Building Connections That Last™

ASC Engineered Solutions

Series 227

Installation, Operation and Maintenance Manual

ABZ VALVE
An ASC Engineered Solution

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1. Installation of Actuator

Series 227 actuators are mounted directly to valves or adapted to the valve by means of an intermediate bracket and coupler. The coupler adapts the output of the actuator to the valve shaft. Standard mounting kits provide mounting of the actuator in the direction of the pipe.

Pipelines can be horizontal, vertical, or other positions. When mounting the actuator to a valve using a mounting kit, the pinion drive, coupling device and valve stem should be centered and concentric to prevent any side loading to the bottom pinion radial bearing and valve stem seal area. After mounting, it may be necessary to adjust the end of travel mechanical stops for proper open and closed valve position. Pneumatically stroke the actuator several times to assure proper operation with no binding of the coupler.

2. Air Supply

Pneumatic piping to the actuator and associated accessories should follow the best practices for instrument pneumatic piping systems, ie line free of water, oil, pipe sealant or other contaminents.

The operating medium is to be filtered dry air or inert gas which is filtered to 50 micron particles size or less. It is extremely important that the actuator be powered with the proper air pressure and air volume. Maximum working pressure is 142 PSI.The spring housing on spring return actuators, if not piped, will breath through the right hand port. It's important that it not be exposed to a corrosive atmosphere. A breather vent can be added to the right hand spring port to prevent dust and debris from entering the actuator.

3. Lubrication

Series 227 actuators are factory lubricated for life and additional lubrication is not normally required. However, with high cycle applications, an oil mist lubricator is recommended. Oil mist lubrication requires a mineral oil type ISO VG32 Class 1 for useage in temperature range 15 to 158 Deg. F. Oil mist lubricator must be set to the lowest setting. Once begun, the oil mist lubrication cannot be discontinued.

Caution: If the actuator is equipped with a pnuematic positioner or pneumatic controller, oil mist lubricated air cannot be used unless the instrument manufacturer indicates that the instrument is compatible with lubricated air.

4. Travel Adjustment

The Series 227 rack & pinion actuators have mechanical travel stop adjustments in both the clock-wise and counterclockwise directions. Actuator travel adjustments can be made from -5° to +5° at the 0° clockwise position and from 85° to 95° at the 90°counterclockwise position.

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

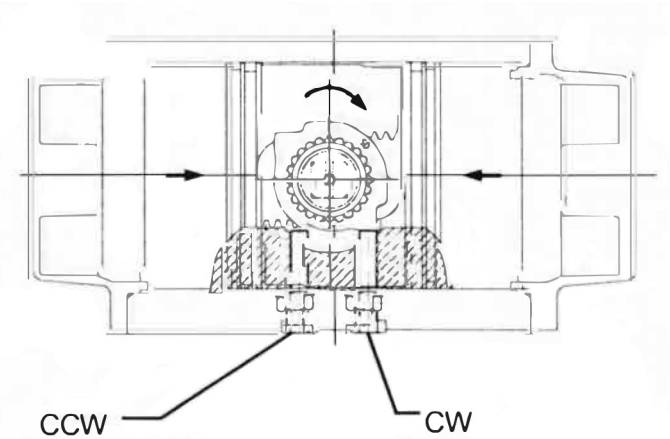


Fig. 1

4. Travel Adjustment (continued)

Ball & Plug Valves require precise adjustment at the open position to protect the seat from the flow media and the closed 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 and to assure maximum flow in the open position.

