BO-02: PM Robots (Balance System)

SAFETY FIRST

- ☐ Follow all Caterpillar facility safety standards when performing this task.
- ☐ Follow all safety procedures when working with Nitrogen.
- ☐ Operate the robot arm with caution, it has many pinch points that could injure personnel.

EQUIPMENT

- ☐ Allen wrench
- ☐ adjustable wrench
- ☐ basic Maintenance Mechanic hand tools

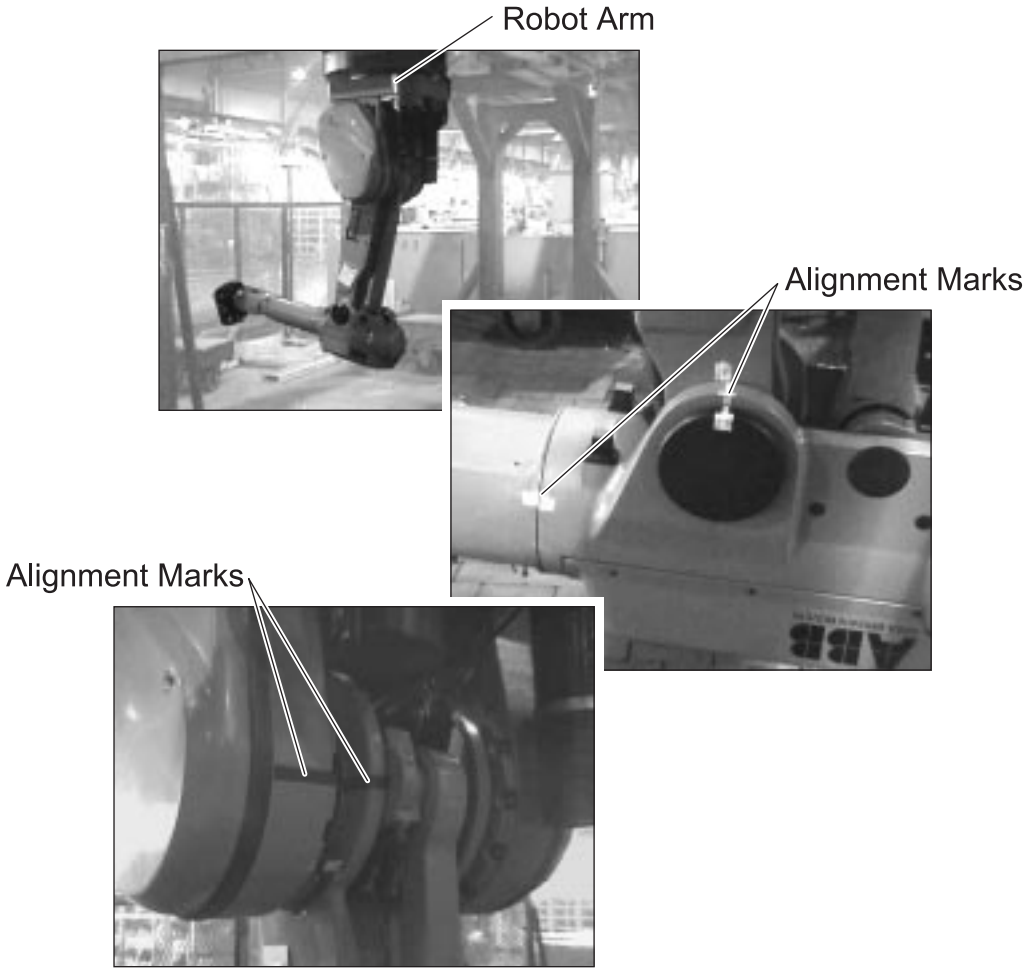
RESOURCES

- ☐ manufacturer's specifications

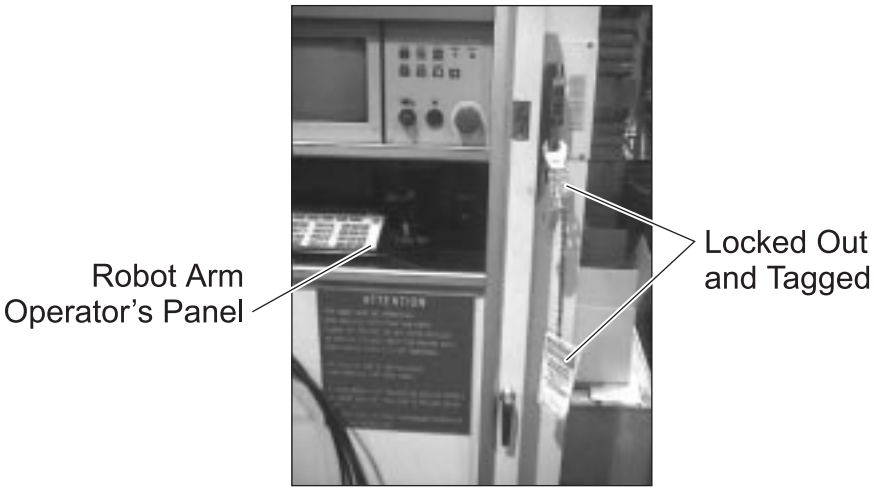
