

**Control Series BFV**  
**Installation, Operation and**  
**Maintenance Manual**  
**(Series C5x, C6x)**

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## 1.1 General Note

Delta T Control Series butterfly valves can be used in a wide variety of applications for manual or automated proportion control. A robust and well structured design allows users to easily inspect, disassemble and maintain the valves for a long service life.

## 1.2 Body Type

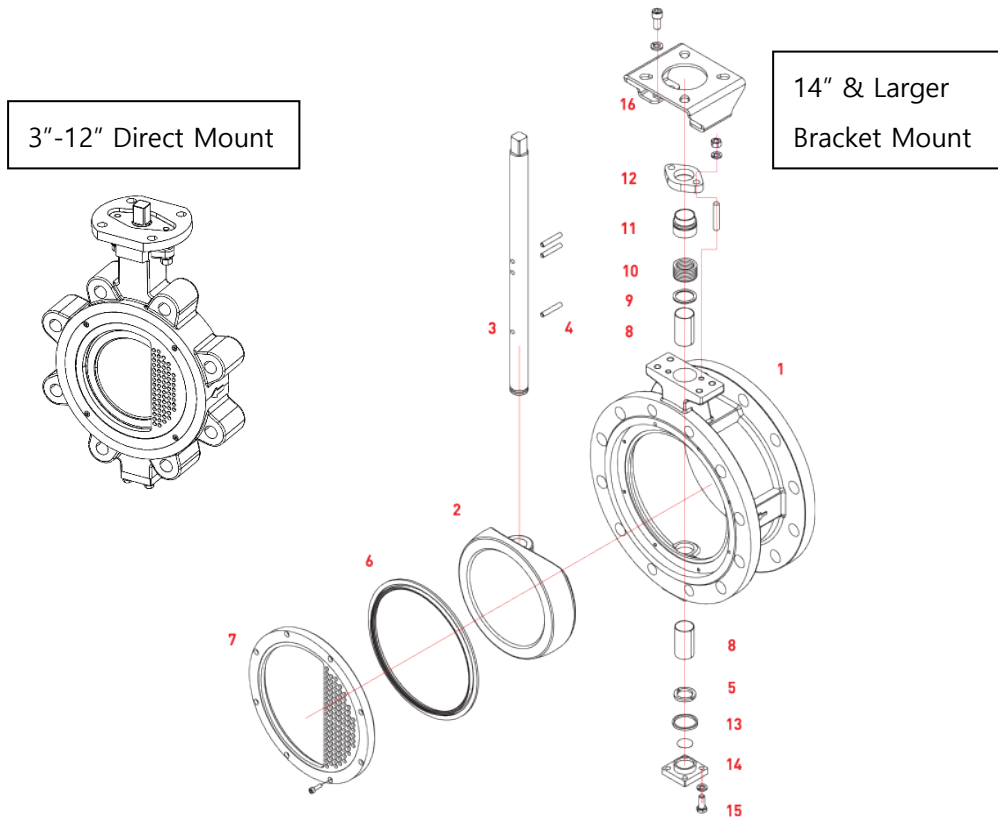
Valves are available in different body types depending on the pipeline connection needed, such as Wafer, Lugged, or Flanged type. Materials of each part are specified according to the application working conditions. Regardless of the connection or material types, the principle valve design and parts consist of a body, disc, seat, with supporting components.

## 1.3 Operation

Valves are quarter-turn type and can be operated by lever handle, manual gear, pneumatic actuator or electric motor operated actuator. By rotating or closing of the disc inside of valve, media flow through the pipe can be shut off or regulated.

It is important to note that high performance valves must operate within a defined quadrant because of integrated hard stops in the valve body. Therefore, the disc ALWAYS closes in the clockwise direction and manual or automated operators must be setup accordingly. Care must be taken in setting operator travel stops in relation to the valve hard stops: installers must ensure that the valve hard stop is reached for full shut-off to be achieved.

