ACR SYSTEMS
PROVEN DATA LOGGING SOLUTIONS

PowerWatch® VDR & EventReader™ Software Reference Guide

ACR EventReader
Data Recorder Software

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ACR PowerWatch Voltage Disturbance Recorder

Features of the Voltage Disturbance Recorder

The ACR PowerWatch VDR records sags, swells, transients, outages and frequency variations on the power line. It is self powered and easy to use - parameters can be set via your PC equipped with EventReader Software.

The VDR can retain 4,000 events. The existence of recorded events is indicated by the recorder's flashing light.

Communication between a PC and the VDR is carried via the Optical Interface Cable. By using this optical data transfer, the PC remains electrically isolated.

ACR EventReader Data Recorder Software

EventReader Software Features

EventReader is a powerful and easy-to-use power quality analysis software application. It has been developed exclusively for the ACR PowerWatch Voltage Disturbance Recorder. With no programming hassles or complex menus, setup and downloading occurs in seconds.

Key Features:

- Quick and simple downloads
- Detailed site reports
- User-selectable threshold values
- Hot-to-neutral and neutral-to-ground readings
- Quick summary option
- Powerful and easy to use

PowerWatch® VDR & EventReader™
Software Reference Guide

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1 ACR Systems Inc.

1.1 Welcome
1.2 About ACR Systems Inc.
1.3 Contact Information
1.4 Mailing Address

1.1 Welcome

Congratulations on your purchase of a PowerWatch® data logger. We are confident that you will find it to be a most valuable and useful tool for your data collection applications.

This Reference Guide is designed to be used hand-in-hand with the EventReader™ Software and frequently refers to EventReader conventions and procedures. To get the most from your recorder, please take time to familiarize yourself with the EventReader software and this Reference Guide.

For important information on how all PowerWatch Voltage Disturbance Recorders work and how to use them, read the PowerWatch VDR chapter. It will give you an overview of how the loggers work and how to configure them for your application.

1.2 About ACR Systems Inc.

ACR Systems offers a complete line of compact Data Loggers to measure and record temperature, relative humidity, electric current, pressure, process signals, pulse frequency, power quality and more. ACR Data Loggers have flown with airline pilots, raced with Indy drivers, driven with truckers and have even been into outer space. ACR Loggers sit on top, under and in buildings; they operate in tropical and sub-zero temperatures, in and out of water and in just about any place imaginable.

ACR Systems continues to be customer-driven, using its research and development expertise to accept challenges others prefer to avoid. As a result, ACR remains on the leading edge of technological advancements with simple, cost efficient and state-of-the-art, Technology-based products. Each ACR product will further the tradition of maximizing safety, increasing efficiency and solving problems overdue for solution. ACR products continue to be refined and improved to provide customers of every size and need with innovative ways to do the job better, faster and more efficiently.

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1.3 Contact Information

ACR Systems Inc.

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1.4 Mailing Address

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Surrey, BC V3W 1K7
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Our customer support representatives are available during normal business hours, 6:30am - 4:30pm Pacific Standard Time.

Visit the ACR Web Page by clicking here or using the links found in the ACR Data Logger Software folder on the Start Menu.

From our website, it's easy to learn about our products, find out what's new, order a catalog, or even see when our trade shows will bring us to your area.

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2 PowerWatch Voltage Disturbance Recorder (VDR)

2.1 PowerWatch® VDR Features
2.2 Use and Care Information
2.2.1 Safety Precautions
2.2.2 Plugging in a PowerWatch VDR
2.2.3 Electrical Immunity
2.2.4 Safety Inspection
2.2.5 Battery Care
2.2.6 Maintenance
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2.2.9.1 Surge, Sag & Outage Measurement
2.2.9.2 Impulse Measurement
2.2.9.3 Time Measurement
2.3 Hardware Warranty
2.4 Software Disclaimer
2.5 EventReader Software License Agreement

2.1 PowerWatch VDR Features

The PowerWatch Voltage® Disturbance Recorder (VDR) is an easy-to use, low-cost power quality analysis tool that troubleshoots power line disturbances such as surges, sags, impulses, outages and frequency variations.

It is self-powered and easy to use - parameters can be set easily via your PC. The VDR can retain 4,000 events. The existence of recorded events can be indicated by the VDR's flashing light. Communication between a PC and the VDR is carried via the Lite-Link interface cable. By using this optical data transfer, the PC remains electrically isolated.

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2.2 Use and Care Information

2.2.1 Safety Precautions
2.2.2 Plugging in a PowerWatch VDR
2.2.3 Electrical Immunity
2.2.4 Safety Inspection
2.2.5 Battery Care
2.2.6 Maintenance
2.2.7 Product Service

2.2.1 Safety Precautions

Warning! The VDR is designed and certified to work only on single-phase systems. Attempting to modify the VDR or operating it improperly may cause circuit damage which can ultimately result in property damage, personal injury, or death.

2.2.2 Plugging in a PowerWatch VDR

The VDR does not use a protective earth connection since there are no exposed metal parts. The earth conductor is used to measure neutral to ground (N-G) events. The ground prong may be electrically unconnected (as long as it is not exposed). The VDR does not normally need any special ventilation, however, its ambient temperature should not be allowed to rise above the operating limit [see 2.2.9].

2.2.3 Electrical Immunity

The VDR's internal circuitry is solid-state with built-in EMI and RFI protection to ensure reliable readings.

2.2.4 Safety Inspection

We recommend that you inspect the VDR periodically for visible damage. To ensure that it operates safely, inspect for missing labels, cracks in the case, or bent blades and/or broken leads.

2.2.5 Battery Care

The VDR contains a lithium battery that will, under normal circumstances, allow the VDR to operate for 10 years. Exposing the VDR to extreme temperatures for extended periods of time may reduce battery life by as much as 50%. The VDR is designed for INDOOR USE. It should not be exposed to direct sunlight.

To extend battery life, keep the VDR plugged into a standard convenience outlet even when not in use.

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WARNING: BATTERY POSES FIRE, EXPLOSION AND SEVERE BURN HAZARD. DO NOT RECHARGE, DISASSEMBLE, HEAT ABOVE 100°C (212°F), INCINERATE, OR EXPOSE CONTENTS TO WATER

2.2.6 Maintenance

The PowerWatch® VDR is a maintenance-free product. However, it is recommended that it be kept clean to allow for easy visual inspections. To clean the VDR, unplug it from the outlet and wipe it with a dry, clean cloth.

2.2.7 Product Service

The PowerWatch® VDR has no user-serviceable parts inside. The fuse inside the VDR is NOT OPERATOR REPLACEABLE. Opening the case, or attempting to do so, will void the warranty and safety certification. The lite-link cable is the only replaceable part. If you require service, please contact your local dealer or factory representative.

2.2.8 Approvals

2.2.8.1 Safety
2.2.8.2 Environmental
2.2.8.3 EMC

2.2.8.1 Safety

This device is safety approved in North America by CSA and CSA (NRTL/C) for measurements on 150V CAT III, Pollution Degree 2, double insulation, per:

· CSA C22.2 No. 61010-1-04
· UL STD No. 61010-1 (2nd Edition)

International models evaluated by CSA under CB Test Certificate are suitable for measurement on 300V CAT III.

2.2.8.2 Environmental

· MIL-T-28800E, Type III, Class 3

2.2.8.3 EMC

· FCC rules part 15.
· 89/336/EEC
· Emission: EN50081.1
· Immunity: EN50082.2
· (IEC1000-4-2, -3, -4, -5)

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2.2.9 VDR Specifications

Model Number:	**PWV-001**
Nominal Supply:	100/110V
Operating Range:	70 to 140V
Frequency:	50/60Hz
Power:	2W

Model Number:	**PWV-002**
Nominal Supply:	220/240V
Operating Range:	140 to 270V
Frequency:	50/60Hz
Power:	3W

Model Number:	**PWV-001 & PWV-002**
Memory Size:	32KB, 4000 events
Storage Method:	First-In First-Out, or Stop-When-Full
Sampling Method:	Continuous (half cycle integrated)
Alarm Type:	Optical; red LED
Size:	85mm x 68mm x 35mm (3.35 in x 2.65 in x 1.35 in)
Weight:	120g (4 oz)
Case Material:	Noryl
Operating Limits:	Temperature 5 to 40°C (41 to 104°F) Humidity maximum 80% RH for temperatures up to 31°C decreasing linearly to 50% RH at 40°C Altitude 2000m
Battery:	3.6V Lithium
Battery Life:	10 years projected
Fuse:	1/16A Fast-blow (FACTORY-REPLACEABLE)

2.2.9.1 Surge, Sag & Outage Measurement
2.2.9.2 Impulse Measurement
2.2.9.3 Time Measurement

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2.2.9.1 Surge, Sag & Outage Measurement

Model Number: **PWV-001**

Hot to Neutral

Range: 0 to 200Vrms
Accuracy: ±2Vrms*
Resolution: 1Vrms

Neutral to Ground

Range: 3 to 150Vrms
Accuracy: ±2Vrms
Resolution: 1Vrms

Model Number: **PWV-002**

Hot to Neutral

Range: 0 to 270Vrms
Accuracy: ±4Vrms**
Resolution: 2Vrms

Neutral to Ground

Range: 3 to 150Vrms
Accuracy: ±2Vrms
Resolution: 1Vrms

* sags less than 70V for >1 sec will be reported as 0V
** sags less than 140V for >1 sec will be reported as 0V

2.2.9.2 Impulse Measurement

Model Number: **PWV-001 & PWV-002**

Range

Hot to Neutral: 100 to 2500Vpeak
Neutral to Ground: 50 to 2500Vpeak
Accuracy: ±10% of reading
Resolution: 10V
Width Detection: 1 µsec minimum

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2.2.9.3 Time Measurement

Events <1 second

Accuracy

Hot to Neutral:	±0.5 cycle*
Neutral to Ground:	±1 cycle**

Resolution

Hot to Neutral:	0.5 cycle
Neutral to Ground:	1 cycle

* Outages are reported with 1/2 cycle resolution until the VDR goes into low power mode. A VDR will go into the low power mode after approximately one second of an outage condition. In low power mode, the resolution becomes 8 seconds.

* Surge and Sag and frequency events have 1/2 cycle resolution up to approximately 10 minutes after which the resolution becomes 8 seconds.

** Neutral to Ground surges have 1 cycle resolution up to approximately 10 minutes after which the resolution becomes 8 seconds.

Clock accuracy: ±2 sec/day

Note: ACR reserves the right to change its specifications at any time, without notice.

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2.3 Hardware Warranty

Please note the following disclaimer when using ACR products:

ACR Systems Inc. ("ACR") warrants that its data loggers will perform substantially in accordance with the product documentation supplied with the data loggers (the "documentation") for a period of three years from the date of shipment from ACR. If you have acquired the data logger from an authorized ACR reseller, we will delay the commencement of the warranty until the date the data logger was shipped to you by the reseller, provided that within 90 days of the data logger being shipped to you by reseller, you or the reseller provide us with the serial number of the data logger, your name, and the date the data logger was shipped to you. During the warranty period, ACR shall repair or replace, at its option and at no additional charge to you, any data logger that fails to perform substantially in accordance with its documentation (a "defective data logger"). In order for ACR to repair or replace the logger, you must contact ACR, obtain a return merchandise authorization ("RMA") number and ship the defective data logger to the designated ACR facility. ACR will not accept any product returned without an RMA number. You shall bear all costs of delivering the defective data logger to the ACR facility and ACR shall bear all costs of delivering the repaired or replacement data logger back to you. Replacement data loggers shall be covered by this warranty only for the remainder of the warranty period for the replaced data logger.

