



INSTALLATION & MAINTENANCE MANUAL
SERIES ST – MODELS STHW / STHL
HIGH PERFORMANCE BUTTERFLY VALVES



Triad High Performance Butterfly Valves (STHL, STHW) have been designed and manufactured for fluid control handling in suitable mechanical systems. It is important to follow the instruction to assure valve installation and safe trouble free operation. Failure to follow these instructions may result in reduced valve performance and may cause loss of manufacturer's warranty.

APPLICATION

All Triad High Performance Butterfly Valves have identification marks attached to the valve body. Important information including valve size, class, materials of construction, and pressure ratings are shown.

Review corrosive effects of the media to be used in the valve and assure it is compatible with the valve materials of construction.

Do not install the valve where the pressure/temperature ratings can be exceeded. As temperature increases, the safe working pressure decreases. The pressure/temperature ratings are based on API 609 and stated in the Triad High Performance Butterfly Valve data sheets.

Valve should be regularly maintained. Valves used in services where erosion or other detrimental situations can occur should be inspected on a regular basis.

STORAGE

Valves are shipped in the closed position with protective sealing including bubble wrap and individual carton box. The packing should remain on the valve until actual installation into piping.

The valves must be stored in a dry environment, protected from temperature extremes and possibility of damage. The valve body is made from carbon steel or stainless steel and rust may occur on inside surface. This will not affect valve performance. Special care should be taken to prevent damage to the disc edge and sealing surfaces.

INSTALLATION

Inspect the piping and remove all dirt, welding slag, rust and scale from the piping and flange faces. It is advisable to install a strainer upstream of the valve to prevent contamination from entering the valve. It is very important for long trouble free service to keep the valve free of all contamination that may damage the seal surfaces.

Remove the protective covers from valve face and carefully check the valve for any damage that may have occurred during shipping and handling

Fully open the valve and verify the sufficient diametrical clearance is available for the valve disc to extend into both mating pipe flanges and piping.

Cycle the valve from full closed to full open positions checking to assure the operator stops are set properly. Stops must be properly set before the valve is installed into the piping.

Fully close the valve before installation into piping to prevent damage to disc.

Determined valve orientation. The valve can be installed in any position or direction. However it is preferred to install the valve so flow direction matches the direction arrow cast in the valve body. This allows better protection for the seat from particles flowing in the media and from sediment build-up at stem base giving optimal valve



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service life. This is very important for steam service due to the high travel velocities.

Always check to assure seat retainer ring screws (hex socket bolt) are securely tightened.

Align gasket with valve face and pipe flanges, install proper size bolts thru the flange and loosely tighten into valve mounting ears.

Fully open and close the valve to verify proper operation and that the disc moves freely.

When installing the screws, use cross over diagonal method and evenly tighten all studs using the "cross-over" diagonal method to proper torque for the grade designation of cap screw being used. Do not over tighten cap screws.

Again, fully open and close the valve to verify proper operation and free disc movement. When installing on dead-end service, use of down-stream flanges are recommended.

STOP ADJUSTMENT

High Performance Butterfly Valves can be actuated by manual lever, a manual gear operator or an actuator. For all types of operation methods it is critical that the actuator closed travel limit stop is properly set to match valve disc / seat orientation for proper seal. The open stop adjustment is not critical, plus or minus $\pm 5^\circ$ travel is adequate.

The closed actuator stop should be set before the valve is installed into piping so disc is centered in the seat. Disc front face is parallel with seat retainer faces. Note that the valve has an "over-travel stop" that stops at the disc edge. This "over-travel stop" is only to keep disc from rotating too far thru the seat.

There are several different manufacturers of actuators (electric / pneumatic). While the adjustment procedure is not exactly the same for all manufacturers, it is critical to read each actuator's manual before installing on valve.

OPERATION

The valve can be actuated by manual lever, a manual gear operator, an electric or pneumatic actuator. Turning the valve (as viewed from top) clockwise closes the valve: counter-clockwise opens the valve.

Due to the double offset design of High Performance Butterfly Valve, the disc can cause sufficient torque to open the valves spontaneously. For this reason, it is important not to remove lever or actuator from a valve that is or will be pressurized.

