

Instruction
D-Type01A-1NE
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NOR'EAST

— CONTROLS, INC.
A DIVISION OF ALLGASH INTERNATIONAL, INC.



Operator's Manual

TYPE 01 AIR-O-MOTOR ACTUATOR,
USED WITH GLOBE VALVES

Previously manufactured by Dezurik® and Honeywell®

Nor' East

Type 01 Air-O-Motor Actuator Used With Globe Valves

Instructions

These instructions are intended for personnel who are responsible for installation, operation and maintenance of your DeZURIK Actuator.

Safety Messages

All safety messages in the instructions are flagged with the word Caution, Warning or Danger. These messages must be followed exactly to avoid equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).



WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK Actuator has been packaged to provide protection during shipment. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Order parts from your local sales representative, or directly from DeZURIK, as listed on the back cover. Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

DeZURIK Service

DeZURIK service personnel are available to install, maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

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Type 01 Air-O-Motor Actuator Used With Globe Valves

Description

The Type 01 Air-O-Motor actuator is a power device which can operate on a small air signal from a controller and convert this signal into mechanical motion or force. The force developed can exert either a straight upward or downward thrust, or operate a reversible lever working on a pivot.

Two models are available – Thrust or Lever. Both models can use a spring or springless Type 01 actuator. Thrust models provide more force, but less travel. Lever models provide more travel, but less force. Refer to Tables A, C and C.

Lever Models

Lever actuators provide either Direct or Reverse action with a direct acting spring or springless actuator. Direct action is achieved by connecting the lever so that the pivot is between the actuator stem and the end of the lever.

Reverse action is achieved by connecting the lever so that the actuator stem is between the pivot and the end of the lever. See Figure 1.

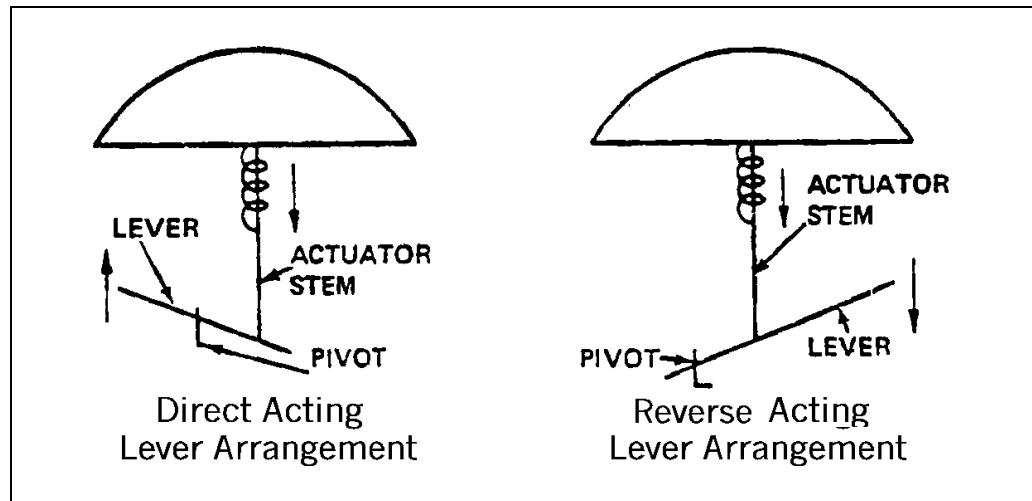


Figure 1 – Lever Arrangement

Lever models provide a wide range of travel selections. Use of holes further out on the lever arm, increases the amount of travel. However, this (increasing the amount of travel) reduces the amount-of force supplied. See Table B for travels for all lever models, spring or springless actuator, direct or reverse action. See Tables C thru K listing corresponding forces for the various holes in the lever arm.

Thrust Models

Thrust model actuators provide Direct action using a spring type actuator. Direct or Reverse action is achieved using a springless type actuator. Thrust models are directly coupled to a control device and provide a greater amount of force-to-air-pressure than lever models. See Table B for travels for Thrust models. See Tables C thru K listing corresponding forces.

Travel

Travel varies with valve model and size of Air-O-Motor actuator.

Table A — Travels, Thrust Models Spring or Springless

Action	Direct or Reverse		
	Actuator Size	01-9*	01-11
Travel, mm (in.)	29 (1.12)	38 (1.5)	38 (1.5)

* Size 01-9 Springless actuator has 25 (1.00) travel.

Table B — Travels, Lever Models, Spring or Springless, Direct or Reverse Action

Actuator Size	01-9	01-11, 01-13	01-9 Springless
Lever Hole	Travel, mm (in)		
A	61 (2.42)	82 (3.24)	54 (2.12)
B	82 (3.22)	110 (4.32)	72 (2.85)
C	102 (4.03)	137 (5.40)	91 (3.57)
D	123 (4.83)	165 (6.48)	109 (4.29)
E	144 (5.65)	192 (7.57)	127 (5.00)
F	164 (6.45)	219 (8.63)	145 (5.72)
G	184 (7.26)	247 (9.72)	163 (6.42)
H	205 (8.08)	274 (10.80)	181 (7.13)

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Forces

Table C — Forces* Springless Air-O-Motor

Actuator Size		01-9	01-11	01-13
Actuator Model	Lever Hole	Force kg (lbs.)		
Thrust	-	299 (660)	445 (980)	612(1350)
Lever	A	138(305)	206 (455)	284 (625)
	B	104 (230)	154 (340)	213 (470)
	C	82 (180)	122 (270)	170 (375)
	D	68 (150)	102 (225)	141 (310)
	E	59 (130)	88 (195)	118 (260)
	F	50 (110)	77 (170)	107 (235)
	G	45 (100)	68 (150)	95 (210)
	H	41 (90)	61 (135)	86 (190)

* The thrusts are based upon a supply pressure of 18 psig and a constant loading pressure of 3 psig, which results in a differential or overpressure of 15 psig. To determine available thrusts when the differential is other than 15 psig, divide the listed values by 15 and then multiply by the actual differential or overpressure.

Table D: Force for Lever Model 01-9 (Direct or Reverse)

Actuator Size	Full Travel				
	01-9				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Lever Hole	Force kg (lbs.)				
A	27 (60)	184 (405)	327 (720)	45 (100)	184 (405)
B	21 (46)	138 (306)	245 (540)	34 (75)	138 (306)
C	16 (36)	111 (245)	195 (430)	27 (60)	111 (245)
D	14 (30)	90 (200)	161 (355)	23 (50)	91 (200)
E	12 (26)	77 (170)	138 (306)	20 (43)	77 (170)
F	10 (23)	68 (150)	120 (265)	17 (38)	68 (150)
G	9 (20)	61 (135)	107 (235)	15 (34)	61 (135)
H	7 (16)	54 (120)	96 (125)	14 (30)	54 (120)

Table E: Force for Lever Model 01-11 (Direct or Reverse)

Actuator Size	Full Travel				
	01-11				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Lever Hole	Force kg (lbs.)				
A	41 (90)	274 (605)	476 (1050)	68 (150)	274 (605)
B	29 (65)	206 (455)	361 (795)	52 (115)	206 (455)
C	25 (55)	163 (360)	288 (635)	41 (90)	163 (360)
D	20 (45)	136 (300)	240 (530)	34 (75)	136 (300)
E	17 (38)	118 (260)	204 (450)	29 (65)	118 (260)
F	15 (34)	102 (225)	179 (395)	25 (55)	102 (225)
G	14 (30)	91 (200)	159 (350)	23 (50)	91 (200)
H	12 (27)	82 (180)	143 (315)	20 (45)	82 (180)

