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Date:
To:
Att:
From: Steve Orlando.
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After attending site yesterday with a differential probe, it became evident that a problem with the DC Link was present. The following scope trace shows the DC Link both before and after the Choke. (Figure 1.)

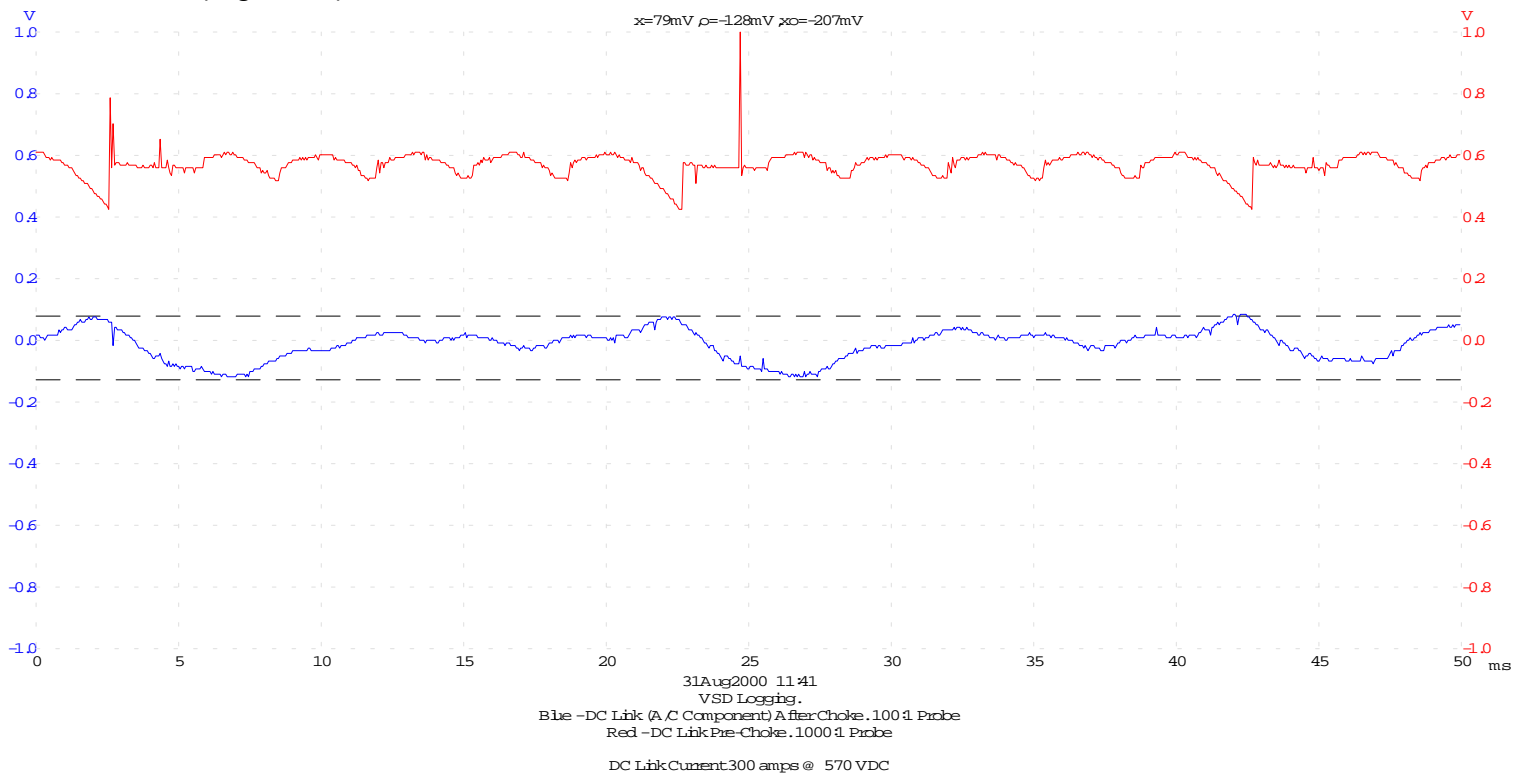


Figure 1.

As the above representation shows, there was either a misfire or faulty diode in the SCR assembly. As it happens it was misfiring. This was causing an irregularity in the DC Link after the Choke in the magnitude of 20 Vdc.

