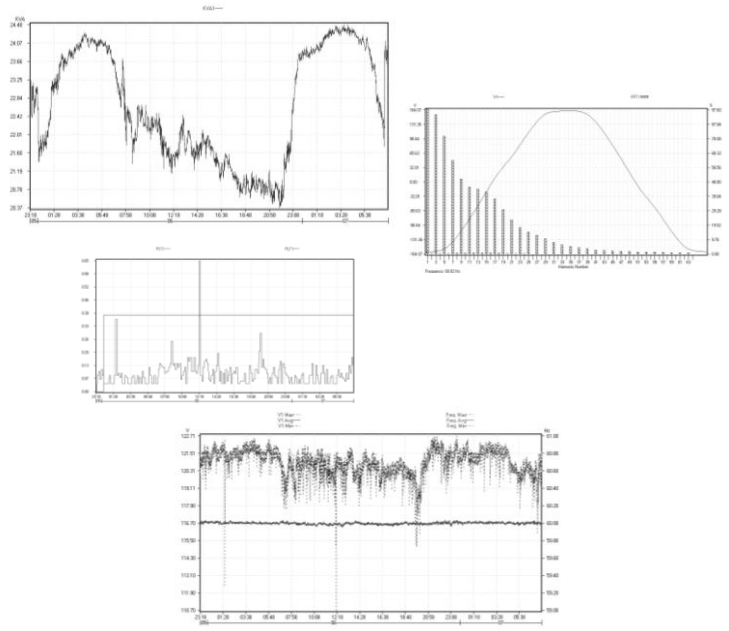
PowerView for the *PowerPro*

Data Analysis Software

User's Guide



PowerView User's Guide

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Table of contents

Introduction 1
- Software Installation 1

Quick Start 1
- Opening a DataCard File 1
- Accessing data directly from a Memory Card 5
- Shortcut for graph selection 6
- Shortcut for Y-axis parameter 7

Speed Bar Icons 8

Main Menu 11
- File 11
  - Open 11
  - Close 11
  - Save As 11
  - Export Data 11
  - Print 11
  - Print Setup 11
  - Export Data 12
- Logger 13
  - Set Time 13
  - Update Firmware 13
  - Update Options 15
- Setup 16
  - PT/ CT Ratios 16
  - Demand 17
    - Integration 17
      - Fixed 17
      - Sliding 17
      - Time Frame Selection 17
    - Tariff Times 17
    - Currency 17
    - Energy Costing 17
  - Graphing 19
    - Y-Axis 19
    - X-Axis 20
    - Channels 21
      - Scaling 21
      - Reference/Limit 22
    - Grid 23
    - General 23
    - Harmonic Trend 24
  - ComPort 24
  - Fonts 25
- Graph 26
  - Copy To Clipboard 26

Reports 26
Generator 26
Report Type 27
- Trend 27
- Daily Costing 27
- Hourly Costing 27
- Energy 27
- Pk Demand 27
- Min Demand 27
- Events 27
- Limits 27

Report Length 27
Title and Notes 27
View Reports 28
Tables 28
Event Table 30
Current Inrush Table 31
Notes 32

Introduction

PowerView is an analysis software, It a simple, yet powerful set of tools for interpreting recorded surveys.

While data statistics such as RMS, THD, Waveforms, Power, and Flicker can be viewed in real time from the logger's display, ***PowerView*** can enhance those statistics by presenting data in detailed graphical forms. It can also generate a complete report of events captured, as well as hourly, daily, weekly and monthly survey summaries. Graphs can be printed out or copied to a word processor. It can also export data to Microsoft EXCEL for presentation in a report or custom post processing.

System Requirements:

- Pentium Processor, Windows 98/NT/2000/XP
- 32MB RAM, 20MB Hard Disk Space
- VGA Display, 16 bit High Color 800 x 600 pixels screen area
- Mouse, Keyboard
- PCMCIA Slot (*Optional*)
- Card Reader (*Optional*)

This manual describes ***PowerView*** features that are used with data collected by the ***PowePro*** power quality analyser.

Introduction

Software Installation

Running the program pvinstall.exe will create the subfolder “Candura” in the Windows folder “Program Files”. The PowerView executable file will be put in the Candura subfolder.

Quick Start

Opening a DataCard File

PowerPro records data to memory card as a DataCard file (*.TST), which is not viewable until the software processes it into a ***PowerPro*** processed file (*.PPF). Once the file is processed, it provides the convenience of faster load up time when re-opening a survey, and recalls all the software-level setups that were previously used on that file.

Usually, a DataCard file will be read directly from a memory card, but, for demonstration purposes, the installation of ***PowerView*** places a sample DataCard file in the Surveys directory. To open this sample file for viewing, perform the following:

- Go to ‘File’ in the menu bar and select ‘Open’.

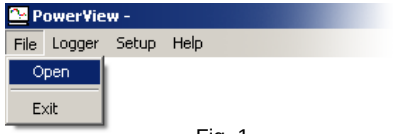


Fig. 1

- Open DEMO.TST under the directory C:\Program Files\ Candura\Survey

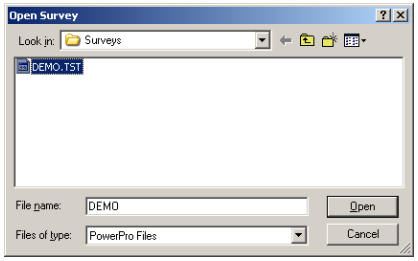


Fig.2

Quick Start

- The following Dialog Box (Fig. 3) will appear with default Title and Notes. They are not required but will be displayed in the Reports generated by ***PowerView***. Enter any desired title and comments and notes then select ‘OK’.

