

U-03d: Clean Linear Scale (Heidenhain)

SAFETY FIRST

- ☐ Follow all Caterpillar facility safety standards when performing this task.
- ☐ Lock and tag required when cleaning a scale still installed to machine.

EQUIPMENT

- ☐ oscilloscope
- ☐ basic Electrician hand tools
- ☐ isopropyl alcohol presaturated swab (Chem Swab or equivalent)
- ☐ blue RTV gasket silicon (or equivalent)
- ☐ Heidenhain PWM7 Diagnostic Kit

RESOURCES

- ☐ Heidenhain Manufacturer's Manual



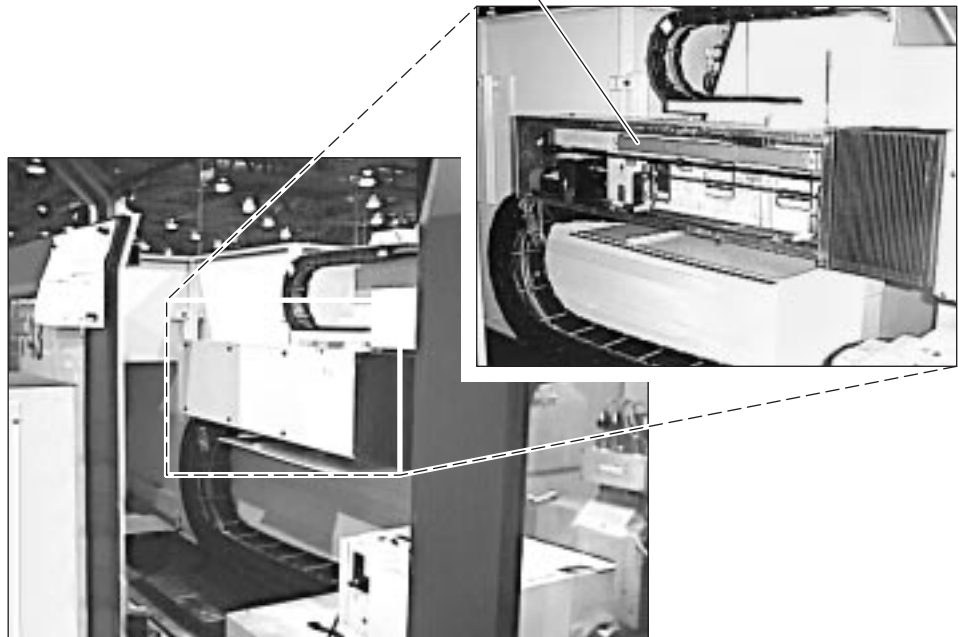
Clean Linear Scale (Heidenhain)

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

Note: Whenever possible the scale should be removed from the machine to clean. The scale may be cleaned on the machine if necessary.



Example of a
Mounted Linear Scale



Caution: Handle the scale with extreme care to avoid damaging the fragile components.

1. Clean your hands.

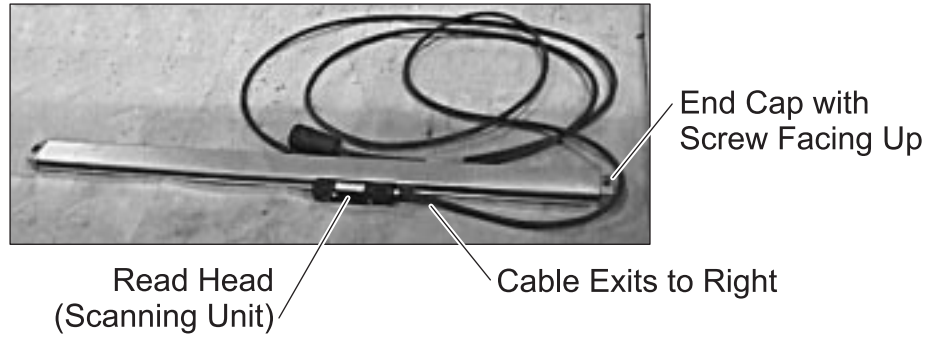
- ☐ Continue to keep your hands free of debris and grime as you clean the scale. Any dirt or debris can leave smears on the glass scale causing a bad reading.

