CV8 SERIES CRYOGENIC VALVES
1/2” – 4” Sizes

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INTRODUCTION

This Installation, Operation, and Maintenance Manual is intended to be as complete and up to date as possible. It covers installation, operation, and - maintenance procedures for a Leslie Controls, Inc. product. CPC-Cryolab reserves right to update this manual and other product information concerning installation, operation, and/or maintenance, at any time and without obligation to notify product owners of such changes.

CPC-Cryolab is not responsible for injury to personnel or product damage due to improper installation, operation, and/or maintenance. All installation, operation, and maintenance procedures should only be performed by trained/certified personnel. All personnel performing these procedures should completely and carefully read and understand all supplied materials before attempting procedures. All personnel should pay strict attention to all Notes, Cautions, and Warnings that appear within procedures detailed in this manual.

CPC-Cryolab welcomes user input as to suggestions for product or manual improvement.

CONTACT INFORMATION

For information concerning warranties, or for questions pertaining to installation,
Operation or maintenance of CPC-CRYOLAB products, contact:

CPC-CRYOLAB
C/O LESLIE CONTROLS INC.
12501 Telecom Drive
Tampa, FL 33637

USA Phone: (813) 978-1000

To order replacement parts, contact CPC-Cryolab at address listed above, or call toll free:

USA/Canada/Caribbean Phone: (800) 323-8366

Note: Please include model and serial number of unit for which parts are being ordered. If ordering by phone, please have this information readily available.

GENERAL NOTES AND WARNINGS
Notes:

- If questions are not answered by this manual, or if specific installation, operation, and/or maintenance procedures are not clearly understood, contact CPC-Cryolab for clarification before proceeding.
- If unit is damaged during installation, operation, or maintenance, complete following steps:

1. Turn off and lock out all supply to unit in an approved manner, including incoming valves.
2. Contact in-house maintenance personnel or CPC-Cryolab for instructions.

NOTE: Throughout this manual, warnings will be denoted by BOXES

CAUTION!
Piping system must be adequately designed and supported to prevent extraordinary loads to pressure equipment.

It is strongly recommended that this document be reviewed before attempting any installation, operation, or maintenance procedures.

CAUTION!

Serious injury or death can occur if not handled by properly trained personnel. Please consult the manufacturer with any questions prior to conducting work on these items.

INSTALLATION

GENERAL NOTES FOR INSTALLATION

Prior to installation, the valve assembly should be unpacked and checked against the packing list and/or the approved customer drawing.

Valves are recommended for installation in the flow-to-open orientation (under seat port to be inlet connection). Globe valves can be mounted in a horizontal pipe run with the actuator or handwheel located above the pipeline and no more than 15° to either side of the valve's vertical centerline. Y-pattern valves can be mounted in a horizontal pipe run with the actuator or handwheel located above the pipeline and no more than 45° to either side of the valve's vertical centerline, and they can be mounted in a vertical pipe run with the actuator or handwheel located above the horizontal. Right angle valves can be mounted in a vertical pipe run with the actuator or handwheel located above the pipeline and no more than 45° to either side of the valve's vertical centerline. See Figure 9 for an illustration of valve mounting orientations.

The valve is not to be installed or used in a pipeline that exceeds the maximum allowable working pressure as listed on the valve tag.

Support the actuator as necessary to avoid inducing extraordinary loads to the bonnet extension and pipeline (especially when installing Y-pattern valves).

For oxygen clean and high purity valves, care must be taken to ensure the level of cleanliness is not compromised during the installation process.

WELDING VALVE INTO PIPELINE

Prior to welding, insure pipeline is clean and free from dirt, weld slag, machining burrs, and pipe scale. The valve ports are identified with a label as "OS", for over seat, and "US", for under seat.

The valve does not require disassembly to be welded into the pipeline if end connection extensions are supplied on the valve (reference Figures 1 and 2); however it is recommended the valve be in the open position prior to welding. This will minimize any heat conducting to the Kel-F® seat. If the valve has no end connection extensions, it should be disassembled (See MAINTENANCE Section) prior to being welded into the pipeline. Support the valve properly until welded into the pipeline.

Weld valve into the pipeline in accordance with any and all applicable local and national codes and standards.

After installation, if system flushing is necessary, first remove the stem/plug assembly (see MAINTENANCE Section) to protect the Kel-F® seat.

PNEUMATIC AND ELECTRICAL CONNECTIONS

If applicable, see the appropriate instruction manual shipped with the valve for the installed actuator, positioner, filter/regulator, solenoid, and/or limit switches.

When making pneumatic connections, it is recommended that PTFE tape or paste is used on threaded joints, unless otherwise specified by the components instruction manual. The pneumatic supply should be clean, dry air or nitrogen.

When making electrical connections, wiring of components should be in accordance with any and all applicable local and national codes and standards.

OPERATION

HANDWHEEL (MANUAL)

The valve is actuated by manually turning the handwheel. The valve opens when the top face of the handwheel is turned counter-clockwise. The valve closes when the top face of the handwheel is turned clockwise. It is not recommended to use spanner wrenches or cheater bars when seating the valve.

