HIOKI

INSTRUCTION MANUAL

9624-50

PQA-HiVIEW PRO

HIOKI E. E. CORPORATION

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Introduction

Thank you for purchasing the HIOKI "Model 9624-50 PQA-HiVIEW PRO." To obtain maximum performance from the instrument, please read this manual carefully, and keep it handy for future reference.
The 9624-50 PQA-HiVIEW PRO is a PC program for use with the Model 3196 and 3197 Power Quality Analyzers.

Registered trademarks

- Microsoft, Windows and Excel and registered trademarks of Microsoft Corporation in the USA.
- Pentium is a registered trademark of Intel Corporation in the USA.

Confirming Package Contents and Handling the CD

When you receive the software, inspect it carefully to ensure that no damage occurred during shipping.
If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

9624-50 PQA-HiVIEW PRO
Program Software (CD)

Instruction Manual

⚠CAUTION

CD Handling Precautions

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

- Always hold the disc by the edges, so as not to make fingerprints on the disc or scratch the printing.
- Never touch the recorded side of the disc. Do not place the disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water, as there is a possibility of the label printing disappearing.
- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent loss of data.
- To remove dirt, dust, or fingerprints from the disc, wipe with a dry cloth, or use a CD cleaner. Always wipe spherical from the inside to the outside, and do no wipe with circular movements. Never use abrasives or solvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD, or for any problem related to the purchase of a Hioki product.

In the interests of ongoing product developments, there may be minor discrepancies between screen displays and the operating instructions, and in the data conversion process.

Symbols and Terminology

The following symbols in this manual indicate the relative importance of cautions and warnings.

Symbols

⚠CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
NOTE	Indicates advisory items related to performance or correct operation of the instrument.

(p.)	Indicates the location of reference information.
*	Indicates that descriptive information is provided below.

Mouse Operation Terminology

Click	Press and quickly release the left button of the mouse.
Right-click	Press and quickly release the right button of the mouse.
Double click	Quickly click the left button of the mouse twice.
Drag	While holding down the left button of the mouse, move the mouse and then release the left button to deposit the chosen item in the desired position.
Activate	Click on a window on the screen to activate that window.

Other Terminology

- Unless otherwise specified, "Windows" represents Windows 2000, or Windows XP.
- Dialog box represents a Windows dialog box.
- Menus, dialogs, buttons in a dialog, and other names on the screen are indicated in brackets.
- Example: **File-Open** indicates that you should click **File** in the menu bar, and then click **Open** in the displayed pull-down menu.

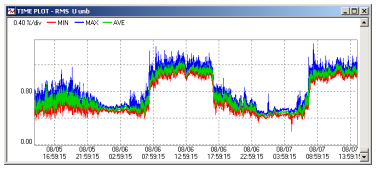
Overview Chapter 1

Product Overview and Features

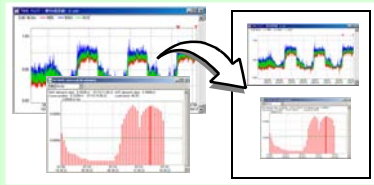
The Hioki 9624-50 PQA-HiView Pro is a software application for analyzing binary-format measurement data from the Hioki 3196 and 3197 Power Quality Analyzers on a computer.
The PQA-HiView Pro can load and read only binary data recorded with the Hioki 3196 and 3197 Power Quality Analyzers.
It cannot read text or CSV data.

The 9624-50 PQA-HiView Pro offers the following functions.

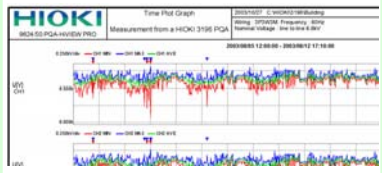
Display and Analyze Measurement Data (p. 16)
Display and analyze measurement data in the same way as on the Power Quality Analyzers.



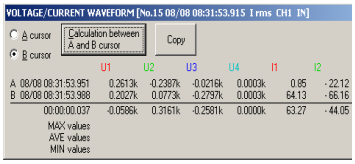
Print Displayed Windows (p. 24) and Copying (p. 27)
Print and copy displayed windows for use in other applications.



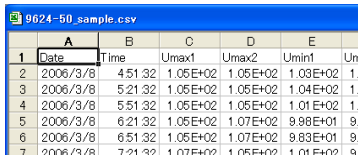
Generate Measurement Data Reports (p. 28)
Print any measurement as a report. You can also save it as a rich text format file, and use it in other applications.



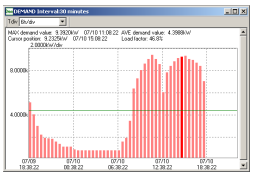
Display Measurement and Calculation Values (Maximum, Minimum and Average) (p. 21)
Use the A/B cursors to view maximum, minimum and average values within any time span.



Convert Measurement Data to CSV Format (p. 35)
Convert any span of measurement data to CSV format. Load converted files into computer spreadsheet programs.



Calculate Demand and Energy Consumption
Hioki 3196(p. 74), Hioki 3197(p. 108)
From the measurement data, calculate maximum and average demand values, and energy consumption.

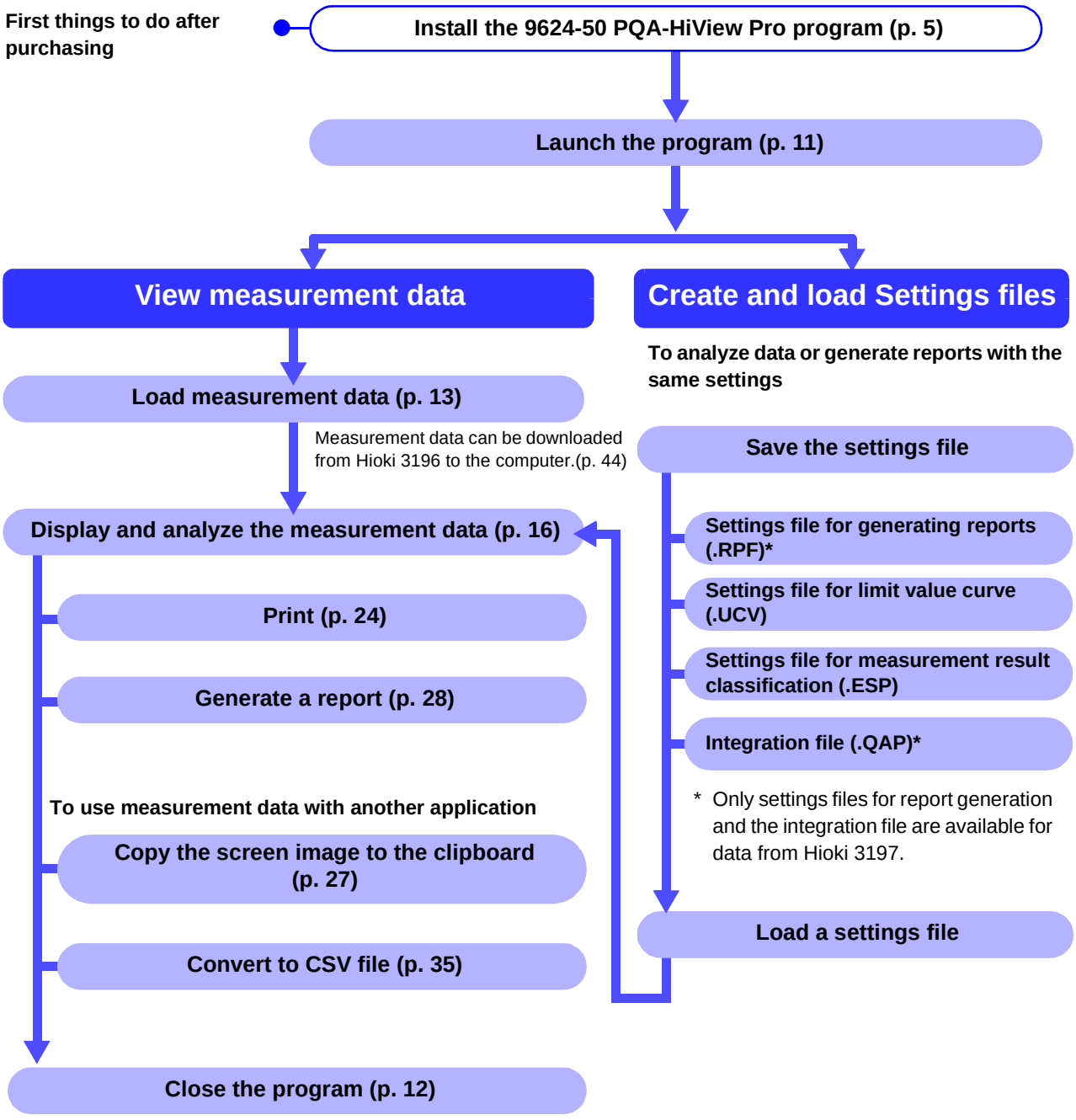


(Hioki 3196 only)

Download measurement data from the 3196 Power Quality Analyzer (p. 44)
Connect the Hioki 3196 to a computer via LAN to download data from its internal memory and data files from the 3196's PC Card.

Display measurement data in EN50160 mode (p. 83)
Judge anomalies according to the ITIC (CBEMA) Curve* (p. 76)
* Commonly used in the USA, the ITIC Curve is a standard for evaluating voltage anomalies by specifying a range of acceptable tolerance. A "User-Defined Curve" can be optionally defined for voltage anomaly evaluation.

Operation Flowchart



Setup Chapter 2

Hardware and OS Requirements (System Configuration)

The 9624-50 PQA-HiView Pro requires the following hardware and software. Please verify your system configuration.

Computer Type	PC/AT compatible
Operating System	English version of any of the following operating systems: • Microsoft Windows 2000 • Microsoft Windows XP
Memory	At least 128 MB
Hard Disk	At least 128 MB free space
Display	XGA (1024 x 768 dots) or higher
Disk System	CD-ROM drive (Used only for installation)
Printer	Required for report printing on the computer. Either color or monochrome can be used, but the fastest possible printing is recommended.

NOTE For some models, proper operation cannot be guaranteed even when the above requirements are satisfied.

Installing the 9624-50 PQA-HiView Pro Program

Install the program by the following procedure.
Windows XP or Windows 2000 should be installed by your Systems Administrator.

Example: Installing on Windows XP

Note: screen messages may differ slightly depending on the operating system.

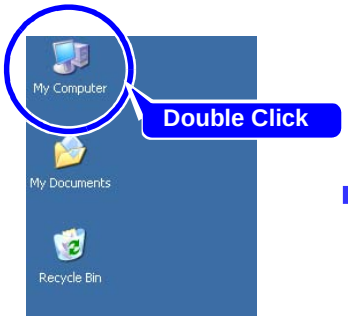
NOTE Installation may not be possible when other applications are running.
Before installing, close all applications that you can.
When an anti-virus program is running, installation may not be possible even when no virus exists. In this case, change your anti-virus program settings as necessary to allow installation to proceed.

1 Start the computer.

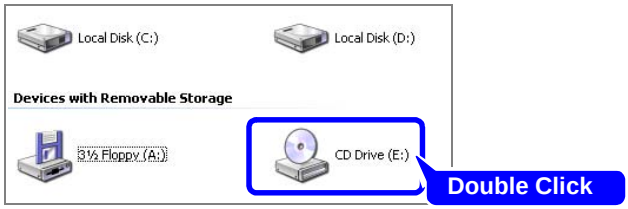
Close all running programs.

2 Insert the program CD into the CD-ROM drive.

3 Double click **My Computer** to open it, then double click the CD-ROM icon.

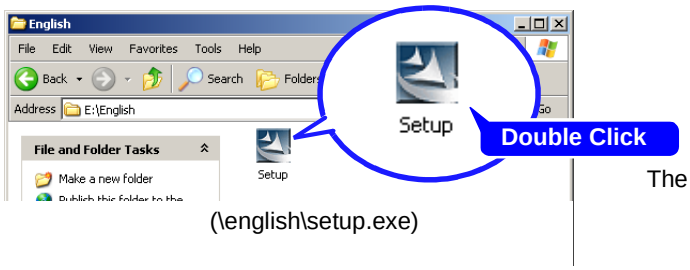


(In the following example, you would double click drive CD Drive:)



The contents of the CD are displayed when you double click.

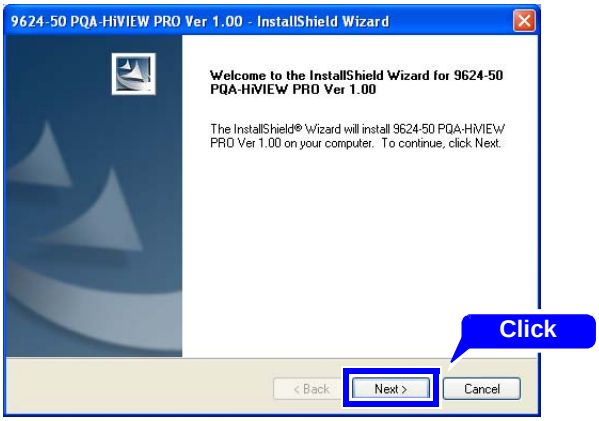
4 In the English folder, double click **Setup.exe** (the extension may not be displayed) to start the installer.

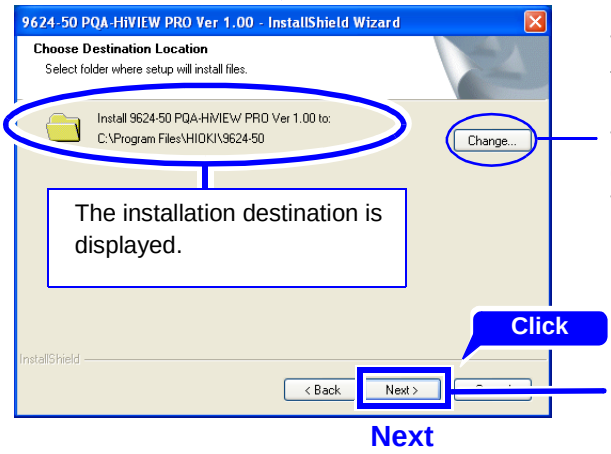


(\english\setup.exe)

The installer starts when you double click.

5 In the installer, click **Next** and confirm the installation destination.



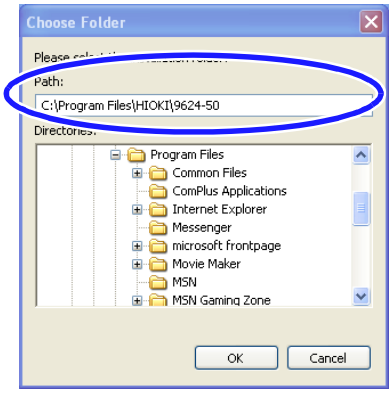


The installation destination folder can be changed on this screen.

To change the installation destination, click **Change** to select another folder. There is normally no need to change it.

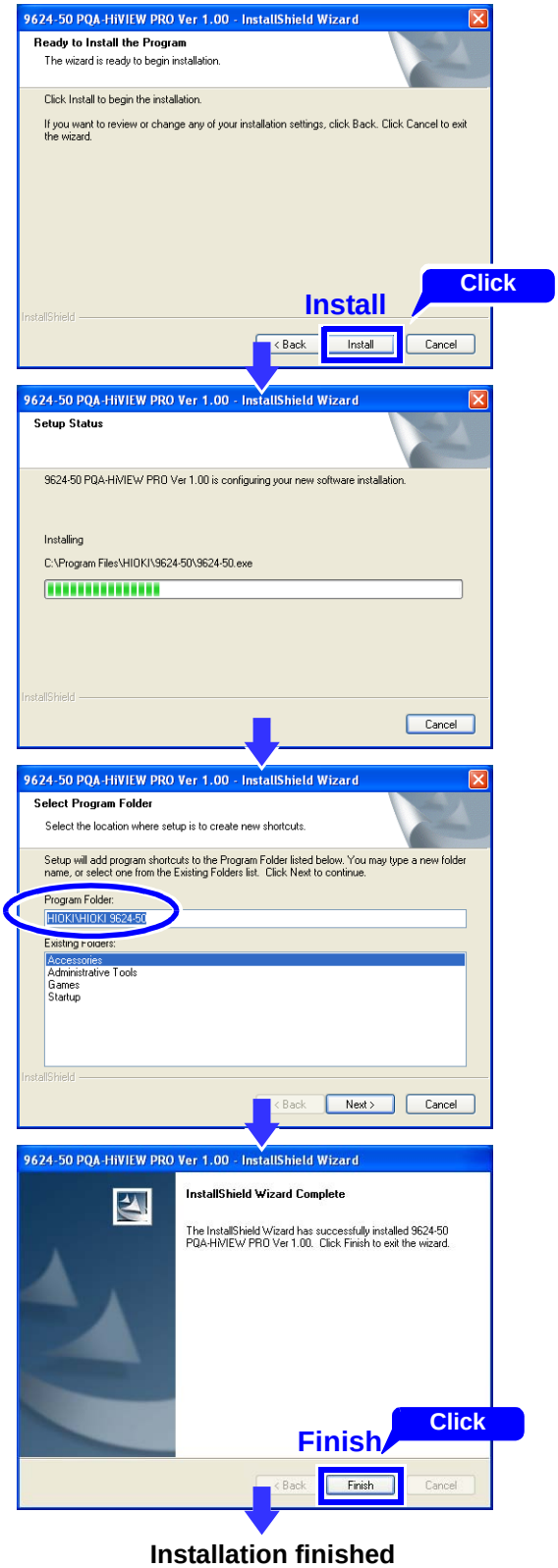
If you are not changing the installation destination, click **Next**.

To change the installation destination



Select the installation folder in the Path field.

6 Click **Install** to start installing.



Installation starts.

Progress is displayed during installation.
To interrupt installation in progress, click **Cancel**.

Select a folder for the program.

Click Finish to finish installation.

Installation finished

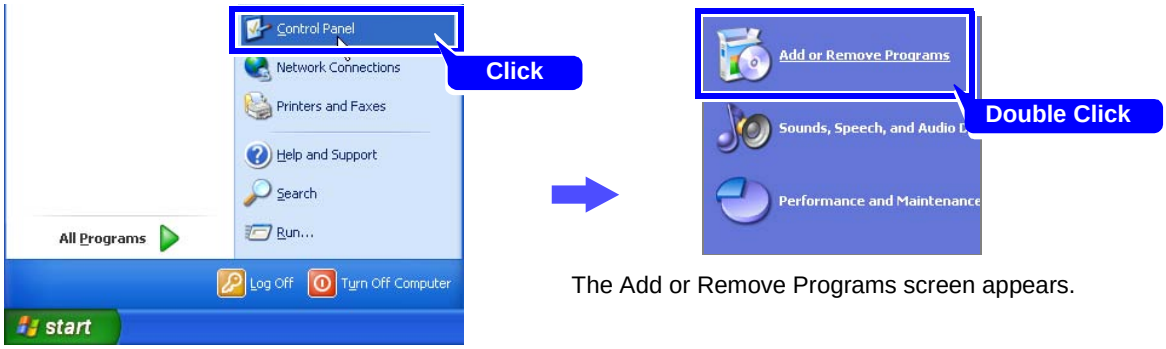
7 Remove the CD from the CD-ROM drive.

Refer to Chapter 3, "Basic Operations" (p. 11) for the next procedure.

Uninstalling the Program

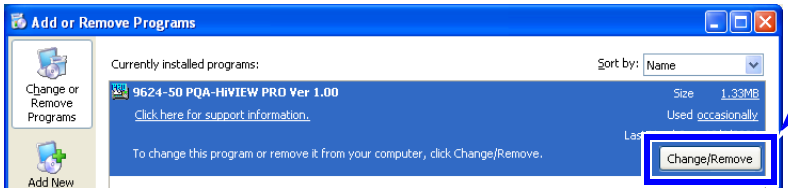
Use the following procedure to uninstall the program.

1 From the Windows **Start** menu, select the **Control Panel**, and double click **Add or Remove Programs**.



The Add or Remove Programs screen appears.

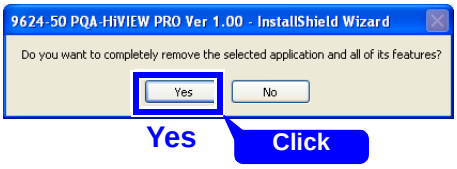
2 Select **9624-50 PQA-HiView Pro** and click the **Change/Remove** (or **Remove**) button



A confirmation dialog appears when you click **Change/Remove**.

Change/Remove

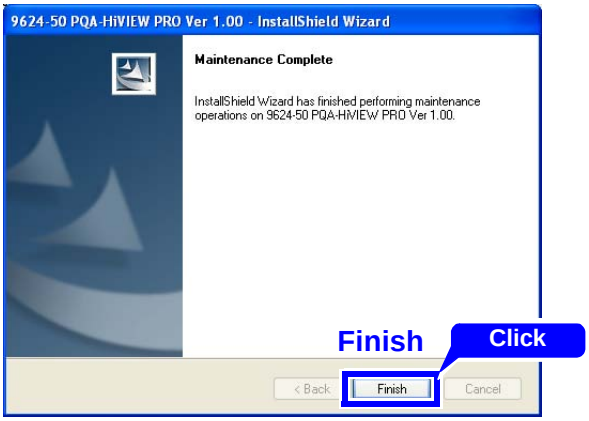
3 Click **Yes**.



The uninstall process begins.

The uninstall progress status is displayed.

4 Click **Finish**.



The 9624-50 PQA-HiView Pro program is uninstalled.
The uninstall procedure is finished.

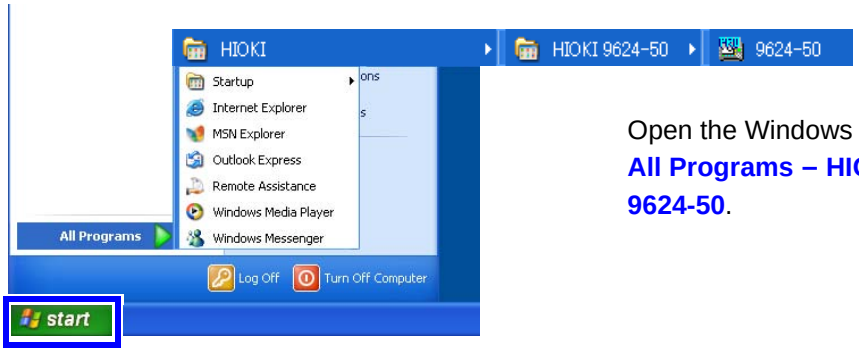
10

Uninstalling the Program

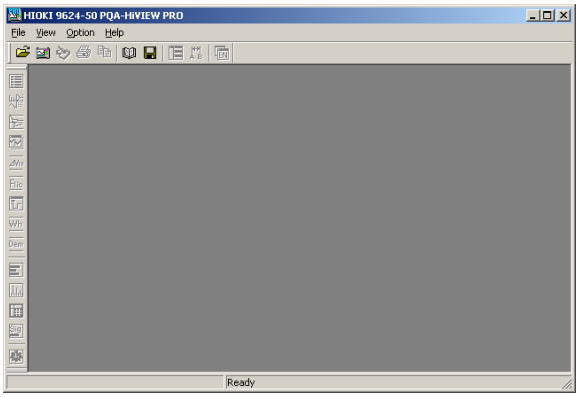
Basic Operations Chapter 3

Starting and Closing the Program

Starting the Program



Open the Windows **Start** menu and click **All Programs – HIOKI – HIOKI 9624-50 – 9624-50**.

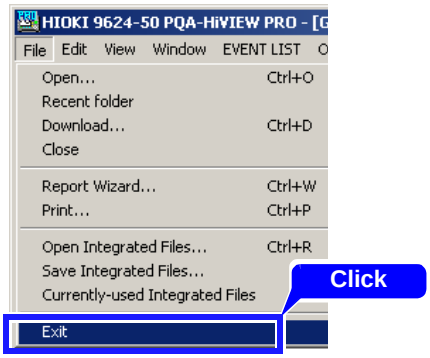


The main screen, entitled HIOKI 9624-50 PQA-HiVIEW PRO, appears.

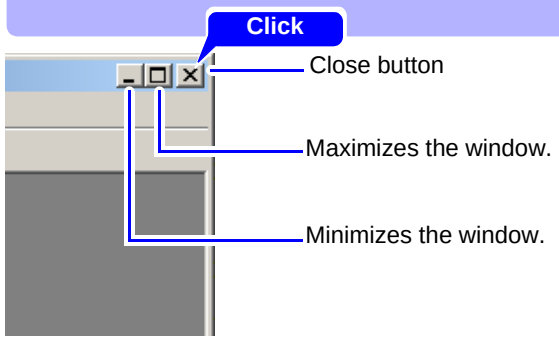
Closing the Program

The program can be closed by any of the following methods.

Method 1
From the menu bar, click **File – Exit**



Method 2
Click the Close button (✕) at the top right corner of the window



Loading Data

Measurement data recorded with the Hioki 3196 or 3197 Power Quality Analyzer can be loaded by the PQA-HiView Pro program.
However, it can load only binary format measurement data. Text and CSV format data cannot be loaded.

To load measurement data:

3196

You can insert a PC Card with stored measurement data into a PC Card reader connected to the computer, or transfer the measurement data over LAN to the computer, and then load it.

See: "Downloading Measurement Data from the Power Quality Analyzer (LAN Download Function)" (p. 44)

3197

You can use the special-purpose application program bundled with the Hioki 3197 to download the measurement data, and the load it.

See: The instructions (PDF) for the special-purpose application program on the CD-R supplied with the Hioki 3197

File Types

The data to be loaded is specified by its folder.
The following data files can be loaded from that folder.

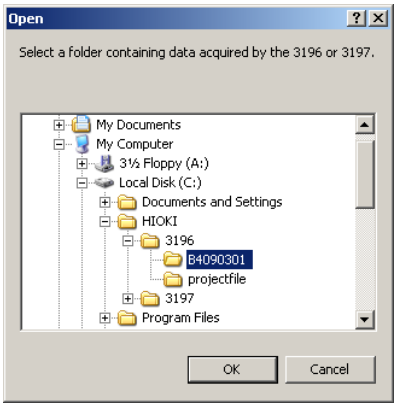
File Contents		File Extension	3196	3197
Setting data		.SET	●	●
TIME PLOT data		.ITV	●	●
Event data	Lists	.EVT	●	●
	Voltage/current waveforms		●	●
	Numerical values		●	—
Flicker data (Delta V10, IEC)		.FLC	●	—
Transient over voltage waveform data		.TRN	●	—
Event voltage fluctuation data		.WDU	●	●
EN50160 data		EN50160.EN	●	—
EN50160 event data		EVENT.EN	●	—
Inrush current graph data		.INR	—	●
Demand graph data		.DEM	—	●

Loading Data

1 Click the  (Open button), or select **File – Open** on the menu bar.

The Open dialog box appears.

2 Select the folder containing the measurement data from the 3196 or 3197 to be loaded.



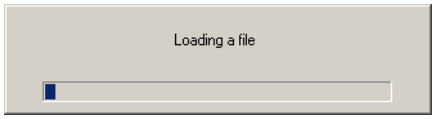
Measurement data from the 3196 or 3197 is stored in folders named as follows:

B + *date* + *serial number* (8 digits)

Example: B6040302

- B: Binary data
- 6: Year 2006
- 04: April
- 03: 3rd
- 02: 2nd folder

3 Click the **OK** button to load the selected data.

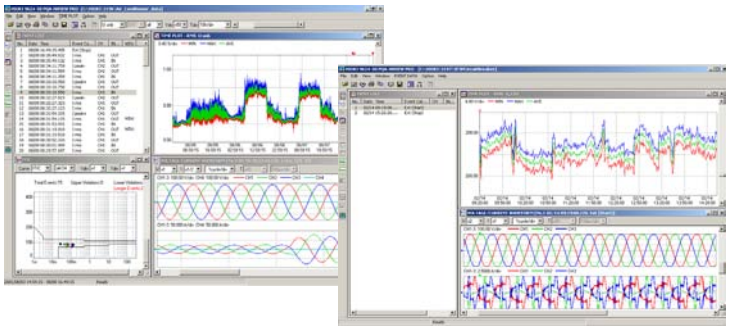


The loaded data is displayed on screen. Refer to the following for the details of each screen.

See: "Analyzing Measurement Data from the Hioki 3196" (p. 49)
"Analyzing Measurement Data from the Hioki 3197" (p. 91)

Analyzing Two Types of Measurement Data

Two instances of the PQA-HiView Pro program can be started and run at the same time.
This is convenient for comparing measurement data from the Hioki 3196 with that from the 3197.



NOTE

- New measurement data can still be loaded even after data has already been loaded. However, only most-recently loaded data can be displayed.
- Reading a folder containing a large amount of data may take some time. The time required to read the data depends on the computer system.

Estimated Loading Time

(Example) To load measurement data into the PQA-HiView Pro from a Flash ATA card inserted in the computer.

Loading time: About 1 minute

Loading conditions:

- Computer System Configuration

Computer	400-MHz Pentium II
OS	Microsoft Windows 2000 Professional
Memory	128 MB

- Measurement Data

Capacity	256 MB
ITV files	TIME PLOT(ALL DATA, MAX/MIN/AVE)
EVT files	1000 items (all transients)

Viewing Measurement Data

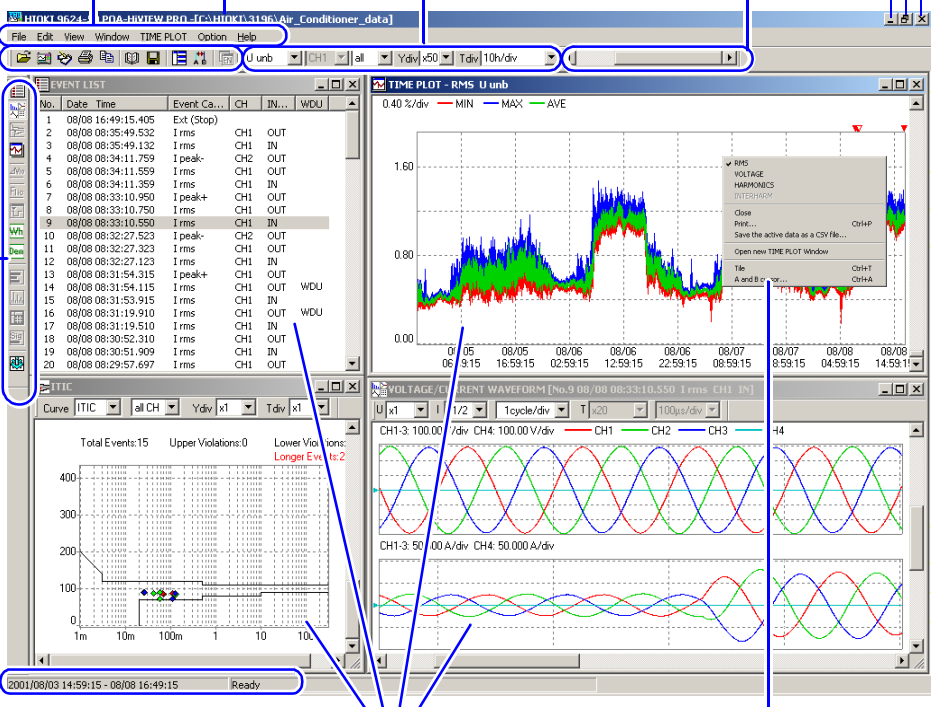
Screens

This section describes the program's windows. The windows for the Hioki 3196 and 3197 are slightly different. Refer to the window content descriptions for details.

See: "Hioki 3196 Measurement Data Window Layout " (p. 49)
"Hioki 3197 Measurement Data Window Layout " (p. 91)

When the Model 9624-50 starts up, the main screen appears.
Measurement data windows are displayed on the main screen.

Example: After loading measurement data from Hioki 3196

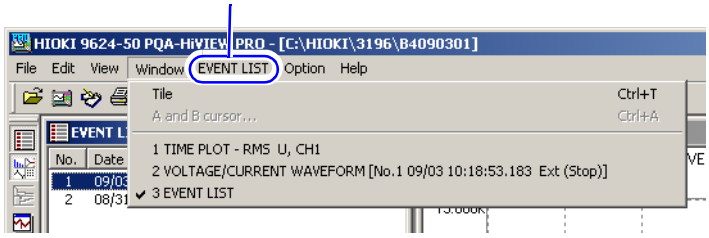


Changing Windows

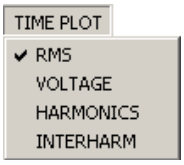
You can change the selected window to a different window.

1 If the window you want to display is not already the active window, click it to make it active, or select it from the **Window** menu.

The selected window type is displayed to the right of the Window menu item.



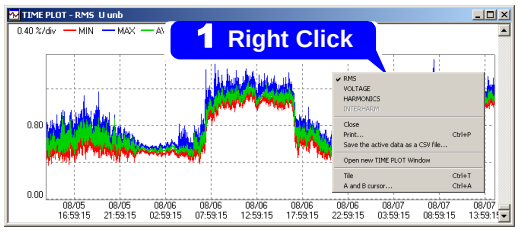
2 Click an item to the right of the Window menu item, and select the window to switch to from the pull-down menu.



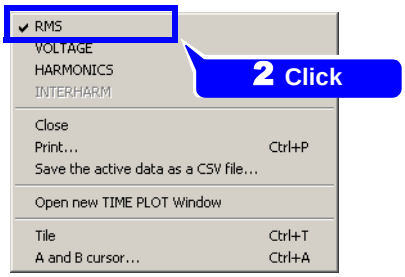
When a Time Plot window is active in step *1* above

The active window is replaced.

You can also select from the pop-up menu.



A pop-up menu appears when you right click on a window.



Click the window you want to activate.
Items that are not selectable are grayed out.

