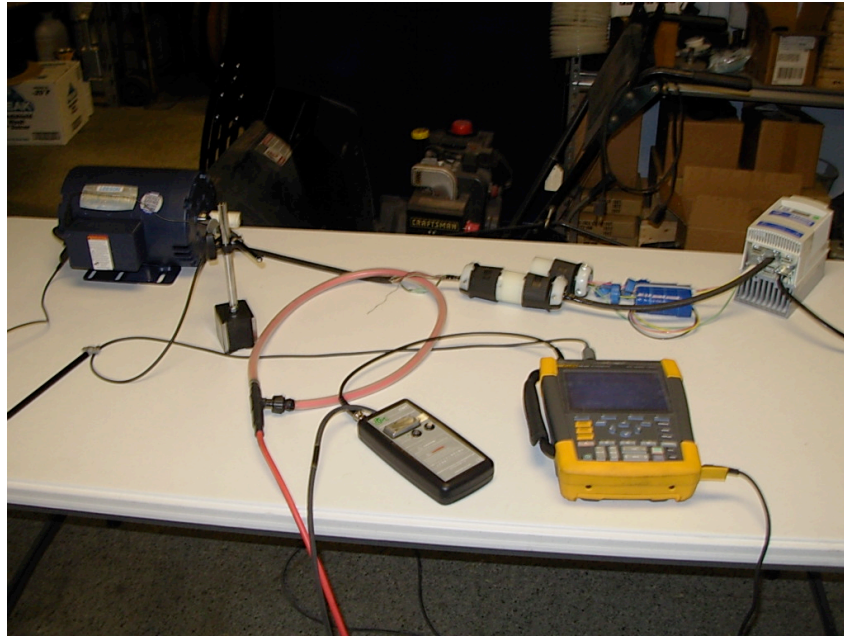
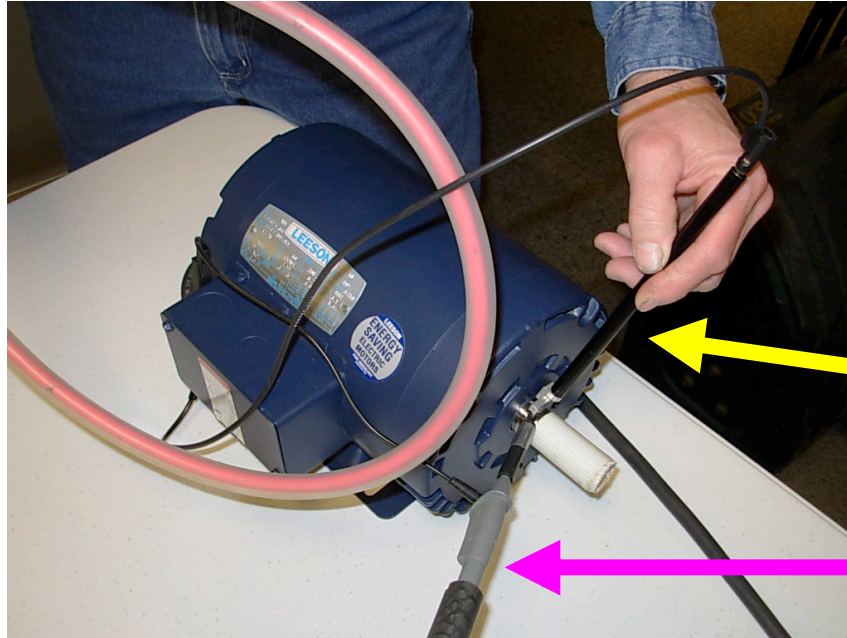


Topeka Electric Motor Repair Inc.  
605 sw Lane st.  
Topeka,Ks.66606



This test shows shaft voltage and shaft currents, with and without the Cool Blue common mode choke cores and Nala rings.

This test shows the effects of what a shaft grounding ring will do and not do, in respect to the present shaft voltage, and shaft currents.



