

# INSTRUCTION MANUAL

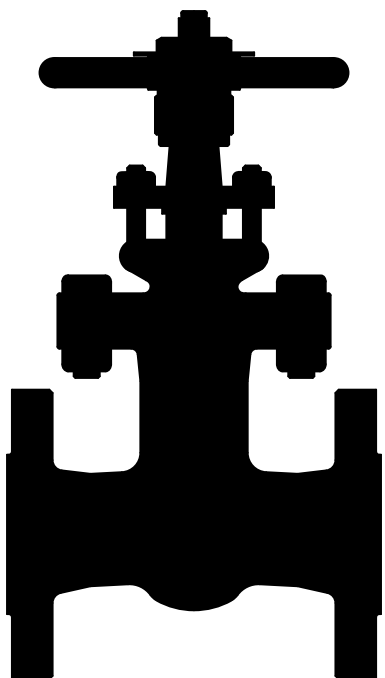
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GENERAL-PURPOSE MANUAL OPERATION VALVE

YASAKA VALVE INDUSTRY CO., LTD.

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**YSK**



Document No. 03-123

## SAFETY INSTRUCTIONS

Be sure to read and fully understand the instructions shown below and the text of the instruction manual for safe, proper use of the product. Keep this manual safe and read it whenever necessary. This instruction manual describes the important matters to be observed to protect you and others and loss of the properties in advance. The marks and the meaning of the symbols are as shown below. Be sure to read and understand the text related to such marks and symbols.



If the product is used improperly, serious injury or death may result.



If the product is used improperly, injury or physical damage may result.

The matters to be observed are classified and explained with the following symbols.



This symbol shows an action that must not be done (prohibition).



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## Exemptions

- We will not bear any responsibility for damage or losses caused by an earthquake, fire not chargeable upon us, actions of third parties, other accidents, user's intention or mistakes, improper use, or use under abnormal conditions.
- We do not warrant that our products are complete, though we make efforts to improve the quality and reliability of our products. Take the proper precautions, including proper safety design and so forth, taking account of defects that may occur normally, when our product is used in equipment that may cause damage to human lives, bodies, and/or properties. Note that we will not bear any responsibility for damage caused by such application, unless our prior consent in written form, such as a specification, is obtained.
- We will not bear any responsibility for incidental losses (losses of business profit or discontinuation of business) caused by improper use or incapability of use of this product.

## About This Instruction Manual

- This manual informs people in charge of transportation, storage, piping, operation, manipulation, and maintenance of our valves and their proper handling methods.
- This manual shows the standard illustrations of each type of valve. For details, see the drawings supplied with the purchased product.

## PRECAUTIONS FOR HANDLING AND USE



- Do not step on or place a heavy object on the valve. (Otherwise, it may be damaged.)
- Do not bring the valve close to fire or a hot object. (Otherwise, it may suffer deformation, breakage, or fire.)




- Use the valve in the allowable service temperature and pressure ranges. (The maximum allowable pressure includes water hammering pressure. If the valve is used out of the allowable range, it may be damaged.)
- Keep sufficient spaces for maintenance and inspection.
- Use fluid containing crystalline substance in conditions that do not allow re-crystallization. (Otherwise, the valve will not work properly.)
- Avoid using the valve in places subject to scattering of water, dust, etc. all the time or exposed to the direct sunlight. Cover the whole valve, if it is necessary to use it in such a place. (Otherwise, the valve will not work properly.)
- Carry out periodical maintenance. (Long-term storage or disuse, temperature change during use, or aged deterioration may cause leakage.)

## PRECAUTIONS FOR TRANSPORTATION, UNPACKING, AND STORAGE



- Be very careful in hoisting or slinging the valve. Do not stand just under the hoisted object.



