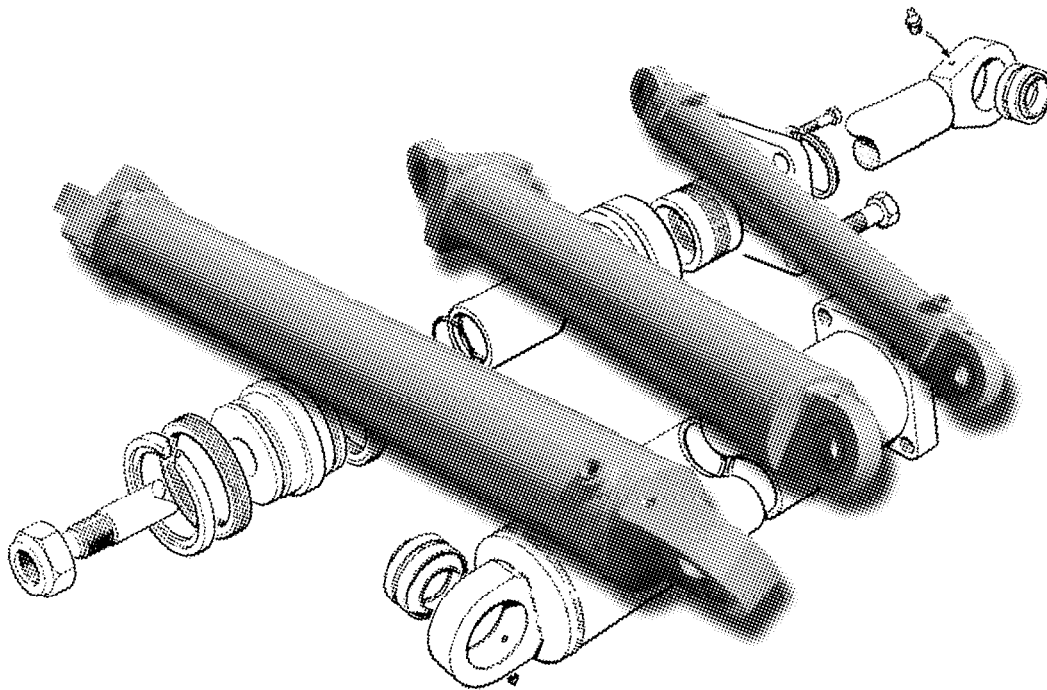


SERVICE MANUAL

BTI HYDRAULIC CYLINDERS



Hydraulic Cylinder Removal
Hydraulic Cylinder Overhaul
Seal Orientation
Hydraulic Cylinder Assembly

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ISO 9001

!WARNING

Before servicing or removing hydraulic cylinders:

Lower all components and support raised equipment.

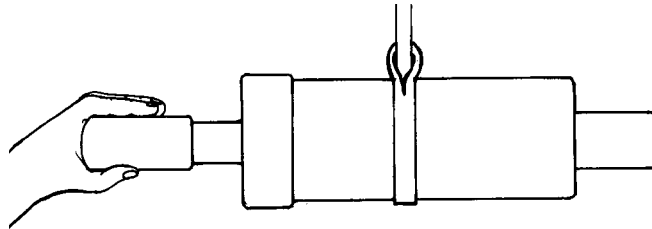
Shut off power supply, relieve any residual pressure by moving all manual control levers on the valve, and open reservoir cap.

Cap all lines and plug ports to keep dirt out.

Take necessary precautions to protect fabric type lifting slings from sharp edges.

