

**Manual No. 1878-YGB-BL-1**  
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**Revision B**



**INSTRUCTION MANUAL**

**for**

**½" thru 2" 1878 lb. Y-Pattern Globe Valves  
with T-Handle and Bellows Seal**

**Flowserve Corporation  
Flow Control Division  
1900 S. Saunders Street  
P.O. Box 1961  
Raleigh, NC 27603**

**Phone: (919) 832-0525  
FAX: (919) 831-3369**

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**REVISION RECORD**

<u>Revision</u>	<u>Section</u>	<u>Description</u>	<u>Date</u>
-	All	Original Issue	11/26/2002
A	9.1.2	Added Gland nut torque Values	04/07/2005
B	11.0	Updated Figure 1	02/01/2008
B	7.2, 9.2, 9.4	Replaced all references to part "110A" with "110"	02/01/2008
B	9.1	Replaced all references to part "024L" with "025"	02/01/2008
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B	9.3.1	Removed 1 <sup>st</sup> paragraph with reference to lapping tool dwg.	02/01/2008
B	9.4-C	Expanded troubleshooting	02/01/2008

## 1.0 **PHYSICAL DESCRIPTION AND OPERATION OF EQUIPMENT**

### 1.1 **GLOBE VALVES** (Figure 1)

These valves are primarily designed for tight shutoff and throttling service where control of the velocity of the fluid is necessary. If required, they can also serve as a means of isolating a portion of a system. Their use however, is limited to those systems where head losses are not critical as the internal flow passage creates a pressure drop across the valve. With the disc in the full open or any intermediate position, the fluid is allowed to flow through seat area at a rate determined by the position of the disc. With the disc in the closed position, the force of the stem provides a mechanical seal between the disc and seat and effects a shutoff at the valve.

The ½"-2" Y-Globe valves have a precision cast body. It is an investment casting and offers smooth flow passages for minimum pressure drop and minimum turbulence. A bellows is provided as a primary sealing device.

The ½"-2" Y-Globe valves can be provided with a variety of disc styles to provide different throttling flow characteristics. The following three distinct disc styles are available: quick plug type, parabolic, cage type. A circular plate below the tee handle/handwheel nut indicates the type of disc.

All ½"-2" Y-Globe valves are supplied with a tee-handle actuator and a bellows seal. To operate these valves, turn the tee-handle in a clockwise direction for closure and counterclockwise for opening.

## 2.0 **DESIGN CONDITIONS**

Refer to the applicable drawings in Section 12.0 of this manual.

## 3.0 **OPERATING CONDITIONS**

Refer to the applicable drawings in Section 12.0 of this manual.

## 4.0 **TEST CONDITIONS**

4.1 Each valve covered by this manual has received the following hydrostatic tests:

4.1.1 Shell hydrostatic test at 1.5 times the 100°F pressure rating.

4.1.2 A disc closure test at 110% of the 100°F pressure rating.

4.1.3 A seat leakage test at 110% of the valves specified maximum "delta P".

4.1.4 A backseat leakage test at 110% of the 100°F pressure rating.

4.1.5 A packing test at 110% of the 100°F pressure rating.

## 5.0 **OPERATING PRECAUTIONS AND LIMITATIONS**

5.1 Maximum hydrostatic test pressure shall not exceed the values imposed by the ASME Code.

## 6.0 **INSTALLATION INSTRUCTIONS**

### 6.1 **LIFTING AND HANDLING REQUIREMENTS AND LIMITATIONS**

6.1.1 Good judgment should be exercised in selecting a lifting device that will safely support the unit's weight.

### 6.2 **INSTALLATION**

6.2.1 Although the valves have been shipped in a clean condition, prior to installing the valves, examine the lines and the valve ports for foreign matter and clean them thoroughly if they have been exposed to the elements. (BEFORE CLEANING IN THIS FASHION, CHECK AT THE SITE TO SEE IF A SPECIFIC CLEANING PROCEDURE SHOULD BE FOLLOWED.) Open the valves fully and flush them out with water if possible; otherwise blow them out with air or steam.

In performing this cleaning procedure, the ports should be vertical, the stem horizontal to assure complete removal of all matter which might have accumulated during storage.

6.2.2 Ensure that there is no line sag at the point of installation. Eliminate any pipeline deviation by the proper use of pipeline hangers or similar device.

