FLUKE®

Power Log

PC Application Software

Users Manual

May 2007 Rev. 3, 3/13
© 2007-2013 Fluke Corporation. All rights reserved.
All product names are trademarks of their respective companies.

Fluke Corporation

FLUKE Power Log Software

License Agreement

BY USING THIS SOFTWARE PRODUCT IN ANY MANNER, YOU ARE AGREEING TO ACCEPT THE FOLLOWING TERMS AND CONDITIONS.

Fluke Corporation (Fluke) grants you a non-exclusive right to use Fluke Power Log software (Product) on a single PC or on multiple PCs. This grant of license does not include the right to copy, modify, rent, lease, sell, transfer or distribute the Product or any portion thereof. You may not reverse engineer, decompile, or disassemble the Product.

Fluke warrants that the Product will perform in its intended environment substantially in accordance with the accompanying written materials for a period of 90 days from the date of license acceptance. Fluke does not warrant any downloading errors or that the Product will be error free or operate without interruption.

FLUKE DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SOFTWARE AND THE ACCOMPANYING WRITTEN MATERIALS. In no event shall Fluke be liable for any damages whatsoever (including, without limitation, indirect, consequential, or incidental damages, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use this Product, even if Fluke has been advised of the possibility of such damages.

Table of Contents

Title	Page
Introduction	1
How to Contact Fluke	2
System Requirements	2
Installing Power Log	3
Installing from CD	3
Installing from Fluke Website	3
Installing for use with Fluke 430-II	3
Connecting to a Power Quality Instrument	3
Connecting a 345	4
Connecting a 43x	4
Connecting a 430-II Instrument (434-II, 435-II and 437-II)	4
Connecting a VR1710	4
Connecting a 1735	5
COM Port Number	5
Loading USB Drivers	5
Using Power Log	6
Starting Power Log	6
Downloading Logged Data to a PC	7
Downloading Data from the 430 Series II	8
Using Saved Measurement Data	9
Uninstalling Power Log	9
Menu Options	9
Fluke 430-II Remote Control	9
Fluke 430-II SD Card	9
Print	9
Copy	9
Preferences	9
Zoom	10
Axis Vertical Scale	10
Save File as EMF	10
Events	10
Data Selection	10
View Legend	10
View Cursors	10
Analyzing Data	10
Summary Tab	11

Spreadsheet Tab 12
Voltage and Amps Tab 13
Statistics Tab 14
Harmonics Tab 15
Dips and Swells Tab 17
Frequency/Unbalance Tab 18
Power Tab 19
Transient Tab 20
Flicker Tab 21
Screens Tab 22
Energy Tab 23
Event Profiles Tab 24
RMS EVENT (430-II) 24
WAVE EVENT (430-II) 24
Power Harmonics Tab 25
Mains Signaling Tab 26
Energy Loss Tab 26
Power Wave Tab 26
Printing Reports and Exporting Data 27
Printing Reports 27
Exporting Data 28

List of Tables

Table	Title	Page
1.	System Requirements	2
2.	430 Series II Data Download	8

List of Figures

Figure	Title	Page
1.	Power Log Welcome Screen	6
2.	Power Log Main Screen	7
3.	Summary Display for User Input	11
4.	Spreadsheet for Saved Data	12
5.	Voltage and Amps Time Plot with Selected Channels Visible	13
6.	Statistics with Channel A Selected	14
7.	Harmonics Time Evolution with Selected Channels	15
8.	Histogram	16
9.	Dips and Swells	17
10.	Frequency/Unbalance Time Plot–Frequency Displayed	18
11.	Power Time Plot with Active and Reactive Power Selected	19
12.	Transient Waveform	20
13.	Flicker Waveforms	21
14.	Screens Pane with Instrument Display Image	22
15.	Energy Time Plot for Selected Period	23
16.	Event Profiles	24
17.	Power Harmonics Displayed	25
18.	Mains Signaling Waveforms	26
19.	Report Writer Assistant Selection Options	27
20.	Export Dialog Screen	28

Introduction

Power Log (the Software) is the PC software for Fluke 345, 433, 434, 434-II, 435, 435-II, 437-II, VR1710 and 1735. These models are referred to throughout this manual as the instrument. The software accepts data downloaded from the instrument. The software is designed for Microsoft Windows® XP and verified to run with Vista, Windows 7, and Windows 8 (Windows 8 compliant drivers for the instrument are required).

After transferring logged data to a PC for graphical and tabular evaluation, data may be exported to a spreadsheet for generating and printing reports.

With Power Log:

- Download recorded logged data to a PC
- Generate data tables
- View, print, and export time plots of all channels
- Perform harmonic studies
- Print tables, graphs, and comprehensive, formatted reports
- Export data for manipulation in other programs (Excel, for example)

This manual provides instruction for installing and using the Software, as well as limited instruction for connecting to Fluke power quality instruments. Brief introductions to opening, viewing, filtering, and exporting data guide users through most features of Power Log.

How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.
To register your product, visit http://register.fluke.com.
To view, print, or download the latest manual supplement, visit http://us.fluke.com/usen/support/manuals.

To contact Technical Support: fpqsupport@fluke.com or 888-257-9897

System Requirements

The minimum computer requirements are shown in Table 1.

Table 1. System Requirements

Component	Necessary	Recommended
Free hard disk space	>2 GB	>20 GB when using Fluke 430-II
CD-ROM drive	✓	
Monitor	1024 x 768 pixels	1280 x 1024 pixels
USB or RS-232 Serial Interface, dependant on instrument	✓	
Color printer		✓

Installing Power Log

Installing from CD

Insert the instrument CD into a PC. The installation should start automatically. If not, run the launch.exe program on the CD. Follow on-screen instructions to install the Software in the desired language. The 43x Series I and II use autorun.exe to install the Software.

Note

The most recent version of Power Log is available at the Fluke website.

The manuals and all application software install in the application directory, with a shortcut in the programs menu. A Power Log quick-launch shortcut can also be added to the desktop during installation.

Installing from Fluke Website

Navigate to the Fluke website at www.fluke.com and install using the on-screen instructions available from the product page for the instrument. Installing from the website requires a short registration.

Installing for use with Fluke 430-II

When Power Log is used with Fluke 430-II instruments, Fluke recommends that 16 GB of hard drive space be reserved. This space will accommodate the large data files of the 430-II instruments.

If no disk space is reserved, up to 2 GB of RAM is the maximum available size to process data.

Connecting to a Power Quality Instrument

⚠⚠ Warning

To avoid electrical shock or damage to the equipment, and before making any connections to the instrument, read and follow the safety warnings and cautions included in the instrument Users Manual.

Regardless of the instrument used, install the Software before connecting to the instrument. The 345, 43x, 43x-II, VR1710 and 1735 instruments use either the RS232 serial or USB interface to connect directly to a PC.

Connect the instrument to a power source and turn it on before starting Power Log. USB cables must be connected prior to running the Software.

Note

For more information such as loading USB drivers and more, refer to the manual provided with your instrument.

Connecting a 345

Connect a 345 to the PC using the standard USB cable supplied with the instrument. The USB port is located on the right side of the instrument.

Connecting a 43x

To connect a 43x to a PC or printer, use the optical interface.

Use the optical interface cable (model OC4USB) provided with the 43x to make the connection with the USB.

The interface connection, located on the right side of the 43x, is accessed by folding out the tilt stand.

Connecting a 430-II Instrument (434-II, 435-II and 437-II)

To connect a 430-II instrument, use the supplied USB cable. The driver for the Fluke device is on the CD supplied with the instrument. If the PC used is connected to the Internet, the driver will be installed automatically. The USB interface is on the left side of the instrument and is protected by a rubber cover. Lift the cover to access the connector.

Connecting a VR1710

Load the USB driver as described in the *VR1710 Users Manual*.

Connect the USB cable and plug the VR1710 power cord into an electrical outlet. To configure VR1710 settings, run Power Log and select .

Available options are:

- Recording Interval from 1 second to 20 minutes. To change the interval setting, recorded data must first be erased.
- Dip and Swell thresholds from 0 V to 300 V.
- Circular memory on or off. Circular memory on will continuously record, writing over old data when memory is full. Circular memory off will stop recording when memory is full.
- Disable transients will not record detected transients.
- Transient sensitivity from 2 V to 20 V. To detect transients, a typical waveform is first determined through sampling. This waveform will change over time as the input waveform changes. An envelope around the typical waveform is created based on the sensitivity setting. If any point of a sampled waveform falls outside of the envelope, the waveform is recorded as a transient.
- Erase stored settings
- Read stored settings

Note

VR1710 firmware version 1.15 or greater is required for circular memory and transient settings.

Connecting a 1735

Note

Turn the power on before connecting the serial/USB cable to the instrument.

Using the provided serial/USB cable, connect the instrument to an available serial/USB port on the PC.

COM Port Number

Note

For older 1735 instruments with RS232, the instrument COM Port must be selected manually.

The COM port number must be 9 or lower (COM1 to COM9). If a higher COM port number was selected when a USB driver was loaded, use the Windows Device Manager to change it:

1. Open the Device Manager located in **Control Panel/System/Hardware/Device Manager** (Windows XP).
2. Locate the device in **Ports** and double-click.
3. Go to **Port Settings/Advanced** and select **COM Port 9** or lower.
4. Press **OK**.
5. To update the Device Manager, select **Action** from the menu and scan for hardware changes.

Loading USB Drivers

USB drivers are located on the CD that came with the instrument. Follow the on-screen instructions and note that some drivers will automatically load twice. See instrument manuals for more details.

Note

There are two versions of the 1735:

1. *A serial port version which uses the serial/USB converter.*
2. *A USB version that lets you plug the instrument into the PC.*

The USB driver is supplied on the product CD or can be found online if the PC is connected to the Internet.

Using Power Log

Power Log may be used with existing, saved recorded data, or with newly recorded data from a connected instrument. Video guides for Power Log use (in English) are available at youtube.com, search for “Fluke Power Log”.

