OPERATING INSTRUCTIONS

BUTTERFLY VALVE APPLICATION

&

MAINTENANCE

MARCH, 2019

Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage. Shown products are according the current production. Dikkan reserves to modify product characteristics according technical evolution or customer special request. Verify if manual comply with used product.

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CONTENTS

1. SAFETY TERMS

The signal terms DANGER, CAUTION and NOTICE are used in this operating manual in the event of notices related special dangers, or for unusual information, requiring a special marking.

Danger infers that there is the danger of life and considerable damage in the event of non-compliance.

Caution infers that there is the danger of injuries and damage in the event of non-compliance.

Notice infers that attention is drawn to technical correlations/connections.

2. TECHNICAL FEATURES

Standard:	EN 593 (DIN 3354) - Double Flanged
Face to Face:	EN 558 Series 14 (DIN 3202 F4)
Flange Dimension:	EN 1092-1, EN 1092-2, EN 1092-3
Material:	Ductile Iron, Cast Steel, Stainless Steel, Bronze
Application:	Neutral water, drinking water, waste water, irrigation lines, water supply stations
Operation:	Manual by handwheel (With Gearbox) (Option: Electric, Pneumatic, Hydraulic Actuator)

Pressure & Temperature Ranges

Ductile Iron, Cast Steel, Stainless Steel, Bronze	Max. Working Pressure [bar]

Bore	80 ℃
DN100-DN2000	25bar

Valves must not be used at higher “pressure & temperature” than defined “working pressure & temperature”.

3. DESCRIPTION

A Butterfly valve is a quarter-turn rotational motion valve. In closed position, the disc blocks the valve bore while in open position, the disc is turned to allow flow. The design of the valve is that of an eccentric valve with a double offset of the disc. Butterfly valves are not suitable for precise flow control.
Flow speed is critical for the average life of a butterfly valve. For this reason there are limits to the flow speeds for butterfly valves. Flow speeds are limited according to EN 593:2017 Table 1

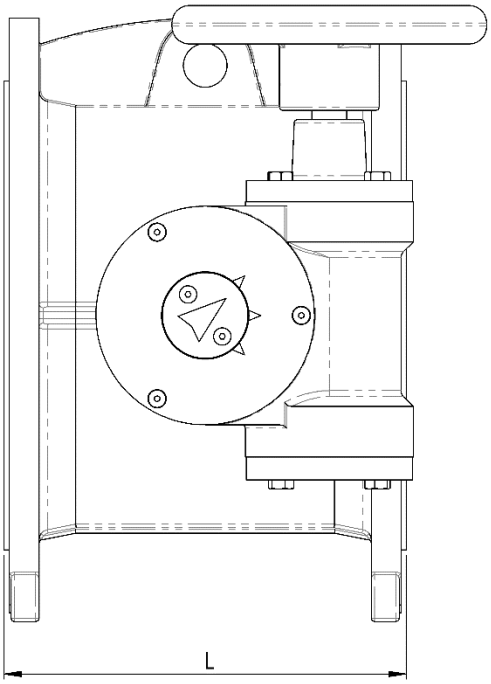
PS (bar)	Maximum flow velocity (m/s)
	Liquid fluids
Up to 6	2,5
6 < PS ≤ 10	3
10 < PS ≤ 16	4
PS > 16	5

Dikkan butterfly valves are designed according to these limits.

