

FLUKE®

1750

Power Recorder

Getting Started Guide

PN 2386767

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1750 Power Recorder

Introduction

The Fluke 1750 Power Recorder is a comprehensive yet easy to use system for power quality investigations. The 1750 Power Recorder, referred to hereafter as simply “the Recorder”, consists of a power recorder instrument, a wireless handheld Personal Digital Assistant (PDA) for control and setup, and a powerful yet easy to use PC application, Power Analyze. Four 400 A current probes are provided as standard equipment (not included in Basic version). A wide range of flexible and clamp-on current probes are available from Fluke.

Key features of the 1750 Power Recorder are:

- No PC needed for setup

Using the included wireless-enabled Personal Digital Assistant (PDA) as a controller, you do not need a PC to configure the Recorder, troubleshoot connections, preview data, or download the recorded data. Downloaded data goes onto the SD memory card plugged into the 1750, not directly to the PDA. The range of the PDA with the wireless link is about 5 meters (16 feet) from the Recorder.

- Simplified test lead connections to the power network

Simply connect a voltage probe to a conductor on each phase that you want to record. On the current inputs, the Recorder automatically identifies what type of probe is connected. The Recorder then configures its measurement system appropriately for the model of current probe you are using.

- Connection diagrams for the supported power network configurations (delta, Wye, and others) appear on the handheld PDA controller.

Once you make connections, you can view live readings and a phasor diagram on the PDA to confirm the connections. If a phase channel is wired incorrectly, you can swap the phase to another channel by changing an internal Recorder setting using the PDA, and then reconfirm correct readings.

- Internal Uninterruptible Power Supply (UPS)

An internal NiMH (Nickel-Metal-Hydride) battery pack and charging system maintain data capture continuity through power interruptions of approximately 5 minutes or less.

- Automatic disturbance capture

The Recorder uses an automatic, self-learning threshold routine, which means you do not have to set any event threshold limits before you start recording. You detect and display power quality events (disturbances) using the Power Analyze software on a PC after the event has been captured. You define thresholds for events after data is stored on the PC. This is called the "event detector" in the software. It does not make permanent changes to the data file, so you can experiment with different thresholds after the fact without worrying about losing data.

With these features, there is little else required to set up and start recording the data to conduct a power quality survey. Should you want to extensively analyze collected data, the procedures described later in this manual review the transfer of data from the Recorder to the PDA, and finally to a PC. Data may then be analyzed using Power Analyze on a PC. Extensive online help is provided in the Power Analyze software on the product CD shipped with the Recorder.

Contacting Fluke

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

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-3434-0181
- Singapore: +65-738-5655
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.

To register your product, visit <http://register.fluke.com>.

To view, print, or download the latest manual supplement, visit <http://us.fluke.com/usen/support/manuals>.

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

Safety Information

See the Specifications section of the Operators Manual for a full agency compliance list. Table 1 lists symbols that appear on the Recorder and in this manual.







Warning

To prevent possible electrical shock, fire, or personal injury:

- **Carefully read all instructions.**
- **Do not work alone.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Use only insulated current probes, test leads, and adapters as supplied with the Product.**
- **Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.**
- **Remove all probes, test leads, and accessories that are not necessary for the measurement.**
- **Make sure the ground conductor in the mains power cord is connected to a protective earth ground. Disruption of the protective earth could put voltage on the chassis that could cause death.**
- **Only use probes, test leads, and accessories that have the same measurement category, voltage, and amperage ratings as the product.**
- **Do not use exposed metal BNC or banana plug connectors.**

- Do not put metal objects into connectors.
- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.
- There are no user-replaceable parts in the Product. Have an approved technician repair the Product.
- Use the Product only as specified, or the protection supplied by the Product can be compromised.

Table 1. Symbols

Symbol	Description	Symbol	Description
	Hazardous voltage. Risk of electrical shock. Precedes Warning		Risk of danger. Important information. See manual. Precedes Caution and Warning.
	Conforms to requirements of European Union and European Free Trade Association (EFTA).		Do not dispose of this product as unsorted municipal waste. Contact Fluke or a qualified recycler for disposal.
	<i>Canadian Standards Association.</i> [Note: Canadian and US.]		Protective conductor terminal.
CAT III	CAT III equipment is designed to protect against transients in equipment in fixed-equipment installations, such as distribution panels, feeders and short branch circuits, and lighting systems in large buildings.	CAT IV	CAT IV equipment is designed to protect against transients from the primary supply level, such as an electricity meter or an overhead or underground utility service.

Standard Accessories

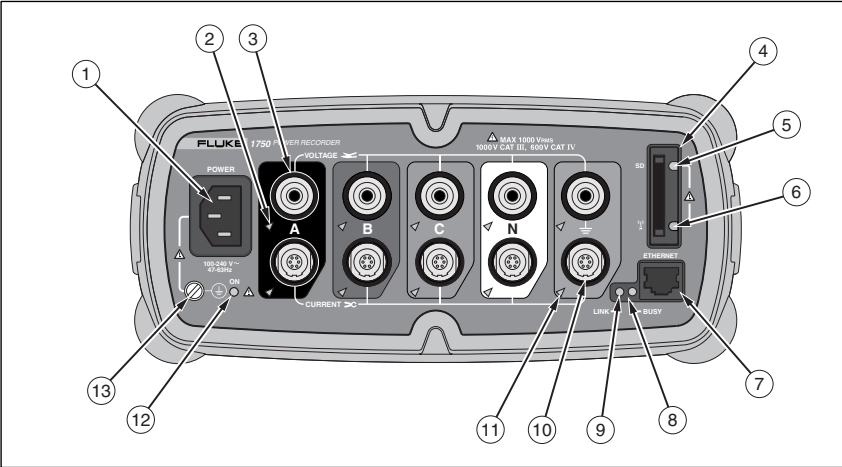
Table 2 describes the standard accessories that ship with the Recorder. Other optional accessories are also available. See the *1750 Operators Manual* for a complete list.

Table 2. Standard Accessories

Description	Part Number
Ethernet cable, 3 meters, yellow	2402854
Colored plastic clips for test leads (32 clips, 8 colors, 4 clips each color)	2157607
Model TLS430, test lead set including cable and clips	2157713
Secure Digital (SD) Memory Card for downloading data	Contact Fluke
Model 3140R, 400 A Probes (4 - not included with Basic version)	2277216
AC power cord, 3 meters	2441360
Personal Digital Assistant (PDA) with USB cable and accessories	2386780
CD ROM Manuals and Software	2386771
1750 Getting Started Guide	2386767
Sheet of Front Panel Decals	2436261
Sets of international ac power plug adapters for the PDA charger	2583479
International adapters for the Recorder power cord	2441372

Features

The Recorder front panel is illustrated in Figure 1 and described in Table 3.



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Figure 1. Fluke 1750 Power Recorder