PM Robots (Balance System)

1. Ask an Operator to move the robot to the alignment position.

2. Check the center markings to verify that the robot is aligned.

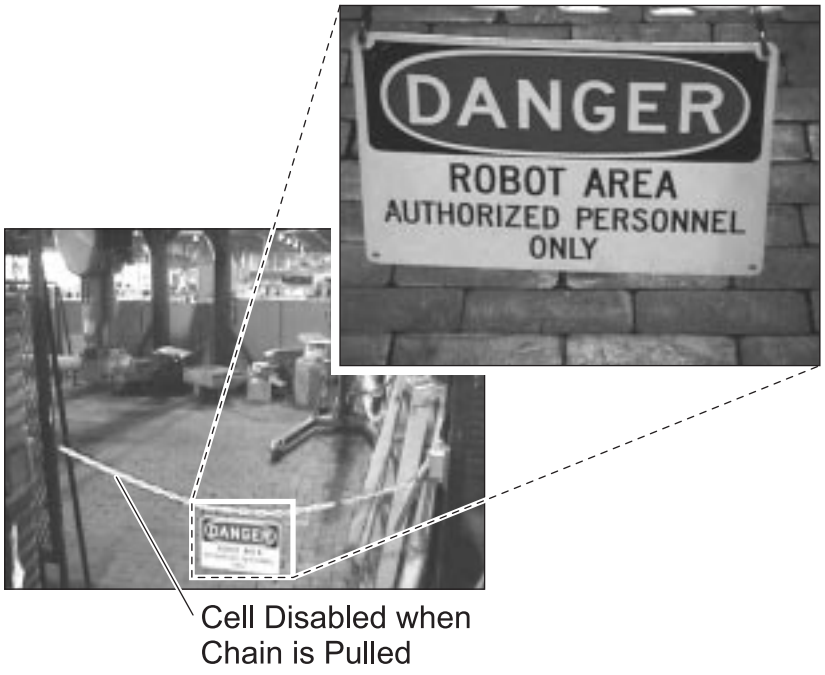


3. Perform lockout/tagout on the control panel.



4. Enter the work area.

☐ Pull the security chain, disabling the entire cell.

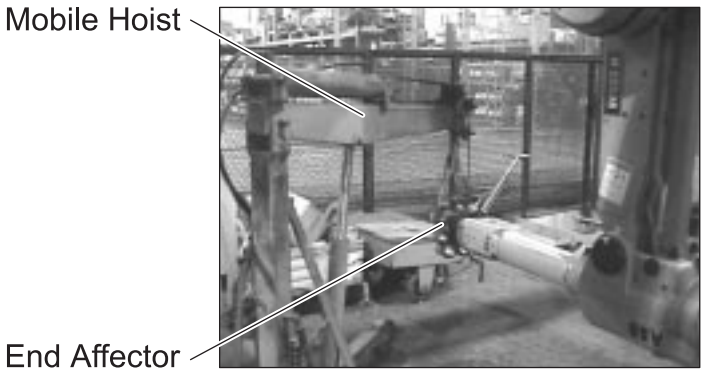


☐ Bring your hand tools into the work area.

☐ Make sure there is a tank of Nitrogen ready.

