



An Introduction to PQSoft

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PQSoft Overview

- PQSoft is a family of software programs and services for power quality and energy efficiency analysis of electric power transmission and distribution systems.
- Replaced previous users groups – 15 year history (EMTP, HarmFlo+, PATH).
- All products and services now available à la carte.

PQSoft Products

- Harmonic Analysis:
 - SuperHarm
 - Harmonic Filter Calculation Spreadsheet
- Transient Analysis:
 - PSCAD (distributor for Manitoba HVDC Research Centre)
- Voltage Variation Analysis:
 - Voltage Sag Predictor
- Ferroresonance Analysis:
 - FerroView

PQSoft Products – continued

- Economic Analysis:
 - Power Quality Solution Evaluator
- Analysis of Monitoring and Simulation Data:
 - TOP, The Output Processor (free download @ www.pqsoft.com/top)
- Training and Reference:
 - Electric Power Systems Quality Seminar
 - Power Quality Monitoring Seminar
 - Contemporary Topics in Power System Harmonics Seminar
 - Utility Capacitor Applications Seminar
- PQView & PQWeb information at www.pqview.com

PQSoft Services

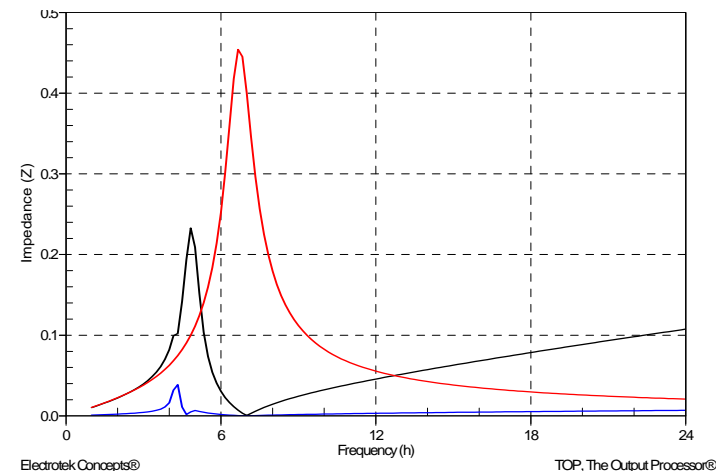
- Software maintenance
- Access to a web-based technical resource area:
 - Technical Forum
 - Power Quality Waveform Library
 - PSCAD/EMTP/SuperHarm Model Library
 - Power Quality Case Studies
 - SuperHarm Nonlinear Load Library
 - Archive of related presentations, papers, and newsletters

PQSoft Services – continued

- Engineering support:
 - Consulting hours can be used for training, modeling and analysis support, data file verification, etc.
- Training and support:
 - PSCAD, EMTP, & SuperHarm Case Study Workbooks
 - Basis for customized in-house training
 - EMTP Modeling and Analysis Tutorial
 - Notes for selected Electrotek power quality seminars

Example Product – SuperHarm

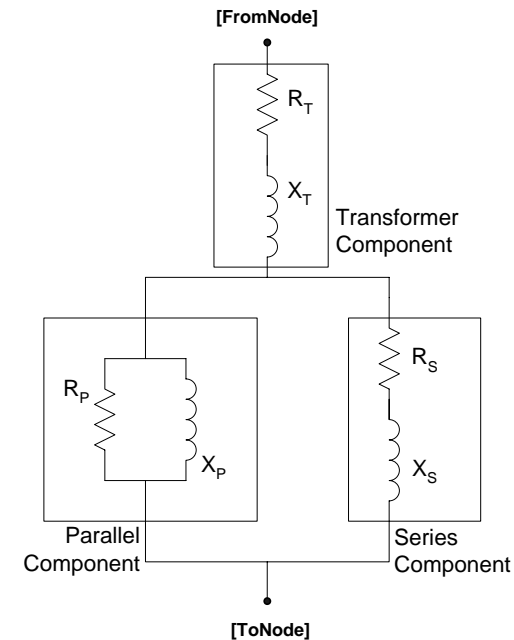
- SuperHarm is a program for simulating harmonics on electric power systems.
 - Used to explore variations on system loads and configurations, along with the resulting impact on system frequency response and distortion levels.
 - Balanced and unbalanced three-phase systems.
 - Harmonic voltage and current source models.



