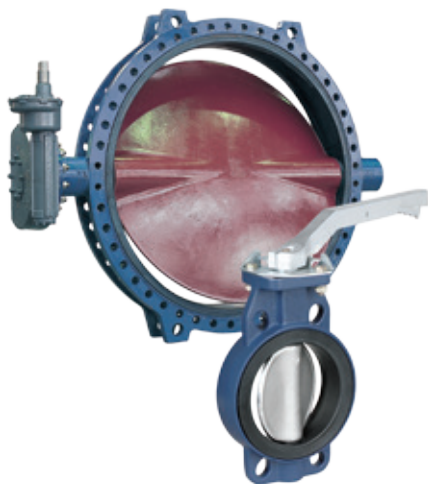


SAPAG BUTTERFLY VALVES JMC
 INSTALLATION AND MAINTENANCE INSTRUCTIONS

Before installation these instructions must be fully read and understood



Please read these instructions carefully

Hazard potentials:

- disregarding of instructions
- improper use of product
- insufficiently qualified personnel

Valve application to be within the pressure/temperature limits indicated in the P/T diagram.

Essential points and functions of the valve should be inspected on a regular basis.

1 STORAGE AND HANDLING

1.1 Protection

Sapag butterfly valves are delivered with protection in accordance with the Sapag Engineering Instructions, to protect the valve seats and disc from damage. Wrapping and/or covers should be left in place until immediately before fitting to the pipe.

1.2 Storage

When valves are to be stored for some time [2 months or more] before being fitted, storage should be in the original delivery crates or cases.

1.2.1 Storage conditions

The valves should be stored off the ground in a clean, dry indoor area. Protect the valve from temperature and humidity extremes, and exposure to excessive dust, moisture, vibration, deformations, sunlight and ozone.

Recommendations

1. Temperature: storage temperature below 25°C, above 0°C preferable below 15°C.
2. Humidity: storage conditions should be such that condensation does not occur, store in a dry environment. Maximal 50% relative humidity.
3. Light: valve rubbers should be protected from light, in particular direct sunlight or strong artificial light with high ultra violet.
4. Ozone: storage rooms should not contain any equipment generating ozone. E.g. lamps, electric motors.

IMPORTANT

Before valves are being installed or used the following actions are recommended.

1. *Valves/parts have to be inspected and thoroughly cleaned if required.*
2. *Rubber parts need to be greased with silicone grease if not present anymore.*
3. *All surfaces in contact with seats have to be thoroughly cleaned and greased with silicone grease if stored for more than 5 months.*

1.3 Handling

1.3.1 Packed valves

Lifting and handling of the packed valves in crates should be carried out by appropriate lifting equipment. If a fork lift truck is used, appropriate fork hitches are required. The lifting and handling of packed valves in cases will be carried out in the lifting points. The transportation of all packed material should be carried out safely and according the local safety regulations.

1.3.2 Unpacked valves

The lifting and the handling of these valves has to be carried out by using appropriate means and by respecting the carrying limits. The handling must, preferably, be carried out on pallets, protecting the machined surfaces and seat to avoid damage.

When lifting the large dimension valves, the sling and the hooking of the load must be carried out by using the appropriate tools (brackets, hook, fasteners) and load balancing tools in order to prevent the valves from falling or moving during the lifting and handling. The valve may be lifted only by slings attached to the flange holes or valve body; never to the actuator or the valve opening.

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2 INSTALLATION

WARNING

For safety reasons, it is important to take the following precautions before you start work on the valve:

1. Personnel making any adjustments to the valves should utilize suitable equipment. All required personal protection means should be worn.
2. The line must be depressurized before installing the valve.
3. Personnel trained in all aspects of manual and mechanical handling techniques only must carry out handling of the valves.
4. Misuse of the valve is not allowed.
For example: the valve, handles, actuators or other parts may not be used as 'climbing tools'.
5. Ensure that valve pressure/temperature limitations marked on the identification tag are within the service conditions. The trim number on the valve's tagplate identifies the valve materials. See Product Manual for valve specific P/T diagram and trim number definition.
6. Ensure that valve materials are compatible with the pipeline fluid.