2. Clean scale exterior.

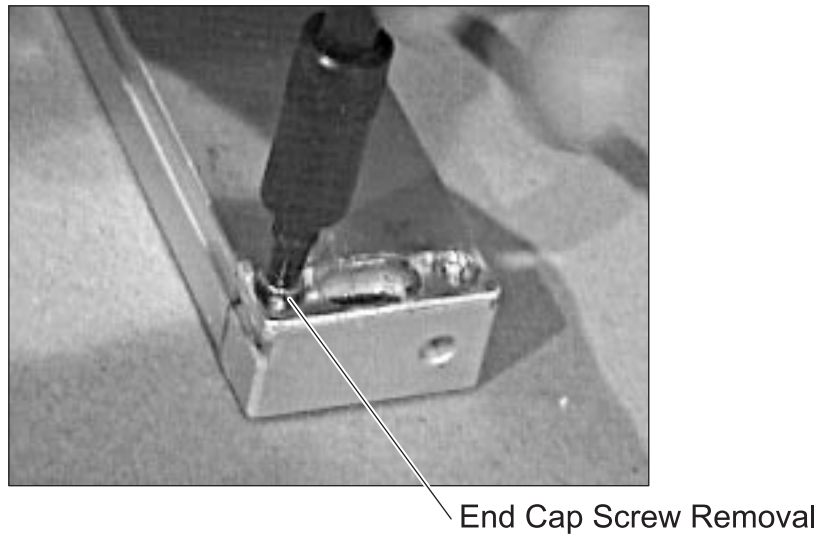
- ☐ Place the scale in a clean work environment.
- ☐ Use a clean towel and soap to clean the housing exterior and cable.

3. Disassemble the scale.

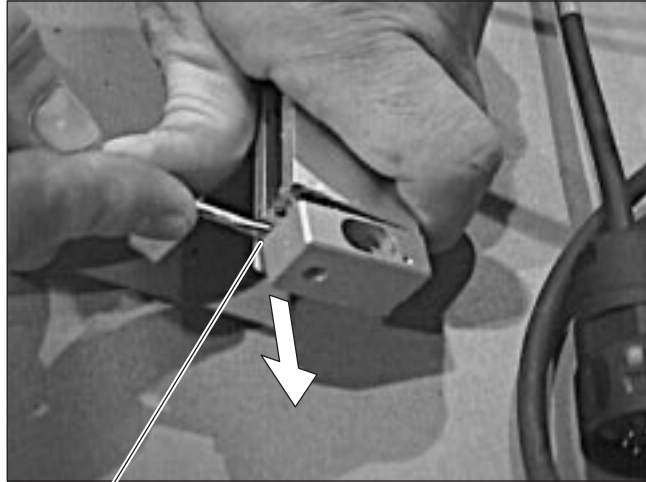
- ☐ With the end cap screws facing up, note the direction that the cable exits the scale.



- ☐ Remove the screws from one of the end caps.



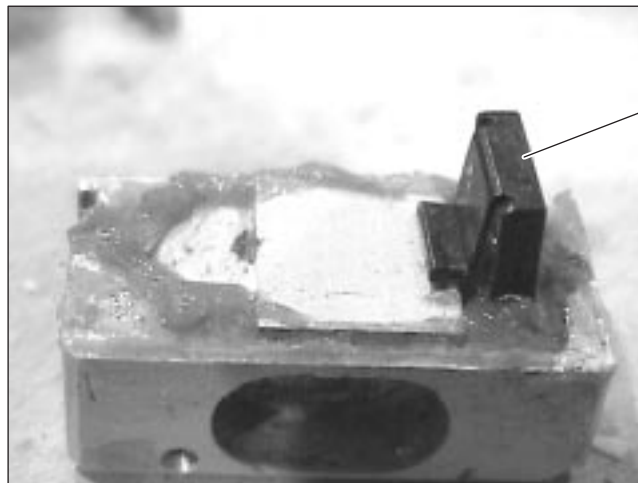
- ☐ Use a small blade screwdriver to carefully break the seal and remove the end cap.