## 6.0 INSTALLATION INSTRUCTIONS (Continued)

6.2.3 Where possible, install the valves with the stem vertical.

6.2.4 The valves should then be blocked or slung into position with apparatus that is sufficient to hold the valve assembly weight while the valve is being welded into the line. WELDING SHOULD TAKE PLACE WITH THE DISC IN THE OPEN POSITION. Care should be taken during welding to ensure that foreign material or dirt does not enter the valve and cause interference with subsequent operation.

6.2.5 Valves are normally shipped pre-packed; if specified otherwise, the packing is shipped loose with the valve, and should be installed at this time.

With the valve fully backseated, install the packing, carefully placing the joint of each ring approximately 180° from the preceding piece. It will probably be necessary to slightly flatten each packing ring prior to installation to allow easy insertion within the stuffing box. The flange gland can be used to seat the packing in position, one ring at a time. Upon completely filling the stuffing box, replace the gland stud nuts (234) and very carefully draw the packing down. (Refer to Section 9.1.2 for bolt torque values). Stroke the valve several times and then retighten the nuts.

Special attention should be observed to assure the flange is drawn evenly and that the bore of the flange is concentric with the valve stem. If the flange is drawn unevenly, scoring of the stem may result.

## 6.3 PRE-OPERATIONAL CHECKS

6.3.1 After installation the operation of manual valves should be verified by closing the valve. The valve should seat tightly with less than 40 lbs. of push/pull force on the handwheel. If the valve does not close tightly **DO NOT** apply extra leverage; instead refer to Para. 9.4 A and B.

## 6.4 OPERATION

6.4.1 After the valves are heated and run in, it may be necessary to draw the packing to eliminate leakage. In adjusting the packing, the flange gland should be drawn in as evenly as possible. This can be accomplished by alternately tightening the gland stud nuts one-half turn until the packing is tight.

## 7.0 **MAINTENANCE REQUIREMENTS**

### 7.1 **PREVENTATIVE MAINTENANCE**

- 7.1.1 Check all nuts and bolts periodically to ensure tightness and to forestall possible leaks. (See applicable assembly drawing for recommended bolt torque values).
- 7.1.2 Keep the valve stem clean and properly lubricated.
- 7.1.3 Check condition of the packing and replace as necessary.

### 7.2 **RECOMMENDED SPARE PARTS**

- 7.2.1 Recommended spare parts are Packing Rings (110,112), Disc (004), Pin (Disc/Skirt)(265) and Rapid Change Kit (802). The recommended quantity is 1 set of packing for every 2 valves of a particular type but not less than 1 set of each type. One complete set of the other parts is recommended for every 10 valves of a particular type.

### 7.3 **LUBRICATION**

- 7.3.1 Apply a light coating of lubricant (Dow Corning Molykote 111, Dow Corning Molykote P37 paste or equal) when necessary to the threaded area of the upper stem. Before lubricating in this fashion, check at the site to see if a special lubrication procedure should be followed.

## 8.0 **PERIODIC INSERVICE TESTING RECOMMENDATIONS AND PROCEDURES**

- 8.1 It is recommended that the valve be operated from full open to full close at least once every six months.

## 9.0 **MAINTENANCE INSTRUCTIONS**

### 9.1 **DISASSEMBLY and REASSEMBLY**

The following instructions cover the disassembly and reassembly of the ½"-2" Y- Globe valves.

#### **WARNING**

**Prior to performing disassembly, close off the line pressure to the valve, and release all pressure in the valve.**

Extreme care should be taken to ensure that the lower stem (025) and disc (004) do not separate when removed as one unit until both are adequately supported. Failure to do so may cause the disc to fall off the stem, and may cause damage to the disc and/or injury to personnel.

After removal of the disc from the valve, care should be taken to protect the seating surface from damage. The disc should be placed in a clean area until it is ready for replacement. **THE SLIGHTEST NICK OR SCRATCH ON A SEATING SURFACE MAY PREVENT COMPLETE SHUTOFF AND NECESSITATE EXTENSIVE REWORK OR REPLACEMENT.**

#### 9.1.1 Valve Disassembly (Refer to figure 1 for reference part numbers)

- (1) Relieve pressure from valve.
- (2) Place the valve in the closed position and then open the tee-handle (175) 1-2 revolutions.
- (3) Remove the Handwheel Nut (240) from the Upper Stem (024).
- (4) Remove the Tee-Handle (175) and Thrust Washer (147) from the upper stem.
- (5) Remove the Gland Stud Nuts (234), and then remove the corresponding Gland Studs (205).
- (6) Remove the Stanchion Capscrews (280) and Stanchion Lockwashers (251).
- (7) Remove the Yoke Cap (019). Remove the Thrust Washers and Needle Bearing (168) (356) if applicable. Rotate the Yoke Sleeve (017) in a counterclockwise direction to remove it from the Upper Stem (024)
- (8) Remove the Stanchions (427) from the Body (001).



