

## A41 REVERSE ACTING ACTUATOR

### I. General

A. In the "normal" position (no air pressure on diaphragm), the reverse actuator holds its stem in a fully extended position by means of the spring. Increasing air pressure in the lower diaphragm chamber thrusts the actuator stem upward and compresses the spring; decreasing air pressure allows the spring to return the stem to its normal position.

1. Mounted on pull-stem-to-open valve body assemblies, the reverse actuator opens the valve upon increasing air pressure on the lower diaphragm chamber.
2. Mounted on push-stem-to-open valves, the reverse actuator closes the valve upon increasing air pressure to the lower diaphragm chamber.

B. Raised mounting pads on the yoke casting are provided for mounting accessories.

C. All accessories should be removed before disassembling actuator.

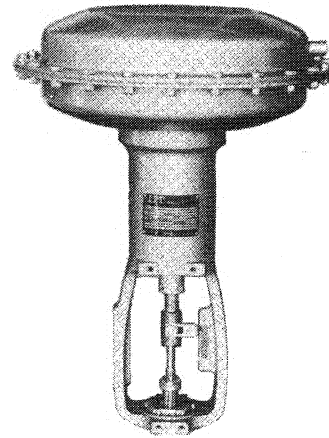
### II. Actuator disassembly

#### A. Spring

1. Remove spring adjuster (11) by inserting a rod or screwdriver and turning counter-clockwise, remove it from the actuator stem (20).
2. Remove spring seat (5), spring (29) and spring retainer (73).
3. Remove the diaphragm capscrews and nuts (9 and 10), then lift off the diaphragm case (1).
4. Lift off the diaphragm assembly, withdrawing the attached actuator stem (20).
5. Unscrew the actuator stem nut (17) to free the diaphragm washer (18) and diaphragm (15) from the actuator stem (20).
6. Lift out the packing box (2). Examine for wear — replace if necessary. Replace two "O"-rings (22).

### III. Disassembly of diaphragm case from yoke

- A. Remove lower diaphragm case bolts (68).
- B. Lower diaphragm case (21) is now free of yoke.
- C. Carefully remove gasket (72). Replace if necessary.



### IV. Assembly

- A. Bolt lower diaphragm case (21) to yoke (31). Use gasket (72). Use diaphragm case bolts (68).
- B. Assembly of diaphragm.
  1. Examine diaphragm. Check for signs of wear or porosity. Dust with talcum to prevent abrasion.
  2. Slide the diaphragm washer (18) over the actuator stem (20) to rest on the shoulder of the stem.
  3. Place the diaphragm (15) on the washer.
  4. Place the diaphragm plate (8) on diaphragm.
  5. Secure the washer-diaphragm-plate assembly with actuator stem nut (17).
- C. With new "O"-rings in position, place the packing box (2) in position at the yoke bridge.
- D. Slide the actuator stem down through the packing box. Lubricate the packing box lightly with silicone grease.
- E. Arrange the diaphragm so that the holes line up on the lower case (21). Bolt the upper case (1) into position with bolts and nuts (9 and 10). Tighten evenly to ensure a good seal.
- F. Invert the actuator to assemble the spring unit.
  1. Slide in spring retainer (73).
  2. Place spring (29) in position.
  3. Slide spring seat (5) over stem to rest on

- spring.
4. Screw spring adjuster (11) up against the spring seat.

#### V. Adjustments

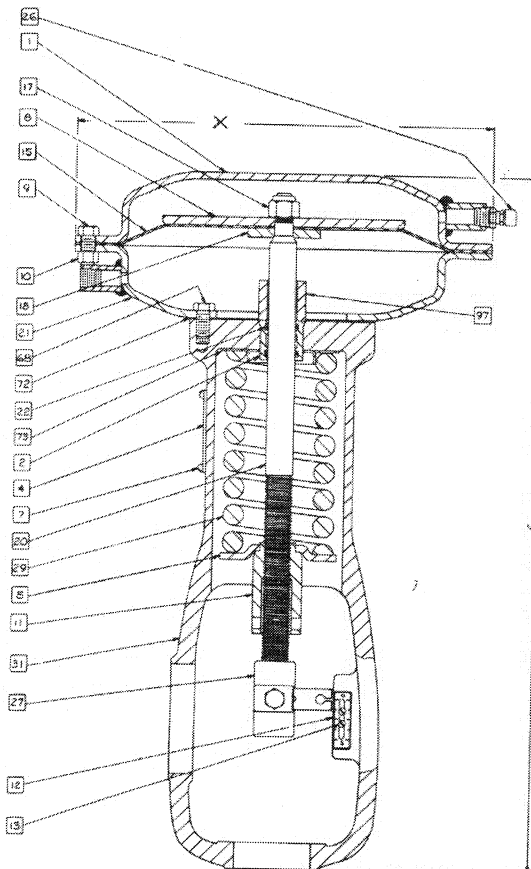
- A. Setting the inherent diaphragm pressure range.
  1. Apply three pounds air pressure (lower value of the spring range) into the lower chamber.
  2. Compress the spring by turning spring adjuster (11) until a starting point for the actuator stem movement has been established.
  3. When air pressure reaches the upper value of the spring range (15 lbs.). The spring will hold the stem in a fully retracted position.
  4. Adjust spring compression, by moving the spring adjuster (11), and again increase air pressure gradually. Repeat this testing and adjusting procedure until the actuator stem just starts to move as the increasing air pressure passes the lower value of the pressure range. The inherent diaphragm pressure range has now been established.
- B. Setting the installed diaphragm pressure range (single seated valve actuation).
  1. As standard factory procedure, single seated valves are tested for shutoff against

the maximum inlet pressure stated on the order. The actuator furnished provides ample power to handle the specified flow conditions at the diaphragm pressure range stamped on the nameplate.

2. Under actual operating conditions, line pressure differentials may differ from the calculated figures. This may require a change in the diaphragm pressure range in order to obtain full valve travel and shutoff.
  - a. On pull-stem-to-open valves, the reverse actuator may require increased initial spring compression to ensure shutoff. (Accomplished by turning the spring adjuster (11) with a screwdriver.) Diaphragm pressure range values must consequently be increased to counter-balance the greater spring force.

Note: Spring design limits the amount of possible "jack-up" compression. Too much initial compression leaves insufficient spring deflection for full actuator stroke.

- b. On push-stem-to-open valves, the reverse actuator usually requires only an increase of the air pressure range values to compensate for pressure drops slightly greater than calculated.



#### Parts List

- 1 Diaphragm case
- \*2 Packing box
- 4 Name plate
- 5 Spring seat
- 7 Name plate screw
- 8 Diaphragm plate
- 9 Capscrew
- 10 Capscrew nut
- 11 Spring adjuster
- 12 Travel indicator scale
- 13 Travel indicator scale screw
- \*15 Diaphragm
- 17 Actuator stem nut
- 18 Diaphragm washer
- 20 Actuator stem
- 21 Lower diaphragm case
- \*22 Packing box "O"-ring
- 26 Air vent assembly
- 28 Travel indicator
- 29 Spring
- 31 Yoke
- 68 Lower diaphragm case bolt
- 73 Spring retainer
- 97 Travel stop

\*Recommended spare parts

**ITT HAMMEL DAHL**  
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