PURE-FLO®
Bio-Tek® Diaphragm Valves
Installation, Operation and Maintenance Manual
Hand Wheel Operated Valves

Staitech

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1.0 INSTALLATION

NOTE: WELD END VALVES

Weld end valves for tubing may be welded with automatic equipment without removing the diaphragm. Manual welding requires bonnet/diaphragm removal before welding. See Section 2.4, steps 1-2, 5-9.

1.1 For vertical piping systems, BIO-TEK diaphragm valves may be installed in any orientation. For horizontal piping systems to be drained through the valve, install the valve with the small machined dots near the valve ends at the 12 o'clock position.

1.2 Prior to pressurization (with the valve slightly open), tighten the bonnet screws (11) in a crisscross pattern to 20-25 in-lb (2.3-2.8 N-m). Use multiple passes to bring the torque up gradually to the final value. It is recommended that bonnet fasteners be retightened at ambient conditions after the system has cycled through operating pressure and temperature. Minimum torque value will provide longer diaphragm cycle life for valves in non-autoclave and low thermal cycle conditions. Maximum torque value will be required for autoclave conditions and high thermal cycle conditions. If leakage occurs at the body-diaphragm sealing area, immediately depressurize the system and tighten the bonnet screws (11) as noted above. If leakage continues, diaphragm replacement is required. See Section 2.4.

2.0 MAINTENANCE

2.1 Periodically inspect condition of external valve parts. Replace all parts showing excessive wear or corrosion.

2.2 If body-diaphragm seating area leaks, depressurize system and open valve slightly. Tighten bonnet screws (11) as described in Section 1.2. If leakage continues, diaphragm replacement is required.

2.3 If leakage is occurring around the handwheel (16) or spindle (7), the diaphragm is ruptured and must be replaced. Warning - when using sealed (-18S) bonnets, diaphragm rupture may not be evident in the form of external leakage. Use care when removing bonnet (1).

2.4 DIAPHRAGM REPLACEMENT

2.4.1 Remove line pressure. Rotate handwheel (16) clockwise to just close valve.

2.4.2 Remove bonnet screws (11) and lift off bonnet (1).

2.4.3 Unscrew diaphragm (3 or 4) from compressor (2) by turning counterclockwise. Replacement diaphragm should be identical size and grade as original diaphragm. The size and grade are marked on the diaphragm tabs, (the diaphragm side with the stud).

2.4.4 For PTFE assemblies only:

2.4.4.1 Install the new elastomer backing cushion over the tube nut (Figure 1).

2.4.4.2 Invert the PTFE diaphragm by pressing the center of the diaphragm face with your thumbs while holding the edge of the diaphragm with your fingers (Figure 2).

2.4.4.3 Engage the threads of the diaphragm into the compressor by rotating clockwise (Figure 3).

Figure 1

Figure 2

Figure 3

2.4.4.4 Continue rotating the PTFE diaphragm clockwise into the compressor while securing the backing cushion from rotating (Figure 4).

2.4.5 Rotate the diaphragm until hard stop or heavy resistance is achieved and additional force does not significantly rotate the diaphragm into the compressor (Figure 5).

Figure 4

Figure 5

2.4.6 For PTFE assemblies only reinvert diaphragm (Figure 6).

2.4.7 Back off (no more than 1/2 turn) until the bolt holes in diaphragm and the bonnet flange align (Figure 7).

Figure 6

Figure 7

2.4.8 Rotate handwheel (16) counterclockwise just enough to permit flange area of diaphragm (3 or 4) to rest flat against flange area of bonnet (1).

2.4.9 Replace valve bonnet (1) on body (6) and tighten bonnet screws (11) handtight.

2.4.10 Close valve fully by rotating handwheel (16) clockwise; then back off one-half to one full turn of handwheel (16). Tighten bonnet screws (11) evenly to 20-25 in-lb. (2.3-2.8 N-m) (see Section 1.2).

2.4.11 Open valve and check bonnet screws (11) to ensure they are evenly tightened.

2.4.12 If diaphragm leaks at body-bonnet joint after reaching temperature and pressure, depressurize system and retighten bonnet screws (11) in accordance with Section 1.2.

2.5 LUBRICATION

NOTE: Standard lubricant is Chevron FM ALC EP.

2.5.1 Remove bonnet screws (11) and lift bonnet assembly from body.

2.5.2 Pry caplug (12) loose and remove screw (17), o-ring (10) and handwheel (16).

2.5.3 Inspect and replace o-ring (9) as necessary. Coat o-ring with lubricant.

2.5.4 Reinstall screw (17) and rotate clockwise until spindle (7) begins turn-

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ing. Continue rotating until the spindle (7) disengages from the bonnet (1).