Lever operated valve should always be locked securely in desired 10 position indicate plate notch to prevent unexpected disc movement.

MAINTENANCE

Typical maintenance consists of periodic inspection and cycling of the valve to assure proper function.

Any valve leakage is due to seat damage or to a damaged disc edge. It will then be necessary to disassemble the valve and replace damaged parts.



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If repair parts or service information is required, please locate valve identification information and supply following information:

- Valve Figure Number or Name (STHL, STHW)
- Valve size
- Valve Class
- Manufacturer date year
- Valve serial Number
- Type of Actuator
- If known, Name of distributor and Purchase order No.

Individual Repair kits are available for each size valve. Please contact Triad for detailed information.

PRECAUTIONS BEFORE DISASSEMBLING THE VALVE FROM THE LINE

Fluid flowing in a pipe could be corrosive, toxic, flammable or contaminated. Before removing valve, inspect that no pressure is present in line, either upstream or downstream of the valve. If possible, close valves upstream and downstream to isolate the valve to be repaired.

Following safety precautions are recommended when repairing the valve.
Always wear protective glasses or eye shields.
Always wear gloves and protective footwear.
Ensure easy availability of running water.
Have an adequate fire extinguisher available if media is flammable.

REMOVAL OF VALVE FROM PIPING

Check to confirm piping has been depressurized and drained.

Actuate valve to the fully closed position.

Attach appropriate lifting strap or sling to valve neck. Attach other end of strap or sling to a secure point capable of supporting valve.

Remove all nuts and bolts with the exception of the two lowest sustaining the valve.

Separate the flanges with proper tools and remove valve.

Remove valve from flanges, remove old gaskets and clean pipe flange sealing surfaces.

SEAT REPLACEMENT PROCEDURE

Remove valve from piping per procedure above.

Place valve on bench with seat retainer ring face up, remove hex socket bolts (13) from retainer ring (06). Push retainer ring (06) from valve body (01).

Remove old seat (07) and discard.



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Clean seat cavity and retainer ring (06). Clean and inspect seal surfaces on disc (02). Polish edge to remove any small scratches that may interfere with disc (02) and seat (07).

With valve disc (02) in partial open position, install new seat (07) into valve body. Install retainer ring (06) onto seat and align screw holes. Install hex socket bolts (13) and snug. Position valve disc to closed position. Torque hex socket bolt using "cross over" diagonal method.

GLAND PACKING (STEM PACKING) REPLACEMENT PROCEDURE

Remove valve from piping per procedure above.

Remove actuator and all hardware from top of valve to expose gland flange (04)

Remove spring washers (14), hex nuts (15), flat head screws (17), and top retainer (08). Push upward on studs (16) and remove gland flange (04) from top of valve.

Be cautious not to damage any seal surfaces. Remove graphite gland packing (09) from valve body (01).

Clean packing cavity and packing retainer (05), Inspect for damage.

Install new gland packing (stem packing) (09) into valve body (01). Install gland flange (04), spring washers (14) and hex nuts (15) evenly to gland flange (04).

Install Actuator, open and close valve several times and check for proper operation before placing valve back in service.

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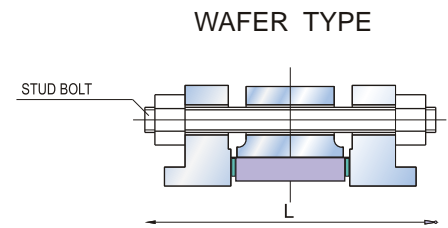
FLANGE BOLTING DATA

