

# 2001 SERIES CRYOGENIC BAR STOCK BODY VALVES

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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  
4430 E. Adamo Dr. #305  
Tampa, FL 33637  
USA Phone: (813) 644-3764  
www.CPC-Cryolab.com

To order replacement parts, contact CPC-Cryolab at address listed above

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

## **GENERAL 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!**

*The piping system must be adequately designed and supported to prevent extraordinary loads to the pressure equipment. It is the responsibility of the end user to ensure that the piping stresses are not transmitted through the CPC-Cryolab equipment. Failure to do so will result in failure and/or breach of the pressure boundary of the equipment*

## **INSTALLATION**

### **GENERAL NOTES**

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 11 (located toward the back of this manual) 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 IN PIPELINE**

Prior to welding, ensure pipeline is clean and free from dirt, weld slag, machining burrs, and pipe scale. The valve ports are identified with a label or stamp (directly on the body) as "OS", for over seat, and "US", for under seat. The valve ports are identified with a label as "OS", for over seat, and "US", for under seat. Typically, in cryogenic applications, the valve is installed for flow under the seat (US). If this is in question, please contact the valve manufacturer for further details.

The valve does not require disassembly to be welded in the pipeline due to the end connection extensions. However, it is recommended the valve be in the open position prior to welding to minimize heat conduction to the PCTFE (Kel-F®) seat, and a purge gas be utilized to help eliminate imperfection in the interior of 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 inner cylinder/plug assembly (see MAINTENANCE Section) to protect the PCTFE (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 Teflon tape or paste is used on threaded joints, unless otherwise specified by the component's instruction manual. The pneumatic supply should be clean, dehumidified (dry) air, or ambient nitrogen.

When making electrical connections, wiring of components should be in accordance with 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 counterclockwise. 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 (NORMALLY OPEN, AIR-TO-CLOSE) PNEUMATIC ACTUATOR**

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 (NORMALLY CLOSED, AIR-TO-OPEN) PNEUMATIC ACTUATOR**

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 in the MAINTENANCE Section).

## **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***

### **GENERAL NOTES - IMPORTANT**

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.

Apply Krytox® or any other suitable lubricant to all threads (manual stem threads, body/bonnet fasteners, and packing 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.

PCTFE (Kel-F®) seat fasteners and body/bonnet fasteners are to be tightened per Fig.'s 3 & 5, respectively. Packing o-rings and spacers must be installed properly to prevent leaking in both manual and automatic valves. Please see the following pages for the proper method of installation.

### **MANUAL: STANDARD AND BELLOW SEAL** *(Refer to Figure 1)*

#### **Disassembly**

#### **Change Out/Top Works Kit**

After ensuring the valve is isolated from all sources of pressure and fully depressurized, remove the body/bonnet fasteners (12), and pull

the top works (3) out of the valve body assembly (1).

#### Soft Goods Kit (Packing, Seat Disc, and Gaskets)

To initially access the internal components, refer to the instructions above.

To remove the packing o-rings (11) and spacers (10) for the standard manual valve, remove plastic cap (7), cotter pin (8), and nut (6) and spin handwheel (5) counterclockwise to remove. Remove the packing by carefully sliding the bronze packing ring (9), spacers (10), and orings (11) out of housing. Be cautious when removing these items as a spring (4) is present at the bottom of that assembly.

To remove the seat disc (18), remove the seat disc nut (17). The seat disc can now be removed.

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 (14) and orings (2 & 15), carefully extract them from their respective grooves; prevent scratching of the sealing surfaces.

#### Reassembly

##### Soft Goods Kit (Packing, Seat Disc and Gaskets)

To install a change out or top works kit only, refer to the instructions below.

To install the new packing into the packing gland, be sure spring (4) is intact. Place ring (4) in first, then spacer (10), and then alternate packing orings (11) and spacers (10) over stem. Once all pieces are installed, put retaining ring (9) back in place.

To install the new o-rings (2 & 15) carefully slide stem assembly (16) out of bonnet (13). Slide oring (2) over stem and into designated groove. Slide stem assembly back into bonnet. For second oring (15) carefully place over plug end of stem and place it near another end in designated groove. To install the new seat disc onto the plug, ensure the beveled edge of the seat disc (18) faces

away from the plug serrations and toward the valve body seat. Replace the seat disc (18) retainer and the seat disc nut (17). Tighten to specified torque and stake the seat disc retainer nut per Figure 3, located toward the back of this manual.