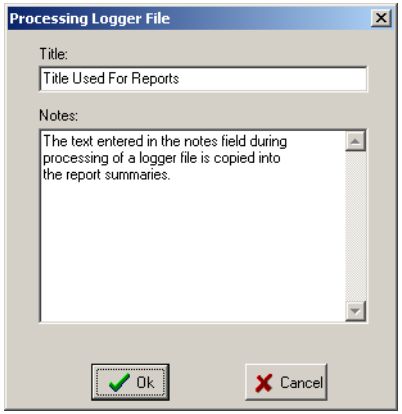


Fig. 3

- A ‘Save As’ dialog box will appear which prompts user to enter a file name for saving the processed file (*.PPF). The default file name is always the same as the DataCard file name. Click ‘Save’ to begin processing.

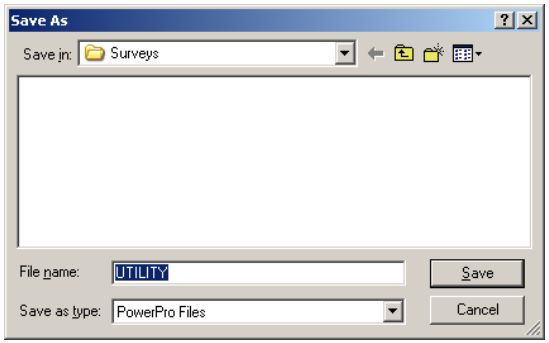


Fig. 4

Continued....

Quick Start (Open an existing file from a drive)

A status bar will appear to indicate % of completion as the file is being processed.

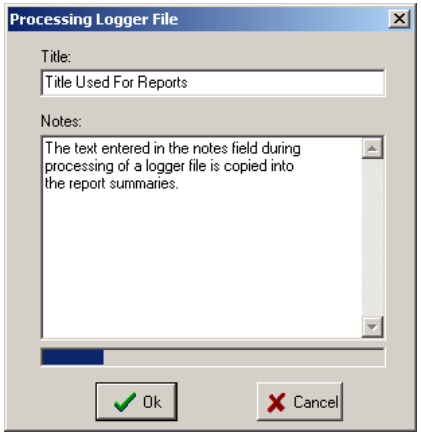


Fig. 5

Note: The PowerPro logger actually saves two different types of DataCard files (*.TST and *.TSU) to the memory card. However, *.TSU is only used when there are events captured in the survey. The software will automatically load up the necessary *.TSU file when a *.TST DataCard file is opened.

The two files share the same file name and must be kept together in the same directory if they are to be transferred from the memory card to the hard drive or other storage medium for future use.

Quick Start

Accessing data directly from a Memory Card

To open a file from a memory card, the computer must have a PCMCIA slot or an external card reader.

Fig. 6

Follow the same procedures as described in previous pages to open the DataCard file from the PCMCIA or card reader drive.

Note: To avoid data corruption, remember to stop recording before removing the card from the logger.

Quick Start

Shortcut for graph selection

There are six types of graphs that ***PowerView*** can plot. They are: Trend; Waveforms/Harmonics; Phasor Diagram; Current Inrush RMS snapshots; Inrush Waveforms; and Event Waveforms. Each graph type can be set with different left and right axis parameters. For convenient access to different graphs, select a predefined graph from the 'Graph' selection menu as shown in Fig.7, or use the speed bar icons along the top side of navigation menus. See section 'Speed Bar Icon' on pg.8 for description of each type of graph.

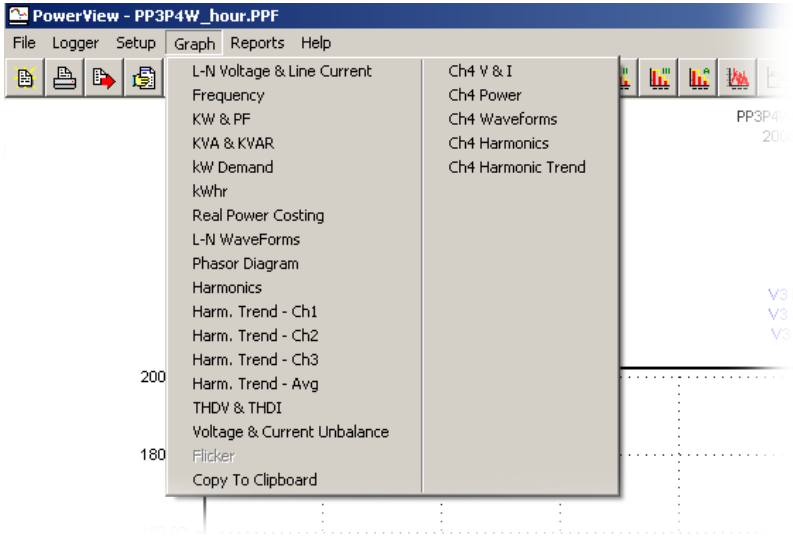


Fig. 7

Quick Start

Shortcut for Y-axis parameter

A graph in each graph type can be plotted with any combinations of up to two Y-axis parameters. Once a graph is plotted, the parameter of left or right y-axis can be quickly selected by opening a pop-up menu with the left or right mouse button respectively. For more detail setup control, refer to section 'Setup - Graphing' on pg.19

