
KITZ

Operation Manual

For
UB TYPE BUTTERFLY VALVE

(WAFER TYPE)

Thank you for having chosen KITZ products.

For safe and trouble-free function and performance of the product, make sure to read and understand all items of this manual before valve mounting and operation.

Keep this manual in a convenient place for your valve operators' easy access.

This manual applies to the KITZ manual UB type butterfly valve of wafer type.

For actuators of automatically operated value, refer to the operation manual of relevant actuators prepared by the manufacturers.

CAUTION AND WARNING

To ensure safe and trouble-free function and performance of the product, please read all items of this manual before handling, mounting and operation of the units.

The items listed here are indicated to prevent personal injury and product damage.

Please follow the cautions described here.

The signal words "WARNING" and "CAUTION" are defined as follows:



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury and product damage.



Indicate prohibition of an action.



Indicate mandatory implementation of an action

NOTES TO USERS

This manual is designed to show an appropriate usage of products for transportation, storage, installation, operation and maintenance.

Be sure to read the manual before starting any of transportation, storage, installation, operation, maintenance, and handling valves.

This manual does not cover the whole scope of conceivable usage of products for transportation, storage, installation, operation and maintenance. If technical assistance beyond the scope of this manual is required, contact KITZ Corporation or its distributors.

The specifications for transportation, storage, installation, operation and maintenance described in this manual have been determined with valve maintenance taken into consideration. DO NOT use products beyond the specifications.

The illustrations given in this manual do not introduce all details. If more detailed data are required, refer to our relevant valve assembly drawings.

- * Any information provided in this operation manual is subject to revision at without prior notice. This edition cancels all previous issues.

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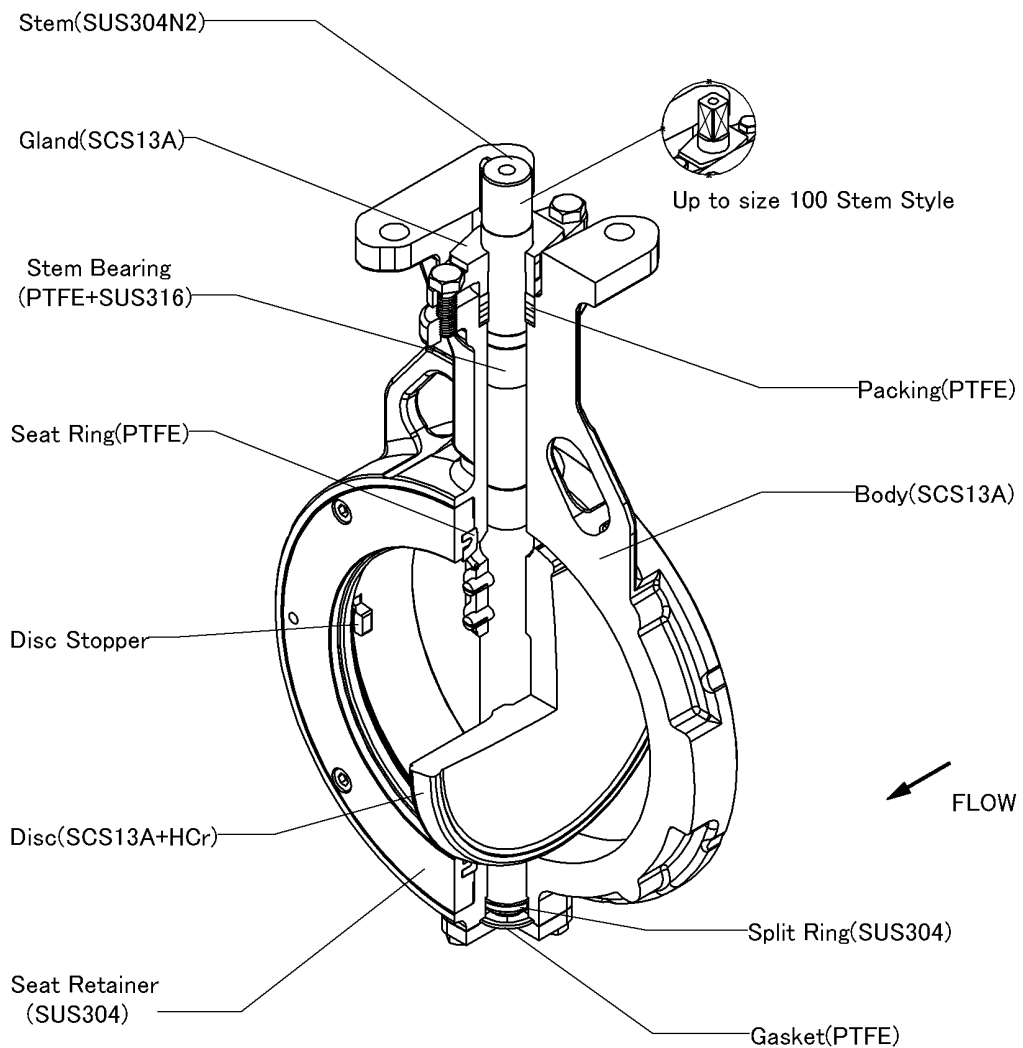
CHAPTER
Construction and Design Features

Construction and Design Features

UB Butterfly Valves

1. Construction and Function

- 1.1 The valve design and the name of the parts are shown below.
- 1.2 90° rotation of the stem opens and closes the valve.
- 1.3 Butterfly valve is serviceable in fully open, closed and intermediate position for volume control.
- 1.4 Double off-set seat configuration is adopted for smooth operation.
- 1.5 Fluid flow is uni direction