Hydraulic Cylinder Removal

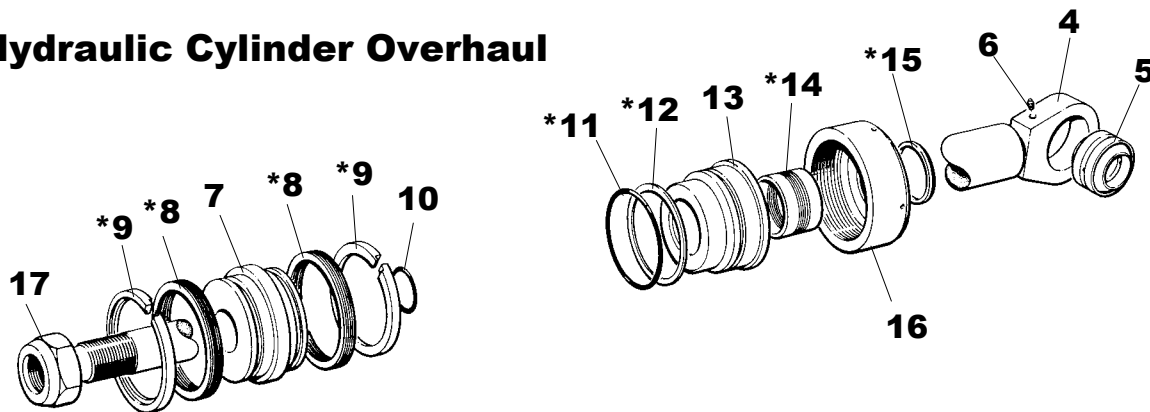
Using a crane or forklift, support the cylinder. Remove the pin locking bolts on the cylinder base end pins. Remove cylinder base end pins.



NOTE: It may be necessary to move the boom or component with a crane to release any tension on the pins.

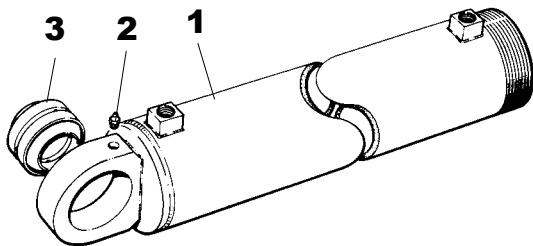
Support the cylinder in such a way that the cylinder will be under control when the remaining pivot pin is removed. Remove the pin locking bolt. Remove the rod end pivot pin. When the pin is out, lift the cylinder away from the unit and place in a secure area. Sling the cylinders as shown in the approximate center of the cylinder. Have an assistant guide the cylinder.

Hydraulic Cylinder Overhaul



* included in Seal Kit

see Hydraulic Cylinder parts plate



- | | |
|----------------------------|------------------|
| 1. TUBE ASSEMBLY | 9. LOCK RING |
| 2. 1/8" NPT GREASE FITTING | 10. O - RING |
| 3. SPHERICAL BEARING | 11. HEAD SEAL |
| 4. ROD ASSEMBLY | 12. BACK UP RING |
| 5. SPHERICAL BEARING | 13. HEAD GLAND |
| 6. 1/8" NPT GREASE FITTING | 14. PACKING |
| 7. PISTON | 15. WIPER RING |
| 8. PISTON SEAL | 16. HEAD CAP |
| | 17. ROD NUT |

Cylinder Disassembly

The best method for disassembly is to have the cylinder clamped to a bench in a vertical position with the rod end up. Have a drain pan available to catch any oil coming out of the cylinder parts when the piston rod assembly is removed. Using the appropriate sized spanner wrench, remove the Head Cap from the cylinder tube. Using an overhead crane, remove the rod assembly from the cylinder tube (crane capacity and sling capacity 500 lb.).

NOTE: As rod assembly is removed, oil will come out of rod end cylinder port. The cylinder tube must be securely held to prevent it from moving as the rod is removed.

Once rod assembly is removed, it can be disassembled to replace the various seals, o-rings and packings. Clamp the rod in a soft jaw vise to prevent damage to the polished surface of the rod. Remove the locknut from the end of the rod.

NOTE: It may be necessary to put a bar through the rod eye and brace it against the work bench to prevent the rod from turning when removing the locknut. (see page 4)

Once the locknut is removed, all other components can be removed from the rod.

Seal Replacement

Using the appropriate seal kit for the cylinder being worked on, replace the seals and o-rings on the piston and head gland. See seal orientation drawing (figure 3) for proper seal placement. Ensure there is no damage to rod or table that may damage new seals.

