



Toyo Valve

Operation Manual

For

Stainless Steel and Ductile Iron
Gate, Globe and Check Valves

[Threaded]

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 the manual operation of stainless steel and ductile iron threaded end gate, globe and check valves.

SAFETY PRECAUTIONS

For the safe use of the product, read all of the safety precautions listed in this manual before handling the product.

The safety precautions in this manual are determined to ensure safe and proper use of the product and to prevent personal injury and property damage. This manual uses two terms, "Warning" and "Caution", according to the hazard level, to clearly indicate the extent and severity of the risk.

Both "Warning" and "Caution" indicate important safety instructions. Please be sure to follow them.



WARNING

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



CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor to moderate injuries or product damage.



Indicates a "prohibited" action that must not be carried out.



Indicates a "mandatory" action that must be carried out.

NOTES TO USERS

- This manual is designed to show an appropriate usage of the products for transportation, storage, installation, operation and maintenance. Be sure to read through this manual before handling the products.
- This manual does not cover the whole scope of conceivable usage of the products for transportation, storage, installation, operation and maintenance. If technical assistance beyond the scope of this manual is required, contact KITZ Corporation or its distributor.
- The specifications have been determined with safety considerations. Do not use the products beyond the specifications.
- The illustrations given in this manual do not show all the details. If more detailed information is required, refer to the relevant approved drawings.

*Any information provided in this operation manual is subject to change without prior notice.

Contents

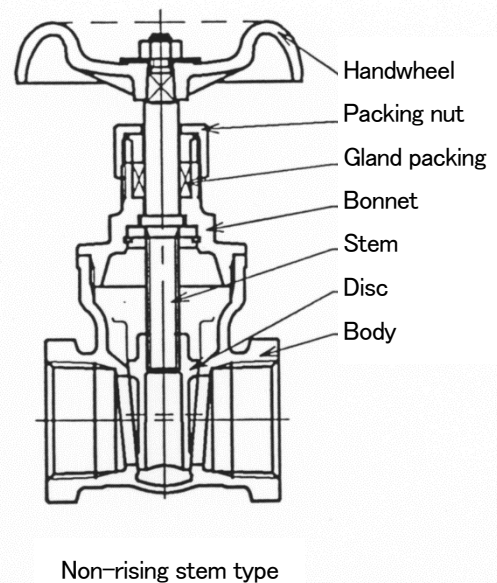
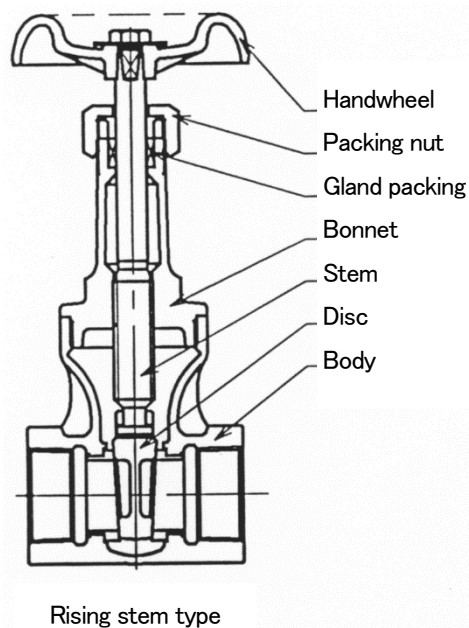
I . Construction and Design Features	
Inside Screw Gate Valve	2
Inside Screw Globe Valve	3
Swing Check Valve	4
Lift Check Valve.....	5
II . Operator	6
III . Transportation and Storage	8
IV . Piping and Mounting	10
V . Valve Operation	15
VI . Periodic Inspection	20
VII . Disassembly and Assembly	
Inside Screw Gate Valve (rising stem)	24
Inside Screw Gate Valve (non-rising stem)	29
Inside Screw Globe Valve	34
Swing Check Valve	39
Lift Check Valve.....	42

I . Construction and Design Features

I . Construction and Design Features

1. Inside Screw Gate Valve

- 1.1 A typical valve construction and parts names are as illustrated below.
- 1.2 There is a rising stem type, of which stem threads are engaged with bonnet threads, and a non-rising stem type, of which stem threads are engaged with disc threads.
- 1.3 Sufficient space to the rising direction is required for a rising stem type of valve for its operation, but not for a non-rising stem type of valve.
- 1.4 Open or close position cannot be checked from the outside of the non-rising type of valve.
- 1.5 Gate valve is designed to be used only in the fully open or close position.
Usage in the intermediate position may damage the valve disc and seats.
- 1.6 The flow is bi-directional.