Tee Assemblies When two valves are operated in tandem through a single operator (3-way configuration), precise adjustment is required at both ends of the stroke to assure the seating of both valves

5. Operation – Double Acting

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

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

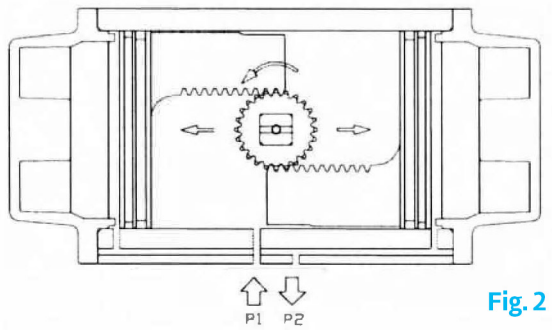
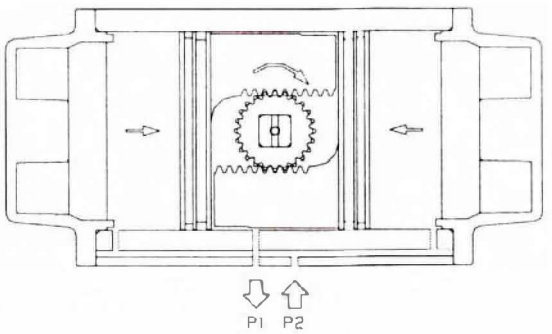


Fig. 2



6. Operation – Spring Return (Fail CW)

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

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

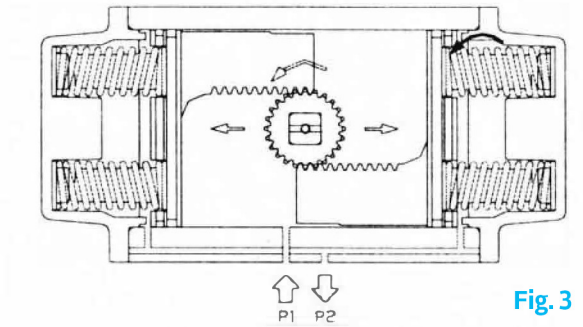
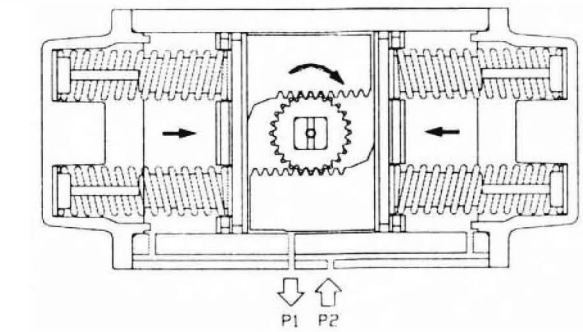


Fig. 3



7. Operation – Spring Return (Fail CCW)

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

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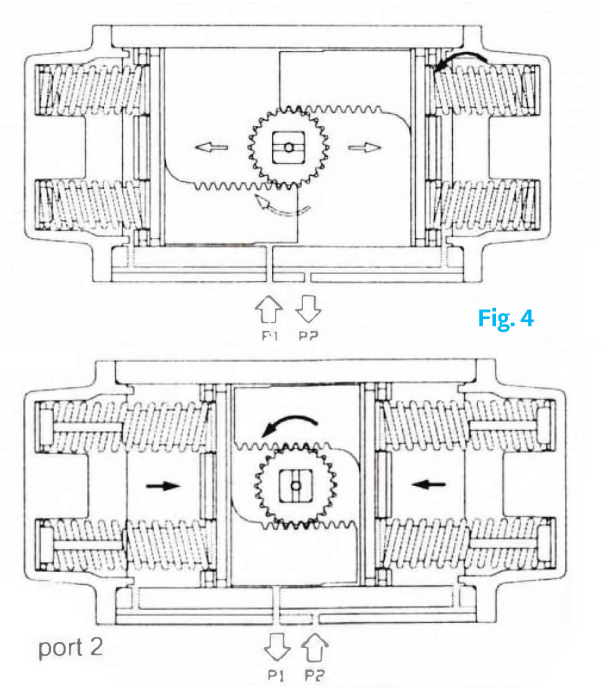


Fig. 4

8. Disassembly Procedures

Caution!
Before removing any components of the actuator, ensure that all pneumatic and electrical power supplies are disconnected.

8.1 Removal of Travel Stops

Disconnect the air supply and electrical power to depressurize the actuator. Release the lock nuts and unscrew both travel stops and seals, which are located at the top of the actuator body on the side.

8.2 Removal of End Caps

Spring Return Units
All end cap bolts are to be removed evenly, allowing the springs to slowly relax and push the end caps out from the body.