# 1.4 General Exploded View



NO.	Part	Materials	Material Standard
1	Body	Carbon Steel	ASTM A216 WCB
		Stainless Steel	ASTM A351 CF8M
		Aluminium Bronze	ASTM B148 C95800 Aluminium Bronze
2	Disc	Stainless Steel	ASTM A351 CF8M
		Aluminium Bronze	ASTM B148 C95800 Aluminium Bronze
		Hard Facing	HCR, Stellite or ENP
3	Stem	Stainless Steel	304, 316, 420
		17-4PH	ASTM A564 630
		K500 Monel	ASTM B865 NO5500
4	Disc Pin	17-4PH	ASTM A564 630
		Stainless Steel	304, 316, 420
5	Stem Retainer	Stainless Steel	ASTM A240 304, 316
6	Seat	PTFE	PolyTetraFluoroEthylene
		RTFE	Reinforced PTFE, RTFE
		Stainless Steel	316, Inconel 625, Incoloy 825
		Fire Safe	RTFE / 316 Stainless Steel

NO.	Part	Materials	Material Standard
7	Insert Ring	Carbon Steel	ASTM A36
		Stainless Steel	ASTM A240, 304, 316
		Aluminium Bronze	ASTM B148 C95400/C95800
8	Bush Rearing	316 Stainless Steel with Teflon	
9	Packing Retainer	Stainless Steel	ASTM A240 316
10	Packing	PTFE / RTFE -V Packing	
		Graphite	
11	Gland	Stainless Steel	ASTM A351 CF8
12	Gland bridge	Stainless Steel	ASTM A351 CF8
13	Bottom Packing	PTFE / RTFE	
		Graphite	
14	Bottom	Stainless Steel	ASTM A351 CF8
15	Bolt	304 / 316 Stainless Steel	
16	Bracket	Carbon Steel	ASTM A36

Other materials are available. Reference assembly drawing or bill of materials to confirm materials of construction.

## 2.1 Pre-Installation

Before installation of the valve to the pipeline, it is recommended to inspect the valve per below guidelines.

### 2.1.1 Inspecting Valve & Accessories

- Inspect for any damage that might have occurred during transportation.
- Remove the protective cover(s) of the valve just before installation and clean dust or debris with an air blaster or soft dust cloth / mop.
- Check tightness of all bolts and nuts at mechanical connections between the valve and operator and any accessories.
- For pneumatically operated assemblies, check tightness for any pneumatic quick connect or pipe fittings to ensure no leakage of pressurized air.
- For electrically operated assemblies, follow local electrical guidelines and use a qualified electrician. Ensure all conduit fittings and electrical connections are tight and DO NOT power up any components until all connections are complete and enclosures are safely and securely closed.

### 2.1.2 Inspecting Pipeline

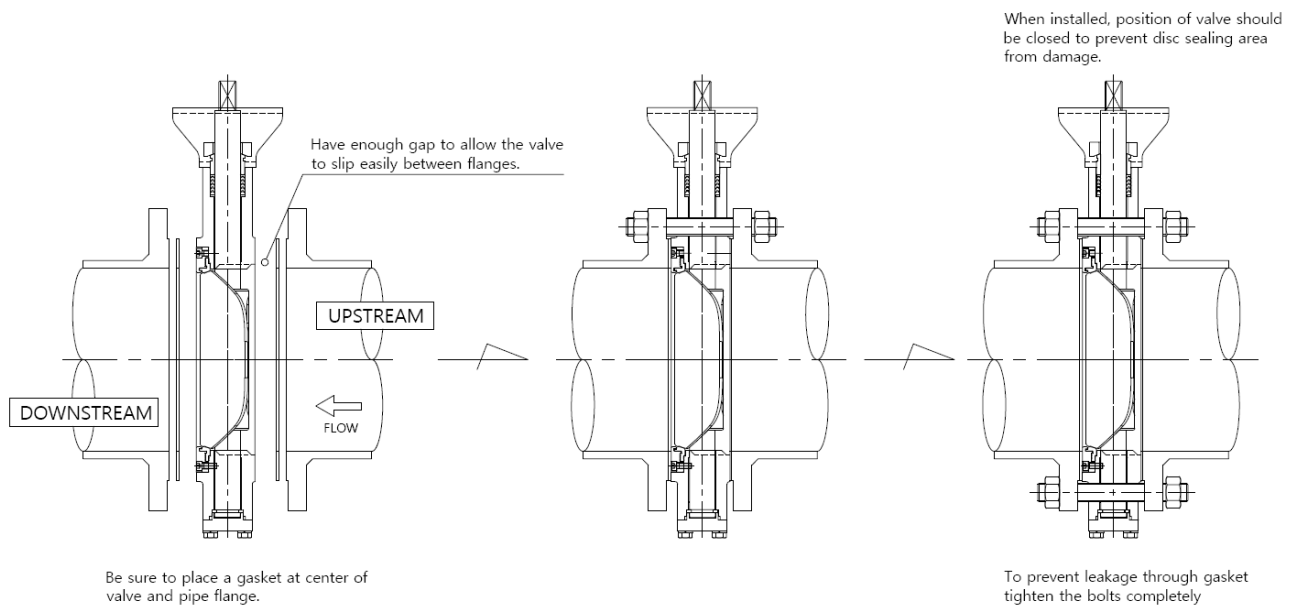
- Remove foreign materials such as a rust, welding chips, debris in the pipeline.
- Make sure pipe flanges and valve gasket surfaces are clean and free of debris.