Table 3. Input Terminals and Controls

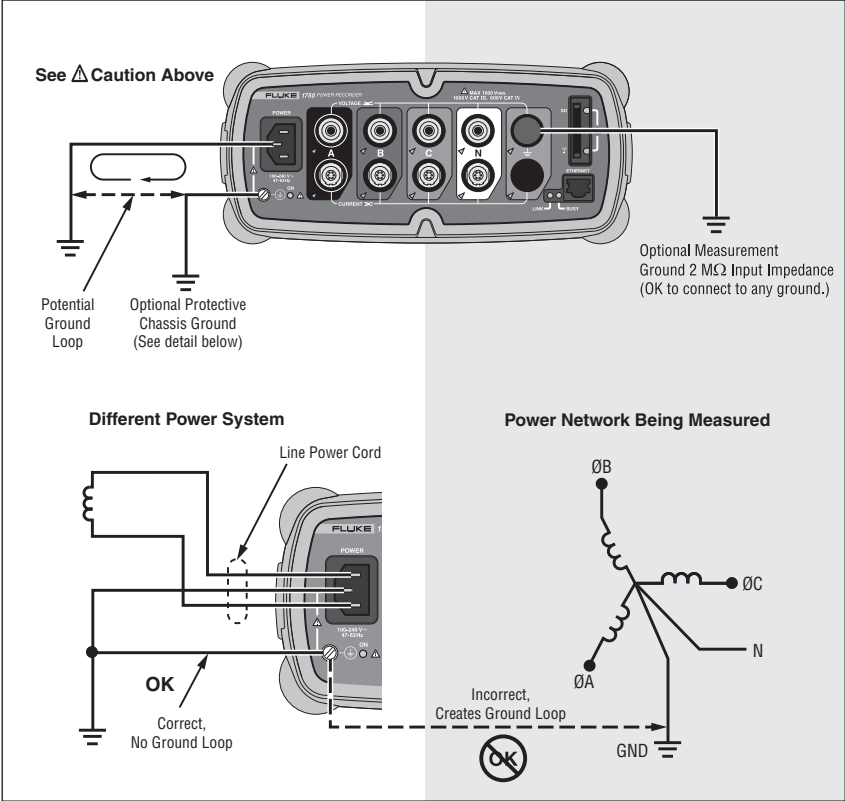
Number	Description
①	Standard 120/240 V 50/60 Hz power input for Recorder power
②	Voltage indicator Steady Voltage is present, not overloaded Blinking Voltage overload (overload threshold 1100 V)
③	Five voltage measurement inputs
④	Removable Secure Digital (SD) memory card for transfer of large quantities of data. You can remove the card from the Recorder, insert in the PDA and transfer data to the PC via the “synchronize data” feature of the PDA. A USB SD card reader may also be used.
⑤	SD status indicator Blinking green Reading from SD card – do not remove the card Blinking orange Writing to SD card – do not remove the card Off No active SD card operation – you can safely remove the card

Table 3. Input Terminals and Controls (cont.)

⑥	<p>Wireless Controller Status Indicator</p> <p>Blinking Wireless controller communicating</p> <p>Off Inactive</p>
⑦	<p>Ethernet port. TCP/IP via Ethernet is used to connect the Recorder to a PC for downloading recorded data, and for configuring the Recorder when not using the PDA. This is the recommended method of data transfer due to its speed and reliability.</p>
⑧	<p>Busy Indicator</p> <p>Blinking Network is busy</p>
⑨	<p>Link indicator</p> <p>Off No link</p> <p>Steady Link Present</p> <p>Blinking Communicating with PC</p>
⑩	<p>Current Measurement Terminals (5)</p>
⑪	<p>Current indicator</p> <p>Steady Current probe in normal range</p> <p>Blinking >110 % of probe range, use a higher range probe</p> <p>Off Current insufficient to measure</p>
⑫	<p>Red/Green LED</p> <p>Steady green AC input power normal, instrument is not booted or locked</p> <p>Green/Orange blinking Recording</p> <p>Blinking red Recorder running on UPS</p>
⑬	<p>Ground Terminal</p> <p>Connecting the supplemental ground terminal and the line cord safety ground to different ground potentials creates a ground loop that can damage the Recorder. To avoid this, use the supplemental ground terminal only when no protective earth ground connection exists through the line power cord. If there is any chance that a safety ground connection does exist through the line power cord connection, make sure to connect the supplemental ground terminal only to the ground system used by the ac receptacle that powers the Recorder. See Figure 2.</p>

⚠ Caution

Connecting the supplemental ground terminal and the line cord safety ground to different ground potentials creates a ground loop that can damage the Recorder.



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Figure 2. Connecting the Supplemental Ground Terminal

Charging the PDA Battery

Your PDA is shipped with a discharged or partially charged, rechargeable battery. You should fully charge the battery before setting up the device, and recharge it regularly. Refer to your PDA user's guide for detailed information about the battery.

⚠ Caution


Do not leave important data on the PDA. If the battery discharges completely, you will lose all data not stored in File Store (ROM). Discharging the battery completely is similar to performing a hard reset. Refer to the PDA Users Manual for more information.

Installing the Software

This section describes how to install Fluke Power View software on the PDA and Fluke Power Analyze software on your PC. Keep your product CD in case you need to reinstall this software in the future. You should periodically check the Fluke website: www.fluke.com to see if any 1750 firmware or application software updates are available for download. Fluke encourages you to register the Recorder. After your Recorder has been registered, you will receive email notifications of firmware and software update availability.

Installing Power View on the PDA

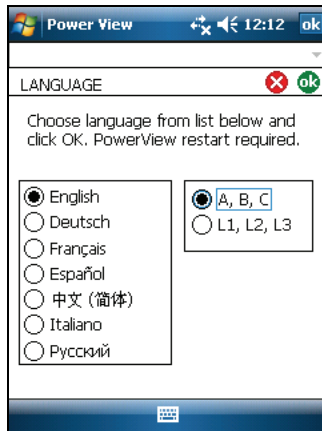
1. Insert the CD that ships with your PDA. Follow the on-screen instructions to install the ActiveSync software for Windows XP (or Mobile Device Center for Windows Vista and Windows 7) that allows your PC to communicate with the PDA.
2. Connect the PDA to your PC with the USB lead and establish communication between the PDA and your PC. Keep your product CD in case you need to reinstall this software in the future.
3. Insert the CD that ships with your Recorder in the CD-ROM drive on your PC.
4. A window appears that lists options on the CD. If the install software window does not automatically appear, do the following:

- a. Use Windows Explorer to locate the **sw/FPV_Vx.yy.exe** file on the CD. Replace x.yy with the current version number shipped on the CD.
 - b. Double-click **FPV_Vx.yy_Install.exe** to launch the installation program.
5. Select a language preference for the installation.
 6. Follow the on-screen prompts. Power View is installed in the Programs folder on the PDA.
 7. To start Power View, select Start, and then Programs on the PDA.
 8. Tap the Power View icon () to start using the application.

Language Selection

Power View features a localized user interface for English, German, French, Spanish, Chinese, and Italian. When Power View operates for the first time on a new PDA or after a hard reset, it directly opens the language setup window. This window is also accessed by **Menu>1750 Setup>Language**.

The Language window also provides the option to choose between the phase identifiers A, B, C and L1, L2, L3.



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PC System Requirement for Power Analyze

- Windows XP, Windows Vista 32/64bit, Windows 7 32/64bit. Administrator privileges are required to install applications.
- PC with 500 MHz or faster processor.
- 256 MB RAM, 1 GB recommended (100 MB of available disk space, 10 GB recommended).
- 1024 x 768 or higher resolution video.
- Keyboard and mouse.


Installing Power Analyze


Before installing the software on your PC, make sure you have Internet Explorer version 6, or later, installed. Other recommended software:

- Adobe Acrobat Reader
- Microsoft Word 2000 or higher
- Microsoft Excel 2000 or higher

⚠ Caution

Do not remove the CD until after you have successfully installed the software, rebooted the machine, and opened the application.

1. Insert the CD into your CD-ROM drive.
2. A window appears that lists options on the CD. If the window does not automatically appear:
 - a. Use Windows Explorer to locate the **sw/FPA_Vx.yy.exe** file on the CD. Replace x.yy with the current version number shipped on the CD.
 - b. Double-click **FPA_Vx.yy_Install.exe**.
3. Select a language preference for the installation process. Power Analyze initially starts in this language. You can change the language from the menu **Settings>Language**.
4. Follow the installation instructions that appear. After software installation is complete, the Power Analyze icon  appears on your desktop.

5. Start Power Analyze on your PC by choosing **Start >All Programs >Fluke >Power Analyze >Power Analyze** or double-click the Power Analyze icon  on your desktop.
6. After the installation is complete, please take a few minutes to complete your product registration. You can register quickly online (preferred) at <http://register.fluke.com> or you can print the form and fax it to the number provided on the form. Product registration is very important since it allows you to get free software updates and helps us provide you with the fastest and most efficient technical support.

Note

You may need to change your Windows firewall settings to allow the program FPA.exe to use ports 18571 (TCP) and 18572 (UDP). For more on changing firewall settings, refer to <http://support.microsoft.com>.

Installing the Power Recorder at a Facility

This section describes the steps you need to take to set up the Recorder at a facility and begin a recording session.

Work Flow

There are three distinct stages for a recording session.