5. Secure the robot.

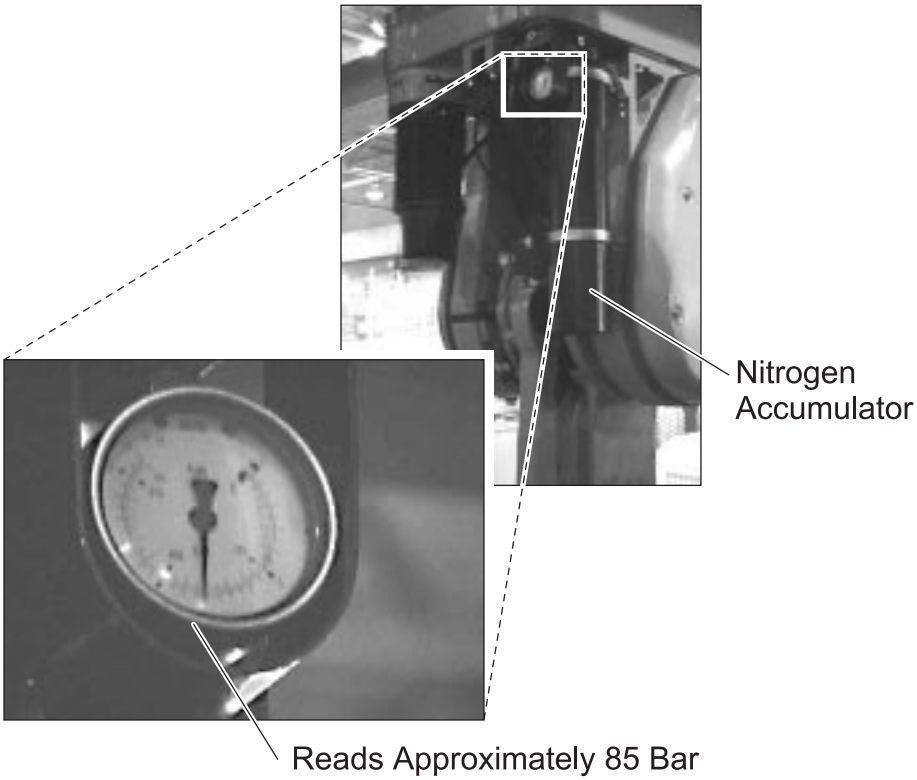
☐ Rig the robot so that the arm will not fall.



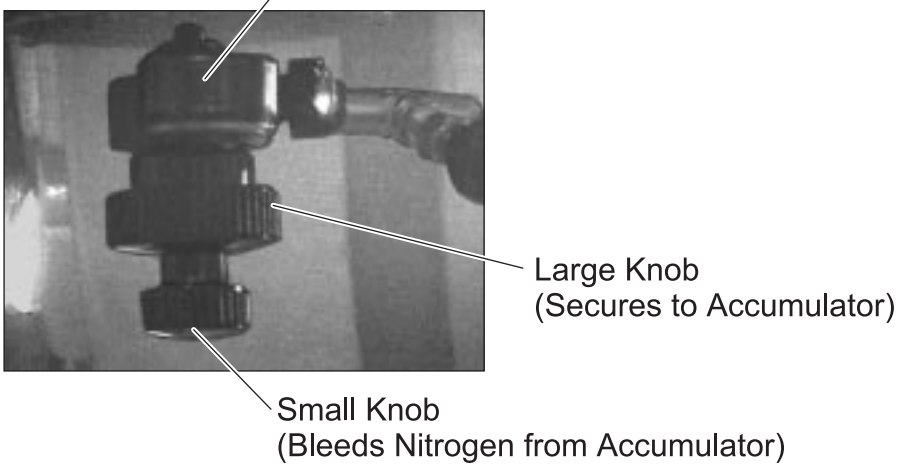
Example of Robot Rigging

6. Discharge the Nitrogen accumulator.

☐ Note the pressure shown on the accumulator gage.



- ☐ Set up the Nitrogen supply tank with the reducer housing (discharge/charge tool).
- ☐ Turn the large knob clockwise to attach the reducer housing to the nitrogen accumulator.



Caution: Turn the small knob on the reducer slowly to avoid damaging the valve.

