

ONETORK

AT Series Installation & Maintenance Instructions Service Issue No.: 90-AT-00002

INTRODUCTION:

The AT Series single or double acting pneumatic actuators are designed to drive any quarter turn application, i.e. ball, plug, butterfly and damper. The actuators both have 90° stroke with +/- 5° adjustment in both Clockwise and Counter-Clockwise rotation. Actuators are made using an extruded aluminum alloy cylinder. A steel pinion is inserted in the cylinder on nylon bushings and NBR O-rings seals. Two cast aluminum alloy pistons seated on Fluorine-Carbon rings and Nylon guide rings equipped with NBR O-rings to guarantee proper sealing. The cylinder is sealed using two cast aluminum end caps fitted with O-rings seals.

The top of the actuator cylinder is drilled in conformance with VDE/VDI 3845 (NAMUR) and allow for mounting switch boxes and positioners with appropriate brackets. Mounting holes are also provided for (NAMUR) or direct mounted solenoid valves.

Both the mounting holes and female drive are ISO5211 standard and allow for direct mounting to the valve corresponding ISO mounting flange.

FUNCTION:

Double Acting:

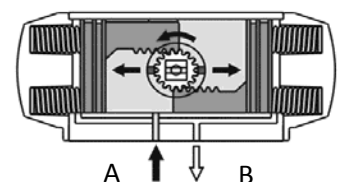
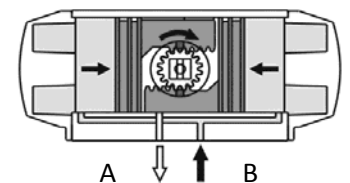
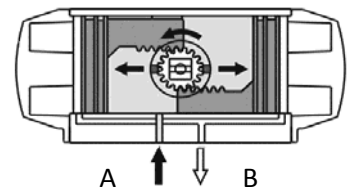
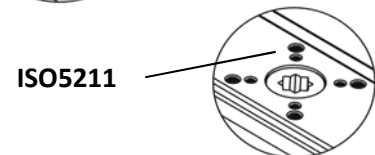
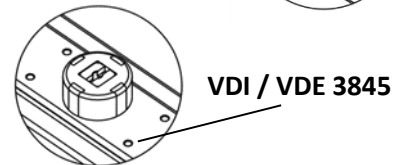
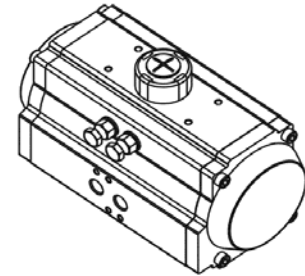
When pressurizing the actuator on "Port A", the central chamber of the cylinder is loaded moving the pistons outward. The pinion rotates counter-clockwise permitting the valve to open. Simultaneously the air present in the outer two chambers exhausts from "Port B".

When pressurizing the actuator on "Port B", the two external chambers are loaded via the channeling hole in the aluminum cylinder. The pressure pushes the pistons inward rotating the pinion clockwise permitting the valve to close. Simultaneously the air present in the internal chamber exhausts from "Port A".

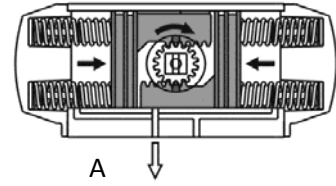
Single Acting (Spring Return):

Actuators can be assembled spring to close (CW) rotation or spring to open (CCW) rotation.

When pressurizing the actuator on "Port A", the central chamber of the cylinder is loaded and pushes the pistons outward. While the pistons move outward, the springs are compressed and the air in the two external chambers leaves via "Port B". In this stroke, the pinion rotates counter-clockwise permitting the valve to open.



When the air supply is discontinued the springs immediately extend pushing the pistons inward and exhausting the air present in the central chamber via "Port A". In this stroke, the pinion rotates clockwise permitting the valve to close. "Port B" serves as an exhaust and a breather to atmosphere. It is recommended to use a filter and/or muffler in order to reduce air noise as well as to prevent dirt or other foreign matter from entering the cylinder.



MOUNTING THE ACTUATOR ON THE VALVE:

Carefully read the following instructions prior to mounting actuator to valve.

