U-04f: Setup / Adjust Feedback Device (Sony Magnascale)

SAFETY FIRST

- ☐ Follow all Caterpillar facility safety standards when performing this task.
- ☐ Failure to phase the scale could result in “runaway,” causing damage to the machine or injuring personnel.
- ☐ Moving equipment hazard exists anytime a machine is worked on when power is not locked out and tagged.

EQUIPMENT

- ☐ Oscilloscope
- ☐ trimpot screwdriver

RESOURCES

- ☐ Sony Magnascale Instruction Manual

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Note: Before performing this task, the machine axis must be located in the center of travel. If the scale was changed, machine axis must be centered before axis parameters are enabled.

Set Direction

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.

1. Verify the axis direction.

- ☐ Put one hand on the E-stop and jog the axis in the expected direction.
- ☐ Press the E-stop if the axis moves rapidly or in the wrong direction.
- ☐ Perform step 2 if the machine moves at a rapid rate or wrong direction. If the direction and rate is correct, perform the steps to Adjust Scale Signal.

2. Change the axis direction switch.

- ☐ Locate the scale amplifier direction switch on the scale amplifier.
- ☐ Change the direction switch setting, shown below, to the opposite polarity.

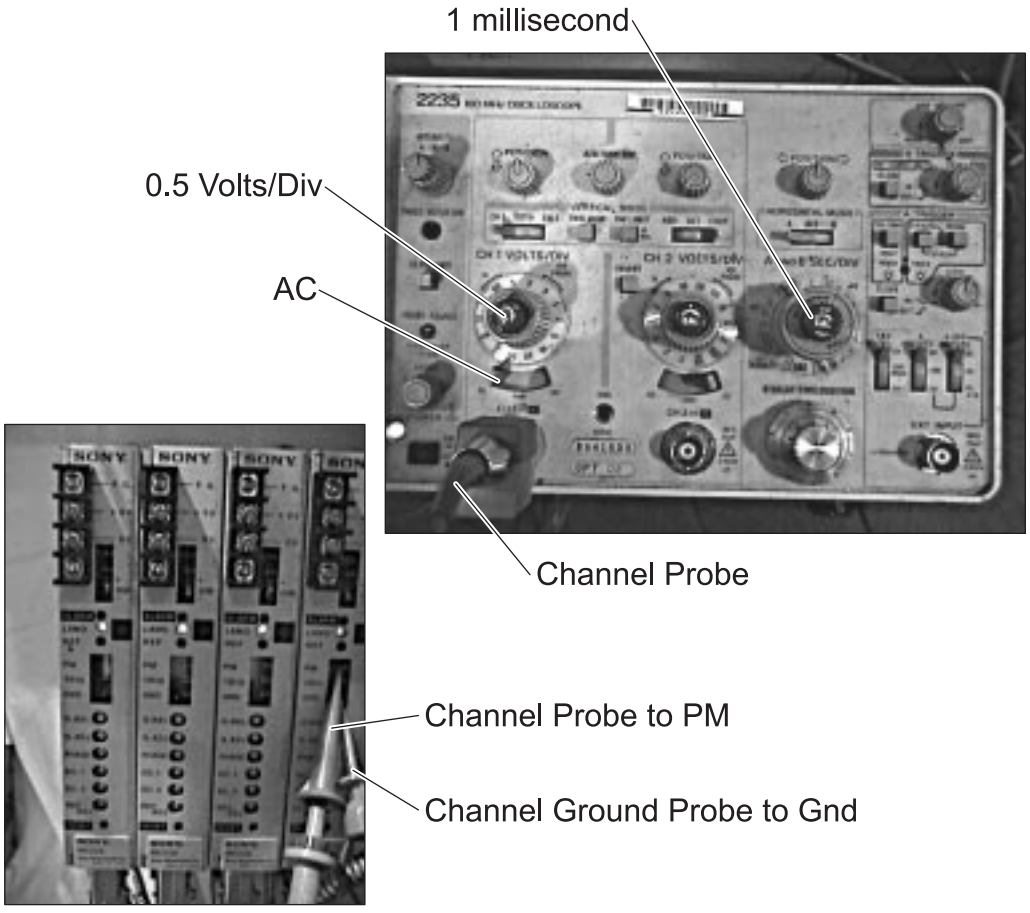
3. Verify the axis direction again.

