

KEYSTONE OPTISEAL F14/16 - 15/17 AND BREWSEAL BUTTERFLY VALVES
 INSTALLATION AND MAINTENANCE INSTRUCTIONS

Before installation these instructions must be fully read and understood



Intended valve use

The valve is intended to be used only in applications within the pressure/temperature limits indicated in the P/T diagram of the product manual.

When the valve is used in an end-of-line function, PED Cat-I applications are allowed only. For other categories, please contact the factory.

1 STORAGE AND HANDLING

1.1 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.

1.1.1 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.

1.2 Handling

To prevent damage during handling, the valves should be lifted by hand or using appropriate lifting equipment. The valves should be protected from external events e.g. (bumps, hitting and vibration) during transport. Any flange protection caps need to be removed before the valve is mounted in the pipeline. Lift the valve with great care from the transport package (crate, pallet). While handling or installing the valve, ensure that no damage occurs to the valve, the pneumatic/electrical/-hydraulic actuator or other instrumentation.

2 SPARE PARTS

Only original Keystone spare parts are allowed to be used. Safe operation can not be guaranteed if third party spare parts are used.

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3 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. Installation and handling of valves should be done only by personnel that is trained in all aspects of manual and mechanical handling techniques.
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.
7. For DVGW-Gas approved lugged valves, through threaded rods must be used instead of flange bolts.

3.1 Visual valve inspection

1. Confirm that the materials of construction listed on the valve nameplate are appropriate for the service intended and are as specified.
2. Tag/name plate identification

Manufacturer:	Keystone
Fig.:	e.g. OptiSeal 14-112
JOB:	Job number
Nominal size:	DN
M.P.W.P.:	maximum permissible working pressure
Flange compatibility:	e.g. PN 10/16
Temperature:	e.g. -40/120°C
Body:	e.g. GJL 250.

3.2 Flange and pipe compatibility

Check matching of flange drilling pattern of valve and pipe 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 optimum inside diameter (ID) is equal to the inside diameter of flange standard EN 1092-1, table 8, type 11.
- For larger than D max inside diameters or other flange types please contact your local Emerson Sales organization, as larger inside diameters might result in reduced valve functionality.

- If the flange (or pipe) is provided with a raised face, the diameter of this shall be at least 8 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 Keystone seat-face design eliminates the need for the gaskets.

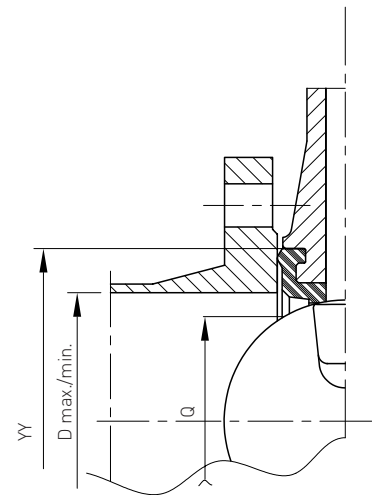
Use flange bolting in agreement with appropriate standard.

Do not use flange gaskets, these lead to valve damage!

3.3 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 feel a mismatch resulting from a disc touching the adjacent piping.
- It is the responsibility of the valve user - and not the valve manufacturer! - to ensure that the pipeline system has been built professionally and the valve has been properly installed.
- 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 section '1.2 Handling'.

IMPORTANT

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

3.3.1 Existing system (see sketch)

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. In case of a wafer valve, insert some flange bolts in the pipe flanges, to help you bear the valve after insertion.
3. Close the valve so far, that the disc edge is at least 10 mm within the body.
4. Insert the valve between the flanges, center the valve body and insert all flange bolts. Tighten the flange-bolts hand tight.
5. Slowly open the valve completely. (The disc is in line with parallel flats or keyway in stem head. Keyway points towards disc edge).
6. Maintain the valve flange alignment while gradually removing the flange-spreaders and tighten the flange-bolts hand tight.
7. Slowly close and open the valve to check for adequate disc clearance.
8. Cross-tighten all bolting to the proper torque. Do not over tighten.

3.3.2 New system (see sketch)

1. With the disc in near-closed position center each mating flange with the valve body. Fix the body with some flange-bolts and tighten the bolts.
2. Use the flange-valve-flange assembly for fit-up and centering to the pipe.
3. Tack-weld the flanges to the pipe.
4. Remove the bolting and remove the valve from between the flanges.

