



SERIES VSS
STAINLESS RESILIENT LINED BUTTERFLY VALVES
INSTALLATION & MAINTENANCE MANUAL

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1 SCOPE

1.1 CAUTION

- 1.1.1 For your safety, read this manual before installation or servicing.
- 1.1.2 Before installing or servicing, please ensure the line pressure has been relieved and any hazardous fluids have been drained or purged from the system.
- 1.1.3 Ensure that all Lockout and Tagout procedures for the system have been properly implemented.

1.2 USE

- 1.2.1 Vtek Controls VSS Series Resilient Seated Butterfly Valves are available in lug and wafer style designs and are compatible with ASME B16.5 Class 125/150 flanges for sizes 1-1/2"-24" and ASME B16.47 Series A Class 150 for sizes 28"-48". 1-1/2"-12" wafer style valves are also compatible with EN1092-2 PN10/16 and JIS B2220 10K flanges.
- 1.2.2 Maximum results and optimum valve life can be maintained under normal service conditions and in accordance with pressure/temperature ratings and corrosion data chart.

2 INSTALLATION

- 2.1 Vtek Controls VSS Series Resilient Seated Butterfly Valves are bi-directional and can be installed with the flow in either direction. The valve can be mounted in any position so that the handle, gear, or actuator has proper clearance, can be easily accessed, and the open/close indicator can be viewed. If the gear is equipped with a chain wheel, the valve shall be mounted in a way so that the chain does not come in contact with the valve or pipeline.
- 2.2 Before installation of the valves, the pipe must be flushed clean of dirt, burrs, and welding residues. Failure to do so can cause the seats and sealing surfaces to be damaged.
- 2.3 The pipe must be free from tension and in proper alignment.
- 2.4 Before installation of the valves, check to ensure that all flange seals are free from defects.
IMPORTANT NOTE: Flange gaskets shall not be used with Vtek Controls VSS Series Resilient Seated Butterfly Valves. The valves have a seal around the seat so that a gasket shall not be used.
- 2.5 Before installation of the valves, check to ensure that there is proper clearance for the disc to be able to fully open and close without being obstructed. This is especially important when using sch. 80 pipe as the clearances become smaller. See the ES Series catalog for valve dimensions.
- 2.6 VSS Controls ES Series Resilient Seated Butterfly Valves shall be installed in the pipeline completely assembled and open approximately 5 degrees from the closed position. The valves shall **NOT** be opened so that the disc is outside of the seat. Do **NOT** disassemble the valves or remove any handles, gears, or actuators to install.
- 2.7 Install the valve in the pipeline and tighten the flange bolts properly per the recommended minimum flange bolt torques in the table below. The bolts shall be torqued in a uniform pattern as to evenly compress the seat for sealing (no flange gaskets shall be used).

Recommended Minimum Flange Bolt Torques ES Series Resilient Seated Butterfly Valves			
Size	Torque (ft-lbs)	Size	Torque (ft-lbs)
1-1/2"	40-50	10"	95-120
2"	40-50	12"	120-150
2-1/2"	40-50	14"	225-250
3"	65-80	16"	215-240
4"	40-50	18"	300-330
5"	75-95	20"	275-300
6"	75-95	24"	440-470
8"	100-125		

2.8 DEAD-END SERVICE

Vtek Controls VSS Series Resilient Seated Butterfly Valves are rated for dead-end service applications.

3 VALVE OPERATION

3.1 MANUAL

CAUTION: A-T Controls recommends a manual gear operator for all valves larger than 6".

3.1.1 HANDLES

3.1.1.1 10 Position Handles

To **OPEN** the valve; squeeze the handle to unlock it and turn it in the counter-clockwise direction. The handle can be locked in at 10 degree increments to adjust the flow. The valve will be locked into the 90 degree marker and parallel to the pipeline when fully open.

To **CLOSE** the valve; squeeze the handle to unlock it and turn it in the clockwise direction. The handle can be locked in at 10 degree increments to adjust the flow. The valve will be locked into the 0 degree marker and perpendicular to the pipeline when fully closed.

