AUTOSEAL

DIAPHRAGM

ACTUATORS

TABLE OF CONTENTS

TABLE OF FIGURES

CAUTION!

The piping system must be adequately designed and supported to prevent extraordinary loads to the pressure equipment.

INSTALLATION

Refer to Fig. 1 for an illustration of the actuator.

1. Carefully lower the actuator assembly onto the valve assembly. Leave enough space between the actuator stem and the valve stem to insert the yoke lock nut (10) and any other connections required for optional actuator accessories (i.e. pickup arm for limit switches, positioners, etc.).
2. Finish lowering the actuator assembly until it completely seats on the valve bonnet/actuator adapter.
3. Secure the actuator assembly to the valve assembly by tightening the yoke lock nut to the valve bonnet/actuator adapter.
   NOTE: This may require the use of a hammer and punch to adequately tighten.
4. Manually push down on the valve stem until it is seated (hold down if valve contains a bellow sealed stem).
   NOTE: You may need to loosen the valve packing to push down on the valve stem.
5. Fail Closed Models:
   While the valve stem is on the seat, slowly apply regulated pressure to the bottom of the actuator to the pre-load indicated on the actuator tag (located on the side of the actuator yoke). If no pre-load is given, use the following formula to calculate the minimum pre-load for bubble tight shut-off.

   Pre-Load [psig] =
   $(.98 \cdot P \cdot d^2 + 157 \cdot d + 50)/A$

   where P = required valve shut-off pressure [psig], d = nominal valve size [in], and
   A = AutoSeal actuator size (36 or 60).

   Fail Open Models:
   While the valve stem is on the seat, slowly apply regulated pressure to the top of the actuator to the pre-load indicated on the actuator tag (located on the side of the actuator yoke). If no pre-load is given, apply enough pressure until the actuator stem can engage the valve stem with the stem block coupler (11).
   NOTE: Lower the actuator stem adequately to achieve the required valve travel.

6. Attach the stem block coupler (11) and secure it with the two bolts (12).
7. Ensure valve is completely seating and fully stroking without sticking, binding, or galling.
8. Attach and adjust any accessories equipped on the actuator. Actuate the valve assembly checking for proper function and smooth operation.

OPERATION

Refer to Fig. 1 for an illustration of the actuator.

Fail Closed Models
The actuator springs (7) provide a force in the direction of valve closing. Using clean, dry air or nitrogen gas, supply pressure to the bottom of the actuator, and the valve opens with increasing supply pressure.

Fail Open Models
The actuator springs (7) provide a force in the direction of valve opening. Using clean, dry air or nitrogen gas, supply pressure to the top of the actuator, and the valve closes with increasing supply pressure.

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 the valve has been completely isolated from the process and vented to atmospheric pressure.***

Refer to Fig. 1 for an illustration of the actuator.

Actuator Removal Procedure
1. Isolate any and all system pressure from the valve prior to removal of actuator.
2. Apply enough supply pressure to the actuator to position the valve stem at mid-stroke.
   NOTE: You will need to by-pass the solenoid valve if equipped on the actuator.
3. Remove the two bolts (12) from the stem block coupler (11) and remove the coupler from the actuator and valve stems.
4. Maintain the supply pressure to the actuator.
5. Detach any other connections attached to the valve stem that may be present due to optional actuator accessories (i.e. pickup arm for limit switches, positioner, etc.).
6. Remove the yoke lock nut (10). This may require the use of a hammer and punch to loosen.
   NOTE: You may need to increase the supply pressure to the actuator on fail closed models to create enough space between the actuator and valve stems to remove the yoke lock nut and any other items attached to the valve stem. Manually pushing down on the valve stem will also create additional space between the actuator and valve stems. You may need to loosen the valve packing to manually push the valve stem down.
7. Carefully lift the actuator assembly and remove it from the valve.
8. Once removed and secured, slowly release the supply pressure to the actuator. You are now ready for maintenance work on the actuator.