2.1 Valve inspection

1. Carefully remove the valve from the shipping package (box or pallet) avoiding any damage to the valve or, in case of automated valves, to the electric or pneumatic/hydraulic actuator or instrumentation.
2. Confirm that the materials of construction listed on the valve nameplate are appropriate for the service intended and are as specified.
3. It is not allowed to use third party spare parts. In case of third party spare parts, safe operation is not guaranteed.

2.2 Flange and pipe compatibility

Check matching of flange drilling pattern of valve and pipe flange before assembly.

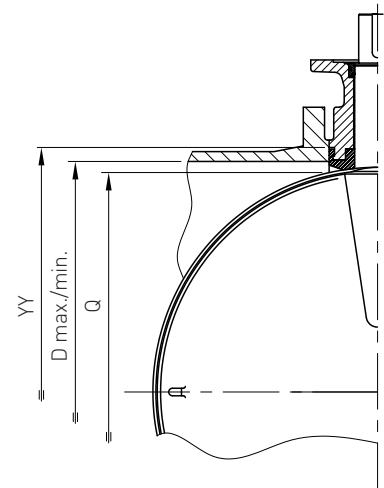
Flanges have to meet the following requirements:

- The face inside diameter should be:
D min.: The valve Q-dimension + adequate disc clearance.
D max.: The inside diameter (ID) of standard pipe for the nominal size ISO 4200.
For larger inside pipe diameters contact factory.
- If the flange (or pipe) is provided with a raised face, the diameter of this shall be at least 10 mm larger than the YY-dimension of the valve.
- The use of the flange gaskets is not allowed since it might damage the valve.
- The Sapag seat face design eliminates the need for the gaskets.
- Use flange bolting in agreement with appropriate standard.

Do not use flange gaskets!

2.3 Valve installation

The valves are bi-directional and may be fitted in either direction relative to the flow. The valve will control flow equally in either direction. The recommended installation position is shaft horizontal and the lower disc edge opening down-stream. (Especially for slurry service and media with a tendency for sedimentation). For optimum valve control and smooth performance, it is recommended to have a 10 to 20 pipe diameters of straight run inlet piping and 3 to 5 pipe diameters straight outlet piping. A valve is no crow-bar. Do not use the valve to spread the flanges. Seat damage might be the result.



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NOTES

- The valve can be installed in the pipe-line either with or without the actuator mounted on top of the valve. Make sure that you can turn the disc cautiously so you can detect a mismatch resulting from a disc touching the adjacent piping.
- Do not use the valve as a support of the pipe line construction.
- Adjacent piping must be positioned so that minimal piping stresses are transmitted to the valve flanges during or after installation.
- Handling and lifting of the valves during installation MUST be performed following the same instructions described in previous paragraph '1.3 Handling'.

IMPORTANT

Mating flange faces should be in good condition and free of dirt and/or inclusions. Both pipe insides to be well cleaned.

1. Check whether the flange distance meets the valve face-to-face dimensions. Spread with adequate tooling the flanges for easy insertion of the valve.
2. Close the valve so far, that the disc edge is at least 10 mm within the body.
3. Insert the valve between the flanges, center the valve body and insert all flange bolts.
4. Maintain the valve flange alignment while gradually removing the flange-spreaders and tighten the flange-bolts hand tight.
5. Slowly open and close the valve to check for adequate disc clearance.
6. Cross-tighten all bolting to the proper torque.

2.4 Valve verification

Check the operation of the valve by operating it to 'full open' and 'full close'. To verify the valve operation, the disc position indicator on the actuator or the manual operator should rotate between the 'full open' and 'full close' indicators. Generally the valve disc travels clockwise to close.

2.5 Sources of possible danger

This section contains some examples of possible foreseen danger sources.

2.5.1 Mechanical

- A. When manual operators are used, available space should be checked in order to avoid hands being clamped.
- B. Mechanical sparks caused on impact of valve and e.g. tooling, are a potential source of ignition of surrounding atmosphere.

2.5.2 Electrical

If static charges or stray electrical currents can initiate explosions, the valve should be grounded to earth.