Table F: Force for Lever Model 01-13 (Direct or Reverse)

Actuator Size	Full Travel				
	01-13				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Lever Hole	Force kg (lbs.)				
A	57 (125)	379 (835)	658 (1450)	93 (205)	379 (205)
B	43 (94)	284 (625)	499 (1100)	70 (155)	284 (625)
C	34 (75)	227 (500)	397 (875)	57 (125)	227 (500)
D	28 (62)	188 (415)	329 (725)	48 (105)	188 (415)
E	24 (53)	161 (355)	284 (625)	41 (90)	161 (625)
F	21 (47)	141 (310)	249 (550)	34 (75)	141 (310)
G	19 (41)	125 (275)	220 (485)	32 (70)	125 (275)
H	17 (37)	113 (250)	197 (435)	28 (62)	113 (250)

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Table G: Force for Lever Model 01-9, 01-11 & 01-13 (Direct or Reverse)

Actuator Size	Zero Travel					
	01-9		01-11		01-13	
Spring Range kPa (psig)	21-103 (3-15)	41-207 (6-30)	21-103 (3-15)	41-207 (6-30)	21-103 (3-15)	41-207 (6-30)
Air Pressure kPa (psig)	-	-	-	-	-	-
Lever Hole	Force kg (lbs.)					
A	30 (60)	60 (132)	45 (100)	91 (200)	70 (155)	141 (310)
B	22 (49)	44 (96)	34 (75)	68 (150)	52 (115)	104 (230)
C	18 (39)	35 (78)	27 (60)	54 (120)	43 (95)	85 (190)
D	15 (33)	30 (66)	23 (50)	45 (100)	35 (78)	71 (156)
E	13 (28)	25 (56)	19 (41)	38 (84)	30 (67)	61 (134)
F	11 (25)	23 (50)	17 (37)	34 (74)	27 (59)	54 (118)
G	10 (22)	20 (44)	15 (33)	30 (66)	24 (52)	47 (104)
H	9 (20)	18 (40)	14 (30)	27 (60)	21 (47)	43 (94)

Table H: Force for Thrust Model 01-9

Actuator Size	Full Travel				
	01-9				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Force kg (lbs.)	59 (130)	399 (880)	703 (1550)	100 (220)	399 (1550)

Table I: Force for Thrust Model 01-11

Actuator Size	Full Travel				
	01-11				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Force kg (lbs.)	66 (145)	594 (1310)	1038 (2290)	147 (325)	594 (1310)

Table J: Force for Thrust Model 01-13

Actuator Size	Full Travel				
	01-13				
Spring Range kPa (psig)	21-103 (3-15)			41-207 (6-30)	
Air Pressure kPa (psig)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)
Force kg (lbs.)	124 (18)	241 (35)	345 (50)	241 (35)	345 (50)

Table K: Force for Thrust Model

Actuator Size	Zero Travel					
	01-9		01-11		01-13	
Spring Range kPa (psig)	21-103 (3-15)	41-207 (6-30)	21-103 (3-15)	41-207 (6-30)	21-103 (3-15)	41-207 (6-30)
Air Pressure kPa (psig)	-	-	-	-	-	-
Force kg (lbs.)	64 (140)	127 (280)	96 (215)	195 (430)	152 (335)	304 (670)

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Maximum Allowable Air Pressure



CAUTION!

Do not exceed the maximum allowable air pressure for actuators as indicated in Table L.

Table L: Maximum Allowable Air Pressure

Valve/Actuator Model Number	Maximum Air Pressure
1001, 1401, 1405*, 1601, 1605*, 1611, 1605*, 1901, 2421, 9101, 9105*, 9201, 9205*, 9131, 9135*, 9501	50 psig
01 Actuator, 05 Actuator*, 01 Air-O-Motor, 05 Air-O-Motor	
4705*, 4805*, 4905*, 8105*, 8205*, 8305*, 8605*, 8905*	35 psig

*NOTES:

1. When Type 05 actuator is Reverse Acting, the maximum allowable air pressure is 35 psig regardless of the valve model on which it is mounted.

Installation

**CAUTION!**

If valve is used in a water system, the water must be adequately treated to prevent the formation of rust, carbonates and other undesirable deposits on valve parts. Otherwise, deposit build up can damage packing, seats or other internal valve parts.

- For maximum efficiency and minimum wear, install valve in the vertical position with valve stem pointing up.
- Be sure to leave a minimum of 4 inches clearance for actuator removal.
- Before installing, be sure valve and pipeline are clean inside and free of scale, chips and welding spatter.
- The valve must be installed with the fluid flow in the direction of the arrow on the valve body (pressure under plug). Pipes must be lined squarely with the valve at each connection. If they are forced into the valve, the body may become twisted, causing improper seating. Be sure there are no pockets in the line where condensate could accumulate and cause an undesirable water hammer.
- Be sure that the flow medium and ambient temperature and the selected location will not exceed the maximum temperature limitations for the valve or actuator.
- Air-O-Motors can be either wall or base mounted. Four holes in the base plate provide base mounting, while an additional wall bracket can be provided if needed (specify Kit No. 30686889 for size 01-0 Air-O-Motor and Kit No. 30686899 for size 01-11 and 01-13 Air-O-Motor actuators).
- All air connections are 1/4-inch NPT. Corresponding size tubing and fittings are recommended for the rest of the lines.
- Thrust models are normally shipped completely assembled. To mount actuator in an upright position insert four bolts through 14 mm (9/16-inch) diameter mounting holes in base plate and secure in place. For wall mounting, the 9Q0 angle bracket has four holes to match base plate. insert bolts in place using four washers and four nuts provided. The clevis is screwed onto the actuator stem extension and locked in position with a set screw. To attach the clevis to valve linkage, remove clevis pin, insert valve linkage, and replace clevis pin.
- Lever models are normally shipped with the lever unassembled. To assemble lever, see paragraphs ASSEMBLING LEVER FOR DIRECT ACTION or CHANGING TO REVERSE LEVER ACTION. Lever models can be base or wall mounted in the same manner as thrust models.

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Air Connections

NOTE: Air supply must be filtered and should never exceed 345 kPa (50 psi). A minimum constant air pressure will increase diaphragm life.

Connect diaphragm case ("INSTRUMENT" Connection if positioner is used) to controller with 1/4-inch copper tubing.

Install air pressure regulator in supply line, when positioner is used, to maintain steady air pressure and protect the diaphragm.

With springless type actuators, connect supply line to air pressure regulator and gage (which should be piped to constant loading side of diaphragm).

Check all air Connections for leaks.

Parts Identification

Nameplate Data

The nameplate gives vital information on valve construction and operation. Always reference the serial number when ordering spare parts.

The spring range (on spring diaphragm actuators) is factory set to specifications on the order. Note the type of trim material, packing and lubricant number ("NONE" means packing does not require lubrication.) Remember that a change in operating conditions may mean a change in trim material, packing and lubricant type. Keep a permanent record of all nameplate information.

