

M Series Actuators

Maintenance Instructions & Parts List

Provide Model Number and Serial Number When Ordering Spare Parts.

General

Limit the maximum operational pressure of the Parker M series rotary actuator to 3000 PSIG. Refer to the engineering catalog for operational specifications.

The actuator consists of the: rotary group which includes the rack gear and cylinder tubes; the pinion gear; the end cap group; the housing group; and the seal group.

The actuator rotates CCW when (facing the output shaft or mounting face) the lower left (and upper right) cylinder ports receive flow from a suitable power unit. Likewise, the actuator rotates CW when the lower right (and upper left) cylinder ports receive flow from a suitable power unit.

AAD lubricates the gear train with an EP grease that has a minimum MOS2 content of 3%. The factory installs TEXACO MOLYTEX EP(2) extreme pressure grease at assembly and test. If necessary, replenish the gear box lubricant with either MOLYTEX EP(2) lubricant or an equivalent.

Lubricant leakage from the housing relief valve is a symptom of a damaged piston seal and/or the cylinder tube bore. The urgency of repair depends upon the actuator's duty cycle and the rate at which the lubricant leaks from the housing. The typical repair involves replacing the piston seals; smoothing out any minor damage in the cylinder bore or replacing severely damaged cylinder tubes; and replacing or replenishing

the gear lubricant. Any good quality EP grease similar to TEXACO MOLYTEX EP(2) grease would be suitable.

In the event that a maintenance repair is needed, then we suggest using the following (outline) steps:

A. Inspection and Replacement of the End Cap O-Ring (14) and Back Up Ring (15)

1. Rotate shaft to mid-stroke position. Remove the end cap bolts (2) and the flat washers (3).
2. Screw threaded rod into tapped holes of end cap (16) and push end cap (16) into cylinder tube (29) and stop when you see the keeper ring (17).
3. Remove the keeper ring (17) by moving the short sides of the keeper rings radially into the cylinder; then move the larger top and bottom sides the same way.
4. Pull the end cap (16) out of the cylinder tube.
5. Cushion equipped end caps: remove adjusting screw (40.)

Assembly

(Omit steps 6 & 7 if end cap is not equipped with the cushion feature.)

6. Inspect adjusting screw o-ring (39); replace if necessary.
7. Install cushion adjusting screw into cushion equipped end cap.
8. Inspect end cap o-ring (14) and back up ring (15); replace if necessary. Note that the back up ring must be installed opposite the high pressure side of the o-ring.
9. Install end cap (16) into the cylinder tube (29) and push into position described in section A2.
10. Install the keeper ring (17) by positioning the large top and bottom segments and then the short segments. If necessary, suggest using a grease or vasoline as an installation aid to hold the segments in place.
11. Pull end cap (16) back into position against keeper ring.
12. Install the end cap bolts (2) and flat washers (3).
13. Apply proper torque to secure end cap assembly.

B. Inspection & Replacement of Piston Seal (12)

1. Follow steps 1, 2, 3 & 4 from section A.
2. Remove rack bolt (18) or remove cushion spear (35).
3. Install the piston (13) into the cylinder (29) and push until the piston is flush against the face of the rack gear (28).
4. Screw threaded rod into tapped holes in piston (13).
5. Pull piston, piston seal (12), and wear ring (11) free from cylinder (29).
6. Inspect and if necessary, replace the piston seal. (Polypak o-ring must face toward the high pressure side.) Replace the wear ring (11) if necessary.
7. Inspect and replace rack bolt or cushion spear o-ring seal (19) and back up ring (20). Replace if necessary. Install the back up ring opposite the pressure side.
8. Install the rack bolt (18) or the cushion spear (35) and tighten with the appropriate torque value presented in the table.
CAUTION: The nylok slug (21) is used to help the rack bolt or cushion spear resist loosening caused by vibration. Ensure the nylok slug is properly installed into the rack bolt or cushion spear prior to assembly. Replace if necessary.
9. Follow steps 6 through 13 from section A to install the end cap.