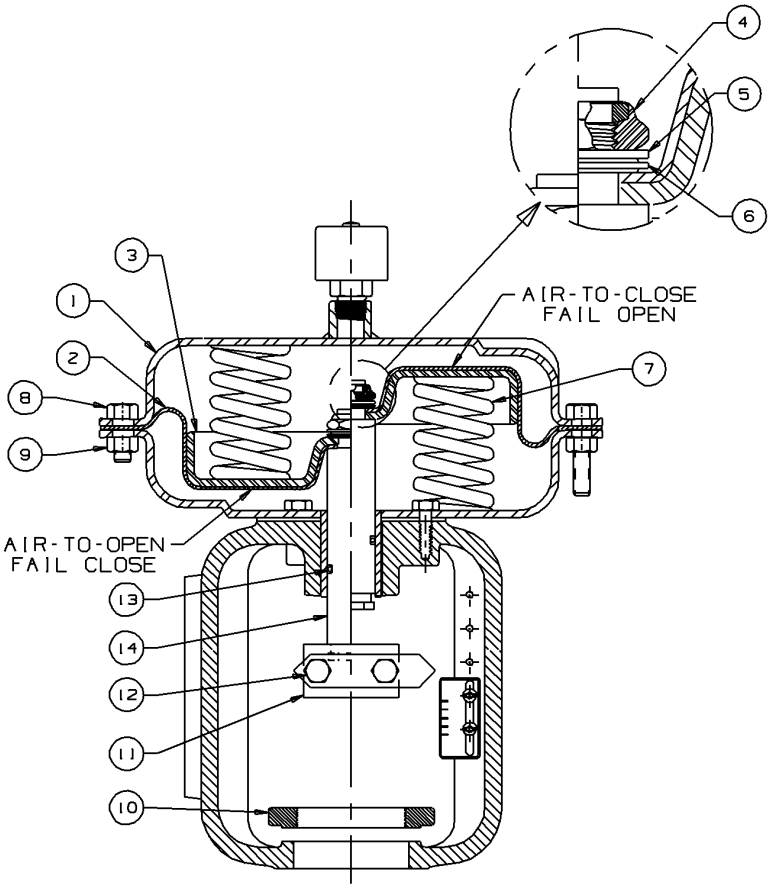
Soft Goods Replacement Procedure
(Diaphragm, Seal Washer, & O-Ring)
1. Ensure all pressure within the actuator has been completely exhausted

> ***WARNING!***
> ***Compressed springs are contained with the actuator casing. Exercise care when removing the upper casing to prevent bodily injury.***

2. Examine the casing bolts (8) securing the upper casing (1) to the actuator assembly. If some bolts are longer than others, leave these secured and

removed the shorter casing bolts and nuts (9) first. *Carefully and slowly* remove the remaining longer bolts and nuts, loosening them evenly as they are removed.

3. Once all casing bolts and nuts are detached, remove the upper casing.
4. Fail Closed Models:
   Remove the actuator springs (7) and disengage the lock nut (4). Remove the diaphragm flat washer (5), the seal washer (6), the piston (3), and the diaphragm (2). Drop the actuator stem (14), and replace the existing o-ring (13) using a light coat of o-ring grease on the new one. Re-install the actuator stem, new diaphragm, piston, new seal washer, flat washer, lock nut, and springs.
   NOTE: Torque the lock nut to 18 ft-lbs. Hold the diaphragm and piston in place so they do not rotate when installing the lock nut.
   Fail Open Models:
   Remove the lock nut (4), the diaphragm flat washer (5), the seal washer (6), the diaphragm (2), and the piston (3). Drop the actuator stem (14), and replace the existing o-ring (13) using a light coat of o-ring grease on the new one. Re-install the actuator stem, piston, new diaphragm, new seal washer, flat washer, and lock nut.
   NOTE: Torque the lock nut to 18 ft-lbs. Hold the diaphragm and piston in place so they do not rotate when installing the lock nut.
5. Replace the upper casing and secure using the diaphragm bolts and nuts. Torque the AutoSeal Size 36 bolts to 15 ft-lbs and the AutoSeal Size 60 to 10 ft-lbs. NOTE: Due to the compression of the springs, the longer bolts should be installed first, evenly spaced around the casing. Tighten them evenly until the shorter bolts can engage the nuts. Proceed with fully tightening all remaining bolts and nuts using an alternate-opposing method (i.e. fully tighten one bolt, then fully tighten the bolt 180° across from the first, next fully tighten the bolt beside the first bolt, then the bolt across from that one, etc.).
6. Pressurize the unit no more than 60 psig, and check for external leaks using a soapy solution around the edges of the actuator casing and around the actuator stem. An external leak will be indicated by the formation of bubbles. If necessary, increase the casing bolts torque value in 2.5 ft-lbs increments to prevent leakage. Additionally, check for internal leakage (leakage across the diaphragm) by dead heading supply pressure (not to exceed 60 psig) to the unit. This can be accomplished by piping a valve (such as a ball valve) between the supply line and the actuator. When the actuator is pressurized, close the valve and remove the supply. Monitor the actuator stem position over a five-minute period. A recognizable movement in stem position will indicate an internal leak.
7. After testing, stroke the actuator several times ensuring smooth operation with no signs of sticking, binding, and galling.
8. Attach the actuator to the valve according to the Installation section of this manual, and retest the operation of the actuator.



ITEM	QTY	DESCRIPTION
1	1	UPPER CASING
2	1	DIAPHRAGM
3	1	PISTON
4	1	LOCK NUT
5	1	FLAT WASHER
6	1	SEAL WASHER
7	A/R	SPRINGS

ITEM	QTY	DESCRIPTION
8	A/R	CASING BOLTS
9	A/R	CASING NUTS
10	1	YOKE LOCK NUT
11	1	STEM BLOCK COUPLER
12	2	STEM BLOCK BOLTS
13	1	STEM O-RING
14	1	STEM

Figure 1 – AutoSeal Actuator Section View

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.

CPC-Cryolab™
A CHART CRYOGENICS COMPANY
12501 Telecom Drive, Tampa, FL 33637
Ph: (813) 978-1000 • Fax: (813) 977-3329
www.cpc-cryolab.com