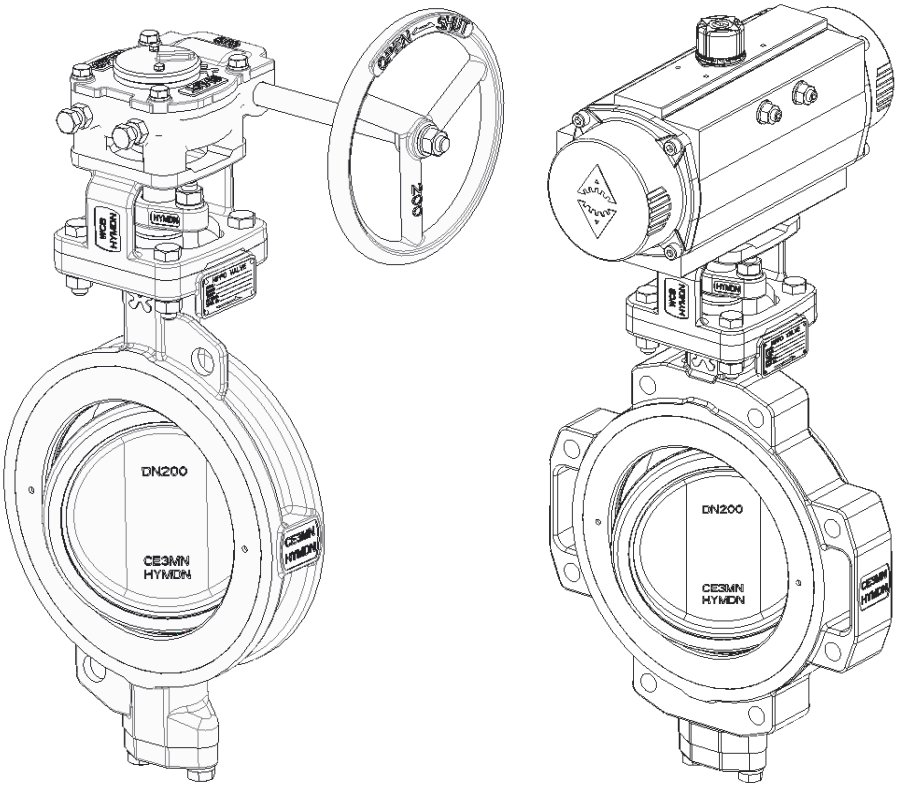
MAX-SEAL

L631/731 W631/731 Series Double Offset High Performance Butterfly Valve Installation, Operation, and Maintenance (IOM) Manual



Reference No：MS-IOM- L631/731 W631/731

Version： 3.0d

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1. Introduction

Max-Seal's High-performance butterfly valve has many strong capabilities such as floating seat design, bi-directional zero leakage, low emission system, high-life-cycle. It is widely used in industrial applications such as paper and pulp, power and energy, water treatment, petrochemical, air separation, vacuum and ultra-high vacuum, super clean CDA, and etc.

1.1 Definition of Terms

CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or asset lose.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

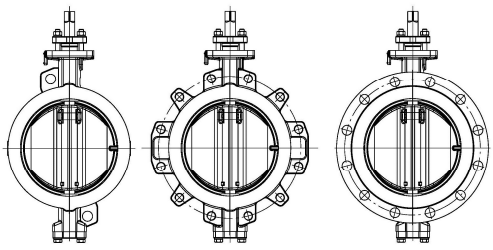
1.2 Flange Types

Three Standard connections:

