



Rotary Control Valve

508V

INSTRUCTION MANUAL

This instruction manual explains standard usage of the Rotary Control Valve 508V .
Please read this manual thoroughly in order to ensure correct use of the product.

ROTARY CONTROL VALVE STANDARD SPECIFICATIONS

| | | |
|---|--|---------------------------------|
| Disc type | 508V | |
| Body shape (Connection) | Wafer type | |
| Valve nominal size | 50mm to 200mm | 250mm to 600mm |
| Flange accommodation | JIS 5K/10K/16K/20K, ANSI 150Lb, etc | JIS 10K/16K, ANSI 150Lb, etc |
| Face-to-face dimensions | JIS B2002 series 46/ISO 5752 wafer butterfly valve (short) | |
| Max. working pressure | Shut-off pressure 1.6 MPa | Shut-off pressure 1.0M Pa |
| Service temperature | EPDM: -20 to 120 degrees C, NBR: -10 to 80 degrees C | |
| Allowable temperature in continuous use | EPDM: 0 to 100 degrees C, NBR: 0 to 60 degrees C | |
| Seat leakage rate | Tight shut-off | |
| Standard materials | Body | FCD450 |
| | Disc | SCS14 |
| | Stem | SUS420J2 |
| | Gland packing | EPDM and NBR (core-reinforced) |

508V ALLOWABLE DIFFERENTIAL PRESSURE FOR 6X AND 6W

(kPa)

| Nominal size | | Valve opening | | | | | | | |
|--------------|------|---------------|-----|-----|-----|-----|-----|-----|-----|
| mm | inch | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° |
| 50 | 2 | 1600 | 685 | 334 | 148 | 86 | 59 | 45 | 40 |
| 80 | 3 | 1400 | 694 | 475 | 308 | 176 | 116 | 69 | 47 |
| 100 | 4 | 800 | 765 | 575 | 315 | 204 | 133 | 69 | 37 |
| 150 | 6 | 1600 | 783 | 546 | 360 | 219 | 152 | 90 | 44 |
| 200 | 8 | 1600 | 676 | 453 | 287 | 178 | 124 | 79 | 44 |

508V ALLOWABLE DIFFERENTIAL PRESSURE ON STEM

(kPa)

| Nominal size | | Valve opening | | | | | | | |
|--------------|------|---------------|-----|-----|-----|-----|-----|-----|-----|
| mm | inch | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° |
| 50 | 2 | 1600 | 685 | 334 | 148 | 86 | 59 | 45 | 40 |
| 80 | 3 | 1600 | 694 | 475 | 308 | 176 | 116 | 69 | 47 |
| 100 | 4 | 1600 | 765 | 575 | 315 | 204 | 133 | 69 | 37 |
| 150 | 6 | 1600 | 783 | 546 | 360 | 219 | 152 | 90 | 44 |
| 200 | 8 | 1600 | 676 | 453 | 287 | 178 | 124 | 79 | 44 |
| 250 | 10 | 1000 | 562 | 233 | 149 | 84 | 58 | 37 | 21 |
| 300 | 12 | 1000 | 220 | 232 | 149 | 84 | 58 | 37 | 21 |
| 350 | 14 | 1000 | 367 | 222 | 116 | 65 | 45 | 29 | 16 |
| 400 | 16 | 1000 | 209 | 118 | 58 | 52 | 46 | 33 | 25 |
| 450 | 18 | 1000 | 223 | 197 | 115 | 56 | 48 | 33 | 26 |
| 500 | 20 | 1000 | 162 | 143 | 97 | 55 | 44 | 30 | 23 |
| 600 | 24 | 1000 | 246 | 171 | 110 | 54 | 49 | 41 | 27 |

The above is based on the result at our test plant. The test was conducted with fresh water at ambient temperature. Therefore, please use the data for reference only. Consult us if you have a question or doubt.

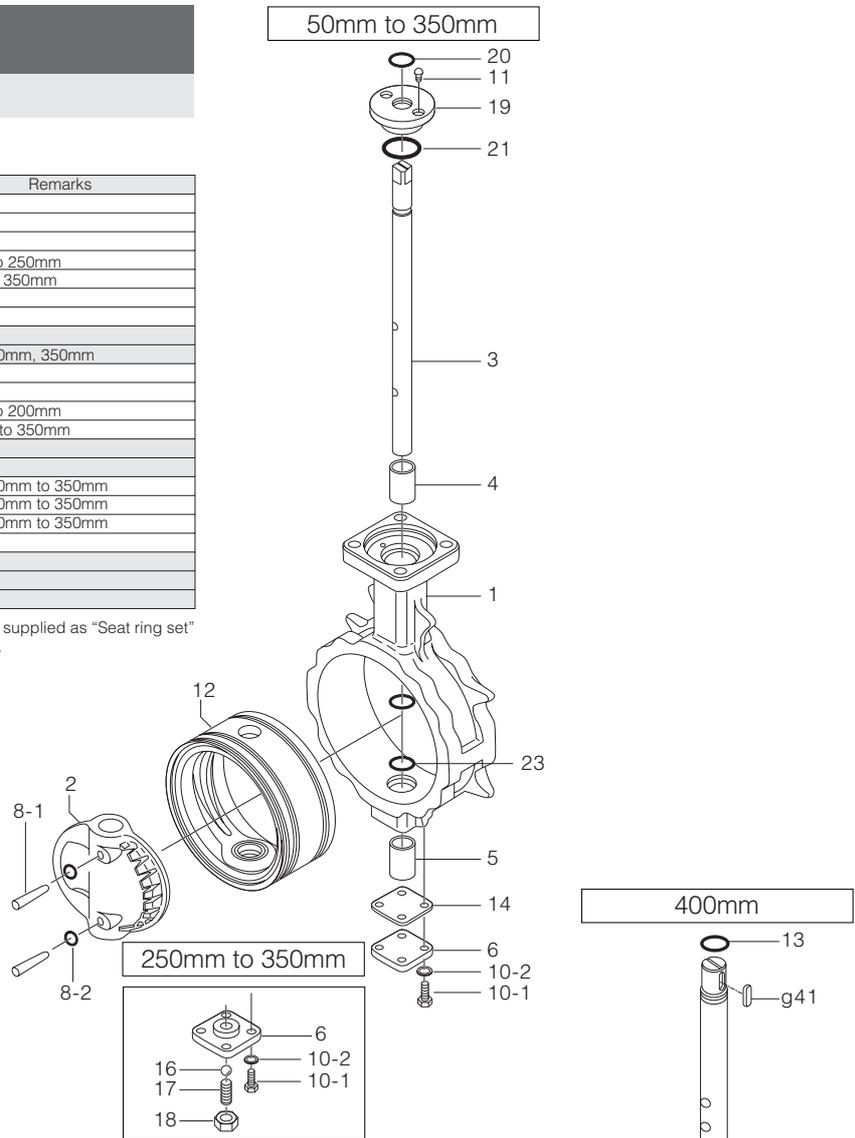
508V

Expanded View

508V Parts list(50mm to 350mm)

| No. | Description | Q'ty | Remarks |
|------|---------------|------|---------------------|
| 1 | Body | 1 | |
| 2 | Disc | 1 | |
| 3 | Stem | 1 | |
| 4 | Bearing | 1 | 50mm to 250mm |
| | | 2 | 300mm, 350mm |
| 5 | Bearing | 1 | |
| 6 | Bottom cover | 1 | |
| 8-1 | Taper pin | 2 | |
| 8-2 | "O"ring | 4 | Only 300mm, 350mm |
| 10-1 | Hexagon bolt | 4 | |
| 10-2 | Spring washer | 4 | |
| 11 | Machine screw | 2 | 50mm to 200mm |
| | | 4 | 250mm to 350mm |
| 12 | Seat ring | 1 | |
| 14 | Gasket | 1 | |
| 16 | Ball | 1 | Only 250mm to 350mm |
| 17 | Hollow bolt | 1 | Only 250mm to 350mm |
| 18 | Lock nut | 1 | Only 250mm to 350mm |
| 19 | Dust seal | 1 | |
| 20 | "O"ring | 1 | |
| 21 | "O"ring | 1 | |
| 23 | "O"ring | 2 | |

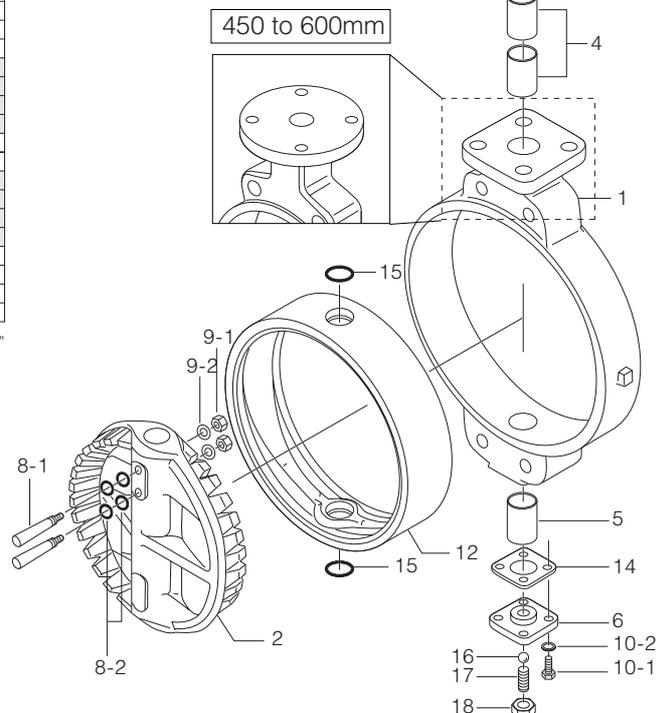
Remark: The  indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt.



