



Ver. 01

Installation and Maintenance Manual

88/89 Series

TOV Butterfly

Valve



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Terms Concerning Safety

The safety terms Warning, Caution and Note are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

Warning : indicates that death, serious personal injury and/or substantial property damage can occur if proper precaution are not taken.

Caution : indicates that minor personal injury and/or property damage can occur if proper precaution are not taken.

Note : indicates and provides additional technical information which may not be obvious, even to qualified personnel.

1. Introduction

1-1. General

The principle of operation incorporated in the JFLOW triple offset valve is geometry in motion. Both the seat in the body and the seal on the disc are surfaces of a cone which is sectioned at an angle. The valve stem is located slightly to one side of the seat center and above the plane of the seat. Its center of rotation is also somewhat offset from the axis of the imaginary cone which extends from the surface of the seat.

When the valve is closed, the surface of the seal and the seat are in full contact at all points. Any effort to try to further close the disc (rotating it into the seat) increases the sealing force and tightens the valve. This allows the valve to achieve a bi-directional seal. Opening the valve, or rotating the disc away from its seat, results in the seal moving away from the seat at all points, eliminating rubbing or sliding of the seating surfaces, thus avoiding wear. JFLOW valves feature true non-rubbing seating surfaces for long life and tight shutoff.

Single Offset - 1st offset

The stem is offset behind the seat axis to allow complete sealing contact around the entire seat. This offset was initially introduced as standard with the introduction of the high performance butterfly valve.

Double Offset - 2nd offset

The centerline of disc rotation is moved laterally from the centerline of the stem. This provided eccentric rotation of the disc which swung the seal ring completely off the seat upon opening. This also was introduced as standard on the high performance butterfly valves.

Triple Offset – 3rd offset

The seat cone axis is offset from the stem centerline to eliminate friction during closing and opening and to achieve uniform compressive sealing around the entire seat.

The centerline of the seat cone angle is identical to the cone angle of the laminated seal ring on the disc. Additionally the point of the centerline of cone rotation is moved laterally from the centerline of disc rotation. As stated the point of cone angle of the laminated seal ring on the disc does not used this offset for the placement of the cone angle.

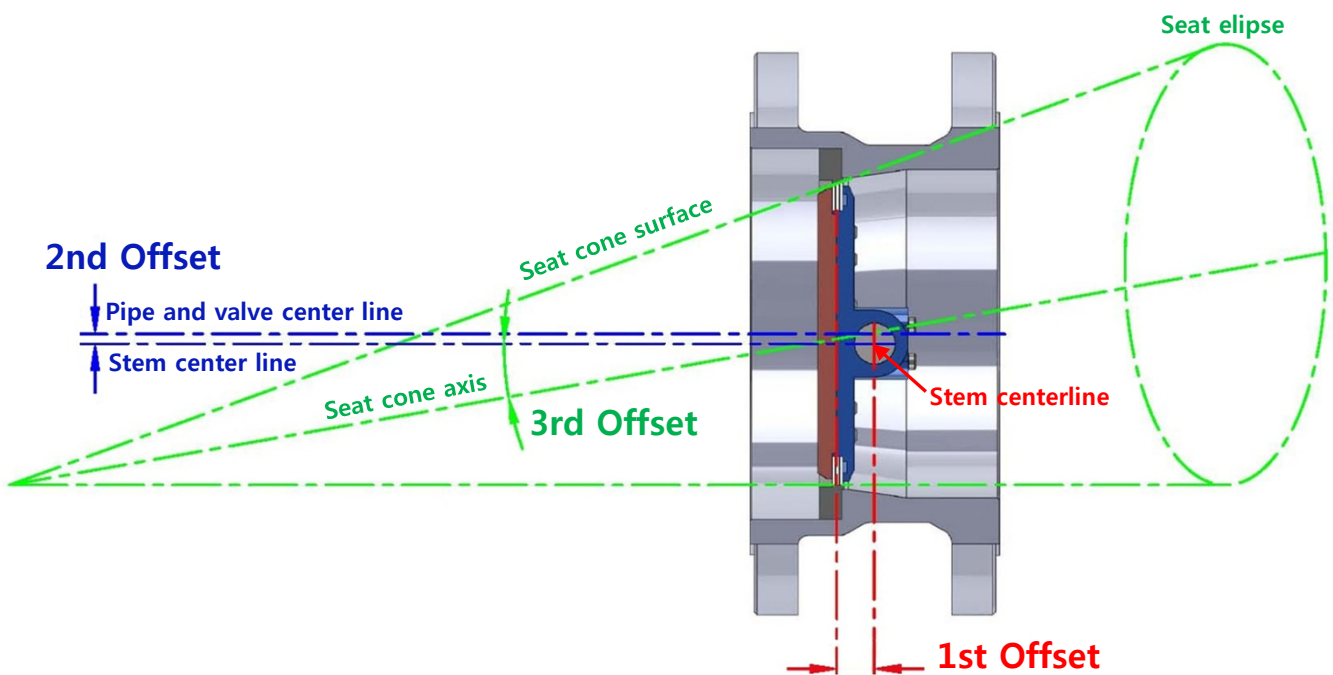


Figure 1. Principle of Operation

1-2. Personnel qualification

Transport, installation, commissioning, maintenance or repair must only be performed by trained or instructed personnel.

