User's Manual

Model 760122 Application Software WTViewer

YOKOGAWA
Yokogawa Electric Corporation

IM 760122-01E
4th Edition

Foreword

Thank you for purchasing WTViewer application software (Model 760122) for the WT210[*1]/WT230[*1], WT1600, and WT3000 Digital Powermeters. This user's manual contains useful information about the functions and operating procedures of WTViewer and lists the handling precautions of the software. To ensure correct use, please read this manual thoroughly before beginning operation.

[*1] For information about the WT210/WT230, see the WTViewer help menu.

After reading this manual, keep it in a convenient location for quick reference in the event a question arises during operation.
For the handling precautions, functions, and operating procedures of the WT210, WT230, WT1600, and WT3000 Digital Powermeters, see the user's manual that came with the instrument.

Refer to the manuals that came with your version of Windows for information on how to use that program.

Notes

- This document covers version 4.01 of WTViewer. A WTViewer version upgrade is required to support all[*2] of the WT210, WT230, and WT3000 models. The upgrade program can be downloaded from the Web page below.

  [*2] See page iv for the WT firmware versions supported by WTViewer.

  www.yokogawa.com/tm/tm-softdownload.htm
- In order to perform communications with a personal computer (hereinafter, PC) via a WT3000 with a USB interface, a USB driver must be installed in the PC. The driver can be downloaded from the Web page below.

  www.yokogawa.com/tm/tm-softdownload.htm
- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.
- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the software's performance and functions. Display contents illustrated in this manual may differ slightly from what actually appears on your screen.
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4th Edition:	June 2005

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Product Overview

WTViewer takes advantage of a connection between a PC and a Yokogawa WT main unit (hereinafter, “a/the WT” by allowing the user to load and save measured data and settings from the WT on the PC. Up to four WT’s can be connected (only one unit when using the RS-232 communication interface), and measured data from multiple units can be loaded at once.

WT Firmware (ROM) Versions Supported by WTViewer

WT Model	Firmware Version
WT210[*1]	1.06 or later
WT230[*1]	1.06 or later
WT1600	2.01 or later
WT3000	2.01 or later

[*1] For information about the WT210/WT230, see the WTViewer help menu.

On-Line and Off-Line Modes

WTViewer operates in two different modes: On-Line and Off-Line.
In On-Line mode, you can use a communication interface (GP-IB, RS-232, Ethernet (WT1600/WT3000 only) or USB (WT3000 only)) to change WT settings on the PC, or load or save measured data or settings from the WT on the PC. Also, using the FTP client function (when using Ethernet), you can transfer measured data, settings (setup data/information), and screen image data between the WT and PC.

WT Model	Communication Interface Type			
	GP-IB	RS-232	ETHERNET	USB
WT210	Y	Y	x	x
WT230	Y	Y	x	x
WT1600	Y	Y	Y	x
WT3000	Y	Y	Y	Y[*2]

Y: Supported[*3], X: Not supported

[*2] In order to perform communications with a personal computer (hereinafter, PC) via a WT3000 with a USB interface, a USB driver must be installed in the PC. The driver can be downloaded from the Web page below.
www.yokogawa.com/tm/tm-softdownload.htm

[*3] The installed communication interface type differs depending on the specifications of the WT.

Note

- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.

In Off-Line mode you can load and display various kinds of files on WTVewer that were saved by WTViewer[*4] without the WT and PC being connected.

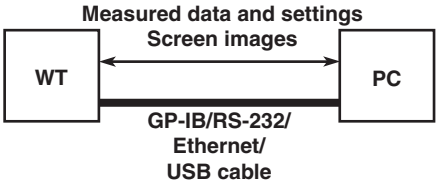
[*4] For details on the data formats in which WTViewer can save, and the data formats that can be loaded by WTViewer, see page vii.

Note

Data that were saved from the WT to files on the memory medium can be loaded using Yokogawa’s free “File Reader” software on the PC. The data can be displayed on the PC or saved in CSV format on the PC’s memory media. Download “File Reader Software” from our Web site.

www.yokogawa.com/tm/tm-softdownload.htm

On-Line mode



Measured data is loaded onto the PC from the WT at the display update rate of the PC, then the data can be displayed and/or saved to a memory medium. Measured data, settings, or screen images can be transferred back and forth between the WT and the PC.

Off-Line mode

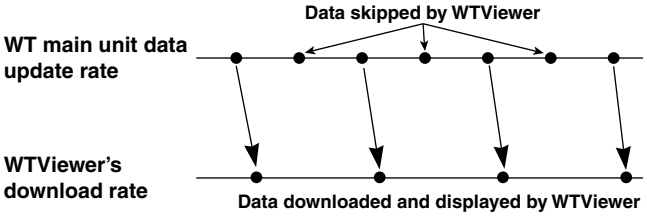
Data measured on the WT is loaded onto the PC from a floppy, then the data can be displayed and/or saved to a memory medium.

WT Data Update Rate and WTViewer Data Download Rate

The WTViewer operation screen contains buttons for starting and stopping download of measured data, and an Update button for updating measured data.
When the Start button is clicked, WTViewer begins downloading measured data. When the download is complete, the PC waits for the WT to update the data. When the WT finishes updating the data, WTViewer resumes the download. The operation repeats until the Stop button is pressed.

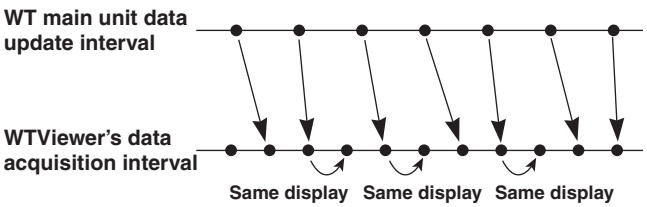
WT Data Update Rate < WTViewer Data Download Rate

If the WT data update interval is shorter than the time required for WTViewer to acquire measured data once, there will be some data that WTViewer does not acquire.



WT Data Update Interval > WTViewer Data Acquisition Interval

If the data update rate on the WT is longer than the time it takes for WTViewer to acquire one set of measured data, WTViewer will only be able to download data after the WT has updated it, so the WTViewer's display will appear to have the same update rate as the WT.

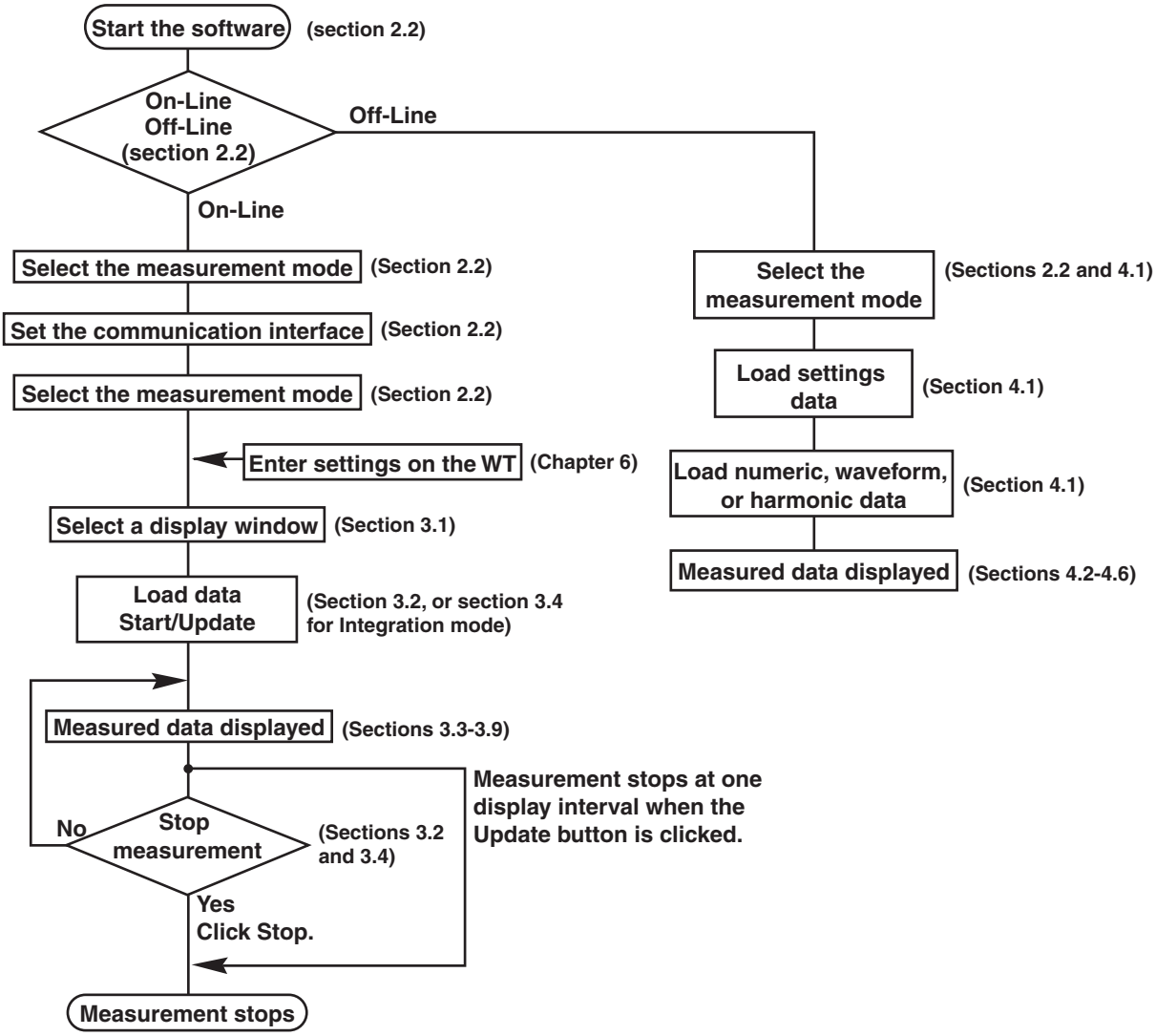


If the Stop button is clicked during a download, the download will continue until the complete set of data is downloaded. As such, there is a time lag between the time when the Stop button is pressed and the time the WTViewer display stops.

If you click the Update button, data is updated one time only. In this situation the measurement interval is the same as the display update interval on the PC. It is independent of the display update rate of the WT.
The display update rate of the PC depends on the CPU, memory, quantity of data being displayed, and the number of WT's connected.

Flow of Operation

The figure below shows the general flow of operation up to the point when the WT displays data.



Display Screen Types

The following are the main display screen types. For information on the meanings of each type, see the WT main unit user's manual.

Numeric View
Displays numeric data from the WT during normal measurement. On the WT3000, numeric harmonic data can also be displayed.

Harmonics List
Numerically displays measured values from the WT during harmonic measurement. Select when using the WT1600.

Wave
Displays waveform display data acquired from the WT. On the WT210/WT230, the harmonic option is required.

Bar Graph
Displays a bar graph of harmonic components at each order during harmonic measurements.

Vector
Displays the relationship between the phase difference of the fundamental wave of each element when performing harmonic measurements.

Trend
Displays the trends of all measurement functions for the object being measured during normal and harmonic measurement

WTViewer File Formats

Data Format (Extension) That Can Be Saved by WTViewer.

The data formats (extensions) that can be saved by WTViewer are given in the table below. Note that CSV files cannot be read by WTViewer. These types of files can be opened in commercial spreadsheet programs (such as Excel).

File Types and Extensions

Type	Setting	Numerical Data	Waveform Data	Harmonic Data
WT1600	CSV frmt (.csv) BIN frmt (.set)	CSV frmt (.csv) BIN frmt (.wta)	CSV frmt (.csv) BIN frmt (.wta)	CSV frmt (.csv) BIN frmt (.wta)
WT3000	-*1 CFG frmt(.cfg)	CSV frmt (.csv) WTN frmt (.wtn)	CSV frmt (.csv) WTW frmt (.wtw)	-*2 -*2

*1 If WTViewer is working with the WT3000, the function whereby settings are saved in CSV format is not available.

*2 With the WT3000, since harmonics are also measured along with normally measured numerical data measured in normal measurement mode, harmonic data is also saved when saving numerical data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.

Data Formats (Extensions) That Can Be Loaded by WTViewer

Files that can be loaded by WTViewer are given in the table below. Data saved using Auto Saving (described in section 3.3) cannot be loaded by WTViewer.

File Types and Extensions

Type	Setting	Numerical Data	Waveform Data	Harmonic Data
WT1600	SET frmt (.set)	WTViewer frmt (.wta)	WTViewer frmt (.wta) WT1600 frmt (.wvf)*3	WTViewer frmt (.wta)
WT3000	CFG frmt (.cfg)	WTN frmt (.wtn)	WTW frmt (.wtw)	-*4

*3 Load the setting information (with the .set extension) before loading the waveform data in WT1600 format (with the .wvf extension). If the settings are not loaded, the waveform will not be displayed.

*4 With the WT3000, since harmonics are also measured along with normally measured numerical data measured in normal measurement mode, harmonic data is also saved when saving numerical data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.

.wtd Files

Measured data files saved by the WT main unit. WTViewer cannot read files with the .wtd extension. To read .wtd files, download the File Reader Software from the Web site below.

www.yokogawa.com/tm/tm-softdownload.htm

System Requirements

PC

- **CPU**
  Celeron 500 MHz or higher (recommended)
- **Memory**
  256 MB or more (recommended)
- **VRAM**
  4 MB or more
- **Hard Disk**
  500 MB or more of free space

Operating System

Microsoft Windows 98 SE, Windows Me, Windows NT Windows 2000, or Windows XP.

Communications Port

- **GP-IB**
  NI (National Instruments) AT-GPIB, PCI-GPIB, PCI-GPIB+, PCMCIA-GPIB, PCMCIA-GPIB+, with driver NI-488.2M version 1.60 or later.
- **RS-232**
  An available COM port on the PC
- **Ethernet**
  10BASE-T or 100BASE-TX compatible Ethernet port
- **USB**
  A USB Rev. 1.1 or later USB port

Display, Printer, and Mouse

Devices supported by Windows 98 SE, Windows Me, Windows NT, Windows 2000, or Windows XP.

WT Main Unit

For the models that are compatible for communication between the PC and WT when using WTViewer, see the product overview (page v).

Contents

1.1 Connecting the PC to the WT

CAUTION

When connecting or removing communication cables, always turn the power to the PC and instrument OFF. Failure to do so may cause a malfunction or damage to the internal circuitry.

GP-IB Based Control

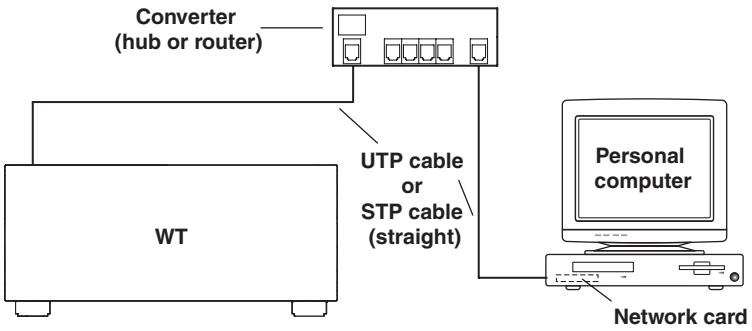
The GP-IB connector on the WT is a 24-pin IEEE Standard 488-1978 connector. Be sure to use a GP-IB cable that complies to the IEEE Standard.
Connect the cable to the GP-IB connector on the rear panel of the WT.
For connections to the PC, use a connector compatible with your PC.

Serial Based Control (RS-232)

Before connecting the WT and the PC with a cable, open the system device manager on the PC and check for an available communications port. Connect an interface cable to an available COM port.
For connections to the PC, use a connector compatible with your PC.

Ethernet Based Control

The WT1600 and WT3000 support Ethernet communications (optional).
To connect the WT and PC, attach a straight UTP (unshielded twisted pair) or STP (shielded twisted pair) cable through a hub or other converter to the Ethernet port on the rear panel of the WT. The transfer speed differs depending on the model. Use a converter, cable, and network card appropriate for the transfer speed.



Note

- When connecting to a 100BASE-TX network, use a UTP (unshielded twisted pair) or STP (shielded twisted pair) cable of category 5 or higher.
- Avoid one-to-one connections between the WT and the PC (a hub should be used). We cannot guarantee results using a direct connection.

USB Based Control

The WT3000 supports communication with a PC via a USB port (optional). Use the PC connection port (type B connector) on the rear panel of the WT3000 to connect to the PC.

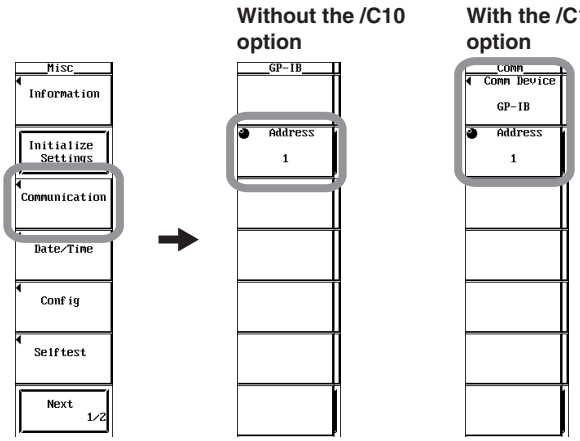
1.2 GP-IB Control Settings

Procedure

With the WT1600 (for Products with the -C1 Suffix Code)

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Communication** soft key.
   - For products without the /C10 option, the GP-IB menu is displayed. Proceed to step 4.
   - For products with the /C10 option, the Comm menu is displayed. Proceed to step 3.
3. Press the **Comm Device** soft key and select GP-IB.

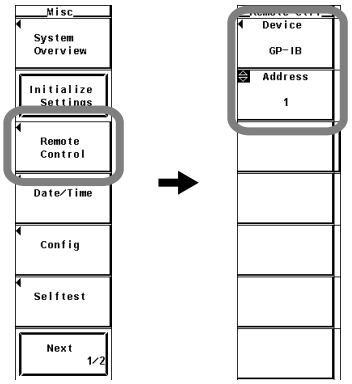
   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.
4. Turn the **jog shuttle** to enter the address.



With the WT3000

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Remote Control** soft key. The Remote Ctrl menu is displayed.
3. Press the **Device** soft key and select GP-IB.

   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.
4. Press the **cursor keys** to enter the address.



Explanation

When using the software in On-line mode via the GP-IB interface, select GP-IB on the WT main unit.

Setting the Address

Set the address of the WT in the following range.
0 to 30

When connecting via GP-IB, each device has its own unique system-internal GP-IB address. This address is used to differentiate the devices. As such, when connecting the WT to a PC or other device, you must make sure not to enter the same address for the WT as the other device.

Note

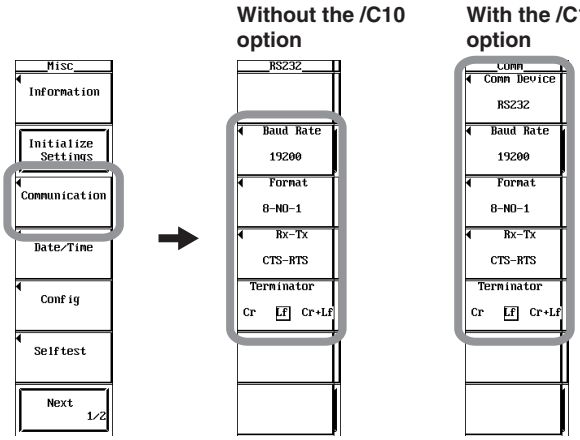
- Do not change the address while the controller (PC) or other device is using GP-IB.
- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.
- Use an NI (National Instruments) model GP-IB port (or card) on the PC side. For details, see page x.
- If a converter is used along the communciation cable connecting the WT and PC (for example, a GP-IB-to-USB or RS-232-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.

1.3 RS-232 Control Settings

Procedure

With the WT1600 (for Products with the -C2 Suffix Code)

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Communication** soft key.
   - For products without the /C10 option, the RS232 menu is displayed. Proceed to step 4.
   - For products with the /C10 option, the Comm menu is displayed. Proceed to step 3.
3. Press the **Comm Device** soft key and select RS232.
   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.
4. Press the **Baud Rate**, **Format** (data format), **Rx-Tx** (handshaking method), and **Terminator** soft keys in turn, and select the items for each.



With the WT3000 (for Products with the -C2 Option)

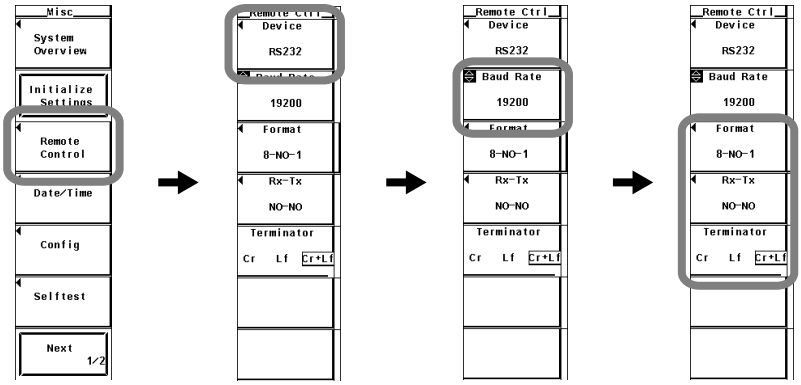
1. Press **MISC**. The Misc menu is displayed.
2. Press the **Remote Control** soft key. The Remote Ctrl menu is displayed.
3. Press the **Device** soft key and select RS232.
   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.

