

## U-02f: Replace Feedback Device (Sony Magnascale)

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Lock and tag required when working on a machine.
- Ladder may be needed to reach scale covers.
- Hoist overhead hazard may exist on some machines.
- Tripping/slipping hazard exists when working on top of machine.

### EQUIPMENT

- basic Electrician hand tools
- dial indicators with magnetic bases (Maintenance Mechanic)
- ladder

### RESOURCES

- Sony Magnascale Instruction Manual



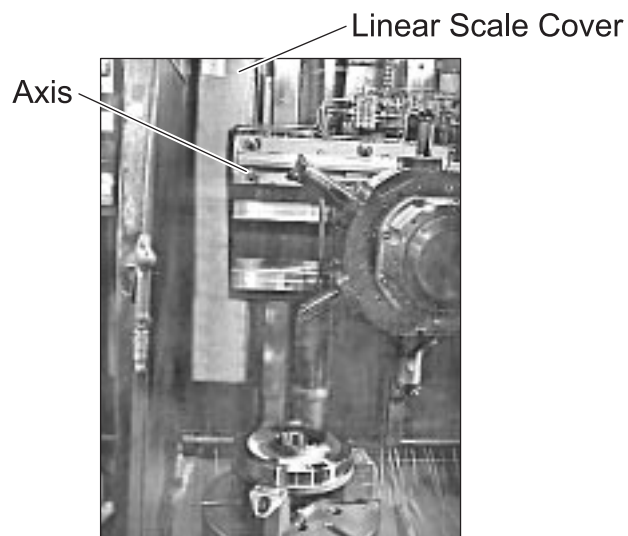
## Replace Feedback Device (Sony Magnascale)

**Note:** Throughout these steps the scanning unit on the scale is referred to as a read head.

**Note:** These steps performed on a Saginaw Lathe Z Axis.

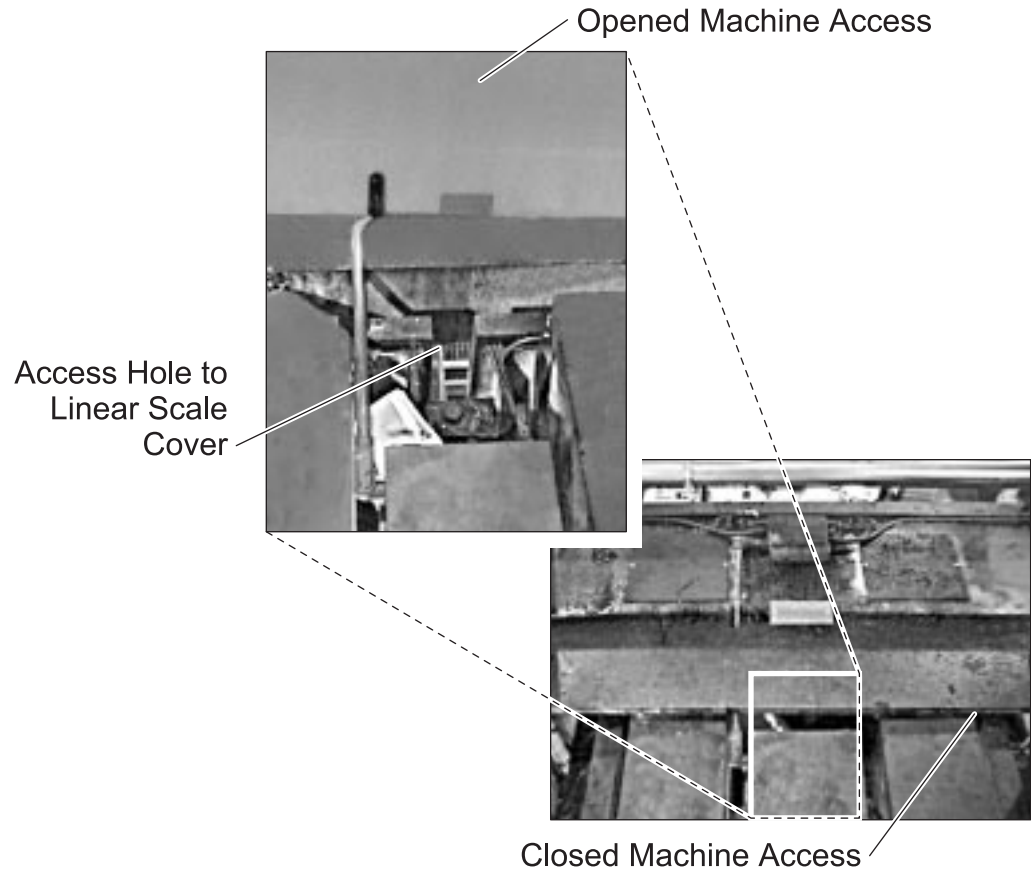
### 1. Remove Magnascale covers.