Window List

Windows for analyzing data from the 3196

Window Name		See Page
Event List Window		(p. 62)
Time Plot	RMS	(p. 58)
	Voltage	(p. 59)
	Harmonics (Harmonic Fluctuations)	(p. 60)
	Interharm (Inter-Harmonic Fluctuations)	(p. 61)
Event Data Window	Event details	(p. 64)
	Voltage/Current	(p. 65)
	Voltage/Transient	(p. 66)
	Voltage	(p. 67)
	Current	(p. 68)
	Vector	(p. 69)
	DMM	(p. 70)
	Harmonics Bar Graph	(p. 71)
	Harmonics List	(p. 72)
ITIC Window	Tolerance Curve	(p. 76)
Delta V10 Flicker Window		(p. 80)
IEC Flicker Window		(p. 81)
Voltage Fluctuation Event Graph		(p. 73)
Integrated Power Window		(p. 74)
Demand Window		(p. 75)
EN50160 Window	Overview	(p. 83)
	Harmonic	(p. 85)
	Signaling	(p. 86)
	Measurement Result Classification	(p. 87)
System Window		(p. 82)

Windows for analyzing data from the 3197

Window Name		See Page
Event List Window		(p. 100)
Time Plot	RMS	(p. 98)
	Voltage	(p. 99)
Event Data Window	Event details	(p. 102)
	Voltage/Current	(p. 103)
	Voltage	(p. 104)
	Current	(p. 105)
Voltage Fluctuation Event Graph		(p. 106)
Inrush Current Event Graph		(p. 107)
Integrated Power Window		(p. 108)
Demand Window		(p. 109)
System Window		(p. 110)

Viewing Event Phenomena

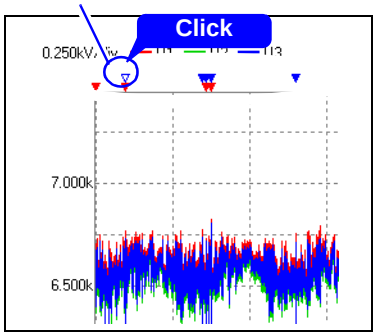
An event name or marker is displayed in each window at the location where an event has occurred (Event Marker function).
Each displayed window is interlinked, so by clicking an event's name or marker, you can view other characteristics related to that event in other windows.

Measurement data from the Hioki 3196 is displayed differently than that from the 3197.

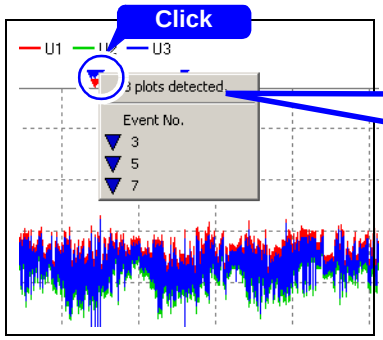
Event Viewing Windows	Event Display		
	Event Occurrence	Voltage Fluctuation Graph (WDU event)	Inrush Current Graph (INRUSH event, Hioki 3197 only)
Event List Window	Event Category items indicate the contents of events.	The WDU column shows WDU events.	The INRUSH column shows INRUSH events.
Time Plot Window	▼ (Red) Event markers are displayed at the times that event occurred.	▼ (Blue) Event markers are displayed at the times when voltage fluctuations occurred.	▼ (Pink) Event markers are displayed at the times that inrush current occurred.
Voltage Fluctuation Event Window **Inrush Current Graph Window (Hioki 3197 only)**	Displays the message, "Specified file xxx does not exist."	Displays the waveform for the event selected in another window.	
Event Data Window	Displays the waveform for the event selected in another window. Event markers ▼ (yellow-green) are displayed at event occurrences.		
ITIC Window (Hioki 3196 only)	———	◆ (CH1: Red) ◆ (CH2: Yellow-Green) ◆ (CH3: Blue)	———

Example: Viewing event phenomena in a Time Plot window

Event Marker



The selected event marker becomes hollow.



When multiple event markers overlap

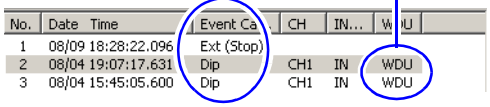
Click on overlapping event markers to display a menu on the graph.

Select an event marker from the menu.
If more than 30 event markers overlap, they are displayed in submenus of up to 30 markers each.

Example: Graph of a voltage fluctuation event (WDU) in measurement data from Hioki 3196

Event List Window

Event Content — Click to display the event graph.



WDU — Indicates that a voltage fluctuation event graph exists

INRUSH — Indicates that an inrush current graph exists (Hioki 3197 only)

To view the same event phenomenon in other windows:
Activate the window and click the desired event item, or select it with the up- or down-arrow keys on the keyboard. In the Event List, the selected event is indicated by a gray background.

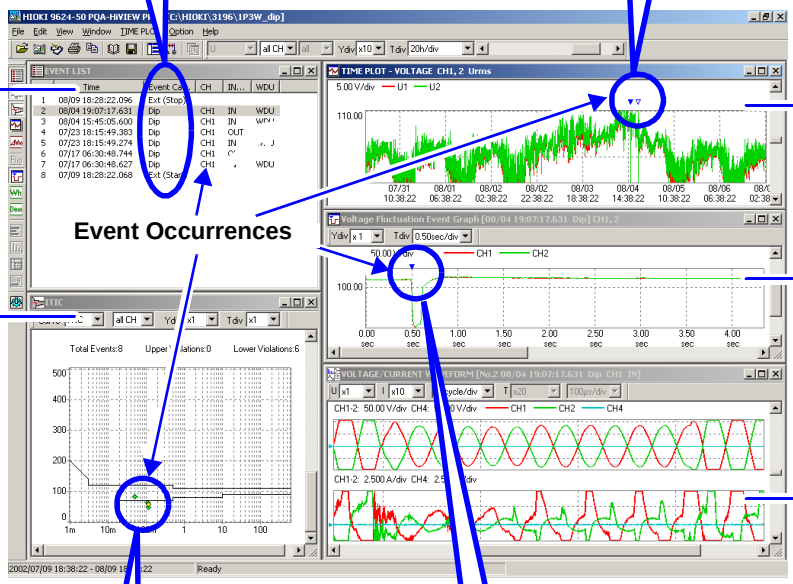
TIME PLOT Window

▼(Blue) Voltage fluctuation event (WDU) occurrence

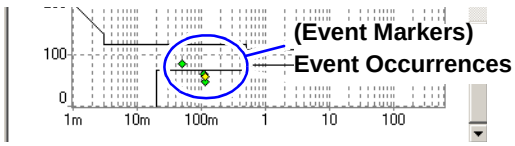
▼(Pink) Inrush current event (INRUSH) occurrence (Hioki 3197 only)

▼(Red) An event occurrence other than the above types

To view the same event phenomenon in other windows:
Activate the window and click the desired event marker, or select it with the up- or down-arrow keys on the keyboard. The selected event marker becomes hollow (▽).



ITIC Window (Hioki 3196 only)



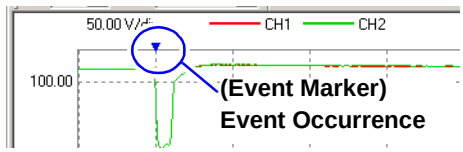
◆(Red) Event occurrence on CH1

◆(Yellow-Green)Event occurrence on CH2

◆(Blue) Event occurrence on CH3

To view the same event phenomenon in other windows:
Activate the window and click the desired event marker. The selected event marker blinks.

Voltage Fluctuation Event Window



▼(Blue) Voltage fluctuation event (WDU) occurrence

▼(Pink) Inrush current event (INRUSH) occurrence (Hioki 3197 only)

▼(Red) An event occurrence other than the above types

Displays the graph for the event selected in another window.
When an inrush current event marker is selected in another window, the inrush current screen appears (Hioki 3197 only).

Viewing Measurement Data as Numerical Values (Cursor Measurement)

The values measured at the A and B cursor positions (cursor values) can be displayed numerically. Maximum, minimum and average values within a span of measurement data (between cursors) can also be checked by demarcating the span with the cursors.

Measurement values can be confirmed in the A/B cursor dialog. An image of the displayed numerical values can be copied to other applications.

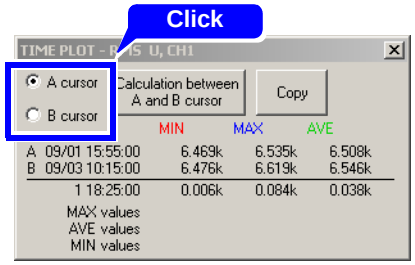
Windows supporting cursor measurement: Waveform and Graph windows

Example: Viewing measurement values in a Time Plot window.

1 Click the  (A and B cursors) button, or select **A and B cursor** in the **Window** menu.

You can also right click and select from the pop-up menu.
The A/B cursors appear in the window, and a dialog box indicates values at the cursor positions. Displayed contents differ according to the type of data displayed.

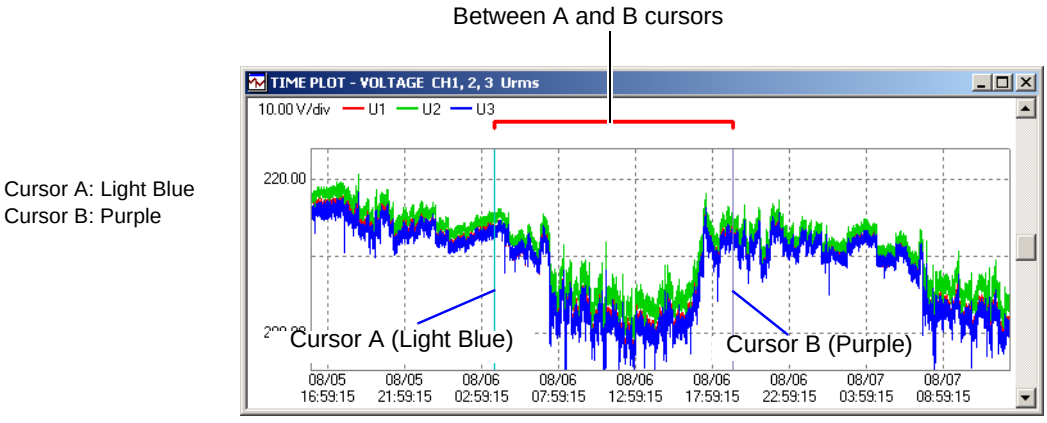
2 Click the A or B cursor button in the dialog box to select the cursor to move.



The values at the cursor positions in the active window are displayed.

3 To view the values at a particular point, activate the relevant window, and either click that point or press the left/right arrow keys to move the cursor to it.

To find the maximum, minimum and average values within a span, move the A/B cursors to demarcate the span.

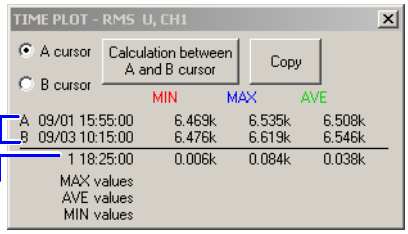


Cursor A: Light Blue
Cursor B: Purple

4 Confirm the measurement values in the dialog.

Time and numerical values at A and B cursor locations

Differences between A and B data (B – A)

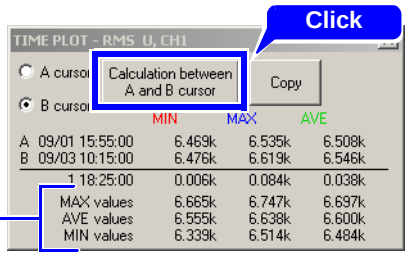


Viewing Maximum, Minimum and Average Values

5 Click the **Calculation between A and B cursor** button.

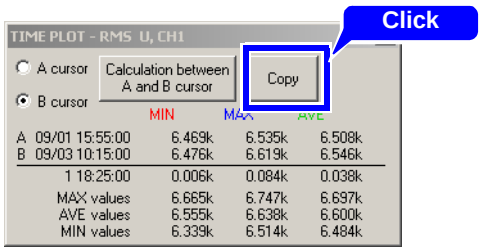
Maximum, minimum and average values between A/B cursors are displayed.

Maximum
Average
Minimum



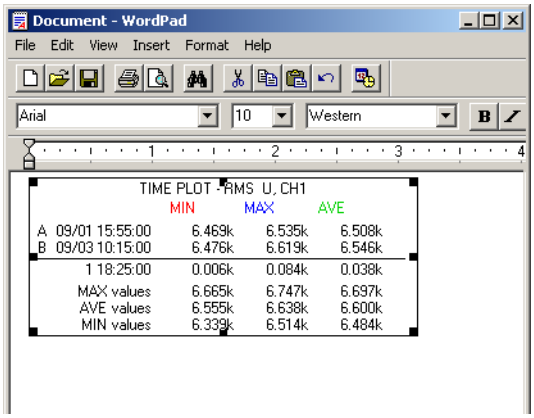
Copying a Dialog Box Image to the Clipboard

6 Click the **Copy** button.



7 Open a document in another application program such as Microsoft Word or Excel, and insert the image using an **Insert** or **Paste** operation.

For further details, see the Help file for your application program.



Viewing Measurement Settings

Instrument settings recorded on the Hioki 3196 or 3197 can be viewed in the Settings window. Of course, the settings cannot be changed here.

The Settings window can only be displayed when a SET file is loaded.
In addition, the EN50160 setting tab is not displayed unless EN50160 data is loaded (Hioki 3196 only).

Refer to the window content descriptions for details.

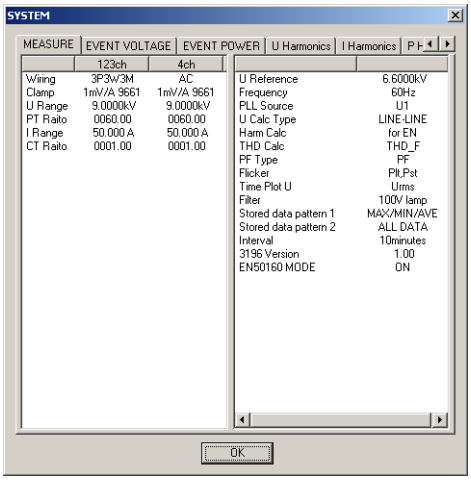
See: 3196 measurement data: "Viewing Setting Conditions for Measurement Data [SYSTEM]" (p. 82)
3197 measurement data: "Viewing Setting Conditions for Measurement Data [SYSTEM]" (p. 110)

1 Click the (Settings Icon) button or select **View – SYSTEM** from the menu bar.

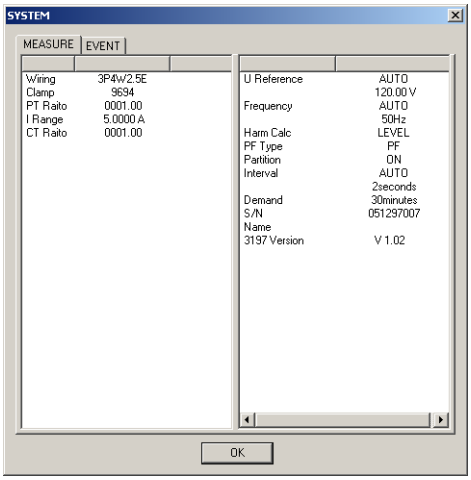
The Settings window appears.

2 Select the tabs to view each setting.

Example: Hioki 3196 Settings Window



Example: Hioki 3197 Settings Window



Printing Measurement Data

Each display screen can be printed out. In addition, all open Time Plot windows can be printed together on one page.

1 Activate a window to be printed, and display the area to print.

The qualification for printing is that whatever is displayed will be printed as it appears.
Maximize windows for clearest printing of large quantities of data.

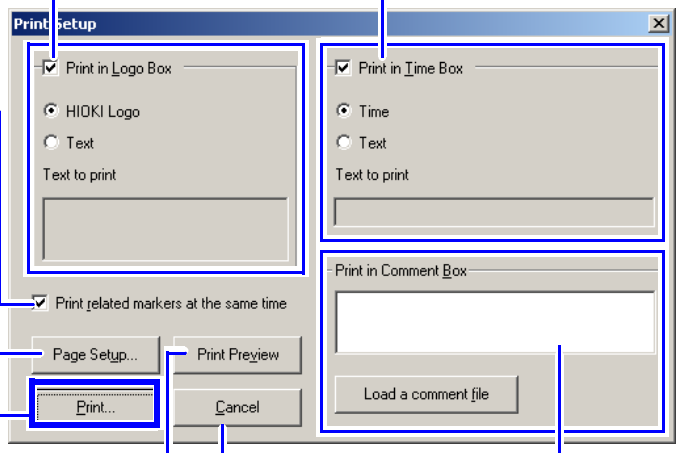
2 Click the (Print) button or select **File – Print** from the menu bar.

The Print Setup dialog box opens.

3 Select the items you need to print, and click the **Print** button.

To print a logo or comment in the Logo field (p. 25)
Select the logo or text to be printed.
- Unselected: The field will be blank.
- HIOKI Logo: Select an image file to print.
  If no file name is selected, the HIOKI logo is printed.
- Text: The field will contain your entered text.

To print the time and date or comment in the Time field (p. 25)
Select the content to be printed.
- Unselected: The field will be blank.
- Time: The printing time will be printed.
- Text: The field will contain your entered text.



Select to include maximum, minimum and average values and channel information in the printout.

Selects the printing destination.

Starts printing.

Shows a preview of the printout.

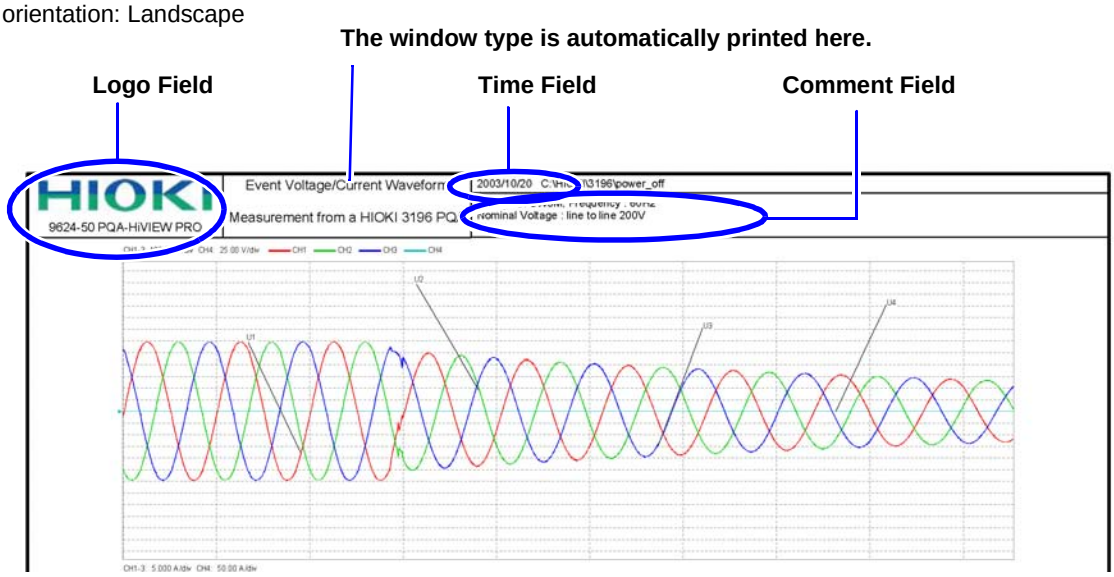
Cancels printing.

To print comments in the Comment field (p. 25)
Enter the contents to be printed (up to three lines).
To load the contents of a text file, click the Load a comment file button.

Printout Example

Sample of an Event Waveform Printout

Paper setting: A4
Printing orientation: Landscape



Arranging Windows (Window Layout)

All currently open windows can be displayed by arranging the application's windows.

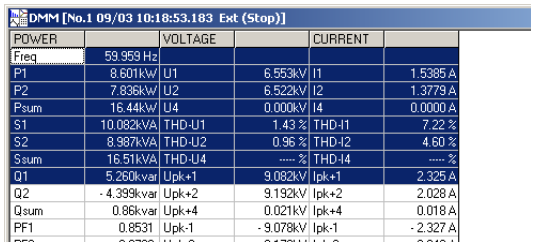
Click the  (Tile) button or select **Window – Tile** from the menu bar.

Copying a Display Image to the Clipboard

Any image data can be copied to the clipboard and then pasted into an application such as Microsoft Word and Excel.
You can also copy and paste measurement values displayed in the A/B cursor dialog (p. 22).

1 Activate the window to be copied.

If copying the DMM or Harmonic List to Microsoft Word or Excel, select the range to copy.



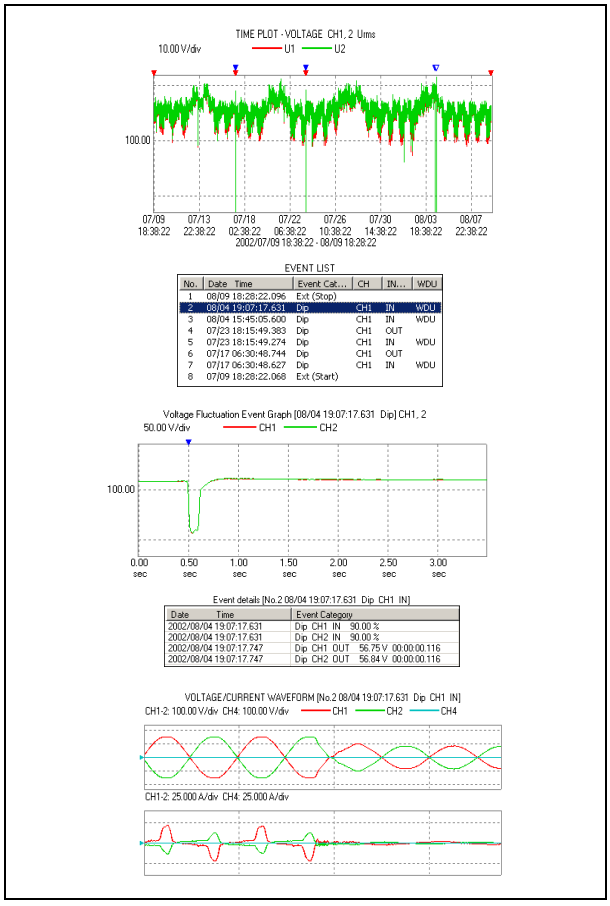
DMM [No.1 09/03 10:18:53.183 Ext (Stop)]

POWER		VOLTAGE		CURRENT	
Freq	59.959 Hz				
P1	8.601kW	U1	6.553kV	I1	1.5385 A
P2	7.836kW	U2	6.522kV	I2	1.3779 A
Psum	16.44kW	U4	0.000kV	I4	0.0000 A
S1	10.082kVA	THD-U1	1.43 %	THD-I1	7.22 %
S2	8.987kVA	THD-U2	0.96 %	THD-I2	4.60 %
Ssum	16.51kVA	THD-U4	----- %	THD-I4	----- %
Q1	5.260kvar	Upk+1	9.082kV	Ipk+1	2.325 A
Q2	- 4.399kvar	Upk+2	9.192kV	Ipk+2	2.028 A
Qsum	0.86kvar	Upk+4	0.021kV	Ipk+4	0.018 A
PF1	0.8531	Upk-1	- 9.078kV	Ipk-1	- 2.327 A

2 Click the  (Copy) button or select **Edit – Copy** from the menu bar.

3 Paste the copied image into your destination program.

An example of five windows pasted into Microsoft Word



Generating Reports

Reports are generated from loaded measurement data, and can be printed out or saved as rich text format (.rtf) files.
Rich text format files can be loaded and edited in application programs such as Wordpad (supplied with Windows), or Microsoft Word.

Reports can be generated by three methods.

Report Generation Method	Details
Generate report contents automatically (Auto)	Report contents are generated without selecting output items. Items that can be output with auto report generation are limited.
Generate report with specified contents (Custom Settings)*	Report contents are generated by selecting output items. Note that for transient waveforms, the Transient Waveform selection is available only when Worst Case is selected.
Generate report with specified detailed contents (Detailed Settings)*	Report contents are generated from selected details of each output item and channel.

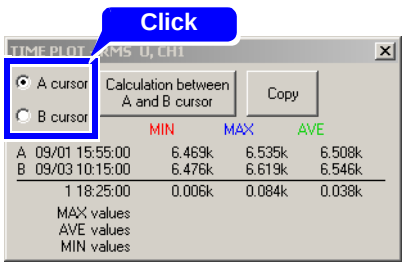
* Report generation settings can be saved and reloaded as settings files.

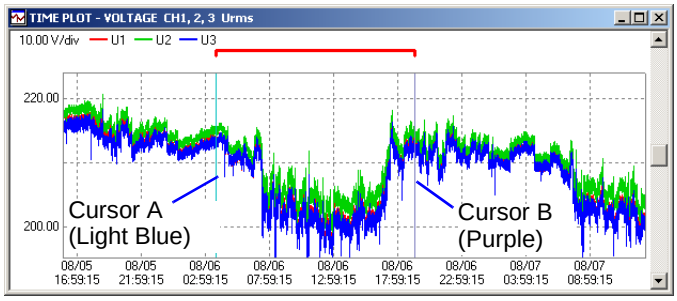
See "Report Output Items" (p. 32) for the items available for output in reports.

1 Confirm the span of data to be used in generating the report.

When the report wizard starts, the measurement data span is determined automatically from the current display state and position of the cursors in the window.
Set the A/B cursor locations if you want the report to specify a particular waveform span.
See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

If the A/B cursors are not enabled, the report is automatically generated using all loaded measurement data.





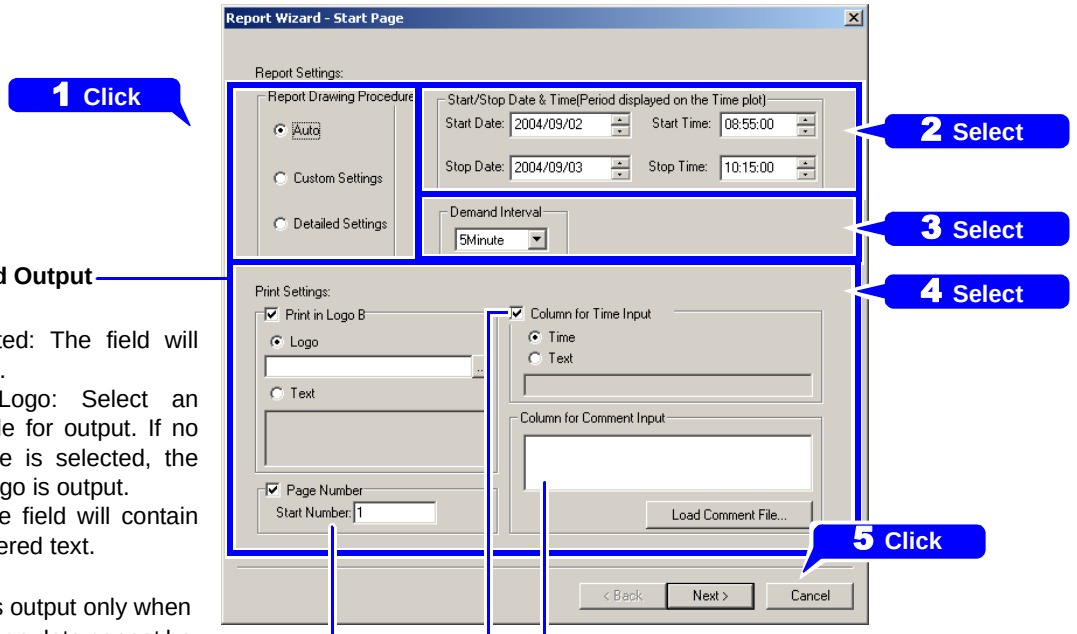
2 Click the (Report Wizard) button or select **File – Report Wizard** from the menu bar.

The Report Wizard – Start Page dialog box opens.

The Report Wizard cannot be started unless a window is already open.

3 Make settings in the Start Page dialog box.

1. Select a report generation method.
2. Set the starting and ending times of the data span to be reported.
   (These are automatically set to match the loaded data when the Report Wizard starts, but you can change them here.)
3. If report output is to include a demand graph, set the demand time span here.
4. Make settings for printing as occasion demands.
   (Comments and other information can printed in the Logo, Time and Comment fields, shown below.)
5. Click Next.
   If Auto is selected: The Report Wizard – Last Page dialog box opens.
   If Custom Settings is selected: The Report Wizard – Individual Setting Page dialog box opens.(p. 30)
   If Detailed Settings is selected: The Report Wizard – Detailed Setting Page dialog box opens.(p. 31)



Logo Field Output Settings

- Unselected: The field will be blank.
- HIOKI Logo: Select an image file for output. If no file name is selected, the HIOKI logo is output.
- Text: The field will contain your entered text.

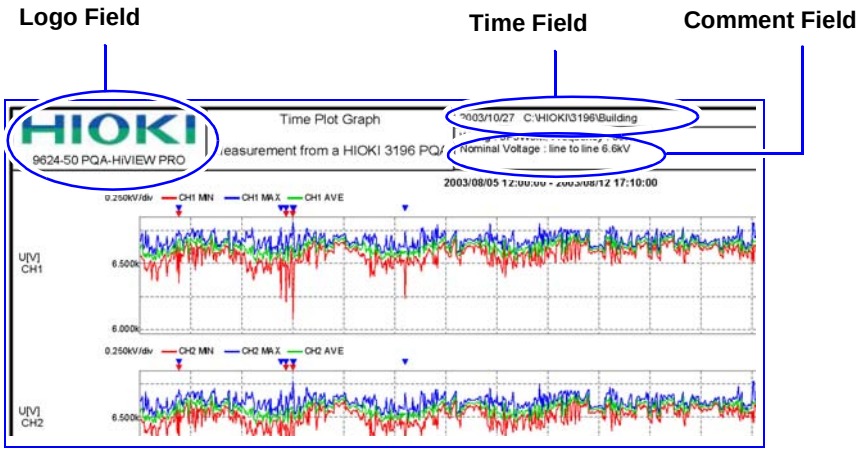
The logo is output only when printing. Logo data cannot be output to a rich text format file.

Starting Page No.
Specify the number for the first page of report output.

Comment Field Output Settings
Enter the contents to be output (up to three lines).
To load the contents of a text file, click the Load a comment file button.

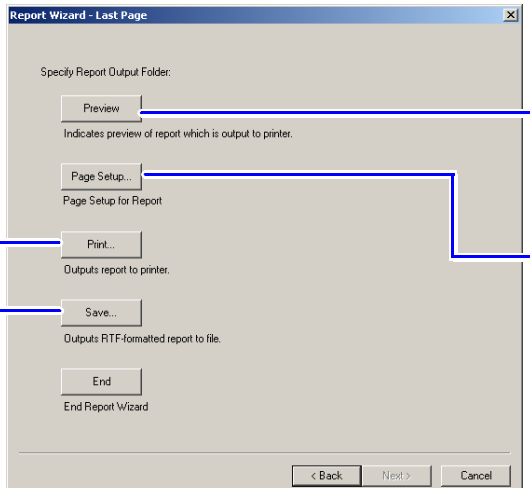
Time Field Output Settings

- Unselected: The field will be blank.
- Time: Outputs the time of report generation.
- Text: The field will contain your entered text.



Printout Example

4 In the Last Page dialog, select whether to save or print the report.



Prints a report.
Opens the Print dialog for you to make printer settings and print.

Saves a report to a rich text format file.
Opens the Save RTF File dialog where you can specify the save destination and name.

Preview
Displays a preview of print-out contents before printing.

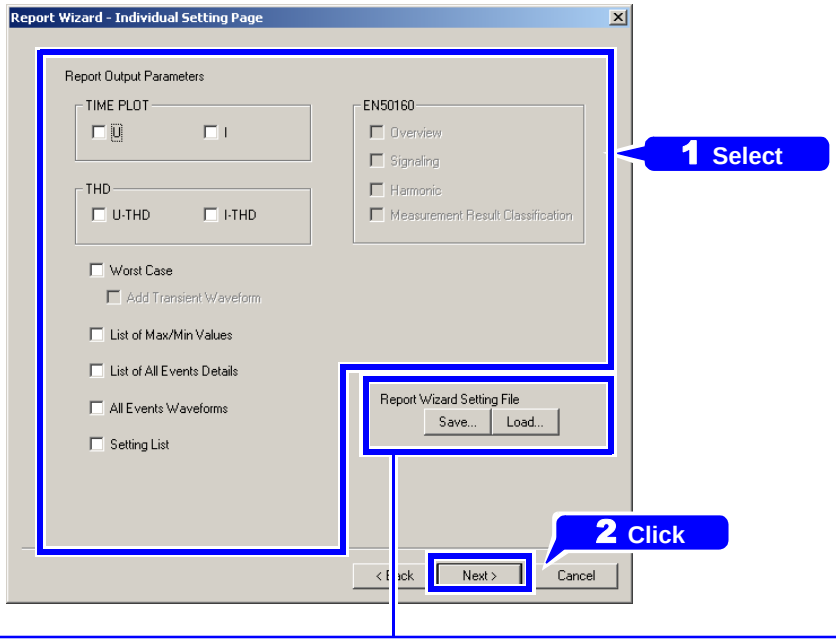
Page Setup
Displays the Print dialog. Printer and paper selections can be made here.

Selecting Custom Settings

Make settings in the Individual Setting Page dialog box.

1. Select those items to be output in the report.
   Note that Transient Waveform can be selected only when Worst Case is selected.
2. Click Next.
   The Report Wizard – Last Page dialog box opens.

Dialog Example for Hioki 3196



Settings can be saved and reloaded later.
For your convenience, you can save your report selections as a Report Wizard Settings file that you can simply reload whenever you want to create another report with the same settings.
The Report Wizard Settings file contains all custom and detailed report output settings.

Printout Example: (p. 34)

Selecting Detailed Settings

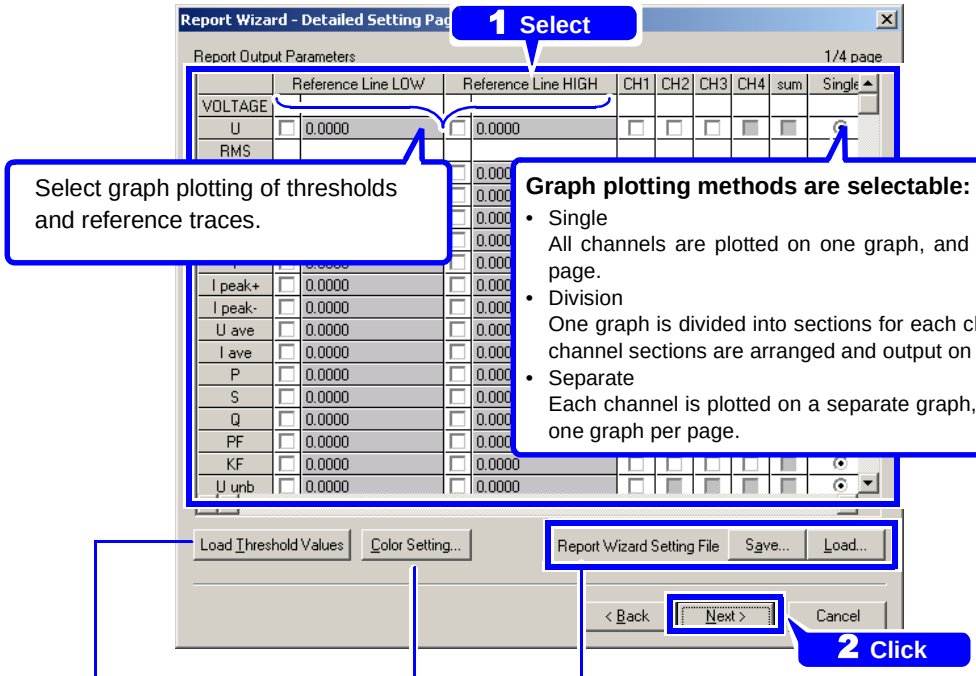
Make settings in the Detail Setting Page dialog box.