In no event shall ACR be responsible for the repair or replacement of any data logger if ACR reasonably determines that a problem results from:

a. The use of the data logger in a manner or for an activity not contemplated by the documentation.

b. The use of the data logger in conjunction with software or hardware that has not been supplied or specifically authorized by ACR.

c. Abnormal environmental conditions.

d. Wiring, electrical or network problems.

e. Your willful or negligent acts.

To the maximum extent permitted by applicable laws, ACR disclaims all representations, warranties, and conditions not expressly provided herein, whether expressed or implied, Including without limitation any implied warranty or condition of fitness for a particular purpose, merchantability, durability, performance and non-infringement. In no event shall ACR Systems Inc., or its suppliers or resellers be liable for any indirect, consequential, Incidental, special or punitive damages arising out of the use of a data logger and ACR's aggregate liability to you shall not in any event exceed the amount paid to ACR for the data logger associated with such liability. The exclusions and limitations set out herein shall apply regardless of whether the liability arises out of breach of contract, tort or statutory liability. This warranty sets out your sole remedies in connection with or arising out of your purchase of a data logger.

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3 EventReader Software Initial Setup

3.1 PWI-100 Interface Package Contents
3.2 ACR EventReader Software Requirements
3.2.1 Optional Equipment
3.3 Installing EventReader
3.4 Setting Time and Date
3.5 Starting the EventReader Application

3.1 PWI-100 Interface Package Contents

The PWI interface package enables you to set up the PowerWatch VDR as well as download and display all the stored events and information using the included EventReader Software.

Each package contains:

- One Compact Disc containing the EventReader software
- One LIC-101 (Serial) or LIC-102 (USB) Lite-Link interface cable
- This reference guide (On CD)

3.2 ACR EventReader Software

Requirements:

- PC running Windows XP, Windows Vista or Windows 7
- At least one free serial or USB port (depending on interface cable)
- A pointing device (recommended)
- 500 MB hard drive space
- 512 MB RAM

3.2.1 Software Disclaimer

NOTICE ON SOFTWARE PACKAGE / WEB DATA

Important notice: The software supplied in this Package [or you are downloading from this data] is licensed to you by ACR and is not sold to you. The terms and conditions of the license are set out in the installation software. You can only complete the installation of the software after indicating your acceptance of the license terms and conditions by clicking "I accept" where provided during the installation process. Please review these terms and conditions carefully. If you have any questions or concerns about the license terms and conditions please feel free to contact ACR (current contact information is included in the license). If PRIOR TO COMPLETING THE INSTALLATION OF THE SOFTWARE, you decide that the terms and conditions are not acceptable to you, indicate this by clicking on the "I do not accept" button. The installation will immediately cease, you may return the Software and any

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ACR Data Logger you purchased in conjunction with the Software and you will be relieved of any obligation to pay for the Software and these ACR Data Loggers. If you have already paid for the Software, the Software media, or ACR Data Loggers, if applicable, ACR, or ACR's authorized Reseller (depending on who supplied you with the executable copy of the Software) will refund to you any monies you have paid for the Software or Software media and any ACR Data Logger purchased in conjunction with the Software upon return of the Software, the ACR Data Loggers, and all accompanying documentation and proof of purchase.

Carefully read the following terms and conditions. If you are prepared to accept these terms and conditions please indicate this by clicking the "I accept" button provided below. You will not be able to complete the installation or use the ACR software supplied in association with these terms and conditions and any third party software embedded in that software (collectively the "Software") unless you accept these terms and conditions. Please feel free to contact ACR if you have any questions or concerns about these terms and conditions. If, PRIOR TO COMPLETING INSTALLATION OF THE SOFTWARE, you decide you are unwilling to accept these terms and conditions, indicate your decision by clicking on the "I do not accept" button. The installation of the Software will cease, you may return the Software and any ACR Data Logger you purchased in conjunction with the Software and you will be relieved of any obligation to pay for the Software and these ACR Data Loggers. If you have already paid for this Software, the Software media or the ACR Data Loggers, if applicable, ACR or ACR's reseller (depending on who supplied the executable copy of the software to you) will refund these monies to you upon return of the Software, the ACR Data Loggers, and all accompanying documentation (the "Documentation") and proof of purchase. ACR can be reached at:

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E-mail: info@acrsystems.com
Web: www.acrsystems.com

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3.2.2 Optional Equipment

Printer supported by Microsoft Windows

3.3 EventReader Software License Agreement

1. Legal agreement. This is a legal agreement between you and ACR Systems Inc. ("ACR"). Please treat it as valuable property.

2. Ownership of Software. The Software and Documentation is licensed and not sold to you. Although you own any media on which the Software is supplied, this Agreement does not convey to you any ownership right, interest or title in or to the Software, or to any related intellectual property rights.

3. Grant of license(s). Subject to the terms and conditions set out in this Agreement and of your paying any necessary fees for the Software or the Software media, ACR hereby grants to you, for each item of Software, a personal, non-exclusive and non-transferable license to install and to use the object code of that Software on no more than one personal computer at any given time, and to use the documentation supplied with the Software (the "Documentation") solely in connection with this use. If you have paid Reseller for the Software media, ACR shall grant you the license contemplated in this paragraph at no additional cost.

4. Restrictions. You shall not (i) use the Software except as expressly permitted in this Agreement and for the purposes contemplated by the Documentation, (ii) redistribute or authorize or acquiesce in the use of the Software by any third party (other than consultants who need to use the Software in order to perform services on your behalf), or (iii) attempt to defeat any protection method designed to prevent the unauthorized use of the Software. You shall not copy or reproduce the Software except to make one archival copy to be stored in a secure location and used for back-up purposes only. For the purposes of this provision, "copy" shall not include copying that naturally results from the authorized use of the Software or in the course of making regular back-ups of the computer or system on which the Software is installed.

5. Confidentiality. The Software and Documentation contains information that is confidential and proprietary to ACR. Upon receipt of your written request, ACR shall provide you with any information about the Software in its possession or control that you require to operate the Software in conjunction with any other software or equipment that you use in your business. You shall not: remove any notices, labels or marks from the Software; deliver, disclose, convey, either directly or indirectly, the contents of the Software to any third party; or alter, modify, translate, decompile, disassemble, or reverse engineer the whole or any part of the Software, without first obtaining the express written consent of ACR.

6. One Year Warranty. ACR warrants that it shall use reasonable commercial efforts to resolve any problem with the Software of which you notify ACR during the warranty period that precludes the Software from operating substantially in accordance with its

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Documentation. The warranty period for the Software is one year. Unless you acquired the Software from an authorized ACR Reseller ("Reseller"), the warranty period commences on the date of shipment of the Software from ACR's facility. If you bought the Software media from a Reseller, we will delay the commencement of the warranty until the date the Software was shipped to you by the Reseller, provided that within 90 days of the Software being shipped to you, you or the Reseller provide us with the serial number of the Software, your name, and the date of shipment.
In no event shall ACR be responsible for any problem with the Software or damage caused by the Software if the problem or damage is due to:
(a) a modification of the Software made or required by any person other than ACR or its agents;
(b) its use in association with other software or hardware (other than software or hardware with which the Documentation specifically indicates it is compatible);
(c) its use in a manner or for an activity not contemplated by its Documentation;
(d) electrical supply, wiring or network problems;
(e) the improper use or installation of the Software;
(f) abnormal environmental conditions; or (g) the willful or negligent acts of any person other than ACR or its agents. If ACR is unable to resolve any problem contemplated by this warranty provision, ACR, or the Reseller, as the case may be, shall refund to you the monies you paid to it to acquire the Software. If there is a defect in the media on which the Software was supplied you may contact ACR during the warranty period, obtain a Return Merchandise Authorization ("RMA") and upon receipt of the defective media, the dated proof of purchase and the RMA, ACR shall replace the defective media at no charge. This paragraph sets out your sole remedy for the breach of the warranty set out herein.

7. No Additional Warranties: to the maximum extent permitted by applicable law the warranty set out in paragraph 6 is the only warranty, made with respect to the Software, and no other warranty, representation or condition either express or implied, including without limitation, any implied warranty or condition of merchantability, non-infringement, performance, durability or fitness for a particular purpose or use shall apply. ACR does not warrant that the Software will operate on a continuous and trouble free basis. You are responsible for selecting the software that will achieve your desired results, and for the installation, use and results obtained from the Software.

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11. Miscellaneous: Paragraphs 4, 5, 7, 8, 9, and 11 shall survive termination or expiration of the license(s) granted hereunder. When used in this Agreement, the term "license" shall be deemed to include "sublicense" for items of third party software embedded in the Software. This Agreement constitutes the entire agreement of the parties with respect to the Software, and supersedes all prior communications, agreements and discussions between the parties. It will be governed by the laws of the Province of British Columbia, and the laws of Canada applicable therein, excluding any rules of private international law that lead to the application of the laws of any other jurisdiction. The United Nations Convention on Contracts for the International Sale of Goods (1980) does not apply. The courts of the Province of British Columbia shall have non-exclusive jurisdiction to hear any matter arising in connection with this Agreement. If any provision of this Agreement is void or is declared void, the provision shall be severed from this Agreement, which shall otherwise remain in full force and effect.

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3.4 Installing EventReader

For Windows XP, Windows Vista and Windows 7, the setup dialog box will appear automatically after inserting the EventReader Software disc into the CD ROM drive.

If autorun is disabled on your computer, locate and select the CD ROM drive in Windows Explorer; Double click on the Setup icon to proceed.

1. A Setup dialog box will appear asking if you want to continue installing EventReader on your hard drive.
2. Follow the instructions on the screen to continue the EventReader installation
3. A dialog box will inform you when the software installation is complete.

3.5 Setting Time and Date

When retrieving data from the VDR, the EventReader application uses the PC's internal clock for time and date reference. It is very important that your PC system's time and date are correct before using EventReader Software.

The PC's date and time are typically set via the Control Panel or by clicking the time display located at the bottom right corner of the screen. Additional information can be found in the Windows User's Guide.

3.6 Starting the EventReader Application

Click the ACR EventReader application icon in the ACR Data Logger Software folder on the Start Menu. The main EventReader window will open.

See also:
EventReader Main Window

4 EventReader Main Window

4.1 The Status Bar
4.2 The Toolbar
4.3 The Menu Bar
4.3.1 File Menu
4.3.1.1 Open Data File
4.3.1.2 Save Data
4.3.1.3 Print
4.3.1.4 Page Setup
4.3.1.5 Exit
4.3.2 Edit Menu
4.3.2.1 Undo
4.3.2.2 Redo
4.3.2.3 Copy to Clipboard (Ctrl-C)
4.3.2.4 Select All

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4.3.3 View Menu
4.3.3.1 Toolbar
4.3.3.2 Status Bar
4.3.4 Communicate Menu (Open COM Port)
4.3.5 Options Menu
4.3.5.1 Default Settings
4.3.5.2 Default Options
4.3.5.3 Enable Calibration
4.3.6 Window Menu
4.3.6.1 Cascade
4.3.6.2 Tile Horizontally
4.3.6.3 Tile Vertically
4.3.6.4 Arrange Icons
4.3.6.5 Additional Items
4.3.7 Help Menu
4.3.7.1 Show Help
4.3.7.2 About...

