

# 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**

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 5 (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, 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 in the pipeline due to the end connection extensions; 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. 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 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 (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 pressure.*

### 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.

Kel-F® seat fasteners and body/bonnet fasteners are to be tightened per Fig.'s 3 & 6, respectively.

Packing fasteners/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 Fig. 4.

### STANDARD: MANUAL

Please refer to Fig. 1 for a basic illustration of this type of valve. The number in parenthesis refers to the item number in the specified figures.

#### 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 (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.

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

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

To remove the packing (4) for the 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 to extract from the bottom of the bonnet (9). Remove the packing follower (6) and the packing (4). Take care not to scratch the stem and packing sealing surfaces.

To remove the seat disc (13), remove the seat disc bolts (15) and slide off the seat disc retainer (14). 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 (12), 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 (4) into the packing gland (9). For Teflon® chevron packing, install the packing set so that the point is up and the v-pocket is facing the pressure.

Install the new o-rings (5) on the packing follower. Please refer to the GENERAL NOTES under MAINTENANCE section for important information regarding the proper lubrication of the o-rings prior to installation. Replace the packing nut, or packing

flange and associated fasteners, and tighten according to instructions in GENERAL NOTES under MAINTENANCE section. Thread the valve stem (3) up through the bottom of the bonnet (9).

Install the new seat disc (13) 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 (14) and the seat disc bolts (15). 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 o-ring (11) and gasket (12) in the valve body assembly. Use care when extracting the existing bonnet gasket and o-ring 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.

### **AUTOMATIC: STANDARD**

Please refer to Fig. 2 for a basic illustration of this valve. The number in parenthesis refers to the item number in the specified figures.

#### 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 (2), and pull the top works 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, or contact the manufacturer.

To remove the packing (4), loosen the packing retainer nut (10) and remove the packing follower (5). Pull the stem (3) to extract from the bonnet (9). Remove the packing. Take care not to scratch the stem and packing sealing surfaces, or damage the o-rings on the packing follower.

To remove the seat disc (13), remove the seat disc bolts (15) and slide off the seat disc retainer (14). 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 o-ring (11) and gasket (12), 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. For Teflon® chevron packing, install the packing set so that the point is up and the v-pocket is facing the pressure.

Install the new o-rings (6) on the packing follower. Please refer to the GENERAL NOTES under MAINTENANCE section for important information regarding the proper lubrication of the o-rings prior to installation. Replace the packing follower and the packing retainer nut (10), and tighten according to instructions in GENERAL NOTES under MAINTENANCE section.

Carefully insert the valve stem (3) up through the bonnet (9).

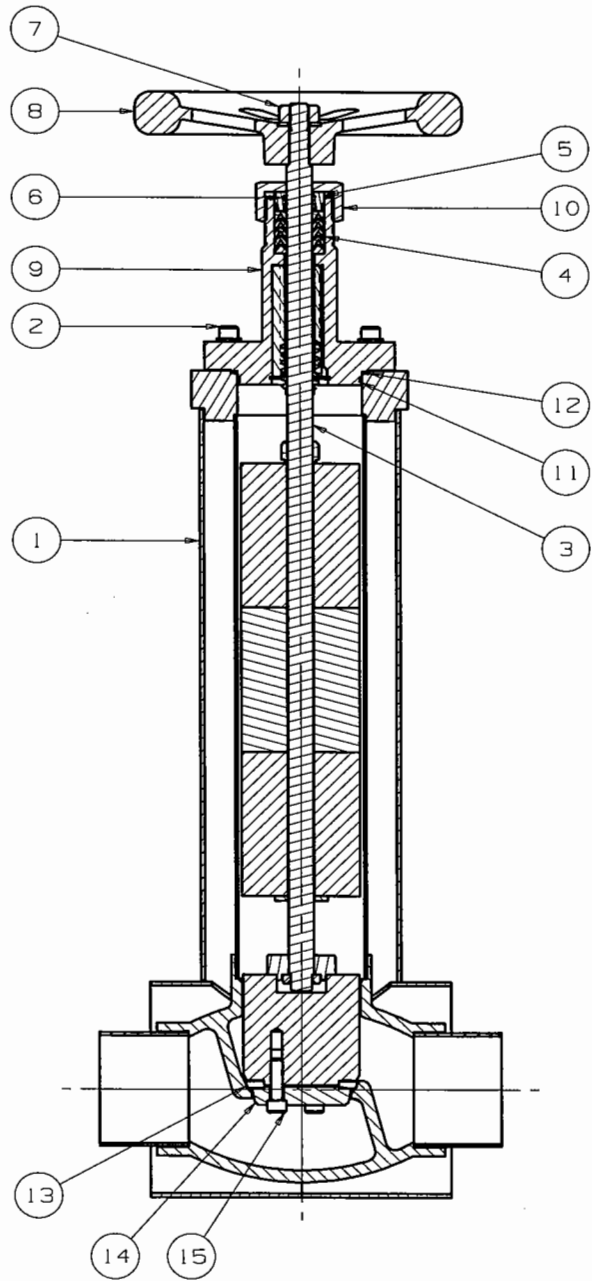
Install the new seat disc (13) onto the plug. Ensure the beveled edge of the seat disc faces away from the plug serrations and toward the valve body seat. Replace the seat disc retainer (14) and the seat disc bolts (15). For the smaller size valves (1/2 – 1”), tighten and stake the seat disc retainer nut per Figure 3, located toward the back of this manual. For the larger sizes, a lock wire is utilized with the cap screws. Refer to Figure 3 for notes.

