



**Toyo Valve**

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Operation Manual

for

Stainless Steel, Ductile Iron and Bronze Gate,  
Globe and Check Valves

[Flanged]

We appreciate your purchasing our products.  
Ensure to read all the contents of this manual before piping and using them.  
Also keep this manual to the  
place accessible to the operator.

This manual applies to manual operation of flanged ends stainless steel, ductile iron and bronze inside screw gate, globe and check valves.

## CAUTION AND WARNING

To ensure safe and trouble-free function and performance, please read all the contents of this manual before handling, transportation, mounting and operation of the valves.

Keep this manual to the place accessible to the operator.

The signs “WARNING” and “CAUTION” are defined as follows:



**WARNING**

Indicating potentially hazardous conditions which may result in serious injury to personnel, if such warnings shall be ignored.



**CAUTION**

Indicating potentially hazardous conditions which may result in minor or moderate injury to personnel or property damage, if such conditions shall be ignored.



Indicates prohibition of an action.



Indicates mandatory implementation of an action.

## NOTES TO USERS

This manual covers normal usage of our products. Technical data and instructions for operation, maintenance and inspection of the products are prepared in consideration of safety. However, they are good only to cover typical applications as a general guideline to users. If technical assistance beyond this manual is required, contact KITZ Corporation or its distributors.

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

※ Any information provided in this manual is subject to change at any time without notice, which cancels all previous issues.

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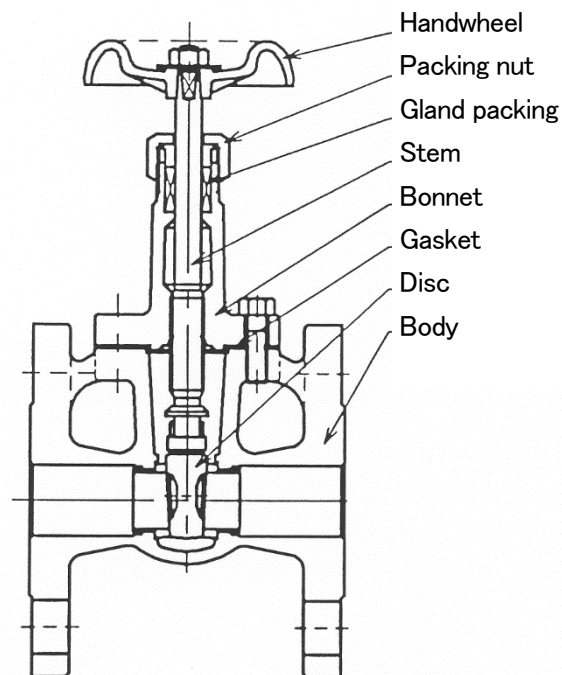
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## I . Construction and design features

## I . Construction and design features

### 1. Inside screw gate valve

- 1.1. The typical valve construction and parts names are as illustrated below.
- 1.2. This is the rising stem type whose stem threads are engaged with bonnet threads.
- 1.3. The space for rising stem is required for valve operation of rising stem type.
- 1.4. Gate valve is designed to be used at fully open or close position.  
Usage at intermediate position should damage the valve disc and seats.
- 1.5. The valve can be used in bi-directional flow.

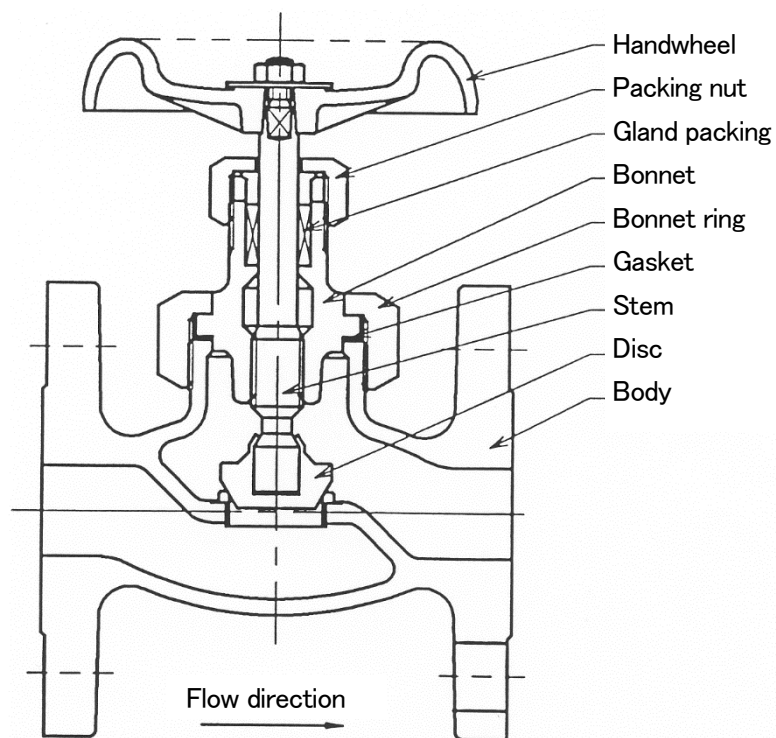


This illustration shows typical construction.

## I . Construction and design features

### 2. Inside screw globe valve

- 2.1. The typical valve construction and parts names are as illustrated below.
- 2.2. This is the rising stem type whose stem threads are engaged with bonnet threads.
- 2.3. The space for rising stem is required for valve operation.
- 2.4. Globe valve is designed to be used at fully open, fully close or intermediate position for flow control.
- 2.5. Globe valve has higher fluid resistance from its construction.
- 2.6. Globe valve requires higher operational torque to close the valve with full fluid resistance to the disc.
- 2.7. The valve should be used in unidirectional flow.

