

Installation, Operating & Maintenance Instructions

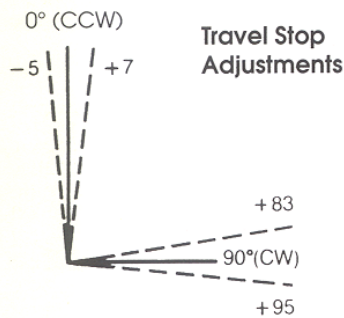
All actuators are factory lubricated for life, but still should be protected from the elements and stored indoors until ready for use. The ports of the actuator are plugged as supplied from the factory. In case the actuators are stored a long period before installation, it would be a good practice to stroke the actuators before mounting. Prior to assembly, check the mounting surfaces, the stem adaptor and the bracket to assure proper fit.

Manually open and close the valve to insure freeness of operation. Be sure the valve and actuator rotate in the same direction and are in the same position. Secure the valve with the stem vertical. Bolt the bracket to the valve and place the stem adaptor on the valve stem. Position the actuator over the valve and lower to engage the stem adaptor to the actuator shaft.

Continue to lower until the actuator seats on the bracket mounting surface. In order to align the bolt holes, it may be necessary to turn or stroke the actuator a few degrees and/or adjust the actuator travel stops. Bolt the actuator to the bracket.

After consulting the valve manufacturer's recommendations, adjust the travel stop bolts of the actuator for the proper open and closed valve positions. Pneumatically stroke the actuator several times to assure proper operation with no binding of the stem adaptor. If the actuator is equipped with limit switches or other accessories, adjust them at this time.

To prolong actuator life use only clean, dry plant air. Lubricated air is not required, however it is recommended particularly for high cycle applications. Do not use lubricated air with positioners.



Travel Stop Adjustment Both Directions 5° Overtravel 12° Adjustment Each End

The **SuperNova** Series actuators have unique travel stop adjustments in both clockwise and counterclockwise directions. The 10° total overtravel provides adjustments from -5° to +7° at the "0°" Counterclockwise position and from +83° to +95° at the "90°" Clockwise position.

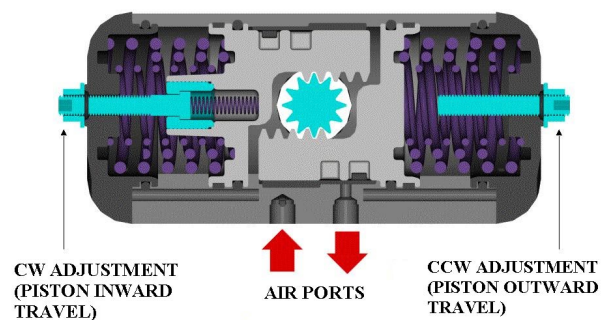
All actuated valves require accurate travel-stop adjustments at both ends of the stroke to obtain optimum performance and valve seat life. The accumulation of tolerances in the adaption of the actuators to valves is such that there must be a range of adjustment for both ends of the stroke to achieve the expected performance.

Ball and Plug Valves require precise adjustment at the open (CCW) position to protect the seat from the flow media and the closed (CW) position to assure absolute shut-off

Butterfly Valves require precise adjustment at the closed position to assure full shut-off, to prevent disc overtravel and damage to the seat at the closed position.

Tandem Valves, where two valves are operated in tandem through a single solenoid valve (eg. A 3-Way configuration), absolutely require precise adjustment at both ends of the stroke to assure the seating of both valves.

Sop adjustment and Locations



Adjustment Bolt Location

Actuator	Endcap Screw Socket Size	Adjustment Bolt Socket Size	Spring Color Code
S050	4 mm	3 mm	White
S063	5 mm	4 mm	Light green
S085	6 mm	5 mm	Blue
S100	6 mm	6 mm	Red
S115	6 mm	6 mm	Yellow
S125	8 mm	6 mm	Grey
S150	8 mm	8 mm	Dark green
S175	10 mm	8 mm	Purple
S200	12 mm	8 mm	Orange

Actuator Type	Fail position	Clockwise (CW) closed	Counterclockwise (CCW) open
Double Acting		Left End Cap	Right End Cap
Spring Return	CW	Left End Cap	Right End Cap
Spring Return*	CCW*	Right End Cap	Left End Cap

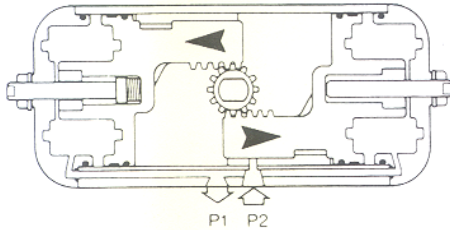
*The pistons are rotated 180° for CCW fail position

OPERATION

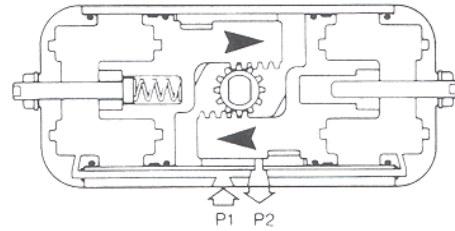
(As viewed from top of the actuator)

Double Acting

Applying air pressure to Port 2 drives the pistons outward, which turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 1.