2.5.5 Inspect and replace o-ring (8) as necessary. Coat o-ring with lubricant.

2.5.6 Disassembly is complete. Reassembly is the reverse of the above procedure. Remove any residual grease and re-lubricate spindle threads (7) and bonnet screw threads (11) prior to assembly. Ensure compressor pin (15) is aligned and engages hole in bonnet (1) when reassembling.

2.6 TRAVEL STOP SETTING

The travel stop should be adjusted at time of installation. After diaphragm replacement or other maintenance, travel stop setting is recommended. Use one of the following procedures:

Refer to Figure 8

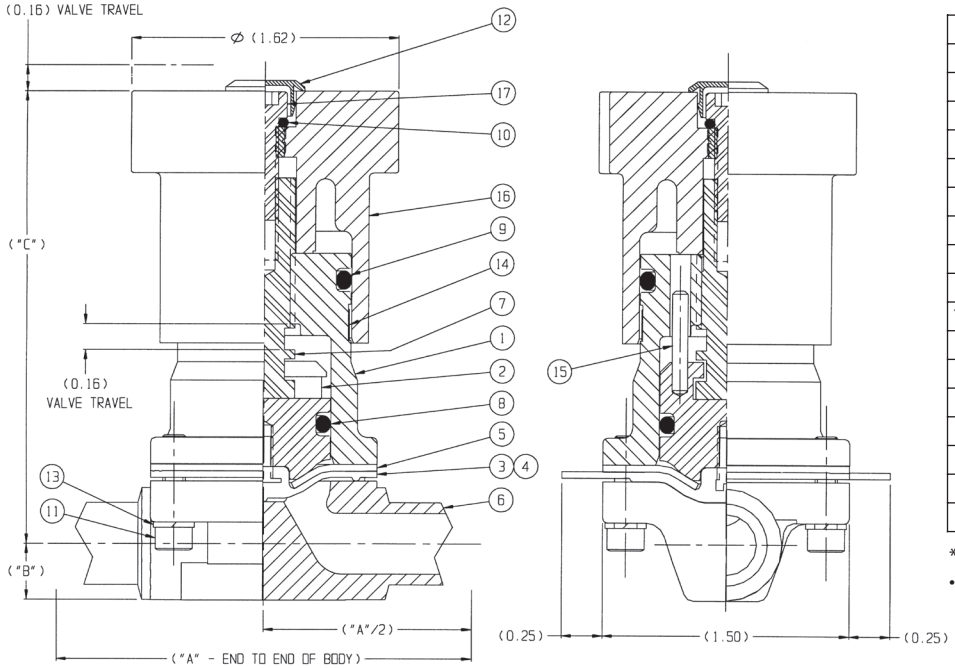
Method 1

1. With the valve slightly open, apply air pressure at 150 psig to the upstream side. Connect the downstream side to a flexible tube immersed in a container of water. USE CAUTION TO ENSURE SEAT LEAKAGE IS NOT EXCESSIVE AT THIS TIME RESULTING IN WHIPPING ACTION OF THE FLEXIBLE TUBE. Air bubbles should be evident in the water.
2. Remove the cap (12) and screw (17).
3. Turn the handwheel (16) clockwise until the air bubbles stop.
4. Push down on the handwheel (16); reinstall the screw (17) and cap (12).
5. The travel stop is now set.

Method 2

1. With system pressure vented, remove the cap (12), screw (17) and handwheel (16).
2. Using a wrench applied to the stem flats, close the valve to the following final torque (depending on the type of diaphragm) in inch-pounds:
   Elastomer: 15 in-lb. PTFE: 15 in-lb.
3. Slide the handwheel (16) over the stem (7), push down and reinstall the screw (17) and cap (12).
4. The travel stop is now set.

Figure 8



Item	Description	Material	Qty.
1	Bonnet	S.S. ASTM A 351 - CF8M	1
2	Compressor	S.S. ASTM A 276 - 316	1
3	Diaphragm - Plastic	TFE GR. R2 DR TM	1
4	Diaphragm - Elastomer	Elastomer	1
5	Cushion - Backing	EPDM	1
6	Body - Weir	S.S. ASTM A 182 - F316L	1
7	Spindle - Adj. Travel	S.S. ASTM A 276 - 316	1
8*•	O-Ring #114	Viton	1
9*•	O-Ring #118	Viton	1
10*•	O-Ring #007	Viton	1
11	Screw - SOC HD CAP	S.S. 18-8	4
12	Cap - Caplug	Flextemp	1
13	Washer - Spring Lock	S.S. 18-8	4
14	Indicator - Decal	Mylar	1
15	Pin - Spring	S.S. 18-8	1
16	Handwheel - Shroud	PAS	1
17	Screw - SOC HD CAP	S.S. 18-8	1

* 1. Recommended Spare Part
• 2. Only Applicable to Model 18S

BODY TYPE	("A")	("A"/2)	("B")	("C")
TRI-CLAMP	2.53	1.27	0.34	2.77
BUTT WELD	3.53	1.77	0.37	2.84

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