CECO Fybroc

Fybroc® Series NM WSB Butterfly Valves

INSTALLATION MANUAL

CECO Fybroc

Fybroc® Wafer Style Butterfly Valves

NM WSB Series:
Lever: 1.5″ – 6″ (40 – 150 mm)
Gear: 1.5″ – 12″ (40 – 300 mm)

Body Material:
Proprietary Black Polypropylene

User's Manual

Contents

This User's Guide contains information important to the proper installation, maintenance and safe use of the product store in an easily accessible location.

<Warning & Caution Signs>

 Warning	This remark expresses the user to take caution due to the potential for serious injury or death.
 Caution	This remark expresses the user to take caution due to the potential for damage to the valve if used in such a manner.

<Prohibition & Mandatory Action Signs>

	Prohibition: When operating the valve, this remark indicates an action that should not be taken.
	Mandatory action: When operating the valve, this remark indicates mandatory actions that must be adhered to.

(1) Be sure to read the following description of our product warranty

- Always observe the specifications of and the precautions and instructions on using our product.
- We always strive to improve product quality and reliability, but cannot guarantee perfection. Therefore, should you intend to use this product with any equipment or machinery that may pose the risk of serious or even fatal injury, or property damage, ensure an appropriate safety design or take other measures with sufficient consideration given to possible problems. We shall assume no responsibility for any inconvenience stemming from any action on your part without our written consent in the form of specifications or other documented approval.
- The related technical documents, operation manuals, and other documentation prescribe precautions on selecting, constructing, installing, operating, maintaining, and servicing our products. For details, consult with our nearest distributor or agent.
- Our product warranty extends for one and a half years after the product is shipped from our factory or one year after the product is installed, whichever comes first. Any product abnormality that occurs during the warranty period or which is reported to us will be investigated immediately to identify its cause. Should our product be deemed defective, we shall assume the responsibility to repair or replace it free of charge.
- Any repair or replacement needed after the warranty period ends shall be charged to the customer.
- The warranty does not cover the following cases:
  (1) Using our product under any condition not covered by our defined scope of warranty.
  (2) Failure to observe our defined precautions or instructions regarding the construction, installation, handling, maintenance, or servicing of our product.
  (3) Any inconvenience caused by any product other than ours.
  (4) Remodeling or otherwise modifying our product by anyone other than us.
  (5) Using any part of our product for anything other than the intended use of the product.
  (6) Any abnormality that occurs due to a natural disaster, accident, or other incident not stemming from something inside our product.

(2) General Operating Instructions

- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressed fluids, even when the gas is under the same pressure as water. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use gas in testing, please consult your nearest service station beforehand.

- Do not step on the valve or apply excessive weight on valve.
  (It can be damaged.)
- Keep the valve away from excessive heat or fire.
  (It can be damaged, or destroyed.)

- Operate the valve within the pressure vs. temperature range.
  (The valve can be damaged by operating beyond the allowable range.)
- Allow sufficient space for maintenance and inspection.
- Select a valve material that is compatible with the media
  (Some chemicals may damage incompatible valve materials.)
- Do not use the valve on condition that fluid has crystallized.
  (The valve will not operate properly.)
- Keep the valve away from places of direct sunlight, water and dust. Use cover to shield the valve.
  (The valve will not operate properly.)
- Perform periodic maintenance.
  (Leakage may develop due to temperature changes or changes with time during prolonged storage, rest, or operation.)
- Gear Operator Operation; we utilize a self-locking worm gear design on our manual operators. This design allows flow control of the valve in intermediate positions in normal process conditions.