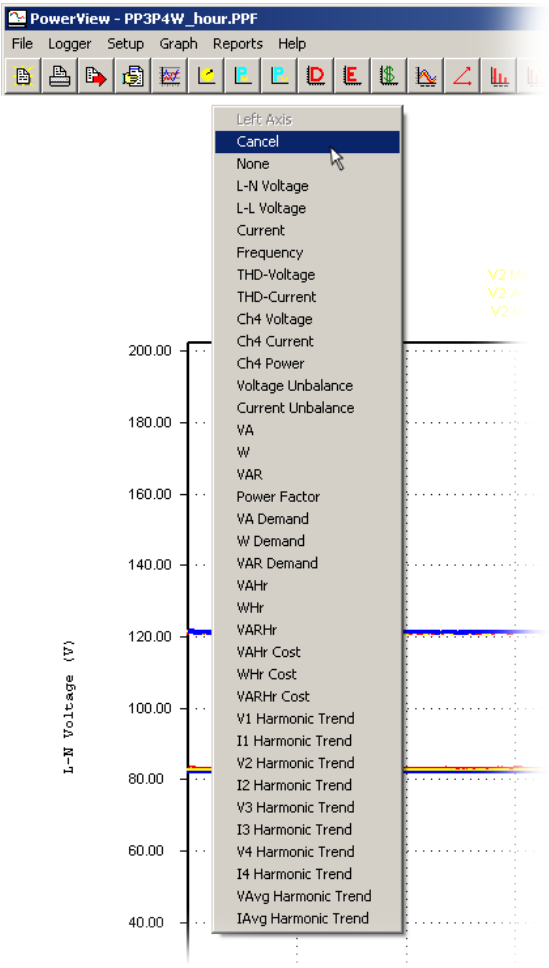
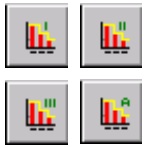


Fig. 8

Speed Bar Icons

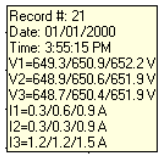
	File Open brings up the Open Survey Dialog Box. Used for opening a file for viewing.
	Print Graph brings up the Print dialog box. Print a graph via the printer.
	Export Data brings up the Export dialog box. Used for exporting data into an Excel file.
	Reports launch the report generator
	RMS Voltage and Current Graph displays the RMS Voltage plotted on the left axis with the RMS current plotted on the right axis.
	Frequency Graph displays the frequency plotted on the left axis.
	KW and PF Graph displays the real power plotted on the left axis with the power factor plotted on the right axis.
	KVA and KVAR Graph displays the apparent power plotted on the left axis with the reactive power plotted on the right axis.
	W Demand and VA Demand Graph displays the Real Demand plotted on the left axis with the Apparent Power Demand plotted on the right axis.
	KWh & KVARh Graph displays the Real Energy plotted on the left axis with the Apparent Energy plotted on the right axis.
	Real and Reactive Power Costing Graph displays the Real Energy Cost plotted on the left axis with the Apparent Energy Cost plotted on the right axis. The costing and tariff rates can be setup from the Demand setup dialog box.

Speed Bar Icons Continued

	WaveForm Voltage and Current Graph displays the voltage waveforms plotted on the left axis and the current waveforms plotted on the right axis. Note that the FFT Magnitude Graph and Phasor Diagram are derived from these waveforms.
	Phasor Diagram displays the vector relationship between voltage and current.
	FFT Magnitude Graph displays the voltage harmonics plotted on the left axis with the current harmonics plotted on the right axis. Note that the harmonics are plotted as a percentage of the fundamental and all results are based on the waveforms recorded during the survey. Harmonics can be plotted as a % of fundamental, % of RMS or magnitude. The data box will indicate the direction of harmonic current flow.
	**Harmonic Tread - Phase 1, 2, 3 and Average** displays the harmonic trends of phase 1, 2, 3, and their average. Harmonics can be plotted as a % of fundamental, % of RMS or magnitude. The data box will indicate the direction of harmonic current flow.
	THD Graph displays the voltage THD plotted on the left axis with the current THD plotted on the right axis.
	Voltage and Current Unbalance Graph displays three phase unbalance determined by the negative sequence component divided by the positive sequence component.
	Flicker Graph (Option) displays the short term and long term perception plotted on the left axis. This item may appear disabled if the survey did not include flicker.
	Channel 4 Voltage and Current Graph displays DC and AC values for voltage and current

Continued….

Speed Bar Icons

	Event Table displays a list of events that were recorded in the survey. This may appear disabled if the survey did not trigger on any events.
	Inrush Table displays a list of Current Inrush events that were recorded in the survey. This may appear disabled if the survey did not capture any Current Inrush occurrences.
	Set Up Graph displays the Graph Setup dialog box.
	Zoom In will enable zooming. The cursor will turn into a magnifying glass indicating that zoom is enabled.
	Zoom Out will disable zooming and zoom out of the graph.
	Data Box displays information on a specific record as the cursor move across the graph. Information will be displayed according to the type of graph and channels that are activated. Use left or right arrow key on the keyboard to move data box record by record.  Record #: 21 Date: 01/01/2000 Time: 3:55:15 PM V1=649.3/650.9/652.2 V V2=648.9/650.6/651.9 V V3=648.7/650.4/651.9 V I1=0.3/0.6/0.9 A I2=0.3/0.3/0.9 A I3=1.2/1.2/1.5 A Multiple data boxes can be pasted on to the graph by clicking the left mouse button.
	Arrow disables the zoom and data box.