Note: The handles contain a pin that can be used to deter unwanted operation. The pin can be removed if unnecessary per the end user's requirement. A padlock (not included) can also be used through this hole in the handle to lock out operation of the handle.

3.1.1.2 Infinite Handles

To **OPEN** the valve; loosen the lock bolt & nut to unlock it and turn the handle in the counter-clockwise direction. The handle can be set in infinite positions between fully open and fully closed to adjust the flow. Once in the desired position, tighten the lock bolt & nut to hold the handle in place. The valve will be fully counter-clockwise and parallel to the pipeline when fully open.

To **CLOSE** the valve; loosen the lock bolt & nut to unlock it and turn the handle in the clockwise direction. The handle can be set in infinite positions between fully open and fully closed to adjust the flow. Once in the desired position, tighten the lock bolt & nut to hold the handle in place. The valve will be fully clockwise and perpendicular to the pipeline when fully closed.

3.1.2 GEAR

To **OPEN** the valve; turn the hand wheel counter-clockwise. The indicator will be pointing to the open position and stop rotating when fully opened. The flow can be adjusted by stopping the indicator anywhere between open and close.

To **CLOSE** the valve; turn the hand wheel clockwise. The indicator will be pointing to the close position and the hand wheel will stop rotating when fully closed. The flow can be adjusted by stopping the indicator anywhere between open and close.

Note: The gears contain a locking device that allows handwheel operation to be locked out through the use of a padlock (not included). The locking device can be removed if unnecessary per the end user's requirement.

3.2 AUTOMATED

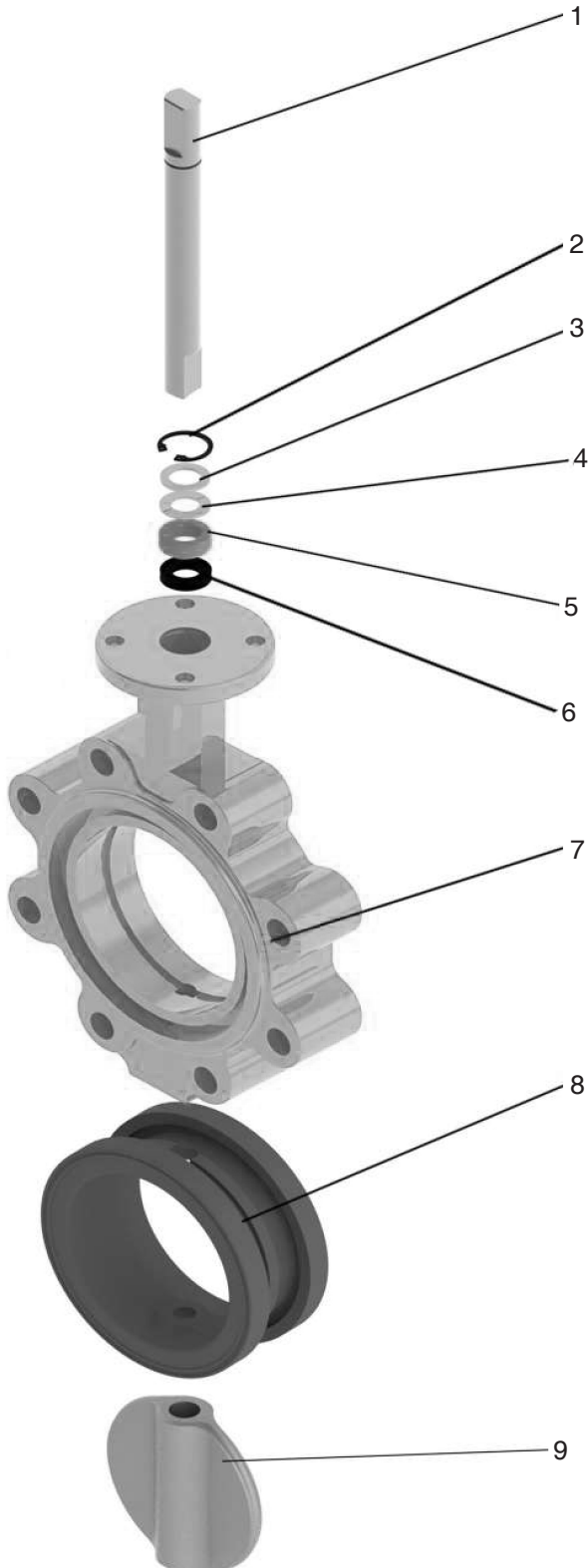
Vtek Controls VSS Series Resilient Seated Butterfly Valves can be mounted with quarter turn actuators. Valves with actuators shall be checked for proper valve stem alignment. Angular or linear misalignments may result in high operational torque and unnecessary wear on the valve stem. See the actuator IOM for information on operating the actuator.

