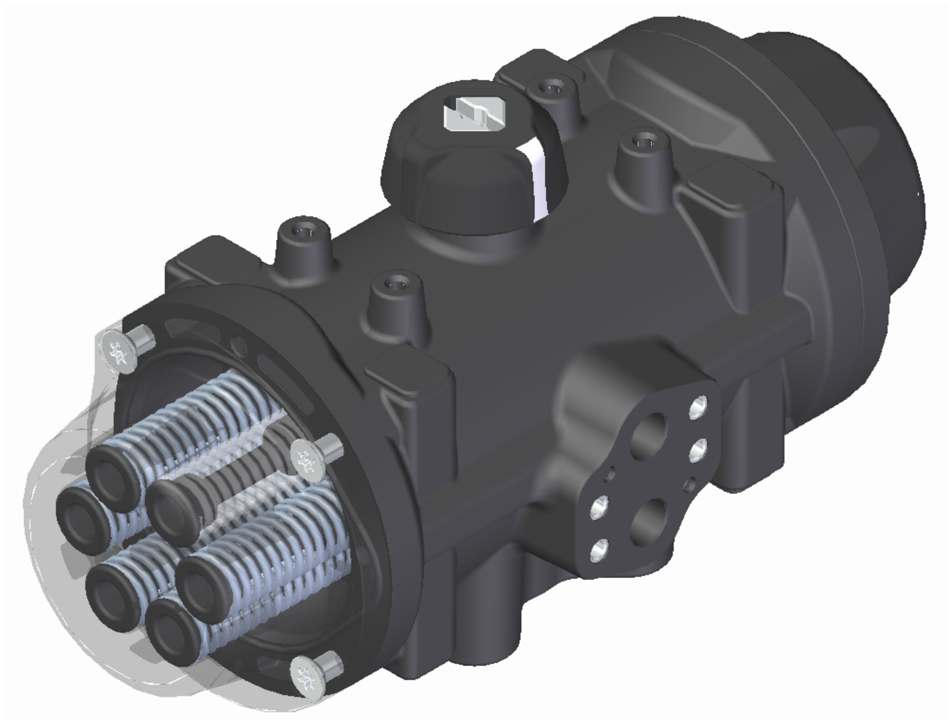
Pneumatic Series 79P Actuator



Installation, Operation and Maintenance Manual

ASAHI/AMERICA®

USER INFORMATION

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Series 79P Pneumatic Actuator Introduction

Description

The Series 79P Pneumatic Rack & Pinion Rotary Actuator is a quarter turn operator, that has two opposed pistons with racks engaging with a single pinion on the actuator shaft. Racks and pinion engage with massive teeth over full length of pinion, resulting in balanced forces with minimal backlash.

The Series 79P is available in single acting versions, double acting versions, three materials and multiple sizes to satisfy a multitude of rotary applications for ball and butterfly valves. Depending on actuator and/or valve size, it may be necessary to utilize the assistance of a crane of some sort to avoid injury.

Various options are available for the Series 79P rotary actuators, such as dry contact switches, solenoids, and positioners. These are offered as NEMA Type 4X as a standard.

All units are provided as fully calibrated and tested, no further adjustments should be required for proper operation.

Smaller pneumatic actuators have a quick cycle time, many are less than 1 second. To help eliminate water hammer, we recommend using a speed control device to slow down the cycle time of the pneumatic actuator; a standard feature with our ASCO 8401 solenoid.

Air Requirement

The condition and quality of the compressed air supply to an actuator will affect the efficiency and the life of the seals, guides, and actuator in general. We recommend installing a shutoff valve and a 3-way dump valve locally in the upstream side of the air supply ahead of actuator. This will allow the the air supply to be shut off and the dumping of compressed air from within the actuator, for safe removal from the system.

80psi, clean, instrument quality dry air or non-combustable gas is recommended for satisfactory operation. Lubricated air is acceptable, but is not necessary as the o-ring material is self-lubricating BUNA-N. Standard actuators are sized for 80psi air supply.

If air lubricators are used, the lubricant must be compatible with actuator internals!

Actuator may also be used with liquid as the power source as long as liquid is compatible with actuator internals, and contains no suspended particles.

The actuator environment temperature limits are -25°F and 195°F.

Series 79P Actuator Materials

Three actuator materials are available; PAG (P79P), Rilsan (79PA), and CF8M (S79P).

PAG, Glass-filled Polyamide

PAG is the standard offering for Asahi America, Inc. and is available in 4 sizes, AP79P, BP79P, CP79P, & DP79P. Each size is available as double acting (Air to Air) or single acting (Air to Spring).
As an Example; BP79P would be double acting and BP79PS would be single acting.
This range of actuators covers the most common size valves; up to 4” ball and butterfly.

Rilsan Coated Aluminum

PA is optional for all size ball valves and 1 ½” - 4” butterfly valves, and is the standard offering for 6” – 24” butterfly valves. This Series is available in 12 sizes, A79PA, B79PA, B579PA, C79PA, C579PA, D79PA, D579PA, E79PA, F79P, G79PA, L79PA, & M79PA.
Each size is available as double acting (Air to Air) or single acting (Air to Spring).
As an Example; B79PA would be double acting and B79PAS would be single acting.
This range of actuators covers the all size valves; up to 4” ball and up to 24” butterfly.