DIRECT ACTING PNEUMATIC ACTUATOR (NORMALLY OPEN, AIR-TO-CLOSE)

In this configuration, the actuator contains springs that provide an upward force to open the valve upon decreasing pneumatic supply pressure. Therefore, the valve closes with increasing pneumatic supply pressure. See the actuator instruction manual and data plate for additional information.

REVERSE ACTING PNEUMATIC ACTUATOR (NORMALLY CLOSED, AIR-TO-OPEN)

In this configuration, the actuator contains springs that provide a downward force to close the valve upon decreasing pneumatic supply pressure. Therefore, the valve opens with increasing pneumatic supply pressure. The required pre-load to achieve standard bubble tight shut-off is factory set. See the

actuator instruction manual and data plate for further information.

START-UP
After initial cool down, check and re-tighten packing and body/bonnet fasteners as needed (see GENERAL NOTES FOR MAINTENANCE).

MAINTENANCE

WARNING!
Injury or death can occur due to failure to completely isolate equipment from all sources of pressure before beginning disassembly. Do not proceed until valve has been completely isolated from the process and vented to atmospheric pressure.

GENERAL NOTES FOR MAINTENANCE
Standard maintenance kits for valves include a soft goods kit to replace all elastomeric seals and a change out, or top works, kit to replace the entire valve except for the body. Change out kits are provided pre-assembled, ready to drop into the valve body, and can be used to convert manual valves to automatic and vice versa.

Remove the actuator from automatic valves prior to starting valve maintenance.

Apply Krytox® or any other suitable lubricant to all threads (manual stem threads, body/bonnet fasteners) and O-rings prior to reassembly. NOTE: Lubricant must be compatible with process fluid.

Apply NIKAL® (nickel anti-seize compound) or any other suitable lubricant to yoke lock nut (on automatic actuator valves) for ease of disassembly.

Kel-F® seat retainer nut/bolts are to be tightened per Table 1 and Fig. 4.

Body/bonnet bolts are to be tightened per Table 5 and Fig 8. ***Any drawing specific body/bonnet bolt torque supersedes torques listed in Table 5***

Packing nuts for all manual and automatic valves are to be tightened enough to prevent leakage under operating conditions only. Over tightening reduces the packing life and causes excessive friction forces on the valve stem, leading to higher actuation force and premature degradation of valve performance. Initial recommended torques for these valves are listed in Tables 2, 3, & 4 depending on specific configuration.

DISASSEMBLY
Please refer to Figs. 1, 2, & 3 for a basic illustration of each type of valve: Standard manual and automatic or bellow sealed manual and automatic. The number in parenthesis refers to the item number in the specified figures.

Top Works
After ensuring the valve is isolated from all sources of pressure and fully depressurized, remove the body/bonnet bolts (2), and pull the top works out of the valve body assembly (1).

If it becomes necessary for removal of the Teflon convection breakers, please consult with the manufacturer for the proper procedure.

Packing, Seat Disc, and Bonnet Gasket & O-ring
To remove the packing (4) from a standard manual valve (see Fig. 1), remove the hand wheel nut (7) and pull off the hand wheel (8). Then remove the packing nut (10) and rotate the stem (3) to extract it from the bottom of the bonnet (9). Then remove the packing follower (6) and the packing (4). Take care not to scratch the stem and packing sealing surfaces.

To remove the packing (4) from a bellow sealed manual valve (see Fig. 3), remove the packing nuts (10) and packing flange (7), and then turn the hand wheel (8) clockwise while holding the yoke (9) still. Once the stem (3) threads disengage, pull the stem out from the bottom of the yoke (9). Remove the packing follower (6) and the packing (4). Take care not to scratch the stem and packing sealing surfaces.

To remove the packing (4) from a standard automatic valve (see Fig 2), remove the packing nut (10) and pull the stem (3) to extract it from the bottom of the bonnet (9). Then remove the packing follower (6) and the packing (4). Take care not to scratch the stem and packing sealing surfaces.

To remove the packing (4) from a bellow sealed automatic valve (see Fig 3), loosen the packing retainer lock nut (8) and unthread the packing follower (6). Pull the stem (3) to extract from the actuator adapter (9) then remove the packing (4). Take care not to scratch the stem and packing sealing surfaces.

To remove the seat disc (13), remove the seat disc nut/screws (15) and slide off the seat retainer (14). The seat disc (13) can now be removed. For removing balanced plug seals see CV8 Supplement IOM 17/2.5.3B. *NOTE: The seat disc retainer may be different than shown in the figures. The retainer may be profiled for linear or equal percentage flow.*

To remove the bonnet gasket (12), bonnet O-ring (11) and (if applicable) bellows flange O-ring (16), carefully extract them from their grooves. Take care not to scratch the sealing surfaces.

REASSEMBLY

Please refer to Figs. 1, 2, & 3 for a basic illustration of each type of valve: Standard manual and automatic or bellow sealed manual and automatic. The number in parenthesis refers to the item number in the specified figures.

Packing, Seat Disc and Bonnet Gasket & O-ring

For Teflon® chevron packing, install the packing set so that the point is up and the v-pocket is facing the pressure. Lubricate threads and O-rings prior to installation (see GENERAL NOTES FOR MAINTENANCE).

To install new packing (4) into a standard manual or automatic valve (Figs. 1 & 2), install packing into the bonnet (9) then install new O-rings (5) on the packing follower (6) and install packing follower. Then tighten the packing nut (10) hand tight prior to installing the valve stem (3). Thread (on manual) or push (on automatic) the valve stem (3) up through the bottom of the bonnet (9). Then tighten packing nut (10) per Table 2.