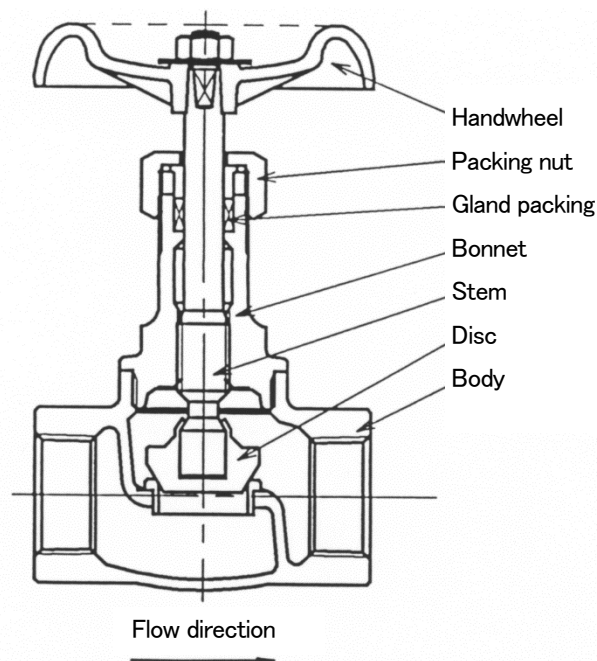


The illustration shows a typical construction.

I . Construction and Design Features

2. Inside Screw Globe Valve

- 2.1 A typical valve construction and parts names are as illustrated below.
- 2.2 Stem threads are engaged with bonnet threads and the stem rises upward and downward.
- 2.3 Sufficient space to the rising direction is required for the stem.
- 2.4 Globe valve is designed to be used in the fully open position, fully closed position or intermediate position to control the flow.
- 2.5 Globe valve has higher fluid resistance due to its construction.
- 2.6 Globe valve requires higher operational torque to close the valve because the stem (disc) receives the full fluid resistance..
- 2.7 The flow is uni-directional.



The illustration shows a typical construction.

I . Construction and Design Features

3. Swing Check Valve

3.1 A typical valve construction and parts names are as illustrated below.

3.2 The hinge pin clamps the arm and disc.

The disc moves upwards only.

3.3 Swing check valve is uni-directional and prevents back flow.

3.4 The flow is uni-directional.

3.5 Swing check valve is used for both horizontal and vertical piping.

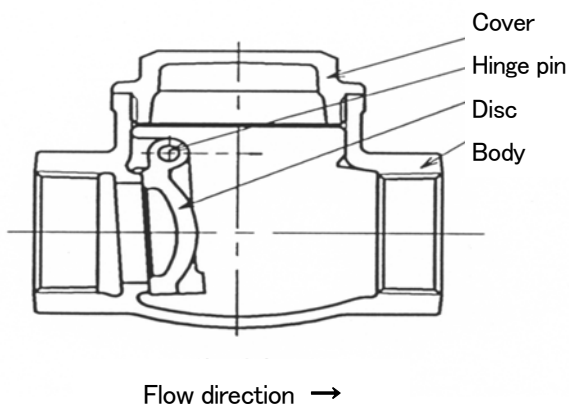
When installed in vertical piping, the flow direction shall be upward and the arrow on the body shall also indicate the upward direction.

When installed in horizontal piping, the cover (Construction 1) or the protrusion on the cover (Construction 2) shall be positioned in the upper side.

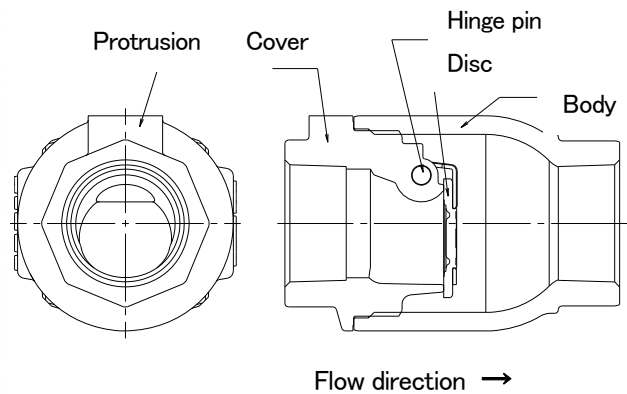
3.6 When enough fluid flow cannot be obtained, the disc may flap the body seat and make a noise, causing a chattering phenomenon.

3.7 Fluid vortex, turbulence and pulsation are expected at the pump outlet and the downstream of the reducer and elbow, which may damage the valve and result in a short life cycle of the product. It is recommended to place a valve at the distance of 6 times the nominal bore size or farther from the above-mentioned devices.

Example of Construction 1



Example of Construction 2

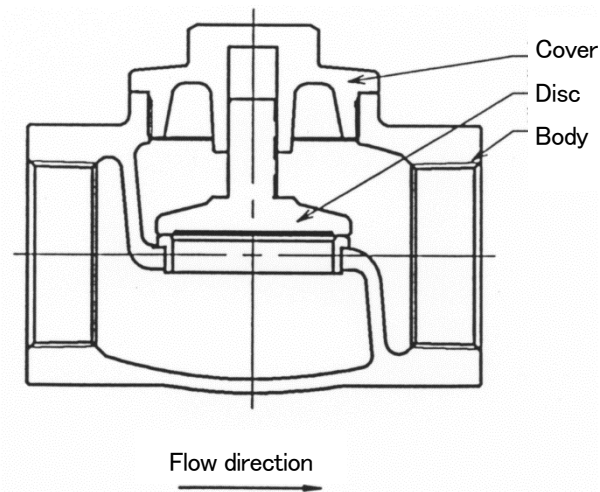


The illustration shows a typical construction.