- **Selecting the Baud Rate**

4. Press the **cursor keys** to select **Baud Rate**.

- **Selecting the Data Format, Handshaking Method, and Terminator**

4. Press the **Format** (data format), **Rx-Tx** (handshaking method), and **Terminator** soft keys in turn, and select the items for each.



Explanation

When using the software in On-line mode via the RS-232 interface, select RS-232 on the WT main unit.

Selecting the Baud Rate

Select from the following choices. When using WTViewer, the baud rates that can be selected for the WT are predetermined.
1200, 2400, 4800, 9600, 19200, 38400

WT Model	Baud Rate
WT210	Fixed at 9600
WT230	Fixed at 9600
WT1600	Fixed at 19200
WT3000	Select 19200 or 38400

Selecting the Data Format

The data format is shown as a combination of the data length, parity, and stop bit. Select from the choices below. When using WTViewer, you must select 8-NO-1.
8-NO-1, 7-EVEN-1, 7-ODD-1, 7-NO-2

Selecting the Handshaking Method

The handshaking methods are in the form *transmit control - receive data control*.
When using WTViewer, select CTS-RTS.
NO-NO, XON-XON, XON-RTS, CTS-RTS

Selecting the Terminator

Select the terminator to be used when sending data from the WT from the following choices.
When using WTViewer, select Lf.
Cr, Lf, Cr+Lf

Note

- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.
- If a converter is used along the communciation cable connecting the WT and PC (for example, a GP-IB-to-USB or RS-232-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.

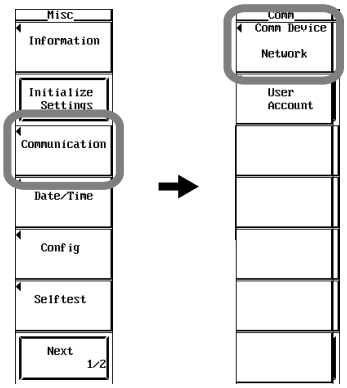
1.4 Ethernet Control Settings

Procedure

With the WT1600 (for Products with the -C10 Option)

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Communication** soft key. The Comm menu is displayed.
3. Press the **Comm Device** soft key. Select Network

   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.



- **User Name and Password Settings**

4. Press the **User Account** soft key. The User Account dialog box opens.
5. Turn the **jog shuttle** to enter the User Name.
6. Press **SELECT**. A keyboard appears.
7. Use the WT **keyboard** to enter the user name.

   For information on operating the WT keyboard, see the Wt user's manual.
8. Turn the **jog shuttle** to select Password.
9. Press **SELECT**. A keyboard appears.
10. Use the WT **keyboard** to enter the password.

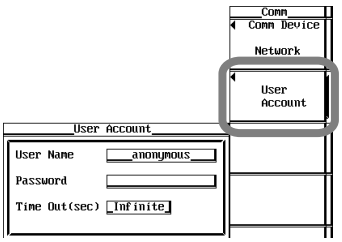
    Input the password again to confirm.

    If the user name is "anonymous," the password setting is not required.

    For information on operating the WT keyboard, see the WT user's manual.

- **Setting the Timeout Time**

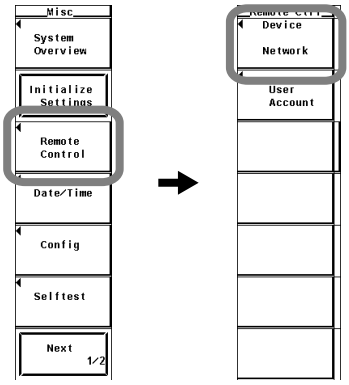
11. Turn the **jog shuttle** to select Time Out.
12. Press **SELECT**. The time out time setting box is displayed.
13. Turn the **jog shuttle** to enter the timeout time.
14. Press **SELECT** or **ESC** to close the setting box.



With the WT3000 (for Products with the -C7 Option)

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Remote Control** soft key. The Remote Ctrl menu is displayed.
3. Press the **Device** soft key and select Network.

   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.



- **User Name and Password Settings**

4. Press the **User Account** soft key. The User Account dialog box opens.
5. Press the **cursor keys** to enter the User Name.
6. Press **SET**. A keyboard appears.
7. Use the WT **keyboard** to enter the user name.

   For information on operating the WT keyboard, see the WT user's manual.
8. Press the **cursor keys** to select Password.
9. Press **SET**. A keyboard appears.
10. Use the WT **keyboard** to enter the password.

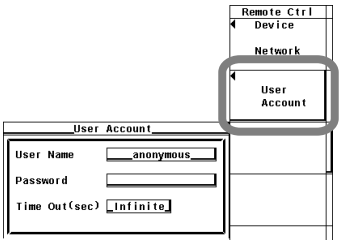
    Input the password again to confirm.

    If the user name is "anonymous," the password setting is not required.

    For information on operating the WT keyboard, see the WT user's manual.

- **Setting the Timeout Time**

11. Press the **cursor keys** to select Time Out.
12. Press **SET**. The time out time setting box is displayed.
13. Press the **cursor keys** to enter the timeout time.
14. Press **SET** or **ESC** to close the setting box.



TCP/IP Settings

To control the WT from a PC through the network, TCP/IP must be configured. For the setup procedures, see the WT user's manuals.

Explanation

When using the software in On-line mode via network, select Network on the WT main unit.

Setting the User Name

- Enter a user name for granting access on the WT.
- You can enter up to fifteen alphanumeric English characters.
- The supported characters are 0-9, A-Z, %, _, ( ) (parentheses), and - (minus).
- If anonymous is specified, you can access the WT from the PC without a password.

Password Settings

- Enter a password for the user name for granting access on the WT.
- You can enter up to fifteen alphanumeric English characters.
- The supported characters are 0-9, A-Z, %, _, ( ) (parentheses), and - (minus).
- If the user name is anonymous, you can access the WT from the PC without a password.

Setting the Timeout Time

If access to the WT is not made after a certain time (the timeout time), the WT closes the connection to the network.
The available settings are 0 to 3600 s, or Infinite. The default value is Infinite.

Note

- To apply the settings, you must power cycle the WT.
- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.
- If a converter is used along the communciation cable connecting the WT and PC (for example, a GP-IB-to-USB or RS-232-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.

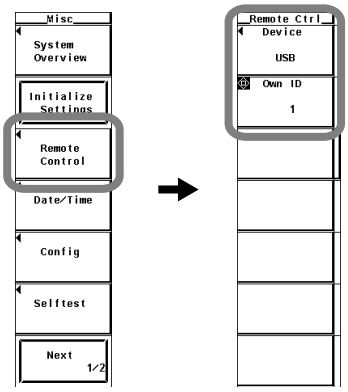
1.5 USB Control Settings (WT3000 Only)

The WT3000 can be operated from a PC using USB.
However, a USB driver must be installed on the PC. Before beginning the procedure below, download the driver from the following Web page.

www.yokogawa.com/tm/tm-softdownload.htm

Procedure

1. Press **MISC**. The Misc menu is displayed.
2. Press the **Remote Control** soft key. The Remote Ctrl menu is displayed.
3. Press the **Device** soft key and select USB.
   Only the communication interface selected here is enabled. If commands are received using other communication interfaces that are not selected, the WT will not accept them.
4. Press the **cursor keys** to enter the Own ID.



Explanation

When using the software in On-line mode via USB interface, select USB on the WT main unit.

Own ID Settings
Set the ID of the WT3000 in the following range.
1 to 127

Each device that can connect via USB has its own unique system-internal ID. This ID is used to differentiate the devices. As such, when connecting the WT3000 to a PC or other device, you must make sure not to enter the same ID for the WT as the other device.

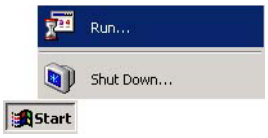
Note

- Do not change the address while the controller or other device is using the ID.
- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer.
- If a converter is used along the communciation cable connecting the WT and PC (for example, a GP-IB-to-USB or RS-232-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.

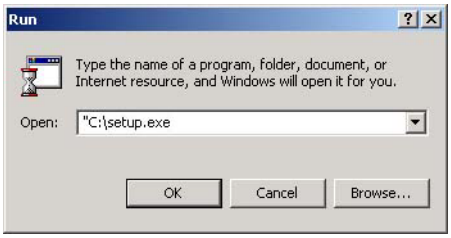
2.1 Installation

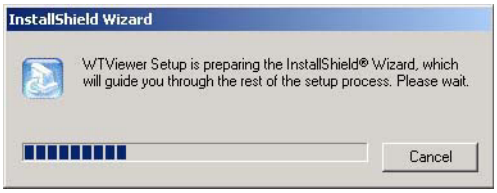
Have the CD-ROM for this software ready. Exit all programs that are currently running before starting the installation.
If an older version of WTViewer is already installed on the PC, you must uninstall that version before proceeding with the installation of the new one.

1. Turn ON the PC and start Windows.
2. Insert the WTViewer CD-ROM into the CD-ROM drive.
3. From the **Start** menu, choose **Run**. The Run dialog box appears.



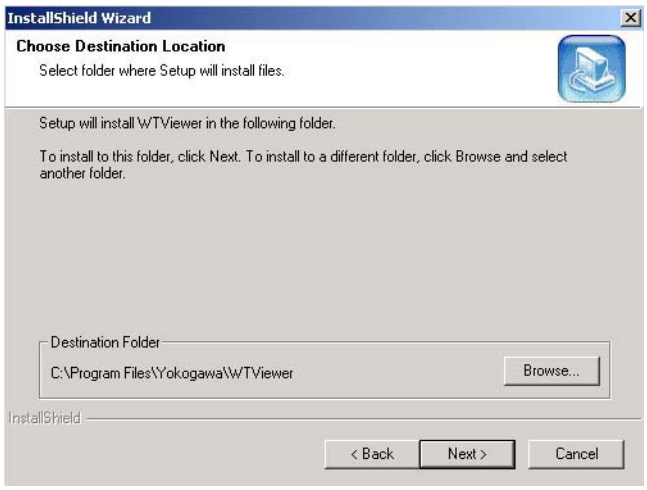
4. Specify the **Setup.exe** file from the system CD-ROM root directory in the **Open** box, then click **OK**. The InstallShield Wizard preparation progress bar is displayed. When the InstallShield Wizard preparation is finished, the InstallShield Wizard dialog box appears.



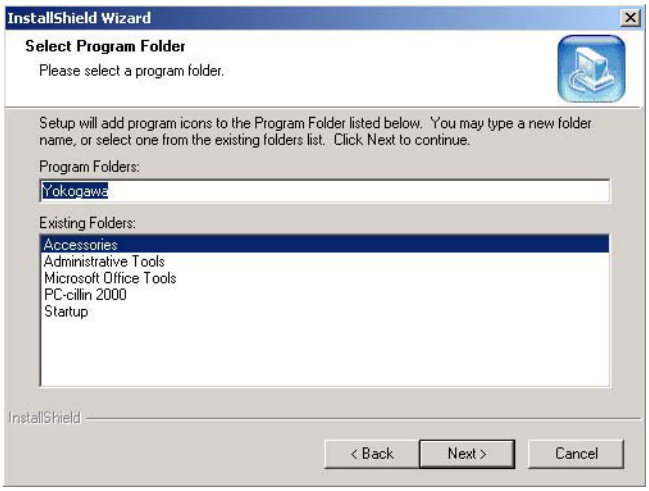


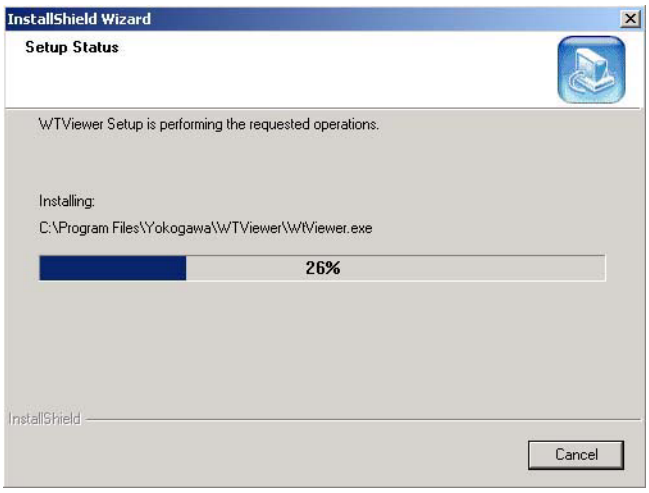
5. Click **Next**. The Choose Destination Location window is displayed.

6. C:\Program Files\Yokogawa\WTViewer is shown by default under Destination Folder. Click the **Browse** button if necessary to change the installation destination.
7. Click **Next**. The program folder selection dialog box is displayed. You can click **Back** to return to the previous screen.

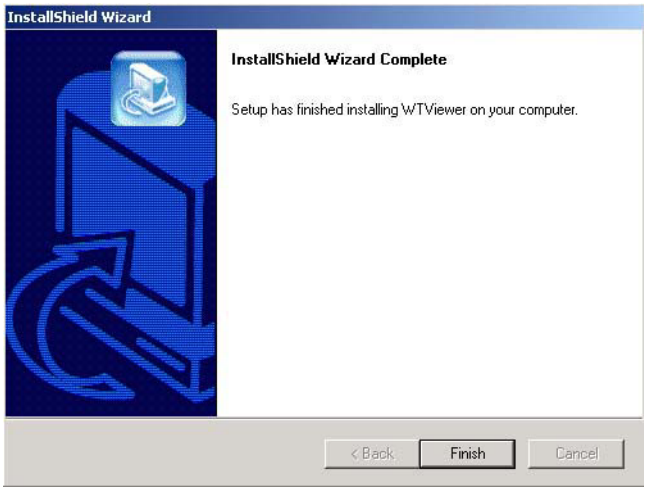


8. Select a program folder from the list, or enter a new folder name.
9. Click **Next**. The setup status progress bar is displayed, and the software installation begins. If the installation is successful, the InstallShield Wizard complete dialog box appears.





10. Click **Finish**.



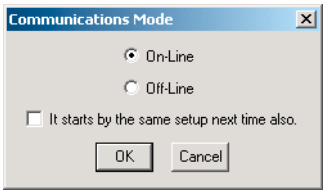
2.2 Running and Exiting the Software (Communication and Measurement Mode Settings)

Running the Software

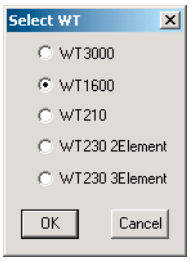
1. From the **Start** menu, choose **Programs > Yokogawa > WTViewer > WTViewer**. WTViewer starts. Upon startup, the Communications Mode dialog box is displayed.

Selecting the Communication Mode

2. Select On-Line or Off-Line, then click the **OK** button.
   - If you select Off-Line, the Select WT dialog box appears. Proceed to step 3.
   - If you select On-Line, the Communications Interface dialog box appears. Proceed to step 4.



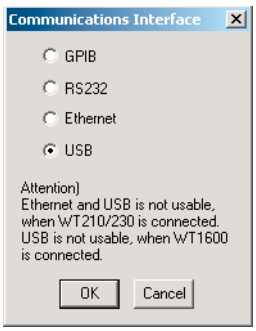
3. If you selected Off-Line in step 2, then select the target WT, and click the **OK** button. Proceed to step 6 (page 2-6).



Selecting the Communications Interface

4. If you selected On-Line in step 2, then select a communication interface from GPIB, RS232, Ethernet, or USB, and click the **OK** button. The connection dialog box for the selected communications interface is displayed.

   The installed communication interface type differs depending on the specifications of the WT. Make sure you check the specifications before selecting a communication interface.

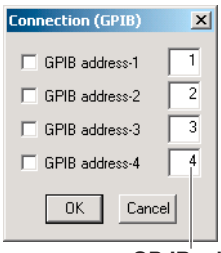


Entering Communications Interface Settings

5. Enter the detailed settings as shown below according to the communication interface selected in step 4, then click the **OK** button. After loading the WT settings, the Measurement Mode dialog box is displayed.

When GPIB is Selected

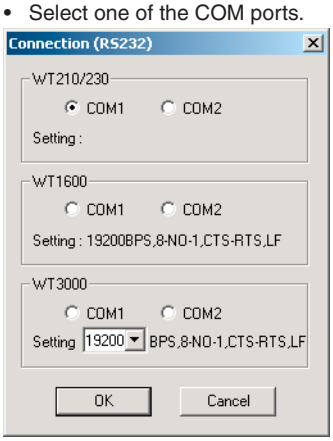
- Up to four units can be set for each WT model. Select the GP-IB address for the target WT. Communication is made with the selected addresses.
- Match the GP-IB address with the address set on the WT



GP-IB address

When RS232 is Selected

- One unit of the WT can be set.
- Select one of the COM ports.



Baud Rate
- WT210/WT230
  Fixed at 9600
- WT1600
  Fixed at 19200
- WT3000
  Select 19200 or 38400

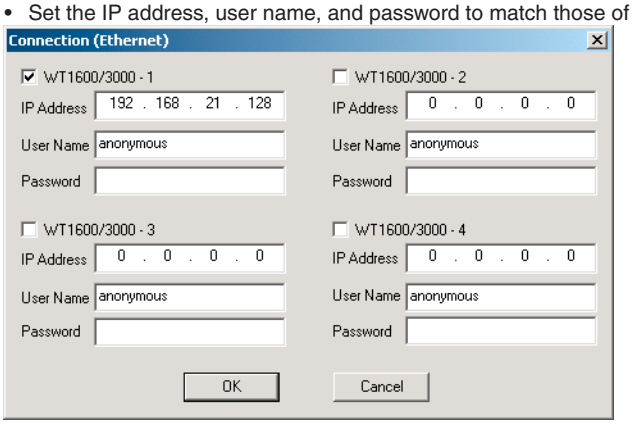
Data format
Fixed at 8-NO-1

Handshaking Method
Fixed at CRS-RTS

Terminator
Fixed at LF

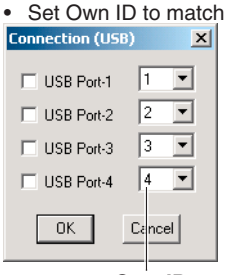
When Ethernet is Selected

- Up to four WT1600s or WT3000s can be set. Select the target WT1600/WT3000. Communication is made with the selected addresses
- Set the IP address, user name, and password to match those of the WT.



When USB is Selected

- Up to four WT3000s can be set. Select the target USB Ports. Communication is made with the selected IDs.
- Set Own ID to match that of the WT.



Note

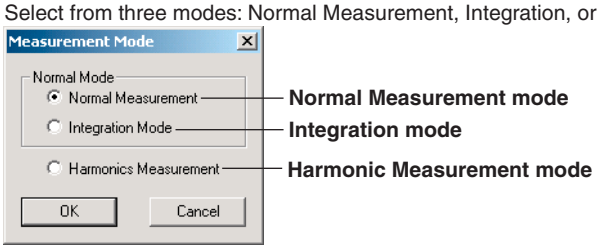
- For information on how to set the IP address, user name, and password on the WT when Ethernet is selected, see the WT main unit user's manual.
- When connecting a single WT to a single PC for WT control using WTViewer, multiple types of communication interfaces cannot be used at the same time. Also, even if they have identical communication interfaces, different models (for example the WT1600 and WT3000) cannot be connected to a single PC for simultaneous control using WTViewer.

Selecting the Measurement Mode

6. Select a measurement mode, then click **OK**.

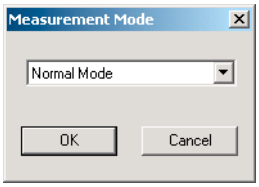
With the WT1600

Select from three modes: Normal Measurement, Integration, or Harmonics measurement.



With the WT3000

When Normal mode is selected, normal measurement, integration, and harmonics measurement are all executed.



Changing the Communication Settings

You can change the communication mode, measurement mode, or communication interface set when the software is first started (see the previous section).

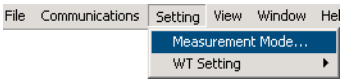
Changing the Communications Mode

1. Choose **Communications > Communications Mode** from the menu bar. The Communication Mode dialog box (see page 2-4) appears.

2. Select On-Line or Off-Line.

Changing the Measurement Mode

1. Choose **Setting > Measurement Mode** from the menu bar. The Measurement Mode dialog box is displayed.



2. Select a measurement mode, then click **OK**.

Changing the Communications Interface

1. Choose **Communications > Communications Interface** from the menu bar. The Communications Interface dialog box (see page 2-4) appears.