(3) General Instructions for Transportation, Unpacking and Storage

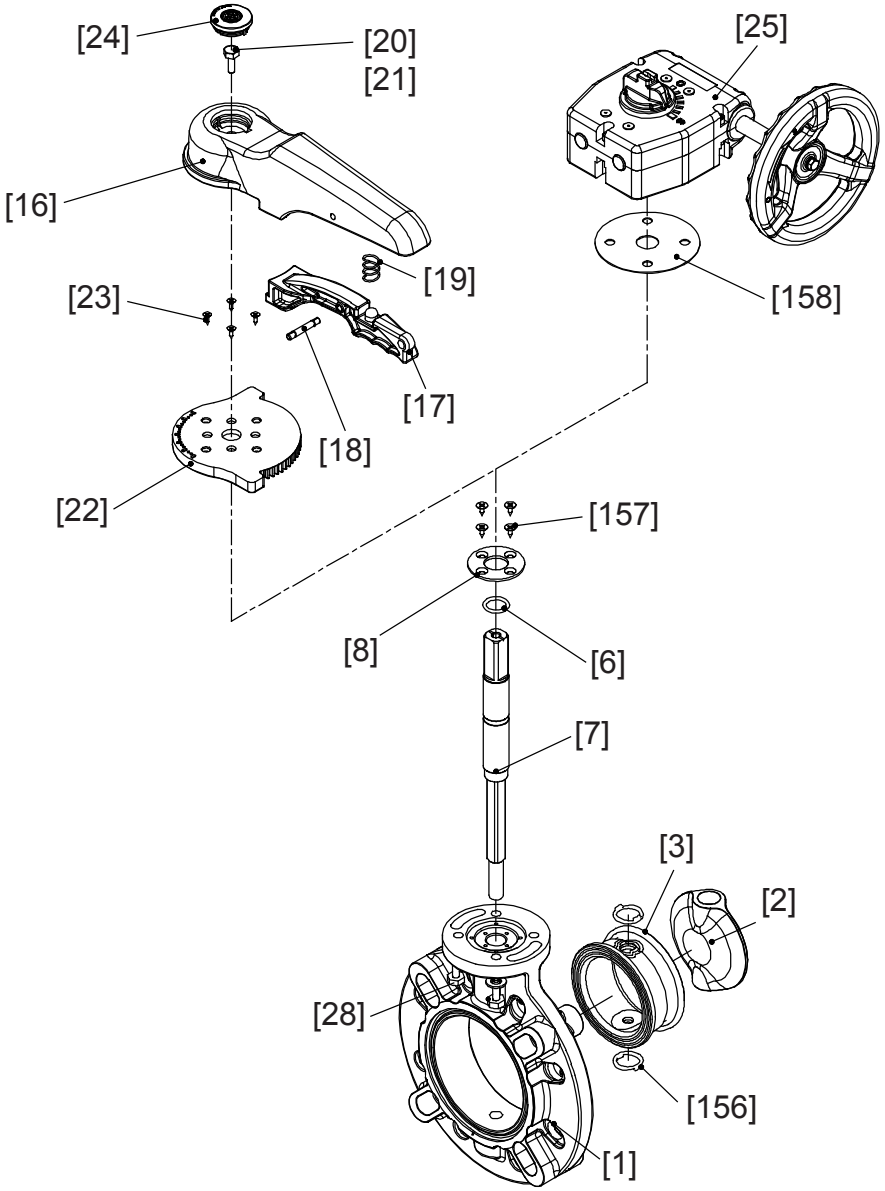
- In suspending and supporting a valve, take enough care and do not stand under a suspended valve.

- The valve is not designed to handle any kind of impact. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.
- Do not pile up corrugated cardboard packages one on top of another too much. Excessively piled-up packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint. (The force of swelling may damage the valve.)
- When transporting a valve, do not carry it by the handle.

- Keep the valves in the corrugated cardboard boxes, avoid direct sunlight, and store it indoors (at Room Temperature). Also avoid storing it in a place which may become very hot. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take enough care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

(4) Names of Parts

NM WSB Series: Lever: 1.5” – 6” (40 – 150 mm); Gear: 1.5” – 12” (40 – 300 mm)
Body Material: Proprietary Black Polypropylene



No.	Description	No.	Description	No.	Description
[1]	Body	[17]	Handle Lever	[24]	Cap
[2]	Disc	[18]	Pin	[25]	Gear Box
[3]	Seat	[19]	Spring	[28]	Bolt
[6]	O-Ring	[20]	Washer	[156]	Stabilization Ring
[7]	Stem	[21]	Bolt	[157]	Screw
[8]	Stem Retainer	[22]	Locking Plate	[158]	Gasket
[16]	Handle	[23]	Screw		

(5) Comparison between working temperature and pressure

NM WSB Valve: Body – PP-Black / Disc– PVDF / Seat – Viton®

	Temperature Range		
Size	**7.5º F – 140º F (-14º C – 60º C)**	**141º F – 175º F (60.5º C – 79.5º C)**	**176º F – 200º F (80º C – 93º C)**
1.5" – 6" (40-150 mm)	150 PSI (10.3 bar)	100 PSI (6.9 bar)	90 PSI (6.2 bar)
8", 10" (200, 250 mm)	150 PSI (10.3 bar)	85 PSI (5.9 bar)	80 PSI (5.5 bar)
12" (300 mm)	110 PSI (7.6 bar)	55 PSI (3.8 bar)	50 PSI (3.4 bar)

NOTE: For other disc and seat material combinations, **Consult Factory** for pressure vs. temperature ratings.