I . Construction and Design Features

4. Lift Check Valve

- 4.1 A typical valve construction and parts names are as illustrated below.
- 4.2 The disc moves vertically to the seats, along the cover guide.
- 4.3 Lift check valve is used to flow the fluid unidirectionally and to prevent back flow.
- 4.4 The flow is unidirectional.
- 4.5 Lift check valve is used only for horizontal piping and it must be installed in the upright position.
- 4.6 When enough fluid flow cannot be obtained, the disc may flap the body seat and make a noise, causing a chattering phenomenon.
- 4.7 Fluid vortex, turbulence and pulsation are expected at the pump outlet and the downstream of the reducer and elbow, which may damage the valve and result in a short life circle of the product. It is recommended to place a valve at the distance of 6 times the nominal bore size or farther from the above-mentioned devices.



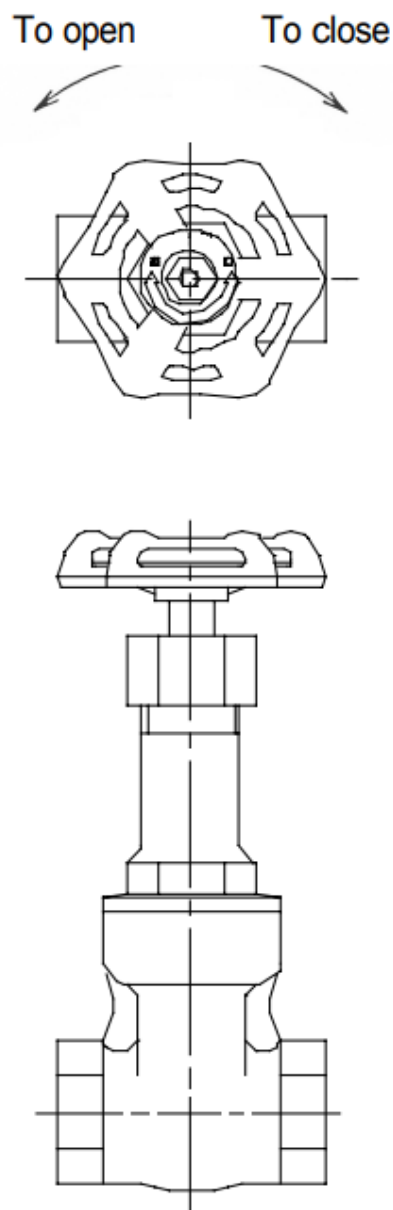
The illustration shows a typical construction.

II . Operator

II. Operator

1. Handwheel

- 1.1 Handwheel is directly mounted on the valve stem.
- 1.2 Clockwise operation of the handwheel closes the valve and counterclockwise operation of the handwheel opens the valve as indicated on the handwheel arrow.
- 1.3 Handwheel operating torque differs depending on the valve types and the opening degrees.





III. Transportation and Storage

III. Transportation and Storage

1. Transportation

1.1 Precautions for Transportation

 CAUTION	
	<ul style="list-style-type: none"> ● 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. ● Pay attention to handling and storage of carton packed products. High humidity may damage the cartons.



1.2 Transportation

1.2.1 Keep products in their original packaging 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 must be avoided.

2. Storage

2.1 Precautions for Storage

 CAUTION	
	<ul style="list-style-type: none"> ● DO NOT store valves in the corrosive environment. It may cause corrosion in the valve threaded areas. ● DO NOT place any objects on valves, or DO NOT step on them. Overloading may cause damage to the valves. ● DO NOT pile up products carelessly. Avoid damage to the products and personal injury caused by unstable piling.

2.2 Storage

2.2.1 Store valves in a dust-free, least humid and well ventilated place. 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 (threaded type)

1.1 Precautions for Installation

 CAUTION	
	<ul style="list-style-type: none">● Keep a secure footing for valve installation and operation.● Sufficient lighting shall be provided for valve operation.● Piping shall be properly supported, if needed.

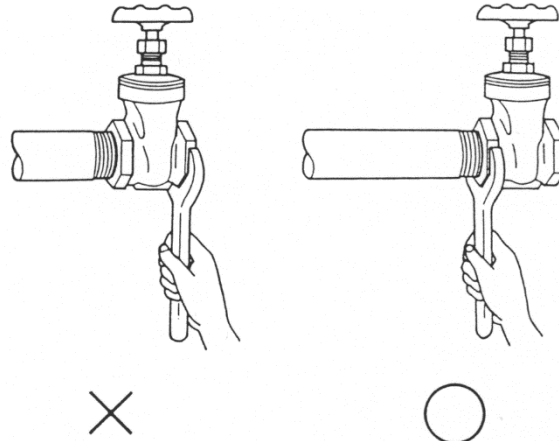
- 1.1.1 Allow sufficient room for operation, installation and maintenance of valves, considering the valve height and the stem direction.
- 1.1.2 Take appropriate measures for smooth operation, inspection and maintenance of valves in the case that they are installed in a small space.
- 1.1.3 Avoid installing valves in the place where valve functions may be hampered by external forces such as vibration.
- 1.1.4 It is recommended to install the valve in horizontal piping with the valve in the upright position.
- 1.1.5 Fluid flow of swing check valve shall be upward when it is installed in vertical piping.
- 1.1.6 Lift check valve shall be installed in horizontal piping only.
- 1.1.7 Fluid flow of lift check valve with springs shall be upward when it is installed in vertical piping.