Note: When closing the valve, the disc will begin to seal on the seat before it is perfectly perpendicular to the pipeline/flow. In certain circumstances this may be desired to reduce the torque required to "close" the valve or when moving from the closed to open position. Gear or actuator stops can be adjusted to achieve the new "closed" position. This would only be recommended for lower pressure applications as Vtek Controls only rates the valves to the full pressure differential in the fully closed position.

4 DISASSEMBLY & ASSEMBLY

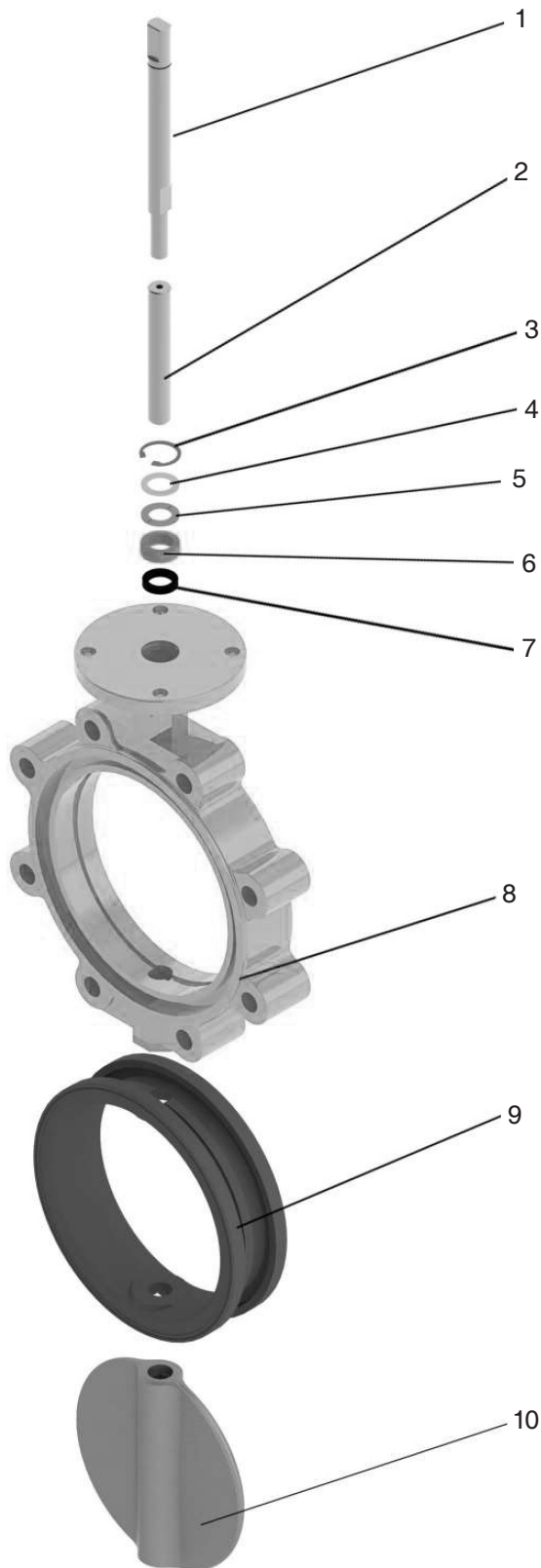
- 4.1** Drain and make sure there is no pressure in the pipeline and take necessary precautions for the media in the pipeline.
- 4.2** Set the valve in the closed position and remove it from the pipeline.
- 4.3** Reference the procedure below for disassembly & assembly.