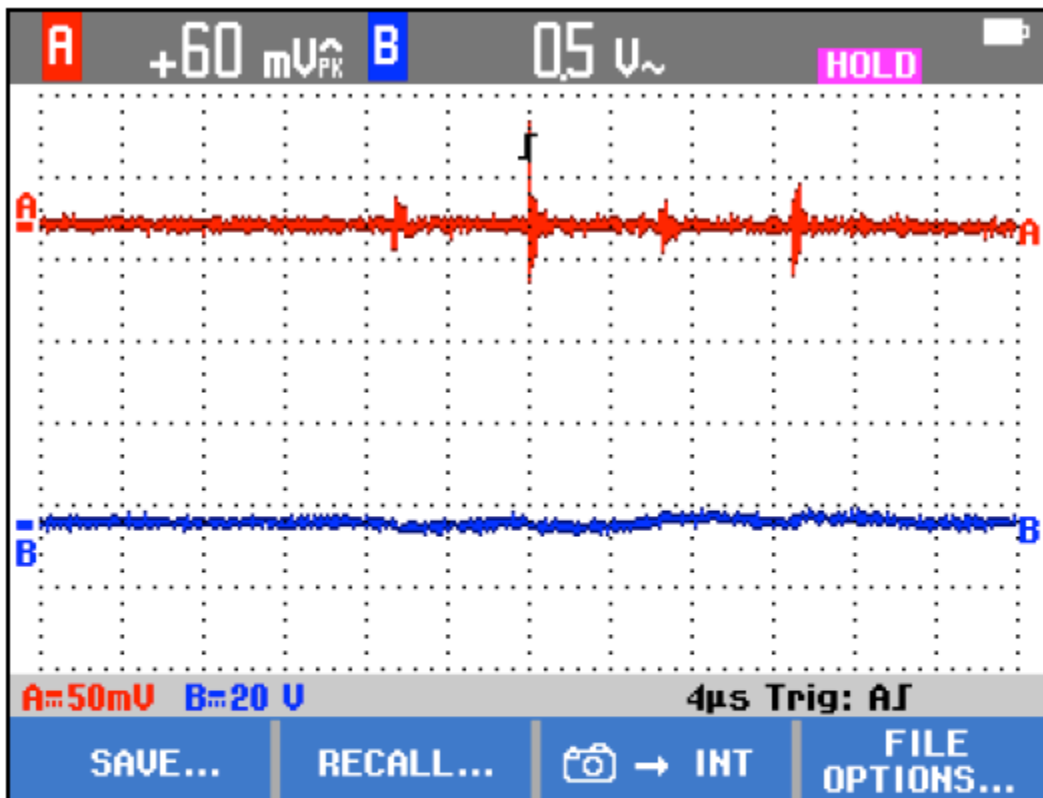
This photo shows how the test results were achieved. We are using a pick up brush to measure the shaft voltages. See pink arrow.

The hand held grounding brush is used to show how shaft voltages are redirected from the shaft to ground, so the bearings do not see the voltages. See yellow arrow.

The Rogowski Coil ( the red loop) is used to measure high frequency currents. It is looped around the hand held grounding brush to measure currents being directed from shaft to ground. This test will be done with and with out the Cool Blue common mode chokes and Nala rings.

**A Line** – represents the common mode currents. The meter is set in milli-volts and the Rogowski coil has a conversion of, Milli-volts divided by .05 = amps.

**B Line** – represents the shaft voltage.



Ragowski coil on grnd brush with no  
cool blue or nala  
3/11/15 06:14:55  
test #1

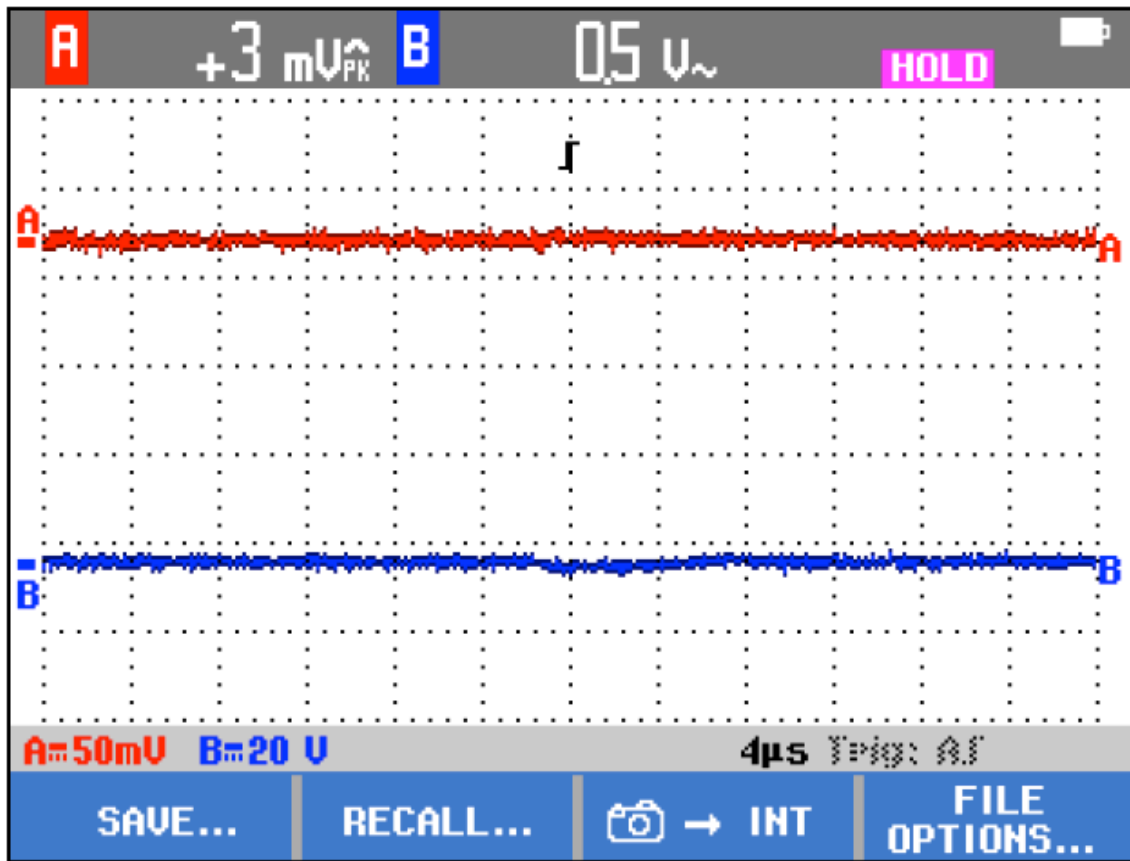
This test was conducted with the Rogowski Coil around the hand held grounding brush to measure common mode currents and shaft voltage, with no Cool Blue cores or Nala rings installed.