WAFER TYPE VALVE

Recommended stud length for tightening Triad Wafer type valve between flanges

Valve size		JIS 10K flanges		DIN PN10 flanges		DIN PN16 flanges		ANSI 150 flanges	
mm	inch	Studs Dia and length (mm.) L	N° studs	Studs Dia and length (mm.)	N° studs	Studs Dia and length (mm.) L	N° studs	Studs Dia and length (inch.)	N° studs
50	2"	M16 X 130	4	M16 X 130	4	M16 X 130	4	5/8" X 5 1/8"	4
65	2 1/2"	M16 X 130	4	M16 X 130	4	M16 X 130	4	5/8" X 5 1/8"	4
80	3"	M16 X 140	8	M16 X 140	4	M16 X 140	8	5/8" X 5 1/12"	4
100	4"	M16 X 150	8	M16 X 150	8	M16 X 150	8	5/8" X 5 1/12"	8
125	5"	M20 X 150	8	M16 X 150	8	M16 X 150	8	3/4" X 6 3/8"	8
150	6"	M20 X 160	8	M20 X 160	8	M20 X 160	8	3/4" X 6 3/8"	8
200	8"	M20 X 170	12	M20 X 170	8	M20 X 170	12	3/4" X 6 1/4"	8
250	10"	M22 X 190	12	M20 X 180	12	M24 X 190	12	7/8" X 7 1/2"	12
300	12"	M22 X 200	16	M20 X 190	12	M24 X 200	12	7/8" X 8 3/8"	12
350	14"	M22 X 220	16	M20 X 230	16	M24 X 220	16	1" X 8 3/4"	12
400	16"	M24 X 240	16	M22 X 230	16	M27 X 240	16	1" X 10"	16
450	18"	M24 X 250	20	M24 X 250	20	M27 X 250	20	1 1/8" X 11 1/8"	16
500	20"	M24 X 280	20	M24 X 250	20	M30 X 280	20	1 1/8" X 12"	20
600	24"	M30 X 300	24	M27 X 300	20	M33 X 300	20	1 1/4" X 13 13/16"	20

For pipe conveying oil, the flange needs 8 studs instead of 4.

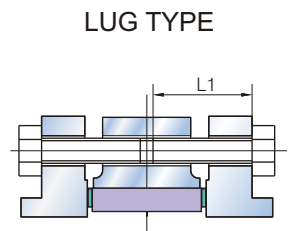


LUG TYPE VALVE

Recommended stud length for tightening Triad Lug type valve between flanges

Valve size		JIS 10K flanges		DIN PN10 flanges		DIN PN16 flanges		ANSI 150 flanges	
mm	inch	Screws Dia and length (mm.) L1	N° screws	Screws Dia and length (mm.)	N° screws	Screws Dia and length (mm.) L1	N° screws	Screws Dia and length (mm.)	N° screws
50	2"	M16 X 35	8	M16 X 35	8	M16 X 35	8	5/8" X 1 1/2"	8
65	2 1/2"	M16 X 35	8	M16 X 35	8	M16 X 35	8	5/8" X 1 1/2"	8
80	3"	M16 X 35	16	M16 X 35	8	M16 X 35	16	5/8" X 1 1/2"	8
100	4"	M16 X 40	16	M16 X 40	16	M16 X 40	16	3/4" X 1 3/4"	16
125	5"	M20 X 45	16	M16 X 45	16	M16 X 45	16	5/8" X 1 3/4"	16
150	6"	M20 X 45	16	M20 X 45	16	M20 X 45	16	3/4" X 2"	16
200	8"	M20 X 50	24	M20 X 50	16	M20 X 50	24	3/4" X 2 1/4"	16
250	10"	M22 X 55	24	M20 X 55	24	M24 X 55	24	7/8" X 2 1/4"	24
300	12"	M22 X 60	32	M20 X 60	24	M24 X 60	24	7/8" X 2 1/2"	24
350	14"	M22 X 60	32	M20 X 60	32	M24 X 60	32	1" X 2 1/2"	24
400	16"	M24 X 70	32	M24 X 70	32	M27 X 70	32	1" X 3 1/4"	32
450	18"	M24 X 80	40	M24 X 80	40	M27 X 80	40	1 1/8" X 3 1/4"	32
500	20"	M24 X 80	40	M24 X 80	40	M30 X 80	40	1 1/8" X 3 1/4"	40
600	24"	M30 X 90	48	M27 X 90	40	M33 X 90	40	1 1/4" X 3 1/2"	40

For pipe conveying oil, the flange needs 16 screws instead of 8.