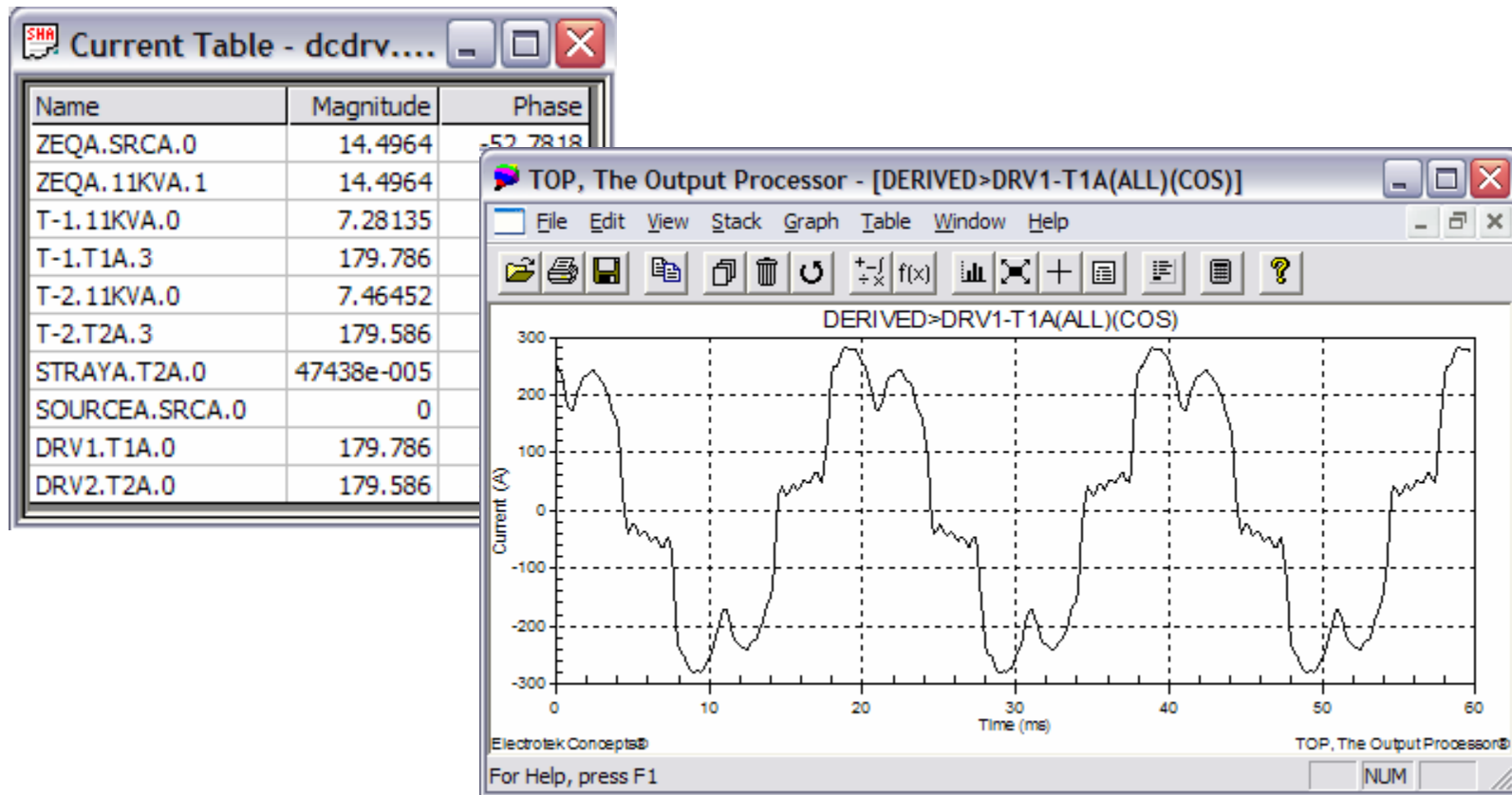
SuperHarm's Circuit Description Language

```
// 1.5 MVA, 13.2kV Feeder Load
// Displacement Power Factor = 0.80
// Transformer Component = 7.5%, X/R = 10
// Series Component = 80%      Parallel Component = 20%
```

```
LINEARLOAD      NAME = CKTL1A
                 BUS.A = 200_A
                 BUS.B = 200_B
                 BUS.C = 200_C
                 KV = 13.2
                 KVA = 1500.0
                 DF = 0.80
                 %PARALLEL = 20.0
                 %SERIES = 80.0
                 KVAXFMR = 1500.0
                 %X = 7.50
                 %R = 0.75
                 XRCONSTANT = YES
```