2.5.3 Thermal

- A. If the valve is used in applications with a fluid temperature above 40°C the outside of the body might be hot. Sufficient measurements should be taken to avoid burning. A manual operated valve should be opened and closed with sufficient protection for the personnel operating the valve. For example: protecting gloves.
- B. Hot surfaces can be a potential source of ignition of environment.

2.5.4 Operational

Closing a valve too fast may result in waterhammer in the upstream part of the pipeline. Waterhammer results in excessive stresses in the valve's body and will cause severe damage.

Waterhammer should be avoided in all circumstances.

Due to differential pressure across the valve disc, butterfly valves have the tendency to be closed by the flow. This is called dynamic torque. Take care when unlatching or removing the valve operating mechanism. The valve might be closed by the dynamic torque created by the flow.

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2.6 TROUBLESHOOTING GUIDE

Symptom	Possible cause	Resolution
Valve would not rotate	Actuator has failed	Replace or repair
	Valve packed with debris	Flush or clean valve to remove debris
Valve leaking	Valve not fully closed	Close valve
	Debris trapped in valve	Cycle and flush (with valve open) to remove debris
	Seat is damaged	Replace seat
Jerky operation	Debris trapped in valve	Cycle and flush (with valve open) to remove debris
	Air supply actuator inadequate	Increase air supply pressure and/or volume

3 MAINTENANCE

The Sapag butterfly valve JMC is designed to require a minimum of maintenance.

3.1 Routine maintenance

Routine maintenance or lubrication is not required other than periodic inspection to ensure satisfactory operation and sealing. If problems occur with valve pressure tightness the seat can be replaced.

3.2 Removing the valve

1. Turn the disc to the nearly closed position. (The disc is in line with the keyway in the stem).
2. Secure the valve with proper lifting equipment and loosen all flange bolts and remove the bolts, which prevent removing of the valve.
3. Spread the flanges with adequate tooling, and remove the valve.

3.3 Valve disassembly

1. Place the valve on a horizontal support.
2. Turn the disc to the full open position.
3. Remove the actuation.
4. Secure the disc with proper lifting equipment.
5. Remove the bottom plug or cover.
6. Remove the nut of the thru-bolt at bottom hub.
7. Mark the position of the bottom shaft and of the driving shaft versus the disc.
8. Pull the driving shaft and belonging thru-bolt out off body and disc. If required use threaded hole in stemhead. Support shaft and disc during removal. It is possible that also the shaft seal is removed.
9. Remove bottom shaft. If necessary the shaft can be pushed out with help of a bar through the body driving shaft hole.
10. Lift the disc out off the body.
11. Pull the lip of the seat out off the groove and deform the seat to the shape of a heart and remove the seat.

3.4 Valve assembly

1. Place the valve on a horizontal support. Inspect correct position of bearings. For some sizes a circlip should be mounted on driving shaft and in disc bottom shaft hole.
2. Collapse the seat in the shape of a heart perpendicular to the shaft holes. Pull the seat lip over the edges and push the hubs into the shaft holes. Divide the rubber equally over the complete circumference.
3. Put some silicon grease on the inside of the seat. Especially on the circumferential contact area between shaft and seat, the shaft bearing and seat hole.
Pay attention!! Area between seat outside and body inside should be free of grease.
4. Lift the disc in vertical position (shaft holes horizontal) leaving the shaft holes free.
5. Let the disc descend into the seat until the shaft holes of body and disc are exactly in line.
6. Insert the bottom shaft in the initial position as marked during disassembly. Take care of spline or key position if applicable.
7. Insert driving shaft with fixed thru bolt. Put the shaft in the initial position as marked during disassembly. Position of spline, key or square should match exactly. Look at the mark on shaft and disc placed during disassembly. When the shaft is ca 10 cm before its landing surface the shaft seal should be placed on the shaft top. For some sizes a circlip should be mounted near stemhead to lock up the seal.
8. Mount nut and ring on thru bolt at bottom shaft side and tighten.
9. Place bottom plug or cover and tighten screws.
10. Remount the actuation and test valve

WARNING

Depressurize and, if necessary in case of dangerous fluids, drain the line and flush with appropriate cleaning fluid before starting any maintenance. Failure to do so may cause serious personal injury and/or equipment damage. Before disassembling the valve ensure the valve has been decontaminated correctly from any harmful gasses or liquids and that it is within a safe temperature range for handling. Personnel making any adjustments to the valves should utilize suitable equipment. All required personal protection means should be worn. Only personnel trained in all aspects of manual and mechanical handling techniques must carry out handling of all valves.