Seal Orientation in Typical Hydraulic Cylinder

Figure 3

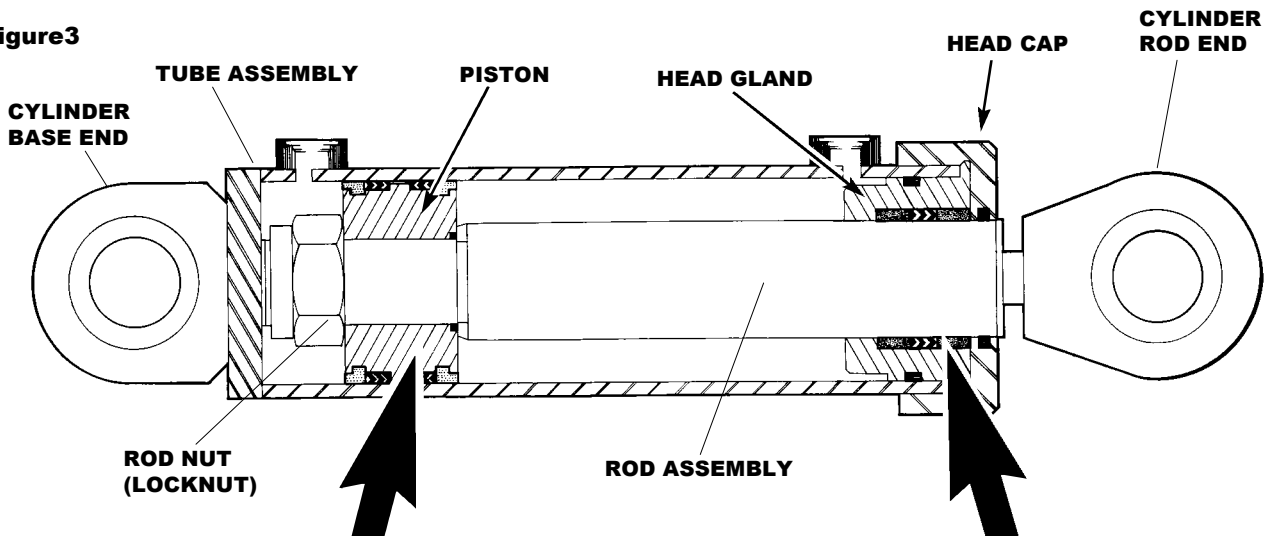


Figure 3A

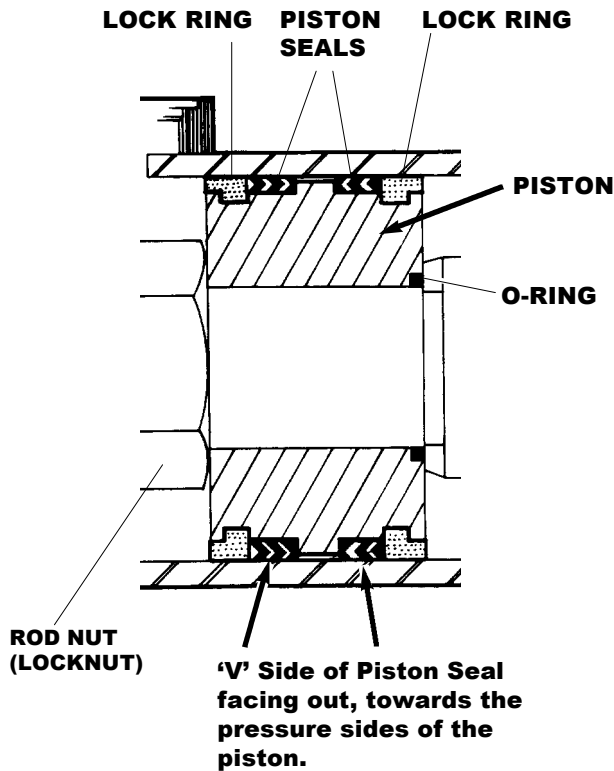
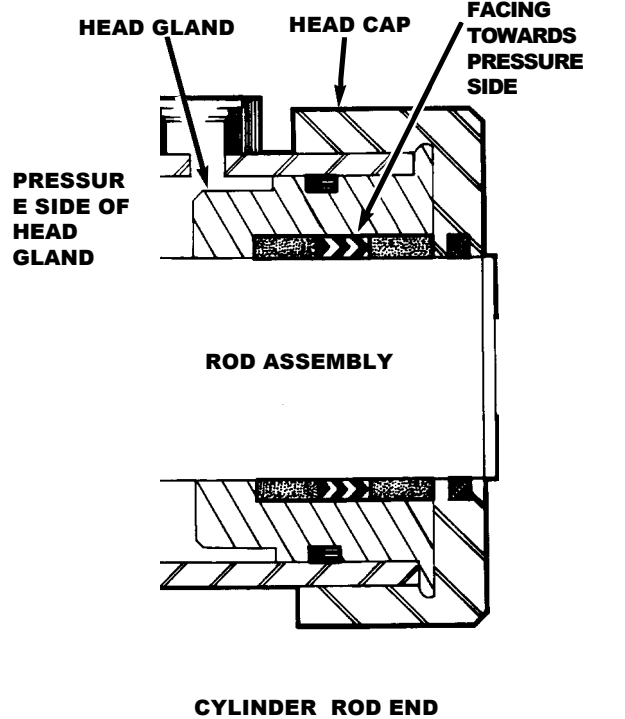


