

Valve Actuators

Type PA58 Multi-Spring Pneumatic Actuator



CONTENTS

Description	3
Unpacking & Inspection	3
Storage	3
Actuator Lifting Instructions.	4
Identification Label	4
Before Operating the Actuator	5
Installation.	5
After Commissioning the Actuator	5
Safety	6
Specifications.	7
Materials	7
Action.	7
Maintenance	8
General	8
Torque Settings.	8
Before and After Maintenance	8
Maintenance Schedule	8
Important Notes	8
Disassembling the Actuator	9
Assembling the Actuator.	12
Troubleshooting	14
Personal Protection Equipment	14
Scrapping Soft Parts.	14
Emergency Situations	14
Reversing The Actuator Action	14
Converting a Normally Closed Actuator to a Normally Open Actuator	14
Converting a Normally Open Actuator to a Normally Closed Actuator	14
Parts Drawings	15

DESCRIPTION

The PA58 actuator is a 58 square-inch pneumatic, multi-spring diaphragm actuator designed specifically to fit the RCV product line. The actuator can be used with a wide range of valve solutions from larger process valves to high pressure applications. The actuator is field reversible (without additional parts) allowing flexibility within the field. This actuator is available air-to-open or air-to-close. The yoke and the actuator housings are made of carbon steel and coated with epoxy for corrosion resistance.

Unpacking & Inspection

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

- Check the contents of the box against the packing slip.
- Do not lift box/heavy products manually. Manual lifting of actuators may cause serious injury.
- For heavy actuators, follow the lifting procedure in "*Actuator Lifting Instructions*" on page 4.
- Keep the box on flat/plain surface with arrow facing up.
- Open the box from top only.
- Handle the product with care.

Storage

The Type PA58 actuators are factory lubricated for 10,000 cycles under normal operating conditions. The ports are plugged to prevent foreign particles from entering during shipping. If the actuators are not for immediate use, take the following precautions during storage.

- Store the product with care.
- Protect the product from rain and heat.
- Do not remove the plastic plugs on the air supply ports until the actuator is in use.
- Store the actuator with its bottom resting on flat base.
- Duration of storage: 2 years maximum from date of manufacture.



Figure 1: Actuator in upright position

Actuator Lifting Instructions

Required Materials

Use a polyester sling with the following specifications to lift the actuator:

- Material: Polyester
- Maximum working load that sling can lift: 800 kg
- Factor of safety considered: 8
- Length of the sling: 1.5 m
- Width of the sling: 25 mm minimum



Figure 2: Lifting the actuator

Lifting Procedure

1. Use hook and sling at both the ends of the actuator.
2. Put the sling into the hook of the crane.
3. Verify that both the ends of the sling are properly hooked into the lifting bolts.
4. Lift the actuator slowly with the help of crane at an appropriate height of 500 mm.
5. Adjust the sling, if necessary, so the actuator is properly balanced.
6. Lift the actuator to the required height.
7. Rest the actuator on the surface.
8. Release the tension on the sling and remove the sling.

Identification Label

An identification label is attached to each actuator cover. When ordering parts, requesting information or service assistance, provide all of the label information.



 Badger Meter		 RCV Research Control® ReCo® Valves	
MODEL			
S/N			
TAG			
ACT.	SIG.	TRIM	

Figure 3: Product label

Before Operating the Actuator

- Inspect the actuator for any damage.
- Make sure all the connections have been made properly.
- Make sure the specified air pressure is in the line and that the air is dry filtered, instrumentation grade air.
- No shop air should be used at any time. Any moisture in air supply will seriously damage the actuator or valve positioner (if installed).

Installation

NOTE: Use 1/4 in. NPT fittings for connection. Pipe connections to be made should be rigid or flexible, according to the requirements of the user.

CAUTION

MAKE SURE THAT CONNECTIONS MADE (EITHER FLEXIBLE OR RIGID) MUST BE INTENDED FOR THEIR USE IN POTENTIALLY EXPLOSIVE ENVIRONMENT.

CAUTION

THE MAXIMUM OPERATING PRESSURE IS 65 PSIG.

After Commissioning the Actuator

- The actuator should let the valve open and close smoothly with no jerking or uneven motion.
- There should be no leakage of air from the actuator.
- There should be no abnormal noise from the actuator.

If you find any issue with the functioning of the actuator, see "*Troubleshooting*" on page 14. If troubleshooting does not rectify the issue, contact Technical Service department.

SAFETY

The installation of the PA58 actuator must comply with all applicable federal, state, and local rules, regulations, and codes. Failure to read and follow these instructions can lead to misapplication or misuse of the product, resulting in personal injury and damage to equipment.