Note: Pressing 'Esc' on the keyboard will restore the displayed graph to its original unzoomed configuration with data boxes removed and the 'Arrow' tool selected.

Main Menu

File

Once a File is opened, the File Menu selections appear as follows:

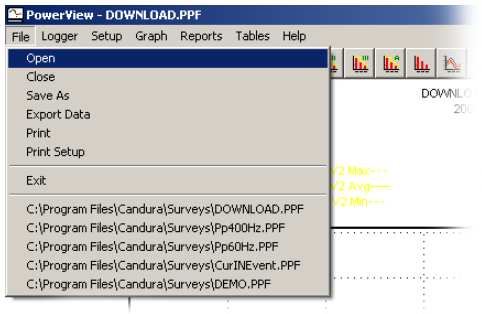


Fig. 9

Open

Open a pre-processed file or a DataCard file.

Close

Close an opened file.

Save As

Save the opened file, which also includes all the configurations that were made, such as PT/CT ratio, manual min/max axis limits, tariff rate, general color and line width for the graphs, etc.

Export Data

Export data to a comma delimited ASCII file (.CSV) which can be imported into an EXCEL spreadsheet for formatting and editing.

Print

Print the current graph on display.

Print Setup

Setup printer source and configurations.

Main Menu (File - Export Data)

Export Data

Select the type of data and parameter to export. The length of data is automatically set to the time scale of the graph on display, it can be changed to other starting and ending record numbers if desired.

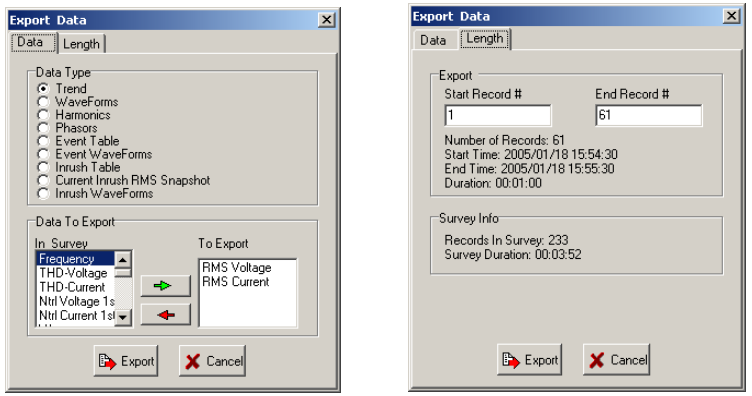


Fig. 10

	Adds data to export box.
	Removes data from export box.
	Starts the export process. This will bring up a save dialog box that will permit the user to specify the export filename. Specifying a filename and selecting 'OK' will generate a comma delimited ASCII file (*.CSV) for importing into EXCEL spreadsheet.
	Exits the dialog box.

Main Menu

Logger

The Logger menu selection appears as follows:

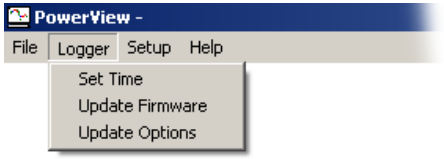


Fig. 11

These commands require that the logger be connected to a serial port on the computer via an RS-232 cable. See section 'Setup - ComPort' on pg.24 for details on ComPort configurations.

Set Time

This command will set the time on the logger to the computer time. Note that the logger cannot be recording.

Continued….

Main Menu (Logger - Update firmware)

After opening the new firmware file, press F3, F4, F5, and F6 on the ***PowerPro*** simultaneously to begin update process.

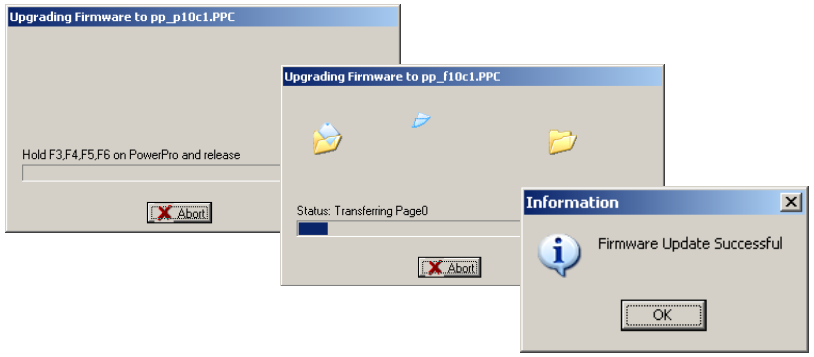


Fig. 13

Verify the new firmware version on the ***PowerPro*** by pressing the 'Display' button on the logger and select 'Logger Stats'.

If there's a communication error between the logger and computer, a warning message will pop up.

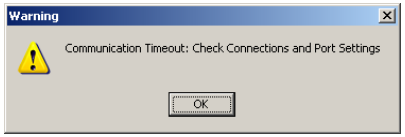


Fig. 14

Caution: If a logger fails during firmware upgrade, or if the process is aborted, the logger will no longer operate correctly and should be placed on charge, using the external AC/DC adapter, until the firmware is successfully upgraded.

Main Menu (Logger - Update Options)

Update Options

The ***PowerPro*** logger can be purchased as a base unit and have additional options add to it in the field. Options are available as follows:

- Flicker
- 400 Hz

A custom 'Users Key' will be supplied according to the options purchased.

