

Hydraulic Heavy Duty

Installation

1. 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 every 3 months to prevent the seals from taking a set.
2. Prior to assembly, manually open and close valve to insure freeness of operation. Be sure valve and Automax Actuator rotate in same direction and are in same position, i.e. valve closed, actuator closed.
3. Check mounting surfaces, stem adapter, and bracket to assure proper fit. Secure valve in closed position with stem vertical. Bolt bracket to valve and place stem adapter on valve stem. Position actuator over valve and lower to engage stem adapter to actuator shaft. Continue to lower until actuator seats on bracket mounting surface. To align bolt holes, it may be necessary to turn or stroke actuator a few degrees and/or adjust actuator travel stops. Bolt actuator to bracket.
4. After consulting valve manufacturer's recommendations, adjust travel stop bolts of actuator for proper open and closed valve positions. Hydraulically stroke actuator several times to assure proper operation without binding of stem adapter. If actuator is equipped with an Ultraswitch or other accessories, adjust them at this time.
5. To prolong actuator life, use a petroleum based hydraulic oil, such as Mobil DTE 24. Consult factory for seal compatibility with other fluids. For normal temperature ranges (50°-110°F), use an oil with viscosity of 150 SSU at 100°F.
6. Oil should be filtered with a minimum of 40 μ filter, depending on other system components and environment.

Travel Stop Adjustments

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

The Heavy Duty series actuators have travel stop adjustments in both clockwise and counterclockwise directions. The 12 degree overtravel feature provides adjustments from -6 to +96 degrees.

Field Conversion from FCW to FCCW (For Spring Return Actuators)

1. Dismount actuator from valve.
2. Apply hydraulic pressure to actuator and loosen Stop Bolt Jam nut (17). Back off clockwise Stop Bolt (16) to remove spring preload.
3. Remove hydraulic pressure from actuator.
4. Support Spring Cartridge (11) and loosen all four Spring Cartridge Nuts (41) evenly until all nuts are loose. The spring cartridge does not have to be removed.
5. Remove Position Indicator (44) or any other accessories that may be on output shaft.
6. Remove Bearing Retainer Screws (14) from valve mounting side, and slide Retainer Plate (13) off shaft.
7. The Torque Shaft (20) may now be tapped out of Housing (1) using a soft faced hammer. Use care not to drop shaft or Bearing (12) when they come out.
8. Rotate Torque Shaft (20) end for end and reinstall into Yoke (4), using care to line up shaft with Bearing (12) on opposite end. Push shaft through until shaft bottoms out. Hand pressure only should be needed to reinstall shaft.
9. Reinstall Bearing (12) into housing, ensuring that it is flush with top of housing.
10. Reinstall Bearing Retainer Plate (13) and Screws (14) ensuring that Gasket (37) is in place.
11. Tighten Spring Cartridge Nuts (41) evenly until all four are evenly tightened. See bolt torque chart below.
12. Apply hydraulic pressure to actuator and reset Stop Bolt (16). Never adjust stop bolt against spring force.
13. Reinstall any accessories or position indicator onto Torque Shaft (20).
14. Check actuator for proper operation.

MAINTENANCE INSTRUCTIONS

Disassembly Procedures

1. Disconnect all hydraulic and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount from valve.
2. To remove Piston Rod (3) and Piston Rod Bearing (2), center Yoke in mid- or 45 degree position.

Spring Group

Note: *Personal Injury may result if Step 2 is attempted before Step 1 is completed.*

1. Apply hydraulic pressure to the cylinder to release spring pressure from Stop Bolt (16). Remove both Stop Bolts (16) and remove hydraulic pressure. This will relieve majority of spring load.
2. The Spring Cartridge (11) is welded as an integral component and cannot be disassembled. To remove from actuator remove Spring Cartridge Nuts (41) and Lockwashers (42). At this point all spring forces are contained within welded cartridge and spring may be removed from body.

Note: *Support Spring Cartridge (11) during removal so as not to damage Piston Rod (3).*

Pressure Group

Note: *Rod pusher pressure group will not have a piston. Step 3 is not applicable.*

1. Remove Tie Rod Nuts (28), Tie Rods (27), and Endcap (29).
2. Slide Cylinder (23) over and off Piston (24), being careful not to scratch or dent honed and chrome plated surface of cylinder (23).
3. Remove Piston Bolt (25), Piston Bolt Lockwasher (26), Piston (24), and Piston Face Seal (32).
4. Remove Adapter Bolts (43) and carefully slide the Adapter (22) over the Piston Rod (3).

