

## 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



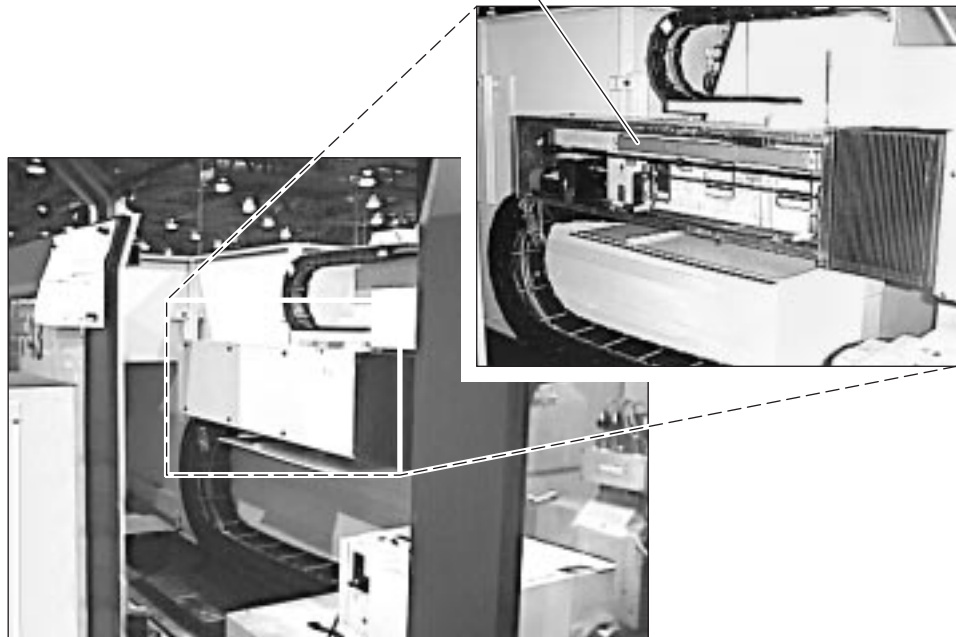
## Clean Linear Scale (Heidenhain)

**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.

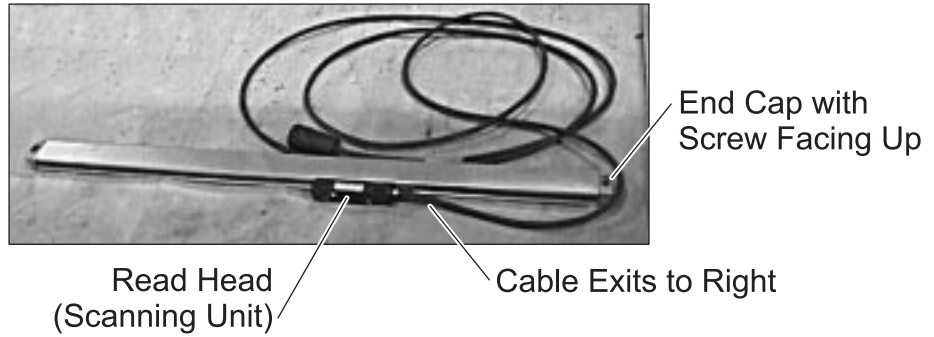
- Continue to keep your hands free of debris and grime as you clean the scale. Any dirt or debris can leave smears on the glass scale causing a bad reading.

### 2. Clean scale exterior.

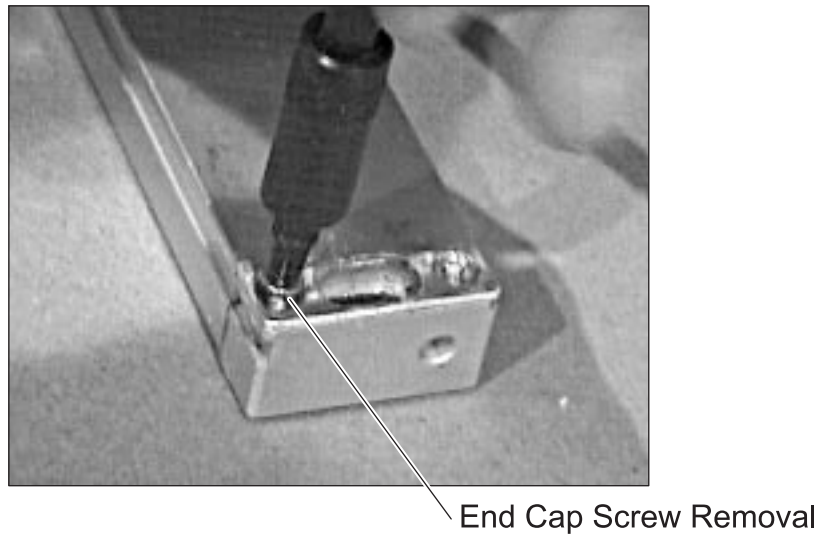
- Place the scale in a clean work environment.
- Use a clean towel and soap to clean the housing exterior and cable.