IMPORTANT

Do not finish-weld the flanges to the pipe with the valve bolted between the flanges as this will result in serious heat-damage to the seat.

5. Finish-weld the flanges to the pipe and allow the flanges to cool completely.
6. Install the valve now according to the procedure for installing in existing systems.

3.4 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 handle should rotate between the 'full open' and 'full close' indicators on the actuator or throttle plate. Generally the valve disc travels clockwise to close.

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3.5 Sources of possible danger

This section contains some examples of possible foreseen danger sources.

3.5.1 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.

3.5.2 Electrical

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

3.5.3 Thermal

- A. Isolation should be used on valves with application temperatures $> +40^{\circ}\text{C}$ and $< -20^{\circ}\text{C}$ to prevent them from being touched (to avoid burning).
- B. If the valve is used in hot gas/fluid applications that might give exothermic reactions, precautions must be taken so that the valve surface can not lead to danger for people or the direct environment. In dust and possible explosion zones, the operation temperatures and ignition temperatures for dust should be reviewed.

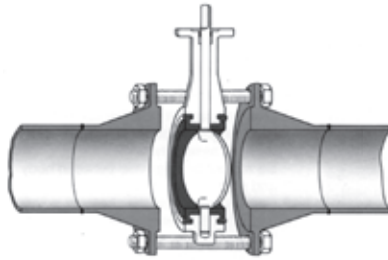
3.5.4 Operational

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

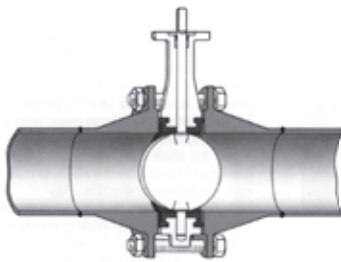
Waterhammer should be avoided in all circumstances.

Due to differential pressure across the valve disc, butterfly valves have the tendency to be closed by the flow. Take care when unlatching the valve operating mechanism.

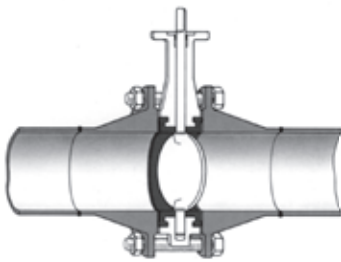
EXISTING SYSTEM



1. Spread the flanges with the adequate tooling. Insert some flange bolts to bear the valve.

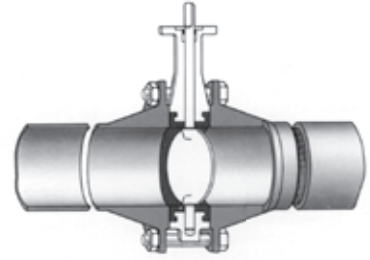


2. Open the valve and remove the flange spreads.

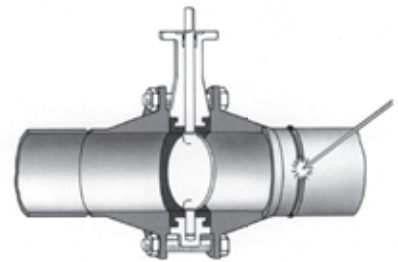


3. Close the valve clockwise, return to open position and cross-tighten all bolting.

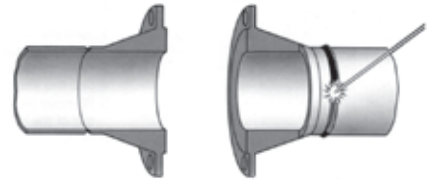
NEW SYSTEM



1. Center a flange-valve-flange assembly between the pipes.



2. Tack weld the flanges to the pipes.



3. Remove the valve and finish weld. Install the valve according to the procedure in the left column.

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3.6 TROUBLESHOOTING GUIDE

Symptom	Possible cause	Resolution
Valve would not rotate	1. Actuator has failed 2. Valve packed with debris	1. Replace or repair 2. Flush or clean valve to remove debris
Valve leaking	1. Valve not fully closed 2. Debris trapped in valve 3. Seat is damaged	1. Close valve 1. Cycle and flush (with valve open) to remove debris 2. Replace seat
Jerky operation	1. Extreme dry application 2. Air supply actuator inadequate	1. Put some silicon oil on seat or increase size of actuator 2. Increase air supply pressure and/or volume

4 MAINTENANCE BUTTERFLY VALVES OPTISEAL FIG. 14/16 AND BREWSEAL

The Keystone butterfly valves OptiSeal Fig. 14/16 and BrewSeal are designed to require a minimum of maintenance.