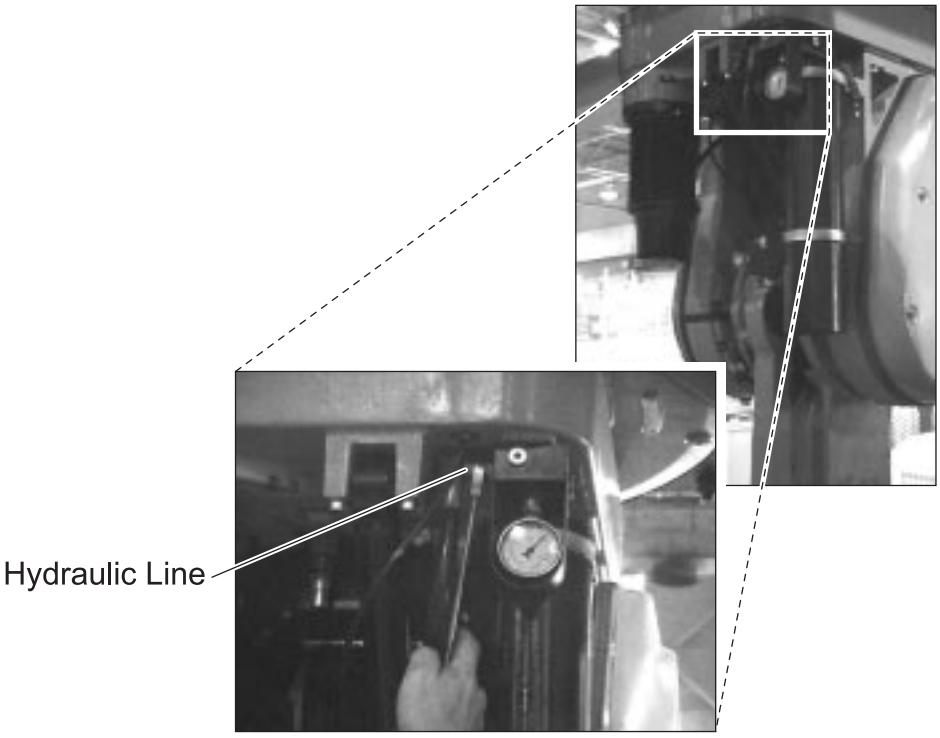
- ☐ Slowly turn the small knob on the reducer housing clockwise to bleed the Nitrogen from the accumulator.

Caution: Only screw the small knob in far enough to allow nitrogen to begin to bleed. Turning the knob too far may damage the accumulator needle valve.

- ☐ Monitor the accumulator gage as the Nitrogen bleeds from the system until the gage reads zero BAR.

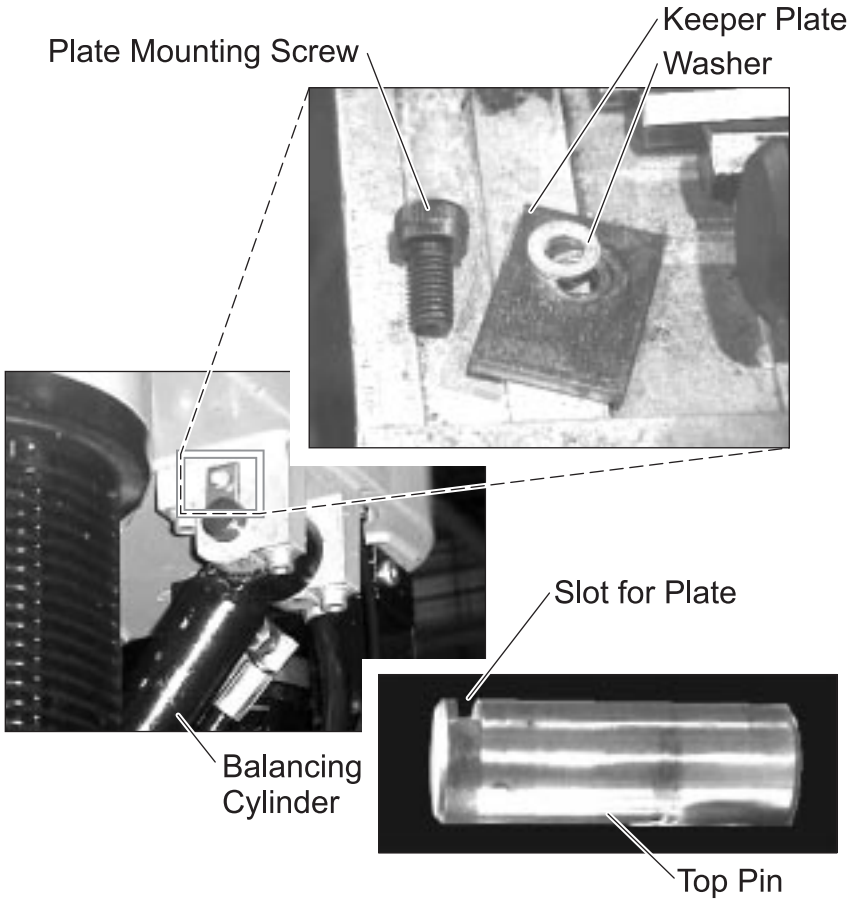
7. Open the hydraulic line to the cylinder.