To install gasket (14) be sure gasket groove is clean and free of debris and insert new one. Once in place, topwork assembly (3) can be installed and body bonnet fasteners replaced. Please refer to the GENERAL NOTES under MAINTENANCE section for important information regarding the proper lubrication of the orings prior to installation. Be certain to replace the bronze retainer ring (9) to ensure proper operation of the valve, and to prevent leaking once valve is fully assembled.

#### Change Out/Top Works Kit

Replace the existing bonnet gasket (14) in the valve body assembly. Use care when extracting the existing bonnet gasket to preserve the surface finish of the groove. 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. To remove and replace handwheel, loosen nut (6) and remove cotter pin (8). When replacing, torque nut until snug, and replace cotter pin (8).

### **AUTOMATIC: STANDARD AND BELLOW SEAL (Refer to Figure 2)**

#### Disassembly

##### Change Out/Top Works Kit

After ensuring the valve is isolated from all sources of pressure, disconnected from source of actuation, and fully depressurized, remove the body/bonnet fasteners (5), and pull the top works (6) out of the valve body assembly (1).

#### Soft Goods Kit (Packing, Seat Disc, and Gaskets)

To initially access the internal components, refer to the instructions above. Remove the actuator according to the instructions supplied with the actuator.

To remove the packing o-rings (11), loosen the packing retainer nut (8) and remove the packing retainer ring (9). Pull the stem to extract from the bonnet (12). Remove the packing orings (11) and spacers (10). Take care not to scratch the stem and packing sealing surfaces. To remove the seat disc (3), remove the seat disc retainer (2) and slide off the seat disc. The seat disc can now be removed.

*(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 (14), carefully extract the bonnet gasket from its groove; prevent scratching of the sealing surfaces.

### Reassembly

#### Soft Goods Kit (Packing, Seat Disc, and Gaskets)

To install a change out or top works kit only, refer to the instructions below.

Install the new packing orings (11) and spacers (10) once the spring (7) has been put in place. Alternate spacers and o-rings until all are in place and put packing retainer (9) in place. Once complete, tighten packing retainer nut (8) as snug as necessary to prevent leaking.

*(Note: Please refer to the GENERAL NOTES under MAINTENENCE section for important information regarding the proper lubrication of the o-rings prior to installation. Replace the packing nut and tighten according to instructions in GENERAL NOTES under MAINTENENCE section.)*

Carefully insert the valve stem up through the bonnet. For bellow seal valves, install the bonnet gasket (14) in the stem assembly flange prior to re-inserting the stem. Install the new o-rings (13 & 15) before replacing packing retainer nut. Once complete, tighten packing retainer nut (8) as snug as necessary to prevent leaking.

Install the new seat disc (3) onto the plug. Ensure the beveled edge of the seat disc faces away from the plug serrations and toward the valve body

seat. Replace the seat disc retainer and the seat disc nut. Tighten and stake the seat disc retainer nut per Figure 3, located toward the back of this manual.

#### Change Out/Top Works Kit

Replace the existing bonnet gasket (14) in the valve body assembly. Use care when extracting the existing bonnet gasket to preserve the surface finish of the groove. It is highly recommended that o-rings (13 & 15) be replaced as well. When mating actuator back to valve, and to recalibrate, contact manufacturer.

With the plug in the open position, slide the top works in the valve body assembly and fasten the body/bonnet bolts (5) according to the torque and sequence procedure per Figure 5, located toward the back of this manual.

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.

### **TROUBLESHOOTING TIPS**

For any troubles with use of your valve, see the short list of tips below.

#### *Leaking observed around bonnet gasket/handwheel*

Tighten bolts to specified torque found on customer supplied print.