2. Select a communication interface from GPIB, RS232, Ethernet, or USB, and click the **OK** button. The connection dialog box (see pages 2-5 and 2-6) for the selected communications interface is displayed.

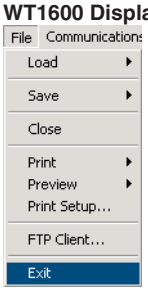
   The installed communication interface type differs depending on the specifications of the WT. Make sure you check the specifications before selecting a communication interface.

3. After entering settings (see pages 2-5 and 2-6) for the communication interface selected in step 2, click the **OK** button.

Exiting the Software

Choose **File > Exit WTViewer** on the menu bar.

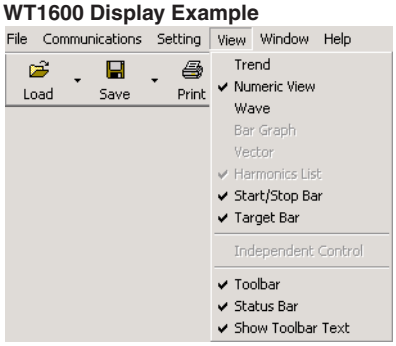
WT1600 Display Example

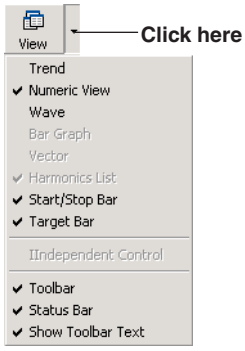


3.1 Selecting a Display Window

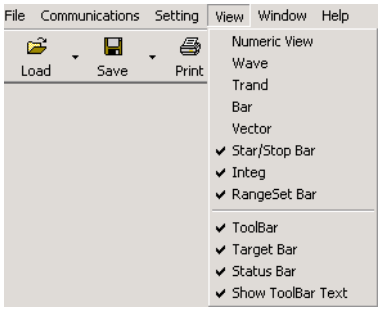
Before starting measurement, click **View** on the menu bar or **View** on the toolbar and select a display screen.

WT1600 Display Example





WT3000 Display Example



Display Items Common to Both Instruments

Trend
Displays a trend window.

Numeric View
Displays a window for numeric data in normal measurement mode. On the WT3000, numeric harmonic measured data can also be displayed.

Wave
Displays the waveform display data screen.

Bar Graph
Displays a bar graph screen. On the WT1600, this can be selected when in harmonic measurement mode.

Vector
Displays a vector window. On the WT1600, this can be selected when in harmonic measurement mode.

Start/Stop Bar
Displays the Start, Stop, and Update operation buttons for normal measurement. On the WT3000, harmonic measurement is also executed.

Target Bar
Check boxes for selecting WTs for communications.

Toolbar
Operation buttons for data loading/saving, printing, display, measurement modes, and WT settings.

Status Bar
Displays the status of the software in terms of the communication mode, communication interface, measurement mode, and other conditions. In the bottom of the display screen.

Toolbar Text
Displays the names of the operation buttons in the start/stop bar, toolbar, target bar, and other locations.

WT1600-Specific Display Items

Harmonics List
Displays a window for numeric data in harmonic measurement mode. On the WT3000, the normal numeric display screen is able to display numeric data from harmonic measurement.

Independent Integration Control
An item displayed in Integration mode. Displays integration settings and the integration Start, Stop, and Reset operation buttons.

WT3000-Specific Display Items

Integration Bar
Displays the integration Start, Stop, and Reset operation buttons. On the WT1600, these buttons appear in the screen displayed when setting the measurement mode to Integration mode.

Range Settings Bar
Displays the Range button. When this button is clicked, a setting screen for the WT measuring range is displayed.

Note

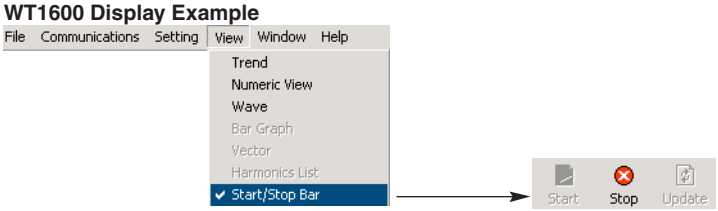
When certain screens are active and data acquisition is started, data for all inactive display windows are also updated. If there are inactive screens, the measurement rate is slower than when only active screens are displayed. The more inactive screens that are displayed, the slower the measurement interval. Therefore, do not display unnecessary screens.

3.2 Starting and Stopping Data Acquisition (Normal and Harmonic Measurement Modes), and Selecting the WT for Communication

Starting Data Acquisition

1. Choose **View > Start/Stop Bar** to display the **Start**, **Stop**, and Update operation buttons.

WT1600 Display Example



2. Click **Start** or **Update**. Data acquisition begins.
   - If the WT data update rate is shorter than the time required for WTViewer to download measured data once, when you click Start, WTViewer acquires measured data from the WT at the display update rate of the PC.
   - If the data update rate on the WT is longer than the time it takes for WTViewer to download one set of measured data, when you click Start, WTViewer will only be able to download and display data after the WT has updated it, so measured data will appear to be acquired at the data update rate of the WT.

Before Download starts or when Stop is clicked

When Start or Update is clicked

Note

- When downloading measured data other than that in the currently opened measured data display screen, start data acquisition after selecting a display screen as in section 3.1.
- If communication is being carried out with several WTs, the Start, Stop, and Update buttons apply to all currently selected WTs as shown by the check marks in the target bar (see below). However, there is no synchronization of data updating.

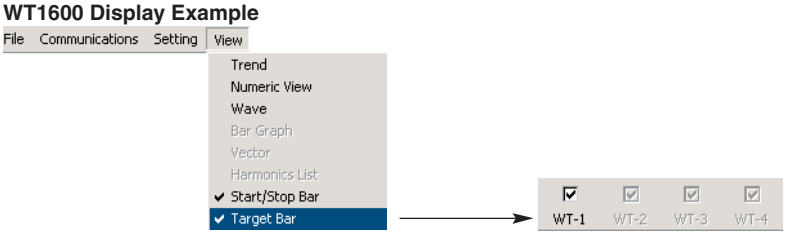
Stopping Data Acquisition

Click **Stop**. Downloading of measured data from the WT stops.

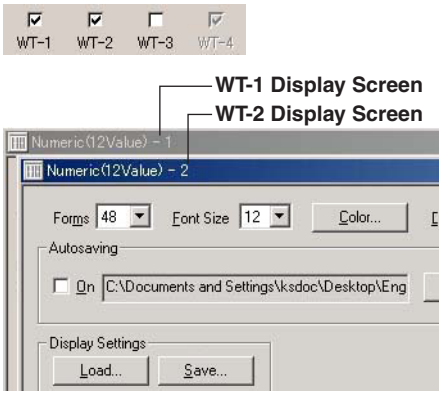
Select a WT for Communications

1. Select **View > Target Bar** from the menu bar to display the check boxes for selecting WTs for communications with the PC.

WT1600 Display Example



2. Select the check boxes for the WTs with which you wish to carry out communications (WT-1, WT-2, WT-3, WT-4).
   - Communication is enabled with the WTs whose check boxes are active and selected. Unselected WTs are connected to the PC but cannot be controlled through communication.
   - For example, if WT-1, WT-2, and WT-3 are connected but only WT-1 and WT-2 are selected in the target bar, only the screens from WT-1 and WT-2 are displayed in the PC screen.
   - Only when the communication interfaces used are the same, the models are the same, and the specifications included in the options are the same, can multiple WTs be connected to a single PC for simultaneous control by WTViewer. However, there is no synchronization of data updating.



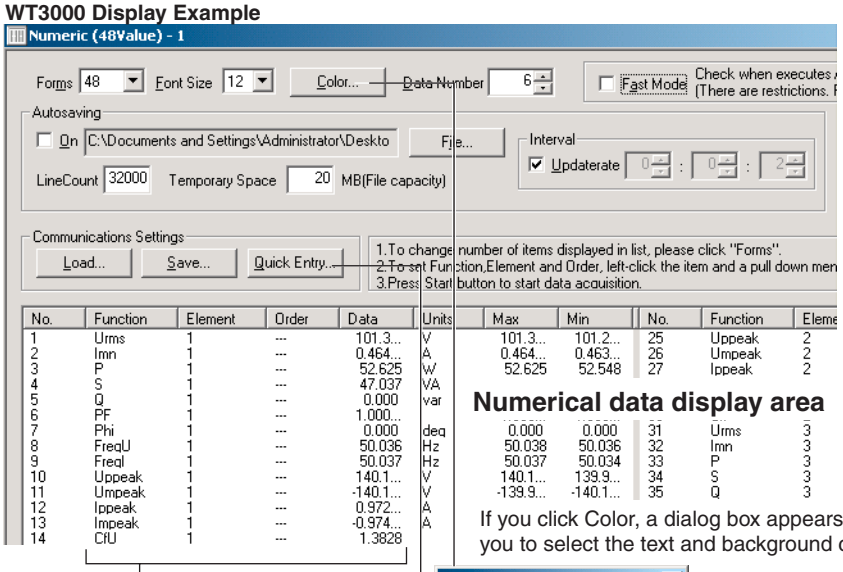
3.3 Numeric Value Display Function

You can display trends and waveforms after setting up measurement functions and elements in the numeric value screen. Trend and waveform graphs cannot be displayed for items whose settings have not been entered.
On the WT1600, since you change to harmonic measurement mode to measure harmonics, there is a separate screen for displaying only harmonic data (harmonics list display). See section 3.5.
With the WT3000, since harmonics can also be measured in normal measurement mode, harmonics can be displayed together with numeric data from other normal measurements in the numeric screen described in this section.

Displaying the Numeric Screen

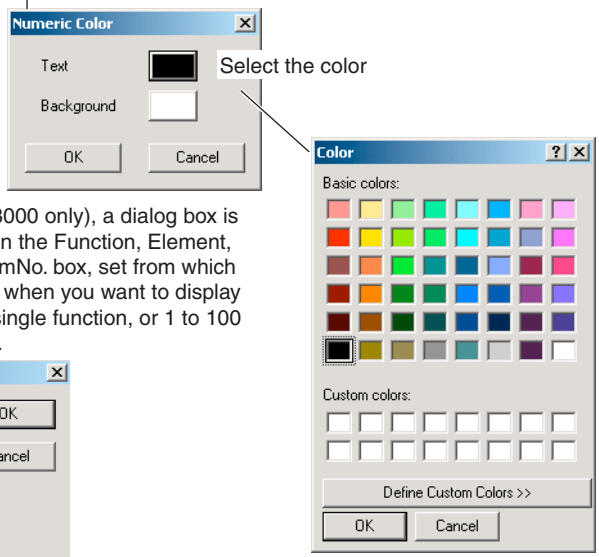
Choose **View > Numeric** in the menu bar.

WT3000 Display Example

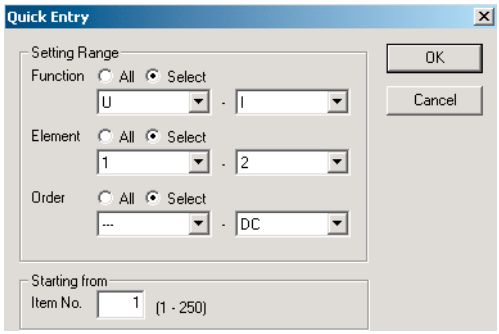


Click in the intersection of one item and its Function, Element, or Order (Order is on the WT3000 only) to display a combo box, then select the various items.

If you click Color, a dialog box appears allowing you to select the text and background color.



If you click Quick Entry (available on the WT3000 only), a dialog box is displayed. Select a numerical display range in the Function, Element, and Order boxes, and in the Starting from ItemNo. box, set from which item number to start display. This is effective when you want to display numerical data from multiple elements for a single function, or 1 to 100 orders of numerical data for a single function.



* On the WT1600, the Order, Max, and Min items are not included in the numeric data display area. Also, there is no Quick Entry operation button.

Forms

Select the number of numeric data to display.

- Select 12, 24, 48, or 250.
- If you select 250, all of the currently downloadable numeric data of measurement functions and elements are displayed.

Font Size

Select the font size from the list.
The size can be set from 10 to 40 in steps of 2 (10, 12, 14, ...38, 40).

Color

Select a text and background color.

Data Number

Indicates how many numeric data have been downloaded from the WT up to the currently displayed data. After data has finished downloading, you can change the Data Number setting to display the desired numeric data.

Temporary Space

A temporary quantity of memory is set to display numeric data. The larger this quantity, the larger the Data Number becomes.

- You can set the space in the range from 20 to 1000 MB.
- It cannot be set larger than the amount of free space on the PC's hard disk.

Function

Select the measurement function of numeric data to display.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function for each item in this column.

Element

Select the element of numeric data to display.

1. Click the **Element** column. A combo box opens.
2. Select the element for each item in this column.

Order (WT3000 Only)

Select the order of numeric data to display.

1. Click the **Order** column. A combo box opens.
2. Select an order.

Max, Min (WT3000 Only)

Displays the maximum and minimum values for each display item of the numeric data downloaded from the WT.

Quick Entry (WT3000 Only)

Lets you set the displayed measurement function, element, and order all at once. For example, this is effective when you want to display numeric data from multiple elements for a single function, or 1 to 100 orders of numeric data for a single function.

1. Click **Quick Entry**. A dialog box opens.
2. Set the numeric value display range for the **Function**, **Element**, and **Order** boxes.
3. In the **Item No.** box under **Starting from**, enter the item number from which you wish to start applying the settings.

Saving Numeric Data While Downloading

Auto Saving

While downloading numeric data from the WT, it is automatically saved in CSV format. Saved files can be opened in commercial spreadsheet programs (such as Excel).

- When the On check box is selected, numeric data is automatically saved to a file when data starts downloading (see section 3.2).
- When the On check box is selected, the time stamp of each data is the time at which WTViewer updated the data. If the On check box is not selected, all data time stamps are set uniformly to the time that the data was saved upon clicking the Save button. In both cases, this is not the time the data was measured on the WT.
- If a file name is not specified, the default name AutoSave.csv is used.
- If the numeric data saved in a single file exceeds the Line Count described below, file names are incremented and new files are saved as in: AutoSave.csv, AutoSave_0000.csv, AutoSave_0001.csv, ...AutoSave_9999.csv.
- If a file name is specified, that name is used in place of the AutoSave portion of the file name that is automatically assigned when no file name is specified. Up to 1001 files can be saved using a single specified name.
- To specify a file name, click File.

- **File**

  Enter the file name for automatic saving.

  1. Click **File**. The Numeric Data Save dialog box is displayed.
  2. Enter a file name and save destination and click **Save**.

- **Line Count**

  Specify the number of lines of numeric data to be saved to a single file during automatic saving.

  - If the saved numeric data is opened in a spreadsheet program such as Excel, 1 page's worth of the numeric data display area is displayed on one row of the open sheet. This number of lines (corresponding to numbers of pages of the numeric data display area in WTViewer) is set as the Line Count.
  - For example, if you set Line Count to 10 and begin downloading measured data, 10 pages worth of the numeric data display area is saved to a single file, and the next ten pages (page 11 to 20) are saved to the next file. This process continues until all measured data is downloaded.

- **Interval**

  Set the interval for downloading numeric data.

  - If the Updaterate check box is selected, data is saved at the data update rate of the WT while data is being downloaded.
  - If the Updaterate check box is not selected, the time interval box is enabled. Data from the WT is saved at the specified time interval during download. The time interval can be specified in the range from 0:0:2 to 24:0:0 (hr:min:sec). For example, if the time interval is set to 0:00:30 (30 seconds), the data update rate on the WT is not set to 30 seconds, but the rate at which data is acquired from the WT and saved on the PC is 30 seconds. Also, if the data update rate on the WT were 2 seconds in this case, the update rate of the data saved on the WTViewer would have a temporal width of 30 ±2 seconds.

Note

- When Autosaving, turn OFF all resident software on the PC. Since virus checking software, for example, frequently checks the files created by WTViewer, the PC's performance would be notably reduced. When you exit virus checking software, make sure your networking environment is sufficiently protected from infection by viruses in other ways.
- Files saved through Autosaving cannot be opened on WTViewer. These types of files can be opened in commercial spreadsheet programs (such as Excel). To save files in a format that can be opened by WTViewer, see section 5.2.
- When measurement is finished and you close the numeric value screen, all data other than that which was visible up to that point is deleted. Using the AutoSaving function, you can save data during download.
- Even if you close the numeric value screen after measurement is finished, the data visible up to that point is held until you either exit WTViewer, change the communication mode, or start the next measurement. If you click View or View on the menu bar and select the numeric value screen, the data that was visible before closing the screen is displayed.

Fast Mode

If you select Fast Mode, communication is sped up, synchronization with the main unit is performed as much as possible, and numeric data is automatically saved.

- **Fast Mode Restrictions**
  - GP-IB is the recommended interface for communication. When connecting with Ethernet, USB, or RS-232 and the display update rate on the main unit is 50 ms, all data may not be able to be saved. In this case, after setting the display update rate on the WT to 100 ms or higher, set the WTViewer Forms (see 3-6 page) to 48 or less. When editing the display update rate setting of the WT or the setting for the number of Forms on WTViewer, open the saved file in a commerically availalbe spreadsheet program, check the time stamp of each data, convert the WTViewer data update rate, and use that value as a guideline.
  - Due to error between the times on the PC and WT, the number of acquired data may fluctuate.
    Guideline:
    For a PC with an Intel (R) Pentium (R) 3, 1 GHz, a WT display update rate of 50 ms, and WTViewer Forms set to 48 or less, data can be saved twenty times per second.
  - On the PC screen, only one save's worth of numeric data can be displayed.
  - If the Autosaving On check box is also not selected, automatic saving is not performed.
  - While numeric data is being downloaded in Fast mode, measuring range information is not acquired from the WT. If the WT measuring range is set to Auto range and is then changed, the numeric value display on the WT and PC screens may differ.
  - Display is not updated on screens other than the numeric value screen.
  - The Fast mode function usage restrictions differ depending on the WT model. For details, see the WTViewer help.

Saving/Loading Numeric Display Settings

Communications Settings

Numeric value display settings can be saved in CSV format (setting information files) and loaded.

- **Save**

  After setting up the numeric display, the file is saved in CSV format.

  1. Click **Save**. The Save Communications Settings dialog box is displayed.
  2. Enter a **file name** and **save destination** and click **Save** button. The numeric value display settings are saved.

- **Load**

  You can load previously saved numeric value display setting files.

  1. Click **Load**. The Load Communications Settings dialog box is displayed.
  2. Select a **file name** and **save destination** and click **Open** button. The saved numeric value display setting file is loaded.

Starting Download of Numeric data

If numeric data is not downloaded from the WT to WTViewer, no measured values are displayed in the numeric value screen. Start data download (see section 3.2). There are setting items that cannot be changed while data is being downloaded.

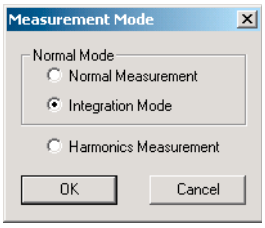
3.4 Starting, Stopping, Pausing, and Resetting Integration

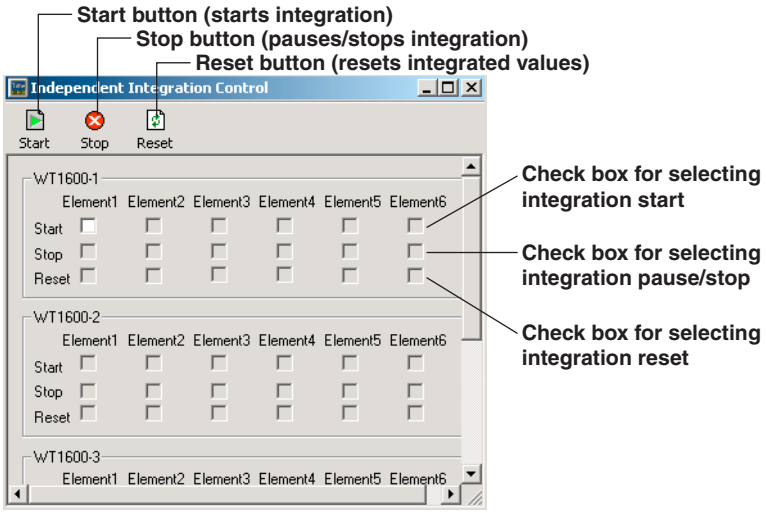
This section covers the WT1600 and WT3000 separately. For a description of setting a WT3000 as the target for communication, see page 3-14.

With the WT1600

Integration Settings

1. Choose **Setting > Measurement Mode** from the menu bar. The Measurement Mode dialog box is displayed.
2. Select the Integration Mode option and click **OK**. The Independent Integration Control dialog box is displayed.