- Read and save all instructions prior to installing, operating and servicing this product.
- Follow all warnings, cautions and instructions marked on, and supplied with, the product.
- Inform and educate personnel in the proper installation, operation and maintenance of the product.
- Install equipment as specified in the installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources.
- For proper performance, use qualified personnel to install, operate, update, tune and maintain the product.
- When replacement parts are required, ensure that the qualified service technician uses factory replacement parts. Substitutions may result in fire, electrical shock, other hazards, or improper equipment operation.
- Keep all product protective covers in place (except when installing, or when maintenance is being performed by qualified personnel) to prevent electrical shock, personal injury or damage to the actuator.

SPECIFICATIONS

Actuator Type	Multi-spring diaphragm linear pneumatic actuator
Effective Diaphragm Area	58 in.2 (225 sq cm)
Stroke	1 in. (Smaller stroke available with positioner)
Operating Medium	Filtered dry instrument grade air supply or dry nitrogen
Spring (Bench) Loading	Adjustable (select ranges available)
Action	ATO or ATC (reversible without additional parts)
Accessory Mounting	IEC534 (Namur)
Operating Pressure Max.	65 psig @ 70° F (4.5 bar @ 21° C)
Diaphragm Pressure Max.	90 psig @ 70° F (6.2 bar @ 21° C)
Upper Ambient Temperature Limit	176° F (80° C) @ 30 psig
Lower Ambient Temperature Limit	-20° F (-29° C) @ 30 psig
Max. Surface Temperature	120° F (49° C) at 116 lb and room temperature or ambient temperature of 86° F (30° C)
Signal Range	Standard 3...27 psig (Others available)
Max. Noise Level	70 dB maximum measured on pressure level scale for the actuator (intermittent)
Weight	35 lb (16 kg)

Table 1: Product specifications

Materials

Top Cover	ASTM A620/IS 513
Bottom Cover	ASTM A620/IS 513
Working Diaphragm	Neoprene with nylon fabric
Yoke	C.S. ASTM A216 Gr. WCB
Spindle	S.S. AISI 304
Working Diaphragm Holder	IS 2062 MS
Balancing Plate	ASTM A620/IS 513
Main Spring	Chrome Vanadium
Bellow	Nitrile
Rod Wiper Seal	Nitrile
O-Ring	Nitrile

Table 2: Material specifications

ACTION

- Air-to-Open (Fail Close Condition, Normally Closed): Actuator air supply to be connected to Port B. Port A to be used as exhaust port.
- Air-to-Close (Fail Open Condition, Normally Open): Actuator air supply to be connected to Port A. Port B to be used as exhaust port.

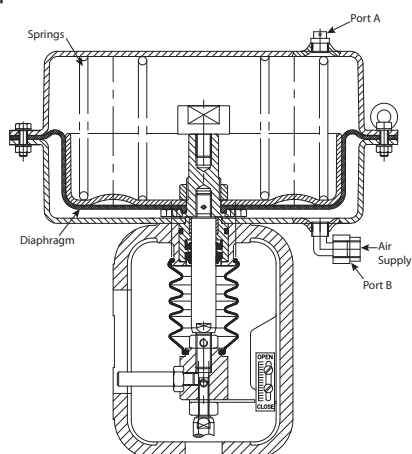


Figure 4: ATO, NC

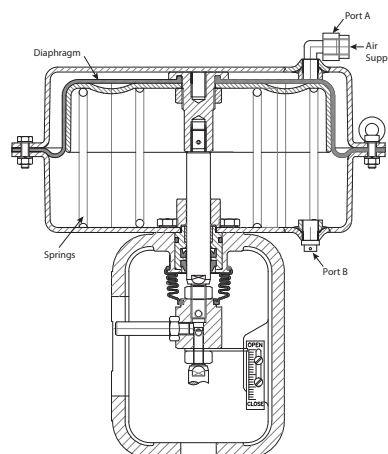


Figure 5: ATC, NO

MAINTENANCE

General

Type PA58 actuators are supplied with metric/UNC fasteners. Under normal operating conditions, the actuator requires only periodic observation for proper adjustment. Service kits are available to replace seals and diaphragm.

Torque Settings

Size	Top Cover Bolts Tightening Torques (N-m)
M4	5
M5 / 10"-24 UNC	10
M6 / 1/4"- 20 UNC	16
M8 / 5/16"-18 UNC	40
M10 / 3/8"- 16 UNC	80
M12 / 1/2" - 13 UNC	135
M16 / 5/8" - 11 UNC	360

Table 1: Torque settings

Before and After Maintenance

- Verify that all internal ports are clean and free from foreign particles.
- Verify that all the soft parts are clean and free from dust.
- Verify that all the components are assembled correctly.
- Verify the cleanliness of inside grease before assembly.
- Verify that all the parts are properly fitted.
- Verify that the top and bottom cover bolts are tightened to the required tightening torques, per *Table 1*.
- After introducing air in the actuator, check for air leakage with soap water bubble.

