

BO-01: Rebuild Robot Gripper

SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Moving equipment hazard refers to the potential of the gripper slides to move and pinch, cut, or smash fingers.

EQUIPMENT

- Allen wrenches
- snap ring pliers
- basic Maintenance Mechanic hand tools
- air supply

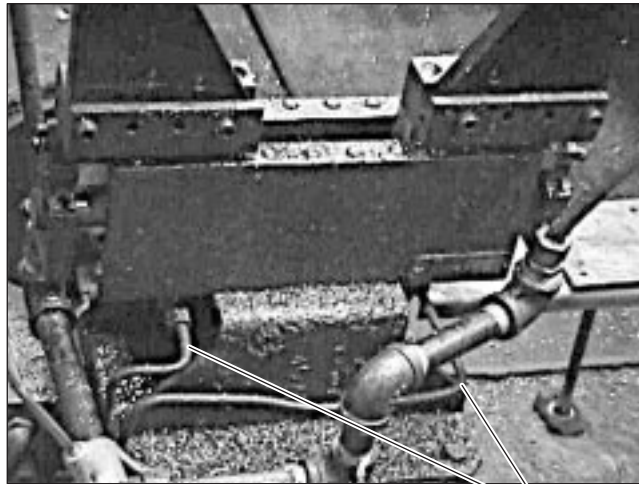
RESOURCES

- manufacturer's specifications

Rebuild Robot Gripper

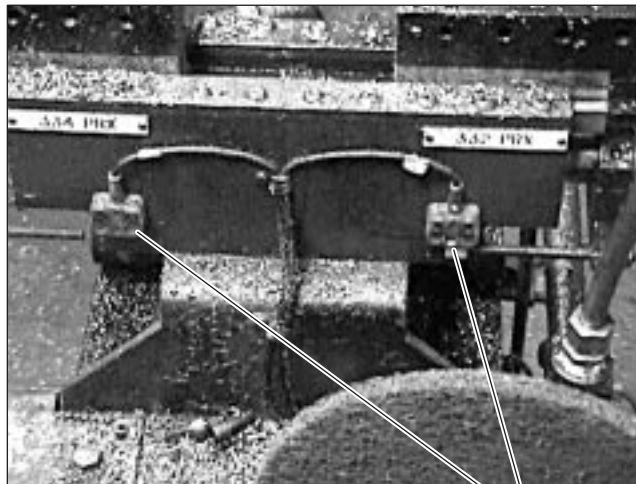
- 1. Position the robot for repair.**
- 2. Lockout/tagout the robot.**
- 3. Perform ZMS.**
 - Remove the air supply from the grippers.