Verify that the mounting hole pattern of the actuator matches that of the valve mounting flange or the mounting bracket,

Verify that the dimensions and the position of the actuators female drive match those of the valve stem adaptation (coupling).

Verify that the valve is either open or closed (as required) in order to guarantee alignment between the threaded holes of the actuator and those of the valve.

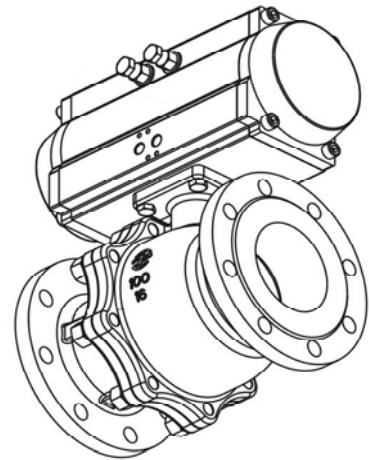


Fig. 1

If the valve is already mounted in the pipeline, make sure that there is no pressure in the line so that the disc will no accidentally be opened or closed.

If the valve is not mounted in the pipeline, after mounting the actuator, check to be sure there is no interference between the actuator and the valve disc during operation.

The AT Series actuator has been designed to be mounted on valves parallel to the pipeline or may be mounted perpendicular to the pipeline if space is an issue.

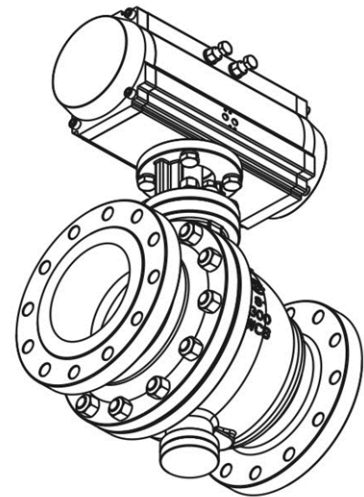


Fig. 2

Mounting of the actuator to the valve, may be accomplished directly if the valve is designed for such applications (Fig. 1), or by utilizing a bracket and a coupling (Fig. 2).

INSTALLATION OF ACTUATOR TO VALVE:

Figure 1 - Mounting of the actuator directly to valve

After observing the points mentioned above:

- 1) Position the actuator over the valve mounting flange.
- 2) Insert the square (ISO) valve stem into the female square or star shaped drive of the actuator.
- 3) Lower the actuator until it meets the valve mounting surface.
- 4) Align the mounting holes of the valve flange with those of the actuator. Insert and partially tighten the mounting screws.
- 5) Stroke the actuator / valve four to five times to allow self centering prior to tightening the mounting screws completely.
- 6) Adjust the end positions of actuator if necessary to achieve full open and closed position of valve.

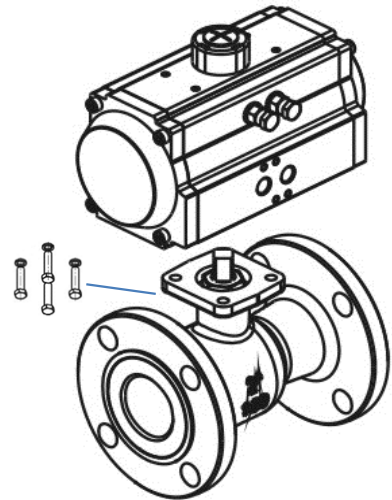
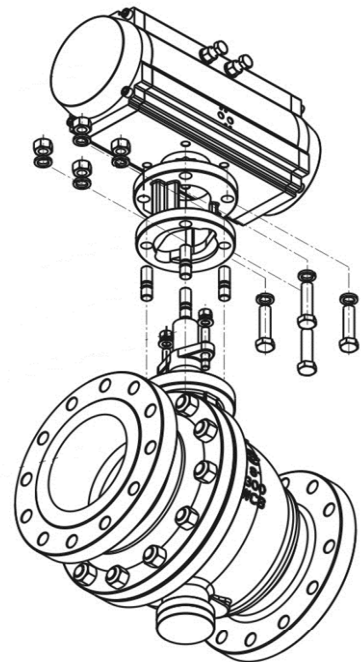