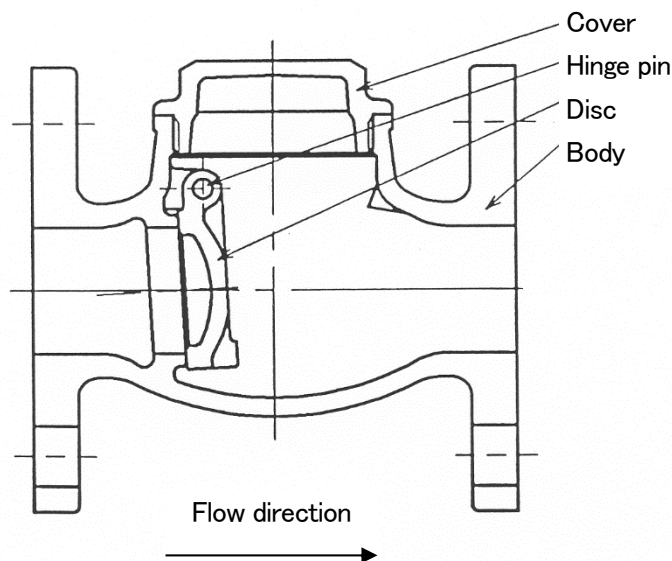


This illustration shows typical construction.

## I . Construction and design features

### 3. Swing check valve

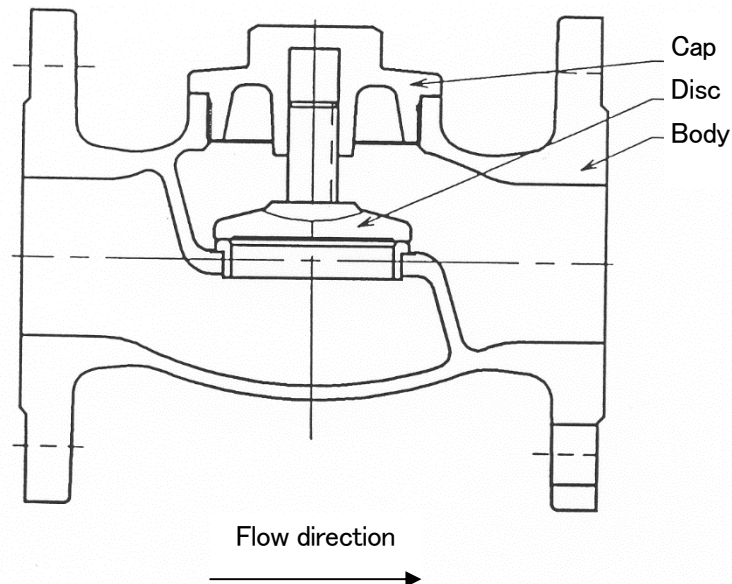
- 3.1. The typical valve construction and parts names are as illustrated below.
- 3.2. The disc is attached to the body by the hinge pin and arm.  
The disc swings from open to closed position against unidirectional flow.
- 3.3. Swing check valve is used in unidirectional flow to prevent back flow.
- 3.4. The valve should be used in unidirectional flow.
- 3.5. Swing check valve is installed in both horizontal and vertical pipelines.  
In vertical pipelines, the valve should be installed with an arrow mark on the body directing upward.  
In horizontal pipelines, the valve should be installed with the cover facing upward.
- 3.6. If flow is not sufficient, the disc won't be maintained at open position and will continuously hit the body seat, resulting in making a noise, known as chattering.
- 3.7. Fluid vortex, turbulence and pulsation are expected at pump outlet and downstream of reducer and elbow, which may damage the valves and result in shortening life circles of the valves.  
It is recommended to place valves at the distance of 6 times nominal bore size or further from these devices.



## I . Construction and design features

### 4. Lift check valve

- 4.1. The typical valve construction and parts names are as illustrated below.
- 4.2. The disc vertically travels along the cover guide.
- 4.3. Lift check valves are designed to prevent back flow.
- 4.4. This is a uni-directional valve.
- 4.5. Lift check valves can only be used in horizontal position.  
The valve should be installed with the cover directed upward.
- 4.6. If flow is not sufficient, the disc won't be maintained at open position and will continuously hit the body seat, resulting in making a noise, known as chattering.
- 4.7. Fluid vortex, turbulence and pulsation are expected at pump outlet and downstream of reducer and elbow, which may damage the valves and result in shortening life circles of the valves.  
It is recommended to place valves at the distance of 6 times nominal bore size or further from these devices.



This illustration shows typical construction.



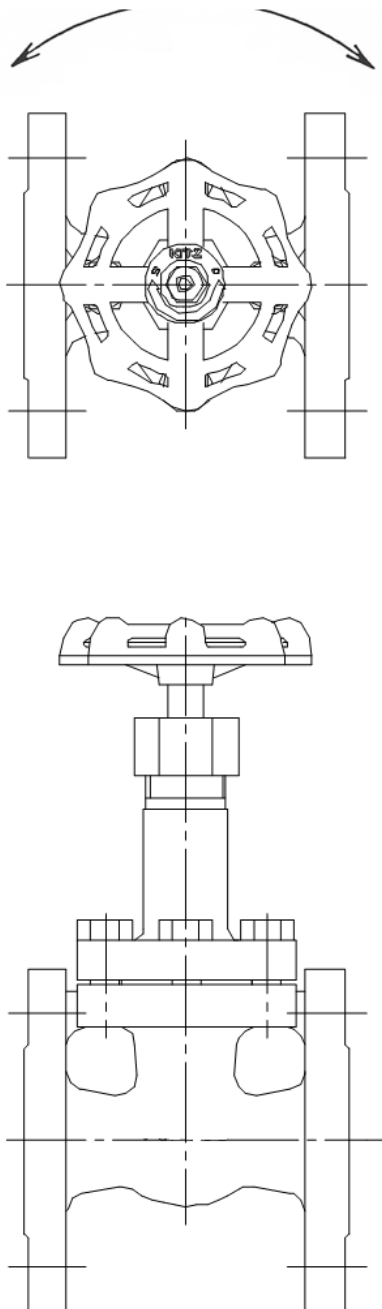
## II . Operator

## II. Operator

### 1. Handwheel

- 1.1. Handwheel is directly mounted on the valve stem.
- 1.2. Turn the handwheel clockwise according to the symbol or mark indicating the direction to close gate or globe valves. Turn it counter-clockwise to open them.
- 1.3. Handwheel operating torque also depends on the type of each valve, and its opening position as well.