Starting Power Log

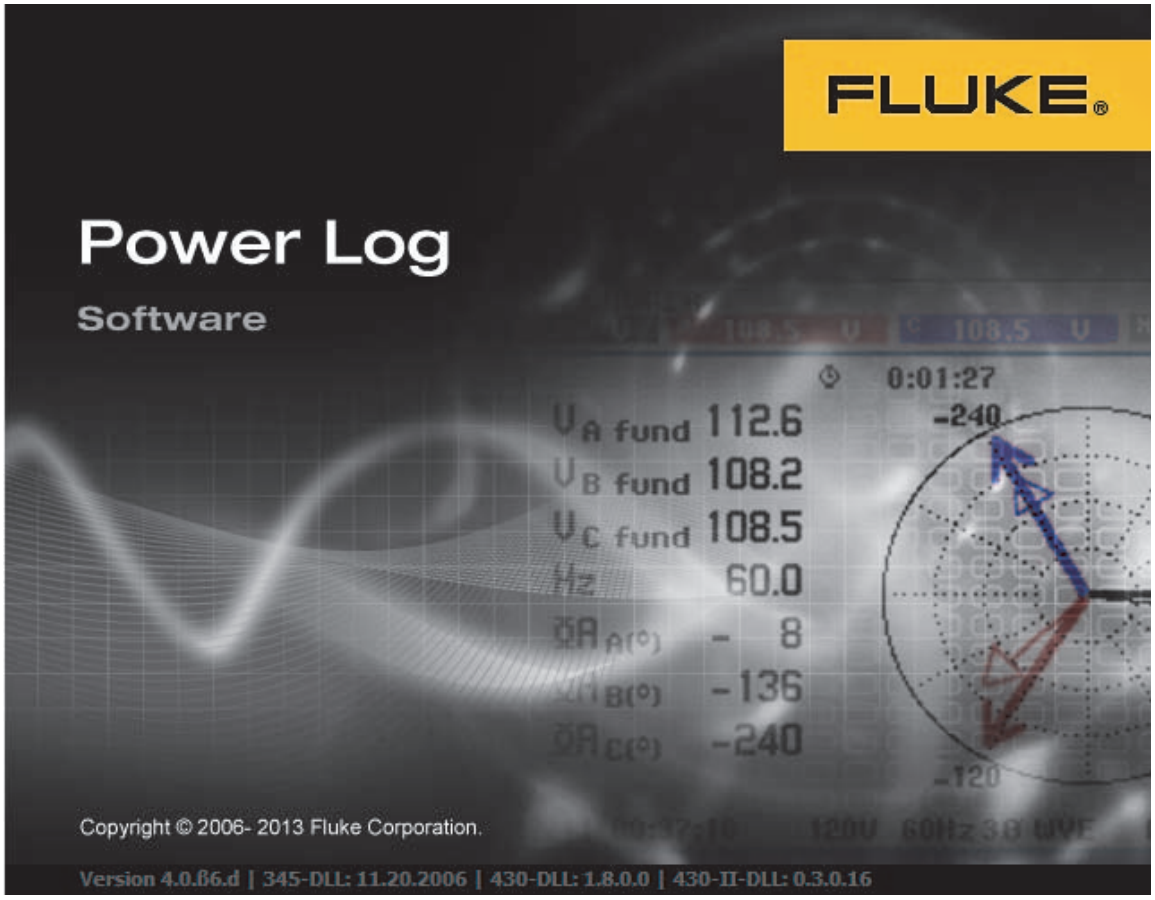
To start the Software:

1. If communication with an instrument is desired, refer to Connecting to a Power Quality Instrument.
2. Start the Software by selecting the **Power Log** program icon from the menu:

   Start | Programs | Fluke | Power Log | Power Log

   Alternatively, use the **Power Log** icon shortcut on your PC desktop.

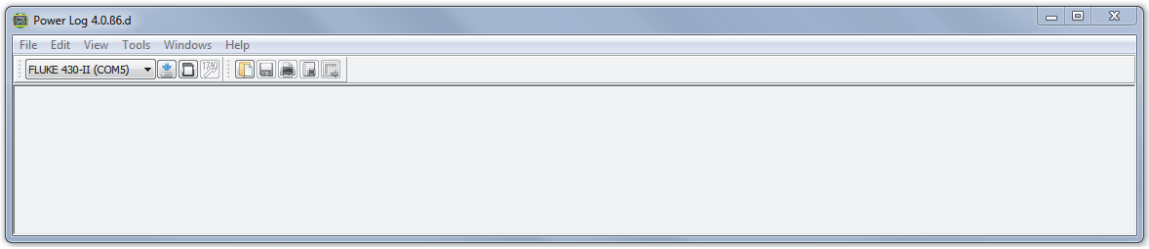
The Power Log welcome screen displays briefly during the launch sequence. See Figure 1.



eto001.bmp

Figure 1. Power Log Welcome Screen

The welcome screen is replaced by the following menu bar with a blank pane. The main menu displays the communications port and menu options. See Figure 2.



eto002.bmp

Figure 2. Power Log Main Screen

Downloading Logged Data to a PC

Data stored in the instrument can be transferred to a PC.

Note

Do not download data while the instrument is still logging; wait until logging is finished before downloading.

1. The instrument should be connected as described in Connecting to a Power Quality Instrument with the Software running.

   To download stored data from a 433, 434 or 435:

   a. Press the MEMORY button.

   b. Select RECALL/DELETE (F1).

   c. Select saved data file to load.

   d. Select USE (F5).

2. Select the COM port from the drop down list. USB-based instruments may display as the instrument model.

3. Select from the menu **File | Download**, or press the download icon. The data transfer can take seconds or minutes, depending on the baud rate and the amount of data. Once the download is complete, a time plot of the data appears.

   VR1710 prompts: **Download complete. Keep Measuring?**

   1. **Yes**

   2. **Yes, and Erase memory**

   3. **No**

Note

The window that opens on the PC desktop depends upon the mode the instrument was in when the information was recorded.

Downloading Data from the 430 Series II

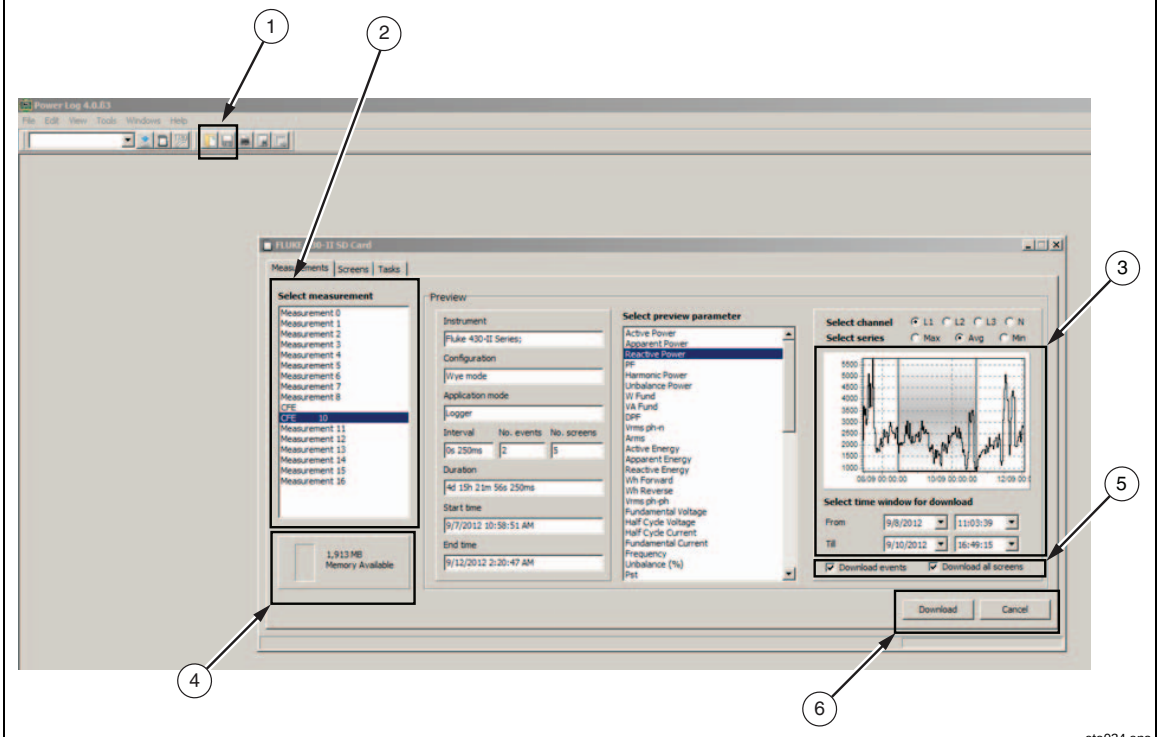
The Fluke 430-II data can download with a USB connection or read data directly from an SD card. Reading directly from the SD card improves the data download speed.

To download the data from the SD card:

1. Take the card out of the instrument.
2. Plug the card into an SD Card reader connected to your PC.
3. Select **File | Fluke 430-II SD card** (or click the SD card button).
4. Browse to the FLUKE folder on the SD card or push the download icon.

Both USB or SD card downloads have the same functionality. A popup window shows the available measurements. When you click one of the measurements, the File preview shows a brief summary of the measurement. See Table 2.

Table 2. 430 Series II Data Download



Item	Description
①	Push the download button or select Fluke Folder on SD-Card.
②	Select measurement.
③	Select time interval of interest. Drag the vertical rulers on the preview screen to set the time window.
④	Check if the measurement will fit into the available memory. If not, select a shorter interval.
⑤	Select if the screens and event data should be included with the download.
⑥	Select Download to start downloading the selected data.

Using Saved Measurement Data

Open a saved data set using Power Log with the following steps:

1. If it is not already running, start **Power Log**.

   After the welcome screen and reminders have displayed, the menu offers limited options.

2. Select **File | Open**, and navigate to the DataFiles folder in the **Fluke | Power Log** folder. Or, if the data files are at another location on the PC, browse to the location.

3. Select a file to use and press **Open**.

The window that opens defaults to the mode last used, or the mode the instrument was in when the data was recorded and saved. The tabs displayed are dependant on the instrument and saved data.

Uninstalling Power Log

Uninstall Power Log from a PC using the uninstall feature included with the Software.

To uninstall Power Log, follow this path from the Windows Start button:

Start | Programs | Fluke | PowerLog | Uninstall

The uninstall wizard completes the removal of the Software from the PC. The data files remain untouched.

Menu Options

Menu options are available based on the Windows tab selected. The sections below briefly explain the options.

Fluke 430-II Remote Control

Click the buttons on screen to control the 430-II remotely. Remote control also provides a save screen function for saving instrument screens.

Note

The text setting magnifier must be set to default (100 %) in the display control panel.

Fluke 430-II SD Card

Open the file browser to download measurements directly from the SD card or open saved measurement data from hard disk or network.

Print

Prints current window view.

Copy

Copies current window view to the PC clipboard which can be pasted into other applications. Not available for all windows.

Preferences

Select from menu or windows that have mouse right-click menus. Select trace colors for all windows.

Zoom

Select from menu, icons or windows that have mouse right-click menus. Mouse right-click menus also have a restore zoom selection.

Axis Vertical Scale

Select from windows that have mouse right-click menus. Set the scale to automatic or define minimum and maximum. Scaling can also be applied to all graphs.

Save File as EMF

Select from windows that have right-click menus. Saves current view as EMF (Enhanced Windows Metafile) format.

Events

Windows that have events can be viewed by using the Tools menu or the arrow icons. Examples of events are dips, swells or transients.

Data Selection

Data sets can be selected using dates, zooming or events. The data set selected will be used for exporting data.

View Legend

Select from menu or windows that have mouse right-click menus.

View Cursors

Select from menu or windows that have mouse right-click menus or double-click on the graph.