The following scope trace determined that the SCR on L1 was causing the irregularity. (Figure 2). Further testing of it's gate showed that it was being misfired due to a mis-wiring of the loom.

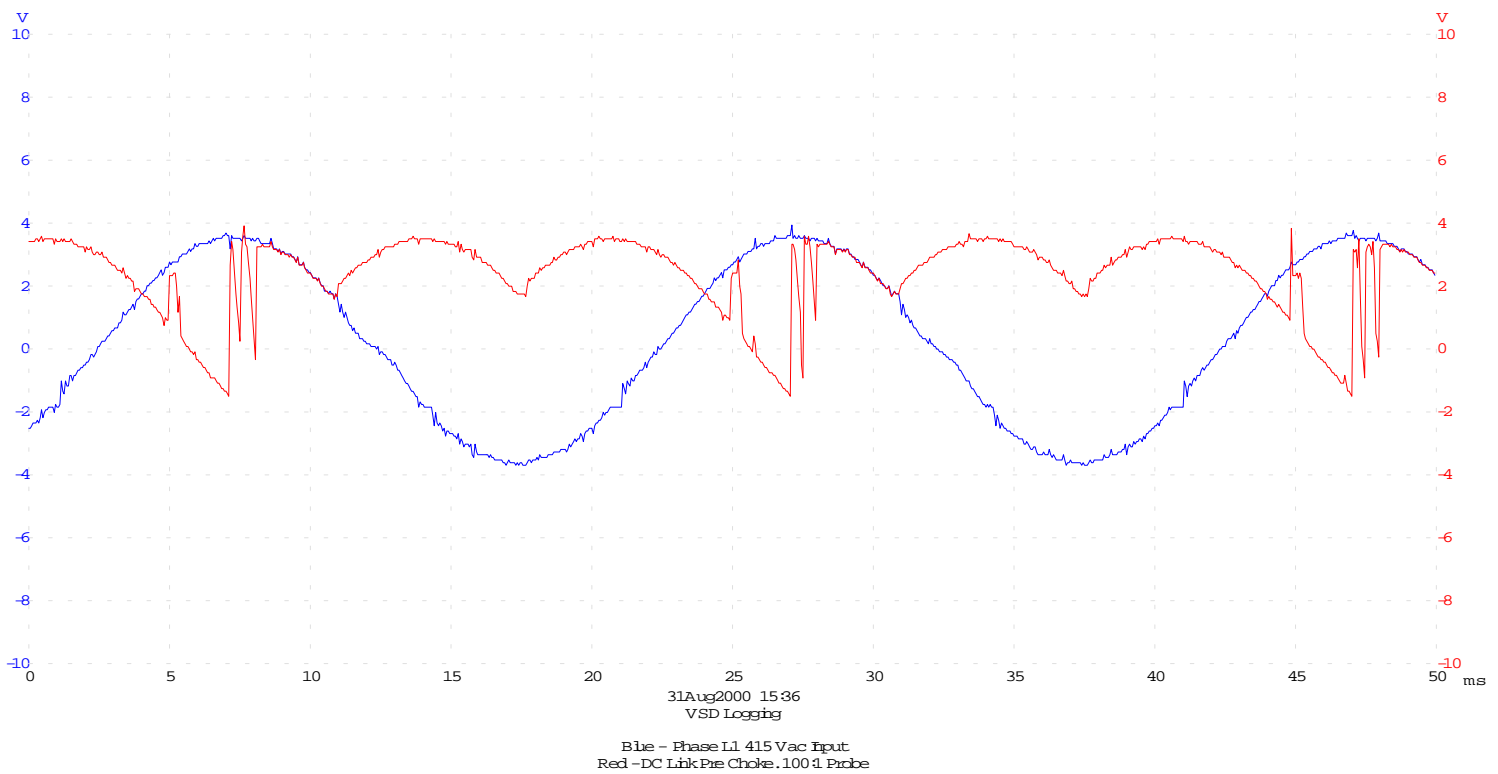


Figure 2.

Further investigation showed the Gate Plugs for Thyristor L1 and Thyristor L2 had been incorrectly located. That is swapped or mis-wired from factory. (Figure 3). The affected gate plugs are labelled J1 & J2.