##### Change Out/Top Works Kit

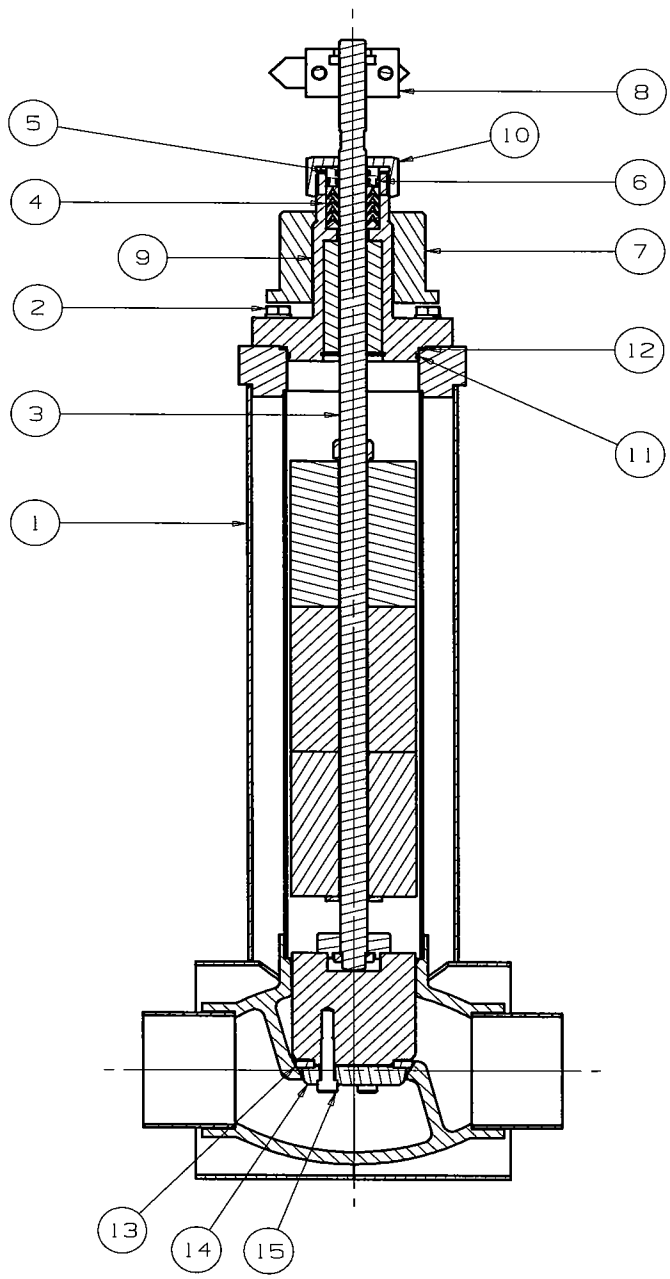
Replace the existing bonnet o-ring (11) and gasket (12) in the valve body assembly. Use care when extracting the existing bonnet gasket to preserve the surface finish of the groove.