To install new packing (4) into a bellow sealed manual valve (Fig. 3), install packing into the yoke (9) then install new O-rings (5) on the packing follower (6) and install packing follower and packing flange (7) then tighten the packing nuts (10) hand tight. Install the bellows flange O-ring (16) in the bellow flange (17) prior to installing the stem (3). Place the yoke (9) over the stem (3) and lower until the stem threads meet the yoke gland nut (18). While holding the yoke (9) still, rotate the hand wheel (8) counter-clockwise until stem (3) begins to protrude through yoke gland nut (18). Then tighten packing nuts (10) per Table 3.

To install new packing (4) into a bellow sealed automatic valve (Fig. 3), install packing into the actuator adapter (9) then install new O-rings (5) on the packing follower (6) and install packing follower and packing follower retainer (8) hand tight. Install the bellows flange O-ring (16) in the bellow flange (17) prior to installing the stem (3). Push the valve stem (3) up through the bottom of the actuator adapter (9). Then tighten packing follower (6) and packing follower retainer (8) per Table 4.

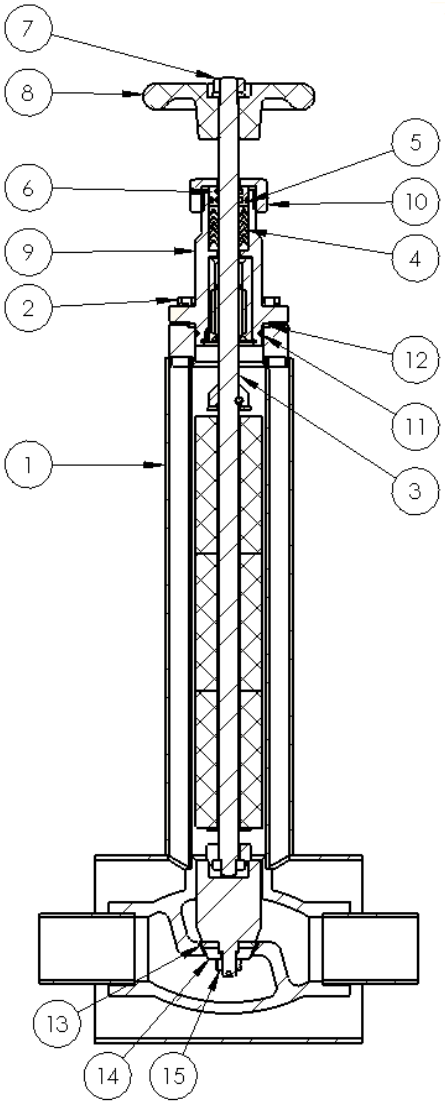
Install the new seat disc (13) onto the plug. If seat disc (13) contains a beveled edge ensure the beveled edge of the seat disc faces away from the plug serrations and toward the valve body seat. If seat disc (13) contains a step ensure the step of the seat disc faces toward the plug and away from the valve body seat. Replace the seat retainer (14) and the seat disc nut/screws (15). Tighten the seat retainer nut/screws (15) per Table 1 and lock wire per Figure 4. For installing balanced plug seals see CV8 Supplement IOM 17/2.5.3B.

Install new bonnet gasket (12) in the valve body assembly (1) and new bonnet o-ring (11) on the bonnet (9) or bellow flange (17).

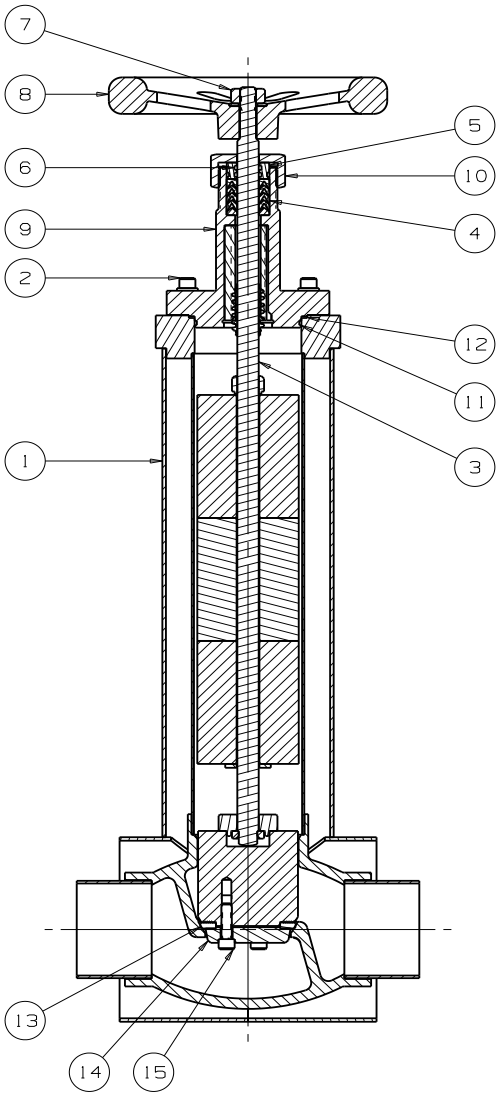
Top Works

With the plug in the open position, slide the top works into the valve body assembly (1) and tighten the body/bonnet bolts (2) according to Figure 8 & Table 5.