- Position the axis to allow access to the scale cover mounting bolts.



- Remove all cover bolts accessible from the floor level.

- Open any required machine access covers to provide access to the scale from the top of the machine.



- Remove the top scale cover mounting bolts and pull the scale cover from the top of the machine.



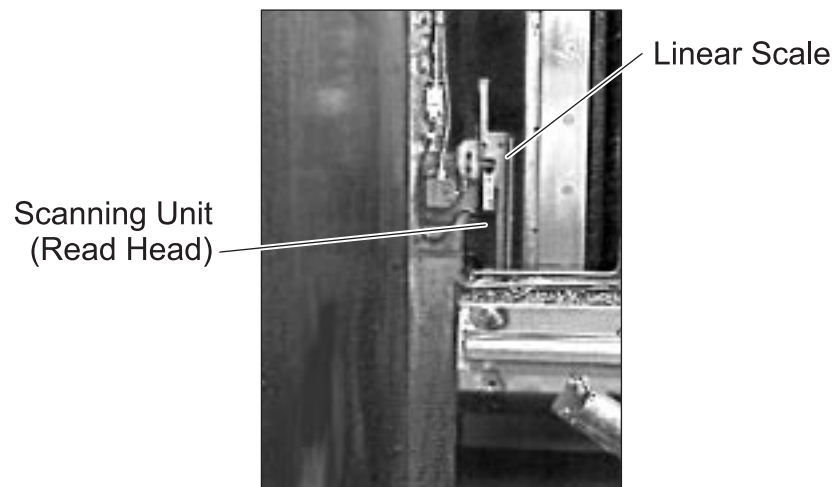
Linear Scale Cover

**2. Set the machine parameters to disable the scale and to run the axis from the motor encoder.**

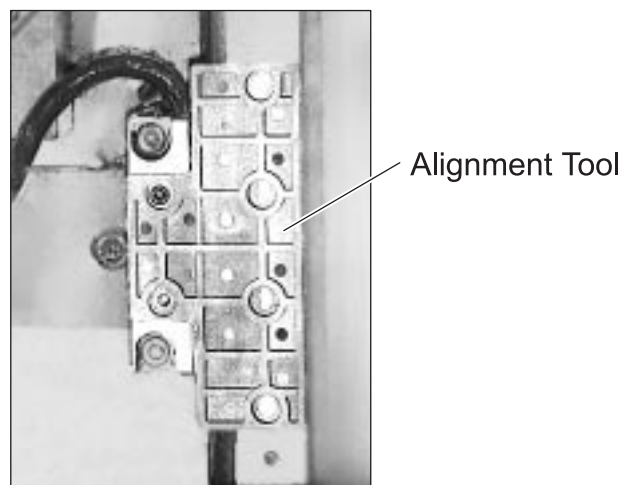
- Follow the machine manufacturer's manual or ask an experienced Electrician to change the machine parameters to disable the scale and run the machine from the encoder.

**3. Attach the scale alignment tool.**

- Run the axis to a position where mounting holes for the alignment tool match the holes in the scanning unit (read head) and scale.



- Attach the alignment tool to the read head and scale with all four screws to ensure the protection of the scanning unit and scale.

