

Flowserve Corporation
Flow Control Division
www.flowserve.com

765 South 100 East
Provo, Utah 84606
Phone: 801 373 3028

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931-432-4021

SuperNova B-Series Pneumatic Actuator

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. If actuators are stored for a long period of time prior to installation, the units should be stroked periodically to prevent the seals from taking a set.

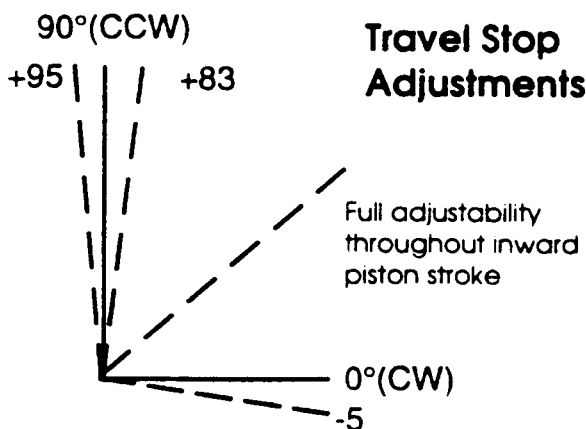
Prior to assembly, check the mounting surfaces, the stem adaptor and the bracket to assure proper fit. Manually open and close the valve to insure freeness of operation. Be sure the valve and actuator rotate in the same direction and are in the same position (i.e., valve open, actuator open). Secure 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 an UltraSwitch 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. *Caution: Do not use lubricated air with positioners.*

Travel Stop Adjustments (Patent#4,949,936) Both Directions

The SuperNova actuators have unique, patented travel stop adjustments in both the clockwise and counterclockwise directions.

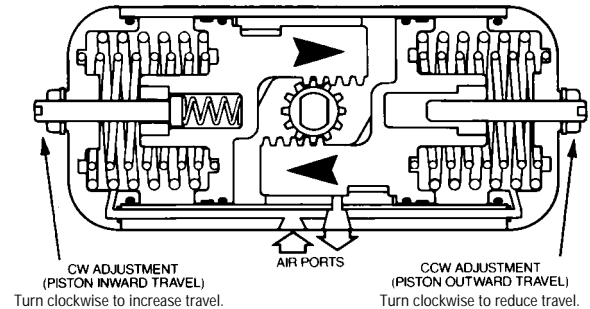


Actuator	Endcap Screw Socket Size	Adjustment Bolt Socket Size	Spring Color Code
B050	4mm	3mm	White
B063	5mm	4mm	Light Green
B085	6mm	5mm	Blue
B100	6mm	6mm	Red
B115	6mm	6mm	Yellow
B125	8mm	6mm	Grey
B150	8mm	8mm	Dark Green
B175	10mm	8mm	Purple
B200	12mm	8mm	Orange

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 adapting actuators to valves is such that there must be a range of adjustment for both ends of the stroke to achieve the expected performance.

Stop Adjustments and Locations

View the actuator with the Air Ports facing you.



Adjustment Bolt Location

Actuator Type	Fail Position	Clockwise (CW)	Counterclockwise (CCW)
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.

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).

Flowserve Corporation
Flow Control Division
www.flowserve.com

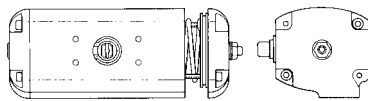
765 South 100 East
Provo, Utah 84606
Phone: 801 373 3028

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931-432-4021

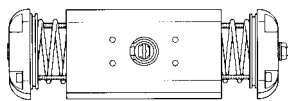
- Exhaust air from Port 2, the Stop Bolt (9) should now turn freely. Continue turning Stop Bolt (9) clockwise until it is disengaged from the Endcap.
- Spring Return Actuator:**

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

To remove Spring Return endcap, 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).