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. We recommend that personnel should be trained in all aspects of these instructions before carrying out handling of any valve.

4.1 Routine maintenance

The Keystone OptiSeal Fig. 14/16 and BrewSeal butterfly valves are designed to require a minimum of maintenance. Routine maintenance or lubrication is not required, we recommend periodic (visual) inspection to ensure satisfactory operation and sealing to the environment.

4.2 Removing the valve from the pipe system

1. Turn the disc to nearly closed position. (The disc is in line with the parallel flats in the stem).
2. 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.

4.3 Valve disassembly (see sketch)

1. Turn the disc to almost open position.
2. Remove actuator.
3. Remove the body screws.
4. Remove the lower part of the body. This is more or less held by the rectangular shaped seat lip and groove. Use two screwdrivers in the body-splits to separate the body halves and pull the bottom-part off with a rotating motion.

5. Pull the disc stem and seat out of the body top part.
6. To remove the disc stem from the seat, deform the seat into a long 'oval' sufficient to clear the end of the short stem, move the short stem-end out off the seat bore, and pull the long end from the seat stem hole, using a rotating motion.
7. The body top part contains a top bushing and dirt scraper. Generally there is no need to remove these parts.
8. For some versions of the OptiSeal only, the bodies are equipped with bearings. If required these can be removed.

4.4 Valve assembly (see sketch)

1. Clean all parts. Use silicone grease on the disc stem to facilitate the assembly. If the valve has to be provided with a TFE-lined-seat preheat this seat during half an hour in nearly boiling water before assembly.
2. If removed before, re-assemble the top (shaft)-bushing in the body upper part.
3. For some versions of the OptiSeal, mount the two shaft bearings and split seals.
4. Take the disc stem and insert the long stem-end into a hole of the seat, using a twisting motion.
5. Deform the seat into a long 'oval' sufficient to clear the end of the short stem. With the disc stem simulating an open position, move the short stem-end into the elongated seat-bore and assemble the short stem-end into the other seat stem-hole by releasing the distorted seat. Do not put oil or grease between body and seat.
6. Push the long stem-end of the disc stem/ seat unit into the body top part. Push the seat with seat lip and groove in place.
7. Assemble the bottom part of the body. Take care of the positioning of the bottom part. The little rectangular cast on indicator near the body split should correspond to the indication on the bottom part. Install the body screws and tighten securely. Take care that the body parts are aligned securely.
8. Assemble the dirt scraper.
9. Mount the actuation.

