

## U-02c: Replace Feedback Device (Encoder)

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- A tripping hazard exists when working inside and around a machine.

### EQUIPMENT

- basic Electrician hand tools
- flashlight

### RESOURCES

- CNC machine control panel
- encoder nameplate data
- electrical print

### Replace Feedback Device (Encoder)

**Note:** These steps are performed on a Heidenhain encoder.

1. **Locate the encoder needing a replacement.**
2. **Obtain a replacement encoder.**
  - Check the electrical print for the required encoder.
  - Check for the manufacturer's model number and the number of counts per revolution.

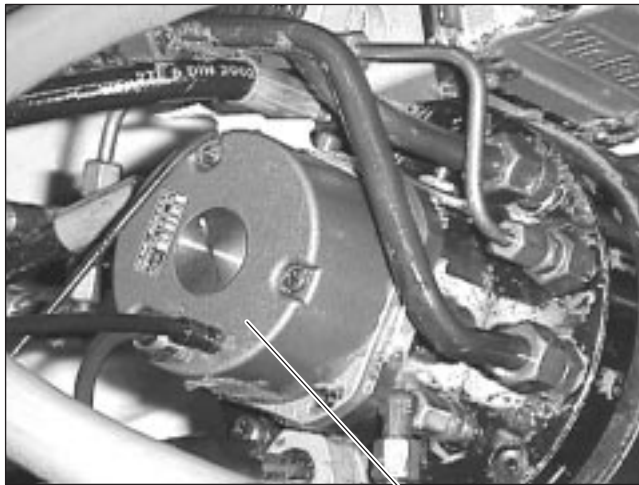
**Note:** If it is necessary to position the axis slide for accessibility to the ball screw, do so now.

3. **Perform a lockout/tagout on the machine.**



**4. Obtain access to the encoder.**

Access to Encoder

**5. Remove the encoder cover.**

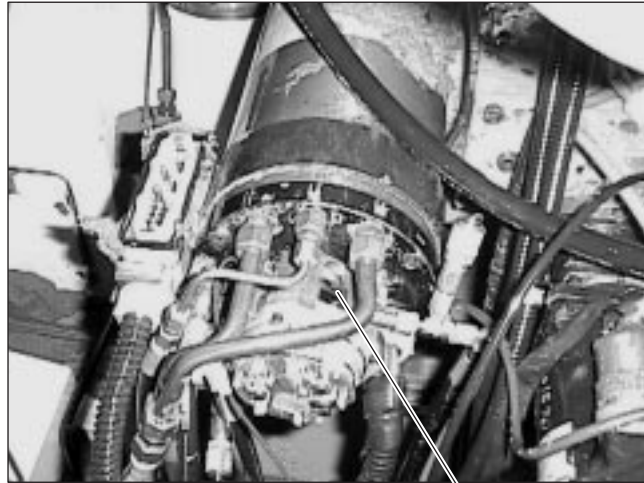
Encoder Cover

**6. Unplug the pin connector.**

- Note the direction the pin connector faces.

7. **Manually turn the shaft to allow access to the coupling screw.**

**Caution: Couplings are fragile; handle with care.**



Access to Coupling

**Note: The procedure to remove the encoder may vary depending upon the application of the encoder.**

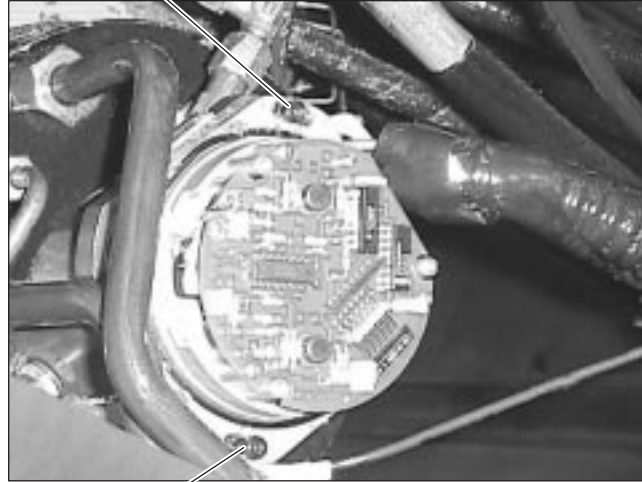
8. **Loosen the coupling screw.**

Use Allen Wrench to  
Loosen Coupling



**9. Remove the encoder bolts with the required Allen wrench.**

Top Encoder Bolt

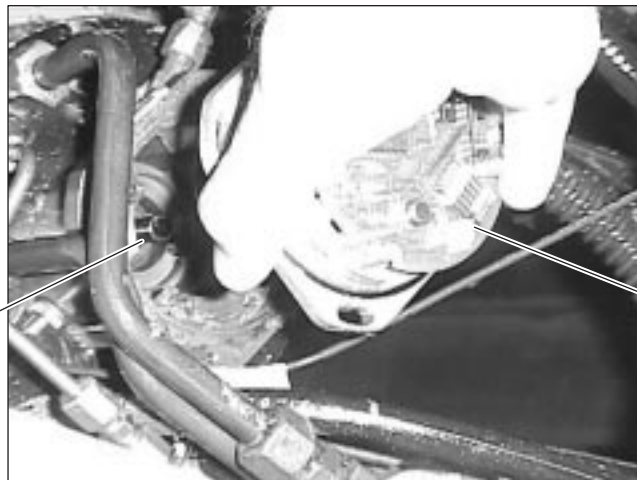


Bottom Encoder Bolt

**10. Break the seal between the encoder and the housing mounting plate.****11. Remove the encoder.**

- Measure the coupling position to a fixed surface for exact replacement of the coupling.
- Pull the encoder straight off the shaft (Either out of the coupling or with the coupling attached).