To open                      To close





### III. Transportation and storage

### III. Transportation and storage

#### 1. Transportation

##### 1.1. Caution during transportation

 <b>CAUTION</b>	
	<p>(1) Pay attention not to damage painted valve surfaces during transportation, which may subsequently cause corrosion to the valve. Repair is required if the surface is damaged.</p> <p>(2) Pay attention to handling and storage of carton packed products. The high humidity may damage the cartons.</p>



##### 1.2. Transportation

- 1.2.1. Keep the packings as they are during transportation. Provide appropriate protection covers if they are found missing during transportation.
- 1.2.2. Handle valves carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact should be avoided.

### III. Transportation and storage

#### 2. Storage

##### 2.1. Caution during storage

 <b>CAUTION</b>	
	<ul style="list-style-type: none"> <li>(1) DO NOT store valves in the corrosive environment, which may cause corrosion from the valve threaded areas.</li> <li>(2) DO NOT remove protection covers until installation. They prevent any foreign objects from intruding valves.</li> <li>(3) DO NOT place any objects on valves, and DO NOT step on them. Overloading may cause damage to valves.</li> <li>(4) DO NOT pile up products carelessly to avoid damage to the products and personal injury caused by unstable piling.</li> </ul>

##### 2.2. Storage

2.2.1. Store valves at dust-free, least humid and well ventilated places. Indoor storage is recommended.



2.2.2. It is not recommended to store valves directly on the ground or concrete floor.

## IV. Piping and mounting

## IV. Piping and mounting

### 1. Installation (flanged)



#### 1.1. Caution during installation

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Keep a secure footing for valve installation and operation.</li><li>(2) Sufficient lighting should be prepared for valve operation.</li><li>(3) Piping should be properly supported, if needed.</li></ul>

- 1.1.1. Allow sufficient room for operation, installation removal and subsequent maintenance of valves, considering the valve height and the stem direction.
- 1.1.2. Take appropriate measures for smooth operation, inspection and maintenance of valves if they are forced to be installed in small spaces.
- 1.1.3. Try not to install valves in the places where valve functions may be hampered by outer forces such as vibrations.
- 1.1.4. It is recommended to install valves to horizontal pipes in upright positions.
- 1.1.5. The swing check can be installed in both horizontal and vertical pipelines.  
However, fluid flow should be upward for swing check valves if they are installed to vertical piping.
- 1.1.6. Lift check valves can be installed to horizontal pipelines only.

#### IV. Piping and mounting

##### 1.2. Caution during installation of valves

 <b>CAUTION</b>	
	<ol style="list-style-type: none"><li>(1) Keep off the working area to prevent personal injury if valves are installed at higher places.</li><li>(2) Pay attention not to catch fingers between flanges during installation.</li><li>(3) Pay attention not to damage flange and seat surfaces.</li><li>(4) Pipes should be properly supported, if needed.</li><li>(5) Check valves are provided with fillers inside for seat damage protection during transportation. Ensure to remove them completely before mounting valves.</li><li>(6) Globe and check valves should be mounted in accordance with arrows indicated on valve bodies. They should be centered properly so that the pipe shaft be straight lines to prevent excessive pipe stress to the valves.</li><li>(7) Retighten gland packing before operation. Packing tightening pressures may be lowered due to the stress relaxation taking place during transportation or storage, which may cause leakage.</li><li>(8) Use new gaskets when installing valves into pipelines.</li></ol>



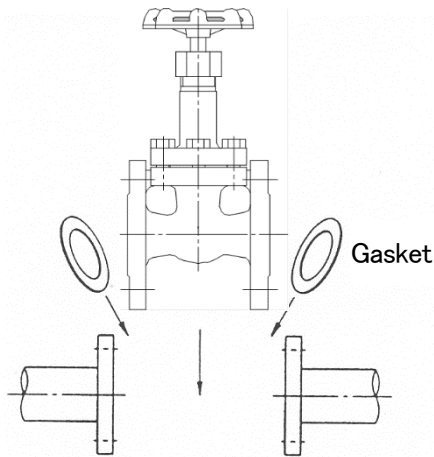
#### IV. Piping and mounting

- 1.2.1. Check followings items before valve are installed.
- (1) Ensure that valves were selected to suit the service pressure.
  - (2) Ensure that flanges of the valves match pipe flanges.
  - (3) Ensure that there are no damages on valve and pipe flange surfaces.
  - (4) Ensure if there is enough, but not too wide, space between flanges of the pipes secured to cover the valve face to face dimension including thickness of gaskets.
  - (5) Ensure that pipes on both the upstream and downstream side are correctly aligned.
  - (6) Flanges on the valve and pipes should be paralleled with flange holes positioned at an equal angle from the valve vertical center line.
- 1.2.2. Remove foreign objects such as sand, dust and welding spatters from the connecting pipe interior before valve are installed.
- 1.2.3. Handle valves carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact should be avoided.
- 1.2.4. Remove protection covers just before valves are installed.
- 1.2.5. All threaded areas should be checked after valves are installed, and retighten them, if needed.
- 1.2.6. The valve and pipe interior should be flushed to remove foreign objects. DO NOT operate valves during flashing.