Adjust Scale Signal

Note: All oscilloscope settings referred to in this task are specific to a Sony Magnascale used on a Saginaw machining center.

1. Set up the oscilloscope.

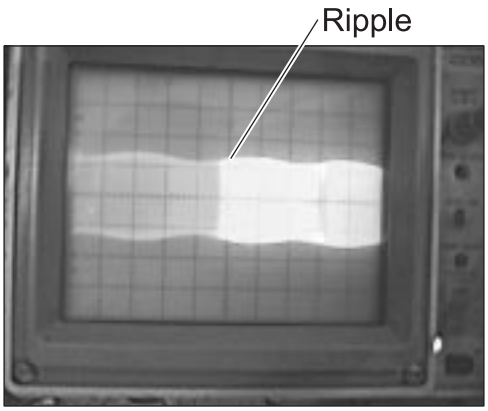
- ☐ Set channel 1 to read AC.
- ☐ Set channel 1 to read .5 volts / division.
- ☐ Set the time / division to read 1 millisecond.
- ☐ Connect the channel 1 probe ground to the ground terminal on the amplifier.
- ☐ Connect the channel 1 probe to the PM terminal on the amplifier.



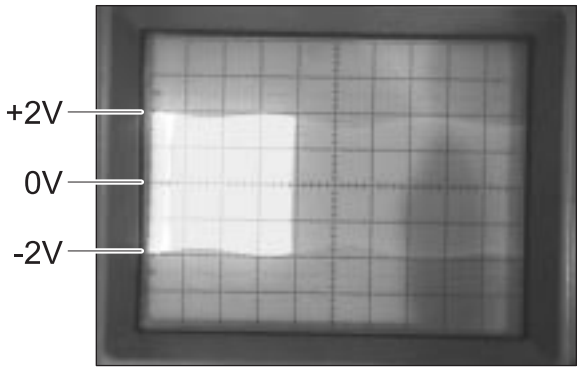
2. Ask an assistant to jog the axis continuously at 20 inches / minute feed rate.

3. Observe the oscilloscope.

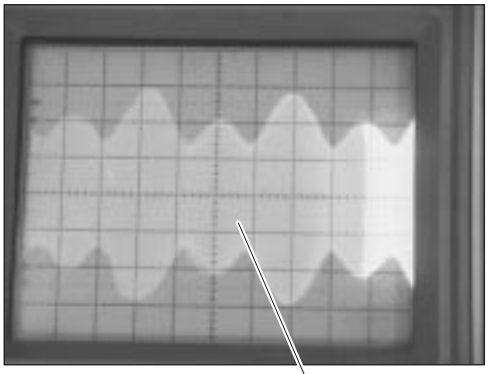
- ☐ Notice that as the scale moves, the phase of the sine wave moves and ripple is observed on the envelope. The waveform is similar to a modulated waveform.



4. Adjust the gain adjust (GADJ) trimmer to set the amplitude of the sine wave to approximately 2 volts peak-to-peak (p-p).