(6) Installation Procedure

Warning

- In suspending and supporting a valve, take enough care and do not stand under a suspended valve.

- Be sure to conduct a safety check on the machine tools and motor-driven tools to be used, before beginning work.
- Wear protective gloves and safety goggles as fluid remains in the valve. (You may be injured.)

Caution

- When installing a pipe support by means of a U-band or something similar, take care not to overtighten (Excessive tension may damage it.)
- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
- Use flat faced flanges for connection
- Ensure that the mating flanges are of the same standards.
- When installing the piping, do not do so with the valves fully closed. (The disc may pinch into the seat, resulting in a high operating torque, thus disabling opening and closing.)
- The gasket is unnecessary. (The seat carries out the role of the gasket.)

Caution

- The valve disc is sent in the position indicated by solid lines in Figure prior to shipment from the factory. If the valve is opened or closed after unpacking, it must be reset in this position before installation. Failure to do so will result in damage to the surface of the valve seat during handling and installation.

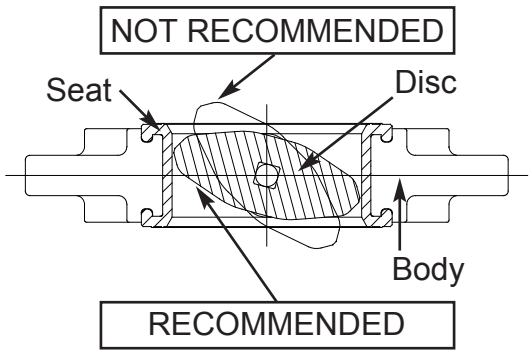
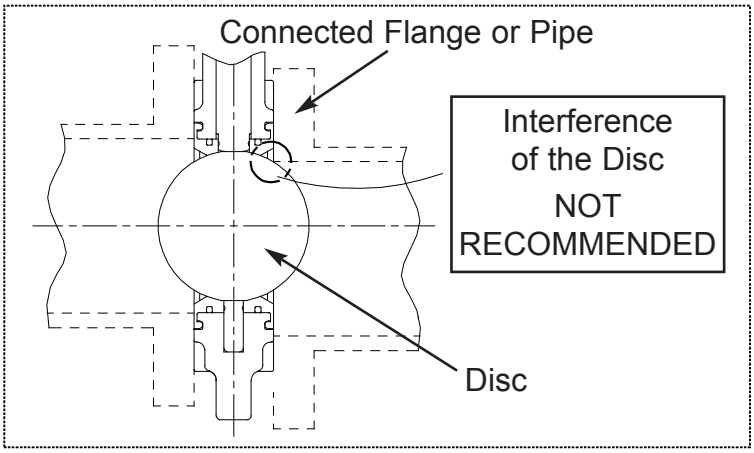


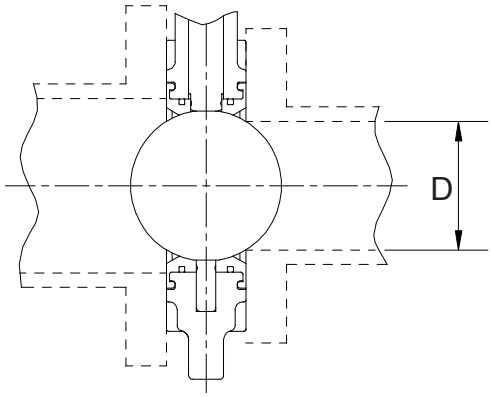
Fig. 6-1

Caution

- Care must be used during piping installation to ensure that the pipes or flanges are properly aligned so that the valve disc does not contact them in any setting. Misalignment as in Figure below will result in damage to the valve.



In case of the thick wall of the connection part (flange and pipe) is too thick, chamfer the flange or the pipe inside in order to avoid the contact of the pipe and disc. If inside diameter of the connection part is larger than size D, chamfering is not necessary.