Fully open and close the valve, checking for smooth operation. With the valve in mid-stroke position, pressurize the valve and check for leaks at the body/bonnet connection and packing gland. Close the valve, and depressurize the downstream side to check for seat tightness.

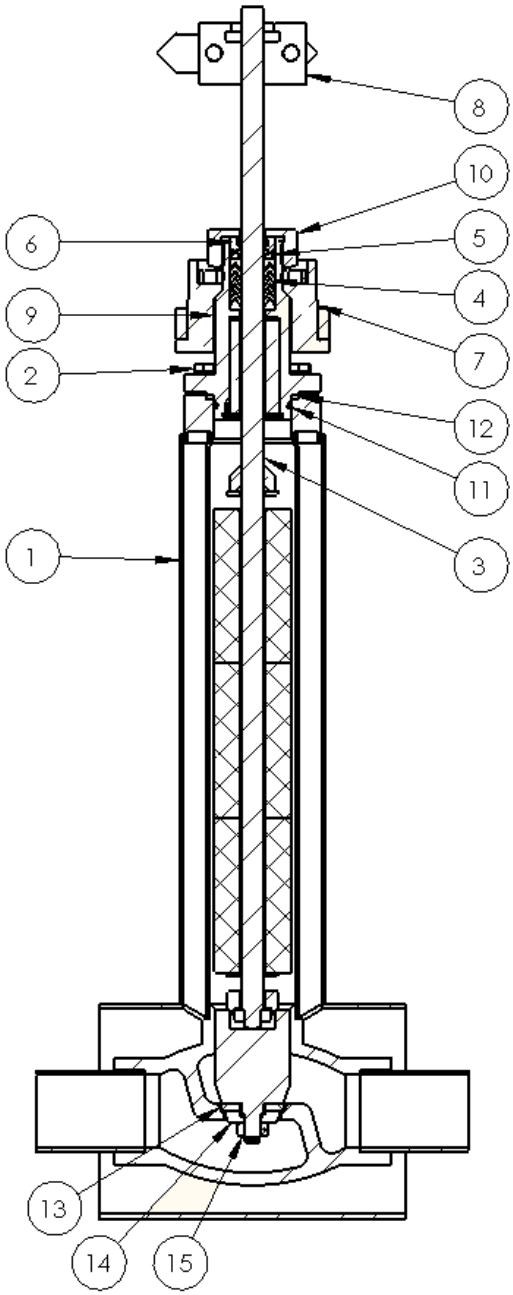


Size ½ - 1.0”

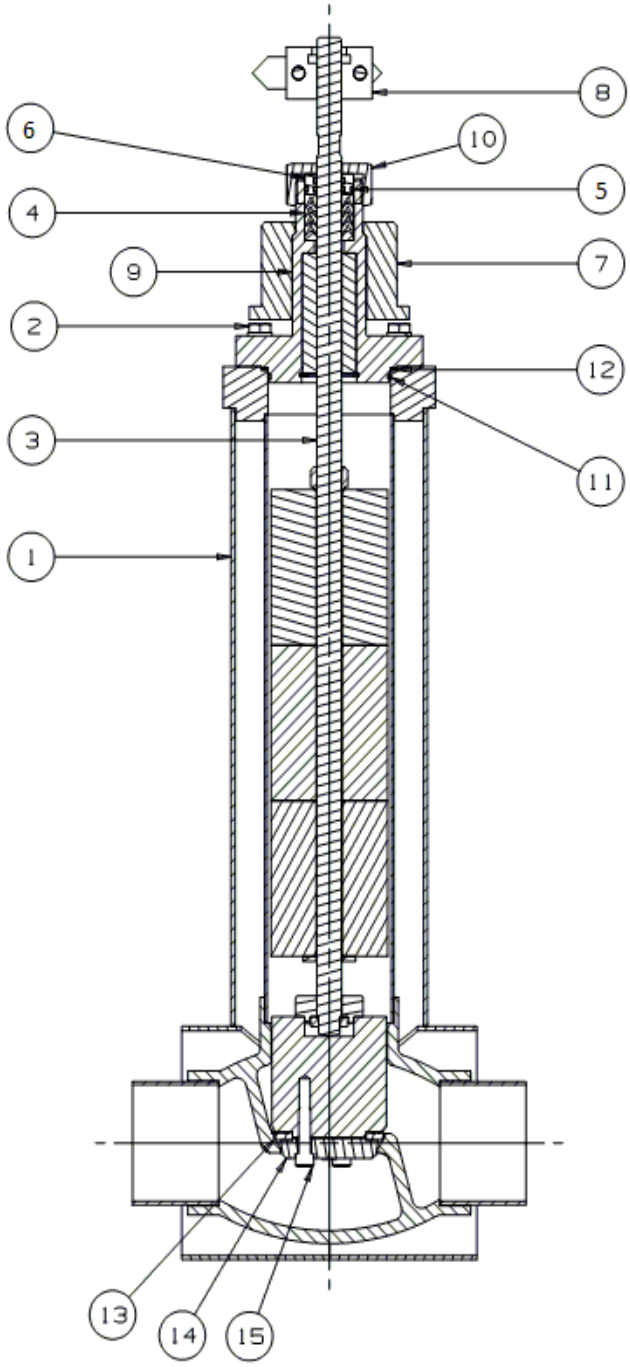


Size 1.5 - 4.0”