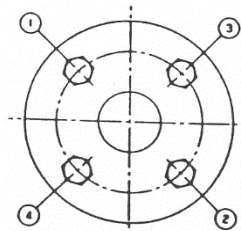
## IV. Piping and mounting

### 1.3. Piping and mounting (flanged)

- 1.3.1. Ensure that pipes on the upstream and downstream side are correctly aligned.
- 1.3.2. Allow enough space between pipe flanges to install valves.
- 1.3.3. Place valves between pipe flanges and insert bolts into lower bolt holes and tighten them temporarily.
- 1.3.4. Insert gaskets between valve and pipe flanges. It is recommended to apply lubricant (gasket paste) on the gasket face.



- 1.3.5. Ensure that gaskets are placed correctly by using lower bolts as a location guide.
- 1.3.6. Insert the rest of the bolts into bolt holes and tighten them temporarily
- 1.3.7. Flange bolts should be tightened evenly and alternately in a diagonal pattern with the equal tightening force. Projection of the bolts above the nuts should be even on both the valve and pipe side, after all of the bolts are finally tightened.






- 1.3.8. Increase gradually line temperature and pressure during pipeline test. Retighten the bolts, if necessary.

## V. Valve operation

## V. Valve operation

### 1. Caution during operation

 <b>CAUTION</b>	
	(1) DO NOT apply excessive torque to the valve operating device. (2) DO NOT loosen bolts and nuts of gland and bonnet of pressurized valves. (3) Avoid usage of gate valves at intermediate position, which may damage stem and disc.
	(4) Open the valve gradually to prevent damage to pipes when the valve handles high temperature fluid such as steam. (5) Close the valve gradually to prevent water hammer if the valve handles liquid. (6) Take appropriate measures not to freeze pipes and valves.

### 2. Valve operation (gate and globe valves)

- 2.1. Clockwise operation of handwheel closes the valve and counterclockwise operation of handwheel opens the valve as indicated on the handwheel arrow.
- 2.2. Handwheel operating torques are different by the valve types and the valve opening degrees.
- 2.3. Turn the handwheel of gate valve to the open direction by about 90° after reaching fully close position to remove thermal stress to the pipes, which makes the valve reopening easier and smoother.

## V. Valve operation



### 3. Daily inspection

Valves used in facilities should be inspected on a daily basis. And inspection should be also given during operation. The inspection items are listed as follows.

Condition	Valve type	Area	Method	Remedial measures
External leakage	Gate Globe	Gland	Visual inspection Soapy water	Retighten gland bolts Retighten gland packing
	All	Flange	Visual inspection Soapy water	Retighten flange bolts Replace gaskets
		Thread	Visual inspection Soapy water	Retighten all threads Replace related parts
		Body surface	Visual inspection Soapy water	Replace valves
Abnormal noise	All	Valve body	Sound inspection	Contact piping engineers
		Loosened bolts	Sound inspection	Retighten the bolts
		Pipe vibration	Sound inspection	Contact piping engineers
Bolt loosening	All	Bolts/nuts	Visual inspection Tactile inspection	Retighten the bolts and nuts
Seat leakage	All	—	—	Remove foreign objects Disassemble and inspect the valves (Lap the seat surface) Replace the valves
Valve operational malfunction	Gate Globe	Operating position	Visual inspection	Open or close valves according to instructions
	All	Not smooth operation	Visual inspection Tactile inspection	Apply lubricant at moving parts. Disassemble and inspect the valve. Replace the valves.

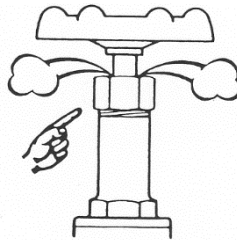
## V. Valve operation

### 4. Remedial measures

 <b>CAUTION</b>	
	<ul style="list-style-type: none"> <li>(1) Wear protective items such as goggles, gloves and working boots.</li> <li>(2) Take safety measures against toxic, flammable and corrosive fluid.</li> <li>(3) Reduce line pressure to the atmospheric level before retightening gland and bonnet bolts.</li> <li>(4) Workers should carry out the operation in the position where they won't be directly exposed to the fluid in case gaskets are blown off while retightening flange bolts.</li> <li>(5) Reduce line pressure to the atmospheric level when packing rings or gaskets are replaced. Workers should carry out operation in the position where they won't be directly exposed to the fluid.</li> </ul>

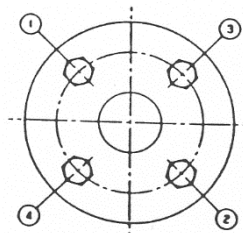
#### 4.1. Leakage from gland area

Retighten a packing nut sufficiently to stop leakage through the gland nut to the degree at which the operation torque becomes too heavy. If the leakage does not stop by retightening the gland nut, replace old gland packing rings for new ones.



#### 4.2. Leakage from flange area

Retighten flange bolts evenly and alternately in a diagonal pattern with the equal and gradual tightening forces as indicated below in order to avoid one-sided tightening.



V. Valve operation

## 5. Trouble shooting

Trouble	Possible cause	Measure
Operation malfunction	Foreign objects stuck around seating area.	Flush out the foreign objects with fluid released by opening the disc.
Excessive operation torque	Foreign objects stuck at stem threads.	Remove the foreign objects and check the valve
	Foreign objects piled up at the bottom of the valve body.	Flush out the foreign objects with fluid released by opening the disc.
	Gland packing being overly tightened.	Loosen packing nut and retighten them until the leakage stops.
Stem damage	Excessive operation torque	Replace damaged parts.
Leakage through gland area	Loose gland bolts	Retighten gland bolts.
	Damaged gland packing	Replace the gland packing rings.
	Damaged stem	Replace the stem.
Seat leakage at fully close position	Damaged seat (by cavity pressure)	Contact piping engineers
	Deformed seats	Contact piping engineers
Noise and vibration	Loosened bolts and nuts	Retighten bolts and nuts.