Figure 2 - Mounting the actuator on the valve with bracket & coupler

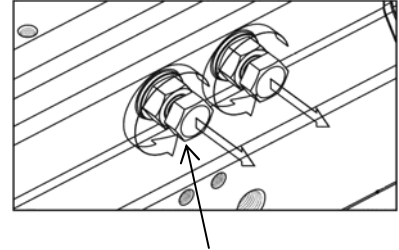
- 1) Position the coupler in the square or star shaped slot of the pinion. If the actuator has a star shaped slot, verify which position is required.
- 2) Position the bracket so that the coupler is located inside the support. The largest hole of the bracket must be on the side of the actuator so that the coupler passes within. After positioning the bracket in correspondence to the threaded holes, tighten four screws.
- 3) Take the entire assembly and place it in position on the valve stem. Insert the coupler on the valve stem and slide into position until the support surface comes into contact with the valve flange surface. Center the bracket holes with those of the valve flange.
- 4) Manually insert the fastening screws in the hole and tighten the nuts and lock washers onto the fastening screws.
- 5) Once positioned, stroke the assembly open and closed several times to ensure it's properly centered. Tighten the nuts, making sure to use two wrenches, one to hold the screw and the other for the nut.
- 6) Proceed to open and close valve and make end stop adjustments.



ADJUSTING ACTUATOR STROKE:

To adjust valve opening (actuators rotating CCW) proceed as follows:

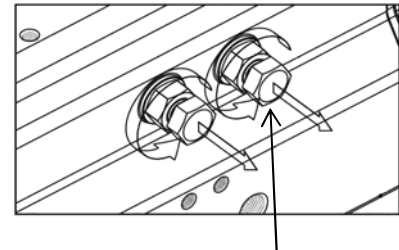
- 1) Open actuator to verify how much travel adjustment will be required, then close actuator prior to making open adjustments.
- 2) Loosen lock nut and tighten or loosen the open (Left Hand) adjustment bolt a couple turns based on whether you require increased or decreased rotation.
- Note: Loosening the adjustment bolt increases travel, while tightening the adjustment bolt decreases travel.
- 3) After tightening the lock nut, verify position by stroking actuator open. If position is not correct for application or not desired, repeat steps above until proper position has been obtained.



Open Adjustment

To adjust valve closing (actuators rotating CW) proceed as follows:

- 1) Close actuator to verify how much travel adjustment will be required, then open actuator prior to making close adjustments.
- 2) Loosen lock nut and tighten or loosen the close (Right Hand) adjustment bolt a couple turns based on whether you require increased or decreased rotation.
- Note: Loosening the adjustment bolt increases travel, while tightening the adjustment bolt decreases travel.
- 3) After tightening the lock nut, verify position by stroking actuator close. If position is not correct for application or not desired, repeat steps above until proper position has been obtained.



Close Adjustment

WORKING CONDITIONS:

Supply Pressure:

Double Acting Model (DA): (40 PSI to 116 PSI)

Single Acting Model (SR): (40 PSI to 116 PSI)

Maximum Supply Pressure: (130 PSI)

Working Temperature:

Standard Seals:

-40 deg. F to +176 deg. F (-40 deg. C to +80 deg. C)

High Temp. Seals:

+5 deg. F to +300 deg. F (-15 deg. C to +150 deg. C)

Operating Media:

Lubricated or dry air, filtered. If an air lubricator is used, it must be maintained because lubricating will wash out factory grease. For other fluids such as non corrosive gases, water or hydraulic oil, consult our office.

Stroke Angle / Rotation:

90 deg. with mechanical adjustment of +/- 5 deg.

Lubrication:

All moving parts have been lubricated for life. Only in high cycle applications or particularly harsh working environments will it be necessary to maintain internal lubrication.

Installation:

Suitable for internal or external environments and in any position. To carry out correct installation, see MOUNTING ACTUATORS ON THE VALVE in this manual. In the case of single action actuators (SR), where an air supply connection remains open, a filter is recommended so that dust or dirt will not contaminate the inside of the cylinder.

Air Supply Connections:

On the front of the pneumatic actuator there are mounting holes to interface with a NAMUR style solenoid valve. The AT Series actuators come standard with NPT threaded connections.