A. Wafer

B. Lug

C. Double-Flange



Wafer Lug Double-Flange

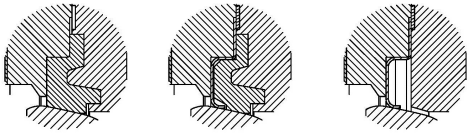
1.3 Seat Types

Three valve seat types：

A. Standard

B. Fire-safe

C. Solid Metal



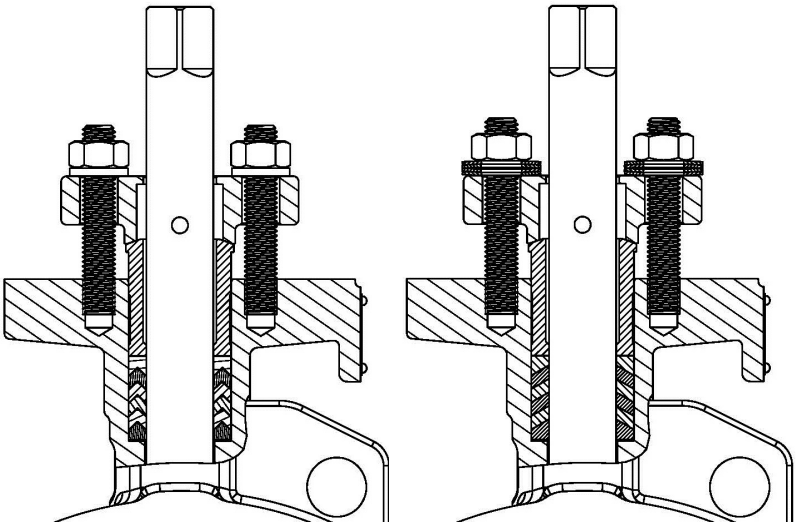
A B C

1.4 Gland Packing System

Major 2 types:

A. General type - PTFE / RTFE。

B. VOC(volatile organic compounds) type



A (GENERAL Type)　　B (VOC Type)

2. Installation

The Butterfly valve structure is based on a quarter-turn 0 ~ 90 degrees rotation disc, which is compact, small and lightweight. These features enable the butterfly valve to be easily disassembled and maintained, open and close quickly, and with good regulation in linear flow control.

2.1 Before Installation

CAUTION 	1.The MS butterfly valve is designed to fit between flanges. When the disc is opened, the disc will enter the tube on both sides of the pipeline (further on the body side than the seat retainer side of the valve), the piping must be enough to open the valve.
	2. If the actuator, such as a lever or gearbox, has been removed, the valve disc must not rotate more than the fully open or closed position.
	3. In order to ensure the longest life, please follow the instructions of the valve arrow installation.
	4.The bi-directional sealing design allows the valve to be installed in any direction, but the valve disc in accordance with the proposed flow can have a longer service life, especially while working with corrosive fluids.
	5. For dead-end service, please follow the recommended flow direction.

2.2 Installation

Install the valve into pipeline：

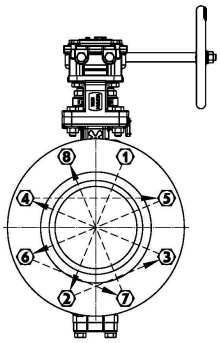
A. Before installing into the pipeline, the pipeline must be clean without welding slag or any other dirt. If necessary, clean the pipe.

B. Confirm that the flow direction of the pipeline is consistent with the recommended flow direction of the valve.

C. Separate the two flanges and make space between the two flanges, at least 8mm greater than the face-to-face dimension of the valve. Ensure the valve disc is in the closed position, then carefully put the valve in between the flanges.

D. Align the center of the valve to the center of the pipeline. Then locate the valve flange or threaded hole, align it with the pipe flange hole or threaded hole.

E. Flange bolts must use two stage locking in diagonal sequence (as shown on the right) with a less than 60Nm average torque. The flanges must keep parallel during locking, otherwise leakage may occur through the flange face.



2.3 After Installation

CAUTION 	1. It is not recommended to remove the valve protection cover before installation, unless inspection or installation of the valve is required.
	2. If the valve must be placed outdoors, the valve should be supported so that it does not come into contact with the ground and protect it with a waterproof cover.
	3.The performance of the valve may be reduced if the valve is kept in a fixed position for a long time without any movement. This is due to loss of effective lubrication, the packing aging, corrosion or accumulation of harmful substances. Therefore a periodic partial or full-cycle operation plan is advised for ideal performance.

3. Operation

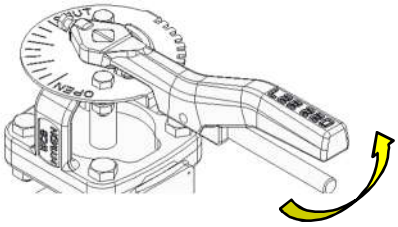
Max-Seal's high performance butterfly valve can be operated with a manual actuator, pneumatic actuator, electric actuator, or other special control devices. On-off control and regulation control are both available according to customer needs.

3.1 With L-Series Lever

WARNING 	Verify that the relative position of the valve to the handle indicator is the same.
	Fast rotation is prohibited. Otherwise water hammer might cause unexpected damage.

Lever operating method:

- Turn on or turn off the handle by 90 degrees.