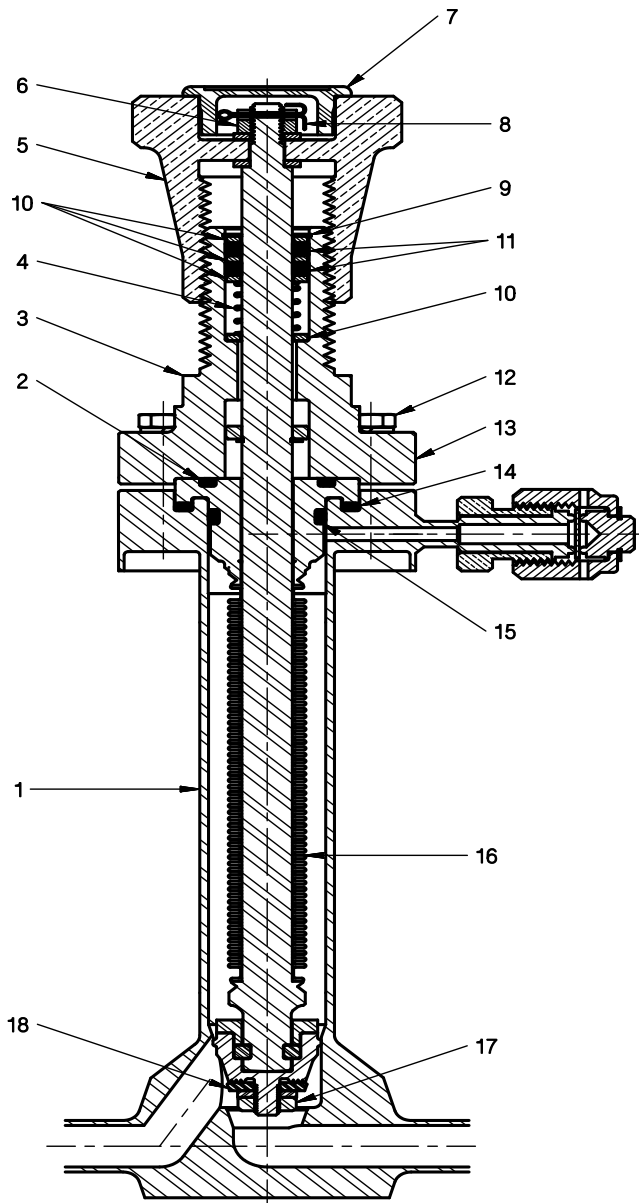
#### *Valve doesn't open/close easily*

Verify packing nut isn't excessively torqued and nothing is restricting travel of stem. If problem persists, cease operation and call manufacturer.

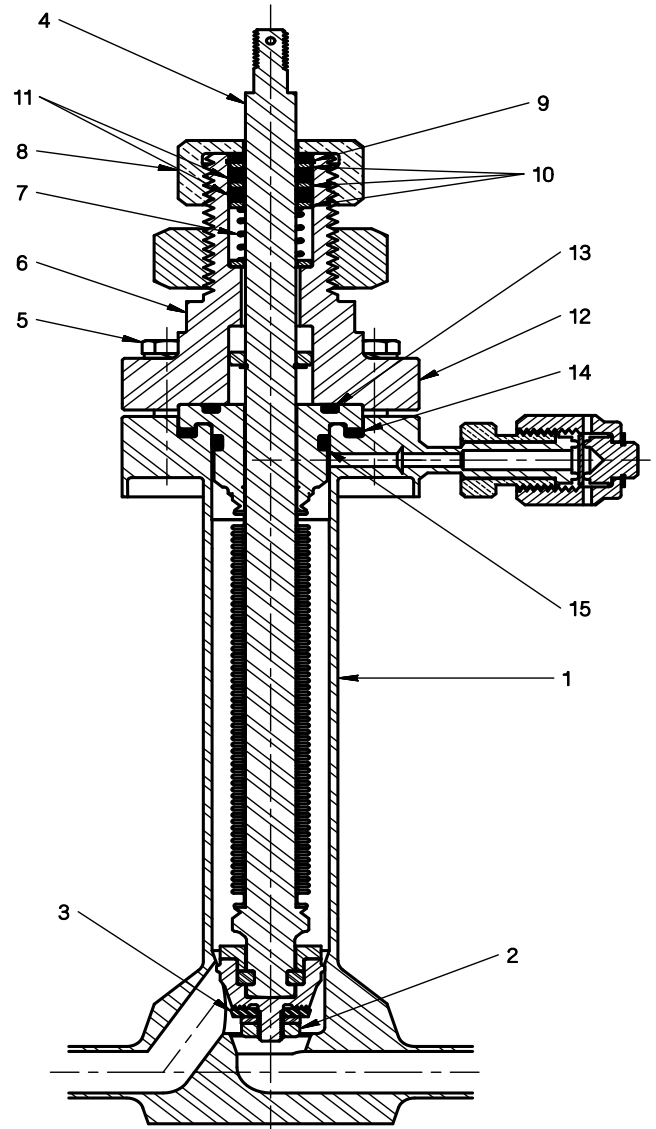
#### *Valve leaks/seat not sealing*

Check to see if seat material is cracked and operating line is free of debris.

