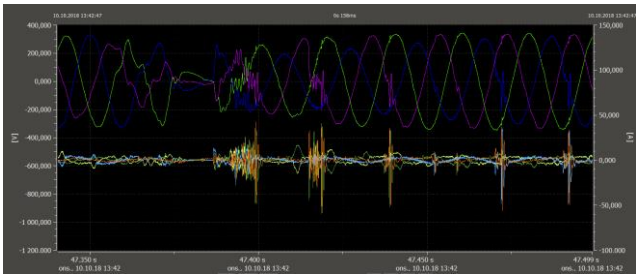

Figure 8: Voltage and current waveform during the most severe islanding transition. Peak current is close to 50 A.

C. Measurement results from October 16th to present date

For future troubleshooting and research, there has been placed continuous power quality measurements in the microgrid (a G4420 Blackbox). During construction these will be used to troubleshoot ongoing issues, and then later as a source for power quality data that for further research and development.

4. Conclusion

A study of power quality in a state of the art microgrid shows several challenges that might be relevant for other installations:

1. Transitioning to island mode is demanding. This is partly due to difficulty in islanding detection in more advanced installation where different systems can interfere with each other. Furthermore, the voltage dips during transitional periods might affect connected equipment, and possibly also damage it, even though it is supposed to be able to withstand these voltage variations.
2. Harmonic noise increases during islanded mode, when short circuit power is reduced. In this case noise levels were low, partially due to light loading of the microgrid. In other cases, increased noise levels during islanding might lead to EMI, which can be difficult to both detect and solve.
3. Integrating several sources with different types of control, including thermal and heating systems, situated in different network topologies can be very challenging. Making systems work together might require configuration changes in some of the equipment, which might cause suppliers to withdraw equipment guarantees. Complex systems also increase the risk of unintended controller interactions.

By documenting these challenges, the authors hope to both inform other microgrid developers, and suppliers to create new systems that addresses some of these issues.

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