Parts Identification
(Continued)

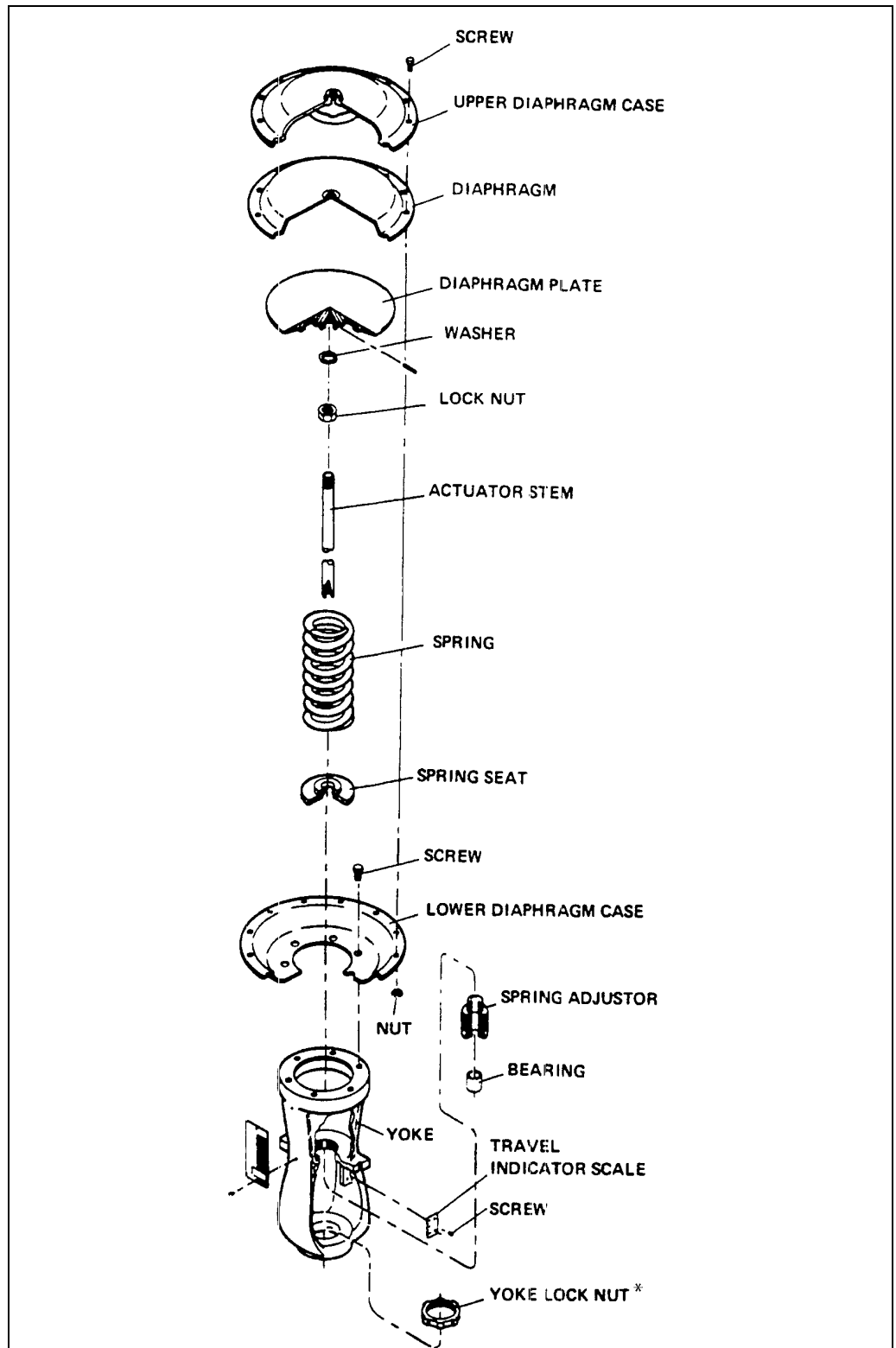


Figure 2 – Typical Direct Actuator Assembly

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Parts Identification (Continued)

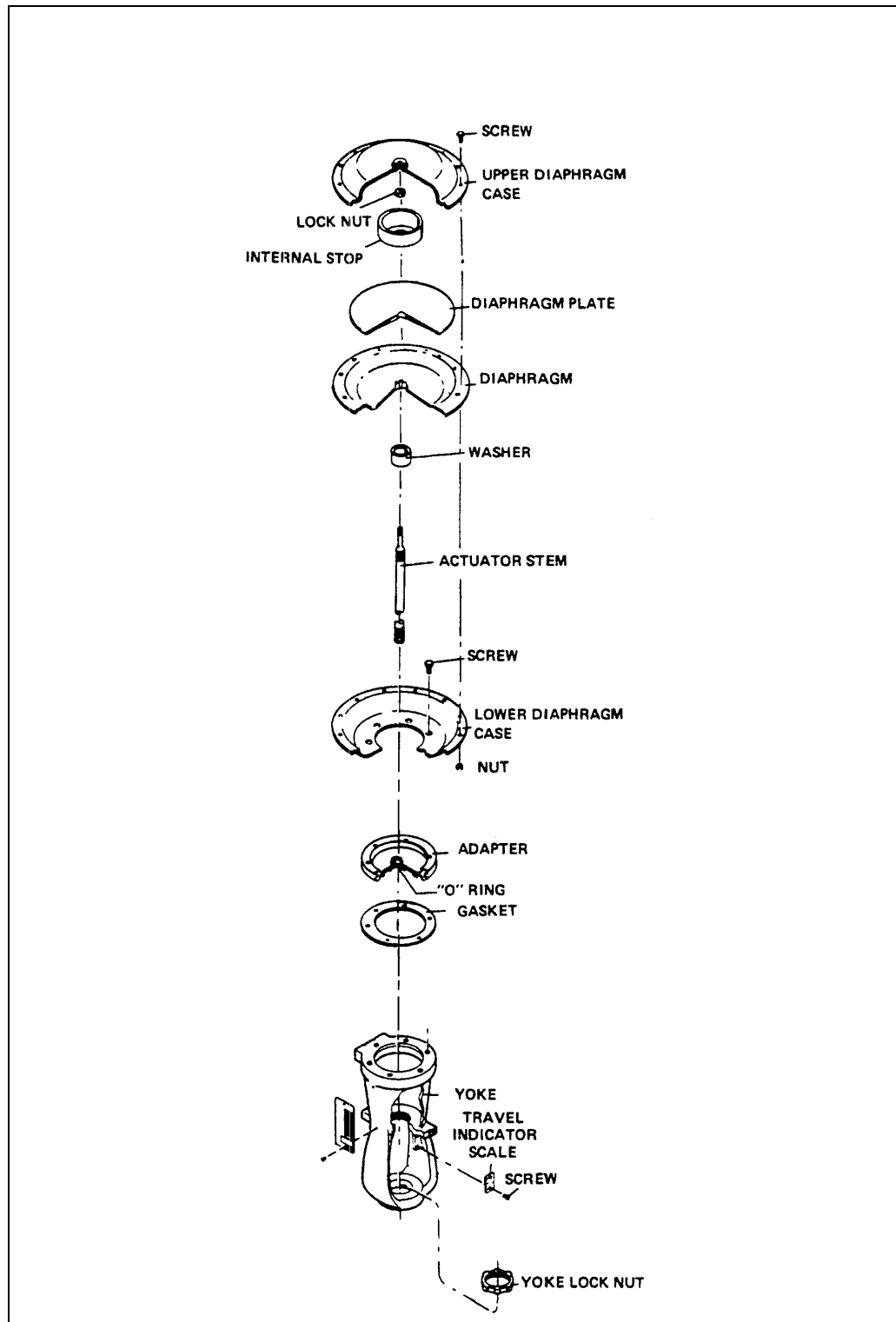
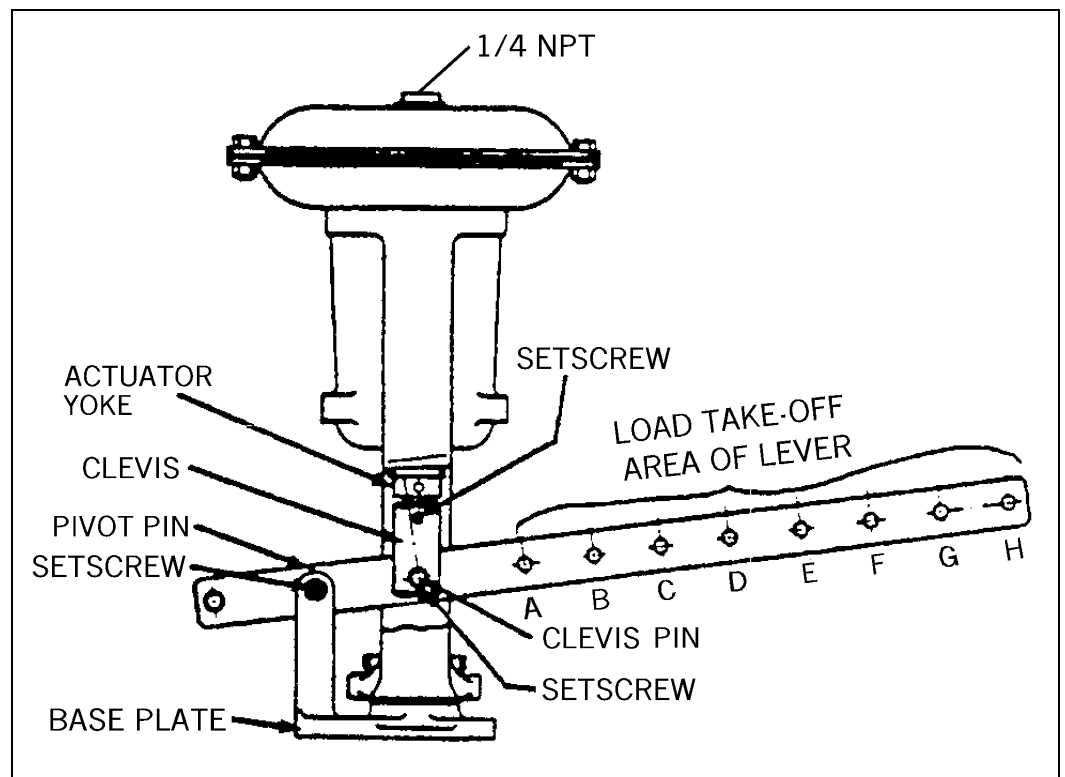


