



KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR OPERATING AND MAINTENANCE INSTRUCTIONS

Operating and Maintenance Instructions for: Figure 79 Pneumatic Actuators (U/E options)



Double Acting Actuator



Single Acting Actuator

4. If pipelines are hydraulically tested, then the lines should be "blown down" with high pressure air to clear all water, prior to connecting lines to the actuator.
5. Where pipe fitting sealants are used, they should be applied to the male threads only. When applied to female threads, excess compound can be transmitted into the actuator control lines.
6. Where a system is dependent on Air Filter Equipment, the air filters should be situated in positions that allow easy access to maintain and/or drain.
7. Where pneumatic valve positioners, or pneumatic controllers are fitted to valve actuator assemblies, oil mist lubricated air should not be used unless the manufacturer states specifically that the controllers are compatible with lubricated air.

Note: Figure 79 Actuators are rated for air pressure in the range 40psig (2.75barg) to 120psig (8.3barg) and can withstand a maximum of 150psig (10barg).

Introduction

The Keystone Figure 79 Pneumatic Actuator range is available in three mounting options, as follows:-

- 79U - Keystone Mounting Standard
- 79E - ISO 5211

General Pneumatic Systems Recommendations

All Keystone Pneumatic Actuators are factory lubricated with Molyrace LT grease and, unless the operating environment is extremely poor, do not require re-lubrication. To maintain maximum efficiency with this, or other pneumatic actuators or pressure vessels, we advise that the following basic system recommendations are followed:

1. Where air pipelines are subjected to extremes of temperature, the system should be fitted with air drying equipment.
2. Air control lines should be run to a 'Recommended Piping Practice' and should not have "exaggerated" loops which may trap condensate.
3. All pipe ends should be thoroughly cleaned and deburred after cutting to ensure that the pipeline is clear of cuttings.

Construction

Figure 79 actuators are available in a range of sizes producing up to 27624 lb in/ 3121 Nm output torque and are designed to be mounted to quarter turn valves either directly or using the correct mounting brackets/adaptors and sizing procedures.

All models are of the opposed piston type. Each piston incorporates a wide toothed rack which engages a one piece drive shaft. The drive shaft is sealbond (TM) treated for maximum protection. The actuator body is of extruded aluminium and is fitted with "Engineered polymer" bearings at the drive shaft locations. Bearing and piston seals are dynamic 'O'-ring type. The actuator drive is by means of a double keyed female shaft (79U/E). A comprehensive range of double "D" adaptors is available for fitting to both the top and bottom of the output shaft for accessories (top) and valve stems (bottom).

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

STANDARD INSTALLATION - DOUBLE & SINGLE ACTING UNITS

These instructions assume that the actuators are installed with the cylinder axis parallel to the axis of the valve bore (In Line).

Single acting actuators are supplied as FAIL-CLOSE units as standard.

Reverse acting FAIL-OPEN must be specified at the time of order.

The actuator is mounted as follows:

1. Ensure that the valve and actuator are both in the following positions:
Double Acting units - fully closed
Single Acting units - air fail mode (normally closed)
 2. Check that the actuator mounting studs are tightly secured in the actuator housing.
 3. Install the correct adaptor, if required, into the actuator (fig. 1 - direct mounting) or install the correct coupling and bracketry, if required, to the valve (fig. 2 - bracket mounted option).
- See Notes 1 & 2**
4. Mount the actuator onto the valve flange or the bracket and secure using a lockwasher and nut on each mounting stud.
 5. Before installing the valve/actuator assembly in a piping system, the disc travel should be verified.
 6. When installing the valve/actuator assembly into pipeline, ensure that the specific instructions relating to the valve installation are followed. For valves which need to be fitted with the valve in a position other than fully closed, it may be necessary to fit the valve into the pipeline prior to mounting the actuator to the valve. Rubber lined butterfly valves are an example of this.
 7. For valves which need to be installed in the pipeline prior to fitting the actuator, ensure that the valve is operated into its failsafe position before mounting the actuator onto the valve.

NON STANDARD INSTALLATION - DOUBLE & SINGLE ACTING UNITS

In circumstances where the actuator is required to be installed in the transverse position i.e. at right angles to the valve bore (Across Line), the actuator must be rotated through 90°.

This is achieved in the following manner:

1. Remove the actuator from the valve or the bracket by unscrewing the 4 fixing nuts and withdraw it vertically from the valve.
2. **79U/E Models** - remove the double 'D' adaptor located in the bore at the bottom of the actuator and re-fit, locating in previously unused keyway of shaft.

3. Refit actuator to the top of the valve. (note:- on models 036/065/090 adaptors may not be required to be fitted ie directly mounted, in this case simply use the previously unused keyway.)

NOTES

1. The adaptor should be lightly tapped or pressed into the actuator.
2. The coupling should be lightly tapped or pressed onto the valve stem. Excessive force should not be used (the use of a lubricant such as Coppaslip is recommended).

FIGURE 1

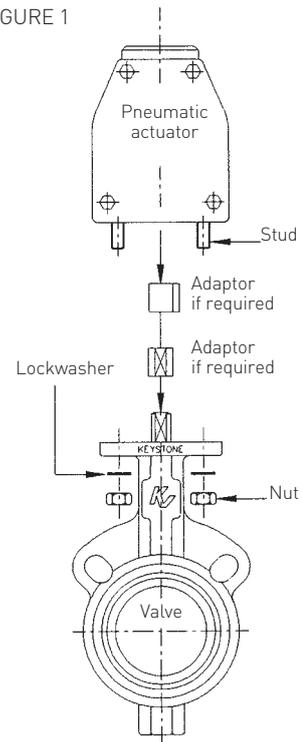
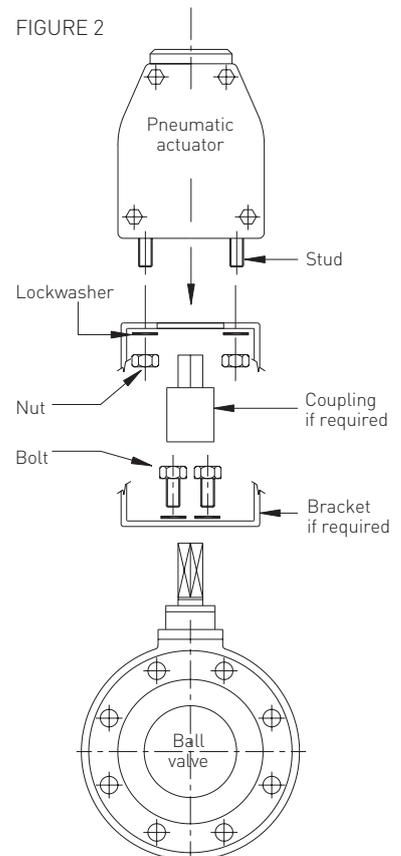


FIGURE 2



KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

DISASSEMBLY - DOUBLE ACTING UNITS

Note: Please refer to the relevant exploded views further on.