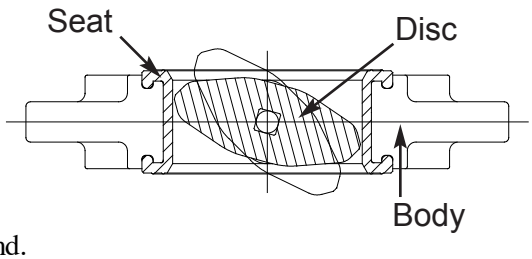


Nominal Size	Diameter D
1.5” (40 mm)	1.22” (31 mm)
2” (50 mm)	1.69” (43 mm)
3” (80 mm)	2.64” (67 mm)
4” (100 mm)	3.58” (91mm)
6” (150 mm)	5.39” (137 mm)
8” (200 mm)	7.05” (179 mm)
10” (250 mm)	9.09” (231 mm)
12” (300 mm)	11.02” (280 mm)

Necessary items

- Torque Wrench
- Spanner Wrench

Procedure



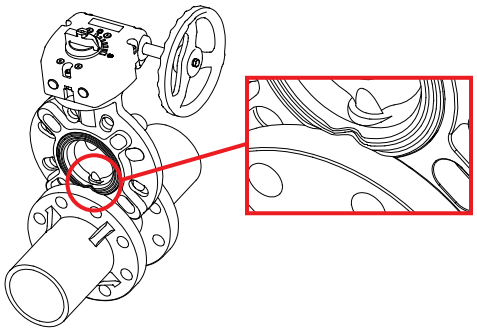
Caution

The disc [2] is prevented from overflowing. (The disc [2] is damaged.)

1) Install the valve between flanges and open the valve slightly.
2) Insert bolts, set nuts and washer and tighten the bolts and nuts temporarily by hand.

Caution

- When you insert a valve between flanges, please insert after extending the fields of flanges fully.
  (If you insert a valve by force without fully extending fields of flanges, a liner may be turned over and suffer a crack.)



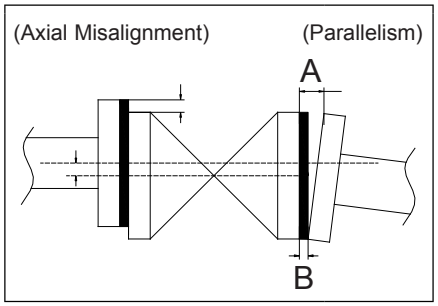
The parallelism and axial misalignment of the flange surface should be under the values shown in the following table

Caution

- The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve.
  (A failure to observe them can cause destruction due to stress application to the pipe.)

Unit : inch (mm)

Nom. Size	Axial Misalignment	Parallelism (a – b)
1.5 - 3 (40 - 80)	0.04 (1.0)	0.03 (0.8)
4 - 6 (100 - 150)	0.04 (1.0)	0.04 (1.0)
8 - 12 (200 - 300)	0.06 (1.5)	0.04 (1.0)

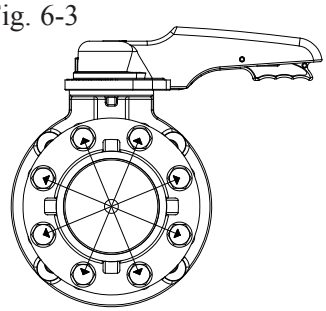


3) Tighten the bolts and nuts gradually with torque wrench to the specified torque in a diagonal manner. (Fig. 6-3)

Caution

- Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner.

Fig. 6-3



Recommended torque value Unit: N-m {kgf-cm} [lb-inch]

Nom. Size	1.5" (40 mm)	2" (50 mm)	3", 4" (80, 100 mm)
Torque value	20.0 {204} [177]	22.5 {230} [200]	30.0 {306} [266]

Nom. Size	6" (150 mm)	8", 10" (200, 250 mm)	12" (300 mm)
Torque value	40.0 {408} [355]	55.0 {561} [488]	60.0 {612} [532]

Caution: Avoid excessive tightening. (The valve can be damaged.)