508V Parts list(400mm to 600mm)

| No. | Description | Q'ty | Remarks |
|------|---------------|------|----------------|
| 1 | Body | 1 | |
| 2 | Disc | 1 | |
| 3 | Stem | 1 | |
| 4 | Bearing | 2 | 400mm, 500mm |
| | | 3 | 450mm, 600mm |
| 5 | Bearing | 1 | 400mm |
| | | 2 | 450mm to 600mm |
| 6 | Bottom cover | 1 | |
| 8-1 | Taper bolt | 2 | |
| 8-2 | "O"ring | 4 | |
| 9-1 | Hexagon bolt | 2 | |
| 9-2 | Spring washer | 2 | |
| 10-1 | Hexagon bolt | 4 | |
| 10-2 | Spring washer | 4 | |
| 12 | Seat ring | 1 | |
| 13 | "O"ring | 1 | |
| 14 | Gasket | 1 | |
| 15 | "O"ring | 2 | |
| 16 | Ball | 1 | |
| 17 | Hollow bolt | 1 | |
| 18 | Lock nut | 1 | |
| g41 | Key | 1 | |

Remark: The  indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt.



PACKAGING



(Fig. 1)

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

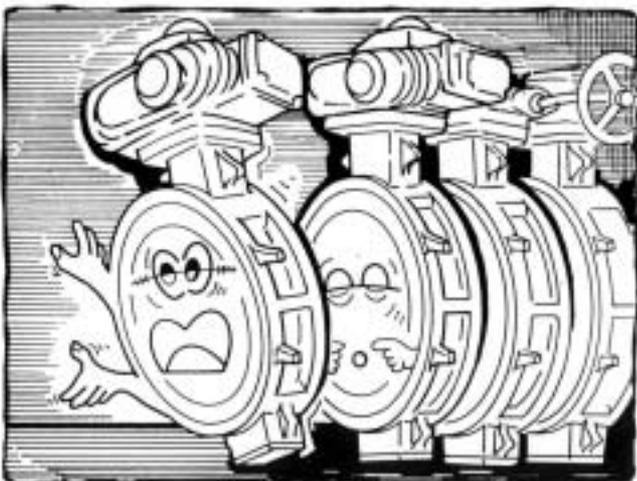
For model 508V

- (4) The sheet face of the disc has been coated with a slight amount of silicon grease.

TRANSPORT

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

STORAGE



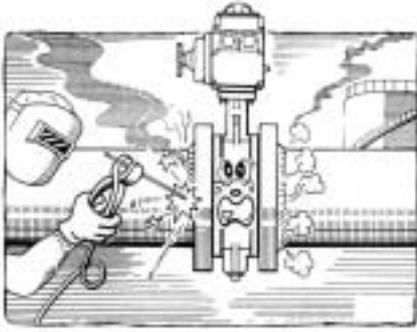
(Fig. 2)

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

UNPACKING

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

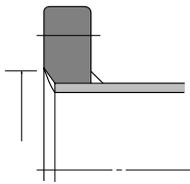
INSTALLATION PRECAUTIONS



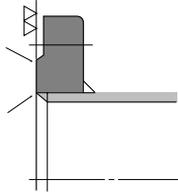
(Fig. 3)

(1) Installation of the valve immediately after welding the pipe flange will lead to adverse consequences, such as damage to the seat ring. Make sure that the temperature has cooled sufficiently and that you have removed weld spatter before installing the valve. Never weld when the valve is in the piping. (Fig. 3)

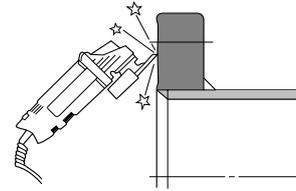
(2) The seat ring might become damaged or the flange may leak if the flange face that contacts the valve seat ring is as shown in Fig. 4. Also, please confirm that there is no distortion to the flange or that there is no damage, such as scratches, to the flange face.



• **Excessive weld**
The resulting oversized inner pipe diameter may cause a flange leak.

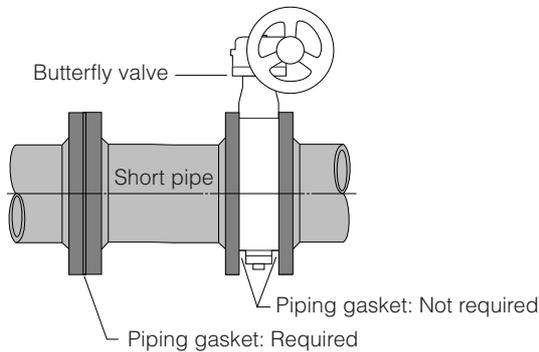


• **Sharp edges**
May cause damage to the seat ring.



• **Rough surface from grinding**
May cause a flange leak.

(Fig. 4)

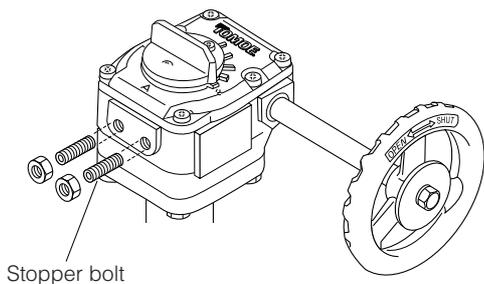


(Fig. 5)

(3) The 508V does not require a piping gasket. Do not use one. Please note, however, that when using a short pipe, a piping gasket may be required for the connection surface that is not the butterfly valve. A piping gasket must always be used on the 507V (Fig. 5).

(4) Do not apply strong shock such as by throwing the valve and do not put objects or put your weight on the lever or handwheel.

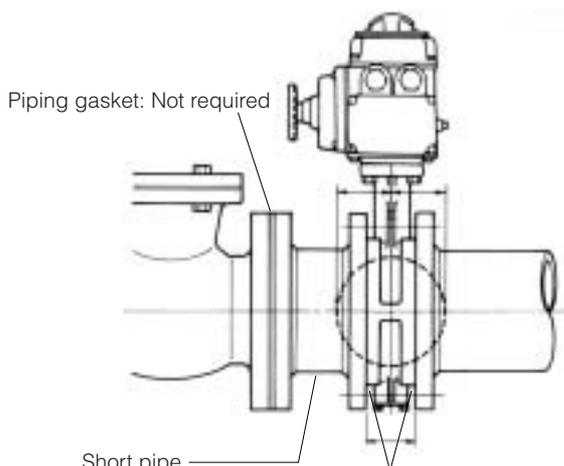
(5) Do not touch the stopper bolts on the gear box. Changing the valve close position will cause valve seat leakage. (Fig. 6)



(Fig. 6)

(6) Alignment of the valve to the flange should be done accurately.

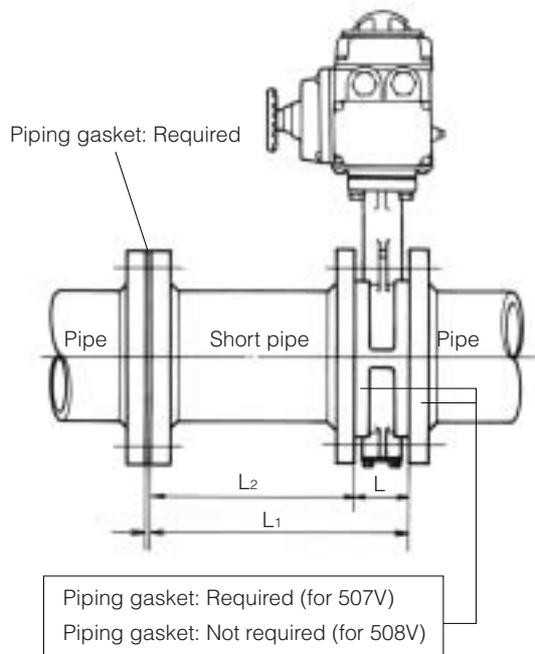
(7) Before tightening the piping bolts, check that the disc does not touch the inside of the flange when the valve is open.



(Fig. 7)

(8) When installing a non-return valve, pump and butterfly valve, always insert a short pipe in between. Not doing so will cause the disc to hit during operation and lead to faulty operation. (Fig. 7)

(9) If a Fail Open valve is installed, make sure that the disc is in the fully closed position. This is accomplished by temporarily applying pneumatic pressure to the drive member. If a manual handle has been incorporated as an option, use the manual handle to completely close the valve. "OPEN-SHUT" is indicated on the handwheel.



(Fig. 8)

(10) On models 507V and 508V, permissible differential pressures have been established for each valve opening. When performing a hydraulic test on the piping, take care not to exceed the permissible differential pressures. For details, see the table of permissible differential pressures (pages 3 and 4).

(11) On model 508V, make sure no solvent gets onto the seat ring. Also, except for those made of NBR and fluorocarbon rubber (FKM), always keep the seat ring away from any machine oil.