CAUTION

Remove all air pressure and observe normal safety precautions including the use of eye protection.

1. Pull off the indicator cap (item 17) from the top of the actuator. If this cap is too tight, light pressure may be applied to the underside via a short length of round bar or a similar blunt ended tool, inserted from the bottom end of the actuator shaft. (Note: levering with a screwdriver is considered to be a potentially dangerous practice and should be avoided.)
`The position relative to the shaft should be noted to ensure correct position for assembly.
2. Remove both travel stop bolts, if fitted (items 19 to 22, see page 10 for all items)
3. Loosen endcap fixing screws evenly (item 15)
4. Remove endcaps (item 3)
5. Rotate output shaft (item 5) in an anti-clockwise direction to drive pistons apart, and remove pistons (item 2) complete with backing pads/rings - if fitted.
6. Remove circlip (item 12) from bottom bore of actuator.
7. Tap shaft downward and remove. Take care to protect the actuator bore from possible damage from the pinion gear teeth.
8. Remove top bearing (item 9) from the actuator body (the bottom bearing (item 6) will have been removed along with the pinion shaft).

DISASSEMBLY - SINGLE ACTING UNITS

Note: Please refer to the relevant exploded views further on.

CAUTION

Remove all air pressure and observe normal safety precautions including the use of eye protection. Always ensure that spring return actuators are in fail safe position before attempting any maintenance. Pay particular attention to this requirement when manual operators are fitted.

For safety reasons DONOT 'Air Assist' Single Acting Pneumatic actuators.

1. Pull off the indicator cap (item 17) from the top of the actuator. If this cap is too tight, light pressure may be applied to the underside via a short length of round bar or a similar blunt ended tool, inserted from the bottom end of the actuator shaft. (Note: levering with a screwdriver is considered to be a potentially dangerous practice and should be avoided.)
The position relative to the shaft should be noted to ensure correct position for assembly.
2. Remove both travel stop bolts, if fitted (items 19 to 22, see page 11 for all items).
3. Loosen endcap/spring return housing fixing screws (item 15) evenly until the spring load is relaxed (3 - 5 mm).
Warning: If, after loosening the screws by 5mm there is still compression on the spring pack, re-tighten the endcap screws and return the unit to the factory for service.
4. Remove endcap/spring housing assemblies.
Warning: Under no circumstances should the spring retaining bolt be loosened or adjusted without first consulting the factory.
5. Rotate output shaft (item 5) in an anti-clockwise direction to drive pistons apart and remove pistons (item 2) complete with backing pads/rings - if fitted.
6. Remove circlip (item 12) from bottom bore of actuator.
7. Tap shaft downward and remove. Take care to protect actuator bore from possible damage from the pinion gear teeth.
8. Remove top bearing (item 9) from the actuator body (the bottom bearing (item 6) will have been removed along with the pinion shaft).

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

ASSEMBLY - DOUBLE ACTING UNITS

Note: Please refer to the relevant exploded views further on.

Liberally grease actuator bore, pistons and pinion assembly with Molyrace LT lubricant.

1. Coat all 'O'-ring seals with Molyrace LT lubricant.
2. Output shaft assembly:-
 - a) Fit the top bearing assembly (item 9) into the top bore of the actuator body (item 1) with the outer o-ring uppermost.
 - b) Fit the bottom bearing assembly (item 6) on to the bottom of the pinion shaft (item 5) with internal o-ring uppermost.
3. Insert pinion shaft assembly from underside of the actuator as shown in fig. 4.
4. Fit internal circlip (item 12) to bottom recess of body to locate the shaft assembly.
5. Fit 'O'-ring seals (item 13) on pistons (item 2).
6. Orientate output shaft at $45^\circ \pm 2^\circ$.
7. Insert pistons (item 2) complete with backing pads(1) (item 18) and backing rings (5), with piston legs on left side of bore (when viewed from the o-ring end of the piston), until racks engages with pinion and then push fully inward, the actuator is now in the fully closed position.

* If no travel stops are fitted proceed to instruction 12.
8. Turn the pinion shaft anti-clockwise approximately 5° until it is orientated in line with the major axis of the actuator body. The shaft is now in the closed position.
9. Insert CLOSE travel stop bolt (item 19/20) together with sealing nut or lock nut (2)(3), flat washer (2)(3) and sealing washer (2)(3)

until the bolt hits the travel stop cam. Tighten the lock nut.

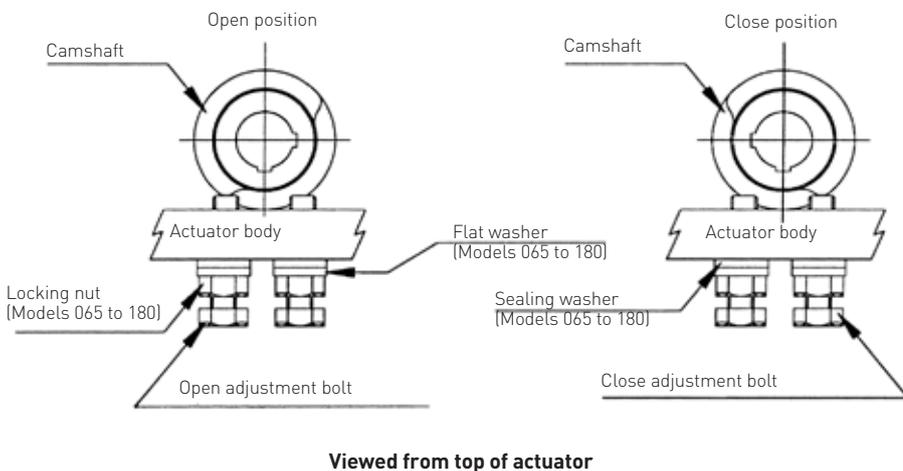
10. Turn the pinion shaft anti-clockwise through 90° to bring it in line with the center line of the actuator bore, the actuator is now in the open position.
11. Insert Open travel stop bolt (item 19/20) (together with sealing nut or lock nut (2) (3), flat washer (2)(3) and sealing washer (2) (3)) until the bolt hits the travel stop cam. Tighten the lock nut.
12. Fit 'O'-ring seals (item 14) to endcaps (item 3) using a light smear of grease.
13. Fit endcaps to body and alternately tighten the endcap screws (item 15) until secure (see recommended torque table).
14. Fit position indicator to top of actuator.
15. Operate the actuator to OPEN & CLOSE positions using compressed air and note the actual positions. If the required travel is not achieved refer to page 12.