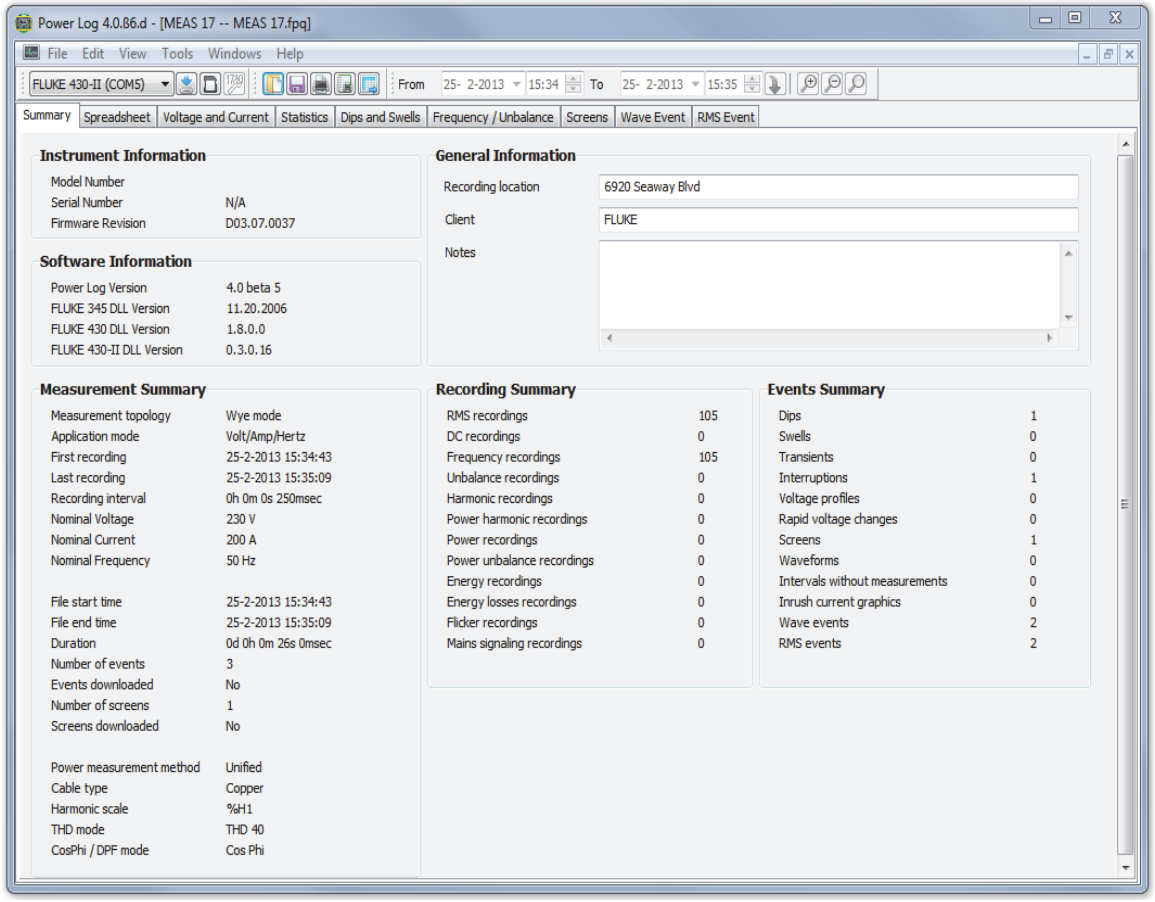
Analyzing Data

Data can be viewed and printed, or exported for use in other software, such as Microsoft Excel and database programs. Whether downloaded from a connected instrument or opened from files, the same tabs and window options are visible. Tabs displayed will be dependent on the instrument and the saved data.

- Summary
- Spreadsheet
- Voltage and Amps
- Statistics
- Harmonics
- Frequency/Unbalance
- Power
- Screens
- Energy
- Transients
- Dips and Swells
- Flicker
- Mains Signaling
- Power Harmonics
- Event Profiles
- RMS Event (430-II)
- WAVE Event (430-II)

Summary Tab

The Summary tab shown in Figure 3 allows you to enter information about the session, the client, and any notes that may be useful.

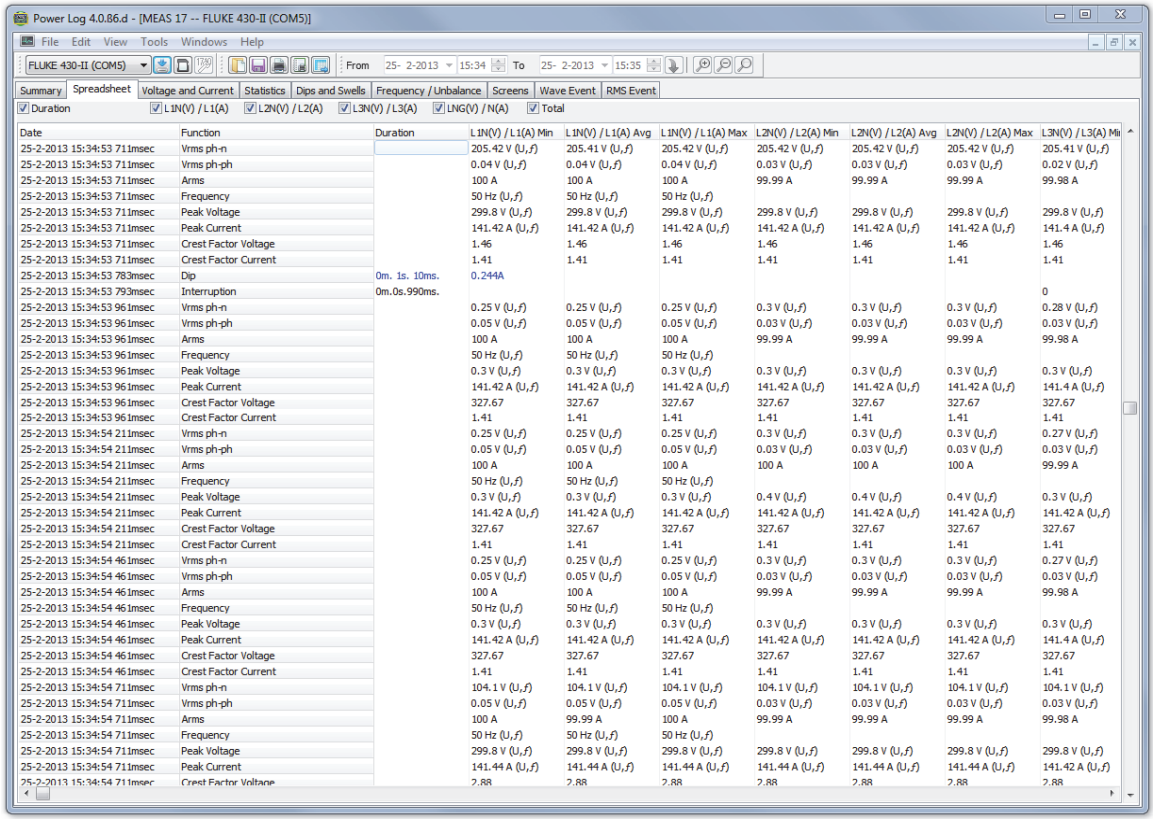


eto016.bmp

Figure 3. Summary Display for User Input

Spreadsheet Tab

The Spreadsheet tab allows viewing of the recorded dates and time, and additionally allows filtering of the data by de-selecting the checkboxes in the top line. Figure 4 shows the Duration checkbox unselected, and only selected channels and options are visible. The data displayed is dependent on the instrument used.



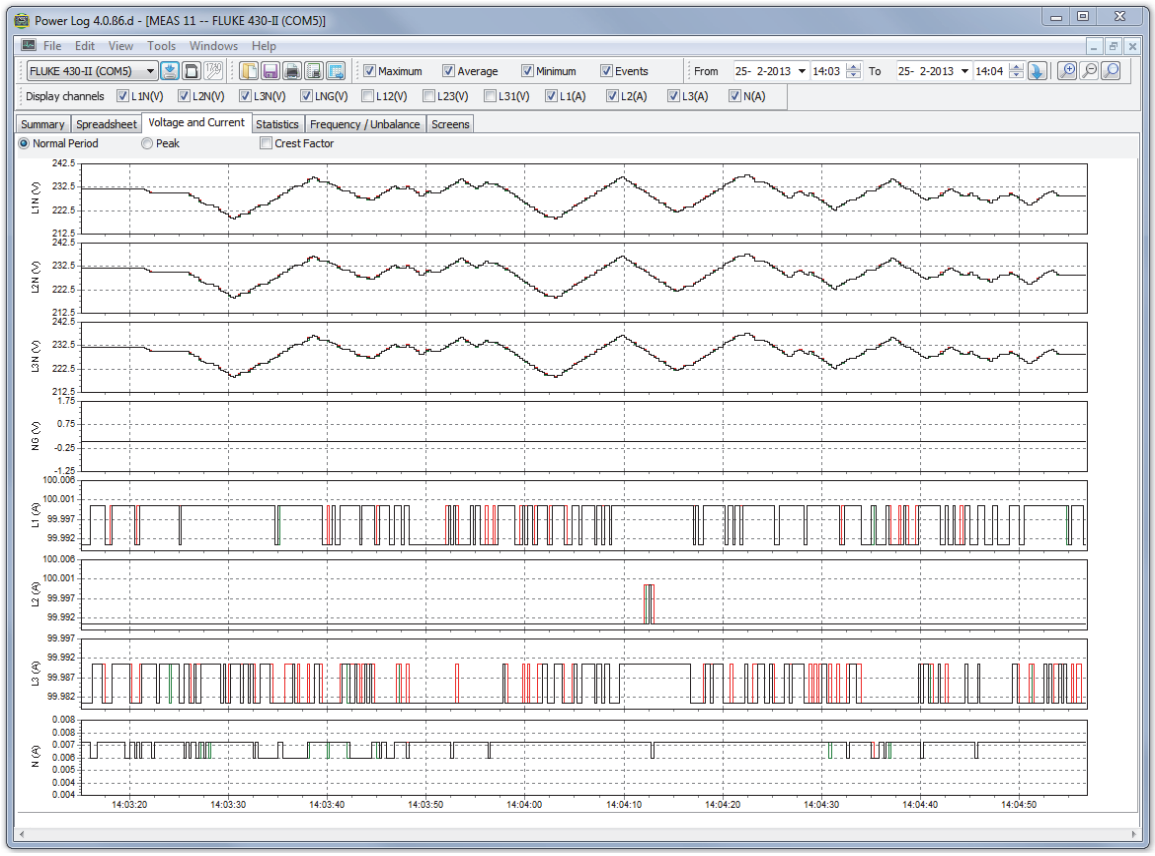
Date	Function	Duration	L1N(V) / L1(A) Min	L1N(V) / L1(A) Avg	L1N(V) / L1(A) Max	L2N(V) / L2(A) Min	L2N(V) / L2(A) Avg	L2N(V) / L2(A) Max	L3N(V) / L3(A) Mi
25-2-2013 15:34:53 711msec	Vrms ph-n		205.42 V (U,f)	205.41 V (U,f)	205.42 V (U,f)	205.42 V (U,f)	205.42 V (U,f)	205.42 V (U,f)	205.41 V (U,f)
25-2-2013 15:34:53 711msec	Vrms ph-ph		0.04 V (U,f)	0.04 V (U,f)	0.04 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.02 V (U,f)
25-2-2013 15:34:53 711msec	Arms		100 A	100 A	100 A	99.99 A	99.99 A	99.99 A	99.98 A
25-2-2013 15:34:53 711msec	Frequency		50 Hz (U,f)	50 Hz (U,f)	50 Hz (U,f)				
25-2-2013 15:34:53 711msec	Peak Voltage		299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)
25-2-2013 15:34:53 711msec	Peak Current		141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.4 A (U,f)
25-2-2013 15:34:53 711msec	Crest Factor Voltage		1.46	1.46	1.46	1.46	1.46	1.46	1.46
25-2-2013 15:34:53 711msec	Crest Factor Current		1.41	1.41	1.41	1.41	1.41	1.41	1.41
25-2-2013 15:34:53 783msec	Dip	0m. 1s. 10ms.	0.244A						
25-2-2013 15:34:53 793msec	Interruption	0m.0s.990ms.							0
25-2-2013 15:34:53 961msec	Vrms ph-n		0.25 V (U,f)	0.25 V (U,f)	0.25 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.28 V (U,f)
25-2-2013 15:34:53 961msec	Vrms ph-ph		0.05 V (U,f)	0.05 V (U,f)	0.05 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)
25-2-2013 15:34:53 961msec	Arms		100 A	100 A	100 A	99.99 A	99.99 A	99.99 A	99.98 A
25-2-2013 15:34:53 961msec	Frequency		50 Hz (U,f)	50 Hz (U,f)	50 Hz (U,f)				
25-2-2013 15:34:53 961msec	Peak Voltage		0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)
25-2-2013 15:34:53 961msec	Peak Current		141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.4 A (U,f)
25-2-2013 15:34:53 961msec	Crest Factor Voltage		327.67	327.67	327.67	327.67	327.67	327.67	327.67
25-2-2013 15:34:53 961msec	Crest Factor Current		1.41	1.41	1.41	1.41	1.41	1.41	1.41
25-2-2013 15:34:54 211msec	Vrms ph-n		0.25 V (U,f)	0.25 V (U,f)	0.25 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.27 V (U,f)
25-2-2013 15:34:54 211msec	Vrms ph-ph		0.05 V (U,f)	0.05 V (U,f)	0.05 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)
25-2-2013 15:34:54 211msec	Arms		100 A	100 A	100 A	100 A	100 A	100 A	99.99 A
25-2-2013 15:34:54 211msec	Frequency		50 Hz (U,f)	50 Hz (U,f)	50 Hz (U,f)				
25-2-2013 15:34:54 211msec	Peak Voltage		0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.4 V (U,f)	0.4 V (U,f)	0.4 V (U,f)	0.3 V (U,f)
25-2-2013 15:34:54 211msec	Peak Current		141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)
25-2-2013 15:34:54 211msec	Crest Factor Voltage		327.67	327.67	327.67	327.67	327.67	327.67	327.67
25-2-2013 15:34:54 211msec	Crest Factor Current		1.41	1.41	1.41	1.41	1.41	1.41	1.41
25-2-2013 15:34:54 461msec	Vrms ph-n		0.25 V (U,f)	0.25 V (U,f)	0.25 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.27 V (U,f)
25-2-2013 15:34:54 461msec	Vrms ph-ph		0.05 V (U,f)	0.05 V (U,f)	0.05 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)
25-2-2013 15:34:54 461msec	Arms		100 A	100 A	100 A	99.99 A	99.99 A	99.99 A	99.98 A
25-2-2013 15:34:54 461msec	Frequency		50 Hz (U,f)	50 Hz (U,f)	50 Hz (U,f)				
25-2-2013 15:34:54 461msec	Peak Voltage		0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)	0.3 V (U,f)
25-2-2013 15:34:54 461msec	Peak Current		141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.42 A (U,f)	141.4 A (U,f)
25-2-2013 15:34:54 461msec	Crest Factor Voltage		327.67	327.67	327.67	327.67	327.67	327.67	327.67
25-2-2013 15:34:54 461msec	Crest Factor Current		1.41	1.41	1.41	1.41	1.41	1.41	1.41
25-2-2013 15:34:54 711msec	Vrms ph-n		104.1 V (U,f)	104.1 V (U,f)	104.1 V (U,f)	104.1 V (U,f)	104.1 V (U,f)	104.1 V (U,f)	104.1 V (U,f)
25-2-2013 15:34:54 711msec	Vrms ph-ph		0.05 V (U,f)	0.05 V (U,f)	0.05 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)	0.03 V (U,f)
25-2-2013 15:34:54 711msec	Arms		100 A	99.99 A	100 A	99.99 A	99.99 A	99.99 A	99.98 A
25-2-2013 15:34:54 711msec	Frequency		50 Hz (U,f)	50 Hz (U,f)	50 Hz (U,f)				
25-2-2013 15:34:54 711msec	Peak Voltage		299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)	299.8 V (U,f)
25-2-2013 15:34:54 711msec	Peak Current		141.44 A (U,f)	141.44 A (U,f)	141.44 A (U,f)	141.44 A (U,f)	141.44 A (U,f)	141.44 A (U,f)	141.42 A (U,f)
25-2-2013 15:34:54 711msec	Crest Factor Voltage		2.88	2.88	2.88	2.88	2.88	2.88	2.88