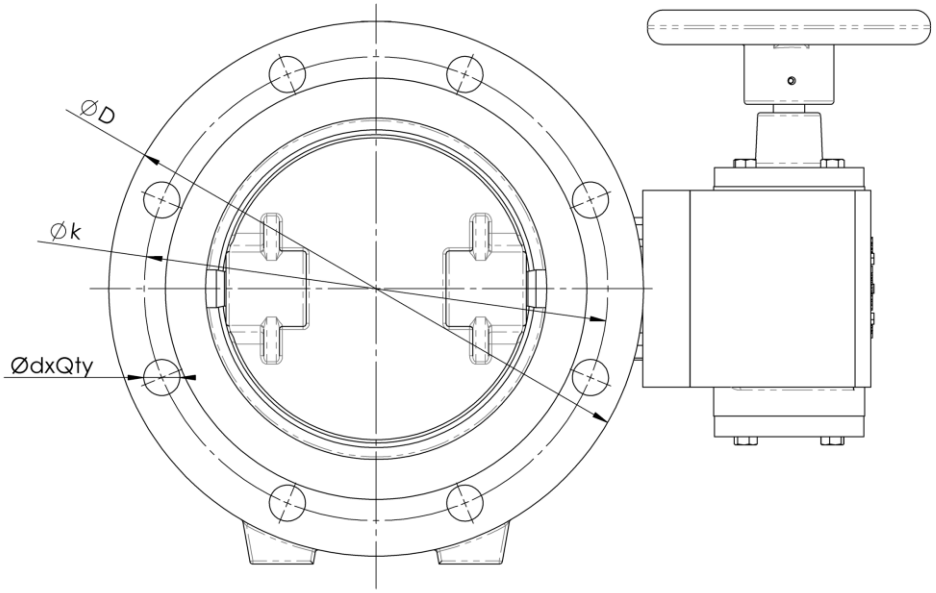
Butterfly valves are operated by worm gearbox for low torque & easy operation. Gearboxes have a protection class of IP67. IP68 can be provided upon customer special request.
Hard rubber lined valve was designed for corrosive medium.

4. HOW TO MEASURE VALVES

It is very important to supply dimensions as described below as well as pressure, temperature and medium information, to request or purchase the exact valve as per your needs.