Figure 3 – Typical Springless Actuator Assembly

Assembling Lever for Direct Action

1. Loosen two set screw; in clevis and one in pivot point.
2. Remove clevis pin and pivot pin.
3. Loosen set screw locking clevis to actuator Stem and turn clevis so clevis pin hole faces open area between base plate and actuator yoke. Place lever in clevis so that actuator stem is between the pivot and the load take-off as shown in Figure 4. Insert clevis pin.
4. Align lever in pivot notch and insert pivot pin.
5. Tighten set screws in clevis and pivot notch.

**Figure 4 – Direct Acting Lever Arrangement**

CHANGING TO REVERSE LEVER ACTION

1. Remove pivot set screw and remove pivot pin.
2. Loosen set screw locking clevis to actuator stem. Lift lever from pivot notch and place it in space between pivot notch and actuator yoke.
3. Loosen clevis pin set screw and drive out clevis pin with a punch.
4. Remove lever from clevis and yoke.
5. Turn lever 180° and place it in clevis so that pivot is between the actuator stem and the load take-off as shown in Figure 5.
6. Drive clevis pin in until near end is flush and tighten clevis pin set screw.
7. Align lever in pivot notch and insert pivot pin.
8. Tighten set screws in clevis and pivot notch.

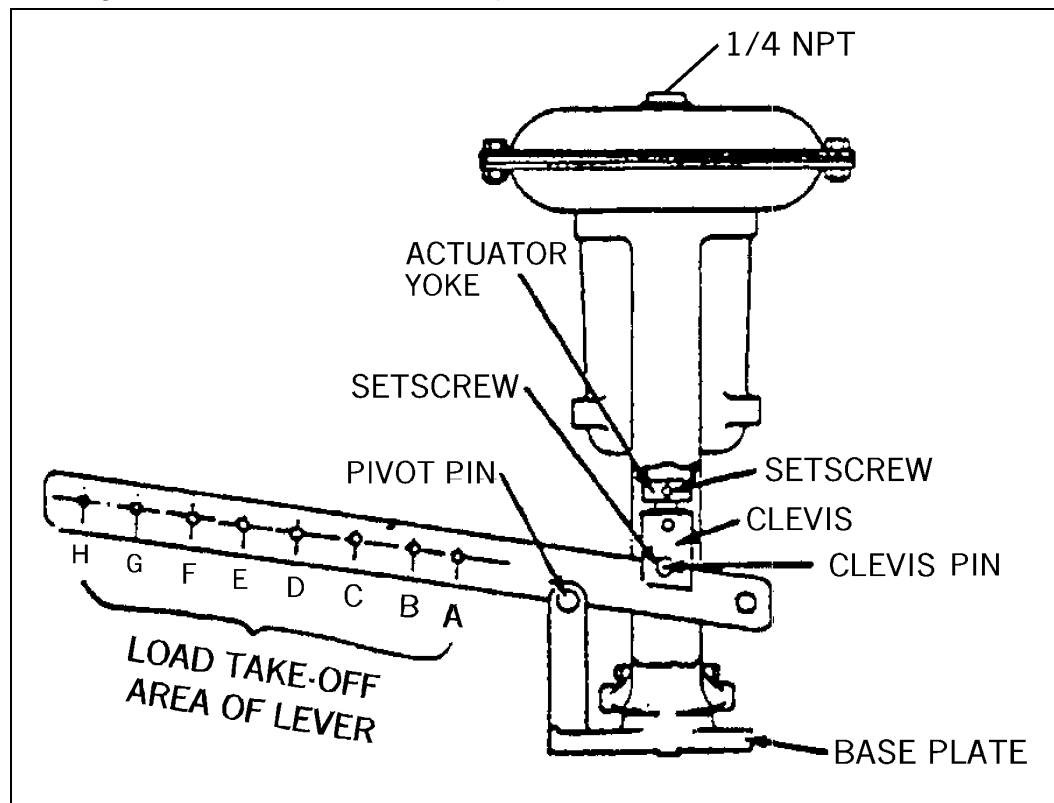


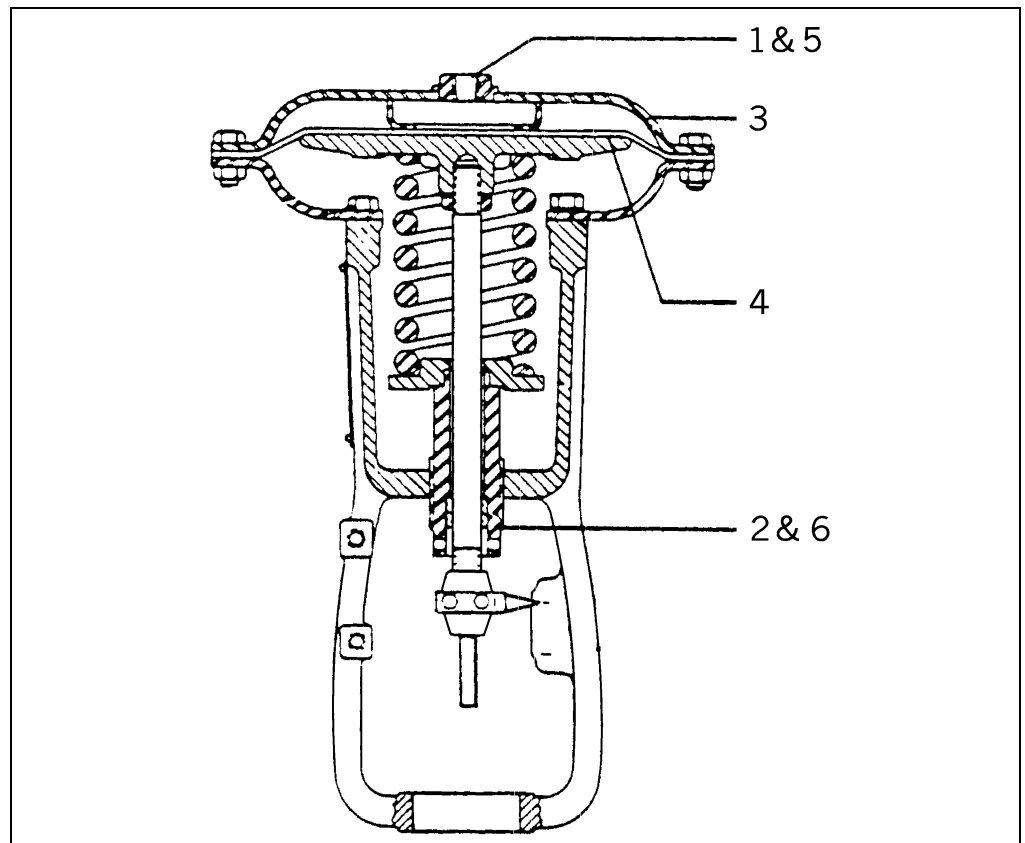
Figure 5 – Reverse Acting Lever Arrangement

Diaphragm Replacement

Air-to-Close (Direct Acting) Actuator

See Figure 6.

1. Disconnect air supply from actuator.
2. Loosen spring adjuster.
3. Remove upper diaphragm case.
4. Remove and replace diaphragm.
5. Replace upper diaphragm case and reconnect air supply to actuator.
6. Re-adjust spring compression. See "*Spring Adjustment*" section.

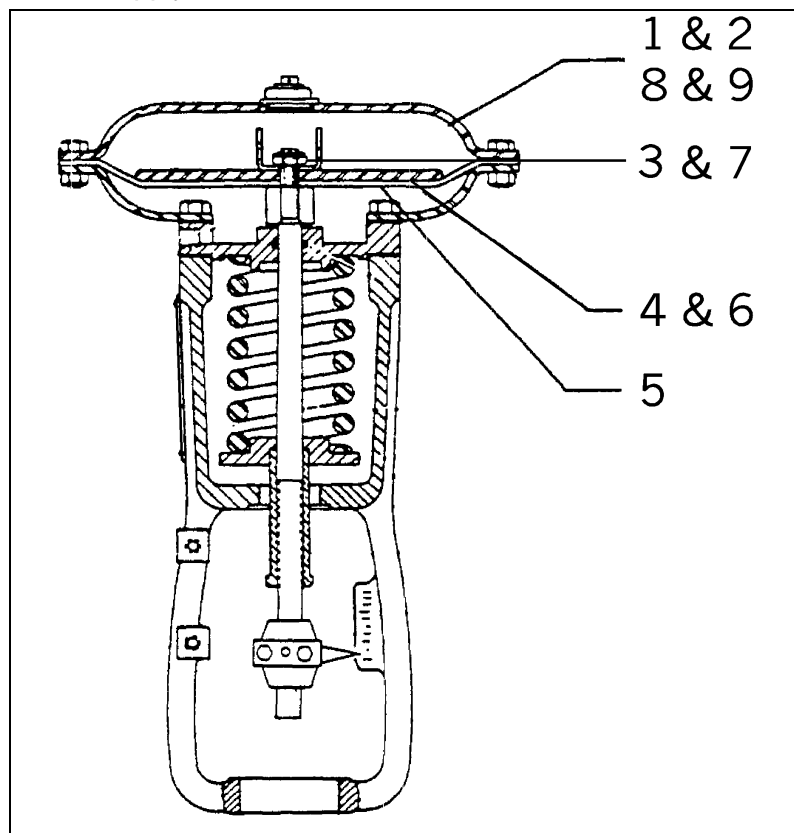


**Figure 6 – Diaphragm Replacement,
Air-to-Close Direct Acting Actuator**

Air-to-Open (Reverse Acting) Actuator

See Figure 7

1. Disconnect air supply from actuator.
2. Remove upper diaphragm case.
3. Unscrew locknut while holding diaphragm plate to prevent turning.
4. Remove diaphragm plate.
5. Remove and replace diaphragm.
6. Replace diaphragm plate.
7. Screw locknut while holding diaphragm plate to prevent turning.
8. Replace upper diaphragm case.
9. Reconnect air supply to actuator.

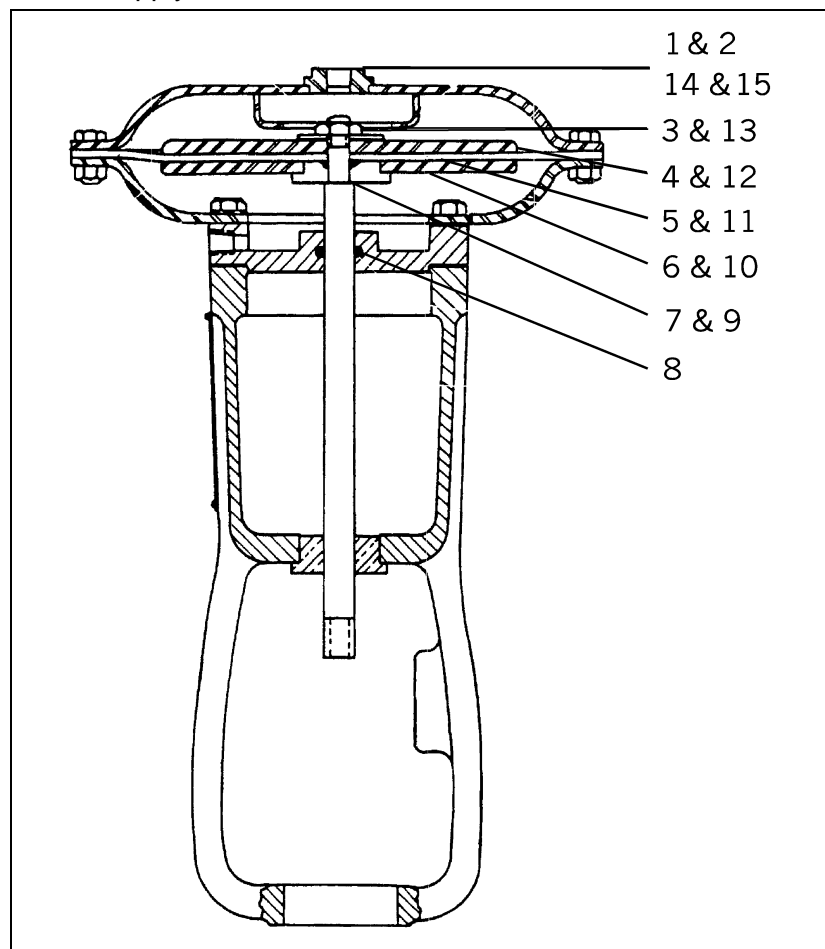


**Figure 7 – Diaphragm Replacement,
Air-to-Open (Reverse Acting) Actuator**

Springless Type Actuator

See Figure 8 (includes O-Ring replacement)