- ☐ Let the line bleed any stored pressure.
- ☐ Retighten the line.



Caution: Do not move the rod during removal or installation of the cylinder. Movement of the rod could cause leakage.

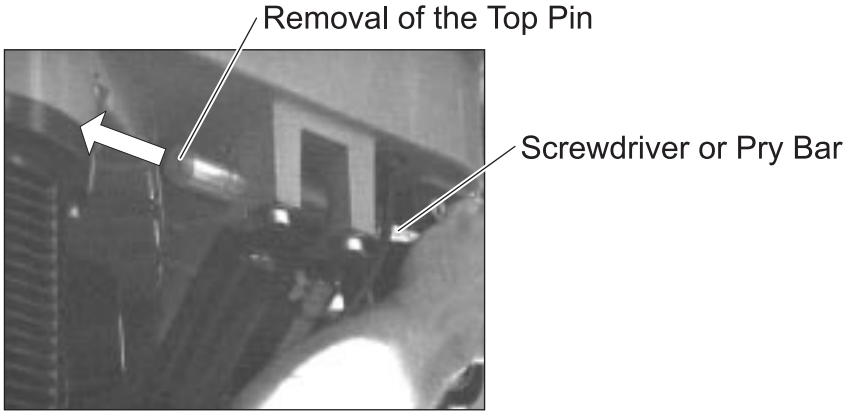
8. Remove the locking (keeper) pin plates.



- ☐ Remove the locking pin plate mounting screw.
- ☐ Remove the plates from the top and bottom of the balancing system cylinder.
- ☐ Inspect the plates and mounting hardware, replacing as needed.

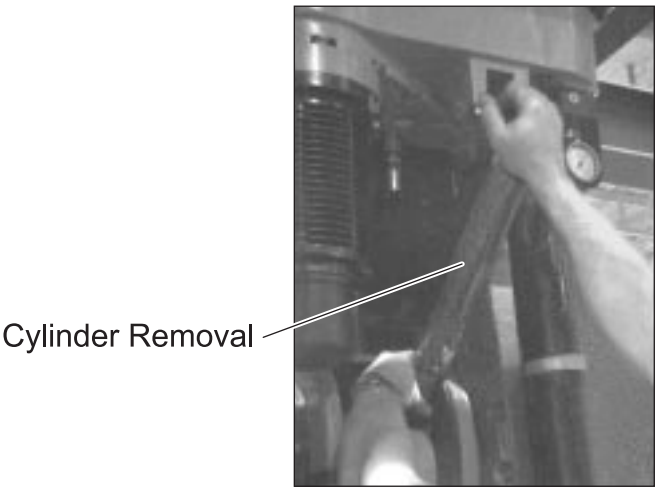
9. Remove the top of the balancing system cylinder.

- ☐ Pull the pin from the top of the cylinder.