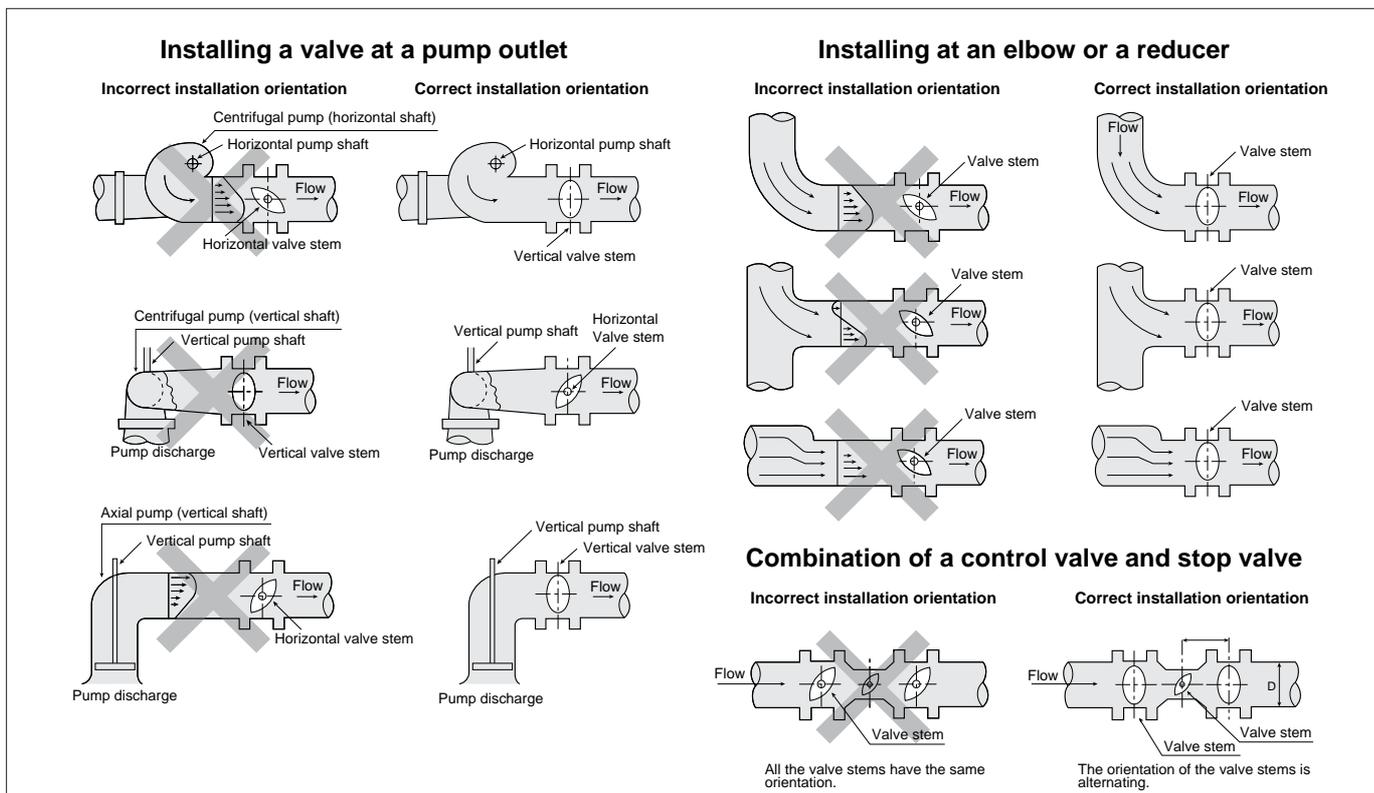
(12) When replacing a previously installed regular valve with a butterfly valve, since the face-to-face dimension of the previously installed valve will be greater, you must insert a short pipe and adjust to the face-to-face dimension of the original valve pipe flange. Use the equation below when making the short pipe. (Fig. 8)

Length of short pipe

| | |
|---|----|
| $L_2 = L_1 - L$ | mm |
| L_2 : Length of short pipe | mm |
| L_1 : Face-to-face dimension of existing valve | mm |
| L : Face-to-face dimension of TOMOE butterfly valve | mm |

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

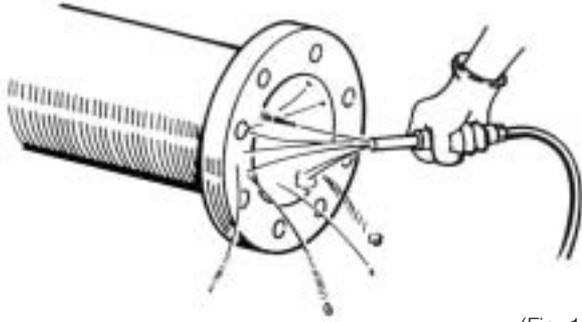
- 1 On model 508V with nominal diameters 250 mm and above have steel balls at the lower end of the stems; therefore, make sure that the actuator does not face downward (relative to horizontal).
- 2 When the drive member is a diaphragm, always keep the stem horizontal and the diaphragm facing up.
- 3 Be careful of the stem direction when piping conditions are as shown in Fig. 9



(Fig. 9)

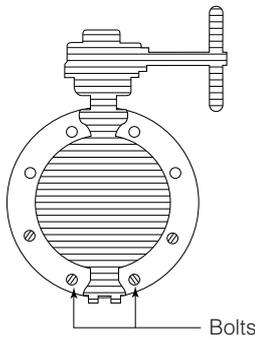
INSTALLATION PROCEDURE

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



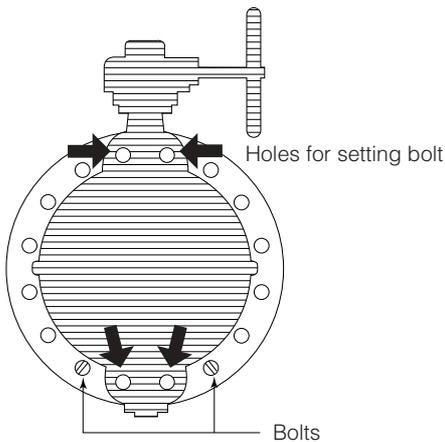
(Fig. 10)

Without setting bolts holes



(Fig. 11)

With setting bolt holes



(Fig. 12)

(1) Use air purging to clean the flange faces that will contact the valve. If there is rust or some other foreign material sticking to a flange face, clean it with a suitable cleaning fluid (alcohol or neutral detergent, etc.). (Fig. 10)

If possible, install in the piping a short pipe with a face-to-face dimension identical to the butterfly valve and blow into the pipe to completely remove foreign substances.

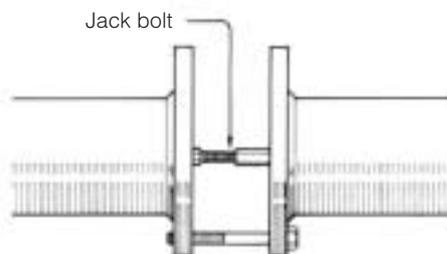
(2) Check the valve number and the material of the main component on the nameplate to verify applicability.

(3) Close the disc completely.

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

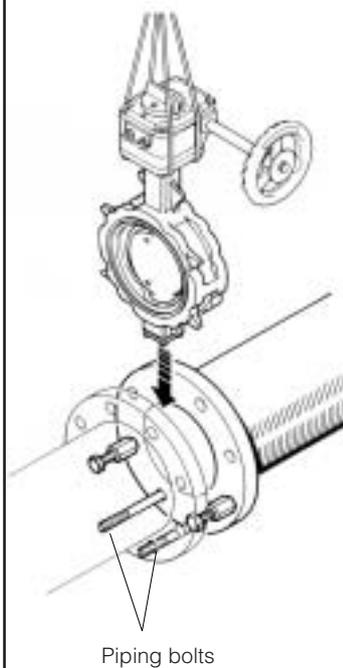
*The valves have two drilled setting bolt holes at both the top and bottom of the valve body. Insert piping bolts in the locations shown in the diagram to prevent falling. (Fig. 11) (Fig. 12)

(5) Place a jack bolt in the position shown in the figure to widen the face-to-face dimension. (If you require, we can supply jack bolts.) Push and widen to make the face-to-face dimension 3 to 5 mm greater than the valve width on each side. (Fig. 13)



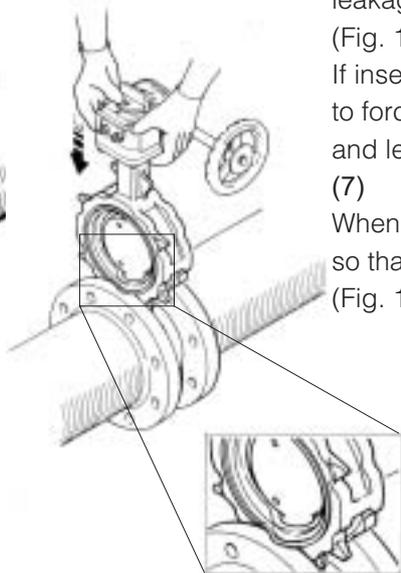
(Fig. 13)

For model 508V



Piping bolts

(Fig. 15)



(Fig. 16)

(6)

Match the direction of valve pressure to the direction of the arrow indicated on the valve body, and insert the valve as shown taking care not to damage the seat ring face of the valve. If the valve is forcibly pushed between the piping edges, the seat rings will be damaged and leakage will result.

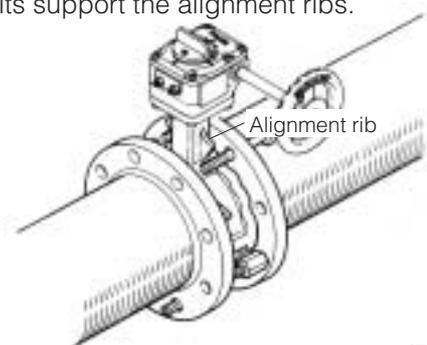
(Fig. 15) (Fig. 16)

If inserting a blind flange or similar device, take care not to forcibly insert the flange as damage to the seat ring and leakage will result.

(7)

When the valve is completely inserted, insert piping bolts so that the bolts support the alignment ribs.