Actuator with springs partially disassembled (right side)



Actuator with springs totally disassembled

- Double Acting Actuator:** Remove the 8 endcap screws (21). Step (7) will push the endcaps (18,19) from the body (1).
- Rotate Pinion (3) counterclockwise (DA & SR-FCW) or clockwise (DR & SR-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).
 - Remove the right piston (2) by pushing out through inside of Body (1).
 - Remove the snap ring (5), steel pinion washer (4a), and pinion washer (4).
 - Tap pinion (3) lightly with plastic mallet to remove.
 - Remove seals from pinion, endcaps, and piston. If necessary, remove seal from top pinion bearing.
 - 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

- Inspect all parts for wear and replace any worn parts as needed. Replace all O-rings.
- Clean all components and lightly grease cylinder bore, pinion and seals per temperature rating notes (page 4).
- Reverse the disassembly procedures to reassemble. Grease endcap screw (21) threads with multipurpose "polymer" fortified grease, such as DuBois Chemical MPG-2, before assembly.
- 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.
- The standard Pinion (3) orientation is with the NAMUR slot perpendicular with the body (1) in the CW position.
- When fitting the Pistons (2) ensure the teeth engage the Pinion (3) at the same time by measuring in from the edge of the body (1) the same distance 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.
- Test the actuator for smooth operation and air leakage at service pressure before reinstalling.

Changing Number of Springs

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

Spring chart B063-B200			
Spring Group	Spring Combination ①		
	#1 Spring (inner)	#2 Spring (middle)	#3 Spring (outer)
4		2	
5		1③	1③
6			2
7	1		2
8	2		2
9	1③	1③	2
10		2	2
11	1	2	2
12	2	2	2

Spring chart B050 ②			
	Spring Combination ①		
	#1 Spring (inner)	#2 Spring (low rate outer)	#3 Spring (high rate outer)
4	1③	1③	
5		2	
6	2	1	
7	1	2	
8	2	2	
9	2		2

Note: ① #1 Spring has one color code dot
#2 Spring has two color code dots
#3 Spring has three color code dots
② B050 has maximum of 2 springs per endcap
③ Install springs on opposite sides

Changing Pinion Orientation

Note: Steps 4&8 are not required for DA actuator.

- Disconnect all air and electrical supplies from actuator.
- Remove all accessories from actuator and dismount actuator from valve.
- Position actuator with air supply ports facing you.
- Follow step 6 under disassembly procedure to unload spring pressure from right endcap (18) only.
- Remove the Pinion Snap ring (5), Steel Pinion Washer (4a) and Pinion Washer (4).
- Tap Pinion (3) lightly with plastic mallet to remove.

Caution:
Failure to follow step 4 will result in permanent damage to SR actuator.

- Reverse steps 5&6 with new pinion (3) orientation.
- Assemble right endcap (18) in reverse order of disassembly. Grease endcap screw (21) threads with multipurpose "polymer" fortified grease, such as DuBois Chemical MPG-2, before assembly.

Flowserve Corporation
Flow Control Division
www.flowserve.com

765 South 100 East
Provo, Utah 84606
Phone: 801 373 3028

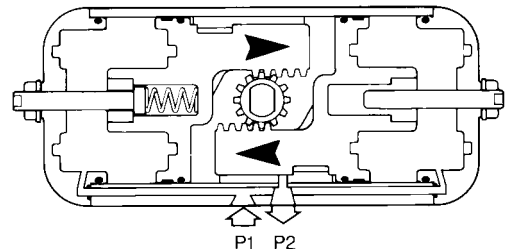
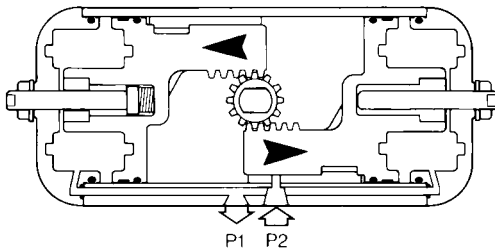
1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931-432-4021

Operation (as viewed from top of 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.