- Do not expose to shocks caused by throwing, dropping, striking, etc. (Otherwise, it may be damaged or broken.)
  - Do not scratch or pierce the valve with a sharp object (such as a knife or hook).
  - Do not pile up corrugated cardboard packages in such a manner that they may collapse.
  - Do not apply a handle when operating the valve.
  - Do not remove the dust and protective covers from the flanges until just before piping. Otherwise, dust may enter and the inner parts of the valve may be damaged.
  - Do not store the valve in a corrosive gas atmosphere. (Otherwise, threads and other parts may become corroded.)
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- Keep the product in the corrugated cardboard package until just before piping if it is supplied in the package. (Protect the product with a vinyl sheet if it is supplied not in a package.) Store it in a dry (at the room temperature), dust free, and well-ventilated place not exposed to direct sunlight. Do not store it in a hot place.
  - After unpacking, check if the product is proper and meets the specifications.

## CHECK POINTS AND PRECAUTIONS IN PIPING

- Tighten the flange bolts and nuts for piping evenly if the valve is a flange-type valve.
- Remove impurities if they adhere, if the valve is a weld-type valve.

### <Connecting weld-type valve>

- a) Open the valve slightly before welding. (If it is welded in the fully closed condition, the valve box may be deformed by welding heat.)
- b) Do not leave any welding chips inside the valve.
- c) Open the valve fully and clean the inside after welding.

### <Connecting insertion-weld-type valve>

- a) Open the valve slightly before welding.
- b) Make a slight gap (of 1.5 mm) when inserting a pipe so that the pipe end does not contact with the valve.
- c) The weld leg length should be over the pipe thickness.

## PRECAUTION FOR OPERATION



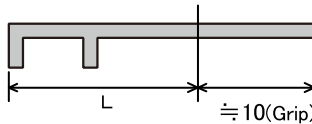
- Do not rotate the handle too much with excessive force when closing or opening the valve fully. (Otherwise, the valve may be damaged.)
- Do not open or close the valve in the condition where fluid contains dirt or foreign matter.
- It is very dangerous if bolts of the packing holder, cover connection, or pipe connection are loosened when fluid is pressurized. Never loosen bolts.



- Carry out operation slowly in a long period when hot fluid such as steam flows.
- Quick shutting may cause a water hammering phenomenon, resulting in leakage or rupture. Open and close the valve calmly and slowly.
- Protect the valve to avoid freezing in cold seasons.
- Follow the restrictions shown below when rotating the handle for opening or closing the valve.

### <Restrictions on Handle Rotation>

Restrict the maximum length according to the valve types and sizes shown in the table below when opening or closing the valve with the handle (so-called retightening handle or hacker). If an excessive torque is applied, the valve may be damaged.



(Unit : cm)

Nominal diameter		GROBE VALVE		GATE VALVE	
A	B	JIS10K・ANSI150	JIS20K・ANSI300	JIS10K・ANSI150	JIS20K・ANSI300
		Length (L)	Length (L)	Length (L)	Length (L)
40	1½	7	18.5	8	13
50	2	10	20	8	20
65	2½	20	28.5	15	30
80	3	22.5	46	15	32
100	4	38	65	25	44
125	5	66	115	36	60
150	6	68	-	51.5	62
200	7	75	-	59	67
250	8	-	-	67	82
300	9	-	-	80	104

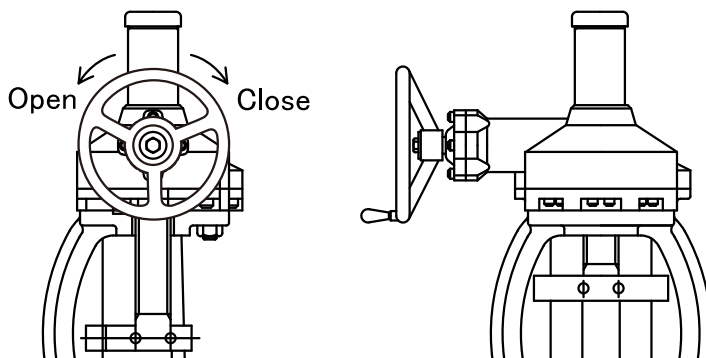
(Cited from Appendix1 “Restrictions on Handle Rotation” of “Valve Installation Guidelines” published by the High-Pressure Gas Safety Institute of Japan)

## <Open–Close Operation of Gate Valve and Globe Valve >

- As indicated on the handle wheel, rotate the handle clockwise to close the valve or counterclockwise to open it.
- The torque necessary for handle operations differs with the valve types and specifications.
- When using gate valve, be sure to return the handle wheel by 90° in the opening direction after closing it fully.

