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**Maintenance Bulletin H100-M02**  
**Series H Hydraulic Cylinders**  
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## KITS FOR SERIES 'H' HYDRAULIC CYLINDERS

Atlas service kits of expendable parts for fluid power cylinders are stocked in principal industrial locations across the U.S.A. For prompt delivery and complete information, contact your nearest Atlas Cylinders distributor. When ordering seal kits, call out the kit number listed below. If your fluid or temperature conditions differ from standard service, call out both the name of the fluid and the operating temperature.

### STANDARD SEALS

Polyurethane and Buna-N seals are supplied on all standard cylinders. They are suitable for use with pressurized air, nitrogen, mineral and petroleum based hydraulic fluids. The recommended operating temperature range for standard seals is  $-10^{\circ}\text{F}$  ( $-23^{\circ}\text{C}$ ) to  $+165^{\circ}\text{F}$  ( $+74^{\circ}\text{C}$ ).

### FLUOROCARBON SEALS (FPM)

FPM seals can be supplied on request, and are especially suitable for elevated temperature service. When using FPM seals for high temperature service or fluid compatibility within a temperature range of  $-10^{\circ}\text{F}$  ( $-23^{\circ}\text{C}$ ) to  $+250^{\circ}\text{F}$  ( $+121^{\circ}\text{C}$ ), specify FPM seals. For elevated temperatures above  $+250^{\circ}\text{F}$  ( $+121^{\circ}\text{C}$ ) specify FPM seals and a pinned piston connection. This recommendation should also be followed when ordering spare piston and rod assemblies. FPM seals can operate up to a maximum of  $+400^{\circ}\text{F}$  ( $+204^{\circ}\text{C}$ ) with reduced service life.

### ! WARNING!

The threaded piston rod to piston connection is secured with an anaerobic adhesive that is temperature sensitive. Cylinders ordered with FPM seals are assembled with an adhesive with a maximum operating temperature rating of  $+250^{\circ}\text{F}$  ( $+121^{\circ}\text{C}$ ). Cylinders ordered with all other seal compounds are assembled with adhesive having a maximum operating temperature rating of  $+165^{\circ}\text{F}$  ( $+74^{\circ}\text{C}$ ). These temperature limitations must be strictly followed to prevent loosening of the threaded connections. When cylinders are intended to be used above  $+250^{\circ}\text{F}$  ( $+121^{\circ}\text{C}$ ), specify a pinned piston to rod connection. The same limitations are true if a studded rod end is used. Specify a solid rod end for temperatures above  $+250^{\circ}\text{F}$  ( $+121^{\circ}\text{C}$ ).

| ROD DIA | STANDARD SEALS |              | FPM SEALS     |              |
|---------|----------------|--------------|---------------|--------------|
|         | CARTRIDGE KIT  | ROD SEAL KIT | CARTRIDGE KIT | ROD SEAL KIT |
| 5/8     | 0A06R000S      | 0A06S000S    | 0A06R000V     | 0A06S000V    |
| 1       | 0A10R000S      | 0A10S000S    | 0A10R000V     | 0A10S000V    |
| 1 3/8   | 0A13R000S      | 0A13S000S    | 0A13R000V     | 0A13S000V    |
| 1 3/4   | 0A17R000S      | 0A17S000S    | 0A17R000V     | 0A17S000V    |
| 2       | 0A20R000S      | 0A20S000S    | 0A20R000V     | 0A20S000V    |
| 2 1/2   | 0A25R000S      | 0A25S000S    | 0A25R000V     | 0A25S000V    |
| 3       | 0A30R000S      | 0A30S000S    | 0A30R000V     | 0A30S000V    |
| 3 1/2   | 0A35R000S      | 0A35S000S    | 0A35R000V     | 0A35S000V    |
| 4       | 0A40R000S      | 0A40S000S    | 0A40R000V     | 0A40S000V    |
| 4 1/2   | 0A45R000S      | 0A45S000S    | 0A45R000V     | 0A45S000V    |
| 4 1/2+  | 0A45R100S      | 0A45S100S    | 0A45R100V     | 0A45S100V    |
| 5       | 0A50R000S      | 0A50S000S    | 0A50R000V     | 0A50S000V    |
| 5+      | 0A50R100S      | 0A50S100S    | 0A50R100V     | 0A50S100V    |
| 5 1/2   | 0A55R000S      | 0A55S000S    | 0A55R000V     | 0A55S000V    |
| 5 1/2+  | 0A55R100S      | 0A55S100S    | 0A55R100V     | 0A55S100V    |
| 7       | 0A70R000S      | 0A70S000S    | 0A70R000V     | 0A70S000V    |
| 8       | 0A80R000S      | 0A80S000S    | 0A80R000V     | 0A80S000V    |