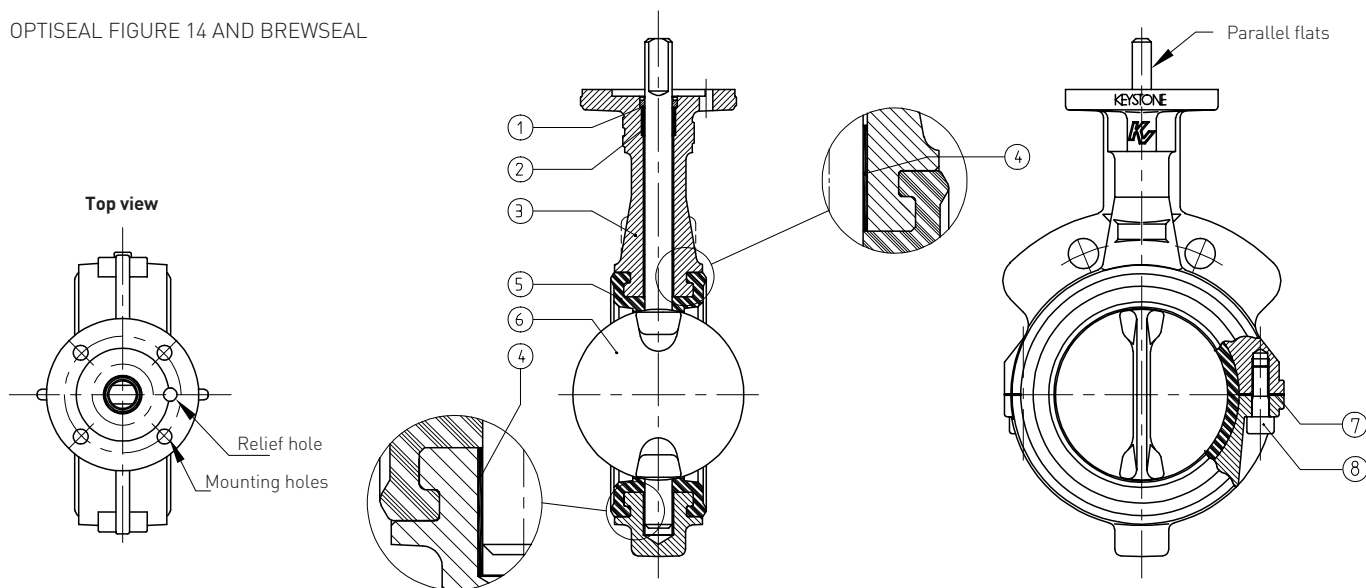
4.5 Re-installing the valve

See section 3.3.1

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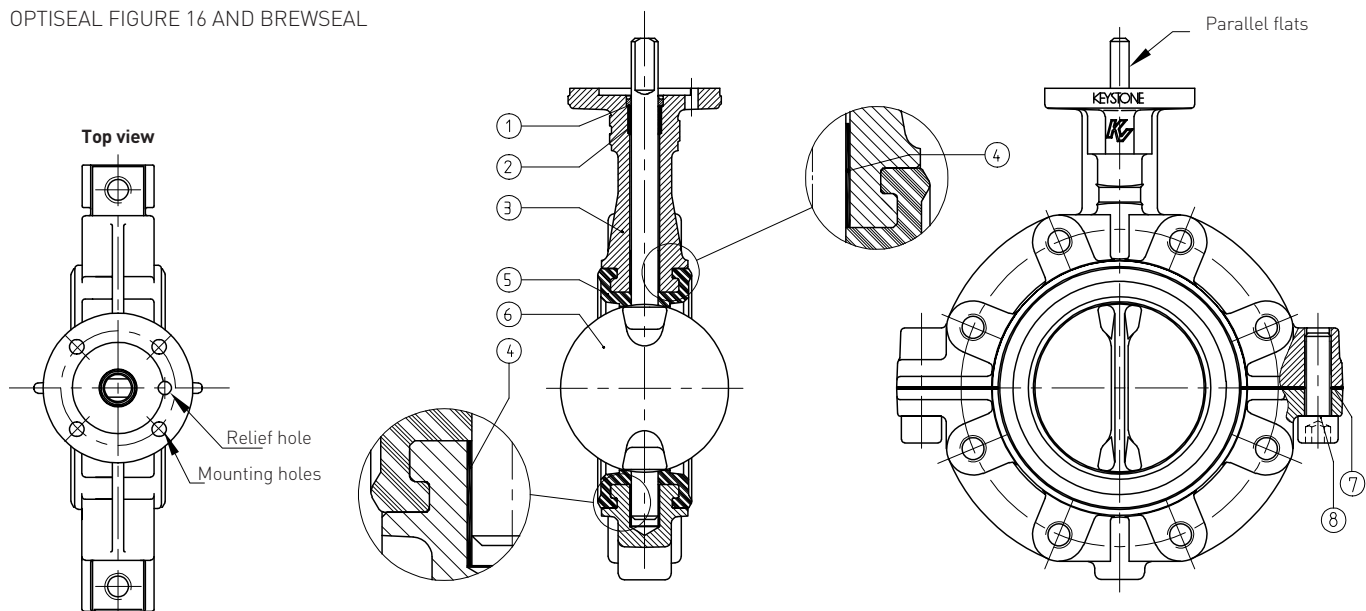
OPTISEAL FIGURE 14 AND BREWSEAL



Parts identification

- | | |
|--|----------------|
| 1. Dirt scraper | 5. Seat |
| 2. Shaft bushing | 6. Disc stem |
| 3. Body | 7. Split-seal |
| 4. Bearing (not for grey cast iron body) | 8. Body screws |

OPTISEAL FIGURE 16 AND BREWSEAL



Parts identification

- | | |
|--|----------------|
| 1. Dirt scraper | 5. Seat |
| 2. Shaft bushing | 6. Disc stem |
| 3. Body | 7. Split-seal |
| 4. Bearing (not for grey cast iron body) | 8. Body screws |

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5 MAINTENANCE BUTTERFLY VALVES FIG. 15/17

The Keystone butterfly valve figure 15 and 17 are designed to require a minimum of maintenance.