Maintenance Schedule

- Perform periodic maintenance of the actuator after every 10,000 cycles.
- Replace sealing parts of the actuator (like O-rings) after 10,000 cycles.

Important Notes

- The inside temperature (function temperature) of the actuator may rise to the maximum 176° F (80° C) under extreme working conditions.
- Design the control system so the actuator operates only after it is supplied with air.
- The actuator START/STOP function depends only upon the supply of air. The user controls the air supply.
- Air to be supplied for actuator must be clean and dry and should not contain any hazardous gas.
- In case of accidental blockage, do not open the actuator. Return the actuator to the factory for further maintenance.
- Use a silencer at the exhaust port.

Disassembling the Actuator

IMPORTANT Before disassembling the actuator, turn off the air supply and remove the air connection.

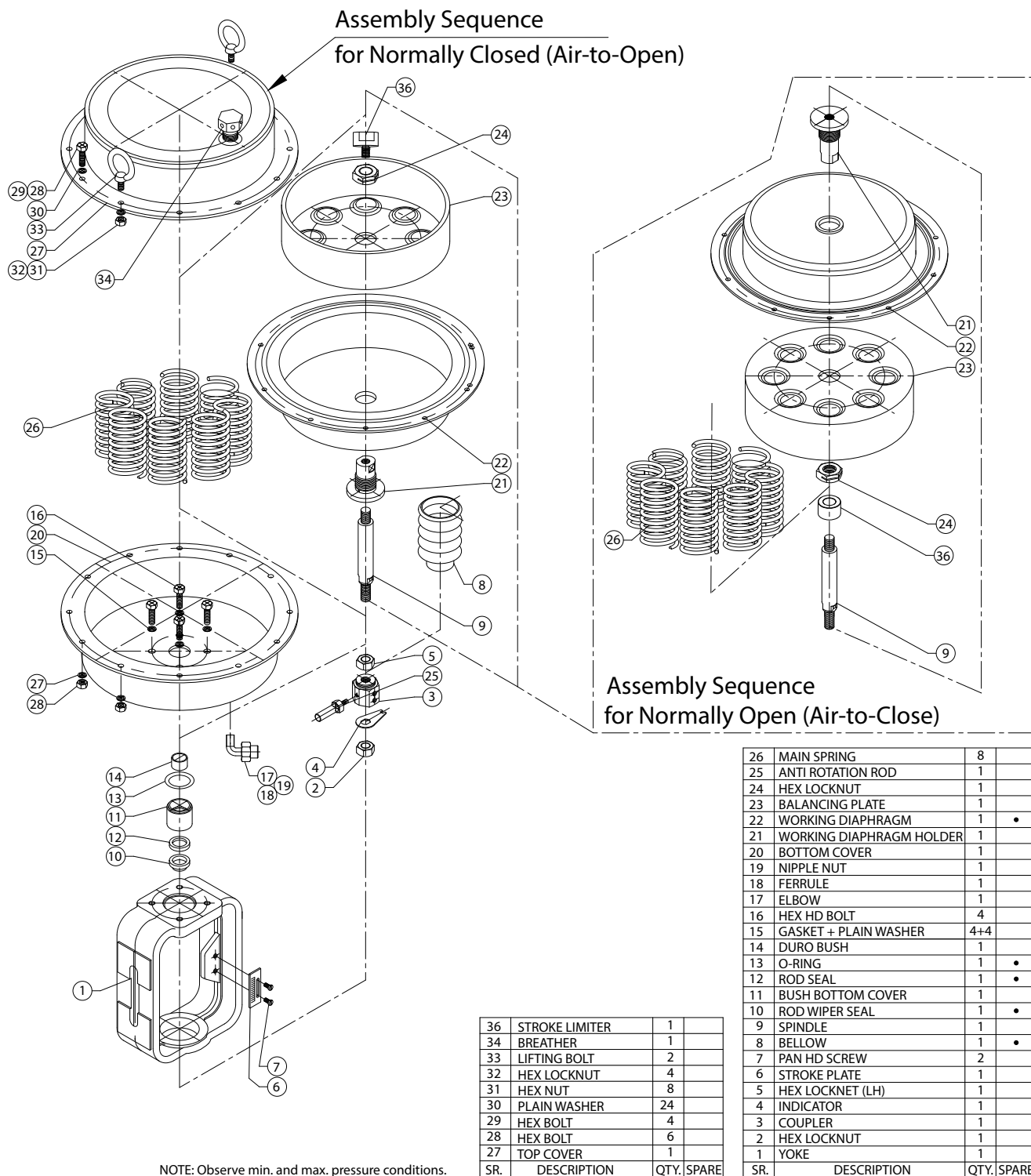


Figure 6: Assembly sequences

Air-to-Open (Fail Safe Close Condition, Normally Closed)

1. Shut off the air supply to the actuator.
2. Disconnect the air piping from the bottom cover (20).

⚠ CAUTION

AT THIS TIME PROVISIONS MUST BE MADE TO SUPPORT AND LIFT THE ACTUATOR OFF THE BODY USING RECOMMENDED LIFT SUPPORTS AND PROCEDURES.

