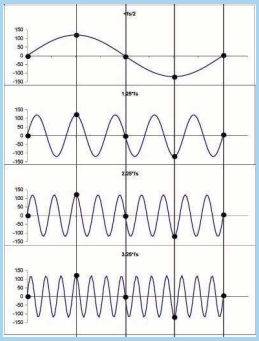
UNIPOWER

Newsletter

Q3 – 2008

A newsletter from Unipower

How do I know if my instrument has got an anti-aliasing filter or not?



Alias phenomenon: *The points in the chart to the left are sampling points. Note that the four wave forms have identical values in the sampled points despite the fact that they are totally different.*

Last newsletter's articles regarding anti-aliasing filters created a lot of interest. One of the questions we get is if there is a way to easily perform the test yourself. There is a way. To be 100% sure, all parameters must be tested, but the following basic test will give you a hint:

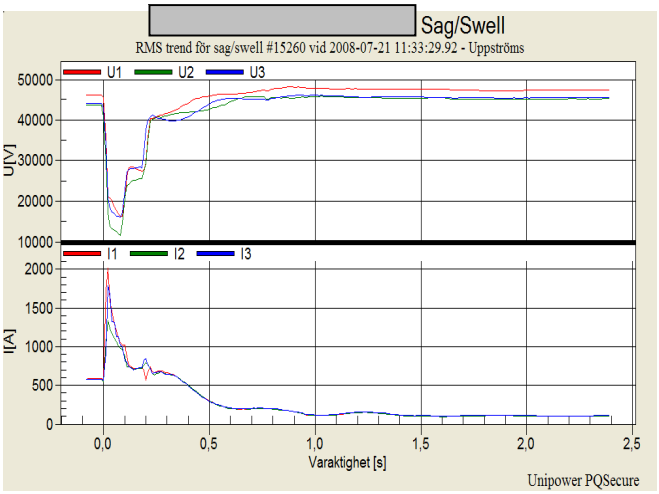
1. Connect a signal generator to the instrument's U1 channel input.
2. Inject, say 100 V, 50 Hz. Observe the voltage indicated by the instrument (it should be 100V).
3. Inject 100 V at a frequency higher than half the sampling frequency (fs/2). Observe the voltage indicated by the instrument. The voltage should be zero since no frequencies higher than fs/2 should influence the results.
4. Repeat the test in 3 at higher frequencies in steps like 50 kHz, 100 kHz, 150 kHz. Observerve the voltage indicated by the instrument. The voltage should still be zero.

If your instrument shows a value close to 0 it may have efficient anti-aliasing filters. Further testing must be performed to be 100% sure.
If your instrument shows a voltage, then **no adequate filters are present**!

Note. 256 samples/cycle corresponds to a sampling frequency of 12800 Hz (15360 Hz) at 50 Hz (60 Hz) fundamental frequency).

Must lightning cause production standstill?

Sweden has more or less been spared from lightning during the years 2006-2007. This summer, however, was normal when it comes to weather changes and thunderstorms. Daily registrations of disturbances were reported for some of our customers in certain regions. From July 25 to months end, intense thunderstorms were common in Sweden. Last of July was an extreme lightning day with more than 30000 discharges (source: SMHI, Sweden's Meteorology and Hydrology Institution).



Example of polyphase disturbance caused by lightning.

Obviously, this kind of weather is damaging for industries with high demands on power supply. These disturbances cause problems for many companies, leading to simple disturbances or in worst case total stoppage in production.
What consequences would the disturbance in the following picture cause for your company?
It is a well-known fact that disturbances cause cost. Most companies would like to do something about this. A common problem is not knowing what to do and where to start.

We therefore forwarded these questions to Gunnar Eneberg at Holmen industry group in Braviken. Gunnar has a long experience in proactive measures of production standstill. He knows that thunderstorm seasons may cause problems to Holmen industry group. We asked Gunnar for recommendations to others before next thunderstorm?

- Knowledge is the key to everything. Holmen has been measuring power quality since 1990. We have since then worked together with our power supplier to continuously improve the network. We have also calibrated our machinery to the actual quality of power delivered. We know the quality profile of our power input and therefore the latest thunderstorms only caused minor and manageable disturbances compared to when we started to measure. In the 90's we had no information whatsoever about what was going on.
Do you have any quick recommendations?

- One would be to start measuring now! In reality there are no shortcuts; it's more a question of where to measure to ensure correct analysis and proper actions. In order to achieve durable improvements, I recommend a dialogue with your power supplier.

Gunnar Eneberg, Project Manager, proactive maintenance, Holmen industry group

The benefit of reports and alarms?

Unipower's Torkel Bergström demonstrates PQ high voltage solution in ABB's stand.