## VI. Periodic inspection



## VI. Periodic inspection

### 1. Periodic inspection



- 1.1. Carry out periodic inspection of the valves mounted to piping approximately once a year.
- 1.2. Ensure smooth operation and sufficient function of the valves.
- 1.3. Refer to daily inspection page for inspection items and methods.
- 1.4. Carry out periodic inspection also for the valves which are not operated or inspected daily.
- 1.5. More frequent inspections should be given particularly valves that are important for operation control, installed in pipelines where fluid is easily stuck and built up or installed in areas where corrosion and wear by fluid are expected. Remove the valves from pipelines, disassemble and inspect them, if necessary.
- 1.6. It is recommended to replace gland packing at the periodic inspection.



## VI. Periodic inspection

### 2. Inspection and maintenance

In case pipelines or facilities where valves are installed are shut down for production line inspection, provide the valves with inspection, if necessary, to check body and seat leakage and their operational function. If any defect is detected, 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. Warning and caution during removal or installment of valves from and to the pipelines.

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>(1) Discharge the fluid from pipes and reduce line pressure to the atmospheric level when disassembling valves.</li> <li>(2) Discharge the fluid and pressure trapped within the valve body with the valve intermediate position before disassembling.</li> <li>(3) In case fluid is toxic, inflammable or corrosive, remove the fluid completely from pipes and internal valves</li> <li>(4) Take protective measures to prevent direct exposure to the fluid and catching fire.</li> <li>(5) Keep off the working area to prevent personal injury if valves are installed at higher places.</li> </ul>

 <b>CAUTION</b>	
	<ul style="list-style-type: none"> <li>(1) Wear protective items such as goggles, gloves and working boots.</li> <li>(2) Keep a secure footing at dismantling and mounting valves.</li> <li>(3) Pipes and valves should be properly supported to avoid misalignment, when the valves are removed or installed.</li> <li>(4) Mark both pipes and valve flanges, before valves are removed from pipelines. Valves should be reinstalled with these marks mated.</li> <li>(5) Ensure to use new gaskets, when valves are reinstalled in pipelines.</li> </ul>

## VI. Periodic inspection

### 2.2. Disassembly and assembly

Refer to VII. Disassembly and assembly of this manual for disassembly and assembly.

### 2.3. Test and inspection



Procedure for test and inspection is described as follows

#### 2.3.1. Operation test

- (1) A handwheel should be smoothly rotated without galling or being stuck.
- (2) A stem should be securely connected with the disc. Loose connection should not be allowed.
- (3) For gate valves, at fully closed position, the center of the disc seats should be above the center of the body seats. At fully open position, the disc shall not remain in the bore of the valve.
- (4) For globe valves, the center of the disc and body seat should be aligned. At fully closed position, the disc should be seated securely on the body seat.
- (5) For check valves, a disc should be open until it reaches to the stopper provided in the internal valve body and the disc should smoothly move from open to closed position.

#### 2.3.2. Shell test and seat leakage test

- (1) Caution during shell test and seat leakage test

 <b>CAUTION</b>	
	<ol style="list-style-type: none"><li>(1) Wear protective items such as goggles, gloves and working boots.</li><li>(2) Take sufficient precautions before shell test and seat leakage test for operation safety.</li></ol>

- (2) Shell test and seat leakage test

All valves after assembly are subject to hydrostatic or pneumatic shell test as well as seat leakage test at pressure specified in JIS B 2003 or other standards. Ensure the valves pass the tests and meet required standards.



## VII. Disassembly and assembly



## VII. Disassembly and assembly

### 1. Inside screw gate valve

#### 1.1. Disassembly procedure

##### 1.1.1. Caution during disassembly

 <b>WARNING</b>	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire..

 <b>CAUTION</b>	
	(1) Wear protective items such as goggles, gloves and working boots. (2) Pay attention not to catch fingers during disassembly.

##### 1.1.2. For disassembly

- (1) Disassemble valves at dust-free area.
- (2) Care should be taken not to damage body and seat, stem threads and flange surfaces.
- (3) Mark match-marks on flanges of both bonnet and body with an indelible ink before disassembling valves. Assemble the valves to match these marks when reassembling them. Since the disc seats were lapped to mate the body seats, insert the disc in the same orientation as it was placed before the valves were disassembled.

## VII. Disassembly and assembly



### 1.1.3. Disassembly

- (1) Open valves to the halfway position.
- (2) Loosen the wheel nut.
- (3) Loosen the packing nuts.
- (4) Remove the bonnet bolts.
- (5) Remove the bonnet slowly from the body. Since the bonnet will be disassembled with the stem and disc being attached, lift it vertically so that the disc does not fall down. In the meantime, mark the disc so that it may be reassembled in the same direction.
- (6) Remove the disc from the stem.
- (7) Remove a gasket.
- (8) Turn the handwheel clockwise until the stem is completely removed from the bonnet.
- (9) Remove the wheel nut and detach the handwheel from the stem.
- (10) Pull down the stem and remove it from the bonnet.
- (11) Detach the packing nut from the bonnet and remove the gland and gland packing.

## VII. Disassembly and assembly

### 1.2. Assembly

#### 1.2.1. Caution during assembly

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Wear protective items such as goggles, gloves and working boots.</li><li>(2) No fire should be allowed in working area.</li><li>(3) Pay attention not to catch fingers during work.</li><li>(4) Replace packing and gaskets for new ones for satisfactory sealing performance. Reuse of seals may cause leakage.</li></ul>

#### 1.2.2. For assembly

- (1) Check all parts before assembly. Replace the parts, if needed.
- (2) In case parts are reused, clean the parts to remove oil, dust and other foreign objects.
- (3) Assemble valves at dust-free area.
- (4) Care should be taken not to damage body and disc seat, stem threads and flange surfaces.
- (5) Since the disc seats were lapped to mate the body seats, ensure that the disc and body are assembled in the same orientation as they were at disassembly.
- (6) All threaded parts should be securely tightened.