- **Setup**
Setup, hookup, and verification of connections and measured signals. This is when you will want to clear the Recorder memory (not required, but best practice because data download when finished only contains your new data). This is a good time to change any recorder settings. Edit the measurement description now or after downloading the measurement data and insert annotations and/or an optional START mark into the recorded data stream. Annotations are messages or notes you insert into the data stream during a recording session.
- **Interim checkup, mid-recording session**
At this time, you may want to re-check all the live input signals, and download the data recorded since the beginning of the recording session. This does not interfere with ongoing recording in any way. Annotation capability is always available during the recording session.

- End of recording session

You can re-verify if desired, correctness of live data and then download data, power off the Recorder, and pack up for transport.

Installing the Recorder


1. Position the Recorder within 2 m (6 ft) of the monitoring location.
2. The Recorder can be set on the floor or a table, or attached and secured to a pole or other mounting surface. The Recorder can be oriented vertically or horizontally.
3. Connect the Recorder to a 100 to 240 V ac power source, 50 or 60 Hz.
4. Plug the power cord into a properly-grounded wall outlet.

⚠ Caution

To avoid damage to the Recorder:

- **Ground the chassis as appropriate according to your power connection before you do anything else.**
- **Connect the power cord to the Recorder using the appropriate supplied adapter.**
- **Connect the power cord to a properly grounded wall outlet.**
- **Be sure to plug the power cord into the Recorder panel BEFORE connecting it to an outlet.**

After a minute, or two, all LEDs should flash **ON**, then **OFF**, and then each should turn ON and OFF in sequence. The LEDs will then remain on if you make secure test lead connections and there is sufficient voltage and current.

5. Turn on the PDA and tap the Power View icon  to launch Power View.

If a Recorder is within range and is not password protected, it should appear in the drop down menu just below the main title bar on the PDA. You may need to select **Browse for recorder** when first connecting. Select the recorder you want to browse to with the PDA stylus. Upon selection, the Home screen for live data appears.

If more than one Recorder is within range, these will appear in the drop down menu list.

6. If you have previously established password protection for the Recorder, you must type the correct password in the Password text box and click **OK**. (Password protection is established for a specific Recorder using either the Setup Password menu in Power View or the Power Analyze software).

Connecting the Recorder to the Wiring

After you have set up the Recorder you are ready to connect the voltage leads and current probe or flexi-probes to the power network being tested. Refer to the Power Type diagrams provided on the PDA or in this manual.

Warning

To prevent possible electrical shock, Flexi-probes should not be applied or removed from hazardous live conductors.

In most cases, you should install the current probes first. Because they are clamped around wires, current probes are usually more secure than voltage probes. Examine the conductors you are about to connect to and determine if you should attach the current probes to the phase wires or busbars before you connect the voltage probes.

1. Select and attach the appropriate current probes to the Recorder.
2. Select and attach the appropriate voltage test leads and probes to the Recorder.

Note

If your power connections require potential transformers (PTs) or current transformers (CTs), you can use the ratio settings in Power View to set the Recorder to display readings as they exist on the primary side of the PT and CT (for example, 12000 V).

3. Connect the Recorder to the wiring by first connecting the measurement ground test lead to the distribution system ground, and then the neutral probe to neutral.

4. Connect the ground current probe to the distribution system ground and the neutral current probe to neutral, with the arrow on the current probe pointing towards the load (away from the source) in each case.
5. Connect the remaining current probes to the power network.
 - The arrow on the current probe should point toward the load.
 - Use the color-coding on the leads to help you connect the probes to the correct phases, neutral and ground.
6. Connect the remaining voltage probes.

Note

Make sure the voltage probes and current probes are paired correctly, Phase A (L1) voltage to Phase A (L1) current and so forth. Calculations are made in pairs and cannot be changed after data is recorded. The leads for the voltage probe and current probe of the same color should be attached to the same phase wire or busbar.

7. Check the LED for each phase to make sure a connection is established.
 - When a phase LED is ON or lighted, you know that the connection is active and that voltage and current is within the normal range.
 - When a phase LED is BLINKING, you are connected but the voltage or current is exceeding the normal range or exceeding the range of the probe that you are using.
 - When a current LED is OFF or unlit, there is insufficient current present in the line.

Verifying Your Connection

Before you leave the Recorder to accumulate data at the facility, double-check the connections.

- Make sure the current probes are secured and completely closed around the conductors and that the voltage and current LEDs are steady-on.
- Use the PHASOR screen on the PDA or PC to verify that the voltage and current connections are correct. You can swap the connections using Power View if they are incorrect.

Finishing Up

After making any corrections to the connections, recheck the PHASOR diagrams to confirm your connection. Make sure the nominal voltage, nominal line frequency, and power type (delta, wye, other) are correct before you leave the Recorder. It is a good practice to insert a Start Mark when you are finished with all settings so you can download data and ignore useless readings and events common at the beginning probe connecting activities. You can also use the “**Erase Memory**” function and measurement descriptions such as company, name, and measurement purpose. This can be done at this point or after downloading the measurement data.

Managing Recorded Data

Recorded data resides in the Recorder on an internal non-physically accessible flash memory circuit. The transfer of recorded data to the SD card in the Recorder’s SD slot is automatic when you insert the SD card or you request a download action using the PDA. Downloading to a PC running Fluke Power Analyze Software (included) using the Ethernet cable is recommended and the fastest way to retrieve data from the Recorder.

Note

*To stop the automatic copy from the SD card memory, go to **Menu >Tools >1750 Internal Memory** or **Menu >Tools >1750 SD Memory**.*

Downloading Data and Erasing Memory

Use the Data menu options to manage the Recorder memory and download recorded data to the SD card plugged into the Recorder's (not the PDA) SD card slot. You are downloading recorded data from the flash memory to an SD card in the Recorder. When you want to use that data, you must move the card to the PDA. You can later copy the data to your PC for review using the Power Analyze software.

Auto Download

The Auto Download feature copies all recorded data to the SD card without a PDA or PC. Auto Download starts when you insert the SD card and have no connection to Power View or Power Analyze. The SD card status indicator flashes while a copy of the data moves to the SD Memory card.

Note

Do not remove the SD card while the SD status indicator is flashing. The SD card can be safely removed when the SD status indicator is off.

To stop the automatic download with Power View, select either **Menu>Tools>1750 Internal Memory** or **Menu>Tools>1750 SD Memory**.

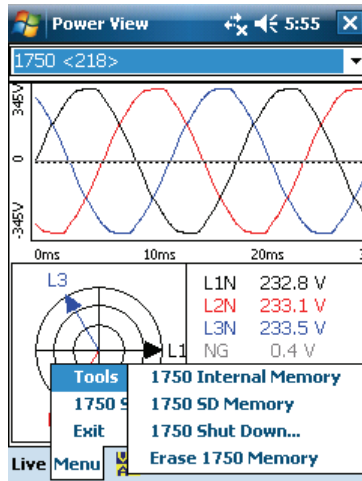
If the download does not start automatically:

1. Verify that neither Power View nor Power Analyze is connected to the device.
2. Watch the SD status indicator. As soon as an SD card is inserted, the indicator flashes green for a short time. This is the indication that the device has recognized the SD card. If nothing happens the SD card is not compatible with the Fluke 1750.
3. Check to see if the SD card is write-protected. Make sure the slider on the card is not in LOCK position.

If the SD status indicator flashes when the SD card has been inserted but it does not flash for a longer period of time (>1 second) the available space may be insufficient. Use a new, empty card or delete files on the SD card with the use of the PDA or a card reader.

PDA Download

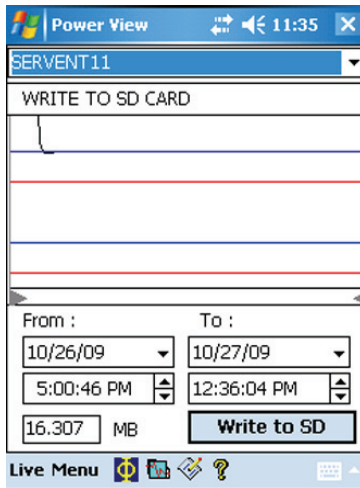
Tap **1750 Internal Memory** in the Data menu to view the Download screen.