NOTES

- 1 Backing pads are not required on 002/003 models which have nylon pistons.
- 2 Lock nuts, flat washers and sealing washers are only fitted to models 065-180.
- 3 On models 003/036 the lock nut & sealing nut are one item.
- 4 Gear shim is required on models 006 and 012 only.
- 5 Backing rings and pads are only fitted to models 065/090/180.

Note: Backing pads and rings need only a smear of grease on the undersides before fitting to pistons.

FIGURE 3



KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

ASSEMBLY - SINGLE ACTING UNITS

Note: Please refer to the exploded views further on.

Liberally grease actuator bore, pistons and pinion assembly with Molyrace LT lubricant.

Note: The endcap spring assembly is a complete module with the appropriate spring preset to suit the selected duty parameters. Spring retaining bolt threads are bonded to end caps with threadlock sealant to ensure double security.

Caution! No attempt should be made to remove or adjust spring retaining bolts.

1. Coat all 'O'-ring seals with Molyrace LT lubricant.
2. Output shaft assembly:-
 - a) Fit the top bearing assembly (item 9) into the top bore of the actuator body (item 1) with the outer o-ring uppermost.
 - b) Fit the bottom bearing assembly (item 6) on to the bottom of the pinion shaft (item 5) with internal o-ring uppermost.
3. Insert pinion shaft assembly from underside of the actuator as shown in the diagram opposite.
4. Fit internal circlip (item 12) to bottom recess of body to locate the shaft assembly.
5. Fit 'O'-ring seals (item 13) on pistons (item 2).
6. Orientate output shaft at $45^\circ \pm 2^\circ$.

Fail Close Units

7. Insert pistons (item 2) complete with backing pads(1)(item 18) and backing rings(4) as follows:-
 - with piston legs on **left side** of bore (when viewed from the o-ring end of the piston), until racks engages with pinion and then push fully inward, the actuator is now in the fully closed position.

Note: If no travel stops are fitted proceed to instruction 12.
8. Turn the pinion shaft anti-clockwise approximately 5° until it is orientated in line with the major axis of the actuator body. The shaft is now in the closed position.
9. Insert CLOSE travel stop bolt (item 19/20) together with sealing nut or lock nut (2)(3), flat washer (2)(3) and sealing washer (2)(3) until the bolt hits the travel stop cam. Tighten the lock nut.
10. Turn the pinion shaft anti-clockwise through 90° to bring it back in line with the center line of the actuator bore, the actuator is now in the open position.
11. Insert Open travel stop bolt (item 19/20) together with sealing nut or lock nut (2)(3), flat washer (2)(3) and sealing washer (2)(3) until the bolt hits the travel stop cam. Tighten the lock nut.

Fail Open Units

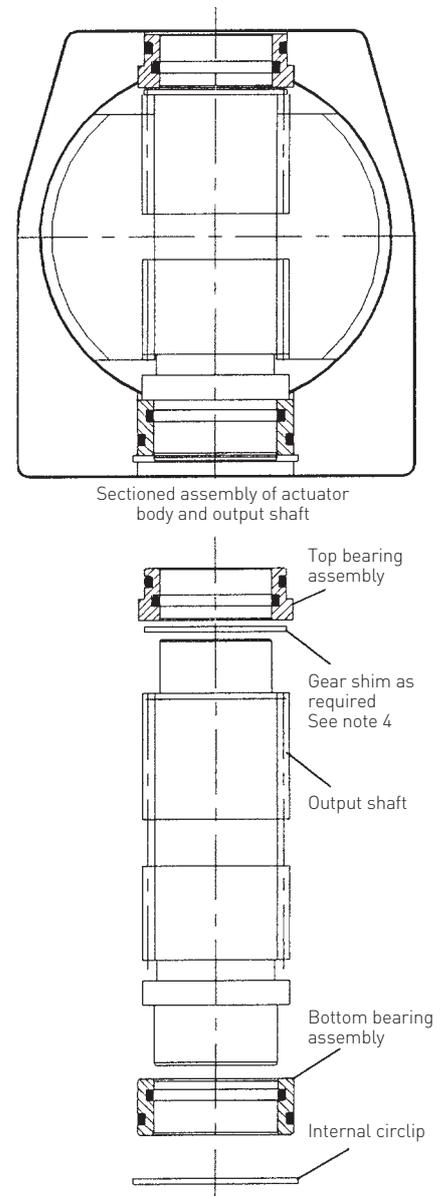
7. Insert pistons (item 2) complete with backing pads (1) (item 18) and backing rings (4) as follows:-
 - with piston legs on **right side** of bore (when viewed from the o-ring end of the piston), until racks engages with pinion and then push fully inward, the actuator is now in the fully open position.

Note: If no travel stops are fitted proceed to instruction 12.
8. Turn the pinion shaft clockwise approximately 5° until it is orientated in line with the major axis of the actuator body. The shaft is now in the open position.
9. Insert Open travel stop bolt (item 19/20) together with sealing nut or lock nut (2)(3), flat washer (2)(3) and sealing washer (2)(3) until the bolt hits the travel stop cam. Tighten the lock nut.
10. Turn the pinion shaft clockwise through 90° to bring it in line with the center line of the actuator bore, the actuator is now in the close position.
11. Insert CLOSE travel stop bolt (item 19/20) together with sealing nut or lock nut (2)(3), flat washer (2)(3) and sealing washer (2)(3) until the bolt hits the travel stop cam. Tighten the lock nut.
12. Fit 'O'-ring seals (item 14) to endcaps (item 3) using a light smear of grease.
13. Fit endcap spring assemblies to body and alternately tighten the endcap screws (item 15) until secure (see recommended torque table).
14. Fit position indicator to top of actuator.
15. Operate the actuator to OPEN & CLOSE positions using compressed air and note the actual positions. If the required travel is not achieved refer to page 10.

NOTES

Refer to notes on page 4 as indicated.

