PENINSULAR®
CYLINDER CO.

Cylinder Repair & Maintenance Instructions

Model LH

NFPA Low Pressure Hydraulic Cylinder

- 2,500 PSI Rated - 1,500 PSI Working Pressure
- 1 1/2” to 6” Bore Sizes
- Teflon Backup Seals at all Pressure Points
- Designed for Tough Applications

800-526-7968

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PENINSULAR CYLINDER COMPANY

CYLINDER MAINTENANCE AND REPAIR MANUAL
LH SERIES LOW PRESSURE HYDRAULIC CYLINDER
- 1.500 to 6.000 BORE -

Please refer to Cylinder Parts List drawings and related charts when performing cylinder repairs. (See pages 5 & 6)

NOTES:

1. **MEAN TIME TO REPAIR (MMTR) FOR THE LH SERIES HYDRAULIC CYLINDER IS . 5 HOURS - THIS DOES NOT INCLUDE THE TIME NECESSARY TO REMOVE THE CYLINDER FROM THE TOOL.**

2. **PREVENTIVE MAINTENANCE IS LIMITED TO KEEPING ANY EXPOSED PISTON ROD SURFACE FREE OF DEBRIS (GRIT, WELD SLAG, ETC.) AND PROVIDING ADEQUATE LUBRICATION TO CYLINDER PIVOT POINTS (CLEVIS PINS & BORES, TRUNNION PINS, ETC.)**

3. **FOR YOUR SAFETY, BE CERTAIN THAT THE CYLINDER IS FULLY DE-PRESSURIZED PRIOR TO PERFORMING ANY MAINTENANCE OPERATION DESCRIBED BELOW.**

4. **FOR PRESSURE RATINGS ON LH SERIES CYLINDERS REFER TO TABLE 2 ON PAGE 7.**

ROD CARTRIDGE SEALS

To replace rod seal, rod wiper, and cartridge seals:

1. Remove cartridge retainer screws (item 24). Normally, the tie rod nuts (item 18) DO NOT have to be loosened to replace cartridge seals unless cylinder is supplied with "Tie Rod Retained Cartridge".
2. Remove cartridge retainer (item 4).
3. Remove rod bearing cartridge (item 2) from head by pulling straight out while twisting slightly.
4. Remove rod wiper (item 3), rod seal (item 23), and cartridge o'ring & backup (items 5 & 6). Note orientation of sealing lips on rod seal and rod wiper.
5. Clean cartridge and inspect for excessive wear or scoring. Replace as required.
6. Install new rod wiper, rod seal, and cartridge o'ring and backup noting orientation of rod seal and wiper in seal grooves. Coat I.D. of rod cartridge and seals with system fluid.
7. Check piston rod end for burrs in area of threads and wrench flats. Remove and polish sharp edges as required.
8. Install cartridge assembly over piston rod end with a slight twisting motion. Push cartridge into cavity in head (item 7)
9. Install cartridge retainer and torque screws to values in torque table.

TUBE END SEALS

To replace tube end seals:

1. Remove tie rod nuts (item 18). It may be helpful to grip tie rods (item 19) with visegrip pliers to prevent tie rods from twisting.
2. Remove head (item 7) and cap (item 20) from cylinder tube (item 11).
3. Remove old tube end seals (item 8). Clean seal grooves thoroughly.
4. Install new o'rings in head and cap. Make sure that o'ring is fully seated in seal groove.
5. Re-assemble head and cap to tube being careful not to pinch o'rings.
6. Hand tighten tie rod nuts initially, making sure that head and cap are square to tube. Assembly of cylinder on a flat surface may be helpful to assure proper alignment of head and cap.
7. Torque tie rod nuts in order shown in Figure 1 and to the torque values shown in torque chart (Table 1). Gripping tie rods with visegrip pliers may be helpful to avoid twisting of tie rods during tightening.