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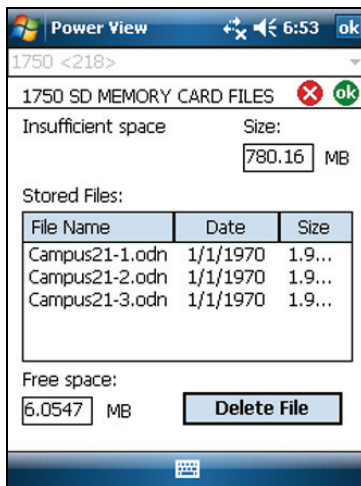
The Download screen shows a three-phase rms V strip chart with date and timescale shown. This represents the data in the Recorder internal memory. The default settings of the start and stop times is everything in memory. To download ALL, tap the **Write to SD** button. If you want to trim off data that contains partial information because probes were being connected, select the START mark annotation (if one was entered by the user) as the start point.

The gray cursor lines right and left with triangular arrowheads at the bottom of the screen show the start and stop times currently selected for download. Green and red flags are START and STOP mark annotations inserted during the recording session. Yellow flags are file name annotations inserted during the recording session, or setup parameter changes that change the data significantly, such as nominal voltage or power type.



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If the SD storage card already contains data files, it may not have room for the new download. Power View alerts you to this condition and asks if you would like to erase the SD card before downloading.



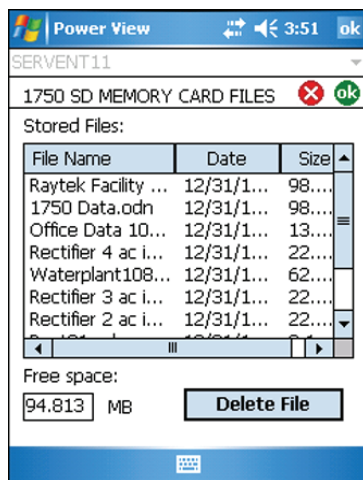
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You can also access the SD card to delete files by selecting **Menu>Tools>1750 SD Memory**.

1750

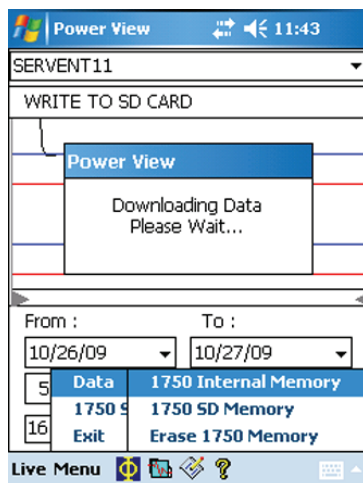
Getting Started Guide

You can delete files as necessary, and when satisfied that there is room on the card, proceed to write the selected internal Recorder memory data to the SD card.



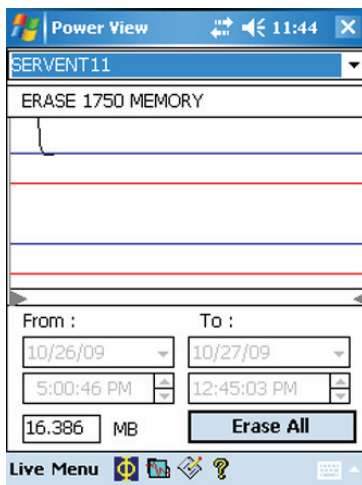
azd108s.bmp

When there is room on the card, a message confirming the download will appear.



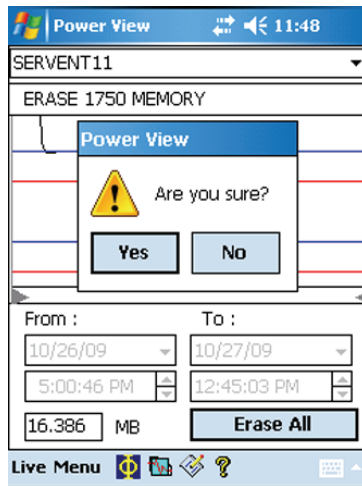
azd118.bmp

You can also tap the **Erase 1750 Memory** from the Data menu option which is available under **Menu**, and tap the **Erase All** button to erase all power quality data stored in the Recorder. Even then, if you want, you can leave old data in Recorder memory. It will be overwritten automatically when you start your next Recorder session, so it never has an adverse effect on recorded data quality or quantity.



azd109s.bmp

When you choose to **Erase All**, the following popup caution “Are you sure?” appears on the screen.



azd119.bmp

Note

You can also download data by connecting your PC directly to the Recorder with an Ethernet cable and run Power Analyze in the 1750 Live mode. All of the functions (controller, PDA, and Power View) are duplicated in 1750 Live mode.

Power Type Diagrams

Power type diagrams are provided on Power View and Power Analyze and can be referenced when you are setting up nominal power on the Recorder. The diagrams are used as an aid in making the correct test lead connections. The following power type diagrams are for the standard power configurations:

- One-Phase Plus Neutral
- One-Phase IT No Neutral
- One-Phase Split Phase
- Three-Phase Wye
- Three-Phase Delta
- Three-Phase IT
- Three-Phase High Leg

- Three-Phase Open Leg
- 2-Element Delta
- 2 ½-Element Wye

Using Fluke Power Analyze

In addition to analyzing data that has already been recorded, you can also connect to a Recorder through Power Analyze. When you do this, all of the features available through the PDA are also available directly on your PC. For example, you can:

- View live data by connecting to a Recorder connected to power.
- Configure a 1750 Power Recorder to which you are connected.
- Add annotation markers and take manual snapshots that are then stored in the Recorder.

Fluke Power Analyze software lets you work on your PC with power quality data monitored by and received from the Recorder. With Fluke Power Analyze, you can download, review, and analyze data. For example, you can:

- Download data from a Recorder into a data file on your PC, or open a file that was downloaded previously and moved to your computer.
- Analyze the data you have downloaded using a series of views to see different aspects of it, including summary graphs of Summary, events, harmonics, THD, flicker, power and energy.

As you review the data on the Power Analyze screens, you can adjust the data shown by turning on and off display of different channels and select other parameters. You can focus on the specifics that help you analyze and understand the power quality data.

- See snapshots of the recorded power quality data at specific points in time as though you had looked at the measurements while they were live.


Because snapshots are captured at regular intervals, you can advance through them and review the measurement as they were at successive points in time.


- Build reports with a single click. Store the report configuration for reuse. Document important data as you identify it in the recorded data files.

This section of the Getting Started Guide describes how to begin working with Power Analyze software to review and analyze data in recorded data files. Use it to become familiar with the Power Analyze interface and features. Detailed information for is available in the Power Analyze online help.

Getting Answers to Questions as You Work



As you work with Power Analyze, you can use Online Help to get detailed information about how to use the software to examine recorded data, connect to instruments and view live data, download data, and other tasks. You can access the online help system included in Power Analyze in several different ways.

In the main window, click the **Help** question mark  on the toolbar and then click an item on the screen to get information about that item. You can use this to find information about buttons and other items on the toolbar, commands in menus, and the main screens.

For information about the current view, or for help in a dialog box, click . You can also see this information by pressing the **F1** key.

You can also open the help system by choosing **Help Topics** from the Help menu.

Once Help is open, you can use the **Contents**, **Index**, and **Search** tabs on the left to help you locate information.

If the Help window is too wide, you can hide the navigation pane on the left by clicking  at the top of the Help window. To open the navigation pane again, click .

Starting Power Analyze

You can start Power Analyze on your PC by choosing **Start >All Programs >Fluke >Power Analyze**.

As you learn to use Power Analyze, you can use the file named SAMPLE.ODN until you have a data file you want to analyze.

Working with Recorded Data Files

You work in the Fluke Power Analyze works with one file at a time. When you download data, it is stored in a file with the extension ".odn". When you download using Power Analyze, these files are stored by default in the directory "My Documents\Fluke\Power Analyze\". If you move downloaded data from the Recorder to the PC via an SD card, you can copy the .odn file either to this Power Analyze directory or to another folder. For information about moving downloaded data to your PC, see "Moving Downloaded Data from the Recorder to a PC" later in this manual

To start Fluke Power Analyze and open a file at the same time

1. In the Windows Explorer or on your desktop, locate the .odn file you want to open.
2. Double-click the file to open the file in Fluke Power Analyze.