## 9.0 **MAINTENANCE INSTRUCTIONS** (Continued)

- (9) Loosen the Stem Clamp Setscrews (221) and remove the Stem Clamp (029) and Stem Clamp Key (255).
- (10) Lift the Flange Gland (133) upward and remove the Packing (110, 112) from the stuffing box. Removal of the packing is best accomplished with a packing hook or similar device.
- (11) Loosen the Gland Retainer Setscrews (220) until they do not make contact with the Gasket Retainer (033). Then turn the Gland Retainer (131) counterclockwise off the Bonnet (002). Turn the Gasket Retainer (033) out of the Body (001).

Note: The bellows is seal welded to the bonnet and stem and is an assembly. The assembly is referred to as a Rapid Change Kit, and is comprised of all trim parts, stem, bellows, bonnet, and pressure seal gasket. The Rapid Change Kit is a complete assembly and must be removed and replaced as such.

- (12) Remove the Pressure Seal Gasket (030) by carefully lifting the Upper Stem (024), (including the attached bellows assembly) from the Body (001). It is imperative that the bellows assembly be lifted out of the body as straight as possible to eliminate the possible scoring of the stem. If the bonnet is wedged into position, carefully lift up on the stem until the gasket and bonnet come free.

Note: The Disc (004) and Disc Skirt (005) are attached to the stem by the use of a Stem Retainer (028) and Disc Skirt Pin (265).

- (13) The Disc (004), and Disc Skirt (005), can now be removed from the stem.

### **WARNING**

**Be careful when removing the assembly from the valve body. After removal from the valve, care should be taken to protect the seating surface of the disc from damage. The disc should be placed in a clean area until ready to replace in the valve. THE SLIGHTEST NICK OR SCRATCH ON A SEATING SURFACE MAY PREVENT COMPLETE SHUTOFF AND NECESSITATE EXTENSIVE REWORK OR REPLACEMENT**

- (14) Remove the Disc Skirt Pin (265) from the Skirt (005). Unthread the Disc (004) from the Disc Skirt (005). Place the disc (004) where it won't become damaged or scratched. Remove the Stem Retainer (028) and Disc Skirt (005).

## 9.0 MAINTENANCE INSTRUCTIONS (Continued)

- (15) At this time, the disc and seat ring may be lapped if required. The seating surface should be inspected to determine if scratches or minor imperfections may be corrected by lapping and/or if replacement parts are necessary. (refer to Para. 9.3 for lapping instructions).

### 9.1.2 REASSEMBLY

REASSEMBLY OF THE VALVES is simply the reverse of the disassembly task; also read the following special instructions.

First, all dirt, scale and foreign matter should be removed from inside the valve body and bonnet.

Before reassembling the valve, check the seating surfaces to determine that no scratches or minor imperfections are on the disc or seat ring. If any are evident - lap these surfaces until no imperfections are visible. (Reference Para. 9.3).

Prior to installing the Rapid Change Kit or Bellows Assembly, ensure that the keyhole in the stem clamp is lined up with the keyway on the stem. Ensure that the stem clamp is parallel with two of the stanchion holes to prevent interference with the stanchions once installed and rotation of the bellows assembly for line up, once installed into the body.

The following torque values serve only as a guide in determining approximate gland bolt nut torque values for 1878 Bellows-Sealed Globe Valves. It should not be necessary to exceed the following gland bolt nut torques for pressures up to 2735 psi.

<u>VALVE SIZE</u>	<u>APPROXIMATE TORQUE</u>
½" thru 1"	6 ft-lbs
1½" & 2"	17 ft-lbs

After tightening gland bolt nuts, stroke the stem and retighten the nuts as required.

## 9.0 **MAINTENANCE INSTRUCTIONS** (Continued)

### 9.2 **REPLACEMENT OF PACKING** (Refer to Figure 1 for reference part numbers)

- (1) Remove the two Gland Nuts (234) and raise Gland Flange (133) allowing the Gland Studs (205) to be removed.
- (2) Lift the Gland Flange (133) upward and away from the stuffing box area.
- (3) Use a packing hook or similar device to remove the old packing.
- (4) Install the Packing (110, 112) one ring at a time - carefully placing the joint of each ring approximately 180° from the preceding piece to prevent a leakage path. It might be necessary to slightly flatten each packing ring prior to installation to allow easy insertion within the stuffing box. Do not use a pointed instrument to push the rings into position. The Gland Flange (133) can be used for this purpose.
- (5) Upon completely filling the stuffing box, lubricate the bolt threads, replace the nuts and very carefully draw the packing to assure that the gland flange is even and that the bore of the gland flange is concentric with the upper stem. (If the Gland Flange (133) is drawn unevenly, scoring the upper stem may result; or the gland might be tilted which could cause binding.)
- (6) After tightening the gland stud nuts to the above specified torque values, stroke the stem and retighten the nuts as required.
- (7) Check the packing periodically (6-month intervals), replacing it as needed.