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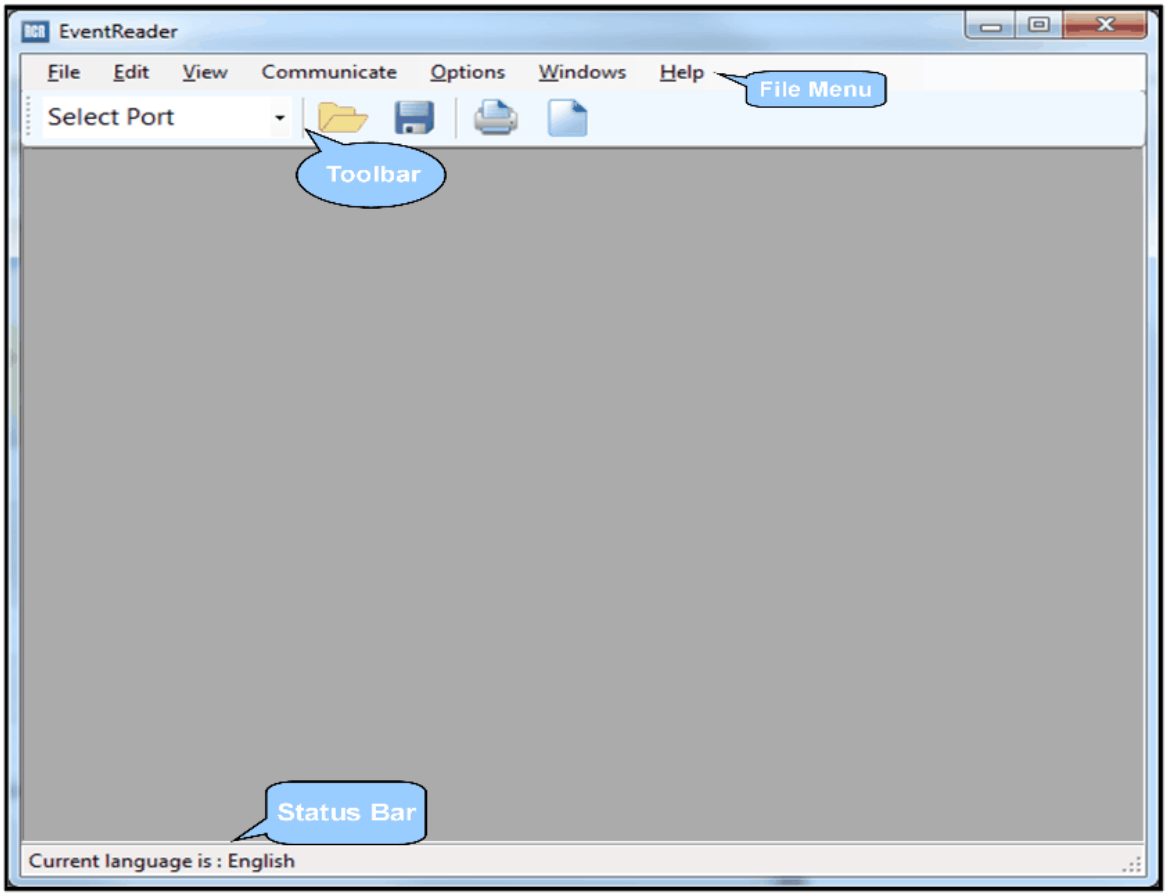
EventReader Main Window



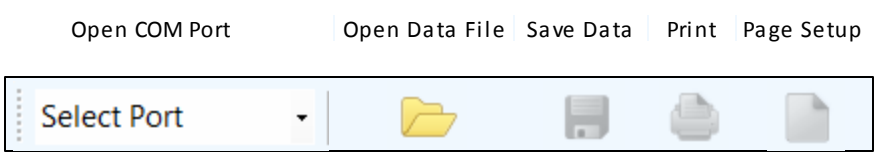
At the top of this window is a menu bar listing various menu selections; below that is a toolbar; and at the bottom of the window is a status bar.

4.1 The Status Bar

The Status Bar displays messages indicating the current status of PowerWatch.

4.2 The Toolbar

These buttons provide quick access to the menu functions described below. The buttons are (from left to right):



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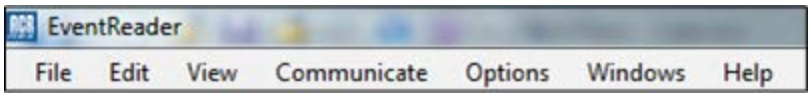
4.3 The Menu Bar

The Menu Bar consists of the following items:



4.3.1 File Menu
4.3.1.1 Open Data File
4.3.1.2 Save Data
4.3.1.3 Print
4.3.1.4 Page Setup
4.3.1.5 Exit
4.3.2 Edit Menu
4.3.2.1 Undo
4.3.2.2 Redo
4.3.2.3 Copy to Clipboard (Ctrl-C)
4.3.2.4 Select All
4.3.3 View Menu
4.3.3.1 Toolbar
4.3.3.2 Status Bar
4.3.4 Communicate Menu
4.3.5 Options Menu
4.3.3.1 Toolbar
4.3.3.2 Status Bar
4.3.6 Windows Menu
4.3.6.1 Cascade
4.3.6.2 Tile Horizontally
4.3.6.3 Tile Vertically
4.3.6.4 Arrange Icons
4.3.6.5 Additional Items
4.3.7 Help Menu
4.3.7.1 Show Help
4.3.7.2 About...

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4.3.1 File Menu

4.3.1.1 Open Data File
4.3.1.2 Save Data
4.3.1.3 Print
4.3.1.4 Page Setup
4.3.1.5 Exit

4.3.1.1 Open Data File

This menu item opens a previously saved data file.

Toolbar Icon

4.3.1.2 Save Data

This menu item saves the active window's data. A dialog box will appear to prompt for a file name.

Toolbar Icon

4.3.1.3 Print

This menu item prints the active Device Report window. Since data from a full VDR will span many pages, a Print Preview is first generated to allow the user to see the data on each page.

When the Print button on the Print Preview window is pressed, a print dialog box appears, allowing the user to select the number of pages and other print options.

Toolbar Icon

4.3.1.4 Page Setup

This menu item sets the page orientation and margins.

Toolbar icon:

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4.3.1.5 Exit

This menu item ends the program.

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4.3.2 Edit Menu

4.3.2.1 Undo
4.3.2.2 Redo
4.3.2.3 Copy to Clipboard (Ctrl-C)
4.3.2.4 Select All

4.3.2.1 Undo

This undoes the last action. Only valid for text editing.

4.3.2.2 Redo

This redoes the last action. Only valid for text editing.

4.3.2.3 Copy to Clipboard (Ctrl-C)

This copies the active Window's data or graph to the clipboard.

The Device Report will copy either the event data or the setup information according to which tab is selected. Partial event data may be copied by selecting only the desired rows on the events table.

4.3.2.4 Select All

This selects all data on the active Window's data grid.

4.3.3 View Menu

4.3.3.1 Toolbar
4.3.3.2 Status Bar

4.3.3.1 Toolbar

When this item is checked, the toolbar is visible.

4.3.3.2 Status Bar

When this item is checked, the status bar is visible.

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4.3.4 Communicate Menu (Open COM Port)

When EventReader is run, it finds all available COM ports and adds them to the Communicate Menu drop down list.

Ports that it cannot find either don't exist or are in use by other devices on your system. For example, if your computer has two COM ports (1, 2) and if COM 1 is being used by the mouse, and COM 2 is unused, then only COM 2 will appear on the Communicate menu.

Clicking a port will cause PowerWatch to open that port.

4.3.5 Options Menu

4.3.5.1 Default Settings
4.3.5.2 Default Options
4.3.5.3 Enable Calibration

4.3.5.1 Default Settings

This shows the contents of a default settings file. A file dialog box is opened to select the file.

4.3.5.2 Default Options

This allows the user to change the default file path, column widths and language.

4.3.5.3 Enable Calibration

This allows the user to change the calibration of the VDR voltage reading.

This feature is recommended only for advanced users.

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4.3.6 Windows Menu

The Window menu makes available a standard set of Windows commands to aid in placement of the "child" windows (data and graphs) of the main program.

4.3.6.1 Cascade
4.3.6.2 Tile Horizontally
4.3.6.3 Tile Vertically
4.3.6.4 Arrange Icons
4.3.6.5 Additional Icons

4.3.6.1 Cascade

Arranges the windows in descending order

4.3.6.2 Tile Horizontally

Arranges the windows side by side

4.3.6.3 Tile Vertically

Arranges the windows on top of each other

4.3.6.4 Arrange Icons

Automatically arranges all icons (minimized forms) along the bottom of the main program window.

4.3.6.5 Additional Items

There will also be a listing of all child windows within the main window. Clicking an item in this list will set focus to the respective window.

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4.3.7 Help Menu

This menu contains several help items.

4.3.7.1 Show Help
4.3.7.2 About...

4.3.7.1 Show Help

Opens the application's Help document. You can view the Help contents or search for specific topics.

4.3.7.2 About...

Displays the About window which contains the software version and copyright information.

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5 EventReader Operating Overview

5.1 Connecting to a VDR
5.1.1 Connecting the Lite-Link Interface Cable
5.1.2 COM Port Selection
5.2 Opening a Device Report
5.2.1 Device Report Fields
5.2.1.1 Real-Time Readings
5.2.1.2 Threshold Settings
5.2.1.2.1 Hot to Neutral Thresholds
5.2.1.2.2 Neutral to Ground Thresholds
5.2.1.2.3 Frequency Thresholds
5.2.1.3 Options
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5.4.2.4 Outage Events
5.4.2.5 Frequency Events
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5.7 Viewing Events
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5.7.3.1 Display Options
5.8 Printing Events and Graphs
5.8.1 Printing Events

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5.8.2 Printing a Graph
5.9 Erasing Events

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5.1 Connecting to a VDR

5.1.1 Connecting the Lite-Link Interface Cable
5.1.2 COM Port Selection

5.1.1 Connecting the Lite-Link Interface Cable

The EventReader application communicates with a VDR through a Lite-Link interface cable which connects to a USB or Serial Port on your computer (depending on the type of interface cable (USB or Serial) you've purchased).

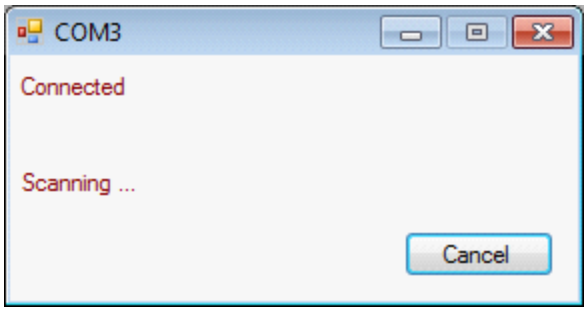
Depending on the Lite-Link interface cable purchased (USB or Serial), plug the cable into an available USB port or 9-pin serial port on your computer.

5.1.2 COM Port Selection

The Communicate menu on the EventReader main window displays the available COM ports on your computer.

Warning! Do not look directly at the flashing light on the Lite-Link cable, as damage to your eyes may result.

Click the COM port to which the Lite-Link cable is connected to open the port. When you have chosen the correct port, the Lite-Link wand will start to flash and a communication form will open.