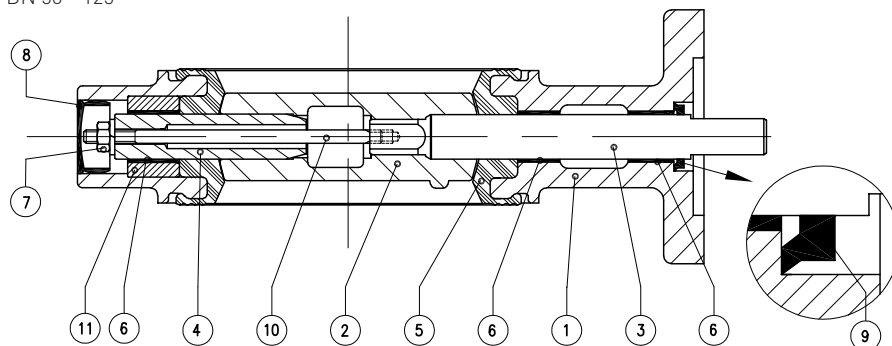
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PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Plug
9	Seal
10	Thru bolt
11	Bushing

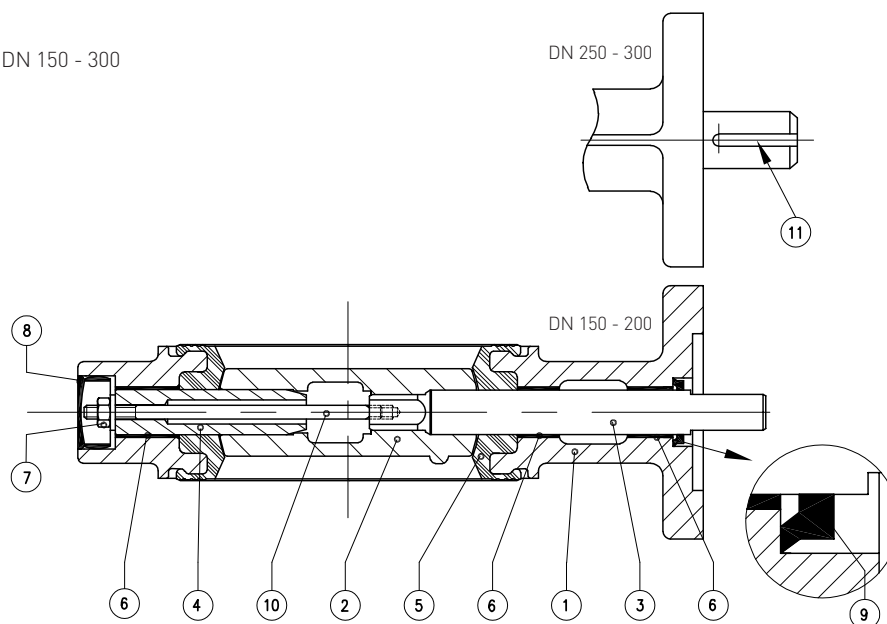
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PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Plug
9	Seal
10	Thru bolt
11	Key

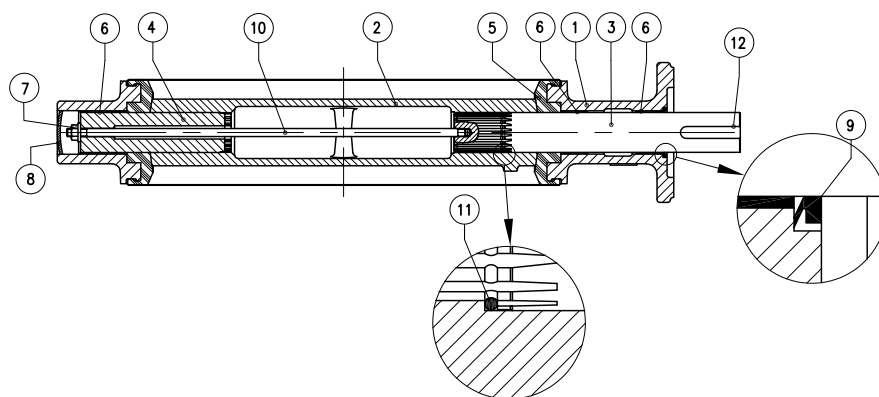
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PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Plug
9	Seal
10	Thru bolt
11	Snap ring
12	Key