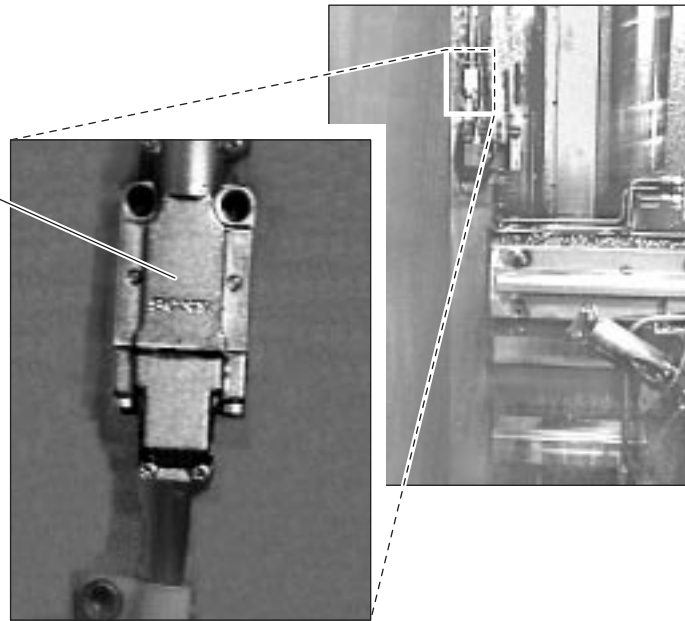


**Caution: Do not move the axis after attaching the alignment tool, or damage to the machine will result.**

4. **Perform a lockout/tagout.**
5. **Remove the electrical connection to the scale.**
  - Use care to avoid getting dirt into the cable connectors.
  - Disconnect the read head amplifier electrical cable connector.

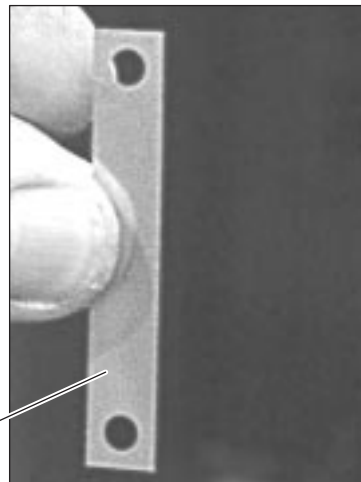


Electrical  
Connection



- Note cable position and remove any cable clamps.
6. **Remove the read head mounting bolts.**
    - Retain the shims from behind the read head for possible reuse.

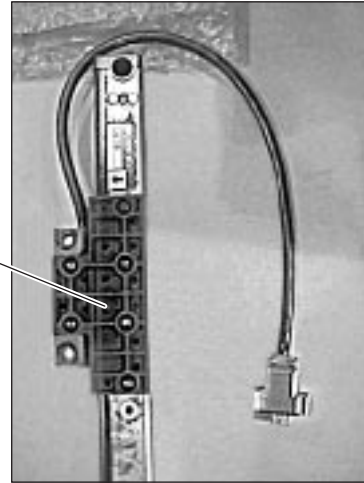
Shim



7. **Remove the scale mounting bolts.**
8. **Remove the scale and read head together.**
  - Send the scale to repair with the alignment tool installed.