FIGURE 4



KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR
 OPERATING AND MAINTENANCE INSTRUCTIONS

STANDARD DOUBLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 002 - 036

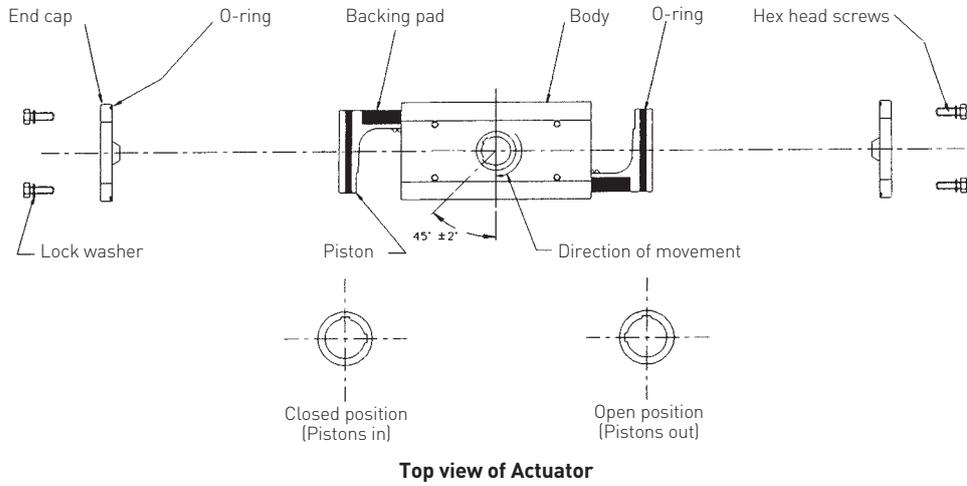


FIGURE 5

Top view of Actuator

STANDARD SINGLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 002S-036S

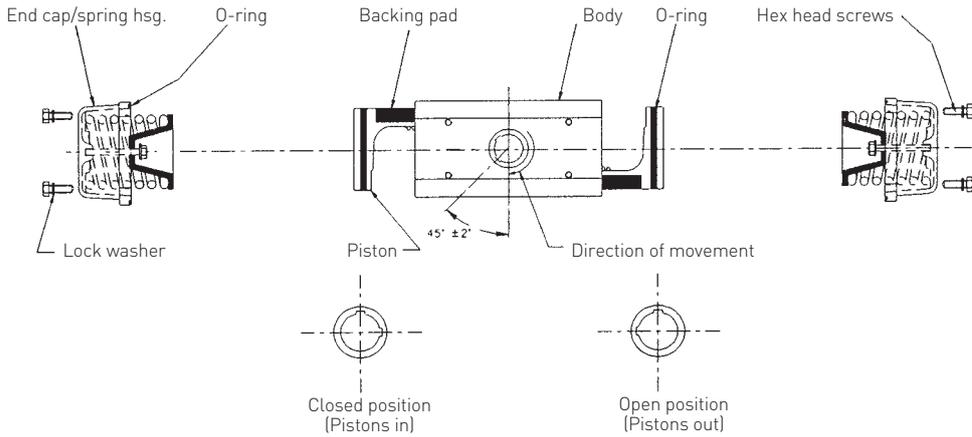


FIGURE 6

Top view of Actuator

NON-STANDARD (FAIL OPEN) SINGLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 002S-036S

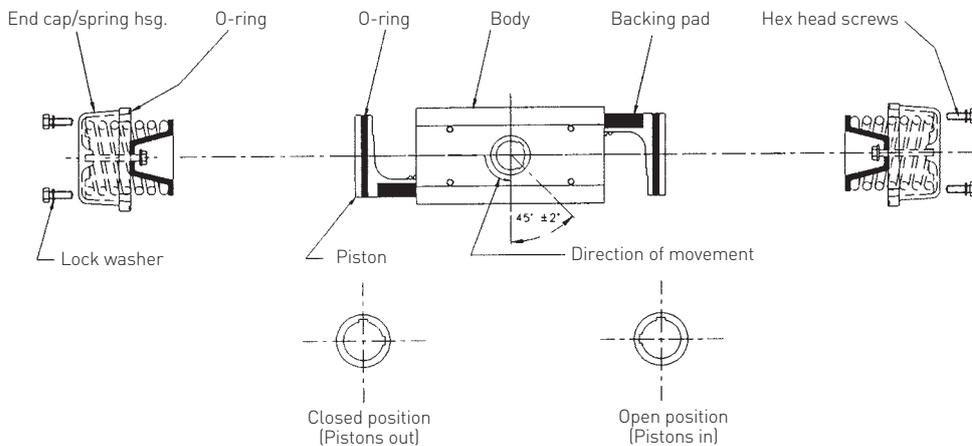


FIGURE 7

Top view of Actuator

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

STANDARD DOUBLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 065-180

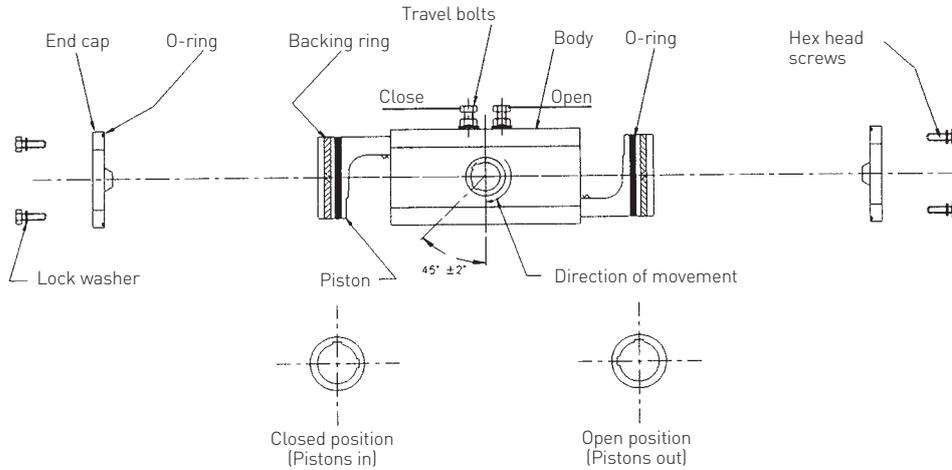


FIGURE 8

Top view of Actuator

STANDARD (FAIL CLOSE) SINGLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 065S-180S