**3. Disassemble the scale.**

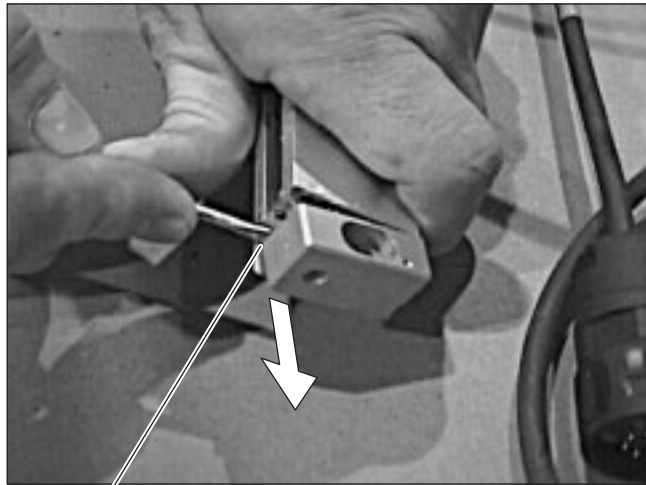
- With the end cap screws facing up, note the direction that the cable exits the scale.



- Remove the screws from one of the end caps.



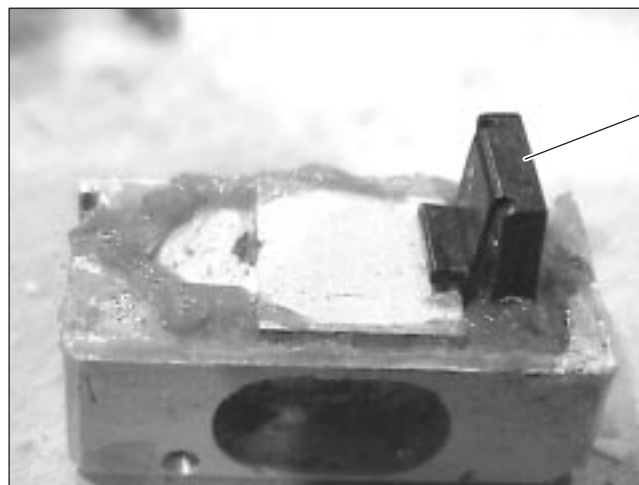
- Use a small blade screwdriver to carefully break the seal and remove the end cap.



Pry Away from Scales

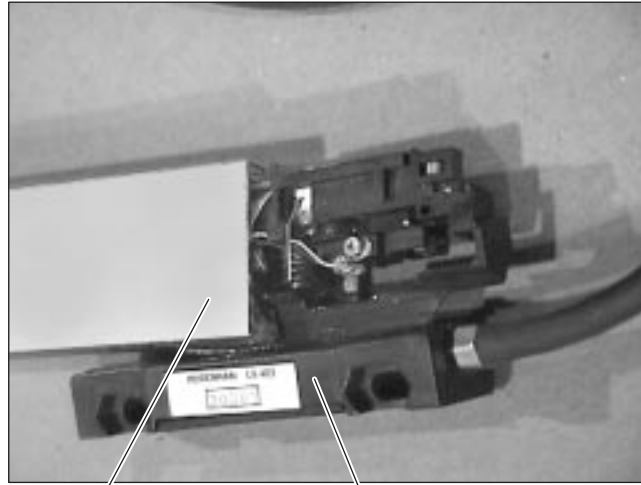
**Caution: Use care to pry away from the scale when breaking the seal on the end cap.**

- Remove the plastic spacer block.



Plastic Spacer Block

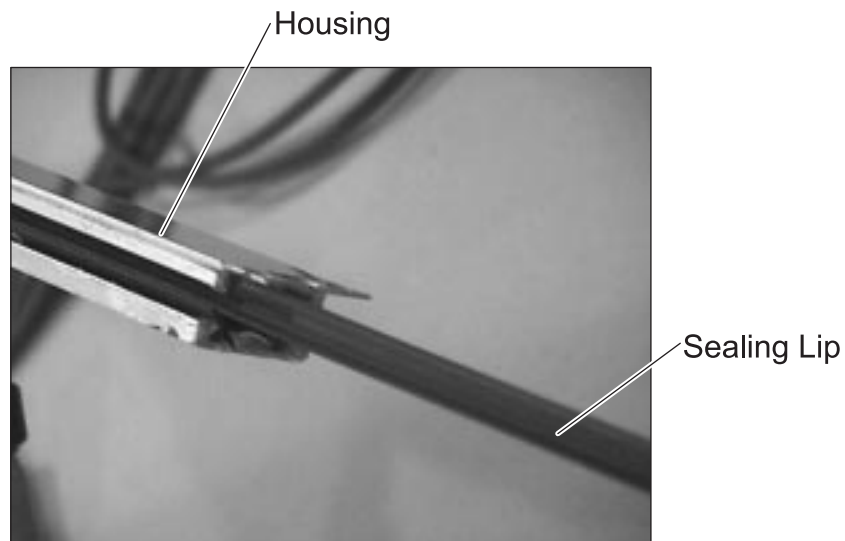
- ❑ Carefully slide the read head out the end. The read head is spring loaded.



