MAGNETEC
Magnet - Technologie
Manager EMC / IT
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Dipl.-Ing.(FH)

Date: 07.02.2017

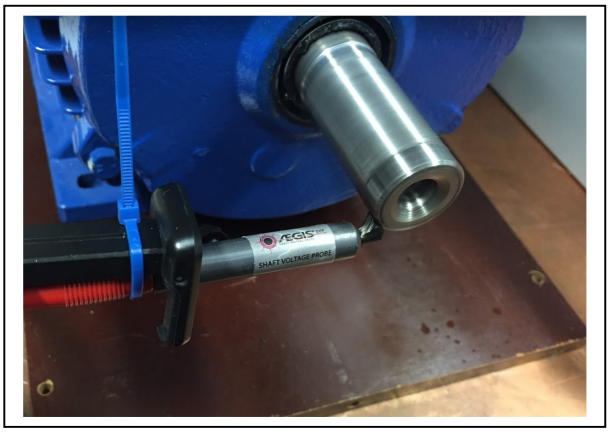
Analysis of Motor Shaft Voltages and Currents

Variable Frequency Drive is from an European Manufacturer 0,75 kW

Motor is a 1 kW Asynchronous machine

Motorcable is unshielded less than 1 m

Sensor for measuring Shaft Voltage: AEGIS



We do measure the grounding current of the measuring device (Oscilloscope)
To show the Currents running over the Ground path.

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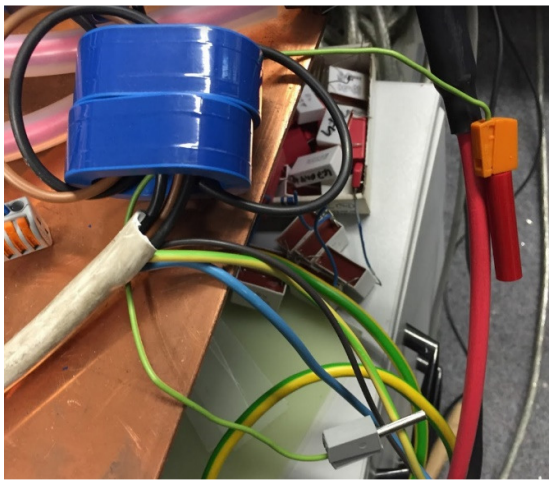
In the next picture you can see the Voltage versus Time behaviour

Important is, that the CoolBlue Cores and NaLA are in and they are not deactivated.



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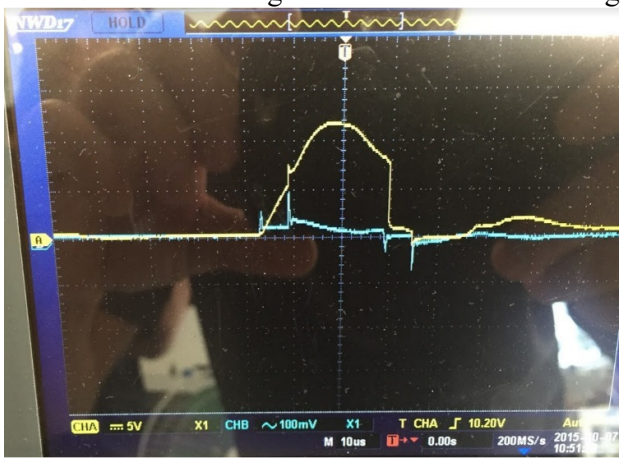
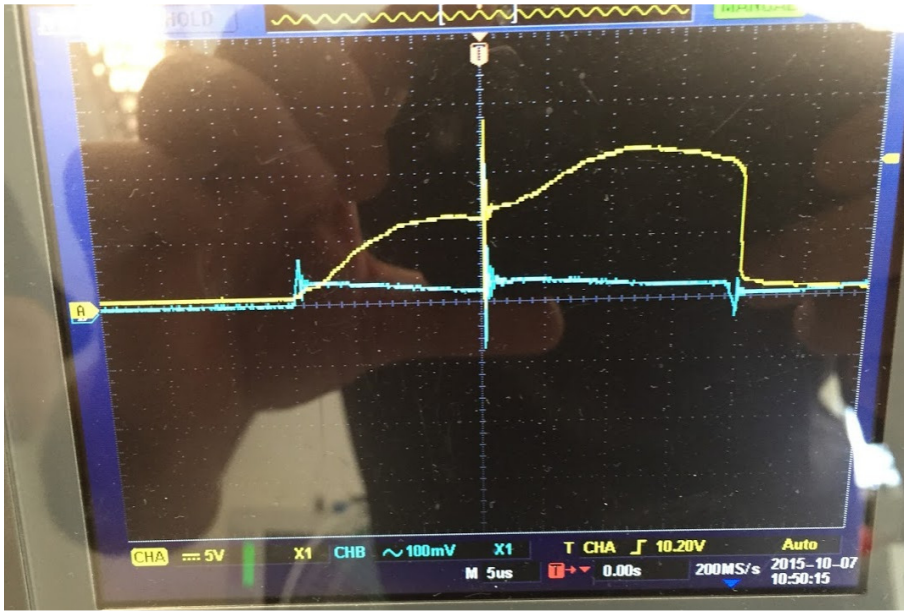
Now we are measuring the Ground current running over the Insturment with the AEGIS Brush



Now if we deactivat the CoolBlue Cores we see much more Harmonics



And it looks like that the higher and more dangerous Currents are not at the “Dropdown” of the Voltage. There is another area, while switching of the IGBT which creates more Common mode current.