CF8M (316SS)

CF8M is an optional material. and is available in 5 sizes, BS79P, CS79P, DS79P, ES79P, & FS79P. Each size is available as double acting (Air to Air) or single acting (Air to Spring).
As an Example; BS79P would be double acting and BS79PS would be single acting.
This range of actuators covers all ball valves up to 4”, and 1 ½” – 12” butterfly valves.

Installation

It is imperitive that the plant air compressor be sized properly and should include all pneumatic actuators and/or potential pneumatic “draws” when calculating the air compressor tank size. Please reference the chart below for actuator air consumption.

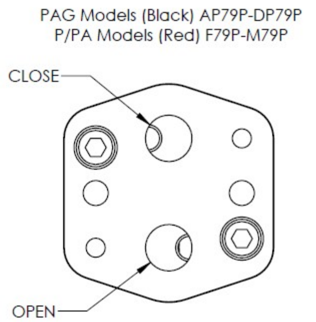
AIR CONSUMPTION (CUBIC INCHES)				
Model No.	Air to Air		Air to Spring	
	Open Port A	Close Port B	Open Port A	Close Port B
A79P	4.58	6.71	4.58	-
B79P	9.15	10.98	9.15	-
B579P	17.09	22.58	17.09	-
C79P	21.36	27.46	21.36	-
C579P	39.66	50.04	39.66	-
D79P	48.82	70.17	48.82	-
D579P	91.53	123.26	91.53	-
E79P	125.09	183.06	125.09	-
F79P	323.41	323.41	323.41	-
G79P	640.71	427.14	640.71	-
L79P	1189.89	1263.11	1189.89	-
M79P	1891.62	1830.60	1891.62	-

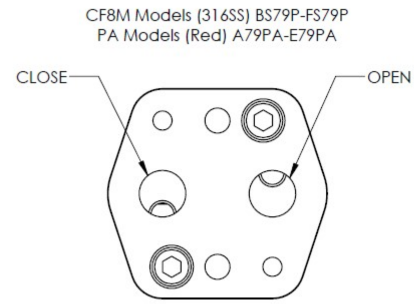
Cycle Time (Seconds)				
Model No.	Air to Air		Air to Spring	
	Open Port A	Close Port B	Open Port A	Close Port B
A79P	0.10	0.10	0.15	0.15
B79P	0.15	0.15	0.20	0.20
B579P	0.20	0.20	0.25	0.25
C79P	0.25	0.25	0.30	0.30
C579P	0.30	0.30	0.40	0.40
D79P	0.40	0.40	0.50	0.50
D579P	0.50	0.50	0.80	0.80
E79P	0.60	0.60	1.20	1.20
F79P	1.20	1.20	2.00	2.00
G79P	2.00	2.00	6.00	6.00
L79P	3.00	3.00	6.00	5.00
M79P	4.00	4.00	8.00	6.00

Operation

Single and Double Acting:

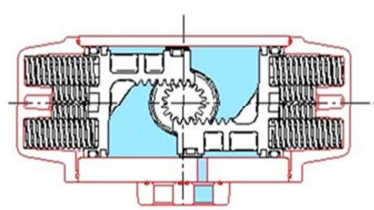
Pressurized air is introduced via the bottom port, or right, port (depending on model) and displaces two opposed pistons. When the pistons are displaced, they in turn rotate the actuator output shaft counterclockwise, which opens the valve. This action is the same for single acting and double acting actuators.





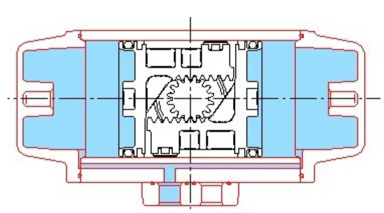
Single Acting:

When the pressurized air is removed from the bottom port, or right, port, the compressed springs located at the opposite side of the pistons extend. As the spring extend, they in turn rotate the actuator output shaft in a clockwise rotation, which closes the valve. The springs are ALWAYS under tension, so caution must be exercised. Single acting units have a filter installed in the top port, or left port, and must not be removed.



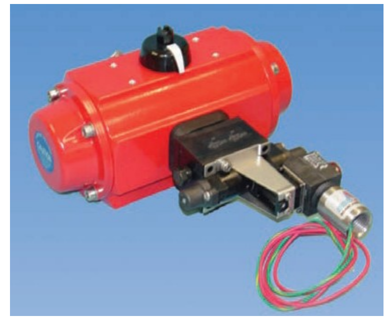
Double Acting:

When the pressurized air is removed from the bottom port, or right, port, the unit remains in the same position until pressurized air is applied to the top port, or left, port (unlike the single acting actuator). When the pressurized air is introduced to the top port, or left port, it is channeled to the opposite side of the pistons, driving them to their original position, which in turn rotates the actuator output shaft in a clockwise direction, closing the valve.