1. Disconnect air supply from actuator.
2. Remove upper diaphragm case.
3. Unscrew locknut while holding diaphragm plate to prevent turning.
4. Remove upper diaphragm plate.
5. Remove old diaphragm.
6. Remove lower diaphragm plate.
7. Remove stem washer, stem clamp and pull stem up through O-Ring.
8. Remove and replace O-Ring in adapter.
9. Carefully push stem down through new O-Ring and replace stem washer.
10. Replace lower diaphragm plate.
11. Replace new diaphragm.
12. Replace upper diaphragm plate.
13. Screw locknut while holding diaphragm plate to prevent turning.
14. Replace upper diaphragm.
15. Reconnect air supply to actuator.



**Figure 8 – Diaphragm Replacement,
Springless Type Actuator**

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Mounting Actuator

Normally the valve and actuator are factory assembled and adjusted before shipment. If the actuator needs to be field mounted, use the following procedures for Reverse or Directing Acting actuators.

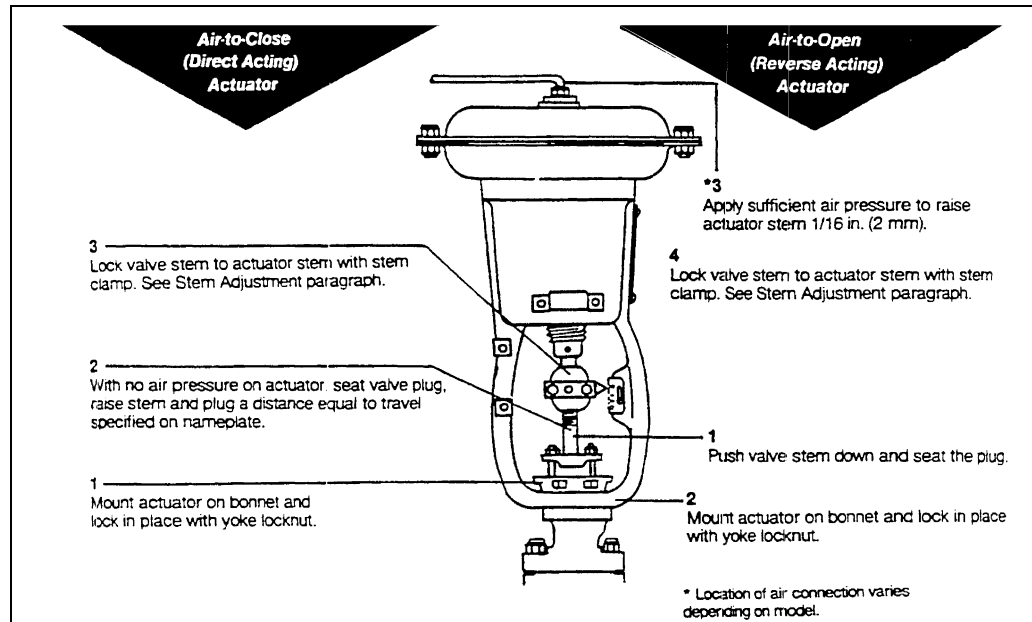


Figure 9 – Mounting Actuator

Stem Adjustment

NOTE: Use drift pin inserted through valve stem to turn it.

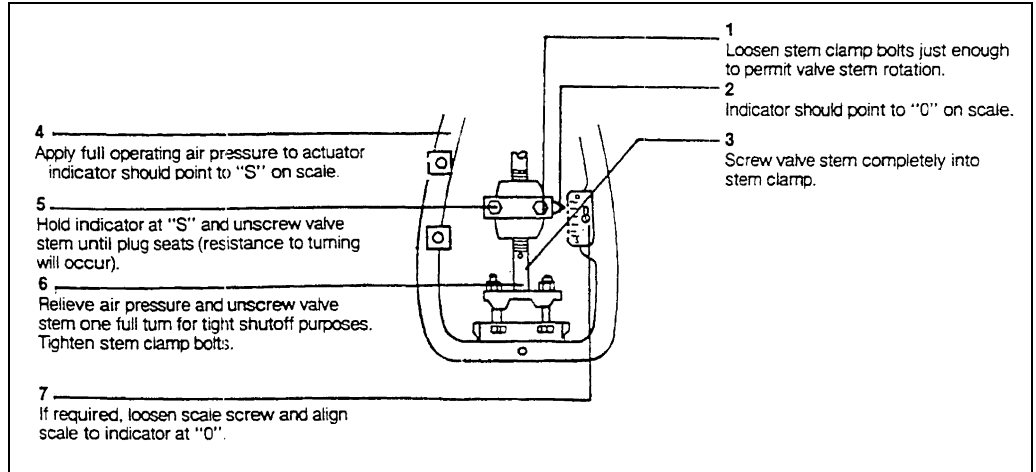


Figure 10 – Air-to-Close (Direct Acting) Stem Adjustment

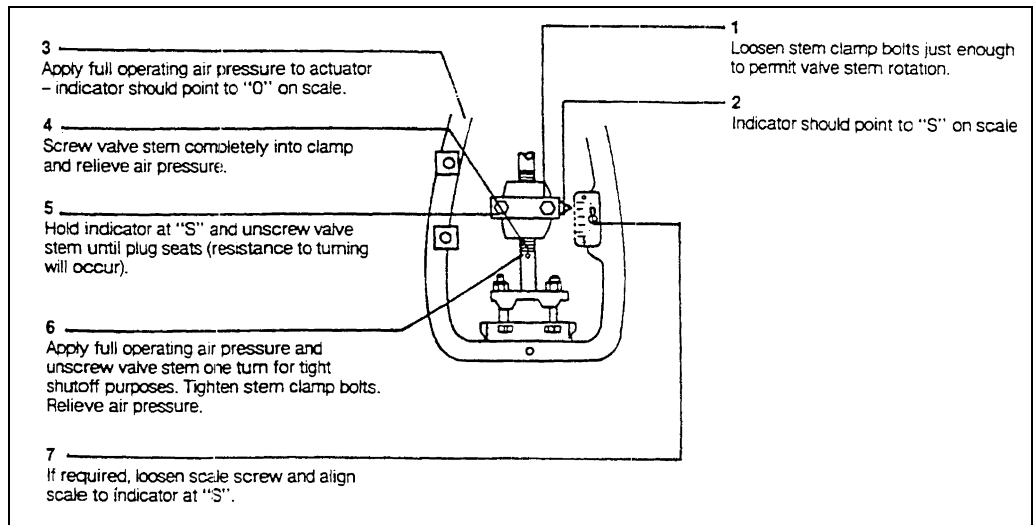


Figure 11 – Air-to-Open (Reverse Acting) Stem Adjustment

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Spring Adjustment

Factory adjustment provides for a complete actuator stroke for a pressure change from 21 to 103 kPa (3 to 15 psi) or 41 to 207 kPa (6 to 30 psi) with heavier spring. The operating spring can be shifted up or down if necessary. The starting point, with no external load, should not be adjusted more than 34 kPa (5 psi), for a 21 to 103 kPa (3 to 15 psi) spring, or 69 kPa (10 psi), for a 41 to 207 kPa (6 to 30 psi) spring. Adjustment of less than 1 psi is not recommended.