Refer to test # 3 to see what the shaft voltage was before any of the tests were performed. Shaft voltage was 2.3 vac.

As seen in test #1, when the hand held grounding brush is placed on the shaft, the shaft voltage drops to .5 vac. This shows what a grounding ring does when installed on an electric motor.

As seen in test #1, when the hand held grounding brush is placed on the shaft, the common mode currents do not reduce in reading. .060 mv divided by .05 = 1.2 amps of current that is flowing through the bearings. This test shows that grounding rings do nothing to remove the common mode currents.

This type of current is what causes the damage to the windings, through voltage over shoots, and damage to bearings.



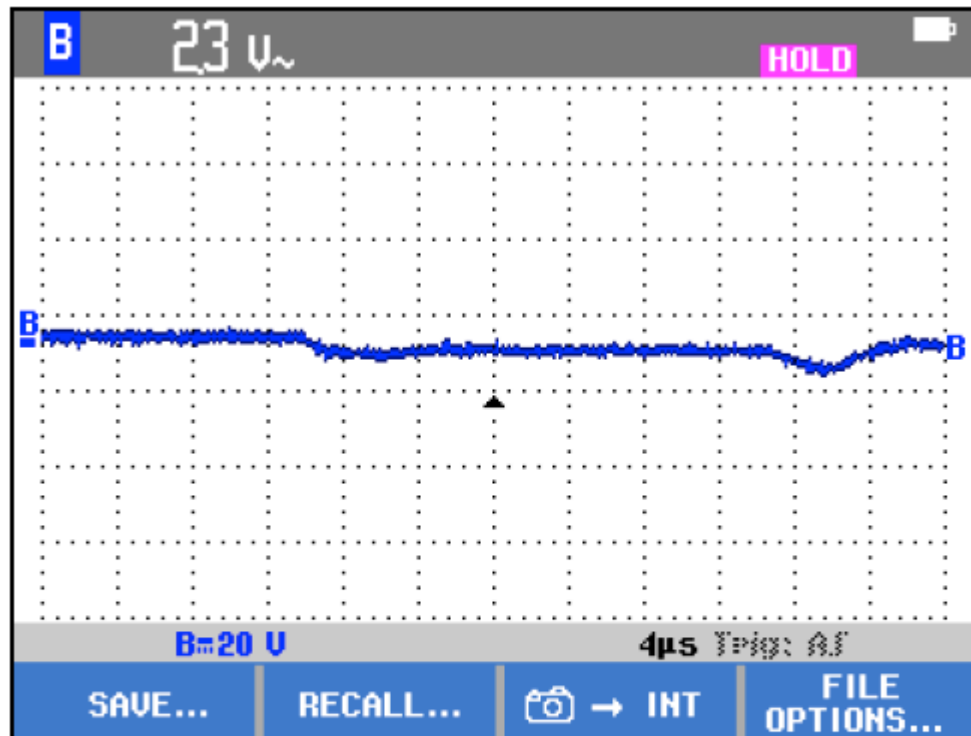
Rogowski coil on gnd brush with cool  
blue and nala

03/11/15 06:17:32

test #2

This test was conducted with a Rogowski Coil around the hand held grounding brush to measure common mode currents and shaft voltage, with Cool Blue cores and Nala rings installed.

As seen in test #2, the Cool Blue cores and the Nala rings did not change the shaft voltage, but did reduce the amount of common mode currents being diverted to ground. .003 mv divided by .05 = .06 amps of current flowing through the bearing. This was a reduction of + 90 % in common mode currents.



shaft voltage measured with with  
shaft brush  
test #3  
03/11/15      06:18:52

Test #3 represents shaft voltage before performing any tests. We have found that installing Cool Blue cores and Nala rings has little effect on shaft voltage.

We have found that results will vary, depending on location of the demonstration, as to the voltage input into the VFD. There will still be common mode currents, with reduction rates from 65% to 75%. As with this test we achieved more than 75%. Not all results will be this good.