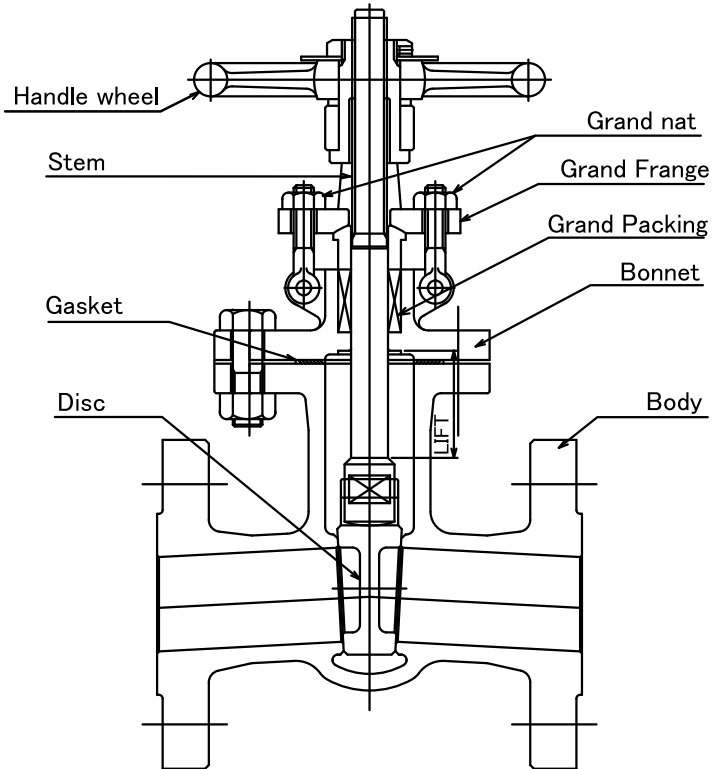
### \* Gear handle operation

- Gear mechanisms make it easy to open and close large-diameter valves by reducing the rotational forces of the handles with gears.
- A gear handle has an equivalent mechanism to the shock handle wheel (hammer blow). A gap is made between the rotation transmitting parts of the handle shaft and handle. It applies shocks to obtain a larger tightening torque when closing.