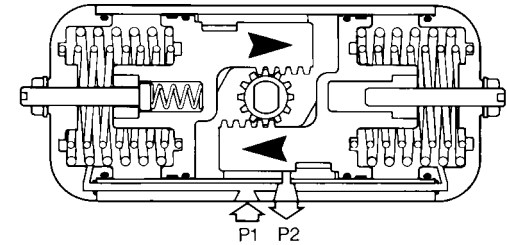
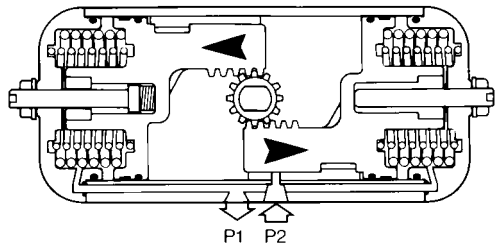
Applying air pressure to Port 1 drives the pistons inward, which turns the pinion clockwise as the air volume on the inside of the pistons exhausts through Port 2.



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.

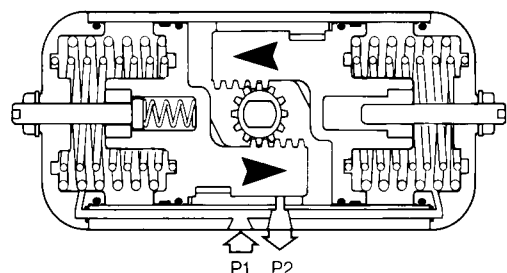
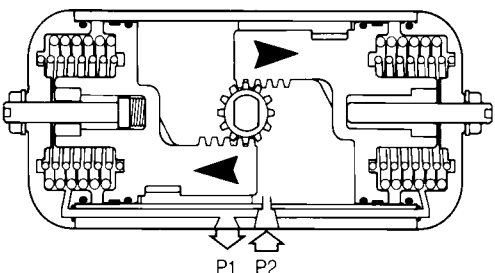
Exhausting the air pressure from Port 2 allows stored energy of the springs to drive pistons inward, turning the pinion clockwise. Air volume on outside of pistons vents through Port 1.



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.

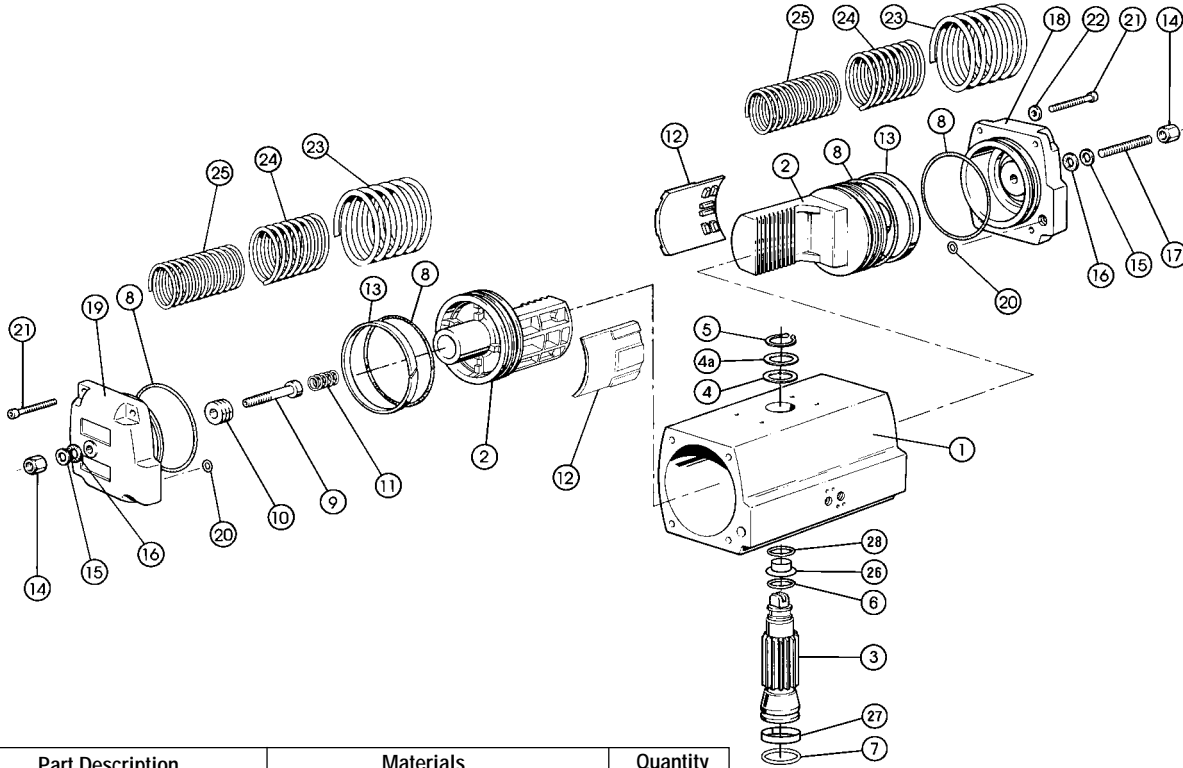
Exhausting the air pressure from Port 2 allows stored energy of the springs to drive pistons inward, turning the pinion counterclockwise. Air volume on the outside of pistons vents through Port 1.



