

1. Introduction

- 1.1 P range actuators are double-sealed to ensure the integrity of the lubricant in the center body and prevent the ingress of moisture and dirt. The piston rod and cylinder barrel are electroless nickel-plated to prevent corrosion and improve efficiency. These features make the P range actuator practically maintenance free.
- 1.2 The condition of the air supply to the actuator will effect the efficiency and life of the seals. Although it is not essential, seal life will be prolonged if a dryer, filter and lubricator are incorporated in the air supply system. A pressure regulator is also recommended to prevent over-pressurization of the units.
- 1.3 Standard P range actuators are capable of operating in environments ranging in temperature from -10°F to 200°F (-23°C to 93°C). High and low temperature builds are also available.

2. Installation instructions

- 2.1. It is recommended that before lifting an actuator onto a valve, great care is taken to ascertain the position of the valve and orientate the actuator accordingly.
- 2.2. P range actuators can be mounted on valves in almost any desired position. It is usual however to align the centerline of the cylinder to the centerline of the associated pipework.
- 2.3. When the actuator has been bolted to the valve flange or adapter and keys inserted, the position of the stop bolts should be checked to ensure full opening and closing of the valve.
- If these end positions are not suitable, the stop bolts 21 may be adjusted by first loosening the jam nut 22 and screwing the bolts in or out until the desired position is obtained. Stroke the yoke away from the stop bolt when adjusting, then return it to check position. When the correct positioning is obtained, retighten the jam nut.
- 2.4. Certain valves incorporate their own stops. In these cases, it is recommended that the actuator stop bolt positions coincide with the valve stop positions.
- 2.5. Relocate the yoke cover so that the white bar lies parallel to the pipeline when the valve is open. This is the visual position indicator.
- 2.6. Once in position, the actuator should operate the valve with a smooth continuous action.
- If jerky operation occurs, the air supply should be checked for correct pressure and volume flow. Flow may be restricted by undersize pipe or fittings, these could throttle the flow thus reducing the air pressure at the actuator and causing intermittent motion. All Rotork actuators are tested prior to dispatch and copies of test certificates are available on request.
- 2.7. The speed of operation can be adjusted by varying the air supply. A needle valve in the supply or exhaust line will reduce flow and hence increase operating time.

3. Preventive maintenance

- 3.1 P range actuators are designed to be maintenance free; however, preventive maintenance may be desired and the following items should be covered in such a program.
- 3.2 Grease or oil levels in the body should be checked, the oil level should be approximately 1/2"/12.5mm from the inside of the top cover. Use Mobil SCH624.

BODY SIZE	CAPACITY	
	U.S. Gallon	LITERS
250	0.75	3.0
325	1.50	5.7
500	3.25	12.3
700	8.00	30.3
900	14.00	52.9

For greased filled units, all moving surfaces should be liberally coated with grease. Use Schaffer #221 Moly Ultra 800 EP.

- 3.3 When prolonged periods of storage or inactivity are encountered for P range actuators, it is recommended that the actuators are operated for three or four cycles every month. This will ensure that the flexibility of the seals is maintained and will prevent the seal material from taking a permanent set.

To prevent the ingress of contaminating or corrosive substances it is recommended that all air inlets or outlets be plugged not only on the actuator, but also on any accessories such as direction control valves or positioners. All openings such as electrical conduit to junction boxes should also be sealed.

Actuators should not be stored in an atmosphere harmful to the seal material. If available, indoor storage is preferable.

P range actuators are extremely robust, however, the above precautions are recommended to ensure the required durability of the actuator.

- 3.4 Should a full strip down be part of a preventive maintenance program, follow the disassembly procedure (Sections 4-8) taking care to renew all seals and gaskets.

4. Disassembly double-acting

- 4.1 For normal duty, P range actuators are designed to be maintenance free for life. In instances of high load and high frequency of operation, more comprehensive maintenance may be required. In such cases, the following disassembly procedure should be adopted.
- 4.2 Ensure that the air supply is disconnected or locked off before removing the air supply pipe from the actuator.
- 4.3 Drain oil, if oil filled, by removing plug 26.
- 4.4 Disconnect the air supply pipe from the actuator and remove the actuator from the valve.