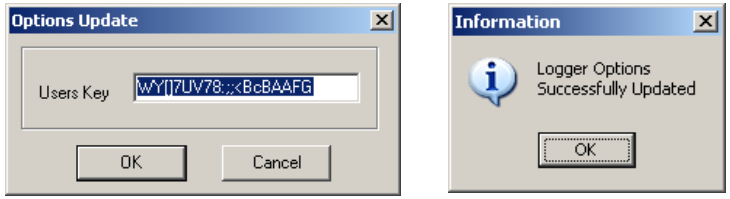


Fig. 15

Main Menu

Setup

The Setup menu selection appears as follows:

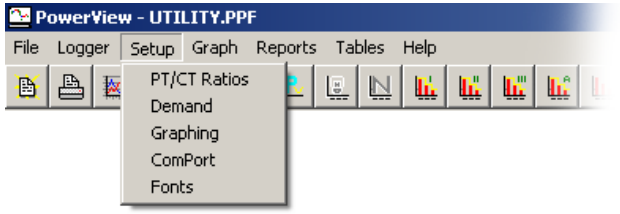


Fig. 16

PT/ CT Ratios

When the logger is setup for recording, external PT and CT ratios can be entered. This ratio determines the scaling of data. The logger has a limitation to the amount of scaling that can be done internally, but data can be rescaled in software by entering a second set of PT and CT ratios.

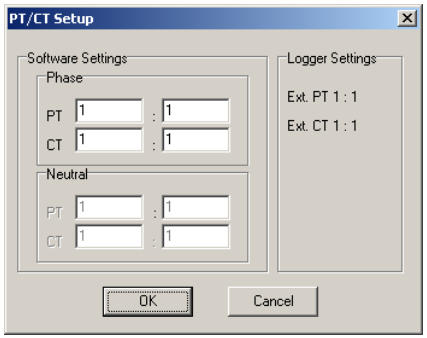


Fig. 17

Changes made to PT and CT ratios are saved when exiting the file.

Main Menu (Setup)

Demand

The demand setup dialog box permits user to setup tariff times, costing and integration methods for the demand and costing graphs. This information is also used when generating peak demand, minimum demand and costing reports.

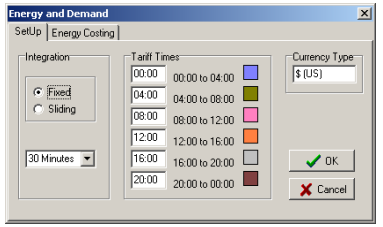


Fig. 18

Integration

- **Fixed** - Determines the trend by calculating the average demand using a fixed window.
- **Sliding** - Determines the trend by calculating the average demand using a sliding window.
- **Time Frame Selection** - Set up time interval of integration

Tariff Times

PowerView allows up to 6 different tariff times within a 24 hour day. Each tariff time can be identified by a user-defined color.

Currency

Input the type of currency in use.

Energy Costing

Enter the cost for each tariff time.

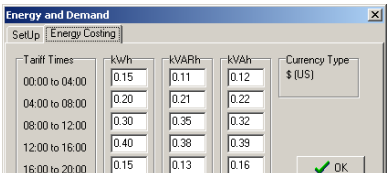


Fig. 19

Main Menu (Setup - Demand)

Demand, Energy and Costing graphs are plotted in bar chart form (Fig. 20) when only one channel is enabled. If more than one channel is enabled the graph is plotted in line form (Fig. 21).

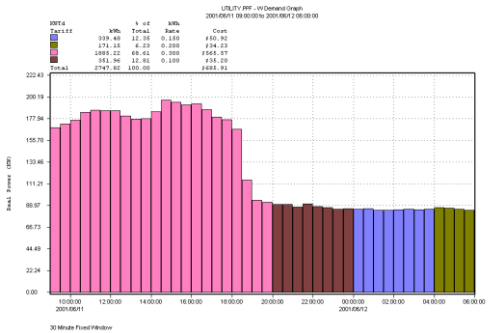


Fig. 20

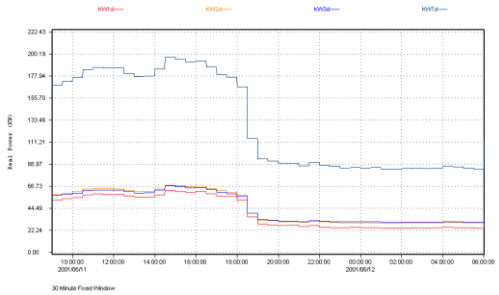


Fig. 21

Note: Tariff time and costs settings are not saved to the individual *.PPF file like other software-level settings. Instead, it is saved to the software memory and used for all files. This is because most users only use one set of tariff time and costs based on the pricing and regulations of their local electric utilities.

Main Menu (Setup - Graphing)

Graphing

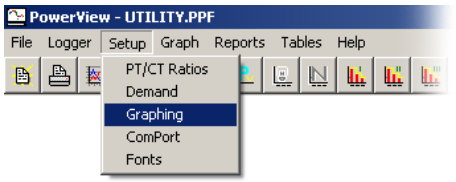


Fig. 22

Graphing setup controls graph types, axis parameters, channel selections and general graphic configurations. Most of the graph customizations are controlled from here. Note that some of the commonly used functions can also be accessed by the speed bar icons and the left/right click pop-up menu. See pg.8 - pg.10 for those shortcut functions. Changes that are made in Graphing Setup will be saved when exiting the file.

