warranty

Tomoe warrants that the product is free from defects in material and workmanship under normal use and operation.

The warranty period is 12 months from the commencement of the use (including the test use) of the product, or for 18 months from the shipment of the product from Tomoe's factory, whichever expires earlier.

Tomoe will, without charge, repair or replace, in its sole discretion, such product that, in the opinion of Tomoe, is found to be defective within the warranty period.

This warranty only applies to the Tomoe products delivered from Tomoe or its authorized subsidiaries and distributors. Except as explicitly provided herein, Tomoe neither provides any warranty, whether express or implied, with respect to the products (including, but not limited to, warranties of merchantability or fitness for a particular purpose and non-infringement of any third party's intellectual property rights), nor provides any remedy with respect to a defective product including, but not limited to, any compensation of damages resulting from the defect of the product or malfunction of the equipment or machinery that uses the product. In no event shall Tomoe be liable for any incidental, indirect, special or consequential damage of any nature whatsoever.

This warranty does not cover the normal wear and tear of any expendable parts, such as seat rings and gland packing, that occurs through the normal use of the product, or any defect in the products that occurs under any of the following circumstances. In such cases, Tomoe may, subject to its consent, repair or replace the defective product for a fee.

- 1) The defect is caused by the product being used or handled under conditions, or in an environment, or in a manner, or by means other than in strict accordance with the instructions in the catalog, product specifications and operating instructions.
- 2) The defect is caused by the product or any part thereof being altered, adjusted, dismantled, modified or repaired, or any part of the product being removed or replaced, by any person not authorized by Tomoe to do so.
- 3) The defect is caused by products which are not supplied by Tomoe.
- 4) The defect is caused wholly or partly by any drawings or specifications supplied or approved by you (the purchaser) or by any materials, parts or components supplied by you or bought at your instruction.
- 5) The defect is caused by inadequate or inappropriate inspection or maintenance of the product or the equipment or machinery that uses the product (including, without limitation, poor replenishment of consumables such as lubricant).
- 6) The defect is caused by high frequency of use or operation of the product or the equipment or machinery that uses the product (including, without limitation, high frequency opening and closing thereof).
- 7) The defect is caused by any problem or trouble related to power or air supply to the equipment or machinery that uses the product.
- 8) The defect is caused by inflow of foreign matter, such as dust, into the product.
- 9) The defect is caused by the product being stored in an inadequate or inappropriate condition, such as open-air storage.
- 10) The defect is caused by any reason that is beyond the control of Tomoe, including, without limitation, an act of war, act of public enemy, revolution, riot, act of god, flood, fire, earthquake, and so on.
- 11) The defect is caused by any other reason not attributable to Tomoe.

Paid Repair, Replacement and Supply of Parts for Discontinued Products

Tomoe reserves the right to change the design, or discontinue the production, of any products, without notice. Neither paid repair nor replacement of the products, nor supply of their parts, may be available after 5 years have passed from the change of design or discontinuance of production of such products. However, please note that paid repair or replacement of the products and/or supply of their parts may not be available during such 5 year period.

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