When the wand is flashing, it is ready to communicate with a VDR.

See also:
Connecting the Lite-Link Interface Cable
Opening a Device Report

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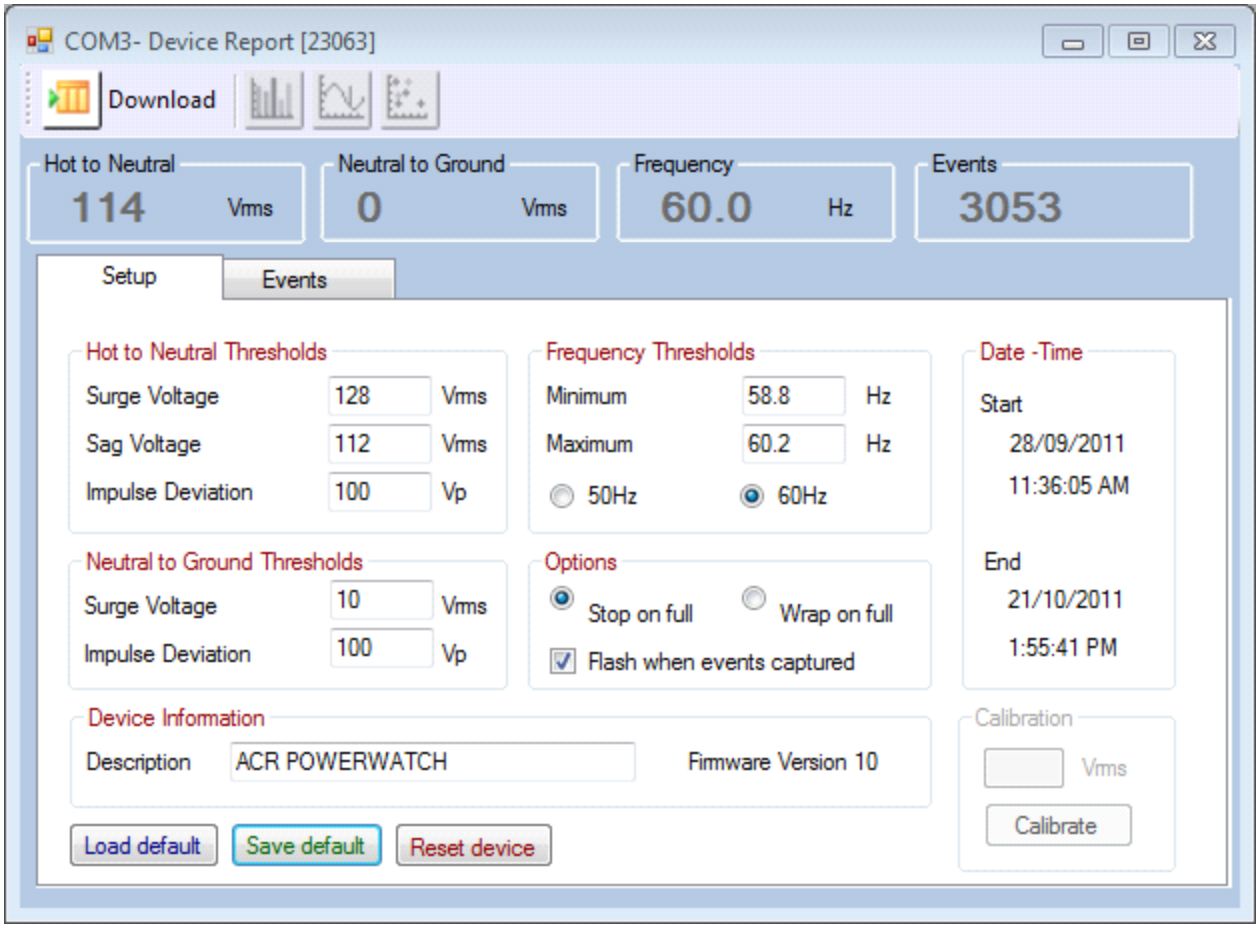
5.2 Opening a Device Report

Point the flashing Lite-Link wand at the optical port of the VDR (from 12mm (0.5") away or closer) or plug the wand directly into the VDR's recessed optical port.

The Device Report window will open.



The Device Report window displays the VDR's settings and number of recorded events.

Note that the communication form is automatically minimized at the bottom of the main window when a device form appears. The port remains open when the form is in this state.

If the VDR is not plugged in, communication with the VDR is halted to conserve battery life. A message window will appear indicating this and the communication form will remain normal size on the screen. To re-start communication with the VDR, click the start button on the communication form.

5.2.1 Device Report Fields
5.2.1.1 Real-Time Readings
5.2.1.2 Threshold Settings

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5.2.1.2.1 Hot to Neutral Thresholds
5.2.1.2.2 Neutral to Ground Thresholds
5.2.1.2.3 Frequency Thresholds
5.2.1.3 Options
5.2.1.4 Device Information
5.2.1.5 Date - Time
5.2.1.6 Calibration

See also:
COM Port Selection

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5.2.1 Device Report Fields

5.2.1.1 Real-Time Readings
5.2.1.2 Threshold Settings
5.2.1.2.1 Hot to Neutral Thresholds
5.2.1.2.2 Neutral to Ground Thresholds
5.2.1.3 Options
5.2.1.4 Device Information
5.2.1.5 Date - Time
5.2.1.6 Calibration

5.2.1.1 Real-Time Readings

After establishing communication with PowerWatch, leave the wand in the optical port while the VDR is plugged into an outlet to see, in real time:

· Line voltage readings (the voltage between the hot and neutral lines).
· Ground voltage readings (the voltage between the neutral and ground lines).
· Line frequency readings (the frequency between the hot and neutral lines).
· Number of stored events

These readings appear at the top of the Device Report.

See also:
Threshold Settings
Operating Options
Data Description
Date - Time

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5.2.1.2 Threshold Settings

Setting Thresholds on the Status Tab

The thresholds are divided into three categories on the Status tab of the Data report window:
Hot to Neutral, Neutral to Ground, and Frequency.

5.2.1.2.1 Hot to Neutral Thresholds
5.2.1.2.2 Neutral to Ground Thresholds
5.2.1.2.3 Frequency Thresholds

5.2.1.2.1 Hot to Neutral Thresholds

Surge Voltage:	If the line voltage exceeds this level, a Surge Event will be recorded
Sag Voltage:	If the line voltage falls below this level, a Sag Event will be recorded
Impulse Deviation:	If a transient voltage exceeds this level, an impulse event will be recorded

5.2.1.2.2 Neutral to Ground Thresholds

Surge Voltage:	If the line voltage exceeds this level, a Surge Event will be recorded
Impulse Deviation:	If a transient voltage exceeds this level, an impulse event will be recorded

5.2.1.2.3 Frequency Thresholds

Minimum/Maximum

If the line frequency exceeds these limits, a frequency event will be recorded.

50/60 Hz

The appropriate mode of operation should be selected by the user corresponding to the nominal frequency of the voltage being measured.

See also:
Real-Time Readings
Operating Options
Data Description
Date - Time

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5.2.1.3 Options

PowerWatch can store 4,000 events and can be programmed to either stop recording events when it is full or continue recording over the oldest events in its memory.

Choose either
Stop Recording When Full to record the first 4000 events or
Overwrite Oldest Events When Full to record events continuously

Check
Flash When Data Available to enable the PowerWatch to blink when it has stored one or more events.

See also:
Threshold Settings
Real-Time Readings
Data Description
Date - Time

5.2.1.4 Device Information

Data Description, on the Status tab of the Data Report window, gives the opportunity of specifying the location of the VDR, for instance, if you need to distinguish between the locations of three different VDR units in one office. You may describe the data in your own words using up to 30 characters.

The data description will also appear as the title of a Quick Summary, an Impulse Graph and an Event Distribution Graph.

The firmware version of the VDR also appears in this area of the Status tab. (If a default file is being viewed, the version is replaced by buttons indicating to which type of VDR (110V/220V) the file applies).

See also:
Threshold Settings
Real-Time Readings
Operating Options
Date - Time

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5.2.1.5 Date - Time

Date - Time, on the Status tab of the Data Report window, displays time span over which the data was collected. The Start time is the time the VDR was reset and the End time is the time the VDR was downloaded.

See also:
Threshold Settings
Operating Options
Data Description

5.2.1.6 Calibration

This option is provided for advanced users only and is disabled by default. Changing the calibration value of the PowerWatch VDR is not expected to be necessary under normal conditions.

However, if the user believes the VDR's real-time voltage reading could be improved, the following procedure can be followed to re-calibrate the Hot-Neutral voltage.

No calibration for the Neutral-Ground voltage is provided, as this voltage should be 0V under normal conditions.
Before adjusting the logger's calibration, you will need the following:

- a stable AC power source
- a calibrated multimeter (to verify the voltage of the AC source)

Warning! Inserting anything into an electrical socket can be dangerous, potentially causing serious injury or death and should only be attempted by qualified personnel. ACR assumes no liability in relation to this action by non-qualified persons.

The calibration procedure is as follows:

1. Click "Enable Calibration" on the Options Menu to enable the calibrate field of the device Window
2. Enter the voltage measured on the multimeter in the calibration text box
3. Click the Calibrate button

If the real-time reading of the VDR is sufficiently different from the measured value, the VDR will perform one or more iterations of calibration. The progress of this operation is displayed on the communication window. When complete, a message window will appear indicating this.

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5.3 VDR Settings

5.3.1 VDR Factory Default Settings
5.3.2 Changing VDR Settings
5.3.3 Factory Default Settings Files
5.3.4 Saving a Custom Default Settings File

5.3.1 VDR Factory Default Settings

The EventReader program has factory-installed default threshold settings. These settings are adequate for most applications.

If you are concerned that some of your electronic equipment may have particular power quality requirements, we suggest that you call the equipment manufacturer for that information. You may discover that you should alter some of the VDR's threshold settings in order to monitor power quality closer.

See also:
Changing VDR Settings

5.3.2 Changing VDR Settings

To change the thresholds or option setting used by a VDR, do **one** of the following on the Device Report Settings tab:

- Type the new value into the appropriate text box, select the appropriate option button or click the check box **or**
- Click the Load default button to load values from a saved settings file

Once all changes have been made, the new threshold settings have to be sent to the VDR by clicking the Reset Device button at the bottom of the Status tab. Doing this will erase any data previously saved in the VDR. The data currently in the VDR can be saved by clicking the save button.

See also:
Factory Default Settings Files
Saving a Custom Default Settings File

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5.3.3 Factory Default Settings Files

In the event that the user wishes to return the VDR to its original Factory Default settings, the EventReader software automatically installs two factory default files on your computer matching the settings stored in the PowerWatch when it ships from the factory.

The path of these files is: My documents\My data

The file names are default*.pwv, where * is 1 or 2, depending on the VDR voltage type.

See also:
Changing VDR Settings

5.3.4 Saving a Custom Default Settings File

If EventReader's default settings do not suit your application, you may choose new settings and save them as a custom default settings file. To do this:

1. Open the device report window (see Opening a Device Report)
2. Make your changes to the values shown on the Status tab
3. Click the **Save Default** button at the bottom of the device report.
4. In the save file dialog box that appears, enter the file name and path and press OK.

The settings file is now saved in your computer and can be sent to any VDR of the same voltage type by clicking **Load Default** on the new VDR's Device Report window.