Flowserve Corporation
Flow Control Division
www.flowserve.com

765 South 100 East
Provo, Utah 84606
Phone: 801 373 3028

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931-432-4021



Item No.	Part Description	Materials	Quantity	
			DA	SR
1	Body	Hard Anodized Aluminum	1	1
2	Pistons	Die Cast Aluminum	2	2
3	Pinion	Nitride Coated Steel	1	1
4	Pinion Washer ①	Nylon	1	1
4a	Steel Pinion Washer ①	Stainless Steel	1	1
5	Pinion Snap Ring ①	Steel/Plated	1	1
6	Upper Pinion O-ring ①	Nitrile Rubber	1	1
7	Lower Pinion O-ring ①	Nitrile Rubber	1	1
8	Piston and End Cap O-ring ①	Nitrile Rubber	4	4
9	Inward Travel Stop Bolt ②	Stainless Steel	1	1
10	Inward Travel Retaining Nut ②	Stainless Steel	1	1
11	Inward Travel Spring ②	Steel/Plated	1	1
12	Piston Guide ②	Nylon and Molybdenum Disulfide	2	2
13	Piston Guide Band ②	Nylon and Molybdenum Disulfide	2	2
14	Stop Bolt Retaining Nut ②	Stainless Steel	2	2
15	Stop Bolt Washer ②	Stainless Steel	2	2
16	Stop Bolt O-ring ①	Nitrile Rubber	2	2
17	Stop Bolt ②	Stainless Steel	1	1
18	Right End Cap	Die Cast Aluminum/Electrostatic Poly	1	1
19	Left End Cap	Die Cast Aluminum/Electrostatic Poly	1	1
20	End Cap Supply O-ring ①	Nitrile Rubber	2	2
21	End Cap Screw ②	Stainless Steel	8	8
23	Outer Spring	Spring Steel Coated	0	2 max. ③
24	Middle Spring	Spring Steel Coated	0	2 max. ③
25	Inner Spring	Spring Steel Coated	0	2 max. ③
26	Top Pinion Bearing ②	Hard Anodized Aluminum	1	1
27	Bottom Pinion Bearing ②	PEEK	1	1
28	Top Bearing O-ring ①	Nitrile Rubber	1	1

Note: ① Parts included in Seal Kit and Repair Kit. ② Parts included in Repair Kit.
③ See spring chart for required spring combination.

Seal/Repair Kits	Seal Kits	Repair Kits
Buna Kit	B__SKB	B__RKB
Viton Kit	B__SKV	B__RKV
Low Temp Kit	B__SKL	B__RKL

Replace “_” with actuator size, e.g. B100SKB.
Seal kits consist of all sealing parts, snap ring and washers, and pinion bearings. Repair kits consist of seal kits plus all actuator hardware, such as screws, nuts, etc.

Pressure Rating
150 psig maximum

Temperature Ratings

Standard ●	Nitrile	-20°F to +175°F
High Temp ▲	Viton	0°F to +300°F
Low Temp ▲	Silicon-based	-55°F to +175°F

Notes:

- For standard applications use multi-purpose polymer fortified grease, such as Dubois Chemicals MPG-2.
- ▲ For low temperature and high temperature applications, use special formulated grease such as Dow Corning® 55 O-ring Lubricant.