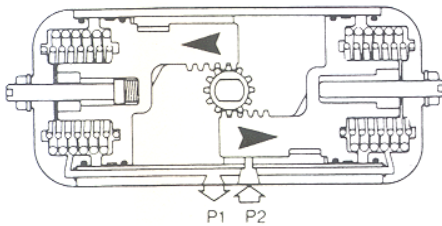


Applying air pressure to Port 1 drives the pistons inward, which turns the pinion clockwise as the air volume on the inside of the pistons exhausts through Port 2.

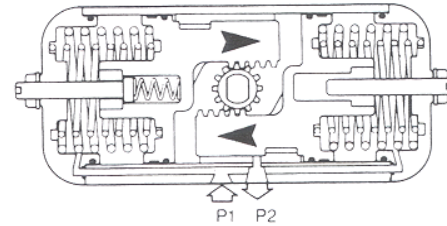


Spring return (Fail CW)

Applying air pressure to Port 2 drives the pistons outward, which compresses the springs and turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 1.

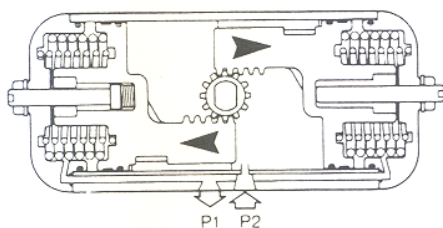


Exhausting the air pressure from Port 2 allows stored energy of the springs to drive pistons inward, turning the pinion clockwise. Air volume on outside of pistons vents through Port 1.

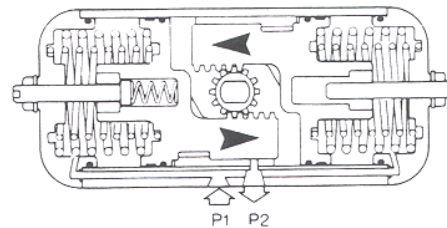


Spring Return (Fail CCW)

Applying air pressure to Port 2 drives the pistons outward, which compresses the springs and turns the pinion clockwise as the air volume on the outside of the pistons exhausts through Port 1.



Exhausting the air pressure from port P2 allows stored energy of the spring to drive pistons inward, turning the pinion counterclockwise. Air volume on outside of pistons vents through Port 1.



Changing direction of pinion rotation (CW to CCW)

The SuperNova series actuators are normally assembled as Double Acting or Spring Return Fail CW (spring action turns pinion clockwise).

To assembly the actuator on Spring Return Fail CCW (spring action turns pinion counterclockwise):

1. Follow disassembly procedures (next page) from point #1 through #8.

2. Rotate both pistons 180° around their axis: left piston rack must be on air supply ports side, right pinion on the opposite side (see Spring Return CCW drawing).
3. Follow reassembly procedures.

MAINTENANCE INSTRUCTIONS

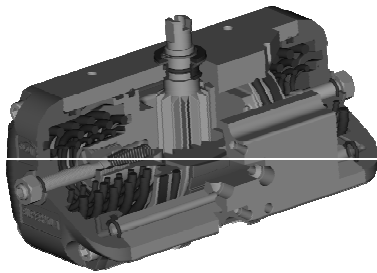
Disassembly Procedures

1. Disconnect all air and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount actuator from valve.
3. Position actuator with air supply ports facing you. Apply air pressure to Port 2 to release spring pressure from the Stop Bolt (9).
4. Remove the Stop Bolt Retaining Nut (14), Washer (15), and O-ring (16) on the left Endcap (19) and turn the Stop Bolt (9) clockwise into the Body (1) until it is flush with the Endcap (19).
5. Exhaust air from Port 2, the Stop Bolt (9) should now turn freely. Continue turning Stop Bolt (9) clockwise until it is disengaged from the Endcap.
6. **S Spring Return Actuator:**

CAUTION: Follow step 4 to relieve force on inward travel stop before proceeding.