The springs are contained on spools and the tension will be relaxed when the end cap is removed. Always use caution when removing springs.

Double Acting Units
Remove the end cap bolts evenly on both end cap. Using a wrench, rotate the pinion, driving the pistons apart until they partially push the end caps from the body. Remove the end caps by pulling them free from the body.

8.3 Removal of Pistons

Rotate the pinion using a wrench to drive the pistons apart until they are free of the actuator body.

8.4 Removal of Pinion

Remove the snap ring, thrust washer and thrust bearing from the top of the pinion and carefully remove the pinion from the cylinder body through the bottom. The travel stop cam will not fit through the bottom bore, it will slip off the pinion prior to pinion removal. Take care to ensure the pinion does not damage the pinion bores on removal

9. Assembly Instructions

9.1 Inspection

Check that all components are clean and free from damage. It is recommended that all o-rings, bearings, washers, etc. are replaced using only ABZ replacement parts.

9.2 Installing the Pinion

Lightly grease the pinion, o-ring grooves and guide bushing groove of the pinion and pinion o-rings with multi-purpose grease. Install the top bearing into the actuator body bearing bore.

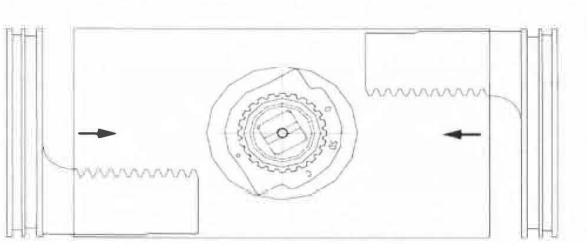
Fit the top o-ring into the top pinion groove. Fit the bottom guide bushing into the bottom pinion groove. Slip the bottom o-ring into the bottom pinion groove. Carefully insert the pinion into the body until the top

of the pinion is inside the body cylinder. Fit the travel stop cam over the top of the pinion and slide it down until it is engaged with the pinion. (Note: The travel stop cam will engage with the pinion in only one position)

Gently push the pinion up through the body making sure the bottom guide bushing, bottom o-ring & top o-ring stay in their grooves. With the pinion in this position, install the thrust bearing washer, then the thrust washer and lastly the snap ring (make sure the snap ring fits properly in the groove)

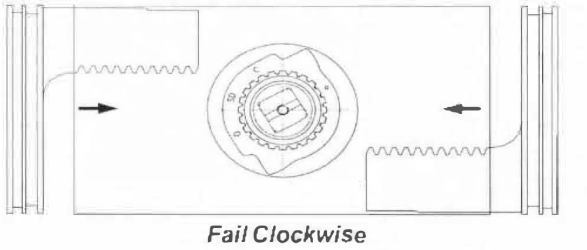
9.3 Alignment of Pinion for correct Piston installation.

Rotate the pinion to the position shown in Fig. 5 (When viewed from the slot at the top of the pinion) ensuring that the machined stop flats are in the correct orientation.



Fail Counter-Clockwise

Fig. 5



Fail Clockwise

9.4 Installing the Pistons.

Lightly grease the piston o-rings, piston backup ring & guide plate with multi-purpose grease & fit the o-rings, backup ring & guide plate into their respective grooves on the piston. Liberally grease the actuator body bore and the piston rack . Insert the pistons into the bore, one piston in each end with the teeth facing each other, See Figures 2, 3 & 4. (Note: The position of the piston determines the fail rotation of the actuator) Push both pistons together until they are both in contact with the pinion, so that when the pinion is rotated (Clockwise for Fail-CW, counterclockwise for Fail-CCW) the pistons are drawn together. When the pistons are together and the racks correctly engaged with the pinion, the top pinion drive flats should now be a several degrees past (perpendicular to the body for Fail-CW, Parallel to the body for Fail-CCW) to the axis of the body.