⚠ Warning:

In order to ensure successful and safe operation of our valves the entire operation manual must have been read through and understood prior to installation and commissioning. Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death. If you have any questions about problems arise, contact JFLOW office.

1-3 Structure / Type

Butterfly valves are classified as Wafer Type, Lug Type and Double Flange Type by their shape. Their principal parts consist of body, disc, seat and stem, and materials of each part are different according to the working condition.

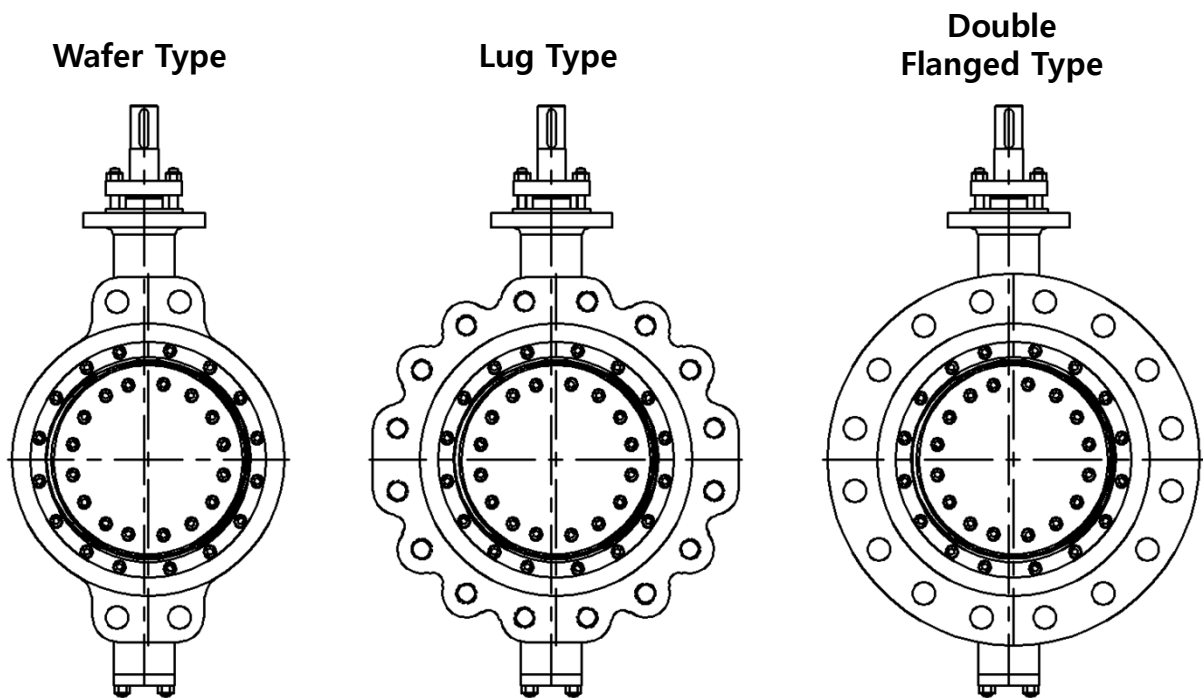


Figure 2. Butterfly Valve Type

1-4 Operation

The valve operator could be classified into a lever handle, manual gear, pneumatic actuator and electric motor operated actuator. By rotating or closing the disc located at the inside of valve using an operator, the fluid flows through the pipe can be shut-off or regulated. (Generally, on-off direction is indicated on the operator)

2. Pre-Inspection

Before installation of valve to the 'Pipe Line', it is recommended to inspect a valve closely as below.

2-1. Inspecting Valve & Accessory

- Ensure any damage that might be occurred during the transportation.
- Remove the protection cover of valve just before installation and clean a dust or harmful particles with an air blaster or smooth dust cloth / clean towel.
- Check the tightness of all kinds of bolts and nuts.

2-2. Inspecting Pipeline

- Remove foreign materials such as a rust, welding chip, etc, which remain in the pipe or flange.
- Make sure the clearness of pipe flange and gasket surface.

Caution :

When the fluid is flowing through the line, any foreign material is subject to scratch the disc, seat and inner body, so that the scratch may cause leakage and shortening of the valve lifetime.

To avoid product damage, inspect the valve before installation for any damage or any foreign material that may have collected in the valve body.

Also remove any pipe scale, welding slag, or other foreign material from the pipeline.