Warranty:

ONETORK AT Series pneumatic actuators are guaranteed for a period of two years from ship date and 100,000 cycles. Warranty is dependent upon normal usage and correct application of the actuator, see operating media and installation.

MAINTENANCE:



IMPORTANT: BEFORE CARRYING OUT ANY MAINTENANCE OPERATIONS MAKE SURE THAT THE PNEUMATIC ACTUATOR HAS BEEN DISCONNECTED FROM AIR SUPPLY AND POWER LINES IF SUPPLIED WITH A SOLENOID VALVE.

Note:

For proper performance and long actuator life, **ONETORK** recommends that a maintenance program be devised and carried out at least every 400,000 cycles in order to evaluate wear of O-rings, clamps or plastic guide rings. Whenever such material demonstrates evident wear, replace it. In high cycle applications, it is recommended that more frequent maintenance be preformed.

ONETORK recommends that only original spare parts be utilized, and that maintenance be performed by a competent qualified personnel.

For maintenance operations, proceed as indicated in exploded views of actuator on next page:

Actuator Disassembly:

Refer to DWG. No.: 30-00002 for exploded view of actuators numbered parts list.

1) Shown in Fig. 3, remove plastic screw (#13) and plastic indicator (#12) if it has not been removed prior for assembly. A flat tip screwdriver might be needed to pry the indicator loose from the output shaft.

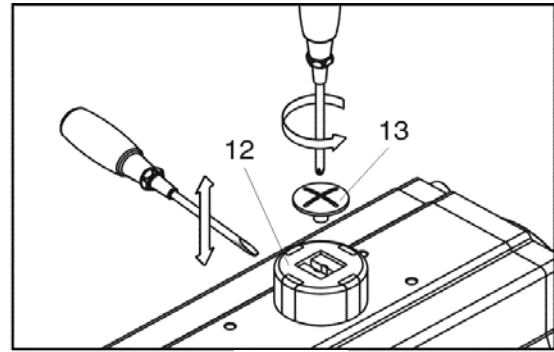


Fig. 3

2) Loosen both lock nuts (#26) and remove both open and close adjustment bolts (#27) from actuator cylinder (Fig. 4). Items #24 (O-Ring) and #25 (Washer_S.S.) will be part of this dis-assembly.

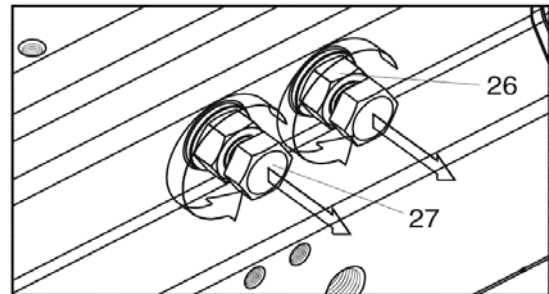


Fig. 4

3) End Caps

Spring Return - Remove end cap bolts (#23) in order shown in Fig. 5, loosen diagonally to equalize bolt loading until spring preload is no longer present. Remove both end caps (#21 & #22) along with spring assembly (#19). Springs may accompany end caps during removal process.

Double Acting - Remove end cap bolts (#23), loosen all bolts completely and remove end cap.

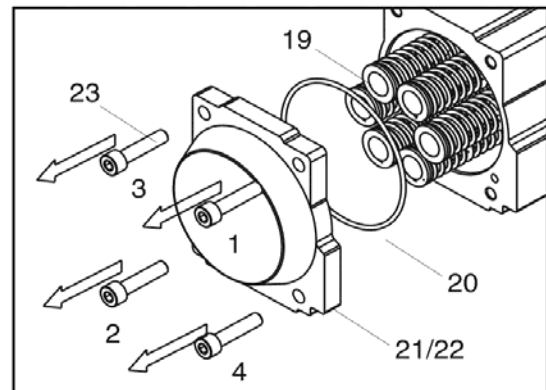


Fig. 5

4) Place cylinder in a vise or fixture to keep secure from moving or twisting. Rotate output shaft (#2) either CW (Clockwise) or CCW (Counter-Clockwise) to remove pistons (#15) from actuator body shown in Fig. 6.