(Fig. 17)



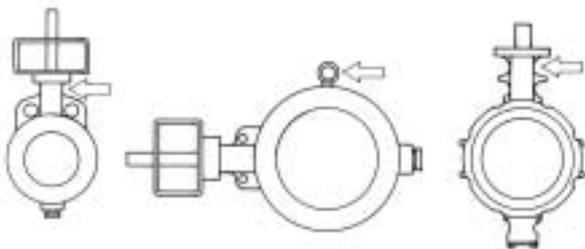
Alignment rib

(Fig. 17)

(8)

To facilitate installation, suspend the valve with a crane or similar while working.

When suspending the valve, use nylon string and suspend it from its "neck section" if the valve has no eye bolts. (Fig. 18)



(Fig. 18)

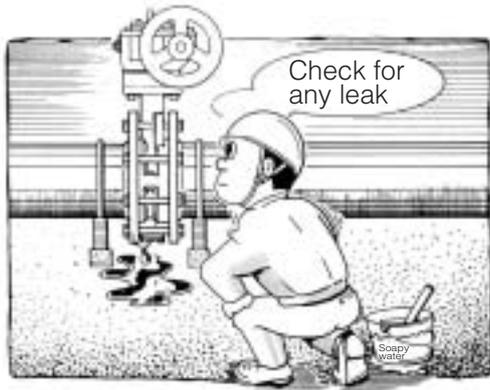
(9)

When tightening the hexagon nuts, alternate diagonally, applying equal strength as you gradually tighten each nut. Be careful not to tighten the nuts on one side too much or too little in order to prevent lopsided tightening.

(10)

After installing, open and close the valve to verify that the disc does not hit the piping or piping gaskets.

HANDLING PRECAUTIONS AFTER INSTALLATION



(Fig. 19)

- (1) Before beginning operation, air-purge the outside of the piping and clean the inside of the piping by running water through the piping.
- (2) Prior to operating, increase the internal pressure of the piping and check for possible leakage from the flange gaskets, glands, and bottom cover by employing soapy water or similar.
When doing so, make sure the internal pressure does not exceed the permissible differential pressure (See page 3 and 4.) of the valve. (Fig. 19)

- (3) If leakage is observed from the bottom cover, immediately retighten the bottom cover installation bolts. Alternate and tighten gradually with equal strength to avoid lopsided tightening. If leakage is observed from the flanges or glands, release the internal pressure and remove the valve from the piping. Check that there is nothing wrong with the seat rings and piping gaskets.

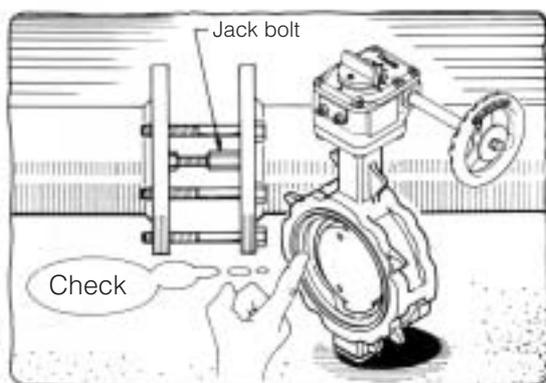
- (4) Opening and closing operation of the worm gear type must be done by hand. Do not use a Wilky key on the gear handle. Doing so can damage the handle and break the valve.

- (5) When performing a pressure test, completely open the valve (if using a pressure higher than the rated pressure). Never use a fully closed valve in place of a blind flange. If inserting a blind flange or similar device, take care not to forcibly insert the flange as the seat ring may tear off on the 508V or the flange face may be damaged on the 507V, causing leakage.

- (6) If the system will be not be operated for a prolonged period of time after the piping work is finished, exercise the valve by opening and closing it about once every two weeks.

- (7) Please consult us if the valve is to be used at an opening of 30 °or less.

INSPECTION AND MAINTENANCE



(Fig. 20)

(1) Periodic inspection

Perform an inspection once per year and check for disc corrosion and wear of the seat ring. The gear box have been designed to be maintenance-free.

(2) Abnormal operation

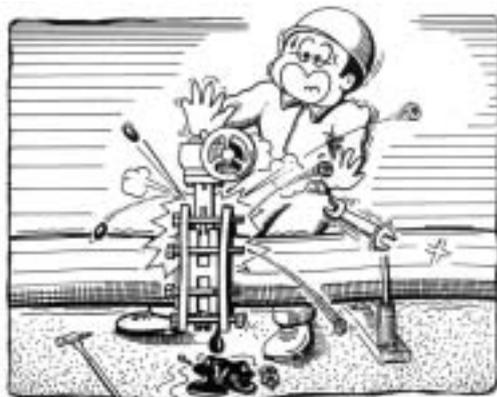
Abnormal operation is usually caused by accumulation of foreign material or damage to the seat ring. If foreign material has accumulated and the disc is in the fully open position, it can be removed by maintaining the fully open position and flushing it out. If that does not work and if the seat ring is damaged, remove the valve from the piping and inspect it. (Fig. 20)

(3) Lubricants

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

| Rust preventive agents and Lubricants | Product name (manufacturers) | To be applied to: |
|---------------------------------------|--|---|
| FELLOW GUARD | FELLOW GUARD #1009 | Plated parts (bolts, nuts and handle shaft) |
| Lithium-base grease | Multinoc grease No.2 (Nippon Oil Corporation) | Pneumatic Actuator T-matic |
| Grease | M ystik JI-6 (Kyodo yushi) | Gear box |
| Silicon oil | Shin-Etsu Silicon KF96H (Shin-Etsu Chemical Co., Ltd.) | Disc edge (for 508V only) |

VALVE REMOVAL PROCEDURE



(Fig. 21)

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

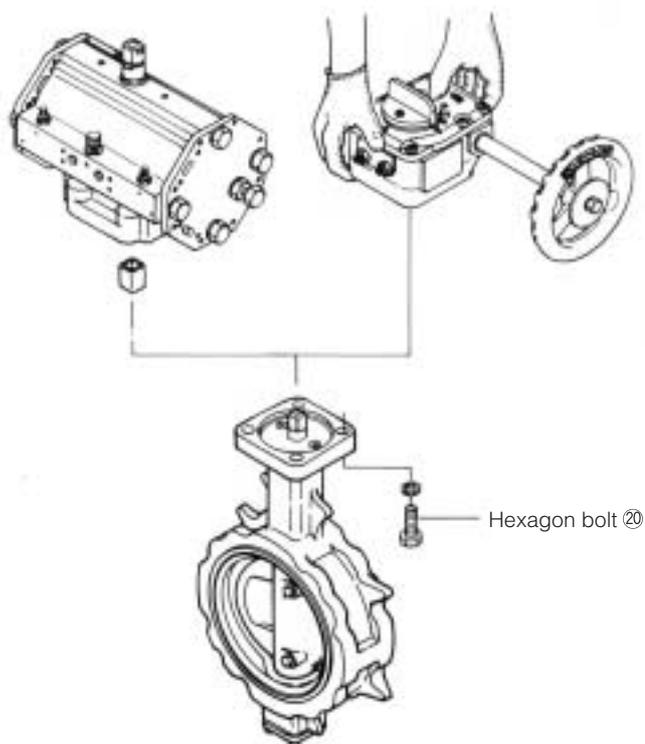
It is very dangerous to loosen any piping bolts while the piping is under pressure. Be very careful. Also, drain off any residual fluid from the piping.

(Fig. 21)

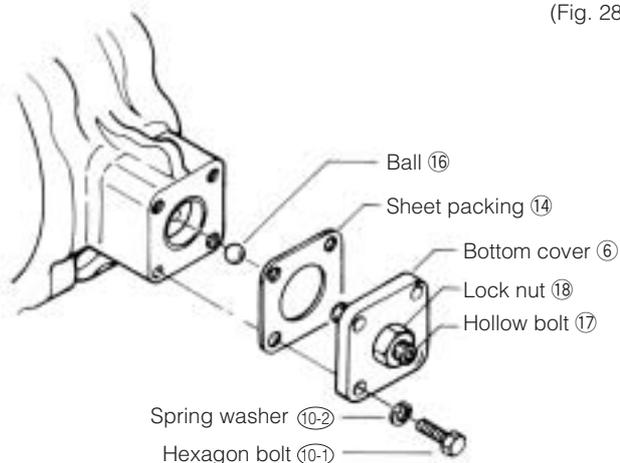
(2) With the disc closed, loosen the piping bolts and nuts. Remove them all except those on the lower side. Remove the valve. Use of a jack bolt in between the flanges will assist in removing the valve more easily.

Disassembling Model 508V

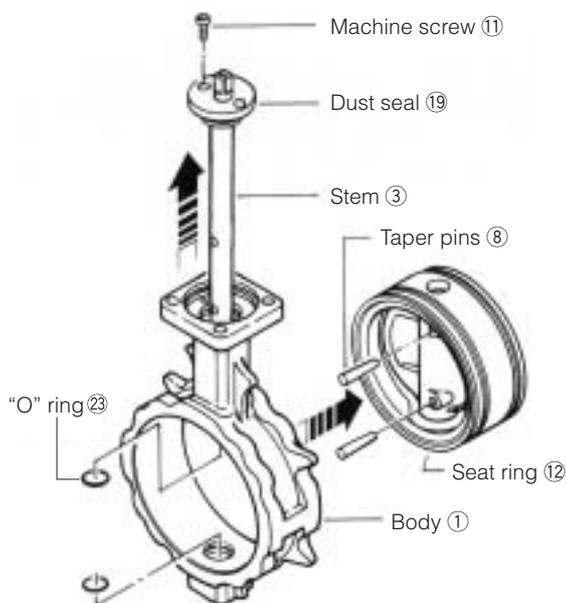
50 mm to 350 mm



(Fig. 28)



(Fig. 29)



(Fig. 30)

(1) Put the disc (2) into the fully closed position. Prior to disassembly, make an alignment mark using an oil based pen or chisel on the bonnet (bracket) that connects the actuator and body in order to clarify the position and direction in which the actuator and body are assembled.