# 1. Gate Valve

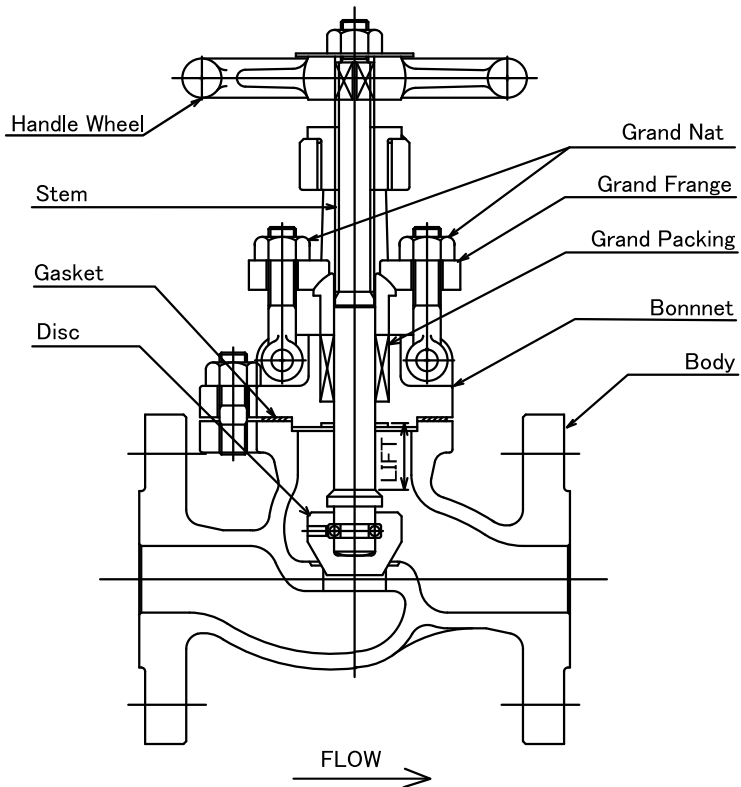
- As the handle wheel is rotated, the stem and disc move up and down together to open or close the valve.
- Since the stem moves up to open, a lifting space is required in the upper part of the handle wheel.
- Use the valve in the fully opened or fully closed condition only. The valve cannot control the flow rate. Do not use it in half-closed to slightly opened conditions, since the valve seat may possibly be severely damaged under such conditions.
- The valve may be used in either fluid flow direction.



\* This illustration shows the typical structure.

## 2. Globe Valve

- As the handle wheel is rotated, the stem and disc move up and down together to open or close the valve.
- Since the stem moves up to open, a lifting space is required in the upper part of the handle wheel.
- The valve can adjust the flow rate when using in the half-open condition.
- The globe valve has larger fluid resistance than the gate valve for reasons of the valve structure.
- The globe valve can be used in one fluid flow direction only.

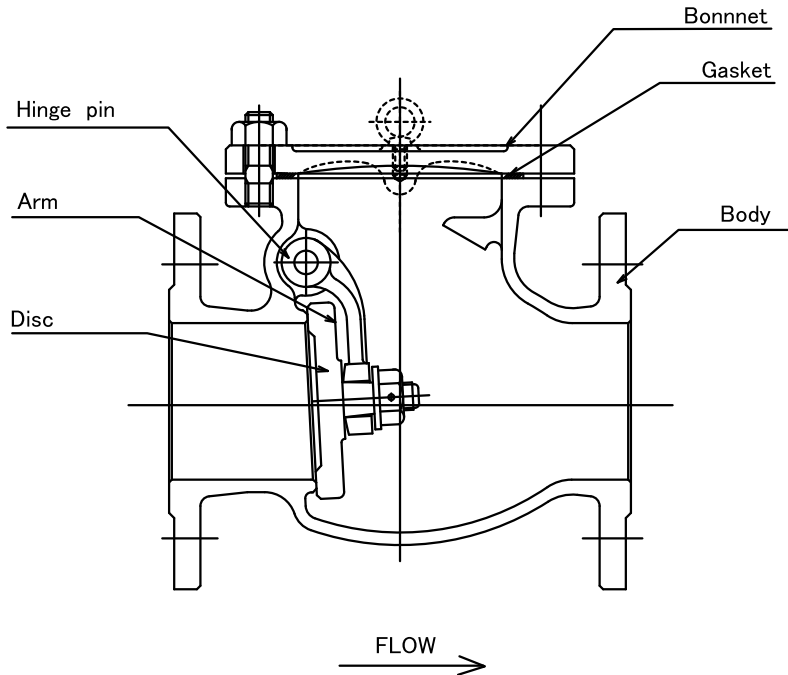


\* This illustration shows the typical structure.



