

# LC CRYO CRYOGENIC VALVES

## 1/2, 1, 1 1/2 Inch 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 CPC-Cryolab product. CPC-Cryolab reserves the 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 proceeding. 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 the 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  
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 the manual fails to answer all questions, or if specific installation, operation, and/or - maintenance procedures are not clearly understood, contact CPC-Cryolab for clarification before proceeding.
- If the unit is damaged during installation, operation, or maintenance, complete following steps:
  1. Turn-off and lock-out all supply to the unit in an approved manner, including incoming valves.
  2. Contact in-house maintenance personnel or CPC-Cryolab for further instructions.

Throughout this manual, warnings will be denoted as shown in the example below:

### **CAUTION!**

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

### **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.*

## **INSTALLATION**

### **GENERAL NOTES**

Prior to installation, the valve and all associated parts should be unpacked and checked against the packing list and/or the approved customer drawing. If parts are missing or extra, contact the manufacturer.

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 vertical centerline. See Figure 4 (page 8) for an illustration of valve mounting.

The valve is not to be installed or used in a pipeline that exceeds the maximum allowable working pressure 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 cleanliness is maintained and not compromised during the installation process.

### **WELDING VALVE IN PIPELINE**

Prior to welding, ensure pipeline is clean and free from things such as dirt, weld slag, machining burrs, and pipe scale. The valve ports are identified with a cast arrow showing flow direction.

The valve does not require disassembly to be welded in the pipeline due to the end connection extensions. However, the valve should be in the open position prior to welding as this will minimize heat conduction to the PCTFE soft seat. Support the valve securely until it is 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 soft seat.

### **PNEUMATIC AND ELECTRICAL CONNECTIONS**

See the appropriate instruction manual shipped with the valve for any installed accessory including: actuator, positioner, filter/regulator, solenoid, or limit switch.

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**

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. The use of spanner wrenches or 'cheater bars' to close the valve restricts safe operation and could void warranty.

### **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**

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 equivalent lubricant to all threads (manual stem threads, body/bonnet fasteners, and packing fasteners) and o-rings prior to reassembly. Lubricant must be compatible with process fluid!

Apply NIKAL® (nickel anti-seize compound) or equivalent lubricant to the yoke nut for ease of disassembly.

PCTFE soft seat fasteners are to be tightened per Figure 2 (Page 6).

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.

## STANDARD

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

### *Disassembly*

After ensuring the valve is isolated from all sources of pressure and has been fully depressurized, remove the handwheel nut (27), washer (26) and handwheel (25). Remove the packing nuts (22), washers (21), and bolts (20) from the assembly. The packing flange (19) will remain loose on the stem. Remove the bonnet bolts (11), washers (12), and nuts (13) from the body/bonnet assembly. Carefully pull the top works from the body by lifting vertically.

Carefully remove the spiral wound gasket (8) from the gasket groove ensuring not to scratch the sealing surface of the body. Unscrew the stem (28) from the yoke (10) through the yoke nut (23) and gently pull the stem (28) through the packing (15) and stem bushing (14). Take care to not scratch the stem or packing sealing surfaces.

The packing follower (18) and flange (19) can now be removed from the bonnet assembly (10). Remove the three o-rings (16,17) from the packing follower (18). If necessary, remove the yoke nut set screw (24) and unscrew the yolk nut (23) from the bonnet (10). Remove the packing (15) and packing spacer (14) from the bonnet.

To remove the seat disc (5), remove the seat disc nut (7) and slide off the seat disc retainer (6). The seat disc (5) 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.*

### *Reassembly*

Ensure the valve parts are present and clean for the service intended.

Install the new seat disc (5) 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 (6) and the seat disc nut (7). Tighten and stake the seat disc retainer nut per Figure 2 (Page 6).

Replace the packing spacer (14) and place new packing (15) into the packing gland. If Teflon® chevron packing is used, install the packing set so that the point is up and the v-pocket is facing the pressure boundary.