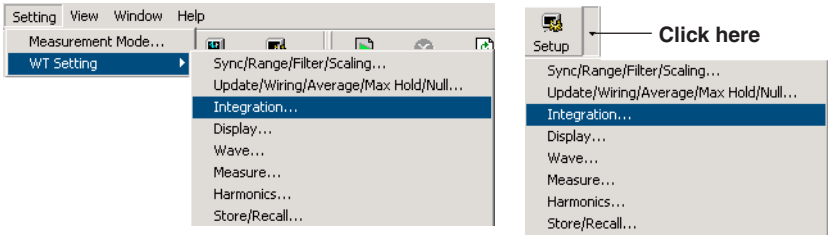


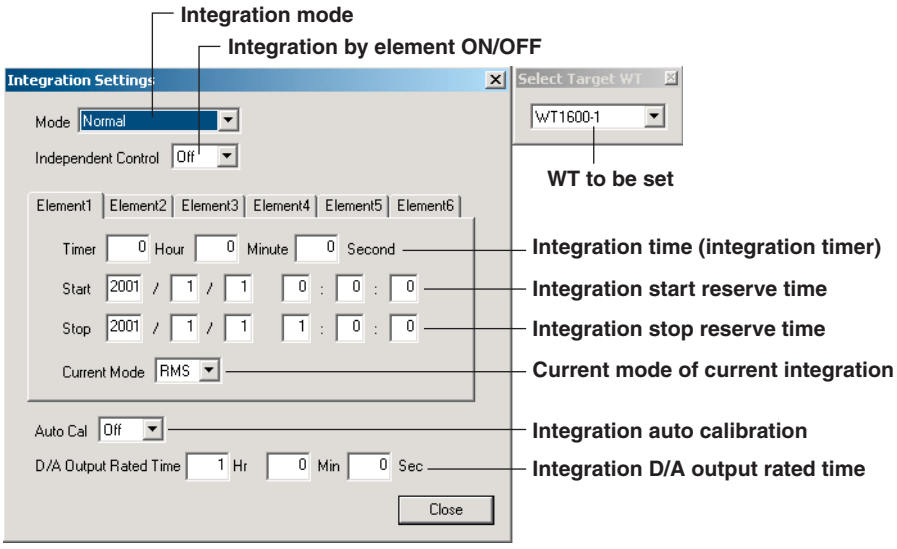


Note

- The Independent Integration Control dialog box only appears when in Integration mode. When you change the measurement mode, the dialog box closes.
- Integration Start, Stop, and Reset are executed in the Independent Integration Control dialog box. Measured data from the WT cannot be downloaded.
- To display the dialog box, choose View > Independent Control from the menu bar.
- Before integration is started, only the Start check box is active.
- After integration is started, the Stop check box becomes active.
- After integration is paused or stopped, the Start and Reset check boxes become active.
- If the Start/Stop/Reset check box is not selected, clicking the Start/Stop/Reset button is invalid.
- If you click Start/Stop/Reset and an error occurs, an error message is displayed.
- Even if the measurement mode is Integration mode, if you click Start/Stop/Update (see section 3.2) when the trend or numeric value screen is displayed, you can start, stop, or update normal mode data acquisition.

3. Select **Setting > WT Setting > Integration** from the menu bar, or click Setup and select Integration. The Integration Settings and Select Target WT dialog boxes appear.
4. Select the target WT in the Select Target WT dialog box.
5. In the Integration Settings dialog box, set the **Mode** (integration mode), **Independent Control** (integration by element (independent integration)), **Timer** (integration time (integration timer)), **Start** (reserved time for integration start), **Stop** (reserved time for integration stop), **Current Mode** (current mode for current integration), **Auto Cal** (integration auto calibration), and **D/A Output Rated Time** (integration D/A output rated time), and other settings.
   - For information on the meanings of each item, see the WT main unit user's manual.
   - If you will not change the integration settings, skip to "Starting Integration" on the next page.





Note

- Settings cannot be changed during integration or if integration has been paused. Click Reset, or change the settings after integration stops.
- If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

6. Click **Close**. The Integration Settings and Select Target WT dialog boxes close.

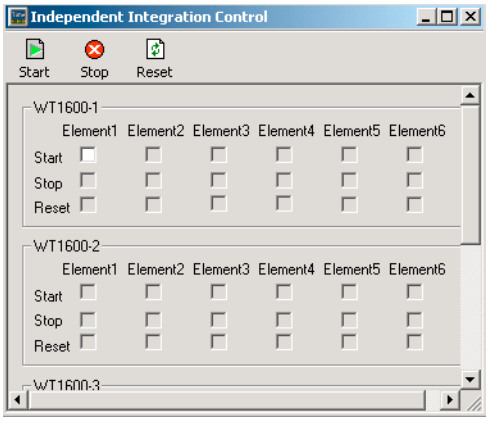
Starting Integration

Check the following before starting integration.

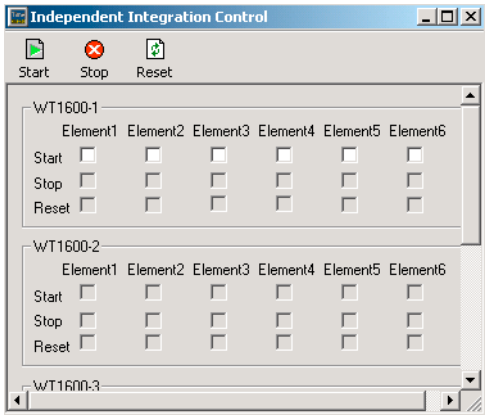
- Set up the measurement function and elements (see section 3.3) so that the integrated values are displayed in the numeric data display area.
- If integrated values are not downloaded from the WT to WTViewer, no integrated values are displayed even if integration is started. Start data download (see section 3.2).

1. Select **Display > Independent Integration Control** from the menu bar, or click **View** and select Independent Integration Control. The Independent Integration Control dialog box is displayed.
2. Of the **Start check boxes** corresponding to elements 1-6 of the WT selected for integration, select the elements on which you wish to perform integration. If integration by element is turned Off, only the Start check box of Element 1 is enabled. Select the Element 1 Start check box.
3. Click **Start**. If integration by element is turned ON, integration begins on the selected elements. If integration by element is turned OFF, integration begins on all elements installed in the WT.

When integration by element is ON



When integration by element is OFF



Stopping/Pausing Integration

1. In the Independent Integration Control dialog box, of the **Stop check boxes** corresponding to elements 1-6 of the WT selected for integration, select the elements on which you wish to pause or stop integration. If integration by element is turned Off, only the Start check box of Element 1 is enabled. Select the Element 1 Start check box.
2. Click **Stop**. If integration by element is turned ON, integration pauses on the selected elements. If integration by element is turned OFF, integration pauses on all elements installed in the WT.

Note

- If Stop is clicked before the specified integration time or reserved time is reached, integration is paused. If you then click Start, integration resumes.
- If you click Reset and then Start while paused or if integration stopped because the specified integration time or reserved time was reached, integration is reset and starts from the beginning.

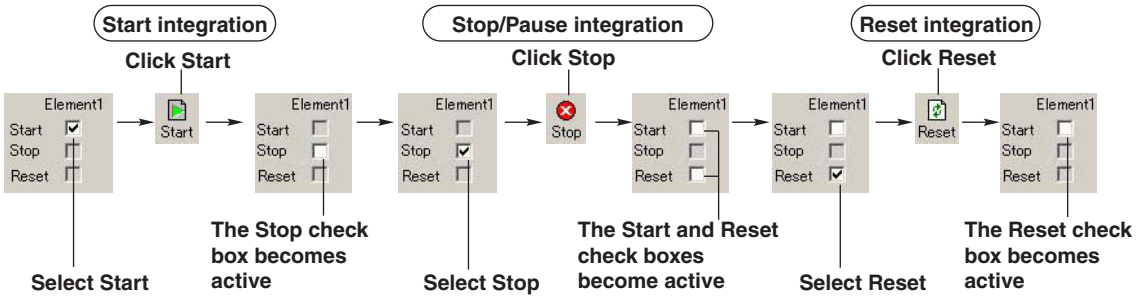
Resetting Integration

1. In the Independent Integration Control dialog box, of the **Reset check boxes** corresponding to elements 1-6 of the WT selected for integration, select the elements on which you wish to reset integration. If integration by element is turned Off, only the Reset check box of Element 1 is enabled. Select the Element 1 Reset check box.
2. Click **Reset**. If integration by element is turned ON, integration is reset on the selected elements. If integration by element is turned OFF, integration is reset on all elements installed in the WT.

Note

If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

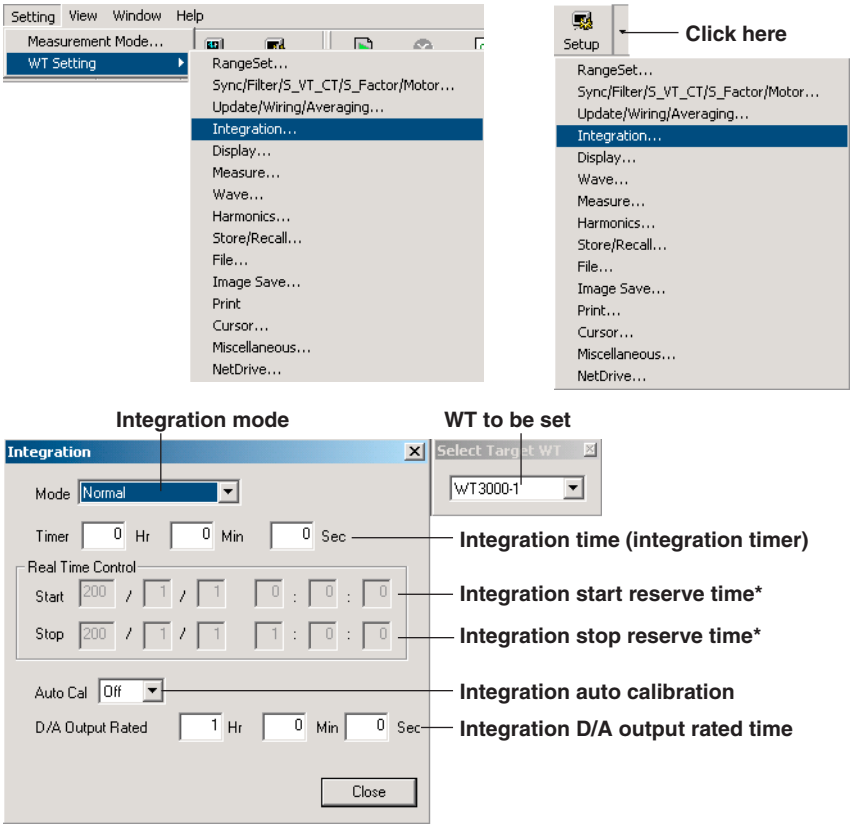
Example of Starting, Pausing, Stopping, and Resetting Integration



With the WT3000

Integration Settings

1. Select **Setting > WT Setting > Integration** from the menu bar, or click **Setup** and select **Integration**. The Integration and Select Target WT dialog boxes appear.
2. Select the target WT in the Select Target WT dialog box.
3. In the Integration dialog box, set the **Mode** (integration mode), **Time** (integration time (integration timer)), **Start** (reserved time for integration start), **Stop** (reserved time for integration stop), **Auto Cal** (integration auto calibration), and **D/A Output Rated Time** (integration D/A output rated time), and other settings.
   - For information on the meanings of each item, see the WT main unit user's manual.
   - If you do not need to change the integration settings, skip to "Starting Integration" on the next page.



* Enabled during real time integration mode.

Note

- Integration is not allowed during waveform acquisition. Begin integration after waveforms have been loaded.
- Settings cannot be changed during integration or if integration has been paused. Click Reset, or change the settings after integration stops.
- If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

4. Click **Close**. The Integration and Select Target WT dialog boxes close.

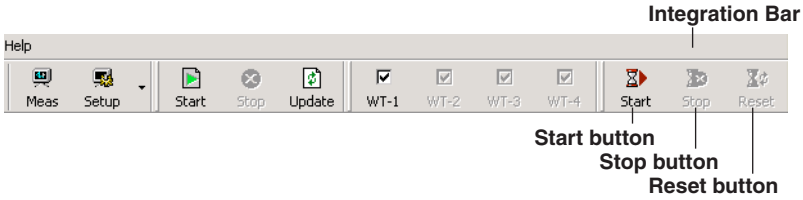
Starting Integration

Check the following before starting integration.

- Set up the measurement function and elements (see section 3.3) so that the integrated values are displayed in the numeric data display area.
- If integrated values are not downloaded from the WT to WTViewer, no integrated values are displayed even if integration is started. Start data download (see section 3.2).

Click **Start** on the integration bar. Integration begins on all elements installed in the WT.

If you select Integration bar in the View menu, the Start, Stop, and Reset operation buttons are displayed in the same row as other tool bars.



Stopping/Pausing Integration

Click **Start** on the integration bar. Integration pauses on all elements installed in the WT.

Note

- If Stop is clicked before the specified integration time or reserved time is reached, integration is paused. If you then click Start, integration resumes.
- If you click Reset and then Start while paused or if integration stopped because the specified integration time or reserved time was reached, integration is reset and starts from the beginning.

Resetting Integration

Click **Reset** on the integration bar. Integration is reset on all elements installed in the WT.

Note

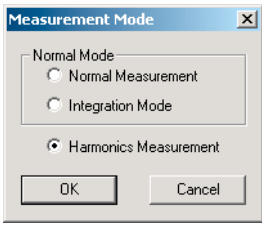
If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

3.5 Harmonics List Display Function

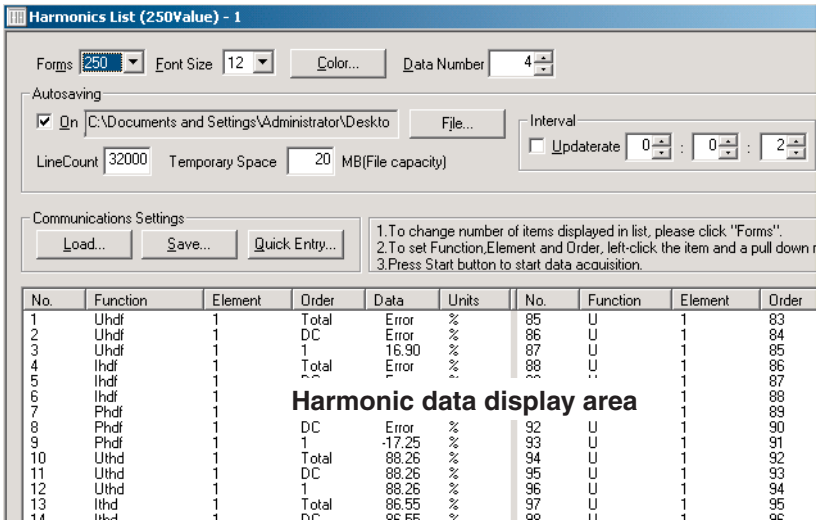
This section describes the WT1600. For the WT3000, see section 3.3.
On the WT1600, since you change to harmonic measurement mode to measure harmonics, there is a separate screen for displaying only harmonic data (harmonics list display). Therefore, the harmonics list display is explained separately in this section.
With the WT3000, since harmonics can also be measured in normal measurement mode, harmonics can be displayed together with numeric data from other normal measurements in the numeric screen described in section 3.3.

Displaying the Harmonics List

1. Choose **Setting > Measurement Mode** from the menu bar. The Measurement Mode dialog box is displayed.
2. Select the Harmonic Measurement option (harmonic measurement mode) and click **OK**. The Harmonics List dialog box is displayed.



Harmonics List



Forms

Select the number of harmonic data to display.

- Select 12, 24, 48, or 250.
- If you select 250, all of the currently downloadable harmonic data of measurement functions and elements are displayed.

Font Size
Select the font size from the list.
The size can be set from 10 to 40 in steps of 2 (10, 12, 14, ...38, 40).

Color
Select a text and background color. Click a color to display the Color dialog box. For details, see page 3-5.

Data Number
Indicates how many harmonic data have been downloaded from the WT up to the currently displayed data. After data has finished downloading, you can change the Data Number setting to display the desired numeric data.

Temporary Space
A temporary quantity of memory is set to display numeric data. The larger this quantity, the larger the Data Number becomes.
- You can set the space in the range from 20 to 1000 MB.
- It cannot be set larger than the amount of free space on the PC's hard disk.

Function
Select the measurement function of harmonic data to display.
1. Click on the **Function** column. A combo box opens.
2. Select the measurement function for each item in this column.

Element
Select the element of the harmonic data to display.
1. Click the **Element** column. A combo box opens.
2. Select the element for each item in this column.

Order
Select the order of harmonic data to display.
1. Click the **Order** column. A combo box opens.
2. Select an order.

Quick Entry
Lets you set the displayed measurement function, element, and order all at once. For example, this is effective when you want to display harmonic data from multiple elements for a single function, or 1 to 100 orders of harmonic data for a single function. Click Quick Entry to display a display item setting dialog box (see page 3.5).
1. Click **Quick Entry**. A dialog box opens.
2. Set the harmonic data range for the **Function**, **Element**, and **Order** boxes.
3. In the **Item No.** box under **Starting from**, enter the item number from which you wish to apply settings.

Saving Harmonic Data While Downloading

Auto Saving

While downloading numeric data from the WT, it is automatically saved in CSV format. Saved files can be opened in commercial spreadsheet programs (such as Excel).

- When the On check box is selected, numeric data is automatically saved to a file when data starts downloading (see section 3.2).
- When the On check box is selected, the time stamp of each data is the time at which WTViewer updated the data. If the On check box is not selected, all data time stamps are set uniformly to the time that the data was saved upon clicking the Save button. In both cases, this is not the time the data was measured on the WT.
- If a file name is not specified, the default name AutoSave.csv is used.
- If the numeric data saved in a single file exceeds the Line Count described below, file names are incremented and new files are saved as in: AutoSave.csv, AutoSave_0000.csv, AutoSave_0001.csv, ...AutoSave_9999.csv.
- If a file name is specified, that name is used in place of the AutoSave portion of the file name that is automatically assigned when no file name is specified. Up to 1001 files can be saved using a single specified name.
- To specify a file name, click File.

- **File**

  Enter the file name for automatic saving.

  1. Click **File**. The Save Numeric Data dialog box is displayed.
  2. Enter a file name and save destination and click **Save**.

- **Line Count**

  Specify the number of lines of harmonic data to be saved to a single file during automatic saving.

  - If the saved harmonic data is opened in a spreadsheet program such as Excel, 1 page's worth of the harmonic data display area is displayed on one row of the open sheet. This number of lines (corresponding to numbers of pages of the harmonic data display area in WTViewer) is set as the Line Count.
  - For example, if you set Line Count to 10 and begin downloading measured data, 10 pages worth of the harmonic data display area is saved to a single file, and the next ten pages (page 11 to 20) are saved to the next file. This process continues until all measured data is downloaded.

- **Interval**

  Set the interval for downloading harmonic data.

  - If the Updaterate check box is selected, data is saved at the data update rate of the WT while data is being downloaded.
  - If the Updaterate check box is not selected, the time interval box is enabled. Measured data from the WT is saved at the specified time interval during download. The time interval can be specified in the range from 0:0:2 to 24:0:0 (hr:min:sec).

Note

- When Autosaving, turn OFF all resident software on the PC. For example, since virus checking software frequently checks the files created by WTViewer, the PC's performance would be notably reduced. When you exit virus checking software, make sure your networking environment is sufficiently protected from infection by viruses in other ways.
- Files saved through Autosaving cannot be opened on WTViewer. These types of files can be opened in commercial spreadsheet programs (such as Excel). To save files in a format that can be opened by WTViewer, see section 5.2.
- When measurement is finished and you close the harmonics list screen, all data other than that which was visible up to that point is deleted. Using the AutoSaving function, you can save data during download.
- Even if you close the harmonics list value screen after measurement is finished, the data visible up to that point is held until you either exit WTViewer, change the communication mode, or start the next measurement. If you click View or View on the menu bar and select the harmonics list value screen, the data that was visible before closing the screen is displayed.

Saving/Loading Harmonics list Display Settings

Communications Settings

Harmonics list display settings can be saved in CSV format (setting information files) and loaded.

- **Save**

  After setting up the harmonics list display, the file is saved in CSV format.

  1. Click **Save**. The Save Communications Settings dialog box is displayed.
  2. Enter a **file name** and **save destination** and click **Save** button. The harmonics list display settings are saved.

- **Load**

  You can load previously saved harmonics list display setting files.

  1. Click **Load**. The Load Communications Settings dialog box is displayed.
  2. Select a **file name** and **save destination** and click **Open** button. You can load previously saved harmonics list display setting files.

Starting Download of Harmonic Data

If harmonic data is not downloaded from the WT to WTViewer, no harmonic data are displayed in the harmonics list screen. Start data download (see section 3.2). There are setting items that cannot be changed while data is being downloaded.