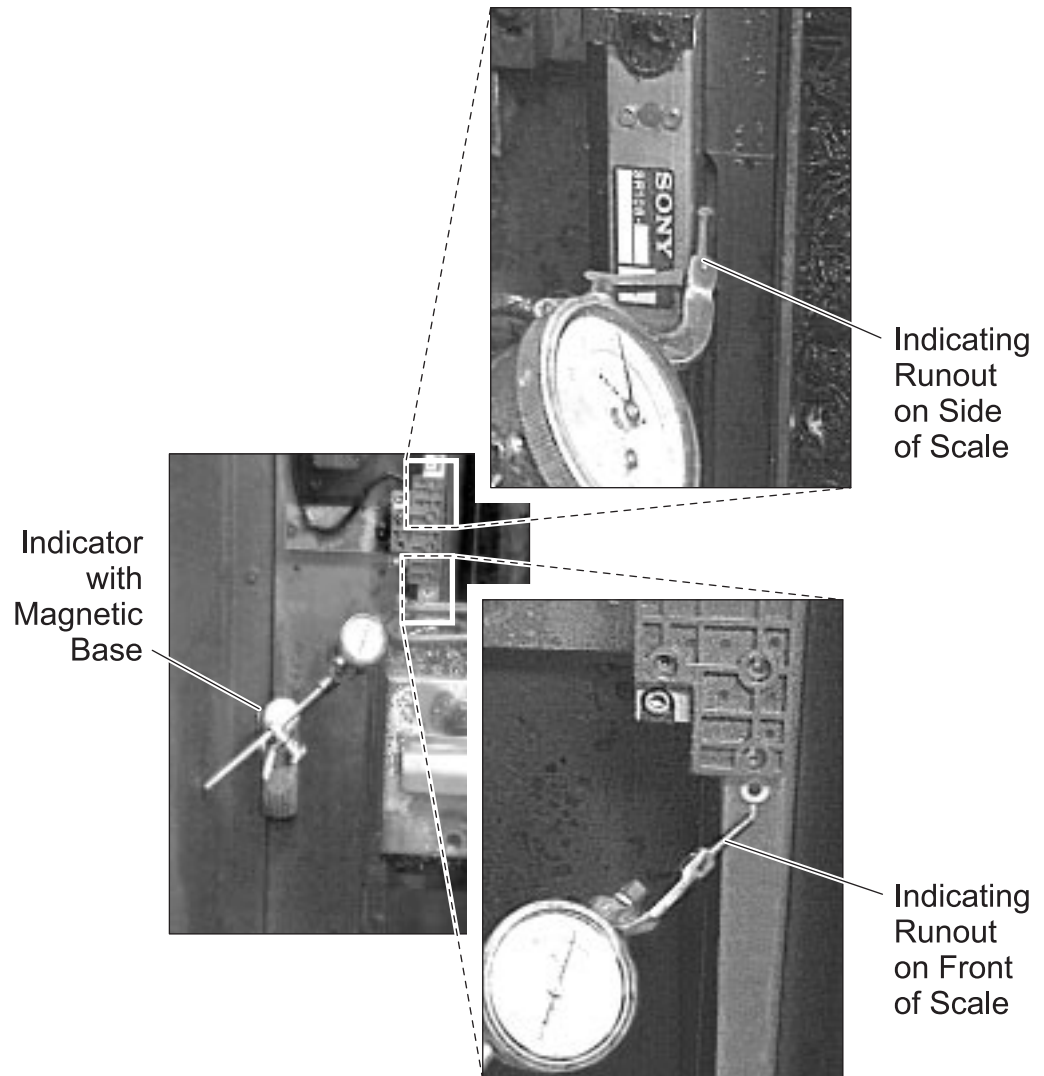
Alignment Tool  
Attached to Removed  
Linear Scale



9. **Obtain a replacement scale.**
  - The new scale comes with the alignment tool installed.
10. **Install the scale.**
  - Loosely mount the scale allowing “play” for adjustment.

**Caution: Do not install mounting bolts into the read head or reconnect the electrical cable. To align the scale, the cable and read head must not be attached to the machine.**

11. **Install dial indicators to measure run out on the top and side of the scale as shown below.**



12. **Remove lockout/tagout and restore power.**
13. **Measure run out and adjust the scale.**

**Caution: Use care to avoid damaging the read head cable connector while operating the machine.**

- Manually move the axis to measure run out on the scale.
- The scale must measure within 0.002" from end to end on the dial indicators.

**14. Measure for the read head shims.**

- Move the axis to a position to line up the read head mounting bracket with the read head.
- Use a feeler gage to measure the distance between the back of the read head and the mounting block.

**15. Attach the read head.**

**Caution: Do not move the machine until the alignment tool is removed from the scale and the read head. Moving the machine will damage the scale.**

- Install the shims behind the read head.
- Install and tighten the mounting bolts into the read head.

**16. Perform lockout/tagout.****17. Remove the alignment tool and save it for future replacement.****18. Cover the alignment tool mounting holes on the scale with small stickers or tape to keep dirt out.****19. Reconnect the read head's amplifier cable.**

- Replace any cable clamps.

**20. Remove lockout/tagout and restore power.****21. Move axis to center of travel.****22. Restore machine parameters to enable the scale.**

- Restore the parameters according to the machine manufacturer's manual.

**Warning: A new scale must be phased the same as the replaced scale or the axis could "runaway" resulting in a wreck or injuring personnel.**

**23. Check axis movement**

- It may run away, if direction switch on amplifier is not matched to the new scale.



24. **Perform the procedure to Setup/Adjust Feedback Device (Magnascale).**
25. **Cycle the machine to verify positioning information and axis zero position.**
26. **Replace the scale cover.**