Construction Plan

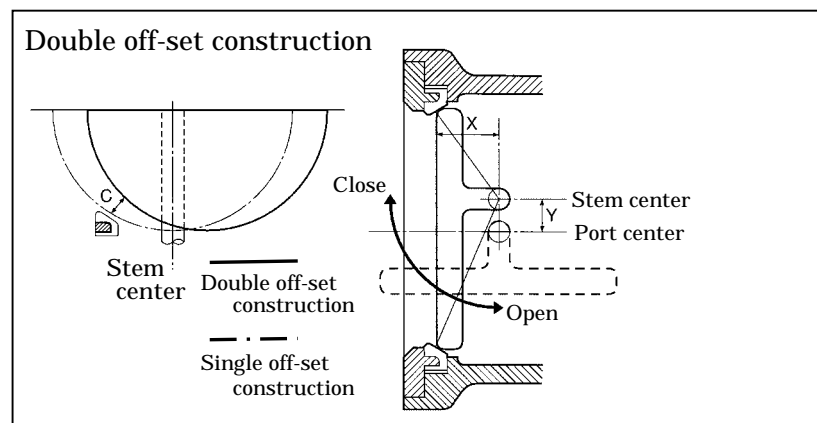
This drawing shows typical construction of valve.

Construction and Design Features

2. General Feature

2.1 Double off-set seat configuration to prevent seat damage under high velocity

In fully open position, there are Cmm clearance between seat ring and disc because they have Xmm off-set between stem center and seat ring center and Ymm off-set between port center and stem center. So, it happens no partial wear the seat ring by the vibration under high velocity fluid.



2.2 Small operation torque

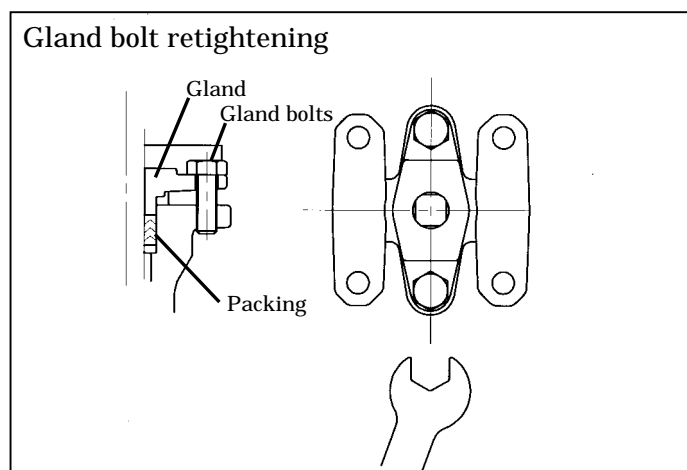
The disc contacts seat ring only fully closed position as shown in above figure. The disc does not contact seat ring intermediate position, as the result operation torque is small.

2.3 Long life seat ring

Seat ring material is PTFE that have low friction coefficient and long endurance performance. In addition, it has uniformly seating stress and smooth seating force in accordance with double off-set configuration, so the seat ring can use for long time with no crack and no partial wear.

2.4 Retightenable gland packing

It is available to retighten the gland bolts without disassemble any parts such as lever or gear unit.



Construction and Design Features

3. Valve Specification and Pressure-Temperature Rating

3.1 Valve specification

3.1.1 Maximum service pressure

JIS 5K	0.7 MPa
JIS 10K	1.4 MPa
JIS 16K (50A-300 A).....	2.0 MPa
JIS 16K (350 A-600A).....	1.4 MPa
ASME Class 150 (50A-300 A).....	1.9 MPa
ASME Class 150 (350 A-600A).....	1.4 MPa

3.1.2 Service temperature range

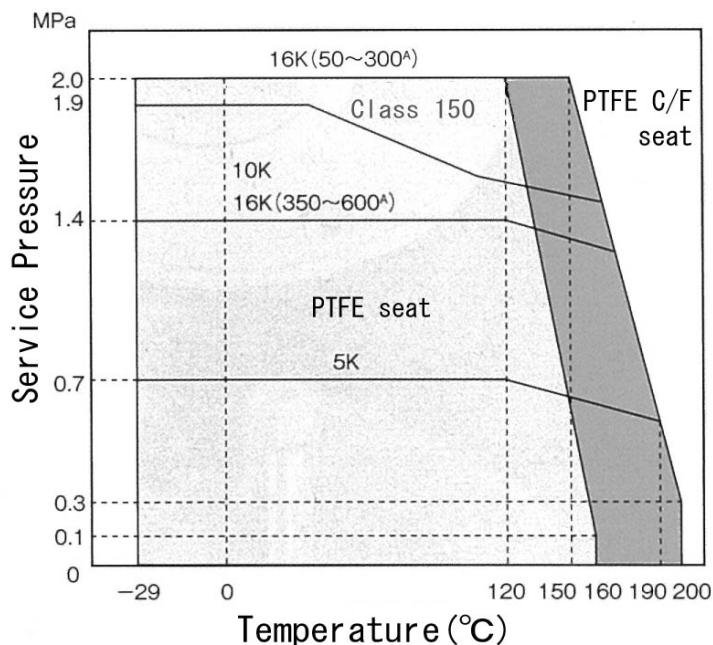
PTFE seat	from -29 (*) to +160°C
C/F PTFE seat.....	from -29 (*) to +200°C

* Refer to P-T chart for more details. (Media should not be frozen)

3.1.3 Applicable flange

Type 5K	JIS B 2220 5K
Type 10K	JIS B 2220 10K
Type 16K	JIS B 2220 16K
Type 150	ASME Class 150

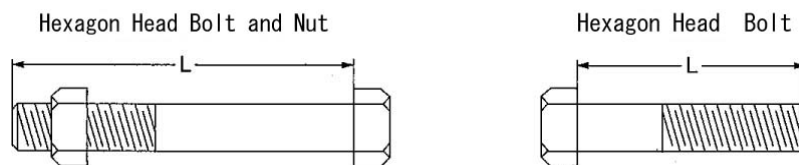
3.2 Pressure-Temperature Rating.