Pry Away from Scales

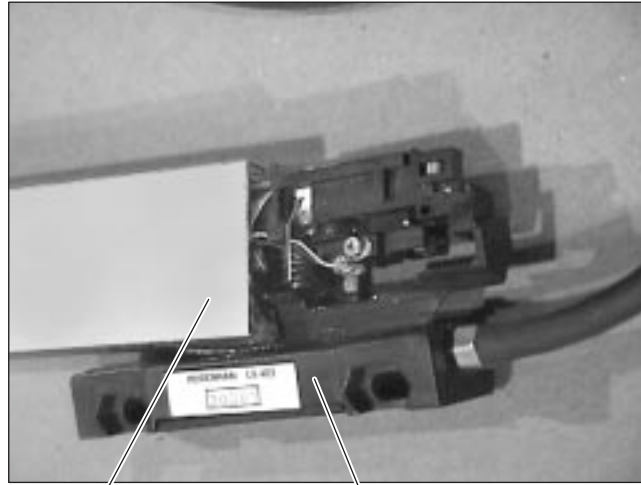
Caution: Use care to pry away from the scale when breaking the seal on the end cap.

- ☐ Remove the plastic spacer block.



Plastic Spacer Block

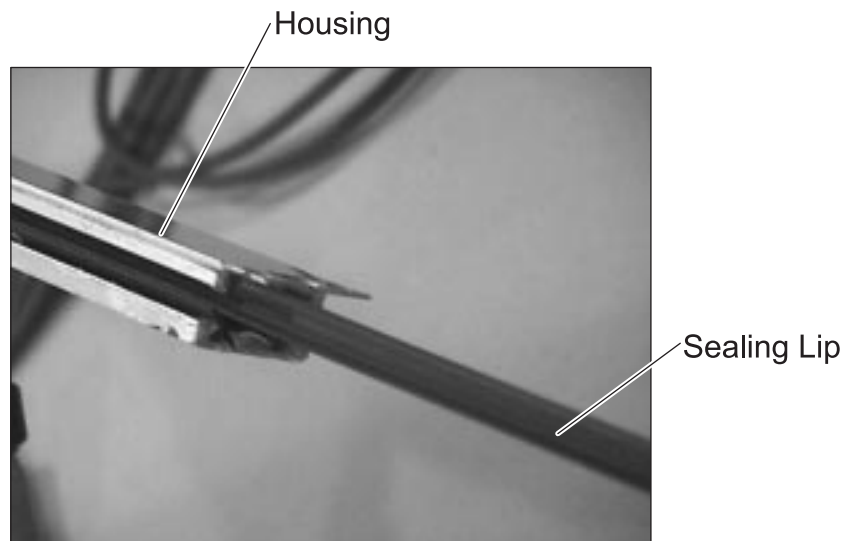
- ❑ Carefully slide the read head out the end. The read head is spring loaded.



Housing

Read Head

- ❑ Remove the other end cap.
- ❑ Use a pair of needle nose pliers to carefully pull the rubber sealing lips out of the housing.

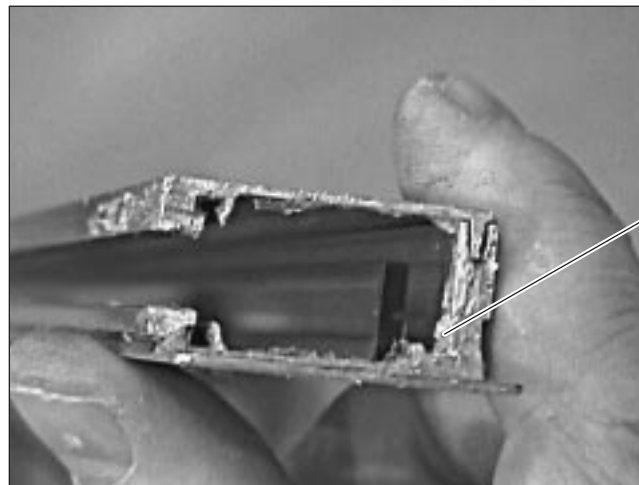


Housing

Sealing Lip

Note: The metal clamps that hold the sealing lips in place may need to be removed. If present, clamps are in a seal groove, held by a set screw, at the end caps.