*Note: When pistons release from output shaft, note or mark the position of the output shaft in relation to the cylinder body. The output shaft will need to be placed in this position during re-assembly of actuator.

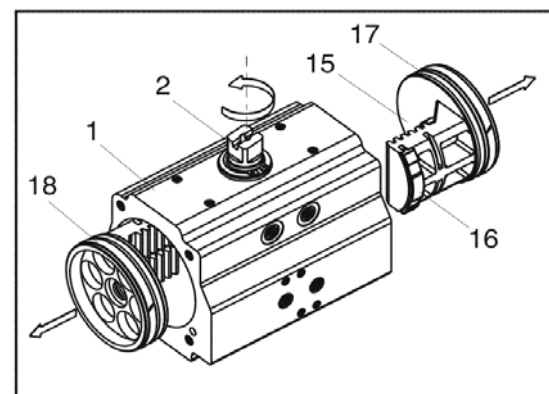


Fig. 6

5) Shown in Fig. 7, use a snap ring pliers to remove (#11) the snap ring from top of output shaft; followed by (#10) S.S. Washer & (#9) Nylon bushing/washer.

Next, gently tap the top of the output shaft with a rubber mallet until the output shaft O-rings (#3 & #8) are past the cylinder body. The output shaft should be free moving at this point.

*Note the position of the Adjustment Cam (#5) in relation to the output shaft and cylinder body, it will need to be placed in the same position during re-assembly.

Disassembly is now complete, make sure to clean each part and inspect for damage or excessive wear.

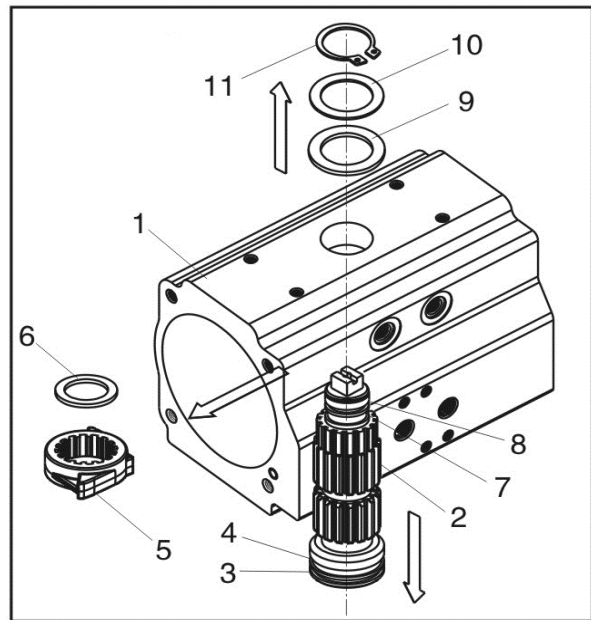


Fig. 7

Actuator Assembly:

Follow instructions below to replace all recommended spare parts. Refer to the following parts list, suggested spare parts are shown with an "*" next to them.

Refer to DWG. No.: 30-00002 for exploded view of actuators numbered parts list.

1) Install bottom O-ring (#3), bottom bearing (#4), top bearing (#7) and top O-ring (#8). Grease each item prior to installing into actuator cylinder. Partially install output shaft (#2) into the bottom of the actuator body.

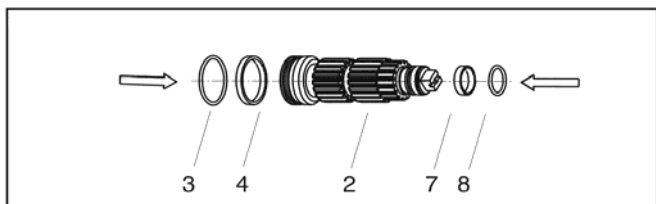


Fig. 8

2) Install adjustment cam (#5) and thrust bearing (#6) onto output shaft inside the actuator cylinder. Looking through the top hole of the actuator body, position the splined adjustment cam onto the shaft as noted during disassembly. Press the output shaft (#2) all the way into the actuator body until the O-rings are seated. Install bearing (#9) and S.S Washer (#10) onto the top of the output shaft, then install snap ring (#11).