Options

ASCO Solenoid



An ASCO 8401 NAMUR mount solenoid can be supplied mounted directly to the actuator, or as a stand alone product. The cycling is accomplished by energizing the solenoid coil for one valve position (typically open), and de-energizing for the opposite valve position (typically closed). The unit is electrically fail safe; so it will return to its de-energized position on electrical failure, provided the air supply is not interrupted.

The 8401 solenoid is equipped with mufflers, speed controls, a manual override, 18 inch long #18 AWG lead wire, and may be used at +10% to -10% of rated voltages. Coils are 50/60 Hertz and are rated for continuous duty if operated at 60 Hertz.

The speed controls are needle valves that will reduce the C_V value or increase the cycle time by creating back pressure within the actuator. Speed control adjustments are independent for the opening and closing strokes.

Caution: If speed control adjustments are screwed in too far, the actuator can not exhaust properly and may not cycle!!

The manual override is engaged by pressing and rotating the red slotted screw clockwise 90 degrees for the open position. Once the valve is open, simply rotate the red screw counter-clockwise 90 for the closed position.

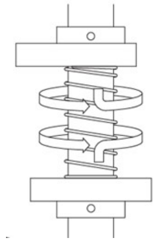
Caution: Solenoid manual override will not work without air supply!!

P-Series Double Limit Switch

The P-Series Double Limit Switch consists of an aluminum enclosure meeting NEMA Type 4X, with a polyester powder coat finish. Inside are 2-SPDT cam operated mechanical switches rated at 16Amps. Each switch is independently adjustable via touch set cams. These switches are dry contact and perfect for PLC position confirmation, sequencing with other equipment, etc. Electrical connection is via 2 x ½” NPT conduit entries.
See next page for adjusting cams.

Westlock Controls Double Limit Switch

The Westlock Controls Model 1040N Double Limit Switch consists of an engineered resin enclosure meeting NEMA Type 4X. Inside are 2-SPDT cam operated mechanical switches rated at 15Amps. Each switch is independently adjustable via touch set cams. These switches are dry contact and perfect for PLC position confirmation, sequencing with other equipment, etc. Electrical connection is via 2 x ½” NPT conduit entries. See next page for adjusting cams.



Adjust cams by hand by pushing/ pulling the cam against the shaft spring to disengage from the mating spline, rotating to adjust and re-engaging firmly onto spline. Top cam is open (CCW) and bottom cam is closed (CW).

Cam adjustment procedure is the same for NEMA 7 switches.

Pneumatic Positioner

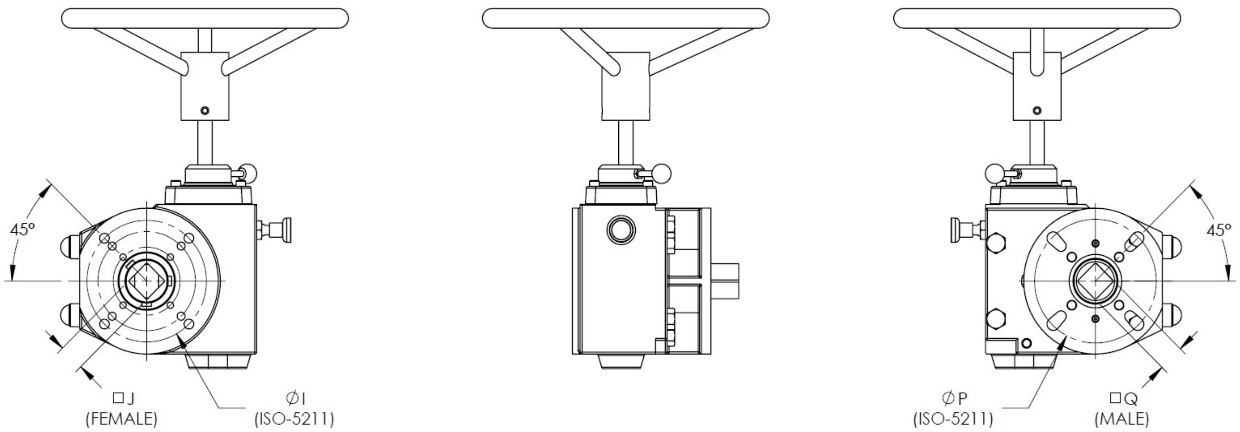
The PST-101 pneumatic positioner will allow the actuated valve to modulate, or throttle between 3psi and 15psi, for specific applications, such as maintaining a specific flow rate. The PST-101 consists of an aluminum enclosure meeting NEMA Type 4X, with a polyester powder coat finish. Inside are independently adjustable Zero and Range adjustments for calibration. Air connections are via ¼ NPT threaded air inlet ports. If adjustments need to be made, the large thumb wheel located by the air inlet ports will adjust the Zero (3psi) and the slotted screw on the span will adjust the Range (15psi). One adjustment will affect the other, so one must check/adjust back and forth until no more adjustments are required. If more detail is required, please download the PST-101 IOM from the Asahi America, Inc. website.