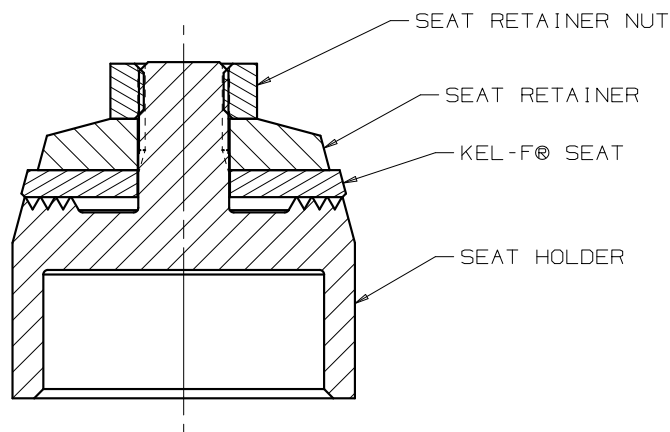
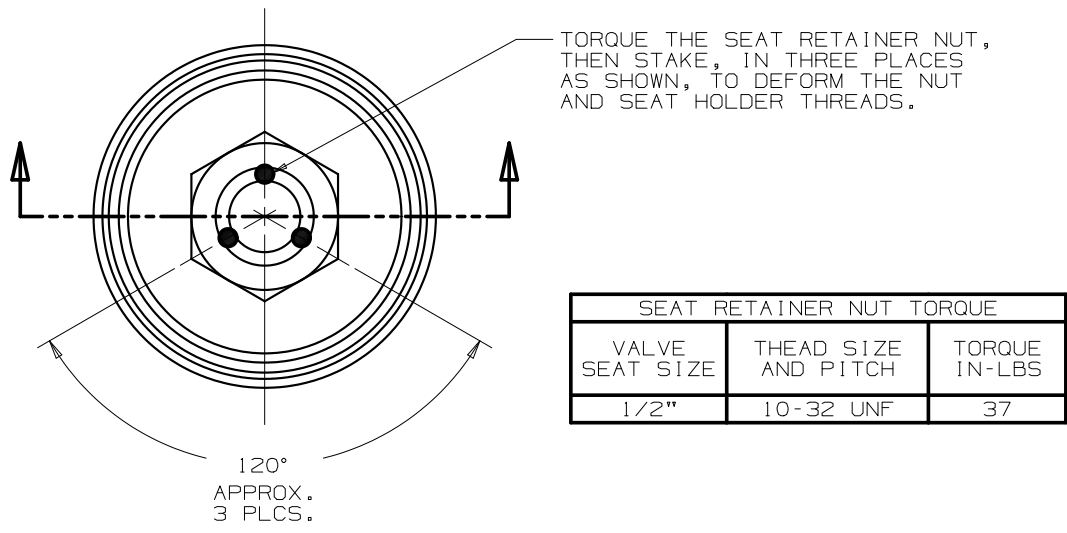
**NOTE:**  
***If problems continue, contact  
Manufacturer immediately!***



