

INSTALLATION AND MAINTENANCE INSTRUCTIONS

for DurAir II Pneumatic Actuators

Thank you for selecting the DuraValve Actuator for your valve automation requirement. We here at DuraValve are proud of our products and feel confident they will meet or exceed your expectations of quality and reliability.

Every precaution has been taken to insure that your equipment will arrive undamaged; however, accidents do occur. Therefore, the first thing you must do upon receipt of your package is to inspect it for damage. If the box is damaged there is a possibility that the equipment inside the box may be damaged as well. If this is the case YOU MUST FILE A CLAIM with the delivering CARRIER. All shipments are F.O.B. Elk Grove, IL and it is YOUR RESPONSIBILITY to file a claim for damages.

STORAGE

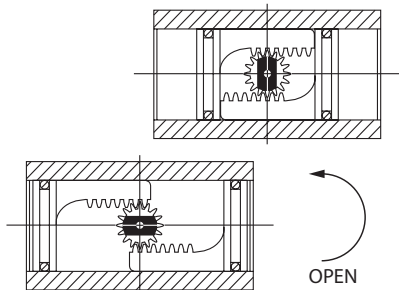
If the actuators are scheduled for installation at a later date:

1. Store off the floor.
2. Store in a climate controlled building.
3. Store in a clean and dry area.

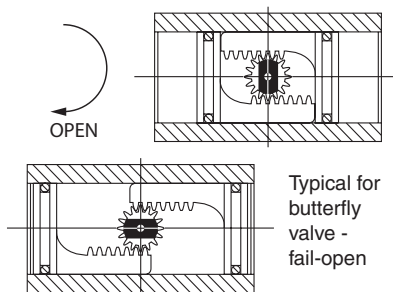
BASIC ACTUATOR

The DurAir "AP" model pneumatic actuators are 90 degrees rotating actuators, suitable for quarter-turn valves. Spring return and double action units are available.

Standard Piston Set-up



Optional Set-up

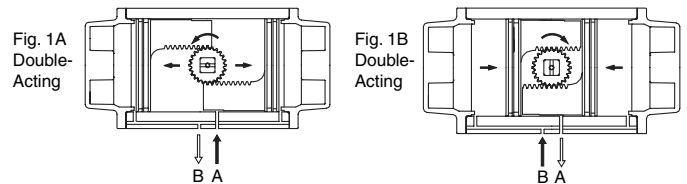


Operation

DOUBLE ACTING MODELS

The air is introduced to port "A" (Fig. 1A) forcing the pistons apart and towards the end positions, resulting in a counter-clockwise rotation of valve stem. When valve opens, exhaust air will exit at port "B". Air supplied to port "B" (Fig. 1B) forces pistons toward the center resulting in a clockwise rotation of valve stem and causing the valve to close. The exhaust air will exit at port "A".

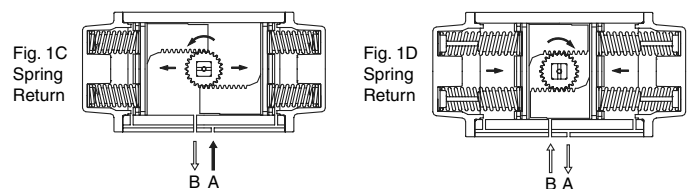
Flow Diagram Double Acting (Top View)



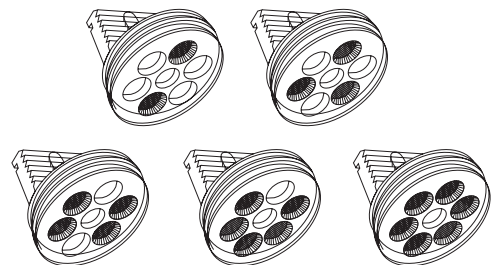
SPRING RETURN MODELS

The air is introduced to port "A" (Fig. 1C) forcing pistons apart and towards end position, compressing springs and resulting in a counter-clockwise rotation of valve stem, which will open or close valve as required. Exhaust air will exit at port "B" when air supply to center chamber of actuator is depressurized due to air or electrical failure (Fig. 1D). The compressed springs will force piston towards the center position and will rotate valve stem clockwise 90 degrees, which will open or close valve as required.

Flow Diagram Spring Return (Top View)



Recommended Spring Arrangement



INSTALLATION

All DurAirII actuators have pre-drilled and tapped standard namur connections for direct mounting of integral solenoids and for bracketry mount of valve and actuator (See actuator mounting section of this procedure).

Be sure maximum supply pressure does not exceed 150 PSIG. Pressure regulator may be used to control pressures over 150 PSIG.

Integral Solenoid Installation

- A. Check solenoid valve name plate to verify proper voltage.
- B. Place the solenoid on the actuator. Prior to tightening socket head cap screws make sure that the 2 "O" rings are firmly secured in the counter-bored area at solenoid porting.
- C. Wire the solenoid valve using 20 gauge stranded wire or better wiring.