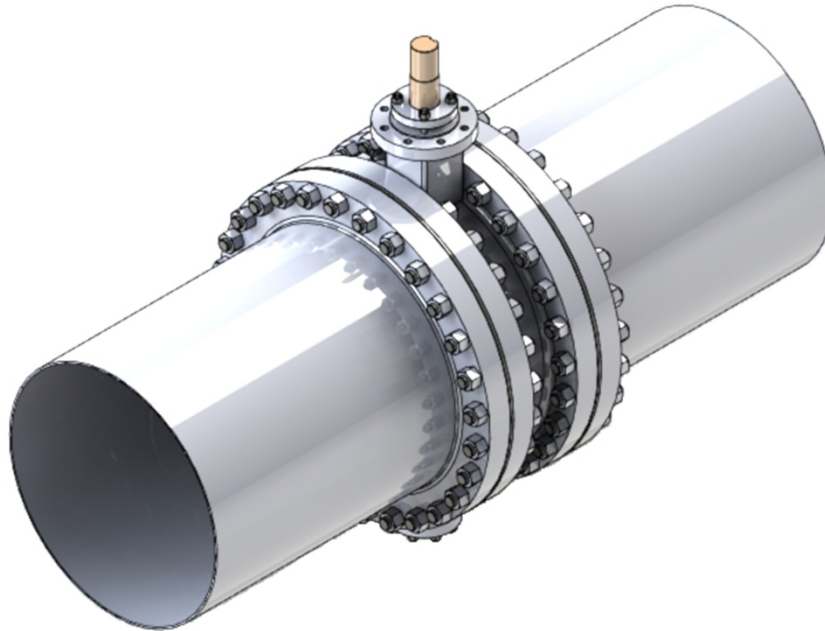
3. Installation

- Make sure the valve disc should be fully closed.
(Usually, valve is delivered with disc closed tightly to protect seat)
- Be sure of indication of the flow direction with an arrow marked on the body. - Be sure to place a gasket at center of valve and pipe flange.
- When you connect valve to the piping with a bolt or stud, install it diagonally. -
- When installing wafer style, full face gaskets must be used to seal fully. -

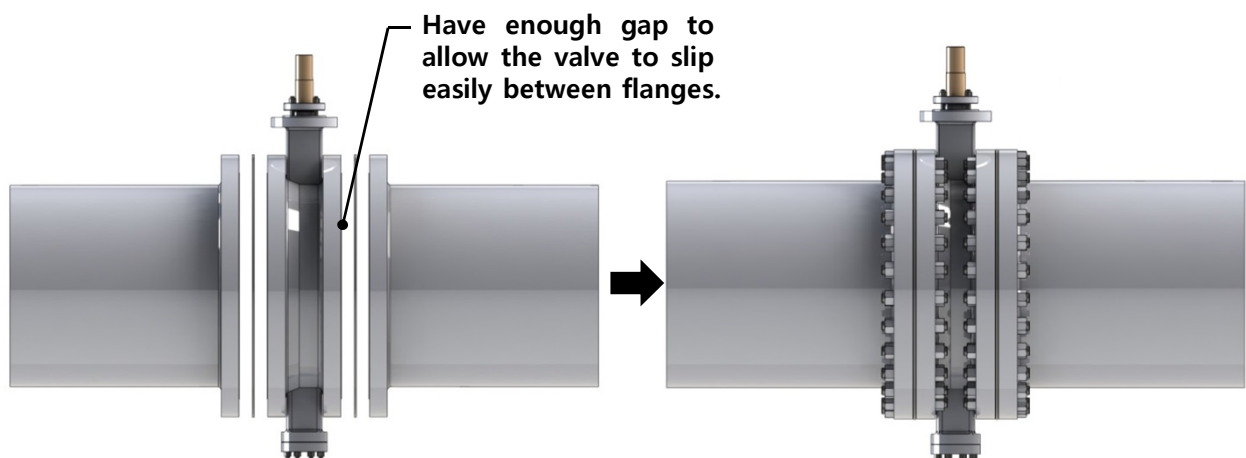
See the reference figure as follows. (Fig.3)

Caution :

- *For longer lifetime of the valve, please be sure of the arrow on valve and flow direction.*
- *Over torque on the bolt might cause damage of gasket.*
- *Clean pipe flange faces and valve faces from any residue and dirt.*

**Caution :**

- To avoid damage to the valve Disc during installation, the valve must be in the fully closed position.
- To prevent leakage through gasket. Tighten the bolts completely. (See. Fig.4)
- Flange Gaskets should be centered along with valve.

