Armstrong

Repair and Adjustment

C-1801 Pneumatic Operators

This bulletin should be used by experienced personnel as a guide to the repair and adjustment of Armstrong C-1801 Pneumatic Operators. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

WARNING: Be sure that the steam supply to the device being controlled has been *turned off* and that the body is *at a safe handling temperature* before attempting inspection or repairs to the operator!

Maintenance procedures for the Armstrong pneumatic operator should include:

- disassembling the operator;
- installing the operator;
- replacing stem seals;
- changing operator springs;
- replacing the diaphragm;
- replacing the valve and seat.

Please refer to Figure 2-1 for part locations and identification.

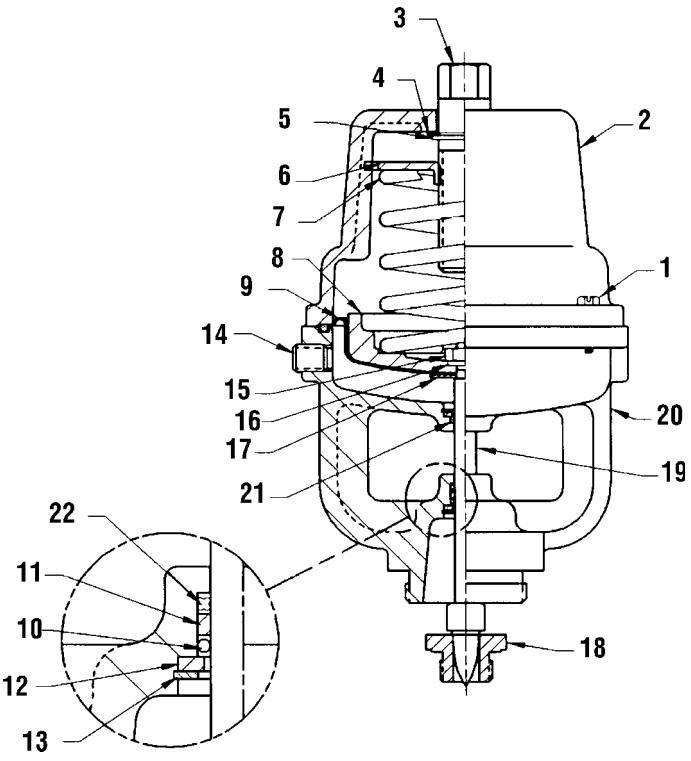
A. REMOVING THE OPERATOR AND INSPECTING THE VALVE AND SEAT

The operator must be removed to inspect or replace valves and seats, or to recondition the operator.

1. Turn off fluid supply to the device being controlled.
2. Turn off the instrument air to the operator. Disconnect the control line.
3. Unscrew the operator to remove it.
4. Inspect the valve. A properly wearing valve has a bright NARROW ring all the way around its circumference.
5. Inspect the seat. A properly wearing seat has a SHARP EDGE, with no nicks or gaps.
6. If the valve and seat are wearing properly, proceed to Section G, Steps 9, 10, and 11. Valves and seats must **ALWAYS** be replaced as a set. Replacing the valve requires disassembly of the operator.

Figure 2-1

Number	Description	Part Number
1	Flange Hold Down Screws #10-24 with washers	A-8956-A
2	Operator Cover	C-1800-C
3	Spring Adjusting Screw	A-8996 Set
4	Friction Washer	
5	Spring Adjustment Snap Ring	
6	Spring Adjustment Disc	B-2358
7	Spring	A-6958 (10#) A-6958-B (5#)
8	Piston	B-2360-C
9	Diaphragm	A-9330
17	Flat Washer	
10	Spring Loaded Stem Seal	A-8991 Seal Kit
11	Brass Seal Spacer	
12	Seal Retaining Washer	
13	Seal Retaining Ring	
21	Upper Quad Ring	
22	Lower Quad Ring	
14	1/8" NPT Pipe Plug	A-6000-C
19	Valve and Seat Assembly	See Chart 1130
15	Hex Nut	
16	Lock Washer	
18	Valve Seat	See Chart 1130
20	Operator Base (91, 92, 93)	C-1799-F
20	Operator Base (90)	C-1799-H



B. DISASSEMBLING THE ARMSTRONG C-1801 PNEUMATIC OPERATOR

Most subsequent repair procedures require disassembly of the operator.

1. Turn the spring adjusting screw (3) clockwise until it moves freely.
2. Remove the four flange screws (1).
3. Remove the operator cover (2).
4. Remove the spring adjusting screw (3), spring adjusting disc (6), snap ring (5), and friction washer (4).
5. Remove the spring (7).

C. REPLACING THE VALVE AND SEAT

ALWAYS replace the valve and seat as a set.

1. Remove operator in accordance with Section A.
2. Using a socket wrench, remove the old valve seat (18) from the body and install a new one.
3. Disassemble the pneumatic operator in accordance with Section B.
4. Place an ⅛" allen wrench in the end of the valve & stem assembly (19). Hold the valve stem in position with the allen wrench while removing the hex nut (15) with a 7⁄16" wrench.
5. Remove washer (16).
6. Remove valve and stem assembly (19) and replace with the new one.
7. Replace the washer (16) and the hex nut (15). Tighten the nut.
8. Assemble the operator in accordance with Section G.