### 3. Swing Check Valve

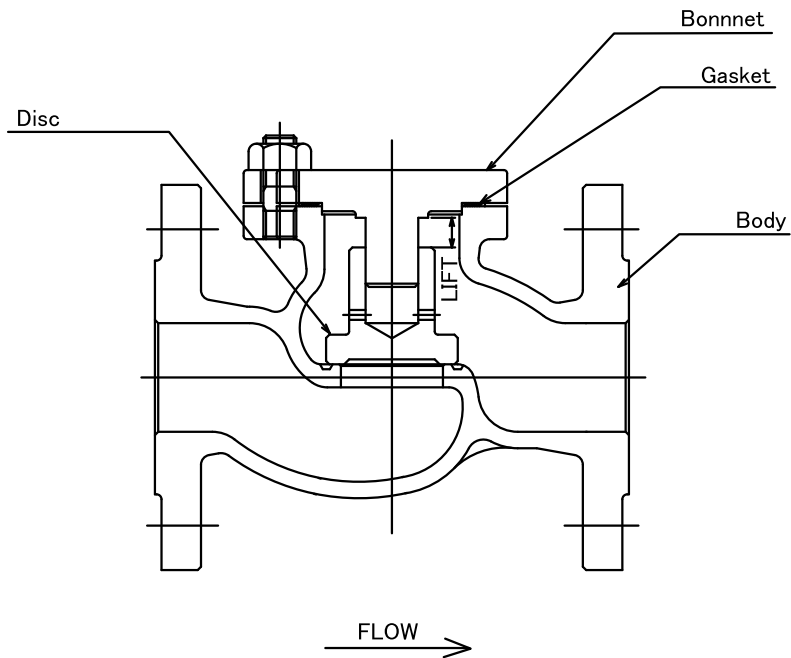
- The disc is fixed to the valve box with an arm and hinge pin. Since the disc opens and closes freely in one direction only, it maintains the fluid flow in the single direction and prevents reverse flow.
- This valve can be installed on a horizontal or vertical pipe. When vertical pipe, the fluid must flow upward from below. Install the valve so that the cast arrow mark showing the direction of flow on the valve faces up.
- If the flow rate in the piping is low, the disc may chatter and hit the valve seat (so-called chattering). If this phenomenon takes place, the disc and other parts may be damaged. Keep the flow rate constant.
- The swing check valve can be used in one fluid flow direction only.



\* This illustration shows the typical structure.

## 4. Lift Check Valve

- The disc is lifted up vertically by the fluid and opens. Fluid presses down the disc in the reverse direction to close it. Like this, the fluid flow is kept constant and reverse flow is prevented.
- This valve can be installed on a horizontal pipe only. Be sure to install it with the cover upside.
- If the flow rate in the piping is low, the disc may chatter and hit the valve seat (so-called chattering). If this phenomenon takes place, the disc and other parts may be damaged. Keep the flow rate constant.
- The lift check valve can be used in one fluid flow direction only.



\* This illustration shows the typical structure.

## 5. Y-Strainer

- The Y-strainer filters out foreign matter and dirt contained in the fluid with a screen.
- It can be installed on a horizontal or vertical pipe. When installing on a vertical pipe and fluid flows down, the cast arrow mark on the valve body must face down. If fluid flows up, provide the piping with a horizontal part. Installing the valve so that the cast arrow mark faces up is not recommended, since dirt may return. When installing on a horizontal pipe, the cover must be on the downside.
- There should be a space for taking out the screen on the cover side.
- Remove the cover and throw away foreign matter and dirt collected on the screen periodically. Collection or clogging may increase pressure loss, resulting in breakage of the screen.
- The Y-strainer can be used in one fluid flow direction only.

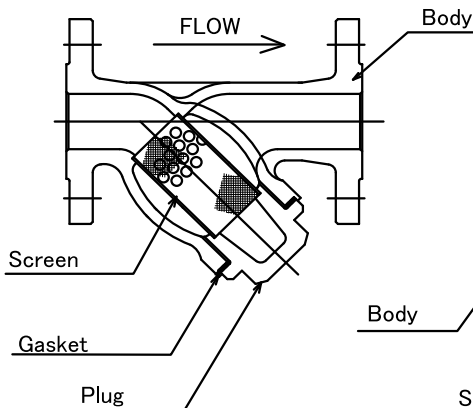
### <Disassembly and cleaning>

- (i) Make sure that the fluid in the strainer has no pressure. Remove the plug and cover and take out the screen. (When cover type strainer, detach the drain plug first to discharge fluid.)
- (ii) Dispose of dirt collected on the screen and clean the screen with compressed air or detergent. (Do not use chlorine detergent.)