(2) Remove the actuator, bracket and joint. (Fig. 28)

(3) Remove the hexagon bolts (10-1) and spring washers (10-2) that secure the bottom cover (6), and remove the bottom cover (6) and sheet packing (14). (Fig. 29)

On 250 mm to 350 mm types, do not remove the hollow bolt (17) and lock nut (18); leave them attached to the bottom cover (6). In addition, a ball (16) is seated in the assembly. Take care not to lose the ball.

(4) Remove the machine screw (11).

(5) Remove the taper pins (8) that join the disc (2) and the stem (3).

(6) Pull the stem (3) up together with the dust seal (19). If it is difficult to remove the stem, insert a rod through the stem hole in the bottom of the valve bottom and gently tap the rod against the bottom of the stem with a hammer. (Fig. 30)

(7) Pull the seat ring (12) together with the disc (2) out of the valve body (1).

(8) Remove the disc (2) from the seat ring (12).

(9) Remove the "O" ring (23) from the valve body and the "O" rings (20, 21) from the dust seal (19).

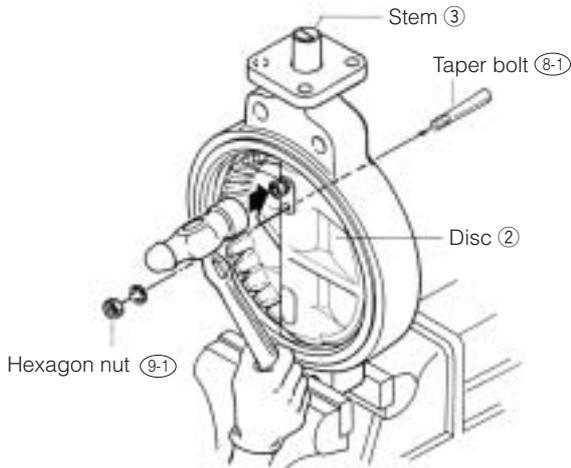
Disassembling Model 508V

400 mm to 600 mm



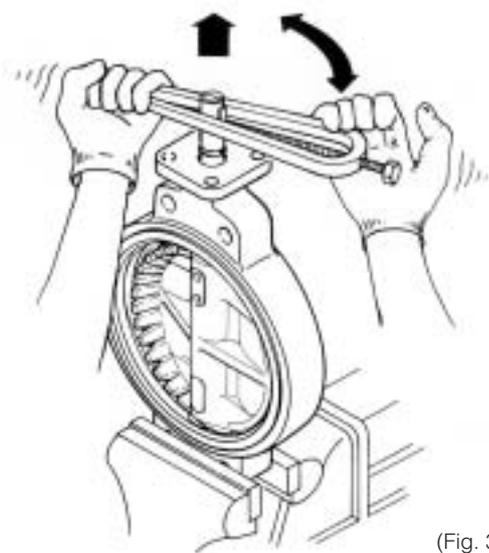
(Fig. 31)

- (1) Hold the valve body ① firmly in a vise.
- (2) Loosen the hexagon nut ⑨-1 on each taper bolt ⑧-1 that secures the stem ③ and disc ② until it is flush with the threaded end of the taper bolt ⑧-1. (This is to protect the threads when the bolt is tapped by a hammer.) (Fig. 31)

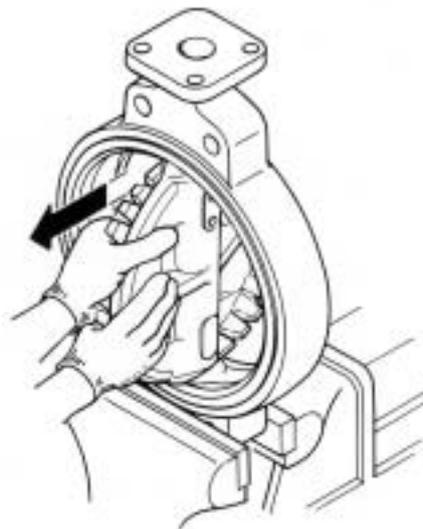


(Fig. 32)

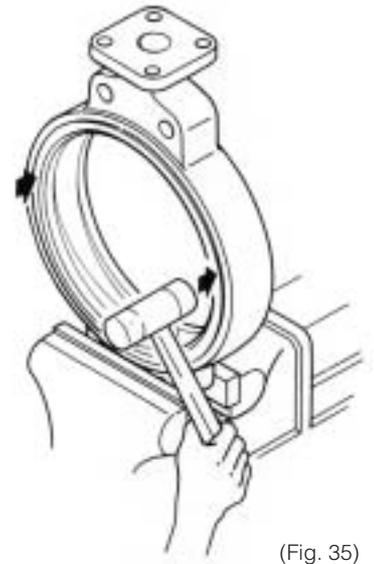
- (3) Tap the hexagon nut ⑨-1 straight with a hammer straight to remove the taper bolt ⑧-1. (Fig. 32)
- (4) Grip the end of the stem ③ with a gripping tool and rotate it back and forth to pull it out. (Fig. 33)
- (5) Rotate the disc ② 90° so that it is fully open and pull it out with both hands. (Fig. 34)



(Fig. 33)

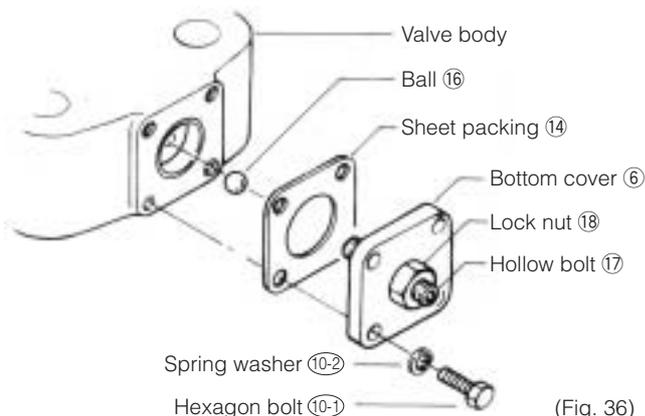


(Fig. 34)



(Fig. 35)

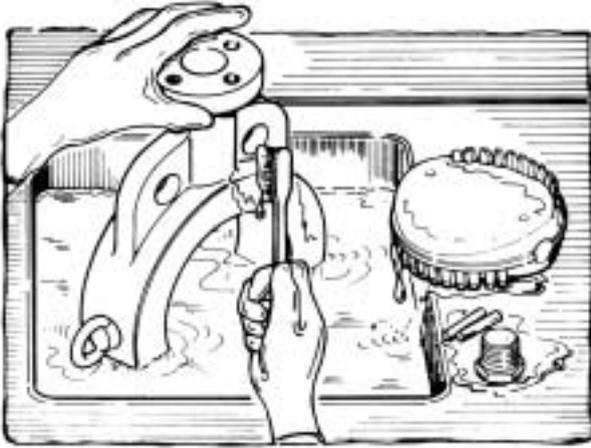
- (6) Gently tap around the edge of the seat ring ⑫ with a plastic hammer or similar tool to remove it. (Fig. 35)



(Fig. 36)

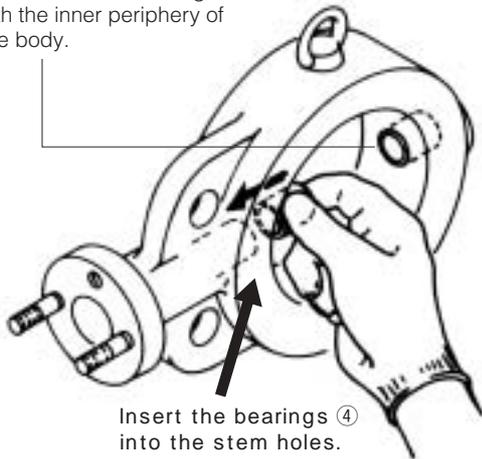
- (7) Remove the "O" ring ⑧-2 from the seat ring ⑫ using a scriber or similar implement.
- (8) Remove the valve body ① from the vise and remove the bottom cover ⑥ and sheet packing ⑭ that are secured with the hexagon bolt ⑩-1 and spring washer ⑩-2. When removing the bottom cover, keep the hollow bolt ⑰ and lock nut ⑱ on the bottom cover ⑥. Take care not to lose the ball ⑩. (Fig. 36)

Assembly Procedure



(Fig. 37)

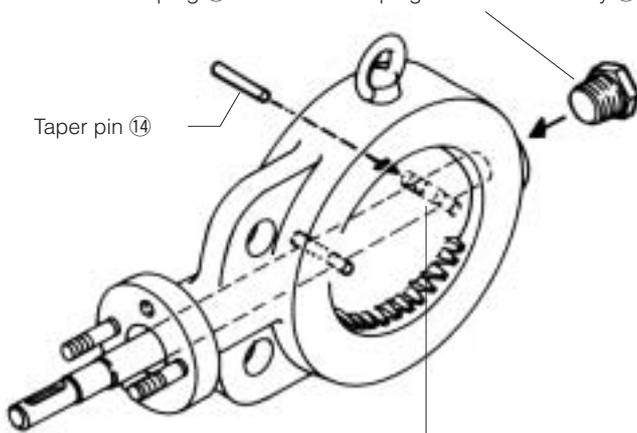
Each bearing ④ should be inserted so that the end of the bearing is flush with the inner periphery of the valve body.