Figure 3B



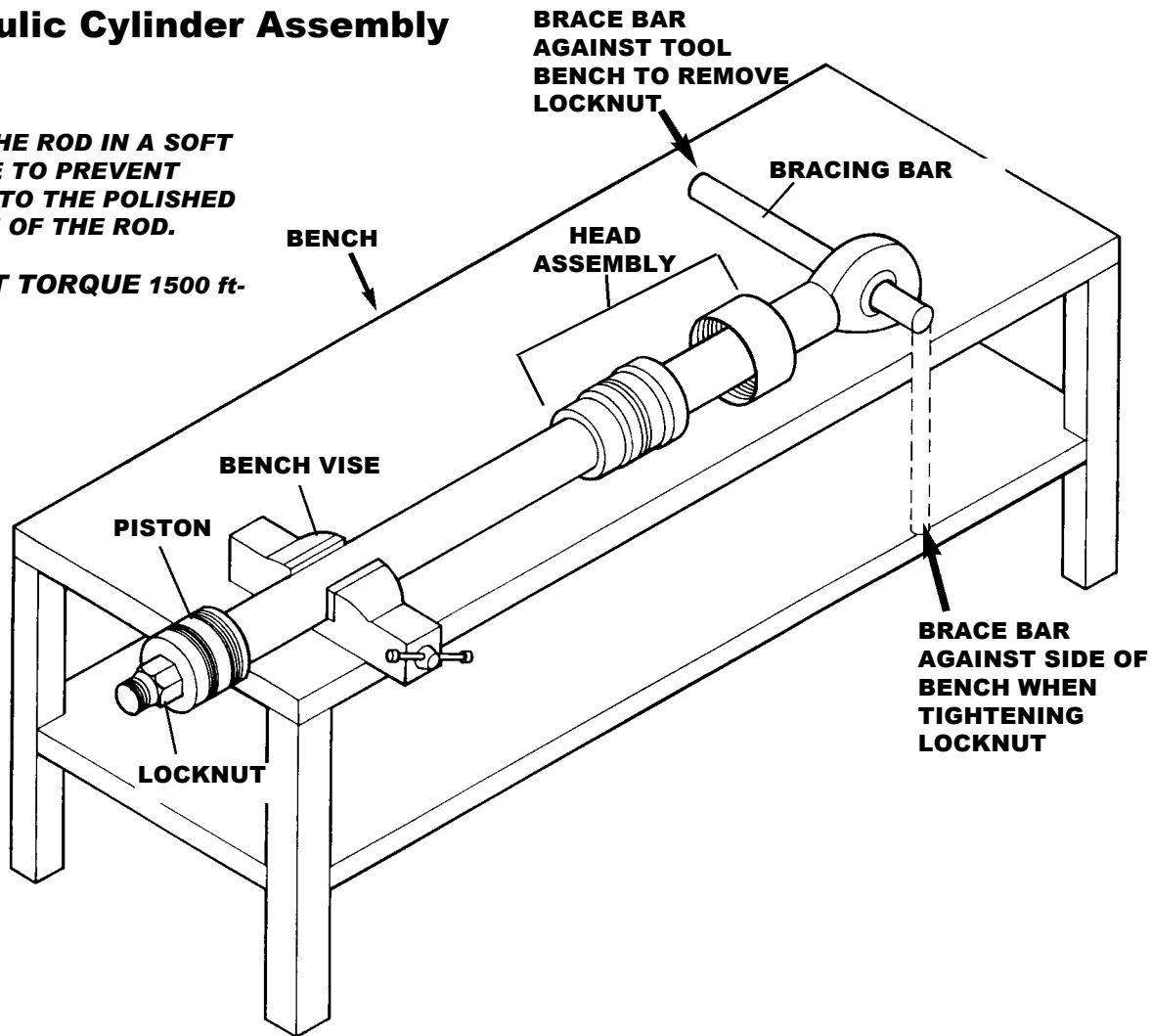
Hydraulic Cylinder Service

1. Always service cylinders in a clean area with clean parts.
2. Check for score marks on the cylinder tube and piston rod. New cylinder packings can be cut and damaged on score marks.
3. Remove burrs and sharp corners on the piston, head gland, and head before assembly to avoid scoring of the cylinder tube.
4. Check all o-rings, rod packings, and hydrolock sets for cuts before assembly; replace if necessary.
5. Tighten piston rod nut to specified torque.
6. Check wear rings in the head gland for wear or cuts; replace if necessary.
7. When assembling, make sure that:
 - A. Rod "V" packing set is assembled with the "V" form towards the piston of the cylinder.
 - B. For O-rings with single back up rings or parbak, position the parbak opposite to the pressure face of the O-ring.
8. Tighten head cap until threads are seated.

Hydraulic Cylinder Assembly

CLAMP THE ROD IN A SOFT JAW VISE TO PREVENT DAMAGE TO THE POLISHED SURFACE OF THE ROD.

ROD NUT TORQUE 1500 ft-lbs.



Rod assembly

Install head assembly onto rod, then install piston assembly onto the rod. clamp rod assembly using a soft jawed vise.

NOTE: It will be necessary to install a bar through the rod eye and brace it against the work bench to prevent the rod from turning when the lock nut is being tightened.

Install locknut and torque to 1500 ft-lbs (207 kg.m) Once the rod assembly is complete, install the assembly into the cylinder tube. Again, it is easier if the cylinder tube is in a vertical position, and the rod assembly is lowered into it. Ensure all seals are well lubricated before installation. Once rod assembly is installed, tighten the head cap onto the cylinder tube using a spanner wrench - head cap is designed to seat against cylinder tube, once seated strike spanner wrench to ensure good seat - there is no specified torque for the head cap.

Spherical Bearing Replacement

Removal

Old bearings may be driven out using appropriate drift and hammer.

Installation

The recommended method is to freeze the new bearing in dry ice or liquid nitrogen to shrink bearing - time for freezing minimum 1 hour for dry ice, 5 min. for liquid nitrogen. It may be easier if the receiving eye is heated to 150 deg. F before bearing installation. Before freezing the bearing and heating the eye, check the dimensions of the bore and the bearing there should be .0015" to .002" interference fit. If not, the bore will need to be built up and machined to size or new components, either the cylinder tube or cylinder rod be obtained. Once the bearing is frozen and the bore is heated (heating is optional), install the bearing into the bore, trying to center it in the bore. When the bearing warms it will be locked in the bore.

Cylinder is now ready for testing and installation on machine.



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