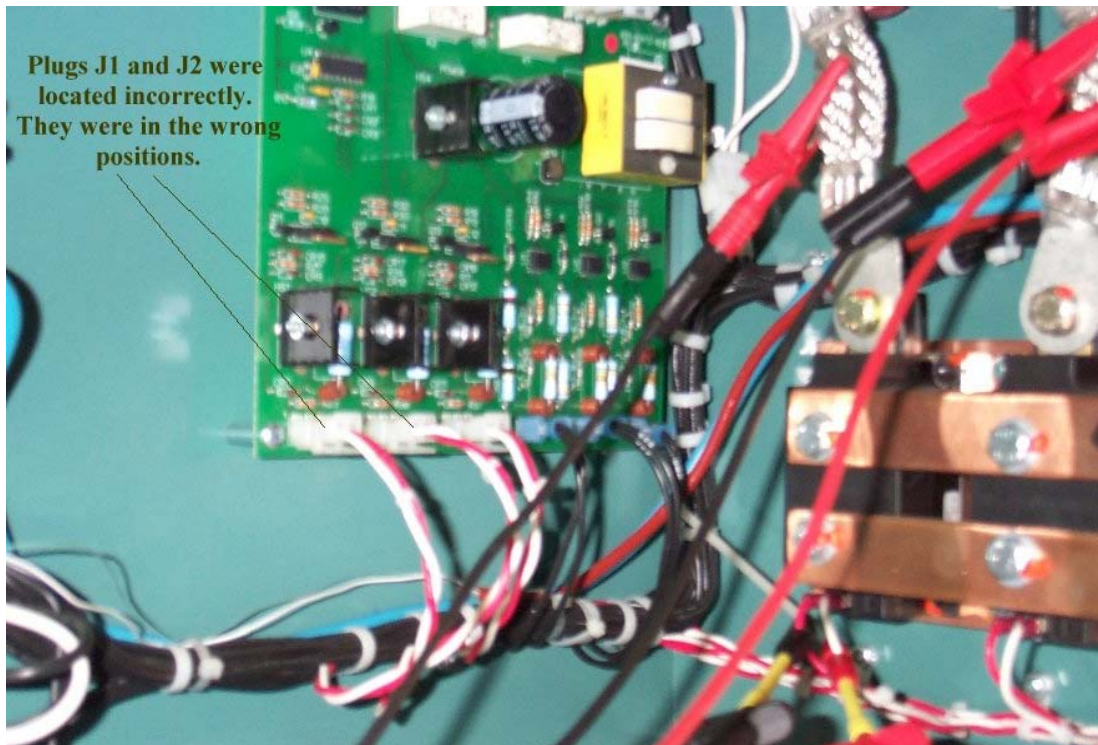


Figure 3.

Once the correction was made with the SCR's Gate connections the Pre-Choke DC Link began to perform as expected. (Figure 4). The DC Link after the Choke became very regular in all load conditions as reflected by the A/C component of the DC Current draw. (Figure 5).