4. **Disconnect the air connectors from the gripper.**

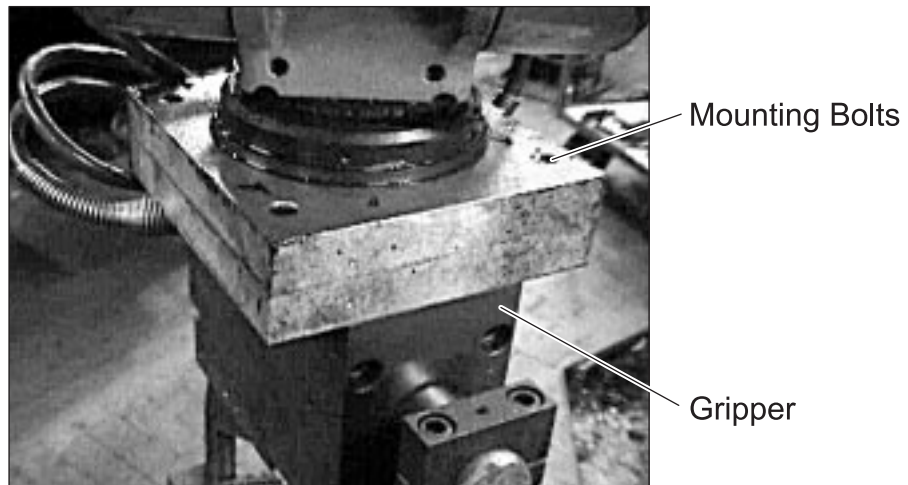


Air Lines

5. **Disconnect the proximity switches from the gripper.**



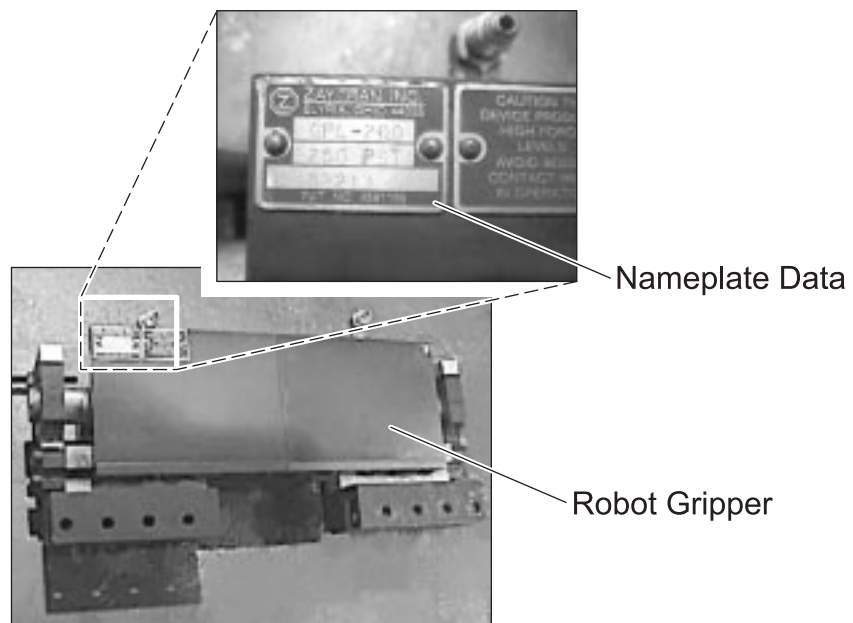
Proximity Switches

6. Disconnect the gripper assembly from the robot.

- Remove each mounting bolt with the required Allen wrench.

7. Obtain the needed replacement parts/kits.

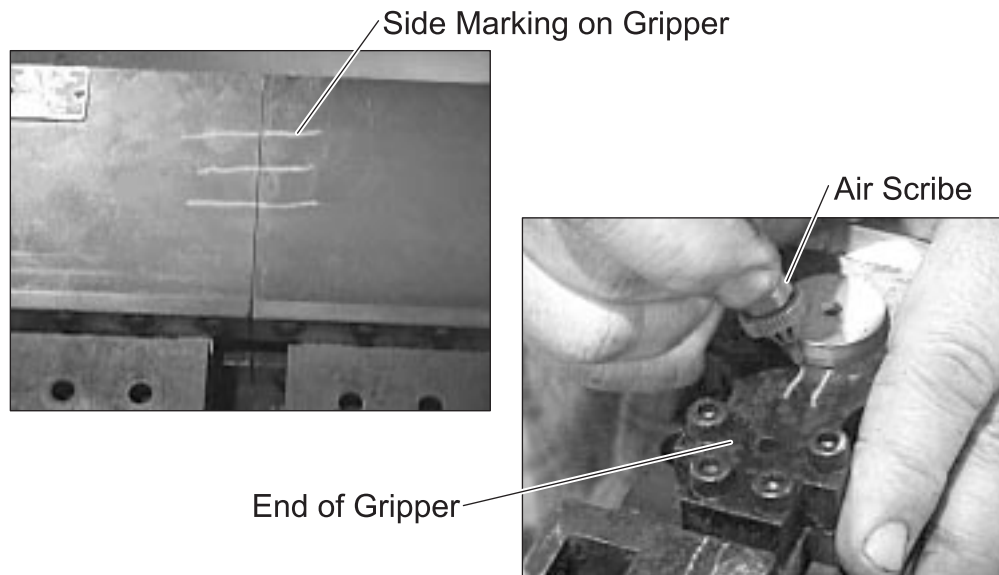
- Note the manufacturer's data from the nameplate.



- Obtain the required parts from the crib.