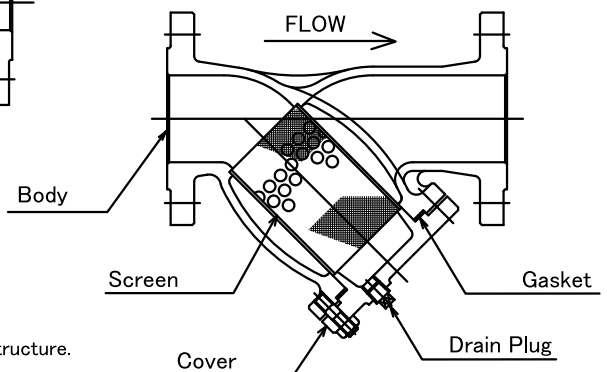
### <Assembling method>

- Plug type... Attach a new gasket to the plug, insert the screen into the plug groove, and install it on the body.
- Cover type... Insert the screen into the body, assemble a new gasket, and attach the cover. The drain plug must be downside as shown below. When the drain plug is removed, it is necessary to take leakage-protecting measures such as the winding seal tape around the threads.

[15A~50A]



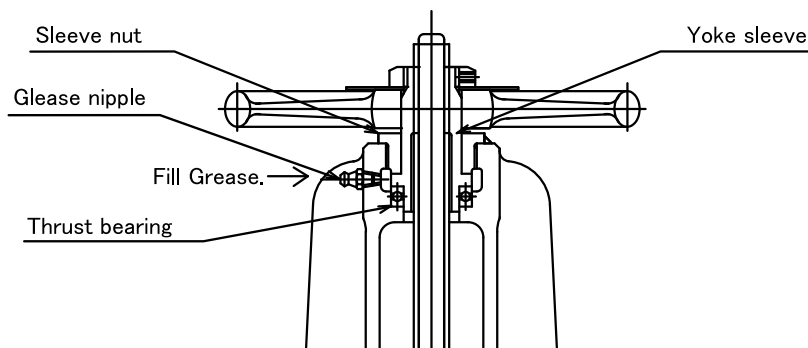
[65A~200A]



\* This illustration shows the typical structure.

Daily check item (Inspection during operation)			
Check point	Check position	Check method	Countermeasures against found troubles
Leakage	Gland (Gate/Globe valve)	Visual check /soap water	<ul style="list-style-type: none"> <li>Retighten the gland nut.</li> <li>Replace the gland nut.</li> </ul>
	Flange (common)	Visual check /soap water	<ul style="list-style-type: none"> <li>Retighten the flange bolts.</li> <li>Replace the gasket.</li> </ul>
	Screw (common)	Visual check /soap water	<ul style="list-style-type: none"> <li>Retighten each screw.</li> <li>Replace related parts.</li> </ul>
	Valve surface (common)	Visual check /soap water	<ul style="list-style-type: none"> <li>Replace the valve body.</li> </ul>
Abnormal noises	Valve body (common)	Hearing check	<ul style="list-style-type: none"> <li>Contact the pipe engineer for countermeasures</li> </ul>
Operating conditions	Handle (Gate/Globe valve)	Touch feeling	<ul style="list-style-type: none"> <li>Lubricate or grease movable parts. * Pour grease into the yoke sleeve When having a grease nipple. (See below.)</li> <li>Check and adjust the gland packing tightening torque.</li> </ul>

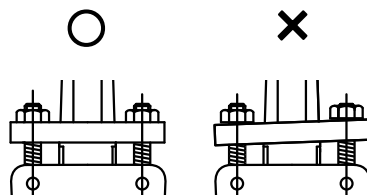
\* Example of pouring grease into the yoke sleeve



<Points of retightening bolts>

When retightening bolts, evenly turn all nuts little by little. As for flange bolts, tighten nuts on diagonal lines alternately.