eto017.bmp

Figure 4. Spreadsheet for Saved Data

Voltage and Amps Tab

The Voltage and Amps tab displays a time plot showing the recorded voltages for the selected channels shown in Figure 5. Use the mouse to select data points on the plot and view data details in pop up window.



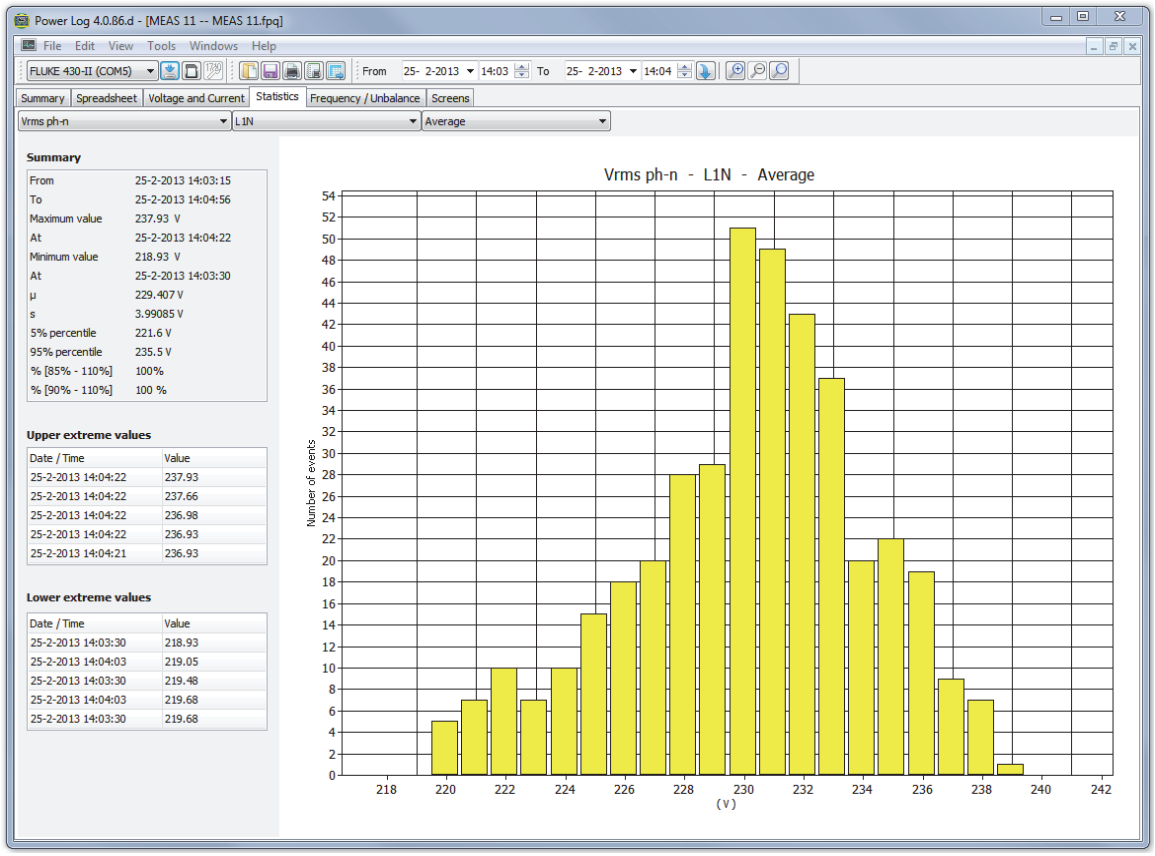
eto018.bmp

Figure 5. Voltage and Amps Time Plot with Selected Channels Visible

Statistics Tab

Selecting the statistics tab allows filtering by Maximum, Average, and Minimum values, as well as Selected Channel for the recorded or saved data. You can also select readings to be used for statistical analysis.

Statistical information to support the image is provided in addition to the graphic display of the recorded data. See Figure 6.



eto019.bmp

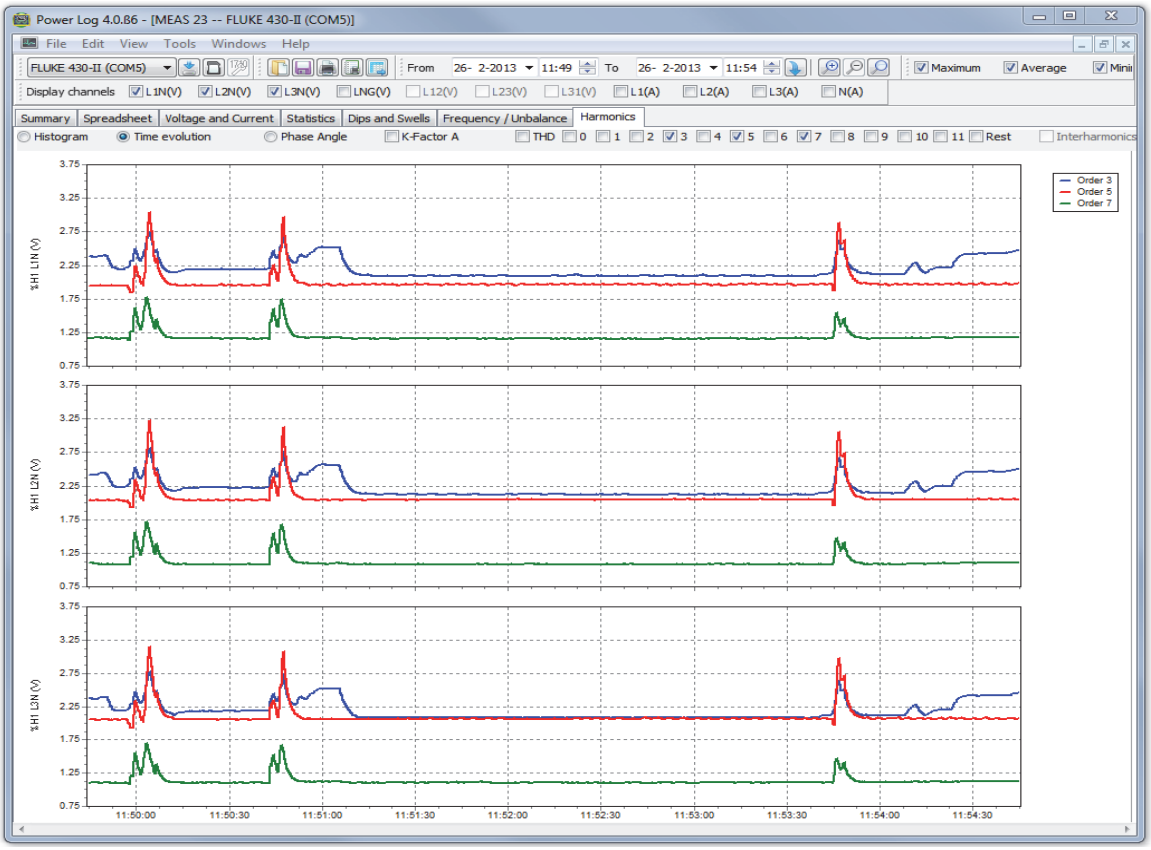
Figure 6. Statistics with Channel A Selected

Harmonics Tab

Harmonics are periodic distortions of voltage, current, or power sine waves. Each waveform can be considered as a combination of various sine waves with different frequencies and magnitudes.