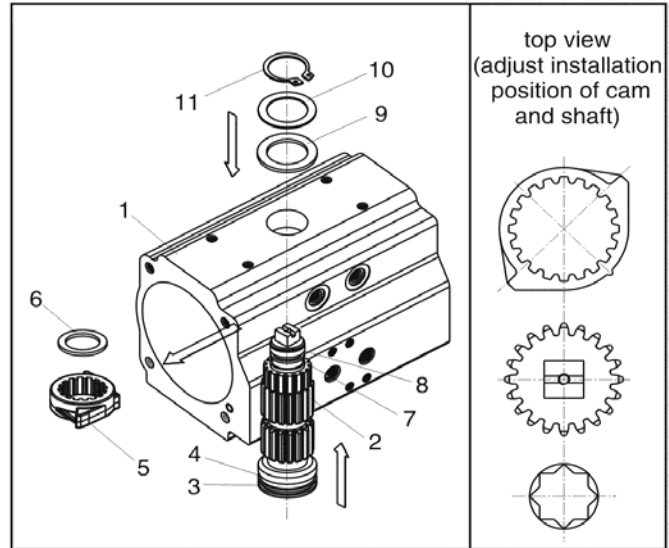


Fig. 9

3) Install guide bearing (#16) on the back side of piston (#15), piston O-ring (#17) and piston guide ring (#18). Grease the inner bore of cylinder body, O-ring, piston guide and rack.

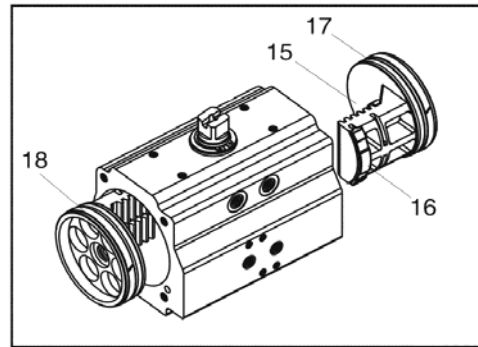


Fig. 10

4) When reinserting the pistons, make sure the output shaft has been aligned in the proper position as when disassembled. The pistons should be the same distance apart, keeping them flush with the cylinder body. Push pistons all the way into the actuator to assure proper output shaft position.

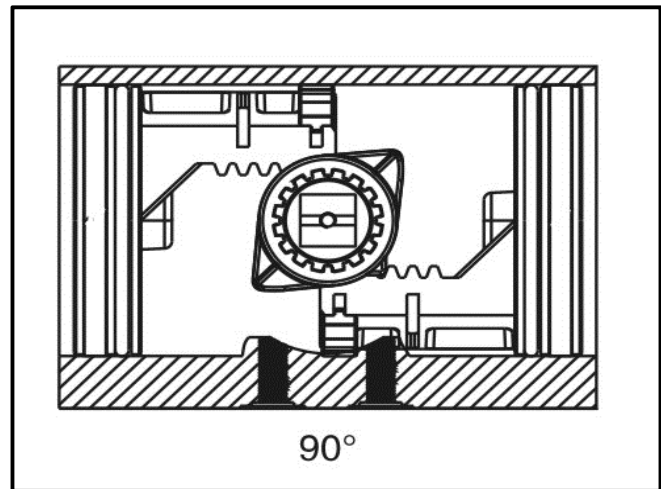


Fig. 11

5) Spring return actuators require that you replace the springs back into the piston pockets. Fig. 12 illustrates the proper spring installation for both sides of the actuator.

Fig. 13 shows the springs installed in the actuator body.