Insert the bearings ④ into the stem holes.

(Fig. 38)

Apply liquid gasket to the threads of the bottom cover plug ⑯ and screw the plug into the valve body ①.



Taper pin ⑭

(Fig. 39)

Align the taper pin holes in the disc ② and stem ③.

(1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 37)

(2) Any parts judged unusable or “O” rings that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

(3) Insert one bearing ④ each into the top and bottom stem holes in the valve body ① so that the end of each bearing ④ is flush with the inner periphery of the valve body (where the disc ② will be inserted). (Fig. 38)

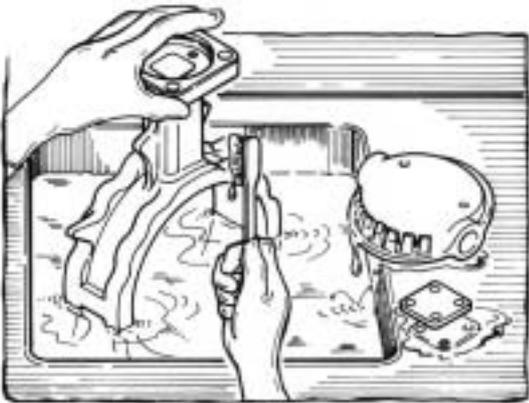
(4) Insert the disc ② into the valve body ①, and then insert the stem ③ supporting it with your hand. While inserting the stem, make sure that the disc ② is oriented correctly.

(5) Align the taper pin holes in the disc ② with the holes in the stem ③, and insert the taper pins ⑭ by tapping them gently with a hammer. (Fig. 39) To align the holes, use the alignment marks that you made on the valve body ① and stem ③ during disassembly.

(6) Apply liquid gasket to the threads of the bottom cover plug ⑯ and screw the plug into the valve body ①.

Assembling Model 508V

50 mm to 350 mm



(Fig. 45)

(1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 45)

(2) Any parts judged unusable or “O” rings that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

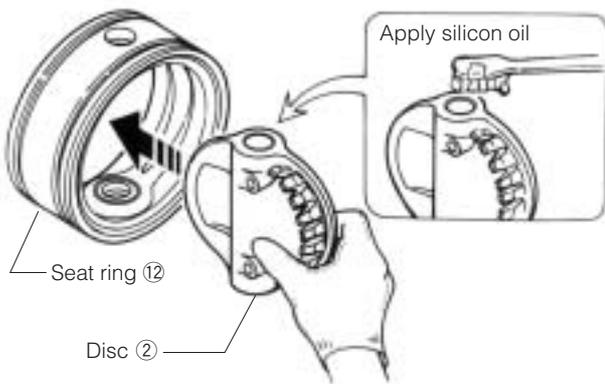
Note: If the seat ring material is other than NBR (EPDM or other material), use only silicon grease for the grease that is applied to the shaft, disc and other parts. Regular grease will cause swelling and corrosion.

(3) Apply a thin coating of silicon oil to the outer edge of the disc ②.

(4) Insert the disc ② into the seat ring ⑫. When inserting the disc ②, adjust its position by inserting a rod through the stem hole in the seat ring to align the stem holes in the seat ring ⑫ and disc ②. (Fig. 46)

(5) Place the “O” ring ⑬ in the valve body ①.

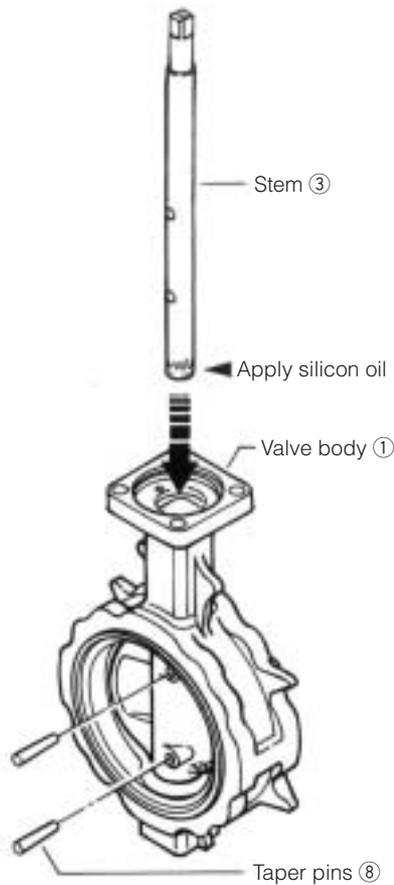
(6) Apply a thin coating of silicon oil to the metal core surface on the outside of the seat ring ⑫ and then insert the seat ring with the disc into the valve body ①. When inserting the seat ring, position it so that the stem holes in the seat ring ⑫ and disc ② are aligned with the stem holes in the valve body ①. (Fig. 47)



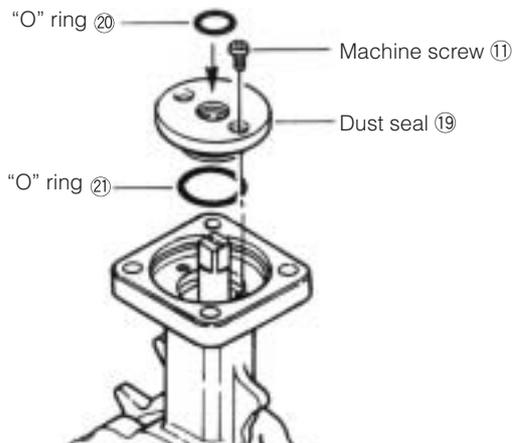
(Fig. 46)



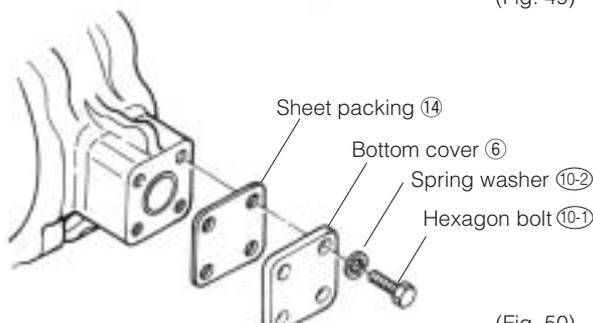
(Fig. 47)



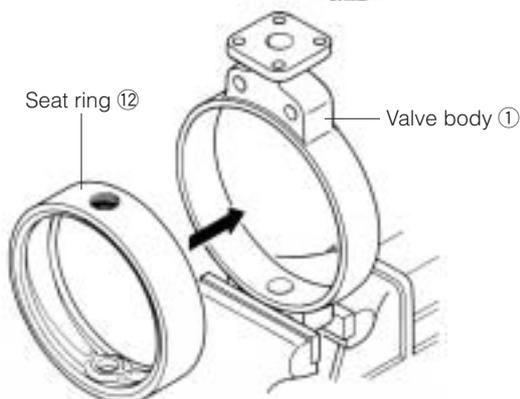
(Fig. 48)



(Fig. 49)



(Fig. 50)



(Fig. 51)

(7) Apply a thin coating of silicon oil to the bottom end of the stem ③ and insert this end of the stem through the upper stem hole in the valve body. Position the stem so that its taper pin holes are aligned with the taper pin holes in the valve body. (Fig. 48)

(8) Use a hammer to tap the taper pins ⑧ through the pin holes in the valve body ② and join the disc ② to the stem ③. (Fig. 48) (For 350 mm or less types, caulk with a punch after tapping in the taper pin to prevent the pin from slipping out.)

(9) Place the "O" rings ⑳ ㉑ in the dust seal ⑲ and slide onto the top end of the stem. Secure to the valve body with the machine screw ⑪. (Fig. 49)

(10) Attach the sheet packing ⑭ and bottom cover ⑥ to the bottom of the valve body in that order using the hexagon bolt ⑩. (Fig. 50)

(For 250 mm or larger types, apply grease to the tip of the hollow bolt ⑰ and use the grease to hold the ball ⑱ in the tip of the hollow bolt ⑰. Secure the sheet packing ⑭ and bottom cover ⑥ with the hexagon bolt ⑩-1 and spring washer ⑩-2.)

(11) Put the disc ② into the fully closed position.

(12) Install the bracket, joint, and actuator. When assembling, align and position each part using the alignment mark you made prior to disassembly.

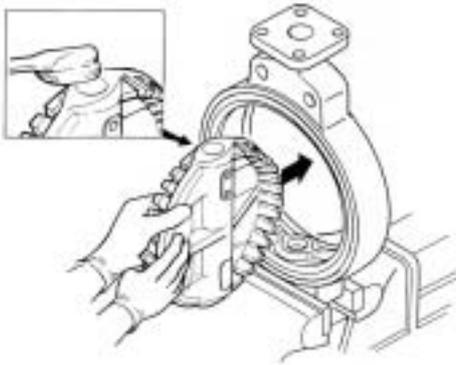
(13) Open and close the valve to verify that operation is smooth.

Assembling Model 508V

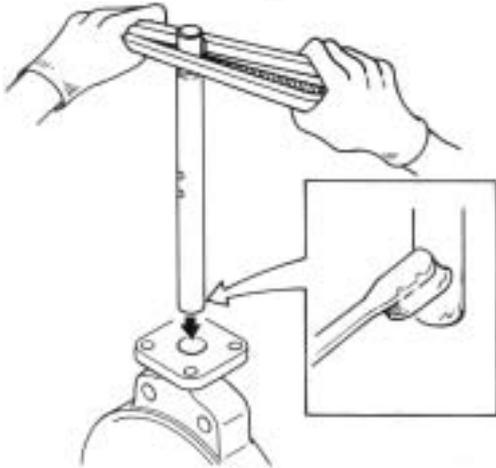
400 mm to 600 mm

(1) Insert "O" ring ⑮ in the upper and lower stem holes in the seat ring ⑫.