PISTON SEALS

To replace piston seals and wearband:

1. Remove tie rod nuts, tie rods, head and cap (see instructions 1 & 2 under "Tube End Seals").
2. Pull piston and rod assembly from cylinder tube (item 11).
3. Remove piston seals (item 14) and wearband (item 15) from grooves with brass or plastic tool. Avoid the use of tools which will damage seal groove surfaces.
4. Clean piston and cylinder tube with suitable solvent. Blow dry with compressed air. Inspect parts for wear or scoring. Replace if necessary.
5. Install new wearband and (2) new piston seals on piston. (Note: Lips on piston seals must face system pressure in cylinder; see parts list for proper seal orientation). Lightly coat seals and tube I.D. with system fluid.
6. Install piston assembly into tube being careful to avoid damage to piston seals.
7. Re-install head, cap, and tie rods; tighten tie rod nuts following instructions 5 thru 7 under "Tube End Seals".

CUSHION INSERTS & CUSHION ADJUSTING SCREW

To replace cushion inserts & cushion adjusting screw:

1. The cushion adjusting screw and its sealing o'ring may be replaced without dismantling the cylinder. **(Make sure that the cylinder is not pressurized before attempting this procedure).**
2. Remove cushion adjusting screw (item 22) by turning counterclockwise.
3. Inspect cushion screw tip and o'ring seal (item 21). Replace any worn or damaged parts.
4. Install new o'ring (item 21) on cushion adjusting screw. Reinstall components into head and/or cap.
5. To replace floating cushion inserts (items 10 & 17), head and/or cap must be removed (follow instructions under "Tube End Seals"). Once head and/or cap is removed, cushion inserts may be removed by removing the retaining rings (items 9 & 16). Avoid the use of tools that will damage the metal surfaces. Note orientation of cushion inserts - flange on cushion insert should face toward head or cap. Clean out cushion insert bore(s) and install new cushion insert(s) by simply placing it into the bore and installing the retaining ring(s). The cushion insert should float in its bore. Inspect cushion bushing and cushion spear surfaces for wear or scoring. Worn or scored surfaces will damage the new cushion inserts. Replace if necessary.
6. Re-install piston assembly, head, cap, and tie rods; tighten tie rod nuts following instructions 5 thru 7 under "Tube End Seals".

PISTON & PISTON ROD

To remove piston from piston rod:

1. Piston rod (item 1) and piston (item 13) are assembled at the factory with a high strength locking sealant.
2. Remove piston rod/piston assembly from cylinder (see instructions 1 & 2 under "Piston Seals"). Remove piston seals from piston.
3. Heat piston and piston rod assembly to 400 - 450 degrees F.
4. Disassemble piston and rod while hot. Use spanner wrench or strap wrench to remove piston from rod (piston is equipped spanner wrench holes). Remove cushion bushing (item 12) with strap wrench. Do not damage surface of piston rod or cushion bushing - replace if worn or damaged.
5. Clean all threads with solvent and bristle brush. Blow dry with compressed air.
6. Apply Loctite™ sealant #277 or equivalent to threads of piston rod. Assemble components and tighten securely. Allow sealant to cure for 30 minutes before using cylinder.