<ANSI Standard>

Body Material: Proprietary Black Polypropylene

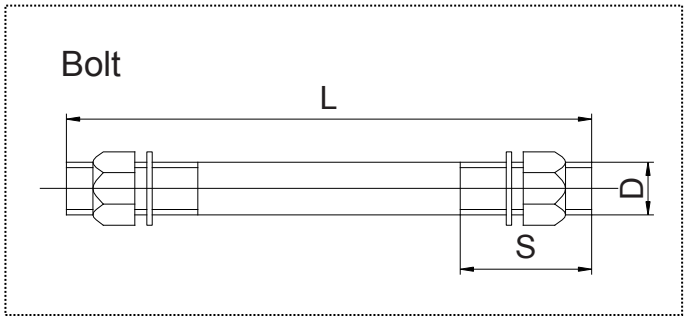
Dimension of Insert Bolt

Nom. Size		Bolt (Minimum)			Nut	Washer
inch	mm	d	L	S		
1.5”	40	5/8”-11	4.92” (125 mm)	1.38” (35 mm)	5/8” - 11	5/8” Flat (0.63”)
2”	50		4.92” (125 mm)			
3”	80		5.12” (130 mm)			
4”	100		5.71” (145 mm)			
6”	150	3/4” - 10	6.89” (175 mm)	1.57” (40 mm)	3/4” - 10	3/4” Flat (0.79”)
8”	200		7.48” (190 mm)			
10”	250	7/8” - 9	8.66” (220 mm)		7/8” - 9	7/8” Flat (0.87”)
12”	300		9.65” (245 mm)			

Note: Bolt lengths shown are for reference only.

These bolt lengths assume using 1 piece solid style flanges and not stub end and backing ring arrangement.

If stub end and backing ring arrangement is used, the bolts will have to be longer than listed above.



(7) Operating Procedure

Caution

- **Do not use the valve with fluids containing slurry.**
  (The valve will not operate properly.)

- The installed valve must never be opened or closed when foreign matter such as sand is present in the pipeline.
- Do not exert excessive force in closing the valve.
- When operating the handle, be sure to do so with your hand. (Using a tool may damage the handle.)

1) Open and close the valve by turning handle smoothly.
   (Turn clockwise to close and counterclockwise to open.)
2) In case of lever type (1.5" – 6" (40 - 150 mm)), the direction of handle is same as the disc as shown in Fig. 7-1.
   - For the full-shut (Close) position, the handle is perpendicular to the piping axis direction.
   - For the full-opened position, the handle is parallel to the piping axis direction.

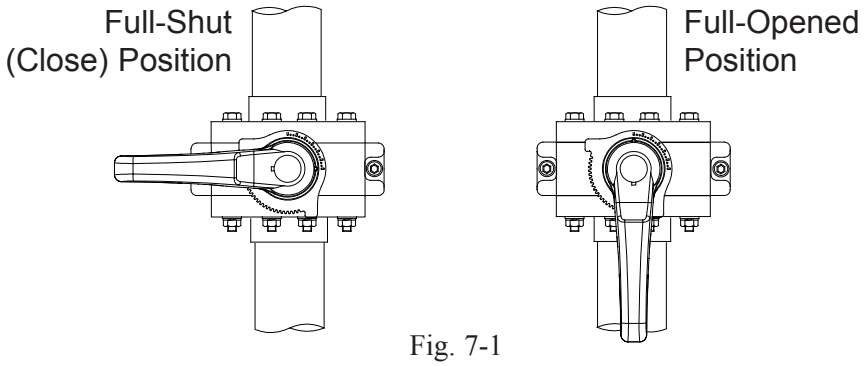
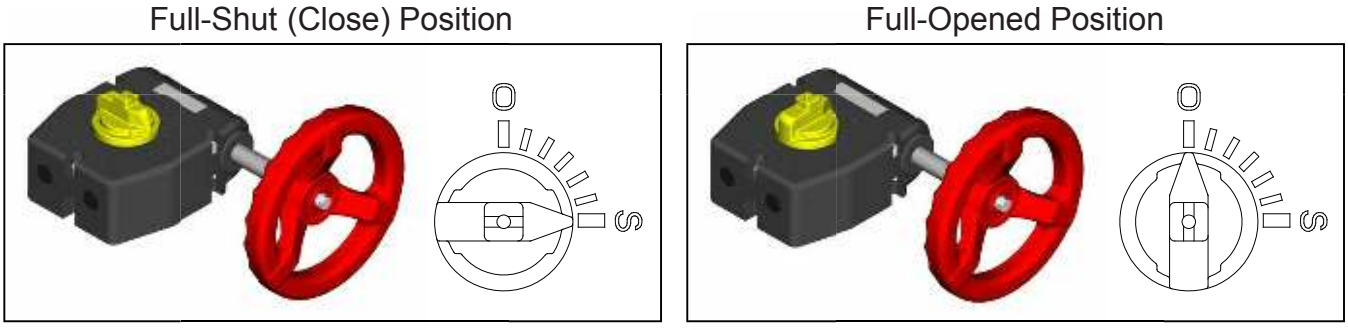


