

BU-3041

Maintenance Instructions for Manual 4-Way and 5-Way Ball Valves Catalog Number / Series 4K103, 4K203, 5K103

1.0 Reference

- 1.1 Butech Drawing Numbers: C-1445 Rev. 9
C-1460 Rev. 4
C-1975 Rev. 0
C-1400 Rev. 3

2.0 Disassembly Instructions

- 2.1 Remove valve assembly from system.
- 2.1.1 **Important Note:** Relieve system pressure before removal and make sure that valve is in the open position.
- 2.2 Place valve assembly in vise equipped with 'soft jaws' and tighten vise.
- 2.3 Place correctly sized open-end wrench on the side adapter, **items 2, 3, 4 or 5**, and turn the side adapter counter-clockwise to loosen. Continue to turn side adapter until disengaged from valve body, **item 1**. With the side adapter will also come the seat retainer, follower, spring washers, seal, back-up washers and o-rings, **items 9, 10, 12, 19, 20, 23 and 25**. Repeat this step for each remaining side adapter until all 4 are removed from the valve body.
- 2.4 Insert 3/16" hex Allen wrench in to the hex-socket set screw, **item 18**, in the handle, **item 13**, and loosen counter-clockwise several turns until the hub, handle and set screw, **items 11, 13 and 18**, can be removed from the valve stem, **item 7**.
- 2.5 Place the correctly sized open-end wrench on the bottom adapter, **item 6**, and turn counter-clockwise until disengaged from valve body, **item 1**.

- 2.6 Lightly tap stem, **item 7**, with rubber or leather mallet into the valve body to remove the stem and trunnion, **items 7 and 8**, out through the open bottom adapter connection in the valve body.
- 2.7 Loosen the vise and remove the valve body.
- 2.8 Inspect all components for erosion, wear, scratches, nicks, extrusion, etc. and thoroughly examine all sealing surfaces after removing the sealing and pressure containing parts. Discard any used components that show signs of wear and discard all of the components that are provided for in the correct repair kit, which include the stem, trunnion, seat retainer and seal, spring washers, o-rings and back-up washers.

3.0 Assembly Instructions

- 3.1 Lightly lubricate the stem, **item 7**, in the areas where there is contact with the bearing washer, **item 17**, the o-ring and back-up washer, **items 21 and 22**, using a good grade of teflon-based lubricant or equivalent, such as Christo-Lube or Dow Corning #33 grease.
- 3.2 Place the new bearing washer, **item 17**, o-ring, **item 22**, and back-up washer, **item 21**, onto the lubricated stem, **item 7**, in that order.
- 3.3 Insert the stem, **item 7**, up through the bottom connection in the valve body and extend out through the top. Grasp the stem with your fingers and, while turning, pull the stem up until it shoulders against the bearing washer, **item 17**, and the valve body.
- 3.4 Check to make sure that the bearing, **item 16**, is in place. This bearing is pressed into the valve body and should not be loose. Lubricate the shoulder of the trunnion, **item 8**, that comes in contact with the bearing and insert the trunnion into the valve with the top groove toward the stem. Grasp the stem with your fingers and turn until the tongue on the stem engages into the groove on the trunnion.
- 3.5 Install o-ring, **item 24**, over the threads of the bottom adapter, **item 6**, down to the o-ring groove on the adapter at the shoulder of the hex.
- 3.6 Lightly lubricate the o-ring, **item 24**, the external threads on the bottom adapter, **item 6**, and the internal surface of the installed bearing, **item 15**, inside the bottom adapter.
- 3.7 Insert the bottom adapter, **item 6**, into the bottom connection of the valve body, **item 1**, and engage the threads clockwise until finger-tight. Rotate the stem, **item 7**, and trunnion, **item 8**, until the ports in the trunnion are centered in the side connection openings in the valve body. Place the correct size open-end wrench on the hex of the bottom adapter, **item 6**, and tighten threads until metal-to-metal contact is made between the adapter and valve body. Torque the bottom adapter to approximately 30 ft. lbs..
- 3.8 Install o-ring, **item 25**, over the threads and down to the o-ring groove at the shoulder of the hex on all 4 side adapters, **item 2,3,4 and 5**, and lubricate the external threads on each side adapter.

- 3.9 Lightly lubricate the outside surface of the smallest diameter of the seat retainer, **item 9**, and slide the spring washers, **item 12**, and the follower, **item 10**, onto the small diameter of the seat retainer. **Note:** The spring washers should be positioned so that they make contact with each other at the inside diameter only. Insert a back-up washer, **item 20**, the o-ring, **item 23**, and another back-up washer, **item 20**, in to the counter-bore on the side adapter, **item 2**, in that order. Repeat on remaining 3 side adapters.
 - 3.10 Insert the seat retainer assembly, **items 9,10,12 and 19**, into the side adapter, **item 2**, as shown on the drawing. Lightly lubricate the seal, **item 19**, and insert the side adapter assembly into the valve body side connection. **Make sure that the ports in the trunnion are centered on the side adapter ports.** Engage the threads clockwise until finger-tight and torque the side adapter to approximately 30 ft. lbs.. Repeat this step the remaining 3 side adapters.
 - 3.11 Insert the hex socket set screw, **item 18**, into the handle, **item 13**, using a 3/16" hex Allen wrench. Engage only 3-4 turns. Slide the handle, **item 13**, through the hub, **item 11**, and align the holes in both to accept the upper stem, **item 7**. Locate the drill-point on the stem and align the set screw in the handle with the this drill-point, sliding the handle and hub assembly down over the stem. Engage the set screw, **item 18**, into the drill point on the stem and tighten until snug.
- 4.0 Pressure Test
- 4.1 Connect pressure source to side adapter, **item 2**. On the 4-way valves, plug side adapter, **item 5**. On the 5-way valves, plug bottom adapter, **item 6**. Use the correct plug or cap for the downstream adapter connection.
 - 4.2 Pressurize the side connection, **item 2**, to the maximum allowable working pressure of the lowest-rated end connection as shown in the catalog and hold the pressure for a minimum of 30 seconds. A slight pressure drop may occur as the seals form to the trunnion. Re-pressurize to the maximum allowable working pressure and hold for at least 30 seconds.
 - 4.3 Release the pressure and repeat the above procedure for each side adapter. On the 4-way valves, always plug the connecting downstream port as you move from one side adapter to the next. On the 5-way valves, leave the plug in the bottom adapter, **item 6**, throughout testing of all side adapters. Turn the handle several times after testing to assure free movement.