9.5 Installing the Travel Stops.

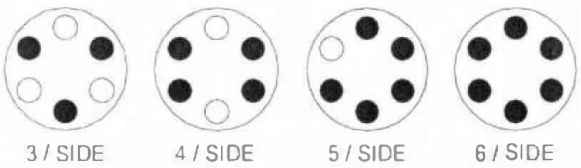
With the pistons together, screw in the corresponding travel stop assembly with locknut and seal until it comes into contact with the pinion. Rotate the pinion 90 degrees to drive the pistons apart and screw in the other travel stop until it comes into contact with the pinion. Final adjustment is easily made when the actuator has been mounted to its valve, damper or other device, to suit individual requirements. Ensure the locknut are tightened.

9.6 End Cap Installation

With the pistons together, lightly grease the end cap o-rings with multi-purpose grease. Grease the ends of the body bore and the end caps. Install the o-rings into the groove in the end caps, line up and secure the end caps with the end cap fasteners.

Spring Return Unit

Install the correct number of springs for the desired torque output. Place the springs into the pockets of the piston and end cap. Balance the springs across the pistons.



10. Testing

Using compressed air at 80psi-100psi, check the seal areas with soapy water, ensuring no bubbles are produced and that the pinion rotates smoothly over its full travel.

11. Cycling of Infrequently Used or Stored Actuators

Actuators not in current use for at least a 3 month period, should be cycled a minimum of ten times. The seal manufacturers recommend this procedure to prevent pre-set of the seals.