C. Inspection and Replacement of Bearing Cap O-Ring (31) and Pinion O-Ring (33).

1. Remove bearing cap bolts (5) and lock washers (6).
2. Pull bearing cap (4) from the housing (1).
CAUTION: Use two bearing cap bolts (5) as “jacking screws” by screwing into the tapped holes in the bearing cap (4). Use wrench to “lift” the bearing cap out of the housing.
3. Mark witness marks on the pinion. Remove bearings (32) and pinion (34). Mark witness marks on the pinion (34) and rack gear (28) to ensure correct timing at assembly.
4. Inspect and replace pinion o-rings (33) in bearing cap (4) and in housing (1) if necessary.
5. Install bearings (32) and pinion (34) in housing. Pay attention to the witness marks so correct timing is achieved.
6. Inspect and replace bearing cap o-ring (31) if necessary.
7. Install bearing cap (4) and bearing cap bolts (5) with lock washers (6). Fasten bolts to torque values indicated in the table.

Bearing Preload Procedure ‘M’Series Rotary Actuators

1. After reassembly of actuator, torque bearing cap bolts, item #3, to the value given in the torque table on page 95.
2. Loosen bearing cap bolts and retighten to approximately 1/2 of the recommended torque value.
3. Using a feeler gauge, measure the gap between the bearing cap and housing created by the loosening of the bolts in step #2.
4. Add shims as required per the measurement taken. If shimming can not be obtained to the exact measured amount, get as close as possible without going over the measured thickness required.

Note: shim thickness available: .005", .015"

D. Disassembly of Actuator. Procedure for Removal, Inspection and Replacement of Rack Bearing (27).

1. Follow suggested instructions 1, 2, and 3 from section C to remove bearing cap (4), bearings (32), and pinion (34).
CAUTION: Mark witness marks on the pinion (34) and rack gear (28) to ensure correct timing at assembly.
2. Follow suggested instruction 1, 2, 3, 4, and 5 from section B.

3. Remove keeper flange bolts (22) and keeper flange lock washers (23).
4. Remove keeper ring (25) by sliding keeper flange (24) along cylinder (29) until keeper ring (25) is exposed. Remove both sections of the keeper ring.
5. Pull cylinder (29) from housing (1).
6. Slide keeper flange (24) from cylinder (29).
7. Inspect and replace cylinder o-ring (26) if necessary.
8. Slide rack (28) out of the housing.
CAUTION: Use care not to damage the rack bearing. Ensure the rack gear teeth remain opposite from the rack bearing (27).
9. Inspect and replace rack bearing (27) if necessary.
CAUTION: Ensure the rack bearing remains centered in the housing.
10. Install rack gears (28). Ensure the rack gear is slid into place. Suggest using grease or vasoline to hold the rack bearing in place during rack installation. Center the rack gear inside the housing. Use generous amounts of EP2 grease or equivalent to coat and ensure the gear train is properly lubricated during operation.
11. Assemble keeper flange (24) and the keeper ring (25) on to the cylinder (29). Install keeper ring (25) in slot of cylinder (29) and the slide keeper flange (24) over keeper ring (25). Slide assembly into the housing.
12. Install keeper flange bolts (22) and lock washers (23). Fasten keeper flange bolts (22) to torque values specified in the table.
13. Repeat steps 4, 5, 6 and 7 from section C.
14. Repeat steps 7, 8 and 9 from section B.
15. Ensure housing has a generous amount of lubricant. Install the housing relief valve (10).

Caution:

Do not pump housing completely full of grease. Only a generous amount of lubricant is required. This will eliminate the potential of filling the “non-pressure” side of the cylinder tubes with grease.

Additional information may be obtained from the PNEUMATIC DIVISION in Wadsworth, Ohio or from the nearest authorized PARKER HANNIFIN Distributor or Representative.