**\* Caution:**

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

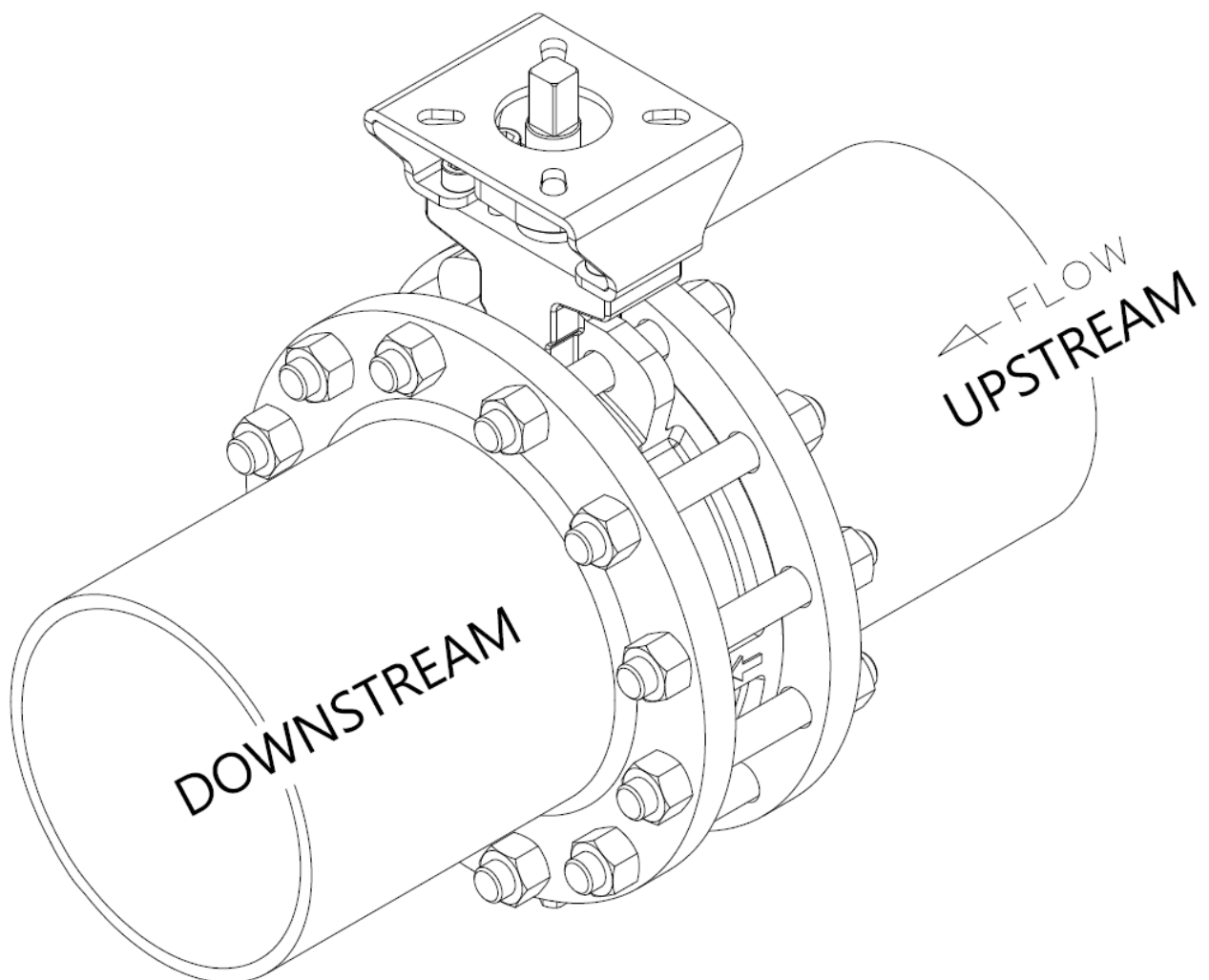
## 2.2 Installation

- Make sure valve disc is fully closed.  
(Usually, valve is delivered with the disc closed tightly to protect the seat ring).
- Ensure correct flow direction with the arrow marked on the body.
- Ensure gaskets are correctly centered between the valve and pipe flanges.



**\* Caution:**

- To ensure long valve life, please align the direction arrow on valve with flow direction.
- Over torquing the pipeline connection bolts might cause damage to gaskets. Follow gasket manufacturer instructions for proper torquing.



## 3.1 Maintenance

Delta T high performance valves do not require regular maintenance unless any leakage is found. However, some routine inspection per below is recommended for safety and to lengthen valve life.