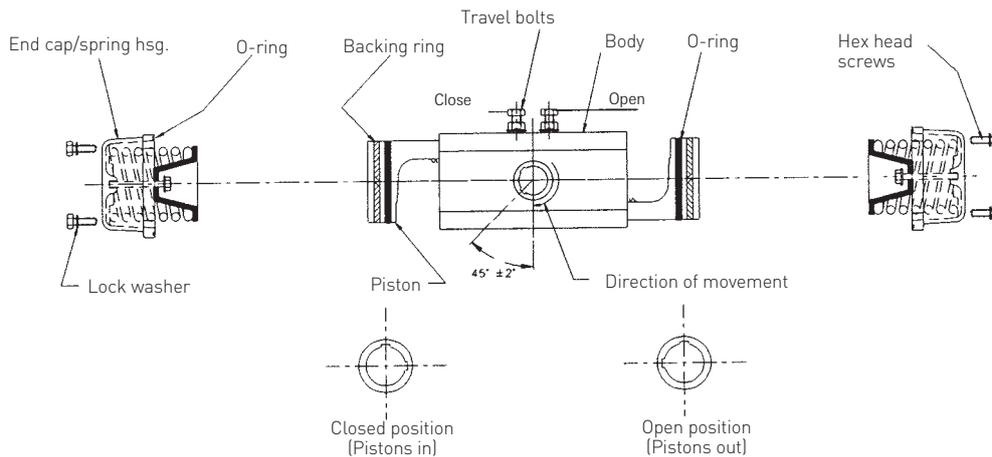


FIGURE 9

Top view of Actuator

NON-STANDARD (FAIL OPEN) SINGLE ACTING ACTUATOR ASSEMBLY - 79U/E MODELS 065S-180S

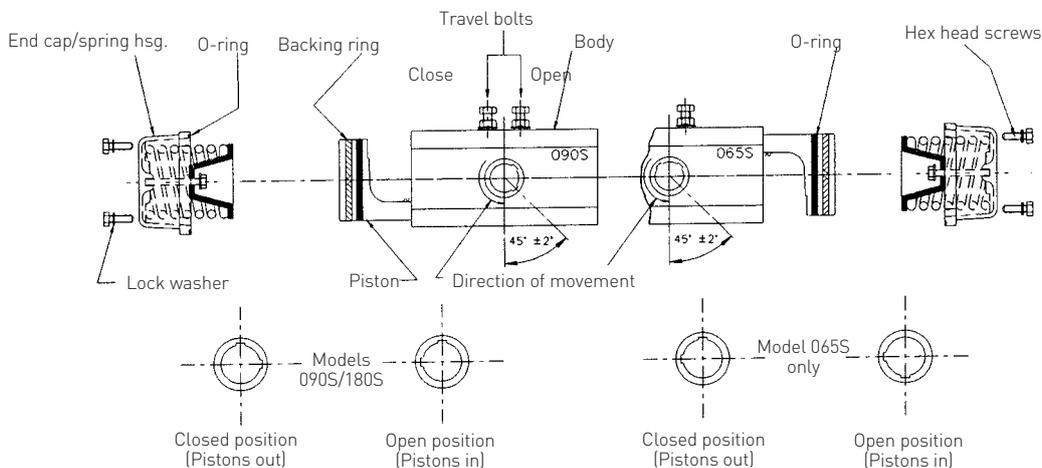


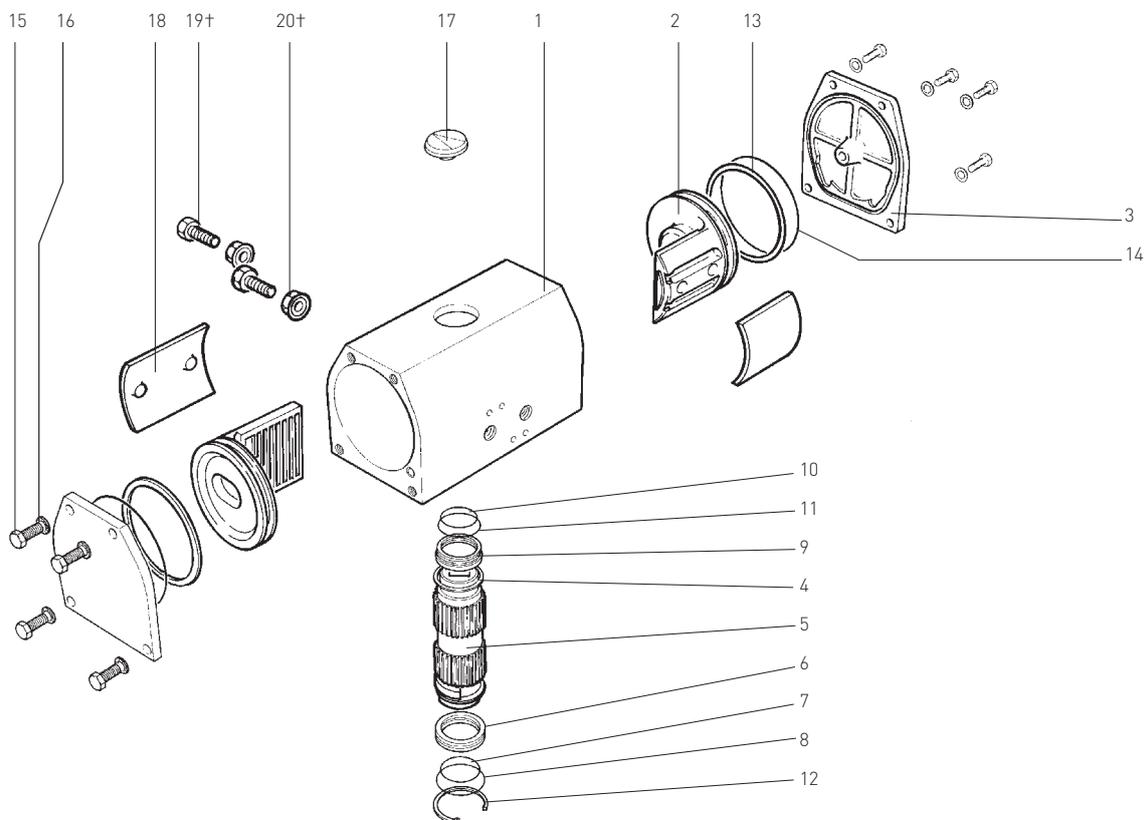
FIGURE 10

Top view of Actuator

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

EXPLODED VIEW OF DOUBLE ACTING ACTUATOR ASSEMBLY - MODEL 002 - 036



MATERIALS OF CONSTRUCTION - MODELS 002 - 036

Item	Description	Qty	Material	
1	Body	1	Aluminium	
2	Piston	2	Aluminium (006-036) Nylon (002-003)	
3	End Cap	1	Aluminium	
4	Gear shim (models 006 & 012 only)	1	Polymer	
5	Pinion Shaft	1	Steel (003-036) Nylon (002)	
6*	Bottom Bearing	1	Polymer	
7*	Bottom Bearing - Internal O-Ring	1	Nitrile	
8*	Bottom Bearing - External O-Ring	1	Nitrile	
9*	Top Bearing	1	Polymer	
10*	Top Bearing - Internal O-Ring	1	Nitrile	
11*	Top Bearing - External O-Ring	1	Nitrile	
12*	Internal Circlip	1	Spring steel	
13*	Piston O-ring	2	Nitrile	
14*	End Cap O-ring	2	Nitrile	
15	Hex Screw	(M5 x 16 -002/003, M5 x 20 -006 M8 x 25 -012, M10 x 30 -024/036)	8	Stainless steel
16	Lock Washer	(M5 -002/006, M8 -012, M10 -024/036)	8	Steel
17	Position Indicator		1	ABS
18	Backing pad		2	Polymer (006-036)
19†	Travel Stop Bolt	(M6 x 25 -003, M8 x 45 -006 M10 x 50 -012, M12 x 65 -024/036)	2	Stainless Steel
20†	Travel Stop Nut	(M6 -003, M8 -006, M10 -012, M12 -024/036)	2	Steel/Polyamid 11