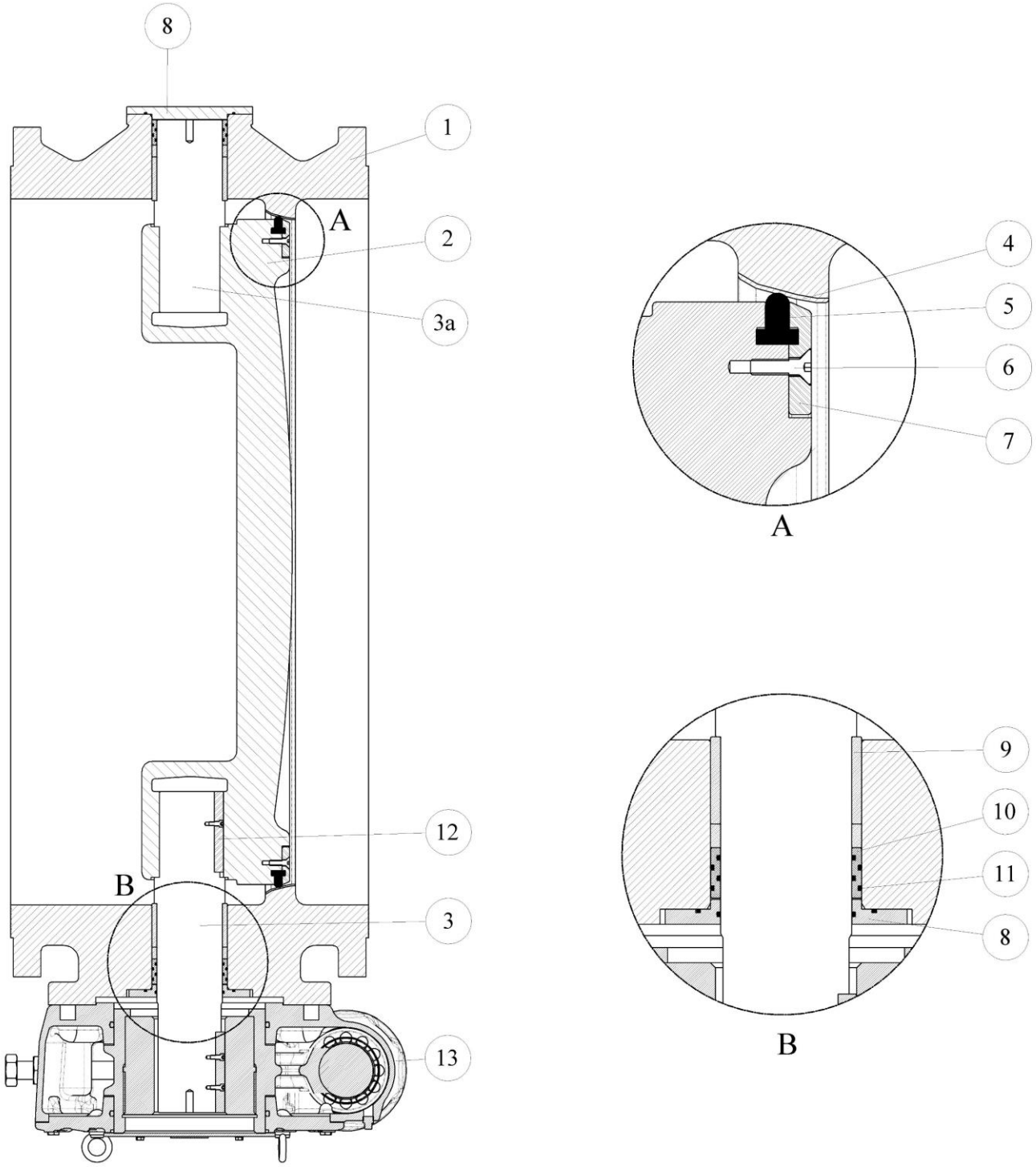


L: Face to Face Length
(Raised face is included in length)



ØD: Outside Flange Diameter
Øk: Hole Circle Diameter
ØdxQty.: Diameter of Bolt Holes x Number of Bolt Holes

5. BUTTERFLY PART LIST



Part No / Part Name							
1	Body	4	Welding	8	Cover	12	Key
2	Disc	5	Disc Seal	9	Bearing Bush	13	Gearbox
3	Drive Shaft	6	Bolt	10	Spacer Bush		
3a	Free Shaft	7	Retaining Ring	11	O-Ring		

6. PROTECTION DURING STORAGE AND TRANSPORT

- Valves should be stored in a closed place where will be exposed to direct to sunlight.
- Valves shall be kept on pallets, avoiding any direct contact with the ground.
- Valves shall be protected from any external effects and mechanical damages in the storage place.
- Valves shall be protected from dust and dirt.
- Valves, keep the packaging until the moment of installation. (In valve packaging to prevent sweating, you are not allowed to sudden changes in temperature in the storage area)
- Keep the valve in the storage space heat and flame sources.
- Protect the valve from excessive vibration during transportation.
- Optimum storage temperature is 5°C to 40°C.
- During the storage, it should be assured that the discs of the valves are in closed position. (except for soft seal valves)
- Unload all valves from wooden pallets carefully to the ground without dropping. When lifting, the valve should be secured by the body and never lifted by the trim.
- Good condition of stored products must be periodically verified.

7. INSTALLATION

- Pipelines and pipeline systems have to be installed in such way that no tensions from thermal expansion (or other) of the pipeline may have impact on the valves. This can theoretically even lead to breaks in the valves, causing danger from medium spills. DIKKAN offers suitable expansion joints for this purpose.
- Before installation, the pipeline must be cleaned off all dirt such as sand, dust, welding residues etc. Use strainers, in suitable sections of the pipeline, for future protection of the valve from dirt and foreign substances.
- Verify that the valve is suitable for the operating specifications of the medium (installation); such as maximum operating pressure, maximum operating temperature, corrosiveness and abrasiveness, etc.
- Verify that the distance between the flanges, where the valve will be connected, is equal to the length of the valve body.
- All protection devices for transport and storage have to be removed before installation.
- The arrow on the valve body must be in the same direction of the liquid flow. Valves without on the arrow mark can be installed with bidirectional piping.
- Valves shall be assembled to the pipeline in fully closed position.
- Use gaskets between the valve flanges and the counter flanges. The gasket should be suitable for operation conditions or maximum pressure/temperature ratings.
- The flanges which the valve will be assembled should be in the same axis and the flange surfaces should be parallel to each other.

- The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized. Tighten the bolts and nuts in the crossover method shown in Fig. 1, to load the pipe and valve evenly and prevent stress on the joints. Finally tighten bolts to correct torque levels as recommended in Table. Do not overtighten.
- To avoid effects of weight and stress of the piping system to the valves, all piping systems should contain independent support mechanisms.
- After the installation process is completed, check the connections for leaks with water. Do not use the valve if it is leaking.
- During installation prevent to damage the paint of the valve.