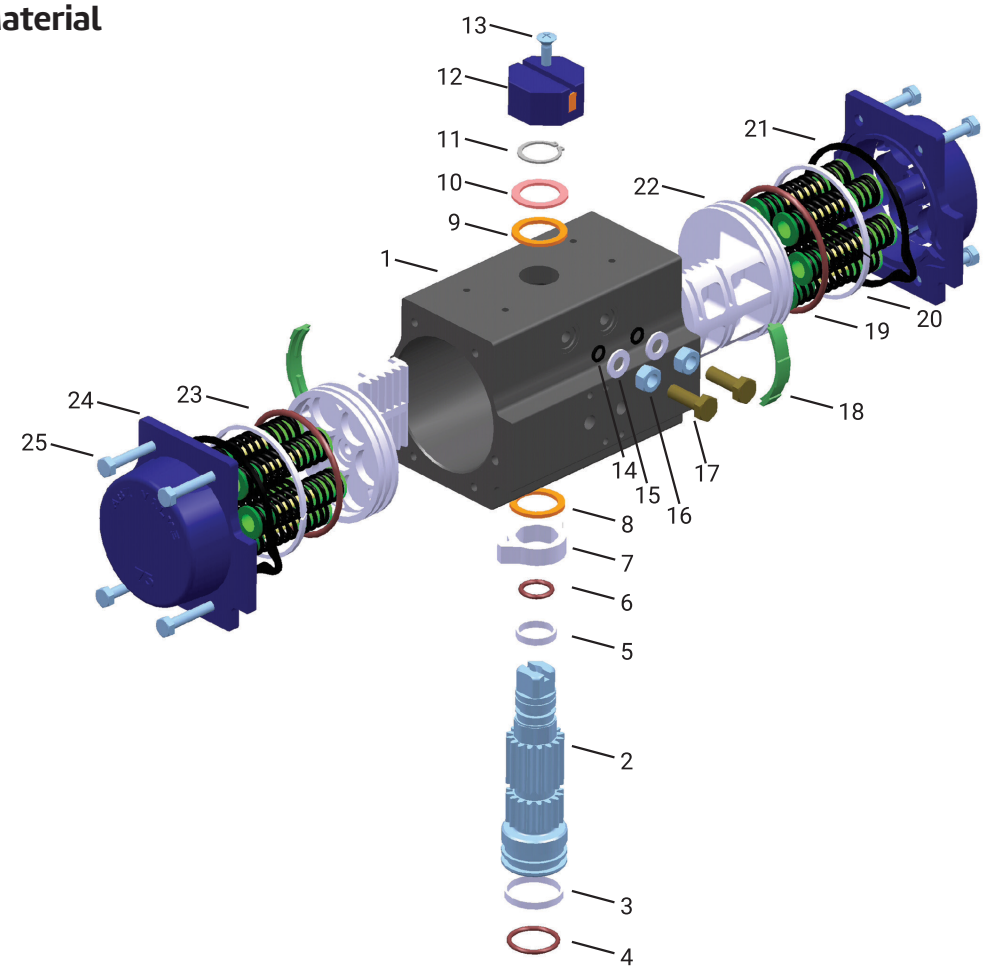
12. Service

It is the policy of ASC to give the best possible service to our customers. We are happy to assist you in any way we can and if you have any questions about Series-227 actuators or other ASC products. Please contact ASC or your local ASC distributor for additional information. www.asc-es.com

277 Seals Repair Kits

Type	Buna Seal Kit	Viton Seal Kit	Silicon Seal Kit
Model / Temperature	-4°F - 175°F	-4°F - 300°F	-40°F - 175°F
50	5350000580	5350000360	5350024720
63	5350000600	5350000380	5350024740
75	5350000620	5350000400	5350024760
88	5350000640	5350000420	5350024780
100	5350000660	5350000460	5350024800
115	5350000680	5350000480	5350024820
125	5350000700	5350000500	5350024840
145	5350000720	5350000520	5350024860
160	5350000740	5350000540	5350024880
180	5350000760	5350000560	5350024900
210	5350000780	5350000580	5350024920
240	5350014320	5350014280	5350024940
270	5350014340	5350014300	5350024960

13. Bill of Material



Bill of Materials

No.	Descriptions	Materials	Remarks	QTY (DA)	QTY (SR)	Seal Kit
1	Body	Extruded Aluminum	Hard Anodized	1	1	
2	Anti-blowout Pinion	Steel	Nickel Plating	1	1	
3	Bottom Pinion Bushing	POM	-	1	1	*
4	Bottom Pinion O-Ring	NBR70	-	1	1	*
5	Top Pinion Bushing	POM	-	1	1	*
6	Top Pinion O-Ring	NBR70	-	1	1	*
7	Travel Stop Cam	Stainless Steel	-	1	1	
8	Top Cam Space	POM	-	1	1	*
9	Top Pinion Space	POM	-	1	1	*
10	Top Pinion Washer	Stainless Steel	-	1	1	
11	Pinion Snap Ring	Stainless Steel	-	1	1	*
12	Piston Indicator	Nylon	-	1	1	
13	Cap Screw (Indicator)	Stainless Steel	-	2	2	
14	Travel Stop O-Ring	NBR70	-	2	2	*
15	Travel Stop Washer	Stainless Steel	-	2	2	
16	Travel Stop Nut	Stainless Steel	-	2	2	
17	Travel Stop Bolt	Stainless Steel	-	2	2	
18	Piston Guide Plate	POM	-	2	2	*
19	Pistion O-Ring	NBR70	-	2	2	*
20	Piston GuideRing	POM	-	2	2	*
21	End Cap Seals	NBR70	-	2	2	
22	Piston	Die Cast Aluminium	-	2	2	
23	Spring Cartridge	Stainless Steel/Nylon	-	-	12	
24	End Cap	Die Cast Aluminium	-	2	2	
25	End CapBolt	Stainless Steel	-	8	8	

About ASC Engineered Solutions

ASC Engineered Solutions connects high-quality products with advanced technology, service, and support. With nearly 2,000 employees, the company's extensive portfolio of precision-engineered piping support, valves and connections provides products to professionals across industries, such as commercial and residential construction, industrial, fire protection, and oil and gas. Its portfolio of leading brands includes ABZ Valve®, AFCON®, Anvil®, Anvil EPS, Basic-PSA, Beck®, Catawissa, Cooplet®, FlexHead®, FPPI®, Gruvlok®, J.B. Smith, Merit®, NAP®, Quadrant®, SCI®, Sharpe®, SPF®, SprinkFLEX®, Trenton Pipe, VEP, and WARDFlex®. With headquarters in Oak Brook, IL, ASC also has ISO 9001:2015 certified production facilities in PA, TN, IL, TX, AL, KS, and RI.

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