- Visual inspection of the body, disc and packing parts of the valve at the initial service or after long-term stand still.
- Inspect the valve for damage when abnormal sounds are heard during operation.
- Ensure tightness of each bolt regularly.

## 3.2 Inspection / Minor Adjustment

### 3.2.1 Packing

Most leakage from the packing parts of a valve can be prevented effectively by tightening of the gland flange's nuts and bolts. If the leakage doesn't stop, packing replacement is required instead of re-tightening bolts. In this case, see the reference figure and the method of packing replacement.

### 3.2.2 Seat / Retainer

Before installation at the pipeline, inspect the Seat condition and bolting of the Seat Retainer.

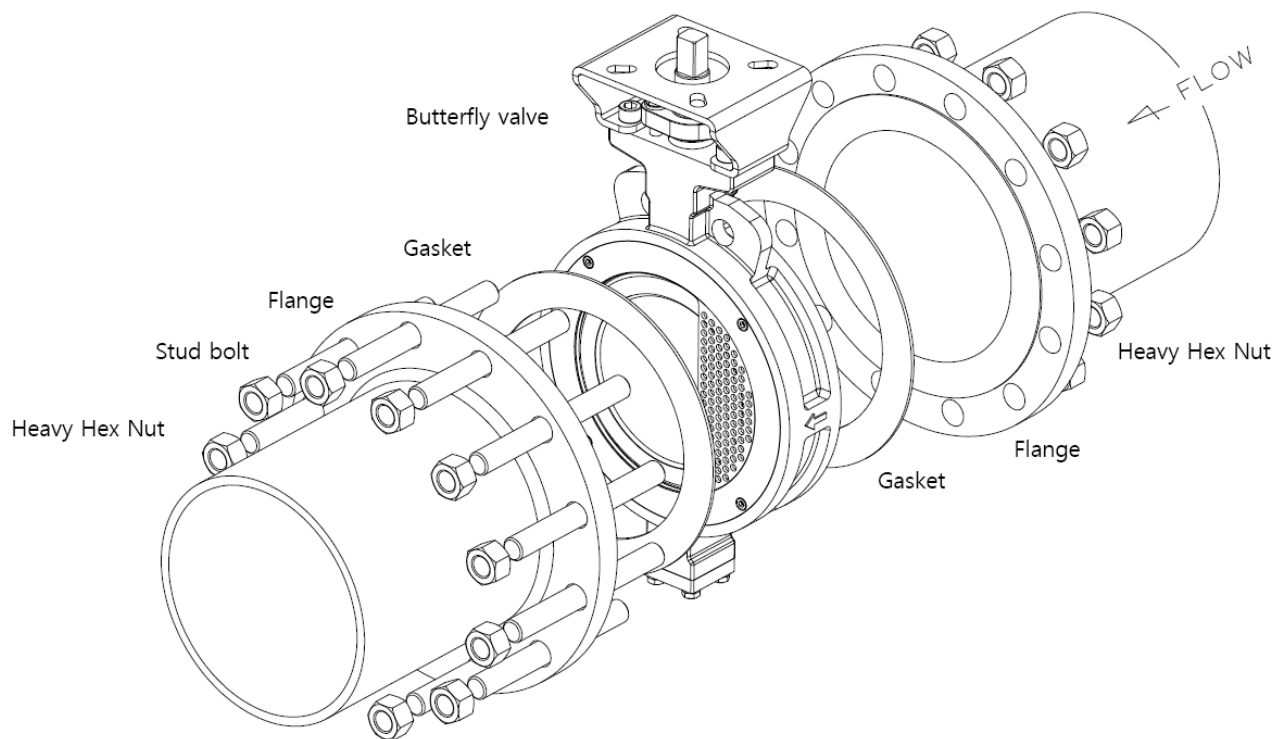
\*\* All valve repairs (disassembly and replacement etc.) should be performed by well-trained experts.