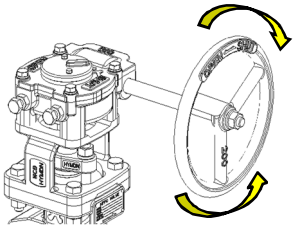


3.2 With G-Series IPX8 Gearbox

CAUTION 	Verify that the relative position of the valve with the indicator on-or-off position is the same.
	Rotate the hand wheel with a fully-open-close operation. Confirm all components stay in good condition then start to install into pipeline.

Gearbox operating method:

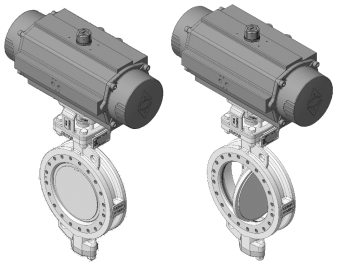
- Rotate the hand wheel to open or close the valve.
- Counter-clockwise rotation is on.
- Clockwise rotation is off.



3.3 With Pneumatic Actuator

CAUTION	Verify that the relative position of the valve with the indicator on-or-off position is the same.
WARNING	When the valve is opened & closed , keep away from the valve disc to avoid injury.

Pneumatic actuator operating method:



- Use compressed air to open the valve with a full stroke to make sure there is no interference.
- Use compressed air to close the valve, not hitting on the stop block but the stop bolt in the actuator.

4. Maintenance

Maintenance components may be different depending on the valve type. For example, as for seat replacement, the standard type only needs to change the valve seat; Metal type needs to replace the metal seat and graphite gaskets; Fire-safe type needs to substitute the soft seat, metal seat, and graphite gaskets. The maintenance methods are the same for the above, but require attention on their relative positions.

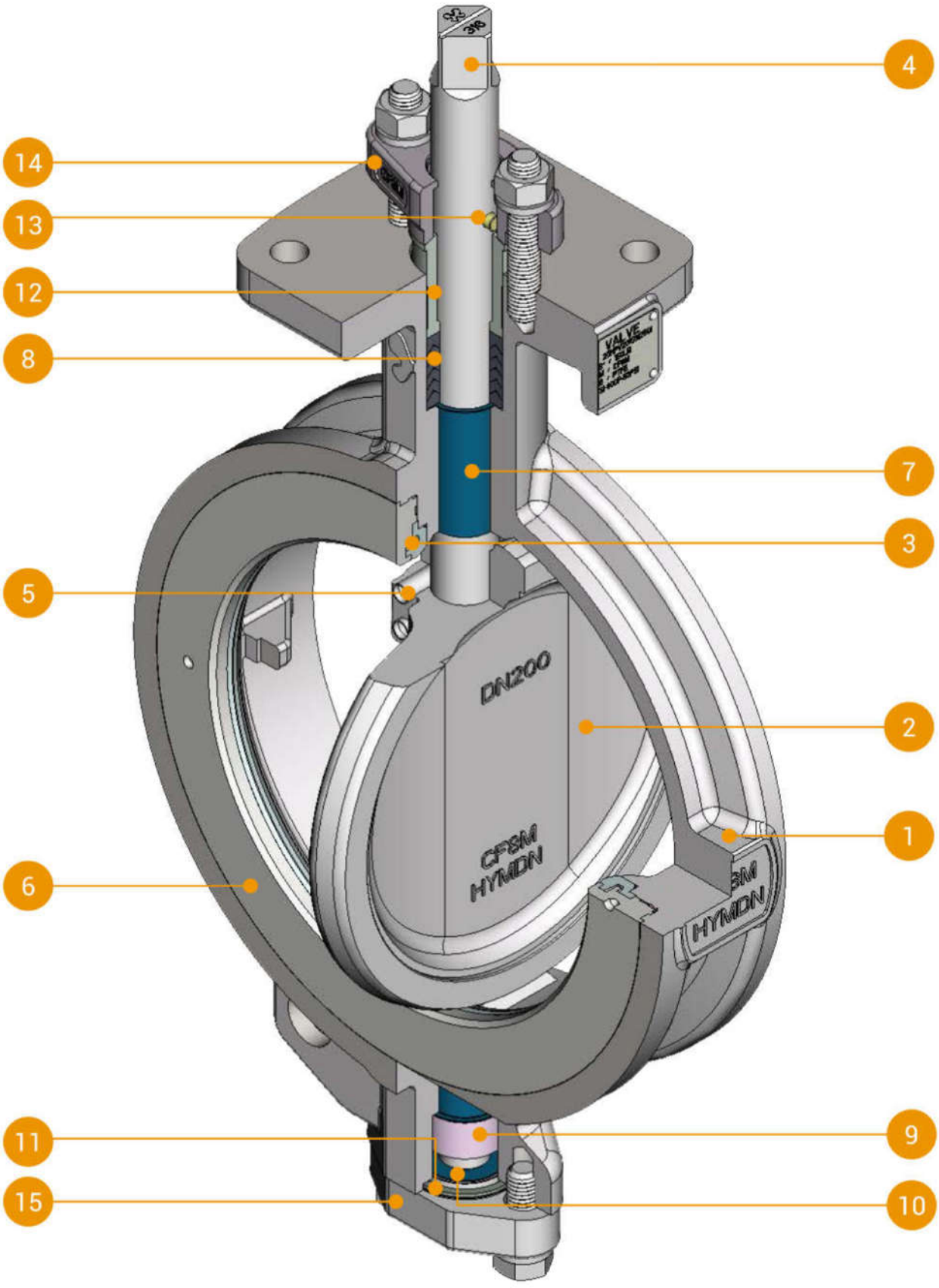
For the replacement of the disc spring, it must be in the right direction during installation.