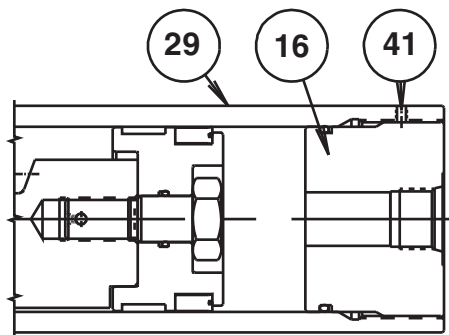
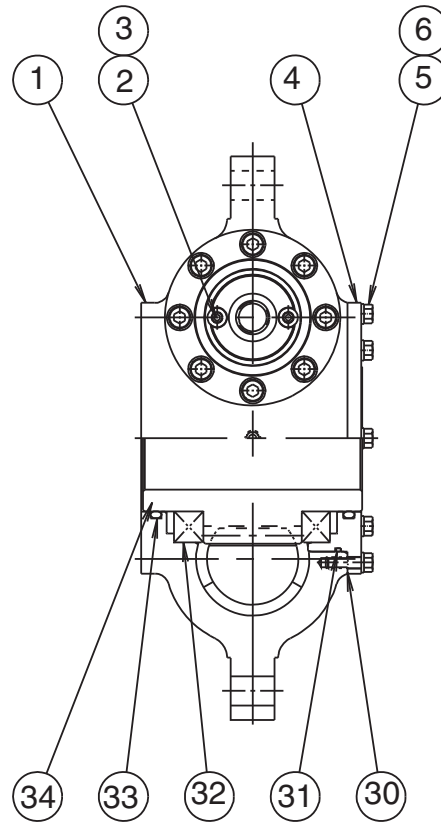
ITEM	DESCRIPTION	QUANTITY	
		SINGLE	DOUBLE
1	Housing	1	1
2	Bolt, End Cap	4	8
3	Flat Washer, End Cap	4	8
4	Bearing Cap	1	1
5	Bolt, Bearing Cap	8	8
6	Lockwasher, Bearing Cap	8	8
7	Plug, Housing	1	1
8	Name Plate, Housing	1	1
9	Drive Screw, Name Plate	4	4
10	Relief Valve, Housing	1	1
11*	Wear Ring, Piston	2	4
12*	Piston Seal	2	4
13	Piston	2	4
14*	O-Ring, End Cap	2	4
15*	Back-up ring, End Cap	2	4
16	End Cap	2	4
17	Keeper Ring, End Cap	2	4
18	Rack Bolt	2	4
19*	O-Ring, Rack Bolt	2	4
20*	Back-up Ring, Rack Bolt	2	4
21	Nylon Slug, Rack Bolt	2	4
22	Bolt, Keeper Flange	16	32
23	Lockwasher, Keeper Flange	16	32
24	Keeper Flange	2	4
25	Keeper Rings	2	4
26*	O-Ring, Cylinder	2	4
27	Rack Bearing, Housing	1	2
28	Rack	1	2
29	Cylinder	2	4
30‡	Shim	2	2
31*	O-Ring, Bearing Cap	1	1
32	Bearing	2	2
33*	O-Ring, Pinion	2	2
34	Pinion	1	1
35+	Cushion Plug	1	1
36+	Retainer Ring	1	1
37+	Cushion Bushing	1	1
38+	Plug, End Cap	1	1
39+*	O-Ring, Adjust Screw	1	1
40+	Cushion Adjusting Screw	1	1
41	Set Screw	2	4
42**	Air Bleeder	2	4