Note: *A double acting actuator will have a rod pusher pressure group on the opposite side of the main pressure group (in place of spring cartridge). Follow disassembly procedure as above, skipping step 3.*

Housing (Body Group)

1. Unscrew Inspection Cover Screw (9) with Lockwashers (10) and remove Cover (8) and Cover Gasket (35).

Note: *Prior to disassembly of remainder of Body Group visually check inspection opening to determine whether further disassembly is necessary. If Yoke (4), Yoke Pin (5), and Yoke Rollers (6) are in good condition, do not disassemble further.*

R2 actuators: To remove the Yoke Pin Retainers (7), use snap ring pliers with 90° tips. Access snap rings through inspection cover opening. Turn Piston Rod (3) to remove Yoke Pin Rollers (6) and Yoke Pin (5) through inspection cover opening.

R3 and R4 actuators: Remove both freeze plugs located in Housing near Bearing Retainer (13). Through these openings, both Yoke Pin Retainer Rings (7) can be removed. Yoke Pin Rollers (6) can be slipped off Yoke Pin (5). Push Yoke Pin (5) through Piston Rod (3) and out opening in other side of Housing (1).

3. Unscrew Bearing Retainer Bolts (14) and remove Bearing Retainer (13), Retainer Gasket (37), and Torque Shaft Seal (38) from valve mounting side of actuator.
4. Remove Torque Shaft (20) by tapping with a soft-faced hammer. Use care not to drop shaft or Bearing (12) as they come out. After removal of Torque Shaft (20) repeat step 3 on accessory side.

Reassembly Procedures

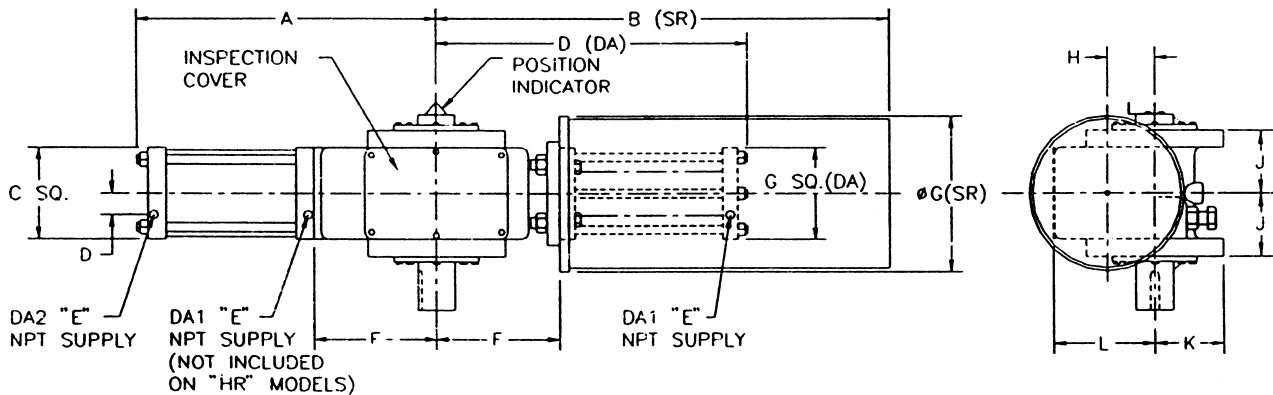
1. Inspect all parts for wear and replace any worn parts as needed. Normally all seals and gaskets should be replaced when reassembling an actuator.
2. Clean and grease all components with a multipurpose "polymer" fortified grease such as DuBois Chemical MPG-2. (Different greases may be required for low or high temperatures; consult factory).
3. Reverse the disassembly procedures to reassemble. Use the proper torque from the torque chart on the Tie Rod Locknuts (28), the Adapter Bolts (43), the Spring Cartridge Nuts (41), and the Piston Bolt (25). These threads should be lubricated with Loctite Threadlocker 242 or equivalent prior to assembly.
4. See attached drawing which depicts all required spare parts.
5. Test the actuator for smooth operation and hydraulic leakage at service pressure before re-installing.