Note: Double acting actuator uses a four-way solenoid valve and spring return actuator uses a three-way solenoid valve.

Non-Integral Installation

- A. Check solenoid valve name plate to verify proper installation.
- B. The solenoid valve can be mounted to the actuator by using suitable bracketry with namur accessory mounting pattern or solenoid may be mounted near valve

Note: Piping solenoid valve to actuator. See Flow Diagram. Spring return models, page 1 (Fig. 1C & 1D) require a three-way solenoid and making one connection to the actuator. Double acting models page 1 (Fig. 1A & 1B) require a four-way solenoid and making two connections to the actuator.

MOUNTING ACTUATORS

Direct Mount of Actuator

Operate valve manually 3 or 4 times prior to mounting actuator.

- A. Remove valve handle, handle nut and washer.
- B. Put stem of valve into recessed stardrive in actuator.

Note: Actuator can be mounted either in-line with run of valve or 90 degrees (perpendicular) to valve run (depending on individual requirements).

- C. Using 4 screws with Locktite, loosely assemble actuator to valve.
- D. After valve and actuator are properly aligned, tighten all screws.

Bracket & Coupling Mount Actuator

Operate valve manually 3 or 4 times prior to mounting actuator.

- A. Remove valve handle, handle nut and washer.

Note: To facilitate tightening packing gland, consideration should be made to placing opening in actuator bracket over center of valve body, 90 degrees opposite of valve run.

- B. Using screws and lock-washers (supplied), assemble bracket to actuator by lining up the 4 threaded holes in actuator (side with recessed square hole in actuator). Loosely tighten all screws.
- C. Place actuator coupling with milled slot straddling flat portion of extended valve stem.
- D. Mount the actuator with bracket assembly onto valve mounting pad using 2 screws and lock-washers. Loosely tighten screws.

Note: Actuator can be mounted either in-line with valve run or 90 degrees opposite run (depending on individual requirements).

- E. After valve and actuator are properly aligned, tighten all screws.



INTERNAL TRAVEL STROKE ADJUSTMENT

To correct any eccentricities in ball port alignment, a travel stroke adjustment may be required. Prior to piping valve into system, a visual inspection may be necessary. The inspection can be done rotating actuator drive shaft a full 90 degrees two or three times. Rotation can be done by applying an adjustable wrench onto drive shaft flats.

Adjustment

- A. Locate the headless socket screw, hex nut and washer at both ends of actuator.
- B. Loosen nut one turn.
- C. Place proper sized hex socket onto (over) hex nut and hold socket firm while turning the headless socket screw with hex key through the socket drive hole.
- D. Either screw or unscrew until proper ball-port alignment is attained.
- E. After making adjustment, firmly tighten hex nut.
- F. Repeat the above identical procedure on the adjustment screw on the reverse side of actuator.

Note: The same degree of adjustment must be made on both sides. If a 90 degree adjustment is made on one side, that same 90 degree adjustment must be made on the opposite side.

ACTUATOR DISASSEMBLY

- A. **Important:** Prior to removing actuator from valve, all operating pressure from actuator should be removed and all electrical service lines to actuator are to be disconnected.
- B. Remove the actuator from mounting bracket or mounting pads
- C. Remove end caps after removing end bolts.
- D. Rotate the drive-shaft (pinion) until pistons travel outward and are flush with body end. To ease reassembly position, mark drive shaft and body. After marking, rotate drive shaft until pistons become disengaged. Remove pistons from body.
- E. Remove spring clip and thrust washer and push drive shaft down through body.
- F. Remove and discard old seals (o-ring) and bearing and replace with new components from actuator designated repair kits.