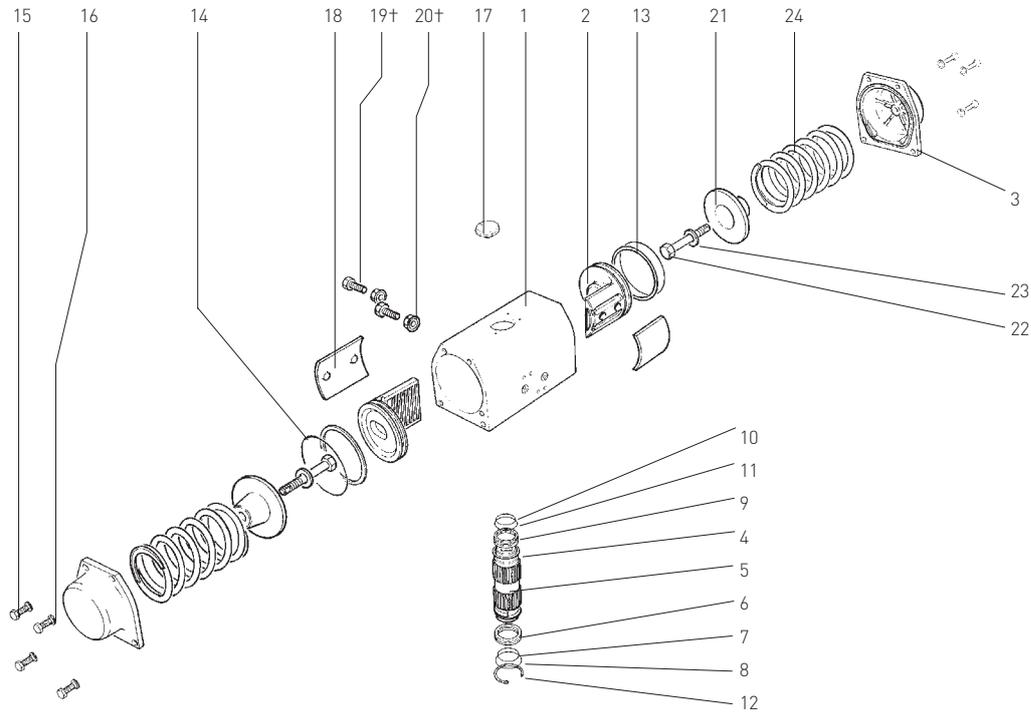
Components shown on the above view may differ slightly in the design shape owing to the range of models being covered.

* Repair Kit contains these items

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

EXPLODED VIEW OF SINGLE ACTING ACTUATOR ASSEMBLY - MODEL 002S - 036S



MATERIALS OF CONSTRUCTION - MODELS 002S - 036S

Item	Description	Qty	Material
1	Body	1	Aluminium
2	Piston	2	Aluminium (006-036) Nylon (002-003)
3	End Cap	1	Aluminium
4	Gear shim (models 006 & 012 only)	1	Polymer
5	Pinion Shaft	1	Steel (003-036) Nylon (002)
6*	Bottom Bearing	1	Polymer
7*	Bottom Bearing - Internal O-Ring	1	Nitrile
8*	Bottom Bearing - External O-Ring	1	Nitrile
9*	Top Bearing	1	Polymer
10*	Top Bearing - Internal O-Ring	1	Nitrile
11*	Top Bearing - External O-Ring	1	Nitrile
12*	Internal Circlip	1	Spring steel
13*	Piston O-ring	2	Nitrile
14*	End Cap O-ring	2	Nitrile
15	Hex Screw (M5 x 16 -002/003, M5 x 20 -006 M8 x 25 -012, M10 x 30 -024/036)	8	Stainless steel
16	Lock Washer (M5 -002/006, M8 -012, M10 -240/036)	8	Steel
17	Position Indicator	1	ABS
18	Backing pad	2	Polymer (006/036)
19+	Travel Stop Bolt (M6 x 25 -003, M8 x 45 -006 M10 x 50 -012, M12 x 65 -024/036)	2	Stainless Steel
20+	Travel Stop Nut (M6 -003, M8 -006, M10 -012, M12 -024/036)	2	Steel/Polyamid 11
21	Spring Retaining Cone	2	Aluminium
22	Spring Retaining Bolt (M8 x 55 -006, M8 x 60 -012 M10 x 80 -024, M10 x 90 -036)		
23	Plain washer (M8 -006/012, M10 -024/036)	2	Steel
24	Spring (40/60/80 or 100 psi) #	2 or 4	Spring Steel

Components shown on the above view may differ slightly in the design shape owing to the range of models being covered.

Items 3,19 to 22 are supplied as a preset spring assembly and must not be disassembled.

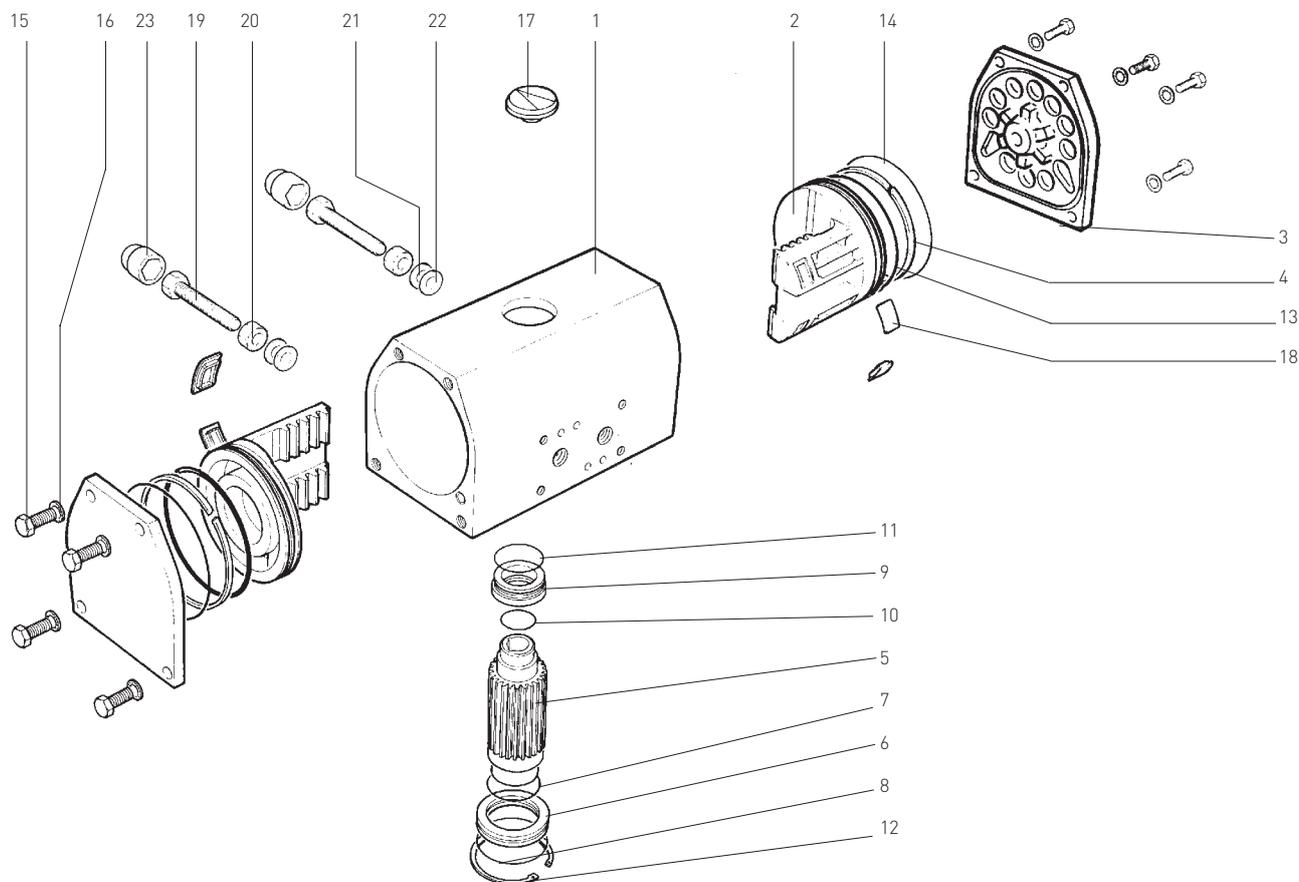
See standard spring color codes for spring combinations.