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MODEL	A	DA	SR05	SR07	SR10	SR12	SR15	B				C	D	E	F	DA
								SR17	SR20	SR22	SR25					
R2HR	19.50	19.50	29.00	30.00	30.00	32.00	38.00	38.00	38.00	40.00	41.00	5.00	0.00	1/4	7.19	5.00
R2HP	20.50	19.50	30.00	32.00	38.00	40.00	41.00	41.00	N/A	N/A	N/A	5.00	0.50	1/4	7.19	5.00
R3HR	21.00	21.00	34.00	34.00	36.00	39.00	38.00	42.00	41.00	43.00	44.00	5.50	0.00	3/8	8.19	6.75
R3HP	22.00	21.00	34.00	36.00	38.00	41.00	43.00	44.00	45.00	45.00	N/A	6.00	0.00	3/8	8.19	6.75
R3HM	23.00	21.00	36.00	38.00	41.00	44.00	45.00	45.00	N/A	N/A	N/A	6.50	0.00	3/8	8.19	6.75
R3HL	23.00	21.00	39.00	41.00	44.00	45.00	N/A	N/A	N/A	N/A	N/A	7.13	0.00	3/8	8.19	6.75
R4HR	28.50	28.50	N/A	50.00	56.00	59.00	55.00	55.00	56.00	56.00	58.00	6.50	1.00	3/8	10.56	7.19
R4HP	31.00	28.50	50.00	56.00	59.00	55.00	56.00	56.00	58.00	59.00	59.00	7.00	1.00	3/8	10.56	7.19
R4HM	31.00	28.50	56.00	55.00	56.00	57.00	59.00	59.00	N/A	N/A	N/A	7.50	1.00	3/8	10.56	7.19
R4HL	33.00	28.50	59.00	56.00	57.00	59.00	N/A	N/A	N/A	N/A	N/A	8.00	1.00	3/8	10.56	7.19



Notes:

1. Actuator is shown in full Clockwise position.
2. *Double Acting:* Pressure at Port DA1 will result in CW rotation. Pressure at Port DA2 will result in CCW rotation. *Spring Return:* Pressure at Port DA2 will result in CW rotation. Spring provides CW rotation upon loss of supply pressure.

MODEL	ØG									H	J	K	L	Vol.
	SR05	SR07	SR10	SR12	SR15	SR17	SR20	SR22	SR25					
R2HR	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75	11
R2HP	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75	19
R3HR	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25	3.00	4.13	4.44	6.81	30
R3HP	13.25	13.25	13.25	13.25	13.25	13.25	14.63	14.63	N/A	3.00	4.13	4.44	6.81	42
R3HM	13.25	13.25	13.25	13.25	14.63	14.63	N/A	N/A	N/A	3.00	4.13	4.44	6.81	58
R3HL	13.25	13.25	14.63	14.63	N/A	N/A	N/A	N/A	N/A	3.00	4.13	4.44	6.81	75
R4HR	N/A	14.63	14.63	16.63	16.63	16.63	16.63	16.63	16.63	4.50	5.82	6.50	9.75	87
R4HP	14.63	14.63	16.63	16.63	16.63	16.63	16.63	16.63	N/A	4.50	5.82	6.50	9.75	113
R4HM	14.63	16.63	16.63	16.63	16.63	16.63	N/A	N/A	N/A	4.50	5.82	6.50	9.75	177
R4HL	16.63	16.63	16.63	16.63	N/A	N/A	N/A	N/A	N/A	4.50	5.82	6.50	9.75	255

"Vol." is Swept volume (in³)

BOLT TORQUE

Piston Bolt (25) (SAE Grade 8 Bolt)*

Actuator Size	Bolt Size	Torque Range
R2HP	3/4"-10 UNC	271-320 ft.lb.
R3HP,R3HM,R3HL	1 1/4"-7 UNC	537-591 ft.lb.
R4HP,R4HM,R4HL	1 1/4"-7 UNC	1014-1116 ft.lb.

*Not present in rod pusher actuators

Tie Rod (27) (A311 Stressproof Rod)

Actuator Size	Bolt Size	Torque Range
R2HR,R2HP	5/8"-11 UNC	117-130 ft.lb.
R3HR-R4HL	3/4"-10 UNC	207-229 ft.lb.