3. Remove the anti-rotation rod (25) by turning it counterclockwise.
4. Disassemble the coupler (03) by turning it counterclockwise to disengage it from the spindle (09).
5. Remove the bellows (08) and the left-hand threaded hexagonal locknut (05).
6. To remove the top cover (27) from the actuator:
 - a. Remove the lifting bolts (33).
 - b. Rotate counterclockwise the long, full-threaded hexagonal bolts (29), the nuts (32) and washers (30).
 - c. Disassemble the other hexagonal bolts (28), nuts (31) and washers (30) and remove top cover (27).

⚠ CAUTION

TOP COVER (27) IS UNDER SPRING TENSION AND IS EQUIPPED WITH TENSION BOLTS (29) WHICH MUST BE REMOVED LAST.

7. Remove the springs (26) from the balancing plate (23).
8. To disassemble the diaphragm:
 - a. Remove the spindle (09) from the diaphragm holder (21).
 - b. Remove the balancing plate (23) and working diaphragm (22) by unscrewing the stroke limiter (36) and locknut (24).
9. Remove the hexagonal bolts (16), gasket and washers (15) to disassemble the bottom cover (20) from the yoke (01).
10. Remove the O-ring (13), bush bottom cover (11), rod seal (12) and rod wiper seal (10) from the yoke (01).

Do not remove the duro bush (14) from bush bottom cover (11).
11. Remove the stroke plate (06) to complete the disassembly of the actuator.

Air-to-Close (Fail Safe Open Condition, Normally Open)

1. Shut off the air supply to the actuator.
2. Disconnect the air piping from the bottom cover (20).

⚠ CAUTION

AT THIS TIME PROVISIONS MUST BE MADE TO SUPPORT AND LIFT THE ACTUATOR OFF THE BODY USING RECOMMENDED LIFT SUPPORTS AND PROCEDURES.

3. Remove the anti-rotation rod (25) by turning it counterclockwise.
4. Disassemble the coupler (03) by turning it counterclockwise to disengage it from the spindle (09).
5. Remove the bellows (08) and the left-hand threaded hexagonal locknut (05).
6. To remove the top cover (27) from the actuator:
 - a. Remove the lifting bolts (33).
 - b. Rotate counterclockwise the long, full-threaded hexagonal bolts (29), the nuts (32) and washers (30).
 - c. Disassemble the other hexagonal bolts (28), nuts (31) and washers (30) and remove top cover (27).

⚠ CAUTION

TOP COVER (27) IS UNDER SPRING TENSION AND IS EQUIPPED WITH TENSION BOLTS (29) WHICH MUST BE REMOVED LAST.

7. To disassemble the diaphragm:
 - a. Remove the spindle (09) from the diaphragm holder (21).
 - b. Remove the balancing plate (23) and working diaphragm (22) by unscrewing the locknut (24).

⚠ CAUTION

DIAPHRAGM CASE IS UNDER SPRING TENSION AND IS EQUIPPED WITH TENSION BOLTS (29) WHICH MUST BE REMOVED LAST.

8. Remove the springs (26) from the bottom cover (20).
9. Remove the stroke limiter (36).
10. Remove the hexagonal bolts (16), gasket and washers (15) to disassemble the bottom cover (20) from the yoke (01).
11. Remove the O-ring (13), bush bottom cover (11), rod seal (12) and rod wiper seal (10) from the yoke (01).

Do not remove the duro bush (14) from bush bottom cover (11).
12. Remove the stroke plate (06) to complete the disassembly of the actuator.

Assembling the Actuator

Air-to-Open (Fail Safe Close Condition, Normally Closed)

- Install the actuators in a position that allows full access for actuator maintenance purposes.
 - The actuator ambient temperature limits are $-10 \dots 80^{\circ} \text{C}$.
 - For low temperature conditions, the air supply must be dry.
 - For high temperature conditions, insulate the control valve and pipework to protect the actuator.
1. Make sure all parts are deburred, clean and lubricated.
 2. Fit these items, in order, into the yoke (01):
 - a. Yoke assembly
 - b. Rod wiper seal (10)
 - c. Rod seal (12)
 - d. Bush bottom cover (11)
 - e. Duro bush (14)
 - f. O-ring (13)
 3. Fill the yoke (01) and bottom cover (20) with Lock-Tite 574 sealer so they are fully air-tight.
 4. Attach the bottom cover (20) to the yoke (01) with hexagonal bolts (16) and washers (15).
 5. Clean the diaphragm holder (21) and fill the groove with 574 lock-tite sealer.
 6. Attach the diaphragm holder (21) to the working diaphragm (22) and the balancing plate (23) with the hexagonal locknut (24). Tighten the locknut.
 7. Fit the spindle (09) into the diaphragm holder (21) as shown in drawing.
 8. Lubricate the diaphragm assembly.
 9. Insert the diaphragm assembly from top in yoke assembly bolt holes of bottom cover (20) with that of diaphragm assembly by positioning yoke assembly and diaphragm assembly align with their assembly bolt holes.
 10. Assemble the stroke limiter (36) onto the Diaphragm holder (21).
 11. Place the springs (26) on the balancing plate (23).
 12. Position the top cover (27) on the diaphragm assembly, aligning the assembly bolt holes.
 13. Insert the four long assembly bolts (29) and tighten the nuts (32) and washers (30) in an alternating pattern until all the bolts of standard size can be inserted properly and the nuts engaged. Tighten all bolts (28) fully up to torque level.