To open a data file when Fluke Power Analyze is already open

1. From the File menu, choose **Open**.
2. In the Open dialog box, navigate to the file you want to open, select it and click **Open**.

The file opens in a Fluke Power Analyze window and displays the Summary view. The name of the file appears in the application title bar. For details about the Power Analyze window, see "Overview of the Power Analyze Screen" later in this manual.

Moving Downloaded Data from the Recorder to a PC

The procedure below describes how to download recorded data from the SD card to your PC to analyze recorded data using Power Analyze.

To move the downloaded data from an SD card to your PC:

1. Download the data from the Recorder's internal flash memory to the SD storage card.
2. Insert the SD storage card into the SD card slot on the PC, if available, or SD card reader.
3. Copy the measurement files to a known location.

To move the downloaded data from an SD card to your PDA:

1. Insert the SD card into the PDA.
2. Connect the PDA to your PC with the USB cable.

The SD card should display as an additional drive storage card for the PDA in the My Computer folder.

- 3. On your PC, open the card as a drive.
 - 4. Copy the files from the PDA to the desired location on your computer.
- You are now ready to open the recorded data files in Fluke Power Analyze.

Overview of the Power Analyze Screen

Whether you are working with a recorded data file or are connected live to a Recorder, many of the elements of the Fluke Power Analyze screen are the same.

Power quality data appears in the central screen area. The type of data you see depends on the active mode and view. Additional view controls on the right side and buttons on the tool bar let you customize how the data displays.

Figure 3 shows the Summary recorded data view and Table 4 describes the areas and controls of the screen. For a detailed review of the contents of the actual data, see “Recorded Data Screen Overview” later in this manual.

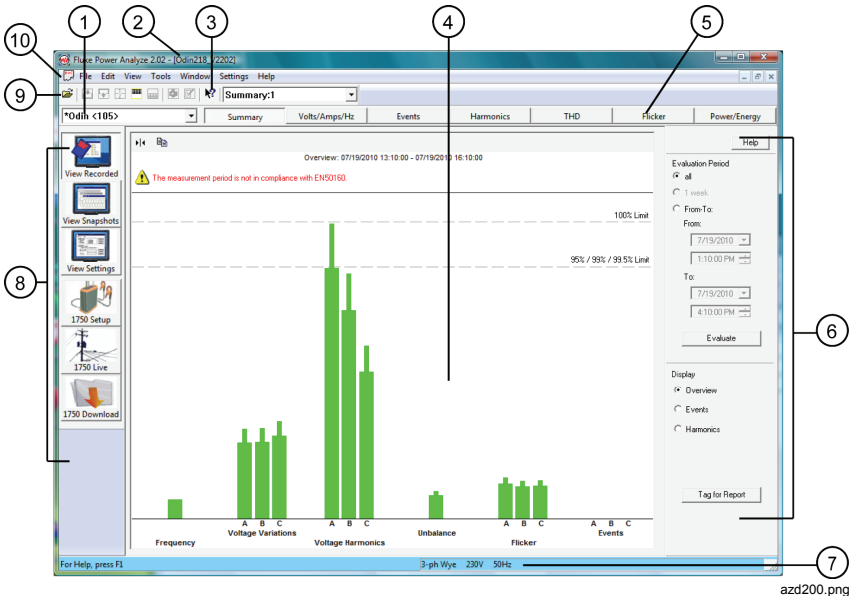


Figure 3. Power Analyze Screen

Table 4. Power Analyze Screen Areas and Controls

Number	Description
①	Connected Recorder. When you are connected to a 1750 Power Recorder, this field shows its name. A drop-down list shows other Recorders to which you can connect.
②	Name of data file. When you view recorded data, the name of the ".odn" file appears in the window title bar.
③	Help buttons. Several types of online help are available for Fluke Power Analyze. Two are shown on this screen. For details about accessing Help, see "Getting Answers to Questions as You Work" earlier in this manual.
④	Main Data Area. The central part of the screen shows the power quality data for the active mode and view. You can make further adjustments to the data displayed by using the view controls and tool bars.
⑤	View toolbar. Provides quick access to the different power quality data views for the active mode (Recorded Data, Snapshots, or Live 1750 Data). The active button on the View toolbar indicates the view you see now.
⑥	View controls. View controls specify what data to display in the view, and how it should appear.
⑦	Status Bar. Shows the power configuration, nominal voltage, and frequency for the data you are viewing. When viewing live data, it also shows the name of the Recorder.
⑧	Power Analyze Mode Side Bar. Mode buttons activate different sets of views and screens in Power Analyze. The active button indicates the mode in view. In the screenshot example, View Recorded is active. For more information, see "Overview of the Power Analyze Modes" later in this manual.
⑨	Main tool bar. Frequently used actions appear as buttons on the toolbar.
⑩	Menu bar. Menus provide access to Power Analyze commands. Frequently used menu items are also available on the main toolbar and view toolbars.

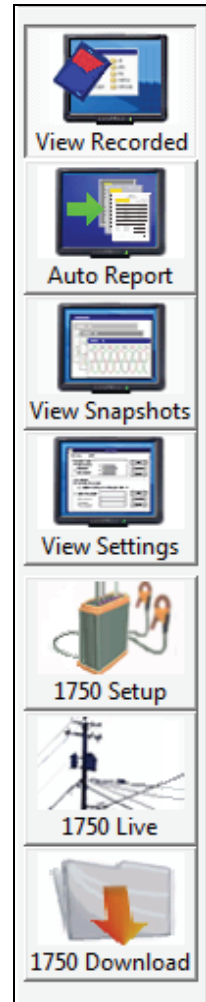
Overview of the Power Analyze Modes

There are six modes in Fluke Power Analyze, all available from the side bar at the left of the screen. The top three allow you to work with recorded data that has been saved as a data file, while the bottom three let you work with live data when you are connected to a Recorder.

Recorded Data Modes

These modes are available when a recorded data file (.odn) is open.

- **View Recorded** lets you analyze data that has been downloaded from a Recorder and saved as a data file.
- **Auto Report** lets you create user-configurable reports of downloaded data in MS Word or PDF.
- **View Snapshots** displays snapshots of measured power conditions taken manually or on a periodic basis throughout the monitoring period and stored in the recorded data file.
- **View Settings** displays the Recorder settings that were in effect when the recording was made. This includes power configuration, nominal voltage and frequency, voltage and current ratios, and other connection factors.



azd246.png

Live Data Modes

These modes are available when connected to a Power Recorder.

- **1750 Setup** lets you view and set the instrument settings, including the power configuration, nominal voltage and frequency, voltage and current ratios, and other details about the data that is recorded before

starting a recording session. You can also create a password in this mode.

- **1750 Live** lets you monitor data directly, when you are connected to a Recorder.
- **1750 Download** lets you retrieve data from the Recorder and save it on your computer.

Recorded Data Screen Overview

Recorded data views are the primary screens you work with when analyzing power quality data. Five different views of recorded data are available: Summary, Volts/Amp/Hz, Events, Harmonics, THD, Flicker, and Power/Energy. Figure 4 shows a sample Recorded Data Screen and Table 5 describes the contents of the screen.

In many of the recorded data views you see both a Reference graph and a Detail graph. The reference graph shows the full range of available data. The detail graph shows a subset of that data. For more information about the screen menu and buttons, refer to the section “Overview of the Power Analyze Screen” earlier in this manual.

When you work with recorded data, many of the elements on the screen are the same regardless of which view is displayed.

Note

Check the Fluke website (www.fluke.com) for updates.