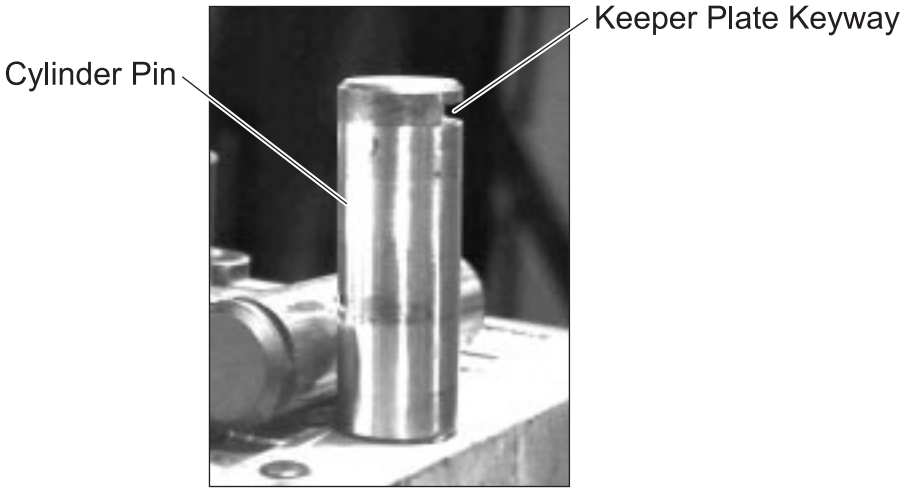
10. Remove the bottom of the balancing system cylinder.

☐ Pull the pin from the bottom of the cylinder, and remove the cylinder.



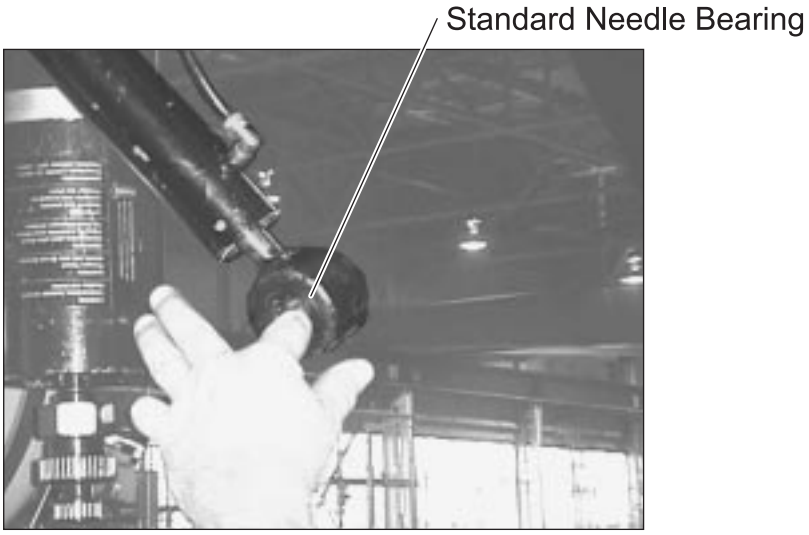
11. Inspect the pins for damage and replace as needed.

☐ Look for nicks and scarring on the shaft of the pin.



12. Lubricate and inspect the bearings.

- ☐ Apply manufacturer's recommended grease for the standard needle bearing.



- ☐ Verify all the rollers roll as you apply the grease.
- ☐ Replace the bearings, as needed.

13. Install the bottom of the balancing system cylinder.

- ☐ Ensure that the pin slides into place with minimum resistance.
- ☐ Use pliers to turn the pin slot towards the locking plate mounting hole.
- ☐ Attach the locking plate so that the plate secures the pin.