**Figure 3. Installation**

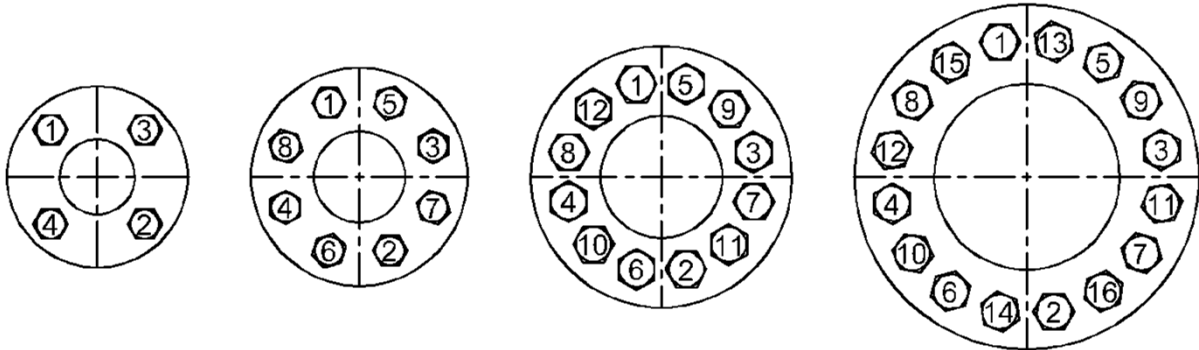


Figure 4. Flange Bolt Tightening Sequence

4. Operation

- Check whether there is any leak from all connections including the air pipe connections.
- To check whether there is any leak from packing gland and gaskets, apply a pressure to the pipeline. If any leak is detected, remove pressure from the pipeline and fasten the packing gland flange nut and flange nut.
- Check whether there are any loose nuts or bolts at the valve stem clamp and accessories bracket. Ensure tightness of bolts and nuts.
- Check whether there is any short circuit in the electric signal system.
- Check whether the manual hand wheel is at the Neutral position.
- Check whether the system operates accurately and flexibly according to the signals from the controller.
- When raising the temperature or the pressure, do it slowly. Never raise the temperature or the pressure quickly.
- Check whether the air pressure required for valve operation is accurately set (specified on the data sheet).
- Check electrical devices such as positioner, limit switch, solenoid valve are installed on the valve. Even if the manufacturer has adjusted them, the tubing may be bent or the valve stem's position become incorrect due to a shock during transportation or careless handling during assembly.

 Warning

Remove air pressure and operating signal from the actuator before using the manual hand wheel. If you use the manual hand wheel without removing them, it may not work normally or smoothly. Damage may occur to the weak parts of the actuator due to such a cause.

⚠ Warning

- *If the manual hand wheel is not at the Neutral position during control operation, valve may not have the full close or full open stroke which required on the data sheet.*
- *If you use a pressure higher than the specified pressure on the data sheet, the actuator may be damaged and cause operation problems.*

5. Maintenance

The 88/89 Series butterfly valve doesn't need a particular maintenance unless any leaks are found, however, some routine inspection are recommended for safety and longer lasting lifetime as below.

Valve parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions.

- Visual inspection of the body, disc and packing part of valve at the initial service or at the re-operation after long-term shut down.
- Check up the valve when abnormal sound is perceived during the operation.
- Ensure tightness of each bolt regularly.

⚠ Warning

Avoid personal injury from sudden release of process pressure. before performing any maintenance operations:

- *Do not remove the actuator from the valve while the valve is still pressurized. Always wear protective gloves, clothing, and eyewear when performing any maintenance operations to avoid personal injury.*
- *Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure that the actuator cannot suddenly open or close the valve.*
- *Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process fluids from both sides of the valve.*
- *Vent the power actuator loading pressure.*

⚠ Warning

- *The valve packing box may contain process fluids that are pressurized, even when the valve has been removed from the pipeline. Process fluids may spray out under pressure when removing the packing from packing box.*
- *Check with your process or safety engineer for any additional measures that must be taken to protect against process fluids.*

Troubleshooting guide

Trouble	Possible Cause	Corrective Action
Valve does not seal properly	1. Valve not fully closed.	1. Close valve.
	2. Foreign matter is present between seat and disc.	2. Operate several times to wipe clean.
	3. Operator stops are not set properly.	3. Adjust stops to proper setting.
	4. The seat and/ or disc is worn or damaged.	4. Replace parts.
	5. Seat retainer screws are not tight.	5. Tighten seat retainer screws
Valve is leaking around the stem	1. Packing flange nuts too loose.	1. Tighten packing nuts.
	2. Packing damaged.	2. Replace packing
Bottom flange leaking	1. Bottom flange bolting loose.	1. Tighten bottom flange bolting.
	2. Spiral wound gasket damage.	2. Replace spiral wound gasket
Valve is hard to rotate	1. Stem packing too tight.	1. Tighten packing only sufficiently to stop leaks.
	2. Operator failed/ not installed properly.	2. Replace or repair.
	3. Build up of solids or roughness on edge of disc.	3. Operate several times to wipe clean or disassemble valve and clean disc edge.
	4. Stem key has sheared.	4. Determine cause of shearing and correctly replace stem key.
	5. Fluid solidification between bearings and stem.	5. Flush bearings.
Jerky operation	1. Packing is too tight.	1. Loosen packing nuts retighten.
	2. Air supply inadequate for the actuator.	2. Increase air supply pressure and/or volume.
	3. Actuator/stem adapter misaligned.	3. Remove actuator mounting and realign.
The valve will not open	1. Disc hits on side of pipe.	1. Check for proper pipe clearance.

6. Inspection / Minor Treatment

6-1. Packing (Packing / Bottom Part)

Most leakage from packing parts of valve could be prevented effectively by tightening of gland flange's nuts and bolts. If the leaks don't stop in spite of re-tightening bolts, packing replacement shall be required. In this case, see the reference figure 6, 9 and refer to the chapter 7.3

6-2. Body Seat / Disc Seat

If it sounds the leakage from inside of the valve after full closing of disc, or if the fluid flows over the drain valve which is equipped at the bottom of piping, then check the seat condition and necessity of the replacement.

Note!

See part 7, chapter 7.5 and 7.6.

7. Replacement

Warning

To prevent human injuries and damages to control system, close the block valve, remove instrument air and signals from the valve and open the bypass valve to switch over the pressure from the line to the bypass. Then slowly unfasten the bolts from the pipe until the internal pressure of the body is completely released and remove the valve before disassembling the actuator.