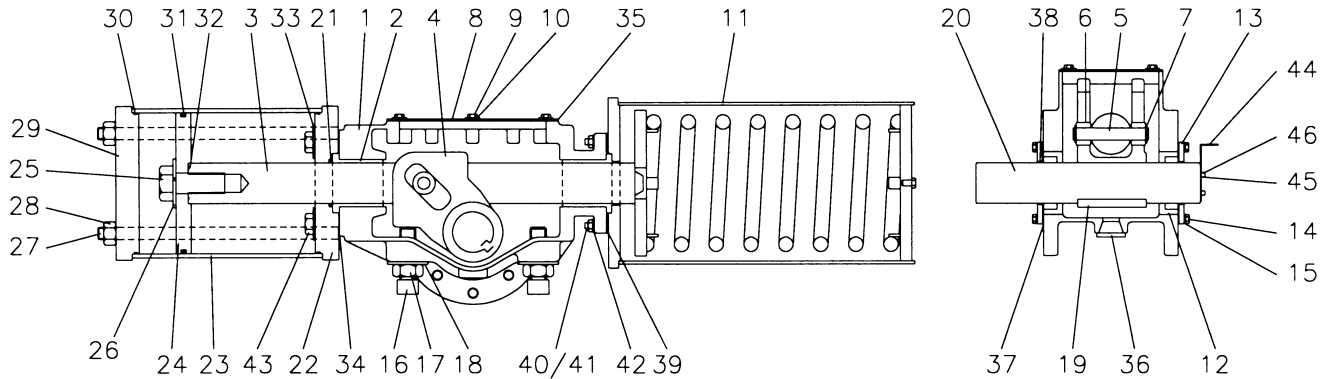
Adaptor Bolt (43) (SAE Grade 5 Bolt)

Actuator Size	Bolt Size	Torque Range
R2HR,R2HP	5/8"-11 UNC	123-136 ft.lb.
R3HR-R4HL	3/4"-10 UNC	217-240 ft.lb.

Spring Cartridge Stud (ASTM A193 Grade B7)

Actuator Size	Bolt Size	Torque Range
R2HP	1/2"-13 UNC	64-71 ft.lb.
R3HR-R3HL	3/4"-10 UNC	226-249 ft.lb.
R4HR-R4HL	1"-8 UNC	546-603 ft.lb.

Parts and Materials



Note: Spring Cartridge is replaced by rod pusher pressure group on DA actuator.

Item	Description	Material	Qty.
1	Housing	Ductile Iron	1
2	Piston Rod Bearing	Bronze	2
3	Piston Rod	Steel/Chrome	1
4	Yoke	Ductile Iron	1
5	Yoke Pin	Steel	1
6	Yoke Pin Roller	Steel	2
7	Yoke Pin Retaining Ring	Steel	2
8	Inspection Cover	Steel	1
9	Inspection Cover Screw	Steel	6
10	Inspection Cover Lockwasher	Steel	6
11	Spring Cartridge/Rod Cover Gp	Steel	1
12	Torque Shaft Bearing	Steel	2
13	Bearing Retainer Plate	Steel	2
14	Bearing Retainer Screw	Steel	8
15	Bearing Retainer Lockwasher	Steel	8
16	Stop Bolt	Steel	2
17	Stop Bolt Jam Nut	Steel	2
18	Stop Bolt Washer	Steel	2
19	Yoke Key	Steel	1
20	Torque Shaft	Steel	1
21*	Piston Rod Seal	Molythane	1
22	Adapter	Steel	1
23	Cylinder	Steel/Chrome	1

Item	Description	Material	Qty.
24	Piston	Steel	1**
25	Piston Bolt	Steel	1**
26	Piston Bolt Lockwasher	Steel	1**
27	Tie Rod	Steel	4
28	Tie Rod Locknut	Steel/Nylon	4
29	Endcap	Steel	1
30*	Pressure Cylinder Seal	Nitrile	2
31*	Piston Cylinder Seal	Molythane	1**
32*	Piston Face Seal	Nitrile	1
33*	Adapter Bolt Thread Seal	Nitrile/Steel	4
34*	Adapter Gasket-Pressure Side	Fiber	1
35*	Inspection Cover Gasket	Fiber	1
36	Breather Plug	Bronze	1
37*	Bearing Retainer Gasket	Fiber	2
38*	Torque Shaft Seal	Nitrile	2
39*	S.C./Rod Cover Gp Gasket	Fiber	1
40	Bolt (Rod Cover Gp) DA only	Steel	4
41	S.C./Rod Cover Gp. Nut	Steel	4
42	S.C./Rod Cover Gp. Lockwasher	Steel	4
43	Adapter Bolt-Pressure Side	Steel	4
44	Position Indicator	Steel	1
45	Position Indicator Bolt	Steel	2
46	Position Indicator Lockwasher	Steel	2

*Recommended Spare Parts

**Not present in rod pusher pressure group

Seal Kits

Buna/Molythane - R(Actuator Base Model No.)SKB
Viton/Fluoromyte - R(Actuator Base Model No.)SKV
ie: Buna Seal Kit for R3HRDA is R3HRSKB

Temperature Ratings

Standard- Buna/Molythane -25°F to 180°F

High Temperature - Viton/Fluoromyte 0°F to 300°F

Note: These temperature ranges are for seals only. Hydraulic fluid temperature limitations may apply. Consult hydraulic fluid supplier.