Construction and Design Features

4. Size and Number of Piping Bolt and Nut

4.1 Hexagon Head Bolt

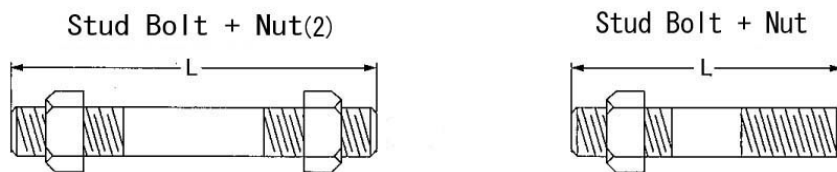


Flange	JIS 10K						JIS 16K					
	Hexagon Head Bolt+Nut			Hexagon Head Bolt			Hexagon Head Bolt+Nut			Hexagon Head Bolt		
Nominal Size(A)	Size	L(mm)	Number	Size	L(mm)	Number	Size	L(mm)	Number	Size	L(mm)	Number
50	M16	100	4	-	-	-	M16	100	8	-	-	-
65	M16	110	4	-	-	-	M16	110	8	-	-	-
80	M16	110	8	-	-	-	M20	120	8	-	-	-
100	M16	115	8	-	-	-	M20	130	8	-	-	-
125	M20	130	8	-	-	-	M22	130	8	-	-	-
150	M20	130	8	-	-	-	M22	140	12	-	-	-
200	M20	150	12	-	-	-	M22	160	12	-	-	-
250	M22	160	12	-	-	-	M24	170	12	-	-	-
300	M22	170	16	-	-	-	M24	180	16	-	-	-
350	M22	180	16	-	-	-	M30 × 3	200	16	-	-	-
400	M24	200	16	-	-	-	M30 × 3	220	16	-	-	-
450	M24	210	16	M24	68	8	M30 × 3	240	16	M30 × 3	80	8
500	M24	220	16	M24	60	8	M30 × 3	250	16	M30 × 3	70	8
600	M30	260	20	M30	78	8	M36 × 3	290	20	M36 × 3	90	8

Flange	Class 150					
	Hexagon Head Bolt+Nut			Hexagon Head Bolt		
Nominal Size(B)	Size	L(mm)	Number	Size	L(mm)	Number
2	5/8	105	4	-	-	-
2 1/2	5/8	110	4	-	-	-
3	5/8	115	4	-	-	-
4	5/8	130	8	-	-	-
5	3/4	140	8	-	-	-
6	3/4	140	8	-	-	-
8	3/4	160	8	-	-	-
10	7/8	180	12	-	-	-
12	7/8	190	12	-	-	-
14	1	200	12	-	-	-
16	1	220	16	-	-	-
18	1 1/8	240	16	-	-	-
20	1 1/8	260	16	1 1/8	75	8
24	1 1/4	300	16	1 1/4	95	8

Construction and Design Features

4.2 Stud Bolt





Flange Bolt	JIS 10K						JIS 16K					
	Stud Bolt+Nut(2)			Stud Bolt+Nut			Stud Bolt+Nut(2)			Stud Bolt+Nut		
Nominal Size(A)	Size	L(mm)	Number	Size	L(mm)	Number	Size	L(mm)	Number	Size	L(mm)	Number
50	M16	120	4	-	-	-	M16	120	8	-	-	-
65	M16	130	4	-	-	-	M16	130	8	-	-	-
80	M16	130	8	-	-	-	M20	140	8	-	-	-
100	M16	135	8	-	-	-	M20	150	8	-	-	-
125	M20	150	8	-	-	-	M22	160	8	-	-	-
150	M20	155	8	-	-	-	M22	170	12	-	-	-
200	M20	170	12	-	-	-	M22	180	12	-	-	-
250	M22	190	12	-	-	-	M24	200	12	-	-	-
300	M22	190	16	-	-	-	M24	210	16	-	-	-
350	M22	210	16	-	-	-	M30 × 3	230	16	-	-	-
400	M24	220	16	-	-	-	M30 × 3	250	16	-	-	-
450	M24	240	16	M24	100	8	M30 × 3	270	16	M30 × 3	120	8
500	M24	250	16	M24	90	8	M30 × 3	290	16	M30 × 3	105	8
600	M30	300	20	M30	115	8	M36 × 3	330	20	M36 × 3	135	8



Flange Bolt	Class 150					
	Stud Bolt+Nut(2)			Stud Bolt+Nut		
Nominal Size(B)	Size	L(mm)	Number	Size	L(mm)	Number
2	5/8	125	4	-	-	-
2 1/2	5/8	130	4	-	-	-
3	5/8	135	4	-	-	-
4	5/8	150	8	-	-	-
5	3/4	160	8	-	-	-
6	3/4	170	8	-	-	-
8	3/4	190	8	-	-	-
10	7/8	200	12	-	-	-
12	7/8	210	12	-	-	-
14	1	240	12	-	-	-
16	1	250	16	-	-	-
18	1 1/8	280	16	-	-	-
20	1 1/8	300	16	1 1/8	120	8
24	1 1/4	340	16	1 1/4	140	8

Construction and Function

5. Minimum Inside diameter of Applicable Pipes

 CAUTION			
	(1) Never apply the pipes with smaller inside diameter than the dimensions shown in the following table. That will cause unwanted contact of the valve disc with the pipe inside.		
	Valve size		Minimum pipe inside diameter
	DN	Inch	
	50	2	43mm
	65	2-1/2	57
	80	3	71
	100	4	88
	125	5	118
	150	6	140
	200	8	190
Valve size		Minimum pipe inside diameter	
DN	Inch		
250	10	239mm	
300	12	281	
350	14	327	
400	16	373	
450	18	424	
500	20	471	
600	24	567	

6. Recommended Gasket

 CAUTION	
	(1) It is need gaskets to install the valve for each end. We recommend to use the following gasket for installation.
	[Gasket Type and Material]
	<ul style="list-style-type: none"> · Joint sheet gasket made of non-asbestos materials. · PTFE or Reinforced PTFE sheet gasket. <p>DO NOT use the PTFE jacketed gasket, spiral wound gasket or metal gasket.</p>
	[Gasket Configuration and Dimension]
	<ul style="list-style-type: none"> · Full face gasket or ring gasket for flat face and raised face depend on JIS B 2404. · Gasket thickness shall be 3mm minimum.