8. Mark the gripper for disassembly.

- Use an air scribe, paint stick, or other means to mark each endplate and across both gripper bodies for proper part reassembly.

**9. Disassemble the cylinder endplates.**

- Remove the proximity switch actuators and mounting bolts.

Proximity Switch Actuator



End Plate

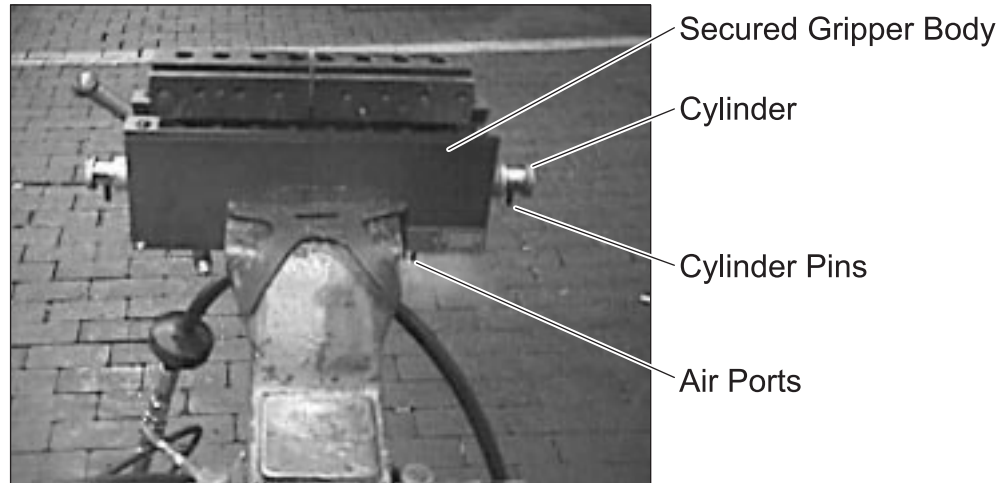
Allen Wrench

- Pry with a screw driver and a hammer (if necessary) to remove the bottom half of the end plate.
- Remove the mounting bolts for the top half of the endplate.
- Pry with a screw driver and a hammer (if necessary) to remove the top half of the endplate.

10. **Secure the gripper body in a vise.**

11. **Remove the pins.**

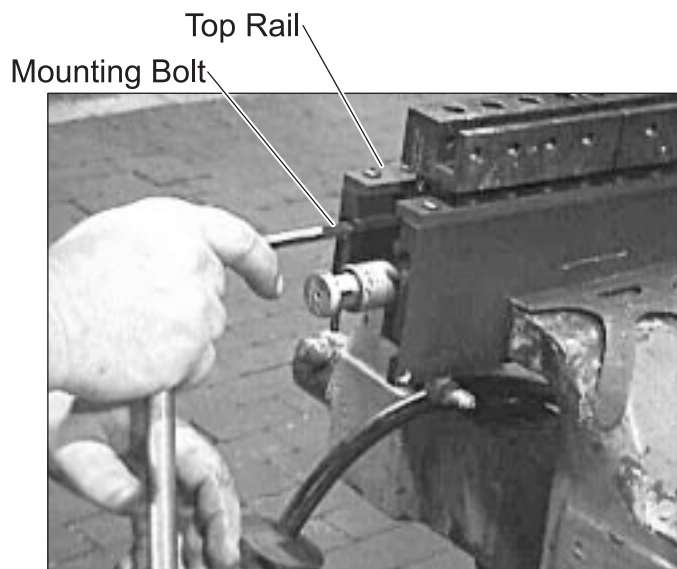
- Rotate the cylinder rod point the pins to the side where the air ports are located.



- Pry the pins from the cylinder rod with a pair of side cutters.