When retightening gland nuts, keep the packing holder horizontally and tighten the nuts evenly as shown on the right. If gland nuts are tightened excessively, the stem is pressed and the handle becomes stiff. Be careful.



## PRECAUTIONS FOR INSPECTION AND MAINTENANCE WORKS



- Put on protective goggles, work gloves, work boots, and other necessary protectors before starting work.
- Take sufficient safety measures before starting work if fluid is toxic, inflammable, or corrosive and a dangerous object.
- If some abnormality is found in an inspection, reduce the pressure in the piping or reset it to atmospheric pressure, be sure to confirm safety with the pressure gauge, and then carry out the work. Loosen the gland gradually if volatile fluid is used.
- When the flange is retightened, the gasket is in danger of breakage. Carry out work in a position where fluid will not splash directly on to the body.
- If it is necessary to replace the packings using back seats, replace one or two upper packings only or add a new packing only and replace all in the next maintenance operation. Foreign matter in the fluid may be caught by the valve seat, resulting in incomplete sealing. Make sure that fluid does not leak before starting work.
- Carry out periodic inspections once a year, in principle.



- Never apply oil if fluid is oxygen.

## Causes of Problems and Countermeasures

Phenomena	Possible causes	Countermeasures to be taken for improvement
Handle does not move.	Since the valve has been left for long periods in the fully closed or fully opened condition, stem screws adhere.	<ul style="list-style-type: none"> <li>▪ Apply lubricant to threads of the yoke sleeve and stem.</li> <li>▪ Pour grease (if the valve has a grease nipple).</li> </ul>
Cannot be closed fully.	Foreign matter is caught in valve seat.	<ul style="list-style-type: none"> <li>▪ Return handle slightly and flush away foreign matter by force of fluid.</li> </ul>
Handle is stiff abnormally.	Foreign matter is caught in stem threads.	<ul style="list-style-type: none"> <li>▪ Remove foreign matter, clean the threads, and apply grease all over the threads.</li> </ul>
	Foreign matter is collected on bottom of valve body.	<ul style="list-style-type: none"> <li>▪ Open the disc slightly and flush away collected matter with the force of the fluid.</li> </ul>
	Gland packing is tightened.	<ul style="list-style-type: none"> <li>▪ Loosen the gland nut and tighten it again properly.</li> </ul>
	The stem interferes with packing holder.	<ul style="list-style-type: none"> <li>▪ Loosen the gland nut and move the packing holder to a position where it will not interfere with the stem.</li> </ul>
Stem is bent or broken.	Excessive torque was applied when moving handle.	<ul style="list-style-type: none"> <li>▪ Replace all damaged parts.</li> </ul>
Leak from packing.	The gland packing is tightened insufficiently.	<ul style="list-style-type: none"> <li>▪ Retighten the gland nut.</li> </ul>
	The gland packing is tightened unevenly.	<ul style="list-style-type: none"> <li>▪ Loosen the gland nut, make the packing holder horizontal, and tighten nuts again evenly.</li> </ul>
	The gland packing is damaged.	<ul style="list-style-type: none"> <li>▪ Replace packing.</li> </ul>
	The stem is damaged.	<ul style="list-style-type: none"> <li>▪ Replace the stem.</li> </ul>
Leak from valve seat in fully closed condition.	The valve seat is damaged or deformed.	<ul style="list-style-type: none"> <li>▪ Contact the pipe engineer for countermeasures.</li> </ul>
Noises or vibrations are produced.	Bolts and nuts are loose.	<ul style="list-style-type: none"> <li>▪ Retighten.</li> </ul>

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