To remove S Endcaps, first completely remove two diagonal Endcap Screws (21) from one Endcap. The two remaining Endcap Screws should be removed evenly. As the screws are removed, the springs will push the Endcap out. Repeat for opposite side. The springs will be totally unloaded before the screws are completely unthreaded.

Remove the springs (23, 24, 25).



Spring return version

D Double Acting Actuator:

Remove the 8 Endcap Screws (21). Step 7 will push the Endcaps (18, 19) from the Body (1).

7. Rotate Pinion (3) counterclockwise (D & S-FCW) or clockwise (D & S-FCCW) to drive the Pistons (2) off the end of the rack. Pull the Left Piston (2) from the body (1) by pulling on the Stop Bolt (9).
8. Remove the Right Piston (2a) by pushing out through inside of Body (1).
9. Remove the Snap Ring (5) Steel Pinion Washer (4a) and Pinion Washer (4).
10. Tap Pinion (3) lightly with plastic mallet to remove.
11. Remove seals from pinion, endcaps, and piston. If necessary, remove seal from top pinion bearing.
12. Top pinion bearing (26) is a light press fit into the housing. To remove, press out towards the bottom of the actuator body. Take care not to damage any of the surfaces. Bottom pinion bearing (27) is split. To remove, find split in bearing and spread apart just enough to fit over bottom pinion.

Reassembly Procedures

1. Inspect all parts for wear and replace any worn parts as needed. Replace all O-rings.
2. Clean all components and lightly grease cylinder bore, pinion and seals with a multi-purpose “polymer” fortified grease such as DuBois Chemicals MPG-2.
3. Reverse the disassembly procedures to reassemble.
4. If top pinion bearing (26) was removed, it must be pressed back into place. The top edge of the bearing must be even with the top of the body. Insert top pinion bearing seal (28) into place, pressing down with a blunt screwdriver or similar tool, taking care not to damage the seals.
5. The standard Pinion (3) orientation is with the top accessory drive slot at 90° to the Body (1) in the 0° position.
6. When fitting the Pistons (2 and 2a) ensure the teeth engage the Pinion (3) at the same time by measuring in from each end. Note: the orientation of the pistons will determine the operation of the actuator. Refer to the diagrams under “Operation” for correct piston position.
7. Test the actuator for smooth operation and air leakage at service pressure before reinstalling.

Changing Number of Springs

1. Follow the Disassembly Procedures through step 6
2. Determine nested spring combination of inner, middle and outer spring. Consult catalog torque charts. Insert appropriate spring according to the attached chart into cylinder. Springs must be properly seated against piston and endcap to assure that springs do not bind.
3. Re-assemble the actuator.

Spring chart models 63-200

Spring Group	Spring Combination 1			Standard Configuration (Air Supply)
	#1 Spring (inner)	#2 Spring (middle)	#3 Spring (outer)	
S04	-	2	-	
S05	-	1	1	3 bar
S06	-	-	2	
S07	1	-	2	4 bar
S08	2	-	2	5 bar
S09	1	1	2	
S10	-	2	2	5,5 bar
S11	1	2	2	
S12	2	2	2	