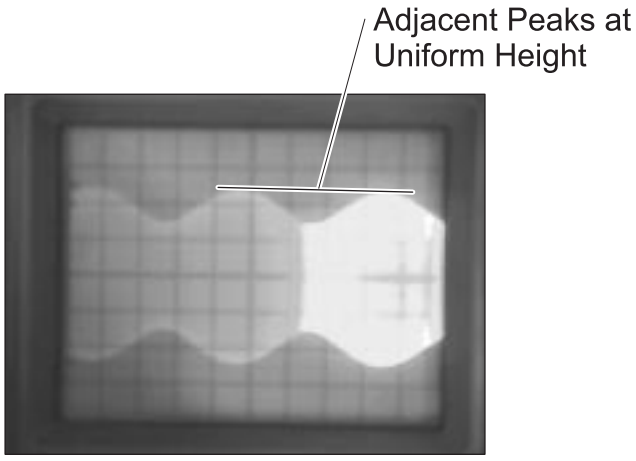


5. Adjust the gain balance (GBAL) trimmer fully clockwise.



Oscilloscope with GBAL Trimmer Fully Clockwise

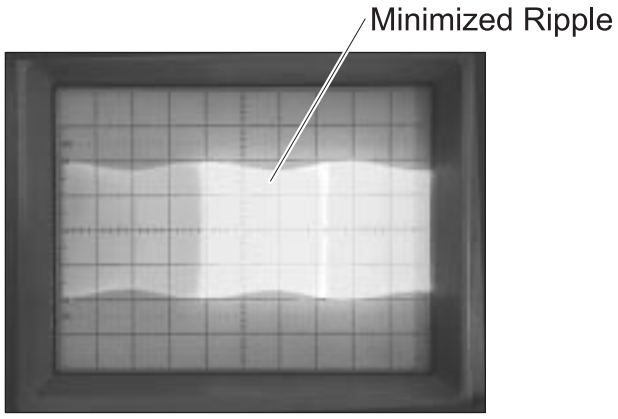
6. **Adjust the DC1 trimmer until the adjacent peaks are of uniform height, as shown below.**



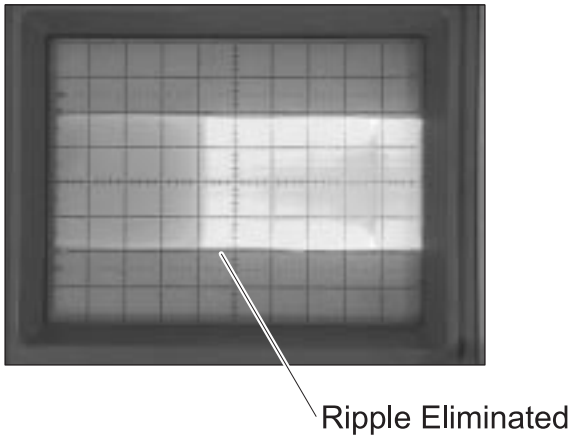
7. **Adjust the GBAL trimmer fully counterclockwise.**

8. **Adjust the DC2 trimmer until the adjacent peaks are of uniform height.**

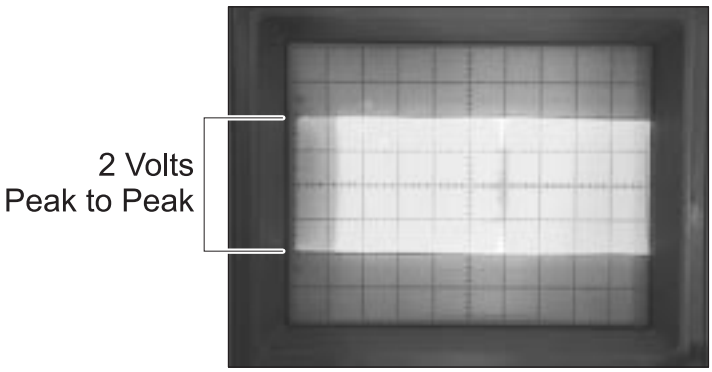
9. **Turn the GBAL trimmer clockwise to minimize the ripple.**



10. **Adjust the Phase trimmer until the ripple is nearly eliminated and smooth.**



11. **Adjust the GADJ until the oscilloscope shows a reading of 2 volts p-p, as shown below.**



Adjust Reference Point

1. **Turn the reference adjustment (REFADJ) trimmer to the center of the rotation range.**

2. **Ask the Operator to jog the machine slowly toward home.**

   - ☐ Ask the Operator to stop when the reference lamp comes on.

3. **Ask the Operator to jog the machine slowly in the opposite direction, until the reference (REF) lamp just goes off.**

4. **Ask the Operator to increment the machine at 0.1 mm toward home until you signal that the REF light has come on.**

5. **Ask the Operator to increment the machine at 0.01 mm away from home until the LAMD lamp is at the darkest possible and the REF light is out.**

6. **Fine tune the reference point.**

   - ☐ While the LAMD lamp is dark, adjust the REFADJ trimmer slowly until the REF lamp comes on.
   - ☐ Slowly turn the REFADJ trimmer back until the REF lamp goes out.
   - ☐ Carefully turn the REFADJ trimmer back until the REF lamp just comes on.