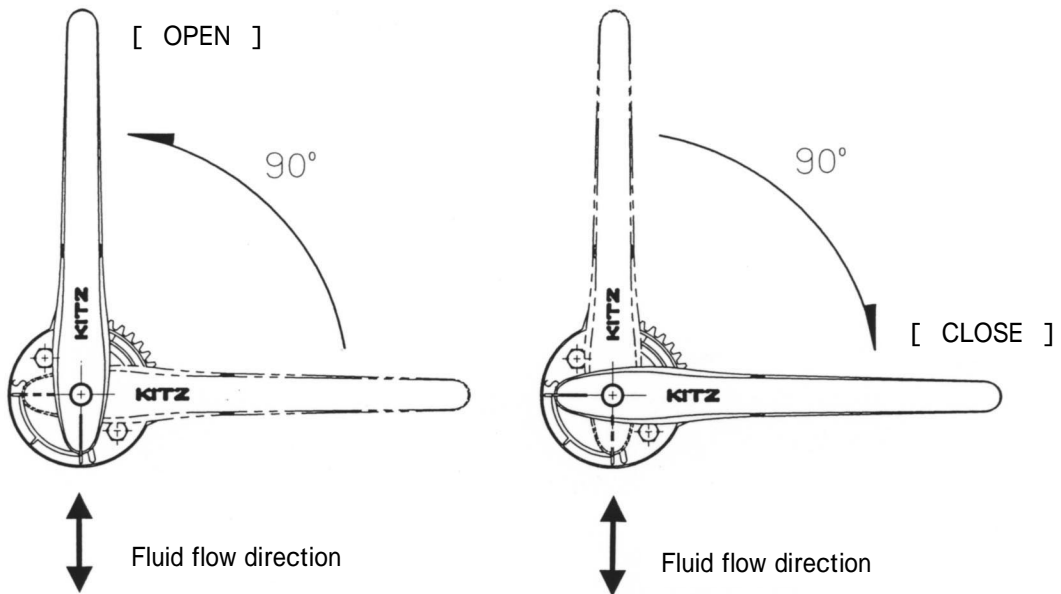
CHAPTER
Valve Operation Device

Valve Operation Device

1. Lever Handle Type

1.1 The lever handle is directly mounted on the stem.

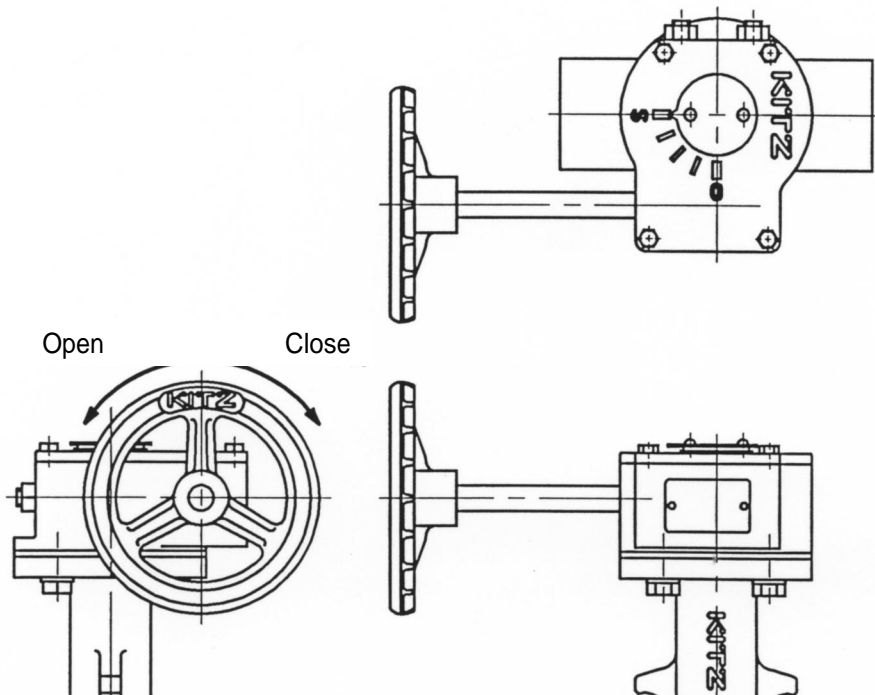
1.2 Turning the lever handle 90° clockwise will close the valve, and turning the lever handle 90° counterclockwise will open the valve.



Valve Operation Device

2. Gear Type

- 2.1 The worm gear operation device is mounted on the valve.
- 2.2 According to the letter or arrow on the hand wheel, turning the hand wheel clockwise will close the valve, and turning the hand wheel counterclockwise will open the valve.
- 2.3 Hand wheel operating torque depends on the size and opening position.
- 2.4 Worm gear operator is to transmit a large torque to valve stem, converting a torque from drive shaft by means of reduction gearing unit using worm gears.





CHAPTER



Transportation and Storage of Valves

Transportation and Storage of Valves

1. Transportation of Valves

1.1 Caution for safety

 WARNING	
	(1) Keep off the valve lifting area to prevent personal injury caused by unsecured valves when transporting the valve by lifting..

 CAUTION	
	<p>(1) Take care not to damage the valve painting surfaces during transportation, which may subsequently cause corrosion and get the valve rusty. Touch-up the damaged surfaces adequately.</p> <p>(2) Take care the handling and storage of the carton packed product. The high humidity may damage the cartons.</p>

1.2 Transportation

1.2.1 Keep the packages as they are delivered just before installation.



If the protective covers are found missing during transportation, provide appropriate type of protective covers.