Harmonics are often caused by non-linear loads such as dc power supplies in computers and other adjustable motor drives. Excessive harmonics may result in overheating of transformers, conductors, or damage to other equipment.

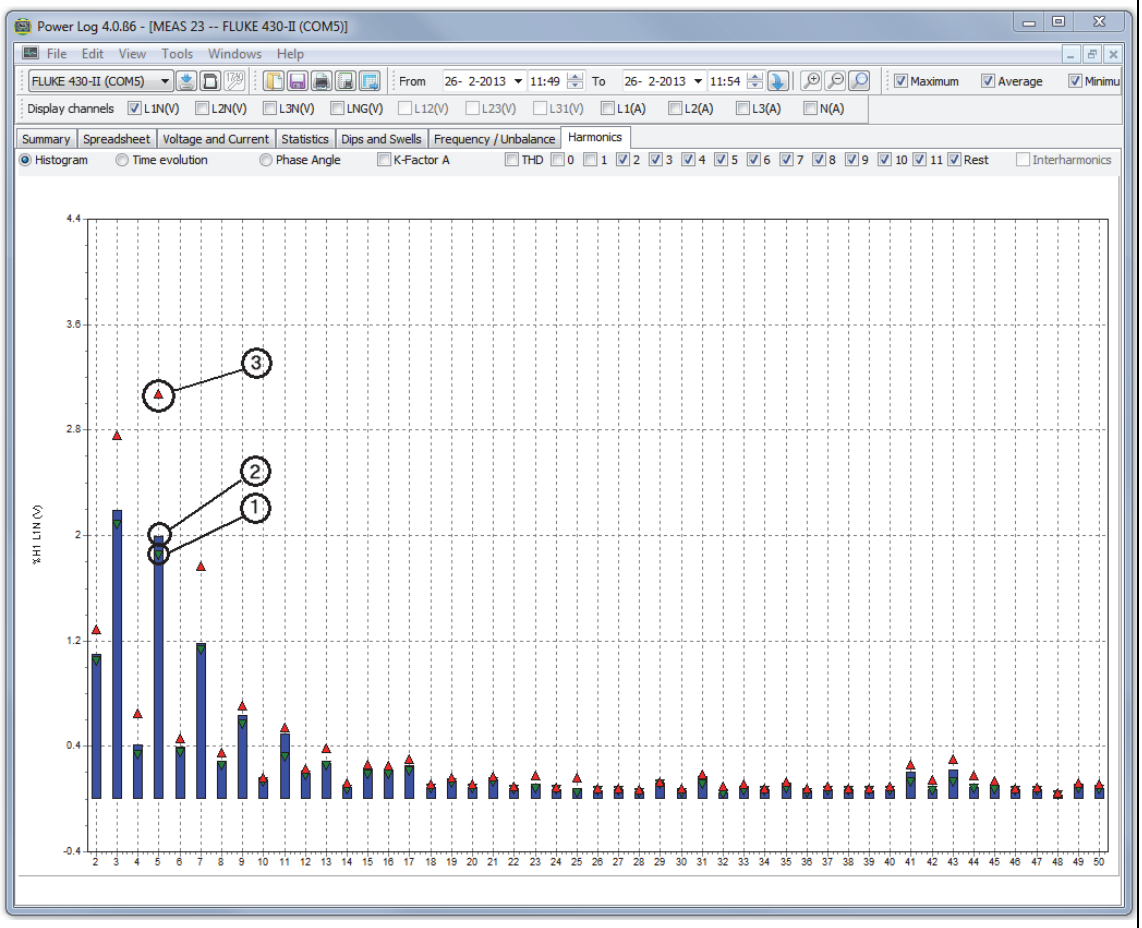
Harmonics tab offers two options for the display: histogram or time evolution. Time evolution plots harmonics data over time. The histogram displays the data in a bar graph, with the % of the fundamental (50 or 60 Hz) on the left side (vertical, or Y axis) and harmonic order on the X axis (horizontal), as shown in Figure 7. This tab is visible only if you captured relevant harmonics data. The 430 Series II instruments also support recording and plotting of harmonic phase angles over time.



eto021.bmp

Figure 7. Harmonics Time Evolution with Selected Channels

Figure 8 shows another way of looking at harmonics data.



eto022f.bmp

Number	Explanation
①	Minimum
②	Average
③	Maximum

Figure 8. Histogram

Note

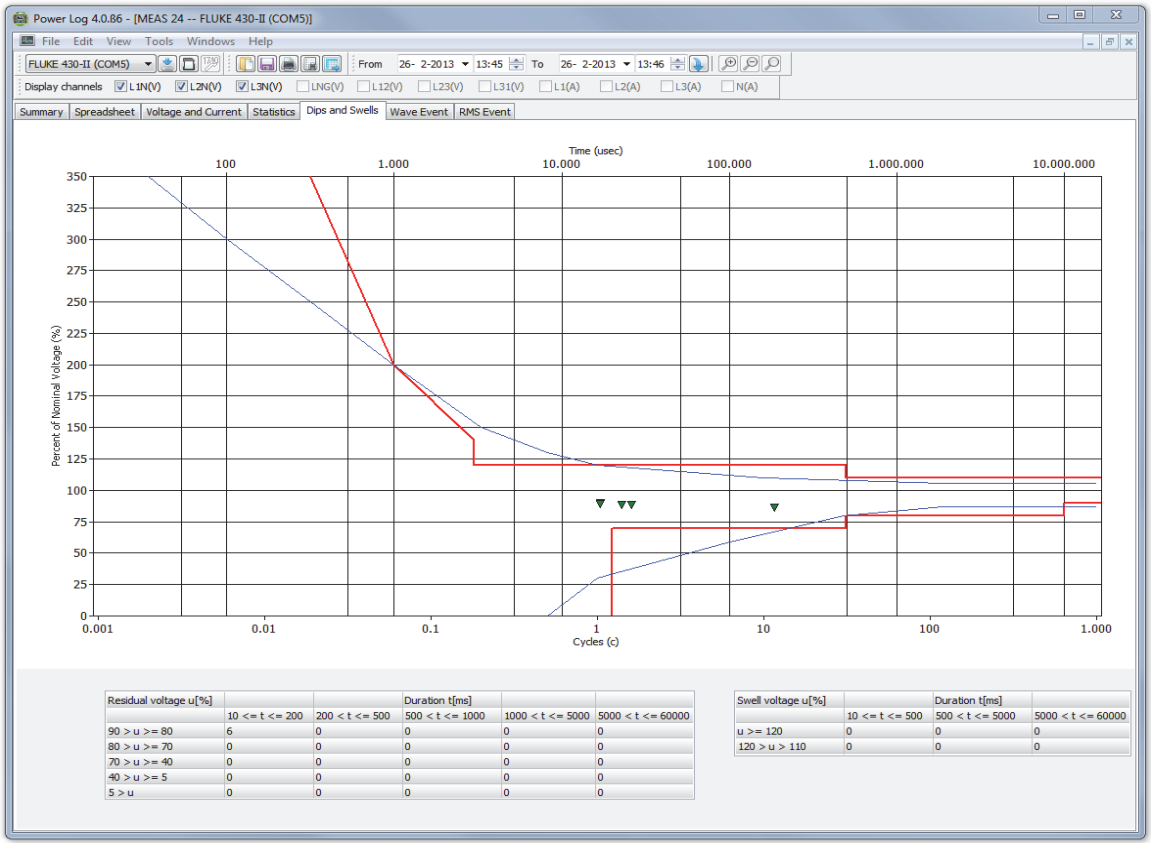
With either the histogram or Time evolution display, harmonics may be selected and un-selected as needed using the check boxes at the top of the display window.

Select the **Time evolution** radio button to change the display to a graph displaying the time along the X (horizontal) axis, as shown in the example data in Figure 7.

Dips and Swells Tab

Dips and swells are shown on a CBEMA (Computer Business Equipment Manufacturers Association) and ITIC (Information Technology Industry Council) plot classification table according to EN50160. On the CBEMA (blue) and ITIC (red), curve markers are plotted for each dip and swell. The height on the vertical axis shows the severity of the dip or swell relative to the nominal voltage. The horizontal position shows the duration of the dip or swell. These curves show an ac input voltage envelope which typically can be tolerated (no interruption in function) by most Information Technology Equipment (ITE).

Displayed data will be based on the zoom level of the Voltage and Amps tabs. See Figure 9.

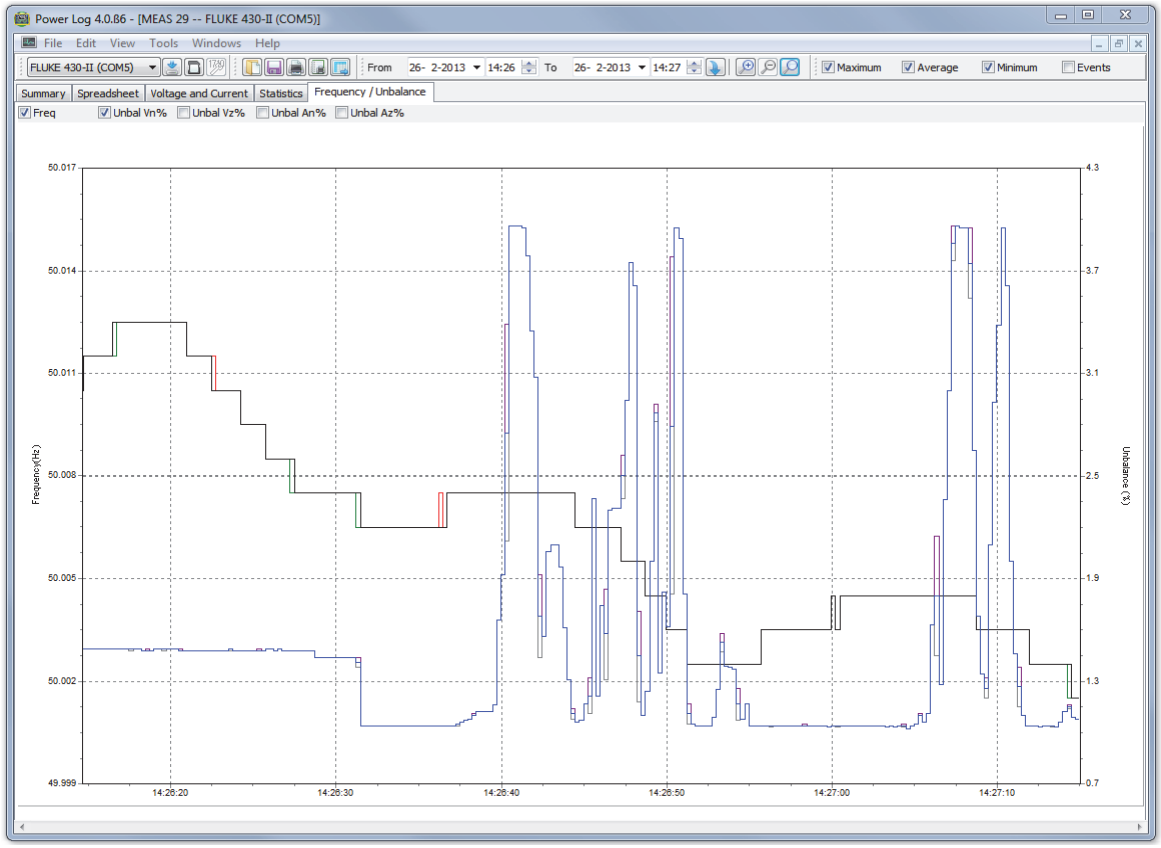


eto020.bmp

Figure 9. Dips and Swells

Frequency/Unbalance Tab

Unbalance displays the voltage unbalance (%) in multi-phase systems. An important measurement in the case of electric motors, which will run hotter when voltage is not balanced. The method of calculation used is the ratio of positive-sequence symmetrical components divided by negative sequence components. This is the measurement method defined by the international standard IEC 61000-4-30. Unbalance is not available for all instruments. Figure 10 shows the frequency time plot.