3.6 Waveform Display Function

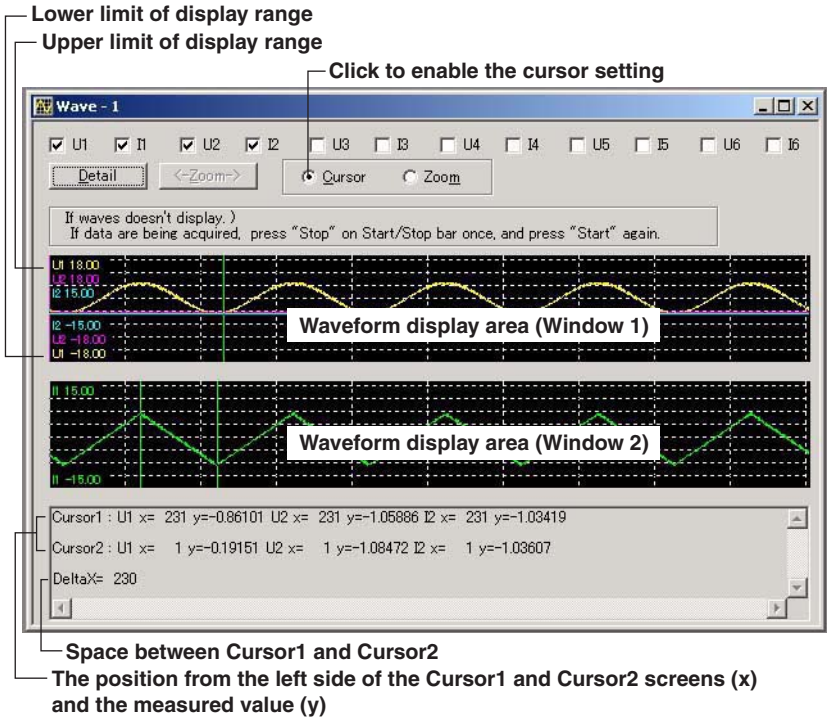
This section describes use of the WT1600. The WT3000 has four elements, so waveforms U5, I5, U6, and I6 are not displayed. Also, with the motor version of the WT3000, Speed and Torque waveforms are displayed.

Displaying the Waveform

Choose **View > Wave** in the menu bar. The Wave dialog box opens.

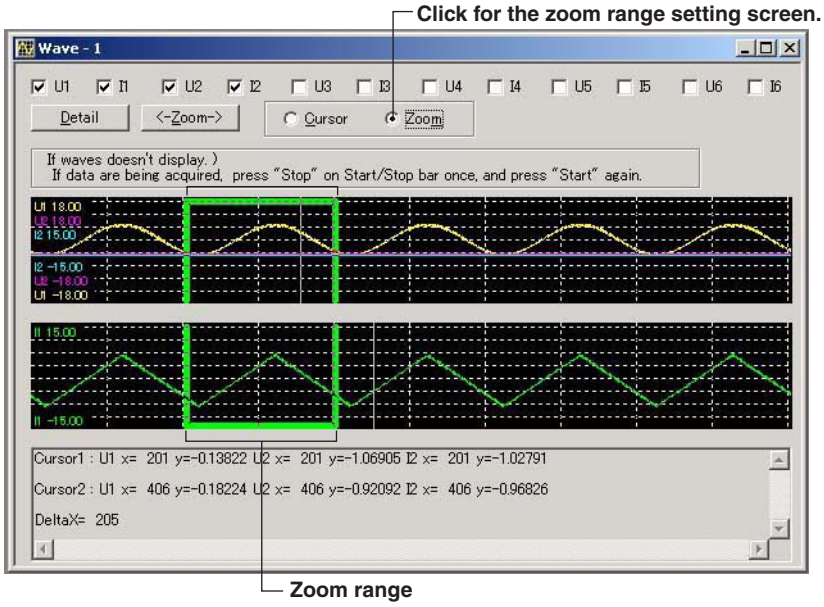
Cursor Setting Screen

Example with two Windows. To set the number of windows, see page 3-22.)



- **U1 to I6**
  (On the WT3000, Speed and Torque may also be displayed depending on U1-I4 and the WT3000 specifications.)
  Select the waveforms to display (select or clear the check boxes). This is linked to the Ch from the Wave Detail dialog box (see page 3-22).
- **Cursor**
  Click here to set Cursor1 and Cursor2 in the waveform display area.
- **Cursor1, Cursor2**
  You can set the position of cursors on waveforms.
  - The line that appears when you first click on the desired waveform is Cursor1.
  - The line that appears the next time you click is Cursor2. The position of Cursor2 can be changed any number of times.
  - To change the position of Cursor1, double-click in the waveform display area, delete cursors 1 and 2, and set new cursors.
  - In the bottom of the waveform display area, the position from the left side of the Cursor1 and Cursor2 screens (x) and the measured value (y) are displayed.

Zoom Area Setting Screen

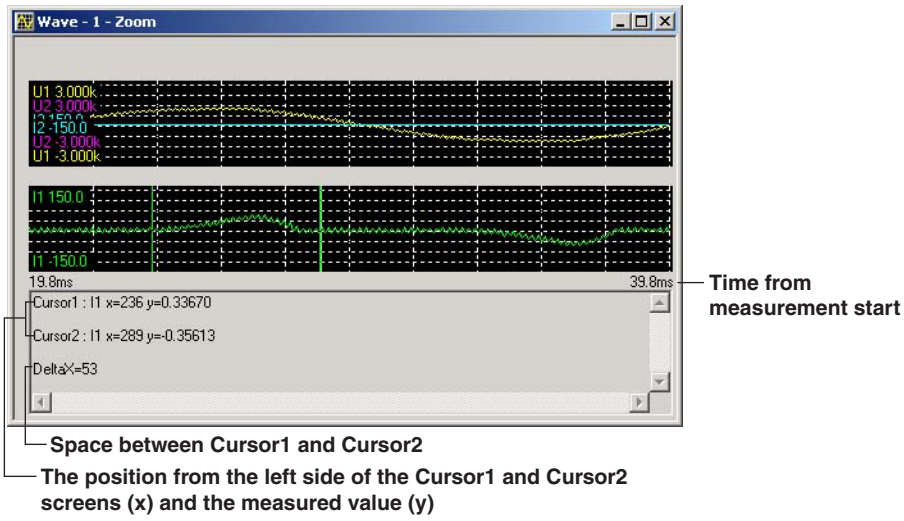


- **Zoom (Time Axis Direction)**

  Click here to set the time axis zoom range in the waveform display area.

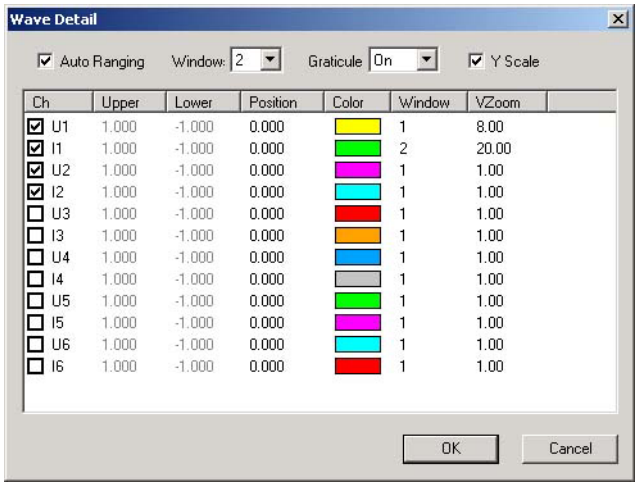
  1. Drag the area to zoom in the waveform display area. The zoomed range is set simultaneously in all of the displayed waveform display areas.
  2. Click **<-Zoom->**. A screen appears in which all waveforms in the waveform display area are zoomed.

     You can set Cursor1 and Cursor2 on these zoomed waveforms. For the procedure, see the previous page.



Entering Waveform Detail Settings

Click **Detail** in the Wave dialog box. The Wave Detail dialog box is displayed.



Auto Ranging

- **When the Auto Ranging Check Box is Selected**
  Displayed in the same display range as the WT settings.
- **When the Auto Ranging Check Box is Not Selected**
  If you click the Upper or Lower column, a combo box is displayed. You can set the Upper limit and Lower limit of the display range for each channel.

Windows

Select the number of displayed waveform windows between 1 and 6. If two or more windows are specified and you click the Window column to display the combo box, you can specify which waveform display area (or Window, as numbered from the top) to use for displaying the waveform.

Graticule

Select whether (On) or not (Off) to display a grid in the waveform display area.

Y Scale

Select whether or not to display the upper and lower limit values in the waveform display area (by selecting or clearing the check box).

Ch

Select the waveforms to display (select or clear the check boxes). This is linked with the waveform display/do not display setting in the Wave dialog box (see page 3-20).

Upper, Lower

If the Auto Ranging check box is not selected, set the Upper and Lower limit of the display range.

1. Click the **Upper** or **Lower** column. A combo box opens.
2. Set the upper or lower limit value of the display range.

Position

Set the waveform display position in the up/down direction in the waveform display area. With the center of the vertical axis taken to be the zero amplitude line, the upper and lower limits of the window are 100% and -100%, respectively.

1. Click on the **Position** column. A combo box opens.
2. Set the waveform display position in the up/down direction in the waveform display area.

Color

Select the waveform display color.

1. Click the **Color** column. A combo box opens.
2. Select the waveform display color.

Window

When the waveform display screen is divided, set how many waveform areas (Windows) from the top in which the waveform is to be displayed.

1. Click the **Window** column. A combo box opens.
2. Select the waveform display area.

VZoom (Vertical Zoom)

Set the zoom factor for the vertical axis of the waveform.

1. Click the **VZoom** column. A combo box opens.
2. Set the vertical axis zoom factor.

Starting Downloading of Waveform Display Data

If you do not acquire waveform display data on the WT and download it from the WT on WTViewer, waveforms are not displayed even if you open the waveform display screen. After setting up waveform data acquisition in the WT settings (see Note below), start data downloading on WTViewer (see section 3.2).

Note

- If waveform data is not acquired on the WT, no waveforms can be displayed on WTViewer. Set up the WT as follows.
  - WT1600
    Turn Wave Sampling ON. For the procedure, see section 6.2.
  - WT3000
    When you start acquisition of waveform display data, the Display setting on the WT3000 becomes Wave, and if you close the Wave dialog box, the WT3000 Display settings are restored to the original display.
- On the WT210/WT230, waveforms cannot be displayed without the harmonic option.

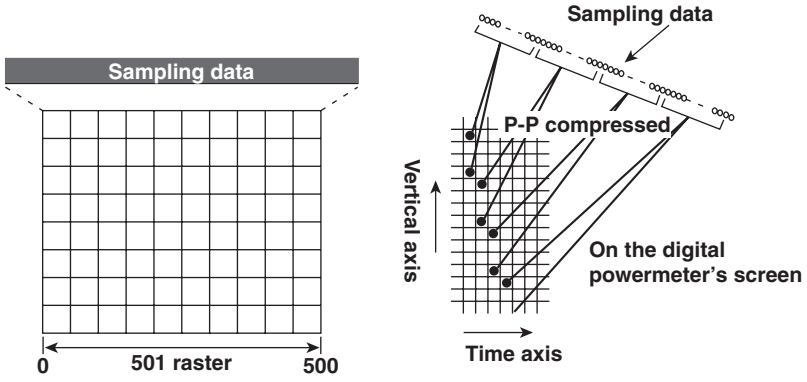
Note

Displayed Points on the Screen and Waveform Display

The number of samples on the WT differs from the number of data displayed on the screen (waveform display data). The number of sampled data varies depending on the sample rate. The number of waveform display data is determined and fixed from the structure of the screen. Since the number of sampled data is normally larger than the number of waveform display data*2, waveform display data of sampling data that has undergone P-P compression*1 every certain period of the time axis direction is displayed on screen.

*1 P-P compression is the determination of the maximum and minimum value of sampled data every certain period.

*2 Waveform display data can be displayed and saved. The source data of the waveform display data (sampled data prior to P-P compression) cannot be displayed or saved.



When Displaying Using the WT's Screen

For example, on the WT1600, the number of display segments in the time axis direction within one screen is 501. By displaying the P-P compressed maximum and minimum values (2 points) of the waveform display data in each segment, the data appears as a waveform.

When Displaying Using WTViewer on the PC Monitor

P-P compressed waveform display data is sent from the WT to the PC and the waveforms are displayed on the PC monitor. When displaying waveforms using WTViewer, the number of display segments in the time axis direction within one screen is 1002. By separating out the P-P compressed maximum and minimum values and displaying one point of the waveform display data in each segment, the data appears as a waveform.

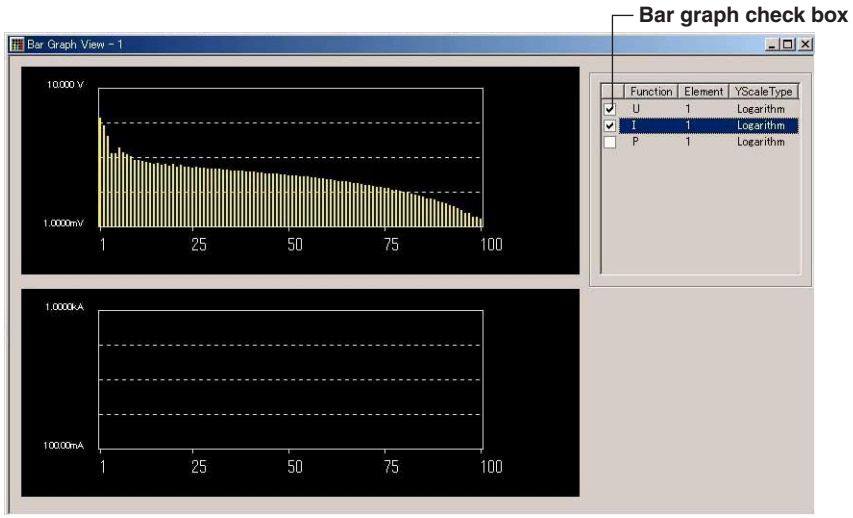
As above, since waveform display on the WT's screen differs from the mechanism of waveform display on WTViewer, if you compare both waveforms so that you can see waveform display data point by point, there are times when the waveforms can appear different. Also, since there are cases in which the order in which data is sent to the PC from the WT differs by model, depending on the WT connected, the waveform tracking may appear different even if the same WTViewer were used to display the waveform.

3.7 Bar Graph Display Function

After selecting measurement functions and elements in the harmonics list screen of the WT1600 (see section 3.5), you can display bar graphs.

Displaying Bar Graphs

Choose **View > Bar Graph** in the menu bar. The Bar Graph dialog box opens.



Displaying Multiple Bar Graphs

Up to three bar graphs can be displayed.

Select the **Bar Graph check boxes**. A bar graph of the selected measurement functions and elements is displayed.

Function

Select the measurement function to be displayed.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function for each item in this column.

Element

Select element to be displayed.

1. Click the **Element** column. A combo box opens.
2. Select the element for each item in this column.

Changing the Displayed Bar Graph

You can change the Data Number in the harmonics list screen (or the numeric value screen on the WT3000) to display the desired number of bar graphs. However, on the WT1600, you must set the downloaded harmonic data in the harmonics list display (see section 3.5) so that the harmonic data of the harmonic measurement and element is acquired that is necessary for displaying the bar graph.

Note

- In the case of the WT1600, even if you stop data acquisition and change the measurement function and elements in the bar graph screen, the bar graph of the changed measurement function and elements is not displayed. Start data acquisition only after you have set up the measurement functions and elements you wish to display in the harmonics list display screen ahead of time.
- In the case of the WT3000, if you do not stop data acquisition, you cannot change the measurement functions and elements displayed in the bar graph screen.
- Up to three bar graph screens can be displayed. The bar graph display colors are displayed on the PC screen according to the default color settings on the WT.

Starting Download of Harmonic Data

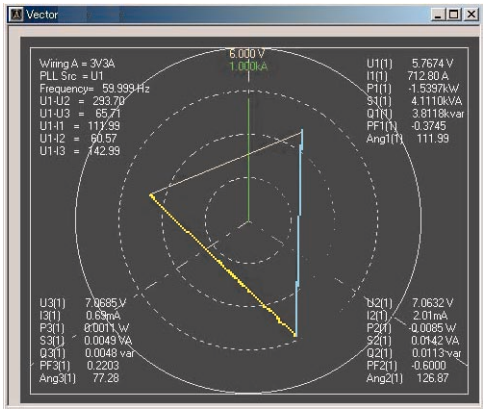
On the WT1600, if harmonic data is not downloaded from the WT to WTViewer, no bar graphs are displayed even if the bar graph screen is opened. Start data download (see section 3.2). There are setting items that cannot be changed while data is being downloaded.

3.8 Vector Display Function

After setting up the measurement functions and elements in the harmonics list screen of the WT1600 (see section 3.5), or the numeric value screen of the WT3000, you can display vectors.

Displaying the Vector

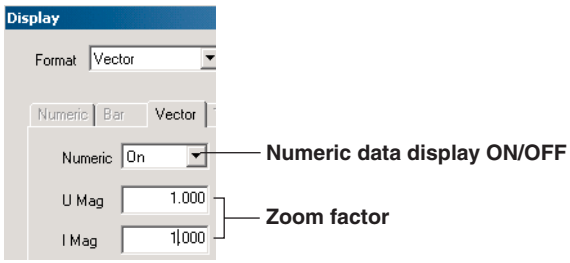
Choose **View > Vector** in the menu bar. Only one vector window can be displayed. The displayed contents are the same as the vector display on the WT main unit screen.



Setting the Vector Zoom Factor and Turning ON/OFF Numeric Data Display on the WT

You can set the vector zoom factor and turn numeric data display in the WT vector screen ON and OFF* by choosing **Setting > WT Setting > Display**, and editing the Display dialog box.

* The ON/OFF setting for the numeric data display on the WT is only reflected in the screen display of the WT. It does not apply to the PC display.



Changing the Displayed Vector

You can change the Data Number in the harmonics list screen (or the numeric value screen on the WT3000), to display the desired number of vectors. However, you must set the downloaded harmonic data (or numeric data on the WT3000) in the harmonics list display on the WT1600 (see section 3.5) or the numeric value display (see section 3.3) on the WT3000 so that the harmonic data of the harmonic measurement function and element is acquired that is necessary for displaying the vectors.

Vector Display Colors

The vector display colors are displayed on the PC screen according to the default color settings on the WT.

Starting Harmonic Data Acquisition

If harmonic data is not downloaded from the WT to WTViewer, no vector data are displayed in the vector screen. On the harmonics list display of the WT1600 (see section 3.5), or the numeric value display of the WT3000 (see section 3.3), start data acquisition (see section 3.2) after setting up the harmonic measurement functions and elements in advance. There are setting items that cannot be changed while data is being downloaded.

3.9 Trend Display Function

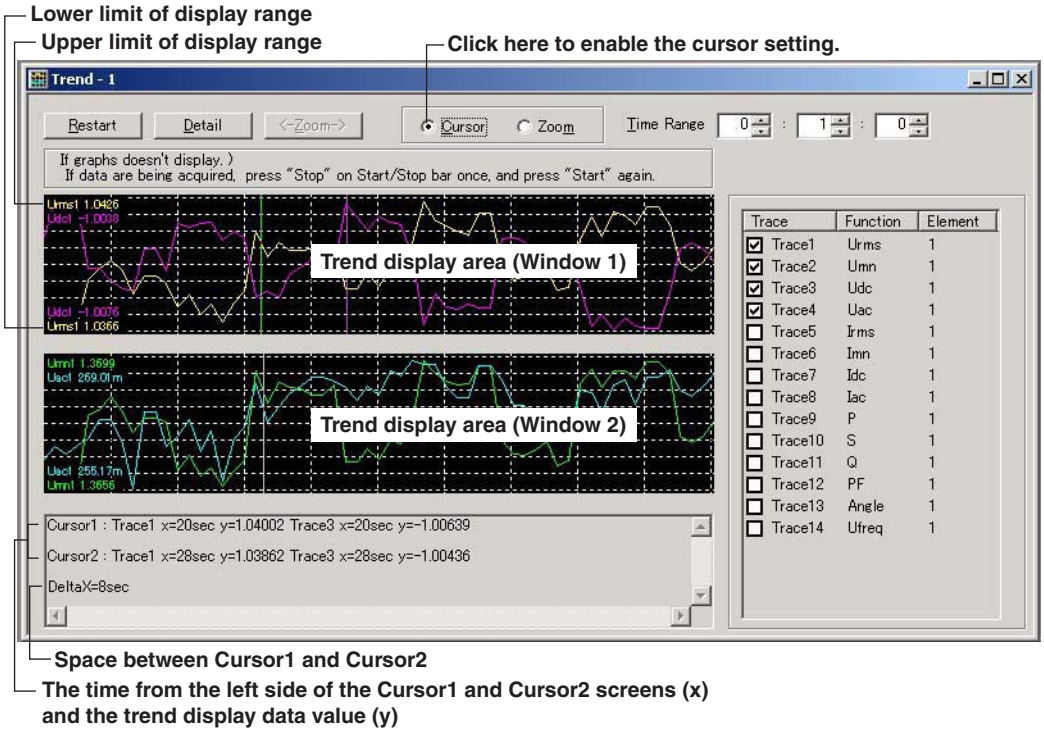
Display trends after setting up measurement functions, elements, and orders (for harmonic measurement mode only) in the numeric value setting screen (normal measurement mode) or the harmonics list screen when in harmonic measurement mode (numeric value screen for the WT3000).