Y-Axis

Select the type of graph and Y-axis parameter. Note that some of the graph types in Fig. 23 may not be available. For example: 'Event WaveForms' will not appear if there is no event triggered during the survey; 'Current Inrush RMS Snapshot' and 'Inrush Waveforms' will not appear if there is no inrush recorded during the survey.

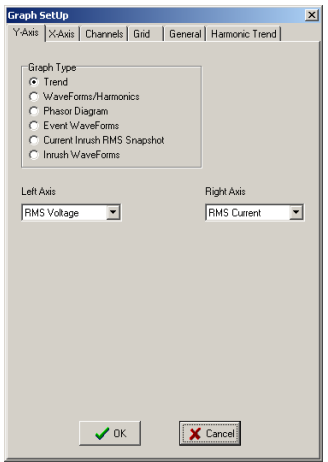


Fig. 23

Select left/right Y-axis parameter from the pull-down menu.

Main Menu (Setup - Graphing)

X-Axis

Control the starting and ending time on X-Axis of any trend graph. Type in date (YYYY/MM/DD) and time (HH:MM:SS), then press the 'Apply' button for any changes to take effect. The 'Apply' button must be clicked to ensure that the time entered is in multiples of the survey's RMS sample rate, if not, ***PowerView*** will automatically round it up/down to scale. 'Reset' will change date and time back to the full survey settings.

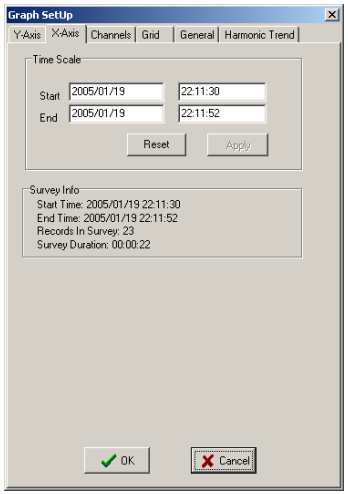


Fig. 24

Main Menu (Setup - Graphing)

Channels

Select channels and traces to be displayed on the graph. Available selections are different according to graph type. Each can be identified by a user-defined color.

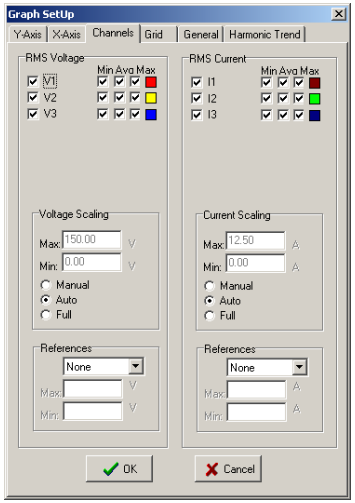


Fig. 25

Scaling

The scaling box enables user to select the scaling that is to be used on the Y-axis. There are three types of scaling for the Y-Axis:

- Auto Scale - Sets up Y-Axis scaling with 10% increment of highest and lowest values obtained from the survey.

- Full Scale **-** Sets up Y-Axis scaling based on the maximum possible value.

- Manual Scale - User-defined scale values.

Main Menu (Setup - graphing - channels)

Reference/Limit

Specifies a set of lines or a region to highlight a section of the graph that is of special interest. Use the pull-down menu to select the type, and set its min/max value. Below is a graph with Limits+ Region set at 235V minimum and 246V maximum.

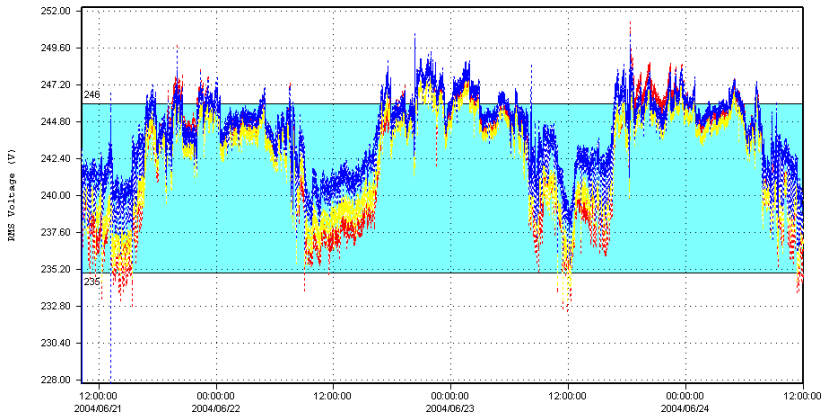


Fig. 26

Below is a sample of the Limit Report based on the same graph:

Voltage Summary

```
21.27% of the average V1 readings were above the maximum voltage limit.
0.07% of the average V1 readings were below the minimum voltage limit.
78.66% of the average V1 readings were within the limits.
8.24% of the average V2 readings were above the maximum voltage limit.
0.05% of the average V2 readings were below the minimum voltage limit.
91.71% of the average V2 readings were within the limits.
22.97% of the average V3 readings were above the maximum voltage limit.
0.07% of the average V3 readings were below the minimum voltage limit.
76.96% of the average V3 readings were within the limits.
```


Main Menu (Setup)

Grid

Turn on/off the horizontal or vertical grid on the graphs.

Fig. 27

General

Set up user-defined color and line values for various objects on the graph.

