

## BO-03: Check Fluids

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- This task is performed with the power on so the axes may be manually rotated for access to the oil reservoirs.
- Be aware of robot operation and alert of any possible sudden movement.
- A ladder is required to reach some of the accesses. Follow all facility safety procedures.

### EQUIPMENT

- basic Maintenance Mechanic hand tools
- flashlight
- Oil and Lubrication Truck
- ladder

### RESOURCES

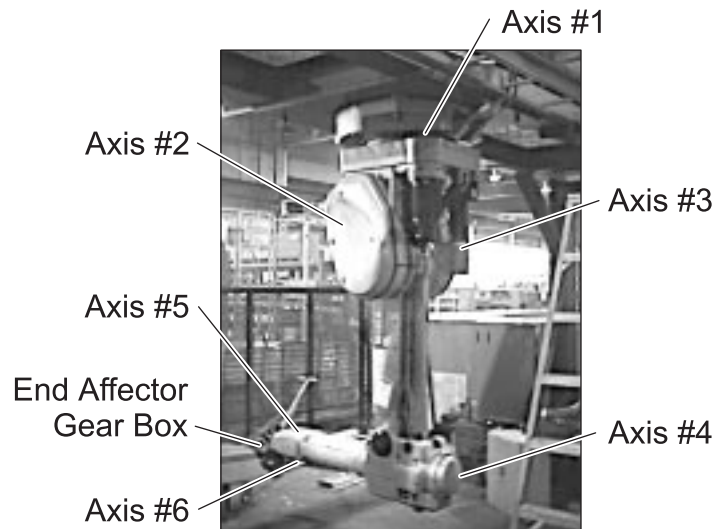
- manufacturer's service manual for the robot



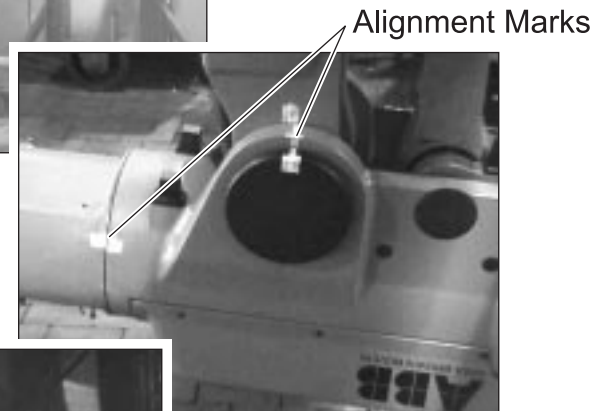
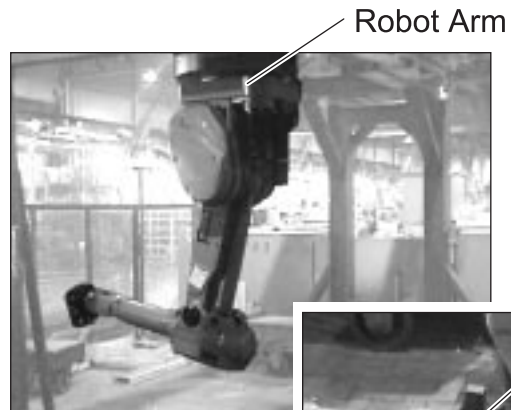
## Check Fluids

**Caution:** Check the manufacturer's manual for special lubrication procedures.

**Note:** The figure below indicates the 6 axes referred to in this task.



**Robot Axes and End Effector**

**1. Verify the robot is in the home position.**

Alignment Marks

**Robot Home Position****2. Immobilize the robot.**

- Verify that the red light on the control panel, indicating the robot is immobilized, is on.

**Warning: A ladder must be used for access to the fittings and reservoir on Axis #1. Follow all Caterpillar safety procedures when working on a ladder.**

**3. Grease the fittings on Axis #1.**

- Use a grease gun to apply one stroke of manufacturer's specified grease to both of the fittings.