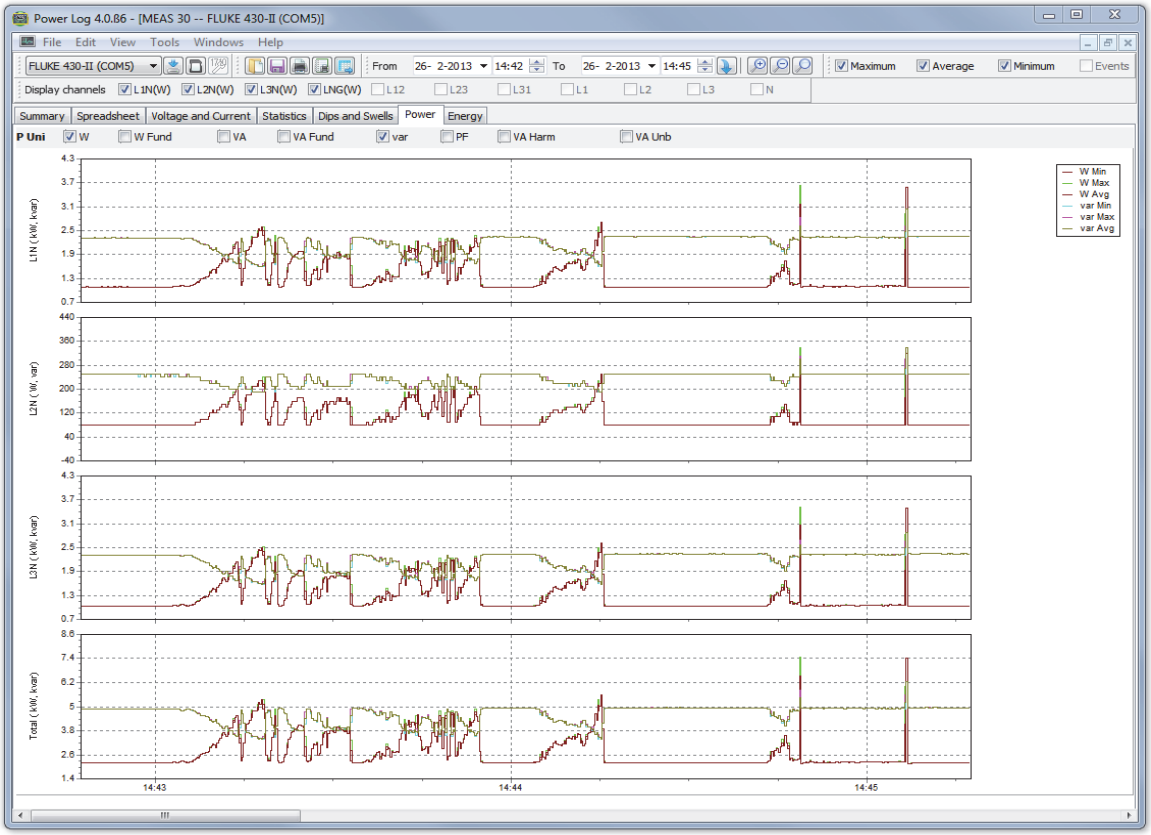


eto023.bmp

Figure 10. Frequency/Unbalance Time Plot–Frequency Displayed

Power Tab

The Power tab allows filtering the information by using the checkboxes at the top of the display window. In Figure 11 the Y axis shows the Total power (kW, KVAR, and three phases). The X or horizontal axis shows the time data. The legend explains the colors used in the graph to distinguish between Active and Reactive power.

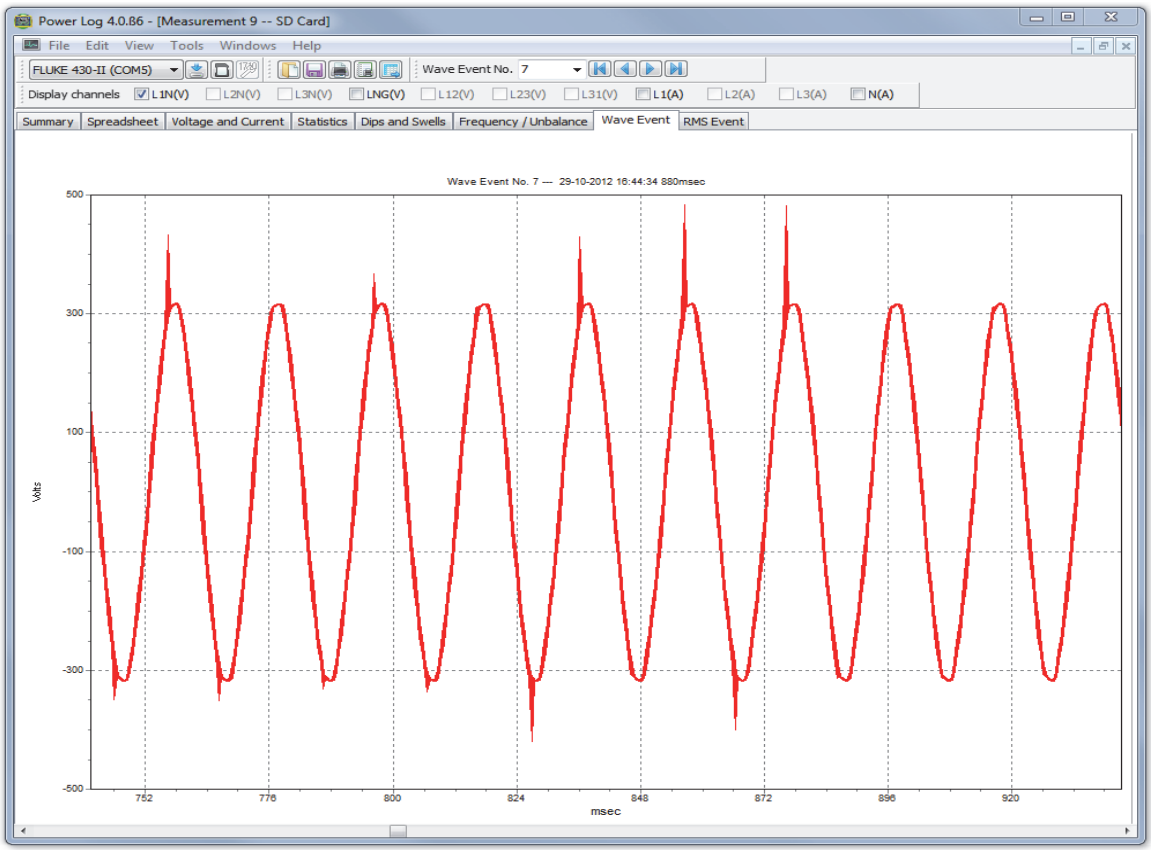


eto026.bmp

Figure 11. Power Time Plot with Active and Reactive Power Selected

Transient Tab

All detected transient waveforms are recorded. Use the arrow icons to move through all transient wave forms. See Figure 12.

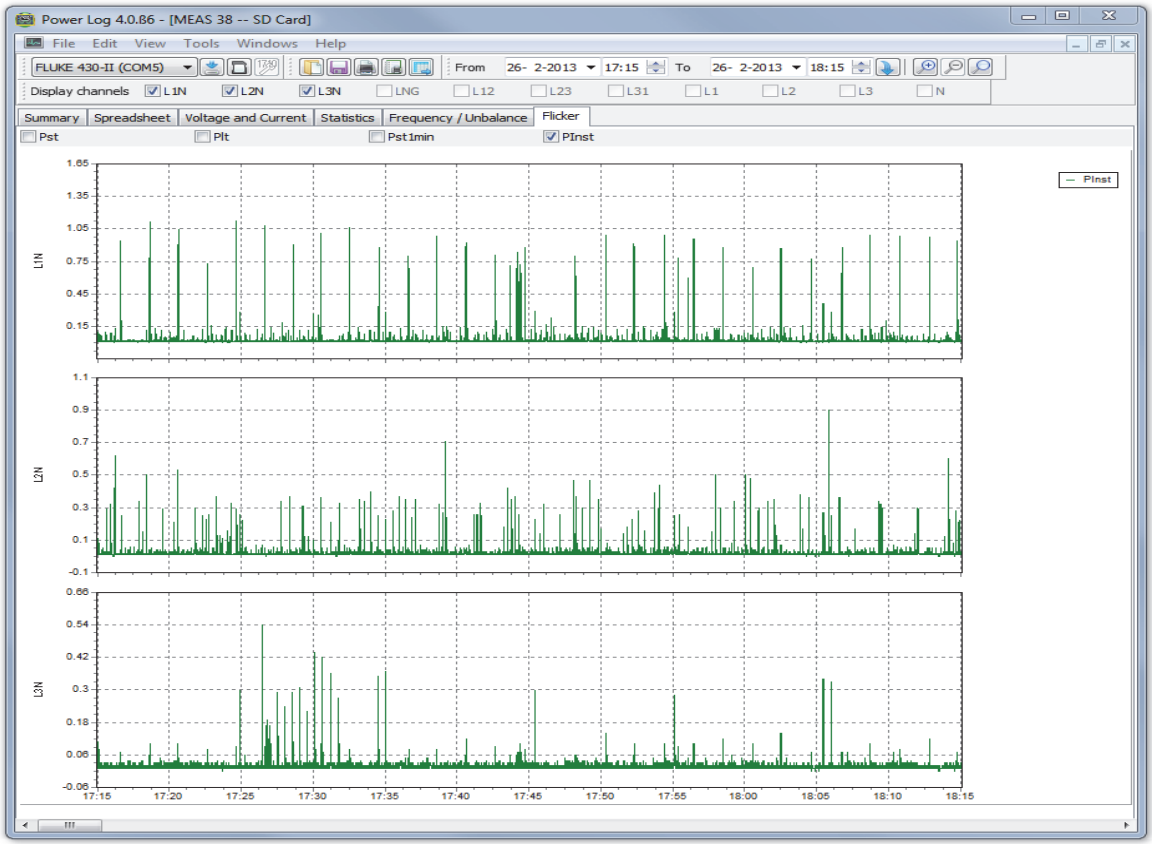


eto024.bmp

Figure 12. Transient Waveform

Flicker Tab

The Flicker tab allows plotting of Instantaneous Flicker PF5 (430 and 430-II Series only), short-term flicker (Pst) and long-term flicker (Plt). Short-term flicker is a value measured over 10-minute intervals and long-term flicker is measured over two hours. A value of 1.0 indicates it is likely to notice a light bulb flickering. See Figure 13.