Figure 1 – Standard Manual Operated Valves



Size ½ - 1.0”



Size 1.5 - 4.0”

Figure 2 – Standard Automatic Operated Valves

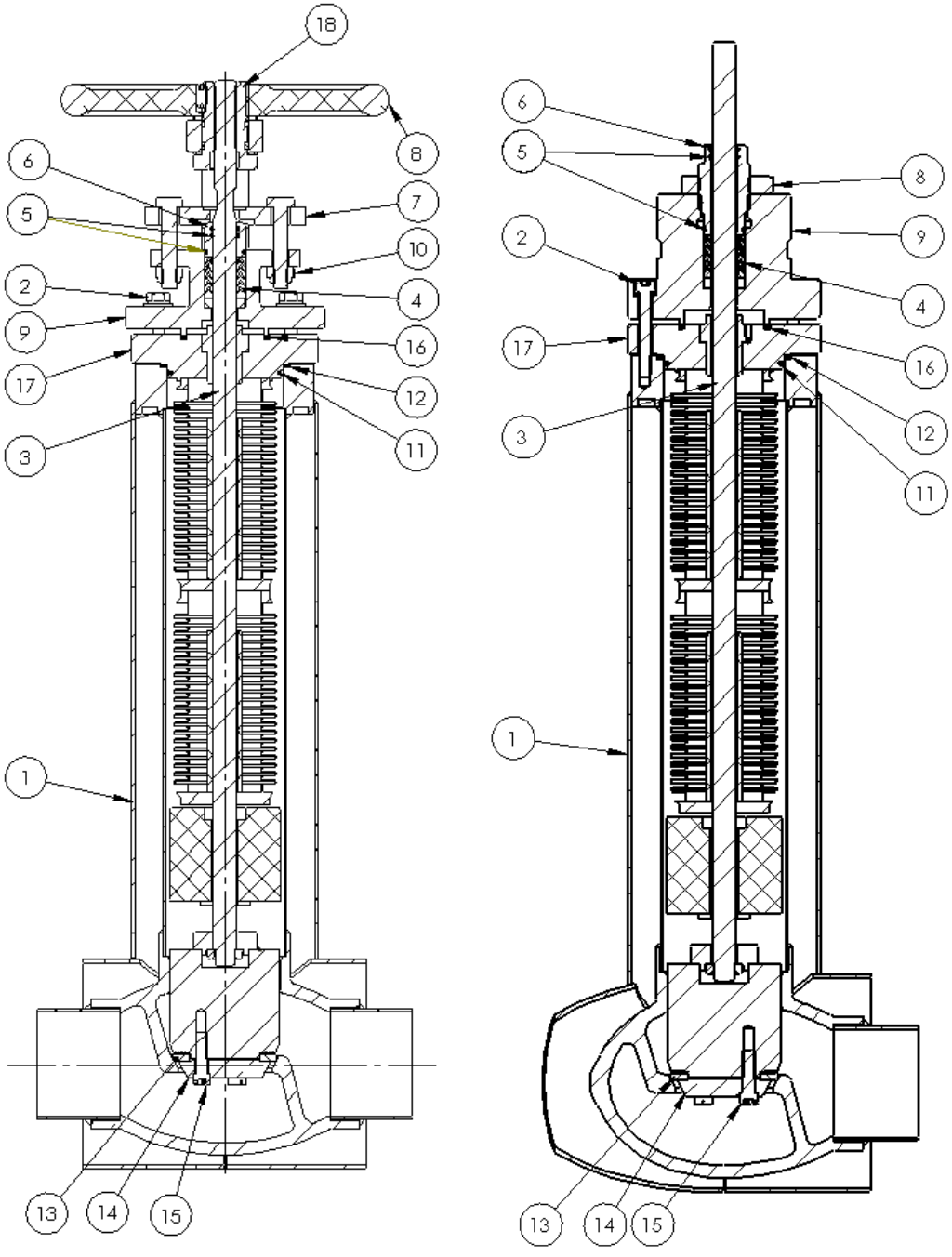
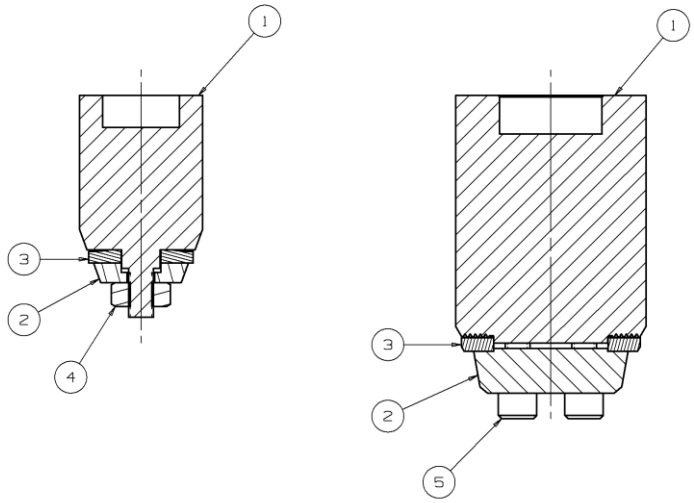