Electro-Pneumatic Positioner

The PST-202DN electro-pneumatic positioner will allow the actuated valve to modulate, or throttle between 4mA and 20mA, for specific applications, such as maintaining a specific flow rate. The PST-202DN consists of an aluminum enclosure meeting NEMA Type 4X, with a polyester powder coat finish. This is a Smart positioner with a transmitter and all calibration is conducted via push buttons which are accessable once the cover is removed. Air connection is via a ¼ NPT threaded air port, and the electrical connection is via ½" NPT conduit entry. If adjustments need to be made, remove positioner cover to expose key pad (up, down, enter, escape), and perform AutoCal 2. Hold "enter" button for a few seconds and AutoCal should display. Push "down" button until AutoCal 2 is displayed, then press enter. This will initiate the AutoCal process. The display will show Complete when the AutoCal has completed the positioner calibration. Press any key and the display will return to the Run position. Install positioner cover. If more detail is required, please download the PST-202DN IOM from the Asahi America, Inc. website.

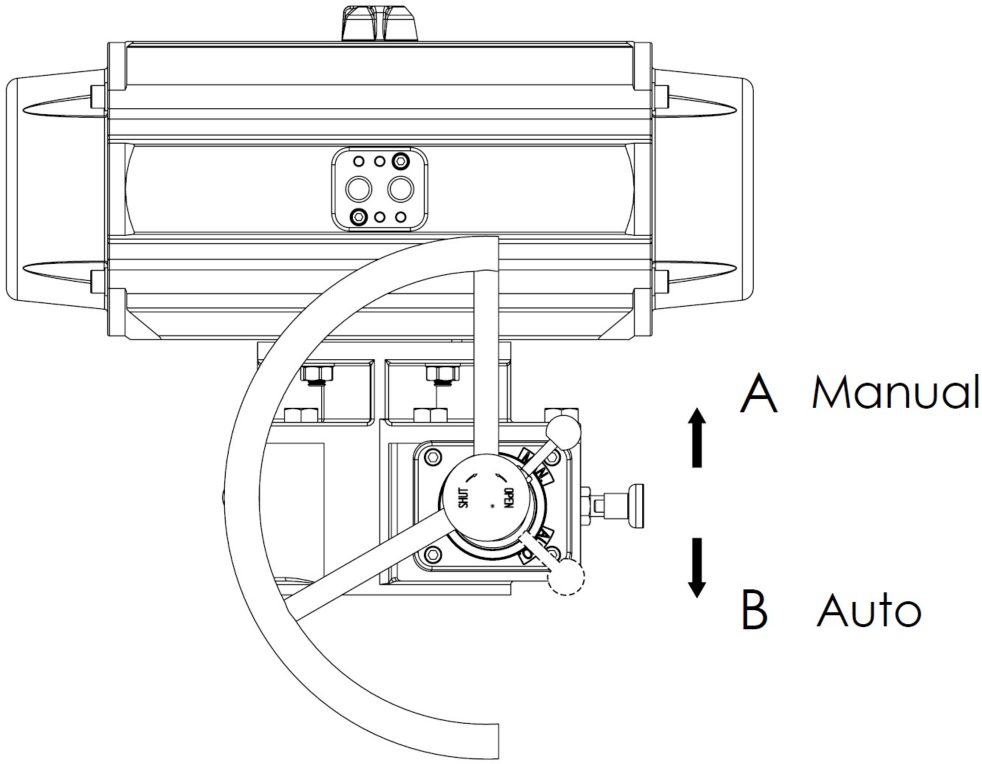
De-Clutchable Manual Override

The Series 79P De-Clutchable Manual Override provides a means to manually cycle the valve when air is not present and is available for all models except for the A-size actuator. The De-Clutchable Manual Override is a gear operator that clutches/de-clutches; allowing the valve to cycle freely via the pneumatic actuator when unclutched, and via the handwheel when clutched. It is recommended to have a shutoff valve and a 3-way dump valve installed locally in the upstream side of the air supply to the actuator. This ensures that the air supply is disconnected from the actuator and that the actuator had bled off any remaining air.



Actuator	De-Clutch	Actuator Side (ISO 5211) Male Square "Q"		Valve Side (ISO 5211) Female Square "J"		Torque in/lbs	Weight lbs
B79P	RD-315.211	F05/F07	14mm	F05/F07	14mm	1,327	10.3
B579PA C79P C579PA	RD-315.111	F05/F07	17mm	F05/F07	14mm	1,327	10.3
D79P	RD-320.111	F05/F07	17mm	F05/F07	17mm	2,212	16.1
D579PA E79PA	RD-330.111	F07/F10/F12	27mm	F07/F10/F12	27mm	6,638	37.4
F79P	RD-345.111	F12	36mm	F12	27mm	12,833	46.2
G79PA	RD-350.111	F14	36mm	F14	36mm	21,995	74.8
L79PA	RD-360.111	F16	46mm	F16	46mm	30,005	118.8
M79PA	RD-370.111	F16	46mm	F16	46mm	65940	176.0

With the lever in the 4:00 position, the manual override is not clutched and the actuator will operate via standard air supply. When you rotate the lever to the 2:00 position, the manual override is now clutched and the actuator will operate by rotating the handwheel.



Maintenance

The Series 79P double rack and pinion actuators do not need any preventative maintenance.