7-1. Separation of Valve from the Pipe

To replacement of valve, the valve must be removed from pipeline and then parts must be separated as below

- Shut down the line, and make sure no pressure inside.
- Drain all mediums from the pipe.
- Completely close the disc of the valve.
- Remove the parts and remove the valve from the pipe.
- Mark the location of each part of valve and pipe in order to be installed at same positions where they were.

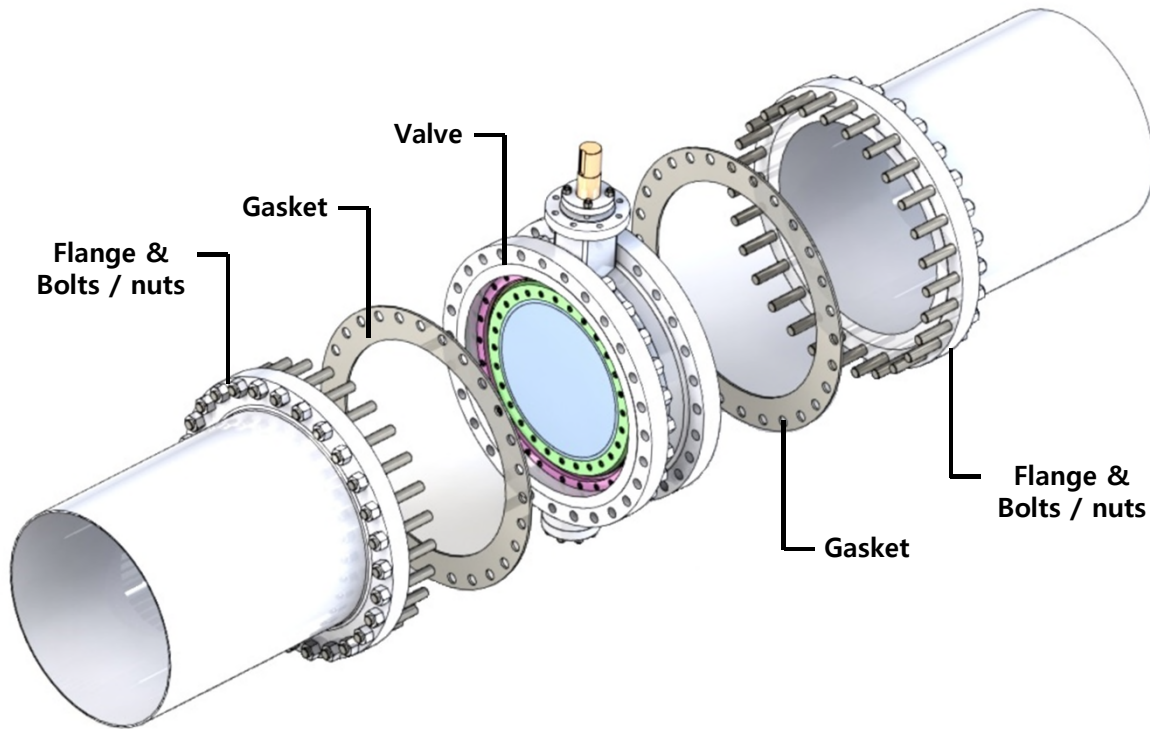


Figure 5. Separation of Valve

Caution :

If the fluid is toxic, proper protection should be required before the removal of valve.

7-2. Disassembly Actuator

- Unfasten the yoke bolt and remove the actuator from the body.
- Refer to the appropriate actuator instruction manual for actuator removal.
- The actuator stops or travel stops must set limit the rotation of the valve stem.

See the CAUTION below.

Caution :

When using an actuator, the actuator travel stop (or actuator travel, for actuators without adjustable stops) must be adjusted so the disc stop in the valve does not absorb the output of the actuator. Failure to set limit the actuator travel can result in damage to the valve, stem or other valve components.

7-3. Packing Replacement (see Fig. 9)

For replacement of packing, please follow the steps as below.

- Remove the packing flange after loosening a nuts of packing flange.
- Slightly lift the packing gland up and remove it with hands or lifting devices.
- Remove the packing from packing box using a packing extractor When you remove the packing with tools(packing extractor), please be careful not to scratch and damage the wall of 'packing box' and the valve 'stem' because the damage may cause a leakage.
- Put a set of packing carefully in to the packing box after cleaning Packing box.
- After inserting the packing, assemble the packing gland and packing flange.
- The nuts of packing flange should be tightened enough to push a packing gland downward, but over tightness of nuts might cause over torque to valve.

Caution :

Be careful when cleaning the packing box. Scratches to the stem or inside diameter of the packing bore might cause leakage.

7-4. Bottom flange parts Replacement (see Fig. 6)

For replacement of bottom, please follows the steps as below.

- Remove the nuts and bottom flange.
- After removing the parts, clean the inner parts area where parts placed prior to installation of new parts.
- Replace the new parts.
- There are three types of Bottom flange configurations.
- Follow the illustration below to replace the parts of the bottom flange.

Warning:

- *Over tightening on the nuts might cause damage of screw thread parts.*
- *The gasket should always be replaced with a new one.*

Note!

- Type 1. Valve pressure for 300LBS or less
- Type 2. Size over 8inch valve. / For valve pressure 600LBS or higher.
- Type 3. Size less than 6inch valve. / For valve pressure 600LBS or higher.