IV. Piping and Mounting

1.2 Precautions for Piping and Mounting

CAUTION

- Keep off the working area to prevent personal injury if the valve is installed in a high place.
- Pay attention not to damage threaded areas and seat surfaces during mounting work.
- Disassembly of valve during mounting work is prohibited.
- Check valves are provided with fillers inside for seat protection during transportation. Ensure to remove them completely before mounting valves.
- Globe and check valves shall be mounted in the correct direction in accordance with the arrow indicated on the valve body.
- Use sealing materials suitable for the temperature and the fluid in the threaded area.
- Use a spanner or other appropriate tools. Use of a pipe wrench is prohibited.
- Apply a spanner to the valve end which is connected with a pipe. Do not fit a spanner to the other end.



- Overtightening may damage the valve internals.
- Retighten gland packing before operation. Packing tightening pressures may be lowered due to stress relaxation during transportation and storage and it may cause leakage.

IV. Piping and Mounting

- 1.2.1 Check the following before valve mounting.
- (1) Service conditions shall be within the valve specifications.
 - (2) Valve threads shall correspond with the piping threads.
 - (3) No damage shall be found on the valve and piping threads.
 - (4) Threads dimensions shall be in accordance with the applicable standards.
- 1.2.2 Remove foreign objects such as sand, dust and welding spatters from the connecting pipe interior before valve mounting.
- 1.2.3 Handle valves carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact shall be avoided.
- 1.2.4 Remove protection covers just before installation of the valve.
- 1.2.5 All tightened areas shall be checked after installation of the valve. Retighten them, if needed.
- 1.2.6 Valve and pipe interior shall be flushed to remove foreign objects. DO NOT operate the valve during flushing.

IV. Piping and Mounting

1.3 Piping and Mounting (threaded)

- 1.3.1 Make sure that valves and pipes are threaded properly.
- 1.3.2 Remove all foreign objects such as cutting oil and spatters from the pipe internals and threaded areas with detergent or waste cloth.
- 1.3.3 Apply sealing material such as sealing tape to the pipe threads.
- 1.3.4 Use appropriate tools when installing a valve.
- 1.3.5 Do not apply any excessive torque to thread a valve into the pipe end. The torque shall be within the following limits.

Size	1/8	1/4	3/8	1/2	3/4	1
Torque N-m	10	20	30	40	60	100




Size	1-1/4	1-1/2	2	2-1/2	3	4
Torque N-m	120	150	200	250	300	400

- 1.3.6 Increase the line temperature and pressure gradually during the test operation. Retighten the threaded portions as required.

V. Valve Operation

V. Valve Operation

1. Precautions for Operation

 CAUTION	
	<ul style="list-style-type: none"> ● DO NOT apply excessive torque to the valve operating device. ● DO NOT loosen bolts and nuts of gland and bonnet while the valve is pressurized. ● DO NOT use gate valves in the intermediate position. It may damage the stem and disc.
	<ul style="list-style-type: none"> ● Open the valve gradually to prevent damage to pipes when the valve handles high temperature fluid such as steam. ● Close the valve gradually to prevent water hammer if the valve handles liquid. ● Take appropriate measures against freezing.

2. Valve Operation (gate and globe valves)

- 2.1 Clockwise operation of the handwheel according to the arrow on the handwheel closes the valve and counterclockwise operation of the handwheel opens the valve.
- 2.2 Handwheel operating torque differs depending on the valve type and valve opening degree.
- 2.3 Turn the handwheel of gate valve to the open direction by about 90° after reaching the fully closed position in order to remove thermal stress from the pipe. It makes the re-opening of the valve easier and smoother.

V. Valve Operation



3. Daily Inspection

Daily inspection is very important for a safe and satisfactory operation of valve. The following are the inspection items to be performed daily. Inspections shall be also performed during operation.

Check Item	Valve Type	Area	Method	Measure
External leakage	Gate Globe	Gland	Visual Liquid soap	Retighten the packing nut.
	All	Threads	Visual Liquid soap	Retighten all of the threaded portions. Replace the related parts.
		Body surface	Visual Liquid soap	Replace the valve.
Abnormal noise	All	Valve body	Listening	Contact a piping engineer.
		Loosened threads	Listening	Retighten all of the threaded portions.
		Pipe vibration	Listening	Contact a piping engineer
Loosened threads	All	Threads	Visual Touch	Retighten all of the threaded portions.
Seat leakage	All	—	—	Remove foreign objects Perform a disassembling inspection. (Lapping of the seat surface) Replace the valve.
Valve operation	Gate Globe	Operating position	Visual	Adjust the position as instructed.
	All	Not smooth operation	Touch Listening	Perform a disassembling inspection. Replace the valve.

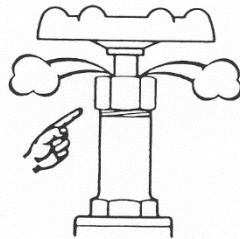
V. Valve Operation

4. Remedial Measure

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take safety measures against toxic, flammable and corrosive fluid.● Reduce the line pressure to the atmospheric level before retightening.● Reduce the line pressure to the atmospheric level when packing is replaced. Take preventive measures against fire and direct exposure to the fluid.