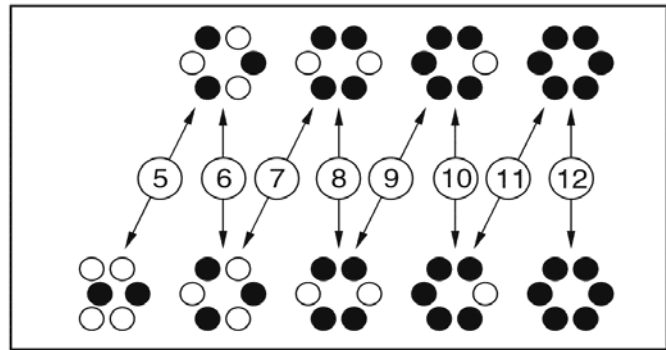


Fig. 12

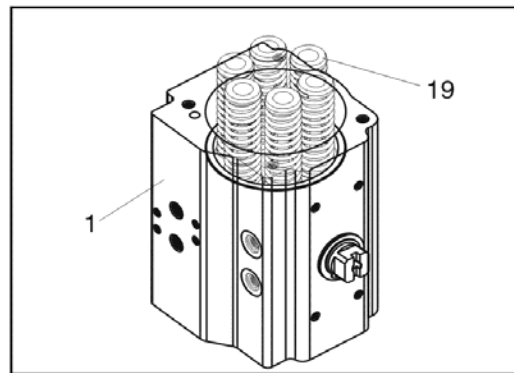


Fig. 13

6) Replace end cap O-rings and install end caps onto the actuator cylinder body. Tight the bolts equally according to Fig. 14.

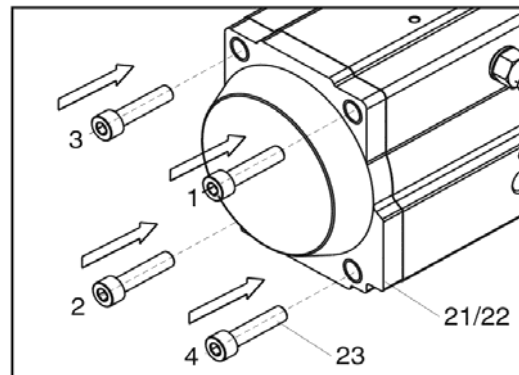


Fig. 14

7) Install adjustment bolts, lock nut, washer and O-ring into actuator body. Final stroke adjustment can be made for applications Open & Close end of travel.

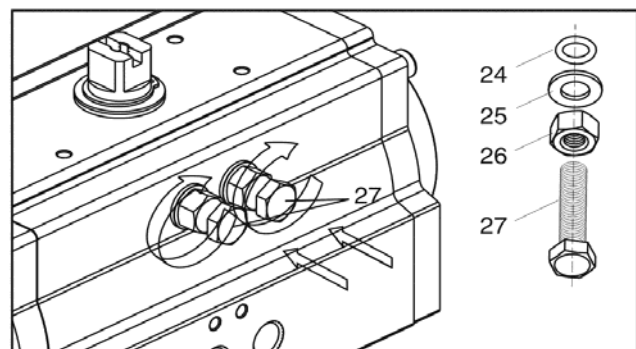
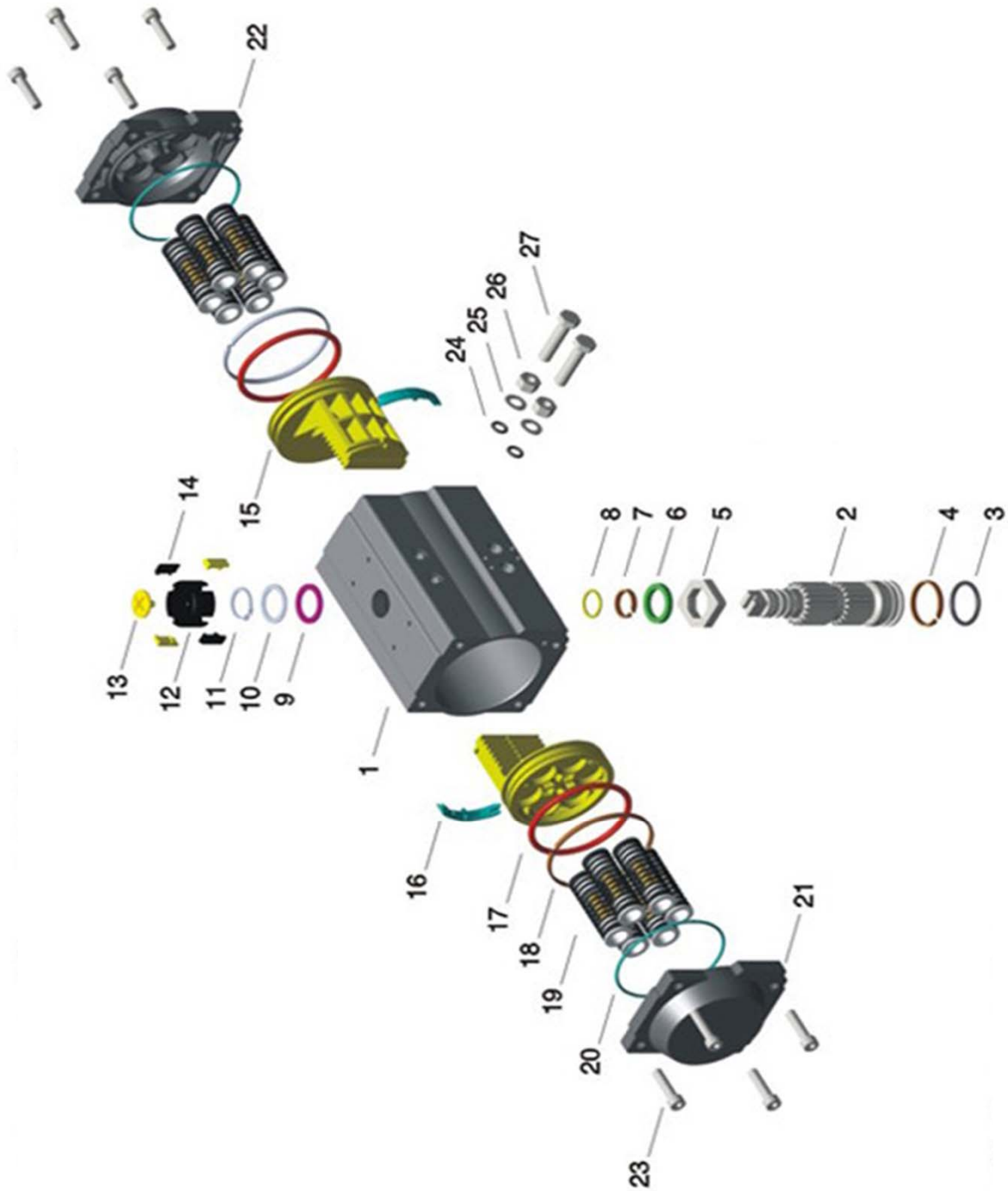