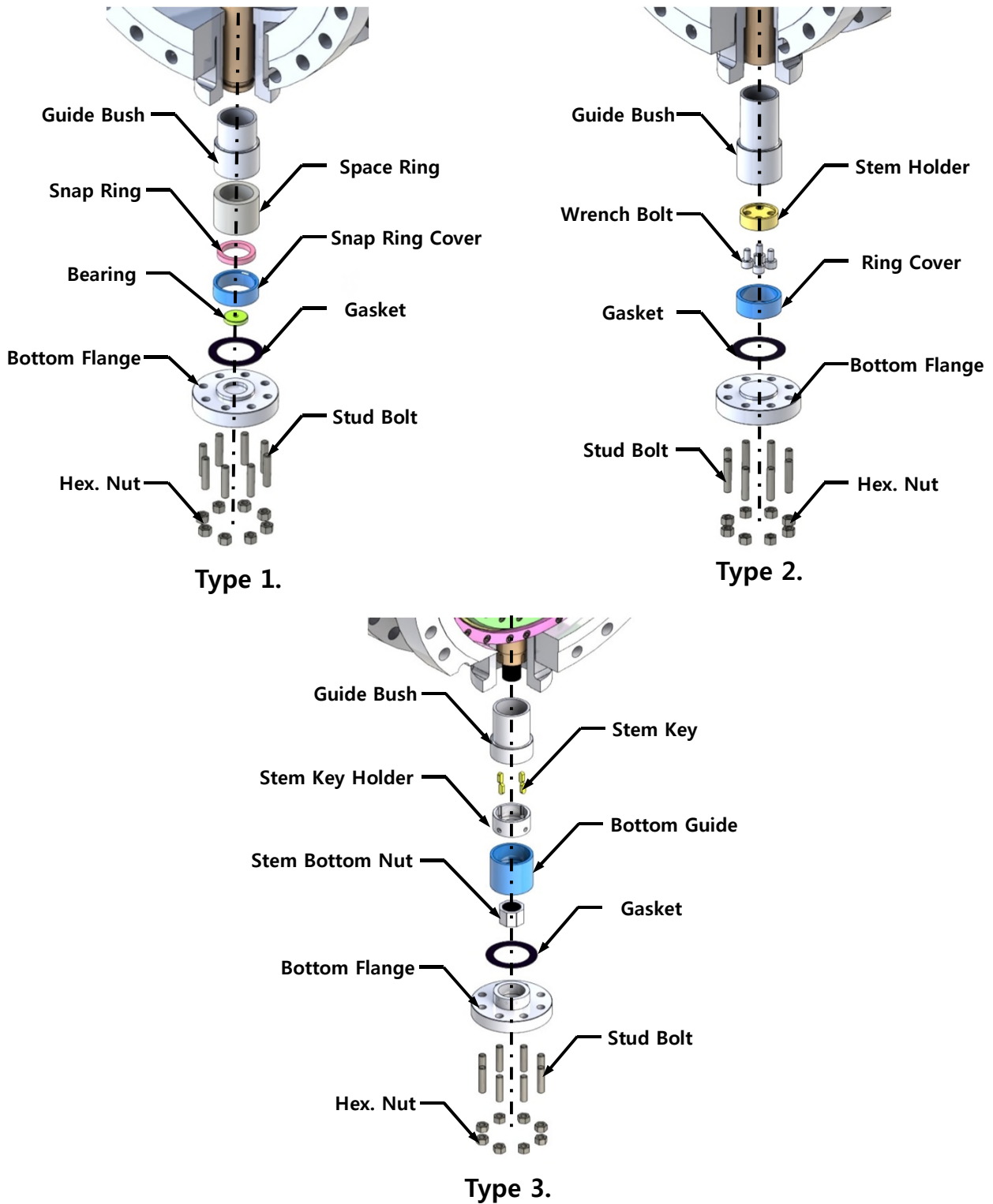
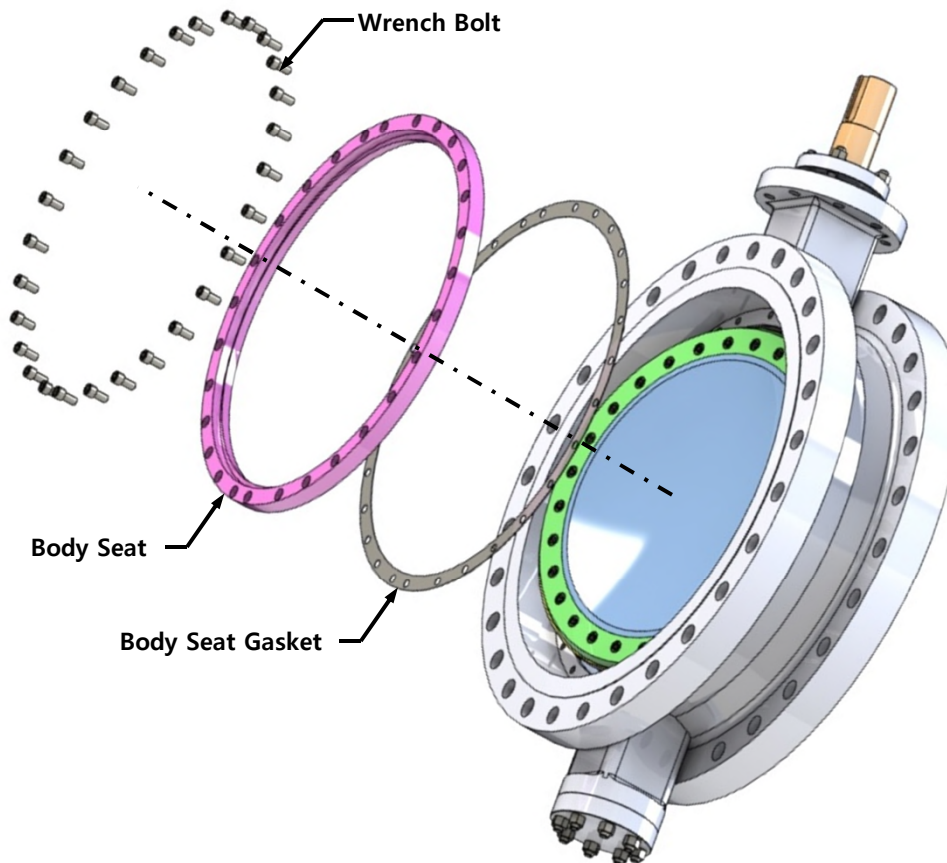