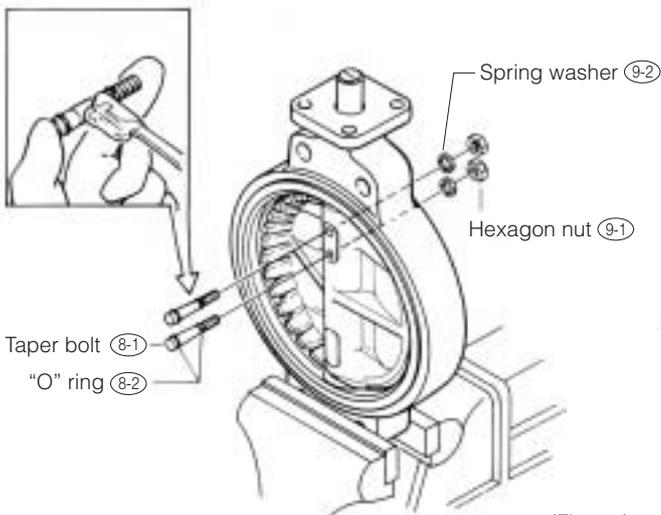
(2) Apply silicon oil to the outer periphery of the seat ring ⑫ and tap it gently and evenly with a plastic hammer to insert it into the valve body ①. At this time, verify that the stem holes at the top and bottom of the seat ring ⑫ and valve body ① are correctly aligned. (Fig. 51)



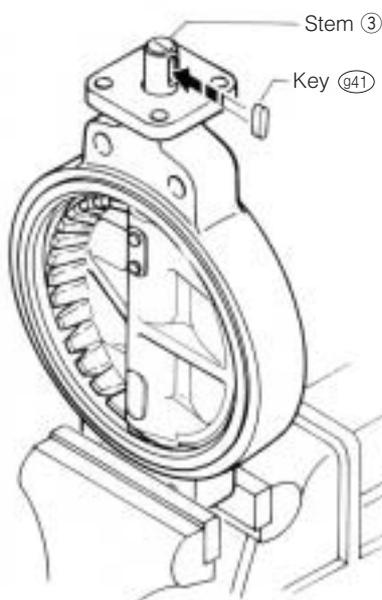
(Fig. 52)



(Fig. 53)



(Fig. 54)



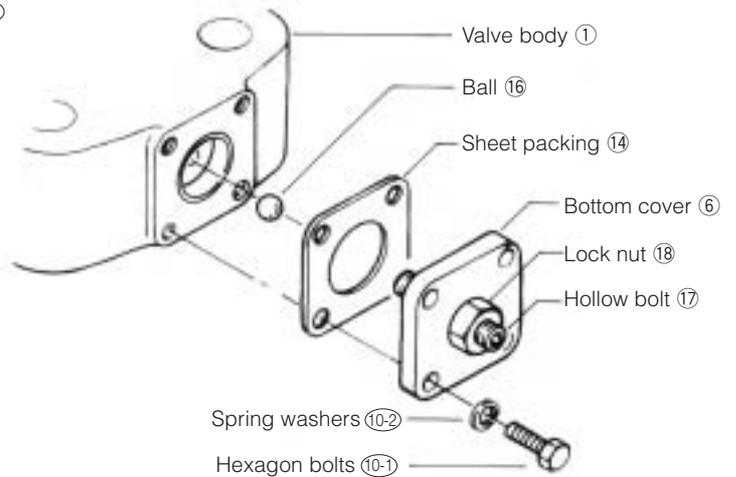
(Fig. 56)

(3) Apply silicon oil or similar lubricant to the top and bottom of the disc ② and insert it into the seat ring ⑫. (Fig. 52)

(4) Insert the stem ③. When inserting the stem, apply silicon grease to the tip of the stem ③ and insert carefully to prevent damage to the hole in the seat ring ⑫ (Fig. 53)

(5) Rotate the stem ③ and verify that the taper bolt holes in the disc ② and stem ③ are aligned. Place a new "O" ring ⑧-2 on the taper bolt ⑧-1, apply grease to the bolt, and insert it in the taper bolt hole in the disc ②. Next, tap the taper bolt ⑧-1 in with a hammer and tighten the taper bolt firmly with the hexagon nut ⑨-1 and spring washer ⑨-2. (Fig. 54)

(6) Apply grease to the tip of the hollow bolt ⑰ and use the grease to hold the ball ⑱ in the tip of the hollow bolt ⑰. Secure the sheet packing ⑭ and bottom cover ⑥ with the hexagon bolt ⑩-1 and spring washer ⑩-2. (Fig. 55)



(Fig. 55)

(7) Attach the key ④① to the stem ③. (Fig. 56)

This completes the assembly of the valve body. Verify that no parts were forgotten or assembled incorrectly.

*To assemble the drive member on the valve, reverse the disassembly procedure.

REQUIRED NUMBER AND SIZE OF PIPING BOLTS

507V Piping bolts and nuts sizes

| Nominal size | | JIS 10K | JIS 20K | ANSI 150Lb | ANSI 300Lb |
|--------------|------|---------------------|------------|---------------------|--------------|
| mm | inch | Long bolts and nuts | | Long bolts and nuts | |
| 50 | 2 | 4-M16×130 | 8-M16×130 | 4-U 5/8×140 | 8-U 5/8×140 |
| 80 | 3 | 8-M16×130 | 8-M20×170 | 4-U 5/8×150 | 8-U 3/4×175 |
| 100 | 4 | 8-M16×130 | 8-M20×170 | 8-U 5/8×150 | 8-U 3/4×175 |
| 150 | 6 | 8-M20×170 | 12-M22×190 | 8-U 3/4×175 | 12-U 3/4×190 |
| 200 | 8 | 12-M20×170 | 12-M22×210 | 8-U 3/4×190 | 12-U 7/8×230 |
| 250 | 10 | 12-M22×210 | - | 12-U 7/8×230 | - |
| 300 | 12 | 16-M22×210 | - | 12-U 7/8×230 | - |
| 350 | 14 | 16-M22×210 | - | 12-U 1 ×260 | - |
| 400 | 16 | 16-M24×240 | - | 16-U 1 ×260 | - |

Material Long bolt: SNB7
Nut: S45C

508V Piping bolts and nuts sizes

| Nominal size | | JIS5K | | JIS10K | | JIS16K | | ANSI 150Lb | |
|--------------|------|---------------------|---------------|---------------------|---------------|---------------------|---------------|---------------------|------------------|
| mm | inch | Long bolts and nuts | Setting bolts | Long bolts and nuts | Setting bolts | Long bolts and nuts | Hexagon bolts | Long bolts and nuts | Setting bolts |
| 50 | 2 | 4-M12×105 | - | 4-M16×120 | - | 8-M16×125 | - | 4-U5/8-11UNC×130 | - |
| 80 | 3 | 4-M16×120 | - | 8-M16×125 | - | 8-M20×135 | - | 4-U5/8-11UNC×145 | - |
| 100 | 4 | 8-M16×130 | - | 8-M16×130 | - | 8-M20×150 | - | 8-U5/8-11UNC×150 | - |
| 150 | 6 | 8-M16×130 | - | 8-M20×155 | - | 12-M22×165 | - | 8-U3/4-10UNC×165 | - |
| 200 | 8 | 8-M20×150 | - | 12-M20×155 | - | 12-M22×170 | - | 8-U3/4-10UNC×180 | - |
| 250 | 10 | - | - | 12-M22×175 | - | 12-M24×190 | - | 12-U7/8-9UNC×195 | - |
| 300 | 12 | - | - | 16-M22×185 | - | 16-M24×210 | - | 12-U7/8-9UNC×210 | - |
| 350 | 14 | - | - | 16-M22×195 | - | 16-M30(P3)×225 | - | 12-U1 - 8UNC×240 | - |
| 400 | 16 | - | - | 16-M24×220 | - | - | - | 16-U1 - 8UNC×255 | - |
| 450 | 18 | - | - | 20-M24×230 | - | - | - | 16-U1 1/8- 8UN×280 | - |
| 500 | 20 | - | - | 20-M24×245 | - | - | - | 20-U1 1/8- 8UN×295 | - |
| 600 | 24 | - | - | 20-M30×290 | 8-M30×65 | - | - | 16-U1 1/4- 8UN×340 | 8-U1 1/4- 8UN×85 |

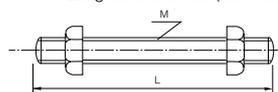
Remarks: Bolt and nut material: SS400/SS400 and SUS 304/SUS04.
Long bolt uses full threaded bolt.
Use thin hexagon nut. (Use heavy hexagon nut for ANSI150Lb.)
A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Example

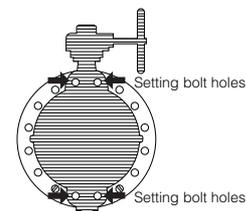
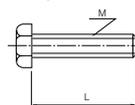
Long bolts: 4 - M12 × 105
Quantity Nominal size (M) Length of bolt (L)

Setting bolts: 4 - M16 × 120
(Hexagon bolts) Quantity Nominal size (M) Length of bolt (L)

Long bolts and nuts (full thread)



Setting bolts (Hexagon bolts)