	Hex Head Bolt - Grade 8.8													
Metric	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M45	M52	M56	M64
Torque (Nm)	50	87,2	210,8	411,9	711	1048	1422	1932	2481	3226	4992	7747	9650	14416

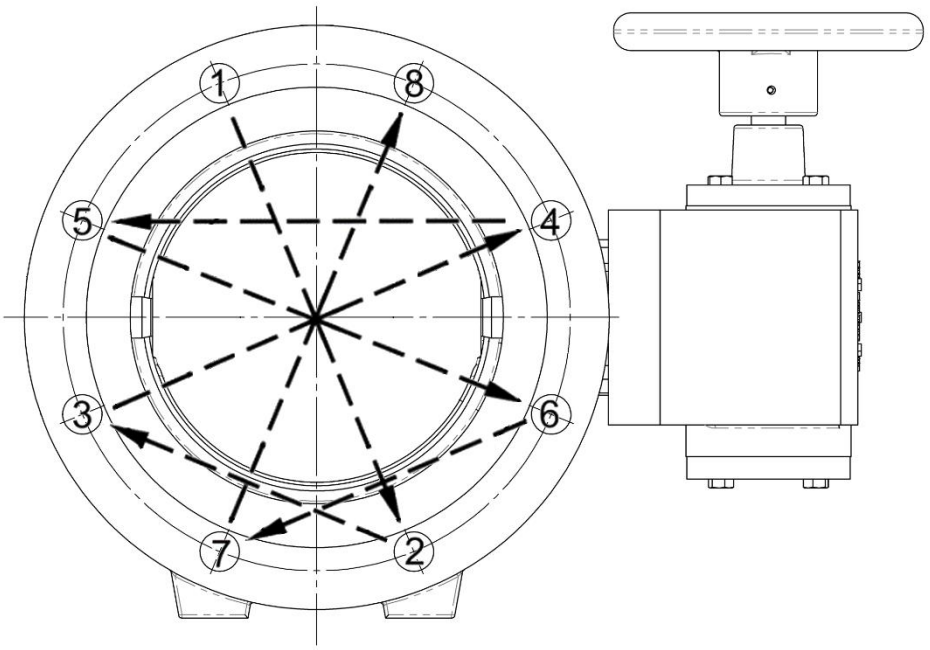
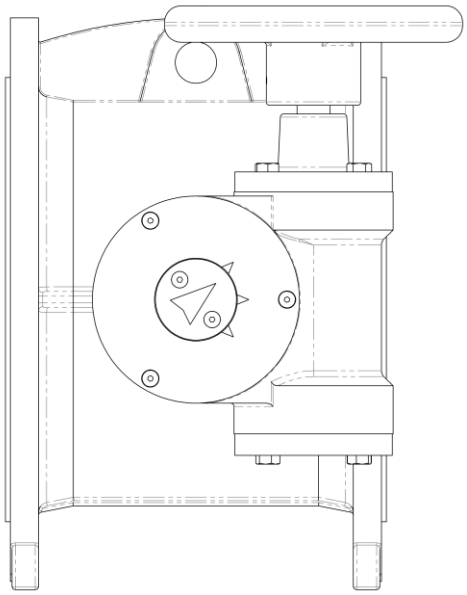
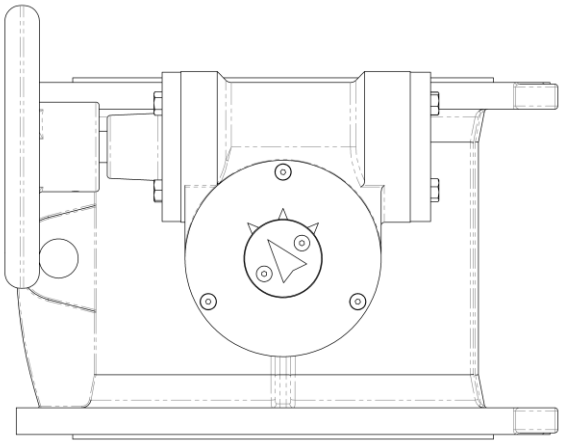


Fig.1

7.1 Installation Position





8. MAINTENANCE

Dikkan butterfly valves are designed to have minimum maintenance. But if you carry out the following maintenance, they will increase the longevity and reliability of the valve.