Figure 6. Disassembly of the Bottom flange parts

7-5. Body Seat Replacement (See Fig. 7)

- Open the disc of valve (5~10 degree) using a kind of rubber or urethane hammer.
- Remove tightened wrench bolts on the body seat of the body.
- Remove the body seat and body seat gasket carefully from the body.
- At this time, be careful about scratching, chopping and damage of a seat, and clean dust or harmful particles on the seat assembly parts with an air blaster or clean towel.
- Refers to the below picture for disassembling of the body seat.

**Figure 7. Disassembly of the Body Seat****Caution :**

After disassembly, please check the surface of body seat . If any damage of body seat is found, the body seat must be replaced. In this case, please be sure to contact the JFLOW office for assistance.

7-6. Disc Seat Replacement

- See part 7-5 for body seat replacement .
- Remove tightened wrench bolts on the disc seat holder of the body.
- Remove the disc seat and disc seat holder carefully from body.
- Please replace the damaged disc seat with a new one.
- For assembling of the disc seat, please take the reverse steps of the previous disassembly. Therefore, it is important to identify the location of each part where they were before.
- Rotate the disc seat several times to match the seat position with body seat. This would help a seat get the most suitable contact with the disc.
- Tighten the wrench bolts on Disc seat holder after set position of Disc seat
- Install the valve on the pipe line with disc fully closed.