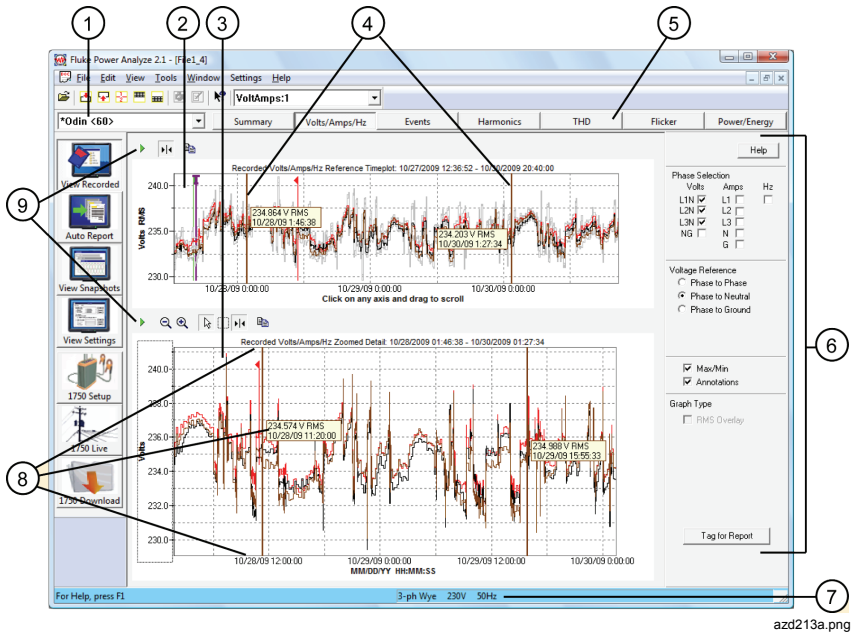


Figure 4. Recorded Data Screen

azd213a.png

Table 5. Recorded Data Screen Contents

Number	Description
①	Name of open data file. Shows the name of data file that is presently open.
②	Reference graph. Provides an overview of the data for the entire recorded period.
③	Detail graph. Shows a detailed view of a portion of the recorded data, determined by the selection cursors on the top graph.
④	Selection cursors. The selection cursor bars mark the data shown in the Detail graph. As you move the cursor bars, the data in the detail graph adjusts.
⑤	View toolbar. Lets you change between recorded data views. The active button indicates the view you see now. In the screenshot above, Volts/Amps/Hz is the active view.
⑥	View controls. Specify data to be displayed in the view, and how it should appear. For example, on the Volts/Amps/Hz graph shown above, view controls let you hide or show phases, select whether maximum values are shown, or show or hide annotations.
⑦	Status Bar. Shows the power configuration, nominal voltage, and frequency for the data you are viewing.
⑧	Measurement guides. This set of guides let you measure data in the Detail graph. The measurement value is shown on the boxed labels between the guides.
⑨	Graph toolbars. Provide access to tools you can use with graphs, such as showing and hiding the guides, or zooming in on data.

1750 Live View Screen Overview

When you are connected to a Recorder, five different views of the live power conditions are available. You can see this same information using Fluke Power View on the PDA. Figure 5 shows a sample Live View Screen and Table 6 describes the contents of the screen.

Although the format of the 1750 Live views vary, the overall structure of the live screens is the same. The screenshot below shows the essential elements in the live Scope view. For more information about the Scope view and other 1750 Live views, see the Online Help.

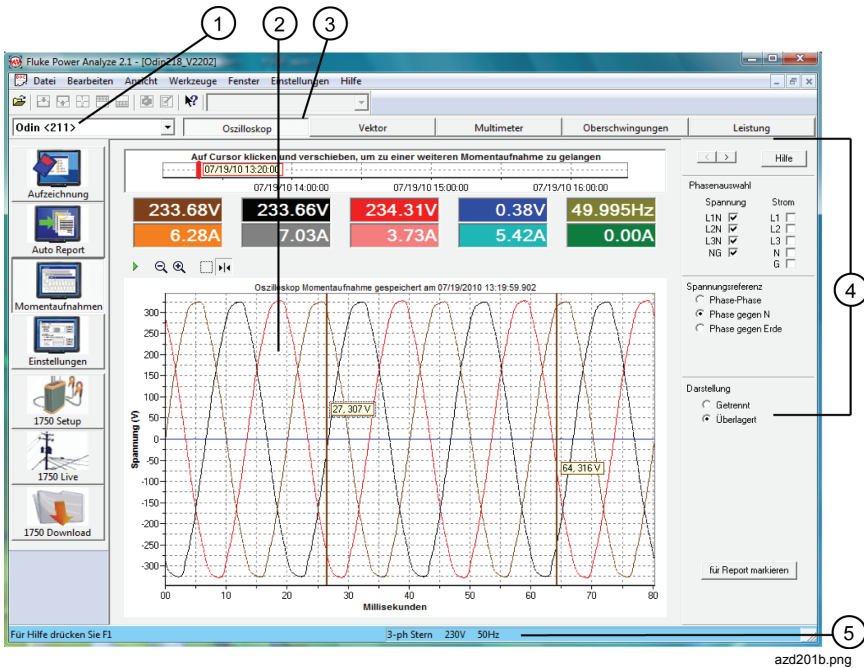


Figure 5. Live View Screen

Table 6. Live View Screen Contents

Number	Description
①	Connected recorder. Shows the name of the Recorder to which you are connected.
②	Main data area. Displays the power quality parameters you are viewing: Scope, PHASOR diagram, meter, harmonics, or power.
③	View toolbar. Lets you change between live views. The active button indicates the view you see now. In the screenshot above, Scope is active.
④	View controls. Specify what data to display in the view, and how it should appear.
⑤	Status bar. Shows the 1750 setup, including Recorder name, IP address, power configuration, nominal voltage, and frequency. You can set this information using the 1750 Setup mode, or using Power View on the PDA. For more information setting up a Recorder through Power Analyze, see the Online Help.

Snapshot Screen Overview

Snapshots are screen captures at a single point in time of the measurements made by the Recorder as displayed in 1750 Live mode. When you download data, you download snapshots (taken manually and at regular intervals), along with the long-term summary data and events. All five views that are available for live power are also available in the snapshot views, giving you a detailed view of conditions at specific intervals.

When you first display the Snapshot views, you see the first snapshot taken in the downloaded data. You can use the Slider Bar or the Next/Previous buttons to bring additional snapshots into view.

The interval at which snapshots are captured is specified when the Recorder is set up. In addition, a snapshot can be taken manually using the PDA or using the **Take Snapshot** button.

Figure 6 shows the main elements in snapshot views. More detail on specific snapshot screen elements are described in Table 7.

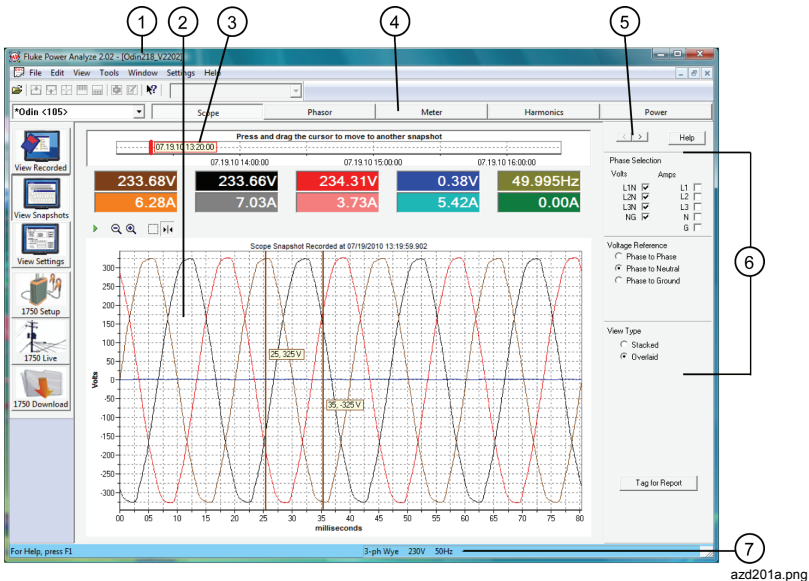


Figure 6. Snapshot Screen

azd201a.png

Table 7. Snapshot Screen Contents

Number	Description
①	Data filename. Shows the name of the data file presently open.
②	Main data area. Displays a snapshot of the conditions at the date and time shown in slider bar. In this example, the snapshot is of the Scope for the phases checked in the Phase Selection area of the view controls. For details about the contents of the different snapshot views, see the Online Help.
③	Slider bar. Allows you to move to a snapshot at a different point in time within the recorded data by dragging the slider.
④	View toolbar. Lets you change to different Snapshot views: Scope, Phasor, Meter, Harmonics, and Power. The active button indicates the view you see now.