Valves shall be dismounted from pipe line before maintenance and shall be cleaned from medium.

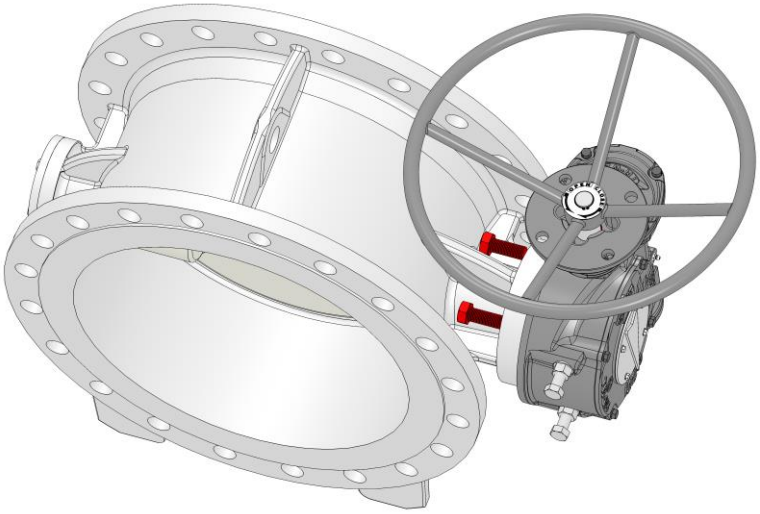
Maintenance work must be performed by qualified, trained and skilled people according to maintenance instructions Welding is not accepted on valves repairing.

- In very seldom used places, valves should be performed open-close every 3-4 months.
- The stem threads that are exposed to atmosphere should be periodically lubricated, with quality grease.
- Bonnet bolt tension should be checked periodically when valves are used in high temperature applications where loosening may occur.
- The valve o-ring should be inspected at least monthly.

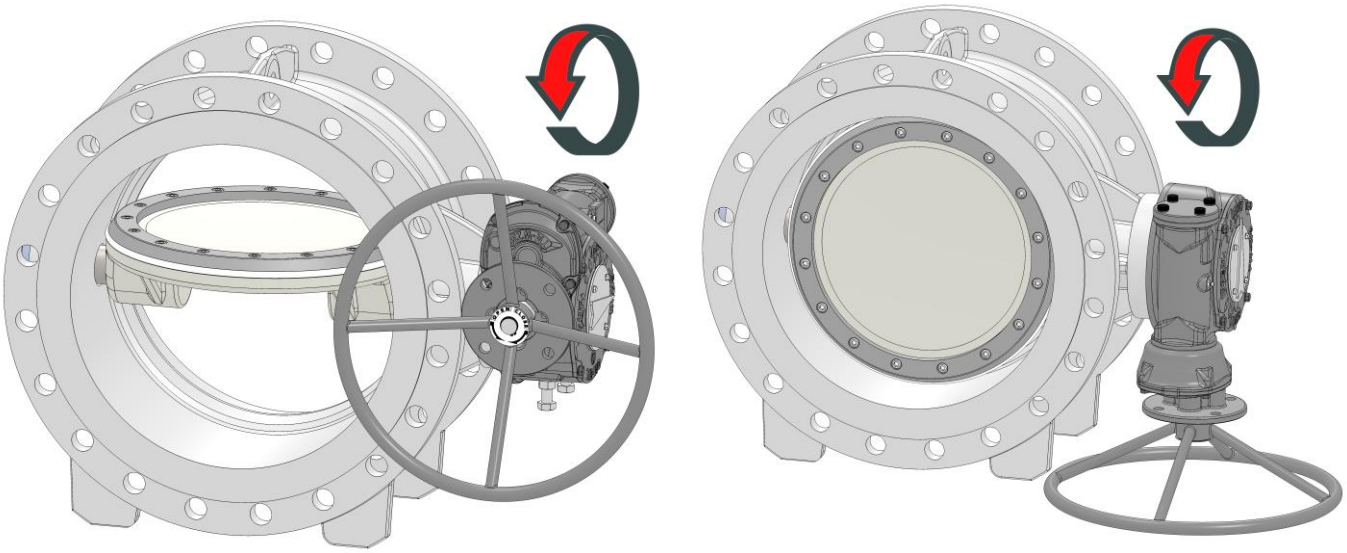
8.1 Replace the Sealing Ring

If there is leakage between sealing ring and body seat, this means the ring is damaged and it should be changed.