1. Select those items to be output in the report.
2. Click Next.
   The pages of displayed setting items depend on the loaded measurement data.

3196		3197	
Page	Setting Items	Page	Setting Items
1/4	Voltage Fluctuations, RMS Fluctuations	1/2	Voltage Fluctuations, RMS Fluctuations
2/4	Harmonic Fluctuations	2/2	Demand, Integrated Power
3/4	Interharmonic Fluctuations		
4/4	IEC Flicker, Demand, Integrated Power		

3. Click Next.
   The Report Wizard – Last Page dialog box opens.(p. 30)

Example: Voltage and RMS fluctuations in the Hioki 3196 dialog (page 1/4)



Select graph plotting of thresholds and reference traces.

Graph plotting methods are selectable:

- Single
  All channels are plotted on one graph, and output on one page.
- Division
  One graph is divided into sections for each channel, and all channel sections are arranged and output on one page.
- Separate
  Each channel is plotted on a separate graph, and output as one graph per page.

Loads the settings (SET) file, after which threshold data can be entered as the reference line value.

Report output graph colors can be selected.
The Color Setting dialog box opens.
Graph colors set here are applied only to graphs output in reports.

Settings can be saved and reloaded later.
For your convenience, you can save your report selections as a Report Wizard Settings file that you can simply reload whenever you want to create another report with the same settings.
The Report Wizard Settings file contains all custom and detailed report output settings.

Printout Example: (p. 34)

Report Output Items

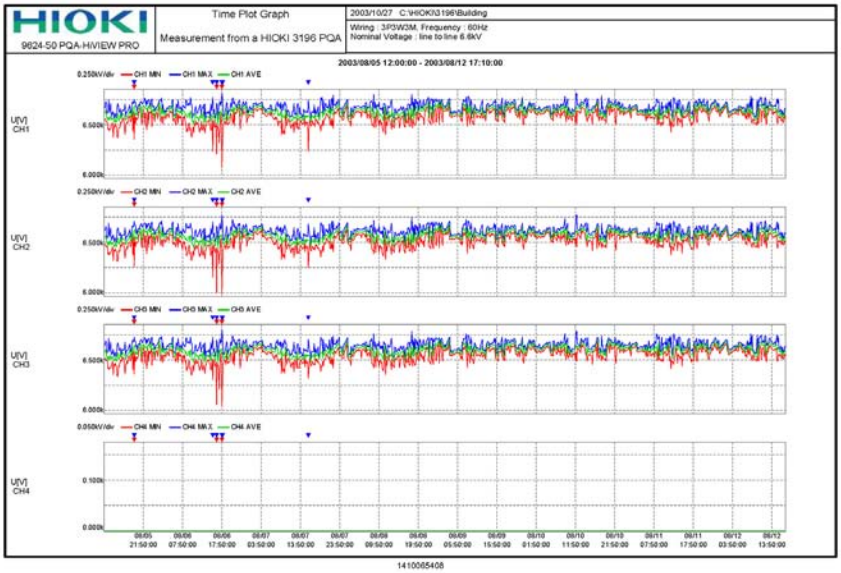
*1. Report output items are fixed for Auto report generation, but are selectable for Custom Settings or Detailed Settings report generation.
*2. Transient Waveform can be selected only when Worst Case is selected.
*3. Output for each channel can be set independently.

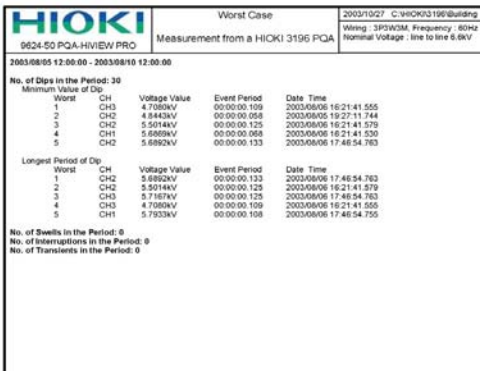
●: Can be output, ×: Cannot be output

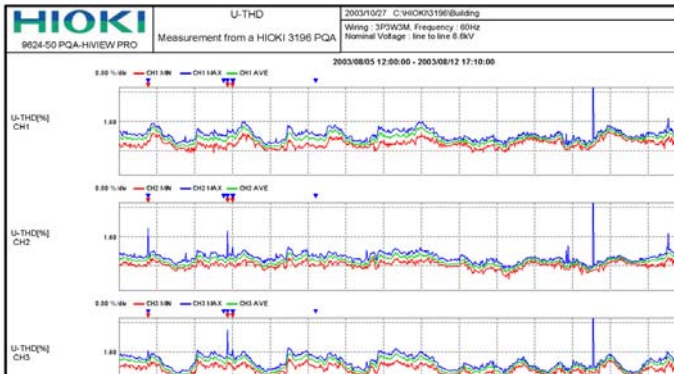
Report Output Item	3196*1			3197*1			Output Contents
	Auto	Custom	Detailed	Auto	Custom	Detailed	
RMS Voltage Fluctuation Graph	●	●	●*3	●	●	●*3	Outputs a graph of rms voltage fluctuation that can be displayed in a Time Plot window.
RMS Current Fluctuation Graph	×	●	●*3	×	●	●*3	Outputs a graph of rms current fluctuation that can be displayed in a Time Plot window.
Voltage Fluctuation, RMS Fluctuation, Energy Consumption Graph, Demand Graph	×	×	●*3	×	×	●*3	Outputs a graph of Energy Consumption and demand that can be displayed in a Time Plot window.
Harmonic Fluctuations, Inter-harmonic Fluctuations, Flicker Graph	×	×	●*3				Outputs a graph of Flicker that can be displayed in a Time Plot window.
Voltage Total Harmonic Distortion Level Graph	●	●	●*3	●	●	●*3	Outputs a graph of voltage total harmonic distortion levels that can be displayed in a Time Plot window.
Current Total Harmonic Distortion Level Graph	×	●	●*3				Outputs a graph of current total harmonic distortion levels that can be displayed in a Time Plot window.
EN50160 Overview	●	●	×				Outputs the contents displayed in the EN50160 Overview window.
EN50160 Signaling	●	●	×				Outputs the contents displayed in the EN50160 Signaling window.
EN50160 Harmonics	×	●	×				Outputs the contents displayed in the EN50160 Harmonics window.
EN50160 Measurement Result Classification	×	●	×				Outputs an EN50169 measurement result classification table.
Worst Case	●	●	×	●	●	×	Outputs the five worst-case values for each voltage swell, dip, interruption and transient event within the reporting span. The worst-case values are maximum voltage swell, maximum continuous voltage swell duration, minimum voltage dip, maximum continuous voltage dip duration, maximum continuous voltage interruption duration and maximum transient value.
Transient Waveform *2	×	●	×				Outputs the worst-case transient waveform.
Maximum/ Minimum List	●	●	×	●	●	×	Outputs a list of voltage fluctuations (each channel separately), rms fluctuations (voltage and current on each channel separately), frequency, and maximum and minimum values of active, reactive and apparent power within the reporting span.
Detailed List of All Events	●	●	×	●	●	×	Outputs a list of all events and event details. The order of the output list can be set to either chronological or priority sequence in the Event List window.
All Event Waveforms	●	●	×	●	●	×	Outputs all event waveforms.
Settings List	×	●	×	×	●	×	Outputs a list of settings for the currently loaded data. These are the settings displayed in the Settings window when you select View – SYSTEM from the menu bar.

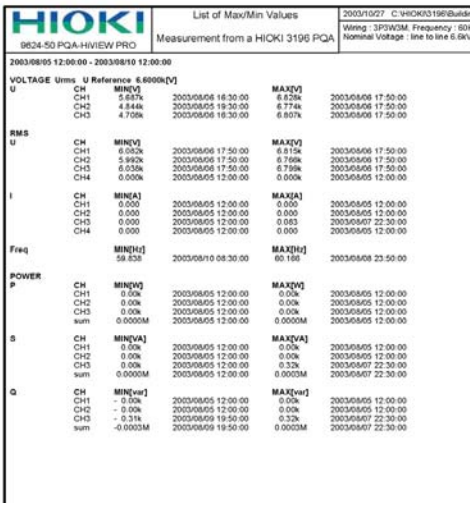
Report Printout Example

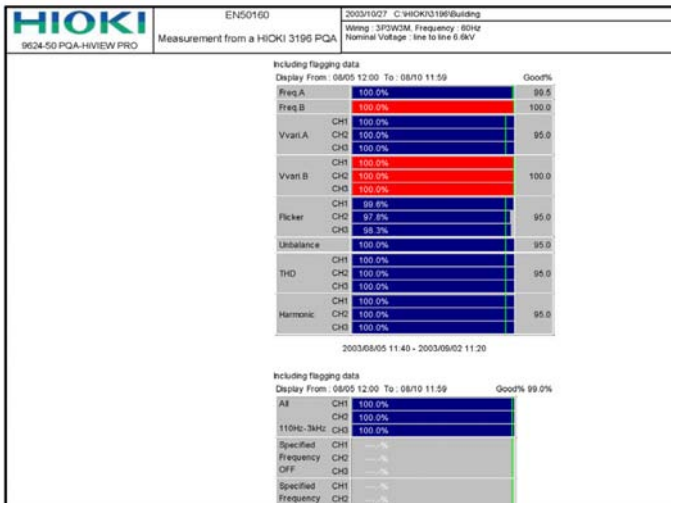
Auto Settings



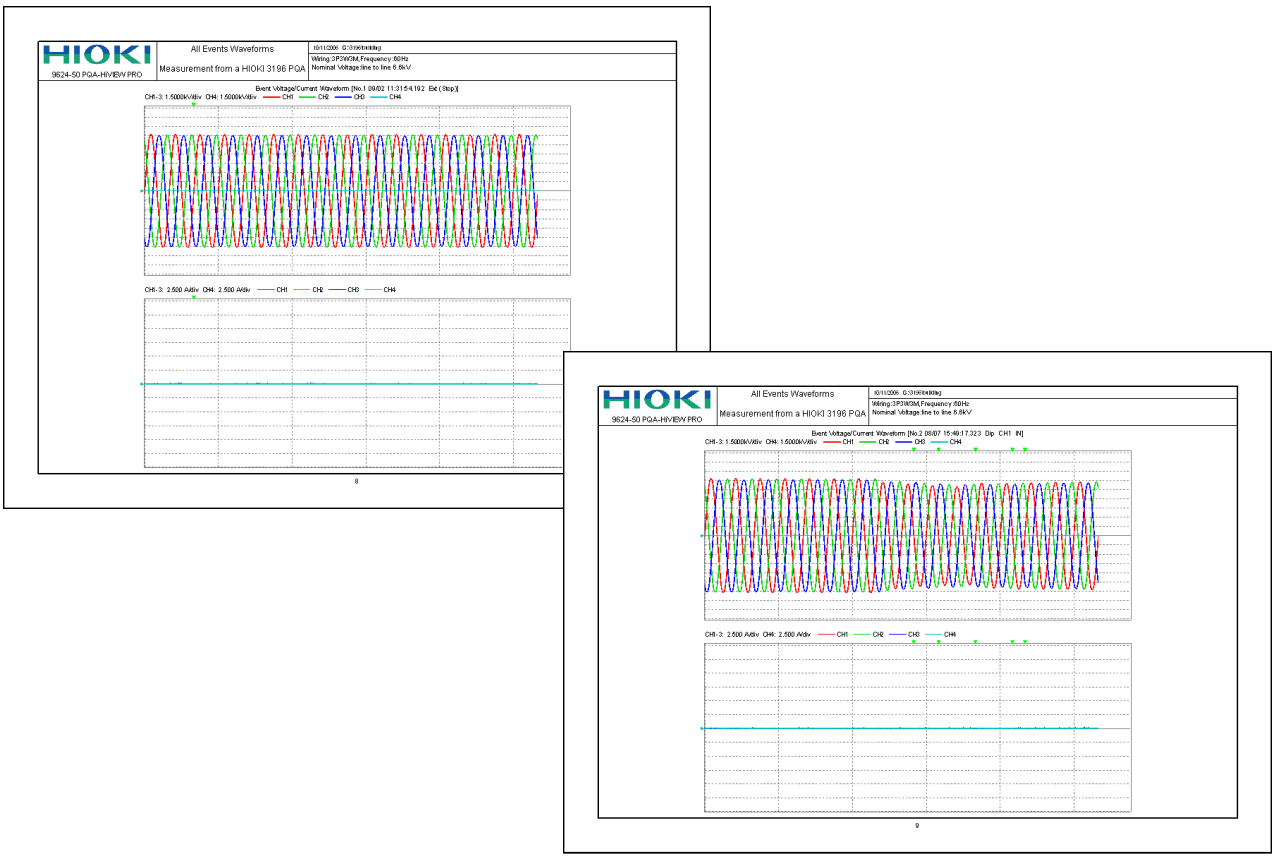




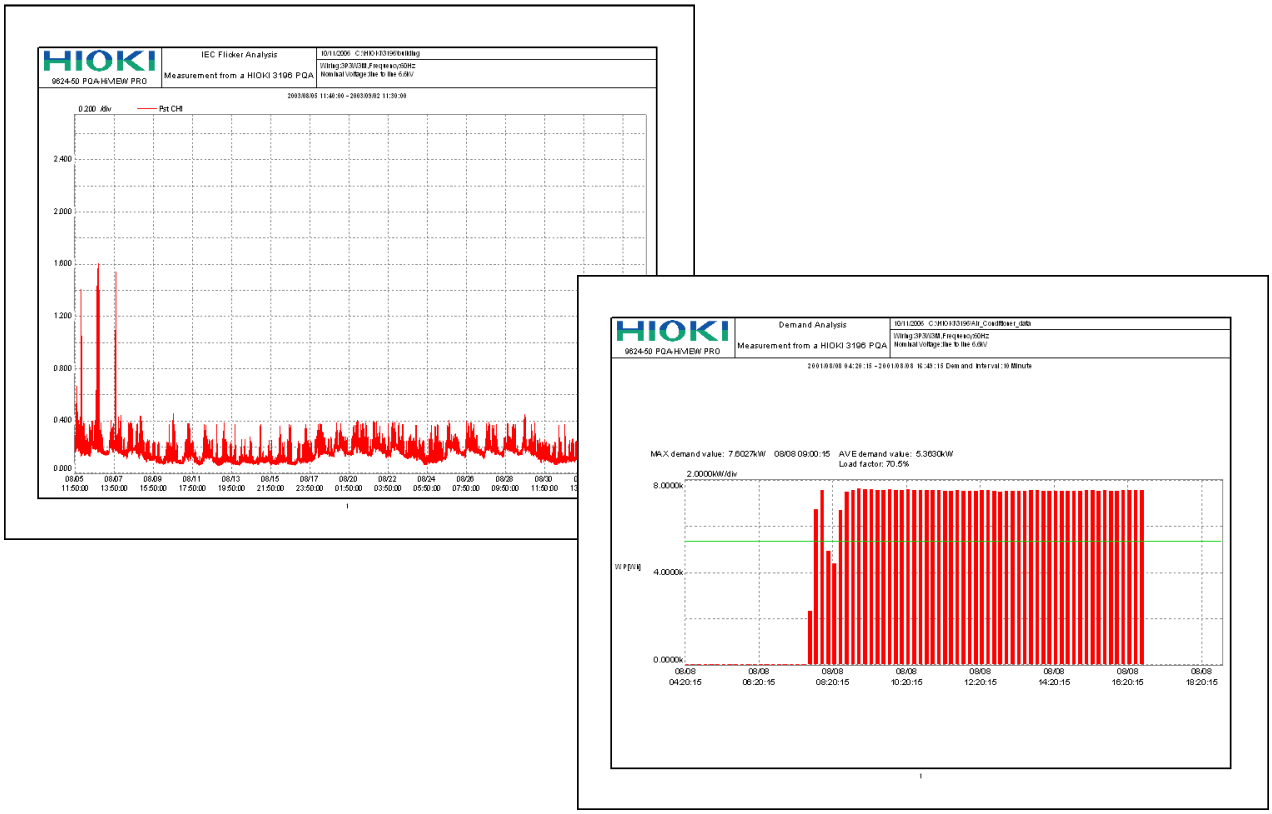




Custom Settings



Detailed Settings



Storing Measurement Data in a CSV File

Measurement data (in binary format) can be converted to CSV format.
Data converted to CSV format can be used in spreadsheet programs such as Excel.

See: "Making Use of CSV File Data (Practical Applications)" (p. 41)

The format of CSV format files is the same for both the Hioki 3196 and 3197 Power Quality Analyzers. Refer to the "Appendix" (p. A1) and the instruments' instruction manuals for file format details.

Convertible Data **●:Convertible, –:Non-Convertible**

Conversion Procedure	Window	Hioki 3196	Hioki 3197
Convert time-series data to CSV format (for the span demarcated by A/B cursors) (p. 35)	Time Plot	●	●
	Flicker Graph	●	–
	Voltage Fluctuation Event	●	●
	Inrush Current Graph	–	●
	Integrated Power	●	●
Convert waveform data to CSV format (p. 38)	Voltage/Current Waveform	●	●
	Voltage/Transient Waveform	●	–
	Voltage Event Waveform	●	●
	Current Event Waveform	●	●
Convert demand data to CSV format (p. 39)	Demand	●	●

Convert Time-Series Data to CSV Format

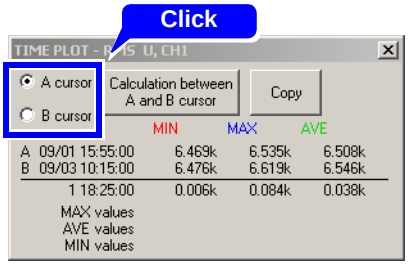
1 Activate the window with the data to be converted.

Demarcate the span for conversion

2 Click the (A and B cursor) button, or select **A and B cursor** in the **Window** menu.

You can also right click and select from the pop-up menu.
The A/B cursors appear in the window, and a dialog box indicates values at the cursor positions.
Displayed contents differ according to the type of data displayed.

3 Click the A or B cursor button in the dialog box to select the cursor to move.



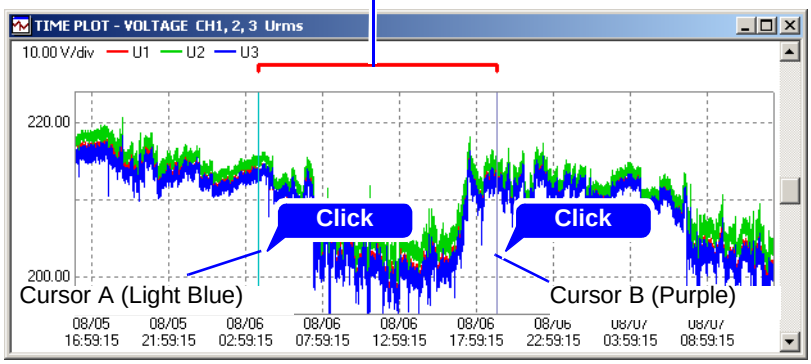
The values at the cursor positions in the currently selected (active) window are displayed.

4 Click the point where you want to move the cursor, or press the right- or left-arrow key on the keyboard to move the cursor.

Using the same procedure, move the other cursor as needed.

Between A and B cursors

Cursor A: Light Blue
Cursor B: Purple



Select the items to be converted to CSV format

5 From the **File** menu, select **Save the active data as a CSV file**.

You can also right click and select from the pop-up menu.

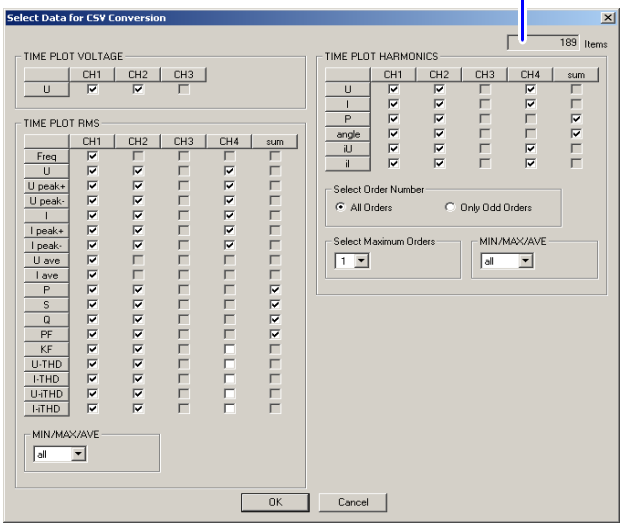
The Select Data for CSV Conversion dialog box opens.
Displayed contents differ according to the type of data displayed.

6 Select the check boxes of the items to be converted to CSV format.

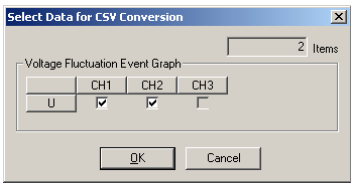
Example

Time Plot Window Example

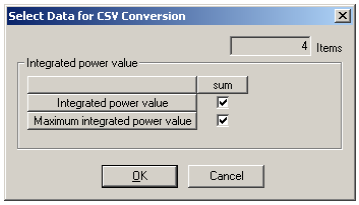
Shows the number of currently selected measurement items (up to 256 items)



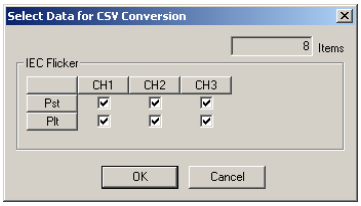
Voltage Event Fluctuation Window Example



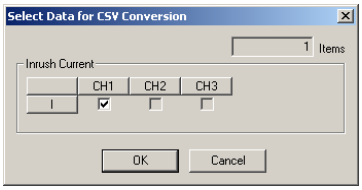
Integrated Power Window Example



IEC Flicker Window Example



Inrush Current Window Example

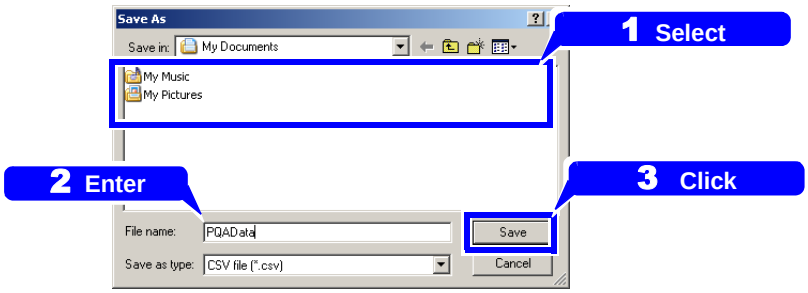


The number of selected measurement items displayed at the upper right of the Select Data for CSV Conversion dialog cannot exceed 256.
Microsoft Excel is unable to load more than 256 items in one CSV format data file.

7 Click the **OK** button.

The Save As dialog box opens.

8 Select the save destination and enter the name of the file to save.



Converting Waveform Data to CSV Format

1 Open the window with the waveform to be converted.

See: "Loading Data" (p. 14)

2 **To convert an event waveform**

Make the Event Waveform window active, and select **Save the active data as a CSV file – Event waveform data** from the **File** menu.

To convert transient waveform data (Hioki 3196 only)

Make the Voltage/Transient Waveform window active, and select **Save the active data as a CSV file – Event transient waveform data** from the **File** menu.

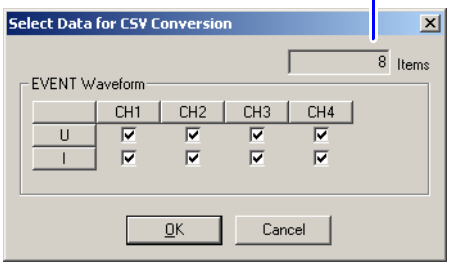
You can also right click and select from the pop-up menu.
The Select Data for CSV Conversion dialog box opens.

3 Select the check boxes of the items to be converted to CSV format.

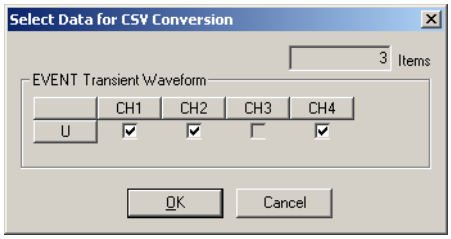
Example

Shows the number of currently selected measurement items

Event Waveform Example



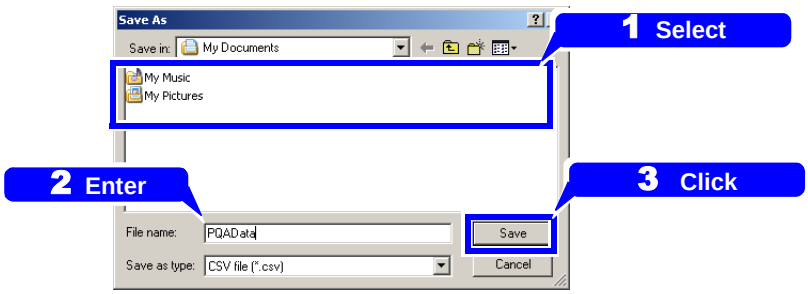
Transient Waveform Example



4 Click the **OK** button.

The Save As dialog box opens.

5 Select the save destination and enter the name of the file to save.



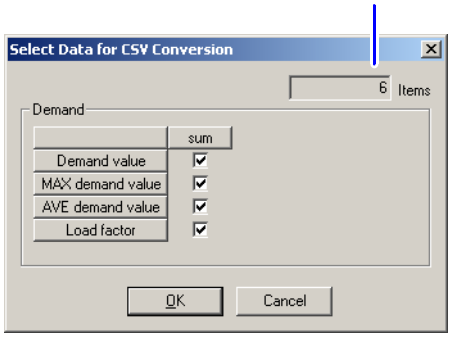
Converting Demand Data to CSV Format

1 Make the Demand window active, and select **Save the active data as a CSV file** from the **File** menu.

The Select Data for CSV Conversion dialog box opens.

2 Select the check boxes of the items to be converted to CSV format.

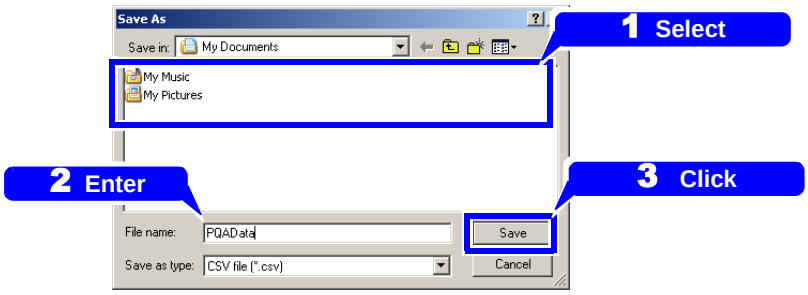
Shows the number of currently selected measurement items



3 Click the **OK** button.

The Save As dialog box opens.

4 Select the save destination and enter the name of the file to save.



Before Converting Harmonic Voltage Measurement Data (EN50160 Mode) to CSV Format (Hioki 3196 only)

For EN50160 mode measurements with the Hioki 3196, harmonic voltage (as opposed to inter-harmonic voltage) content is recorded as a percentage (of Uref) relative to the nominal voltage. This harmonic voltage can be converted from percentage of the nominal voltage (% of Uref) to percentage of the fundamental waveform voltage (% of Ufnd) and saved in CSV format.

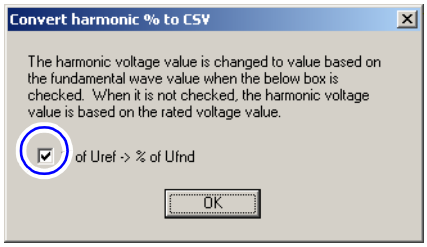
1 Switch to EN50160 mode.

See: "Switching Modes" (p. 55)

2 Select **Convert harmonic % to CSV** in the **Option** menu.

The Convert harmonic % to CSV dialog box opens.

3 Select the check box, and click the **OK** button.



Making Use of CSV File Data (Practical Applications)

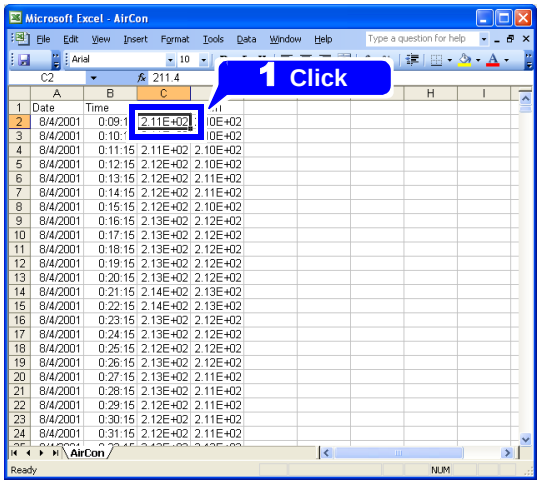
This section describes the procedure to create a graph with Microsoft Excel using a converted CSV file. This example uses Microsoft Excel 2000.

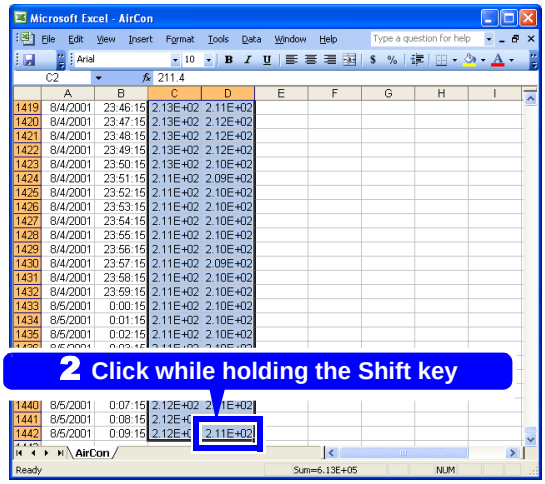
1 Open the converted CSV file with Excel.

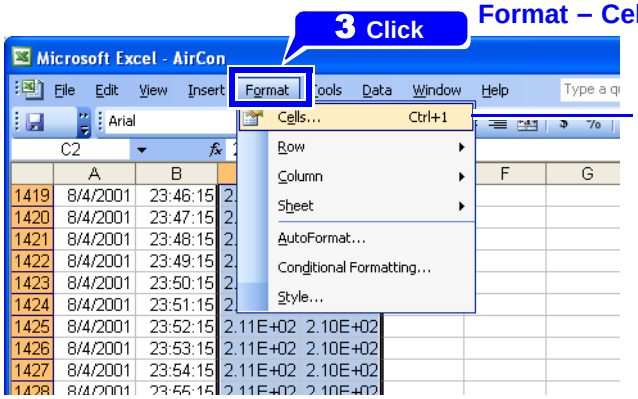
Either double click the converted CSV file, or click File – Open in Excel and select the CSV file.
The file contents appear.

2 Convert measurement data to display as normal numerical values.

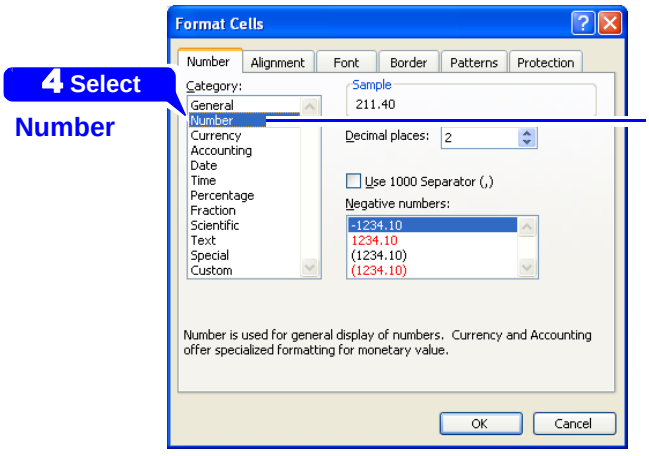
Click the upper left cell of the measurement data, then while holding the Shift key on the keyboard, click the lower right cell of the measurement data to select it. Set the format of the selected cells to Number display.







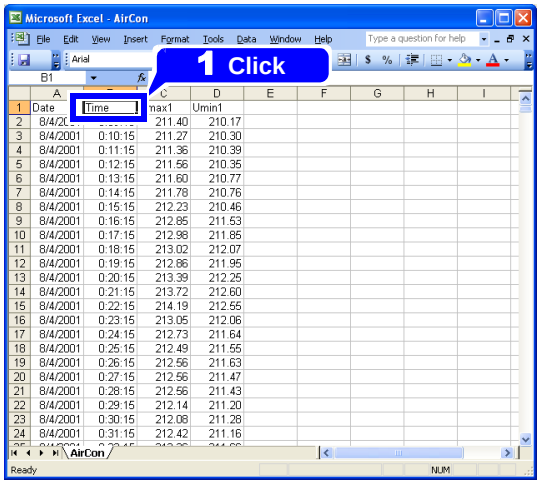
Select Cell in the Format menu. The Format Cells dialog box appears.

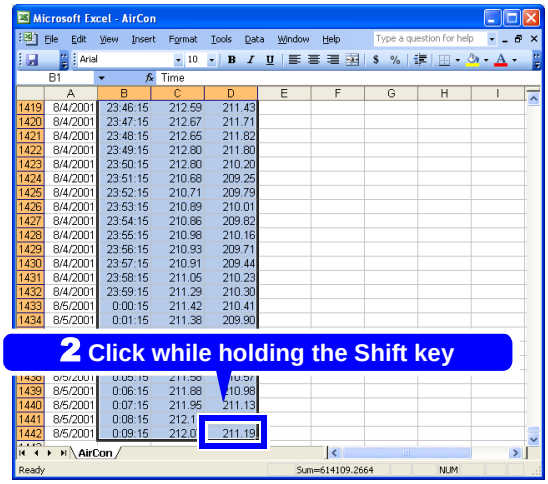


Select Number to display numerical values.

3 Select the range you want to graph.

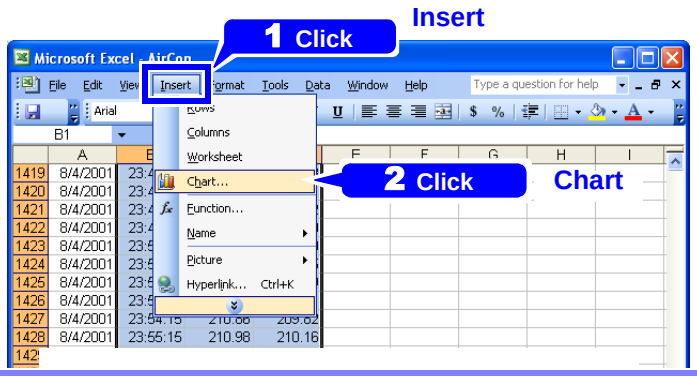
Click the upper left cell of the measurement data, then while holding the Shift key on the keyboard, click the lower right cell of the desired measurement data to select the range.