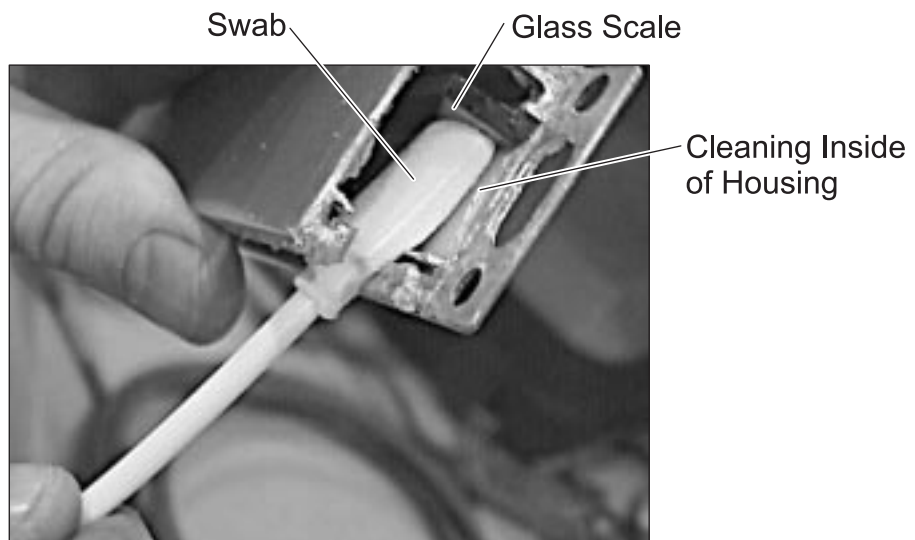
4. **Clean the sealant from the ends of the housing.**



Remove Old
Sealant

5. **Clean the interior of the housing.**

Caution: When swabbing inside the housing, be careful not to scratch or apply pressure against the glass scale.



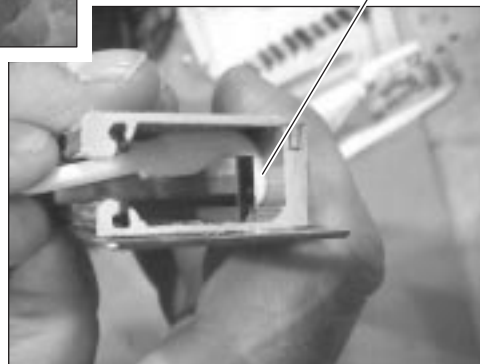
6. Clean the glass scale.

Caution: Use care to avoid touching the glass scale with the tool.

- ☐ Use a swab with isopropyl alcohol to wipe behind the glass scale.

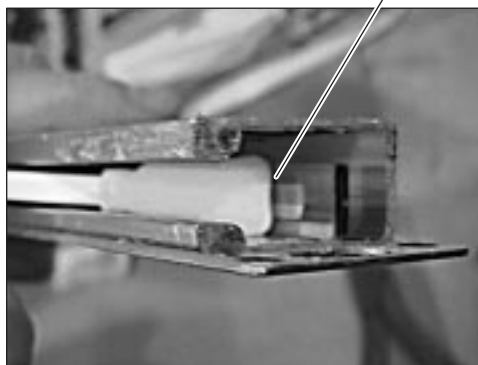


Cleaning Back
of Glass Scale



- ☐ Gently pull the swab through the scale.
- ☐ Change the swab and continue until no residue is found on the swab.
- ☐ Clean the front of the glass scale using a swab (with isopropyl alcohol).

Cleaning Front
of Glass Scale



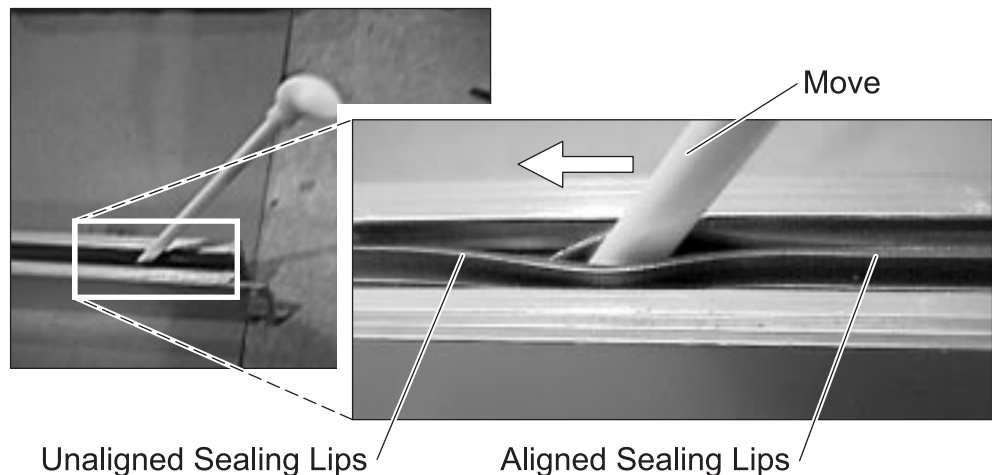
- ☐ Visually inspect the glass scale for smears, dirt, or debris.