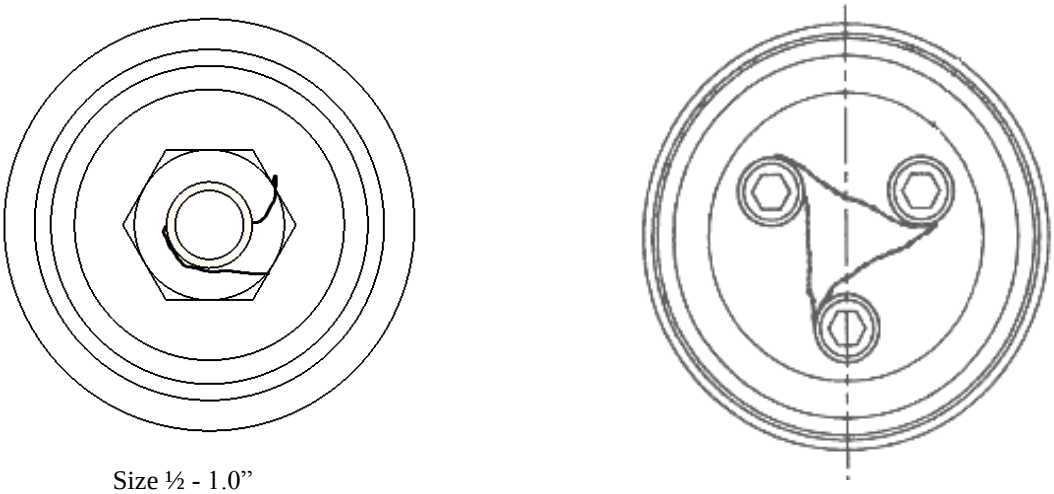
Figure 3 – Bellow Sealed Manual and Automatic Operated Valves



Size ½ - 1.0” Size 1.5” – 4.0”

Size	½” – 1.0”	1.5” – 4.0”
Torque	112 in-lb.	112 in-lb.
Style	Nut	Cap Screw

Table 1 – Seat Disc Nut and Screw Torque Values



Size ½ - 1.0” Size 1.5 - 4.0”

AFTER TORQUING THE SEAT RETAINER NUT, THE WIRE MUST BE PLACED AS SHOWN TO PREVENT THE NUT FROM WORKING LOOSE DURING OPERATION

AFTER TORQUING THE SEAT RETAINER SCREWS, THE WIRE MUST BE PLACED AS SHOWN TO PREVENT THEM FROM WORKING LOOSE DURING OPERATION

Figure 4 - Seat Retainer Nut and Screw Lock wire

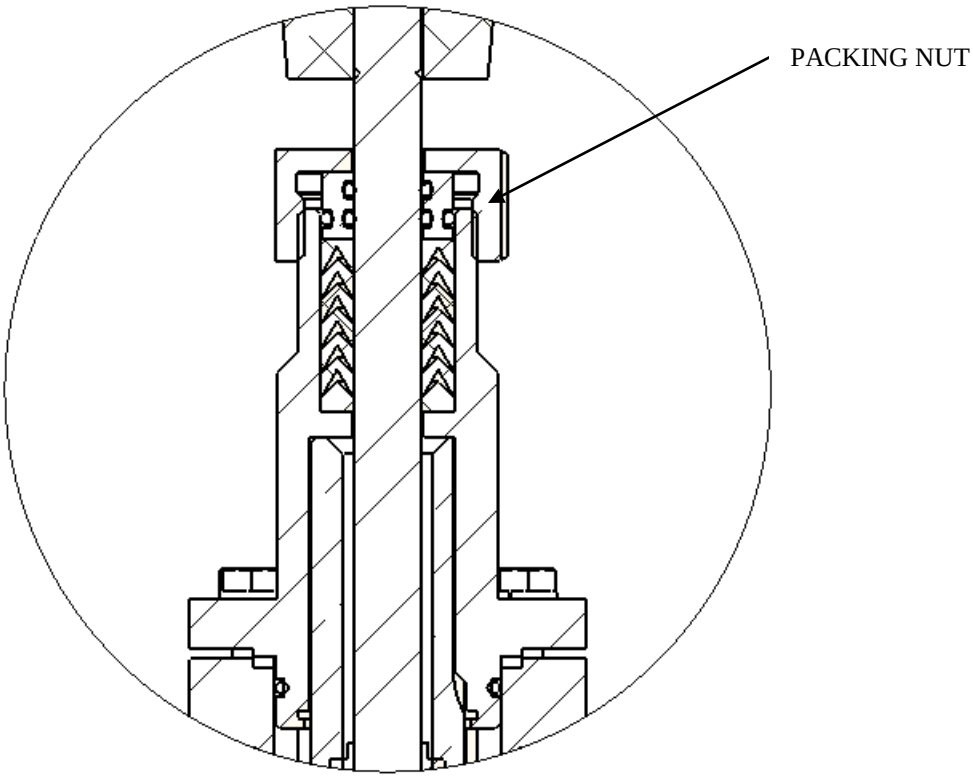


Figure 5 – Standard Packing Nut (PTFE Packing Shown)