## VII. Disassembly and assembly

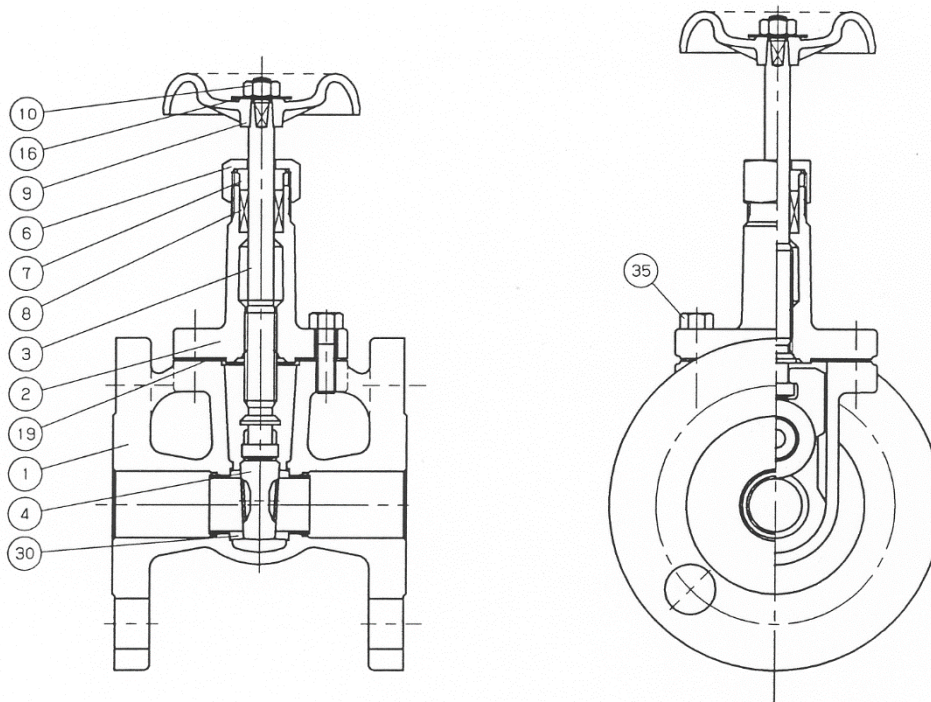
### 1.2.3. Assembly

- (1) Install the gland packing and gland to the bonnet and fix them with the packing nut temporarily.
- (2) Insert the stem from the bottom of the bonnet and screw it counterclockwise into the threads of the bonnet until it reaches to the halfway position of the valve opening.
- (3) Mount the handwheel to the stem, fixed with the handwheel nut
- (4) Place gaskets on the bonnet flange of the body.
- (5) Hang the disc to the stem head and place it along the disc guides provided in the body, then place the bonnet on the body. Ensure that the bonnet is placed to match match-marks on the body and bonnet and that the disc is placed in the same direction as it was at disassembly.
- (6) Insert bonnet bolts and tighten bolts evenly and alternately in a diagonal pattern with gradual tightening force applied to avoid one-sided tightening..
- (7) Tighten the packing nut sufficiently to stop leakage through the gland, but not to the degree at which the operation torque becomes too heavy.
- (8) Ensure if all threaded areas are securely tightened. Retighten them, if found loose.



VII. Disassembly and assembly

1.3. Construction



部番	部 品 名
1	Body
2	Bonnet
3	Stem
4	Disc
6	Packing Nut
7	Gland
8	Gland Packing
9	Handwheel
10	Wheel Nut
16	Name Plate
19	Gasket
30	Body Seat Ring
35	Bonnet Nut



This illustration shows typical construction.  
Refer to the approved drawing at assembly and disassembly.



## VII. Disassembly and assembly

### 2. Inside screw globe valve

#### 2.1. Disassembly procedure

##### 2.1.1. Caution during disassembly

 <b>WARNING</b>	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire.

 <b>CAUTION</b>	
	(1) Wear protective items such as goggles, gloves and working boots. (2) Pay attention not to catch fingers during disassembly.

##### 2.1.2. For disassembly

- (1) Disassemble valves at dust-free area.
- (2) Care should be taken not to damage body and disc seat, stem threads and flange surfaces.

## VII. Disassembly and assembly



### 2.1.3. Disassembly

- (1) Open valves to the halfway position.
- (2) Loosen the wheel nut.
- (3) Loosen the packing nut.
- (4) Remove the bonnet bolts
- (5) Remove the bonnet from the body with the stem and disc being attached.
- (6) Remove a gasket.
- (7) Turn the handwheel clockwise until the handwheel reaches to the wheel nut.
- (8) Remove the wheel nut and handwheel.
- (9) Turn the stem clockwise until the stem is completely removed from the bonnet.
- (10) Pull down the stem and remove it from the bonnet.
- (11) Detach the packing nut from the bonnet and remove the gland and gland packing.

## VII. Disassembly and assembly

### 2.2. Assembly

#### 2.2.1. Caution during assembly

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Wear protective items such as goggles, gloves and working boots.</li><li>(2) No fire should be allowed in working area.</li><li>(3) Pay attention not to catch fingers during work.</li><li>(4) Replace packing for new one for satisfactory sealing performance.</li></ul>

#### 2.2.2. For assembly

- (1) Check all parts before assembly. Replace the valve, if not satisfactory.
- (2) In case parts are reused, clean the reused parts to remove oil, dust and other foreign objects.
- (3) Assemble valves at dust-free area.
- (4) Care should be taken not to damage body and disc seat, stem threads and flange surfaces.
- (5) All threaded parts should be tightened securely.