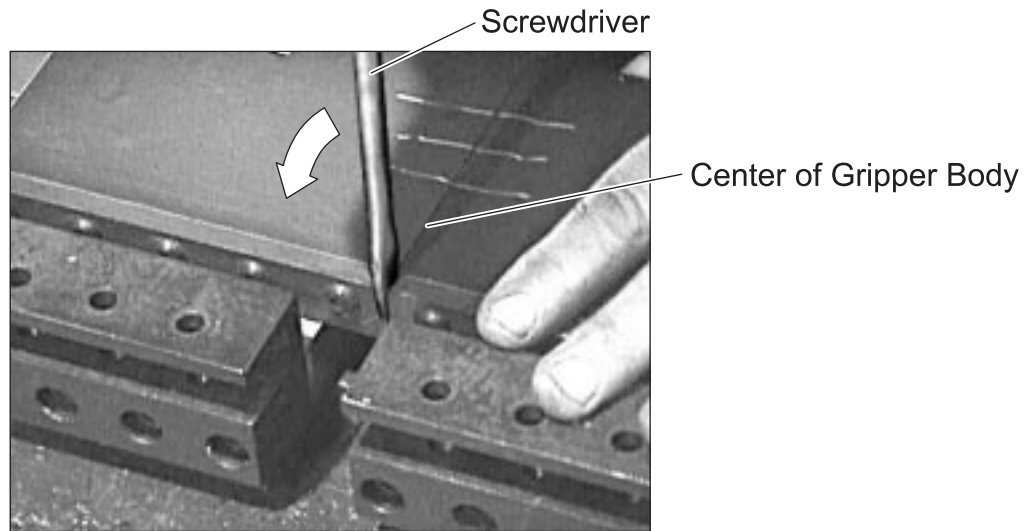
12. **Disassemble the gripper body.**

- Remove the four mounting bolts from the gripper body halves.
- Remove the top rails if they are one piece.



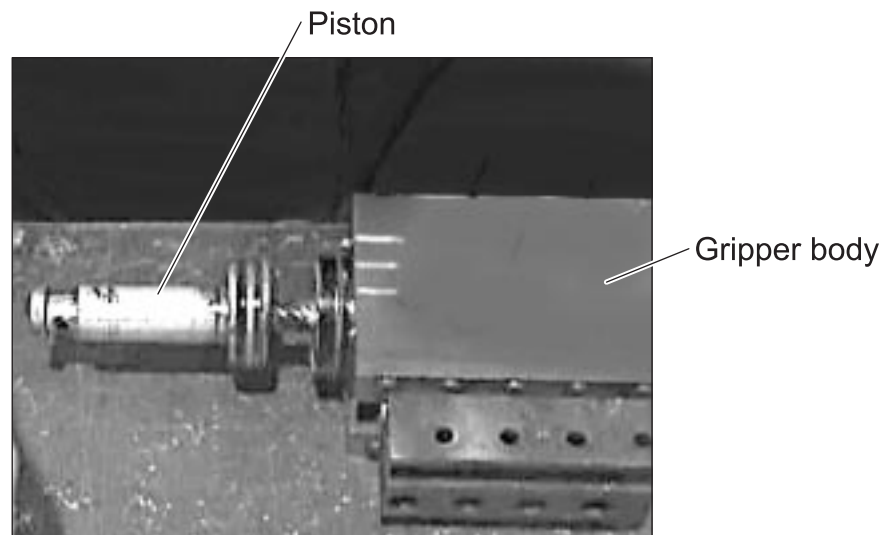
- Remove the gripper body from the vise.

- Pry the gripper body halves apart with a screw driver or putty knife and hammer (if necessary).



Gripper Body Disassembly

- Pull the piston from the gripper body.