1.2.2 Handle valves carefully so that they should not fall or drop on the ground. Avoid any extraordinary mechanical impact.

Transportation and Storage of Valves

2. Storage

2.1 Caution for safety.

 CAUTION	
	<ul style="list-style-type: none">(1) DO NOT store valves in the corrosive environment; otherwise, it may cause corrosion on threaded portions of valves.(2) DO NOT remove protective covers until installation. This will prevent the intrusion of any foreign object, which could cause damage to the closure elements such as disc and seat ring.(3) DO NOT drop or shake the valves during storage and DO NOT apply any heavy load; otherwise, valves may damage.(4) DO NOT carelessly pile up products to avoid risk of product damage and personal injury caused by unstable piling.

2.2 Storage

2.2.1 Store the valve indoors under a dust-free, least humid and well-ventilated condition.



2.2.2 Do not place the valves directly on the ground or concrete floor.
Place packed valves on racks for storage.




2.2.3 Take appropriate measures to prevent valves from direct exposure to dust, rain and sunlight, if valves should be stored outdoors.

CHAPTER
Valve Installation

Valve Installation

1. Cautions for Installation

 WARNING	
	<p>(1) Check the valve specifications with the catalogs and/or attached nameplate. The valve trim and seat materials determine the characteristic of service fluid and service range of pressure and temperature. Services beyond the valve specifications will cause the leakage problem or other accidents.</p>

 CAUTION	
	<p>(1) Keep the firm footing for valve installation and operation.</p> <p>(2) Prepare sufficient lighting for valve installation and operation.</p> <p>(3) Use supports for firmly holding pipes, if needed to avoid excessive load caused by valve weight or valve operation.</p>
	<p>(4) DO NOT connect the butterfly valve directly with check valve or pumps, which may damage the valve disc by unwanted contact.</p>

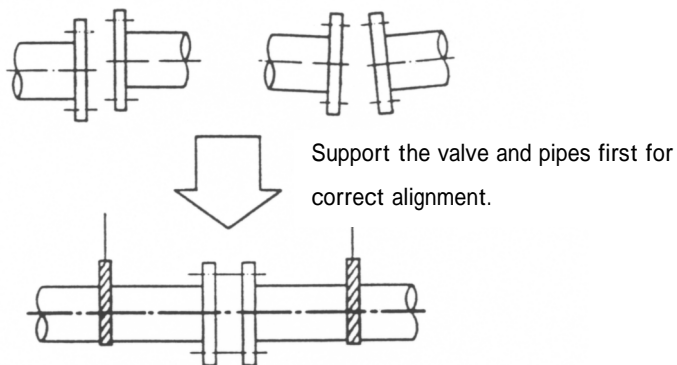
- 1.1 Provide sufficient room for operation, installation and subsequent maintenance of valves.
- 1.2 Take appropriate measures for smooth operation, inspection and maintenance of valves if they are forced to be installed in small spaces.
- 1.3 Try not to install valves in the places where valve functions may be hampered by such outer forces as vibrations and others.

Valve Installation

2 Cautions for Piping

CAUTION

- (1) After flanges are welded with pipes, wait until the welding heat cools down enough before installing the valves.
- (2) Chamfer or round edge of welded flanges appropriately to prevent the valve surface from being damaged .
- (3) Before installation of valves, the connecting pipes should be cleaned to remove any foreign object such as sand, dust or welding spatters.
- (4) Make sure that the flange surface has no damage and defection. Remove any foreign object from the flange surfaces.
- (5) Align the primary side and secondary side piping accurately. The leakage from the flange connection will be caused by the inaccurate alignment.



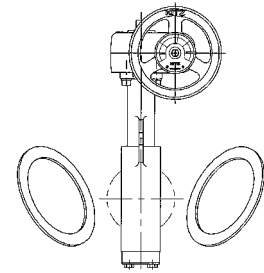
- (6) The flow direction of this valve is limited. Install the valve in accordance with cast out arrow mark, corresponding from high pressure side to low pressure side when valve is close. (Cast out arrow mark is indicated at the lateral of actuator mounting flange of valve body.)
- (7) Be sure to insert new gaskets for valve mounting. Recommended gasket should be installed to prevent leakage from body joint area.
DO NOT use the spiral wound gasket, PTFE jacketed gasket or metal gasket.
- (8) DO NOT use the stub end flange and raised face flange of JIS 5K, 10K and 16K.
- (9) Install or dismantle the valve with the valve of full closed position.
- (10) Retighten the gland bolts before operation of the valve. Check a handle torque while retightening the bolts so that the operation won't become too difficult due to over-tightening. The gland bolts should be alternately tightened with an even force. Even if leakage is observed from the gland section due to stress relaxation, make sure to retighten the gland bolts.
- (11) In order to allow for retightening of the gland bolts, make sure not to cover the gland section when the valve is insulated.

Valve Installation

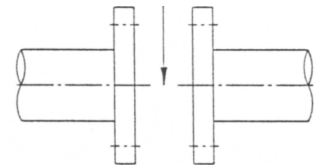
3 Valve Installation

3.1 Set jack bolts to adjust the dimension between pipe flanges, if needed. The dimension between pipe flanges should be 6 to 10mm wider than face to face dimension of the valve for installation.

3.2 First set two bolts into the lower side of the pipe flanges where lower valve mounting guides make contact with the bolts and mount the valve and gaskets between the flanges carefully. Then set two bolts into the upper side of the pipe flanges.



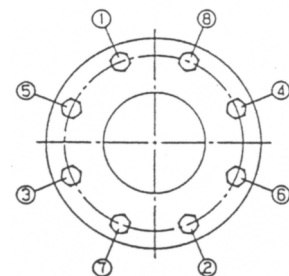
3.3 Tighten four of the upper and bottom bolts temporarily. Align the pipes and valve accurately.



3.4 Before tightening piping bolts, make sure that the disc does not get any contacts with the pipe inside in fully open position.