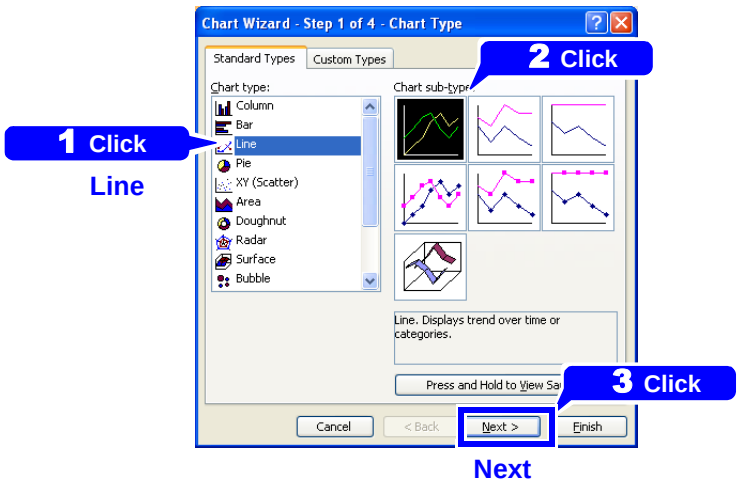
4 Select **Chart** in the **Insert** menu.

The Chart Wizard starts.



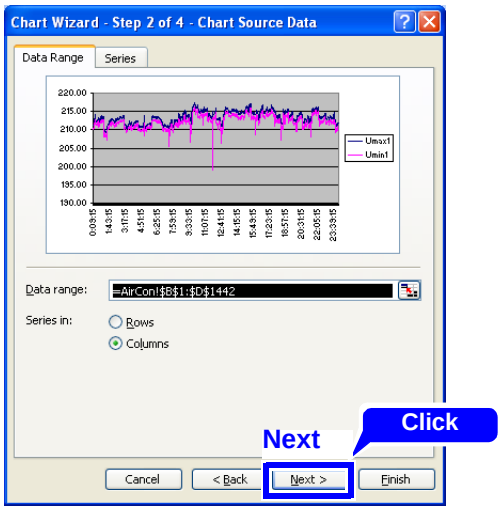
5 Select the Line for the Chart type, and click **Next**.

You can click **Press and Hold to View Sample** to see how the generated graph will look.



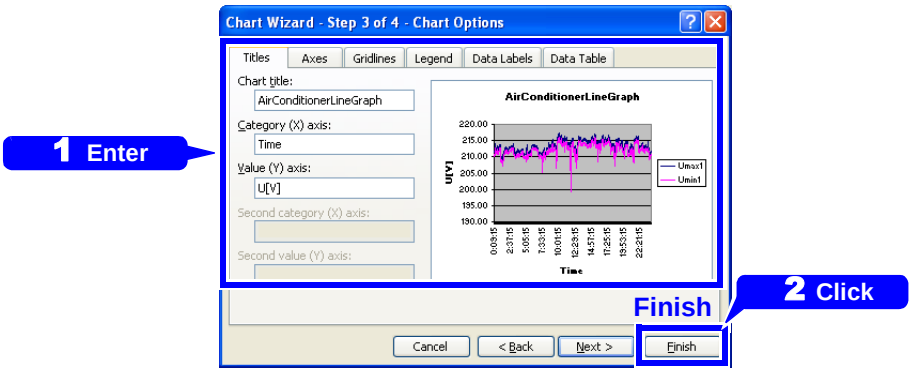
6 Click the **Next** button.

Refer to the Excel Help for the functions available in the window below.



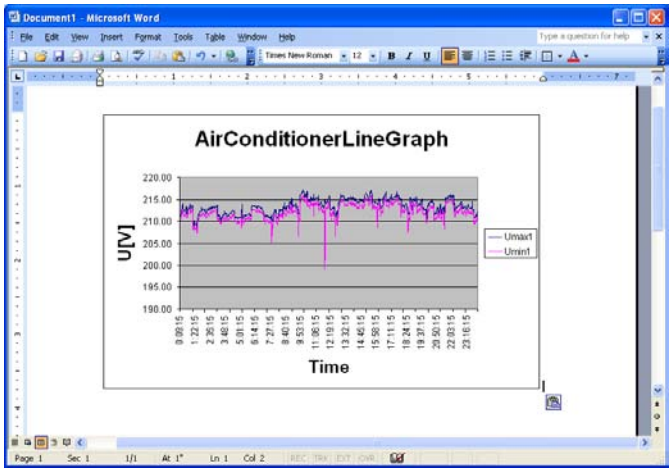
7 Customize your graph as occasion demands, and click the **Finish** button.

Refer to the Excel Help for the functions available in the window below.
In this example, a title and labels for the X and Y axes are added.



8 Save your result as a file or copy to Microsoft Word or Excel.

Example edited with Microsoft Word.



Downloading Measurement Data from the Power Quality Analyzer (LAN Download Function) (Hioki 3196 only)

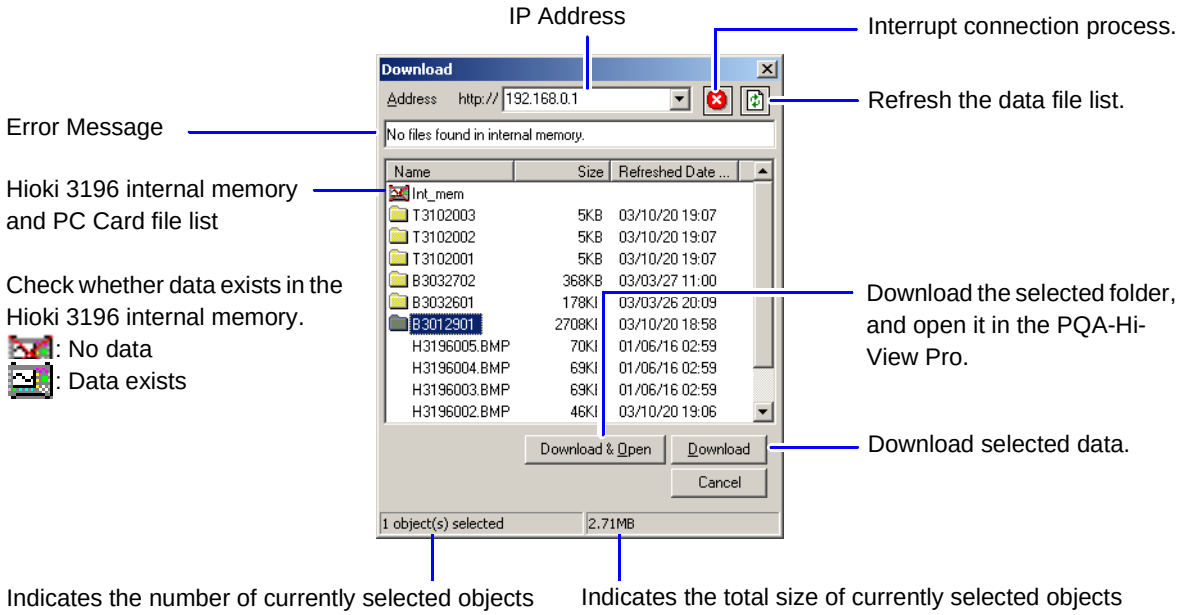
You can download data from the Hioki 3196's internal memory and data files from its PC Card by connecting it to the computer via LAN.
Refer to Section 11.2, "Control and Monitoring Using the LAN Interface" in the Hioki 3196 Power Quality Analyzer Detailed Instruction Manual for the LAN settings.

Before Connecting the Hioki 3196 to the LAN

NOTE Confirm that the 3196 SETTING or ANALYZING display is selected.
Making connections and downloading are not possible when the 3196 display is WAITING (awaiting measurement) or RECORDING.

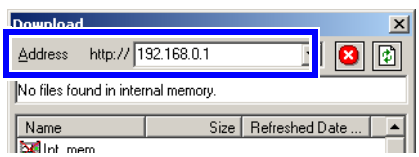
1 Click the (Download) button or select **File – Download** from the menu bar.

The Download dialog box opens.



2 Enter the IP address of the Hioki 3196 to be connected.

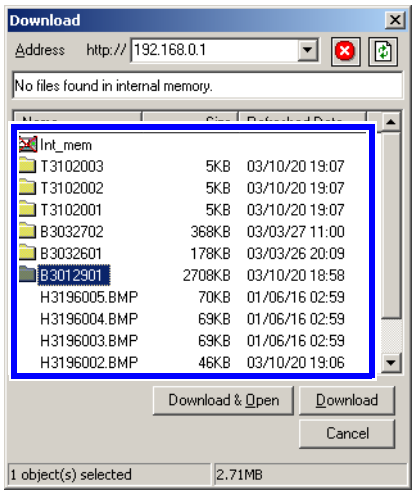
A history is retained of the last ten connected IP addresses.
Click to display this history.



3 Click the (Update) button.

Connection is established to the Hioki 3196, and the data file list is refreshed.
When refreshing is complete, the Hioki 3196 internal memory and PC Card data files are displayed in the data file list.

4 Select a data file to download from the data file list.



5 Click the **Download** button.

The Choose dialog box opens.

6 Select the save destination and, if everything is ready, start downloading.

After downloading, to open a data file with the PQA-HiView Pro, select a folder with “B” appended to the front.

Saving and Loading Settings Files

About Settings Files

The PQA-HiView Pro can save and reload the following settings as a single settings file.
After saving a settings file, you can reload it to view data or create reports using the same settings as when the file was saved. The types of settings files that can be saved are different for the Hioki 3196 and 3197.

The procedure described here is for saving and loading compound files. Refer to the indicated reference pages for the procedures to save and load discrete (non-compound) files.

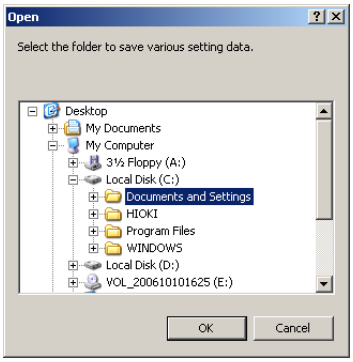
Settings File	File Extension	File Contents	3196	3197	Reference
Report Wizard Settings File	.RPF	(Report Wizard Window) Report output item settings can be saved.	●	●	(p. 28)
User-Defined Curve Settings File	.UCV	(Curve Editing Window) Upper and lower limit curves can be edited and saved.	●	–	(p. 78)
Measurement Result Classification Settings File	.ESP	(EN50160 Measurement Result Classification Editor Window) Different classification tables for EN50160 measurement results can be edited and saved.	●	–	(p. 88)
Compound File (This file type combines all three of the above file types, although the Hioki 3197 supports only the Report Wizard Settings File data.)	.QAP	All data defined for the User-Defined Curve file, Measurement Result Classification file and Report Wizard Settings file are stored together.	●	–	(p. 47)

Specify the Save Destination for the Settings File Beforehand

The default save destination is the My Documents folder.
By specifying another save destination before saving the settings file, all settings files will be saved to the new destination in the future.

1 Select **Option – Change of Setting Data Storage Folder** from the menu bar.

The Open dialog box opens.



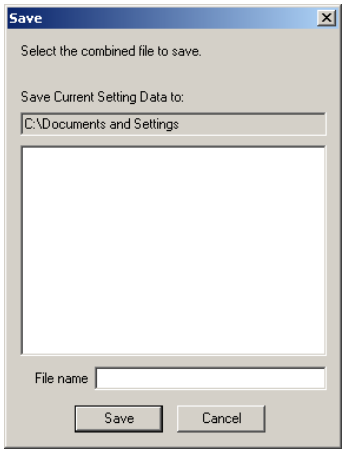
2 Select the folder in which to save settings files, and click the **OK** button.

Saving a Compound File

The data for each type of settings file is combined and stored in a single file.

1 Click the (Save Integrated Files) button or select **File – Save Integrated Files** from the menu bar.

The Save dialog box opens.



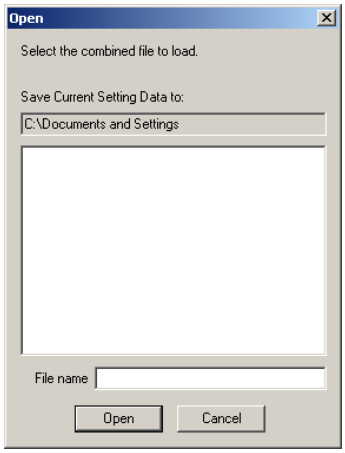
2 Enter the file name to be saved in the dialog, and click **Save**.

The current settings are saved in the specified file.

Loading a Compound File

1 Click the (Open Integrated Files) button or select **File – Open Integrated Files** from the menu bar.

The Open dialog box opens.



2 Select the name of the file to open in the dialog, and click **Open**.

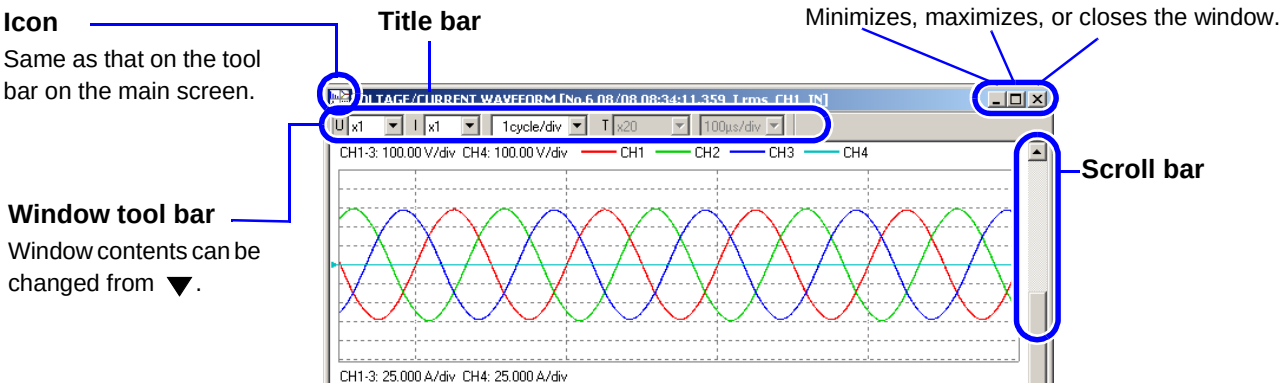
The settings loaded from the file are applied to each setting item.

Analyzing Measurement Data from the Hioki 3196 Chapter 4

Hioki 3196 Measurement Data Window Layout

Window Display

The Measurement Data window appears when data is loaded.



Any window can be displayed using the menu or tool bar. A window can also be changed by right clicking within it and selecting another window to display from the pop-up menu.

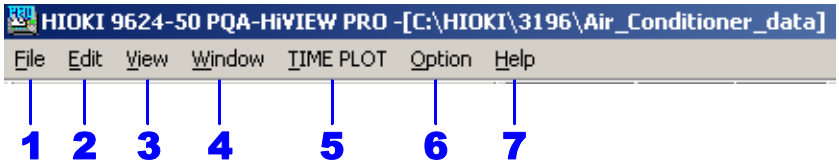
See: "Menu Bar Operations" (p. 50), "Tool Bar Operations" (p. 53)
"Changing Windows" (p. 17)

Two display modes are available for analyzing Hioki 3196 measurement data: normal mode and EN50160 display mode.

See: "Switching Modes" (p. 55)

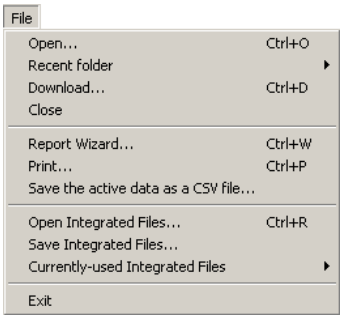
Menu Bar Operations

Clicking a menu item displays one of the pull-down menus shown below. Items not available for the current window are grayed out.



1 File

Click **File** and select from the pull-down menu.

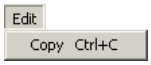


The same operations are available on the tool bar (p. 53).

Open		Opens a file.	(p. 14)
Recent folder		Displays recently used folders.	
Download		Downloads data from internal memory of the 3196 or PC card via LAN.	(p. 44)
Close		Closes the currently active window.	
Report Wizard		Sets the conditions for creating a report.	(p. 28)
Print		Prints the currently active window.	(p. 24)
Save the active data as a CSV file		Saves the loaded data as a CSV format file.	(p. 35)
Open Integrated Files		Loads a settings file for the PQA-HiView Pro.	(p. 47)
Save Integrated Files		Saves a setting file for the 9624-50.	(p. 47)
Currently-used Integrated Files		Displays recently used compound files.	
Exit		Closes the PQA-HiView Pro program.	(p. 12)

2 Edit

Click **Edit** and select from the pull-down menu.

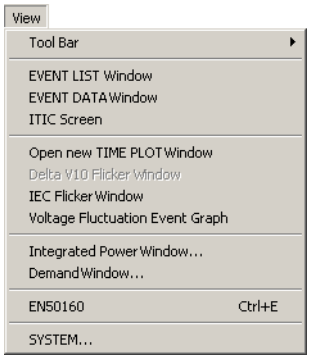


The same operations are available on the tool bar (p. 53).

Copy		Displays can be copied to the clipboard.	(p. 27)

3 View

Click **View** and select the window or items to display from the pull-down menu.



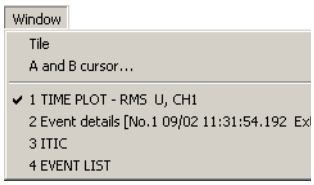
The same operations are available on the tool bar (p. 53).

Tool Bar		Shows or hides the standard tool bar (top) and window tool bar (left).	
EVENT LIST Window		Opens the event list window. You can re-order the displayed list by selecting **Sort by Time (–)**, **Sort by Time (+)** or **Sort by Priority**.	(p. 62)
EVENT DATA Window		Opens the event details window. You can select the following window data types: • Event Details Window • Voltage/Current Waveform Window • Voltage/Transient Waveform Window • Voltage Waveform Window • Current Waveform Window • Vector Window • DMM Window • Harmonic Bar Graph Window • Harmonic List Window	(p. 63)
ITIC Window		Opens the ITIC Window. An EVT file containing voltage swell, dip or interruption data must be loaded in order to display this window.	(p. 76)
Open new TIME PLOT Window		Opens up to four new TIME PLOT windows. You can select the following window data types: • RMS Window • Voltage Window • Harmonics Window • Interharmonics Window	(p. 56)
Delta V10 Flicker Window		Opens the Delta V10 Flicker Window. (An FLC file of Delta V10 flicker data must be loaded in order to display this window)	(p. 80)
IEC Flicker Window		Opens the IEC Flicker Window. (An FLC file of IEC flicker data must be loaded in order to display this window)	(p. 81)
Voltage Fluctuation Event Graph		Opens the Voltage Fluctuation Event Window. (A WDU file of the voltage fluctuation event graph for the selected event must be loaded in order to display this window)	(p. 73)
Integrated Power Window		The Energy Consumption opening dialog is displayed, and after setting, the Integrated Power window appears.	(p. 74)
Demand Window		The Demand opening dialog is displayed, and after setting, the Demand Window appears.	(p. 75)
EN50160		Switches between normal and EN50160 display modes.	(p. 55)
SYSTEM		Displays the settings on the Hioki 3196.	(p. 82)

4 Window

Click **Window** and select from the pull-down menu.
This menu includes the names of the currently displayed windows.

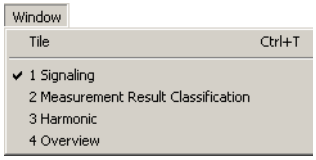
Normal display mode



The same operations are available on the tool bar (p. 53).

Tile	Arranges display of all open windows.	(p. 26)
A and B cursor	Select to demarcate a span or view values at cursor positions.	(p. 21)

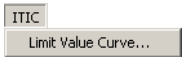
EN50160 display mode



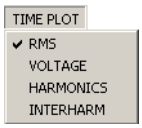
5 EVENT LIST/ EVENT DATA/ TIME PLOT/ ITIC

The menu displayed depends on the selected window.
Click **EVENT LIST**, **EVENT DATA**, **TIME PLOT** or **ITIC** to select a window from the corresponding pull-down menu.
You can also right click and select a window to switch to from the pop-up menu.

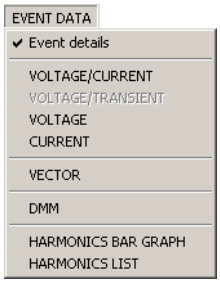
Sort by Time (-)	(p. 62)
Sort by Time (+)	
Sort by Priority	



Limit Value Curve	(p. 76)



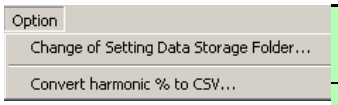
RMS	(p. 58)
VOLTAGE	(p. 59)
HARMONICS (Harmonic Fluctuations)	(p. 60)
INTERHARM (Inter-Harmonic Fluctuations)	(p. 61)



Event details	(p. 64)
VOLTAGE/CURRENT	(p. 65)
VOLTAGE/ TRANSIENT	(p. 66)
VOLTAGE	(p. 67)
CURRENT	(p. 68)
VECTOR	(p. 69)
DMM	(p. 70)
HARMONICS BAR GRAPH	(p. 71)
HARMONICS LIST	(p. 72)

6 Option

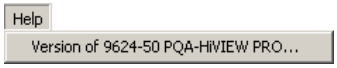
Click **Option** and select from the pull-down menu.



Change of Setting Data Storage Folder	Select this to specify the save destination for settings files.	(p. 46)
Convert harmonic % to CSV	Select this to convert measured harmonic voltage values from percentage of the nominal voltage to percentage of the fundamental waveform voltage when saving data to CSV format. (EN50160 data only)	(p. 40)

7 Help

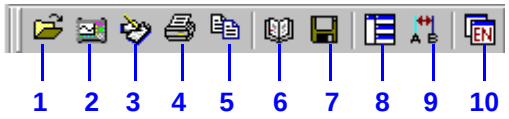
Click **Help** and select from the pull-down menu.



Displays version information for the Hioki 9624-50 PQA-HiView Pro program.

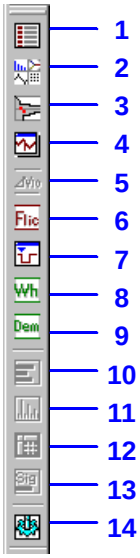
Tool Bar Operations

Tool bar (standard)



1	**Open**	(p. 14)	6	**Open Integrated file**	(p. 47)
2	**Download**	(p. 44)	7	**Save Integrated file**	(p. 47)
3	**Report Wizard**	(p. 28)	8	**Tile**	(p. 26)
4	**Print**	(p. 24)	9	**A and B cursors**	(p. 21)
5	**Copy**	(p. 27)	10	**Switch to EN50160 Window**	(p. 55)

Tool bar (window)



1	**Show/hide EVENT LIST Window**	(p. 62)
2	**Show/hide EVENT DATA Window**	(p. 63)
3	**Show/hide ITIC Window**	(p. 76)
4	**Open new TIME PLOT Window**	(p. 56)
5	**Open Delta V10 Flicker Window**	(p. 80)
6	**Open IEC Flicker Window**	(p. 81)
7	**Open Voltage Fluctuation Event Graph**	(p. 73)
8	**Open Integrated Power Window**	(p. 74)
9	**Open Demand Window**	(p. 75)
10	**Open EN50160 Overview Window**	(p. 83)
11	**Open EN50160 Harmonic Window**	(p. 85)
12	**Open EN50160 Measurement Result Classification Window**	(p. 87)
13	**Open EN50160 Signaling Window**	(p. 86)
14	**View system settings**	(p. 82)

Switching Modes

Two switchable display modes are provided for Hioki 3196 measurement data: Normal display mode and EN50160 display mode.
Window layouts are similar to the screens on the Hioki 3196 Power Quality Analyzer, for easy analysis.
The Normal display mode is initially enabled when data is loaded.

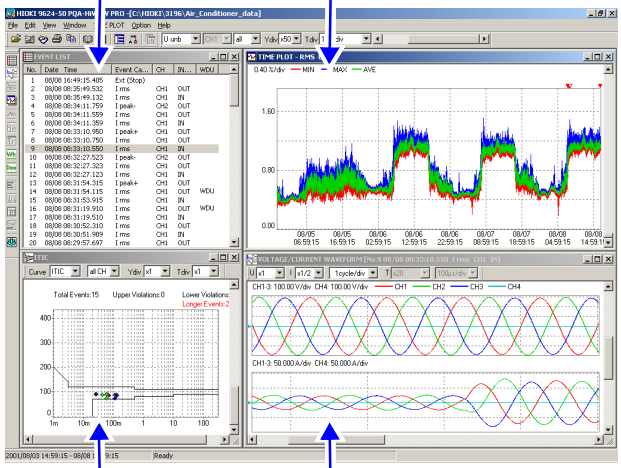
Click  to toggle between Normal and EN50160 display modes.

The  tool appears pressed when the EN50160 display mode is enabled.

Normal Display Mode

Windows:
TIME PLOT, Event List, Event Data, ITIC, Delta V10 Flicker, IEC Flicker, Event Voltage Fluctuation, Integrated Power Value, and Demand

Event List window (p. 62) **Time Plot Window (p. 56)**



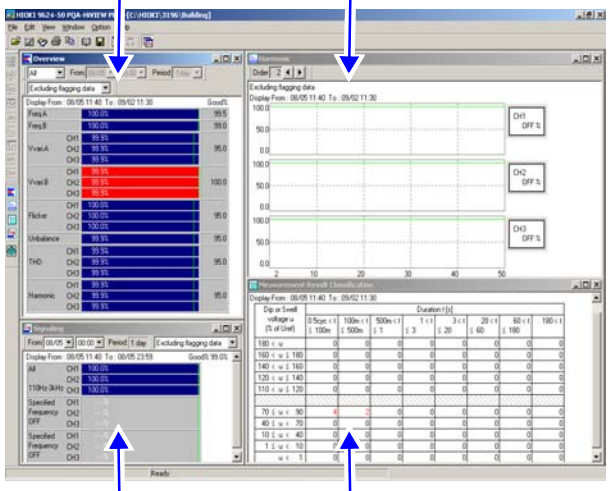
ITIC window (p. 76)

Event data window (p. 63)
You can switch the Event Data window to the Harmonic or DMM window.
(Right click inside the window and select a window to switch to from the pop-up menu.)

EN50160 Display Mode

Windows:
EN50160 data (Overview, Harmonic, Signaling, and Measurement result classification)

Overview window (p. 83) **Harmonic window (p. 85)**



Signaling window (p. 86)

Measurement Result Classification window (p. 87)

The EN50160 display mode is available only when an EN50160 file has been loaded.

Viewing a Time Series Graph [TIME PLOT]

Data measured with the Hioki 3196 Power Quality Analyzer can be displayed as a time series graph (Time Plot window). The program's Time Plot windows correspond to each Time Plot screen on the Hioki 3196.
If the Hioki 3196 has a high-capacity PC Card installed when measuring, long-term recording data may be difficult to display on the instrument's screen (when "Memory full: LOOP" is selected on the SYSTEM – RECORDING screen).
This kind of long-term time plot data can be analyzed with the PQA-HiView Pro.

The following types of Time Plot windows can be displayed up to four windows at a time.

- **RMS Window (p. 58)**
- **VOLTAGE Window (p. 59)**
- **HARMONICS Window (p. 60)**
- **INTERHARM (Interharmonics) Window (p. 61)**

Opening and Switching Time Plot Windows

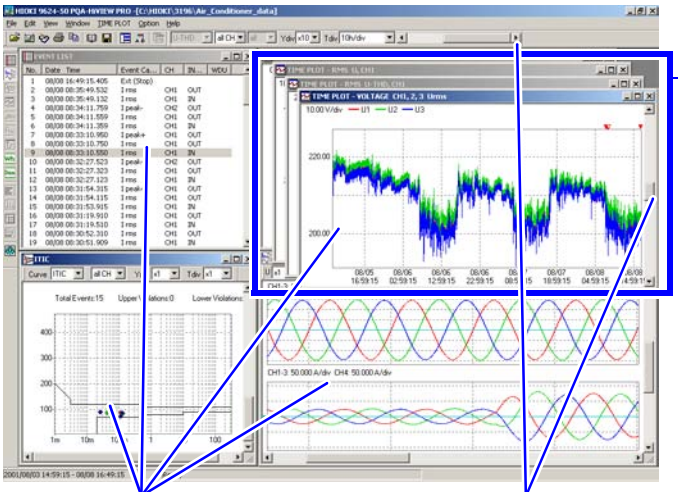
1 Load the measurement data.

See: "Loading Data" (p. 14)

To display a Time Plot window, the loaded data must include an ITV file.

2 Click the  (Open Time Plot Window) button or select **View – Open new TIME PLOT window** from the menu bar.

A Time Plot Window opens.
You can open up to four windows by clicking the button or selecting from the menu bar repeatedly.



Click an event marker to view an event phenomenon in the other windows.

See: "Viewing Event Phenomena" (p. 19)

Scrolls the window

Move a scroll box or click within the scroll bar.
When scrolling horizontally, all open Time Plot windows scroll together.

Switching Windows

3 Activate the Time Plot window to be switched, and select the desired window to display from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.

The windows available for selection depend on the data type that was selected on the SYSTEM – MAIN – RECORDING screen of the Hioki 3196.

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

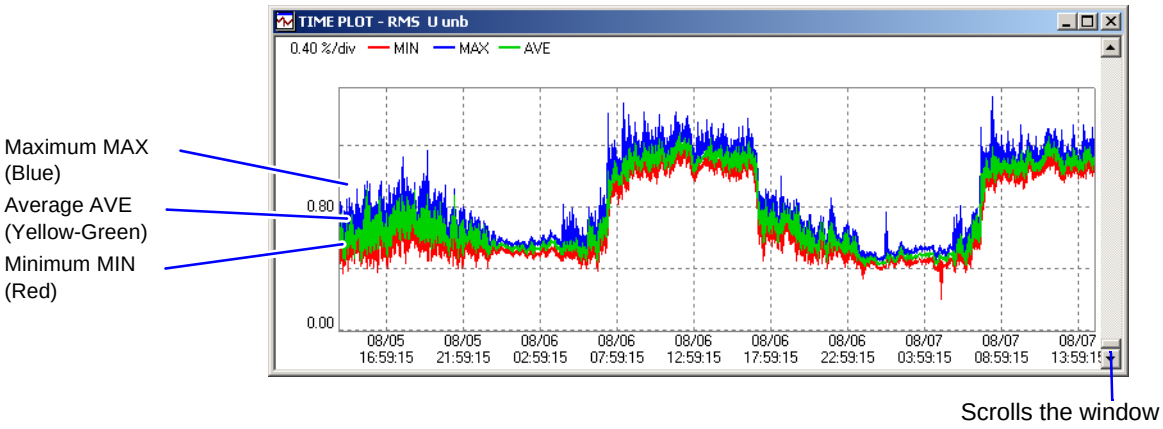
Viewing RMS Fluctuations [TIME PLOT – RMS]

1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 56)

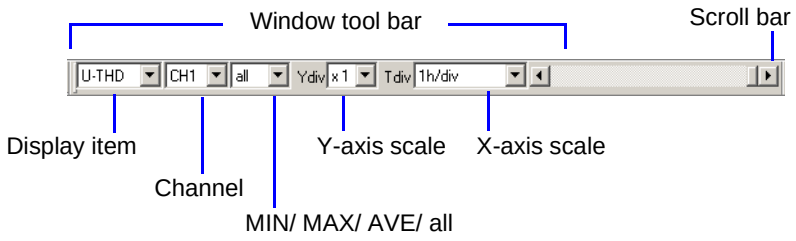
2 Activate the Time Plot window and select **RMS** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The RMS window opens.



Changing Displayed Contents

3 When the RMS window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the RMS window's tool bar.



Viewing Voltage Fluctuations [TIME PLOT – VOLTAGE]

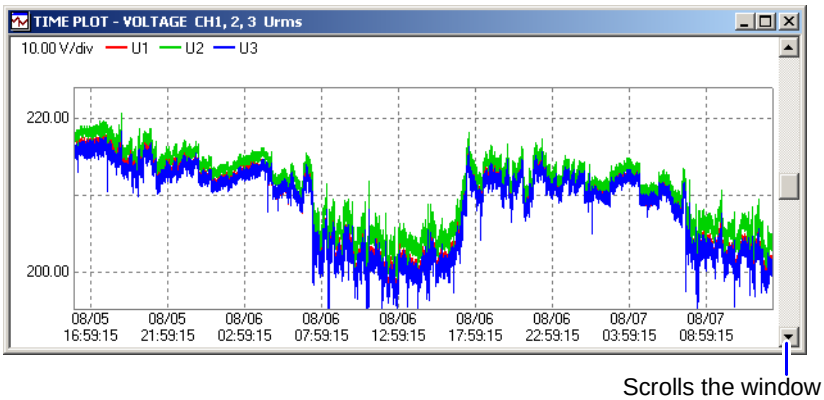
1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 56)

2 Activate the Time Plot window and select **VOLTAGE** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The Voltage window opens.

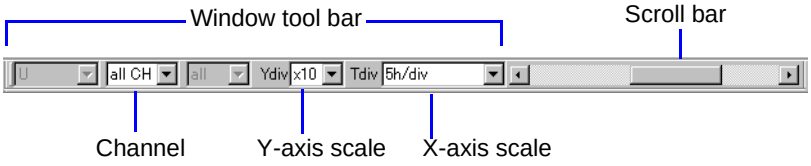
U1 (Red)
U2 (Yellow-Green)
U3 (Blue)



Voltage fluctuation data consists of pairs of maximum and minimum values for every measurement interval. Therefore, expanding the horizontal scale reveals the data as a series of vertical lines between each pair of maximum and minimum values at each measurement interval. There is no horizontal line through the space between measurement intervals.

Changing Displayed Contents

3 When the Voltage window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the Voltage window's tool bar.



Viewing Harmonic Fluctuations [TIME PLOT – HARMONICS]

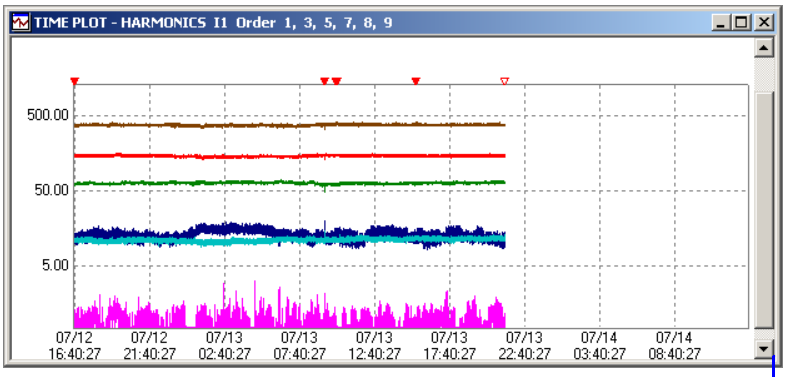
1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 56)

2 Activate the Time Plot window and select **HARMONICS** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The HARMONICS window opens.