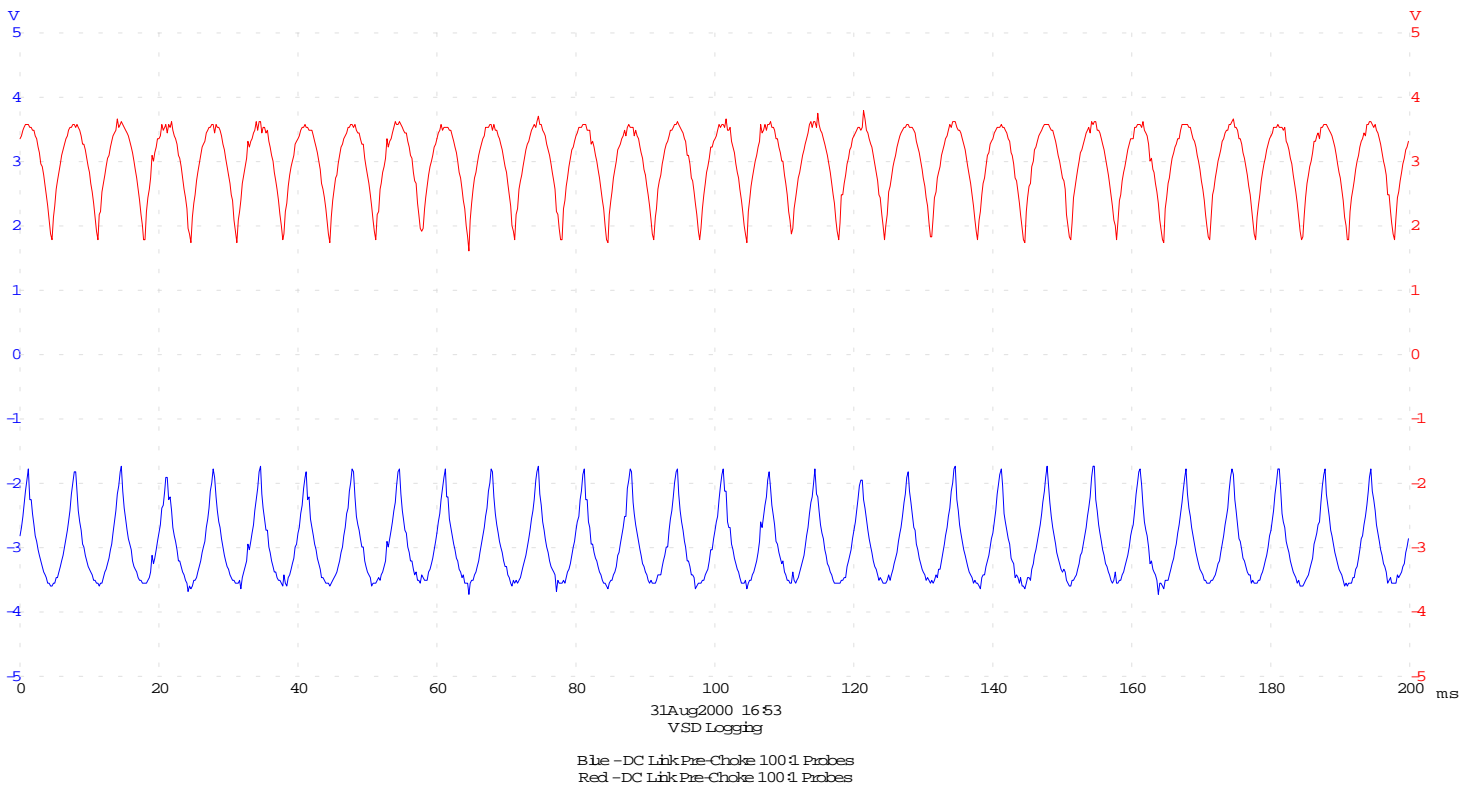


Figure 4.