To see the contents of a default settings file, click **Default Settings** on the Options Menu.

See also:
Factory Default Threshold Settings
Factory Default Settings Files
Changing VDR Settings

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5.4 Downloading Events

5.4.1 Events Tab
5.4.1.1 Event No. Column
5.4.1.2 Start Time Column
5.4.1.3 Description Column
5.4.1.4 Extreme Column
5.4.1.5 End Time/Duration/Degree Column
5.4.1.6 Open Event
5.4.2 Event Types
5.4.2.1 Impulse Events
5.4.2.2 Sag Events
5.4.2.3 Surge Events
5.4.2.4 Outage Events
5.4.2.5 Frequency Events
5.4.2.6 Loss of Synchronization Events
5.5 Saving Events
5.6 Opening a Saved Data File
5.7 Viewing Events
5.7.1 Quick Summary Graph
5.7.2 Single Impulse Graph
5.7.3 Event Distribution Graph
5.7.3.1 Display Options
5.8 Printing Events and Graphs
5.8.1 Printing Events
5.8.2 Printing a Graph
5.9 Erasing Events

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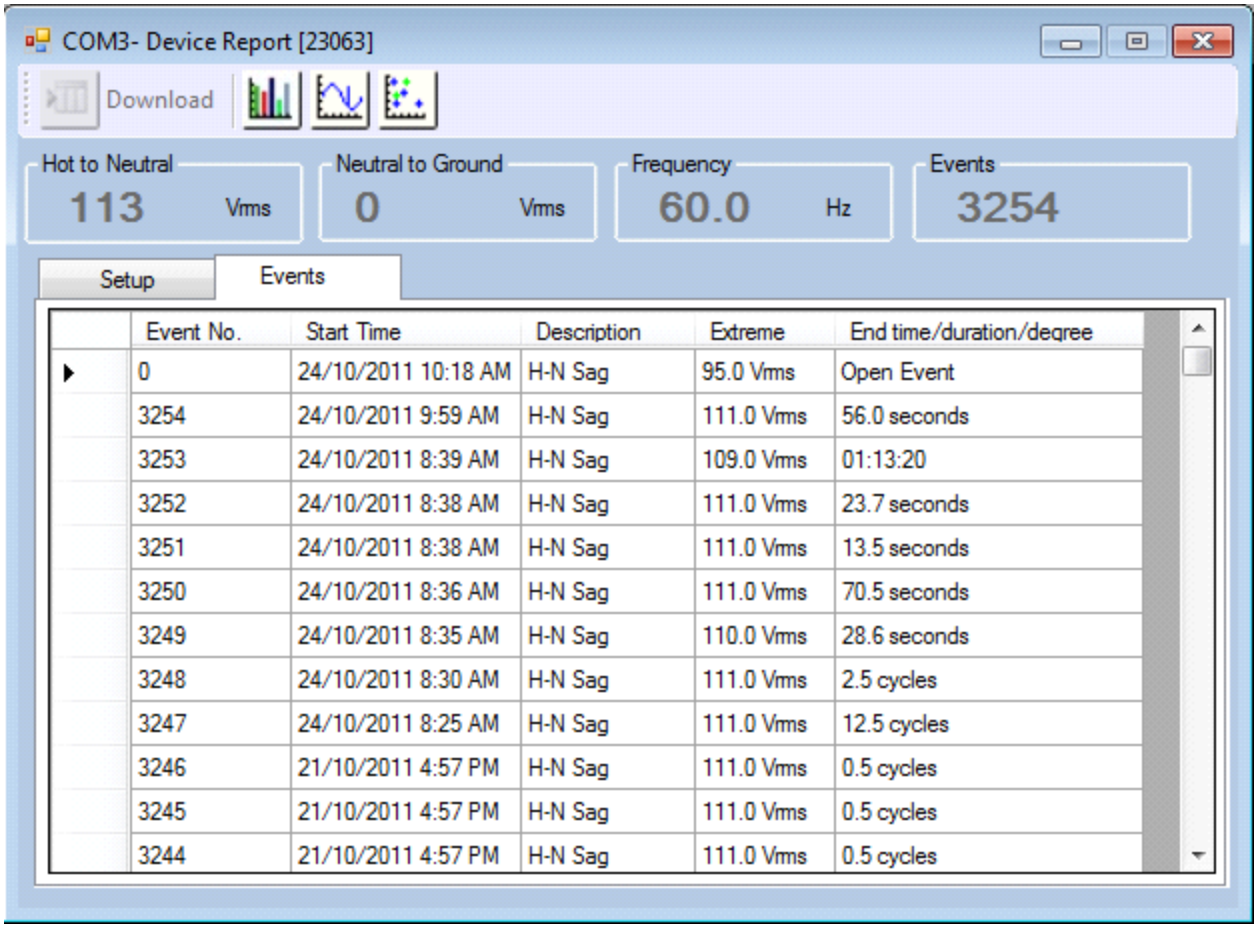
5.4.1 Events Tab

After downloading recorded events from the PowerWatch VDR and with the Events tab still open, you can view and analyze the data that the VDR has gathered since it was last cleared. A VDR can store 4,000 events.



Event No.	Start Time	Description	Extreme	End time/duration/degree
0	24/10/2011 10:18 AM	H-N Sag	95.0 Vrms	Open Event
3254	24/10/2011 9:59 AM	H-N Sag	111.0 Vrms	56.0 seconds
3253	24/10/2011 8:39 AM	H-N Sag	109.0 Vrms	01:13:20
3252	24/10/2011 8:38 AM	H-N Sag	111.0 Vrms	23.7 seconds
3251	24/10/2011 8:38 AM	H-N Sag	111.0 Vrms	13.5 seconds
3250	24/10/2011 8:36 AM	H-N Sag	111.0 Vrms	70.5 seconds
3249	24/10/2011 8:35 AM	H-N Sag	110.0 Vrms	28.6 seconds
3248	24/10/2011 8:30 AM	H-N Sag	111.0 Vrms	2.5 cycles
3247	24/10/2011 8:25 AM	H-N Sag	111.0 Vrms	12.5 cycles
3246	21/10/2011 4:57 PM	H-N Sag	111.0 Vrms	0.5 cycles
3245	21/10/2011 4:57 PM	H-N Sag	111.0 Vrms	0.5 cycles
3244	21/10/2011 4:57 PM	H-N Sag	111.0 Vrms	0.5 cycles

See also:

5.4.1.1 Event No. Column
5.4.1.2 Start Time Column
5.4.1.3 Description Column
5.4.1.4 Extreme Column
5.4.1.5 End Time/Duration/Degree Column
5.4.1.6 Open Event

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5.4.1.1 Event No. Column

The Event No. column displays the number sequence of each event, with the most recent events displayed first. By using the scroll bar on the right of the window, all the events that the VDR has recorded can be viewed. The number 0 is given to an Open Event.

5.4.1.2 Start Time Column

The Start Time column displays the time that an event started.

The Start Time is with respect to the current time of the downloading computer's clock. If the same VDR was downloaded on two different computers with their clocks set 1 minute apart, there would be a difference of 1 minute in the start times of the events downloaded on the two computers.

The resolution of the time stamp in a VDR is eight seconds.

If an impulse occurred once every second starting at 12:00:00, the first eight impulses would all be reported to have the same time of 12:00:00. The next eight impulses would be reported as having the same time of 12:00:08.

If identical information was downloaded twice from a VDR, the two data reports could show a time difference of eight seconds.

5.4.1.3 Description Column

The Event column displays the types of events that occurred during the reporting period. This includes the line (Hot-Neutral or Neutral-Ground) for Surge and Impulse Events, and quantity for Impulse Events.

See also:
Impulse Events
Sag Events
Surge Events
Outage Events
Frequency Events
Loss of Synchronization Events

5.4.1.4 Extreme Column

The Extreme column displays the maximum value measured during the event. The units reflect the type of event:

Frequency Events: Hz
Impulse Events: Peak Voltage (Vp)
Surge/Sag/Outage Events: Vrms

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5.4.1.5 End Time/Duration/Degree Column

The information recorded in this column is context sensitive.

For impulse events, this column indicates the phase angle of the impulse in degrees.

For all other event types, this column shows the duration of the event.

· Outages up to 16 seconds are recorded in 0.5 cycle resolution, otherwise the outage resolution is eight seconds.

The format of the event duration for other event types is as follows:

· Events of less than one second are displayed in number of cycles.
· Events of one to 119 seconds are displayed in seconds.
· Events of between two minutes and 24 hours are displayed in hours, minutes and seconds for example, 07:51:24 (7 hours, 51 minutes, and 24 seconds).
· Events that last longer than 24 hours display the end time (date and time).

An event which has not yet terminated is reported as Open Event.

See also:
Open Event

5.4.1.6 Open Event

If an event was still in progress when data was downloaded from the VDR, the event will be designated as an open event. Open events are assigned the number zero in the Event # column.

PowerWatch can display one each of three open event types simultaneously, corresponding to a surge on both Not-Neutral and Neutral-Ground and a frequency event.

See also:
Event Types

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5.4.2 Event Types

A PowerWatch VDR records four types of events:
· Voltage Impulses (spikes)
· Voltage Surges
· Voltage Sags, Outages, and Loss of Synchronization
· Line Frequency Variations

The Event column on the Events tab of the Data Report window displays the types of events that occurred.

See also:
Events Tab
Impulse Events
Sag Events
Surge Events
Outage Events
Frequency Events
Loss of Synchronization Events

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5.4.2.1 Impulse Events

Impulses are transient voltage fluctuations (sometimes called spikes). They can be positive or negative, and can occur on either the hot-neutral line or the neutral-ground line. The voltage potential of an impulse can be quite large; hundreds of volts is not uncommon.

Impulses typically have a duration far below one cycle time and can be detected with a duration of 1 microsecond or greater. Any voltage deviation above the impulse threshold and less than one half cycle duration will be recorded as an impulse.

PowerWatch can detect both positive and negative impulses. An impulse event can include one or more impulses occurring within the same half cycle. The event column will display the number of impulses that the PowerWatch was able to count.

An important point to note about a multiple impulse event is that the voltage reading in the Extreme column will be the total voltage of any impulses that occur more than 100 microseconds apart. When multiple impulses of different polarity occur, their absolute values are added together. The degree (in the fourth column) will be the position in the cycle of the first impulse. The angle of neutral-ground impulses is referenced to the start of the hot-neutral sine wave.

If an impulse is less than one microsecond in length, PowerWatch will measure the magnitude of the impulse but may be unable to determine the polarity. In this case, PowerWatch will show the sign of the impulse as "+" .

See also:
Events Tab
Sag Events
Surge Events
Outage Events
Frequency Events
Loss of Synchronization Events

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5.4.2.2 Sag Events

Sags are decreases in line voltage lasting for at least one cycle. Sags are only measured on the hot-neutral lines. Typically, a sag will range from a few volts to tens of volts below normal.

If the voltage drops below the sag threshold, a sag event will be recorded. If it drops below 70V, the event will be recorded by PowerWatch as an outage.

See also:
Events Tab
Impulse Events
Surge Events
Outage Events
Frequency Events
Loss of Synchronization Events

5.4.2.3 Surge Events

Surges are increases in line voltage that last at least one full cycle. Surges can occur on both the hot-neutral line or neutral-ground line.