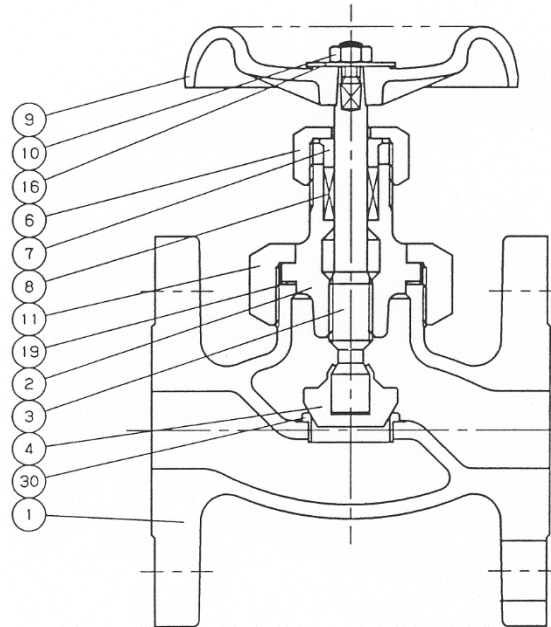
## VII. Disassembly and assembly

### 2.2.3. Assembly

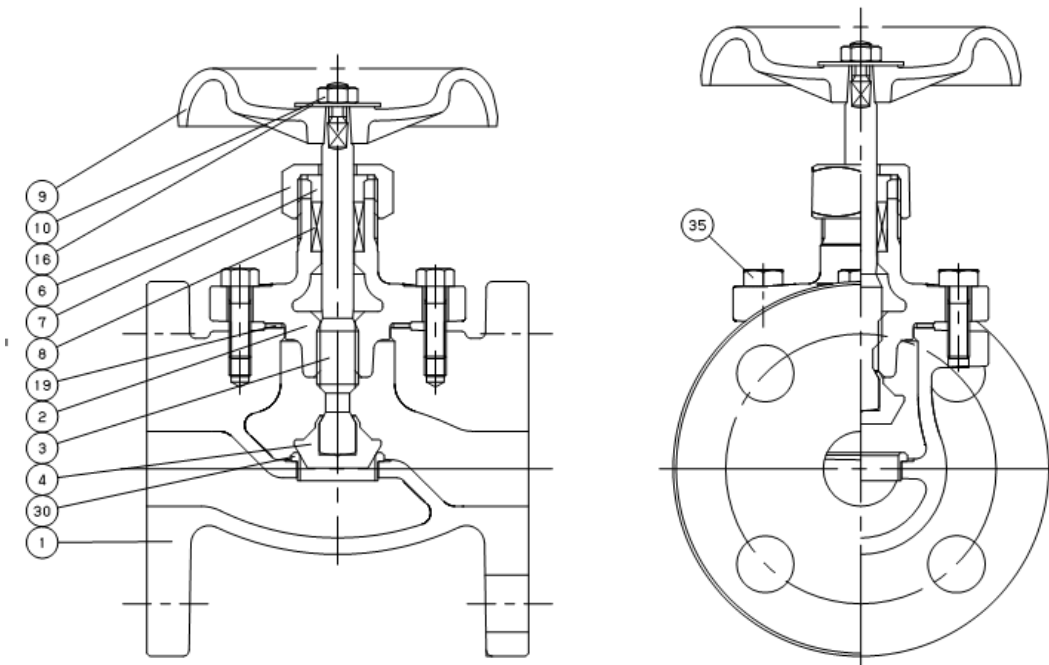
- (1) Install the bonnet ring, gland packing and gland to the bonnet and fix them with the packing nut temporarily.
- (2) Insert the stem from the bottom of the bonnet and screw in counterclockwise into the bonnet threads until it reaches to the halfway position of the valve opening.
- (3) Install the handwheel to the stem, fixed with the handwheel nut.
- (4) Place a gasket on the bonnet flange of the body.
- (5) Place the bonnet on the body.
- (6) Tighten the bonnet ring to fix the bonnet with the body.
- (7) Tighten the packing nut sufficiently, but not to the degree at which the operation torque becomes extremely heavy.
- (8) Ensure if all threaded parts are securely tightened. Retighten them, if found loose.

VII. Disassembly and assembly

2.3. Construction



部番	部 品 名
1	Body
2	Bonnet
3	Stem
4	Disc
6	Packing Nut
7	Gland
8	Gland Packing
9	Handwheel
10	Wheel Nut
11	Bonnet Ring
16	Name Plate
19	Gasket
30	Body Seat Ring
35	Bonnet Bolt





This illustration shows typical construction.  
 Refer to the approved drawing at disassembly and assembly.



## VII. Disassembly and assembly

### 3. Swing check valve

#### 3.1. Disassembly procedure

##### 3.1.1. Caution during disassembly

 <b>WARNING</b>	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire.

 <b>CAUTION</b>	
	(1) Wear protective items such as goggles, gloves and working boots. (2) Pay attention not to catch fingers during disassembly.

##### 3.1.2. For disassembly

- (1) Disassemble valves at dust-free area.
- (2) Care should be taken not to damage the body and disc seat, stem threads and flange surfaces.



##### 3.1.3. Disassembly

- (1) Remove the cover from body.
- (2) Remove the plug from the body.
- (3) Remove the hinge pin from the body. Support the disc, when removing hinge pin, since the disc is hung at the hinge pin.
- (4) Remove the disc from the body.