CAUTION

TIGHTEN THE ASSEMBLY BOLTS (29), NUTS (32) AND WASHERS (30) EVENLY UNTIL THE CASES MEET. DO NOT OVER-TIGHTEN AS THIS COULD POSSIBLY WARP THE DIAPHRAGM CASES. SEE THE TORQUE VALUES OF BOLTS.

14. Establish pneumatic connection at the base of the actuator housing. Pressurize the assembly and check for ease of spindle movement, lift (as specified) and leakage from joints.

CAUTION

DO NOT EXCEED PRESSURE INDICATED ON THE PRESSURE GAUGE OF THE REQUIRED TESTING PRESSURE (4 BAR) FOR THE ACTUATOR.

15. Assemble the coupler (03) by turning it clockwise so that it will be engaged to the spindle (09) along with the bellow (08) and the hexagonal locknet (L.H. threaded) (05).
16. Add the anti-rotation rod (25) by turning it clockwise.
17. Assemble the elbow fitting (17) (18) (19) and breather (34).
18. Fit the stroke plate (06) and pan head screw (07) to their positions onto the yoke (01).

⚠ CAUTION

THE ACTUATOR HOUSING MUST ONLY BE PRESSURIZED ON THE OPPOSITE SIDE OF THE DIAPHRAGM TO THE SPRINGS. THE HOUSING VENT CAP MUST BE LEFT UNRESTRICTED.

Air-to-Close (Fail Open Condition, Normally Open)

1. Make sure all parts are deburred, clean and lubricated.
2. Fit these items, in order, into the yoke (01):
 - a. Yoke assembly
 - b. Rod wiper seal (10)
 - c. Rod seal (12)
 - d. Bush bottom cover (11)
 - e. Duro bush (14)
 - f. O-ring (13)
3. Fill the yoke (01) and bottom cover (20) with Lock-Tite 574 sealer so they are fully air-tight.
4. Attach the bottom cover (20) to the yoke (01) with hexagonal bolts (16) and washers (15).
5. Clean the diaphragm holder (21) and fill the groove with 574 lock-tite sealer.
6. Attach the diaphragm holder (21) to the working diaphragm (22) and the balancing plate (23) with the hexagonal locknut (24). Tighten the locknut.
7. Fit the spindle (09) into the diaphragm holder (21).
8. Position the diaphragm assembly on the top cover (27), aligning the assembly bolt holes.
9. Place the springs (26) on the balancing plate (23).
10. Insert the stroke limiter (36) into the spindle (09).
11. Lubricate the diaphragm assembly insert it in yoke and bottom cover assembly from the top, matching the diaphragm assembly bolt holes with the bottom cover assembly bolt holes.
12. Insert the four long assembly bolts (29) and tighten the nuts (32) and washers (30) in an alternating pattern until all the bolts of standard size can be inserted properly and the nuts engaged. Tighten all bolts (28) fully up to torque level.

⚠ CAUTION

TIGHTEN THE ASSEMBLY BOLTS (29), NUTS (32) AND WASHERS (30) EVENLY UNTIL THE CASES MEET. DO NOT OVER-TIGHTEN AS THIS COULD POSSIBLY WARP THE DIAPHRAGM CASES. SEE THE TORQUE VALUES OF BOLTS.

13. Establish pneumatic connection at the base of the actuator housing. Pressurize the assembly and check for ease of spindle movement, lift (as specified) and leakage from joints.

⚠ CAUTION

DO NOT EXCEED PRESSURE INDICATED ON THE PRESSURE GAUGE OF THE REQUIRED TESTING PRESSURE (4 BAR) FOR THE ACTUATOR.

14. Assemble the coupler (03) by turning it clockwise so that it will be engaged to the spindle (09) along with the bellow (08) and the hexagonal locknet (L.H. threaded) (05).
15. Add the anti-rotation rod (25) by turning it clockwise.
16. Assemble the elbow fitting (17) (18) (19) and breather (34).
17. Fit the stroke plate (06) and pan head screw (07) to their positions onto the yoke (01).