4.1 Warnings

CAUTION 	Before operating the valve, appropriate precautions should be taken. And if necessary, in accordance with the special fluid requirements, protective clothing should be worn.
	Before removing the operator from the valve or removing the valve (when the valve is installed at the end of a line), the valve must be closed and decrease the line pressure.
	If the valve must be removed from the pipeline, the valve must be in the closed position.
	Remove the valve from the pipeline. It is mandatory to perform cleaning and inspection.
WARNING 	Valves without an actuator may be opened in the pipeline due to fluid pressure.
	Do not increase the pressure in the case where the valve is not assembled with a handle or gearbox.
	When handling or moving the valve, be careful not to scratch the disc edge or seat.

- You may obtain replacement valves, fillers, and other parts from Max-Seal.
- For more information like price and shipment, please contact Max-Seal.

VALVE COMPONENTS



ITEM	NAME	QTY	MATERIAL			REMARK
1	Body	1	A216 Gr. WCB	A351 Gr. CF8	A351 Gr. CF8M	
2	Disc	1	A351 Gr. CF8		A351 Gr. CF8M	●
3	Seat	1	PTFE / MPTFE / RTFE / FIRE SAFE / RUBBER / METAL			★
4	Stem	1	A182 Gr. F6A	A182 Gr. F304	A182 Gr. F316	●
5	Taper Pin	2	A182 Gr. F316L			
6	Retainer Ring	1	A351 Gr. CF8		A351 Gr. CF8M	
7	Stem Bush	2	B-Woven Fabric Metal		A182 Gr. F316	
8	Gland Packing	1	PTFE	RTFE	GRAPHITE (FIRE SAFE ONLY)	▲
9	Thrust Ring	1	A351 Gr. CF8M			
10	Thrust Plate	1	B-Woven Fabric Metal			
11	Gasket	1	PTFE	RTFE	GRAPHITE	▲
12	Gland Bush	1	A351 Gr. CF8M			
13	Anti-Blow-Out Pin	1	A182 Gr. F316			
14	Gland Flange	1	A216 Gr. WCB		A351 Gr.CF8	
15	Bottom Cover	1	A216 Gr. WCB	A351 Gr. CF8	A351 Gr. CF8M	

Remark

● Surface is Hard Chrome Plated

▲ Same as ITEM 3 SEAT's material. If valve is Fire-Safe design, use GRAPHITE as material.

★ Working temperature: PTFE -29~160 ℃ , MPTFE -29~180 ℃ , RTFE -29-230℃, **Metal depends on material.**

- When VOC Emission is requested, ITEM10 has 2 more materials, EVSP 9000 and 3300W, in option.
- The listed materials are assorted with standard package. We have ALLOY 20, HASTELLOY C276, Duplex A890 6A , MONEL in option. Please contact us for more details.
- Item 4 uses 17-4PH or UNS S31803 for Class 300LB.