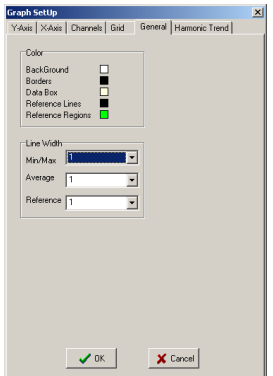


Fig. 28

Main Menu (Setup - Graphing)

Harmonic Trend

User can select maximum of 5 harmonics to be displayed in the Harmonic Trending graphs.

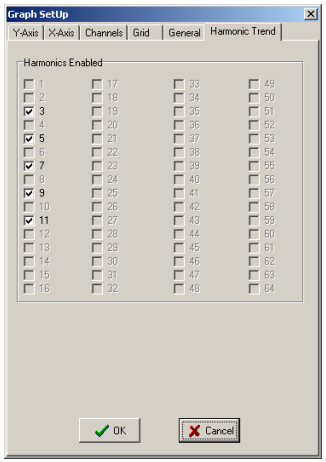


Fig. 29

ComPort

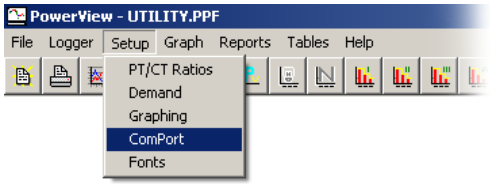


Fig. 30

Set up ComPort number and Baud Rate for the RS-232 serial port. Baud Rate should be set to 38400 for maximum speed.

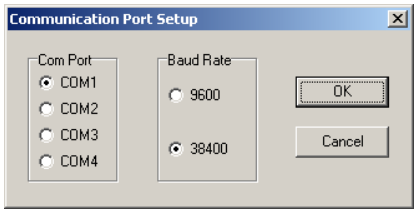


Fig. 31

Main Menu

Fonts

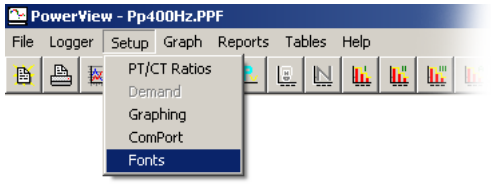


Fig. 32

Change font type to be use on the graph. Press ‘Apply’ button for changes to take effect.

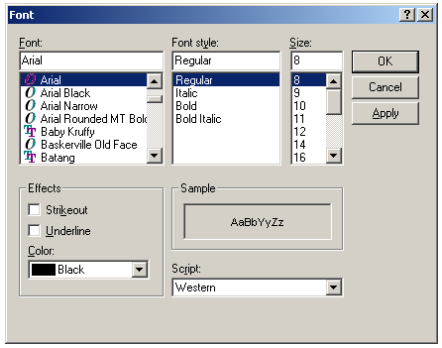


Fig. 33

Main Menu

Graph

This was discussed in previous section 'Quick Start - Shortcut for graph selection' on pg.6. For further description of each graph type, refer to section 'Speed Bar Icons' on pg.8

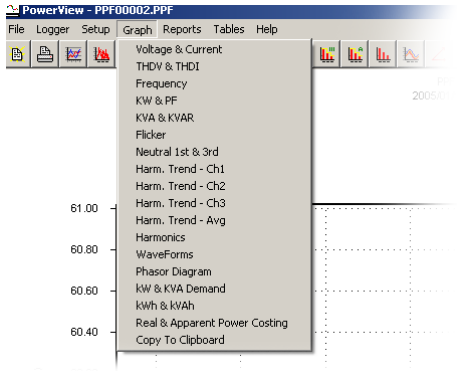


Fig. 34

Copy To Clipboard - use this to copy and paste a graph to other software.

Reports

Fig. 35

Generator

Select the type of report and a segment of the survey to analyze.

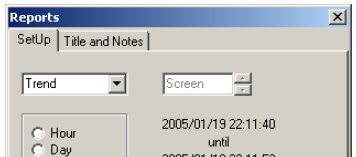


Fig. 36

Main Menu (Reports - Generator)

Report Type

- **Trend** - reports min/max/averages of the trends and the time they occurred.
- **Daily Costing** - reports the cost of energy used on daily basis through out entire survey.
- **Hourly Costing** - reports the cost of energy used on hourly basis through out entire survey.
- **Energy** - reports energy used during the selected time length.
- **Pk Demand** - reports peak demand of energy during the selected time length.
- **Min Demand** - reports minimum demand of energy during the selected time length.
- **Events** - reports events triggered during the selected time length.
- **Limits** - reports the limit/reference values setup for each trend, and the percentage of time when readings are within, above, and below the set boundary.

Report Length

Hour	Specifies any hourly period for report viewing.
Day	Specifies any daily period for report viewing.
Week	Specifies any weekly period for report viewing.
Month	Specifies any monthly period for report viewing.
Survey	Report based on entire survey.

Screen Report based on time length set for the graph currently on display.

Main Menu (Reports)

Title and Notes

Enter a title and any notes to the report. Changes are temporary and will not be saved in the file.

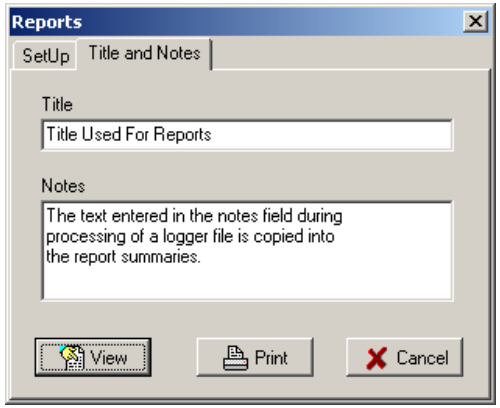


Fig. 37

View Reports

Press 'View' to preview the report.