1. Using a 0-60 psig air regulator and gage, gradually apply final air pressure to actuator for spring compression.
2. If actuator stem stops before reaching maximum psig, spring adjuster is not screwed in far enough.
3. Relieve air pressure and turn spring adjuster into yoke

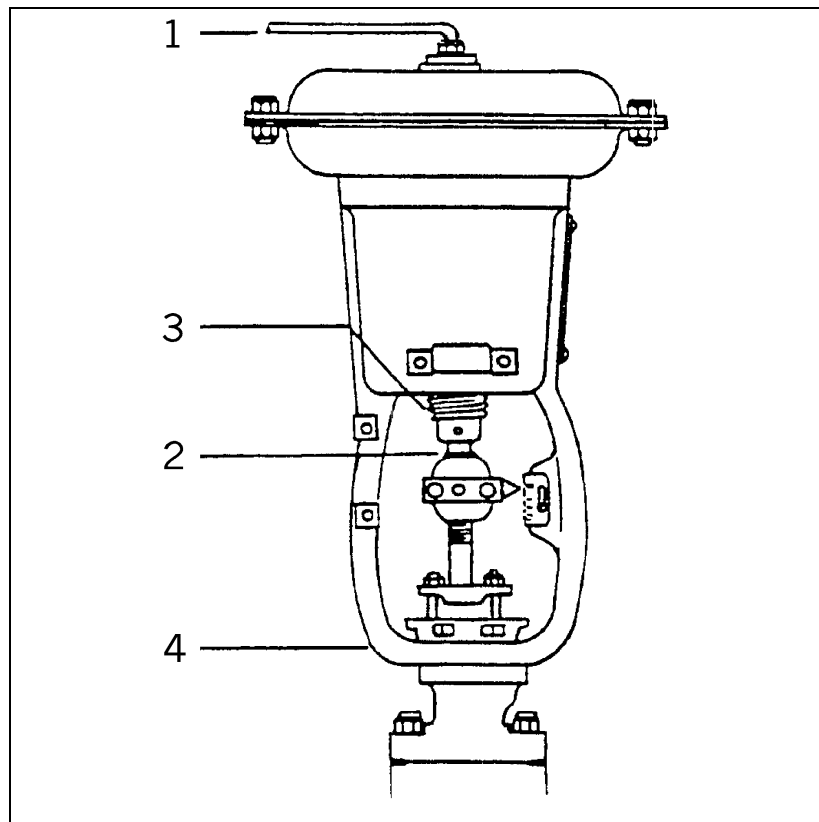


Figure 12 – Spring Adjustment Air-to-Close (Direct Acting) Actuator

To shift the operating range upward, increasing starting pressure, turn spring adjuster into spring housing.

To shift the operating range downward, decreasing starting pressure, turn spring adjuster away from spring housing.

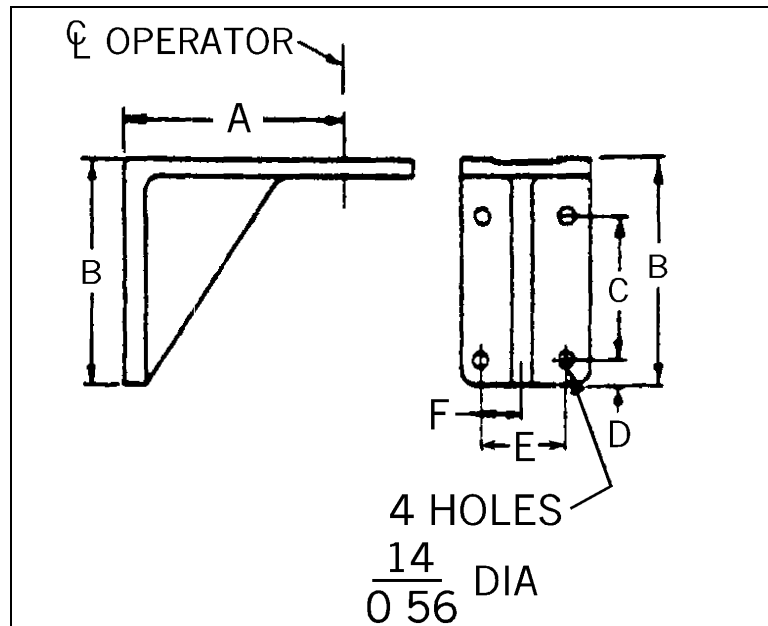


Figure 13 – Wall Bracket Dimensions

Table M: Wall Bracket Dimensions

Actuator Size	Dimensions, mm (in)					
	A	B	C	D	E	F
01-9	140 (5.50)	192 (7.56)	127 (5.00)	14 (.056)	76 (3.00)	38 (1.50)
01-11	191 (7.50)	205 (8.06)	127 (5.00)	25 (1.00)	76 (3.00)	38 (1.50)
01-13	191 (7.50)	205 (8.06)	127 (5.00)	25 (1.00)	76 (3.00)	38 (1.50)

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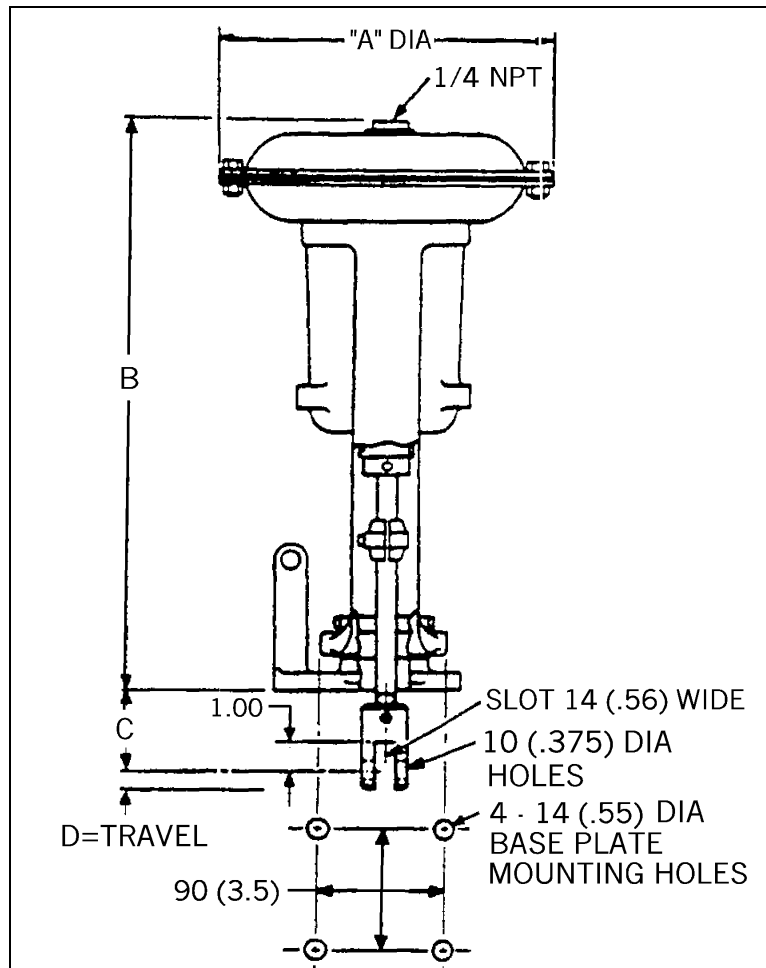