Periodic checks should be performed to ensure proper tightness of all fasteners, smooth operation of automated valve, no leaking air fittings or valves, and that electrical conduit (where applicable) is in good condition.

There may be a time when the Series 79P pneumatic actuator needs a repair kit installed. This has all of the required o-ring seals, along with piston guides and guide rings. Please reference the following procedure and exploded views on the next few pages when installing the repair kit.

Caution: Isolate actuator from electrical power supply and compressed air supply before any maintenance is performed. Make sure both sides of pistons have been bled off.

CAUTION --- DANGER!!!!!!!

The actuator springs are very strong and are compressed when actuator is assembled. The following disassembly process is excluded for F79P and G79PA through M79PA, as a heavy machine press is required!!

Dis-assembly of Actuator

1. Remove end cap by slowly loosening end cap screws, in a crossing pattern.
2. Remove springs.
3. Repeat steps 1 and 2 for opposite end cap.
4. Rotate shaft counter-clockwise to remove pistons.
5. Remove snap ring from shaft.
6. Slide shaft through actuator body and out the bottom.

Assembly of Actuator

1. Install shaft, washer, and secure with snap ring; making sure that the snap ring is seated.
2. With the air inlet ports facing you, install pistons into actuator body with the rack of the right piston facing the air inlet ports.
3. Rotate shaft CCW (beyond open position) to engage both racks.
4. Next, rotate shaft CW to pull pistons to the closed fully position (actuator shaft should not be cocked, and there should be equal distance between the actuator body and the pistons).
5. Install desired number of springs and end cap to actuator body.
6. Set end cap into position, and tighten screws, in a crossing pattern.
7. Repeat steps 5 & 6 for other end.

Repair Kits

NOTE: When ordering repair kits or options, please specify actuator model #, & serial #.

P/PA-Series

Actuator Model	Part Number	Actuator Model	Part Number
A79PA	2385001	D579PA	2385025
B79PA	2385000	E79PA	2385030
B579PA	2385005	F79P	2398040
C79PA	2385010	G79PA	2398050
C579PA	2385015	L79PA	2398060
D79PA	2385020	M79PA	2398070

PAG-Series

Actuator Model	Part Number	Actuator Model	Part Number
AP79P	2386001	CP79P	2386010
BP79P	2386000	DP79P	2386020

316SS-Series

Actuator Model	Part Number	Actuator Model	Part Number
BS79P	2381000	ES79P	2381030
CS79P	2381010	FS79P	2381040
DS79P	2381020		

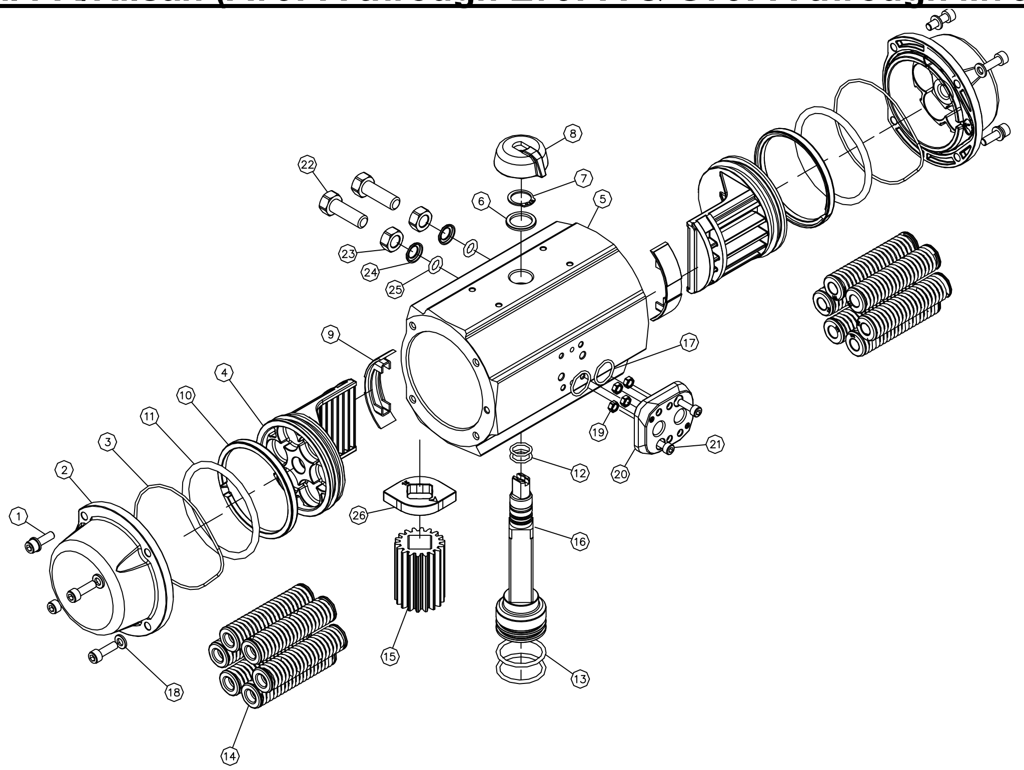
Each repair kit includes the following:

Description	Item Number
1 set of piston o-rings	11
1 set of piston guides	9
1 set of guide rings	10
1 set of end cap o-rings	3
1 set of upper shaft o-rings	12
1 set of lower shaft o-rings	13
1 shaft washer	6
1 shaft snap ring	7

Please reference exploded views on the next few pages during dis-assembly/aasembly process when rebuilding Series 79P pneumatic actuators.