Displaying Trends

Choose **View > Trend** in the menu bar. The Trend dialog box opens.

Cursor Setting Screen

Example with two windows. To set the number of windows, see page 3-31.)



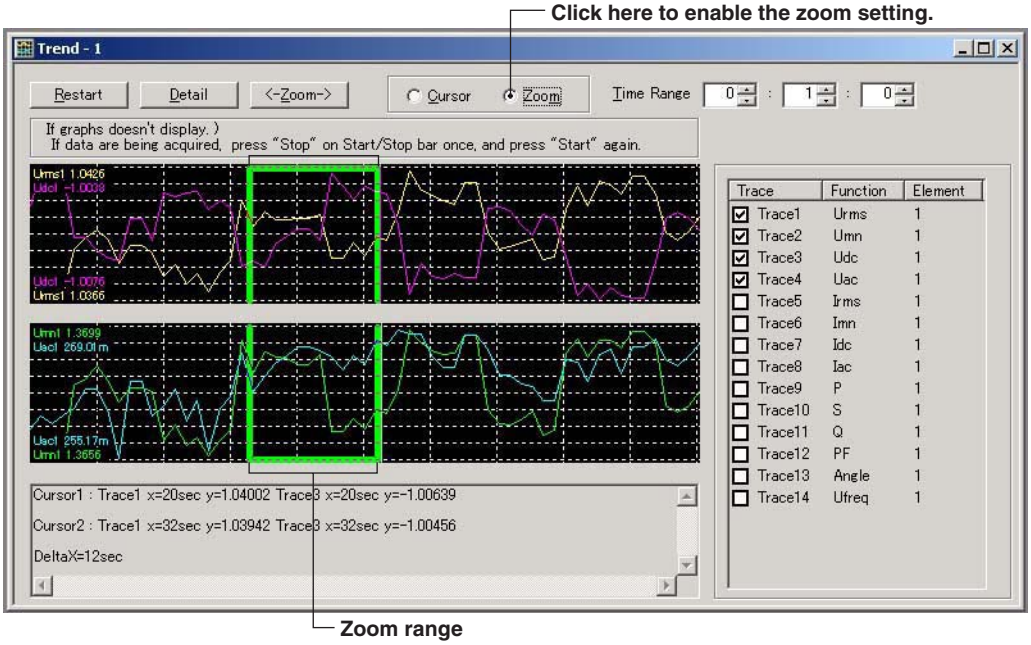
Note

- If you change the size of the trend screen during trend display, the size of the trend display area also changes.
- The data updating of the trend display is fixed to 1 second regardless of the Updaterate setting in the numeric value screen. For example, if Updaterate is set to 2 seconds in the numeric value screen, the same data is plotted twice in the trend display.
- If the Time Range setting in the trend display is large, measured values are P-P compressed for plotting in trends, so the size changes may not be able to be accurately displayed.

- **Restart**
  If you start downloading trend display data (see page 3-32) and then click here, the trend display is restarted. Previous trends will be deleted.
- **Time Range**
  Set the time width of the trend display area. If the trend exceeds the specified time range, new data will overwrite old data in the trend display.

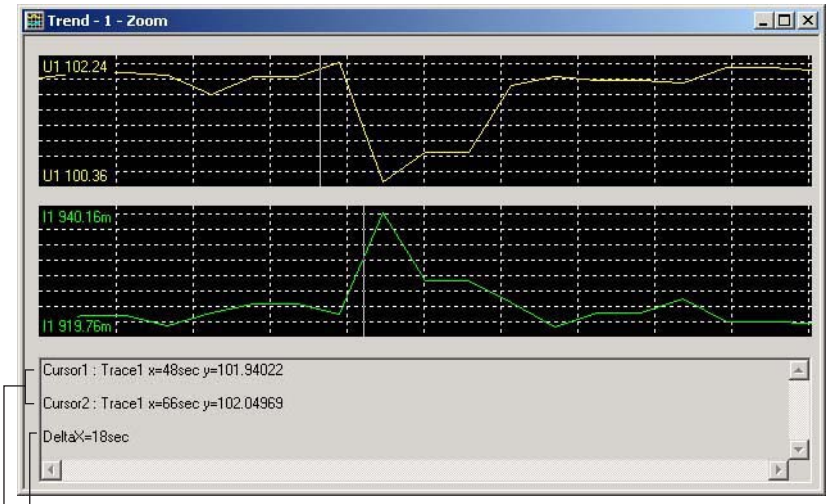
- **Trace**
  Select the trends to display (select or clear the check boxes). These are linked to Trace in the Trend Detail dialog box (see page 3-32).
- **Cursor**
  Click here to set Cursor1 and Cursor2 in the trend display area.
- **Cursor1, Cursor2**
  You can set the position of cursors on trends.
  - The line that appears when you first click on the desired trend is Cursor1.
  - The line that appears the next time you click is Cursor2. The position of Cursor2 can be changed any number of times.
  - To change the position of Cursor1, double-click in the trend display area, delete cursors 1 and 2, and set new cursors.
  - In the bottom of the trend display area, the time from the left side of the Cursor1 and Cursor2 screens (x) and the trend display data value (y) are displayed.

Zoom Area Setting Screen



- **Zoom (Time Axis Direction)**
  If you select this, you can set the time axis zoom range in the trend display area.
  1. Drag the area to zoom in the trend display area. The zoomed range is set simultaneously in all of the displayed trend display areas.
  2. Click **<-Zoom->**. A screen appears in which all trends in the trend display area are zoomed.
     You can set Cursor1 and Cursor2 on these zoomed trends. For the procedure, see the previous page.

Zoom Screen

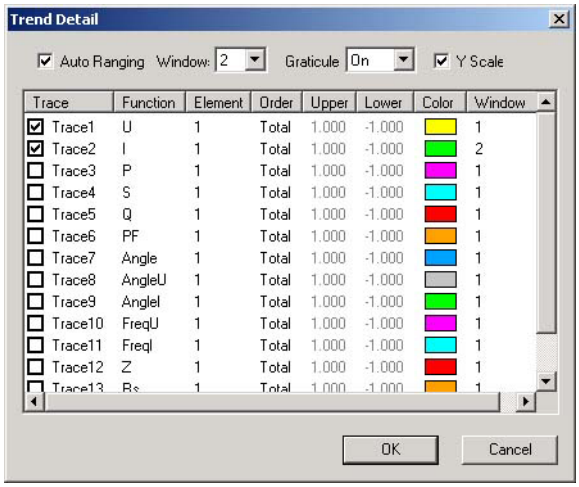


Space between Cursor1 and Cursor2

The time from the left side of the Cursor1 and Cursor2 screens (x) and the trend display data value (y)

Entering Trend Graph Detail Settings

Click **Detail** in the Trend dialog box. The Trend Detail dialog box is displayed.



Auto Ranging

- **When the Auto Ranging Check Box is Selected**
  Trends are automatically switched according to the downloaded values.
- **When the Auto Ranging Check Box is Not Selected**
  If you click the Upper or Lower column, a combo box is displayed. You can set the Upper limit and Lower limit of the display range for each trend (trace).

Windows

Set the number of waveform display windows between 1 and 6. If two or more windows are specified and you click the Window column to display the combo box, you can specify which trend display area (or Window, as numbered from the top) to use for displaying the trend.

Graticule

Select whether (**On**) or not (**Off**) to display a grid in the trend display area.

Y Scale

Select whether or not to display the upper and lower limit values in the trend display area (by selecting or clearing the check box).

Trace

Select the waveforms to display (select or clear the check boxes). These are linked to Trace in the Trend dialog box (see page 3-29).

Function

Select the measurement function to be displayed.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function for each item in this column.

Element

Select element to be displayed.

1. Click the **Element** column. A combo box opens.
2. Select the element for each item in this column.

Order

Select the order of harmonic data to display.

1. Click the **Order** column. A combo box opens.
2. Select an order.

Upper, Lower

If the Auto Ranging check box is not selected, set the Upper and Lower limit of the display range.

1. Click the **Upper** or **Lower** column. A combo box opens.
2. Set the upper or lower limit value of the display range.

Color

Select the trend display color.

1. Click the **Color** column. A combo box opens.
2. Select the trend display color.

Window

When the trend screen is divided, set how many waveform areas (Windows) from the top in which the waveform is to be displayed.

1. Click the **Window** column. A combo box opens.
2. Select the trend display area.

Starting Download of Trend Display Data

Numeric data is downloaded from the WT to WTViewer, and that P-P compressed trend display data is displayed in the trend screen. Start data download (see section 3.2). There are setting items that cannot be changed while data is being downloaded.

4.1 Loading Settings, and Numeric, Waveform, and Harmonic Data

You can load the settings, waveform display data, and numeric data (numeric values or harmonic data) files saved by WTViewer. Files that can be loaded by WTViewer are those of the format (extension) in the table below that were saved using the operation in section 5.2. Data saved using Auto Saving (described in section 3.3) cannot be loaded by WTViewer.

File Types and Extensions

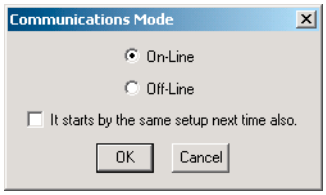
Type	Setting	Numeric Data	Waveform Data	Harmonic Data
WT1600	SET frmt (.set)	WTViewer frmt (.wta)	WTViewer frmt (.wta) WT1600 frmt (.wvf)*1	WTViewer frmt (.wta)
WT3000	CFG frmt (.cfg)	WTN frmt (.wtn)	WTW frmt (.wtw)	-*2

*1 Load the setting information (with the .set extension) before loading the waveform data in WT1600 format (with the .wvf extension). If the settings are not loaded, the waveform will not be displayed.

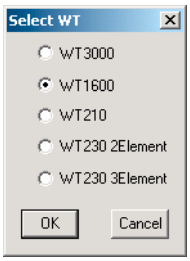
*2 With the WT3000, since harmonics are also measured along with normally measured numeric data measured in normal measurement mode, harmonic data is also saved when saving numeric data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.

If WTViewer is in On-Line communication mode, start with step 1. If it is in Off-Line mode, start with step 4.

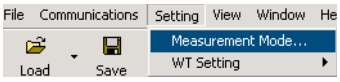
1. When in On-Line mode, choose **Communications > Communications Mode** from the menu bar. The Communications Mode dialog box is displayed.
2. Select Off-Line, then click **OK**. The Select WT dialog box opens.



3. Select a WT to work with, then click **OK**. The Measurement Mode dialog box is displayed. Proceed to step 5.



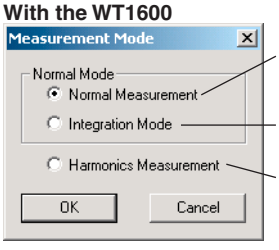
4. Choose **Setting > Measurement Mode** from the menu bar. The Measurement Mode dialog box is displayed.



5. Select a measurement mode, then click **OK**.

   The type of display screen that can be selected in the Display menu differs depending on the measurement mode selected here. Select the same mode as the measurement mode selected when the data file was saved.

With the WT1600

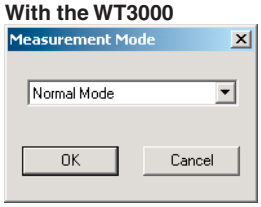


Normal Measurement mode

Integration mode

Harmonic Measurement mode

With the WT3000

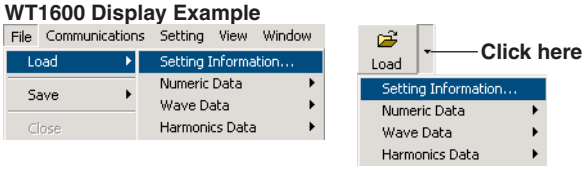


When loading numeric values or harmonic data files (with the .wta or .wtn extension) saved by WTViewer, proceed to step 8 on the next page.

Loading Settings

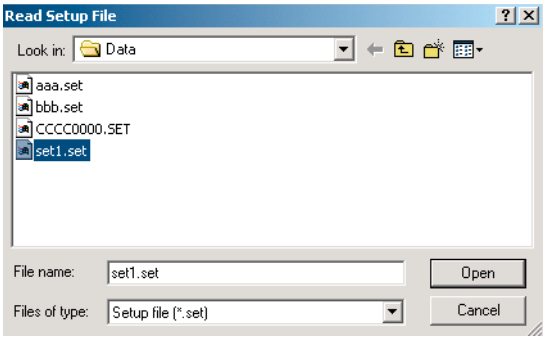
6. Choose **File > Load > Setting Information**, or click **Load** in the toolbar and select Setting Information. The Read setup file dialog box appears.

WT1600 Display Example



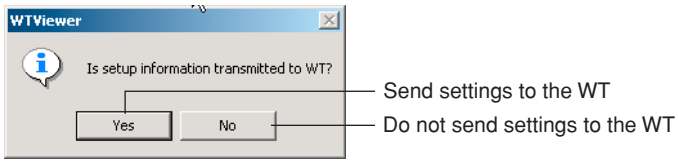
On the WT3000, since harmonics are measured and saved along with numeric data in Normal Measurement mode, there is no Harmonic data item in the load menu.

7. Select a settings file, then click **Open**. The setting data is loaded on WTViewer.
   On the WT1600, the settings file extension is .set. On the WT1600, the settings file extension is .cfg.



Note

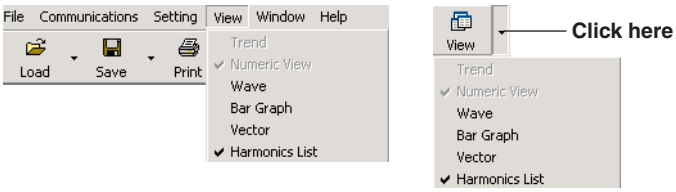
- If you change to On-Line mode after loading settings and the communication target is the WT1600, the following dialog box is displayed.



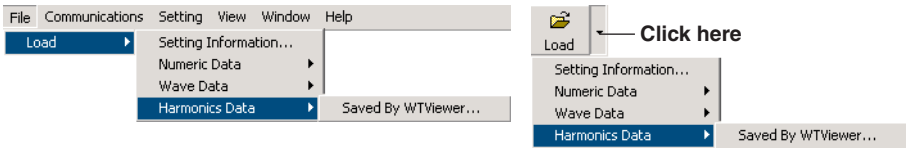
- Settings and numeric data (or harmonic data) are saved in files with extension .wta, .wtn, and .wtw. When files of these extensions are loaded, settings and numeric data (or harmonic data) are loaded.
- If WTViewer is started in offline mode and waveform display data files of extension .wvf are loaded without loading settings, data is not displayed. If you open a waveform display data file after loading settings, the maximum scaling value and number of displayed digits become those of the loaded settings. Displays opened before settings were loaded are changed according to the newly acquired settings.

Loading Numeric Values, Waveform Displays, or Harmonic Data

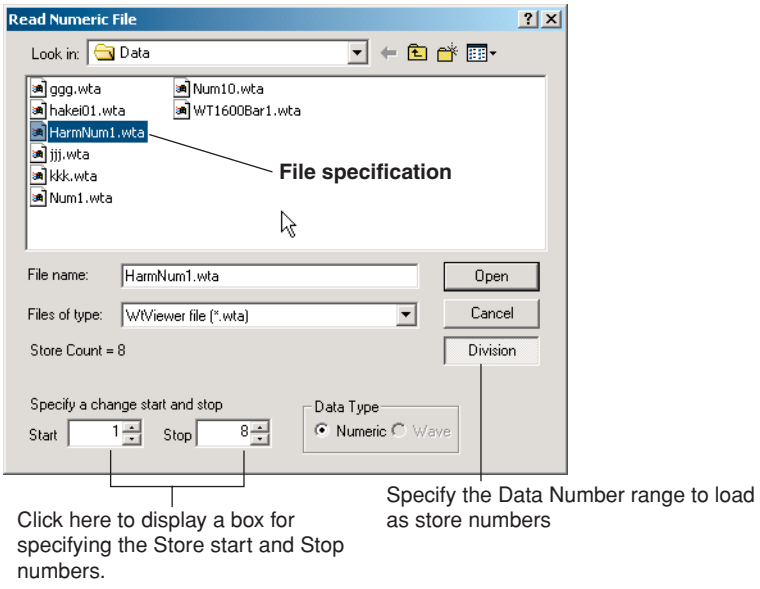
8. Click **View** on the menu bar or click **View** on the toolbar and select a display screen.



9. Choose **File > Load** in the menu bar or click Load and select a file type to load. A dialog box appears in which you can select a data file.



10. Select a file, then click **Open**.



Specifying a Start and Stop Number for Divided Store

When loading numeric data and harmonic data, you can specify a range of data numbers (see section 3.3 or 3.5) to load from the data saved in the files being loaded. You can set the data numbers in the range of those that were used when the numeric data or harmonic data was saved (see section 5.2).

Data Type

Displayed according to the type of file being loaded.

Note

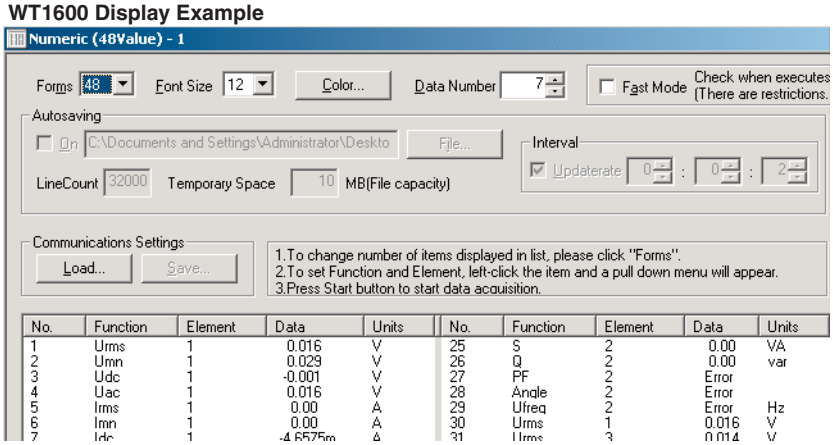
When loading numeric or harmonic data, in step 10 above, if you set the Store start and stop numbers the same, only one data number of data among the data saved in the files being loaded is loaded.

4.2 Numeric Display Function

On the WT1600, since you change to harmonic measurement mode to measure harmonics, there is a separate screen for displaying only harmonic data (harmonics list display). See section 4.3.
With the WT3000, since harmonics can also be measured in normal measurement mode, harmonics can be displayed together with numeric data from other normal measurements in the numeric screen described in this section.

In steps 8 to 10 in section 4.1, numeric data is loaded and displayed.

WT1600 Display Example



Forms

Select the number of numeric data to display.

- Select 12, 24, 48, or 250.
- If you select 250, all of the currently downloading numeric data of measurement functions and elements are displayed.

Font Size

Select the font size from the list.
The size can be set from 10 to 40 in steps of 2 (10, 12, 14, ...38, 40).

Color

Select a text and background color. For details, see section 3.3.

Data Number

Indicates how many numeric data have been downloaded from the WT up to the currently displayed data. After data has finished loading, you can change the Data Number setting to display the desired numeric data.

Function

Shows the measurement function for each item.

Element

Shows the elements for each item.

Order (WT3000 Only)
Displays the orders of numeric data.

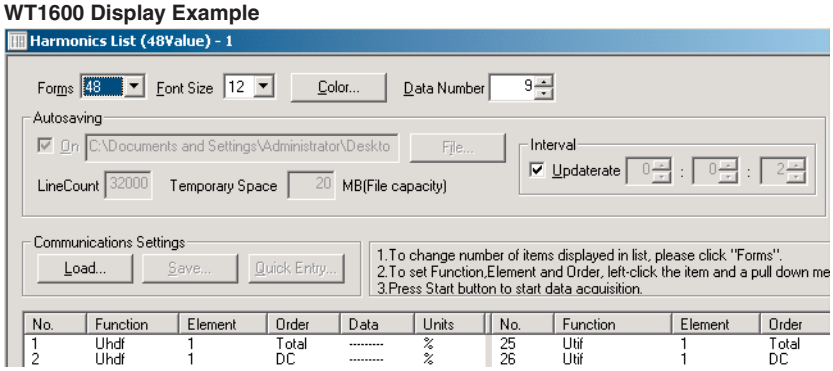
Max, Min (WT3000 Only)
Displays the maximum and minimum values for each display item of the numeric data downloaded from the WT.