3.5 Tighten all other bolts through the holes of pipe flanges.

3.6 Evenly tighten bolts gradually and alternately in a star pattern.






3.7 Gradually raise the line temperature and pressure during test duration. Retighten valve bolting, if needed.

CHAPTER
Valve Operation

Valve Operation

1. Cautions for Safety

 CAUTION	
	<p>(1) DO NOT loosen bolts or nuts of flange area or gland bolts when the fluid is on pressuring.</p> <p>(2) When the pipe line is tested for exceeding the design pressure, do not use the valve as a blank flange by fully closing.</p>
	<p>(3) When the pipe line is tested for exceeding the design pressure, fully open the valve.</p> <p>(4) To operate the handle of the valve with either the lever handle or worm gear type, avoid the use of special tools such as pipes or wrenches, which may damage the valves</p> <p>(5) When the valve is used with an open position less than 30 ° , contact KITZ or its distributor for technical advises.</p>

2. Operation

2. 1 Lever Handle Type

Turning the lever handle by 90° clockwise will close the valve and rotating the lever counterclockwise will open the valve.

2. 2 Worm Gear Type

According to the letter or arrow on the handwheel, turning the handwheel clockwise will close the valve, and turning the handwheel counterclockwise will open the valve.

Valve Operation




3. Daily Inspection

In order to operate your valves safely and satisfactorily, the daily inspection is very important. Here are the inspection items.

Items to be inspected	Areas to be inspected	Inspection Method	Countermeasures
External Leakage	Gland area	Visual check Soap water	Retighten gland bolt. Change the gland packing.
	Connection area	Visual check Soap water	Retighten piping bolts. Change the gasket.
	Body surface	Visual check Soap water	Change the valve.
Abnormal Noises	Valve body	Auditory check	Consult a piping engineer.
	Loosened bolts	Auditory check	Retighten bolts.
	Vibration of pipes	Auditory check	Contact a piping engineer
Loosened bolts and nuts	Bolts and nuts	Visual and Tactile check	Retighten bolts and nuts.
Seat leakage			Remove the foreign objects on seat liner. Disassemble and inspect the valve. Change the seat ring. Change the valve.
Valve operation	Valve position	Visual check	Make sure that the valve is in predetermined open/close position.
	Disturbed operation	Visual and tactile check	Disassemble and inspect the valve.

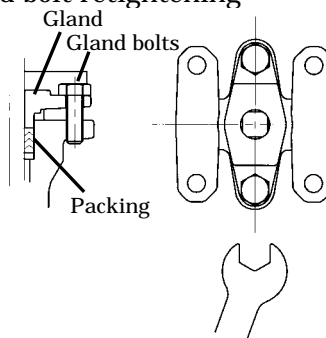
Valve Operation

4. Countermeasures

 CAUTION	
	<p>(1) Wear the protective items such as goggles, gloves, and safety shoes.</p> <p>(2) Take appropriate safety measures for maintenance of valves, which handle toxic, flammable or corrosive fluid.</p> <p>(3) Reduce the line pressure to the atmospheric level before retightening gland and flange bolts and nuts.</p> <p>(4) Operators should take protective measures to prevent direct exposure to the fluid, when the fluid spouts out from flange areas.</p> <p>(5) Reduce the line pressure to the atmospheric level, when the packing and gaskets are replaced or bolts and nuts are loosened.</p> <p>Operator should take protective measures to prevent direct exposure to the fluid, when the fluid spouts out from valves.</p>
	<p>(6) DO NOT apply lubricant to pipes and valves, which handle oxygen.</p>

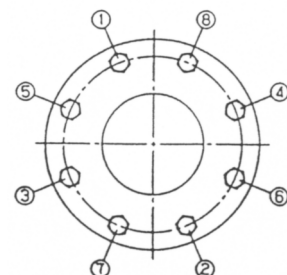
4.1 Retighten the gland bolts if leakage from this area is detected. Evenly tighten the bolts alternately as shown below. Adequate torque should be applied when retightening the bolts so that the valve operation won't become difficult. If it does not stop the leakage, the packing rings should be replaced.

Gland bolt retightening



4.2 Leakage from the flange area.

Tighten flange bolts evenly and alternately in a star pattern as illustrated followings.



Valve Operation

5. Trouble Shooting

Defect	Possible causes	Remedial measure
Excessive valve torque	Foreign objects may have stuck to the stem.	Remove the foreign objects and check the valve.
	Foreign objects may have choked or stock around the seat ring.	Flush the valve bore with the fluid with the valve slightly open to remove the built-up objects or disassemble and inspect the valve.
	The gland bolts may have been overly tightened..	Loosen the gland bolts once and adequately retighten them so that the leakage through the gland does not occur.
Leakage from the gland area	Loose gland bolts.	Retighten the gland bolts.
	Uneven tightening of the gland bolts.	Ones loose the bolts and evenly retighten them.
	Damage on the gland packing.,	Replace the gland packing.
Internal through-bore leakage	Damage on the seat ring.	Disassemble and inspect the valve. Replace the seat ring.
Abnormal noise or vibration	Loose bolts and nuts.	Retighten the bolts and nuts.

CHAPTER
Periodic Inspection

Periodic Inspection

1. Periodic Inspection

- 1.1 Carry out periodic inspection about once a year with the valve installed on pipes.
- 1.2 Ensure the smooth operation and sufficient valve function to be inspected.
- 1.3 Refer to Section V "Daily Inspection" for the inspection items to be inspected and inspection methods.
- 1.4 Carry out the periodic inspection of valves which are not operated for long period or not daily inspected. (Check all valves.)
- 1.5 It is particularly important to thoroughly check the valves used for the following service :
 - a) Where performance failure of valves could result in a major shutdown of an entire plan unit.
 - b) Where the media contain high viscosity and may get stuck to and built up inside the valves.
 - c) Where corrosion or/and wear by the media is expected.

Remove the valves from the pipelines and disassemble them for inspection, if needed.