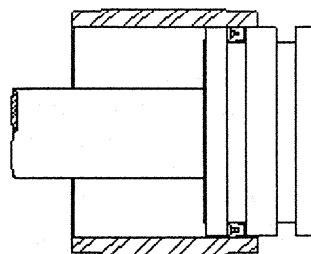
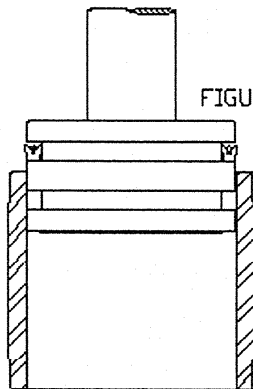
| BORE DIA | STANDARD SEALS | FPM SEALS |
|----------|----------------|-----------|
| 1 1/2    | 0B00S015S      | 0B00S015V |
| 2        | 0B00S020S      | 0B00S020V |
| 2 1/2    | 0B00S025S      | 0B00S025V |
| 3 1/4    | 0B00S032S      | 0B00S032V |
| 4        | 0B00S040S      | 0B00S040V |
| 5        | 0B00S050S      | 0B00S050V |
| 6        | 0B00S060S      | 0B00S060V |
| 7        | 0B00S070S      | 0B00S070V |
| 8        | 0B00S080S      | 0B00S080V |
| 10       | 0B00S100S      | 0B00S100V |
| 12       | 0B00S120S      | 0B00S120V |
| 14       | 0B00S140S      | 0B00S140V |

+ FOR 10 AND 12 INCH BORE SIZES

**SERVICING THE PISTON AND BODY SEALS**

Disassemble the cylinder completely. Remove the old seals and clean all of the parts. The cylinder bore and the piston should then be examined for evidence of scoring. Light scratch or hone marks (too small to catch a fingernail), which are usually present on both piston and cylinder bore, will generally cause no difficulty.

Lubricate the piston OD and both seal grooves using hydraulic fluid from the system or a compatible product. Install one piston seal cup in the groove nearest the piston rod with the lips of the seal facing toward the rod end of the cylinder. Coat the inside of the cylinder body with a suitable lubricant and insert the piston, cap end first into the cylinder body as shown in figure 1. Turn the cylinder body on its side and push the piston through the barrel just far enough to expose the groove for the second seal (See figure 2). Be careful not to move the piston too far so as to expose the first seal. If this is done, the lip of the seal may slip past the end of the barrel and be damaged when the piston is pulled back into the body. If the piston should move too far, pass the entire assembly completely through the body and start again. When the piston is properly positioned, install the second seal cup in the exposed groove with the lips facing away from the rod. Pull the piston assembly into the body.



The piston is sealed and securely locked to the piston rod with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel (see warning on opposite side).

Assemble both cap and rod end heads, complete with the cylinder body seals installed, to each end of the body. Install the tie rods and tighten nuts to the proper torque from the table below. Tie rod twist can be eliminated by chalking a straight line on each tie rod before torquing, and backing off the nut after torquing so this line is straight again. This is particularly important on long-stroke cylinders. Tie rod torque should be applied in a diagonal pattern to avoid cocking the heads or putting the seal in a bind.

In the case of a center trunnion mounted cylinder (TM-3 mounting, or NFPA MT4), care must be taken to prevent binding the cylinder body when repositioning the trunnion. The proper method of assembling this type of cylinder is as follows: Install the trunnion onto the body, torquing the two halves as shown below. Install the piston seals and the piston rod assembly into the body as above, and fit the cap with its seal onto the body. Then 'stud' into the trunnion the four tie rods that connect the cap side. Install and lightly tighten the tie rod nuts, keeping the distances from the inner face of the cap to the back of the trunnion equal when the nuts are in contact with the cap. Finally, install the rod end head and the tie rods for the rod end of the cylinder. When the assembly is ready for final tightening, it may be necessary to adjust the tie rods at the cap to keep the trunnion in its proper location. Tie rod torque should be applied from both ends of the assembly.

**TRUNNION BOLT TORQUE**

| Bore Size    | Thread Size | Torque (Ft - Lbs.) |
|--------------|-------------|--------------------|
| 1.50         | .312-24 UNF | 18 +/- 5           |
| 2.00, 2.50   | .375-24 UNF | 35 +/- 7           |
| 3.25, 4.00   | .500-20 UNF | 75 +/- 15          |
| 5.00         | .500-13 UNC | 90 +/- 15          |
| 6.00         | .750-10 UNC | 275 +/- 35         |
| 7.00         | .875-9 UNC  | 460 +/- 60         |
| 8.00         | 1.00-8 UNC  | 660 +/- 75         |
| 10.00        | 1.25-7 UNC  | 950 +/- 100        |
| 12.00, 14.00 | 1.50-6 UNC  | 1550 +/- 175       |

**RECOMMENDED TIE ROD TORQUE VALUES  
FOR SERIES H CYLINDERS**

| BORE             | 1 1/2  | 2      | 2 1/2  | 3 1/4  | 4      | 5      | 6    | 7        | 8        | 10       | 12       | 14       |
|------------------|--------|--------|--------|--------|--------|--------|------|----------|----------|----------|----------|----------|
| TIE ROD THREAD   | 3/8-24 | 1/2-20 | 1/2-20 | 5/8-18 | 5/8-18 | 7/8-14 | 1-14 | 1 1/8-12 | 1 1/4-12 | 1 1/8-12 | 1 1/4-12 | 1 1/4-12 |
| TORQUE (FT. LB.) | 18     | 45     | 45     | 120    | 131    | 312    | 528  | 800      | 1168     | 700      | 1320     | 1000     |