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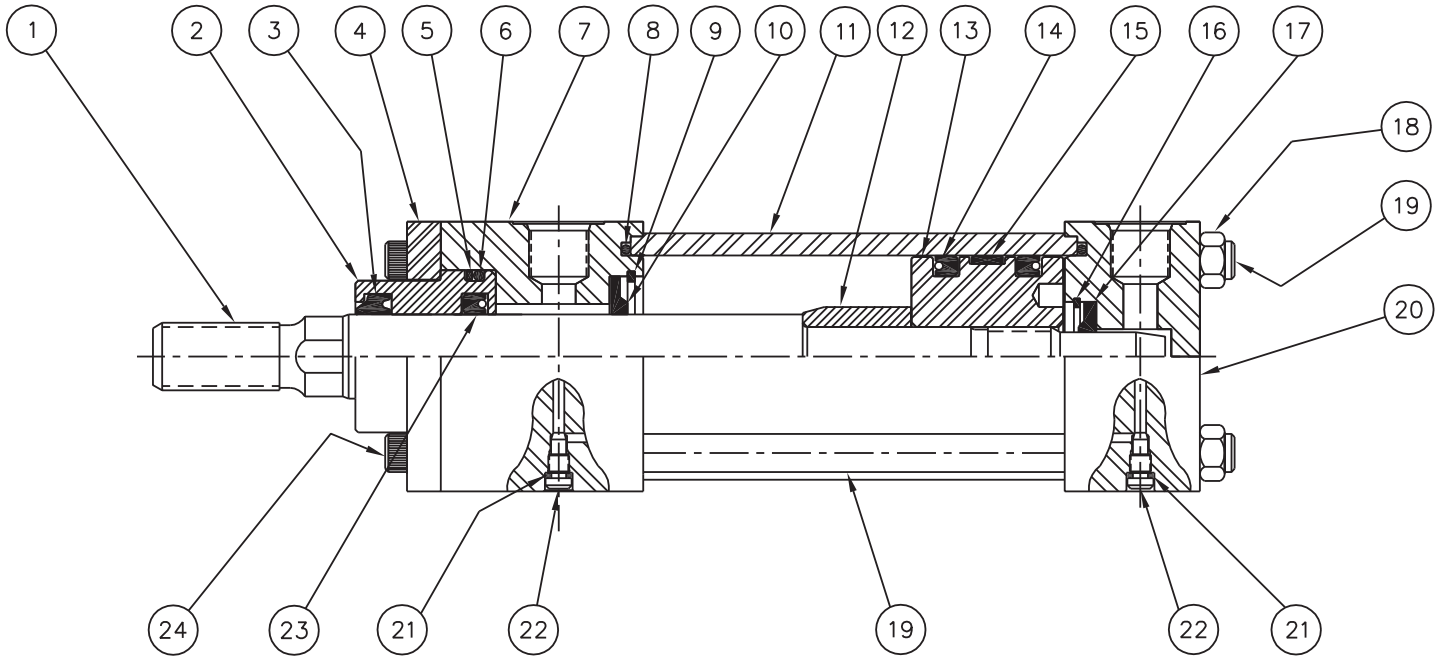
LH HYDRAULIC CYLINDER PARTS LIST



1. PISTON ROD
2. BEARING CARTRIDGE
3. ROD WIPER
4. CARTRIDGE RETAINER
5. BACK UP, CARTRIDGE O-RING
6. O-RING, CARTRIDGE
7. HEAD
8. O-RING, HEAD & CAP
9. RETAINING RING
10. CUSHION INSERT, HEAD
11. CYLINDER TUBE
12. CUSHION BUSHING
13. PISTON
14. PISTON SEAL
15. WEARBAND
16. RETAINING RING
17. CUSHION INSERT, CAP
18. NUT, TIE ROD
19. TIE ROD
20. CAP
21. O-RING, CUSHION ADJ. SCREW
22. CUSHION ADJUSTMENT SCREW
23. ROD SEAL
24. CARTRIDGE RETAINER SCREW

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LH SERIES HYDRAULIC CYLINDER FASTENER TORQUE CHART

TABLE 1

TIE ROD & SOCKET HEAD CAP SCREW TORQUE VALUES	
THREAD SIZE	TORQUE (FT. LBS.)
10-32	3
1/4-28	7
5/16-24	14
3/8-24	25
7/16-20	35
1/2-20	55
5/8-18	110
3/4-16	185
7/8-14	300
1-14 UNS	450
1 1/8-12	600
1 1/4-12	780

FASTENER TORQUE INSTRUCTIONS:

Tighten tie rod nuts & retainer nuts in pattern shown at the right and to torque values in Table 1.
Use MoS2 (moly-disulfide) grease or equivalent on both the threads and bearing surface.

Should lubricant not be available, torque values should be increased by 50%.

TIE ROD TORQUE PATTERN

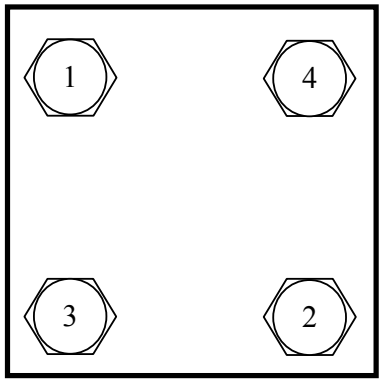

FIGURE 1

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LH SERIES HYDRAULIC CYLINDER PRESSURE RATINGS

TABLE 2

LH SERIES HYDRAULIC CYLINDER PRESSURE RATINGS		
BORE SIZE	WORKING PRESSURE (PSI)	RATED PRESSURE (PSI)
1.50	1500	2500
2.00	1500	2500
2.50	1000	1500
3.25	1000	1500
4.00	1000	1500
5.00	800	1200
6.00	800	1200

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