It is recommended that disassembly, inspection and repair of valve is carried out by manufacturer.

- 1.6 It is recommended to replace the gland packing every time the periodic inspection is conducted.



Periodic Inspection



2. Maintenance and Inspection.

When piping facilities where the valve is installed are to be set open for periodic maintenance and inspection, carry out the seat and external leakage test and operation test, if needed.

If any defect is found, disassemble the valves for further inspection. The valves must pass required inspections before being sent back to the pipelines or facilities for reinstallation.

2.1 Cautions for removal of valves from or installation of the valves on pipelines.

 WARNING	
	<ol style="list-style-type: none"> (1) Discharge the fluid from the pipes and reduce the line pressure to the atmospheric level when removing the valves from the pipelines. It is dangerous to remove valves with the pressure and fluids trapped inside the valves. Possible spout of residual fluids may cause personal injury. (2) Take some measures for maintenance of valves, which handle toxic, flammable, corrosive and explosive fluid. For storage and discard of these valves, they should be handled with appropriate safety measures. Care should be taken to eliminate the possibility for any personnel to contact with such untreated valves. (3) For valves with electric or pneumatic actuators, refer to the operation manuals prepared by the manufactures of the actuators, before handing the valves. (4) Keep off the valve lifting area to prevent damage which may be caused by an extraordinary mechanical impact or load.

 CAUTION	
	<ol style="list-style-type: none"> (1) Wear the protective items such as goggle, gloves and safety shoes. (2) Keep a secure footing for valve dismantle and installation. (3) Use support stands for firmly holding the valve and pipes to prevent misalignment. (4) Before dismantling valves from the pipe, mark the valve body and coupled pipe flanges with their original position. Reinstall the valve on pipes according to the marks after reassembly. (5) Be sure to insert new gaskets for valve mounting.

Periodic Inspection

2.2 Disassembly and Reassembly

Disassemble and reassemble the valve according the instruction in Section VII of this manual.

2.3 Test and Inspection



The following is the main items for test and inspection.

2.3.1 Operation test

- (1) The valve should be operated smoothly by the lever handle or gear operator without galling or sticking.
- (2) The stem should be firmly connected with the disc.
- (3) In fully open position, the disc should be parallel to the fluid flow.

2.3.2 Shell test and seat leakage test

- (1) Cautions for shell test and seat leakage test

 CAUTION	
	<ol style="list-style-type: none">(1) Wear the protective items such as goggles, gloves and safety shoes.(2) Take some precautions before shell test and seat leakage test for operators' safety.

- (2) Shell test and seat leakage test

All valves should be subjected to a hydrostatic or pneumatic shell test and seat leakage test at the required pressure after tests and inspections.

Refer to the JIS B 2003 for test methods.



CHAPTER



Disassembly and Reassembly of Valves

Disassembly and Reassembly of Valves

1. Disassembly

1.1 Cautions for Safety

 WARNING	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or not to catch fire.

 CAUTION	
	(1) Wear the protective items such as goggles, gloves and safety shoes. (2) Take care not to catch fingers during disassembly. (3) When disassembling valves of large size, use appropriate machine to lift up the valves.

1.2 Before Disassembly

1.2.1 Place the valve in a dust-free place.

1.2.2 Take care not to damage the sealing surfaces such as gasket contact surfaces, disc seat surface and stem.

Disassembly and Reassembly of Valves




1. 3 Disassembly procedure

- 1.3.1 Close the valve and remove the set bolt (132), seat retainer (150) and seat ring (30).
- 1.3.2 Give marks on the disc (4) and stem (3) connecting area for easy reassembly. Open the valve and remove the taper pin (110) for connecting stem (3) and disc (4). In this case hit the split end of taper pin by plastic hammer.
- 1.3.3 Remove the hexagonal bolts and nuts that is connected body (1) and actuator (lever handle, gear unit, motor unit or pneumatic cylinder). In this time, give marks on the body top flange (1) and actuator using appropriate marker for easy reassembly.
- 1.3.4 Remove the key (60) from the stem (3) for nominal size 125A and larger valve.
- 1.3.5 Remove the gland bolts (36) from the body (1) and remove the gland (7).
- 1.3.6 Remove the end plate bolts (35), spring washer (45), end plate (147), gasket (19), thrust washer (47) and stem washer (31).
- 1.3.7 Beat the stem (3) from top by plastic hammer until split ring (187) appears, then remove them.
- 1.3.8 Remove the stem (3) from the top of the body (1) then remove the disc (4), gland packing (8) and stem bearing (67A & B).

Disassembly and Reassembly of Valves

2 Reassembly

2.1 Cautions for safety

 CAUTION	
	<p>(1) Wear the protective items such as goggles, gloves and safety shoes.</p> <p>(2) Take care not to catch fire during reassembly.</p> <p>(3) Take care not to catch, fingers during reassembly.</p> <p>(4) Packing and gasket shall be used new one. The reuse of them may cause leakage.</p> <p>(5) When reassembling valves of large size, use appropriate machine to lift up valves.</p>
	<p>(6) DO NOT apply any lubricant to the wetted parts, which handle oxygen.</p>

2.2 Before Reassembly

- 2.2.1 Check all necessary parts before reassembly. If the valve is found dissatisfactory in its function, replace the valve.
- 2.2.2 Prepare the wearing parts such as seat ring, packing, gasket and thrust washer before reassembly.
- 2.2.3 In case the parts are reused, ensure to clean the parts to completely remove the oil, dust and other foreign objects.
- 2.2.4 Reassemble the valve at a dust-free place.
- 2.2.5 Take care not to damage the gasket contact surface, disc seat surface, stem and seat ring.
- 2.2.6 Tighten all bolts and nuts securely.