4.1 Leakage from Gland Area

When leakage is found from the gland packing area, retighten the packing nut appropriately so that the valve operation does not become heavy. If retightening cannot solve the leakage, the gland packing shall be replaced with new one.



V. Valve Operation

5. Troubleshooting

Trouble	Possible Cause	Measure
Failure of opening/closing operation	Foreign objects stuck to the seat	Flash out the foreign objects with fluid flow.
Excessive operation torque	Foreign objects stuck to the stem threads	Remove the foreign objects and check the valve.
	Foreign objects are piled up in the valve body bottom	Flash out the foreign objects with fluid flow.
	Over-tightened gland packing	Loosen packing nut and retighten them adequately.
Leakage from packing	Too loose gland packing	Retighten gland packing.
	Damaged gland packing	Replace the gland packing.
	Damaged stem	Replace the valve.
Seat leakage when in fully closed position	Damaged stem (by cavitation)	Contact a piping engineer.
	Deformed seat	Contact a piping engineer.
Noise and vibration	Loosened threads	Retighten threads.

VI. Periodic Inspection

VI. Periodic Inspection



1. Periodic Inspection



- 1.1 Carry out periodic inspections with the valve installed approximately once a year.
- 1.2 Check the smooth operation and function of valves.
- 1.3 Refer to daily inspection page in this manual for inspection items and methods.
- 1.4 Carry out periodic inspections of valves which are not operated for long period or not inspected daily.
- 1.5 It is recommended to replace gland packing at the time of the periodic inspection.

2. Maintenance Inspection

Perform seat leakage, shell leakage and operation tests, if needed, at the time of the maintenance inspection of the facility. If any defects are found, perform an overhaul inspection.

2.1 Precautions for Removing from Piping and Installing in Piping

 WARNING	
	<ul style="list-style-type: none"> ● Discharge the fluid from the piping and reduce the line pressure to the atmospheric level before removing the valve. ● In the case of gate valve, discharge the fluid and pressure trapped within the valve body by positioning the valve in the intermediate position. ● Take protective measures against exposure to fluid and fire. ● Keep off the working area to prevent personal injury if the valve is installed in a high place.

 CAUTION	
	<ul style="list-style-type: none"> ● Wear protective items such as goggles, gloves and safety footwear. ● Keep a secure footing when dismantling and mounting valves.

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

2.3.1 Operation Test

- (1) The valve shall be operated smoothly without galling or sticking.
- (2) The stem shall be firmly connected to the disc.
- (3) In the case of gate valve, the center of the disc shall be located upward from the center of the body seat when the valve is in the fully closed position. The disc shall not be remained in the valve port.
- (4) In the case of globe valve, the disc shall be seated to the body seat completely when it is in the fully close position. Offset of the disc and the seat center is not acceptable.
- (5) In the case of check valve, the disc shall move to the stopper of the valve body when it is in the fully open position and the opening and closing motion of the disc shall be smooth.

2.3.2 Shell Test and Seat Leakage Test

- (1) Precautions for Shell Test and Seat Leakage Test

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take all safety precautions.

- (2) Shell Test and Seat Leakage Test

All valves are subject to a hydrostatic or pneumatic shell test and a seat leakage test at the specified test pressures after being assembled. Refer to JIS B2003 and other standards for test conditions.



VII. Disassembly and Assembly



VII. Disassembly and Assembly

1. Inside Screw Gate Valve (rising stem)

1.1 Disassembly Procedure

1.1.1 Precautions for Disassembly

 WARNING	
	<ul style="list-style-type: none">● Take preventive measures against fire and direct exposure to the fluid.

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take care not to catch your fingers between the connecting parts.

1.1.2 Disassembly

- (1) Disassemble valves in a dust-free area.
- (2) Pay attention not to damage body the seat, disc and stem threads.
- (3) Check the original position of the valve body and the disc before disassembly so that they can be re-assembled correctly.

VII. Disassembly and Assembly



1.1.3 Disassembly

- (1) Turn the disc to the intermediate position.
- (2) Loosen the wheel nut.
- (3) Loosen the gland nuts.
- (4) Remove the bonnet upward from the body slowly with the stem and disc together so that the disc shall not drop to the body. Check the original position of the disc.
- (5) Remove the disc from the stem.
- (6) Turn the handwheel clockwise to disengage the stem from the bonnet threads.
- (7) Remove the wheel nut and the handwheel from the stem.
- (8) Remove the stem from the bonnet.
- (9) Remove the packing nut, gland and gland packing from the bonnet.

VII. Disassembly and Assembly

1.2 Assembly

1.2.1 Precautions for Assembly

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Use of fire is strictly prohibited.● Take care not to catch your fingers between the connecting parts.● Replace packing with new one for satisfactory sealing performance.

1.2.2 Assembly

- (1) Check the parts before assembly. Replace the valve, if needed.
- (2) Clean re-using parts and remove oil, dust and other foreign objects from the parts.
- (3) Assemble valves in a dust-free area.
- (4) Pay attention not to damage the body seat, disc and stem threads.
- (5) Assemble the body and disc in their original position.
- (6) Tighten each threaded part securely.