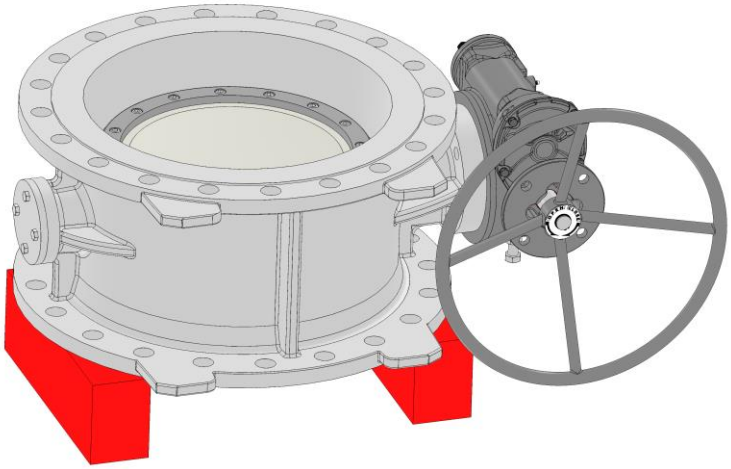
a. Remove the bolts of the gearbox.



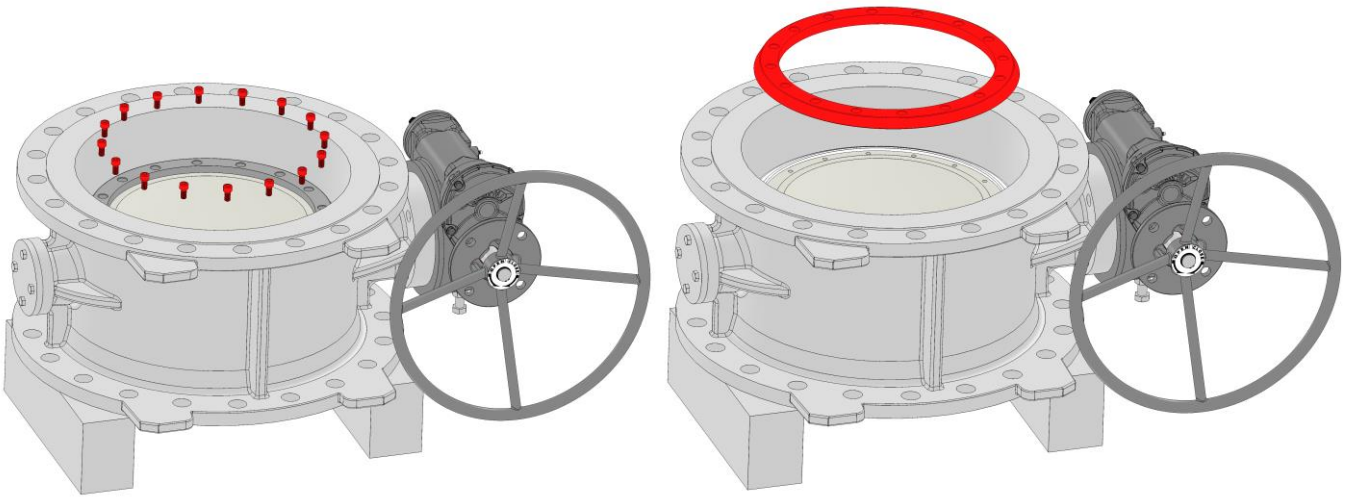
b. Turn the disc 180° by rotating the gearbox.



c. Place the valve on its flange. The retaining ring must point upwards. For big size valve you may need a support under the valve.



d. Remove the retaining ring bolts and remove the retaining ring.



e. Replace the sealing ring with a new one.