7. Clean the sealing lips.

- ☐ Wipe the sealing lips with soapy cloths until no grime or dirt is detected on the cloth.
- ☐ Inspect the sealing lips for cracks or nicks, replacing the sealing lips as needed.

8. Install the sealing lips.

- ☐ Slide each seal into the housing as shown below.
- ☐ Use a plastic swab to align the seal. Be careful not to touch the glass scale.

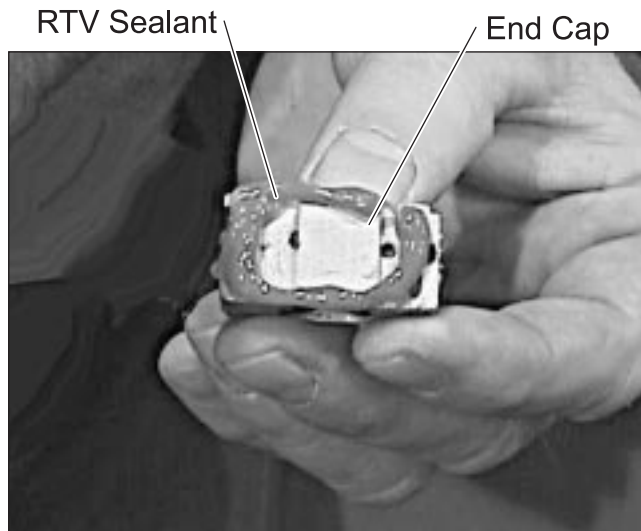


- ☐ Line the sealing lips up at one end of the scale so they are even with each other and the end of the scale.
- ☐ Trim excess of sealing lips from opposite end so they are flush and even on both ends.

9. Replace one of the end caps.

- ☐ Reinstall the plastic spacer block.

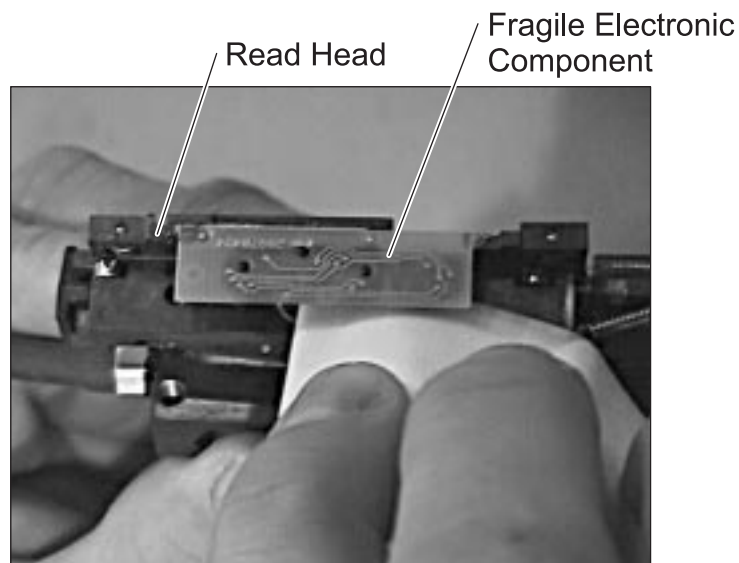
- ☐ Apply blue RTV (or equivalent) gasket silicon to the end cap.



- ☐ Install the end cap hand tightening the screws with the screwdriver.
- ☐ Wipe excess silicon off the housing.

10. Clean the read head.

- ☐ Wipe the read head's plastic parts with a soapy cloth.



- ☐ Carefully clean the electronic components of the read head with a swab (with isopropyl alcohol).



11. Reinstall the read head.

- ☐ Align read head to the glass scale.
- ☐ Without using excessive force, carefully slide the read head into the housing.

Caution: Make sure the cable is facing in the noted direction from step 3.

12. Reinstall the second end cap as shown in step 9.

13. Follow the Electrician procedures to Troubleshoot Feedback Device (Heidenhain Scale) to verify proper scale operation.