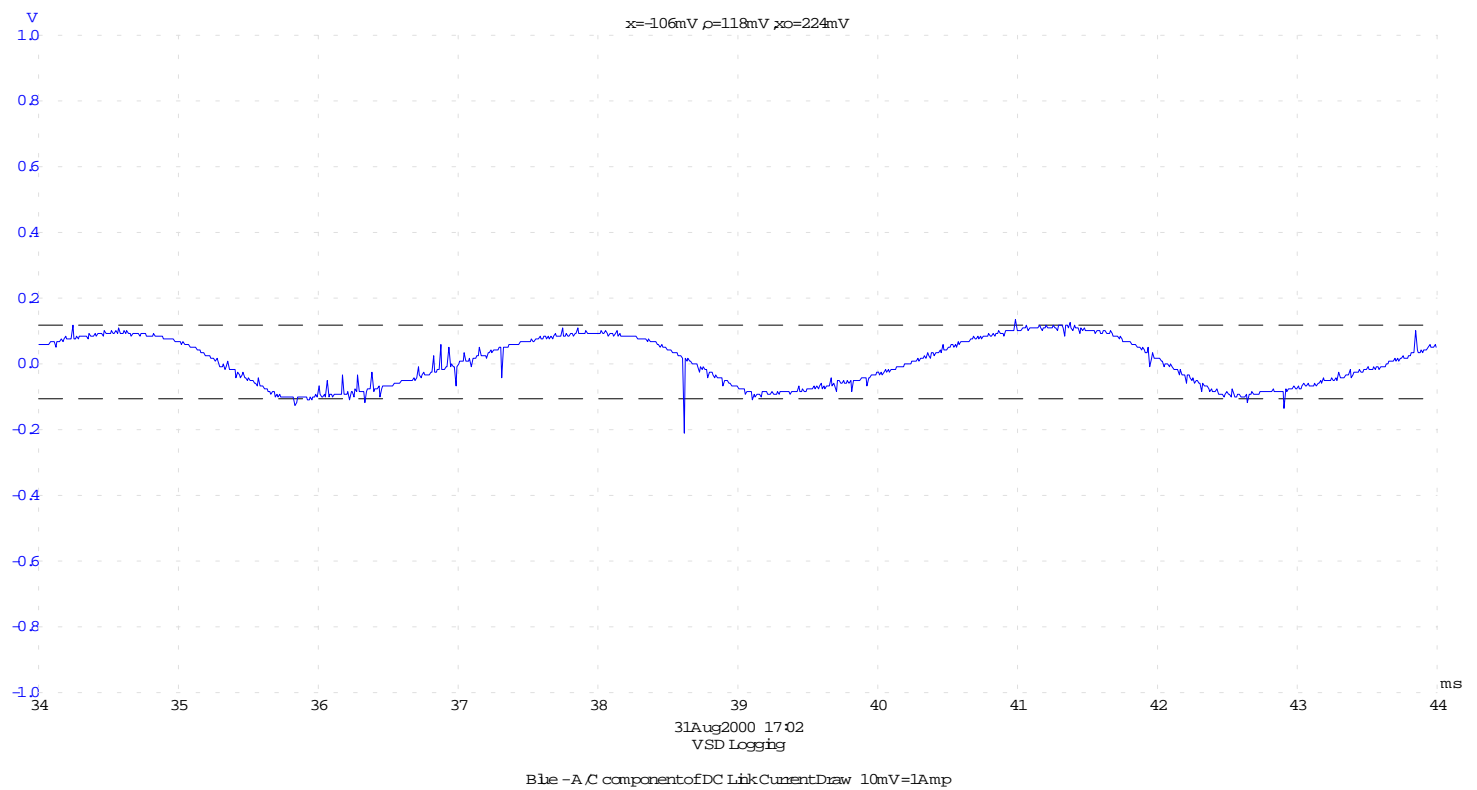


Figure 5.

The current imbalance as described in my previous report can now be explained due to our further site investigations and your confirmation that there could be a 20-fold effect on output current to DC LINK voltage variations. With the misfiring Thyristor L1 this imbalance can be illustrated by the following captured log. (Figure 6).