**Figure 1 - Standard Manual Valve Valve**

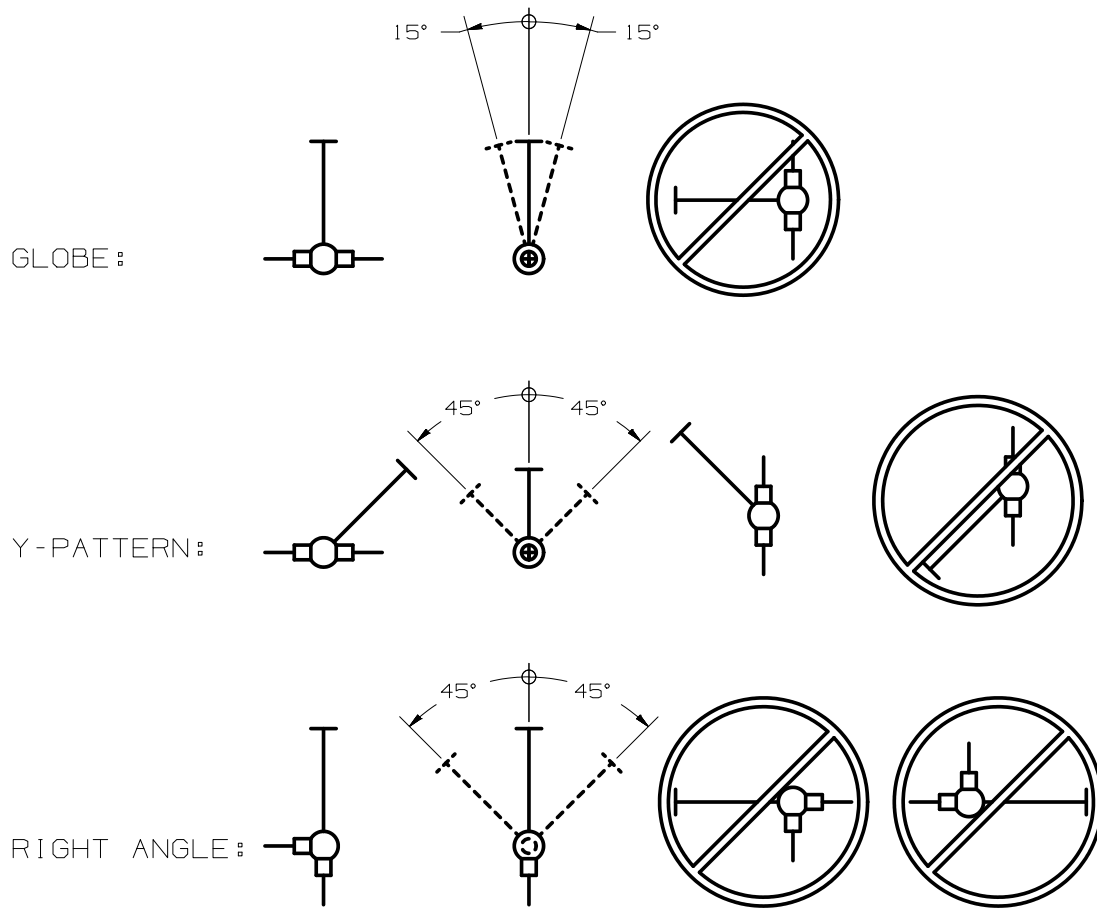


**Figure 2 - Automatic**

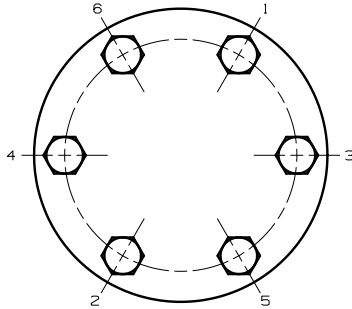


**Figure 3 - Seat Retainer Nut Torque**





**Figure 4 - Valve Mounting Orientations**



BODY/BONNET BOLT AND NUT TORQUE				
VALVE SIZE	THREAD SIZE AND PITCH	50% TORQUE IN-LBS	75% TORQUE IN-LBS	100% TORQUE IN-LBS
1/2"	1/4-20 UNC	50	75	100

TORQUE SEQUENCE:

1 TO 2, 2 TO 3, 3 TO 4, 4 TO 5, 5 TO 6

1. SNUG BOLTS AND NUTS FINGER TIGHT.
2. TIGHTEN TO 50% REQUIRED TORQUE.
3. TIGHTEN TO 75% REQUIRED TORQUE.
4. TIGHTEN TO 100% REQUIRED TORQUE.

*TORQUE VALUES SHOULD BE CHECKED AFTER THE FIRST COLD CYCLE AND RE-CHECKED ON AN ANNUAL BASIS OR AS NEEDED.*

**Figure 5 – Body/Bonnet Fastener Torque Table**

*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.*