

AB-01a: Rebuild Cylinder (Hydraulic)

SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Verify that equipment meets zero mechanical state (ZMS).
- Always wear safety glasses with side shields and ear plugs.

EQUIPMENT

- table vise, pliers, vise grips, screwdriver
- required seal kit (repair part)
- o-ring pick
- ratchet/sockets, spanner wrench, hand wrenches, gland wrench
- marking tools
- rod and gland, as necessary
- Loctite sealant
- ring compressor or hose clamp
- bucket/container
- light bearing grease or oil

RESOURCES

- part/seal kit manufacturer sheet
- assembly or machine prints



Rebuild Cylinder (Hydraulic)

Prepare Cylinder for Disassembly:

1. **Clean the cylinder.**
 - Wipe the cylinder free of dirt and grease.
 - If required, clean the cylinder with steam or a pressure wash with soap and water.
2. **Record the important cylinder information.**
 - Note the rod size, bore size, the stroke, and the manufacturer's number.
 - Cylinder information can be found on the manufacturer's identification tag or may be stamped on the component. If it is not, get the information from the machine print or build and materials assembly print.
3. **Obtain the seal kit.**
 - Locate the manufacturer's manual and/or search the ERS system for the replacement parts.
 - Ask indirect purchasing to obtain the replacement part from the supplier if it is not available from the crib.
4. **Drain any remaining oil from the cylinder.**
 - Drain oil into a bucket or a PE tub.
5. **Secure the cylinder for disassembly.**
 - Mark the orientation of the ports and the end caps to the cylinder barrel with a paint stick, air scribe, or punch.
 - Secure the cylinder.

Disassembly:

6. **Remove the rod bushing/gland.**
 - Loosen the bushing with a spanner wrench and/or gland wrench.



Note: Some cylinders require removing end cap to remove the gland.

7. Remove the end caps from the cylinder barrel.

- Remove the rod and piston assembly.
- Disassemble rod from piston if necessary (it may be fastened with loctite).
- Note orientation of the removable cushion if applicable.

8. Remove all o-rings, piston rings, and seals.

- Set aside all parts on a clean rag in case replacement parts are not available.

Cleaning and Inspection of Parts:

9. Inspect the bushing gland.

- Clean as necessary.
- Look for wear, nicks and scratches.

10. Inspect the o-rings.

- Clean as necessary.
- Look for wear and nicks.

11. Inspect the end caps.

- Clean as necessary.
- Check o-rings and miscellaneous components for damage.
- Check the adjustable cushions for wear if applicable.

12. Inspect the rod and piston.

- Clean as necessary.
- Look for wear, nicks, galling, or scratches on the rod and piston.
- Look for a bent rod and deformed seal grooves.
- Inspect the piston seals.

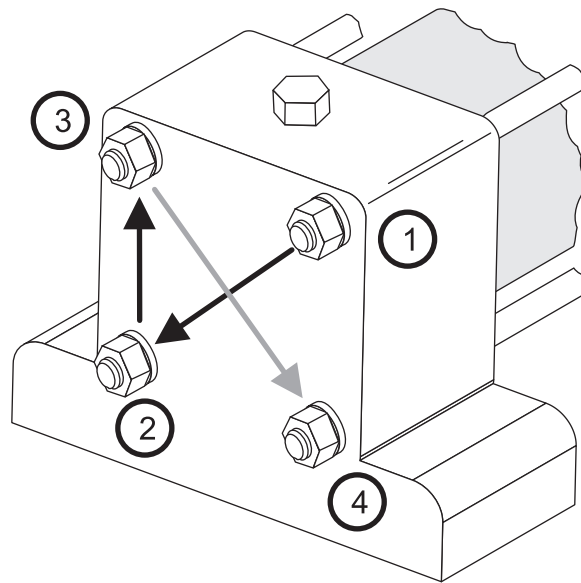
- 13. Inspect the barrel of the cylinder.**
- Clean as necessary.
 - Look for wear, nicks, galling, cracks, bulges, or scratches on the inside of the barrel.

Reassemble the Cylinder:

- 14. Lubricate the component with light bearing grease or oil.**
- 15. Replace all o-rings, seals, and internal parts.**
- 16. Assemble the piston to the rod, if required.**
- Secure the rod to the piston with Loctite or pins.
- 17. Assemble rod/piston assembly into the barrel end caps.**
- Stagger multiple piston rings 180°.
 - Use a hose clamp or ring compressor as needed.
- 18. Assemble the cylinder and align the marks for port orientation.**
- Lay the cylinder on a flat surface to tighten.
 - Use vise grips on the tie bolts to avoid twisting the bolts when tightening, if necessary.



- Tighten the new nuts to the tie bolts according to the figure below.
- Gradually torque the tie bolts to the manufacturer's specifications.



Tighten Nuts Diagonally

19. Assemble the bushing/gland to the rod end cap.

Warning: Never hook up air cylinders to hydraulic test stands.

20. Test the cylinder using a test stand.

Warning: Cylinder must operate under normal operating pressure.
Do not exceed the manufacturer's specifications for the cylinder.

- Determine the manufacturer's specifications for the pressure rating.
- The cylinder must not leak.
- The cylinder must operate smoothly.
- Check for blow-by from the piston seals by leaving one port open and applying pressure to the other end.
- Check both ends.
- Another test may include plugging the piston end and filling the piston with fluid from the rod end. The cylinder should retract the piston and rod against the piston end. If the piston creeps back out, you have a leak.

21. Test stand operation.

- Back off pressure with the relief valve.
- Push the start button.
- Pull the handle towards you and watch the gages for movement.
- Push the handle away from you to bleed air out.
- Turn the pressure regulator up to the desired pressure.
- Work the handle back and forth to make sure the cylinder rod movement is smooth.
- Back off the pressure regulator.
- Cycle handle to relieve trapped pressure or air.
- Disconnect hoses.
- Recap and store the cylinder.