Exploded Views

Typical PA/Rilsan (A79PA through E79PA & G79PA through M79PA)

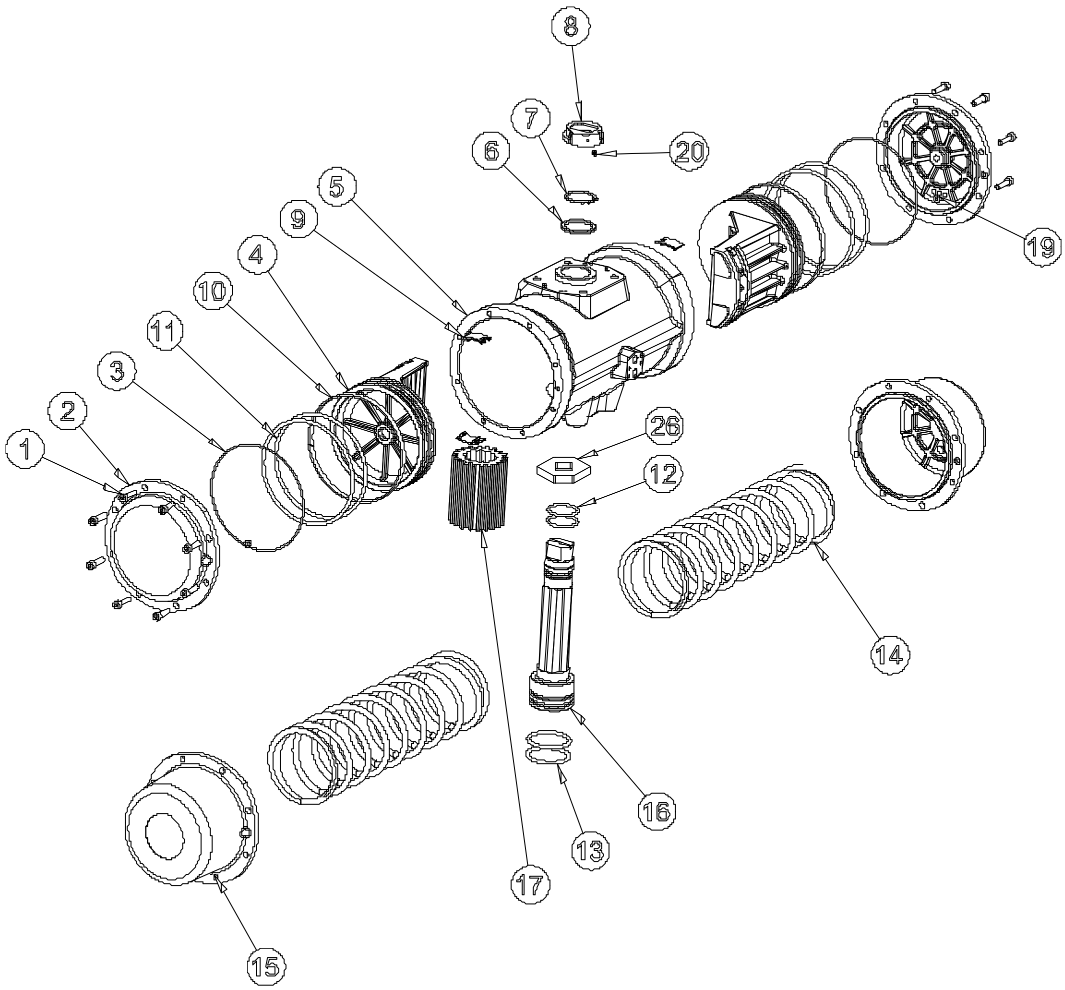


No	Description	Material
1	End Cap Bolt	304 Stainless Steel
2	End Cap	Cataphoresis and Polyurethane coated Aluminum Alloy
3	End Cap O-Ring	NBR
4	Piston	Cataphoresis Coated Aluminum Alloy
5	Actuator Body	Cataphoresis and Rilsan Coated Aluminum Alloy
6	Washer	Polyamide 6
7	Shaft Retaining Ring	Nickel PTFE Coated Steel
8	Position Indicator	Polyamide
9	Piston Guide	Polyacetal
10	Guide Ring	Polyacetal
11	Piston O-Ring	NBR
12	Upper Shaft O-Ring	NBR
13	Lower Shaft O-Ring	NBR

* End position travel adjustment is not available on the A79PA

No	Description	Material
14	Spring Set	DIN-17223-C with Chromium Passivation
15	Pinion Gear	Aluminum Alloy
16	Shaft	Cataphoresis Coated Steel
17	Air Connection Plate O-Ring	NBR
18	End Cap Washer	304 Stainless Steel
19	Nut for Air Connection Plate	304 Stainless Steel
20	Air Connection Plate	Polyamide GF
21	Bolt for Air Connection Plate	304 Stainless Steel
22	Adjustment Bolt	Steel
23	Adjustment Locknut	304 Stainless Steel
24	Bushing	304 Stainless Steel
25	Travel Stop O-Ring	NBR
26	Travel Stop Cam	Cataphoresis Coated Steel