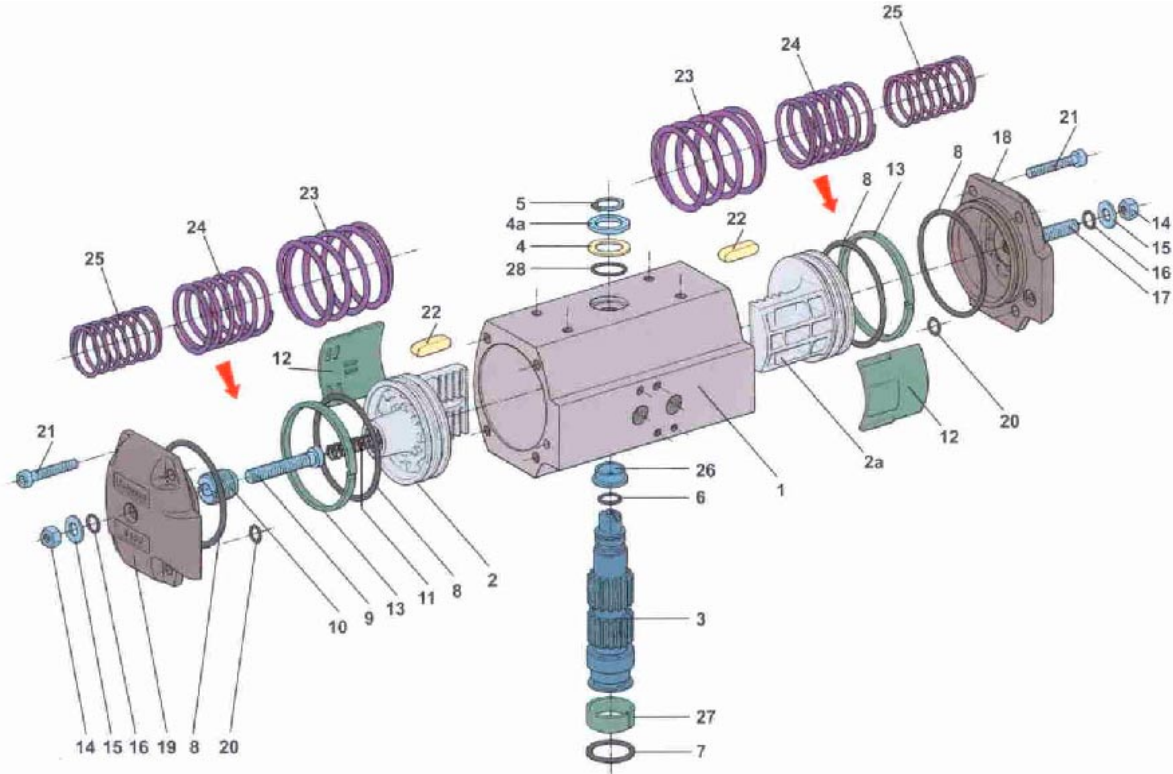
Spring chart model 50

Spring Group	Spring Combination 1			Standard Configuration (Air Supply)
	#1 Spring (inner)	#2 Spring (middle)	#3 Spring (outer)	
S04	1	1	-	
S05	-	2	-	3 bar
S06	2	1	-	4 bar
S07	1	2	-	5 bar
S08	2	2	-	5,5 bar
S09	2	-	2	

Notes:

- #1 Spring has one color code dot
- #2 Spring has two color code dots
- #3 Spring has three color code dots
- S050 has maximum of 2 springs per endcap

PARTS & MATERIALS



ITEM No.	DESCRIPTION	STANDARD MATERIAL	Quantity	
			D	S
1	Body	Hard Anodized Aluminium	1	1
2	Left Piston	Die Cast Aluminium	1	1
2a	Right Piston	Die Cast Aluminium	1	1
3	Pinion	Nitride Coated Steel	1	1
4*	Pinion Washer	Nylon	1	1
4a*	Steel Pinion Washer	Stainless Steel	1	1
5*	Pinion Snap Ring	Steel/Plated	1	1
6*	Upper pinion O-ring	Nitrile Rubber	1	1
7*	Lower pinion O-ring	Nitrile Rubber	1	1
8*	Piston and end cap O-ring	Nitrile Rubber	4	4
9	Inward travel stop bolt	Stainless Steel	1	1
10	Inward travel retaining nut	Stainless Steel	1	1
11	Inward travel spring	Steel/Plated	1	1
12*	Piston guide	Nylon and Molybdenum Disulfide	2	2
13*	Piston guide band	Nylon and Molybdenum Disulfide	2	2
14	Stop bolt retaining nut	Stainless Steel	2	2
15	Stop bolt washer	Stainless Steel	2	2
16*	Stop bolt O-ring	Nitrile Rubber	2	2
17	Stop bolt	Stainless Steel	1	1
18	Right end cap	Die Cast Aluminium/Electrostatic Poly	1	1
19	Left end cap	Die Cast Aluminium/Electrostatic Poly	1	1
20*	End cap supply O-ring	Nitrile Rubber	2	2
21	End cap screw	Stainless Steel	8	8
22	Anti ejection device (optional)	Nylon	2	2
23	Outer spring	Spring Steel Coated	0	2 max
24	Middle spring	Spring Steel Coated	0	2 max
25	Inner spring	Spring Steel Coated	0	2 max
26*	Top pinion bearing	Hard Anodized Aluminium	1	1
27*	Bottom pinion bearing	PEEK	1	1
28*	Top bearing O-ring	Nitrile Rubber	1	1

NOTES:

D= double acting actuators
S= spring return actuators
* parts included in a Repair Kit

SEALS:

Standard - Nitrile:
-30°C ÷ +80°C (-20°F ÷ +175°F)
H= High temp. – Viton:
-30°C ÷ +150°C (-22°F ÷ +302°F)
L= Low temp. – Fluorosilicon:
-50°C ÷ +80°C (-58°F ÷ +176°F)

PRESSURE RATING:
10 bar (150 psi) max