4.3 Harmonics List Display

This section describes the WT1600. For the WT3000, see section 4.2.
On the WT1600, since you change to harmonic measurement mode to measure harmonics, there is a separate screen for displaying only harmonic data (harmonics list display). Therefore, that screen is explained separately in this section.
With the WT3000, since harmonics can also be measured in normal measurement mode, harmonics can be displayed together with numeric data from other normal measurements in the numeric screen described in section 4.2.

In steps 8 to 10 in section 4.1, harmonic data is loaded and displayed.

WT1600 Display Example



Forms

Select the number of harmonic data to display.

- Select 12, 24, 48, or 250.
- If you select 250, all of the currently downloading harmonic data of measurement functions and elements are displayed.

Font Size

Select the font size from the list.
The size can be set from 10 to 40 in steps of 2 (10, 12, 14, ...38, 40).

Color

Select a text and background color. For details, see section 3.3.

Data Number

Indicates how many harmonic data have been downloaded from the WT up to the currently displayed data. After data has finished loading, you can change the Data Number setting to display the desired numeric data.

Function

Shows the measurement function for each item.

Element

Shows the elements for each item.

Order

Displays the orders.

4.4 Waveform Display Function

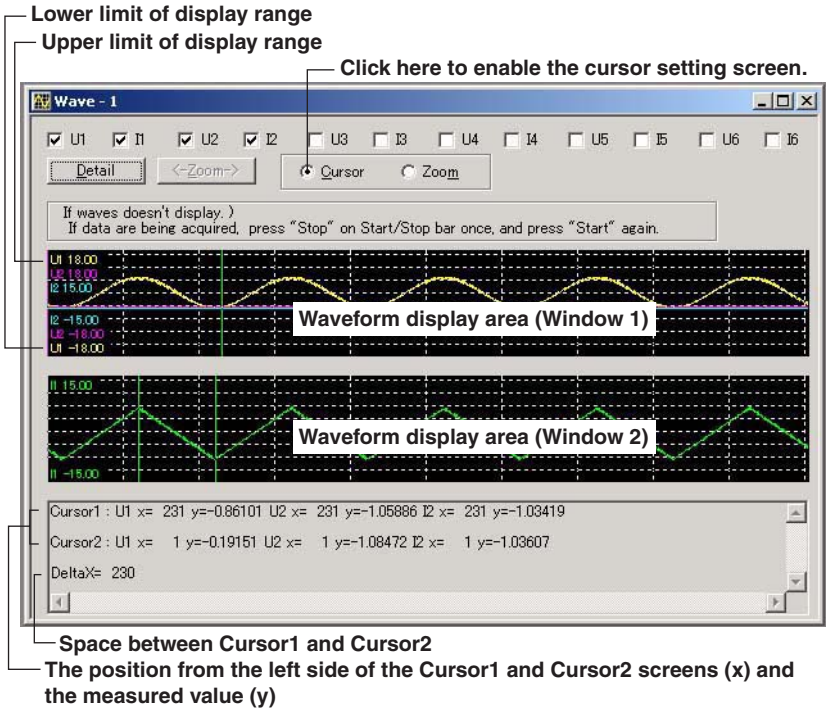
This section describes use of the WT1600 screen. The WT3000 has four elements, so waveforms U5, I5, U6, and I6 are not displayed. Also, with the motor version of the WT3000, Speed and Torque waveforms are displayed.

Displaying the Waveform

In steps 6 to 10 in section 4.1, waveform display data is loaded and displayed.

Cursor Setting Screen

Example with two windows. To set the number of windows, see page 4-9.)



- **U1 to I6**

  (On the WT3000, Speed and Torque may also be displayed depending on U1-I4 and the WT3000 specifications.)

  Select the waveforms to display (select or clear the check boxes). If you select waveforms that are not saved, they are not displayed. The Ch from the Wave Detail dialog box (see page 4-9) is linked.

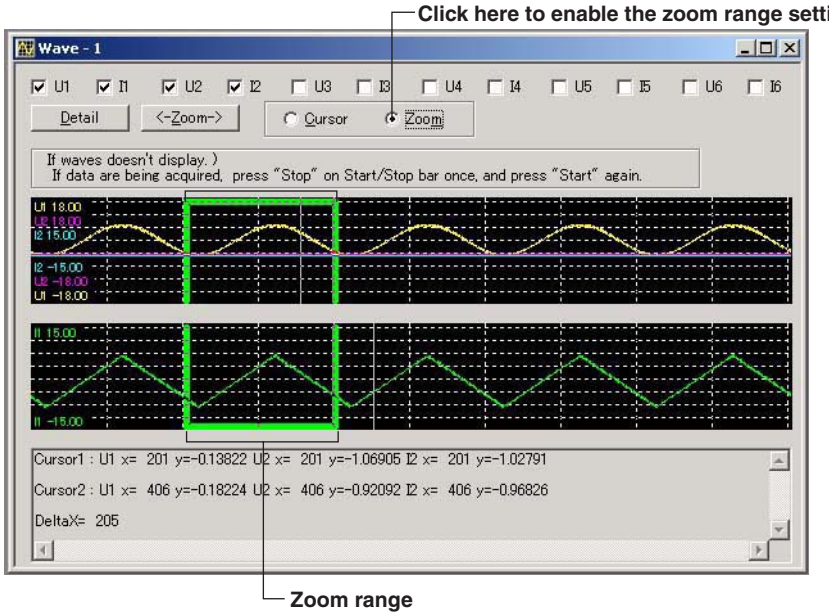
- **Cursor**

  If you select this, you can set Cursor1 and Cursor2 in the waveform display area.

- **Cursor1, Cursor2**

  You can set the position of cursors on waveforms.
  - The line that appears when you first click on the desired waveform is Cursor1.
  - The line that appears the next time you click is Cursor2. The position of Cursor2 can be changed any number of times.
  - To change the position of Cursor1, double-click in the waveform display area, delete cursors 1 and 2, and set new cursors.
  - In the bottom of the waveform display area, the position from the left side of the Cursor1 and Cursor2 screens (x) and the measured value (y) are displayed.

Zoom Area Setting Screen

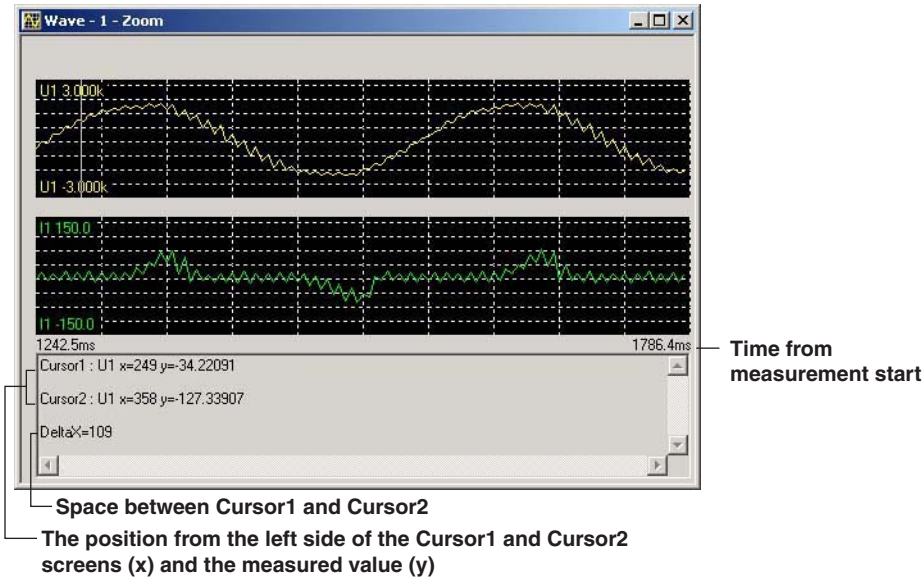


- **Zoom (Time Axis Direction)**

  Click here to set the time axis zoom range in the waveform display area.

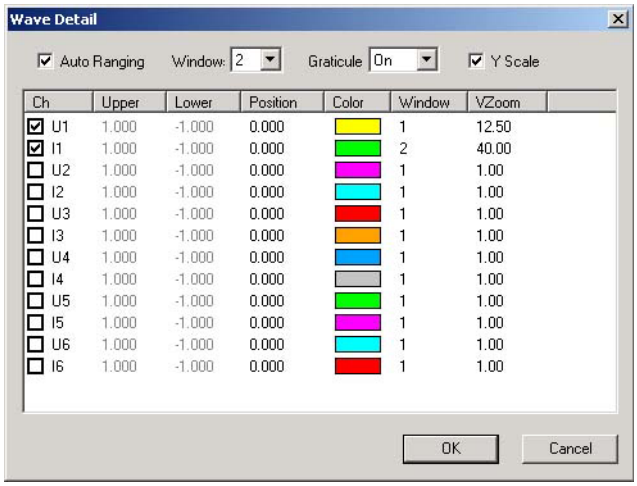
  1. Drag the area to zoom in the waveform display area. The zoomed range is set simultaneously in all of the displayed waveform display areas.
  2. Click **<-Zoom->**. A screen appears in which all waveforms in the waveform display area are zoomed.

     You can set Cursor1 and Cursor2 on these zoomed waveforms. For the procedure, see the previous page.



Entering Waveform Detail Settings

Click **Detail** in the Wave dialog box. The Wave Detail dialog box is displayed.



Auto Ranging

- **When the Auto Ranging Check Box is Selected**
  Displayed in the same display range as the WT settings.
- **When the Auto Ranging Check Box is Not Selected**
  If you click the Upper or Lower row, a combo box is displayed. You can set the Upper limit and Lower limit of the display range for each channel.

Windows

Set the number of waveform display windows between 1 and 6. If two or more windows are specified and you click the Window row to display the combo box, you can specify which waveform display area (or Window, as numbered from the top) to use for displaying the waveform.

Graticule

Select whether (**On**) or not (**Off**) to display a grid in the waveform display area.

Y Scale

Select whether or not to display the upper and lower limit values in the waveform display area (by selecting or clearing the check box).

Ch

Select the waveforms to display (select or clear the check boxes). This is linked with the waveform display/do not display setting in the Wave dialog box (see page 4-7).

Upper, Lower

If the Auto Ranging check box is not selected, set the Upper and Lower limit of the display range.

1. Click the **Upper** or **Lower** column. A combo box opens.
2. Set the upper or lower limit value of the display range.

Position

Set the vertical waveform display position in the waveform display area. With the center of the vertical axis taken to be the zero amplitude line, the upper and lower limits of the window are 100% and -100%, respectively.

1. Click on the **Position** column. A combo box opens.
2. Set the waveform display position in the up/down direction in the waveform display area.

Color

Select the waveform display color.

1. Click the **Color** column. A combo box opens.
2. Select the waveform display color.

Window

When the waveform display screen is divided, set how many waveform areas (Windows) from the top in which the waveform is to be displayed.

1. Click the **Window** column. A combo box opens.
2. Select the waveform display area.

VZoom (Vertical Zoom)

Set the zoom factor for the vertical axis of the waveform.

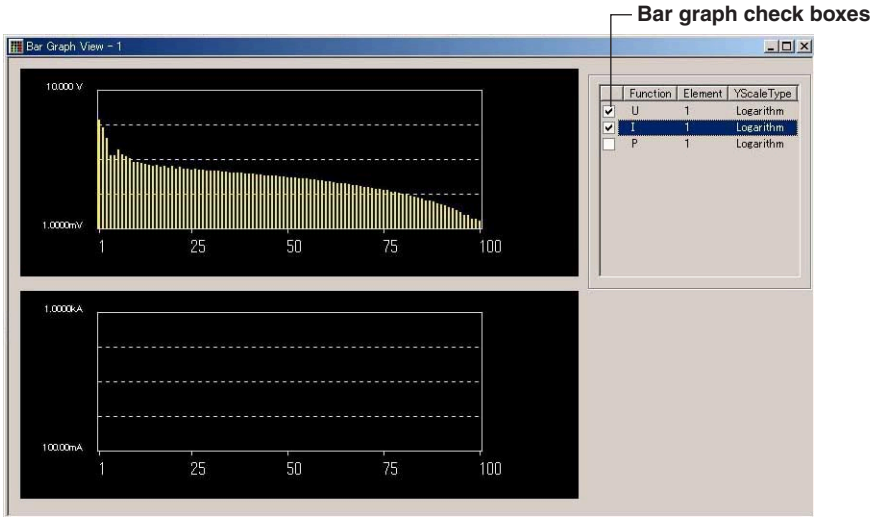
1. Click the **VZoom** column. A combo box opens.
2. Set the vertical axis zoom factor.

Note

Since waveform display on the WT's screen differs from the mechanism of waveform display on WTViewer, if you compare both waveforms so that you can see waveform display data point by point, there are times when the waveform tracking can appear different. For details, see the Note in section 3.6.

4.5 Bar Graph Display Function

Harmonic data (or numeric data on the WT3000) loaded in steps 6 to 10 in section 4.1 is displayed in bar graphs.



Displaying Multiple Bar Graphs

Up to three bar graphs can be displayed.

Select the **Bar Graph check boxes**. A bar graph of the selected measurement functions and elements is displayed.

Function

Select the measurement function to be displayed.

1. Click on the Function column. A combo box opens.
2. Select the measurement function for each item in this column.

Element

Select element to be displayed.

1. Click the **Element** column. A combo box opens.
2. Select the element for each item in this column.

Changing the Displayed Bar Graph

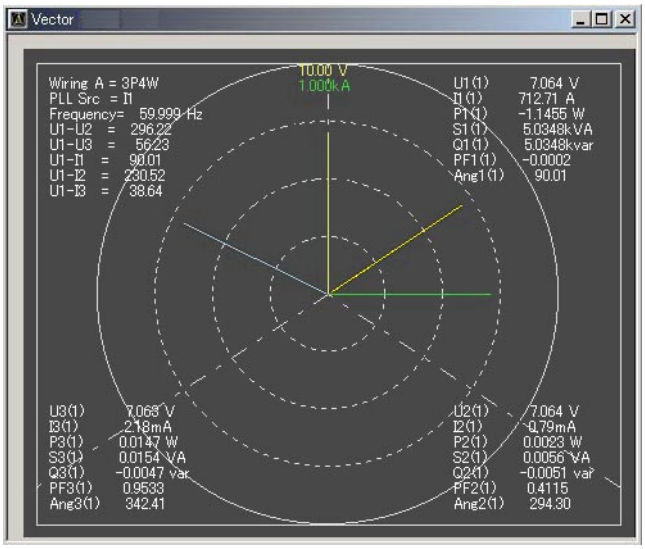
You can change the Data Number in the harmonics list screen (or the numeric value screen on the WT3000), to display the desired number of bar graphs. However, with the WT1600, the harmonic measurement functions and elements required to display the bar graph must be saved in the harmonic data file to be loaded.

Note

- Load data after setting up the measurement functions and elements you wish to display in advance.
- Up to three bar graph windows can be displayed. The bar graph display colors are displayed on the PC screen according to the default color settings on the WT.

4.6 Vector Display Function

Harmonic data (or numeric data on the WT3000) loaded in steps 6 to 10 in section 4.1 is displayed in vectors.
Only one vector window can be displayed. The display windows differ depending on the loaded setting information file.



Changing the Displayed Vector

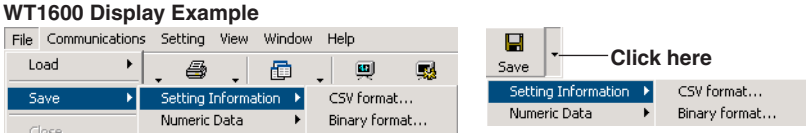
You can change the Data Number in the harmonics list screen (or the numeric value screen on the WT3000), to display the desired number of vectors. However, the harmonic measurement functions and elements required to display the vectors must be saved in the harmonic data file to be loaded (or the numeric data file with the WT3000).

5.1 Saving Settings

You can save WT settings that were entered in Off-Line mode. For details on the data format of settings, see section 5.2.

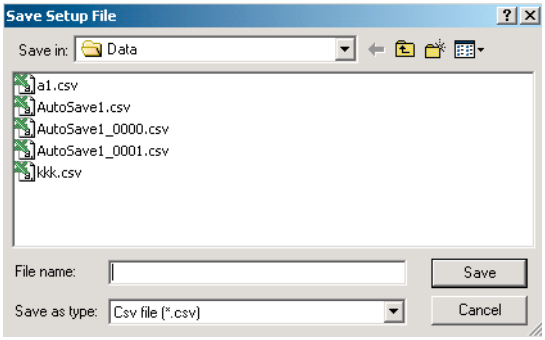
1. Choose **File > Save > Setting Information** from the menu bar, or click **Save** and select Setting Information.
2. Select a save format. The Save Setup File dialog box appears.
   - On the WT1600, select from CSV or BIN format. BIN is a format that can be loaded by WTViewer. CSV format can be opened in commercial spreadsheet programs (such as Excel).
   - On the WT3000, only CFG format can be selected. CFG is a format that can be loaded by WTViewer.

WT1600 Display Example



The only format that can be saved by the WT3000 is CFG.

3. Enter a **save location** and a **file name**.
4. Click **Save**. The settings are saved.



Note

Settings saved in CSV format can be opened in commercial spreadsheet programs (such as Excel).

Example

Set Data									
Input									
ElementOb	Element1								
WiringPatte	[1 P2W]	[1 P2W]	[1 P2W]	[1 P2W]	[1 P2W]	[1 P2W]			
WiringSigma	1 P2W		1 P2W		1 P2W				
Wiring	None	None	None	None	None	None			
WiringSigmaforElem									
PhiHeaderStr									
Module	ModuleID	1000V	5A_Sen	1000V	5A_Sen	1000V	5A_Sen	1000V	
	Label								
	Unit								
	Terminal		Direct		Direct		Direct		
	AutoRange	Off	Off	Off	Off	Off	Off	Off	
	VoltageRar	1.5V		AUTO		AUTO		AUTO	
	CurrentRange		AUTO		AUTO		AUTO		
	CurrentRangeSen		AUTO		AUTO		AUTO		
	LineFilter	Off	Off	Off	Off	Off	Off	Off	
	ZeroCrossF	Off	Off	Off	Off	Off	Off	Off	
	VerticalZoc	x1	x1	x1	x1	x1	x1	x1	
	SensorRatio		0		0		0		

If you load data saved in BIN format by WTViewer when in On-Line mode, you can change the WT settings. Also, if you load BIN format data when in Off-Line mode, the display conditions of the measured data become those of the loaded file.

5.2 Saving Numeric, Waveform, and Harmonic Data

You can save the data displayed by WTViewer. Data that can be saved are numeric, waveform, and harmonic data. The data formats (extensions) that are saved by WTViewer are given in the table below. Note that CSV format files cannot be read by WTViewer. These types of files can be opened in commercial spreadsheet programs (such as Excel).

File Types and Extensions

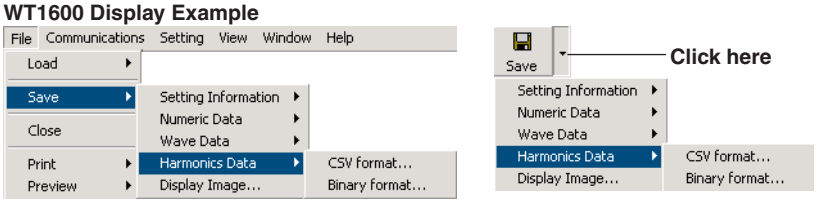
Type	Setting	Numeric Data	Waveform Data	Harmonic Data
WT1600	CSV frmt (.csv) BIN frmt (.set)	CSV frmt (.csv) BIN frmt (.wta)	CSV frmt (.csv) BIN frmt (.wta)	CSV frmt (.csv) BIN format (.wta)
WT3000	-*1 CFG frmt (.cfg)	CSV frmt (.csv) WTN frmt (.wtn)	CSV frmt (.csv) WTW frmt (.wtw)	-*2 -*2

*1 If WTViewer is working with the WT3000, the function whereby settings are saved in CSV format is not available.

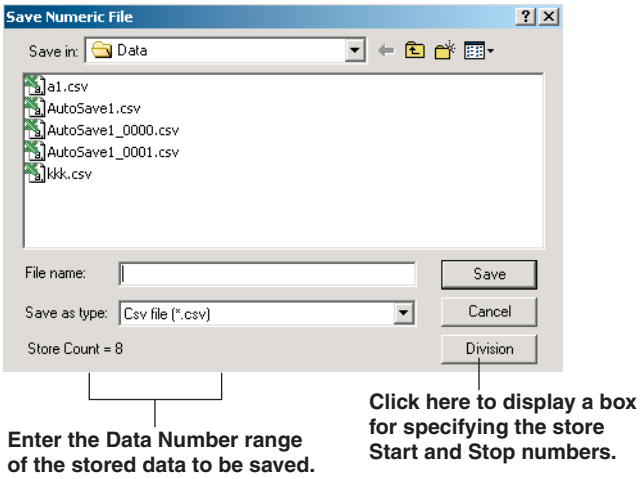
*2 With the WT3000, since harmonics are also measured along with normally measured numerical data measured in normal measurement mode, harmonic data is also saved when saving numerical data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.