N.B. - For lug type valves with free holes use the same studs as referred in wafer type valve's table.

End pipe service

Due to the particular seat perimeter, Triad lug type type butterfly valves can also be installed at the end of pipe. Also known as dead-end service. In this case it is possible to remove downstream piping under pressure for maintenance and operations. For this particular service weld neck or socket flanges are necessary. When the valve is correctly installed on single flange by means of screws, it will have zero leakage, no fluid infiltrations between the flange and seat.

Do not use other types of flanges as they will cause infiltrations and cause the seat to slide into the body. Lug type butterfly valves were specifically designed for this service, however, they can not intercept liquids with pressure over 10.5 bar.

They are not suitable for gas or air lines on single flange service.

After having removed the downstream piping, protect the valve with a blind flange.

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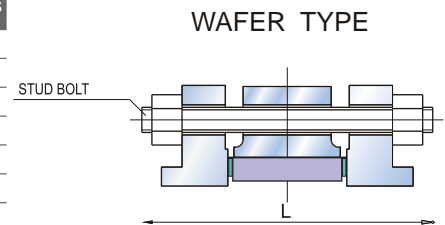
FLANGE BOLTING DATA

WAFER TYPE VALVE

Recommended stud length for tightening Triad Wafer type valve between flanges

Valve size		JIS20K FLANGES		PN25 FLANGES		ANSI300 FLANGES		JIS30K FLANGES		PN40 FLANGES	
mm	inch	Studs Dia and length (mm.) L	N° studs	Studs Dia and length (mm.)	N° studs	Studs Dia and length (mm.) L	N° studs	Studs Dia and length (inch.)	N° studs	Studs Dia and length (mm)	N° studs
50	2"	M16 X 135	8	M16 X 135	4	5/8" X 5 3/8"	8	M16 X 135	8	M16 X 135	4
65	2 1/2"	M16 X 150	8	M16 X 150	8	3/4" X 5 7/8"	8	M20 X 150	8	M16 X 150	8
80	3"	M20 X 160	8	M16 X 160	8	3/4" X 6 3/8"	8	M20 X 160	8	M16 X 160	8
100	4"	M20 X 170	8	M20 X 170	8	3/4" X 6 3/4"	8	M22 X 170	8	M20 X 170	8
125	5"	M22 X 180	8	M24 X 180	8	3/4" X 7"	8	M22 X 180	8	M24 X 180	8
150	6"	M22 X 180	12	M24 X 180	8	3/4" X 7 1/8"	12	M24 X 180	12	M24 X 180	8
200	8"	M22 X 215	12	M24 X 215	12	7/8" X 8 1/2"	12	M24 X 215	12	M27 X 215	12
250	10"	M24 X 245	12	M27 X 245	12	1" X 9 5/8"	16	(M30 X 3) X 245	12	M30 X 245	12
300	12"	M24 X 265	16	M27 X 265	16	1 1/8" X 10 3/8"	16	(M30 X 3) X 265	16	M30 X 265	16
350	14"	(M30 X 3) X 300	16	M30 X 300	16	1 1/8" X 11 3/4"	20	(M30 X 3) X 300	16	M33 X 300	16
400	16"	(M30 X 3) X 325	16	M33 X 325	16	1 1/4" X 12 3/4"	20	(M36 X 3) X 325	16	M36 X 325	16
450	18"	(M30 X 3) X 345	20	M33 X 345	20	1 1/4" X 13 5/8"	24	-	-	-	-
500	20"	(M30 X 3) X 365	20	M33 X 365	20	1 1/4" X 14 3/8"	24	-	-	-	-
600	24"	(M36 X 3) X 415	24	M36 X 415	20	1 1/2" X 16 1/4"	24	-	-	-	-

For pipe conveying oil, the flange needs 8 studs instead of 4.