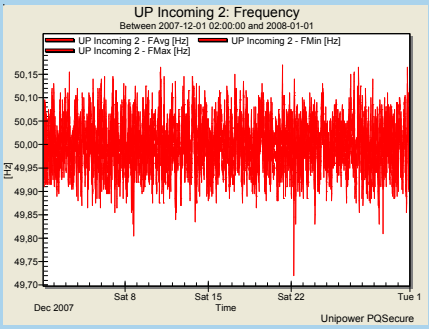
ABB and Unipower at Oslo trade fair

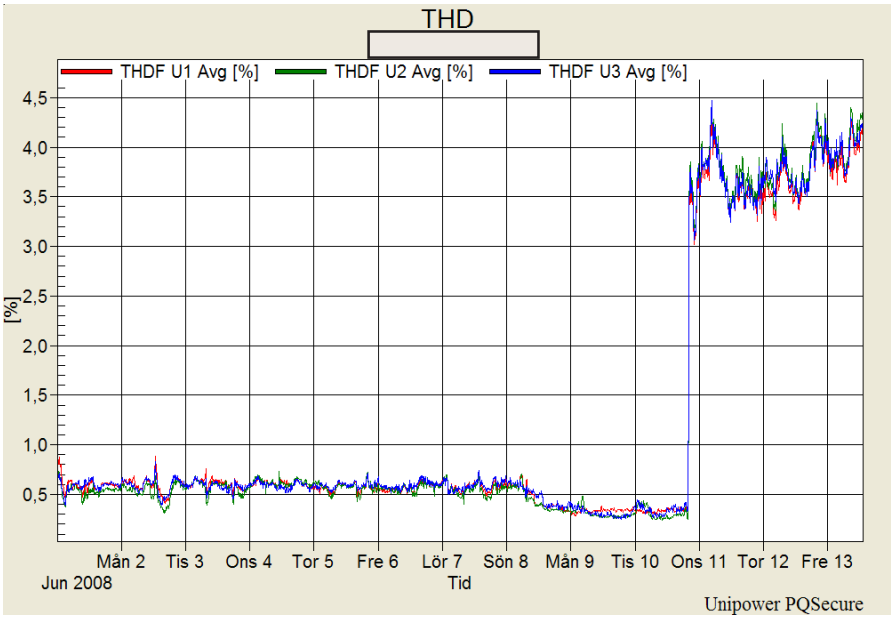
In cooperation with ABB, Unipower demonstrated a Turn-Key solution for quality measurement in high voltage networks at Eliaden, the industry trade show in Oslo, Norway early in June. This Turn-Key solution enables accurate reproduction of distorted power in high voltage networks.

Frequency disturbance

At 22 December 2007 there was a frequency disturbance in the Scandinavian grid. It could be observed in all meters in Scandinavia as well as in our own incoming power meter, which is shown below.
The origin of the disturbance was one nuclear power plant that had an unplanned stop.

The frequency deviation caused a smaller power plant to stop, unexpectedly, for 3 hours. The direct cost of this stop was ca $50,000. If this disturbance had happened January 4-7, 2008 instead the cost would have been $700,000 due to the higher spot market energy price. The higher price was caused by snowstorm related disturbances in southern Sweden.





Both grid companies and industry experience random as well as frequent disturbances which easily could have been avoided. The importance of tailor-made reports and alarm functionality becomes more and more important. In general, alarm functionality for e.g. transients, harmonics, sags etc. is nonexistent in most companies own facilities. This is an area of huge amounts of hidden costs.

The following example comes from a large corporation in Sweden where Unipower have installed measuring units and implemented automatically generated weekly reports in our surveillance software. In the weekly report of a certain week there was warning about the level of harmonics (see above THD diagram).
An investigation revealed that a filter unintendently had been turned off. Thanks to the report, it could now be turned on just a few days after it happened. To be on the safe side, the alarm functionality with automatically generated e-mail alarms was switched on. When the same thing happened a few weeks later, the filter could be switched on immediately because of the automatic response alarm function.

We interviewed the staff who declared:

- Without the alarm and report functionality probelms like disconnected filters could be on-going for years without detection.
- The cost for disconnected filters is hard to define, but it is HIGH. We are dealing with life-time shortening of expensive equipment.

Conclusion: connecting an automatically generated report and alarm functionality to a surveillance system is an efficient way of putting measuring data to use, thereby minimizing the lead time for an error to be detected. Breakdowns are obvious for anyone to see. This facilitates detection about disturbances that gradually destroys expensive machinery.

Unipower recognized in German press

In August 2008, the German web magazine 'OpenPR' writes about Unipower's products. Look at:
http://www.openpr.de/news/231628 for more information.

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UNIPOWER

Unipower AB
Box 411
SE- 441 28 Alingsås
Sweden

Office address:
Metallgatan 4C
SE- 441 32 Alingsås

Phone:
0322 - 63 80 20
+46 322 63 80 20

Fax:
0322 - 63 80 60
+46 322 63 80 60

E-mail:
mail@unipower.se
www.unipower.se