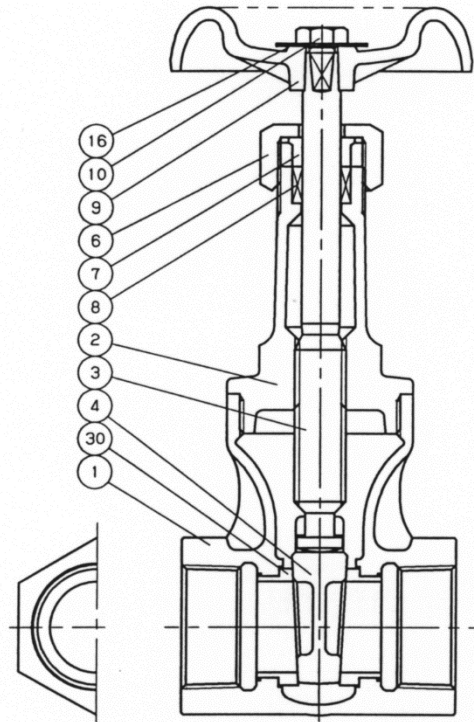
VII. Disassembly and Assembly

1.2.3 Assembly

- (1) Assemble the gland packing and gland to the bonnet and tighten the packing nut temporarily.
- (2) Insert the stem from the lower bonnet to engage the bonnet threads. Turn the handwheel counterclockwise to set the stem in the intermediate position.
- (3) Assemble the handwheel to the stem and tighten the wheel nut.
- (4) Assemble the disc to the stem and place them inside the body in accordance with the disc guide. Mount the bonnet to the body. Make sure that the disc is installed in its original position.
- (5) Tighten the packing nut properly. Excessive tightening may cause an unsmooth operation.
- (6) Check each threaded portion. Retighten them, if found loosened.

VII. Disassembly and Assembly

1.3 Construction



Part No.	Part
1	Body
2	Bonnet
3	Stem
4	Disc
6	Packing Nut
7	Gland
8	Gland Packing
9	Handwheel
10	Wheel Nut
16	Name Plate
30	Body Seat Ring



The illustration shows a typical construction.
Refer to the approved drawing at the time of assembly and disassembly.



VII. Disassembly and Assembly

2. Inside Screw Gate Valve (non-rising stem)

2.1 Disassembly Procedure

2.1.1 Precautions for Disassembly

 WARNING	
	<ul style="list-style-type: none">• Take protective measures against exposure to fluid and fire.

 CAUTION	
	<ul style="list-style-type: none">• Wear protective items such as goggles, gloves and safety footwear.• Take care not to catch your fingers between the connecting parts.

2.1.2 Disassembly

- (1) Disassemble valves in a dust-free area.
- (2) Pay attention not to damage the body seat, disc and stem threads.
- (3) Check the original position of the valve body and disc before disassembling the valve so that the valve body and the disc can be re-assembled correctly.

VII. Disassembly and Assembly



2.1.3 Disassembly

- (1) Turn the disc to the intermediate position.
- (2) Loosen the wheel nut.
- (3) Loosen the gland nuts.
- (4) Remove the bonnet from the body with the stem and disc together. Check the disc original position.
- (5) Remove the disc from the stem.
- (6) Remove the wheel nut and the handwheel from the stem.
- (7) Remove the snap ring and stem washer from the bonnet.
- (8) Remove the stem from the bonnet.
- (9) Remove the packing nut, gland and gland packing from the bonnet.

VII. Disassembly and Assembly

2.2 Assembly

2.2.1 Precautions for Assembly

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Use of fire is strictly prohibited.● Take care not to catch your fingers between the connecting parts.● Replace packing with new one for satisfactory sealing performance.

2.2.2 Assembly

- (1) Check the parts before assembly. Replace the valve, if needed.
- (2) Clean re-using parts and remove oil, dust and other foreign objects from the parts.
- (3) Assemble valves in a dust-free area.
- (4) Pay attention not to damage the body seat, disc and stem threads.
- (5) Assemble the body and disc in their original position.
- (6) Tighten each threaded part securely.

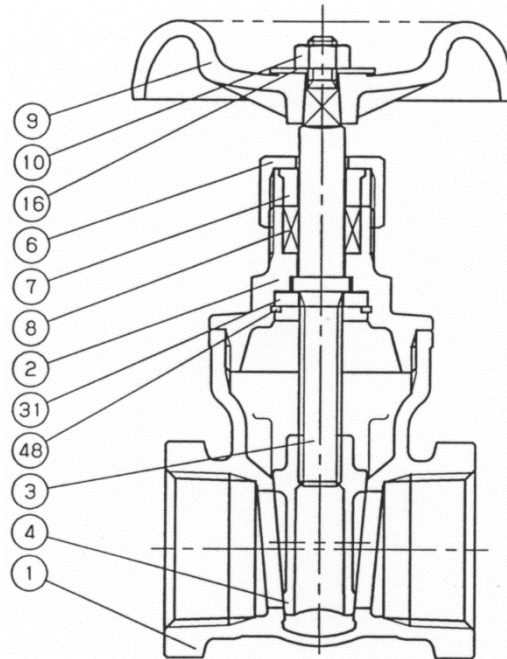
VII. Disassembly and Assembly

2.2.3 Assembly

- (1) Assemble the gland packing and gland to the bonnet and tighten the packing nut temporarily.
- (2) Insert the stem from the lower bonnet.
- (3) Assemble the stem washer and snap ring to the bonnet.
- (4) Assemble the handwheel to the stem and tighten the wheel nut.
- (5) Assemble the disc to the stem and set the disc in the intermediate position.
- (6) Assemble the disc to the stem and place them inside the body along the disc guide. Mount the bonnet to the body. Make sure the disc is in its original position.
- (7) Tighten the packing nut properly. Excessive tightening may cause an unsmooth operation.
- (8) Check each threaded portion. Retighten them, if found loosened.