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.

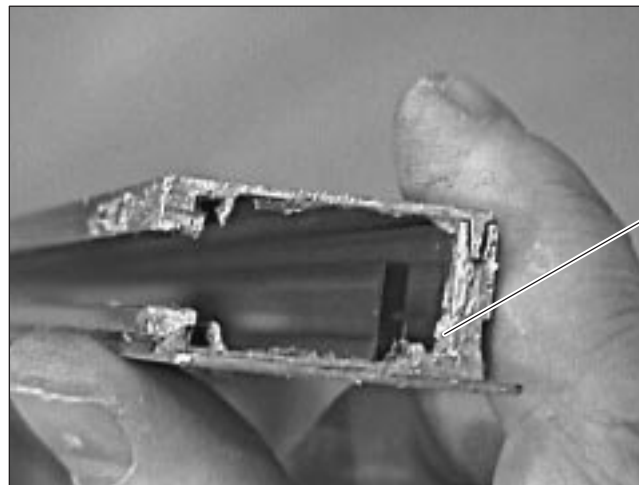


Housing

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.

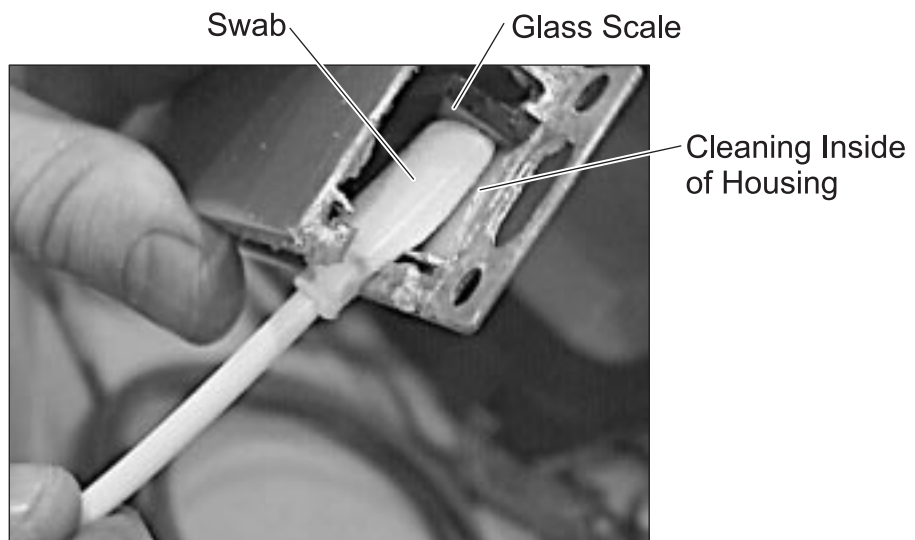
**4. Clean the sealant from the ends of the housing.**



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.**



Swab

Glass Scale

Cleaning Inside of Housing

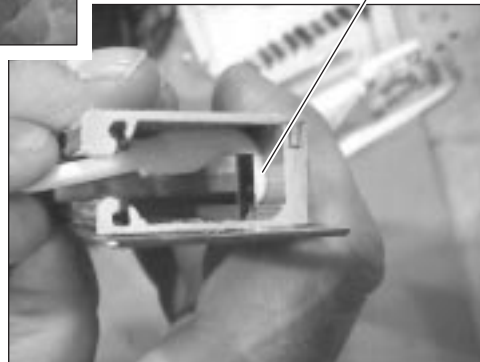
## 6. Clean the glass scale.