Bill of Materials (2" - 3")



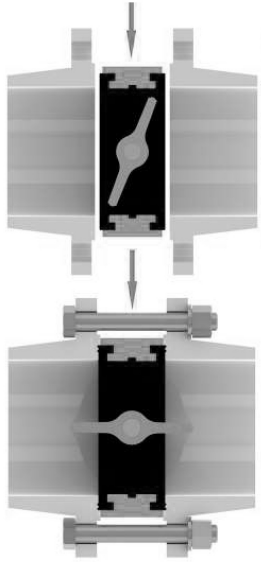
No.	Part Name	Material
1	Shaft	SS410, SS304, SS431, SS316, Monel K500, 17-4PH, C6300, C92200, 2507, 2205
2	Retaining Ring	Sk7
3	Thrust Washer	Stainless Steel, Carbon Steel
4	Shaft Retainer	Stainless Steel, Carbon Steel
5	"O" Ring	NBR, Viton
6	Bushing	FRP
7	Body	304, 316, 316L
8	Body Seat	NBR (BUNA-N), EPDM, HEPDM, FKM (Viton), PTFE, Polychloroprene, Natural Rubber, Silicon Rubber
9	Disc	CF8, CF8M, CF3, CF3M, SAF2507, SAF2205

Bill of Materials (4" - 14")

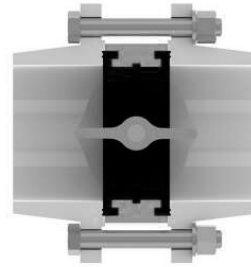


No.	Part Name	Material
1	Up Shaft	SS410, SS304, SS431, SS316, Monel K500, 17-4PH, C6300, C92200, 2507, 2205
2	Up Shaft	SS410, SS304, SS431, SS316, Monel K500, 17-4PH, C6300, C92200, 2507, 2205
3	Retaining Ring	Sk7
4	Thrust Washer	Stainless Steel, Carbon Steel
5	Shaft Retainer	Stainless Steel, Carbon Steel
6	Bushing	FRP
7	"O" Ring	NBR, Viton
8	Body	304, 316, 316L
9	Body Seat	NBR (BUNA-N), EPDM, HEPDM, FKM (Viton), PTFE, Polychloroprene, Natural Rubber, Silicon Rubber
10	Disc	CF8, CF8M, CF3, CF3M, SAF2507, SAF2205

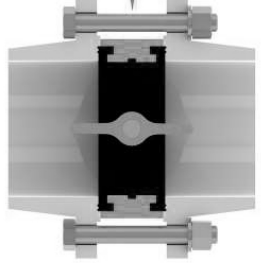
Installation



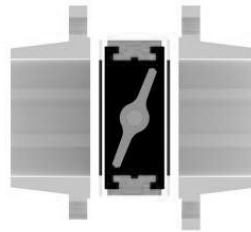
1. Leave a space between flanges so that valve can be easily inserted and removed and move the valve in accordance with the arrow



2. Open completely the valve before tightening flanges



3. Tighten bolts until flanges are in contact with valve body



4. NOTE: do not insert other packing between flange and valve

NOTE: Weld the pipe only in spots with the valve between flanges. Remove the valve before finishing the welding to avoid that heat damaging the seat. Clean welding carefully to avoid that slags damage the seat.