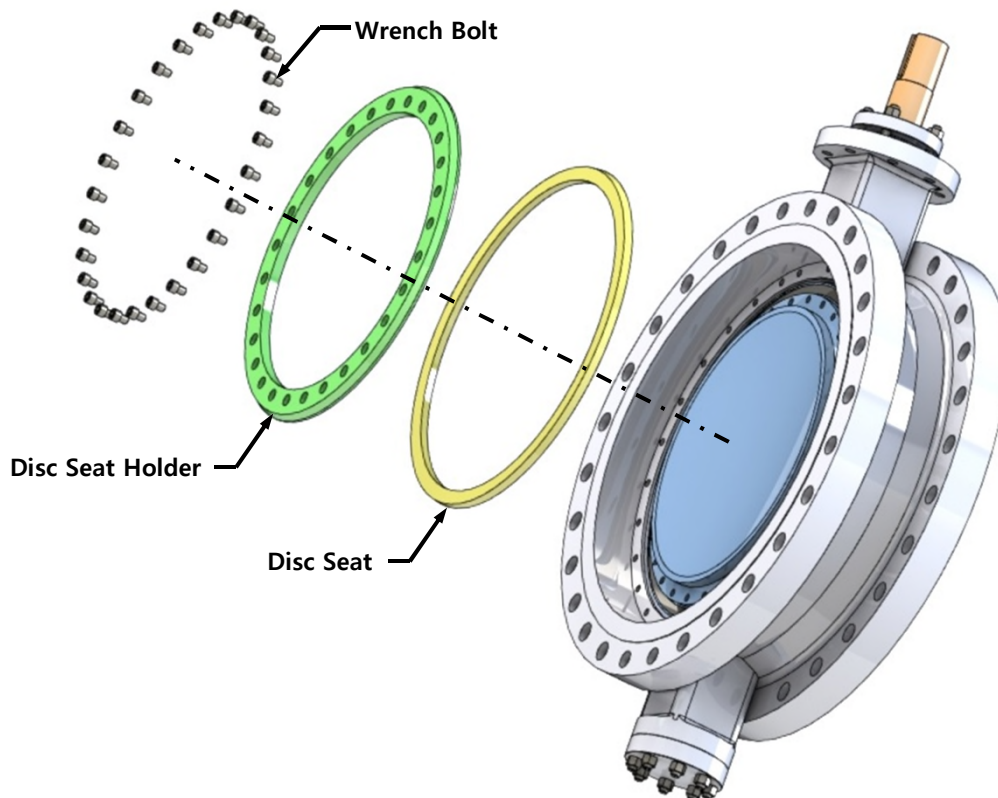


Figure 8. Disassembly of the Disc Seat

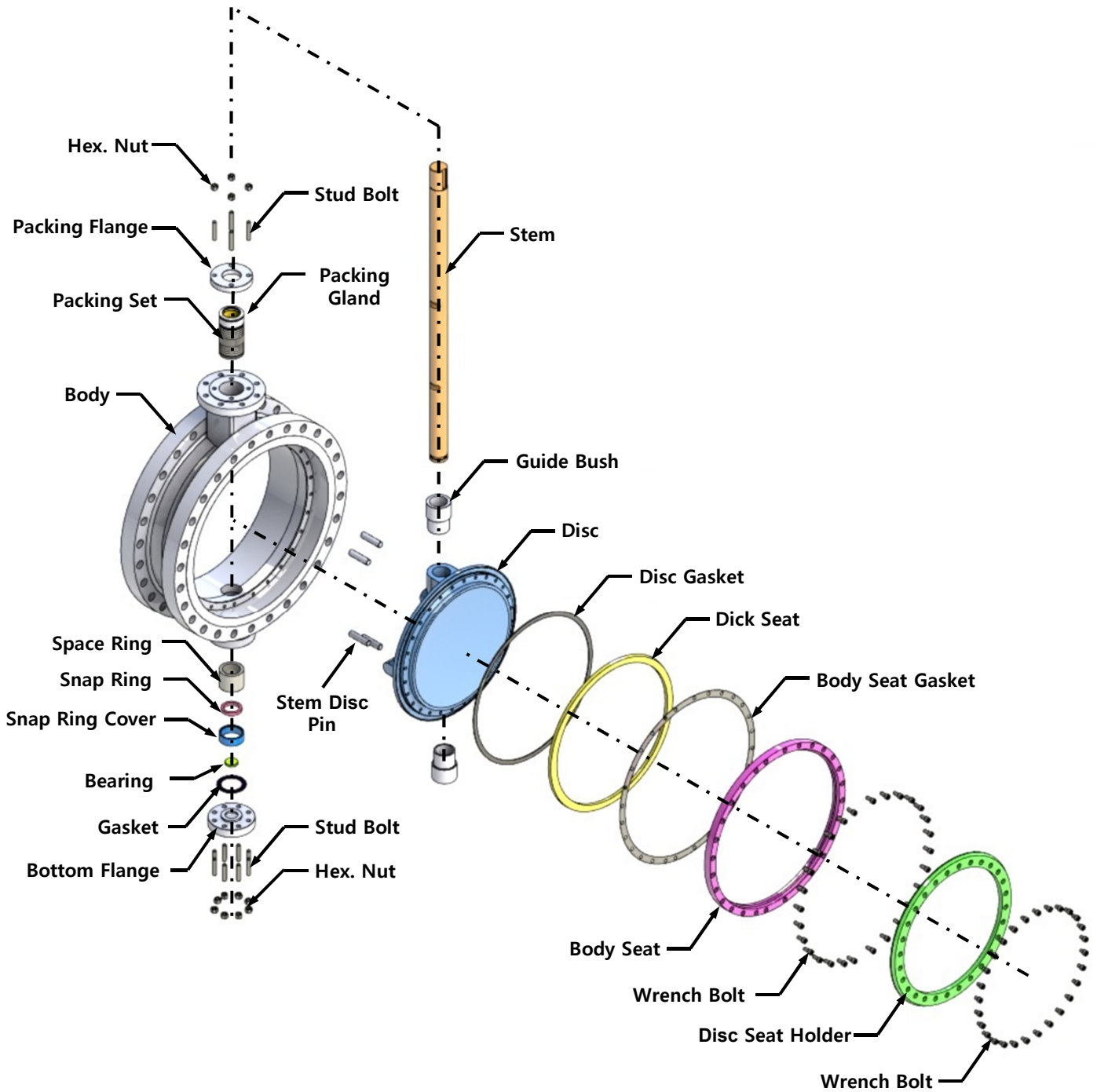


Figure 9. Valve Disassembly Description

8. Storage

During storage, protect the valves from external effects and dirt. Avoid the formation of condensate through ventilation, desiccant or heating. Protect the connection openings to prevent entry of dirt or foreign matter. The storage room should be dry, dust-free and moderately ventilated. Storage temperature frost-free up to +25°C.

9. Packing

Warning

Valves that have come in contact with health-threatening media at the customer must be decontaminated prior to packaging.

Pack the valves so that any coatings or accessories such as plug-in devices, controllers and sensors cannot be damaged through subsequent transport.

Protect connection openings to prevent the entry of dirt. Use the packing material in accordance with the applicable regulations and observe country specific regulations.

10. Transport

Larger valves will require being transported with lifting equipment suitable for the weight to be moved.

Transport the valves by using Eyebolts if available. Do not hook up lifting equipment to accessories such as hand wheels, control lines, pressure gages or flange bores. When using suspension belts, these must be placed around the valve body, providing edge protection and ensuring even weight distribution.

11. Torque

ANSI 150 (No Safety Factor)

Size	In Lbs
3"	709
4"	1257
6"	3205
8"	6950
10"	9560
12"	14170
14"	21760
16"	25225



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