## 9.0 **MAINTENANCE INSTRUCTIONS** (Continued)

### 9.3 **REFINISHING SEALING SURFACES**

Minor discontinuities in the seat sealing surface, which may cause leakage, can, in many cases, be removed by lapping. Major defects such as cracks or deep gouges will generally require replacement of the part.

Minor discontinuities on the valve disc sealing surface may be removed by re-machining the surface to remove a few thousandths of material. Major defects will generally require replacement of the disc.

**NOTE: Lapping is a polishing process where a sealing surface is ground with an abrasive held in place by a special fixture. The abrasive is commonly found in paste form or bonded to a paper backing. Detailed instructions on the use of lapping abrasives and fixtures, normally supplied with such equipment, should be adhered to.**

In order to maintain seat tightness in globe valves, the sealing surface angles on both the disc and seat ring must be kept within close tolerance ( $30^{\circ} [+1/2^{\circ}]$  for the seat and  $29^{\circ} [-1/2^{\circ}]$  for the disc). It is important when lapping to use fixtures that will maintain these angles. Flowserve does not recommend lapping the disc directly to the seat. A good seal is dependent on line contact. Direct contact lapping will result in excessive seat widths.

#### 9.3.1 **Globe Valve Seat Lapping Tool**

Lapping tools and tool drivers for the Series 1878 globe valve seats are available thru Flowserve Corporation. Contact your nearest Flowserve Representative for information.

To lap the seat ring, simply apply two (2) to five (5) lbs of force to the tool as it grinds. Three (3) or four (4) two (2) second cycles should be sufficient. Visually check the seat ring surface for a fine line blue dye check with the disc should assure tight sealing. Flowserve recommends that the disc be turned in a lathe with 16 rms finish at  $29^{\circ} [-1/2^{\circ}]$

## 9.0 **MAINTENANCE INSTRUCTIONS** (Continued)

### 9.4 **TROUBLESHOOTING**

#### A. **Excessive Tee-Handle (175) Effort or Binding**

Excessive tee-handle effort or binding would indicate that the Upper Stem threads or Yoke Sleeve (024) (017) needs to be lubricated; or the Gland Flange (133) is too tight as a result of the gland nuts being tightened unevenly. Lubrication (Para. 7.3) should be checked at regular intervals of 6-months. To tighten the gland nuts evenly, they should be loosened and retightened in even increments while checking concentricity between the stem and gland bore.

#### B. **Leakage Between the Disc (004) and Seat (013)**

This could be an indication that there is foreign matter on the seating surfaces in which case the valve should be opened and closed ONE TIME in an attempt to dislodge any matter that may have inadvertently lodged there. DO NOT OPEN AND CLOSE THE VALVE MORE THAN ONCE AS THIS MAY TEND TO CAUSE PERMANENT DAMAGE TO THE SEATING SURFACES IF THE FOREIGN MATTER IS SECURELY LODGED IN PLACE. Instead, disassemble the valve and remove the source of the trouble.

If no foreign matter is found, inspect the seating surfaces of the valve for signs of a scarred or damaged seat - in which case the seating surfaces of the Disc (004) and Seat Ring (013) should be refinished until no visible defects remain. (Refer to Para. 9.3)

#### C. **Leakage Around Upper Stem (024) and thru the Stuffing Box**

Indicates worn Packing (110, 112) and failed Bellows (163). Tighten the packing, (reference paragraph 9.2(6)) and replace the Packing and Bellows at the earliest opportunity. The Bellows and Packing may be replaced with a Rapid Change Kit (reference paragraph 9.1.1(11) and Section 11.0 Figure 1-Note 10).

## 10.0 **STORAGE REQUIREMENTS**

The valves have been shipped in the closed position. Upon receipt of the valves at destination, the crates should be examined thoroughly for signs of mishandling or damage during shipment. With the valves strapped to the shipping skids, all bolting should be checked to ensure that the joints are secure. Bolting on occasion may become loosened during shipment and handling.