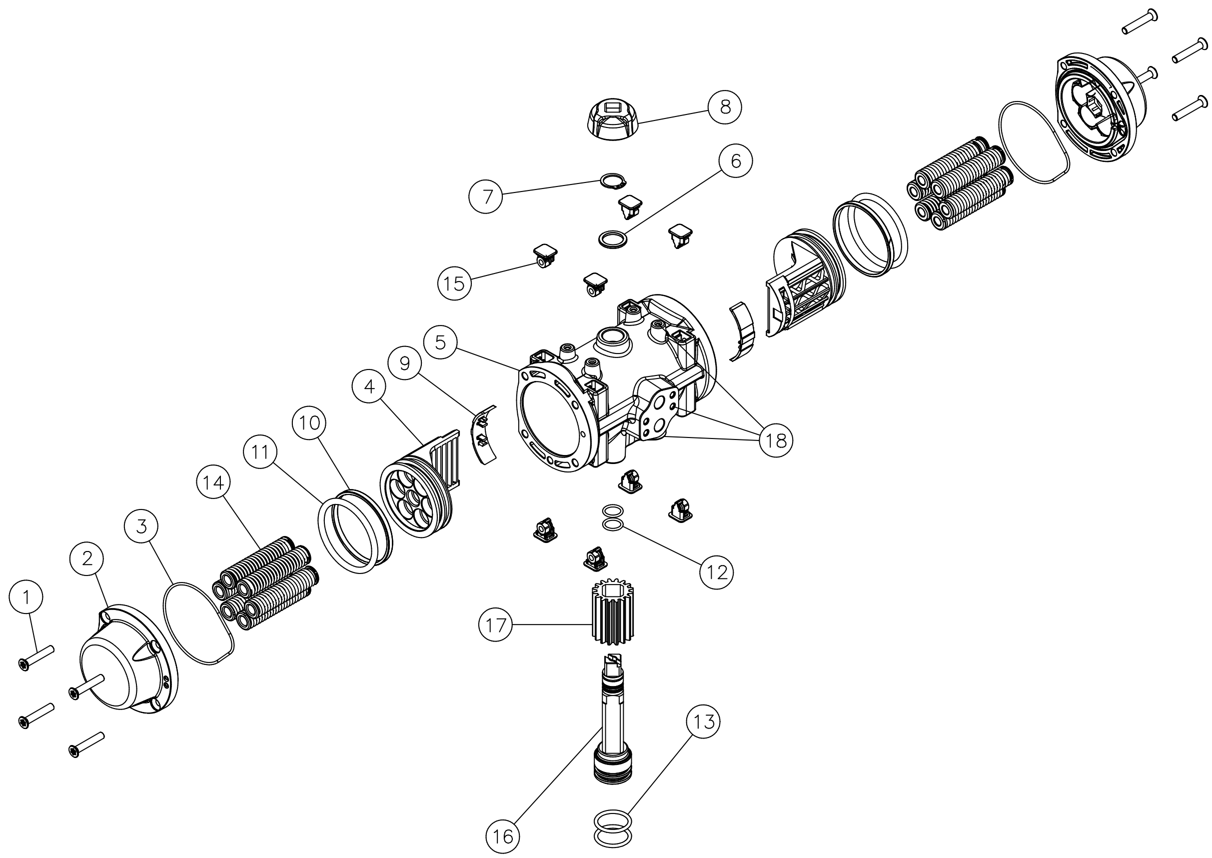
Typical P-Series (F79P)



No	Description	Material
1	End Cap Bolt	304 Stainless Steel
2	Double Acting End Cap	Cataphoresis & Rilsan Coated Aluminum Alloy
3	End Cap O-Ring	NBR
4	Piston	Aluminum Alloy
5	Actuator Body	Cataphoresis & Rilsan Coated Aluminum Alloy
6	Washer	Polyamide 6
7	Shaft Retaining Ring	Cataphoresis Coated Steel
8	Position Indicator	Polyamide
9	Piston Guide	PTFE + Bronze

No	Description	Material
10	Guide Ring	PTFE + Bronze
11	Piston O-Ring	NBR
12	Upper Shaft O-Ring	NBR
13	Lower Shaft O-Ring	NBR
14	Spring Set	Cataphoresis Coated DIN-17223-C
15	Spring Return End Cap	Cataphoresis & Rilsan Coated Aluminum Alloy
16	Shaft	Cataphoresis Coated Steel
17	Pinion Gear	Aluminum Alloy
19	End Cap Gasket	NBR