LUG TYPE VALVE

Recommended stud length for tightening Triad Lug type valve between flanges

Valve size		JIS20K FLANGES		PN25 FLANGES		ANSI300 FLANGES		JIS30K FLANGES		PN40 FLANGES	
mm	inch	Screws Dia and length (mm.) L1	N° studs	Screws Dia and length (mm.)	N° studs	Screws Dia and length (mm.) L1	N° studs	Screws Dia and length (mm.)	N° studs	Studs Dia and length (mm)	N° studs
50	2"	M16 X 40	8	M16 X 40	4	5/8" X 1 1/2"	8	M16 X 40	8	M16 X 40	4
65	2 1/2"	M16 X 45	8	M16 X 45	8	3/4" X 1 3/4"	8	M20 X 45	8	M16 X 45	8
80	3"	M20 X 50	8	M16 X 50	8	3/4" X 1 3/4"	8	M20 X 50	8	M16 X 50	8
100	4"	M20 X 55	8	M20 X 55	8	3/4" X 2 1/4"	8	M22 X 55	8	M20 X 55	8
125	5"	M22 X 60	8	M24 X 60	8	3/4" X 2 1/4"	8	M22 X 60	8	M24 X 60	8
150	6"	M22 X 60	12	M24 X 60	8	3/4" X 2 1/2"	12	M24 X 60	12	M24 X 60	8
200	8"	M22 X 75	12	M24 X 75	12	7/8" X 2 7/8"	12	M24 X 75	12	M27 X 75	12
250	10"	M24 X 85	12	M27 X 85	12	1" X 3 1/4"	16	(M30 X 3) X 85	12	M30 X 85	12
300	12"	M24 X 95	16	M27 X 95	16	1 1/8" X 3 1/2"	16	(M30 X 3) X 95	16	M30 X 95	16
350	14"	(M30 X 3) X 110	16	M30 X 110	16	1 1/8" X 4 1/4"	20	(M30 X 3) X 110	16	M33 X 110	16
400	16"	(M30 X 3) X 120	16	M33 X 120	16	1 1/4" X 4 3/4"	20	(M36 X 3) X 120	16	M36 X 120	16
450	18"	(M30 X 3) X 130	20	M33 X 130	20	1 1/4" X 5 1/4"	24	-	-	-	-
500	20"	(M30 X 3) X 140	20	M33 X 140	20	1 1/4" X 5 1/2"	24	-	-	-	-
600	24"	(M36 X 3) X 155	24	M36 X 155	20	1 1/2" X 6 1/4"	24	-	-	-	-

For pipe conveying oil, the flange needs 16 screws instead of 8.

N.B. - For lug type valves with free holes use the same studs as referred in wafer type valve's table.

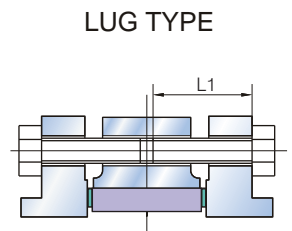
End pipe service

Due to the particular seat perimeter, Triad lug type type butterfly valves can also be installed at the end of pipe. Also known as dead-end service. In this case it is possible to remove downstream piping under pressure for maintenance and operations. For this particular service weld neck or socket flanges are necessary. When the valve is correctly installed on single flange by means of screws, it will have zero leakage, no fluid infiltrations between the flange and seat.

Do not use other types of flanges as they will cause infiltrations and cause the seat to slide into the body. Lug type butterfly valves were specifically designed for this service, however, they can not intercept liquids with pressure over 10.5 bar.

They are not suitable for gas or air lines on single flange service.

After having removed the downstream piping, protect the valve with a blind flange.