Install new o-rings (16, 17) on the packing follower (18). Refer to the GENERAL NOTES under MAINTENANCE section for important information regarding the proper lubrication of the o-rings prior to installation.

If the yoke nut (23) needs to be replaced, thread the yoke nut back into the yoke and tighten the yoke nut set screw (24). Refer to the GENERAL NOTES under MAINTENANCE section for important information regarding the proper lubrication of the yoke nut prior to installation.

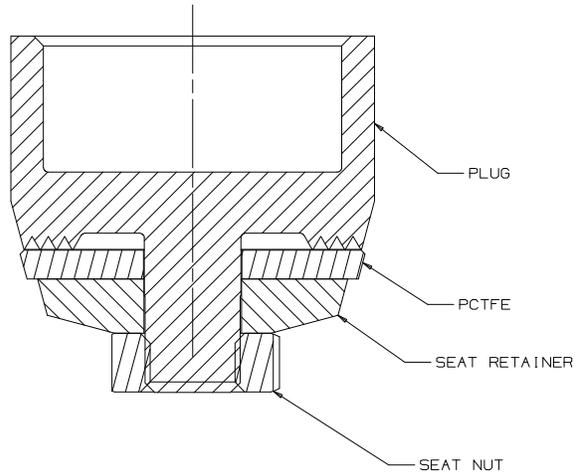
Slide the stem (28) through the bonnet (10), packing spacer (14), and packing (15). Take care to not scratch the stem and packing. Once the stem reaches the yoke, replace the packing follower (18) without tearing the o-rings (16, 17). Slide the packing flange (19) onto the stem and then thread the stem into the yoke nut (23).

Replace a new spiral wound bonnet gasket (8) into the gasket groove. It is not recommended to re-use the bonnet gasket as it could lead to leakage. Replace the bonnet bolts (11), washers (12), and nuts (13) through the bonnet (10) and body (1) and tighten to the required torque value in Figure 3 (page 7) using a criss-cross pattern.

Place the packing bolts (20) through the packing flange (19) into the yoke and tighten according to instructions in GENERAL NOTES under MAINTENANCE section. The recommended torque value for the packing bolts is located in Figure 3 (page 7). Replace the handwheel (25), washer (26), and nut (27) on the stem and tighten.

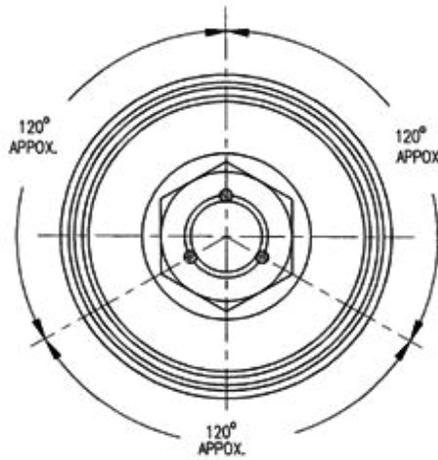
Fully open and close the valve, checking for smooth operation. With the valve in mid-stroke position, pressurize the valve and check for leaks at the body/bonnet connection as well as at the packing gland. Close the valve and depressurize the downstream side to check for seat tightness.





Size	1/2"	1"	1 1/2"
Torque	18 in-lbs.	37 in-lbs.	65 in-lbs.
Style	Nut	Nut	Nut

NOTE: THE NUT MUST BE "STAKED" (AS SEEN BELOW) IN THREE PLACES TO ENSURE THE NUT DOES NOT WORK LOOSE DURING OPERATION.