Grease Fittings

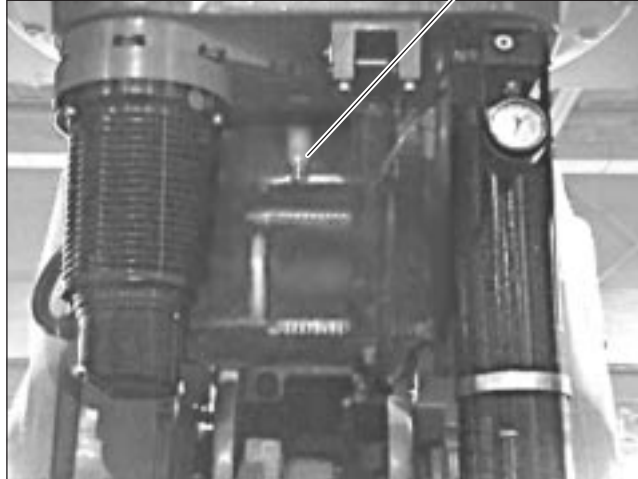


**4. Check the oil on Axis #1.**

- Remove the reservoir plug.
- If necessary, move the axis by pushing the #1 brake release, and manually swinging the axis to provide access to the reservoir plug.
- Feel for oil inside the reservoir.

- Fill the reservoir with the hose from the Lube and Oil truck at the nipple valve shown below.

Reservoir Refill Valve



#### Axis #1 Reservoir Refill Valve

- Fill the reservoir until oil is felt at the oil plug hole.

Oil Plug Hole



**5. Check the oil on Axis #2.**

- Remove the Axis #2 cover.

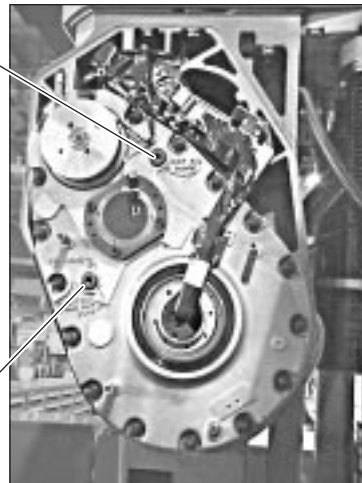
Axis #2 Cover



- Remove the check level plug.

Fill Plug

Check Level Plug

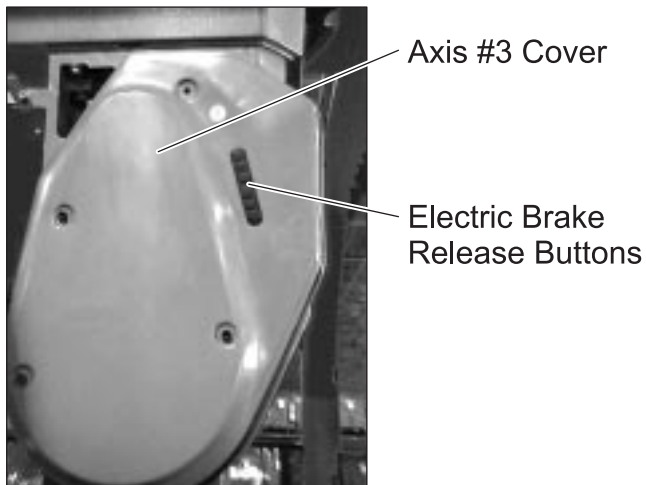


- Oil should come up to the bottom of the check level plug.
- Remove the fill plug.
- Use a funnel and add oil until detected at the bottom of the check level plug.
- Replace the plugs.
- Replace the Axis #2 cover.