DN 350 - 800



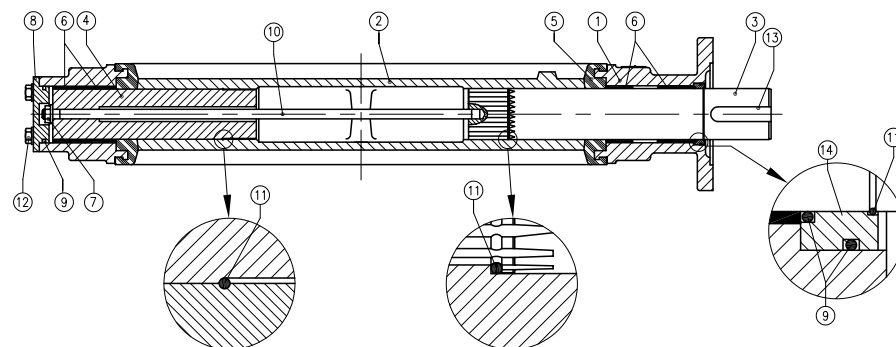
SAPAG BUTTERFLY VALVES JMC

INSTALLATION AND MAINTENANCE INSTRUCTIONS

PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Cover
9	O-ring seal
10	Thru bolt
11	Snap ring
12	Screw + washer
13	Key
14	Bushing

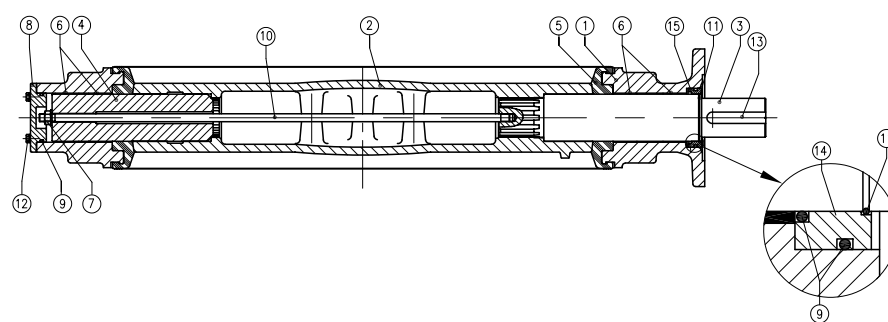
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PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Cover
9	O-ring seal
10	Thru bolt
11	Snap ring
12	Screw + washer
13	Key
14	Bushing

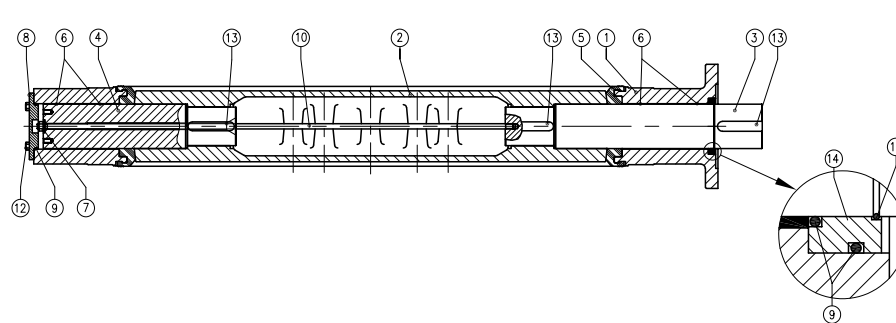
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PARTS LIST

Part	Name
1	Body
2	Disc
3	Driving (top) shaft
4	Bottom shaft
5	Seat
6	Bearing
7	Nut + spring washer
8	Cover
9	O-ring seal
10	Thru bolt
11	Snap ring
12	Screw + washer
13	Key
14	Bushing

DN 1600 (PN 16) - 2400



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