- 4.5 Remove the four yoke cover bolts 18.
- 4.6 Lift off yoke cover 8, gasket 9 and seal washer 15.
- 4.7 Remove the six center body cover bolts 17 (250-700). Items 30 & 32 (900).
- 4.8 Pry off center body cover 2 using the two screw driver slots adjacent to the dowel pins 16.
- 4.9 Remove tie rod nuts 58 (250 – 700).
- 4.10 Slide off end flange 54 gasket or 'O' ring 60 and cylinder 56.
- 4.11 Using piston 53, center the yoke 3 in the body 1.
- 4.12 Remove top slipper 4 and piston rod pin 5.
- 4.13 The piston rod 29 can now be pulled out by grasping the piston 53.
- 4.14 Pull yoke 3 from body 1.
- 4.15 Remove lower slipper 4 from body 1.
For access to piston rod seals in body.
- 4.16 Remove adaptor flange bolts 62.
- 4.17 Remove adaptor flange 55 to expose piston rod seal 52.
- 4.18 Remove piston rod cover bolts 202.
- 4.19 Remove piston rod cover 201 to expose piston rod seal 52.
For access to piston seal
- 4.20 Remove piston retaining bolt 63.
- 4.21 Separate piston 53 from piston rod 29 to expose seal 63.

5 Assembly double-acting

- 5.1 Prior to reassembly, all seals and gaskets must be renewed and lightly coated with clean grease. Care should be taken to ensure that sealing surfaces are clean. Do not grease cylinder gasket or 'O' ring 60.
- 5.2 To reassemble follow the exact reverse of the disassembly procedure.
- 5.3 Tighten piston retaining bolt 63, to recommended torque (Section 8.1).
- 5.4 Tighten adapter flange bolts 62, to recommended torque (Section 8.1).
- 5.5 Tighten cylinder nuts 58 alternating between opposite corners to recommended torque (Section 8.1).
- 5.6 Liberally smear all moving parts with grease, or fill with oil to the recommended level (Section 3.2).
- 5.7 Tighten cover bolts 17 (250 – 700). Item 30 & 32 (900).

6 Disassembly spring-return

- To remove spring cartridge with actuator on or off valve.
- 6.1 Before proceeding with the cartridge removal, it is essential that the piston 53 is at its farthest position from the center body 1.

- 6.2 To prevent unauthorized operation of the actuator, lock off or disconnect the air supply.
- 6.3 Remove four cartridge retaining bolts 159.
- 6.4 Push cartridge toward center body and turn clockwise through 35°, pull away from center body.

To fully disassemble the actuator.
- 6.5 Follow steps 6.1 to 6.4 to remove spring cartridge.
- 6.6 Follow steps 4.3 to 4.20 to dismantle actuator with the exception of steps 4.17 and 4.18, the removal of the piston rod cover, instead remove the spring return adapter 158 retained by bolts 162.

7 Assembly spring-return

- The assembly procedure is the direct reverse of the disassembly procedure.
- 7.1 Assemble unit as explained in Section 5 for the DA actuator.
- 7.2 Assemble SR Cartridge following the reverse of the procedure explained in Section 6.

8 Recommended tightening torque values

Item	No	Torque lbs ft (<i>upper</i>), Nm (<i>lower</i>)				
		250	325	500	700	900
Body Cover Bolt	17	10 13	35 47	87 118	87 118	87 118
Yoke Cover Bolt	18	7 9	27 36	67 91	67 91	67 91
Adaptor Bolt	62	75 102	150 204	525 714	525 714	525 714
Piston Bolt	63	150 204	583 792	1097 1491	1097 1491	1097 1491
Tie Rod – 5/8"	58	95 129	- -	- -	- -	- -
Tie Rod – 3/4"	58	169 229	169 229	169 229	169 229	- -
Tie Rod – 1"	58	- -	525 714	525 714	525 714	- -
Tie Rod – 1 1/8"	58	- -	- -	- -	- -	760 1033