4.2 Leakage Exception Handling

Most leakage exceptions are caused by 2 major conditions：

4.2.1 Internal leakage：

Check whether the valve disc is turned to the close position. If not, solve the issue by referring to the MS Valve G-series gearbox's Installation, Operation and Maintenance (IOM) manual Section 2.1 "Stop screw"; or refer to the MS Valve L-series Lever Installation, Operation, and Maintenance (IOM) manual Section 3.1 "Leakage Exception Handling."

After confirming the valve can be closed to the right position, if there is still a leak occuring, it might mean the valve seat or valve has been damaged. In this case, the valve must be removed from the pipeline and replace the valve.

4.2.2 Stem leakage：

Lock the gland packing with a 1/4" turn. Confirm if the leak has stopped or decreased. If there is a small amount of leakage, it is recommended to slowly lock the gland packing tighter. (Be sure to keep both sides of the bolts locked equally.) If the bolts are locked properly, but the leak has not stopped, it is recommended to replace the packing.

Also, while replacing the seat, it is also recommended to substitute packing and gasket.

4.3 Consumable Parts

If the exceptional leakage happens, it is highly recommend to regain the performance by replacing the below components:

4.3.1 Packing

4.3.2 Seat (Standard type, you only need to change the valve seat;

Metal type needs to replace the metal seat and graphite gaskets; Fire-safe type needs to substitute the soft seat, metal seat, and graphite gaskets.)

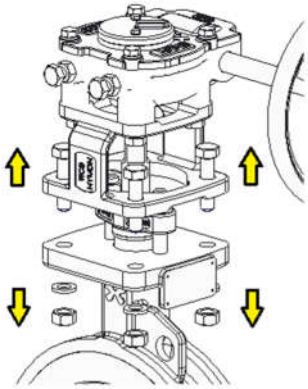
4.3.3 Disc and Stem (This is a set, you will need to change both at the same time)

4.4 Replacement of Consumable Parts

CAUTION 	The installation orientation of the component should be recorded before disassembly.
	During disassembly, do not scratch the valve disc 、valve stem or valve body.
	Flange surface should not be fully touched. Carefully keep the flange surface clean, so it will not be scratched.

4.4.1 Packing replacement

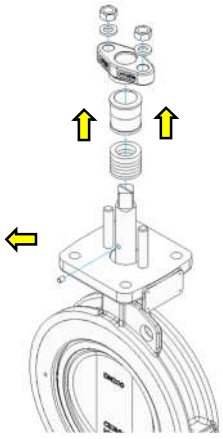
Step 1. For valves with yoke, first remove the yoke bolts and spring washers, then remove the yoke. For valves with actuators, loosen the yoke screws and remove the whole set of actuator and the yoke.



Step 2. Remove the gland flange after loosening the nuts and spring washers of the gland flange.

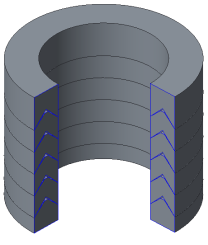
Step 3. Remove the anti-blowout pin and gland bush in sequence, then remove the gland packing.

Step 4. Before installing the new packing, first check the valve packing hole. If there is dirt, it should be cleaned before installing the new packing.



Step 2 - 4

Step 5.When installing the new packing, it should be noted that the gap should be loaded down (as illustrated to the right). This provides the capability to completely block the leakage of fluid.



PTFE Packing

Step 6. Fill the gland bushing into the packing hole, put the anti-blowout pin in and then lock the gland flange.

Step 7. Lock the spring washers and nuts equally.

Step 8. Reinstall the actuator, or install the yoke first if required.

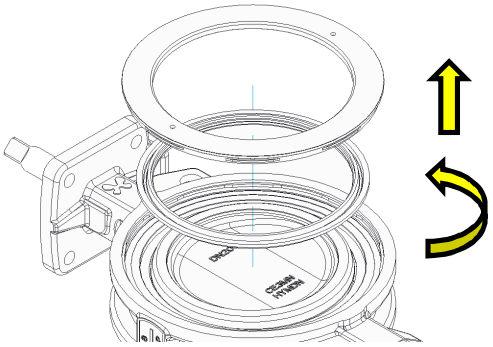
Step 9. Make several on-off operation tests. Make sure the valve works smoothly.

Step 10. Loosen the nut from the gland flange and then re-lock the nuts according to the torque value (seen to the right) to complete the replacement of the packing.