The valves should then be stored in a sheltered area to protect them from the elements, dirt and foreign material. They should not be exposed to the atmosphere, uncrated or removed from the shipping skids except in a clean area just prior to installation.

If the valves are not to be installed within a short period of time after receipt, and will require long-term storage, the following guideline should be adhered to:

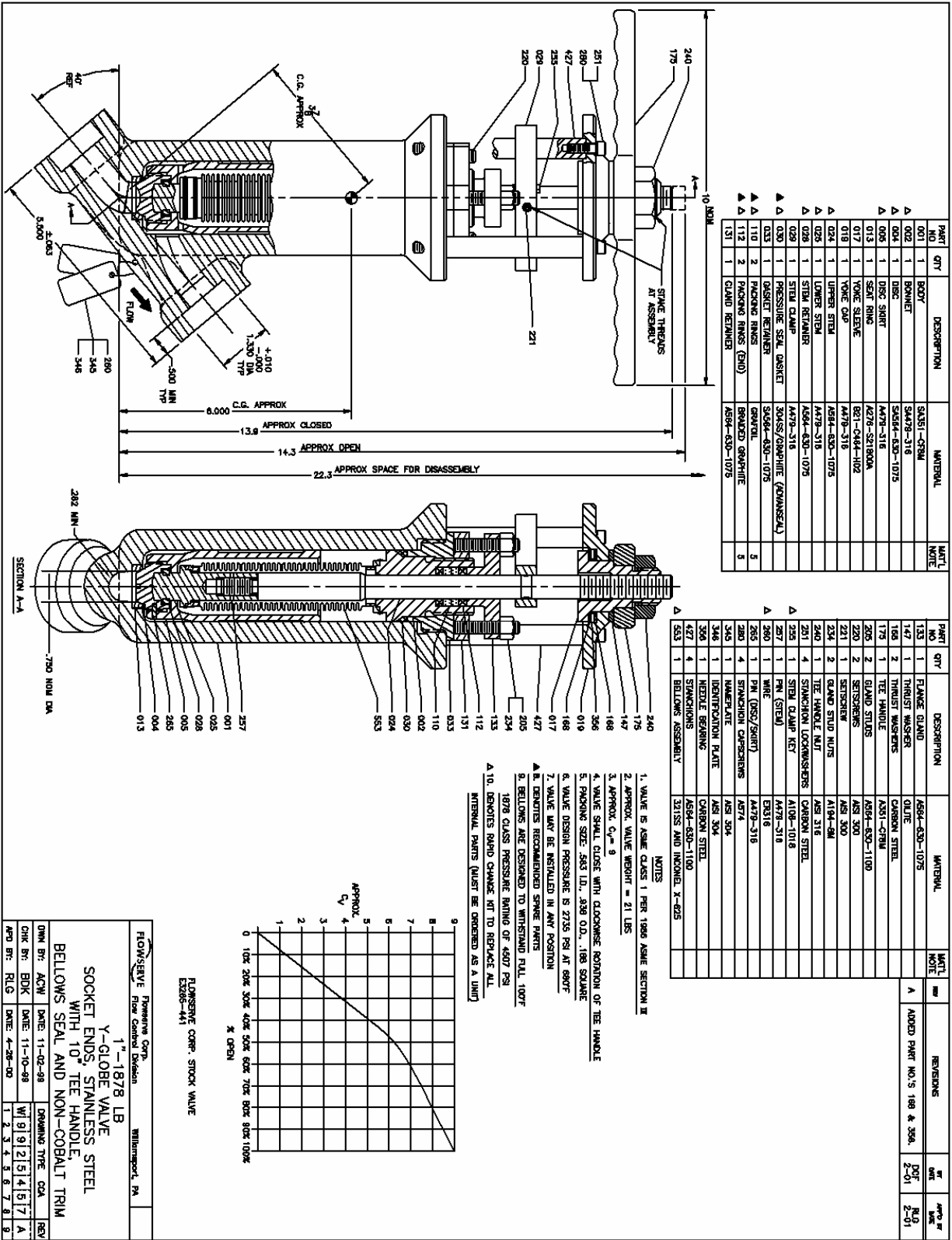
- (a) In their storage condition, the valves should be wrapped in polyethylene to prevent accumulation of dust or foreign matter.

The shelf life for grafoil and graphite filament packing is indefinite.

**SECTION 11.0**

**REFERENCE DRAWING(S)**

**FIGURE 1:**





**SECTION 12.0**

**CUSTOMER ASSEMBLY DRAWING(S)**