eto025.bmp

Figure 13. Flicker Waveforms

Screens Tab

The Screens tab illustrates the screen mode in use by the logger or instrument with which the data was recorded, or screens saved by pressing the **SAVE** or **SAVE SCREEN** button on the instrument. In the example in Figure 14, the power logger in use was the Fluke 1735, and the recording mode set to Harmonics. Use the right and left arrowhead buttons on the top toolbar to display additional screens.



eto027.bmp

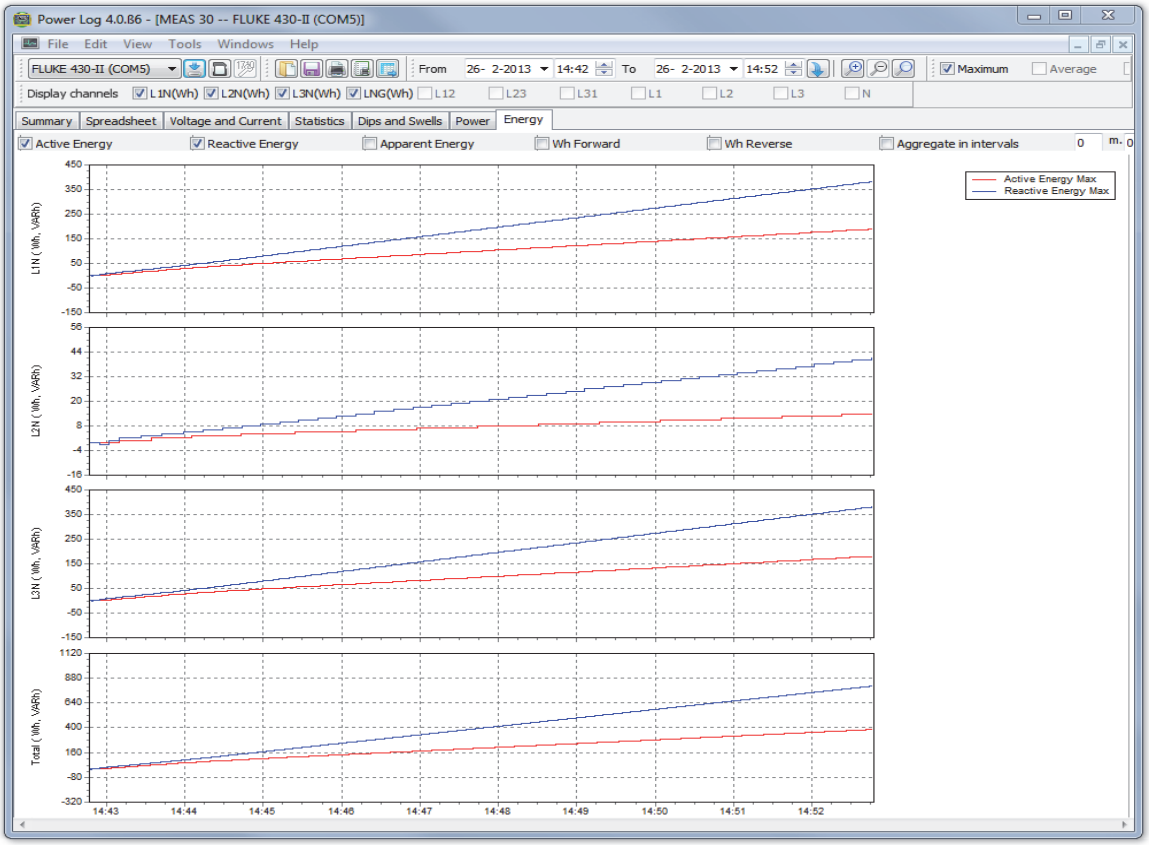
Figure 14. Screens Pane with Instrument Display Image

Energy Tab

This mode displays energy cumulatively or in running averages. For example, the Y axis in Figure 15 displays Total energy and energy by phase. The X axis displays the time.

The checkboxes allow selection of Active energy (in kWh), Reactive Energy (in kVAh), and viewing of cumulative energy. When **Aggregate** is selected, the data can be further broken out into time intervals, illustrated with 10-minute intervals.

Use the refresh button to apply new aggregation settings using m and s inputs. Refresh redraws the screen with the new settings.

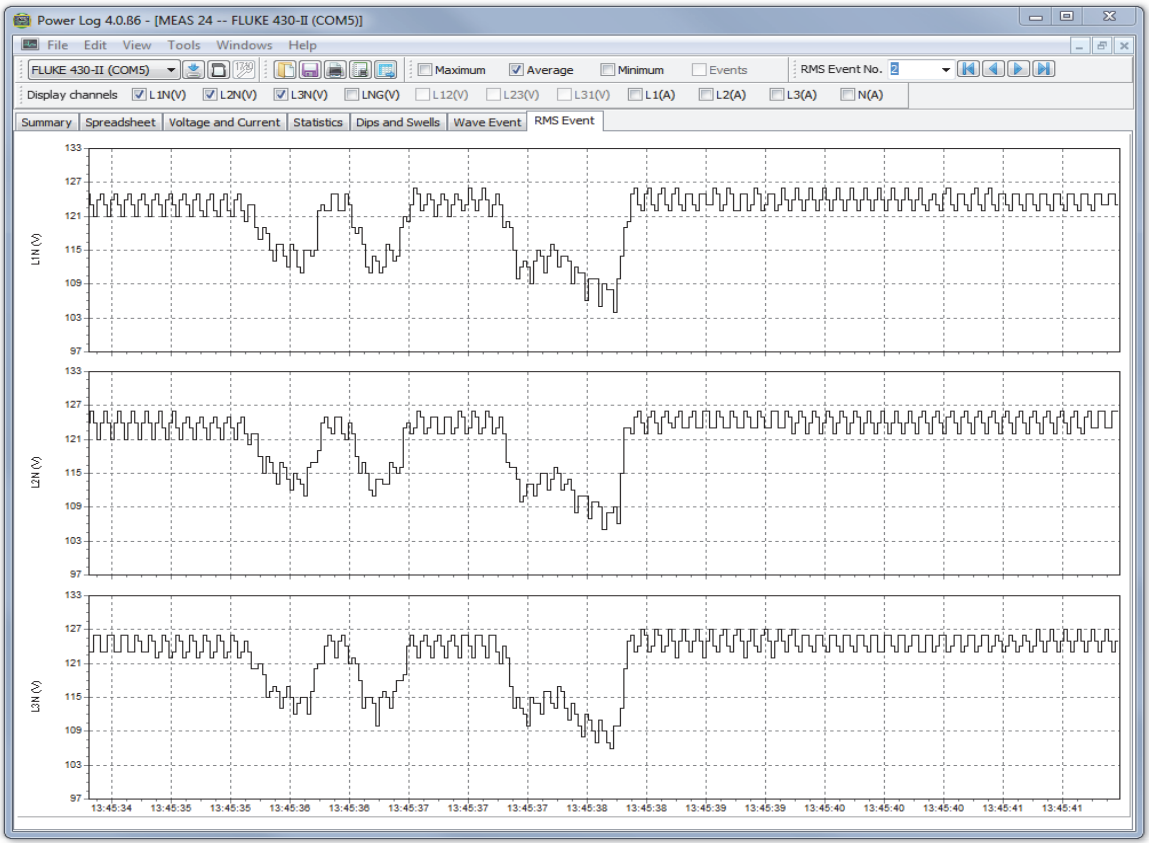


eto028.bmp

Figure 15. Energy Time Plot for Selected Period

Event Profiles Tab

Event profiles display event details such as dips and swells voltage over time. Use the arrow icons to move through all events. See Figure 16.



eto029.bmp

Figure 16. Event Profiles

RMS EVENT (430-II)

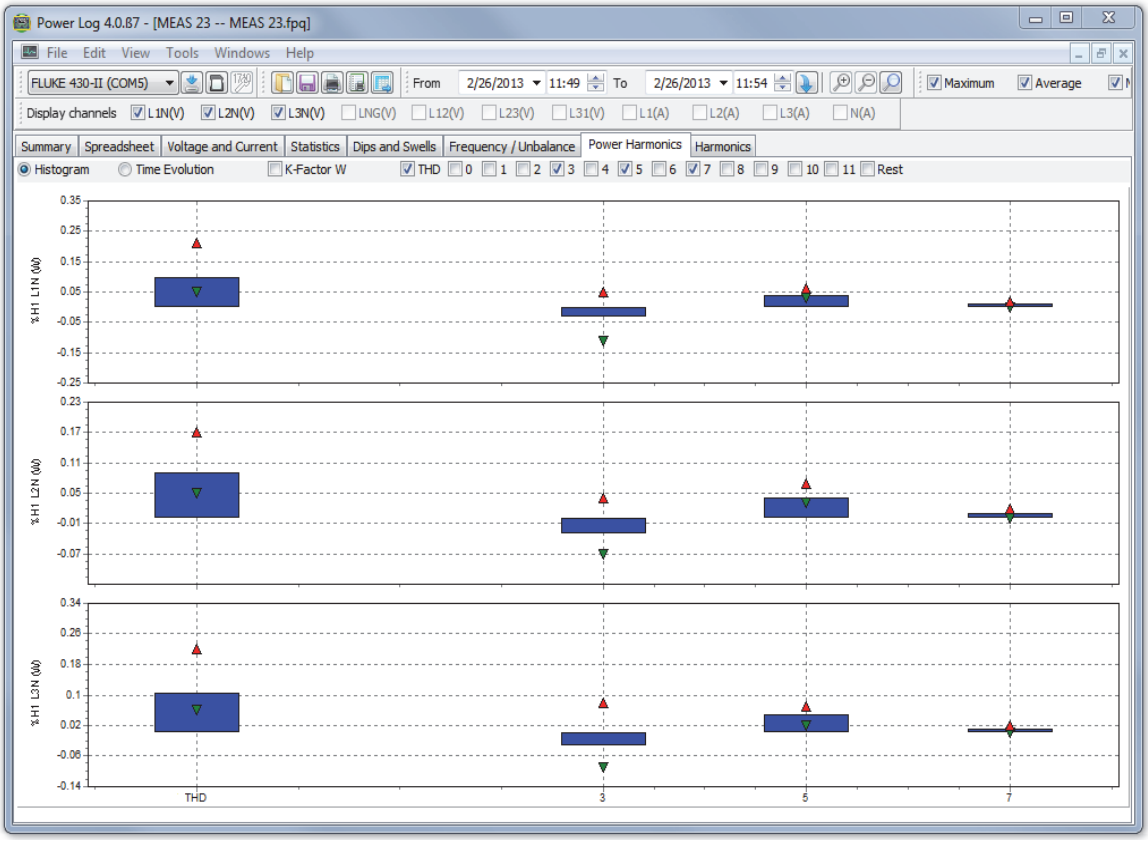
The RMS EVENT tab shows rms profiles of EVENTS with 7 second duration and .25 ms resolution.