Colors and displayed harmonic orders can be set from the tool bar.

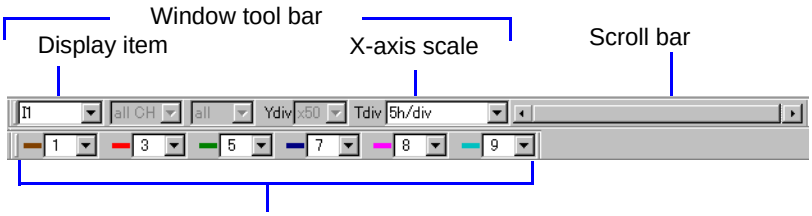


Scrolls the window

Harmonic data that was recorded with the MAX/MIN/AVE recording data type setting consists of maximum, minimum and average values for every measurement interval. Therefore, expanding the horizontal scale reveals the data as a series of vertical lines between each pair of maximum and minimum values at each measurement interval. There is no horizontal line through the space between measurement intervals.
Settings that existed at the time of recording can be confirmed from the Settings window. (p. 82)
Data from 400 Hz measurements can be analyzed up to the 10th harmonic order.

Changing Displayed Contents

3 When the Harmonics window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the Harmonics window's tool bar.



Displayed Harmonic Orders
Up to six harmonic orders (from 1 to 50) can be selected for display together.
The vertical axis has a fixed logarithmic scale.

Viewing Inter-Harmonic Fluctuations [TIME PLOT – INTERHARM]

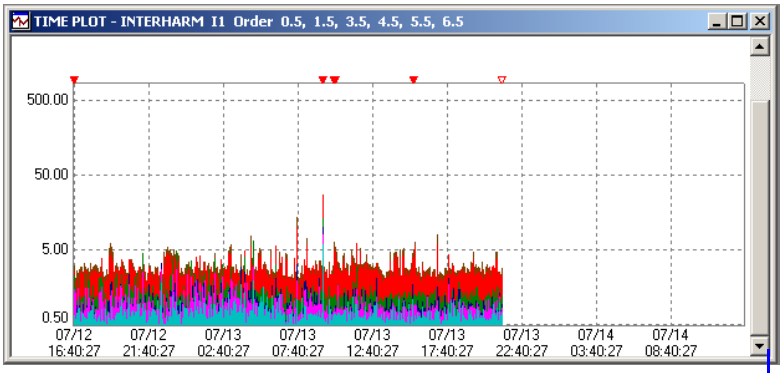
1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 56)

2 Activate the Time Plot window and select **INTERHARM** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The INTERHARM window opens.

Colors and displayed harmonic orders can be set from the tool bar.

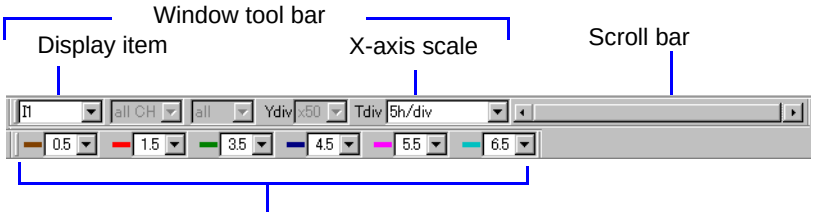


Scrolls the window

Inter-harmonic data that was recorded with the MAX/MIN/AVE recording data type setting consists of maximum, minimum and average values for every measurement interval. Therefore, expanding the horizontal scale reveals the data as a series of vertical lines between each pair of maximum and minimum values at each measurement interval. There is no horizontal line through the space between measurement intervals.
Settings that existed at the time of recording can be confirmed from the Settings window. (p. 82)

Changing Displayed Contents

3 When the Interharm window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the Interharm window's tool bar.



Displayed Inter-Harmonic Orders

Up to six inter-harmonic orders (from 0.1 to 49.5) can be selected for display together.
The vertical axis has a fixed logarithmic scale.

Viewing Events as a List [EVENT LIST]

Event occurrences within data measured with the Hioki 3196 can be displayed as a list (the Event List window).
The Event List window is equivalent to the EVENT – LIST screen on the Hioki 3196.
You can re-order the displayed list by selecting **Sort by Time (–)**, **Sort by Time (+)** or **Sort by Priority**.

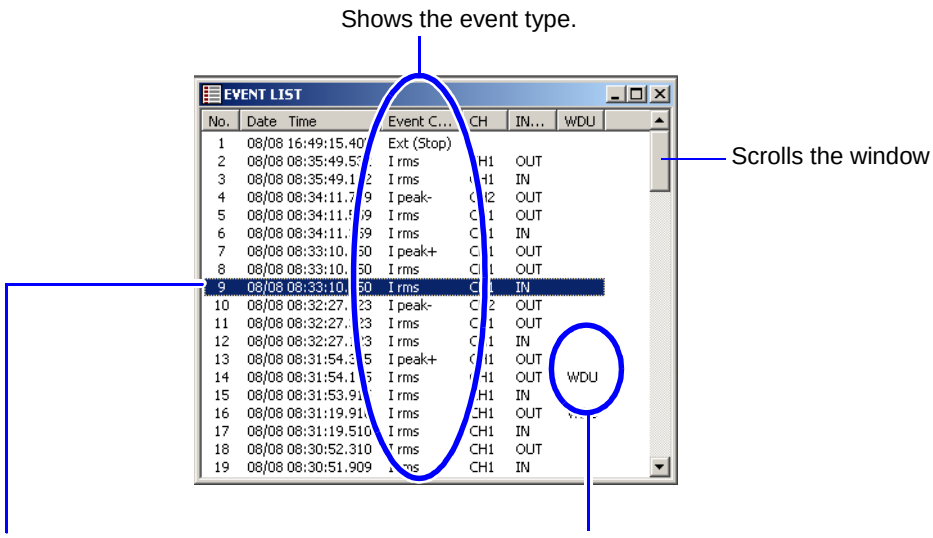
1 Load the measurement data.

See: "Loading Data" (p. 14)

To display the Event List window, the loaded data must include an EVT file.

2 Click the (Show/hide EVENT LIST window) button or select **View – EVENT LIST Window** from the menu bar.

The Event List window opens.



Re-Ordering the Display of Events

3 Make the Event List window active, and select **Sort by Time (–)**, **Sort by Time (+)** or **Sort by Priority** from the **EVENT LIST** menu.

You can also right click and select from the pop-up menu.
The list is re-ordered according to your selection.

Viewing Event Measurement Data [EVENT DATA]

Data measured with the Hioki 3196 upon the occurrence of an event can be displayed as a graph (Event Data window).
The Event Data window is equivalent to the VIEW screen displayed when you select an event in the Event List on the Hioki 3196 and press the ENTER key.

The Event Data window can be switched between the following nine types.

- **Event details Window (p. 64)**
- **VOLTAGE/CURRENT Window (p. 65)**
- **VOLTAGE/TRANSIENT Window (p. 66)**
- **VOLTAGE Window (p. 67)**
- **CURRENT Window (p. 68)**
- **VECTOR Window (p. 69)**
- **DMM Window (p. 70)**
- **HARMONICS BAR GRAPH Window (p. 71)**
- **HARMONICS LIST Window (p. 72)**

In this manual, the above windows are collectively called “Event Data windows”.

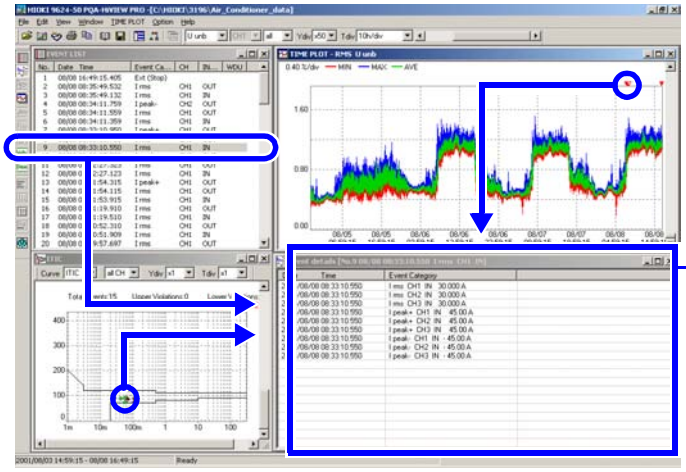
Opening and Switching Event Data Windows

1 Load the measurement data.

See: "Loading Data" (p. 14)

2 Click the  (Show/hide EVENT DATA window) button or select **View – EVENT DATA Window** from the menu bar.

The Event data window opens.



Click an event marker or an event in the Event List to display a graph of the event.

See: "Viewing Event Phenomena" (p. 19)

Switching Windows

3 Activate the Event Data window and select the desired window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.

Viewing Event Details [Event details]

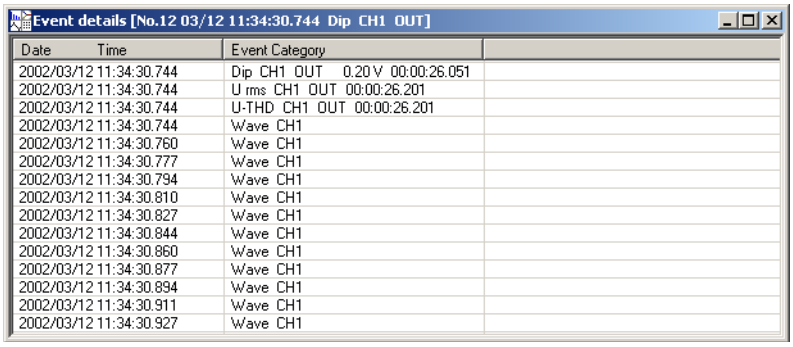
1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

2 Activate the Event Data window and select **Event details** from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.

The Event details window opens.
When you select an event in the Event List window, multiple event contents associated with that event occurrence are displayed.



Viewing Voltage/Current Waveforms [VOLTAGE/CURRENT]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

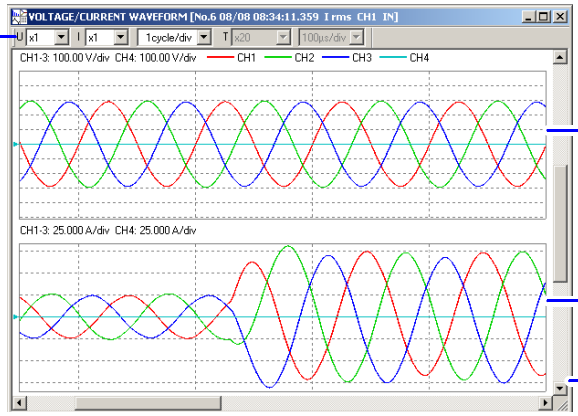
2 Activate the Event Data window and select the **VOLTAGE/CURRENT** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Voltage/Current Waveform window opens.

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)
CH4 (Light Blue)

Up to 14 cycles (50 Hz), 16 cycles (60 Hz) or 112 cycles (400 Hz) can be analyzed.



Voltage waveform

Current waveform

Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Event Data window's tool bar.

Y-axis scale of voltage waveform

X-axis scale of waveform

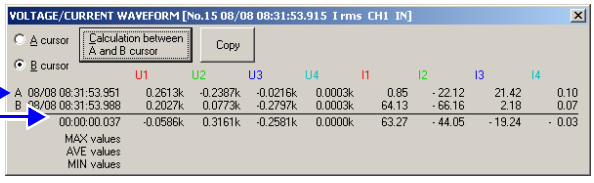
Y-axis scale of current waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

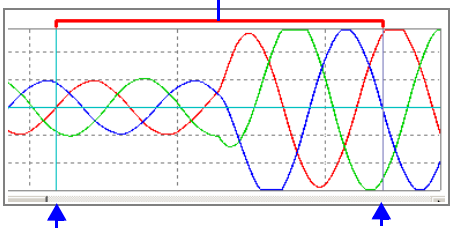
Time and numerical values at A and B cursor locations



Differences between A and B data (B – A)

The time difference between cursors is calculated using internal data resolution of less than 0.001 seconds, but the last digit (0.001 s) may not be exact.

Between A and B cursors



Cursor A (Light Blue)

Cursor B (Purple)

Viewing Voltage/Transient Waveforms [VOLTAGE/TRANSIENT]

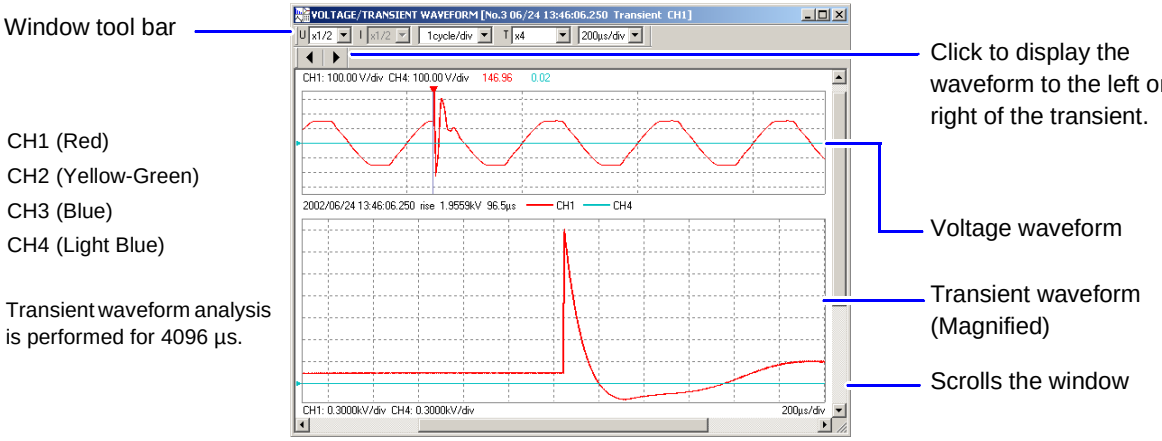
1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

The Voltage/Transient window can only be displayed when a TRN file is loaded.

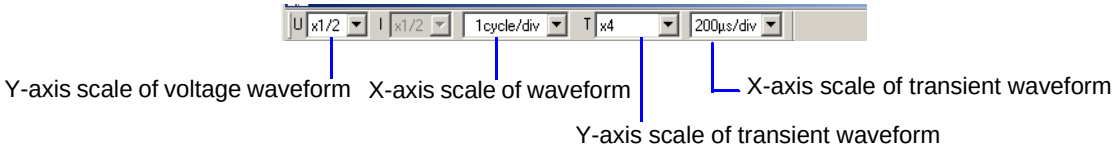
2 Activate the Event Data window and select the **VOLTAGE/TRANSIENT** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Voltage/Transient Waveform window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Voltage/Transient Waveform window's tool bar.

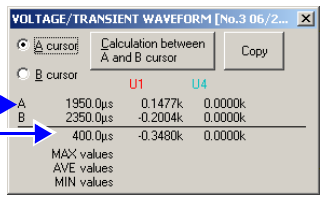


Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

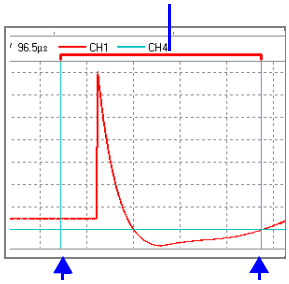
Time and numerical values at A and B cursor locations



Differences between A and B data (B – A)

Time data is 0 µs at the left end of the transient data, and 4096 µs at the right end.

Between A and B cursors



Cursor A (Light Blue) Cursor B (Purple)

Viewing Voltage Waveforms [VOLTAGE]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

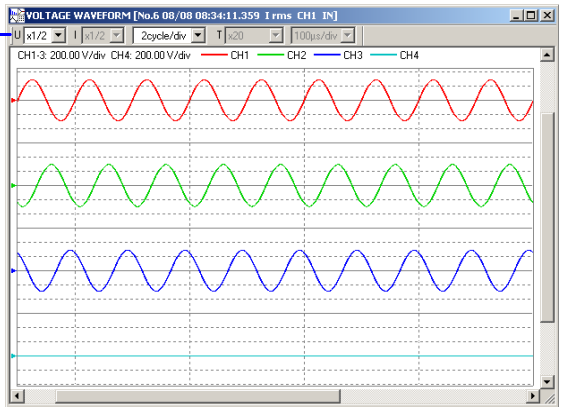
2 Activate the Event Data window and select the **VOLTAGE** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Voltage window opens.

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)
CH4 (Light Blue)

Up to 14 cycles (50 Hz), 16 cycles (60 Hz) or 112 cycles (400 Hz) can be analyzed.



Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Voltage window's tool bar.

Y-axis scale of voltage waveform X-axis scale of waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Current Waveforms [CURRENT]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

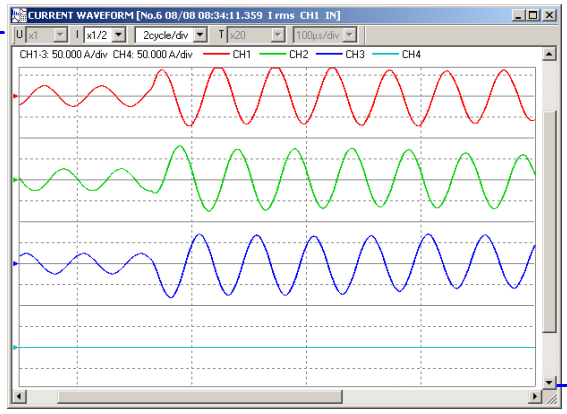
2 Activate the Event Data window and select the **CURRENT** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Current window opens.

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)
CH4 (Light Blue)

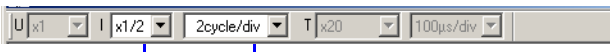
Up to 14 cycles (50 Hz), 16 cycles (60 Hz) or 112 cycles (400 Hz) can be analyzed.



Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Current window's tool bar.



Y-axis scale of current waveform X-axis scale of waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

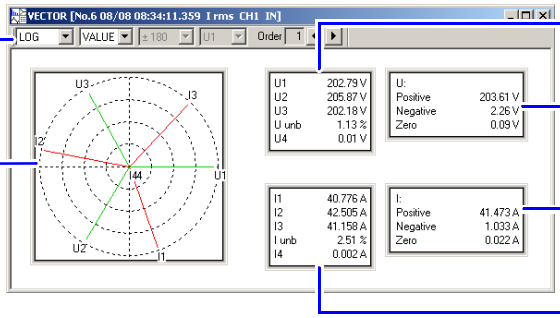
Viewing the Vector Display [VECTOR]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

2 Activate the Event Data window and select the **VECTOR** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Vector window opens.
In addition to the voltage and current data displayed on the screen of the Hioki 3196, calculated values of positive-, negative- and zero-phase voltage and current are displayed (for 3P4W wiring measurements only).



Window tool bar

Vectors

Up to 10 harmonic orders can be analyzed from 400 Hz measurements.

Voltage on each channel

Calculated values of positive-, negative- and zero-phase voltage

Calculated values of positive-, negative- and zero-phase current

Current on each channel

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Vector window's tool bar.

Axis Display
LINEAR (Linear Display)
LOG (Logarithmic Display)

Display Types
VALUE (RMS)
PHASE (Phase Angles)

Numerical Display Method (for phase angles)
±180 (0 to 180º Lead)
lag360 (0 to 360º Lag)

Reference Source (for phase angles)

Order number

Viewing the DMM Display [DMM]

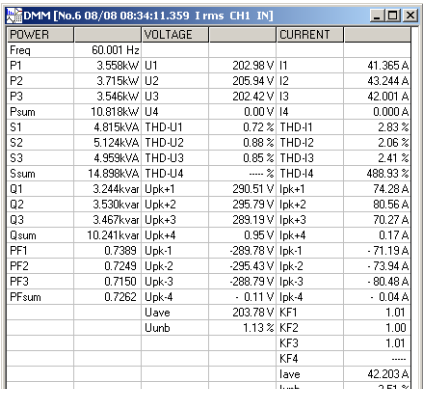
1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

2 Activate the Event Data window and select the **DMM** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.

The DMM window opens.

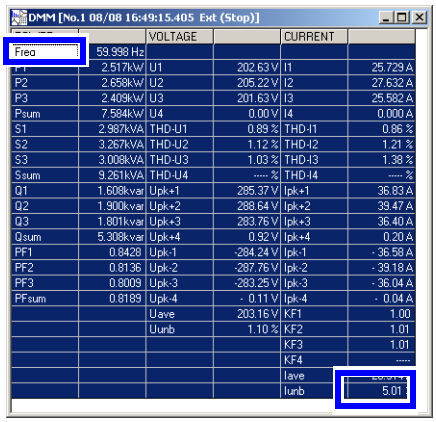


POWER		VOLTAGE		CURRENT	
Freq	60.001 Hz				
P1	3.558kW	U1	202.98 V	I1	41.365 A
P2	3.715kW	U2	205.94 V	I2	43.244 A
P3	3.546kW	U3	202.42 V	I3	42.001 A
Psum	10.818kW	U4	0.00 V	I4	0.000 A
S1	4.815kVA	THD-U1	0.72 %	THD-I1	2.83 %
S2	5.124kVA	THD-U2	0.88 %	THD-I2	2.06 %
S3	4.959kVA	THD-U3	0.85 %	THD-I3	2.41 %
Ssum	14.898kVA	THD-U4	----- %	THD-I4	488.93 %
Q1	3.244kvar	Upk+1	290.51 V	Ipk+1	74.28 A
Q2	3.530kvar	Upk+2	295.79 V	Ipk+2	80.56 A
Q3	3.467kvar	Upk+3	289.19 V	Ipk+3	70.27 A
Qsum	10.241kvar	Upk+4	0.95 V	Ipk+4	0.17 A
PF1	0.7389	Upk-1	-289.78 V	Ipk-1	- 71.19 A
PF2	0.7249	Upk-2	-295.43 V	Ipk-2	- 73.94 A
PF3	0.7150	Upk-3	-288.79 V	Ipk-3	- 80.48 A
PFsum	0.7262	Upk-4	- 0.11 V	Ipk-4	- 0.04 A
		Uave	203.78 V	KF1	1.01
		Uunb	1.13 %	KF2	1.00
				KF3	1.01
				KF4	-----
				Iave	42.203 A

Copying Selected Data to Another Application

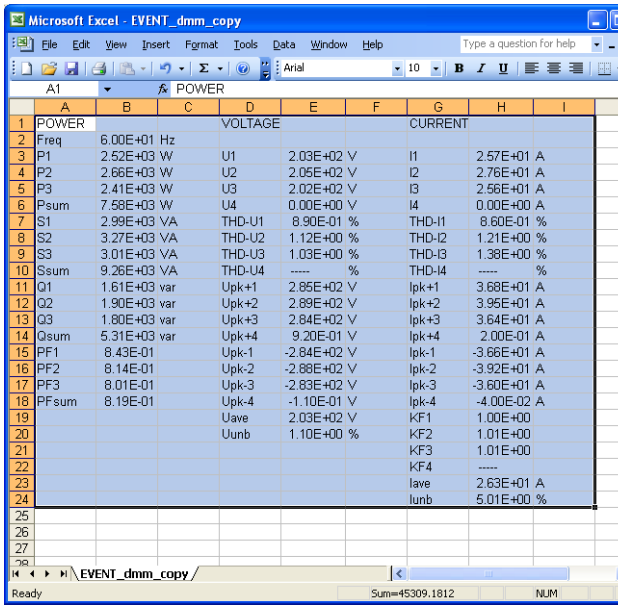
3 Select the range to be copied with your mouse, then select **Edit – Copy** from the menu bar.

As text data with tab separators, you can paste it directly into Microsoft Excel.



		VOLTAGE		CURRENT	
Freq	59.998 Hz				
P1	2.517kW	U1	202.63 V	I1	25.729 A
P2	2.658kW	U2	205.22 V	I2	27.632 A
P3	2.409kW	U3	201.63 V	I3	25.582 A
Psum	7.584kW	U4	0.00 V	I4	0.000 A
S1	2.987kVA	THD-U1	0.89 %	THD-I1	0.86 %
S2	3.267kVA	THD-U2	1.12 %	THD-I2	1.21 %
S3	3.008kVA	THD-U3	1.03 %	THD-I3	1.38 %
Ssum	9.261kVA	THD-U4	----- %	THD-I4	----- %
Q1	1.608kvar	Upk+1	285.37 V	Ipk+1	36.83 A
Q2	1.900kvar	Upk+2	288.64 V	Ipk+2	39.47 A
Q3	1.801kvar	Upk+3	283.76 V	Ipk+3	36.40 A
Qsum	5.308kvar	Upk+4	0.92 V	Ipk+4	0.20 A
PF1	0.8428	Upk-1	-284.24 V	Ipk-1	- 36.58 A
PF2	0.8136	Upk-2	-287.76 V	Ipk-2	- 39.18 A
PF3	0.8009	Upk-3	-283.25 V	Ipk-3	- 36.04 A
PFsum	0.8189	Upk-4	- 0.11 V	Ipk-4	- 0.04 A
		Uave	203.16 V	KF1	1.00
		Uunb	1.10 %	KF2	1.01
				KF3	1.01
				KF4	-----
				Iave	
				Iunb	5.01

Specified Range



	A	B	C	D	E	F	G	H	I
1	POWER			VOLTAGE			CURRENT		
2	Freq	6.00E+01	Hz						
3	P1	2.52E+03	W	U1	2.03E+02	V	I1	2.57E+01	A
4	P2	2.66E+03	W	U2	2.05E+02	V	I2	2.76E+01	A
5	P3	2.41E+03	W	U3	2.02E+02	V	I3	2.56E+01	A
6	Psum	7.58E+03	W	U4	0.00E+00	V	I4	0.00E+00	A
7	S1	2.99E+03	VA	THD-U1	8.90E-01	%	THD-I1	8.60E-01	%
8	S2	3.27E+03	VA	THD-U2	1.12E+00	%	THD-I2	1.21E+00	%
9	S3	3.01E+03	VA	THD-U3	1.03E+00	%	THD-I3	1.38E+00	%
10	Ssum	9.26E+03	VA	THD-U4	-----	%	THD-I4	-----	%
11	Q1	1.61E+03	var	Upk+1	2.85E+02	V	Ipk+1	3.68E+01	A
12	Q2	1.90E+03	var	Upk+2	2.89E+02	V	Ipk+2	3.95E+01	A
13	Q3	1.80E+03	var	Upk+3	2.84E+02	V	Ipk+3	3.64E+01	A
14	Qsum	5.31E+03	var	Upk+4	9.20E-01	V	Ipk+4	2.00E-01	A
15	PF1	8.43E-01		Upk-1	-2.84E+02	V	Ipk-1	-3.66E+01	A
16	PF2	8.14E-01		Upk-2	-2.88E+02	V	Ipk-2	-3.92E+01	A
17	PF3	8.01E-01		Upk-3	-2.83E+02	V	Ipk-3	-3.60E+01	A
18	PFsum	8.19E-01		Upk-4	-1.10E-01	V	Ipk-4	-4.00E-02	A
19				Uave	2.03E+02	V	KF1	1.00E+00	
20				Uunb	1.10E+00	%	KF2	1.01E+00	
21							KF3	1.01E+00	
22							KF4	-----	
23							Iave	2.63E+01	A
24							Iunb	5.01E+00	%
25									
26									
27									

Copied to Excel

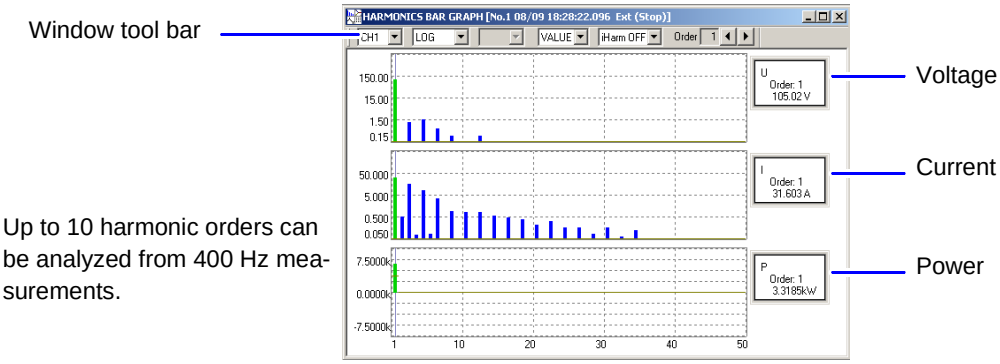
Viewing Harmonics on a Bar Graph [HARMONICS BAR GRAPH]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 63)

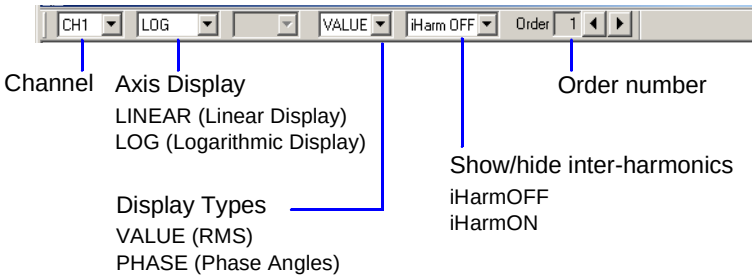
2 Activate the Event Data window and select the **HARMONICS BAR GRAPH** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Harmonics Bar Graph window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Harmonics Bar Graph window's tool bar.



Viewing Harmonics in a List [HARMONICS LIST]

1 Open the Event Data window.

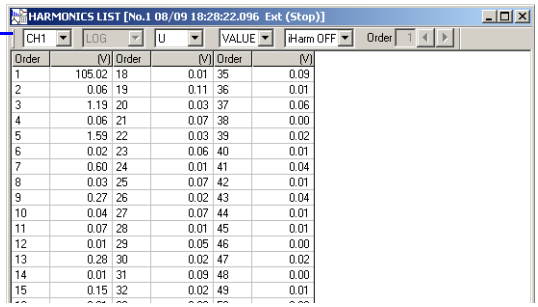
See: "Opening and Switching Event Data Windows" (p. 63)

2 Activate the Event Data window and select the **HARMONICS LIST** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Harmonics List window opens.

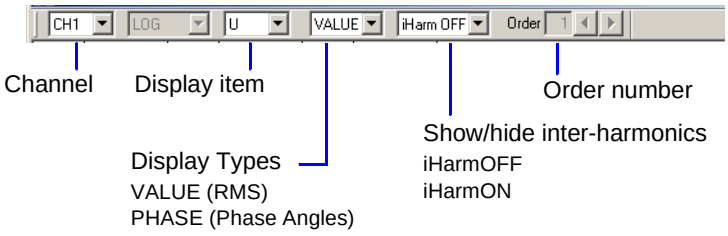
Window tool bar

Data from 400 Hz measurements can be analyzed up to the 10th harmonic order.



Changing Displayed Contents

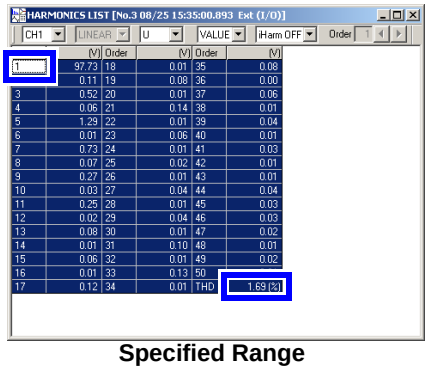
3 Select the items you want to change from the pull-down menus in the Harmonics List window's tool bar.



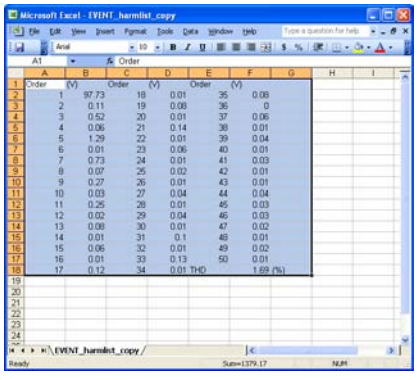
Copying Selected Data to Another Application

4 Select the range to be copied with your mouse, then select **Edit – Copy** from the menu bar.

As text data with tab separators, you can paste it directly into Microsoft Excel.



Specified Range



Copied to Excel

Viewing Voltage Fluctuation Details

[Voltage Fluctuation Event Graph]

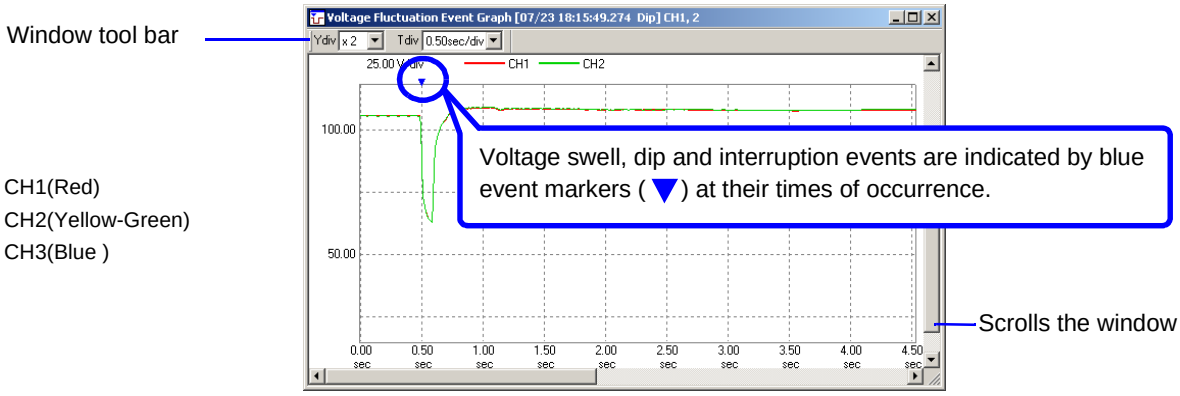
Voltage fluctuation phenomena (swells, dips and interruptions) that occurred within data measured by the Hioki 3196 can be displayed graphically (in the Voltage Fluctuation Event Graph window). This window is equivalent to the VOLTAGE – EVENT (TIME PLOT) screen on the Hioki 3196.
A Voltage Fluctuation Event Graph can be displayed only when an Event file (WDU file) is loaded. Event files can be confirmed in the Event List (p. 62).
A Voltage Fluctuation Event Graph is a 10-second time series graph of rms voltage calculated over one half-cycle-shifted waveform.