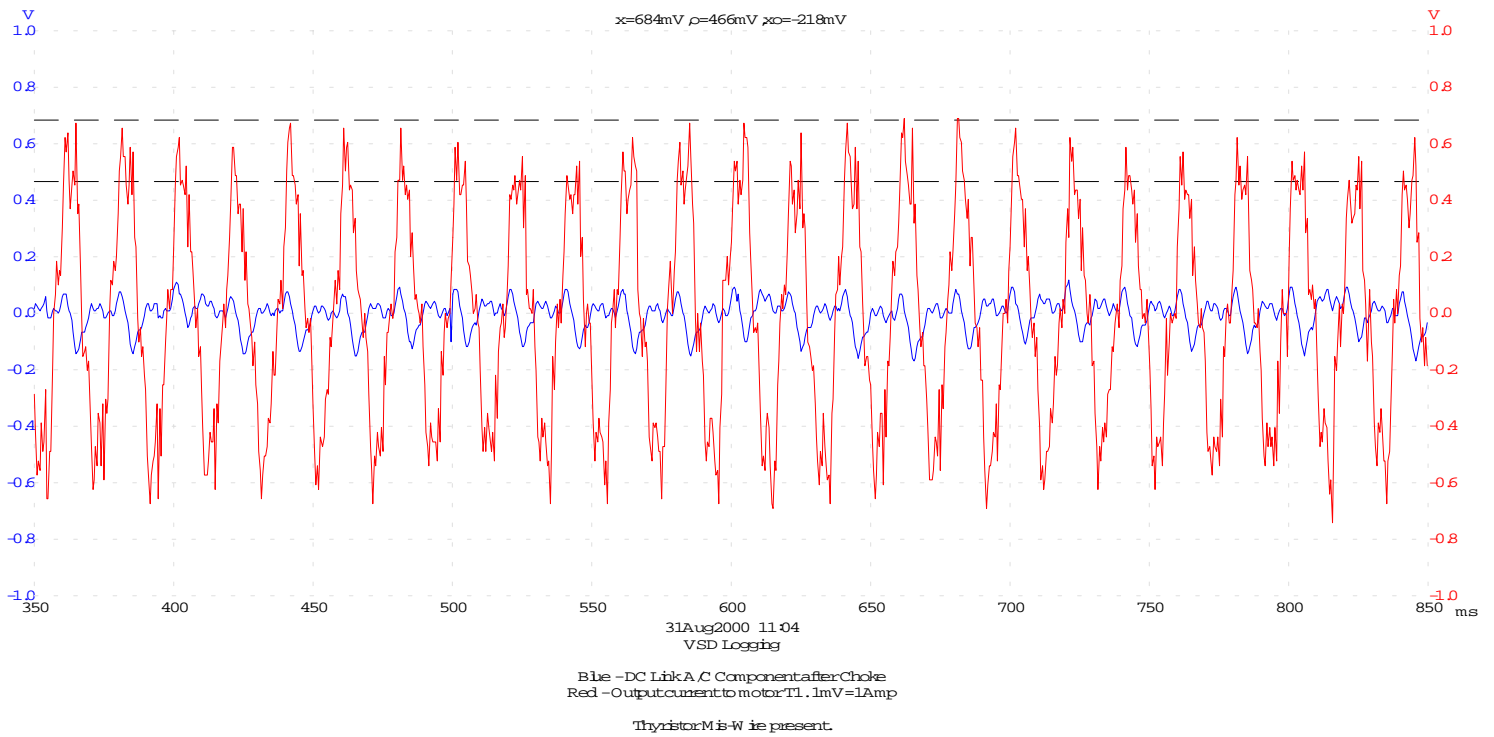


Figure 6.

The above scope log shows a 22 V A/C Component in the DC Link after the Choke. This transcribes to a 230 Amp swing in T1 current Draw to the motor. This is only a 10 fold effect but the motor was only at 60% FLC. This current distortion moves through all 3-output phases as the DC Link Distortion influences them in a set sequence. This indicates that the frequency output never achieves exactly 50 Hz, as we did fix the output to 50 Hz. (Figure 7). The Red, Green and Yellow trace show the current imbalance between phase outputs at a scale of 700 Amps. The illustrated long period of imbalance may also be attributed to the scan time of the processor in relation to the moving distortion in the DC Link.