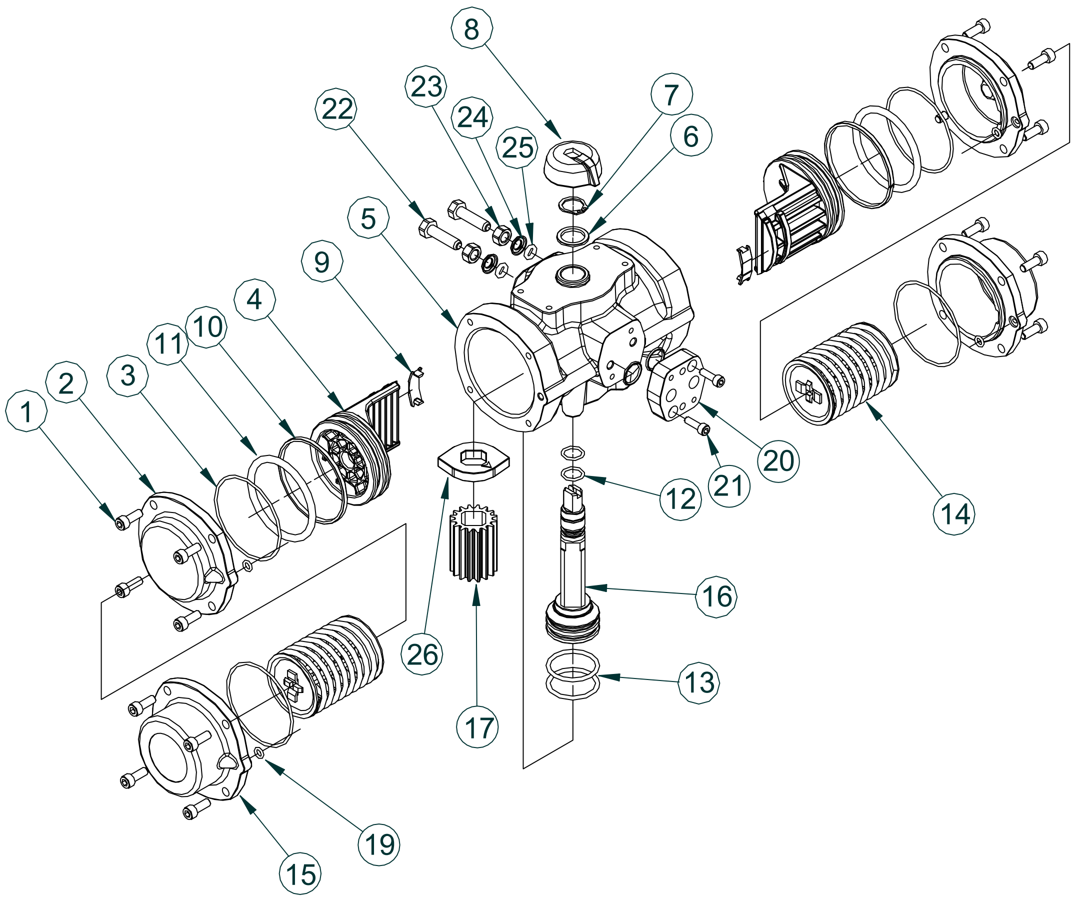
Typical Series P79P/PAG (AP79P through DP79P)



No	Description	Material
1	End Cap Bolt	304 SS
2	End Cap	Polyamide
3	End Cap O-Ring	NBR
4	Piston	Polyarilamide
5	Actuator Body	Polyamide
6	Washer	Polyacetal
7	Shaft Retaining Ring	Stainless Steel
8	Position Indicator	Polyamide
9	Piston Guide	Polyacetal

No	Description	Material
10	Guide Ring	Polyacetal
11	Piston O-Ring	NBR
12	Upper Shaft O-Ring	NBR
13	Lower Shaft O-Ring	NBR
14	Spring Set	DIN-17223-C with Chromium Passivation
15	Nut Protector	Polyamide
16	Shaft	303 Stainless Steel
17	Pinion Gear	Aluminum Alloy
-	-	-

Typical Series S79P/CF8M (BS79P through FS79P)



No	Description	Material
1	End Cap Bolt	316 Stainless Steel
2	Double Acting End Cap	316 Stainless Steel
3	End Cap O-Ring	NBR
4	Piston	Polyarilamide or Cataphoresis Coated Aluminum
5	Actuator Body	316 Stainless Steel
6	Washer	Polyamide 6
7	Shaft Retaining Ring	Stainless Steel
8	Position Indicator	Polyamide
9	Piston Guide	Polyacetal or PTFE/Bronze
10	Guide Ring	Polyacetal or PTFE/Bronze
11	Piston O-Ring	NBR
12	Upper Shaft O-Ring	NBR
13	Lower Shaft O-Ring	NBR

* End position travel adjustment is not available on the BS79P

No	Description	Material
14	Spring Set	Cataphoresis Coated DIN-17223-C
15	Spring Return End Cap	316 Stainless Steel
16	Shaft	316 Stainless Steel
17	Pinion Gear	Aluminum Alloy
19	End Cap Gasket	NBR
20	Air Connection Plate	316 Stainless Steel
21	Bolt for Air Connection Plate	316 Stainless Steel
22	Adjustment Bolt	316 Stainless Steel
23	Adjustment Locknut	316 Stainless Steel
24	Bushing	316 Stainless Steel
25	Travel Stop O-Ring	NBR
26	Cam	316 Stainless Steel
-	-	-