* Repair Kit contains these items

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

EXPLODED VIEW OF DOUBLE ACTING ACTUATOR ASSEMBLY - MODELS 065 - 180



MATERIALS OF CONSTRUCTION - MODELS 065 - 180

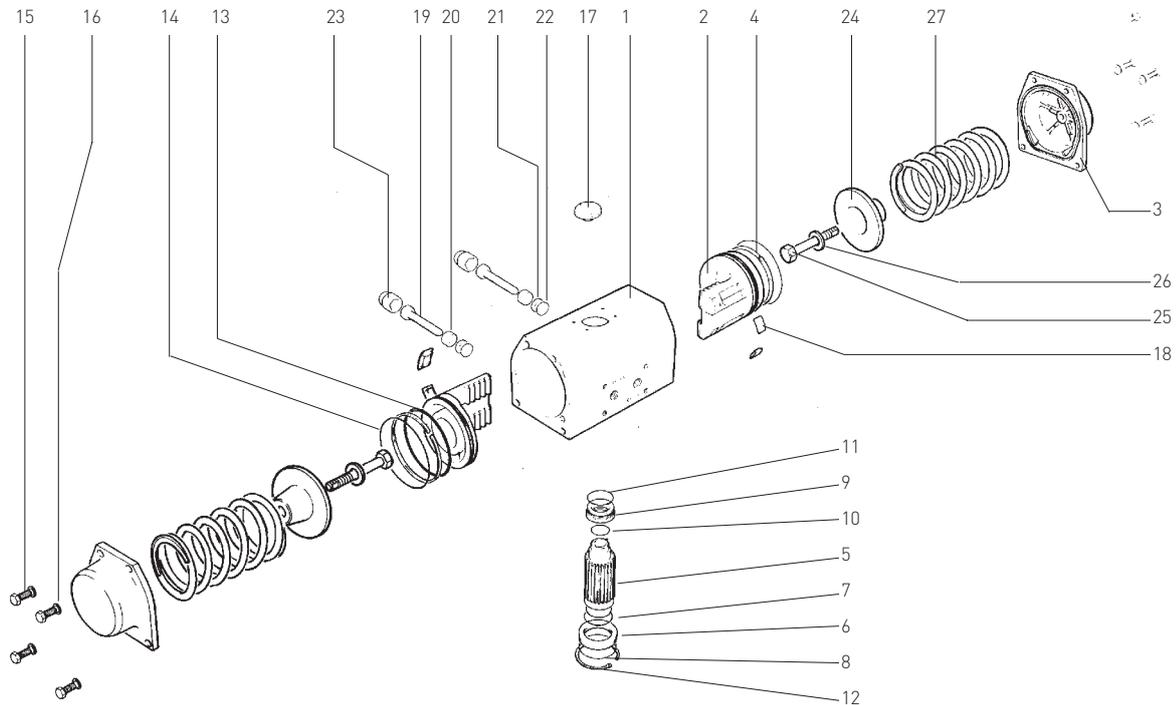
Item	Description	Qty	Material
1	Body	1	Aluminium
2	Piston	2	Aluminium
3	End Cap	2	Aluminium
4	Backing ring	2	Polymer (065/180)
5	Pinion Shaft	1	Steel
6*	Bottom Bearing	1	Polymer
7*	Bottom Bearing - Internal O-Ring	1	Nitrile
8*	Bottom Bearing - External O-Ring	1	Nitrile
9*	Top Bearing	1	Polymer
10*	Top Bearing - Internal O-Ring	1	Nitrile
11*	Top Bearing - External O-Ring	1	Nitrile
12*	Internal Circlip	1	Spring steel
13*	Piston O-ring	2	Nitrile
14*	End Cap O-ring	2	Nitrile
15	Hex Screw (M12 x 40 -065/090, M16 x 55 -180)	8	Stainless steel
16	Lock Washer (M12 -065/090, M16 -180)	8	Steel
17	Position Indicator	1	ABS
18	Backing pad	4	Polymer
19	Travel Stop Bolt (M16 x 65 -065, M16 x 90 -090, M20 x 130 -180)	2	Stainless steel
20	Travel Stop Nut (M16 -065/090, M20 -180)	2	Stainless steel
21	Washer Flat (M16/M20)	2	Stainless steel
22	Washer Thread Seal (5/8" -065/090, 3/4" -180)	2	Steel/Nitrile
23	Protective Cap M16 Bolt	2	Plastic