With the plug in the open position, slide the top works in the valve body assembly and fasten the body/bonnet bolts according to the torque and sequence procedure per Figure 6, located toward the back of this manual.

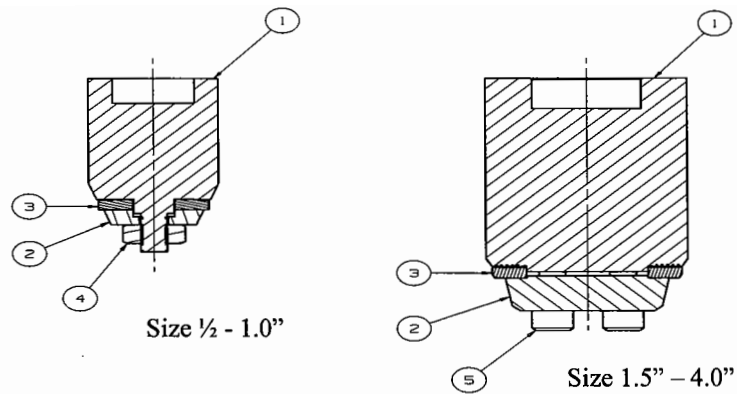
Fully open and close the valve, checking for smooth operation. With the valve in mid-stroke position, pressurize the valve and check for leaks at the body/bonnet connection and packing gland. Close the valve, and depressurize the downstream side to check for seat tightness.



**Figure 1 – CV8 Manual Operated**

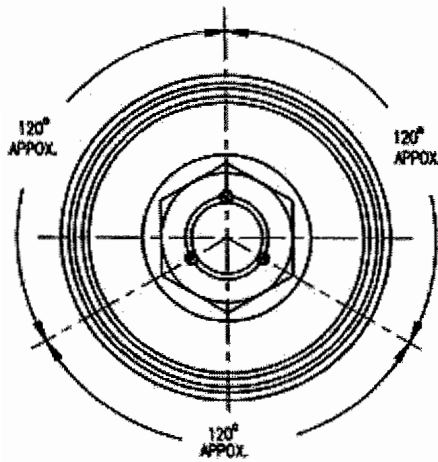


**Figure 2 – CV8 Auto**

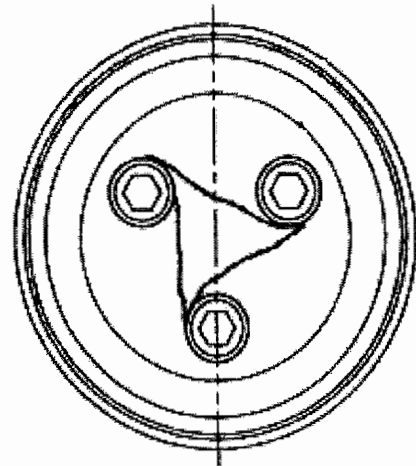


Size	1/2" - 1.0"	1.5" - 4.0"
Torque	112 in-lb.	112 in-lb.
Style	Nut	Cap Screw

*Note: In Cap Screw style, a lock wire is utilized to ensure they stay in place. Prior to reassembly of the valve, this wire tie must be reinstalled (as seen below). In the nut design, nut must be "staked" (as seen below) in three places to ensure the nut doesn't work loose during operation.*



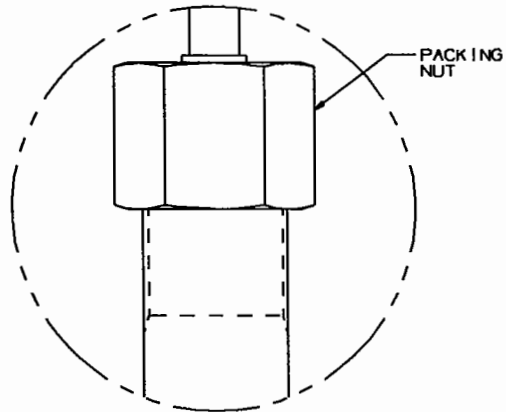
AFTER TORQUING THE SEAT RETAINER NUT, STAKE 3 (THREE) PLACES AS SHOWN ABOVE TO DEFORM THE NUT AND STUD THREADS