1 Load the measurement data.

See: "Loading Data" (p. 14)

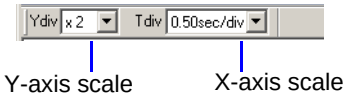
2 Click the  (Open Voltage Fluctuation Event Graph) button or select **View – Voltage Fluctuation Event Graph** from the menu bar.

The Voltage Fluctuation Event Graph window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Voltage Fluctuation Event Graph window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Other Event Phenomena

5 Click any WDU event marker in the Event List or Time Plot window.

A Voltage Fluctuation Event Graph window appears for the selected event.
If there is no WDU file for the selected event, "Specified WDU file not present" appears.

Viewing Energy Consumption [Integrated Power Window]

Energy consumption measured with the Hioki 3196 Power Quality Analyzer can be displayed as a time series graph (Integrated Power window).

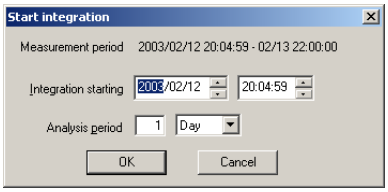
1 Load the measurement data.

See: "Loading Data" (p. 14)

2 Click the Wh (Open Integrated Power window) button or select **View – Integrated Power Window** from the menu bar.

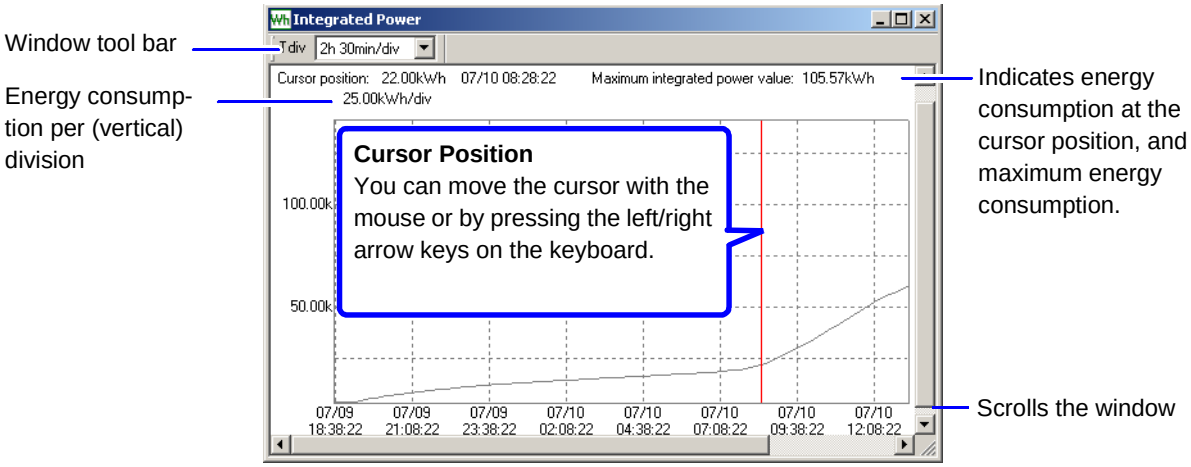
The Start Integration dialog box opens.

3 Set the starting time and span for analysis, and click the **OK** button.



Calculation of energy consumption as an integrated power value begins. When calculation finishes, the Integrated Power window opens.

If the specified starting time is not within the measurement span, energy consumption calculation does not start.



Changing Displayed Contents

4 Select the items you want to change from the pull-down menus in the Integrated Power window's tool bar.

Viewing Measurement Data as Numerical Values (Cursor Measurement)

5 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

When the A/B Cursor dialog is open, A/B cursor movement has priority over the usual screen cursor.

Viewing a Demand Graph [Demand Window]

Data measured with the Hioki 3196 Power Quality Analyzer can be displayed as a demand graph (Demand window).

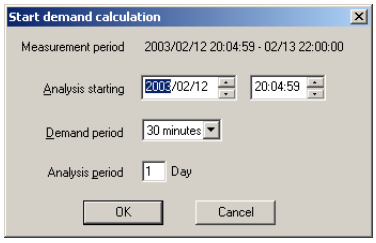
1 Load the measurement data.

See: "Loading Data" (p. 14)

2 Click the Dem (Open Demand window) button or select **View – Demand Window** from the menu bar.

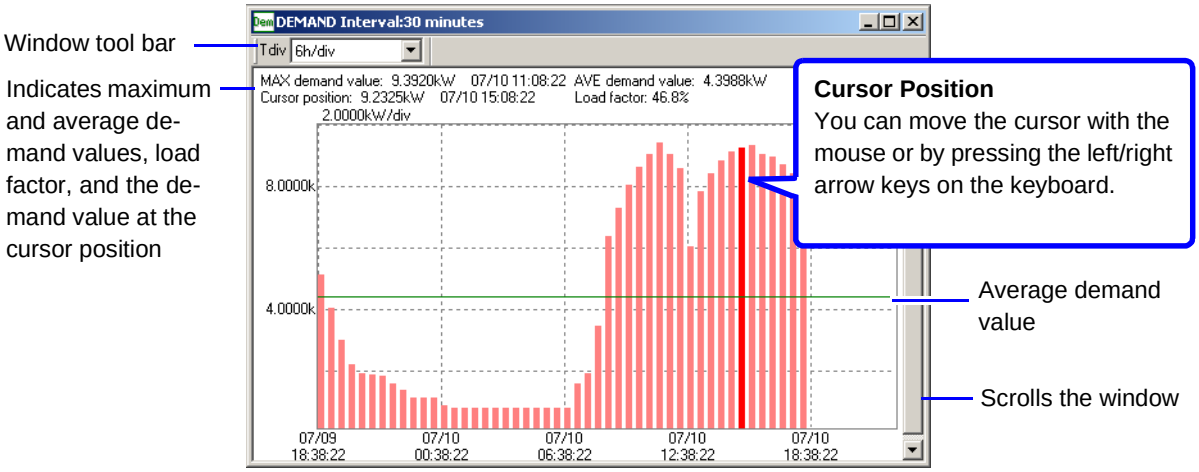
The Start Demand Calculation dialog box opens.

3 Set the starting time, demand period and analysis time span, and click the **OK** button.



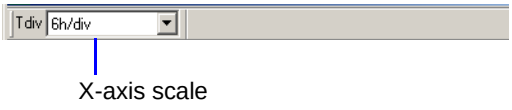
Demand calculation starts. When calculation finishes, the Demand window opens.

If the specified starting time is not within the measurement span, demand calculation does not start.



Changing Displayed Contents

4 Select the items you want to change from the pull-down menus in the Demand window's tool bar.



Testing Measurement Data Conformance [ITIC]

Voltage swell, dip and interruption data are displayed on a graph and judged against upper and lower limit curves (tolerance curves).
The graph plots percentage of nominal voltage (vertical axis) against time (in seconds, horizontal axis).

Event	Time [s]	Percent Nominal Voltage [%]
Voltage Swell	Continuous Swell Duration	Maximum Swell Voltage
Voltage Dip	Dip Duration	Residual Voltage (Dip Voltage Minimum)
Interruption	Continuous Interruption Duration	Residual Voltage (Interruption Voltage Minimum)

Two types of tolerance curves are available: the ITIC Curve used mainly in the USA, and a user-defined curve which can be set as needed.
See: "About CBEMA and ITIC Curves" (p. 77)

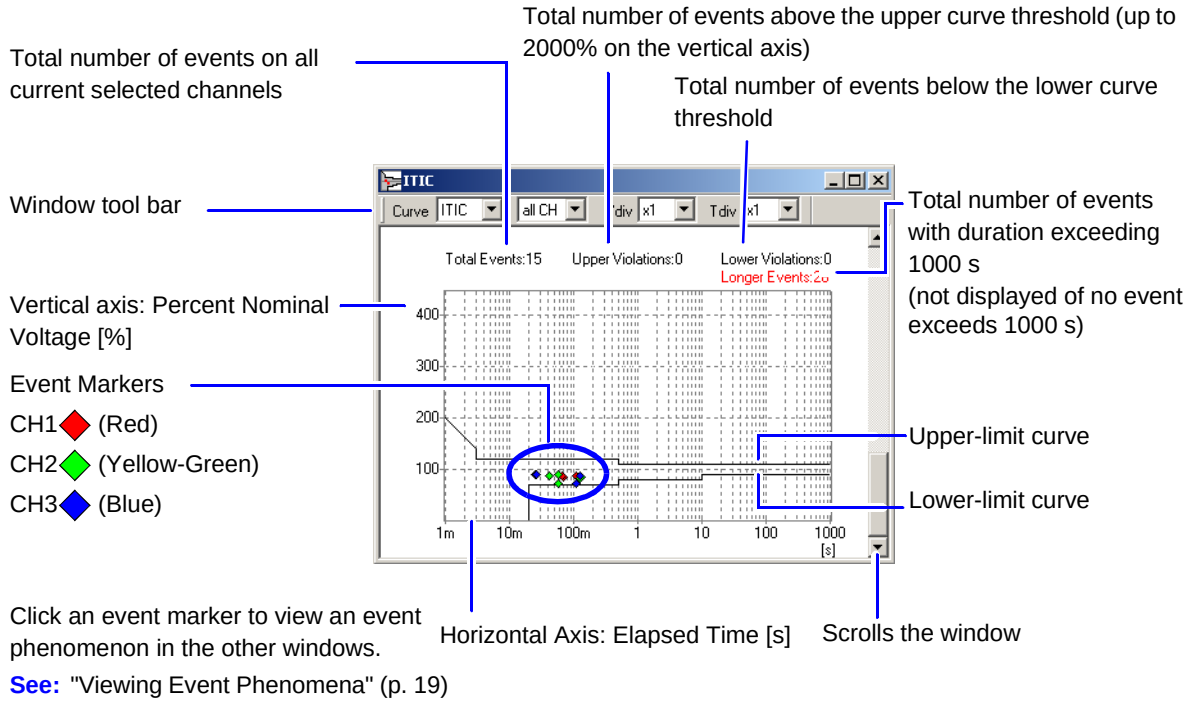
1 Load the measurement data.

See: "Loading Data" (p. 14)

To display a tolerance curve, a EVT file containing voltage swell, dip or interruption data must be loaded.

2 Click the (Open ITIC window) button or select View – ITIC Window from the menu bar.

The ITIC window opens.

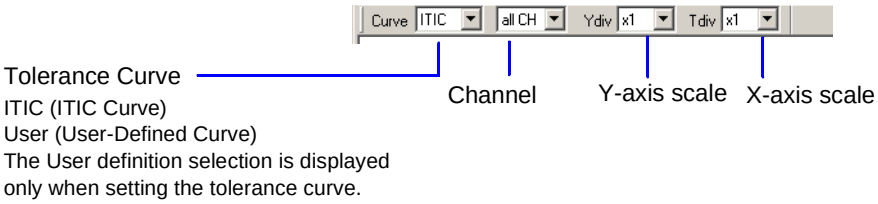


See: "Viewing Event Phenomena" (p. 19)

The event marker for the selected event blinks.
When “all CH” is selected for the channel on this window’s tool bar, multiple event markers blink if an event occurred on multiple channels at the same time.

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the ITIC window's tool bar.



NOTE

About CBEMA and ITIC Curves

Mainly used in the USA, both curves are tolerance ranges for judging rms voltage fluctuations according to voltage swell, dip and interruption events.
The CBEMA Curve was created by the Computer Business Equipment Manufacturers Association. Later, CBEMA established a Working Group called the ITIC (Information Technology Industry Council), which created the ITIC Curve. Use of the CBEMA Curve in applications is now being replaced with the ITIC Curve.

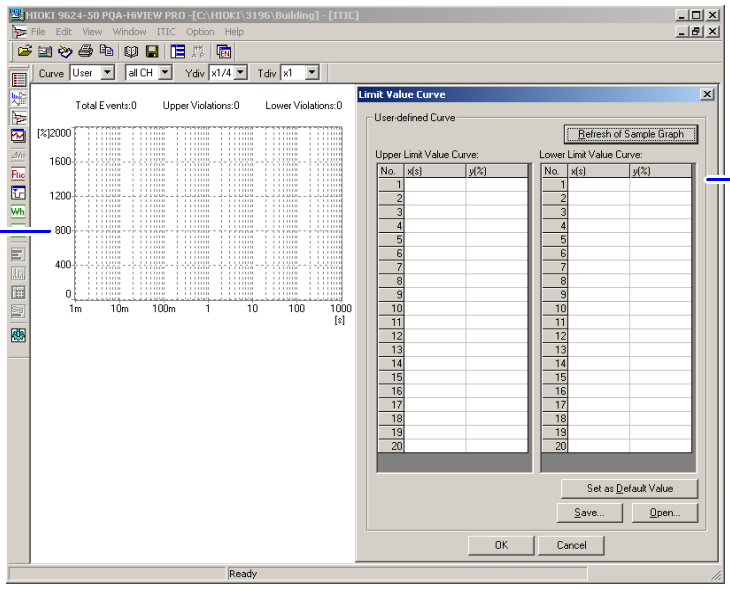
Setting Tolerances (Making a User-Defined Curve)

Tolerance limits can be set freely.
To make user settings, select **User** (User-Defined Curve) as the Curve item on the tool bar in the ITIC window. A user-defined curve is a convenient way to provide a SEMI Curve (p. 79) for tolerance judgments.

1 Select the **User** Curve setting on the ITIC window tool bar.

2 Select **ITIC – Tolerance Curve** from the menu bar.

You can also right click and select from the pop-up menu.
The Curve Editor appears.



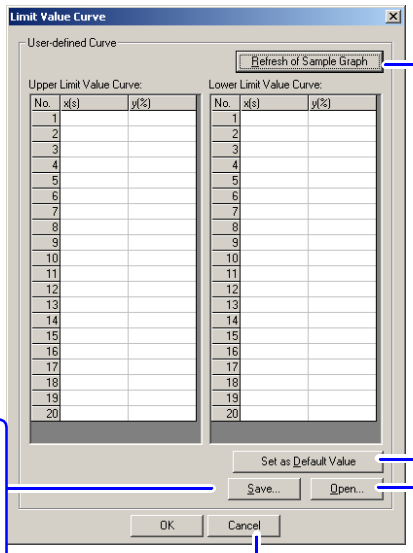
3 Enter numerical values in the upper and lower limit fields.

Up to 20 decimal values can be entered in the x(s) and y(%) fields to define upper and lower curve limits. Millisecond values can be entered for x(s) by appending an “m” unit designator.

Enter values on consecutive lines to reach the edge of the graph.

See: "Curve Tables (Reference)" (p. 79)

User-Defined Curve Range
x(s): 1 ms to 1000 s
y(%): 0 to 2000



Click here to display a sample graph of the data entered for a user-defined curve.

Click here to set ITIC Curve data ("ITIC Curve Chart" (p. 79)).

Click **Save** to display the Save dialog for saving your entered user-defined curve data. User-defined curves can be saved with any file name.

To load a previously saved user-defined curve
Click **Open** and select a file to load.

Closes the Curve Editor without changing the user-defined curve.

4 Click the OK button.

The curve with the specified contents appears in the ITIC window.

Curve Tables (Reference)

ITIC Curve Chart

Upper limit curve		Lower limit curve	
x [s]	y [%]	x [s]	y [%]
1 m	200	20 m	0
3 m	140	20 m	70
3 m	120	500 m	70
500 m	120	500 m	80
500 m	110	10	80
1000	110	10	90
		1000	90

SEMI Curve Chart

Upper limit curve		Lower limit curve	
x [s]	y [%]	x [s]	y [%]
		20 m	0
		20 m	50
		200 m	50
		200 m	70
		500 m	70
		500 m	80
		10	80
		10	90
		1000	90

SEMI curve is made by the SEMI (Semiconductor Equipment and Materials International). It judges the voltage dip and interruption only, and has easier limit than the ITIC curve between 20ms and 200ms.
There is no upper limit curve in the SEMI curve, but we recommend using the upper limit value; x:1m, y:200 and x:1000, y:200.

CISPR24 Curve Chart

Upper limit curve		Lower limit curve	
x [s]	y [%]	x [s]	y [%]
		20 m	30
		500 m	30
		500 m	95
		5	95
		5	100
		1000	100

Per operating judgment standard C

Viewing a Delta V10 Flicker Graph
[Delta V10 Flicker Window]

Data measured with the Hioki 3196 Power Quality Analyzer can be displayed as a flicker graph (Delta V10 Flicker window).
The Delta V10 Flicker window is equivalent to the Delta V10 Flicker Graph (TIME PLOT) screen on the Hioki 3196.

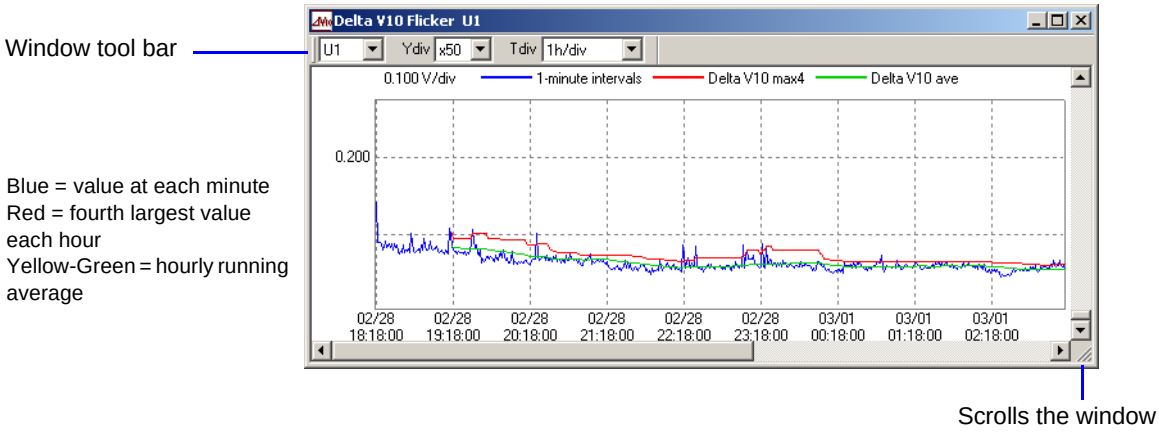
1 Load the measurement data.

See: "Loading Data" (p. 14)

The Delta V10 Flicker window can be displayed only when an FLC file containing Delta V10 Flicker data is loaded.

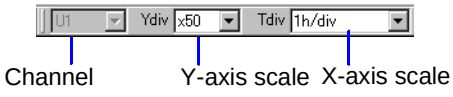
2 Click the (Open Delta V10 Flicker window) button or select **View – Delta V10 Flicker Window** from the menu bar.

The Delta V10 Flicker window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Delta V10 Flicker window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing an IEC Flicker Graph [IEC Flicker Window]

Data measured with the Hioki 3196 Power Quality Analyzer can be displayed as flicker graph (IEC Flicker window).
The IEC Flicker window is equivalent to the IEC Flicker Graph (TIME PLOT) screen on the Hioki 3196.

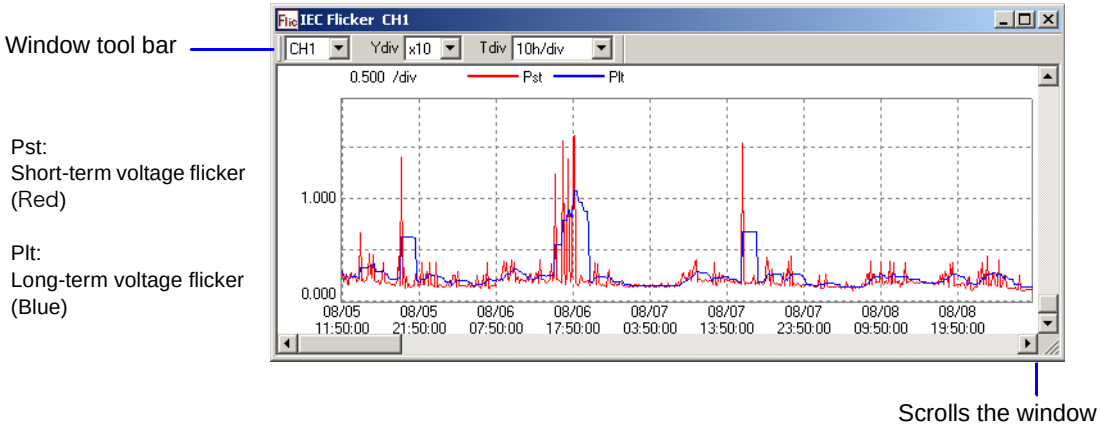
1 Load the measurement data.

See: "Loading Data" (p. 14)

The IEC Flicker window can be displayed only when an FLC file containing IEC Flicker data is loaded.

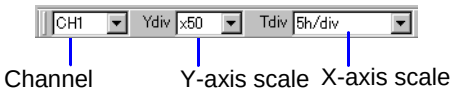
2 Click the Flic (Open IEC Flicker Window) button or select **View – IEC Flicker Window** from the menu bar.

The IEC Flicker window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the IEC Flicker window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Setting Conditions for Measurement Data [SYSTEM]

The settings associated with the currently loaded data can be viewed in the Settings window.
The Settings window is equivalent to the SYSTEM screen on the Hioki 3196.

1 Load the measurement data.

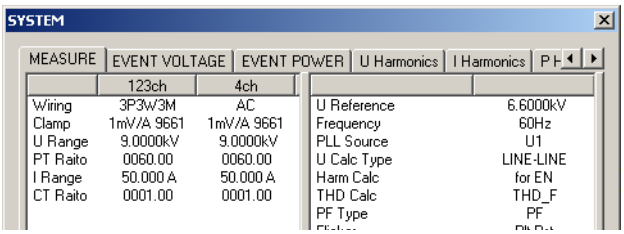
See: "Loading Data" (p. 14)

The Settings window can only be displayed when an SET file is loaded.
In addition, the EN50160 setting tabs are not displayed unless EN50160 data is included in the loaded data.

2 Click the (View system settings) button or select **View – SYSTEM** from the menu bar.

The System window opens.

3 Select the tabs to view each setting.



Correspondence Between Tabs and Hioki 3196 Setting Screens

PQA-HiView Pro Tab Name	Hioki 3196 Settings Screen
Measurement	SYSTEM–DF2–MAIN Measurement and Partial Recording
Voltage Events	SYSTEM–DF3–EVENT–VOLTAGE
Power Events	SYSTEM–DF3–EVENT–POWER
Voltage Harmonics	SYSTEM–DF3–EVENT–HARMONICS
Current Harmonics	SYSTEM–DF3–EVENT–HARMONICS
Power Harmonics	SYSTEM–DF3–EVENT–HARMONICS
Harmonic Phase Difference	SYSTEM–DF3–EVENT–HARMONICS
EN50160 (1)	EVENT–DF4–EN50160–Setting1 (When EN50160 measurement is enabled)
EN50160 (2)	EVENT–DF4–EN50160–Setting2 (When EN50160 measurement is enabled)
EN50160 (3)	EVENT–DF4–EN50160–Setting3 (When EN50160 measurement is enabled)

Viewing EN50160 Mode Measurement Data

Data measured on the Hioki 3196 with the EN50160 function enabled can be displayed in the EN50160 window.
This window is equivalent to the EVENT – EN50160 screens (Overview, Harmonic, Signaling and Events screens) on the Hioki 3196.

The EN50160 mode provides the following four windows:

- **Overview Window (p. 83)**
- **Harmonic Window (p. 85)**
- **Signaling Window (p. 86)**
- **Measurement Result Classification Window (p. 87)**

Overview Window

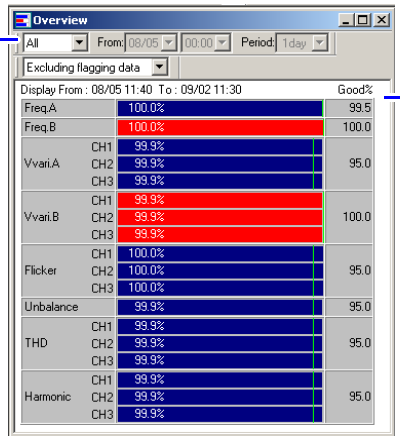
1 Click the (Open EN50160 Overview Window) button, or select **View – EN50160** from the menu bar to activate the EN50160 mode.

See: "Switching Modes" (p. 55)

When the EN50160 mode is activated, the button appears pressed, and the View – EN50160 item in the menu has a check mark.

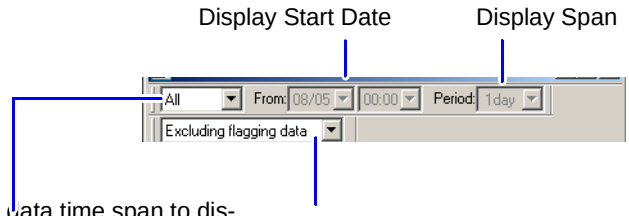
2 Click the (Open EN50160 Overview window) button or select **View – Overview** from the menu bar.

The Overview window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Overview window's tool bar.



You can select the data time span to display.

All	Display data for all times available in the EN data file.
Specific	Display data from the specified starting date for the specified span (Period).

Select whether to include other (flagged) data when a statistical voltage swell, dip or interruption occurs.

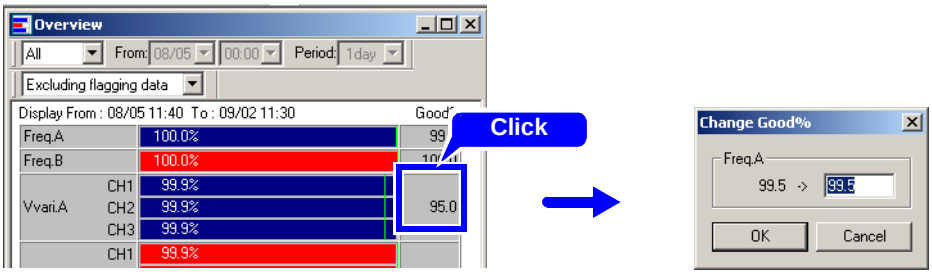
Including flagging data	Includes flagged data in statistics
Excluding flagging data	Excludes flagged data from statistics

Reference: When a voltage swell, dip or interruption event occurs, other parameter data (such as frequency) might interfere with the reliability of the occurrence data. In that case, other data can be flagged so that when a voltage swell, dip or interruption event occurs, the other data can be excluded from the statistics to improve reliability.

Changing the Good% value

4 Click the Good% setting area.

The Change Good% dialog box opens.



5 Enter a new value for the Good%, and click the **OK** button.

The entered Good% value is reflected in the Overview window.

Harmonic Window

1 Click the (Switch to EN50160 Window) button, or select **View – EN50160** from the menu bar to activate the EN50160 mode.

See: "Switching Modes" (p. 55)

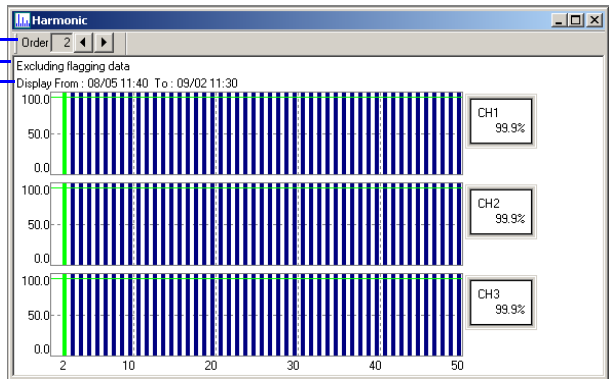
When the EN50160 mode is activated, the button appears pressed, and the View – EN50160 item in the menu has a check mark.

2 Click the (Open EN50160 Harmonic window) button or select **View – Harmonic** from the menu bar.

The Harmonic window opens.

Window tool bar

Shows the display starting date, span (period) and flag status (reflecting the settings in the Overview window)



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Harmonic window's tool bar.

Orders from the 2nd to the 50th can be selected. The first order is not selectable.

Signaling Window

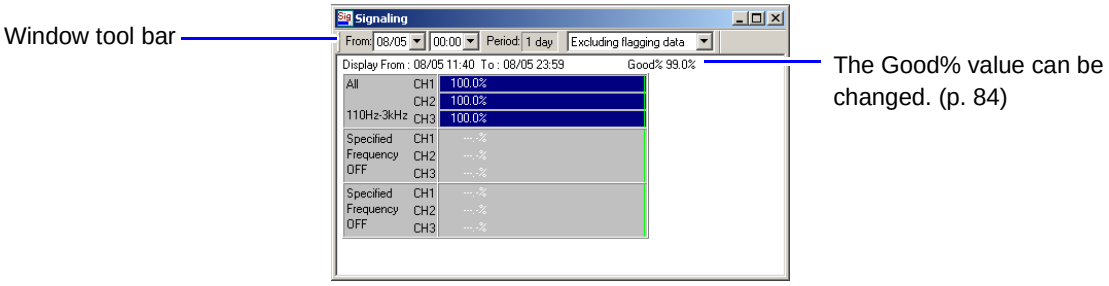
1 Click the (Switch to EN50160 Window) button, or select **View – EN50160** from the menu bar to activate the EN50160 mode.

See: "Switching Modes" (p. 55)

When the EN50160 mode is activated, the button appears pressed, and the View – EN50160 item in the menu has a check mark.

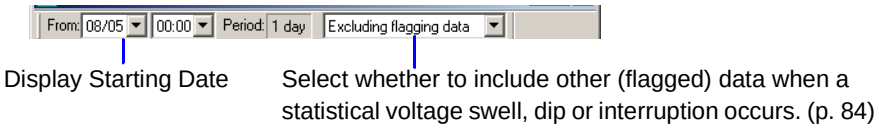
2 Click the (Open EN50160 Signaling window) button or select **View – Signaling** from the menu bar.

The Signaling window opens.



Changing Displayed Contents

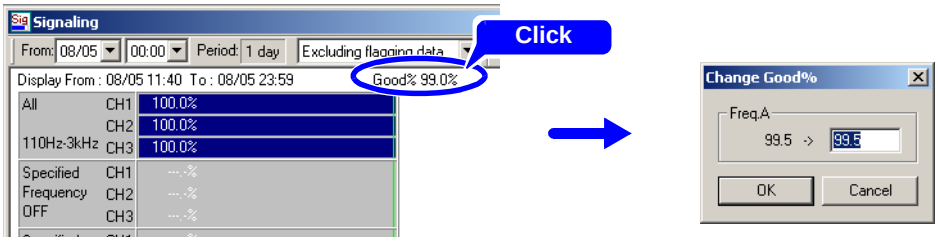
3 Select the items you want to change from the pull-down menus in the Signaling window's tool bar.



Changing the Good% value

4 Click the Good% location.

The Change Good% dialog box opens.



5 Enter a new value for the Good%, and click the **OK** button.

The entered Good% value is reflected in the Signaling window.

Measurement Result Classification Window

Results can be classified as needed, and saved.

1 Click the (Switch to EN50160 Window) button, or select **View – EN50160** from the menu bar to activate the EN50160 mode.

See: "Switching Modes" (p. 55)

When the EN50160 mode is activated, the button appears pressed, and the View – EN50160 item in the menu has a check mark.

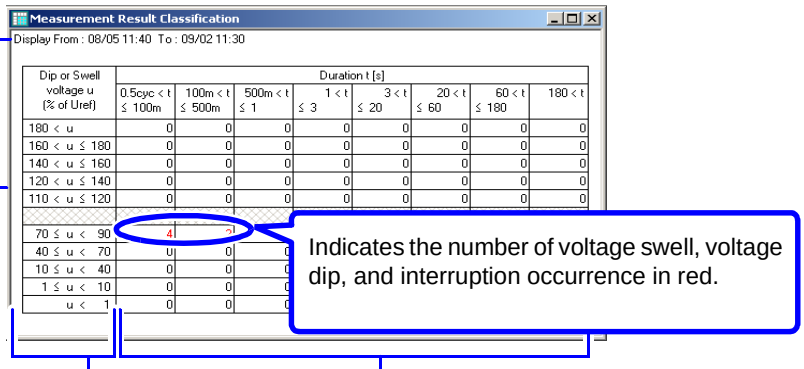
2 Click the (Open EN50160 Measurement Result Classification window) button or select **View – Measurement Result Classification** from the menu bar.

The Measurement Result Classification window opens.

Display Starting Date and Span (Period) (reflecting the settings in the Overview window)

You can edit the table's time span and voltage classifications.

See: "Changing Measurement Result Classifications" (p. 87)



Voltage u
In the event of a voltage swell, Voltage u represents the maximum swell voltage (% of nominal voltage).
In the event of a voltage dip or interruption, Voltage u represents the residual voltage (% of nominal voltage).

Duration
Represents the duration of a voltage swell, voltage dip, or interruption.

See: "Three-Phase RMS Voltage Fluctuation Graph" (p. 89)

Changing Measurement Result Classifications

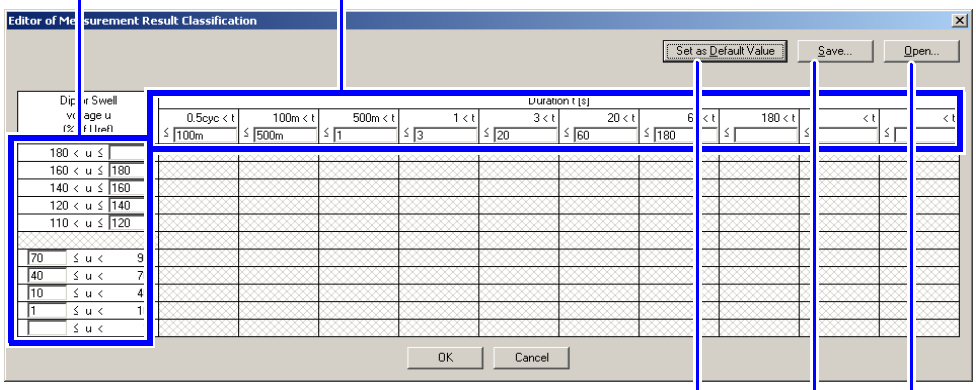
3 Make the Measurement Result Classification window active and select **Measurement Result Classification – Editor of Measurement Result Classification**.

You can also right click and select from the pop-up menu.
The Measurement Result Classification editor window opens.

4 Change the entries in the desired Duration or Voltage fields.

Enter Voltage classifications.

Enter Duration classifications.



To return duration and voltage classifications to their defaults (see "Measurement Result Classification Defaults" below)
Click **Set as Default Value**. Duration and voltage classification values are reset to their defaults.

To save the current classification settings
Click **Save**.
Saves the duration and voltage classification values in the table displayed in the Measurement Result Classification Editing window as a measurement results classification settings (ESP) file.

To load an existing classification settings file
Click **Open**.
Loads a measurement results classification settings (ESP) file and applies its contents to the Measurement Result Classification Editing window.

5 Click the **OK** button.

The duration and voltage classification values in the table displayed in the Measurement Result Classification Editing window are applied to the Measurement Result Classification window.