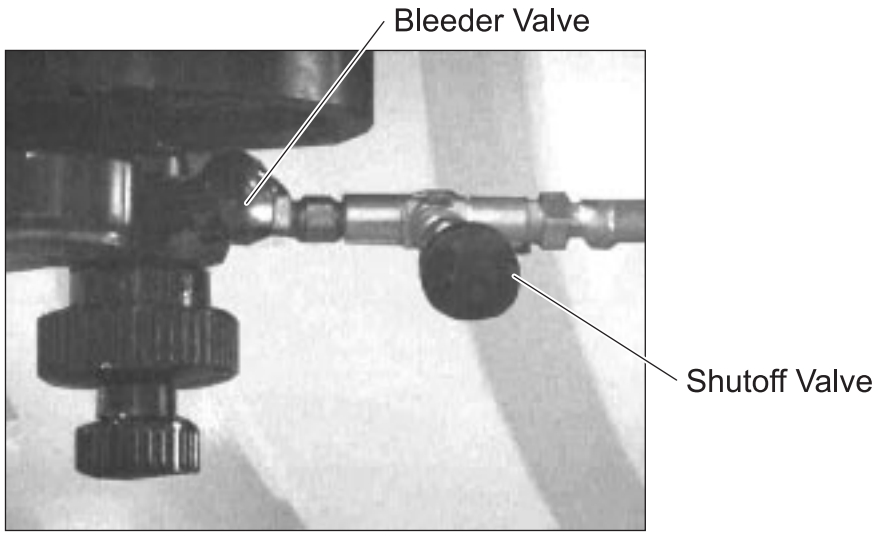
14. Install the top of the balancing system cylinder.

- ☐ Ensure that the pin slides into place with minimum resistance.
- ☐ Use pliers to turn the pin slot towards the locking plate mounting hole.
- ☐ Attach the locking plate so that the plate secures the pin.
- ☐ Verify that the cylinder is securely mounted at the top and bottom.

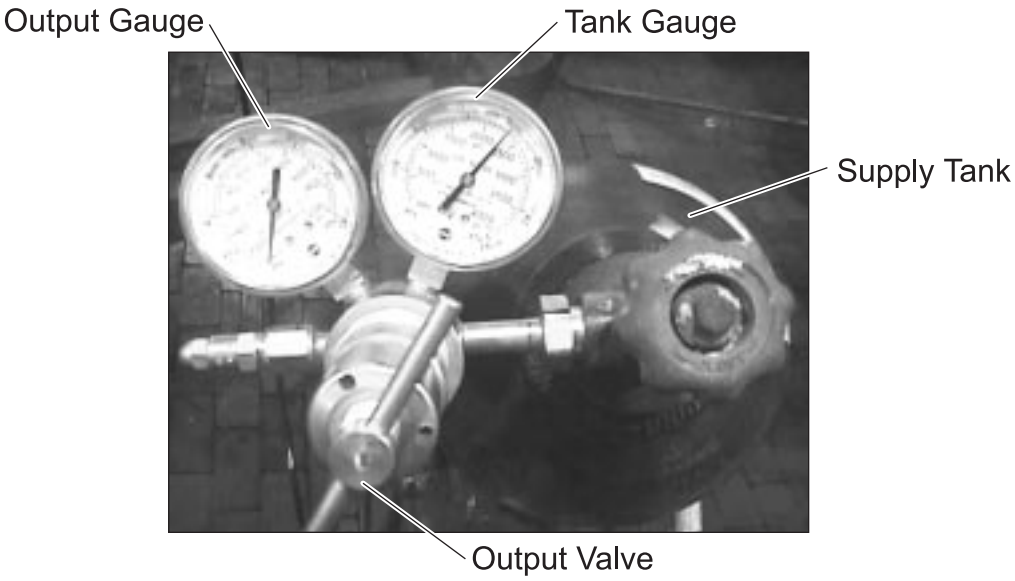
Caution: Verify that the hydraulic lines are secured to avoid spraying hydraulic fluid in the next step.

15. Recharge the Nitrogen accumulator.

- ☐ Make sure the bleeder valve and the shut off valve are closed before opening the supply tank valve.



- ☐ Turn on the supply tank pressure.



- ☐ Verify that the appropriate Nitrogen pressure level is present.
- ☐ Open the output valve to the accumulator until the gage reads the manufacturer's specified pressure (83-87 BARS or 1250 psi).

- ☐ Slowly open the shut off valve to allow the accumulator to begin recharging.
- ☐ When the accumulator gage reads the manufacturer's specified pressure, close the shut off valve.
- ☐ Back off the small knob to close the accumulator needle valve.
- ☐ Turn off the supply tank and disassemble the reducer housing.

16. Remove the rigging from the robot.

17. Clean up the work area.

- ☐ Move your tools, ladder, and gas tanks from the robot area.

18. Re-install the security chain.

19. Remove lockout/tagout and restore power.

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