VII. Disassembly and Assembly

2.3 Construction



Part No.	Part
1	Body
2	Bonnet
3	Stem
4	Disc
6	Packing Nut
7	Gland
8	Gland Packing
9	Handwheel
10	Wheel Nut
16	Name Plate
31	Stem Washer
48	Snap Ring



The illustration shows a typical construction.
 Refer to the approved drawing at the time of disassembly and assembly.



VII. Disassembly and Assembly

3. Inside Screw Globe Valve

3.1 Disassembly Procedure

3.1.1 Precautions for Disassembly

 WARNING	
	<ul style="list-style-type: none">● Take protective measures against exposure to fluid and fire.

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take care not to catch your fingers between the connecting parts.

3.1.2 Disassembly

- (1) Disassemble valves in a dust-free area.
- (2) Pay attention not to damage the body seat, disc and stem threads.

VII. Disassembly and Assembly



3.1.3 Disassembly

- (1) Turn the disc to the intermediate position.
- (2) Loosen the wheel nut.
- (3) Loosen the gland nuts.
- (4) Remove the bonnet from the body with the stem and disc together.
- (5) Turn the handwheel clockwise until it contacts the wheel nut.
- (6) Remove the wheel nut and handwheel.
- (7) Turn the stem clockwise from lower bonnet to disengage the stem from the bonnet threads.
- (8) Remove the stem from the bonnet lower side..
- (9) Remove the packing nut, gland and gland packing from the bonnet.

VII. Disassembly and Assembly

3.2 Assembly

3.2.1 Precautions for Assembly

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Use of fire is strictly prohibited.● Take care not to catch your fingers between the connecting parts.● Replace packing with new one for satisfactory sealing performance.

3.2.2 Before Assembly

- (1) Check the parts before assembly. Replace the valve, if needed.
- (2) Clean re-using parts and remove oil, dust and other foreign objects from the parts.
- (3) Assemble valves in a dust-free area.
- (4) Pay attention not to damage the body seat, disc and stem threads.
- (5) Make sure to tighten each threaded part securely.

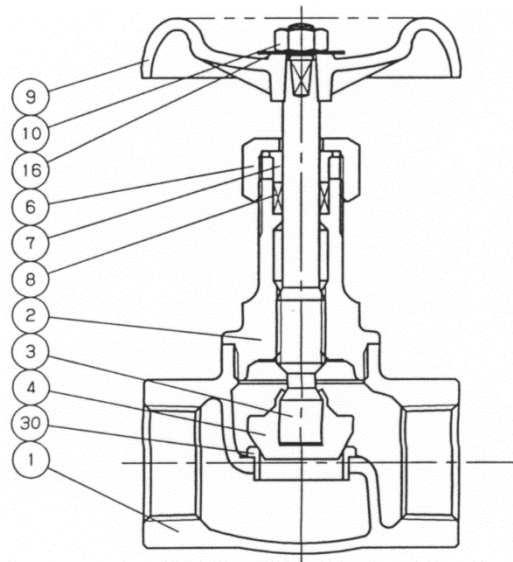
VII. Disassembly and Assembly

3.2.3 Assembly

- (1) Assemble the gland packing and gland to the bonnet and tighten the packing nut temporarily.
- (2) Insert the stem from the lower bonnet to engage the bonnet threads. Turn the handwheel counterclockwise and set the stem in the intermediate position.
- (3) Assemble the handwheel to the stem and tighten the wheel nut.
- (4) Mount the bonnet to the body.
- (5) Tighten the packing nut properly. Excessive tightening may cause an unsmooth operation.
- (6) Check each threaded portion. Retighten them, if found loosened.

VII. Disassembly and Assembly

3.3 Construction



Part No.	Part
1	Body
2	Bonnet
3	Stem
4	Disc
5	Lock Nut
6	Packing Nut
7	Gland
8	Gland Packing
9	Handwheel
10	Wheel Nut
16	Name Plate
30	Body Seat Ring



The illustration shows a typical construction.
Refer to the approved drawing at the time of disassembly and assembly.



VII. Disassembly and Assembly

4. Swing Check Valve

4.1 Disassembly Procedure

4.1.1 Precautions for Disassembly

 WARNING	
	<ul style="list-style-type: none">● Take protective measures against exposure to fluid and fire.

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take care not to catch your fingers between the connecting parts.● Disassembly of the valve of Construction 2 on page 4 may be difficult due to the adhesive agent applied to the threaded portion.

4.1.2 Before Disassembly

- (1) Disassemble valves in a dust-free area.
- (2) Pay attention not to damage the body seat and disc.
- (3) Check the original position of the valve body and disc before disassembly so that they can be re-assembled correctly.