## VII. Disassembly and assembly

### 3.2. Assembly

#### 3.2.1. Caution during assembly

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Wear protective items such as goggles, gloves and working boots.</li><li>(2) No fire should be allowed in working area.</li><li>(3) Pay attention not to catch fingers during work.</li><li>(4) Replace packing into new one for satisfactory sealing performance.</li></ul>

#### 3.2.2. For assembly

- (1) Check all parts before assembly. Replace the valve, if not satisfactory
- (2) In case parts are reused, clean the reused parts to remove oil, dust and other foreign objects.
- (3) Assemble valves at dust-free area.
- (4) Care should be taken not to damage body and disc seat, stem threads and flange surfaces.
- (5) All threaded parts should be tightened securely.



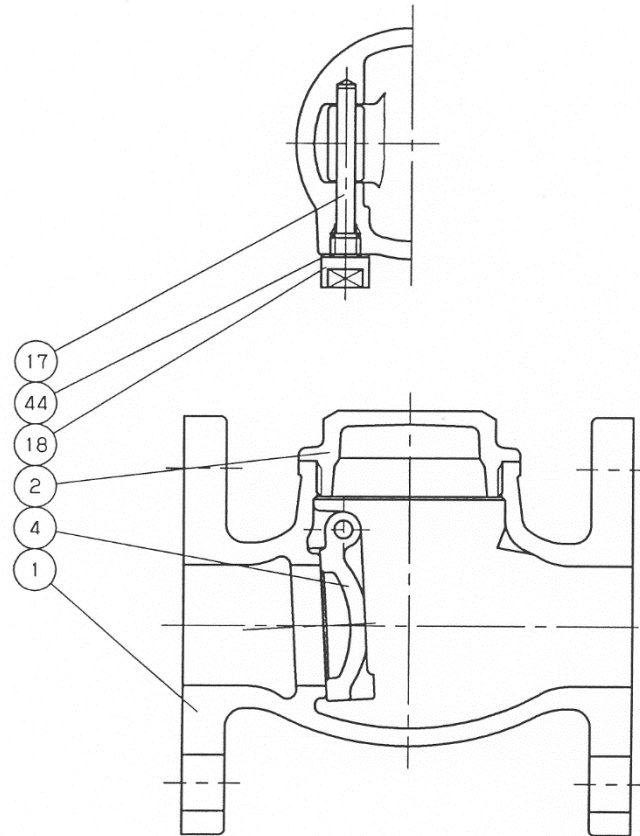
## VII. Disassembly and assembly

### 3.2.3. Assembly

- (1) Insert the disc to the body.
- (2) Insert the hinge pin into the hinge pin hole provided in the body.
- (3) Screw the plug into the hinge pin hole. Ensure to place a gasket between the plug and the body.
- (4) Install the cover on the body.
- (5) Check all threaded parts. Retighten them, if found loosened.

VII. Disassembly and assembly

3.3. Construction



部番	部品名
1	Body
2	Cover
4	Disc
17	Hinge Pin
18	Plug
44	Gasket



This illustration shows typical construction.  
 Refer to the approved drawing at disassembly and assembly.



## VII. Disassembly and assembly

### 4. Lift check valve

#### 4.1. Disassembly procedure

##### 4.1.1. Caution during disassembly

 <b>WARNING</b>	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire.

 <b>CAUTION</b>	
	(1) Wear protective items such as goggles, gloves and working boots. (2) Pay attention not to catch fingers during disassembly.

##### 4.1.2. For disassembly

- (1) Disassemble valves at dust-free area.
- (2) Care should be taken not to damage the body and disc seat and flange surfaces.



##### 4.1.3. Disassembly

- (1) Remove the cap from the body.
- (2) Remove the disc from the body.

## VII. Disassembly and assembly

### 4.2. Assembly

#### 4.2.1. Caution during assembly

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Wear protective items such as goggles, gloves and working boots.</li><li>(2) No fire should be allowed in working area.</li><li>(3) Pay attention not to catch fingers during work.</li></ul>

#### 4.2.2. For assembly

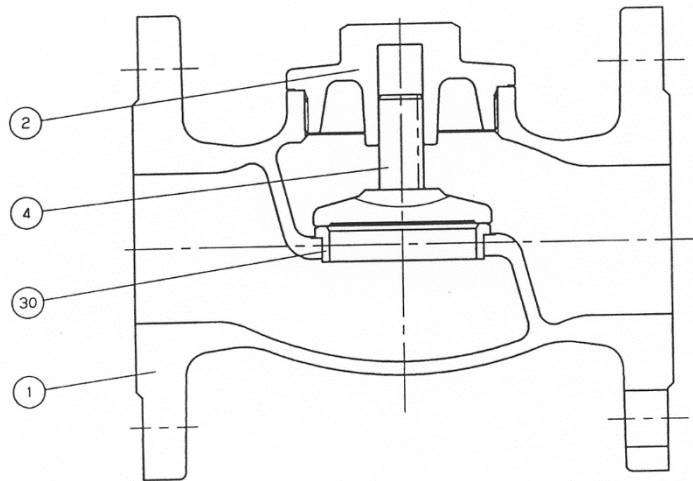
- (1) Check all parts before assembly. Replace the valve, if not satisfactory
- (2) In case parts are reused, clean the reused parts to remove oil, dust and other foreign objects.
- (3) Assemble valves at dust-free area.
- (4) Care should be taken not to damage body and disc seat, stem threads and flange surfaces.
- (5) All threaded parts should be tightened securely..

#### 4.2.3. Assembly

- (1) Insert the disc to the body. Ensure it is placed in the center of the port.
- (2) Install the cap on the body along the disc guide.
- (3) Check all threaded parts. Retighten them, if found loose.

VII. Disassembly and assembly

4.3. Construction



部番	部 品 名
1	Body
2	Cap
4	Disc
30	Disc Seat Ring

This illustration shows typical construction.  
Refer to the approved drawing at disassembly and assembly.