Piston Removal

13. Remove the gripper body rod seals and manifold O-rings with an O-ring pick.



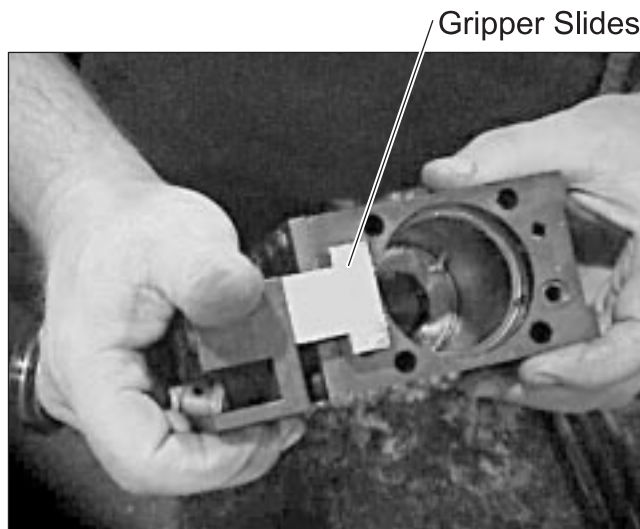
O-ring Pick

Rod Seals

Manifold O-rings



14. Inspect and clean the gripper slides.



Gripper Slides

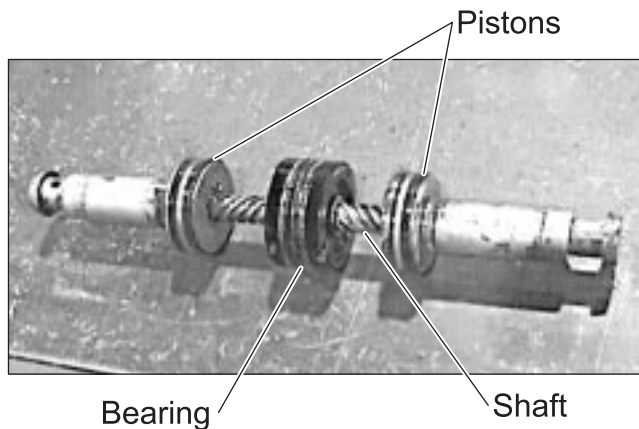
- Slides must manually move smoothly in the groove.
- Grooves must be free of grime and dirt.

15. Inspect and clean the gripper bodies.

- Clean the gripper bodies free of dirt and grime.
- Check for visible damage to the cylinder walls.
- All damaged gripper body rod seals and O-rings must be replaced.

16. Remove and inspect the pistons.

- Remove each piston from the shaft.



- Remove the cupped seals from each piston and replace any damaged seals.

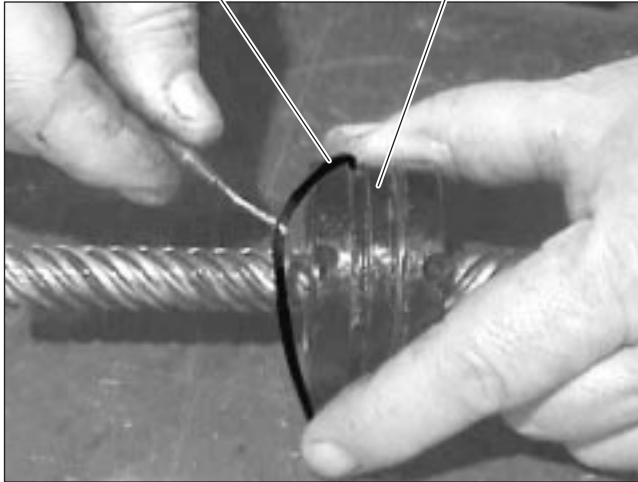
**Piston Seals**

- Remove any grime from the piston.
- Install/replace the seals with the cupped sides facing away from each other.

17. Remove and inspect the bearing.

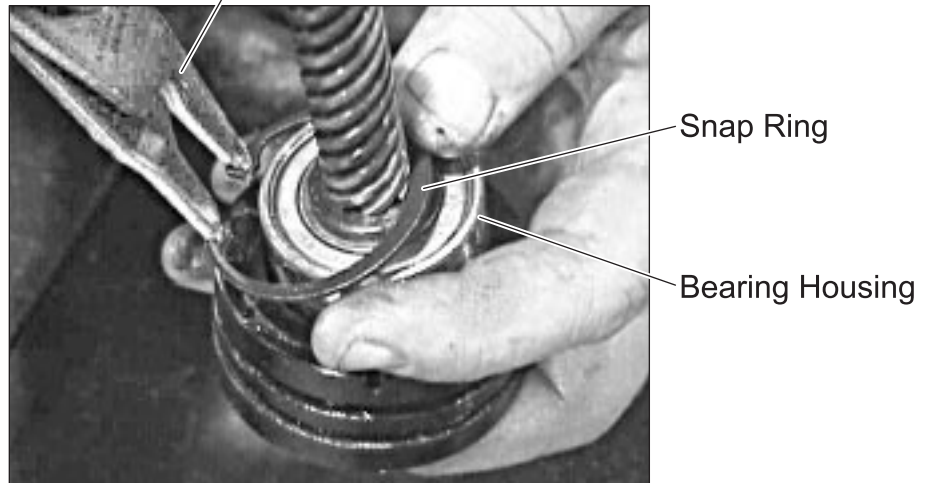
- Remove the O-ring from the bearing housing.