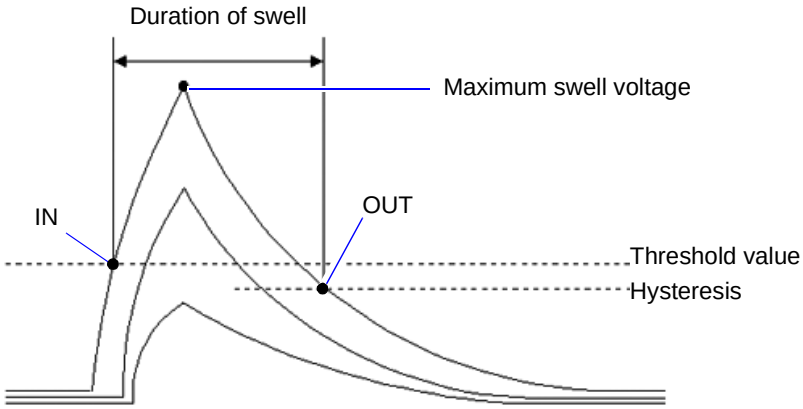
Measurement Result Classification Defaults

Swell, Dip, Interruption

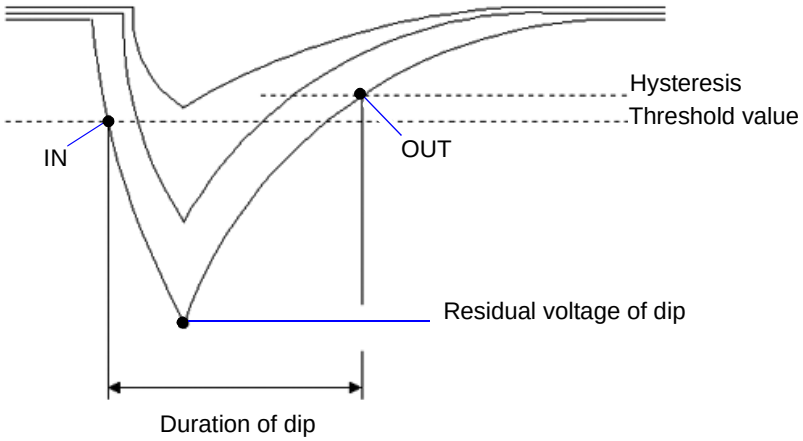
Voltage u (% of Uref)	Duration t (seconds)							
	0.5cyc < t ≤ 100 m	**100 m < t ≤ 500 m**	**500 m < t ≤ 1**	**1 < t ≤ 3**	**3 < t ≤ 20**	**20 < t ≤ 60**	**60 < t ≤ 180**	**180 < t**
180 < u								
160 < u ≤ 180								
140 < u ≤ 160								
120 < u ≤ 140								
110 < u ≤ 120								
70 ≤ u < 90								
40 ≤ u < 70								
10 ≤ u < 40								
1 ≤ u < 10								
u < 1								

Three-Phase RMS Voltage Fluctuation Graph

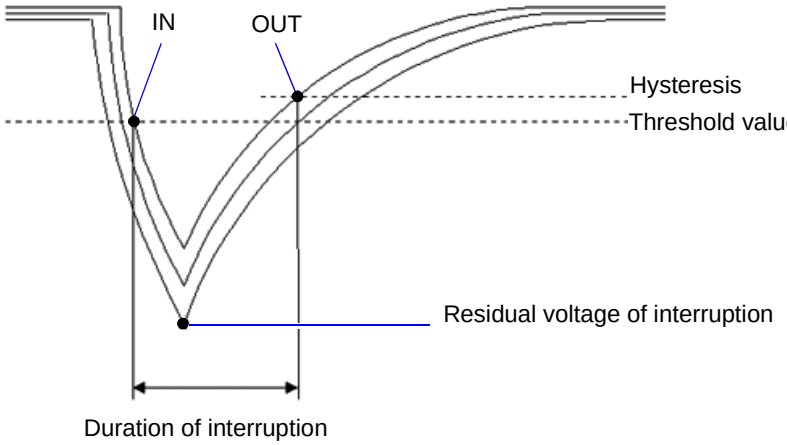
Swell



Dip



Interruption

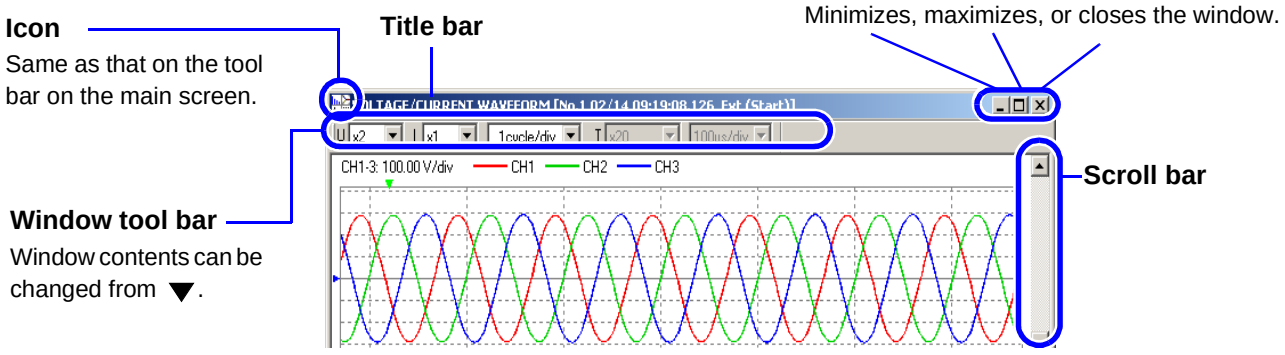


Analyzing Measurement Data from the Hioki 3197 Chapter 5

Hioki 3197 Measurement Data Window Layout

Window Display

The Measurement Data window appears when measurement data is loaded.

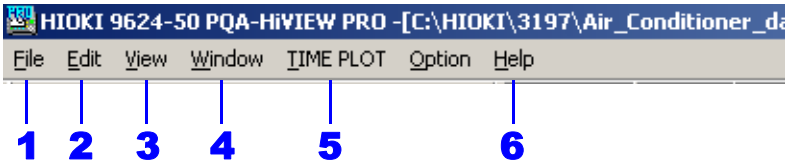


Any window can be displayed using the menu or tool bar. A window can also be changed by right clicking within it and selecting another window to display from the pop-up menu.

See: "Menu Bar Operations" (p. 92), "Tool Bar Operations" (p. 95)
"Changing Windows" (p. 17)

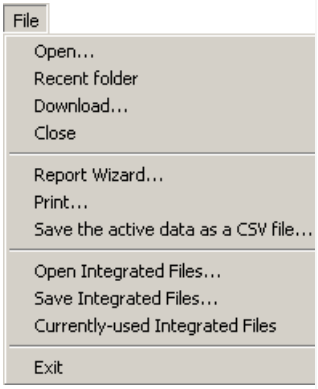
Menu Bar Operations

Clicking a menu item displays one of the pull-down menus shown below. Items not available for the current window are grayed out.



1 File

Click **File** and select from the pull-down menu.



The same operations are available on the tool bar (p. 95).

Open		Opens a file.	(p. 14)
Recent folder		Displays recently used folders.	
Download		Downloads data from internal memory of the 3196 or PC card via LAN.	(p. 44)
Close		Closes the currently active window.	
Report Wizard		Sets the conditions for creating a report.	(p. 28)
Print		Prints the currently active window.	(p. 24)
Save the active data as a CSV file		Saves the loaded data as a CSV format file.	(p. 35)
Open Integrated Files		Opens a setting file for the 9624-50.	(p. 47)
Save Integrated Files		Saves a setting file for the 9624-50.	(p. 47)
Currently-used Integrated Files		Displays recently used compound files.	
Exit		Closes the PQA-HiView Pro program.	(p. 12)

2 Edit

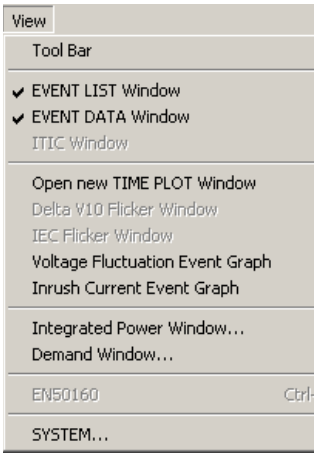
Click **Edit** and select from the pull-down menu.

The same operations are available on the tool bar (p. 95).

Copy		Displays can be copied to the clipboard.	(p. 27)

3 View

Click **View** and select the window or items to display from the pull-down menu.

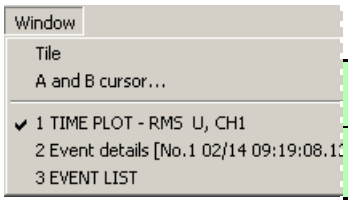


The same operations are available on the tool bar (p. 95).

Tool Bar	Shows or hides the standard tool bar (top) and window tool bar (left).	
EVENT LIST Window	Opens the event list window. To re-order the displayed list, select **Sort by Time (–)** or **Sort by Time (+)**	(p. 100)
EVENT DATA Window	Opens the event details window. You can select the following window data types: • Event Details Window • Voltage/Current Waveform Window • Voltage Waveform Window • Current Waveform Window	(p. 101)
Open new TIME PLOT Window	Opens up to four new TIME PLOT windows. You can select the following window data types: • RMS Window • Voltage Window	(p. 96)
Voltage Fluctuation Event Graph	Opens the Voltage Fluctuation Event Window. (A WDU file of the voltage fluctuation event graph for the selected event must be loaded in order to display this window)	(p. 106)
Inrush Current Event Graph	Opens the Inrush Current Graph window. (An INR file of the inrush current graph must exist for the selected event in order to display this window)	(p. 107)
Integrated Power Window	Opens the Integrated Power window.	(p. 108)
Demand Window	Opens the Demand window.	(p. 109)
SYSTEM	Displays the settings on the Hioki 3197.	(p. 110)

4 Window

Click **Window** and select from the pull-down menu.
This menu includes the names of the currently displayed windows.



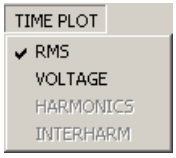
The same operations are available on the tool bar (p. 95).

Tile	Arranges display of all open windows.	(p. 26)
A and B cursor	Select to demarcate a span or view values at cursor positions.	(p. 21)

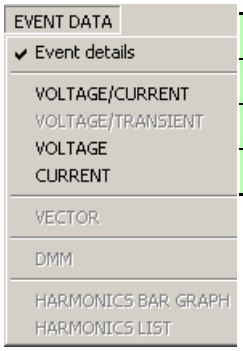
5 EVENT LIST/ EVENT DATA/ TIME PLOT

The menu displayed depends on the selected window.
Click **EVENT LIST**, **EVENT DATA** or **TIME PLOT** to select a window from the corresponding pull-down menu.
You can also right click and select a window to switch to from the pop-up menu.

Sort by Time (-)	(p. 100)
Sort by Time (+)	



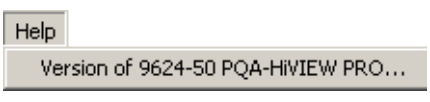
RMS	(p. 98)
VOLTAGE	(p. 99)



Event details	(p. 102)
VOLTAGE/CURRENT	(p. 103)
VOLTAGE	(p. 104)
CURRENT	(p. 105)

6 Help

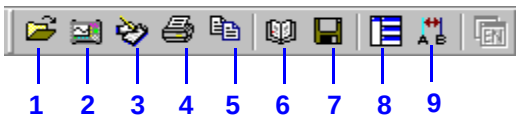
Click **Help** and select from the pull-down menu.



Displays version information for the Hioki 9624-50 PQA-HiView Pro program.

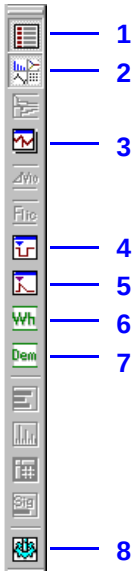
Tool Bar Operations

Tool bar (standard)



1	Open	(p. 14)	6	Open Integrated file	(p. 47)
2	Download	(p. 44)	7	Save Integrated file	(p. 47)
3	Report Wizard	(p. 28)	8	Tile	(p. 26)
4	Print	(p. 24)	9	A and B cursors	(p. 21)
5	Copy	(p. 27)			

Tool bar (window)



1	Show/hide EVENT LIST Window	(p. 100)
2	Show/hide EVENT DATA Window	(p. 101)
3	Open new TIME PLOT Window	(p. 96)
4	Open Voltage Fluctuation Event Graph	(p. 106)
5	Open the Inrush Current Graph window	(p. 107)
6	Open Integrated Power Window	(p. 108)
7	Open Demand Window	(p. 109)
8	View system settings	(p. 110)

Viewing a Time Series Graph [TIME PLOT]

Data measured with the Hioki 3197 Power Quality Analyzer can be displayed as a time series graph (Time Plot window). The program's Time Plot windows correspond to each Time Plot screen on the Hioki 3197.

The following two types of Time Plot windows can be displayed and switched, with up to four displayed at a time.

- **RMS Window (p. 98)**
- **VOLTAGE Window(p. 99)**

Opening and Switching Time Plot Windows

1 Load the measurement data.

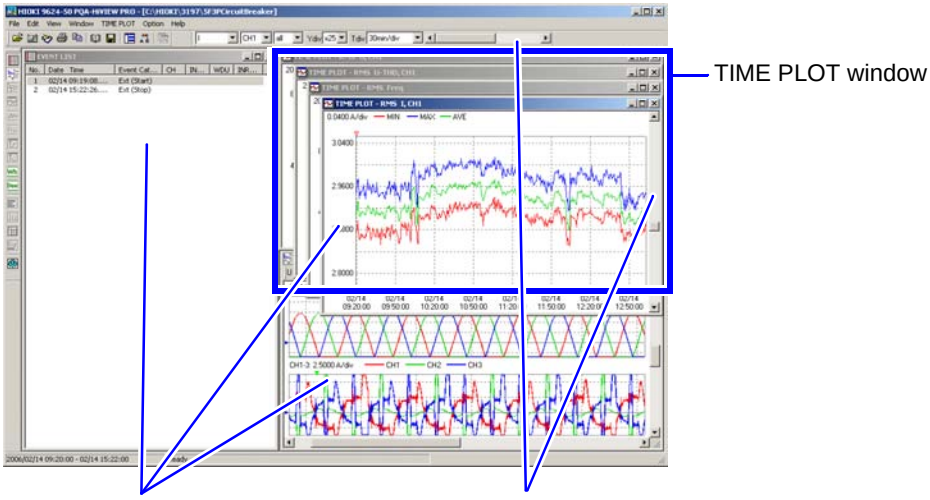
See: "Loading Data" (p. 14)

To display a Time Plot window, the loaded data must include an ITV file.

2 Click the  (Open Time Plot Window) button or select **View – Open new TIME PLOT window** from the menu bar.

A Time Plot Window opens.

You can open up to four windows by clicking the button or selecting from the menu bar repeatedly.



Click an event marker to view an event phenomenon in the other windows.

See: "Viewing Event Phenomena" (p. 19)

Scrolls the window

Move a scroll box or click within the scroll bar.
When scrolling horizontally, all open Time Plot windows scroll together.

Switching Windows

3 Activate the Time Plot window to be switched, and select the desired window to display from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

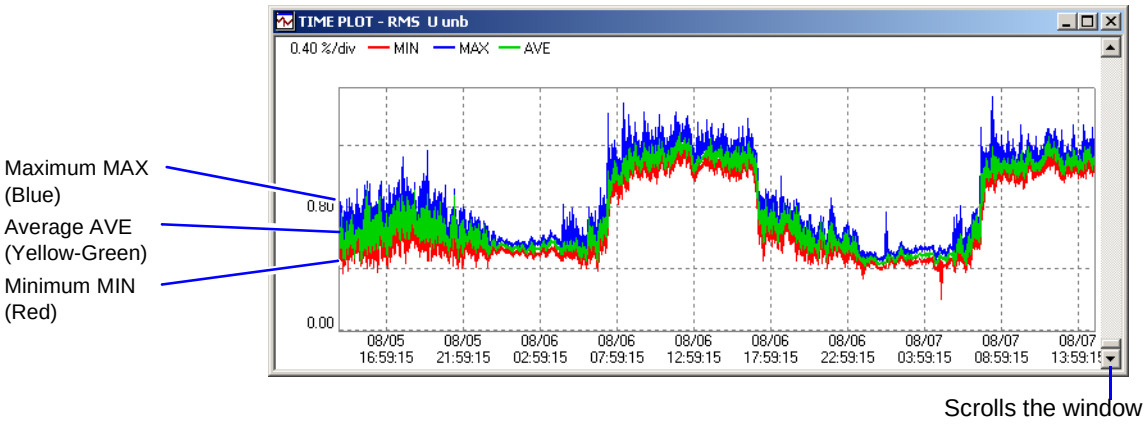
Viewing RMS Fluctuations [TIME PLOT – RMS]

1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 96)

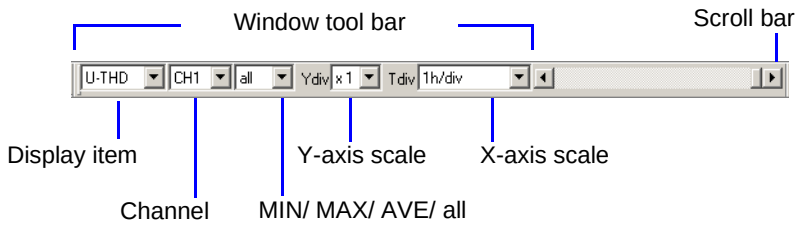
2 Activate the Time Plot window and select **RMS** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The RMS window opens.



Changing Displayed Contents

3 When the RMS window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the RMS window's tool bar.



Viewing Voltage Fluctuations [TIME PLOT – VOLTAGE]

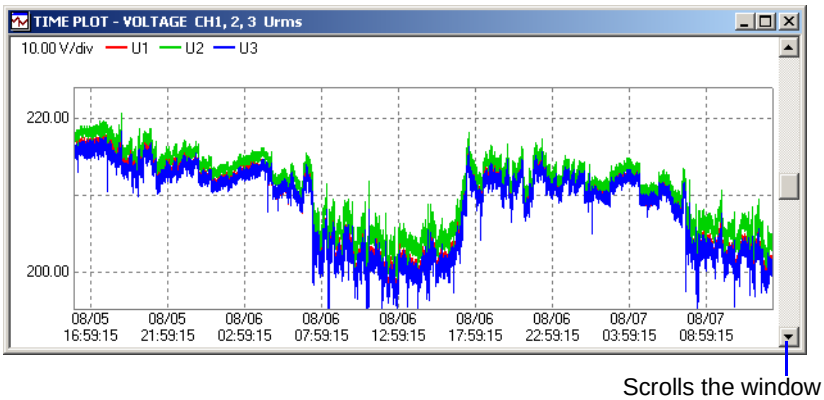
1 Open a Time Plot window.

See: "Opening and Switching Time Plot Windows" (p. 96)

2 Activate the Time Plot window and select **VOLTAGE** from the **TIME PLOT** menu.

You can also right click and select from the pop-up menu.
The Voltage window opens.

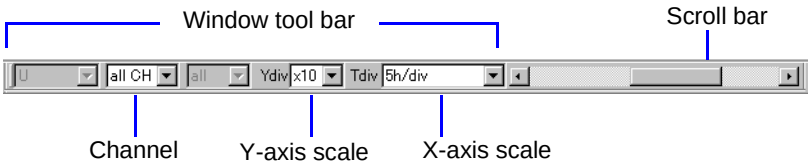
CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)



Voltage fluctuation data consists of pairs of maximum and minimum values for every measurement interval. Therefore, expanding the horizontal scale reveals the data as a series of vertical lines between each pair of maximum and minimum values at each measurement interval. There is no horizontal line through the space between measurement intervals.

Changing Displayed Contents

3 When the Voltage window is active, it's own tool bar is displayed.
Select the items you want to change from the pull-down menus in the Voltage window's tool bar.



Viewing Events as a List [EVENT LIST]

Data measured with the Hioki 3197 Power Quality Analyzer can be displayed in a list (in the Event List window.
The Event List window is equivalent to the EVENT – LIST screen on the Hioki 3197.
To re-order the displayed list, select **Sort by Time (–)** or **Sort by Time (+)**.

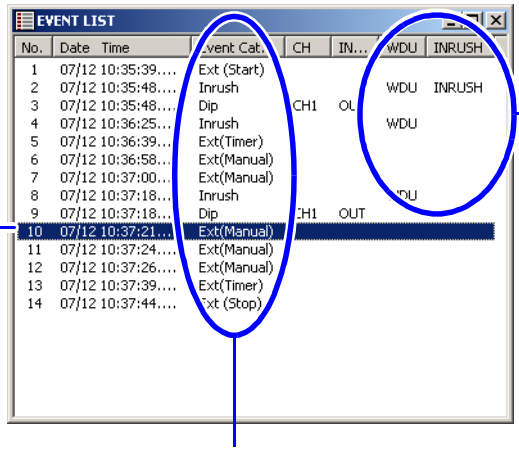
1 Load the measurement data.

See: "Loading Data" (p. 14)

To display the Event List window, the loaded data must include an EVT file.

2 Click the  (Show/hide EVENT LIST window) button or select **View – EVENT LIST Window** from the menu bar.

The Event List window opens.



Indicates whether a graph of the event exists.

- WDU
  Indicates that an voltage fluctuation event graph exists. (p. 106)
- INRUSH
  Indicates that an inrush current graph exists. (p. 107)

Click an event, or select using the up/down arrow keys on the keyboard to view the event phenomenon in other windows.

See: "Viewing Event Phenomena" (p. 19)

Shows the event type.

Re-Ordering the Display of Events

3 Activate the Event List window and select **Sort by Time (–)** or **Sort by Time (+)** from the **EVENT LIST** menu.

You can also right click and select from the pop-up menu.
The list is re-ordered according to your selection.

Viewing Event Measurement Data [EVENT DATA]

Data measured with the Hioki 3197 upon the occurrence of an event can be displayed as a graph and listed in the Event Data window.
The Event Data window is equivalent to the EVENT screen on the Hioki 3197.
The Event Data window can be switched between the following four types.

- **Event details Window (p. 102)**
- **VOLTAGE/CURRENT Window (p. 103)**
- **VOLTAGE Window (p. 104)**
- **CURRENT Window (p. 105)**

In this manual, the above windows are collectively called “Event Data windows”.

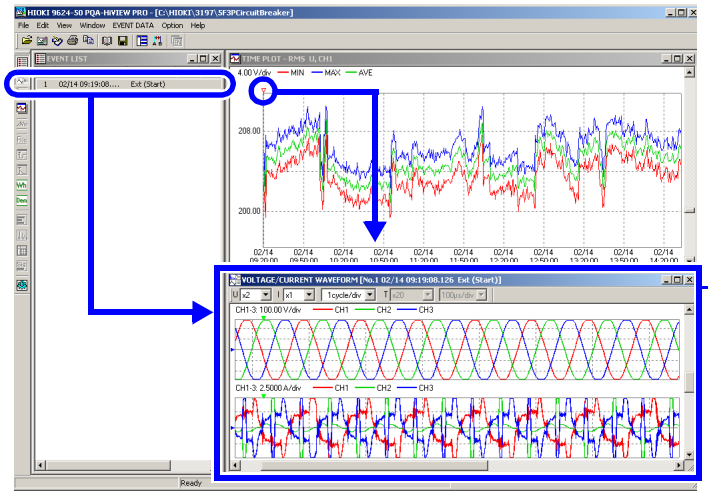
Opening and Switching Event Data Windows

1 Load the measurement data.

See: "Loading Data" (p. 14)

2 Click the  (Show/hide EVENT DATA window) button or select **View – EVENT DATA Window** from the menu bar.

The Event data window opens.



Click an event marker or an event in the Event List to display a graph of the event.

See: "Viewing Event Phenomena" (p. 19)

Switching Windows

3 Activate the Event Data window and select the desired window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.

Viewing Event Details [Event details]

1 Open the Event Data window.

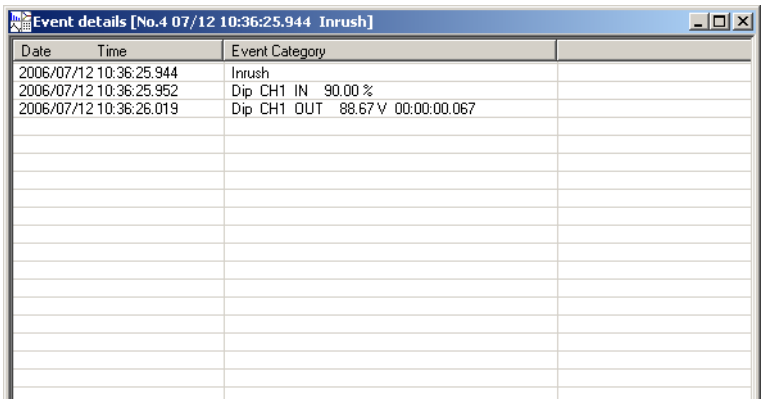
See: "Opening and Switching Event Data Windows" (p. 101)

2 Activate the Event Data window and select **Event details** from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.

The Event details window opens.

When you select an event in the Event List window, multiple event contents associated with that event occurrence are displayed.



Viewing Voltage/Current Waveforms [VOLTAGE/CURRENT]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 101)

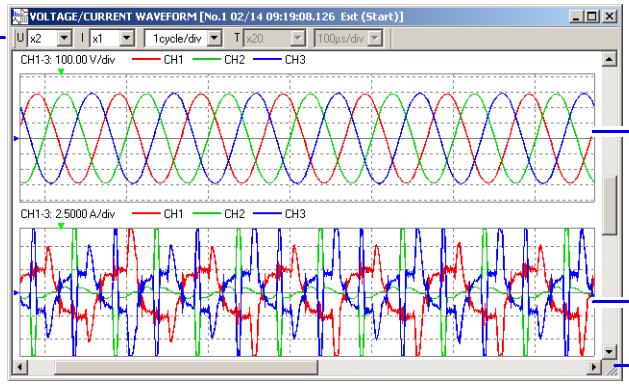
2 Activate the Event Data window and select the **VOLTAGE/CURRENT** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Voltage/Current Waveform window opens.

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)

Up to 14 cycles (50 Hz) or 16 cycles (60 Hz) can be analyzed.



Voltage waveform

Current waveform

Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Event Data window's tool bar.

Y-axis scale of voltage waveform

X-axis scale of waveform

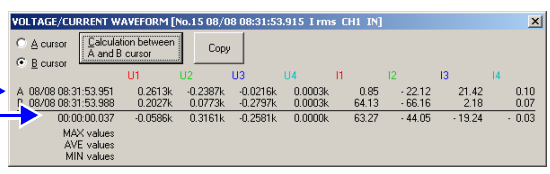
Y-axis scale of current waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

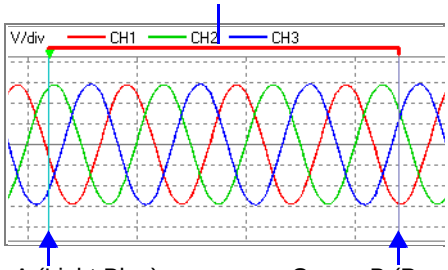
Time and numerical values at A and B cursor locations



Differences between A and B data (B – A)

The time difference between cursors is calculated using internal data resolution of less than 0.001 seconds, but the last digit (0.001 s) may not be exact.

Between A and B cursors



Cursor A (Light Blue)

Cursor B (Purple)

Viewing Voltage Waveforms [VOLTAGE]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 101)

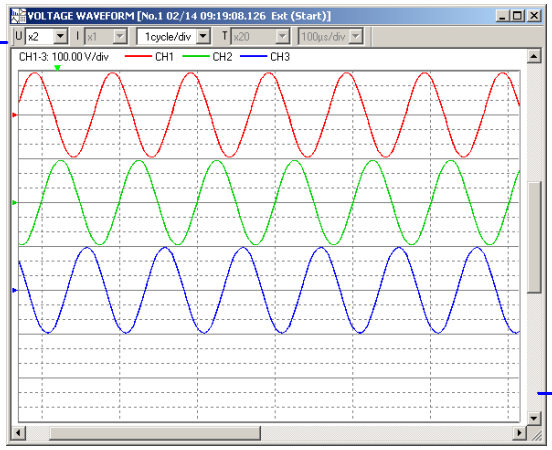
2 Activate the Event Data window and select the **VOLTAGE** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Voltage window opens.

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)

Up to 14 cycles (50 Hz) or 16 cycles (60 Hz) can be analyzed.



Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Voltage window's tool bar.

Y-axis scale of voltage waveform

X-axis scale of waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Current Waveforms [CURRENT]

1 Open the Event Data window.

See: "Opening and Switching Event Data Windows" (p. 101)

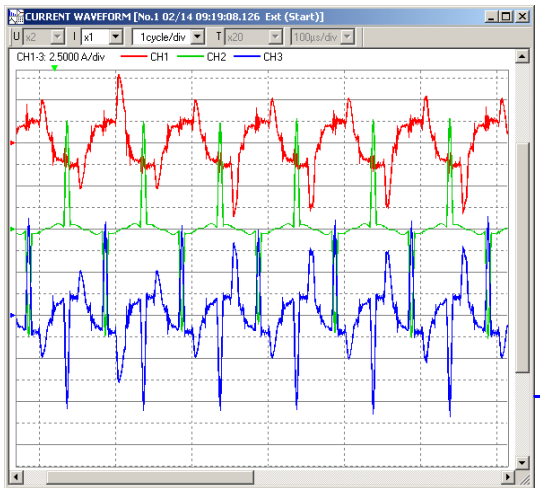
2 Activate the Event Data window and select the **CURRENT** window from the **EVENT DATA** menu.

You can also right click and select from the pop-up menu.
The Current window opens

Window tool bar

CH1 (Red)
CH2 (Yellow-Green)
CH3 (Blue)
CH4 (Light Blue)

Up to 14 cycles (50 Hz) or 16 cycles (60 Hz) can be analyzed.



Scrolls the window

Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Current window's tool bar.

Y-axis scale of current waveform

X-axis scale of waveform

Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Voltage Fluctuation Details

[Voltage Fluctuation Event Graph]

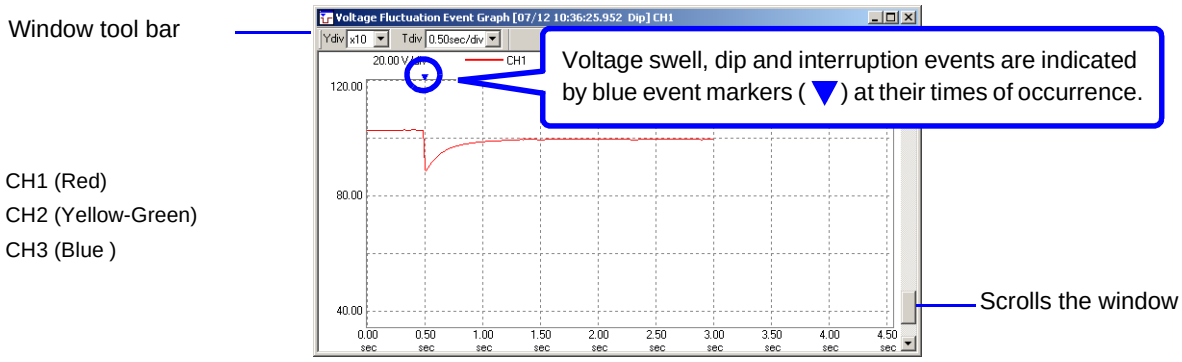
Voltage fluctuation phenomena (swells, dips and interruptions) that occurred within data measured by the Hioki 3197 can be displayed graphically (in the Voltage Fluctuation Event Graph window). This window is equivalent to the EVENT-RMS WAVE screen on the Hioki 3197.
A Voltage Fluctuation Event Graph can be displayed only when an Event file (WDU file) is loaded. Event files can be confirmed in the Event List (p. 100).
A Voltage Fluctuation Event Graph is a 3-second time series graph of rms voltage calculated over one half-cycle-shifted waveform.

1 Load the measurement data.

See: "Loading Data" (p. 14)

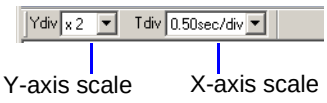
2 Click the  (Open Voltage Fluctuation Event Graph) button or select **View – Voltage Fluctuation Event Graph** from the menu bar.

The Voltage Fluctuation Event Graph window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Voltage Fluctuation Event Graph window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Other Event Phenomena

5 Click any WDU event marker in the Event List or Time Plot window.

A Voltage Fluctuation Event Graph window appears for the selected event.
If there is no WDU file for the selected event, “Specified WDU file not present" appears.

Viewing an Inrush Current Graph

[Inrush Current Event Graph]

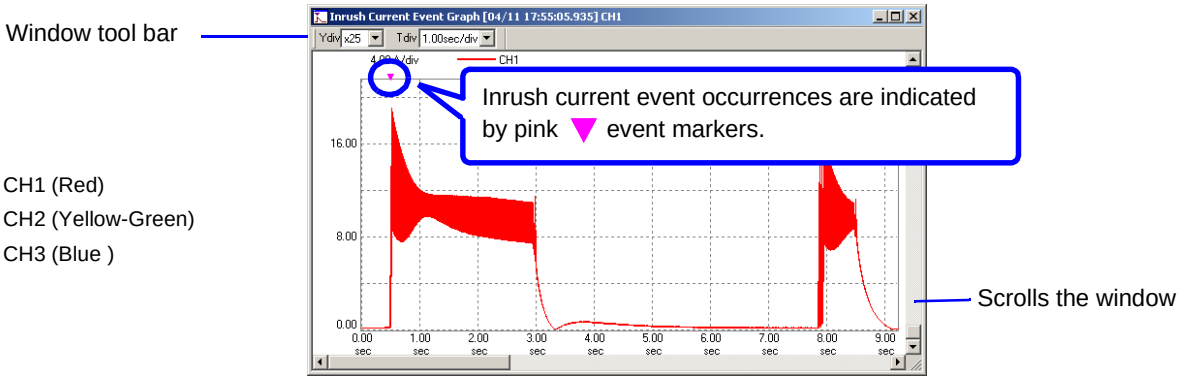
Data measured with the Hioki 3197 Power Quality Analyzer when an inrush current event occurs can be displayed as a graph (Inrush Current Event Graph). The Inrush Current Event Graph window is equivalent to the EVENT-INRUSH screen on the Hioki 3197.
The inrush current graph can be displayed only when an event (INR) file is loaded. Event files can be confirmed in the Event List (p. 100). This is a 30-second time series graph of rms current calculated every half cycle.