Table 7. Snapshot Screen Contents (cont.)

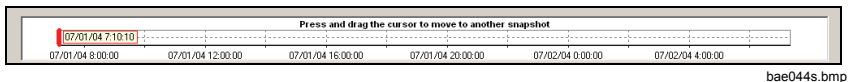
Number	Description
⑤	Next/Previous buttons. Lets you move through snapshots one at a time by clicking these buttons.
⑥	View controls. Specify data to be displayed in the view, and how it should appear.
⑦	Status bar. Shows the power configuration settings at the time the data was recorded.

Working with Snapshots

Snapshots are captured at regular intervals, based on the **Snapshot Interval** set in **1750 Setup**. You can also capture snapshots manually using the **Take Snapshot** button on the Power Analyze toolbar in 1750 Live Mode, or using the wireless PDA with the Recorder. Snapshot data is saved in the Recorder and downloaded with the rest of recorded data.

When viewing at Snapshot screens in Power Analyze, two tools are available to move through the available snapshots:

- The **Slider bar** appears at the top of each Snapshot view.



Press and drag the slider bar to the point in time for which you want to see power conditions.

The snapshot data closest to this point in time is shown in the Snapshot view.

- The **Next/Previous buttons** (< >) appear at the top of the View controls.

Click these buttons to move to the next snapshot in either direction.

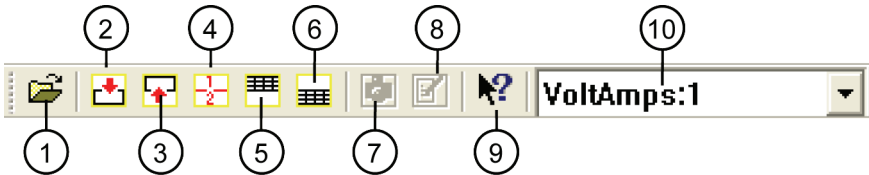
Main Toolbar

The main toolbar in the Power Analyze window includes standard Windows tools and some specialized buttons for working with Fluke Power Analyze graphs. Figure 7 shows the Main Toolbar and Table 8 describes the contents of the toolbar.

Hide or show the toolbar by choosing **View >Toolbar**.

Note

The tools on the main toolbar all have a corresponding topic on a menu.



azd252.png

Figure 7. Main Toolbar

Table 8. Main Toolbar Contents

Button	Description
①	Open. Opens a recorded data file.
②	Top Full Screen View. Expands the top graph to fill the graph window area.
③	Bottom Full Screen View. Expands the lower graph to fill the graph window area.
④	Split Screen View. Displays a reference graph on the top and a details graph in the bottom of the graph window area.
⑤	Top Table View. Toggles the display of the data in the top reference graph from graph to table and then back.
⑥	Bottom Table View. Toggles the display of the data in the bottom detail graph from graph to table and then back.

Table 8. Main Toolbar Contents (cont.)

Button	Description
⑦	Take Snapshot. Takes a snapshot of the current power measurements. Available only in 1750 Live views.
⑧	Insert Annotation. Inserts an annotation marker. Available only in 1750 Live views
⑨	Help. Lets you get information about buttons on the screen and commands in the menus. Click the Help tool button and then the item you want information about. For information about the contents of the main graph area, click the Help button at the top of the Graph controls on the right side.
⑩	Window List. Lets you switch between multiple windows in the same recorded data file.

Graph Toolbars

When you view data on graphs, special toolbars are available to help you work with that data. Figure 8 shows a sample Graph Toolbar and Table 5 describes the contents of the toolbar.

The particular tools available vary depending on the contents of the graph. The screenshot below shows some of the tools that appear on graph toolbars, and more detailed information about specific features follows that.

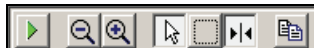








Figure 8. Graph Toolbar

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Table 9. Graph Toolbar Contents

Button	Description
	Zoom All the Way Out. Zooms out to display the full graph. Active only after you have zoomed in on a portion of a graph.
	Zoom Out. Zooms out on the graph keeping the same graph center.
	Zoom In. Zooms in on the graph keeping the same graph center.
	Select. Lets you select annotation markers in graphs on the Summary view and the Events view. When you select this tool Zoom becomes inactive.
	Guide. Shows or Hides the guides on a graph.
	Copy. Copies the current graph to the Clipboard.


Zooming In and Out On Graphs

Sometimes the amount of data shown on a graph makes it hard to clearly see the detail you need to analyze power quality data. When this is the case, you can zoom the graph to magnify your view of the data. A combination of zooming and scrolling can often be used to focus on the specific information you need.

Several zooming tools are available: the **Zoom Box** and **Zoom In/Zoom Out** buttons on the graph toolbar, and the **Auto Scale** and **Manual Scale** commands on the right-click menu (available when you point to either the horizontal or vertical axis).

To zoom in and out incrementally in the graph toolbar, click  and .

To zoom in on a section of a graph with the Zoom box:

1. If it is not already active, click .
2. Draw over the section of the graph you want to see in more detail.

Fluke Power Analyze zooms in on the area you marked and centers it in the window.



The selection cursors on the Reference Graph shift to mark the new selection.

3. If the information you want is not quite centered, you can scroll the graph horizontally or vertically.

Note

You can zoom in multiple times on an area of a graph. If the graph area appears blank, you may have zoomed outside the range of data.

To zoom out

- If you want to zoom out incrementally, click .
- If you want to zoom back to 100 % size, click .

To use **Auto Scale**:

You can automatically zoom the available data to the size of the graph window by using **Auto Scale**.

Auto Scale can be used based on either the Y-axis or the X-axis:

1. Right-click on the axis you want to resize.
2. Choose **Auto Scale** from the right-click menu.

The available data zooms to the size of the window, based on the axis where you right-clicked. If appropriate, the axis will adjust to match the range of data.

In the Harmonics and THD views, using **Auto Scale** on the x-axis of the Harmonics Spectrum graph will display all 50 harmonics in the graph window at once.

You can define the range of the axis by using Manual Scale. Manual scale is supported on the vertical scale and time axes.

To use **Manual Scale**:

1. Right-click on the axis to resize.
2. Click on **Manual Scale**.
3. Enter the minimum and maximum value of the range.

When the Manual Scale is applied on the Y-axis, the dialog box displays the minimum and maximum value of the available data for information.

Using the Manual Scale on the time axis allows you to enter either the start and end date or the start date and a time span from a predefined list.

4. Click **OK** to apply the changes.

Screen View Tools

When you first view recorded data, the views show two types of data in a split view format. Figure 9 shows a sample Screen View Tools and Table 10 describes the tools.

For most views, the data includes reference data, which gives a broad view of the recorded data, and detail data in the display's top half, which appears in the bottom half of the display.

Options on the left toolbar let you expand either set of data to fill the window.

Note




This feature also works when you are displaying as a table either the top or bottom set of data.



Figure 9. Screen View Tools

bae025s.bmp

Table 10. Screen View Tools

Button	Description
	Click to see the top full screen view.
	Click to see the bottom full screen view.
	Click to see both graphs again.

Viewing Data as a Table

In most recorded data views, you can view data in table format as well as in graph format. This is useful for studying results in the form of digital readings, or preparing tabular data for a report.


When you switch to the table display, the tables generated remain on the screen even as you change recorded data views, until you turn off the table display and switch back to graphs.

Note

If you click the Tag for Report button when a table is in view, the portion of the table in view will be included in your next report. (For more information, see “Building a Report” later in this manual.) To print all of the data in the table, first export it to a spreadsheet.

To toggle between graph and table views:

You can toggle between graph and table views for the top graph, the bottom graph, or both graphs.

- Click one of the Table tools  to display the upper or lower graph as a table.
- Click the Table tool again to return to the graph display shown in Figure 10.