Diameter (Inch)	PTFE Locking Torque (Nm)	Graphite Locking Torque (Nm)
2-4"	11	15
5-6"	17	25
8"	23	32
10"	25	35
12"	52	72
14"	60	84
16-18"	87	121
20"	132	182
24"	141	195
28"	192	265
30"	215	300

4.4.2 Seat Replacement

Step 1. Lay down the valve flat with the retainer ring face up, and then rotate the retainer ring counter-clockwise to 22.5° or 45°. If it is a pin-lock retainer ring, you can pick it up, if not, please turn it counterclockwise about 3~4 turns before picking it up.



Step 2. After taking out the retainer ring, carefully remove the valve seat. Clean the valve body and the valve disc. Then check whether scratches or damages are in the valve disc.

Step 3. Place the new valve seat carefully in the valve body. Standard type only needs to change the valve seat; Metal type needs to replace the metal seat and graphite gaskets; Fire-safe type needs to substitute the metal seat, soft seat, and graphite gaskets.

Step 4. Check the retainer ring type

Pin-lock retainer ring

Place the new spring and the positioning pin into the retainer ring or body, rotate to the lock position. The seat replacement process is now completed.

Thread retainer ring

Rotate the thread retainer ring until it can no longer rotate. The seat replacement process is now completed

4.4.3 Disc and Stem replacement

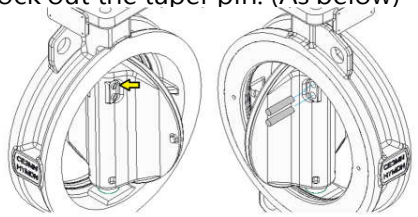
Step 1. For valves with a yoke, first remove the yoke bolts and spring washers. Second remove the yoke. For valves with actuators, turn and loosen the yoke screws and remove the whole set of the actuator and the yoke.

Step 2. Remove the gland flange after loosening the nuts and spring washers of the gland flange.

Step 3. Remove the anti-blowout pin and gland bush in sequence. Then remove packing.

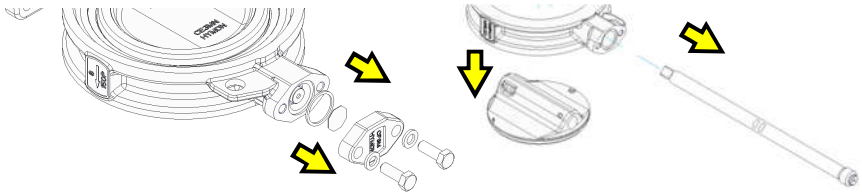
Step 4. Remove the retainer ring. (Refer to 4.4.2 Step 1) · Take out the retainer ring and valve seat in sequence. Carefully clean the valve body.

Step 5. Knock out the taper pin. (As below)



nove the bottom cover after loosen the screw
nove the thrust bearing and the bottom cover

Step 6. Remove the bottom cover after loosening the screw and spring washer. Remove the thrust bearing and the bottom cover gasket. Then pull out the stem and then take out the disc.



Step 7. After confirming the valve body is clean, place the replacement valve disc in the center of the body. Insert the replacement stem into the disc (disc shall be placed inside the body). Then tap the taper-pin.

WARNING 	Do **NOT** tap the taper pin too tight, just make the taper pin lock the stem or the replacement might be unable to complete.

Step 8. Put back the thrust bearing and the bottom cover gasket. Lock them with screws and spring washers equally.

Step 9. Install the new packing with the gap loaded down (This will completely block the leakage of fluid).

Step 10. Fill the gland bush into the packing hole, put the anti-blowout pin and then lock the gland flange.

Step 11. Lock the spring washers and nuts equally.

Step 12. Verify that the disc is in the center of the valve body. (Use vernier caliper to measure the up-and-down distance of disc to the valve body is the same or not. The error shall be within 0.1mm)

Step 13. Place the new valve seat into the valve body carefully.

Step 14. Place the new spring and the positioning pin into the retainer ring and rotate to lock position.

Step 15. Open the disc halfway. Tap the taper pin completely into the pin hole tightly.

Step 16. Reinstall actuator.

Step 17. Make several on-off operation tests. Make sure the valve works smoothly.

Step 18. Loosen the nuts from the gland flange and then re-lock the nuts according to the torque value chart (listed in 4.4.1Packing replacement) to complete the replacement of the lock.

4.5 If Assistance is Needed

For clarification of any relevant concerns in this manual, or for further inquiries, please contact your Max-Seal Valve representative.

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