## 4.1 Removal of Valve from Pipeline

To repair valve with leakage, the valve must be removed from the pipeline and the parts must be dismantled per below.

- Shut down the pipeline and fully relieve pressure.
- Drain all media from the pipeline.
- Completely close the disc of the valve.
- Remove the parts and the valve from the pipeline.

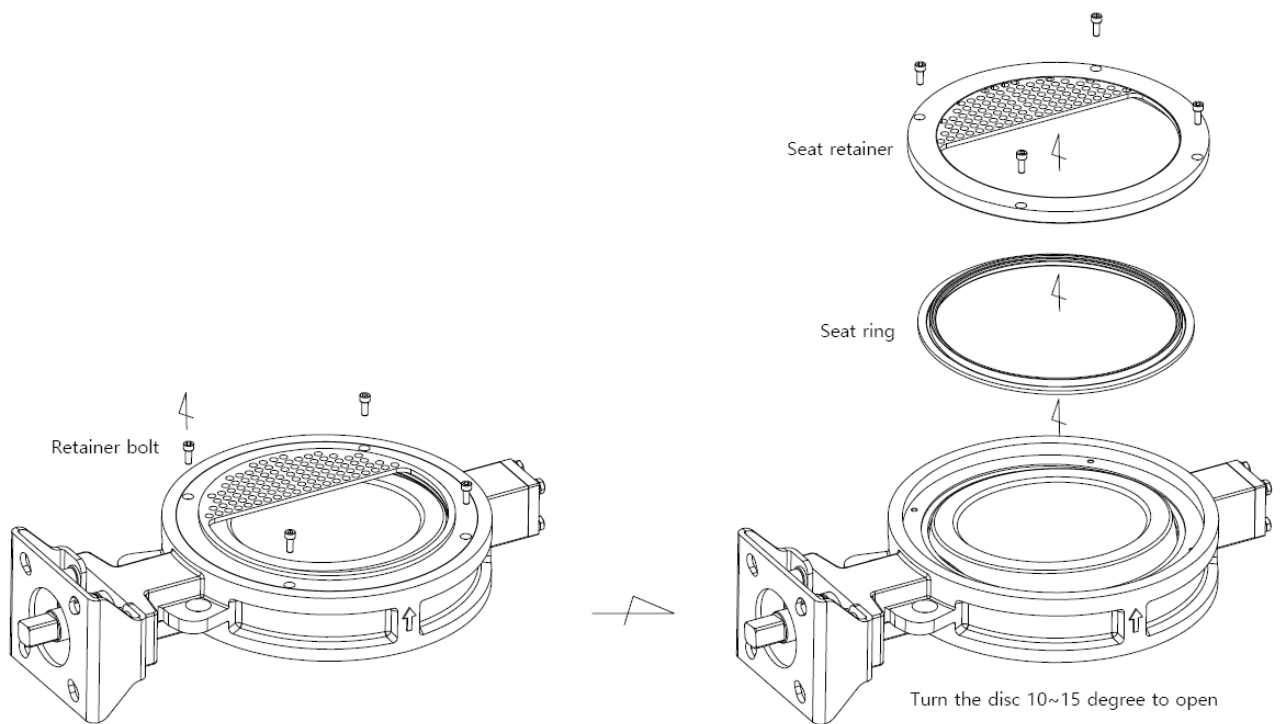


**\* Caution:**

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

## 4.2 Disassembly of Seat and Seat Retainer

- Open the disc of valve (10~15 degrees) with a manual operator.
- Loosen and remove 'Retainer bolts' on the seat retainer of the body.
- Remove the seat retainer by lifting it up with a jacking tap.
- Take out the seat. At this time, carefully inspect for scratching, chopping and damage of a seat, and remove the dust or debris on the assembly parts of the seat with an air blast or cloth.
- Refer to the pictures below for disassembly of the seat retainer & seat.