Typically, surges are in the order of tens of volts and last from several cycles to several seconds.

If the voltage exceeds the surge voltage threshold for longer than one cycle, a surge event will be recorded.

See also:
Events Tab
Impulse Events
Sag Events
Outage Events
Frequency Events
Loss of Synchronization Events

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5.4.2.4 Outage Events

When PowerWatch records a sag of below 70Vrms for longer than a second it displays the event as an outage. The VDR will go into self-powered mode (battery) and will sample the voltage every eight seconds. As a result, the shortest outage it will record will be eight seconds. When the power is reapplied to PowerWatch, the VDR will not detect it immediately, but will wait until the next eight-second sample before returning to the line powered operational mode. This delay will prevent contact bounce being reported as an event when PowerWatch is plugged into a standard electrical outlet.

Since PowerWatch's eight-second clock is not synchronized with outages, it can sometimes report an outage as 16 seconds when in fact the outage only lasted for slightly over one second. An example of when this would happen is if a sag below 70Vrms occurred 6.9 seconds into an eight-second period. At the 7.9-second point, PowerWatch would change to self-powered mode and report a minimum outage of eight seconds. If then, at the 8.1-second point, power was restored, the VDR would not sample again until the 16-second point.

See also:
Events Tab
Impulse Events
Sag Events
Surge Events
Frequency Events
Loss of Synchronization Events

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5.4.2.5 Frequency Events

Frequency events are variations in frequency above or below the nominal frequency (for example, 60Hz in North America and 50Hz in Europe). Variations in frequency are typically a few cycles and can be from seconds to minutes in duration.

If the frequency drops below the minimum threshold a low frequency event will be recorded; if it exceeds the maximum threshold a high frequency event will be recorded.

The factory default nominal frequency is 60Hz for 110V models and 50Hz for 220V models. However, PowerWatch can be user configured to record at 50Hz and 60Hz for either 110V or 240V models.

See also:
Events Tab
Impulse Events
Sag Events
Surge Events
Outage Events
Loss of Synchronization Events

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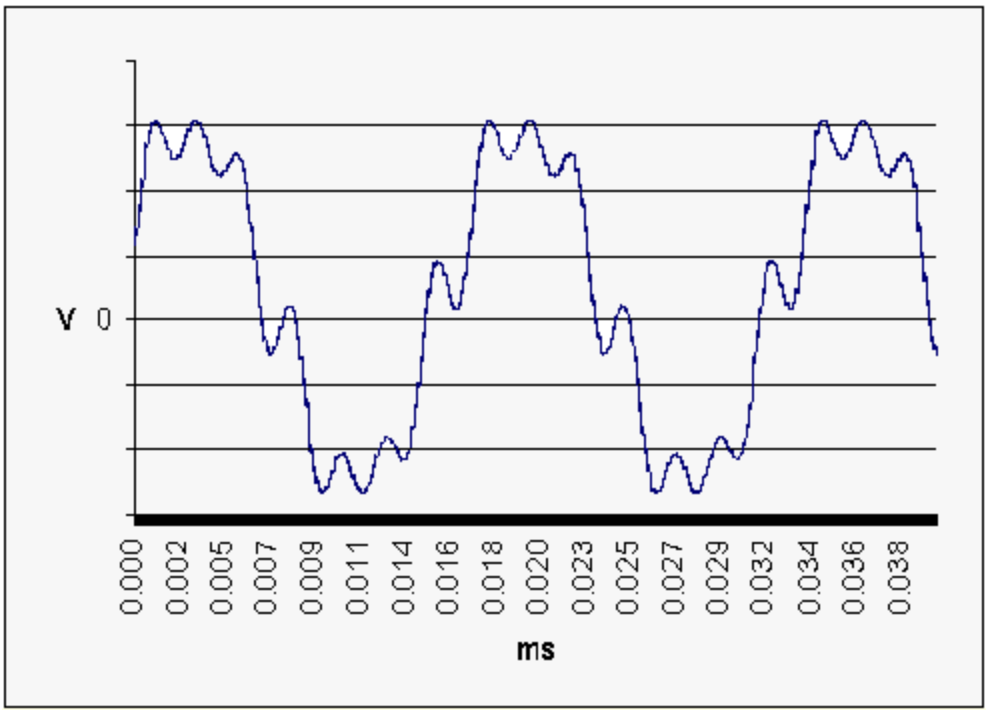
5.4.2.6 Loss of Synchronization Events

Excessive harmonics or noise on a power line may cause severely distorted voltage waveforms. While not common, these distorted waveforms could result in "extra" zero crossings on the AC line.



PowerWatch synchronizes itself to the consecutive positive and negative zero crossings of the AC line (every 8.33 milliseconds at 60Hz). Should the voltage waveform be so highly distorted that unexpected zero crossings are detected, PowerWatch will report a loss of synchronization relative to the measured voltage waveform.

This Loss of Synchronization will be recorded as an event unless the measured voltage falls below 70V (140V for 220V models), in which case, the event will be recorded as an outage with a start time equal to the original loss of synchronization event.

See also:
Events Tab
Impulse Events
Sag Events
Surge Events
Outage Events
Frequency Events

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5.5 Saving Events

To save the events that you have downloaded from a VDR, choose Save from the File menu or click the Save button on the Toolbar.

The Save As dialog box will appear with the current file name highlighted in the File Name box.

You have two saving options:

1. Save the file with the existing name; this means that you will overwrite the previous file of the same name along with all its data. To do this, click OK and then click Yes to replace the previous file.
2. Save the file with a new name; this means that you will type a new name for the file so that the previous file will still exist. To do this, in the File name box, type a new name over the highlighted file name and click OK.

See also:
Opening a Saved Data File

5.6 Opening a Saved Data File

To open a saved data file, do the following:

1. From the File menu choose Open or click the Open icon on the toolbar. The Open dialog box will appear.
2. Scroll through the list of data files until you find the file you want.
3. Double-click the selected file (or click it and then OK) to open the Device Report window.

On the Status tab, notice that the items that cannot be changed are "grayed out". Only the data description can be changed. If desired, the description may be changed and the file saved again.

Note: Only one copy of any data file can be opened at a time. If you try to open a file that is already open, the focus will be set to that window.

See also:
Impulse Events
Sag Events
Surge Events
Outage Events
Frequency Events
Loss of Synchronization Events

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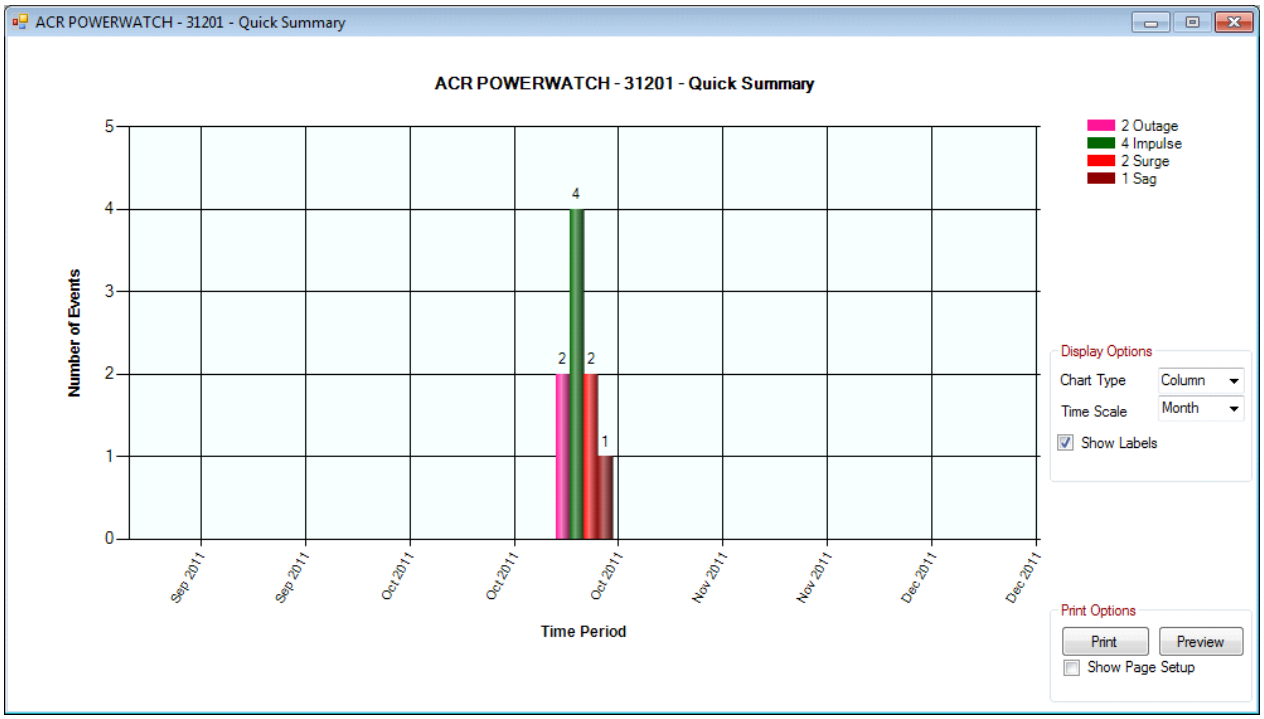
5.7 Viewing Events

· Viewing Events as a Bar Graph (Quick Summary)
· Viewing a Single Impulse as a Graph
· Viewing Events as an Event Distribution Graph

5.7.1 Quick Summary
5.7.2 Single Impulse Graph
5.7.3 Event Distribution Graph
5.7.3.1 Display Options

5.7.1 Quick Summary Graph

The Quick Summary displays the number of surge, sag, impulse, and frequency events as bars on a graph.



To view the Quick Summary graph, click the icon located on the Events tab.

The horizontal axis displays time; the vertical axis displays the number of events that occurred in each time period. In the Quick Summary above, the time periods are sorted by date.

Note that the thickness of a bar and its position in a time period is irrelevant; the bar only displays the number of events and the time period in which they occurred.

The graph displays only the events which are selected on the Events tab. If no events are

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selected, all events are shown.

Choosing Viewing Options

The Display Option box gives you a number of viewing options.