The Display shows over 10 V Shaft Voltage and over 200 mV ~ 0.2 A Peakcurrent.

With an increase Current resolution we can see the very intensive High Frequency behaviour of the Current with the deactivated CoolBlue Cores

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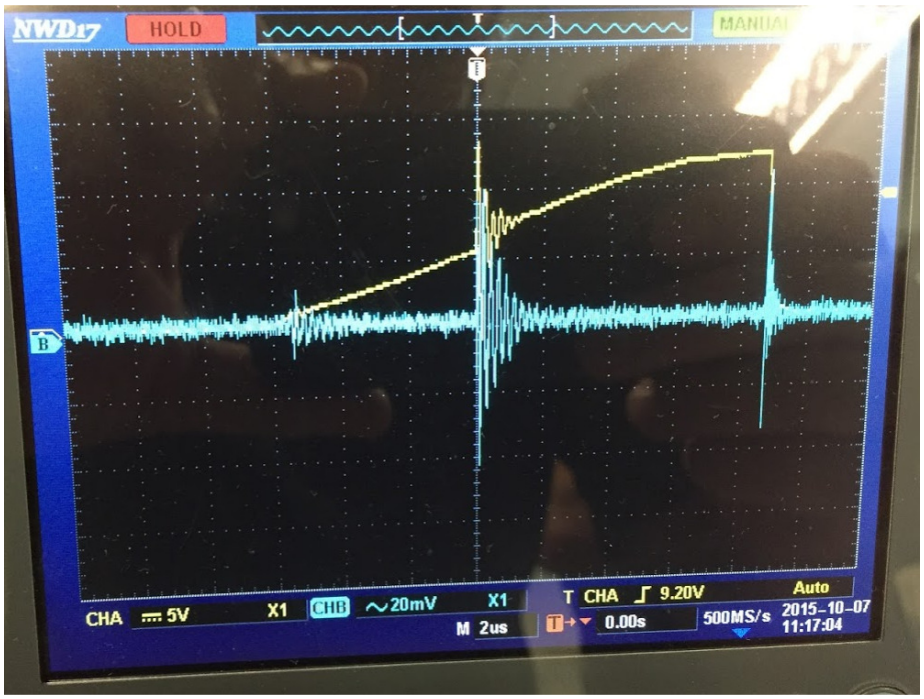
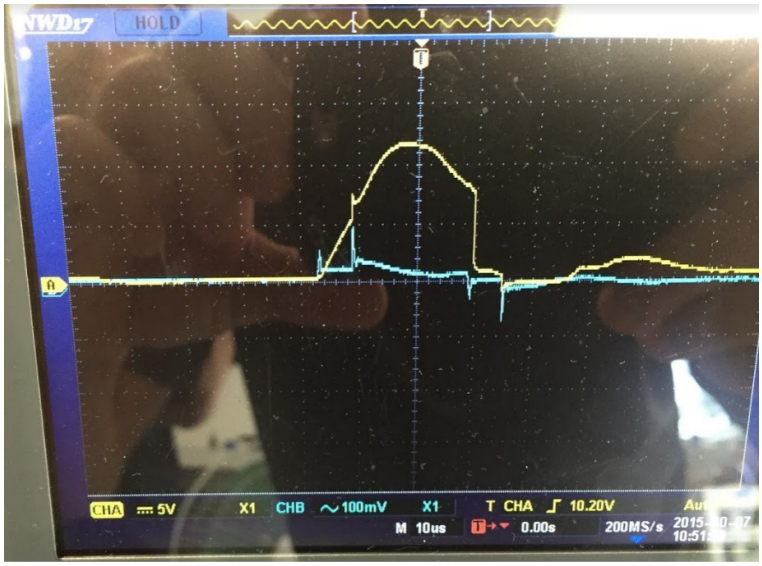


After Activating the CoolBlue Cores again, you can see again the effect
Of the disappearing Voltage but in a much less Amount coming from the Inductive Absorbers CoolBlue.



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Conclusion:

The Shaft - Voltage is only a part of the whole truth and it looks like that there are much more critical situations with a higher Common Mode Energy amount than in the Dropdown of the Common Mode Shaft Voltage

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