## 4.3 Replacement of Wearable Parts

### 4.3.1 Top Packing Replacement:

For replacement of top packing, please take the steps as below.

a. Remove the gland flange after loosening gland flange nuts.

b. Slightly lift the packing gland up and remove it by hand.

c. Remove the packing using a packing extractor such as the corkscrew, awl etc.

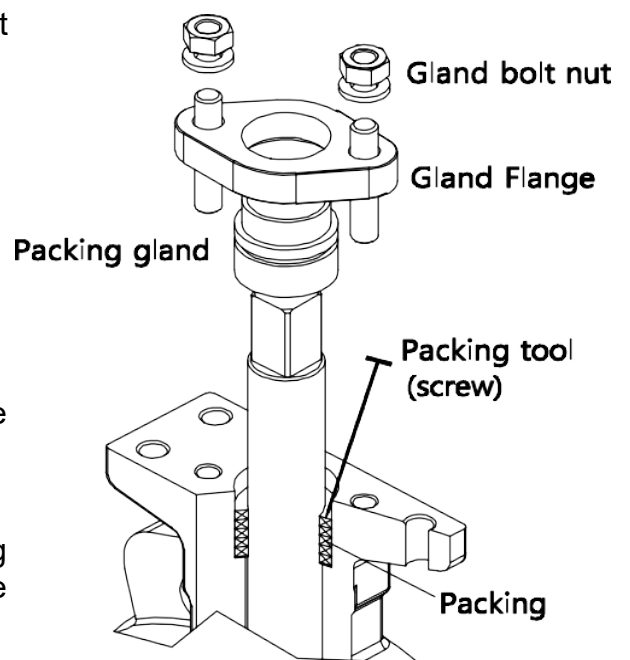
d. When you remove the packing with tools (packing extractor), please be careful not to scratch and damage the wall of packing housing and the valve stem because damage may cause a leakage.

e. Insert a set of packing carefully after cleaning the 'packing housing' by pushing down the packing gland.

f. After inserting the packing, assemble the packing gland and gland flange with nuts.

g. The nuts of gland flange should be tightened sufficiently.

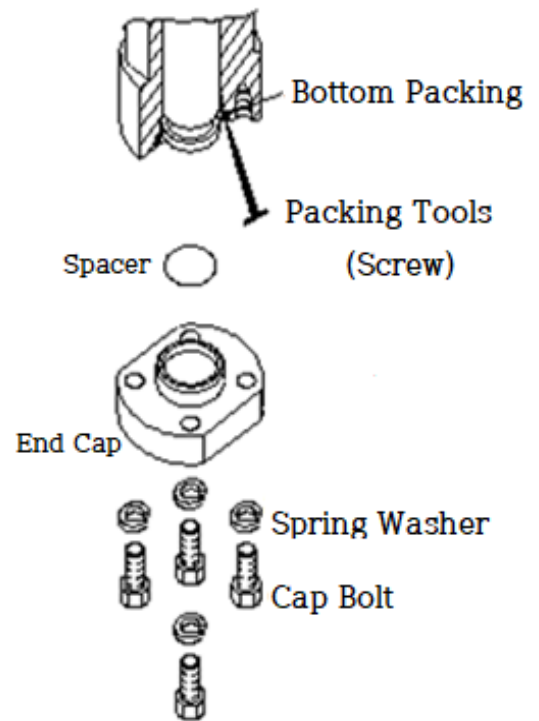
**\*Caution:** Over-tightening of nuts might cause increase in valve torque.