O-ring Bearing Housing



- Remove the snap ring from the bearing housing.

Snap Ring Pliers



- Slide the bearing housing off the shaft.
- Remove the bearing snap ring.



- Slide the bearing off the shaft.
- Clean all grime from the bearing and bearing housing.
- Inspect the bearing for damage and replace as necessary.
- Inspect the O-ring for damage and replace if necessary.

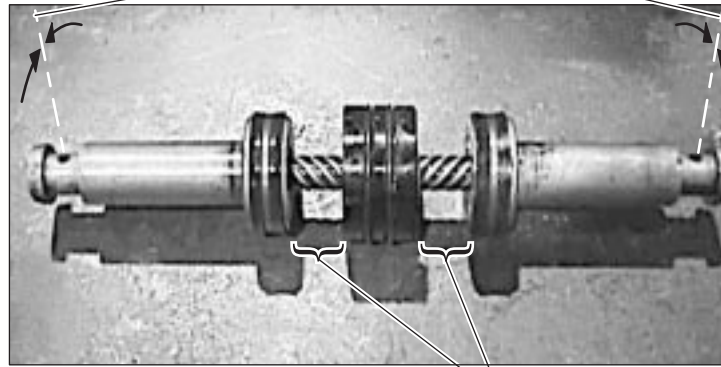
18. Reassemble the cylinder.

- Slide the bearing onto the shaft until it rests against the shoulder.
- Secure the bearing with the snap ring.
- Slide the bearing housing into place and secure with the snap ring.
- Install the O-rings.
- Thread the respective left hand or right hand piston onto the shaft.
- Align the pin holes on each piston so they are facing the same

direction.

- Measure the pistons to ensure equal distance from the bearing.

Pin Holes Aligned



Equal Distance
Between Pistons

19. Lubricate the cylinder and gripper body for proper pneumatic action.

Caution: Be careful not to pinch, cut, or crush your fingers while reassembling the gripper.

20. Install the cylinder into one half of the gripper body.

- Install the gripper body cupped seals with the cupped ends facing into the gripper body.
- Match the markings on the piston ends with the markings on the gripper body.
- Slide the piston into the gripper body using an O-ring pick to pry the

piston past the cupped seals.

- Match the bearing housing set slot with the set pin inside the gripper body.



21. **Replace the manifold O-ring.**
22. **Install the second half of the gripper body.**
 - Make sure the two halves meet evenly and are flush.
23. **Reassemble the gripper body.**
 - Realign the pin holes with the air ports.
 - Install the four mounting bolts wrench tight, making sure the two gripper bodies remain flush.
24. **Extend the cylinder rods with the air supply.**
25. **Replace the cylinder rod pins.**
 - Realign the pins to the air ports, if necessary.
26. **Replace the endplates.**
 - Align all parts according to the orientation marks.
 - Reinstall the top half of the end plate and tighten the four bolts wrench tight.



- Slide the bottom half of the end plate onto the shaft, tapping with a hammer, if necessary.
- Install the proximity switch actuators onto the bottom half of the end plate.
- Make sure the actuator is positioned to operate the switch.
- Tighten the mounting bolts wrench-tight.

27. Test gripper operation.

- Extend the cylinder with the air supply.
- Listen for air leaks or apply soapy water to test for leaks.
- Retract the cylinder with the air supply.
- The gripper slides must close so that they are aligned with the gripper body center line.

28. Reconnect the gripper to the robot.

29. Clean up the work area.

30. Remove lockout/tagout.

31. Verify the robot arm operation.

- Ask the Operator or an Electrician to cycle the robot to verify proper operation.