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

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

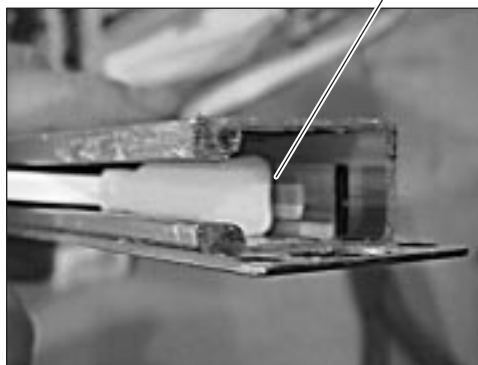


Cleaning Back  
of Glass Scale



- 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



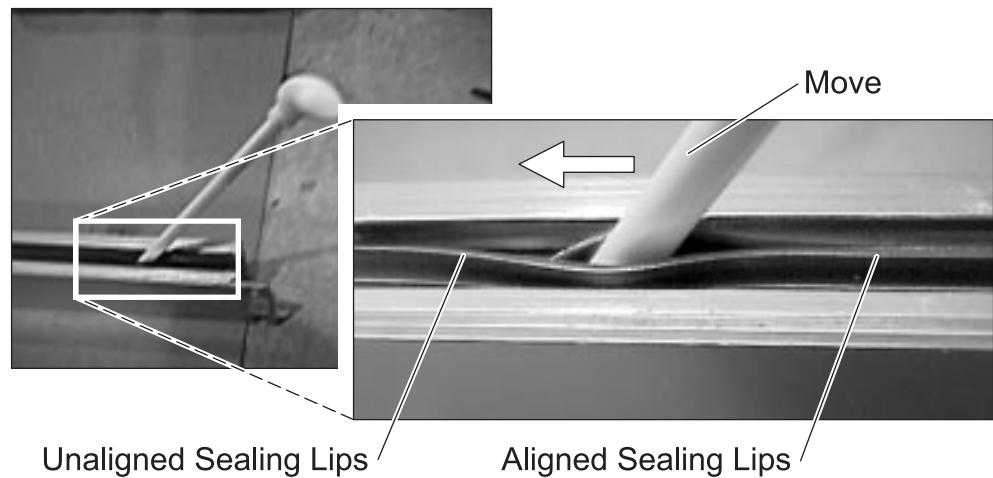
- Visually inspect the glass scale for smears, dirt, or debris.

**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.



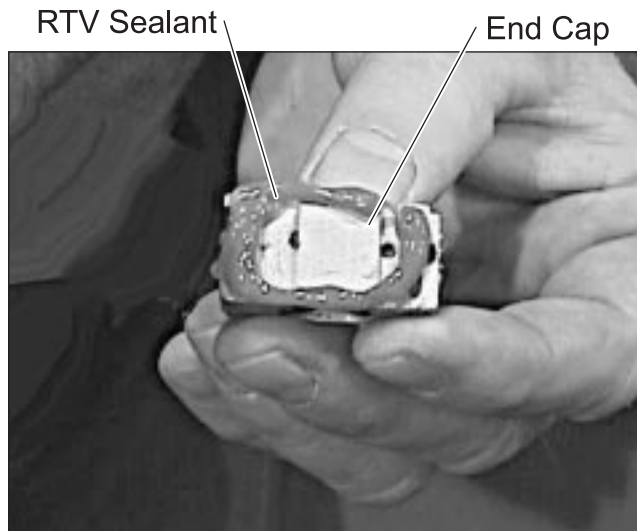
- Line the sealing lips up at one end of the scale so they are even with each other and the end of the scale.
- Trim excess of sealing lips from opposite end so they are flush and even on both ends.

**9. Replace one of the end caps.**

- Reinstall the plastic spacer block.



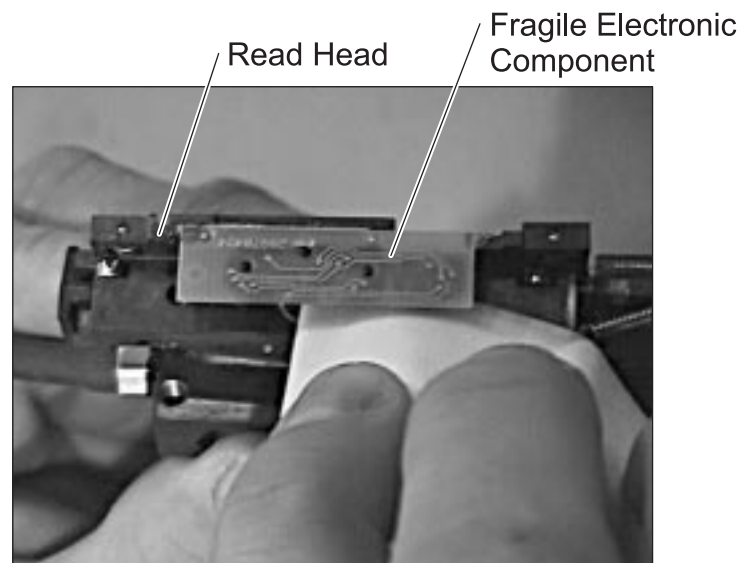
- Apply blue RTV (or equivalent) gasket silicon to the end cap.



- 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.**