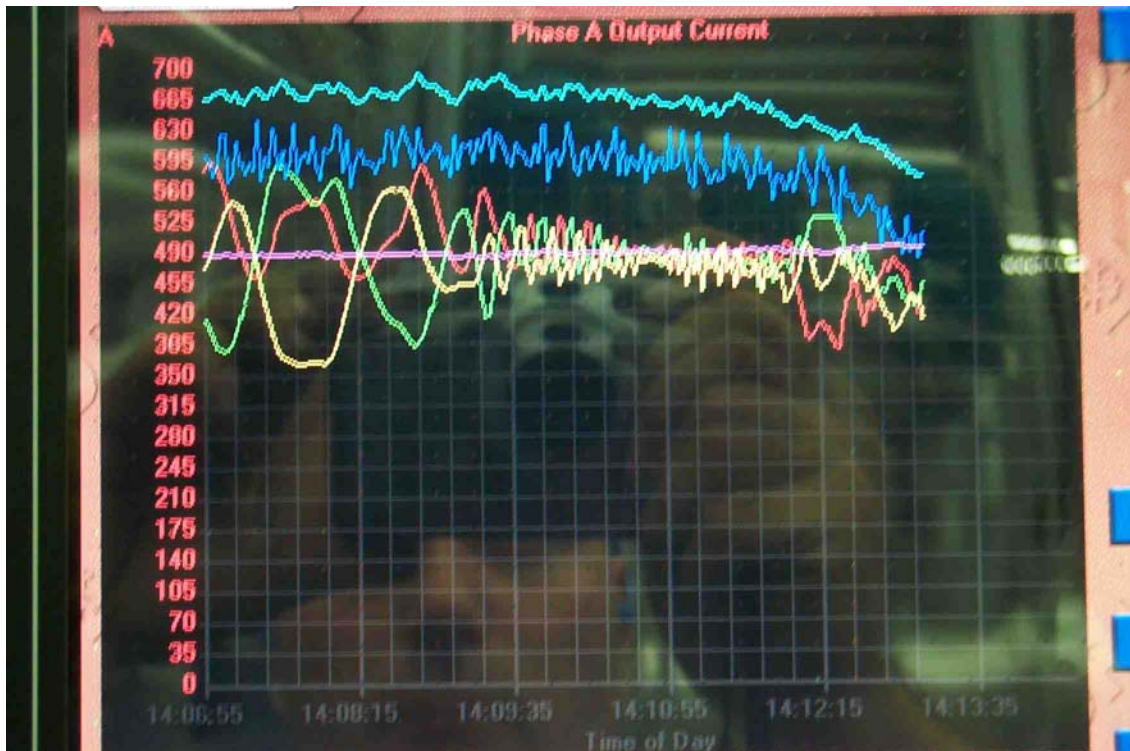


Figure 7.

With the corrected Thyristor L1, the Current Drawn from each output phase is balanced. Figure 8 shows how balanced the phases are at 95% FLA. Using the previous legend.

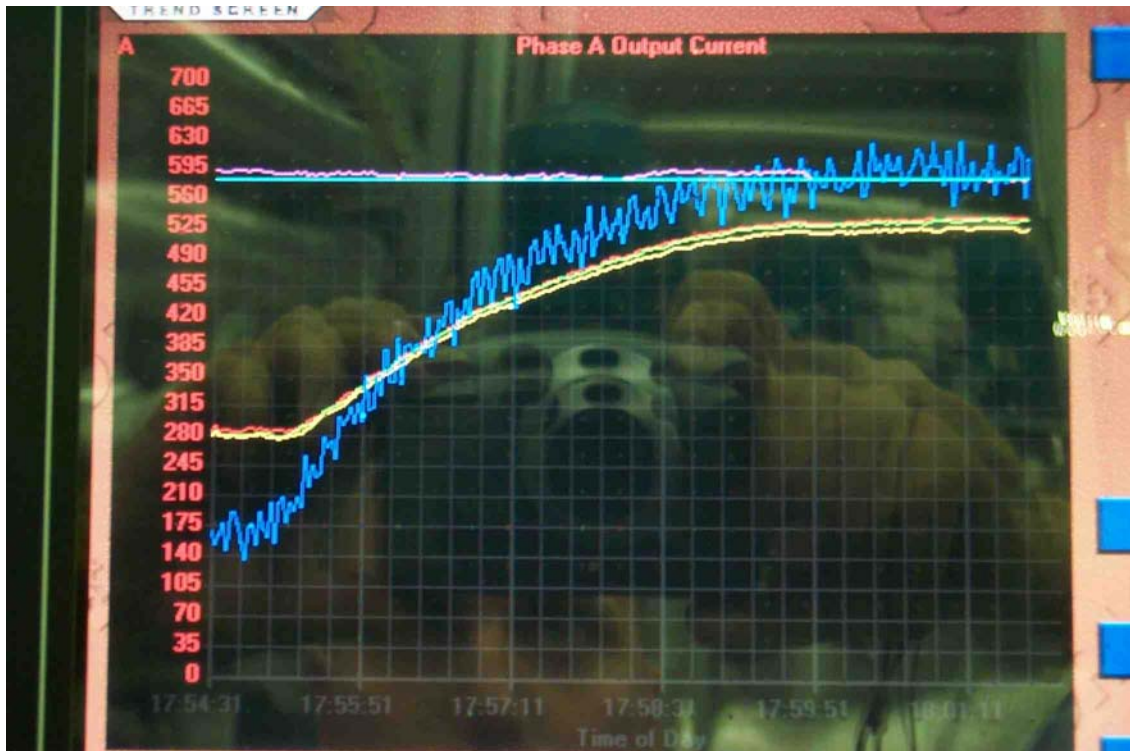


Figure 8.