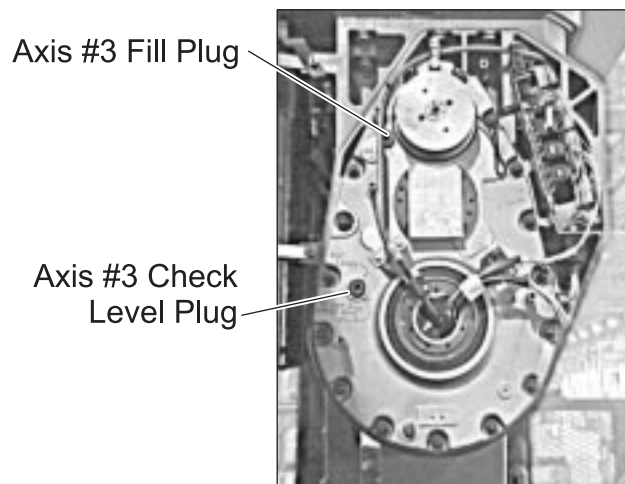
**6. Check the oil on Axis #3.**

**Warning: Use caution not to press any of the brake release buttons. Each button controls the electric brake for the corresponding axis. Accidentally releasing an axis could result in injury to personnel or damage to equipment.**

- Remove the Axis #3 cover.



- Remove the check level plug.



- Oil should come up to the bottom of the fill level plug.
- Remove the fill plug.

- Use a funnel to add oil until detected at the bottom of the check level plug.
- Replace the plugs.
- Replace the Axis #3 cover.

**7. Check the oil on Axis #4 (upper arm gear box).**

- Remove the Axis #4 cover.



Axis #4 Cover

- Remove the oil reservoir plug.



Oil Reservoir Plug

- Check for oil inside the reservoir, just below the plug.
- Fill the reservoir (at the oil reservoir plug) until oil is detected just below the plug.
- Replace the plug.
- Replace the Axis #4 cover.



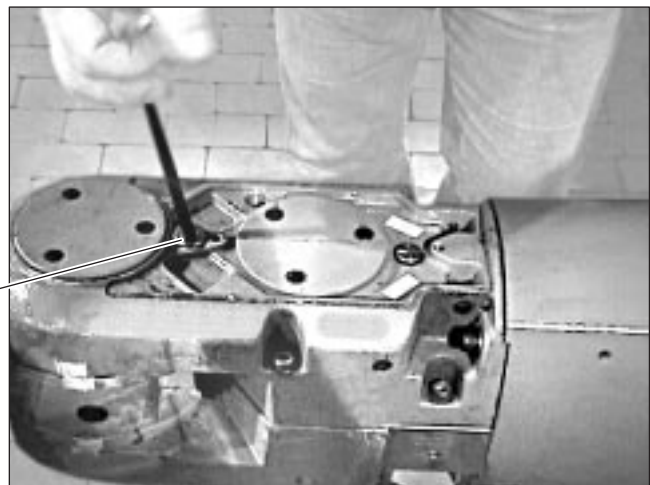
8. **Press the #4 brake release button and rotate the robot wrist until Axis #5 is accessible.**

9. **Check the oil on Axis #5.**


- Remove the robot wrist gearbox cover for Axis #5.



- Remove the oil reservoir plug.



- Use a flashlight to check for oil over the gears inside the gearbox.
- Fill the reservoir, as needed.
- Replace the plug.
- Replace the gearbox access cover.

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10. **Press the #4 brake release button and rotate the robot wrist until Axis #6 is accessible.**
  11. **Check the oil on Axis #6.**
    - Remove the robot wrist gearbox access cover for Axis #6.
    - Remove the oil reservoir plug.
    - Use a flashlight to check for oil over the gears inside the gearbox.
    - Fill the reservoir, as needed.
    - Replace the plug.
    - Replace the gearbox access cover.
  12. **Press the #6 brake release to position the oil plug on the end effector gearbox.**
  13. **Check the oil in the end effector gearbox.**
    - Use a screwdriver to remove the oil plug.
    - Shine the flashlight into the reservoir to check oil level.
    - Add oil if the gears are not fully lubricated with oil.
    - Replace the oil plug.
  14. **Clean up the work area.**
  15. **Restore the robot to normal operating conditions and observe for leaks at each axis.**