WARNING!

See section 4!

5.1 Routine maintenance

See section 4.1

5.2 Removing the valve from the pipe system

See section 4.2

5.3 Valve disassembly

1. Turn the disc to almost open position.
2. Remove actuator.
3. Remove the disc screw with the O-ring.
4. Pull the shaft out of the body.
5. Remove the disc by pulling or 'rolling' out of the seat bore.
6. Remove the seat from the body: pry under both seat edges at one point, collapse the seat into the shape of a round bottom heart configuration and pull the seat out of the body bore.
7. Remove circlip and pull the plug, containing an O-ring, out of the body.
8. Remove the O-ring from the plug.
9. Remove the dirt scraper and bushing from the body top neck.

5.4 Valve assembly

1. Clean all parts.
2. Insert the bushing in top neck.
3. Collapse the seat in the shape of a round bottom heart firmly place the 'bottom' part of the seat into position in the body. Align the holes in the seat properly with the holes in the body.
4. Insert the shaft with sufficient (silicone) grease so far that it protrudes approximately 10 mm into the inside bore of the seat. Install the disc, with the disc screw holes toward the actuator flange, by inserting the disc in the seat with the shaft bore on the topside against the shaft, leaving the bottom part of the disc just outside the seat. Push the bottom part of the disc in place with a twisting motion.
5. Insert the shaft completely using a rotating pressure on the shaft, and a rotating motion on the disc. Pay special attention in order that the seat is not damaged due to any misalignment of stem holes.
6. Align the counter-drilled position of the stem screw holes. Place the O-ring on the disc screw. Install the disc screw and tighten securely.

7. Place the O-ring onto the plug. Place the plug into the body and position it with a circlip.
8. Assemble the dirt scraper.
9. Mount the actuator.