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

**Figure 3 - Seat Retainer Nut Torque**





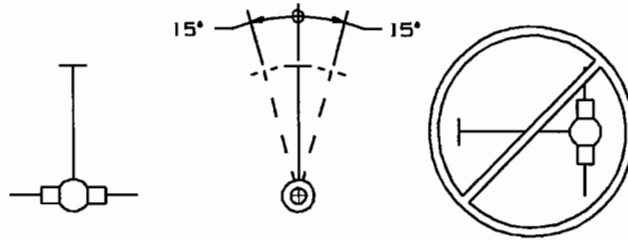
STANDARD MANUAL VALVE PACKING NUT TORQUE		
VALVE SIZE	PACKING MATERIAL	TORQUE IN-LBS
1/2" - 1"	PTFE	50
1/2" - 1"	GRAPHITE	140
1-1/2" - 2"	PTFE	50
1-1/2" - 2"	GRAPHITE	140

NOTE: THE VALUES LISTED ARE INITIAL RECOMMENDED TORQUE VALUES. SEE THE GENERAL NOTES UNDER THE MAINTENANCE SECTION FOR MORE INFORMATION.

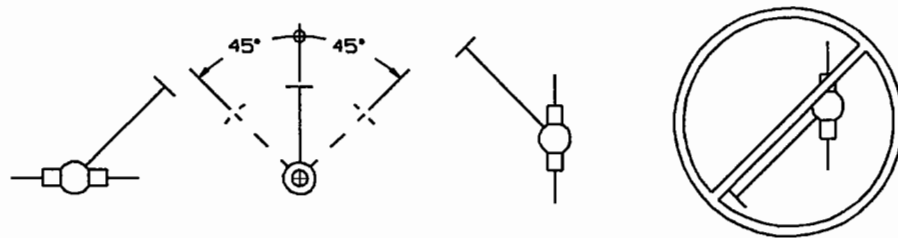
TORQUE VALUES SHOULD BE CHECKED AFTER THE FIRST COLD CYCLE AND RE-CHECKED ON AN ANNUAL BASIS OR AS NEEDED.

**Figure 4 - Standard Manual Valve Packing Nut Torque**

GLOBE :



Y-PATTERN:



RIGHT ANGLE:

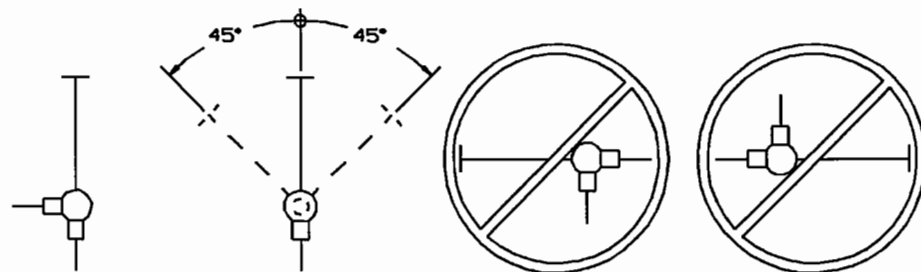
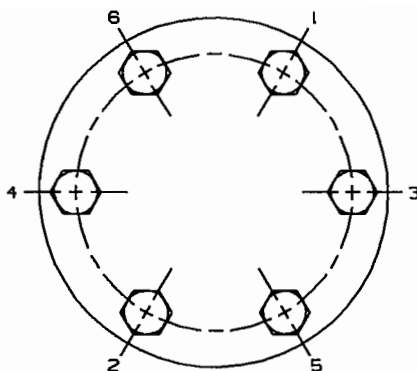


Figure 5 - Valve Mounting Orientations



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"	1/4-20 UNC	50	75	100
1-1/2" - 2"	5/16-18 UNC	100	150	200

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 6 - Body/Bonnet Bolt and Nut Torque**

*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 .*