The Chart Type can be:

Column	as shown above
Box Plot	similar to column, but the bars are replaced with lines
Bar	similar to column, but the axes are reversed

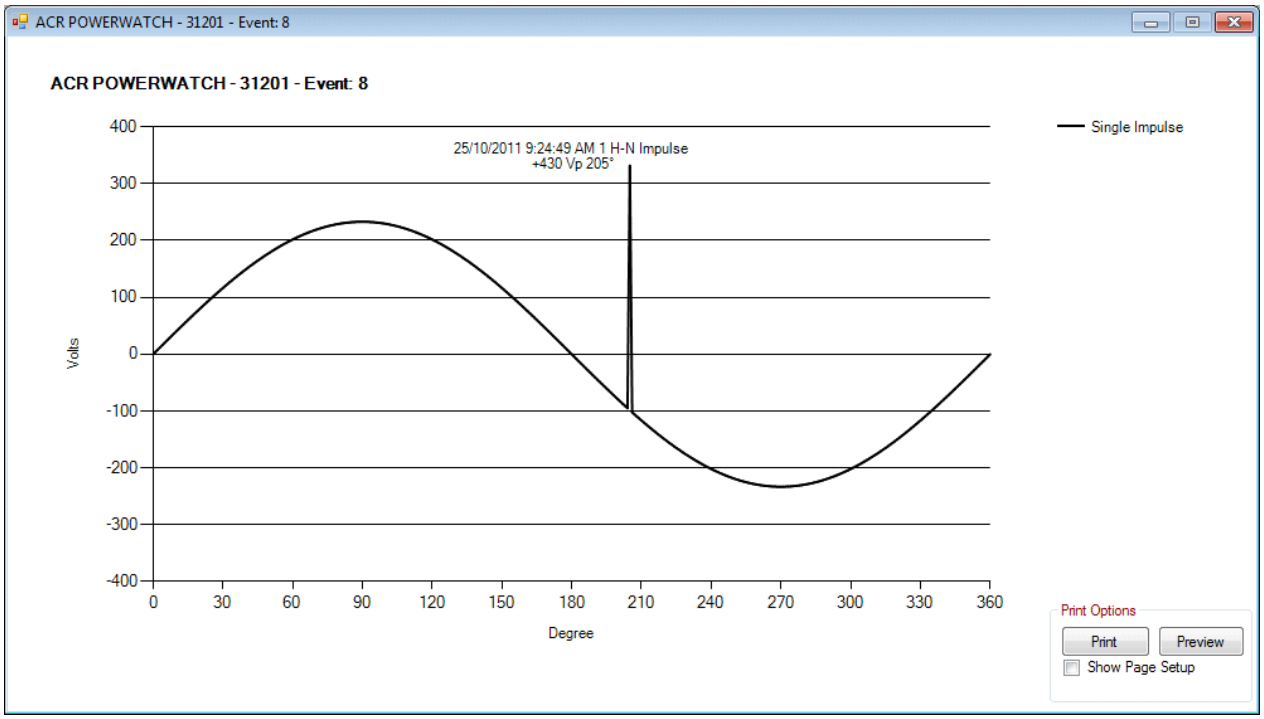
The Time Scale selects how the events are grouped. This can be by year, month, week, day or hour. Hour has the option of displaying the time in 24 or 12 hour format.

The Show Labels check box selects whether or not the numbers associated with the columns are displayed.

See also:
Printing Events

5.7.2 Single Impulse Graph

A single impulse event between hot and neutral or neutral and ground can be displayed as a graph, enabling you to see if the impulse is causing zero crossings.



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To view the Single Impulse Graph, select a single impulse event and click the icon located on the Events tab.

An impulse graph is produced using the amplitude, direction and position (in degrees) of the event. The graphical representation is not intended to show what the wave form looks like nor does it show the duration of the impulse.

To graph an impulse you must choose an event that contains only one impulse; it is not possible to graph an event consisting of multiple impulses .

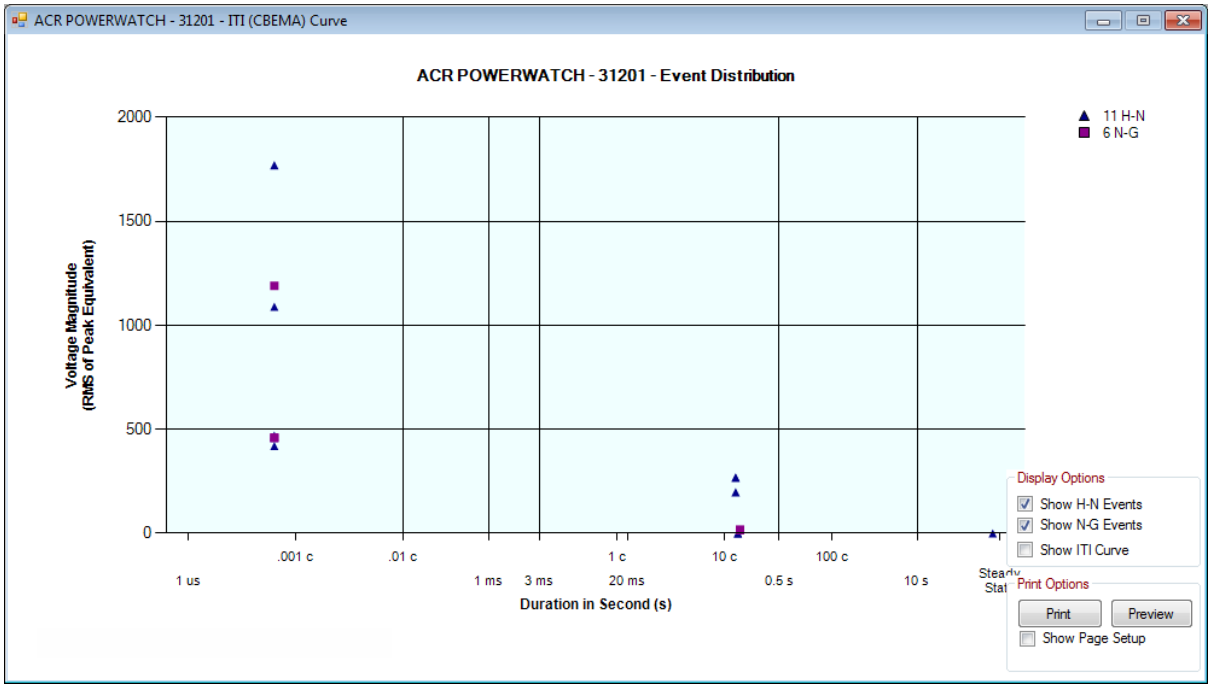
See also:
Impulse Events
Printing Events

5.7.3 Event Distribution Graph

The Event Distribution Graph plots the magnitude of the event against duration on a logarithmic scale in order to determine the importance of the data. For example, a single random event may not be as significant as a cluster of recurring events.

To view the Event Distribution Graph, select the events to plot and click the icon on the events tab. If no events are selected, all events will be plotted. Note that frequency events do not appear on the ITI Curve.

Since the impulses have a duration that is unknown, they are represented as having a width of 10 microseconds.



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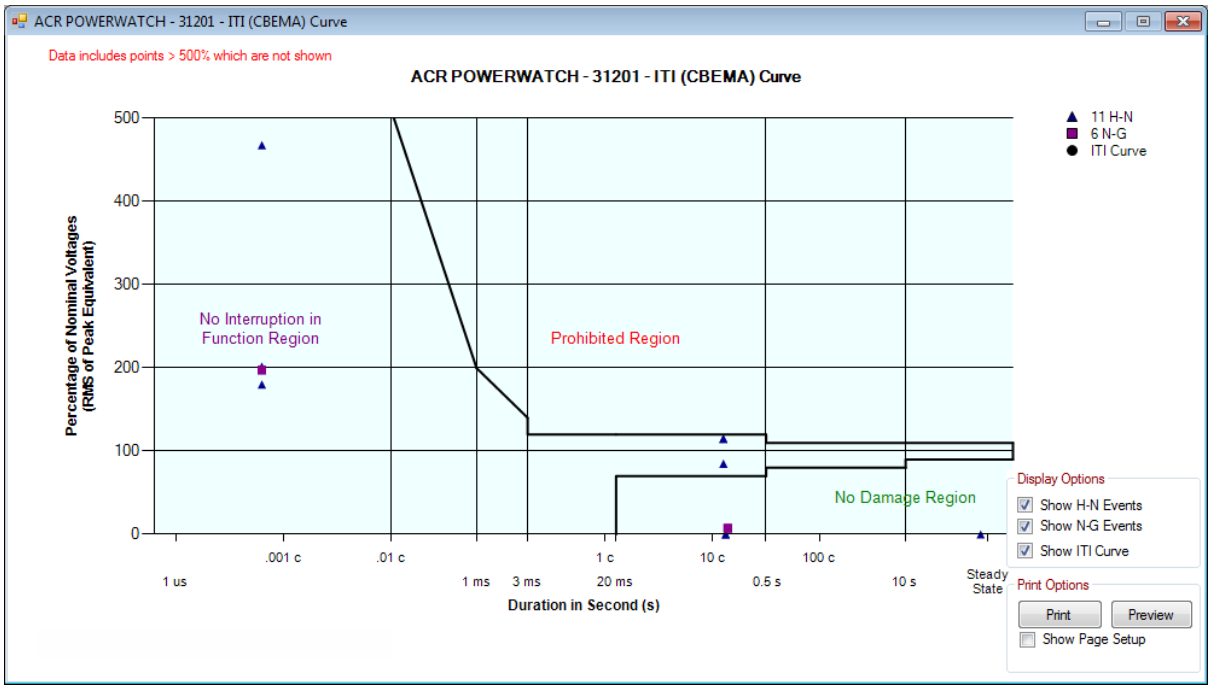
The ITI Curve has a maximum value of 500% of the nominal voltage. Events exceeding this value are not shown on the ITI curve. A message will appear at the top of the graph if this situation occurs.



Clicking the "*Show ITI Curve*" box will change the following parameters of the graph:

1. The ITI Curve is turned off
2. Events are displayed with units of "voltage" rather than "percentage of nominal voltage"
3. The Y-axis scale is changed to display all events
4. The graph title and Y-axis titles are altered to reflect the above changes

See also:
5.7.3.1 Display Options

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5.7.3.1 Display Options

Hot-Neutral events, Neutral-Ground events and the ITI curve can be visible on the graph by selecting the appropriate check box.

Note: The ITI standard curve has a maximum of 500% of nominal voltage. Impulse events exceeding this limit are not displayed, although they are still counted in the legend.

If the ITI curve is turned off, the Y-axis automatically scales to the maximum data value, which will display all events.

See also:
Printing Events

5.8 Printing Events and Graphs

5.8.1 Printing Events
5.8.2 Printing a Graph

5.8.1 Printing Events

The VDR can record up to 4000 events. Printing all events can require over 100 pages. The user may choose to print directly from the EventReader application following the procedure described below, which will allow the user to select which pages to print.

Alternatively, the user may use the standard windows copy and paste commands to copy the desired information to Word or Excel and print from that application.

1. With the Device Report window selected, choose **Print** from the **File** menu (or click the print button on the Toolbar).