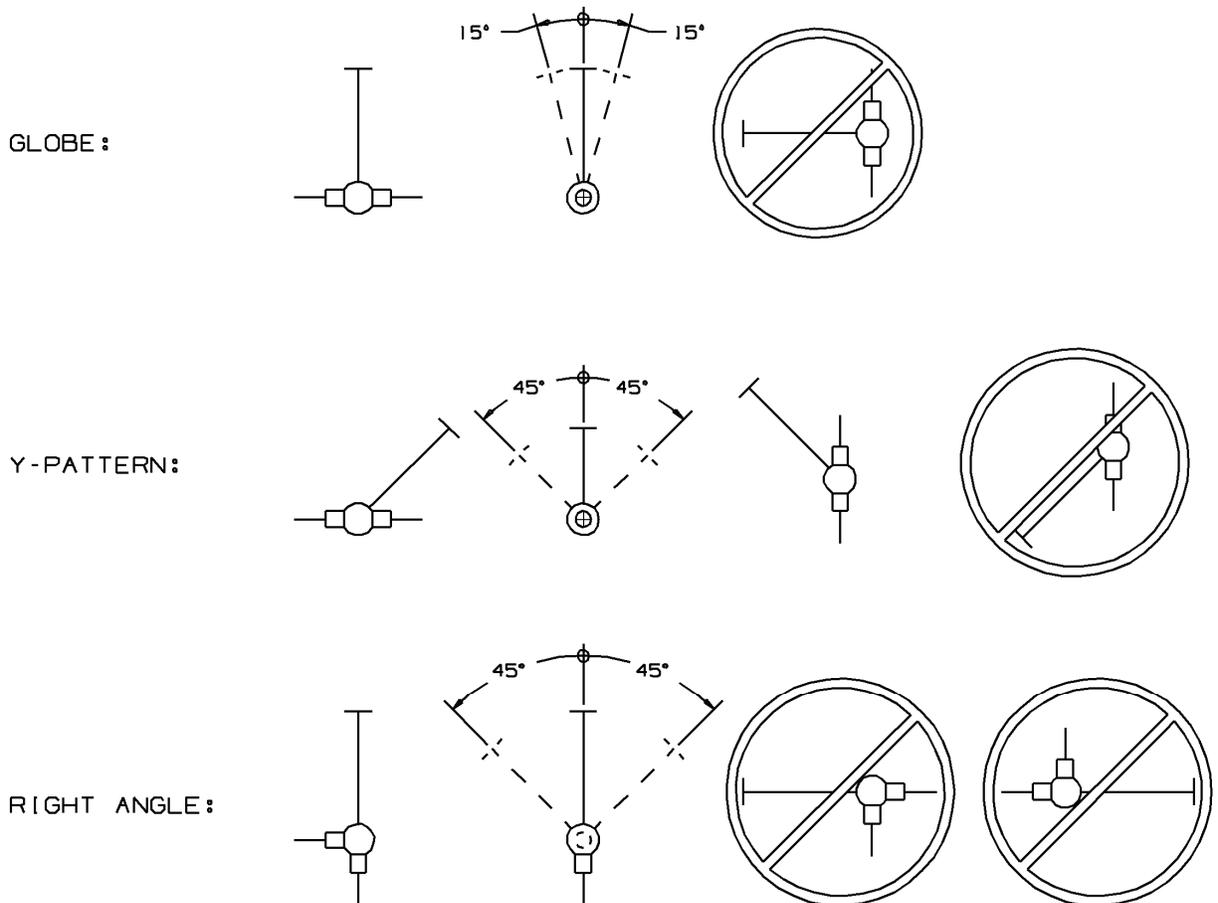
AFTER TORQUING THE SEAT RETAINER NUT, STAKE 3 (THREE) PLACES AS SHOWN ABOVE TO DEFORM THE NUT AND STUD THREADS

**Figure 2 - Seat Retainer Nut Torque**

Recommended Torque Values		
Valve Size	Bonnet Nuts [in-lbs.]	Packing Nuts [in-lbs.]
1/2"	18	18
1"	37	37
1 1/2"	65	37

NOTE: TIGHTEN PACKING NUT UNTIL NO LEAKAGE IS OBSERVED. PACKING NUTS AND BONNET NUTS MAY REQUIRE RE-TIGHTENING AFTER FIRST COOL DOWN. SEE THE GENERAL NOTES UNDER THE MAINTENANCE SECTION FOR MORE INFORMATION.

**Figure 3 – Standard Recommended Torque Values**



**Figure 4 - Valve Mounting Orientation Examples**

*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.*

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