* Repair Kit contains these items

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

EXPLODED VIEW OF SINGLE ACTING ACTUATOR ASSEMBLY - MODELS 065S - 180S



MATERIALS OF CONSTRUCTION - MODELS 065S - 180S

Item	Description	Qty	Material	
1	Body	1	Aluminium	
2	Piston	2	Aluminium	
3	End Cap	2	Aluminium	
4	Backing ring	2	Polymer (065/180)	
5	Pinion Shaft	1	Steel	
6*	Bottom Bearing	1	Polymer	
7*	Bottom Bearing - Internal O-Ring	1	Nitrile	
8*	Bottom Bearing - External O-Ring	1	Nitrile	
9*	Top Bearing	1	Polymer	
10*	Top Bearing - Internal O-Ring	1	Nitrile	
11*	Top Bearing - External O-Ring	1	Nitrile	
12*	Internal Circlip	1	Spring steel	
13*	Piston O-ring	2	Nitrile	
14*	End Cap O-ring	2	Nitrile	
15	Hex Screw (M12 x 40 -065/090, M16 x 55 -180)	8	Stainless steel	
16	Lock Washer (M12 -065/090, M16 -180)	8	Steel	
17	Position Indicator	1	ABS	
18	Backing pad	4	Polymer	
19	Travel Stop Bolt	(M16 x 65 -065, M16 x 90 -090, M20 x 130 -180)	2	Stainless steel
20	Travel Stop Nut	(M16 -065/090, M20 -180)	2	Stainless steel
21	Washer Flat	(M16/M20)	2	Stainless steel
22	Washer Thread Seal	(5/8" -065/090, 3/4" -180)	2	Steel/Nitrile
23	Protective Cap	(M16/M20 Bolt)	2	Plastic
24	Spring retaining cone		2	Aluminium
25	Spring retaining bolt	(M16 x 115 -065, M16 x 125 -090, M20 x 125 -180)	2	Stainless Steel
26	Plain washer	(M16 -065/090, M20 -180)	2	Steel
27	Spring	(40/60/70/80/90 or 100 psi)#	2 or 4	Spring Steel

Items 3, 24 to 27 are supplied as a preset spring assembly and must not be disassembled.

See standard spring color codes for spring combinations.

* Repair Kit contains these items

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

SETTING OF INTERNAL TRAVEL STOPS

Figure 79U & 79E - 065/090/180 are fitted with integral end of travel stops to enable setting of exact travel for the valve being operated. These stops give adjustment of 5° overtravel to 7° undertravel at each end of stroke. The range of the actuator travel is, therefore :-

at closed (0°) position - 5° to +7°

at open (90°) position 83° to 95°

TO SET THE STOPS (DOUBLE ACTING UNITS)

1. Operate valve/actuator assembly to the closed position.
2. Remove air supply.
3. Slacken locknut on the close travel stop.
4. Turn the stop clockwise to reduce travel or anticlockwise to increase travel.
5. Re-Tighten locknut.
6. Reconnect air supply and check that the position is correct. If not repeat from instruction 2.
7. Apply air to operate to the open position.
8. Remove air supply.
9. Adjust open travel stop screw as per instructions 3 to 6.

TO SET THE STOPS (SINGLE ACTING UNITS) AIR FAIL CLOSE

1. Remove air supply so that actuator drives to closed position. Note actual position.
2. Apply air to open the actuator. Note actual position.
3. Whilst the air supply is maintained slacken the locknut on the close stop and adjust the stop screw by an amount estimated to give correct position. (clockwise adjustment decreases travel).
4. Re-tighten lock nut.
5. Remove air so that actuator closes. If correct closed position is not achieved repeat from instruction 2.
6. Slacken locknut on the open stop and adjust the travel by an amount estimated to give correct position. (clockwise adjustment decreases travel).
7. Re-tighten locknut.
8. Apply air and check open position. If correct open position is not achieved. Repeat from instruction 5.

TO SET THE STOPS (SINGLE ACTING UNITS) AIR FAIL OPEN

1. Remove air supply so that actuator drives to open position. Note actual position.
2. Apply air to close the actuator. Note actual position.
3. Whilst the air supply is maintained slacken the locknut on the open stop and adjust the stop screw by an amount estimated to give correct position. (clockwise adjustment decreases travel).
4. Re-tighten lock nut.
5. Remove air so that actuator opens. If correct open position is not achieved repeat from instruction 2.
6. Slacken locknut on the close stop and adjust the travel by an amount estimated to give correct position. (clockwise adjustment decreases travel).
7. Re-tighten locknut.
8. Apply air and check close position. If correct close position is not achieved. Repeat from instruction 5.

WARNINGS

Under no circumstances must the travel stop bolts be totally withdrawn from the actuator whilst compressed air is being applied.

Internal travel stops must not be used for manual override

Accessories mounted to the top of Actuators must be re-adjusted accordingly after setting the travel stops.

KEYSTONE FIGURE 79 PNEUMATIC ACTUATOR

OPERATING AND MAINTENANCE INSTRUCTIONS

MAINTENANCE

If basic pneumatic system procedures are maintained, the Figure 79 actuators will require minimum maintenance for many thousands of cycles.

TROUBLESHOOTING

If loss or reduction of power (in output torque) occurs, take the following steps:-

1. Check air supply.
2. Check for o’ring leakage at the following

‘A’ Top and Bottom Bearing Seals

Apply pressure to PORT A and check with soap/water solution for leaks at the top and bottom bearing seals.

‘B’ Endcap Seals

Apply air pressure to PORT B and check endcap joints for leakage.

‘C’ Piston Seals

Apply air pressure to PORT B and check PORT A for leakage.

For access to ‘O’-ring seals in order to replace, refer to Disassembly procedures for appropriate models i.e. single or double acting.

Note: Reduced stroke i.e. valve to which actuator is fitted not travelling the required stroke or “backlash” may be caused by an incorrect fit between output bore and valve stem.

GENERAL INFORMATION

As standard, clockwise to close rotation, air to PORT A will rotate the actuator to the OPEN position. Air to PORT B will rotate the actuator to the close position.

Warning - for safety reasons **DO NOT** ‘Air Assist’ single acting pneumatic actuators.

STANDARD SPRING COLOR CODES

Spring Rating	Models 003S to 180S	
	End 1	End 2
40 psi - 2.8 bar	Light Blue	Light Blue
50 psi - 3.5 bar	Light Blue	White
60 psi - 4.2 bar	White	White
70 psi - 4.8 bar	Light Blue/Dark Blue*	White
80 psi - 5.5 bar	Light Blue/Dark Blue*	Light Blue/Dark Blue*
90 psi - 6.2 bar	Light Blue/White*	Light Blue/Dark Blue*
100 psi - 6.9 bar	Light Blue/White*	Light Blue/White*

* Nested (double) springs

RECOMMENDED TIGHTENING TORQUES FOR END CAPS

Models	Bolt Diameter	Torque	
		(Nm)	(lbs-ft)
002	M5	3.2	4.3
003	M5	3.2	4.3
006	M5	3.2	4.3
012	M8	13.1	17.7
024	M10	26.2	35.5
036	M10	26.2	35.5
065	M12	45.2	61.3
090	M12	45.2	61.3
180	M16	108.5	147.1

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