1 Load the measurement data.

See: "Loading Data" (p. 14)

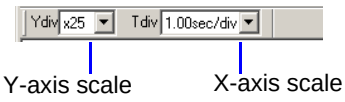
2 Click the  (Open Inrush Current Event Graph) button or select **View – Inrush Current Event Graph** from the menu bar.

The Inrush Current Event Graph window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Inrush Current Event Graph window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

Viewing Other Event Phenomena

5 Click any INRUSH event marker in the Event List or Time Plot window.

An Inrush Current Event Graph window appears for the selected event.
If there is no INR file for the selected event, "Specified INR file not present" appears.

Viewing Energy Consumption [Integrated Power Window]

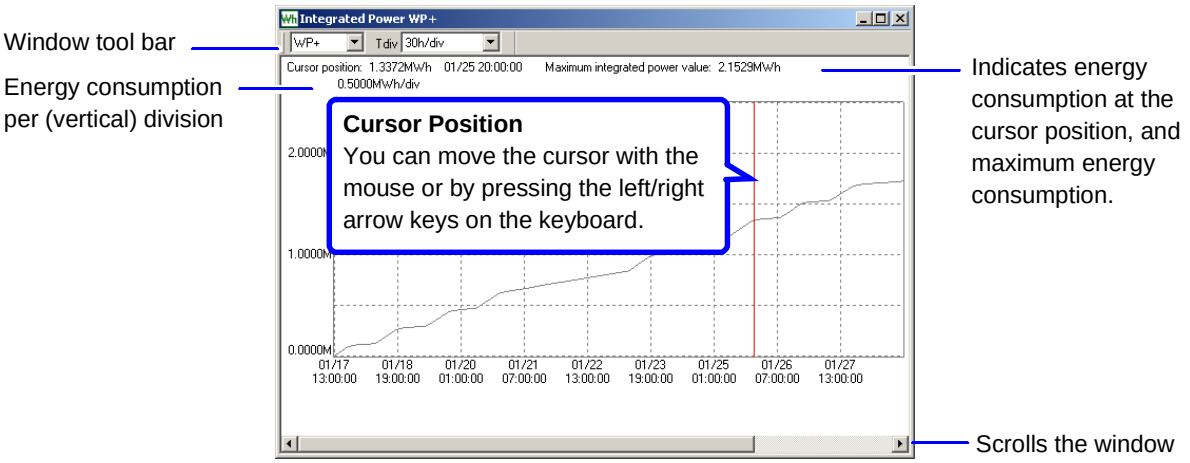
Energy consumption measured with the Hioki 3197 Power Quality Analyzer can be displayed as a time series graph (Integrated Power window).
The Integrated Power window is equivalent to the TIMEPLOT-ENERGY screen on the Hioki 3197.

1 Load the measurement data.

See: "Loading Data" (p. 14)

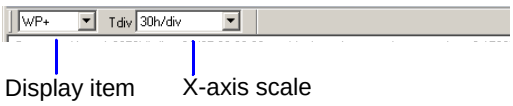
2 Click the Wh (Open Integrated Power window) button or select **View – Integrated Power Window** from the menu bar.

The Integrated Power window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Integrated Power window's tool bar.



Viewing Measurement Data as Numerical Values (Cursor Measurement)

4 Measurement values can be confirmed using the cursors. In addition, the minimum, maximum and average values over any span can be displayed.

See: "Viewing Measurement Data as Numerical Values (Cursor Measurement)" (p. 21)

When the A/B Cursor dialog is open, A/B cursor movement has priority over the usual screen cursor.

Viewing a Demand Graph [Demand Window]

Data measured with the Hioki 3197 Power Quality Analyzer can be displayed as a demand graph (Demand window).
The Demand window is equivalent to the TIMEPLOT-DEMAND screen on the Hioki 3197.

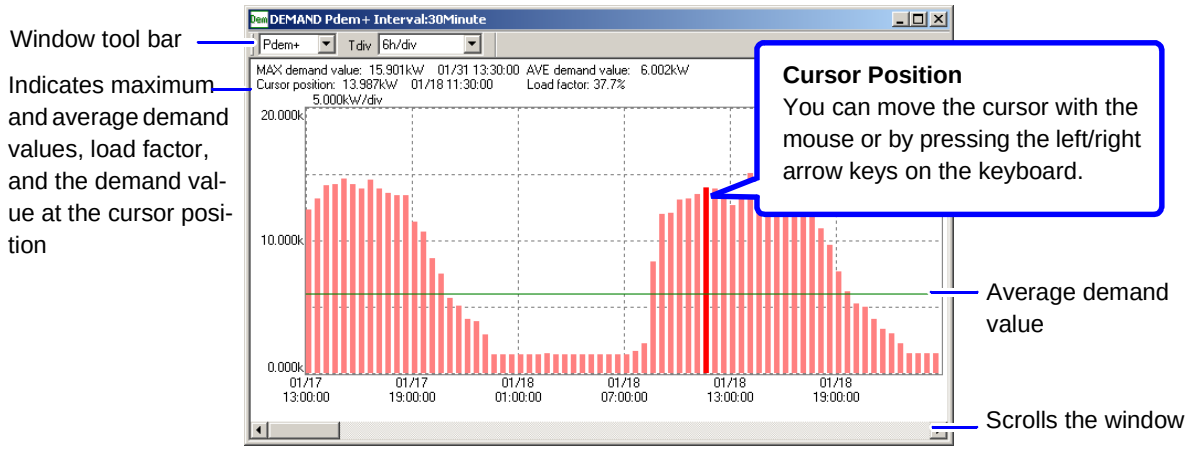
1 Load the measurement data.

See: "Loading Data" (p. 14)

If the measurement duration of the loaded data is too short, the Demand window cannot be displayed.

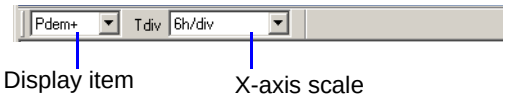
2 Click the Dem (Open Demand window) button or select **View – Demand Window** from the menu bar.

The Demand window opens.



Changing Displayed Contents

3 Select the items you want to change from the pull-down menus in the Demand window's tool bar



To change the cursor position

4 Click the point where you want to move the cursor, or press the right- or left-arrow key on the keyboard to move the cursor.

Maximum and average demand values, load factor, and the demand value at the cursor position are shown.

Viewing Setting Conditions for Measurement Data [SYSTEM]

The settings associated with the currently loaded data can be viewed in the Settings window.
The Settings window is equivalent to the SYSTEM screen on the Hioki 3197.

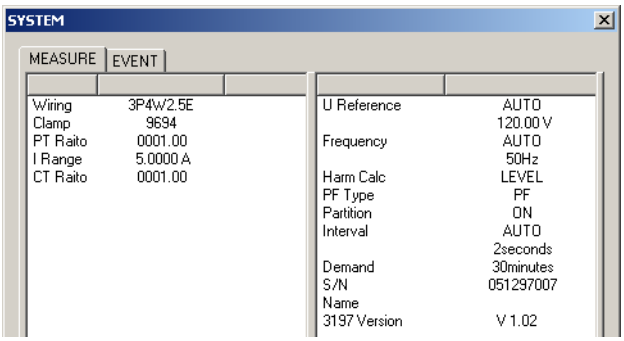
1 Load the measurement data.

See: "Loading Data" (p. 14)

The Settings window can only be displayed when an SET file is loaded.

2 Click the  (View system settings) button or select **View – SYSTEM** from the menu bar.
The System window opens.

3 Select the tabs to view each setting.



Correspondence Between Tabs and Hioki 3197 Setting Screens

PQA-HiView Pro Tab Name	Hioki 3197 Settings Screen
Measurement	SYSTEM measurement settings and some recording events
Event	Event portion of SYSTEM recording events

Specifications Chapter 6

General Specifications

Supported Model	• Model 3196 Power Quality Analyzer • Model 3197 Power Quality Analyzer
Supplied Media	One CD-R disc
Accessories	Instruction Manual

Hioki 3196 Function Specifications and Calculation Formulas

Data Reading Functions

Reading Data	Binary data recorded by the 3196 SET files..... Setting data ITV files..... TIME PLOT data EVT files..... Event data (lists, voltage/current waveforms, numerical values) FLC files..... Flicker data (Delta V10, IEC) TRN files..... Transient over voltage waveform data WDU files..... Event voltage fluctuation data EN50160.EN files..... EN50160 data EVENT.EN files..... EN50160 event data
Reading Method	Reads the above file types in folder units
Maximum Data Capacity	528 MB

Data Display Functions

■ SYSTEM Display Function

Screen Display	SYSTEM (Settings) content display

■ TIME PLOT Display Function

Screen Display	Display of one to four of the following screens 1. RMS fluctuation 2. Voltage fluctuation 3. Harmonics fluctuation 4. Interharmonics fluctuation
Number of Display Screens	Up to four
Cursor Function	A and B cursors (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred (selectable using the cursor key).

■ EVENT List Display Function

Screen Display	EVENT list content display
Display Method Selection	Chronological or priority order
WDU Display Function	Displays "WDU" for a selected event with event voltage fluctuation data.

■ EVENT Data Display Function

Display Function	Displays the event data selected on the Event list display screen (Synchronized switch-over) Displays the event marker data selected on the TIME PLOT display screen (Synchronized switch-over)
Screen Display	One of the following six screen displays 1. Event details displays Detailed event data is displayed. 2. Waveform displays Voltage/current waveforms, 4-channel voltage waveforms, 4-channel current waveforms, Voltage/transient waveforms 3. Vector displays RMS or Harmonic Phase Angle display 4. DMM displays Power, Voltage or Current display 5. Harmonics Bar Graph displays RMS or Phase Angle display 6. Harmonics List display RMS or Phase Angle display
Cursor Function	A and B cursors on the waveform display window (specify an interval for calculations)
Zero/Positive/Negative Phase Calculation Function	Simultaneously displays the voltage and current of zero/positive/negative phase sequence components in the vector window when analyzing 3P4W line data.
Event Marker Function	Uses the marker to indicate where an event has occurred on the waveform display screen.

■ Flicker Graph Display Function

Screen Display	Displays the Delta V10 flicker graph or IEC flicker graph (The graph to be displayed depends on the data saved.)
Cursor Function	A and B cursors (specify an interval for calculations)

■ Event Voltage Fluctuation Graph Display Function

Screen Display	Displays the WDU event data selected on the Event list window. Displays the WDU event marker data selected on the TIME PLOT window.
Cursor Function	A and B cursors (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred

Integrated Power Calculation Function

■ Settings

Analysis Start Time	Year, month, day, hour, minute and second settings
Analysis Period	1 to 31 days

■ Display Method and Calculation Items

Screen Display	Integrated Power Value (consumed value + returned value) [Wh]
Numerical Display	Displays the following values within the analysis period Maximum integrated power value (the last integrated power value within an analysis period)
Cursor Function	The following cursor functions are available • Normal cursor (displays integrated power value at cursor position) • A and B cursors (specify an interval for calculations)

Demand Calculation Function

■ Settings

Analysis Start Time	Year, month, day, hour, minute and second settings
Demand Period	5, 10, 15 or 30 minutes, or 1, 2, 3, 6 or 12 hours (can be set to the measurement interval of the 3196, or longer)
Analysis Period	1 to 31 days

■ Display Method and Calculation Items

Screen Display	Demand graph (consumption values only)
Numerical Display	Displays the following values within the analysis period • AVE Demand value (average demand within the analysis period) • MAX Demand value (peak demand within the analysis period) • Load factor (average demand / maximum demand x 100[%])
Cursor Function	Normal cursor (displays demand value at cursor position)

ITIC Curve Display Function

Display Function	Plots points for the events below on the limit curve. 1. Points to indicate the duration of swell and maximum swell voltage 2. Points to indicate the duration of dip and residual voltage 3. Points to indicate the duration of interruption and residual voltage
Percent of Nominal Voltage	Calculates the proportion of maximum swell voltage or residual voltage to nominal voltage in percentage. Percent of nominal voltage = Peak value / UReference x 100 UReference: Nominal voltage Peak value: Maximum swell voltage in case of swell or residual voltage in case of dip/interruption
Violation Count Display	Number of upper-limit violations, number of lower-limit violations, and total number of events
Limit Curve Selection	ITIC curve, user-defined curve (e.g., arbitrary curve) ITIC curve values

Upper Limit Curve		Lower Limit Curve	
Horizontal axis [s]	Vertical axis [%]	Horizontal axis [s]	Vertical axis [%]
1 m	200	20 m	0
3 m	140	20 m	70
3 m	120	500 m	70
500 m	120	500 m	80
500 m	110	10	80
1000	110	10	90
–––	–––	1000	90

EN50160 Data Viewer Function

Screen Display	EN50160 windows 1 to 4 below are displayed simultaneously. 1. Overview window Corresponds to the EVENT-EN50160-Over View window of the 3196. 2. Harmonic window Corresponds to the EVENT-EN50160-Harmonics window of the 3196. 3. Measurement result classification window Corresponds to the EVENT-EN50160-Events window of the 3196. 4. Signaling details window Corresponds to the EVENT-EN50160-Signaling window of the 3196.
Screen Switching	Note that you must switch the normal display mode into the EN50160 display mode by pressing the EN button once.

Copy Function

Copy Contents	Save various windows as BMP files

Print Function

Printing Format	Screen Image printing
Printing Paper Sizes	A4 and Letter
Print Preview	Provided
Simultaneous Printing	Logo/Model, time (with selectable text to print)
Marker Simultaneous Printing	MAX/MIN/AVE, channel, order (with printing turned ON/OFF)

CSV Format Conversion Function

Convertible Screens	TIME PLOT window, Event waveform window, Flicker graph window, Event voltage fluctuation window, Demand window, Integrated power value window
Specific Conversions	1. Range specified with A and B cursors (TIME PLOT window, Flicker graph window, Event voltage fluctuation window, Integrated power value window) 2. Full range (Event waveform window, Demand window)
Conversion Items	The conversion items, channels, and MAX/ MIN/ AVE can be selected.

Select Text Function

Text Selectable Windows	DMM window, Harmonics list window
Copying	Saves data in the selected range as tab-delimited text.

Download via LAN

Communications Method	HTTP
Connection Method	LAN connection using Ethernet

Report Creation Function

Output Format	Prints out a report containing information set with the report wizard or saves it in a Rich Text format file.

Report Generation Methods

Report Output Items	Automatic (Fixed Output)	Individual Setting (Selectable)	Detail Setting (Selectable)
RMS voltage fluctuation graph in Time Plot window	●	●	●
RMS current fluctuation graph in Time Plot window	×	●	●
Voltage fluctuation, RMS fluctuation, harmonic fluctuation, inter-harmonic fluctuation in Time Plot window	×	×	●
Flicker graph, energy consumption graph, demand graph	×	×	●
Total harmonic voltage distortion graph in Time Plot window	●	●	●
Total harmonic current distortion graph in Time Plot window	×	●	●
EN50160 Overview data	●	●	×
EN50160 Signaling data	●	●	×
EN50160 Harmonic data	×	●	×
EN50160 measurement result classification data	×	●	×
Worst case	●	●	×
Transient waveform	×	●*	×
Max/min list	●	●	×
All-event waveform	●	●	×
All-event detail list	●	●	×
Setting list	×	●	×

***.** Transient waveform is selectable only when worst case is selected.

Setting Save Function

Files to Save	• User-defined curve file • Setting file for sorting measurement results • Setting file for report wizard • Integrated file (combining the three files above)

Calculation Formulas

■ Integrated Power WH [Wh]

$$WH = \frac{\sum_{n=1}^{N} (Psum)}{k}$$

N: integrated sample count
n: sample count

- k = constant for per-hour conversion

Intervals	1 seconds	3 seconds	15 seconds	30 seconds	1 minutes	5 minutes	10 minutes	15 minutes	30 minutes	1 hours	2 hours
k	3600	1200	240	120	60	12	6	4	2	1	0.5

- $Psum$ = the average value during each interval
- This integrated power value includes both consumed power (+ values) and returned power (- values).

■ Demand Power [W]

$$Dem = \frac{\sum_{d=1}^{D} (Psum+)}{D}$$

D: Count of average values of each interval within the demand period
d: Count of samples

- $Psum+$ = the average value of each interval calculated by adding consumed power (+ values) as is, and 0 for returned power (- values).

■ Positive, Negative, and Zero Phase Calculation

$$\text{Component} = \frac{1}{3}\sqrt{\begin{aligned}&(V1 \bullet \cos(\alpha) + V2 \bullet \cos(\beta + seq2) + V3 \bullet \cos(r + seq3))^2 + \\ &(V1 \bullet \sin(\alpha) + V2 \bullet \sin(\beta + seq2) + V3 \bullet \sin(r + seq3))^2\end{aligned}}$$

Zero phase: $seq2$ = 0°, $seq3$ = 0°
Positive phase: $seq2$ = 120°, $seq3$ = 240°
Negative phase: $seq2$ = 240°, $seq3$ = 120°

Voltage component:
V1 = U1, V2 = U2, V3 = U3,
α = Phase angle of U1, β = Phase angle of U2, γ = Phase angle of U3

Current component:
V1 = I1, V2 = I2, V3 = I3,
α = Phase angle of I1, β = Phase angle of I2, γ = Phase angle of I3

■ Depth of Event [%] in ITIC Window or Measurement result classification Window

The depth is calculated as the proportion of peak voltage to nominal voltage.
Percent of nominal voltage = Peak value / UReference x 100
Peak value: Peak voltage of the event
UReference: Nominal voltage

Hioki 3197 Function Specifications

Data Reading Functions

Reading Data	Binary data recorded by the 3197 SET files..... Setting data ITV files ..... TIME PLOT data EVT files..... Event data (list and voltage/current waveforms) WDU files ..... Event voltage fluctuation data INR files..... Inrush current graph data DEM files..... Demand graph data
Reading Method	Reads the above file types in folder units
Maximum Data Capacity	4 MB

Data Display Functions

■ SYSTEM Display Function

Screen Display	SYSTEM (Settings) content display

■ TIME PLOT Display Function

Screen Display	Displays the following windows 1. RMS fluctuation 2. Voltage fluctuation
Number of Display Screens	Up to four
Cursor Function	A and B cursors (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred (selectable using the cursor key).

■ Energy Consumption Display Function

Screen Display	Energy Consumption graph
Displayed Items	WP+, WP–, WQ LAG, WQ LEAD
Numerical Display	Maximum energy consumption during measurement
Cursor Function	Normal cursor (indicates energy consumption at cursor position)

■ Demand Display Functions

Screen Display	Demand Graph
Displayed Items	Pdem+, Pdem–, Qdem LAG, Qdem LEAD
Numerical Display	Maximum demand value during measurement, average demand during measurement
Cursor Function	Normal cursor (indicates demand at cursor position)

■ EVENT List Display Function

Screen Display	EVENT list content display
Display Method Selection	Chronological
WDU Display Function	Displays "WDU" for a selected event with event voltage fluctuation data.
INRUSH Display Function	Displays "INRUSH" for a selected event with event inrush current data.

■ EVENT Data Display Function

Display Function	Displays the event data selected on the Event list display screen (Synchronized switch-over) Displays the event marker data selected on the TIME PLOT display screen (Synchro-nized switch-over)
Screen Display	One of the following screen displays 1. Event details displays Detailed event data is displayed. 2. Waveform displays Voltage/current waveforms, voltage waveforms, current waveforms
Cursor Function	A and B cursors on the waveform display window (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred on the waveform display screen.

■ Event Voltage Fluctuation Graph Display Function

Screen Display	Displays the WDU event data selected on the Event list window. Displays the WDU event marker data selected on the TIME PLOT window.
Cursor Function	A and B cursors (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred

■ Inrush Graph Display Function

Screen Display	Displays the INRUSH event data selected on the Event list window. Displays the INRUSH event marker data selected on the TIME PLOT window.
Cursor Function	A and B cursors (specify an interval for calculations)
Event Marker Function	Uses the marker to indicate where an event has occurred

Copy Function

Copy Contents	Save various windows as BMP files

Print Function

Printing Format	Screen Image printing
Printing Paper Sizes	A4 and Letter
Print Preview	Provided
Simultaneous Printing	Logo/Model, time (with selectable text to print)
Marker Simultaneous Printing	MAX/MIN/AVE, channel (with printing turned ON/OFF)

CSV Format Conversion Function

Convertible Screens	TIME PLOT window, Event waveform window, Event voltage fluctuation window, Inrush Current Event Graph window, Demand window, Integrated power value window
Specific Conversions	1. Range specified with A and B cursors (TIME PLOT window, Event voltage fluctuation window, Inrush Current Event Graph window, Integrated power value window) 2. Full range (Event waveform window, Demand window)
Conversion Items	The conversion items, channels, and MAX/ MIN/ AVE can be selected.

Report Creation Function

Output Format

Prints out a report containing information set with the report wizard or saves it in a Rich Text format file.

Report Generation Methods

Report Output Items	Automatic (Fixed Output)	Individual Setting (Selectable)	Detail Setting (Selectable)
RMS voltage fluctuation graph in TIME PLOT window	●	●	●
RMS current fluctuation graph in TIME PLOT window	×	●	●
Voltage fluctuation and RMS fluctuation in TIME PLOT window	×	×	●
Flicker graph and demand graph	×	×	●
Total harmonic voltage distortion graph in TIME PLOT window	●	●	●
Worst case	●	●	×
Max/min list	●	●	×
All-event waveform	●	●	×
All-event detail list	●	●	×
Setting list	×	●	×

Setting Save Function

Files to Save

- Setting file for report wizard
- Integrated file

Appendix

Appendix 1 3196 Data-header Composition

Text Time-sequence Data-header Composition

Remark: Each item is separated by a comma (,).

Classification	Header	Explanation		
Date and Time	Date	Date	2001/8/20	
	Time	Time	8:12:00	
Voltage fluctuation*	Umax1,..,Umax3	Max. value of voltage fluctuation	CH1 - CH3	
	Umin1,..,Umin3	Min. value of voltage fluctuation	CH1 - CH3	
RMS value fluctuation Maximum value	MaxFreq	Frequency		
	MaxUrms1,...,MaxUrms4	RMS voltage value	CH1 - CH4	
	MaxU+peak1,...,MaxU+peak4	Voltage waveform peak (+)	CH1 - CH4	
	MaxU-peak1,...,MaxU-peak4	Voltage waveform peak (-)	CH1 - CH4	
	MaxIrms1,...,MaxIrms4	RMS current value	CH1 - CH4	
	MaxI+peak1,...,MaxI+peak4	Current waveform peak (+)	CH1 - CH4	
	MaxI-peak1,...,MaxI-peak4	Current waveform peak (-)	CH1 - CH4	
	MaxUave	Average RMS voltage value	ave	
	MaxIave	Average RMS current value	ave	
	MaxP1,...,MaxP3	Active power	CH1 - CH3	
	MaxPsum	Sum of active power	sum	
	MaxS1,...,MaxS3	Apparent power	CH1 - CH3	
	MaxSsum	Sum of apparent power	sum	
	MaxQ1,...,MaxQ3	Reactive power	CH1 - CH3	
	MaxQsum	Sum of reactive power	sum	
	MaxPF1,...,MaxPF3	Power factor/Displacement power factor	CH1 - CH3	
	MaxPFsum	Sum of Power factor/Displacement power factor	sum	
	MaxKF1,...,MaxKF4	K factor	CH1 - CH4	
	MaxUunb	Voltage unbalance factor		
	MaxIunb	Current unbalance factor		
	MaxUthd1,...,MaxUthd4	Total harmonic voltage distortion factor	CH1 - CH4	
	MaxIthd1,...,MaxIthd4	Total harmonic current distortion factor	CH1 - CH4	
	MaxU1(1),...,MaxU4(50)	Harmonic voltage	CH1 - CH4	1st - 50th
	MaxI1(1),...,MaxI4(50)	Harmonic current	CH1 - CH4	1st - 50th
	MaxP1(1),...,MaxP3(50)	Harmonic power	CH1 - CH3	1st - 50th
	MaxPhase1(1),...,MaxPhase3(50)	Harmonic voltage-current phase difference	CH1 - CH3	1st - 50th
	MaxPsum(1),...,MaxPsum(50)	Sum of harmonic power	sum	1st - 50th
	MaxPhasesum(1),...,MaxPhasesum(50)	Sum of harmonic voltage-current phase difference	sum	1st - 50th
	MaxUtihd1,...,MaxUtihd4	Total harmonic voltage distortion factor	CH1 - CH4	
	MaxItihd1,...,MaxItihd4	Total harmonic current distortion factor	CH1 - CH4	
	MaxU1(0.5),...,MaxU4(49.5)	Inter-harmonic voltage	CH1 - CH4	0.5 - 49.5th
	MaxI1(0.5),...,MaxI4(49.5)	Inter-harmonic current	CH1 - CH4	0.5 - 49.5th

*: When ΔU is selected as the voltage recording setting, Umax1, ...Umax3 becomes dUmax1, ...dUmax3, and Umin1, ...Umin3 becomes dUmin1, ...dUmin3.

Appendix 1 3196 Data-header Composition

Classification	Header	Explanation		
RMS value fluctuation Minimum value	MinFreq	Frequency		
	MinUrms1,...,MinUrms4	RMS voltage value	CH1 - CH4	
	MinU+peak1,...,MinU+peak4	Voltage waveform peak (+)	CH1 - CH4	
	MinU-peak1,...,MinU-peak4	Voltage waveform peak (-)	CH1 - CH4	
	MinIrms1,...,MinIrms4	RMS current value	CH1 - CH4	
	MinI+peak1,...,MinI+peak4	Current waveform peak (+)	CH1 - CH4	
	MinI-peak1,...,MinI-peak4	Current waveform peak (-)	CH1 - CH4	
	MinUave	Average RMS voltage value	ave	
	MinIave	Average RMS current value	ave	
	MinP1,...,MinP3	Active power	CH1 - CH3	
	MinPsum	Sum of active power	sum	
	MinS1,...,MinS3	Apparent power	CH1 - CH3	
	MinSsum	Sum of apparent power	sum	
	MinQ1,...,MinQ3	Reactive power	CH1 - CH3	
	MinQsum	Sum of reactive power	sum	
	MinPF1,...,MinPF3	Power factor/Displacement power factor	CH1 - CH3	
	MinPFsum	Sum of Power factor/Displacement power factor	sum	
	MinKF1,...,MinKF4	K factor	CH1 - CH4	
	MinUunb	Voltage unbalance factor		
	MinIunb	Current unbalance factor		
	MinUthd1,...,MinUthd4	Total harmonic voltage distortion factor	CH1 - CH4	
	MinIthd1,...,MinIthd4	Total harmonic current distortion factor	CH1 - CH4	
	MinU1(1),...,MinU4(50)	Harmonic voltage	CH1 - CH4	1st - 50th
	MinI1(1),...,MinI4(50)	Harmonic current	CH1 - CH4	1st - 50th
	MinP1(1),...,MinP3(50)	Harmonic power	CH1 - CH3	1st - 50th
	MinPhase1(1),...,MinPhase3(50)	Harmonic voltage-current phase difference	CH1 - CH3	1st - 50th
	MinPsum(1),...,MinPsum(50)	Sum of harmonic power	sum	1st - 50th
	MinPhasesum(1),...,MinPhasesum(50)	Sum of harmonic voltage-current phase difference	sum	1st - 50th
	MinUtihd1,...,MinUtihd4	Total harmonic voltage distortion factor	CH1 - CH4	
	MinItihd1,...,MinItihd4	Total harmonic current distortion factor	CH1 - CH4	
	MinU1(0.5),...,MinU4(49.5)	Inter-harmonic voltage	CH1 - CH4	0.5 - 49.5th
	MinI1(0.5),...,MinI4(49.5)	Inter-harmonic current	CH1 - CH4	0.5 - 49.5th

Classification	Header	Explanation		
RMS value fluctuation Average value	AveFreq	Frequency		
	AveUrms1,...,AveUrms4	RMS voltage value	CH1 - CH4	
	AveU+peak1,...,AveU+peak4	Voltage waveform peak (+)	CH1 - CH4	
	AveU-peak1,...,AveU-peak4	Voltage waveform peak (-)	CH1 - CH4	
	AveIrms1,...,AveIrms4	RMS current value	CH1 - CH4	
	AveI+peak1,...,AveI+peak4	Current waveform peak (+)	CH1 - CH4	
	AveI-peak1,...,AveI-peak4	Current waveform peak (-)	CH1 - CH4	
	AveUave	Average RMS voltage value	ave	
	AveIave	Average RMS current value	ave	
	AveP1,...,AveP3	Active power	CH1 - CH3	
	AvePsum	Sum of active power	sum	
	AveS1,...,AveS3	Apparent power	CH1 - CH3	
	AveSsum	Sum of apparent power	sum	
	AveQ1,...,AveQ3	Reactive power	CH1 - CH3	
	AveQsum	Sum of reactive power	sum	
	AvePF1,...,AvePF3	Power factor/Displacement power factor	CH1 - CH3	
	AvePFsum	Sum of Power factor/Displacement power factor	sum	
	AveKF1,...,AveKF4	K factor	CH1 - CH4	
	AveUunb	Voltage unbalance factor		
	AveIunb	Current unbalance factor		
	AveUthd1,...,AveUthd4	Total harmonic voltage distortion factor	CH1 - CH4	
	AveIthd1,...,AveIthd4	Total harmonic current distortion factor	CH1 - CH4	
	AveU1(1),...,AveU4(50)	Harmonic voltage	CH1 - CH4	1st - 50th
	AveI1(1),...,AveI4(50)	Harmonic current	CH1 - CH4	1st - 50th
	AveP1(1),...,AveP3(50)	Harmonic power	CH1 - CH3	1st - 50th
	AvePhase1(1),...,AvePhase3(50)	Harmonic voltage-current phase difference	CH1 - CH3	1st - 50th
	AvePsum(1),...,AvePsum(50)	Sum of harmonic power	sum	1st - 50th
	AvePhasesum(1),...,AvePhasesum(50)	Sum of harmonic voltage-current phase difference	sum	1st - 50th
	AveUtihd1,...,AveUtihd4	Total harmonic voltage distortion factor	CH1 - CH4	
	AveItihd1,...,AveItihd4	Total harmonic current distortion factor	CH1 - CH4	
	AveU1(0.5),...,AveU4(49.5)	Inter-harmonic voltage	CH1 - CH4	0.5 - 49.5th
	AveI1(0.5),...,AveI4(49.5)	Inter-harmonic current	CH1 - CH4	0.5 - 49.5th

Delta V10 Flicker Text Time-sequence Data-header Composition

Classification	Header	Explanation	Example
Date and Time	Date	Date	2001/11/02
	Time	Time	17:19:00
Delta V10	dv10	Delta V10 instantaneous value	0.081
	max	Delta V10 total maximum value	0.158
	dv10max	Delta V10 maximum value for one hour	0.000
	dv10max4	Delta V10 fourth largest value for one hour	0.000
	dv10ave	Delta V10 average value for one hour	0.000

IEC Flicker Text Time-sequence Data-header Composition

Classification	Header	Explanation	Example
Date and Time	Date	Date	2002/3/5
	Time	Time	15:24:15
Pst, Plt	Pst 1	CH1 Pst	0.325
	Pst 2	CH2 Pst	0.386
	Pst 3	CH3 Pst	0.358
	Plt 1	CH1 Plt	0.325
	Plt 2	CH2 Plt	0.386
	Plt 3	CH3 Plt	0.358

Appendix 2 3197 Data-header Composition

Classification	Header	Explanation
Date Time Status	Date	Date
	Time	Time
	Status	Status
TIME PLOT DIP/SWELL	Umax1, Umax2, Umax3	Voltage Maximum value
	Umin1, Umin2, Umin3	Voltage Minimum value
TIME PLOT RMS Maximum Values	MaxFreq	Frequency
	MaxUrms1, MaxUrms2, MaxUrms3	Voltage
	MaxU+peak1, MaxU+peak2, MaxU+peak3	Voltage Waveform Peak+
	MaxU-peak1, MaxU-peak2, MaxU-peak3	Voltage Waveform Peak-
	MaxIrms1, MaxIrms2, MaxIrms3, MaxIrms4	Current
	MaxI+peak1, MaxI+peak2, MaxI+peak3, MaxI+peak4	Current Waveform Peak+
	MaxI-peak1, MaxI-peak2, MaxI-peak3, MaxI-peak4	Current Waveform Peak-
	MaxUave	Voltage for 3phase
	MaxIave	Current for 3phase
	MaxPsum, MaxSsum, MaxQsum	Active Power, Apparent Power, Reactive Power
	MaxPFsum, MaxUunb	Power Factor
	MaxUthd1, MaxUthd2, MaxUthd3	Total Harmonic Voltage Distortion Ratio
TIME PLOT RMS Minimum Values	MinFreq	Frequency
	MinUrms1, MinUrms2, MinUrms3	Voltage
	MinU+peak1, MinU+peak2, MinU+peak3	Voltage Waveform Peak+
	MinU-peak1, MinU-peak2, MinU-peak3	Voltage Waveform Peak-
	MinIrms1, MinIrms2, MinIrms3, MinIrms4	Current
	MinI+peak1, MinI+peak2, MinI+peak3, MinI+peak4	Current Waveform Peak+
	MinI-peak1, MinI-peak2, MinI-peak3, MinI-peak4	Current Waveform Peak-
	MinUave	Voltage for 3phase
	MinIave	Current for 3phase
	MinPsum, MinSsum, MinQsum	Active Power, Apparent Power, Reactive Power
	MinPFsum, MinUunb	Power Factor
	MinUthd1, MinUthd2, MinUthd3	Total Harmonic Voltage Distortion Ratio
TIME PLOT RMS Average Values	AveFreq	Frequency
	AveUrms1, AveUrms2, AveUrms3	Voltage
	AveU+peak1, AveU+peak2, AveU+peak3	Voltage Waveform Peak+
	AveU-peak1, AveU-peak2, AveU-peak3	Voltage Waveform Peak-
	AveIrms1, AveIrms2, AveIrms3, AveIrms4	Current
	AveI+peak1, AveI+peak2, AveI+peak3, AveI+peak4	Current Waveform Peak+
	AveI-peak1, AveI-peak2, AveI-peak3, AveI-peak4	Current Waveform Peak-
	AveUave	Voltage for 3phase
	AveIave	Current for 3phase
	AvePsum, AveSsum, AveQsum	Active Power, Apparent Power, Reactive Power
	AvePFsum, AveUunb	Power Factor
	AveUthd1, AveUthd2, AveUthd3	Total Harmonic Voltage Distortion Ratio
TIME PLOT Energy Quadergy	WP+, WP-	Energy (Delivered, Received)
	WQ_LAG, WQ_LEAD	Quadergy (Lagging, Leading)

Appendix 2 3197 Data-header Composition

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HIOKI 9624-50 PQA-HiVIEW PRO
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