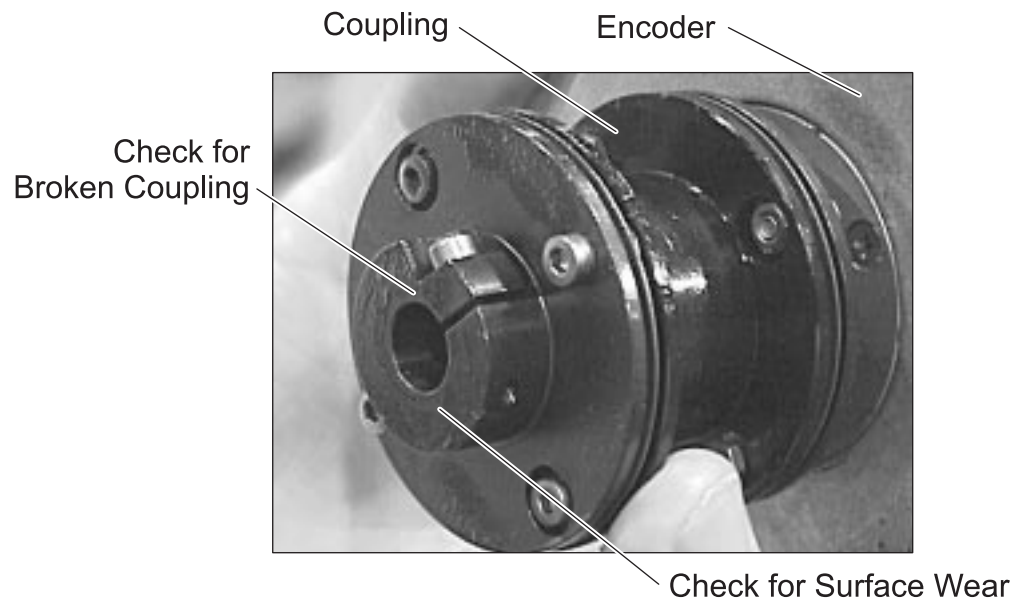
Shaft

Encoder  
(with Coupling)



**12. Inspect the coupling.**

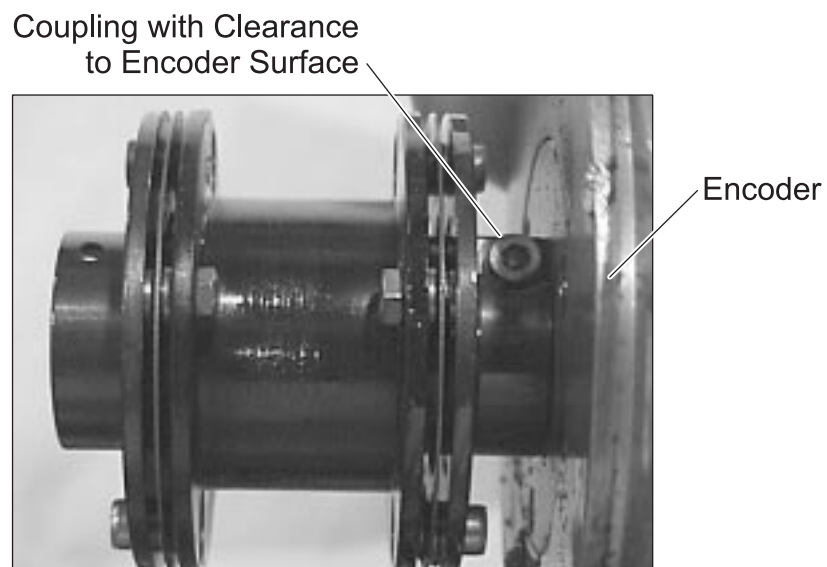
- Check for a shiny surface or unusual wear on the face of the coupling.

**13. Compare the encoder with the replacement.**

- Make sure the manufacturer's model number and counts per revolution match.

**14. Install the replacement to the coupling.**

- Make sure the coupling does not rub against the encoder surface.



- Tighten the coupling to the encoder shaft.

**15. Clean the mounting surfaces.**

- Wipe grime and debris from the housing mounting surface and encoder surface.

**16. Slide the coupling and encoder onto the shaft.**

- Make sure the pin connector is facing in the previously noted direction.

**Caution: Be sure to attach the encoder to the housing before attaching the coupling to the spindle shaft.**

**17. Attach the encoder to the housing.**


- Finger tighten the encoder mounting bolts to the housing.
- Make sure the encoder is flush with the surface of the mounting plate.
- Alternately tighten each mounting bolt.

**18. Tighten the coupling screw. Do not overtighten.****19. Reattach the pin connector.****20. Replace the encoder cover.****21. Pick up all hand tools and close the machine access door.****22. Ask the Operator to cycle the machine to test the encoder.****23. Verify that the encoder references correctly.**

- Check the control panel for the actual axis speed versus the expected (nominal) speed.



- Check the Axis Diagnose screen for manufacturer's recommended specifications.



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Axis diagnose
      : B
Axis designation      : +000000 Increments
Actual following error : 000015 Increments
Stop window (+/-)    : 10000 1/min
Rapid traverse        : 035.5650 degrees
Actual position       : +00.000 V
Output voltage

AK-Reg. ST:0007 IW:5503 SW:0000 MW:5500
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