Installation for powders and muddy fluids



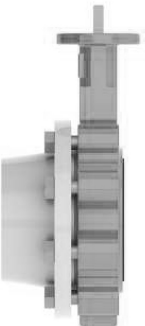
- Wrong
- Vertical rotation axis



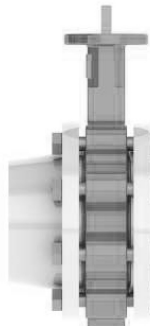
- Right
- Horizontal rotation axis

End piping installation

When valves are installed at the end of piping, a counterflange as per drawing type B is needed to secure tightness at max pressure. Please notice the order when the valves are installed as per drawing type A.



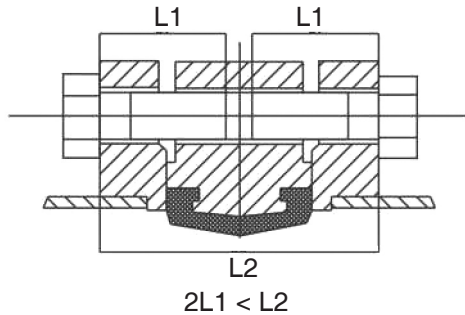
- Type A installation without end piping



- Type B installation with end piping

Pressure max: Type A installation is 174 psi; Type B installation is 232 psi

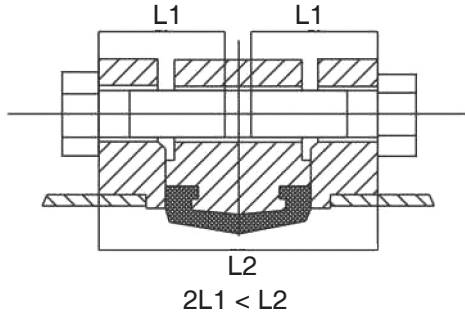
Length & Quantity of Bolts for Valve Installation



Bolt Connection of Lug Butterfly Valve

Size	1.0Mpa		1.6Mpa	
	Hexagon Head Bolt for Type of Lug Valve		Hexagon Head Bolt for Type of Lug Valve	
	Qty	Dia xL1	Qty	Dia xL1
2"	4x2	M16x40	4x2	M16x40
2-1/2"	4x2	M16x45	4x2	M16x45
3"	8x2	M16x45	8x2	M16x45
4"	8x2	M16x50	8x2	M16x50
5"	8x2	M16x50	8x2	M16x50
6"	8x2	M20x50	8x2	M20x50
8"	8x2	M20x55	12x2	M20x55
10"	12x2	M20x60	12x2	M24x60
12"	12x2	M20x65	12x2	M24x65
14"	16x2	M20x65	16x2	M24x65
16"	16x2	M24x75	16x2	M27x75
18"	20x2	M24x80	20x2	M27x80
20"	20x2	M24x90	20x2	M30x90
24"	20x2	M27x100	20x2	M33x100
28"	24x2	M27x100	24x2	M33x100
32"	24x2	M30x110	24x2	M36x110
36"	28x2	M30x130	28x2	M36x130
40"	28x2	M33x140	28x2	M39x140
48"	32x2	M36x165	32x2	M45x165

Length & Quantity of Bolts for Valve Installation



Bolt Connection of Lug Butterfly Valve

Size	150 LB	
	Hexagon Head Bolt for Type of Lug Valve	
	Qty	Dia xL1
2"	4x2	5/8"x40
2-1/2"	4x2	5/8"x45
3"	4x2	5/8"x45
4"	8x2	3/4"x50
5"	8x2	3/4"x50
6"	8x2	3/4"x50
8"	8x2	3/4"x55
10"	12x2	7/8"x60
12"	12x2	7/8"x65
14"	12x2	1"x65
16"	16x2	1"x75
18"	16x2	9/8"x80
20"	20x2	9/8"x90
24"	20x2	5/4"x100
28"	28x2	5/4"x100
32"	28x2	3/2"x110
36"	32x2	3/2"x130
40"	36x2	3/2"x140
48"	44x2	3/2"x165

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only. Because Vtek Controls is continually improving and upgrading its product design, the specifications, dimensions and information contained in this literature are subject to change without notice. Should any question arise concerning these specifications, the purchaser/user should contact Vtek Controls.