WAVE EVENT (430-II)

The WAVE EVENT tab shows waveforms of voltage and current captured during the event. It shows 1 second (100/120 cycles) of data for 50/60 Hz signals. For 400 Hz signals, 15 cycles (for example, 0.0375 seconds) of data is captured.

Power Harmonics Tab

Power harmonics is similar to voltage harmonics, but based on power. This tab is shown when Power Harmonics are included in the measurement setup. The 430 Series II instruments are able to measure Power Harmonics. See Figure 17.

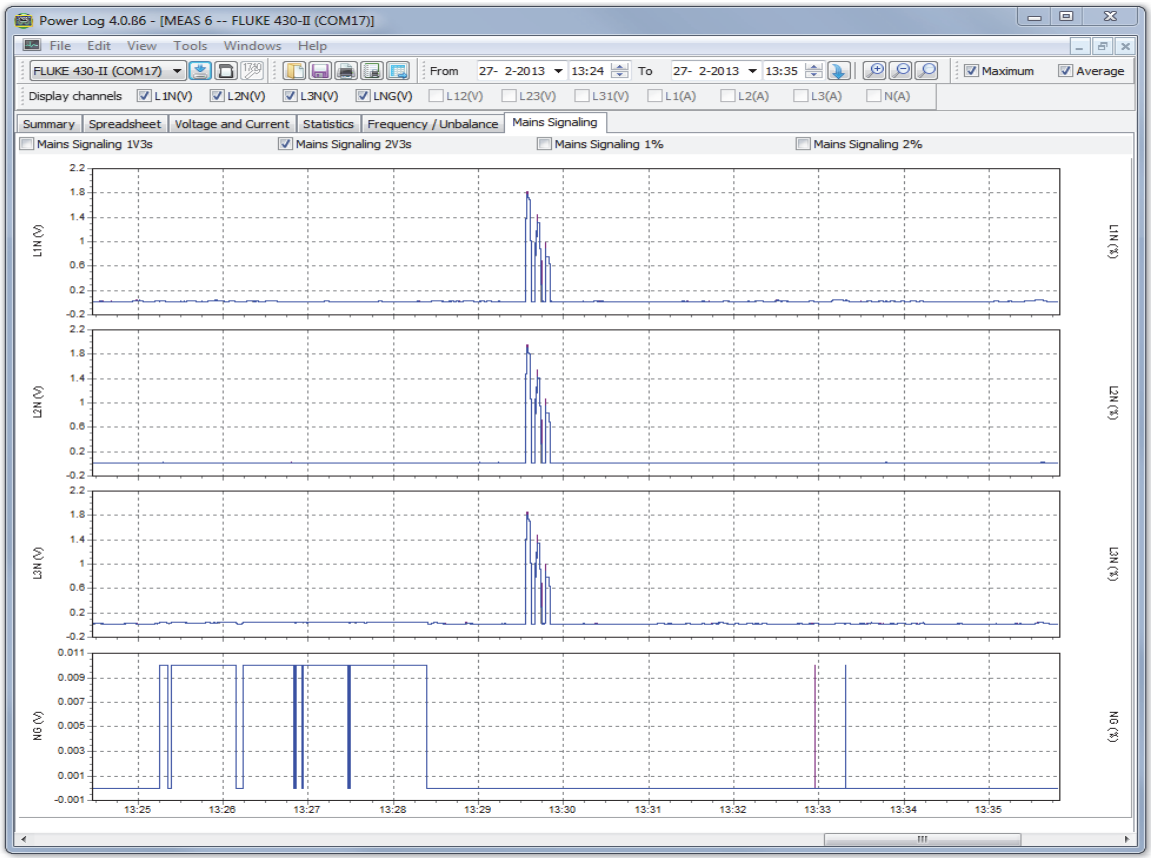


eto030.bmp

Figure 17. Power Harmonics Displayed

Mains Signaling Tab

Mains signaling, available with the 43x instruments, displays control signals on the power line for remotely controlling appliances. See Figure 18.



eto031.bmp

Figure 18. Mains Signaling Waveforms

Energy Loss Tab

The Energy Loss tab shows the Energy Loss measurements of the 430-II.

Power Wave Tab

The Power Wave tab shows a maximum of 5 minutes of waveform data of the Power Wave function of the 430-II. For detailed analysis, the waveform can be scrolled left or right with the scroll bar.

Printing Reports and Exporting Data

In addition to viewing recorded and saved data, users have the option of printing reports for review, and exporting data for use in other software programs.

Printing Reports

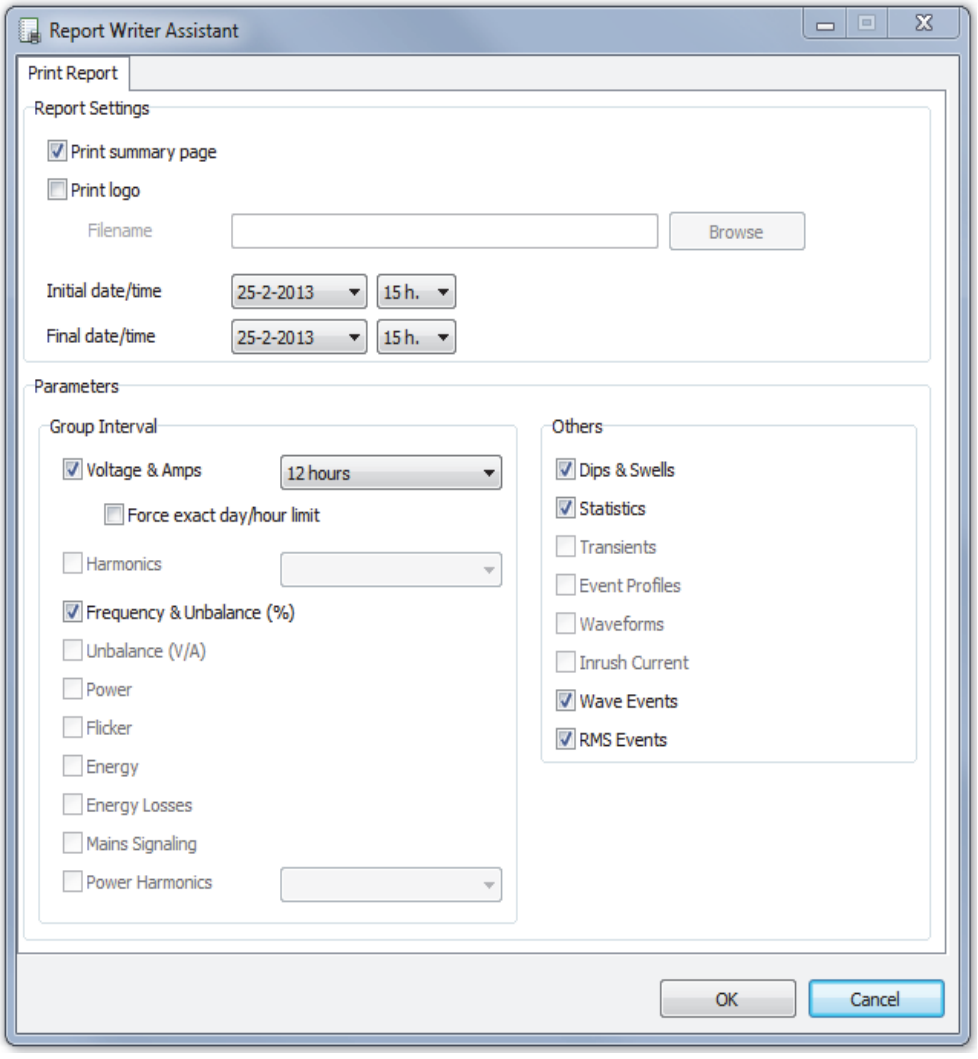
To print a report of saved data:

1. Select **File | Print Report**

   The Report Writer Assistant window opens. See Figure 19.

Note

When using Monitor mode on the 430-II, there is an additional tab for printing an EN50160 report based on the Monitor measurements.



eto032.bmp

Figure 19. Report Writer Assistant Selection Options

2. Use the selection box in the upper left of the dialog box to select **Initial Date/Time**.
3. Use the selection box in the upper right of the dialog box to select **Final Date/Time**.
4. **Print Summary Page** adds the information entered on the summary page to the report.
5. **Print Logo** allows you to add a custom logo to reports. Use **Browse Logo** to select your logo file.

Note

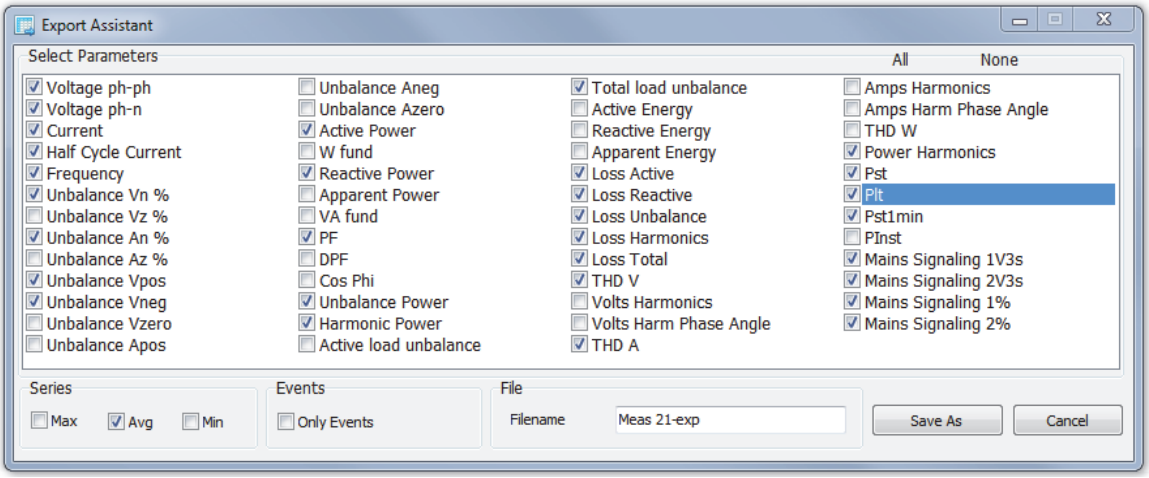
Data can also be selected by zooming in time plot displays prior to selecting print report.

6. Deselect any of the selected options in the **Print Graphs for** section to further limit the printed data.
7. Limit the time interval using the **Group Interval** selection box, with **1 Week** as the default.
8. Click **O.K.**

   The file is sent to the selected printer. The **Print** dialog box allows printer configuration (copies, landscape or portrait layout, and other Properties).

Exporting Data

Set up data for export from the Spreadsheet window. For interval data, select the measurement rows to be exported, as well as the month, date, and year intervals. If items are disabled, no related measurement data exists. Events cannot be exported with other data. If events are selected, all other data will be unchecked. See Figure 20.



eto033.bmp

Figure 20. Export Dialog Screen

To export data files:

1. Open a measurement data file, **File | Export**.

   Note any of the fields using the checkboxes at the bottom of this dialog box can be deselected, in addition to creating a file name for the exported data. The **Save as type** field remains empty, with no selections available.

   The default format works for data processed with Microsoft Excel.

2. Click **Save** to export data.
3. Open the exported data from within the preferred spreadsheet or database management software.

Note

Microsoft Excel limits the amount of data that can be opened in a spreadsheet. Avoid errors in data exporting by limiting the date intervals if there are large amounts of data to manage.