APPLICABLE PIPE AND MINIMUM INTERNAL DIAMETERS

Applicable pipe list in case of A

| Nominal size | | SGP | STPY | Sch20 | Sch40 | Sch10S | Sch20S | Min. internal diameters of piping (mm) | |
|--------------|------|-----|------|-------|-------|--------|--------|--|------|
| mm | inch | | | | | | | 507V | 508V |
| 50 | 2 | | - | | | | | 36 | 34 |
| 80 | 3 | | - | | | | | 71 | 70 |
| 100 | 4 | | - | | | | | 98 | 91 |
| 150 | 6 | | - | | | | | 148 | 144 |
| 200 | 8 | | - | | | | | 199 | 194 |
| 250 | 10 | | - | | | | | 241 | 246 |
| 300 | 12 | | - | | | | | 293 | 294 |
| 350 | 14 | | | | | - | - | 321 | 327 |
| 400 | 16 | | | | x | - | - | 367 | 387 |
| 450 | 18 | | | | x | - | - | - | 434 |
| 500 | 20 | | | | x | - | - | - | 484 |
| 600 | 24 | - | | | x | - | - | - | 581 |

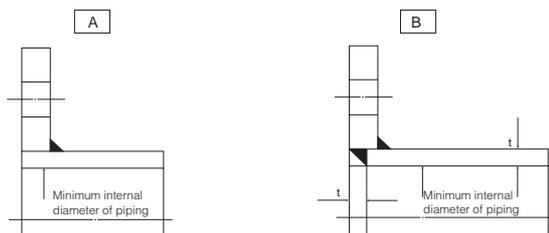
Applicable pipe list in case of B

| Nominal size | | SGP | STPY | Sch20 | Sch40 | Sch10S | Sch20S |
|--------------|------|-----|------|-------|-------|--------|--------|
| mm | inch | | | | | | |
| 50 | 2 | | - | | | | |
| 80 | 3 | | - | | | | |
| 100 | 4 | | - | | | | |
| 150 | 6 | | - | | | | |
| 200 | 8 | | - | | | | |
| 250 | 10 | | - | | | | |
| 300 | 12 | | - | | | | |
| 350 | 14 | | | | | - | - |
| 400 | 16 | | | | | - | - |
| 450 | 18 | | | | | - | - |
| 500 | 20 | | | | | - | - |
| 600 | 24 | - | | | | - | - |

Remark1: : Installation possible, x: Installation not possible, -: No standard

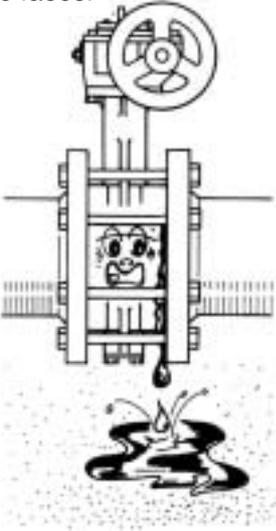
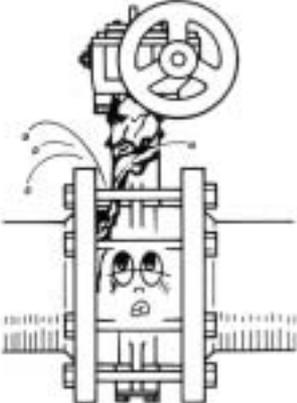
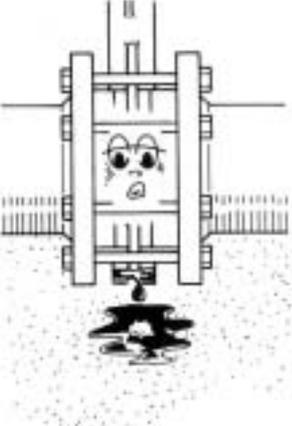
Remark2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

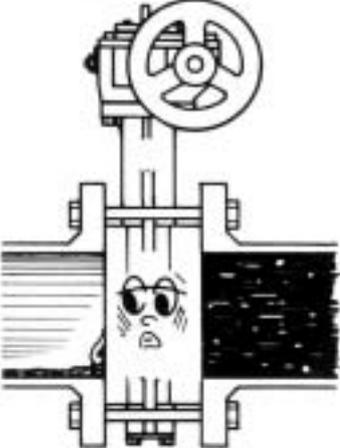
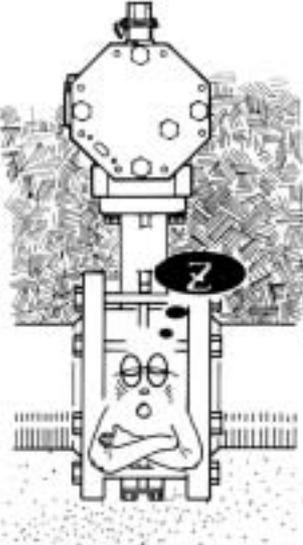
In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



TROUBLESHOOTING

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

| Problem | Cause | Countermeasure |
|---|--|---|
| <p>There is leakage from the gasket between the valve body and pipe flange faces.</p>  | <p>The piping bolts are loose or they were not tightened evenly.</p> | <p>Loosen the bolts and then retighten them.</p> |
| | <p>The valve is misaligned.</p> | <p>Loosen the bolts and realign the valve correctly.</p> |
| | <p>Torn or damaged seat ring</p> | <p>Remove the valve body and check the seat ring for signs of tearing or other damage. If any damage is observed, replace the seat ring.</p> |
| | <p>Seat ring deterioration. (508V only)</p> | <p>Replace the seat ring.</p> |
| | <p>Internal fluid leak due to damage to the seat ring shaft seal. (508V only) (In this case the bottom cover can be removed to verify the existence of the leak.)</p> | <p>Replace the seat ring.</p> |
| <p>There is a leak from the gland.</p>  | <p>Worn or damaged seat ring shaft seal.</p> | <p>Replace the seat ring. (508V only)</p> <p>Re-tighten the gland packing or replace the gland packing. (507V only)</p> |
| <p>There is a leak from the bottom cover.</p>  | <p>For 508 V The primary seal between the seat ring and disc is damaged. In addition, the secondary seal between the seat ring and disc is damaged.</p> | <p>Replace the seat ring.</p> |
| | <p>For 507V The bottom cover plug is loose.</p> | <p>Re-tighten the plug.</p> |

| Problem | Cause | Countermeasure |
|--|---|--|
| <p data-bbox="185 152 592 241">There is leakage from the valve seat and the amount of leakage increases.</p>  | <p data-bbox="639 152 1038 248">The wrong material was selected for the fluid application. (Parts are being corroded.)</p> | <p data-bbox="1094 152 1437 241">Change the material. Please inquire with us regarding selection.</p> |
| | <p data-bbox="639 286 1038 416">There is damage to the disc seal or seat ring due to the presence of foreign matter inside the piping.</p> | <p data-bbox="1094 286 1481 349">Replace the disc seal wrapping and the seat ring.</p> |
| | <p data-bbox="639 436 1038 499">Movement of disc in the fully closed position</p> | <p data-bbox="1094 436 1497 499">Adjust the fully closed position of the disc.</p> |
| | <p data-bbox="639 548 1038 645">Fluid specification is not compatible with valve specification. (Specifications have been exceeded.)</p> | <p data-bbox="1094 548 1437 580">Re-check the specifications.</p> |
| | <p data-bbox="639 660 1038 757">There is torsion of stem due to an unusual increase in opening/ closing torque.</p> | <p data-bbox="1094 660 1501 692">Replace the disc and valve body.</p> |
| | <p data-bbox="639 772 1038 869">Movement of disc in fully closed position due to loose actuator installation bolts.</p> | <p data-bbox="1094 772 1461 869">Re-adjust the fully closed disc position by re-tightening the installation bolts.</p> |
| | <p data-bbox="639 918 1038 981">Wearing of seat ring due to long period of use (508V only)</p> | <p data-bbox="1094 918 1358 949">Replace the seat ring.</p> |
| <p data-bbox="185 1030 592 1097">Faulty operation (The valve does not work.)</p>  | <p data-bbox="639 1030 1038 1097">Prescribed actuator air pressure or voltage not being supplied.</p> | <p data-bbox="1094 1030 1422 1097">Check by using a pressure gauge, tester, or similar.</p> |
| | <p data-bbox="639 1142 1038 1272">For pneumatic pressure cylinder types, diaphragm of speed controller is stuck in the fully closed position.</p> | <p data-bbox="1094 1142 1422 1209">Open the diaphragm of the speed controller.</p> |
| | <p data-bbox="639 1288 1038 1350">By-pass valve is in the open position.</p> | <p data-bbox="1094 1288 1390 1319">Close the by-pass valve.</p> |
| | <p data-bbox="639 1366 1038 1429">Insufficient output due to damaged cylinder parts.</p> | <p data-bbox="1094 1366 1469 1496">Apply the prescribed pressure and observe functioning. If defective parts are suspected, replace them with new parts.</p> |
| | <p data-bbox="639 1512 1038 1608">Increased torque due to presence of foreign matter in the piping.</p> | <p data-bbox="1094 1512 1493 1608">Keep valve in the fully opened position and flush out the foreign material.</p> |
| | <p data-bbox="639 1624 1038 1753">The valve has been installed in reverse orientation to the direction of flow (direction of pressure).</p> | <p data-bbox="1094 1624 1453 1691">Install the valve in the correct orientation relative to the flow.</p> |
| | <p data-bbox="639 1780 1038 1843">Twisted or damaged stem and joints.</p> | <p data-bbox="1094 1780 1382 1843">Replace the valve body assembly.</p> |