Fig. 15



AT Series Components / Parts List

Item No.:	Qty:	Description / Part Name:	Materials:
1	1	Cylinder	Extruded Aluminum Alloy
2	1	Output Shaft	Carbon Steel
3 *	1	O-Ring (Bottom Output Shaft)	NBR
4 *	1	Bearing (Bottom Output Shaft)	Nylon 46
5	1	Adjustment Cam	Stainless Steel
6 *	1	Thrust Bearing (Output Shaft)	Nylon 46
7 *	1	Bearing (Top Output Shaft)	Nylon 46
8 *	1	O-Ring (Top Output Shaft)	NBR
9 *	1	Bearing (Top Output Shaft)	Nylon 46
10	1	Washer (Output Shaft)	Stainless Steel
11	1	Snap Ring (Output Shaft)	Stainless Steel
12	1	Position Indicator	PPPP + 30% GF
13	1	Screw	PPPP + 30% GF
14	4	Position Indicator Pieces	PPPP + 30% GF
15	2	Piston	Cast Aluminum Alloy
16 *	2	Guide Bearing (Back of Piston)	Nylon 46
17 *	2	O-Ring (Piston)	NBR
18 *	2	Guide Ring (Piston)	Fluorine-Carbon Composite
19	12-May	Spring Assemblies	Alloy / Spring Steel
20 *	2	O-Ring (End Caps)	NBR
21	1	Left End Cap	Cast Aluminum Alloy
22	1	Right End Cap	Cast Aluminum Alloy
23	8	End Cap Bolts	Stainless Steel
24 *	2	O-Ring (Adjustment Bolts)	NBR
25	2	Washer (Adjustment Bolts)	Stainless Steel
26	2	Lock Nut	Stainless Steel
27	2	Adjustment Bolts	Stainless Steel

* indicates suggested spare parts for maintenance included in new seal kits.