⚠ CAUTION

THE ACTUATOR HOUSING MUST ONLY BE PRESSURIZED ON THE OPPOSITE SIDE OF THE DIAPHRAGM TO THE SPRINGS. THE HOUSING VENT CAP MUST BE LEFT UNRESTRICTED.

TROUBLESHOOTING

- Check that air supply is at required pressure.
- Verify that the air supply is not restricted in any way.
- Check for air leakage on supply lines to the actuator.
- Check leakage in between top and bottom cover and at the spindle.

PERSONAL PROTECTION EQUIPMENT

The multi-spring diaphragm linear pneumatic actuator runs on pneumatic energy. No special protection measures are needed while it is *operating*.

However, while *handling* the actuator, the operator must wear personal safety equipments such as hand gloves and safety shoes to avoid any kind of injury.

The operator must also follow the instructions given for lifting heavy actuators.

SCRAPPING SOFT PARTS

Soft parts are to be scraped according to the norms of countries in which they are being used.

EMERGENCY SITUATIONS

CAUTION

DO NOT OPEN THE TOP COVER OF THE ACTUATOR TO AVOID ANY KIND OF INJURY WHILE IT IS PRESSURIZED.

In emergency situations, stop the operation of actuator. As the actuator operates on pneumatic energy, the only way to stop the actuator to cut off the air supply.

REVERSING THE ACTUATOR ACTION

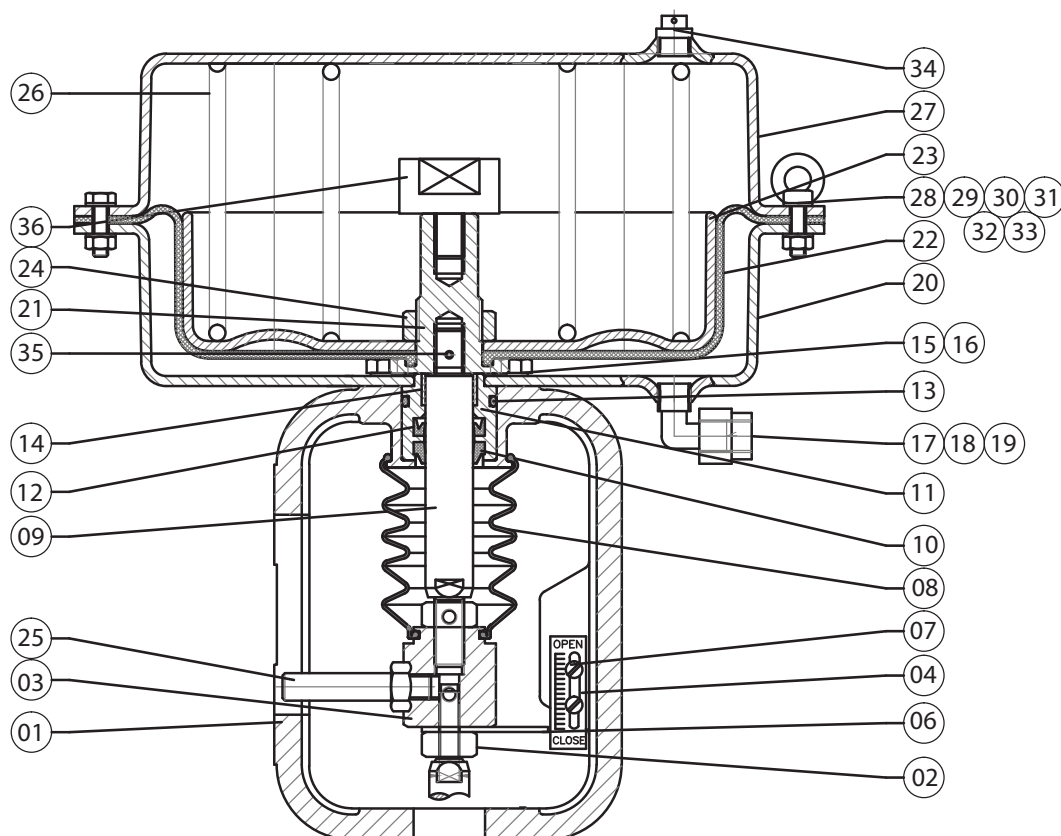
Converting a Normally Closed Actuator to a Normally Open Actuator

1. Replace the NC spindle assembly with the NO spindle assembly.
2. Replace the NC stroke limiter with the NO stroke limiter.
3. Interchange the position of elbow fitting of 1/4 in. NPT from the bottom cover with the breather to top cover.
4. Re-align the stroke plate with the indicator by unscrewing the pan head screw.