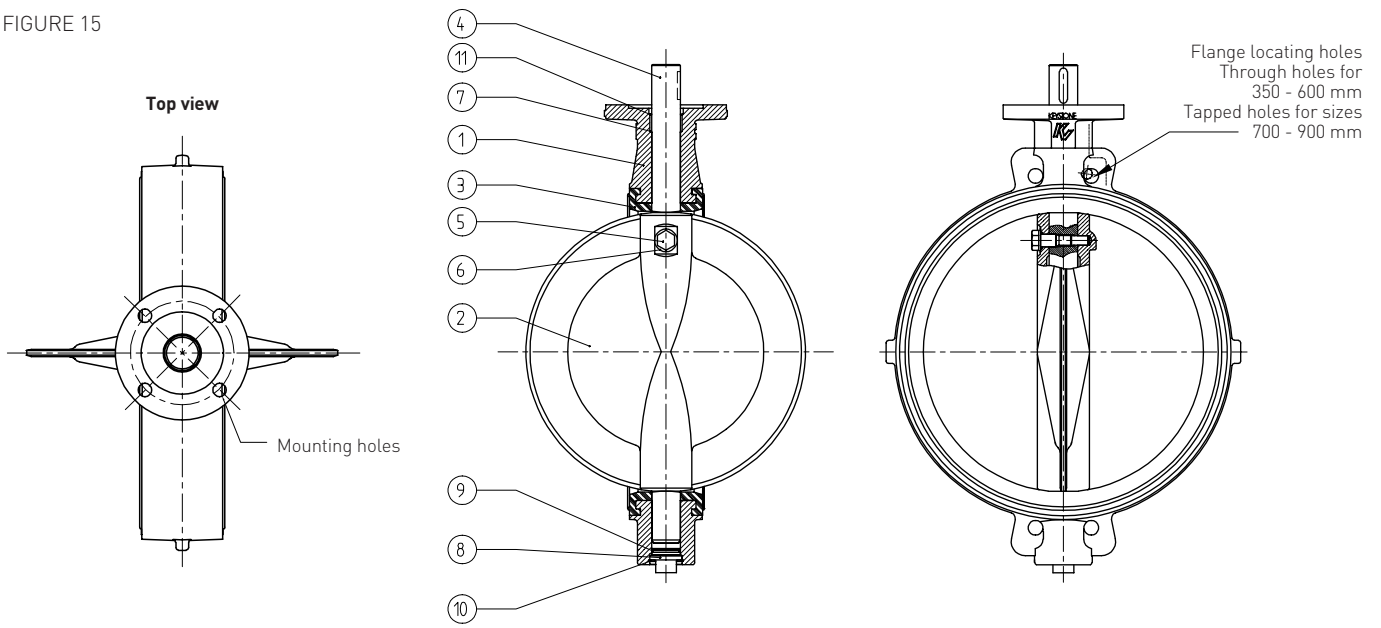
5.5 Re-installing the valve

See section 3.3.1

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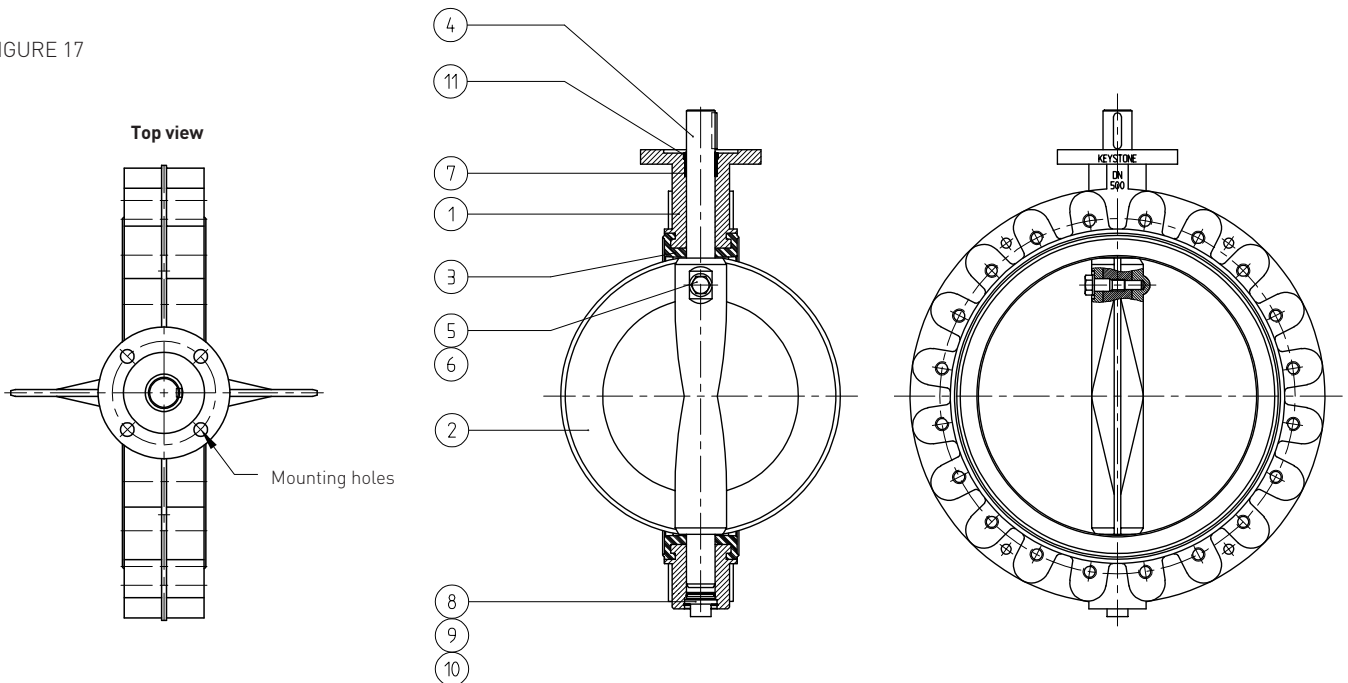
FIGURE 15



Parts identification

- | | |
|---------------|------------------|
| 1. Body | 7. Bushing |
| 2. Disc | 8. Plug |
| 3. Seat | 9. O-ring |
| 4. Shaft | 10. Circlip |
| 5. Disc screw | 11. Dirt scraper |
| 6. O-ring | |

FIGURE 17



Parts identification

- | | |
|---------------|------------------|
| 1. Body | 7. Bushing |
| 2. Disc | 8. Plug |
| 3. Seat | 9. O-ring |
| 4. Shaft | 10. Circlip |
| 5. Disc screw | 11. Dirt scraper |
| 6. O-ring | |