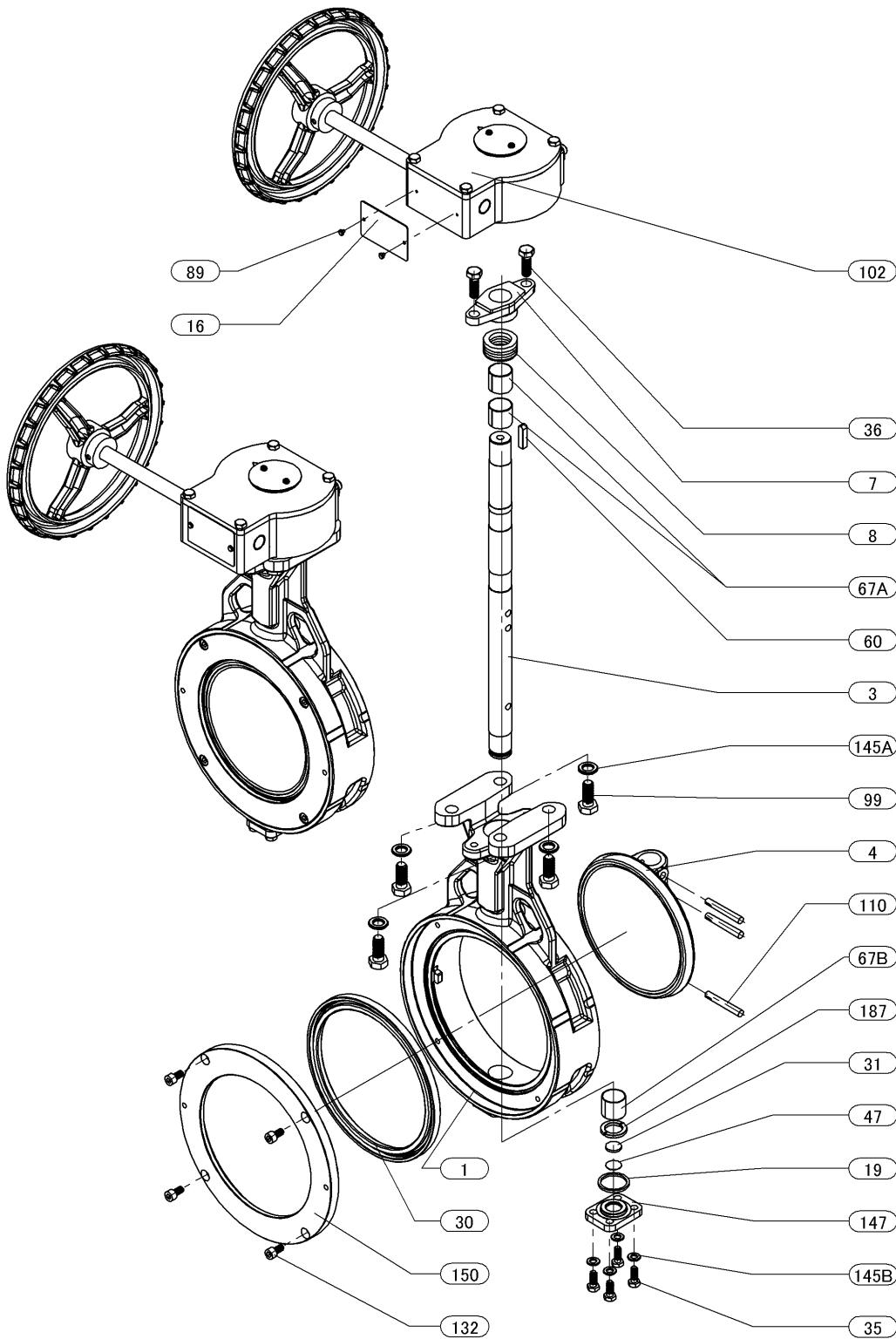
Disassembly and Reassembly of Valves

2.3 Assembly

- 2.3.1 Insert the stem bearing (67A & B) to stem hole of the body (1) for nominal size 250A and larger valve.
Wind the stem bearing (67A) to the stem for nominal size 200A and smaller.
- 2.3.2 Insert the disc into the body (1), then insert the stem (3) to the disc through the body (1) from top flange side. In this time hit the stem (3) lightly for easy assembly.
- 2.3.3 Mount the stem bearing (67B) and split ring (187) on the bottom of the stem (3) for nominal size 200A and smaller valve and mount the split ring (187) on the bottom of the stem (3) for nominal size 250A and larger valve.
Insert the stem washer (31), thrust washer (47) and gasket (44) to the bottom of the body (1). Assemble the end plate (147) with body (1) by tightening end plate bolts (35) with spring washer (145B).
- 2.3.4 Drive the taper pin (110) into the disc (4) and stem (3) with adjustment the position and direction according to the coupling marks provided before disassembly. After then spread the end of taper pin (110) to fix them firmly.
- 2.3.5 Insert the packing (8) into the packing box of the body (1) and assemble the gland with tighten the gland bolts (36).
- 2.3.6 Mount the key (60) on the top of stem (3) for nominal size 125A and larger valve.
- 2.3.7 Check the actuator mechanism has being open position and assemble the actuator with body (1) with open position according to the coupling marks provided before disassembly.
- 2.3.8 Close the valve and assemble the seat ring (30) and seat retainer (150) with body (1). Tighten the set bolts (132) firmly.

Disassembly and Reassembly of Valves

3. Assembly Illustration Drawing



No.	Parts Name
1	Body
3	Stem
4	Disc
7	Gland
8	Gland Packing
16	Name Plate
19	Gasket
30	Seat Ring
31	Stem washer
35	End Plate Bolt
36	Gland Bolt
47	Thrust Washer
60	Key
67A	Stem Bearing
67B	Stem Bearing
89	Parker Tack
99	Bolt
102	Gear unit
110	Taper Pin
132	Set Bolt
145A	Spring Washer
145B	Spring Washer
147	End Plate
150	Seat Retainer
187	Split Ring

This drawing indicates a typical construction of the valve.
 Refer to the approval drawing before disassembly and assembly.