Converting a Normally Open Actuator to a Normally Closed Actuator

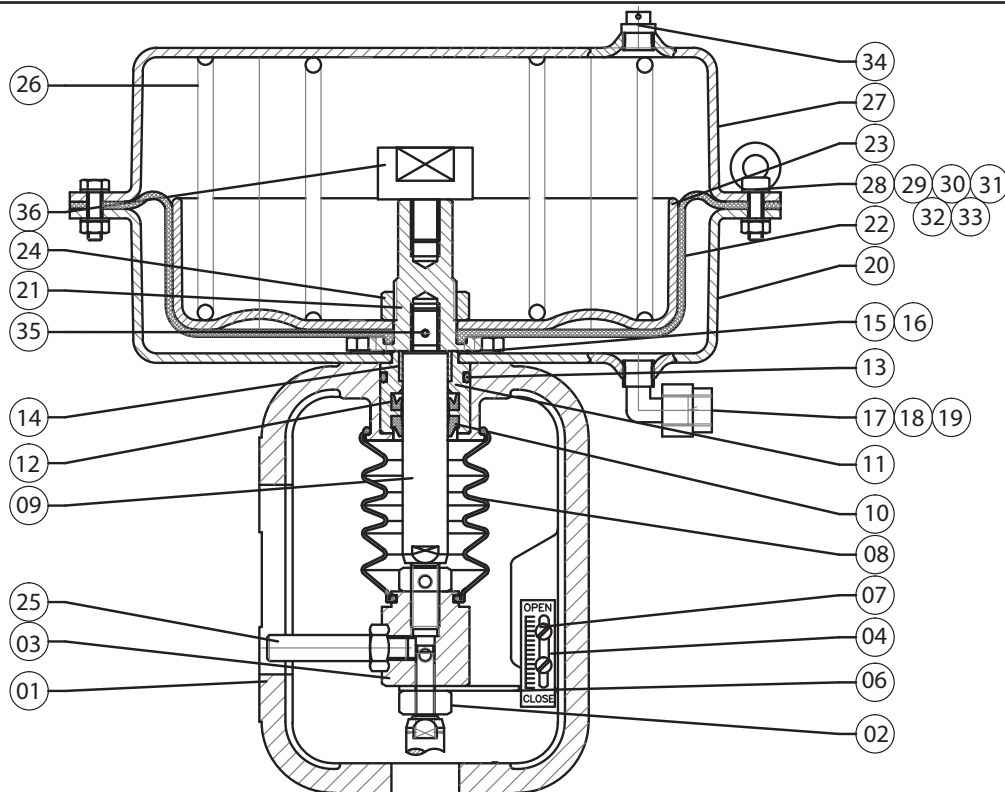
1. Replace the NO spindle assembly with the NC spindle assembly.
2. Replace the NO stroke limiter with the NC stroke limiter.
3. Interchange the position of elbow fitting of 1/4 in. NPT from the bottom cover with the breather to top cover.
4. Re-align the stroke plate with the indicator by unscrewing the pan head screw.

PARTS DRAWINGS



36	STROKE LIMITER	STEEL PLATED	1	10324.29.11.MC.R1/PNS-0015876
35	SPLIT DOWEL PIN	S.S. 304	1	ø3 x 25/135604
34	BREATHER	BRASS	1	A4-7836.02.00/P320290
33	LIFTING BOLT	HT 8.8	2	M6x16Lg/130950
32	HEX LOCK NUT	GR 8.0	4	M6/130642
31	HEX NUT	GR 8.0	10	M6/133312
30	PLAIN WASHER	IS 6649	24	ID 6.5/130804
29	HEX. BOLT	GR. 8.8	4	M6 x 50/130398
28	HEX. BOLT	GR. 8.8	6	M6 x 25/133074
27	TOP COVER	ASTM A620/IS 513-CR3-DD	1	A2-7215.13.01/P293450PC
26	MAIN SPRING	CHROME VANADIUM	8	A3-7215.00.10/233978
25	ANTI ROTATION ROD	S.S.AISI.304	1	A4-7429.61.12/295140
24	HEX. LOCK NUT	STEEL PLATED	1	A4-4088.00.41/294050
23	BALANCING PLATE	ASTM A620/IS 513-CR3-DD	1	A2-7215.16.02/293442
22	WORKING DIAPHRAGM	NEOPRENE	1	A3-7215.16.01/P293204
21	HOLDER WORKING DIA.	STEEL PLATED	1	A4-7215.07.02/295216
20	BOTTOM COVER	ASTM A620/IS 513-CR3-DD	1	A2-7215.38.01/P293446PC
19	NIPPLE NUT	SS304	1	1/4"/140034
18	FERRULE	SS304	1	1/4"/140032
17	ELBOW	SS304	1	1/4"/140030
16	HEX HD BOLT	IS 3757	4	M8 x 20/133090
15	PLAIN WASHER	IS 6649	4	8.5 ID/130806
14	DURO BUSH	ID3/4"xOD7/8"x1/2"	1	12DU08/295218
13	'O' RING	NITRILE(ID34.52x3.53SEC)	1	231562
12	ROD SEAL	NITRILE	1	A4-4009.28.02.R1/286070
11	BUSH BOTTOM COVER	S.S.AISI.304	1	A4-7215.38.02.MC/295184
10	ROD WIPER SEAL	NITRILE	1	A4-7215.00.31/294830
09	SPINDLE	S.S.AISI.304	1	A3-7215.61.02/295180
08	BELLOW	NITRILE	1	A3-7215.14.04/293170
07	PAN HD. SCREW	STEEL PLATED	2	M4 x 6/136542
06	STROKE PLATE	S.S. 304	1	A4-10324.42.05/P260357
04	INDICATOR	STEEL PLATED	1	A4-10324.30.01/P295157P
03	COUPLER	S.S. 304	1	A4-10324.61.08/P295207
02	HEX. LOCK NUT	S.S. 304	1	5/16-24 UNF-2B THREAD
01	YOKE	C.S.ASTM A216 GrWCB	1	A1-10324.42.01.R0/P283747P
SN.	DESCRIPTION	MATERIAL	QTY	DRAWING NO.