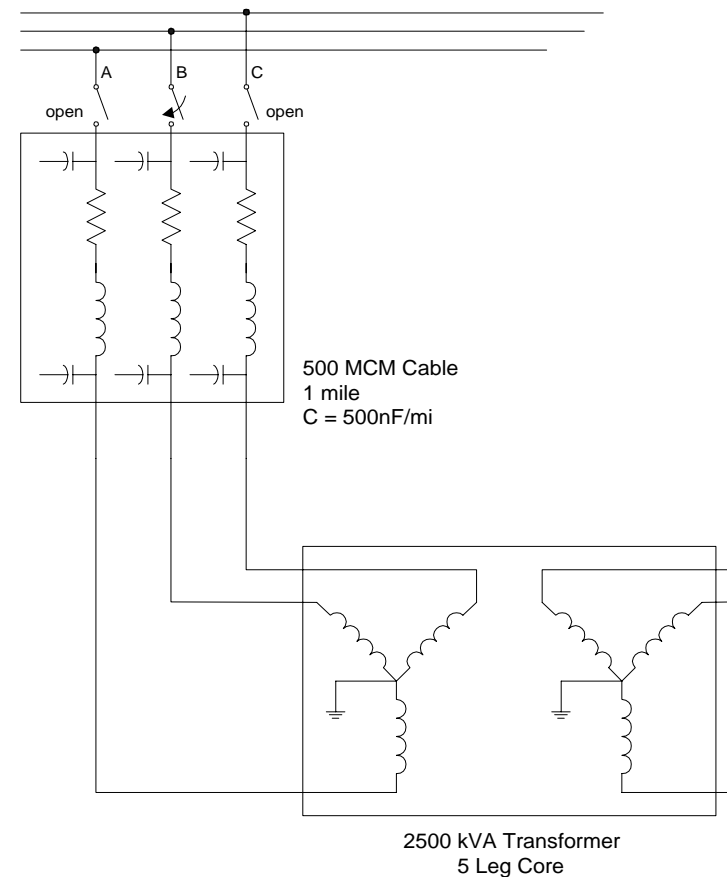


Using TOP with SuperHarm

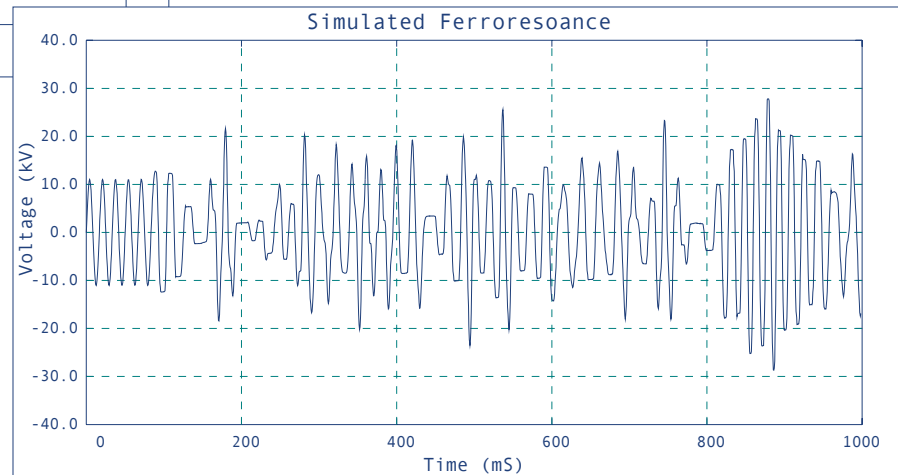
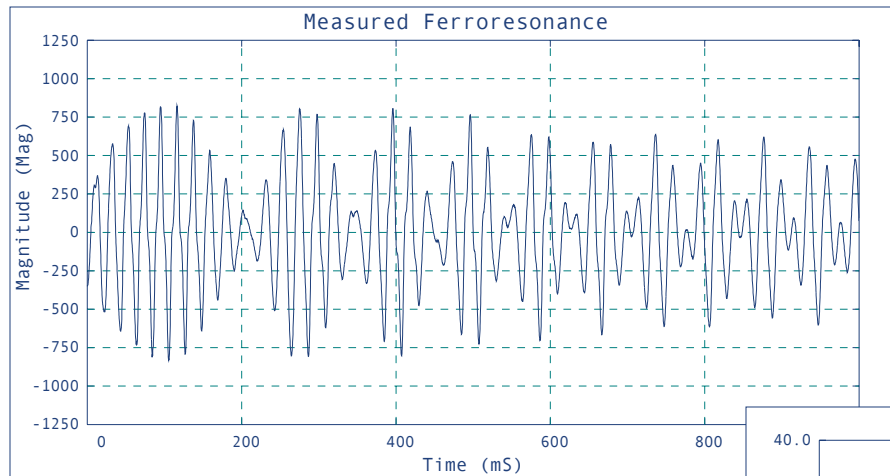


Example Product – FerroView

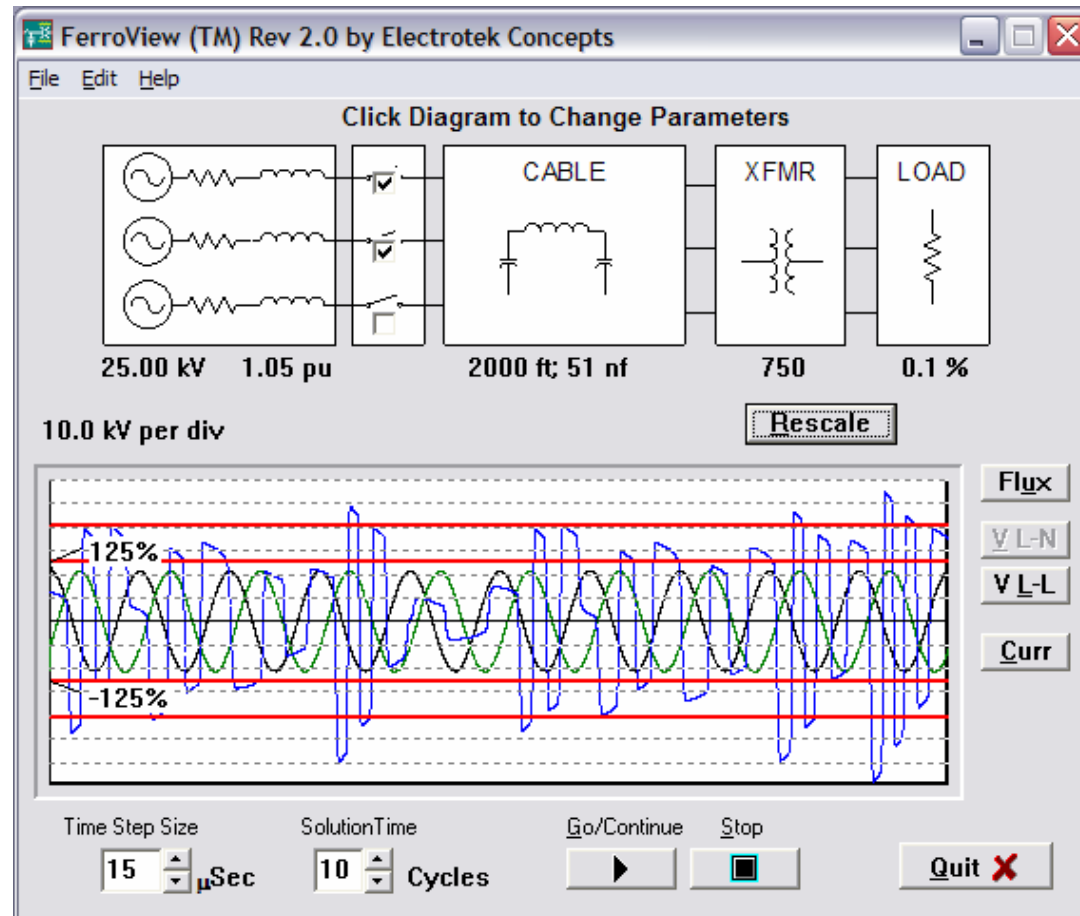
- FerroView is a program for simulating ferroresonance in cable-fed three-phase distribution transformers.
 - Used to analyze the problem where a transformer becomes isolated on a length of cable with one or two phases open.
 - Simple user interface consists of just one screen with the circuit model already created.
 - Customize by adding new cable elements or transformer sizes.