We captured a starting inrush when the inertia of the motor was at zero. There seemed to be around a 600 Amp inrush. The resolution of the scope log is not that good so we cannot draw conclusions from this instance. We believe there may still a question mark over the suitability of the Leroy Somer Motor. We intend to visit site again next Tuesday to capture a more resolved log of Instantaneous Current at initial Rotor Inertia. (Figure 9).

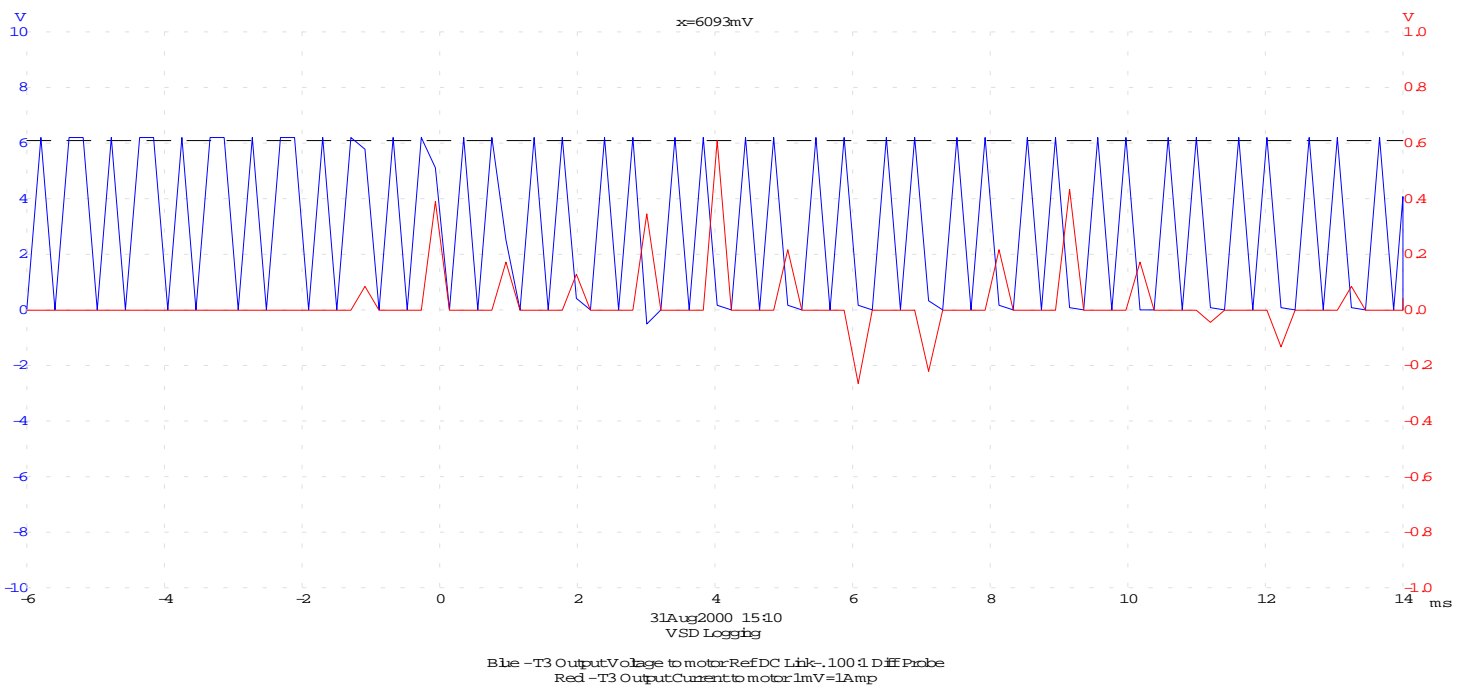
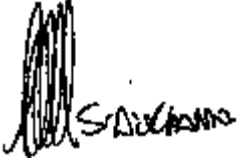


Figure 9.

With the motor suitability in mind, we cannot confirm that Instantaneous Current Trips will not still occur. The Thyristors and Transistors are all firing correctly and we have achieved a stable DC Link Voltage. If these trips still occur then the motor compatibility will then be in question. Currently the VSD and Chiller are in full automatic mode.

Assuring you of our closest attention at all times.

Regards

A handwritten signature in black ink, appearing to read 'Steve Orlando', with a stylized, scribbled initial 'S' on the left.

Steve Orlando
Partner