Valve Size	***PTFE*** (in-lbs)	***Graphite*** (in-lbs)
½" – 1"	**60**	**60**
1½" – 2"	**100**	**150**
3" – 4"	**150**	**250**

Table 2 – Standard Packing Nut Initial Torque Values

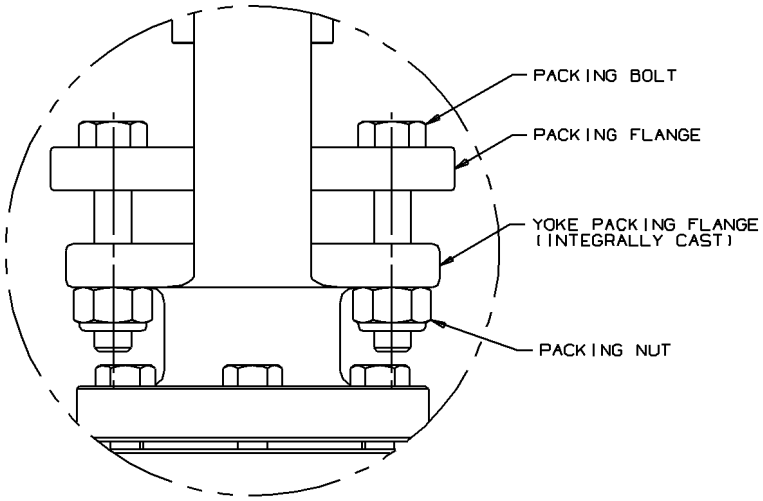


Figure 6 – Manual Bellow Sealed Valve Packing Bolts and Nuts

Valve Size	*PTFE* (in-lbs)	*Graphite* (in-lbs)
½" - 2"	40	70
3" - 4"	75	150

Table 3 – Manual Bellow Sealed Packing Nut Initial Torque Values

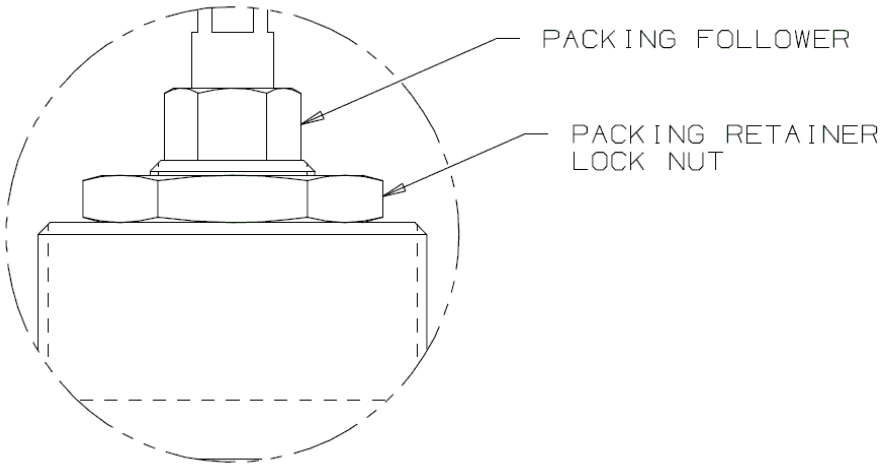


Figure 7 – Automatic Bellow Sealed Valve Packing Follower

Valve Size	*PTFE* (in-lbs)	*Graphite* (in-lbs)
½" - 2"	72	140
3" - 4"	72	140
Packing Retainer Lock Nut (all sizes)	120	120