Figure 7: Part numbers for ATO



36	STROKE LIMITER	STEEL PLATED	1	10324.29.11.MC.R1/PNS-0015876
35	SPLIT DOWEL PIN	S.S. 304	1	Ø3 x 25/135604
34	BREATHER	BRASS	1	A4-7836.02.00/P320290
33	LIFTING BOLT	HT 8.8	2	M6x16Lg/130950
32	HEX LOCK NUT	GR 8.0	4	M6/130642
31	HEX NUT	GR 8.0	10	M6/133312
30	PLAIN WASHER	IS 6649	24	ID 6.5/130804
29	HEX. BOLT	GR. 8.8	4	M6 x 50/130398
28	HEX. BOLT	GR. 8.8	6	M6 x 25/133074
27	TOP COVER	ASTM A620/IS 513-CR3-DD	1	A2-7215.13.01/P293450PC
26	MAIN SPRING	CHROME VANADIUM	8	A3-7215.00.10/233978
25	ANTI ROTATION ROD	S.S.AISI.304	1	A4-7429.61.12/295140
24	HEX. LOCK NUT	STEEL PLATED	1	A4-4088.00.41/294050
23	BALANCING PLATE	ASTM A620/IS 513-CR3-DD	1	A2-7215.16.02/293442
22	WORKING DIAPHRAGM	NEOPRENE	1	A3-7215.16.01/P293204
21	HOLDER WORKING DIA	STEEL PLATED	1	A4-7215.07.02/295216
20	BOTTOM COVER	ASTM A620/IS 513-CR3-DD	1	A2-7215.38.01/P293446PC
19	NIPPLE NUT	SS304	1	1/4"/140034
18	FERRULE	SS304	1	1/4"/140032
17	ELBOW	SS304	1	1/4"/140030
16	HEX HD BOLT	IS 3757	4	M8 x 20/133090
15	PLAIN WASHER	IS 6649	4	8.5 ID/130806
14	DURO BUSH	ID3/4"xOD7/8"x1/2"	1	12DU08/295218
13	'O' RING	NITRILE(ID34.52x3.53SEC)	1	231562
12	ROD SEAL	NITRILE	1	A4-4009.28.02.R1/286070
11	BUSH BOTTOM COVER	S.S.AISI.304	1	A4-7215.38.02.MC/295184
10	ROD WIPER SEAL	NITRILE	1	A4-7215.00.31/294830
09	SPINDLE	S.S.AISI.304	1	A3-7215.61.02/295180
08	BELLOW	NITRILE	1	A3-7215.14.04/293170
07	PAN HD. SCREW	STEEL PLATED	2	M4 x 6/136542
06	STROKE PLATE	S.S. 304	1	A4-10324.42.05/P260357
04	INDICATOR	STEEL PLATED	1	A4-10324.30.01/P295157P
03	COUPLER	S.S. 304	1	A4-10324.61.08/P295207
02	HEX. LOCK NUT	S.S. 304	1	5/16-24 UNF-2B THREAD
01	YOKE	C.S.ASTM A216 GrWCB	1	A1-10324.42.01.R0/P283747P
SN.	DESCRIPTION	MATERIAL	QTY	DRAWING NO.

Figure 8: ATC

Control. Manage. Optimize.

Research Control is a registered trademark of Badger Meter, Inc. Other trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists. © 2015 Badger Meter, Inc. All rights reserved.

www.badgermeter.com

The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-0400
 México | Badger Meter de las Américas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882
 Europe, Middle East and Africa | Badger Meter Europa GmbH | Nürtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
 Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai | UAE | +971-4-371 2503
 Czech Republic | Badger Meter Czech Republic s.r.o. | Maříkova 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411
 Slovakia | Badger Meter Slovakia s.r.o. | Racienska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
 Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464836
 China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412