Measured and Simulated Ferroresonance Waveforms



FerroView User Interface



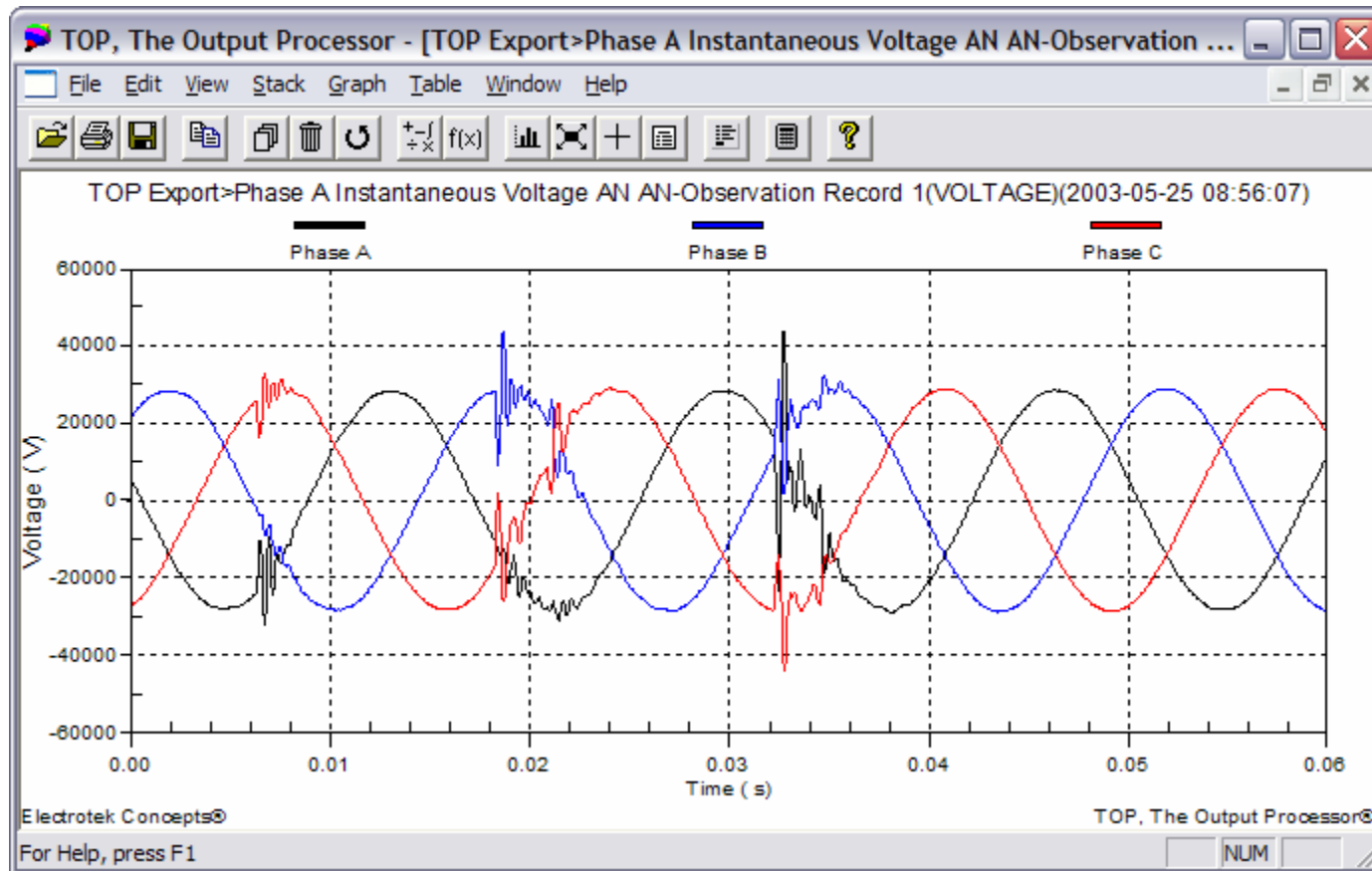
Example Product – TOP

- Input Data Formats:
 - COMTRADE: IEEE Std. C37.111-1991 &-1999
 - PQDIF: Power Quality Data Interchange Format (IEEE Std.1159-3)
 - SuperHarm / FerroView
 - EMTP / ATP / PSCAD
- Time & Frequency Domain Output
- TOPCalc
 - Add, subtract / multiply, divide / FFT, DFT, IDFT / power, energy
 - Filter / time shift / cumulative probability

TOP – continued

- TOP provides a variety of ways to visualize the data of interest.
 - Waveform & Spectrum Plots
 - Frequency Response Plots
 - Summary Tables (e.g., IEEE Std. 519 application)
 - Summary Bar/Column Charts
 - Cumulative Probability Plots
 - Probability Density Charts
 - 3D Magnitude-Duration Histograms (from PQWeb®)
 - Background (CBEMA, ITIC, etc.) Curves for Magnitude-Duration Plots

TOP User Interface



Example Service – Technical Forum

- The PQSoft Forum is a place to trade ideas, pose questions, or to share thoughts with other subscribers. Topics areas include:
 - General Interest and Site Usage
 - Knowledge Base:
 - PQ Glossary and References
 - Power Quality Phenomena
 - Power Quality Waveform Library
 - Power Quality Case Studies
 - Software/Analysis Support

User Forum – continued

Currently logged in as "electrotek\tomg". Last Visit: May 4, 2004.

- What's New in the Forum? Show me the posts in the last:
- Forum jump to:
- Topic jump to:
- Keyword search for: | [Full Text Search](#) |