9. OPERATION

- Valve should be opened and closed at least before the installation. Motion of parts must be checked.
- The valves must be installed at more than 6xDN from the elbows to avoid turbulence.
- Butterfly valves can be operated by gear box with handwheel or electric actuators
- Manual operated valves can be opened by anti-clockwise operation of the handwheel and can be closed by clockwise operation of the handwheel
- A position indicator which attached to valve gearbox is showing valve disc position.
- Wiring diagram which supplied by actuator supplier must be taken into consideration while making electrical connections the actuator that going to operate butterfly valve. Supplier must be informed before changing any limit and torque settings. An authorized electrical person must be responsible for making electrical connections of the system.
- Forcing the valve when the reaching full open or full closed position may make seriously damage.

10. RECYCLING

Product can be recycled. If suitable procedure has been respected, no environment pollution risk occurs. When the recycling of the product is made, the country's laws, rules and regulations must be observed.

11. PRESSURE EQUIPMENT DIRECTIVE (2014/68/EU) AND CE MARKING

Dikkan butterfly valves comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Valves are categorized in accordance with the maximum working pressure, size and ascending level of hazard, which is dependent on the fluid being transported. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam. Categories are SEP (sound engineering practice) and for ascending levels of hazard, I, II, III or IV. All

valves designated as SEP do not bear the CE mark nor require a Declaration of Conformity. Dikkan valves with a CE marking have a declaration of conformity which includes information about the applied conformity assessment

procedure. It has been confirmed that the quality assurance in design control, manufacture and the manufacturer's final acceptance of Dikkan butterfly valve by notified body.

Risk Analysis List									
Hazard	**Hazard Cause**	**Possible Results**	Probability	Severity	Risk	**Preventive Action**	Probability	Severity	Risk
Explosion	Material Selection for low endurance of pressure impact. Internal leakage	Dead, Injured, Devistating Destruction	2	2	4	Using high endurance of pressure impact.(The samples are controlled by toughness and tensile strenght test according to DIN EN ISO 10873)	1	2	2
Corrosion	Wrong material and paint selection	Slightly Injured	3	2	6	Selection of the material and paint which stands up to the corrosive enviroment. Add the corrosion factor to the design calculation	1	2	2
Energy Loss	Used of high pressure drop valves. Having an extensive valve surface	Energy Loss	3	2	6	Remarking the operation pressure on the valve	1	2	2

12. SAFETY REMARKS

- The operating instruction has to be observed in an obligatory way. In the event of mismatch, all warrants and liabilities are reserved.
- Sharp edges and burrs can cause injuries.
- The valves must be mounted, started up or serviced by fully trained and qualified personnel only
- Maintenance staff must be elucidated about the dangers pertaining to disassembling and mounting of valves as well as electric and machinery installations
- Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.
- At all work at a valve installed in a pipeline it has to be made sure that the plant is not under pressure and not medium can leak from the pipeline.
- Be sure that any dangerous or combustible or detonating gas or fluid has been depressurized from product and connected piping, to avoid any danger to maintenance people due to contact or inhalation.
- Preserve valve specific maintenance manual in conjunction with this manual and let them reachable by maintenance staff. Be sure that maintenance staff read any part of those manuals before any use or maintenance operation.

13. TROUBLESHOOTING

⚠ **Be sure to observe the safety instructions during troubleshooting.**

Fault	Possible Cause	Corrective Action
Valve leaking around pipe connections	Flange bolts loose	Tighten flange bolts
	Damaged flange gasket	Replace flange gasket
Valve hard operate	Foreign material in valve	Remove foreign material
	Loose actuator&gearbox connection	Tighten actuator&gearbox - valve connection bolts
Valve does not pass flow	Flange covers not removed	Remove flange covers
	The valves and pipeline must be protected against freezing media	Warm up pipeline system and use valve jacket
Valve seat leaking	Valve is not closed completely.	Turn the valve fully closed position by checking the position indicator.
	Disc seal ring wear or damage	Adjust or replace disc seal ring
Low flow rate	Blockage in the pipeline system	Check pipeline system
Breaking the valve parts	Damage to the parts bearing pressure because of water hammer	To avoid water hammer, where necessary in the pipeline system, place water hammer protective equipment
Noise work	Wrong installation position. (Valve too close to elbows, see Section “9.Operation”)	Change installation position
	Valve exceeds operating conditions	Check operation conditions

14. Warranty

Warranty Period: 18 Months

The warranty shall not cover maintenance work, installation of external parts. When unoriginal parts are used for replacement, warrants and liabilities become invalid.

15. NOTES

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