D. REPLACING THE STEM SEALS

1. Remove and disassemble the operator in accordance with Sections A and B.
2. Place an ⅛" allen wrench in the end of the valve & stem assembly (19). Hold the valve stem in position with the allen wrench while removing the hex nut (15) with a 7⁄16" wrench.
3. Remove the washer (16), piston (8), diaphragm (9), washer (17), and remove valve and stem assembly down thru threaded end of operator base.
4. Use snap ring plier to remove the upper seal retaining ring. Remove washer and quad ring.
5. Turn the operator base (20) over so that the threaded end is up. Use snap ring pliers to remove the lower seal retaining ring (13) from the operator base (20).
6. Remove the washer (12), lower quad ring (22), spring loaded stem seal (10), and the spacer (11).
7. Install a new lower quad ring (22) and spring loaded stem seal (10) with the spacer (11) between them. NOTE: The quad ring goes in first. The spring loaded stem seal should be oriented so that the spring in the seal faces toward the valve.
8. Replace the washer (12) and the seal retaining ring (13).
9. Install a new upper quad ring (21) into its groove. Replace washer and seal retaining ring.
10. Push the valve and stem assembly (19) through the spring loaded stem seal (10), the lower quad ring (22), and the upper quad ring (21). Turn the operator back over so the valve points down.
11. Replace the washer (17), the diaphragm (9), the piston (8), washer (16), and hex nut (15). Tighten the hex nut (15).
12. Assemble the pneumatic operator in accordance with Section G.

E. CHANGING THE OPERATOR SPRINGS

1. Remove and disassemble the operator in accordance with Sections A and B.
2. Place new spring (7) in the base of the operator (20).
3. Assemble the pneumatic operator in accordance with Section G.

F. CHANGING THE DIAPHRAGM

1. Remove and disassemble the operator in accordance with Sections A and B.
2. Place an ⅛" allen wrench in the end of the valve & stem assembly (19). Hold the valve stem in position with the allen wrench while removing the hex nut (15) with a 7⁄16" wrench.
3. Remove the washer (16) and piston (8).
4. Remove the diaphragm (9) and replace it with a new one. Be sure that washer (17) stays in place underneath the diaphragm.
5. Replace the washer (16) and the piston (8).
6. Replace the hex nut (15) and tighten it.
7. Assemble the pneumatic operator in accordance with Section G.

G. ASSEMBLING THE PNEUMATIC OPERATOR

After the necessary repairs have been made, perform the following steps to assemble and install the operator.

1. Place spring (7) in the bottom half of the operator assembly.
2. Screw the adjusting disc (6) onto the adjusting screw (3) until the disc (6) is tightened at the end of the threads on the adjusting screw. See Figure 2-1 for the proper orientation of the adjusting disc (6).

3. Install the snap ring (5) over the hex end of the adjusting screw (3). Slide the friction washer (4) over the hex end of the adjusting screw (3) and let it rest on the snap ring (5).
4. Place the spring adjusting screw subassembly inside the cover of the operator (2). Insert the hex end of the spring adjusting screw (3) in the hole at the top of the operator. The notches in the adjusting disc (6) align with the ribs inside the cover of the operator.
5. Holding the hex end of the adjusting screw (3) from the outside of the operator cover (2), lift the entire assembly and place it on the top of the operator base. NOTE: Check that the diaphragm (9) has not slipped out of the groove in the operator base (20).
6. Start all four flange screws (1) into the base (20). **DO NOT TIGHTEN YET!**
7. Turn the adjusting screw (3) counterclockwise until there is an ⅛" gap between the operator cover (2) and the base (20).
8. Tighten all four flange screws (1).
9. Screw the operator into the device being controlled using a new gasket (if applicable).
10. Turn on the fluid supply to the control valve.
11. Turn on instrument air to the operator. Connect the control line.

H. ADJUSTMENT OF THE START POINT

The Armstrong pneumatic operator is shipped from the factory with a 10 Lb. range spring (5 Lb., if specified) with the start point set at 3 psi.

NOTE: The operating range is not adjustable, only the start point is adjustable. If a different range is desired, change the operator spring in accordance with Section E.

1. Place a pencil, pen or similar implement through the hole in the spring adjustment screw (3).
2. Hook up the air line to the operator with the air line connected to a gauge and a regulator.
3. Start opening the regulator. Watch the implement you place through the spring adjusting screw (3); it will move at the start point. Read the gauge at this pressure.
4. ***If the gauge pressure reading is too low:*** turn the air pressure off, then turn the spring adjustment screw (3) ***counterclockwise*** until the start point has been reached.
5. ***If the gauge pressure reading is too high:*** turn the air pressure off, then turn the spring adjusting screw (3) ***clockwise*** until the desired set point has been reached.
   MAXIMUM START POINT FOR BOTH 5 LB. AND 10 LB. SPRING IS 6 PSI.
   (Start point is adjustable from 3-6 psi., factory set start point is 3 psi.)
   NOTE: Length of full stroke is ¾".

If further information is required, we encourage you to contact Armstrong or your local representative.

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