Fig. 7-1

3) In case of gear type (40-300 mm {1.5"-12"}), the indicator shows the position of the disc on the top of gear box. (Fig.7-2)
   - For the full-shut (close) position, the indication shows Shut (S).
   - For the full-opened position, the indication shows Open (O).



Caution

- The adjustments for full-opened and full-shut position can be set with the stopper adjuster.

Technical Data for Operation

Nom. Size	Body Material	Stem Torque (N·m)	Required Hand -Wheel Torque (N·m)	Length of Lever and Diameter of Handle (mm)		Required Operating Force (N)	
		Seal	Seal	Lever	Gear	Lever	Gear
1.5" (40 mm)	PP	5	0.4	220	80	23	5.0
2" (50 mm)	PP	10	0.8	220	80	46	10
3" (80 mm)	PP	20	1.7	250	80	80	22
4" (100 mm)	PP	30	2.5	250	80	120	32
6" (150 mm)	PP	65	5.4	320	80	205	68
8" (200 mm)	PP	165	13	-	80	-	163
10" (250 mm)	PP	250	21	-	80	-	263
12" (300 mm)	PP	330	22	-	150	-	147

Note: Data mentioned in the table above is reference only.

These data are measured in standard condition and it slightly differs depending on conditions.

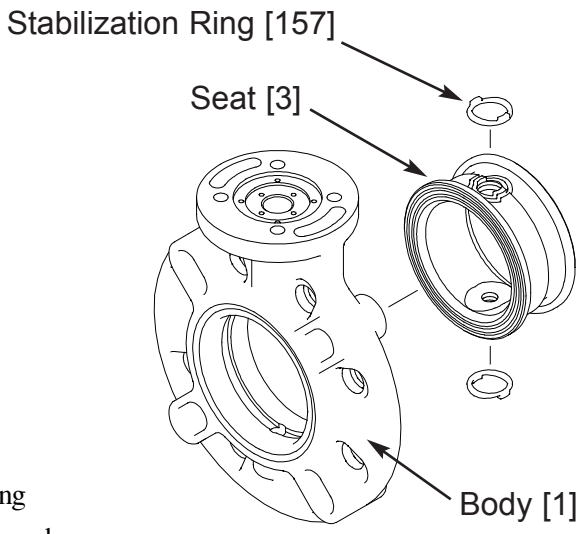
(8) Disassembly and Assembly Procedure for Parts Replacement

Warning
- The handle part can be removed with line pressure present. The stem retainer can't be removed with line pressure present. If stem retainer needs to be removed, there cannot be line pressure present.

Caution
- Wear protective gloves and safety goggles as fluid remains in the valve. (You may be injured.)
- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
- Do not change or replace valve parts under line pressure.

Necessary items

- Protective Gloves
- Goggles
- Spanner Wrench
- Vise
- Grease (Silicone)
- Square Lumber
- Circular Stick (Plastic or Wood)
- Pressing Machine
- Hammer
- Screw Driver (+)
- Screw Driver (–)



<< Disassembly >>

Procedure

1) Drain fluid completely from the pipeline.
2) Leave the valve slightly opened.
3) Loosen the connecting bolts and nuts.
4) Remove the valve from the pipeline.

Lever Type <Nominal size 1.5" - 6" (40 mm - 150 mm)

5) To remove handle [16], first take off the cap [24] by using screw driver (–) and release bolt [21] by using socket wrench, then pull up the handle [16] while holding handle lever [17].
6) To take off locking plate [22], release 4 self-tapping screws [23] by using screw driver (+) and take off stem holder [8].

Gear Type <Nominal size 1.5" - 12" (40 mm - 300 mm)

5) Loosen set bolt [28] for gear box [25] and pull off the gear box upward with gasket [158]*. (*Nominal Size: 300 mm (12") is gasket [25])
6) < Nominal size 1.5" - 12" (40 mm - 300 mm)
   To take off stem holder [8]. Release 4 tapping screws [157] by using screw driver (+).