	V RMS										
	AN			BN			CN			Min	
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max		
10/27/2009 12:39:59.882	232.03	232.42	232.74	232.18	232.52	232.82	232.42	232.71	232.98	0.39	
10/27/2009 12:49:59.873	230.72	232.60	233.04	231.30	232.57	232.90	231.56	232.82	233.20	0.38	
10/27/2009 12:59:59.930	231.95	232.65	234.19	232.07	232.64	234.22	232.29	232.88	234.48	0.37	
10/27/2009 13:09:59.826	232.49	233.21	234.41	232.61	233.38	234.61	232.83	233.61	234.78	0.37	
10/27/2009 13:19:59.988	232.73	233.10	233.33	232.75	233.12	233.41	232.89	233.31	233.62	0.36	
10/27/2009 13:29:59.958	232.49	233.28	233.67	232.10	233.09	233.59	232.62	233.73	234.23	0.37	



azd214.png

Figure 10. Graph Display

To sort the data in a table:

- When you view Events in a table, you can sort the tables by clicking the header for the column you want to sort by.

To maximize a table to full size:

- Click the Top Full View button or the Bottom Full View button ( ) , depending on which table you want to view full size.

Working with Annotations

Annotations are optional markers that can be inserted by the Recorder operator to flag a particular point in the data when recording. They are usually inserted on using Power View with the wireless PDA. Figure 11 shows a sample Annotation View screen.

Annotations can be used to help select what data to download, and to provide additional information when reviewing recorded data in the Summary view.

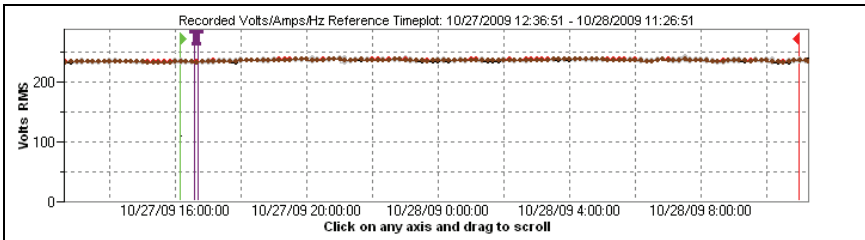


Figure 11. Annotation View

azd221.bmp

There are five types of annotations:

- Start annotation (green)

The Start annotation can be used to signify where important data begins. For example, the operator might want to establish a start annotation after having finished all probe connections and instrument setup, to indicate that any preceding data was preliminary.

Note


You are not limited to using the Start and Stop annotations in pairs, or to show a range of data. You can use each as many times as desired to mark a particular point during recording.

- Stop annotation (red)


The Stop annotation can be used to signify where important data ends.

- File annotation (yellow)

File annotations contain the name of a picture or audio file relevant to the data. See “Using Image or Voice Annotations” later in this manual.

- Text annotation 

Text annotations contain a text note.

- Power Configuration Change annotation 

Power Configuration Change annotations are inserted by the system when a change is made to the Power Configuration in the Recorder. These markers only display in the Download dialog box.

To show or hide annotation markers

- In the Summary or Events view, check or uncheck the Annotations option on the view controls.

To open an annotation

- In the Summary view, Events view, or Download dialog box, click on the annotation.

If the annotation is associated with an audio (.WAV) or image (.jpg) file, the application associated with that file will start and open the file. If the file is not in the default directory `My Documents\Fluke\Power Analyze`, a dialog box opens so that you can navigate to the file.

Note

If clicking on an annotation marker does not seem to do anything, the Zoom box is probably selected in the graph toolbar, instead of the Select tool. Click the Select tool and then select the annotation.

To see overlapping annotations

Sometimes annotations are so close to each other that they actually overlap on the Summary reference graph. When this is the case, if you click on overlapping annotations, a menu opens and you can select either Open, to open the annotation now on top, or Select Next Overlapping Annotation, to bring the next one to the top.

- To open the annotation now on top, choose Open.

- To bring the next annotation to the top, choose Select Next Overlapping Annotation. To then open that annotation, click on it again and choose Open.

Note

To see overlapping annotations more clearly on the Summary reference graph, move the selection cursors so that they just surround the area that contains the overlapping illustrations. The Detail graph adjusts as the cursors move, zooming in to show the area between the selection cursors. You can now see the annotations separately.

Using Image or Voice Annotations

While you are monitoring data with a Recorder, you may find it helpful to take a picture that relates to the power quality data you are recording, or to record verbal comments as you observe the conditions or review the data being measured. You can then associate the image or recording with the data being recorded by adding annotations that reference them.


The PDA includes a microphone for recording notes which are saved as .WAV files, and an optional camera accessory is available on the PDA which will capture images as .jpg files.

You can associate both images and audio files with the data being gathered in the Recorder by inserting annotations and specifying the name of a .WAV or .jpg file. After you download data from the Recorder, you can then move the image and audio files to the PC along with the recorded data (.odn) file.

Note

You can also associate other types of files with the annotation. For example, if you had an .MPJ file with a movie, or a .DOC file with associated information. You can enter any file name using this annotation method.

Inserting Image or Voice Annotations

1. Set up the Recorder and begin monitoring.
2. Using your PDA-cam or another camera, take a picture of what you want to capture.
3. In Power Analyze, go to 1750 Live mode and click  to open the Annotate dialog box.

Or on your PDA, in Power View, click the Annotate icon to display the Annotate screen.

4. Select Insert File.
5. Browse to find the picture file (for example, IMG_2435.jpg) or audio file (for example, voice_123.wav) and select it; then click Insert.

The file name you specified is inserted into the data and associated with the present date and time (and therefore, the present power measurements).

Managing Image and Voice Files

If you are using the PDA, move the image or audio file to a location that will make it easier to Transfer it to a PC later, when you download and move the recorded data file to your PC. You can accomplish this in two ways:

- Place the file into the synchronization folder on your PDA, so that it will be automatically transferred into the sync folder on the PC the next time you dock the PDA.

You may find this approach useful if you download data using Power Analyze on your PC. After synching the files from your PDA, be sure to move the annotation files into the folder that contains your .odn files (by default, *My Documents\Fluke\Power Analyze*).

- Transfer the file onto an SD card for later transfer to your PC.

If you use the PDA to download data to an SD card, copying the audio or image files to the SD card may be the easiest method; then you can copy all associated files to your PC at once. Be sure to copy the files into the same folder that contains the downloaded .odn file.

Auto Report

The Auto Report function automatically generates a report from the active measurement database. The Auto Report function is started by selecting Auto Report from the file menu.

Report Configuration

The items for reporting relate to the items that are usually viewed in the main software package:

- Summary
- Volts/Amps/Hz
- Events
- Harmonics – Bar graphs and Time plots
- THD
- Flicker
- Power/Energy

In addition, there are Common Settings. The Common Settings are used to:

- Define the start and end dates and times of the report.
- Select the types of graphs that are reported; a graph of the entire data set may be reported or this can be split into hourly, daily, or weekly sections for high-resolution data.
- Save and Load defined reports – default templates are provided which may be loaded.
- Select Output Format – The Auto Report is a PDF (ready-to-print format) or RTF (rich text format) file that can be edited by the user before printing.

The standard report configuration files, Basic Report.ini, Intermediate Report.ini, and Comprehensive Report.ini templates can be loaded or the user can select each individual item for the report. Alternatively, an existing report configuration can be opened, edited, and saved with a new name (the default report configurations are set to read-only to prevent changes being saved).

Tagged Screens

You can add tagged data you see on the screen in the View Recorded and Snapshot modes. You can tag as many different views as you want before creating the report. Power Analyze remembers what you have tagged until you exit the application or load a different data file. If you tag more than necessary, it is easy to unselect tagged items before you generate the report.

To include tagged screens in a report:

1. Configure the screen to your preference.

Power Analyze captures the contents of the main area just as you see it. Use the tools, such as, view controls, zoom features, split/full screen, to adjust the display.

2. Click **Tag for Report** at the bottom of the View Controls.

3. In the dialog box, enter a heading to identify the data.

By default, Power Analyze inserts the name of the active view. You can change this heading to be more specific and add a detailed description that appears in the report.

4. Click **OK**.

5. Continue to work and tag additional screens in order to include them.

6. When ready to create the report, choose **File>Auto Report**.

The tree item, **Tag for Report**, is visible when at least one screen is tagged.

7. Click **Tag for Report** to display a list of all tagged items.

8. Review the list to include in the report. You can use **Ctrl+click** to unselect or select an item.

9. Click **OK** to create the report.