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BOLTING TORQUE

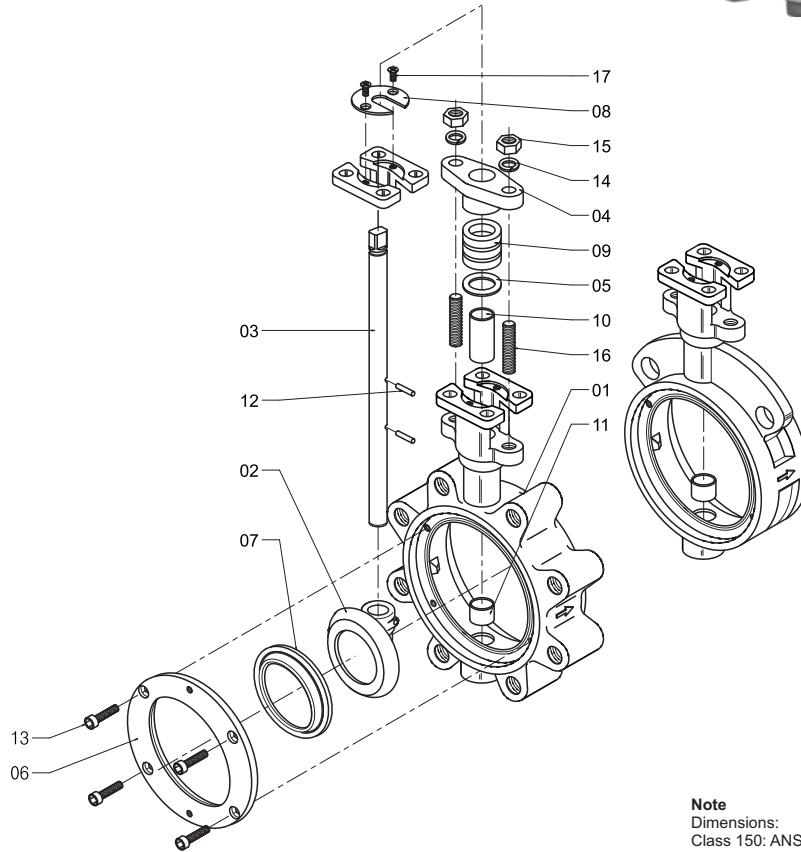
Recommended Bolt Tightening Torques

Valve Size	Connection Bolt Size	Minimum	Maximum	
150 Class	2"	5/8"	20	60
	2 1/2"	5/8"	20	60
	3"	5/8"	20	60
	4"	5/8"	20	60
	5"	3/4"	30	100
	6"	3/4"	30	100
	8"	3/4"	30	100
	10"	7/8"	50	200
	12"	7/8"	50	200
	14"	1"	70	250
	16"	1"	70	250
	18"	1 1/8"	100	350
	20"	1 1/8"	100	350
	24"	1 1/4"	150	450

Valve Size	Connection Bolt Size	Minimum	Maximum	
300 Class	2"	5/8"	20	60
	2 1/2"	3/4"	30	100
	3"	3/4"	30	100
	4"	3/4"	30	100
	5"	3/4"	30	100
	6"	3/4"	30	100
	8"	3/4"	50	200
	10"	1"	70	250
	12"	1 1/8"	100	350
	14"	1 1/8"	100	350
	16"	1 1/4"	150	450
	18"	1 1/4"	150	450
	20"	1 1/4"	150	450
	24"	1 1/2"	200	600



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Note
 Dimensions:
 Class 150: ANSI 150, JIS 10/16K, DIN PN 10/16
 Class 300: ANSI 300, JIS 20/30K, DIN PN 25/40

NO.	DESCRIPTION	MATERIAL	Q'TY
1	Body	A216 WCB / A351 CF8M	1
2	Disc	A351 CF8M	1
3	Stem	A 564 Gr. 630	1
4	Gland Flange	A216 WCB / A351 CF8M	1
5	Packing Retainer	A276 Tp 316	1
6	Retainer Ring	A351 CF8M	1
7	Seat	PTFE/RTFE/ METAL A240/ NBR / EPDM / VITON	1
8	Top Retainer	A283D - A36 / A276 Tp 316	1
9	Grand Packing	Graphite	3
10	Upper Bearing	R.TFE + 316SS	1
11	Lower Bearing	R.TFE + 316SS	1
12	Disc Pin	A276 Tp 316	2
13	Hex Socket Bolt	A283D - A36 / A276 316SS	4 ~ 14
14	Spring Washer	A283D - A36 / A276 316SS	2
15	Hex Nut	A283D - A36 / A276 316SS	2
16	Stud Bolt	A283D - A36 / A276 316SS	2
17	Flat Head Screw	A283D - A36 / A276 316SS	2

**METAL SEAT TYPE WILL SUPPLY WITH GRAPHITE SEAT RING.

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