Lever & Gear Type

7) Hold flat surface of Stem [7] with vise and pull off valve body [1].
8) (A) Set the valve body [1] on square lumbers at edges of valve body on the press and put a lumber on the disc [2]. Operate the press slowly and push disc [2] and seat [3] out if the valve body [1].
   (B) Set the valve body [1] on square lumbers at edges of valve body and put a circular stick on the disc [2]. Strike the circular stick with a hammer and remove disc [2] and seat [3] out of the valve body [1].
9) Set the disc [2] parallel to the working desk to half opened position. Push the seat [3], and remove the disc [2].
10) < Nominal size 1.5" - 12" (40 mm - 300 mm)
    Remove the stabilization ring [156] and the O-ring [6] from the stem [7].

<< Assembly >>

Procedure

1) Put the O-ring [6] onto the stem [7].
2) Before starting assembly, grease (Silicone) should be spread on the top and bottom disc [2], the stem hole of the seat [3] and the stem O-ring [6].
3) < Nominal size 1.5" - 12" (40 mm - 300 mm)
   Insert the stabilization ring [156] into the upper side slot of the seat [3]. The upper side slot of seat [3] has larger stem hole than lower side.

⚠ Caution

Make certain tabs are properly aligned. Both upper and lower stabilization ring [156] are identical.

4) Insert the stem [7] about 1/3 into the body [1]. Install the seat [3] into the body [1] by aligning upper seat stem hole with the stem [7].
11) Collapse the left or right side of seat [3] in towards opposing side exposing lower stem hole by screw driver (–).
    < Nominal size 1.5" - 12" (40 mm - 300 mm)
    Install the stabilization ring [156] into the body [1] aligning tabs of ring with center groove of the body [1]. Seat [3] tabs should line up when bottom of seat is reset into body of valve.
5) Remove the stem [7].
6) Reset the seat [3] into the body [1].

⚠ Caution

<Nominal size: 1.5" - 12" (40 mm - 300 mm)
Make certain stabilization rings [156] sit flush inside of seat [3] with tabs properly aligned. If stabilization rings [156] are not installed correctly, the seat [3] will not sit in the body [1] properly. This is indicated by a visible gap between seat [1] and body [1], and disc [2] will not fit properly.

7) To install disc [2], make certain valve size on disc [2] is in upright direction. Install top of disc [2] into seat [3] aligning with upper stem hole.
8) Rotate disc [2] to 75% (Approx.) closed position and install stem [7] about 50% into the body [1].
9) Press in bottom of disc [2] to lower stem hole.

⚠ Caution

Look into valve body [1] to be certain full square in disc [2] is centered with upper valve [1] stem hole. If not, repeat step 8), 9), and 10).
Make certain line scribed on top of stem [7] indicates disc [2] position while installing stem [7].

10) Install the stem [7] into valve body [1] and disc [2]. If disc [2] is properly aligned, stem [7] should slide in smoothly. If stem [7] does not slide in smoothly, report from step 8) to properly align the disc [2] in the valve body [1].
11) <Nominal size: 1.5" - 12" (40 mm - 300 mm)
Install stem holder [8] onto valve body [1] with countersunk holes facing up using 4 screws [157].
12) To install lever or gear operator reverse disassembly procedure #5.
13) After assembly, make sure that the valve can be fully opened and closed smoothly.

(9) Installation procedure for handle

Necessary items

- Plastic Hammer
- Socket Wrench
- Screw Driver (-)
- Goggles
- Protective Gloves

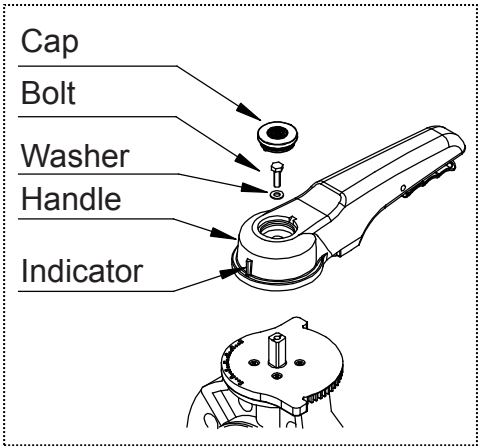
⚠ Caution

Do not give any unjust force to cap, in installing or removing the cap.
(It can be damaged)

《Installation》

Procedure

1) Install the handle on the stem. Set the direction of handle in the indication line at the top of stem.
2) Fix the handle at the top of stem with the attached bolts and washer by using socket wrench.
3) Set the convex part at the side of the cap and the concave of the handle, and set in the cap by striking lightly by using a plastic hammer.