### 4.3.2 Bottom Packing Replacement

For replacement of bottom packing, please take the steps as below

- a. Remove the bolts and bottom end cap.
- b. By using a packing extractor such as the corkscrew, awl or gimlet, remove the packing. At this time, please be careful not to scratch and damage the wall of packing housing and the valve shaft.
- c. After removing the packing, clean the neck of the body prior to replacement of new packing.
- d. Insert the new packing.
- e. Replace the end cap and tighten bolts.



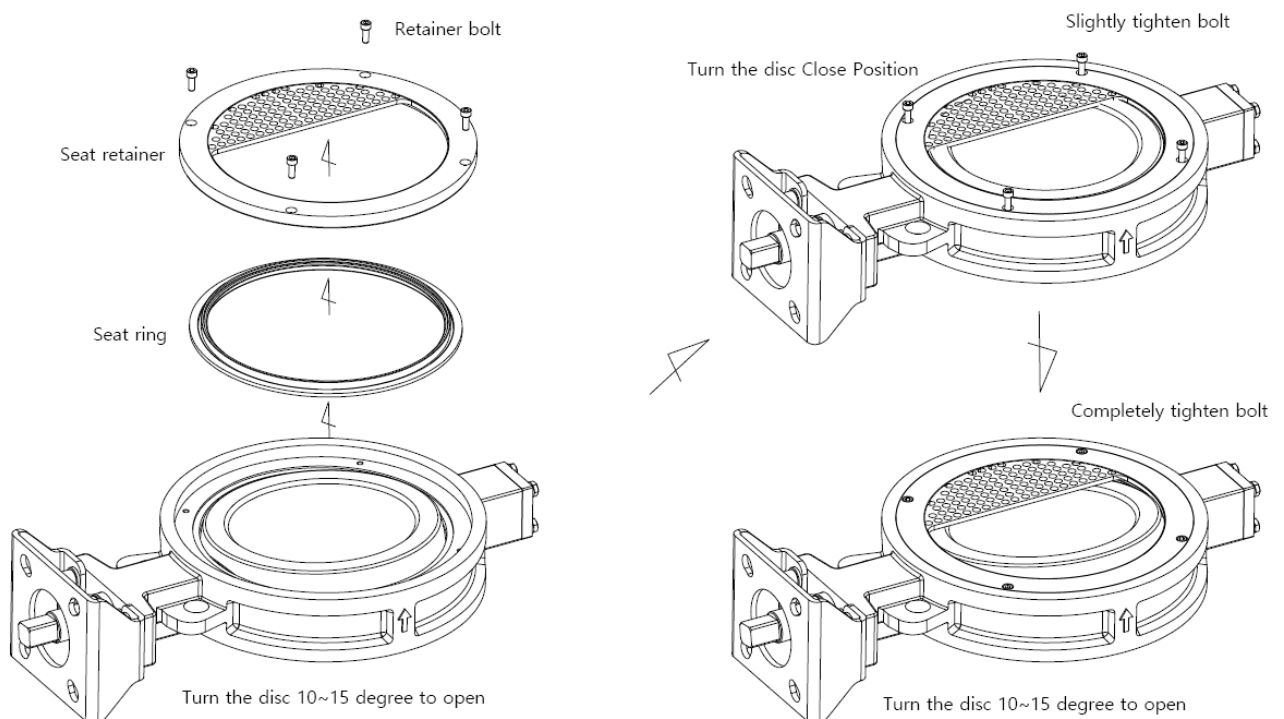
**\* Caution:**

Over-tightening on the bolts might cause damage at the threaded parts and bolt heads.

### 4.3.3 Seat Replacement:

If flow can't be shut off at the full closed position of disc, then seat damage is suspected. In case of seat damage, replacement should be followed as below:

- a. See section 4.2 for disassembly of seat / seat retainer.
- b. Replace the damaged seat with a new one.
- c. New seat should be seated with the 10~15 degree of disc-opening angle.
- d. For assembly of the seat retainer, please apply the reverse steps of the previous disassembly. Therefore, it is important to identify the location of each part as the same location last time.
- e. Slightly tighten the seat retainer bolts with the valve in the closed position, then rotate the disc a couple of times.
- f. Rotate the disc a couple of times and then tighten the retainer bolts completely with the disc at 10~15 degrees open.
- g. Finally, rotate the disc several times to ensure good seating position and stroke.
- h. Install the valve on the pipeline with disc fully closed.





## CONTACT INFORMATION

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