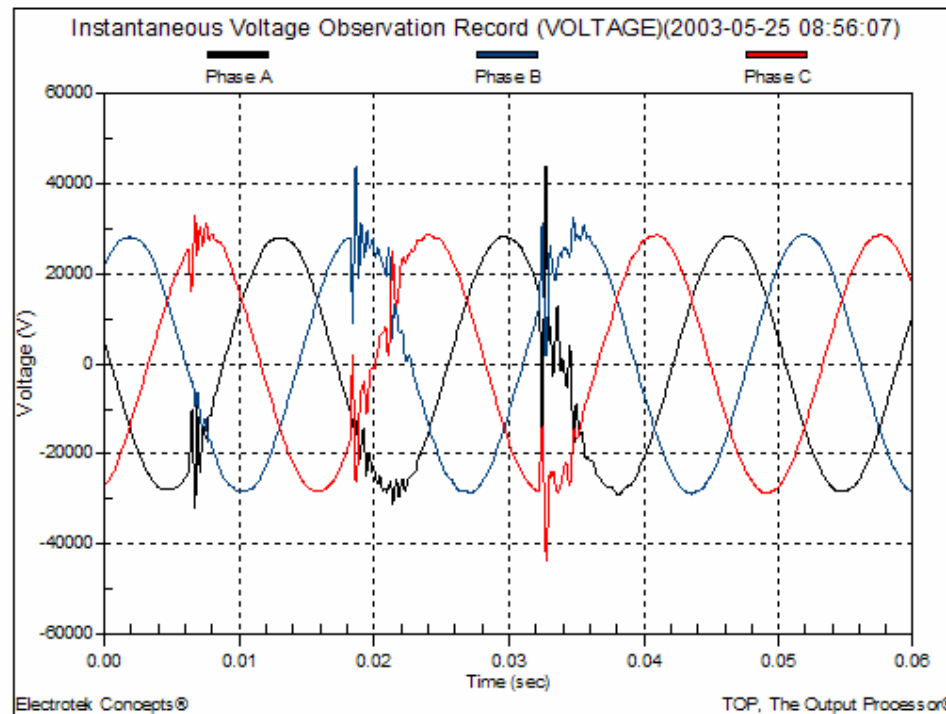
General Interest and Site Usage	Messages	Moderator
Information, News, and Events	23	Webmaster
Frequently Asked Questions	3	Webmaster
Forum Usage and Guidelines	9	Webmaster
Knowledge Base	Messages	Moderator
PQ Glossary and References	6	Electrotek
Power Quality Phenomena	14	Electrotek
Power Quality Waveform Library	69	Electrotek
Power Quality Case Studies	10	Electrotek
Software/Analysis Support	Messages	Moderator
Transient Analysis	7	Electrotek

Example Service – Power Quality Waveform Library

- **Arcing Faults**
- **Capacitor Switching Transients**
- **Current-Limiting Fuse Operation**
- **Ferroresonance**
- **Harmonics (Waveform Distortion)**
- **Long Duration Variations**
- **Momentary Interruptions**
- **Motor Terminal Transients**
- **Power Frequency Variations**
- **Transformer Energizing**
- **Voltage Flicker**
- **Voltage Notching**
- **Voltage Sags**
- **Voltage Swells**
- **Voltage Unbalance**

Power Quality Waveform Library - continued

The following waveform shows the bus voltage during a multiple restrike event on 34.5kV capacitor bank. This waveform was recorded with a Dranetz-BMI 8010 PQNode.



[PQDIF Download](#)

Tour of the Subscribers Area of the PQSoft Website

- Technical Forum
 - Power Quality Waveform Library
- Power Quality Case Studies
- PSCAD/EMTP/SuperHarm Model Library
- SuperHarm Nonlinear Load Library
- Archive of presentations, papers, workbooks, and newsletters

Benefits of Membership

- Access to state-of-the-art power system simulation tools such as SuperHarm and PSCAD.
- Access to a large repository of reference material related to the transient, harmonic, and power quality analysis of electric power systems.
- Access to other users that share the same interests and modeling and analysis goals.
- Access to expert training support and consulting.

Additional Information

- www.electrotek.com
General Electrotek information
- www.pqsoft.com
Software and services for power quality analysis
- www.powermonitoring.com
General power quality monitoring analysis information and power quality monitoring services
- www.pqview.com
Power quality data analysis software
- www.signaturesystem.com
Power quality monitoring systems

Questions?

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<http://www.dranetz-bmi.com/>