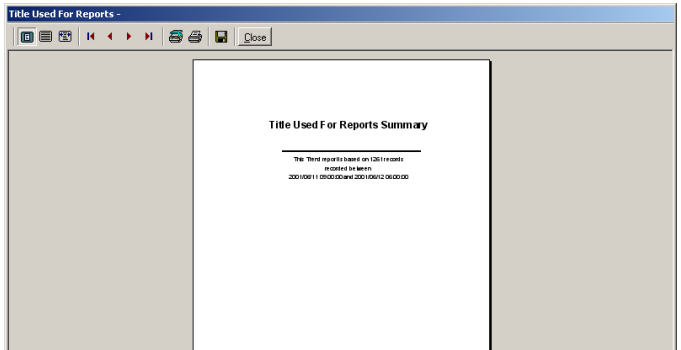


Fig. 38

Main Menu (Reports - View Reports)

While previewing a report, user can print the document or save it as a rich text file for importing into Microsoft WORD. A navigation bar at the top controls the preview window.

	'Zoom to fit', 'Zoom to 100%' and 'Zoom to width'.
	'First Page', 'Previous', 'Next', and 'Last Page'.
	'Printer Setup' and 'Print'
	'Save' document as rich text file (*.RTF) which can be opened in Microsoft Word.
	Close preview window.

Main Menu

Tables

The menu selections may appear disabled if there were no events triggered or current inrush captured.

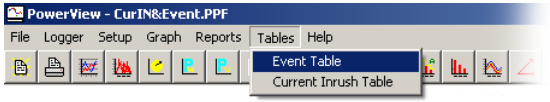


Fig. 39

Event Table

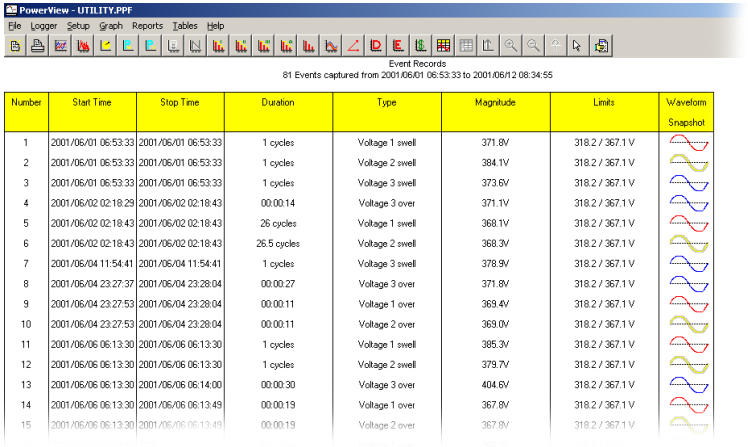


Fig. 40

Event table provides a list of events that were triggered by limits (Trigger Level) configured on the ***PowerPro***. Each sine-wave icon in the 'Waveform Snapshot' column is a quick link to the waveform graph of that particular event. The icon's color: Red, Yellow and blue represents events on Phase 1, 2 and 3 respectively.

Main Menu (Tables)

Current Inrush Table

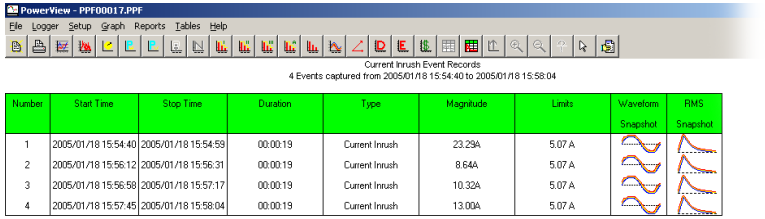


Fig. 41

Current inrush table is similar to event table. In addition to 'Waveform snapshot', it also has quick links to 'RMS snapshot', which links to the RMS graph of each inrush capture with one cycle resolution for voltage and current.

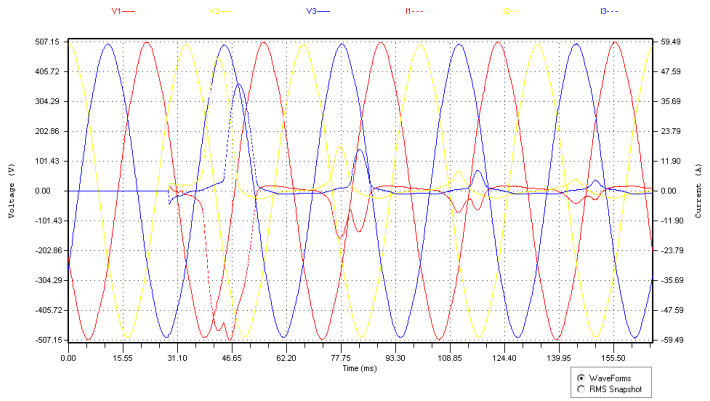


Fig. 42

In the waveform or RMS graph mode, the option box at the bottom right hand corner is used to switch between graphs of the same inrush capture. Use the horizontal scroll bar at the bottom to navigate through the rest of the captures in sequence, or go back to the table to view other captures of interest.

The entire table may be printed using the ‘Print’ speed bar icon or the drop down menu selection: File -> Print

Notes

Notes