Table 4 – Automatic Bellow Sealed Packing Nut Initial Torque Values

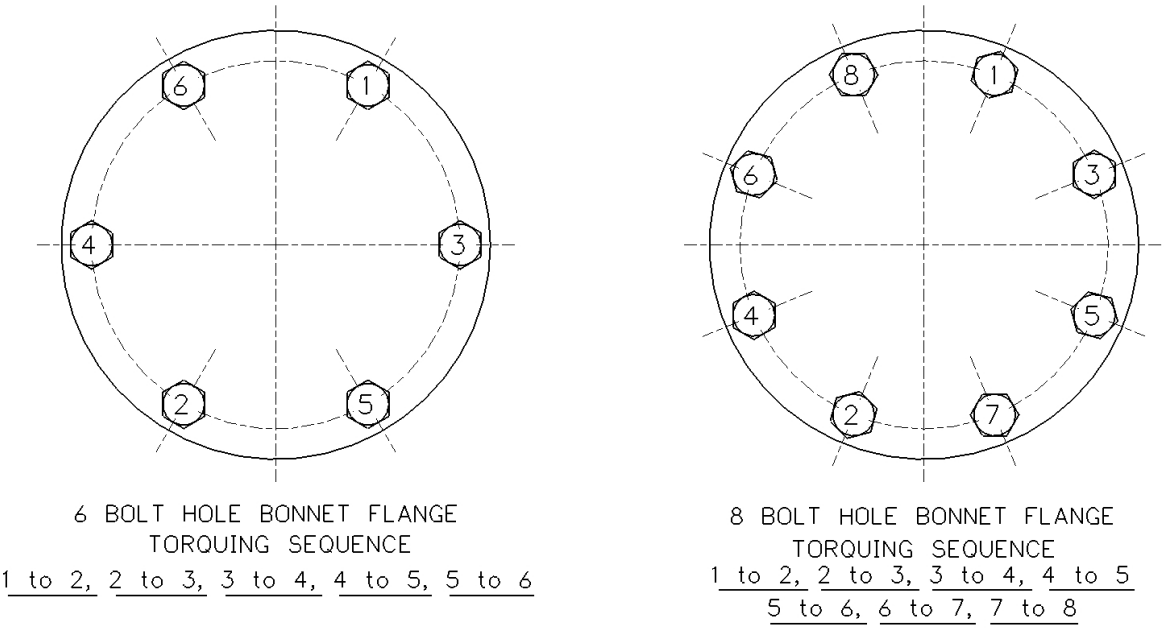


Figure 8 - Body/Bonnet Bolt Torque Sequence

Valve Size	***Bonnet Bolts*** (in-lbs)
½" - ¾"	**29**
1"	**45**
1½" – 2"	**75**
3"	**380**
4"	**870**

Table 5 – Body/Bonnet Bolt Torque Values
Any drawing specific body/bonnet bolt torque supersedes torques listed in Table 5

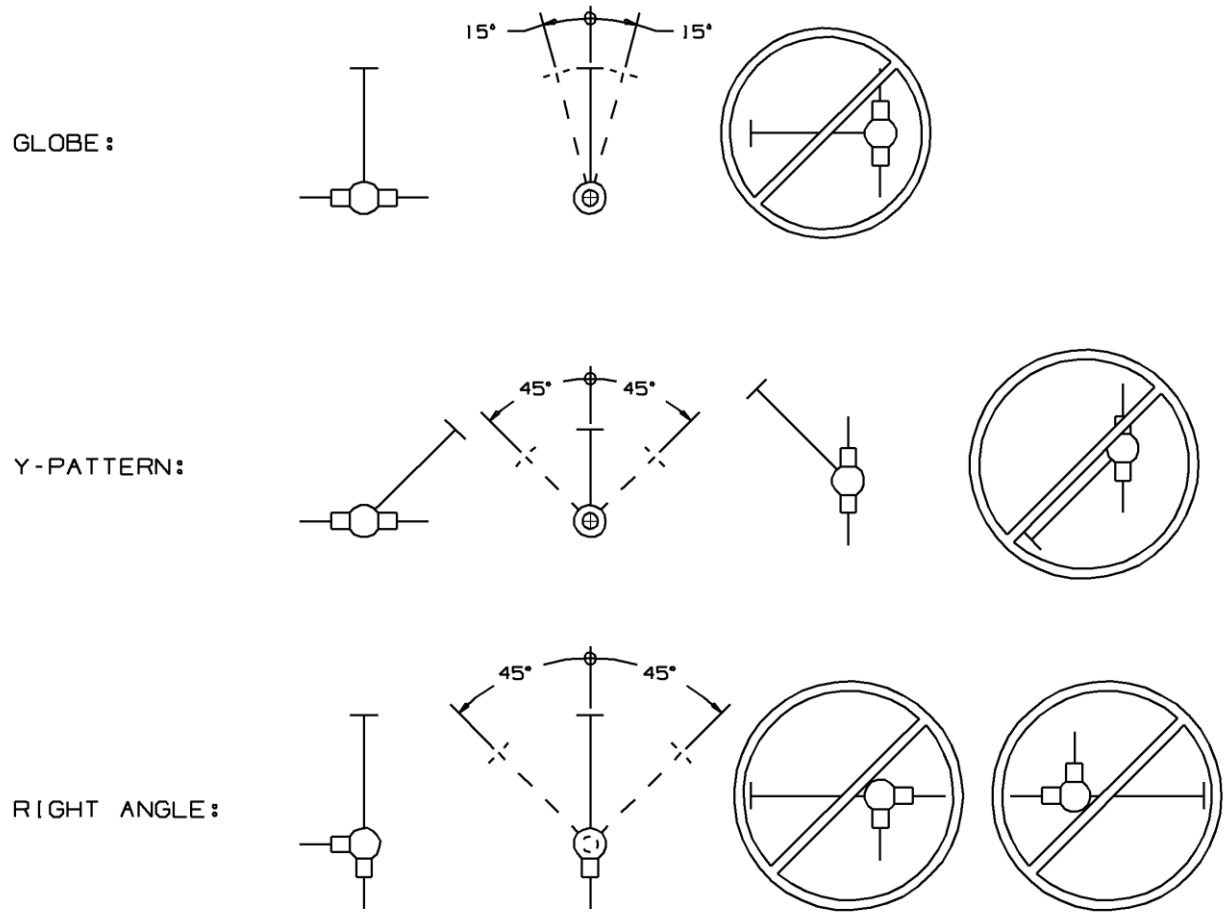


Figure 9 - Valve Mounting Orientations

It is solely the responsibility of the system designer and the user to select products and materials suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Assistance shall be afforded with the selection of the materials based on the technical information supplied to CPC-Cryolab™; however, the system designer and user retain final responsibility. The designer should consider applicable Codes, material compatibility, product ratings and application details in the selection and application. Improper selection, application or use of the products described herein can cause personal injury or property damage. If the designer or user intends to use the product for an application or use other than originally specified, he must reconfirm that the selection is suitable for the new operating conditions .