4.1.3 Disassembly

- (1) Remove the cover from the body.
- (2) Remove the plug from the body.
- (3) Remove the hinge pin from the body while supporting the disc, which is hanging from the hinge pin, with hand.
- (4) Remove the disc from the body.

VII. Disassembly and Assembly

4.2 Assembly

4.2.1 Precautions for Assembly

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Use of fire is strictly prohibited.● Take care not to catch your fingers between the connecting parts.● Replace packing with new one for satisfactory sealing performance.

4.2.2 Before Assembly

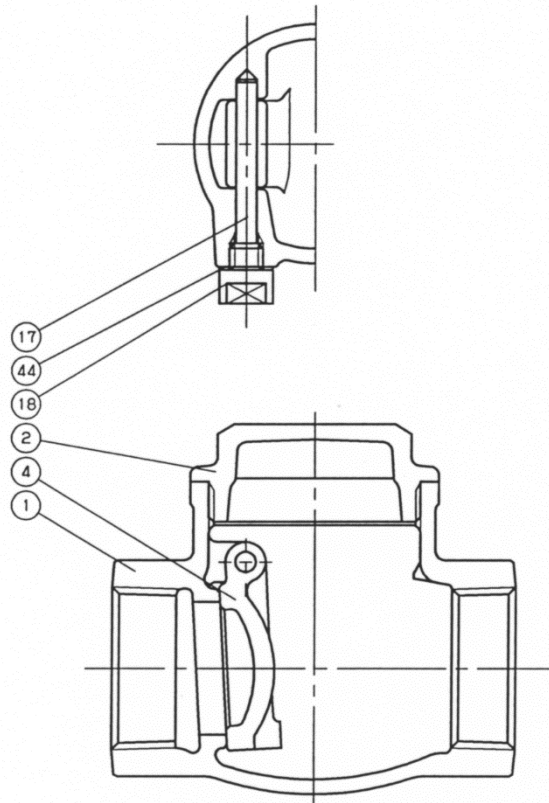
- (1) Check the parts before assembly. Replace the valve, if needed.
- (2) Clean re-using parts and remove oil, dust and other foreign objects from the parts.
- (3) Assemble valves in a dust-free area.
- (4) Pay attention not to damage the body seat and disc.
- (5) Make sure to tighten each threaded part securely.

4.2.3 Assembly

- (1) Insert the disc to the body.
- (2) Insert the hinge pin to the body through the disc hole.
- (3) Assemble the plug to the body.
- (4) Insert the gasket between the body and plug. Mount the cover to the body.
- (5) Check each threaded portion. Retighten them, if found loosened.

VII. Disassembly and Assembly

4.3 Construction



Part No.	Part
1	Body
2	Cover
4	Disc
17	Hinge Pin
18	Plug
44	Gasket



The illustration shows a typical construction...
 Refer to the approved drawing at the time of disassembly and assembly.



VII. Disassembly and Assembly

5. Lift Check Valve

5.1 Disassembly Procedure

5.1.1 Precautions for Disassembly

 WARNING	
	<ul style="list-style-type: none">● Take protective measures against exposure to fluid and fire.

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Take care not to catch your fingers between the connecting parts.

5.1.2 Before Disassembly

- (1) Disassemble valves in a dust-free area.
- (2) Pay attention not to damage the body seat and disc.



5.1.3 Disassembly

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

VII. Disassembly and Assembly

5.2 Assembly

5.2.1 Precautions for Assembly

 CAUTION	
	<ul style="list-style-type: none">● Wear protective items such as goggles, gloves and safety footwear.● Use of fire is strictly prohibited.● Take care not to catch your fingers between the connecting parts.

5.2.2 Before Assembly

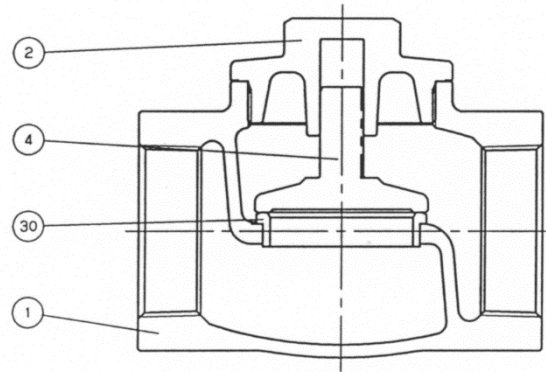
- (1) Check the parts before assembly. Replace the valve, if needed.
- (2) Clean re-using parts to remove oil, dust and other foreign objects from the parts.
- (3) Assemble valves in a dust-free area.
- (4) Pay attention not to damage the body seat and disc.
- (5) Make sure to tighten each threaded part securely.

5.2.3 Assembly

- (1) Insert the disc to body and put the disc in the body port center.
- (2) Mount the cover to the body along the disc guide.
- (3) Check each threaded portion. Retighten them, if found loosened.

VII. Disassembly and Assembly

5.3 Construction



Part No.	Part
1	Body
2	Cover
4	Disc
30	Body seat Ring

The illustration shows a typical construction.
Refer to the approved drawing at the time of disassembly and assembly.