* Item Included in Seal Kit

** If Unit is Equipped With "G" Option (Air Bleeds)

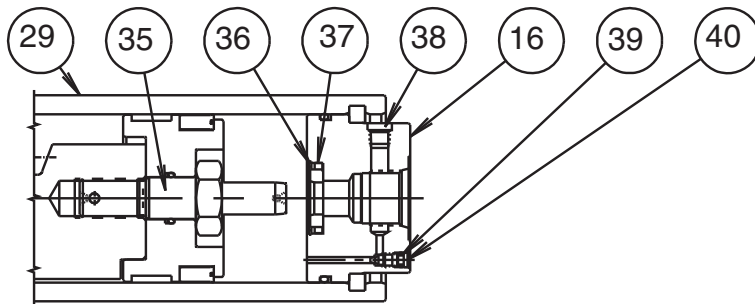
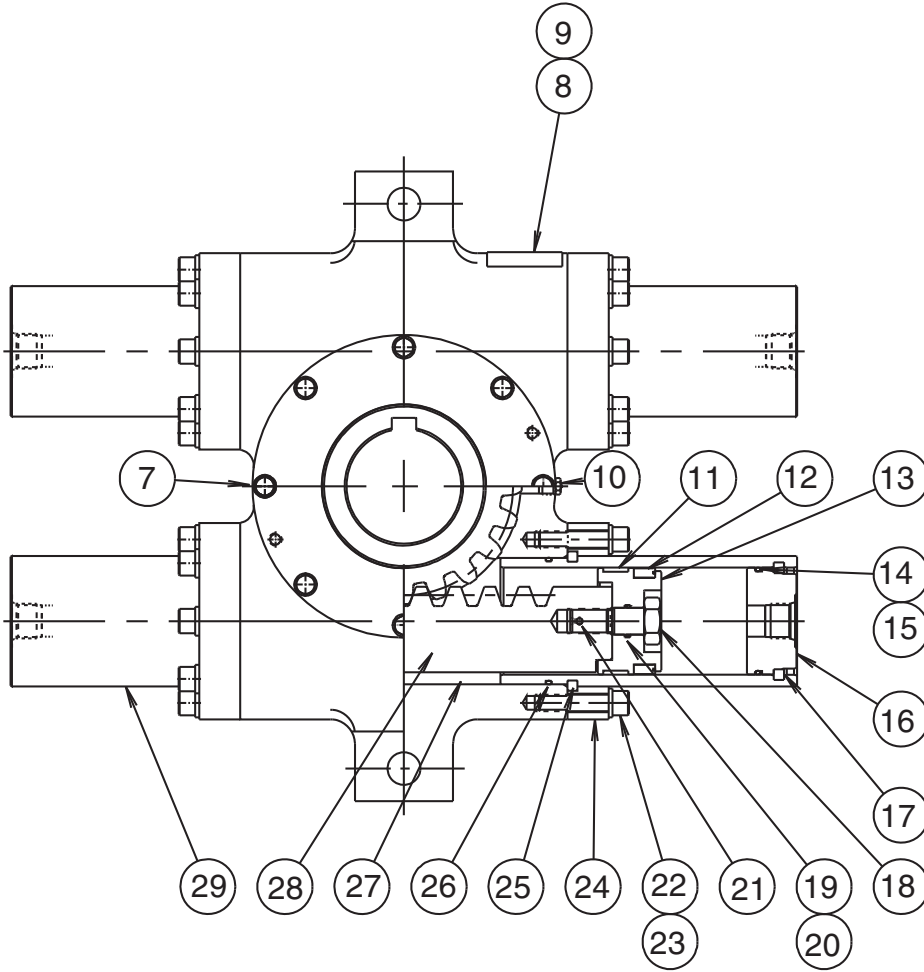
+ For Cushion in One Direction, Qty. 1
 For Cushion in Both Directions, Qty. 2
 On Double Rack for Cushion in Both Directions, Qty. 4

‡ Total Shims = 2 (1 of each, or as required)
 1 Shim = 0.005" Thick
 1 Shim = 0.015" Thick

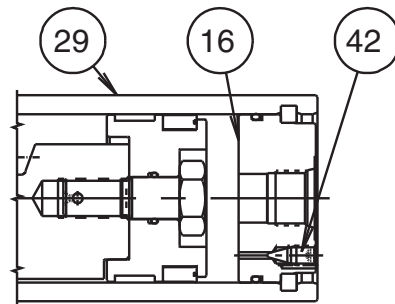


5° Stroke Adjust Option

Caution: Do not adjust out past flush position



Cushion Detail



Air Bleed Detail

Torque Table (LB-FT)

Model No.	Rack Bolt #24 Cush. Plug #35	Bearing Cap Bolt #3	Keeper Flange Bolt #33
15/30M	35	5	10
75/150M	35	18	45
300/600M	110	45	80
1000M	200	90	90

Notes