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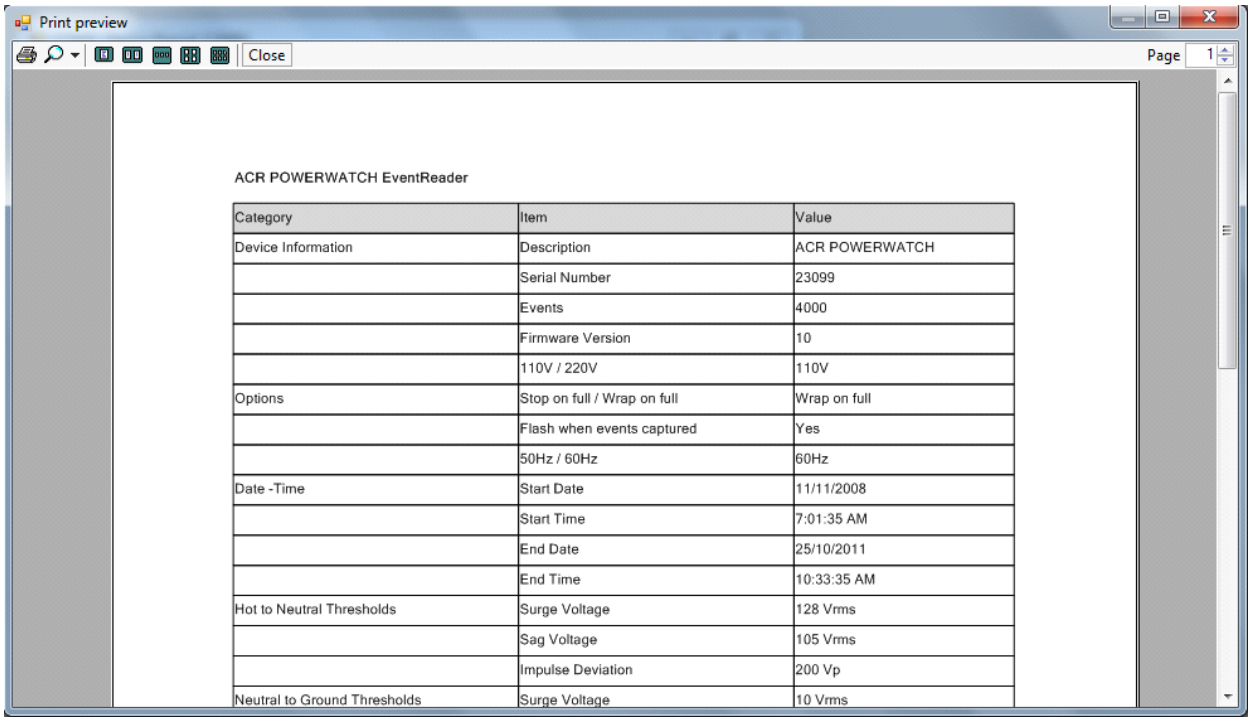

Category	Item	Value
Device Information	Description	ACR POWERWATCH
	Serial Number	23099
	Events	4000
	Firmware Version	10
	110V / 220V	110V
Options	Stop on full / Wrap on full	Wrap on full
	Flash when events captured	Yes
	50Hz / 60Hz	60Hz
Date -Time	Start Date	11/11/2008
	Start Time	7:01:35 AM
	End Date	25/10/2011
	End Time	10:33:35 AM
Hot to Neutral Thresholds	Surge Voltage	128 Vrms
	Sag Voltage	105 Vrms
	Impulse Deviation	200 Vp
Neutral to Ground Thresholds	Surge Voltage	10 Vrms

A Print Preview window will open. The VDR setup information appears on page 1, followed by 1 or more pages of recorded events. The user may scroll through the pages to identify which page range should be printed clicking the arrows in the top right corner of the window.

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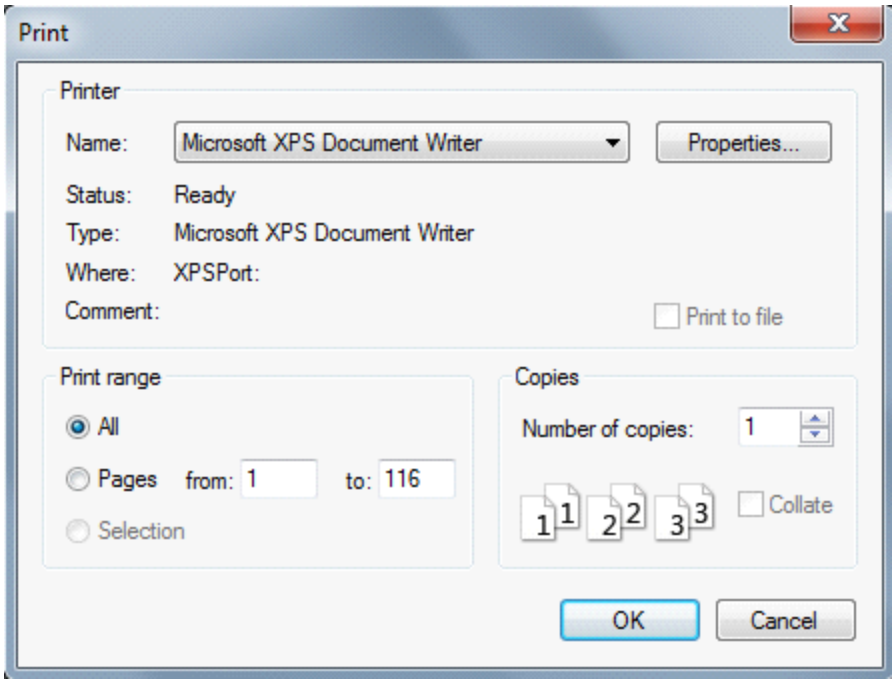
2. Click the Print icon at the top left corner of the window



A Print Dialog window opens with All pages selected.

3. Choose the printer and pages to print
4. Click **OK**

See also:
Copy to Clipboard
Printing a Graph

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5.8.2 Printing a Graph

The print controls for graphs are located in the bottom right corner of the graph.

If the Show Page Setup box is checked, the page orientation and margins can be set prior to printing.

Alternatively, the standard windows copy and paste technique may be used to copy the graph to another application such as Word, enabling you to print from that application.

See also:
Copy to Clipboard
Printing Events

5.9 Erasing Events

The recorded events in the PowerWatch VDR can be erased by following the below procedure.

Caution! Any unsaved data will be lost, so it is recommended to save previously recorded data before proceeding.

This procedure will also update the VDR's threshold and option settings to those displayed on the status tab.

1. Open a Device Report window
2. Click the Reset Device button at the bottom of the window
3. Click 'yes' in the confirmation dialog box that appears

The VDR will begin monitoring when plugged into a standard convenience outlet.

See also:
Saving Events
Downloading Events

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6 Troubleshooting

Overview

· Lite-Link Interface Cable
· Printers
· Voltage Disturbance Recorder
· Technical Support

6.1 COM Port
6.2 Printers
6.3 Voltage Disturbance Recorder
6.3.1 PowerWatch voltage readings are different from other meters
6.3.2 Date and/or time are not correct
6.3.3 PowerWatch time stamps are invalid after a prolonged period of time
6.3.4 Two PowerWatch units have different impulse readings on the same circuit
6.3.5 PowerWatch records long periods of large NG surge
6.3.6 PowerWatch does not record any data
6.4 Technical Support

6.1 COM Port

Many manufacturers of PC software and hardware use serial (COM) port(s). It is difficult to predict potential serial port conflicts. If the Lite-Link interface cable's wand tip is not flashing, there are a few steps that can be taken in order to potentially find the source of the problem.

· **Make sure that the Lite-Link interface cable is securely plugged in.** The Lite-Link may appear to be properly connected but only be partially plugged in.

· **Try a different serial port.** If the PC has more than one serial port, try another port to see if the Lite-Link flashes.

· **Determine if you have any other Windows programs using the serial port.** PC faxing programs or other programs that use the COM port can cause conflicts during data transmission. To verify that no other programs are running and causing communication problems, shut down your computer and restart if before you run the EventReader application.

· **Verify that your serial port settings are correct.** Verify port settings using Device Manager. Device Manager is found on the Task Bar by choosing **Start, Control Panel,** and **Device Manager**.

Standard COM port settings

Port	I/O Address	IRQ
COM1	3F8h	4
COM2	2F8h	3
COM3	3E8h	4
COM4	2E8h	3

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· **Verify that your serial port is functioning properly**. Use any standard Windows communications program to ensure the port is functioning. Examples include: ProComm, Windows 3.1 Terminal or Windows 95 Hyper Terminal.

Exit all programs (including EventReader) and connect the Lite-Link to the port. Run the communications software and set the local echo to "off" and hardware flow control to "none". Any alphanumeric character typed on the keyboard should cause the Lite-Link to flash, and the character to appear on the screen.

If the Lite-Link does not flash during typing, the Lite-Link may need repair.

If the Lite-Link flashes during typing, it should also work with EventReader software. Exit the communications program, and re-start EventReader. If Lite-Link does not flash when running EventReader, re-install EventReader software.

· **Check your mouse driver.** Certain older or inferior drivers for mice, trackballs, and laptop "pointers" are known to interfere with serial port operation. If, after disabling your mouse driver, the Lite-Link functions normally, try using a high quality mouse driver such as Logitech or Microsoft.

· **Try another computer.** An alternative to serial port troubleshooting is to use a different computer. Another computer with its serial ports set up correctly will confirm that there is an incorrect set up or software/hardware conflict with the original PC.

6.2 Printers

· Verify that the printer is plugged in, turned on, has paper, and is connected either directly to the PC or to a LAN.

· Verify that Windows is set up correctly. Windows uses its own printer drivers. Set up is done through the Devices and Printers section of the Control Panel. If you need help, follow the instructions in the Windows Help and Support section. Specifically "Troubleshooting Printers".

· Try printing from another program to eliminate the possibility of a hardware conflict.

6.3 Voltage Disturbance Recorder

6.3.1 PowerWatch voltage readings are different from other meters
6.3.2 Date and/or time are not correct
6.3.3 PowerWatch time stamps are invalid after a prolonged period of time
6.3.4 Two PowerWatch units have different impulse readings on the same circuit
6.3.5 PowerWatch records long periods of large NG surge
6.3.6 PowerWatch does not record any data

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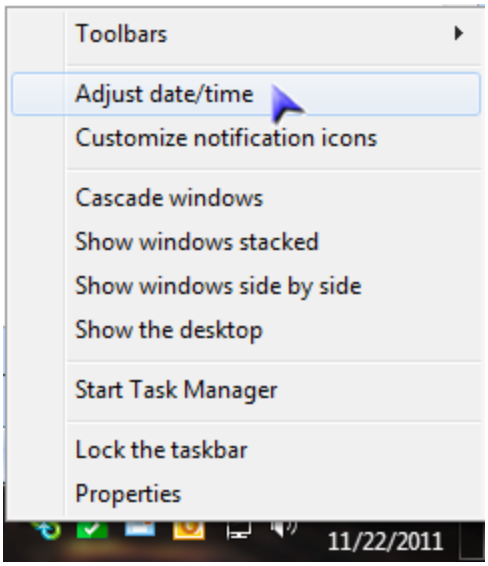
6.3.1 PowerWatch voltage readings are different from other meters

Possible solution 1: A PowerWatch VDR reads voltage in average RMS, while some manufacturers' meters may calculate and display True RMS.

Possible solution 2: Re-calibrate the VDR [see 5.2.1.6]

6.3.2 Date and/or time are not correct

The PowerWatch uses the PC's internal clock to reference the time of the downloaded data. Set the PC's internal clock to the current time. To adjust the date/time in Windows, right click on the clock in the system tray and choose "Adjust date/time".



6.3.3 PowerWatch time stamps are invalid after a prolonged period of time

To eliminate this issue, ensure that the PowerWatch VDR is cleared of data a minimum of once every four years.

6.3.4 Two PowerWatch units have different impulse readings on the same circuit

Locally generated impulses can carry relatively little power. One VDR can absorb some of the energy leaving less for the next one in the series to read.

6.3.5 PowerWatch records long periods of large NG surge

The VDR has been plugged into a convenience outlet that has been wired with the hot and neutral lines reversed. This event can usually be eliminated by setting the Neutral-Ground surge threshold to the maximum value. Impulses on Neutral-Ground will still be recorded in this situation.

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6.3.6 PowerWatch does not record any data

Possible solution 1: The VDR does not record events while communicating. Make sure that real-time display is stopped. PowerWatch will record events in 8 to 16 seconds thereafter.

Possible solution 2: Ensure the threshold settings are low enough to capture the event.

6.4 Technical Support

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Our customer support representatives are available during normal business hours, 6:30am - 4:30pm Pacific Standard Time.

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