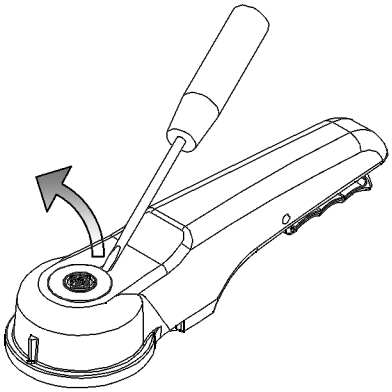


Nominal Size	1.5" – 4" (40 – 100 mm)	6" (150 mm)
Bolt Size	M6×15L	M8×15L
Socket Size	10	13

《Remove》

Procedure

1) To remove the cap, push up the side of the cap by using screw driver (–).
2) Loose the bolts and washer by using socket wrench, then remove the handle.



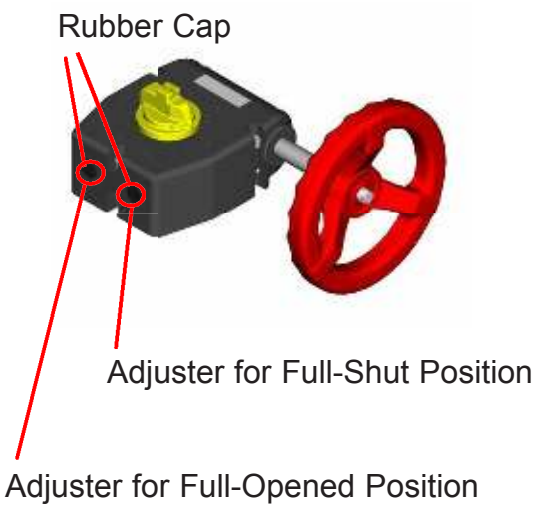
Caution - Do not give any unjust force to cap, in installing or removing the cap.(It can be damaged)

(10) Adjustment Procedure for Stopper Gear Type

Necessary Items

☒ Allen Wrench

The adjustments for full-opened and full-shut position are set with the stopper adjuster.



Adjustment for Full-shut (Full-opened) position

1) Remove the rubber cap of Full-closing (Full-opening) adjuster.
2) Loosen the first stopper hex-bolt completely by Allen wrench.
3) Adjust the disc of valve to required position.
4) Tighten the stopper hex-bolts.
5) Put the rubber cap of Full-closing (Full-opening) adjuster back on gearbox by hand.

(11) Inspection Items

- Perform periodic maintenance.
(Leakage may develop due to temperature changes or changes with time during prolonged storage, rest, or operation.)

Inspect the following items.

(1)	Check for flaw, crack, or deformation on the valve.
(2)	Check for leaks to the outside.
(3)	Check for the deformation of seat due to improper installation of valve.
(4)	Check for the smoothness of handle operation.

(12) Troubleshooting

Phenomenon	Cause	Treatment
Fluid is not stopped in the full closed position at the seat.	1) The stopper is not set correctly. 2) The seat is damaged or worn. 3) Foreign materials are caught. 4) The disc is damaged or worn. 5) The connecting bolts are over tightened or tightened unevenly.	Adjust the stopper. Replace the seat. Clean it up. Replace the disc. Adjust and retighten.
Fluid leaks to the outside.	1) The seat is damaged or worn. 2) The connecting bolts are not tightened in proper torque or evenly.	Replace the seat. Adjust and retighten.
The handle does not work smoothly.	1) Foreign materials have adhered. 2) The gear box is damaged. 3) The connecting bolt is over tightened.	Clean it up. Repair or replace. Adjust and retighten.
Valve does not operate	1) The gear box is damaged 2) The stem is damaged.	Repair or replace. Replace the stem.

(13) Handling of Residual and Waste Materials

- Make sure to consult a waste treatment dealer to dispose of the valves.
(Poisonous gas is generated when the valve is burned improperly.)

08-5007 712

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