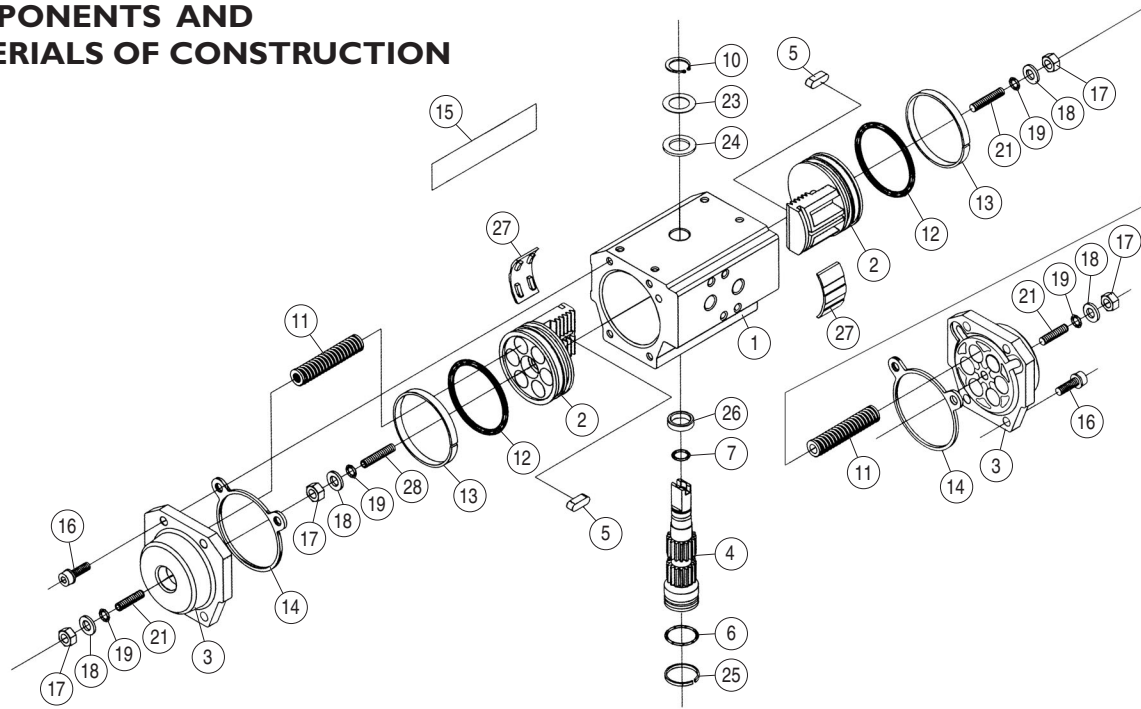
- G. Examine the inside walls of body housing for any wear or scoring. Barely visible scoring or wear is acceptable.
- H. Re-assembly to be done in reverse order of disassembly.
- I. Prior to re-assembly, all seals and internal components should be lightly coated with a PTFE filled lubricant.
- J. Set inward piston travel stops before replacing end caps.
- K. Should adjustment of inward piston be required after assembly, adjustment should be made per internal travel stroke adjustment.

TECHNICAL DATA

1. *Operating media:* Dry or lubricated air, no corrosive gas or light hydraulic oil.
2. *Air supply:* Double acting from 2.7 BAR to 10 BAR (40 to 150 PSI). Spring return from 3.5 BAR to 10 BAR (50 to 150 PSI.)
3. *Temperature:* From -4F to 175F (-20C to 80C).
4. *Lubrication:* Factory lubricated for the life of the actuator under normal working conditions.
5. *Construction:* Suitable for indoor or outdoor installations.
6. *External travel stop:* + or -4 degrees adjustment on 90 degree stroke.
7. *Internal travel stop:* + or -4 degrees adjustment on degree stroke.
8. *Rotation:* Pressurized port "A" produces counter-clockwise rotation. Pressurized port "B", or spring return, produces clockwise rotation.
9. *Angle rotation:* 90 degrees with + or -4 degrees over-travel or less travel each end.



COMPONENTS AND MATERIALS OF CONSTRUCTION



Item	Description	Material	Specifications	Qty.
1	Body	Extruded Aluminum Alloy	ASTM 6063T6	1
2	Piston	Aluminum Alloy (Die Cast)	ASTM B179	2
3	End Cover	Aluminum Alloy (Die Cast)	ASTM B179	2
4	Pinion	Steel (Nickle Plated)	ASTM A105	1
*5	Key (Pinion Anti Ejection)	Nylon		2
*6	O-Ring (Pinion, bottom)	Nitril	NBR	1
*7	O-Ring (Pinion, top)	Nitril	NBR	1
10	Retaining Ring	Spring Steel		1
11	Spring Cartridge	High Alloy Spring Steel		12 max.
12	O-Ring (Piston)	Nitrile	NBR	2
*13	Piston Bearing	Acetal Resin	LAT LUB 731 320AT +20% PTFE	2
*14	Cover Gasket	Nitrile	NBR	2
15	Nameplate	Aluminum		1
16	Cap Screw	Stainless Steel	18-8	8
17	Nut (End Stop)	Stainless Steel	18-8	4
18	Washer	Stainless Steel	18-8	4
19	O-Ring (End Stop)	Nitrile	NBR	4
21	Screw (End Stop)	Stainless Steel	18-18	2
*23	Thrust Washer (Pinion)	Stainless Steel	18-8	1
*24	Thrust Bearing	Nylon		1
*25	Bearing (Pinion, Bottom)	Nylon		1
*26	Bearing (Pinion, Top)	Nylon		1
*27	Bearing (Piston)	Nylon		2
28	Screw (Piston Stop)	Stainless Steel	18-8	2

WARRANTY:

All DuraValve merchandise is guaranteed against defects in workmanship of material for a period of one year from date of invoice. In the event of such defects within the warranty period, DuraValve will, at its option, replace or recondition the product without charge. This shall constitute the exclusive remedy for breach of warranty, and DuraValve shall not be responsible for any incidental or consequential damages, including, without limitation, damages or other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemicals, or any other circumstances over which DuraValve has no control. This warranty shall be invalidated by any abuse, misuse, misapplication or improper installation of the product.

DuraValve makes no other warranties expressed or implied.

SERVICE POLICY:

For inoperative products beyond the warranty period, DuraValve assumes no liability for replacement of product due to service wear or abuse.



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