Figure 14 – Thrust Model Dimensions

Table N: Thrust Model Dimensions

Actuator Size	Dimensions, mm (in)					
	A	B		C*	D	E
		Spring	Springless			
01-9	267 (10.50)	435 (17.13)	476 (18.75)	62 (2.44)	29 (1.13)	143 (5.63)
01-11	324 (12.75)	470 (18.50)	511 (20.13)	62 (2.44)	38 (1.50)	151 (5.94)
01-13	381 (15.00)	533 (21.00)	346 (13.63)	70 (2.75)	38 (1.50)	184 (7.25)

* At beginning of stroke for Direct actuators; at end of stroke for Reverse actuators.

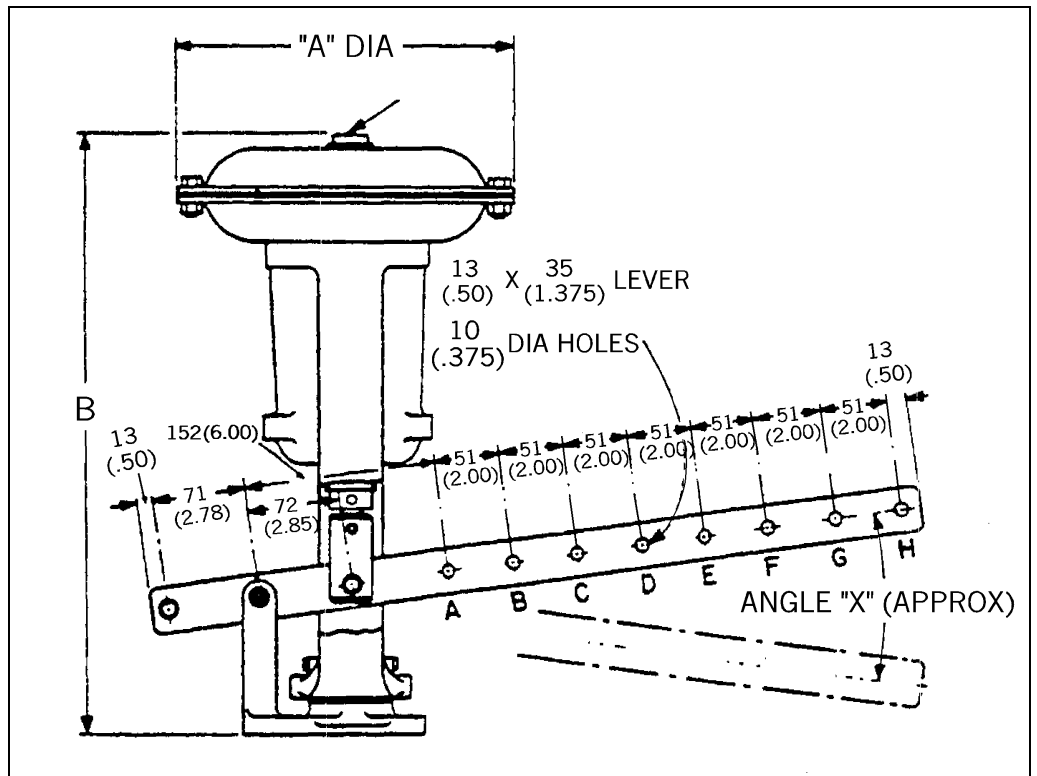


Figure 15 – Lever Model Dimensions

Table O: Lever Model Dimensions

Dimensions, mm (in)			
A	B		C
	Spring	Springless	
267 (10.50)	445 (17.50)	476 (18.75)	23°
324 (12.75)	470 (18.50)	511 (20.13)	31°
381 (15.00)	533 (21.00)	346 (13.63)	31°

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Troubleshooting

If the actuator does not function properly, check the following points while the actuator is still in service.

1. Are air connections tight?
2. Are diaphragm case bolts tight?
3. Is Air-O-Motor firmly fastened to yoke or base plate?
4. Is clevis pin fully engaged in clevis?

Guarantee

Products, auxiliaries and parts thereof, of Nor'East Controls' manufacture, are guaranteed for a period of one year from the date of shipment against defective workmanship and material only, when properly installed, operated and serviced in accordance with Nor'East Controls' recommendations. Replacement for items of Nor'East Controls' manufacture will be made free of charge if proved to be defective within such time. No claim for special or consequential damages, transportation, or labor shall be allowed. Purchaser shall be solely responsible for determining suitability for use and in no event shall Nor'East Controls be liable in this respect. Equipment or parts manufactured by others but furnished by Nor'East Controls will be repaired or replaced, only to the extent provided in the original manufacturer's warranty to Nor'East Controls. Nor'East Controls does not guarantee resistance to corrosion, erosion, abrasion or other sources of failure, nor does Nor'East Controls guarantee a minimum length of service. Failure of the purchaser to give prompt written notice of any alleged defect under this guarantee forthwith upon its discovery, or use and possession thereof after an attempt has been made and completed by someone other than Nor'East Controls or an authorized representative to remedy defects therein, or failure to return products or parts for replacement as herein provided, of failure to install, operate, and maintain said products or parts according to instructions provided by Nor'East Controls, of failure to pay the entire contract price when due, shall be a waiver of all rights under these representations.

The foregoing guarantee shall be null and void, if, after shipment from our factory, the item is modified in any way or component of another manufacturer, such as but not limited to; an actuator is attached to the item by valves & controls other than a Nor'East Controls Factory Service Personnel. All orders accepted shall be deemed accepted subject to this guarantee, which shall be exclusive of any other previous guarantee, and this shall be the only effective guarantee or warranty binding on Nor'East Controls, anything to the contrary contained in the purchase order, or represented by any agent or employee of Nor'East Controls, in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING OBLIGATIONS ARE IN LIEU OF ALL OTHER OBLIGATIONS AND LIABILITIES INCLUDING WARRANTIES OF FITNESS OR MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE NOR'EAST CONTROLS AND EXCLUSIVE LIABILITY AND PURCHASER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THIS SALE OR FURNISHING OF SERVICES, GOODS, OR PARTS, THEIR OWN DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATION.

Limitation of Liability

In no event shall Nor'East Controls be liable for any direct, indirect, special or consequential damages whatsoever, and Nor'East Controls' liability, under no circumstances, will exceed the contract price for the goods and/or services for which liability is claimed. Any action for breach of contract must be commenced within 1 year after the cause of the action has occurred.

1000 Riverside Street, Portland, Maine 04103 Ph: 207-210-6633 Fax: 207-210-6634

Sales and Service

Nor' East Controls representatives are located in major cities throughout the world.
For the name of the representative nearest you, contact:

Web site:www.allagashinternational.com **E-Mail:**sales@allagashinternational.com

Nor' East reserves the right to incorporate our latest design and material changes without notice or obligation. Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing by Nor' East Controls. Certified drawings are available upon request.