1. Choose **File > Save** from the menu bar, or click **Save**.
2. Select a data type to save from Numeric, Wave Data, or Harmonics Data.
3. Select a save format. The dialog box corresponding to the data opens.

WT1600 Display Example



4. Enter a save location and a file name.
   - If saving CSV format numeric and harmonics data, proceed to step 5.
   - If saving data other than CSV format numeric and harmonics data, proceed to step 7.



5. If saving CSV format numeric and harmonics data, click Division. The store Start and Stop number entry boxes appear.
6. Specify the data numbers to save in the store Start and Stop number boxes.
   Specify the range of data numbers (see section 3.3 or 3.5) to save out of the data loaded on WTViewer.
7. Click **Save**. The data is saved.

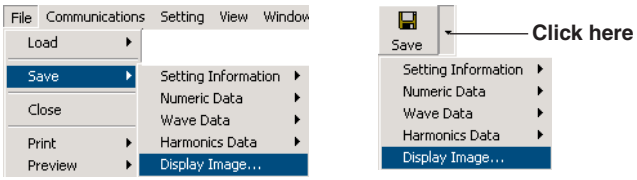
Note

- When saving using the AutoSaving function described in section 3.3 or 3.5, the time stamp of each data is the time at which WTViewer updated the data. If the Save button is clicked to save data, all data time stamps are set uniformly to the time that the data was saved upon clicking the Save button. In both cases, this is not the time the data was measured on the WT.
- If you select multiple target WTs (from WT-1, WT-2, WT-3, and WT-4), only the measured data (numeric, waveform, and harmonics data) of the smallest-numbered WT is saved. This data is saved even if it is not displayed.
- When measurement is finished and you close the numeric or harmonics list screen, all data other than that which was visible up to that point is deleted. To save data other than visible data as well, save the data before closing the numeric or harmonics list display. Using the AutoSaving function, you can save data during download (in CSV format only).
- Even if you close the numeric or harmonics list screen after measurement is finished, the data visible up to that point is held until you either exit WTViewer, change the communication mode, or start the next measurement. If you click Display or View on the menu bar and select the numeric or harmonics list screen, the data that was visible before closing the screen is displayed.
- If Off-Line mode, if data displayed under certain settings (for example, A.set) is loaded using different settings (for example B.set) and then saved in CSV or BIN format, the saved data changes to the B.set settings.

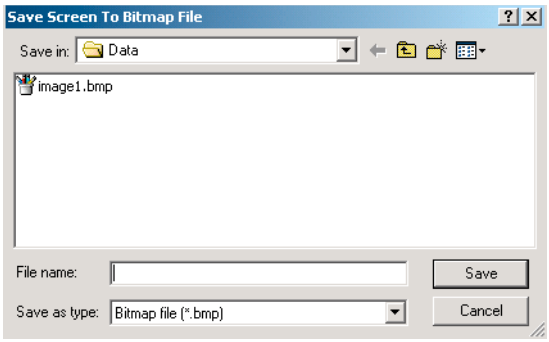
5.3 Saving PC Screen Image Data

You can save WTViewer screen images in BMP (.bmp) format. Only active display screens can be saved.

1. Choose **File > Save > Display Image** from the menu bar, or click **Save** and select Display Image. The Save Screen To Bitmap File dialog box appears.



2. Enter a **save location** and a **file name**.



3. Click **Save**. The screen image data is saved.

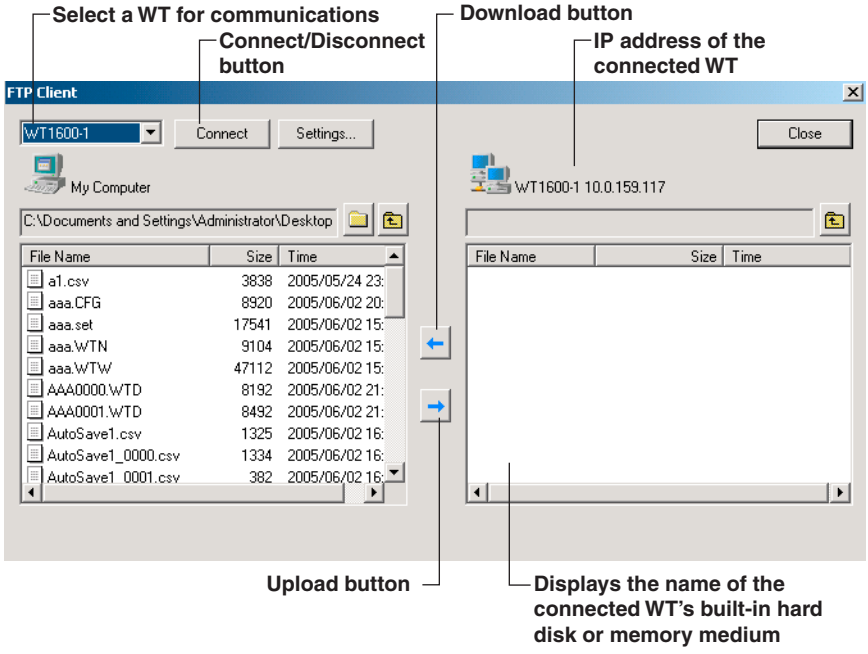
5.4 Transferring Data between the WT and the PC (FTP Client Function)

If the WT and PC are configured for Ethernet communications, files can be exchanged between the WT's and PC's internal hard disks and other memory media.

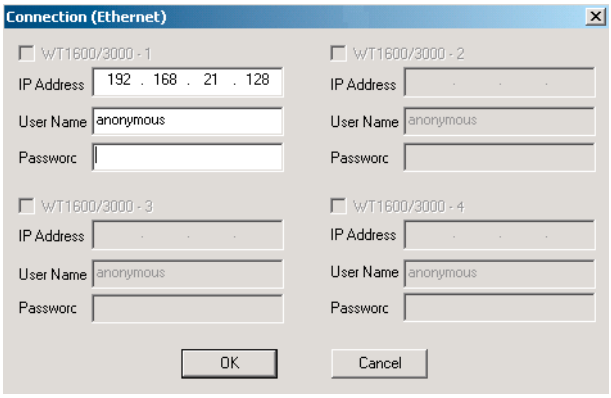
1. Choose **File > FTP Client** from the menu bar. The FTP Client dialog box is displayed.
   - If the communication interface is GP-IB or RS-232, proceed to step 2.
   - If the communication interface is Ethernet, proceed to step 4 on the next page.

WT1600 Display Example

2. Click **Settings**. The Connection (Ethernet) dialog box is displayed.



3. Select target WTs and enter the **IP address**, **user name**, and **password** for each, then click **OK**. The Connection (Ethernet) dialog box closes.



Note

- If you click OK, file transfer using Ethernet is enabled, but the communication interface (GP-IB and RS-232) settings cannot be changed.
- Even if the communication interface is GP-IB or RS-232, connect an Ethernet cable between the WT and PC in addition to a GP-IB cable or serial interface cable.

4. Select a single target WT, then click **Connect**. The IP address and the name of the hard disk or other memory media for the WTs available for communications is displayed. Connect changes to Disconnect.
   The conditions under which Connect and Disconnect are displayed are as follows.
   - Connect: When not connected, or when paused
   - Disconnect: When connected

Note

If you click Disconnect, the connection with the WT is dropped, and the hard disk or memory medium name disappears from the screen.

5. After specifying the files to upload (transfer from the PC to the WT) or download (transfer from the WT to the PC) and the transfer destination, click Upload → or Download ←.

Note

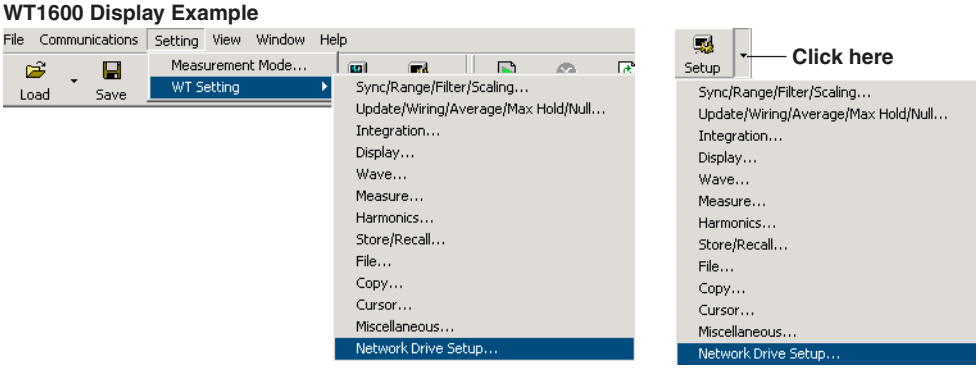
You can drag and drop files to the destination to transfer them.

5.5 FTP Server Function

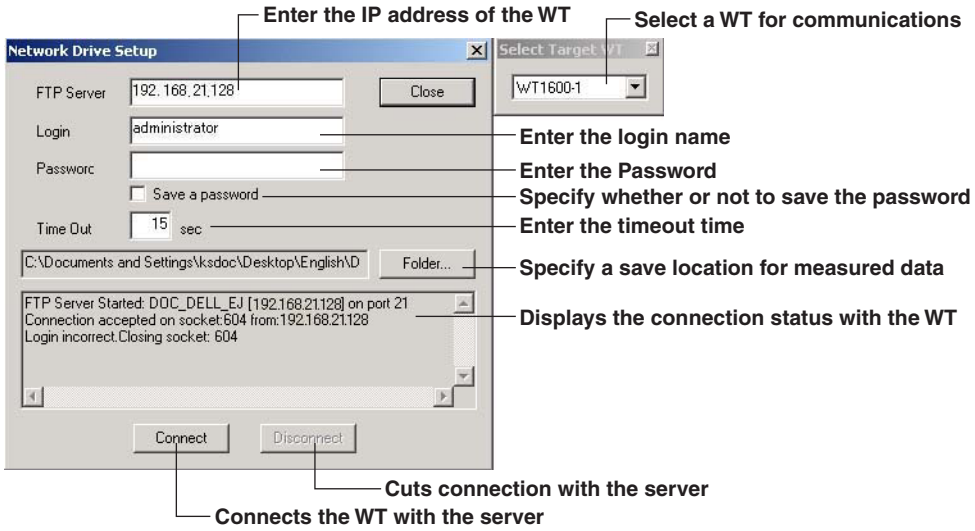
When the WT and PC are Ethernet communciation-enabled, you can connect a WT acting as the the FTP server to the PC and save data from the WT built-in hard disk or memory medium directly on the PC.

1. Choose **Setting > WT Setting > Network Drive Setup** from the menu bar, or click **Setup** and select **Network Drive Setup**. The Network Drive Setup and Select Target WT dialog boxes appear.

WT1600 Display Example



2. Select the target WT in the Select Target WT dialog box.
3. In the Network Drive Setup dialog box, set the WT **IP address**, **login name**, **password**, **timeout time**, and **measured data save location**.

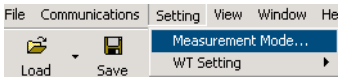


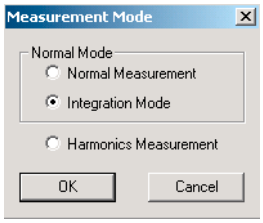
4. Click **Connect**. A server connection is opened with the WT. Disconnect becomes active.
   To close the server connection, click **Disconnect**.

6.1 Precautions While Operating the Software

You can use WTViewer to enter settings on the WT. The following are points to note when entering settings.

- For details on settings, see the WT main unit user's manual.
- Check the user's manual for the input range, number of characters, supported characters, and other restrictions for text box entry of each item. An error message will appear if the settings do not fall within those limits.
- When Normal Measurement or Harmonics Measurement mode is set on the WT1600, integration settings cannot be entered. You must choose **Setting > Measurement Mode > Integration Mode** ahead of time.

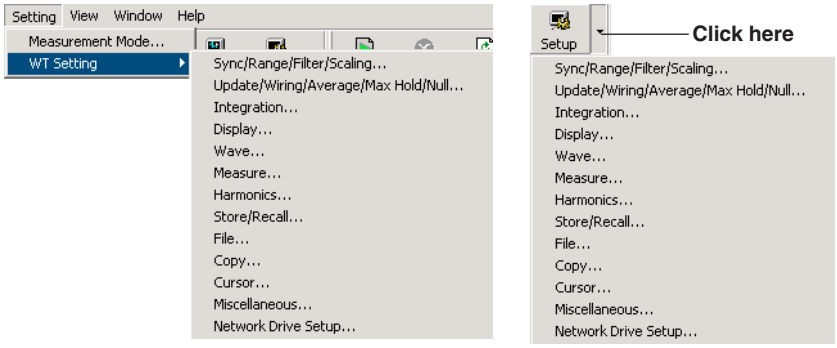




- Except for execution buttons such as Execute, Send, and Store Start, all settings are applied to the WT each time a setting is entered.
- Multiple setting dialog boxes cannot be displayed. Close the open settings dialog box then open a new settings dialog box.
- WTViewer cannot be used to enter display color settings on the WT, select screen image colors, enter a network printer name, select a resolution when printing screen images to a network printer, of for other tasks. These settings must be entered on the WT directly.
- Integration settings cannot be entered while in Harmonics Measurement mode, or when downloading waveforms.
- If the settings dialog box is displayed during communication with the WT, data display and measurement pauses. When the settings dialog box is closed, data display and measurement resumes.
- To display the waveform, bar graph, vector, or trend screen, first set up the measurement functions and elements in advance in the numeric value screen or harmonics list screen.

6.2 Settings Dialog Box (WT1600)

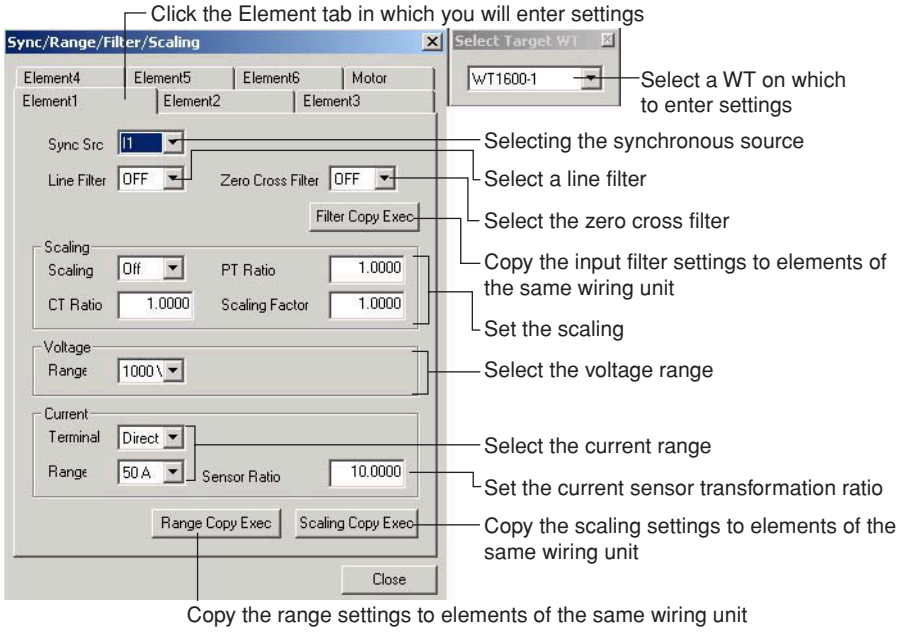
1. Choose **Setting > WT Setting** from the menu bar, or click **Setup**.



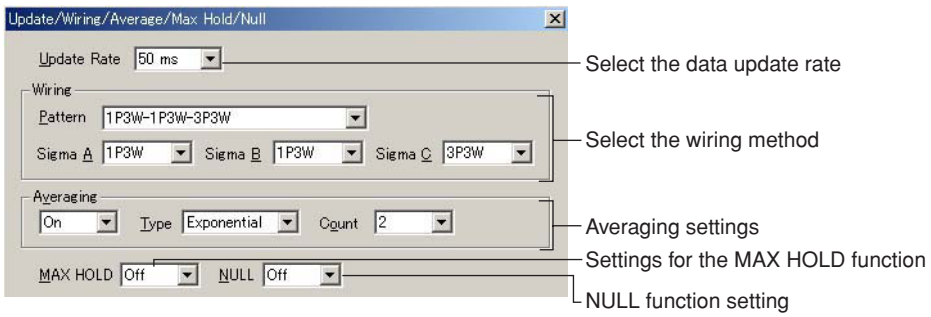
2. Select the item for which you wish to enter settings. The dialog box for the selected item appears.
3. Change the settings as needed.

The following shows a display example of the settings dialog box. The Select Target WT dialog box is displayed simultaneously with all setting screens. Enter settings after selecting the target WT in the Select Target WT dialog box.

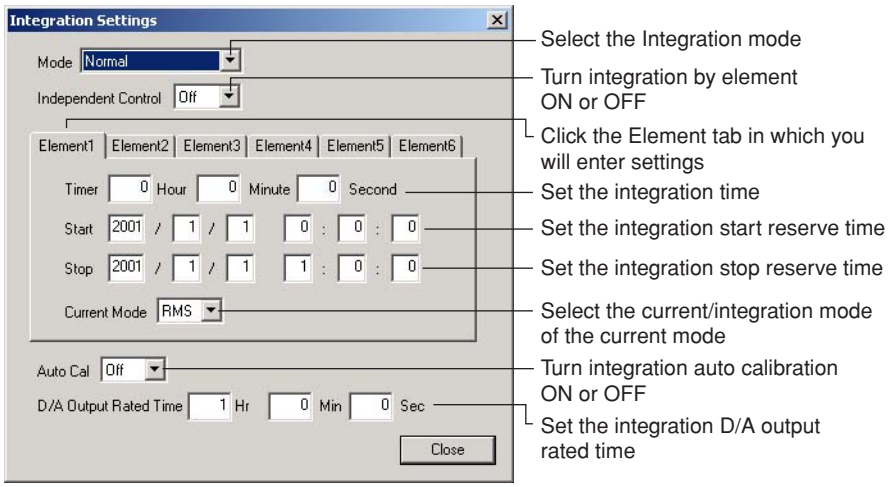
Synchronous Source, Measuring Range, Input Filter, and Scaling Settings



Data Update Rate, Wiring Method, Averaging, MAX Hold, and Null Function Settings

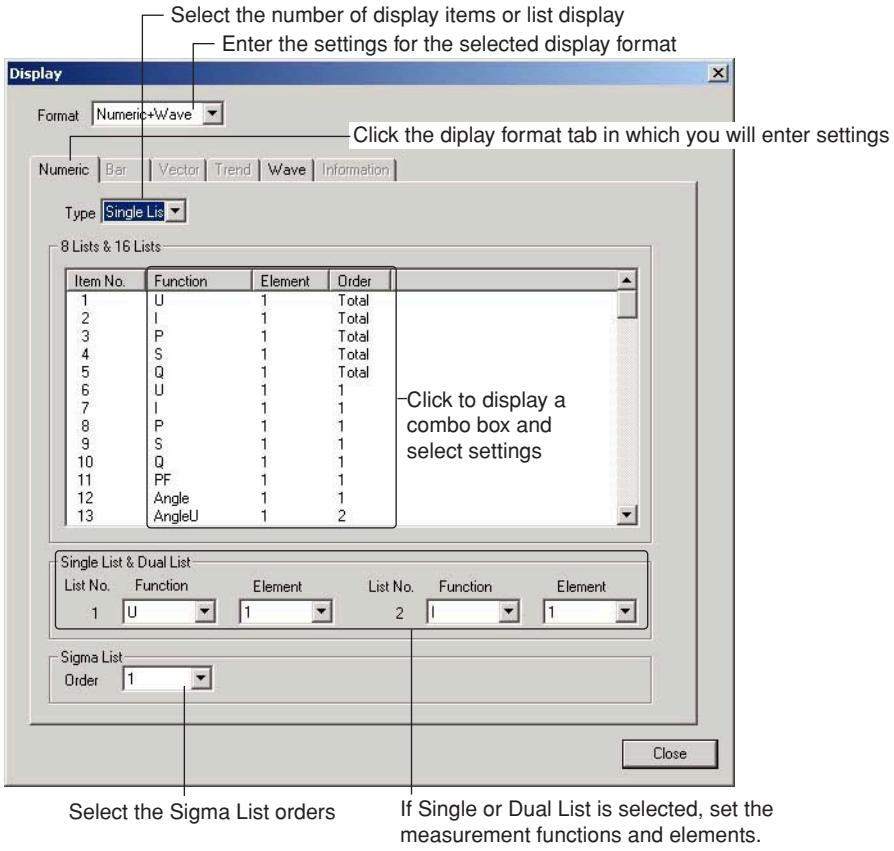


Integration Settings

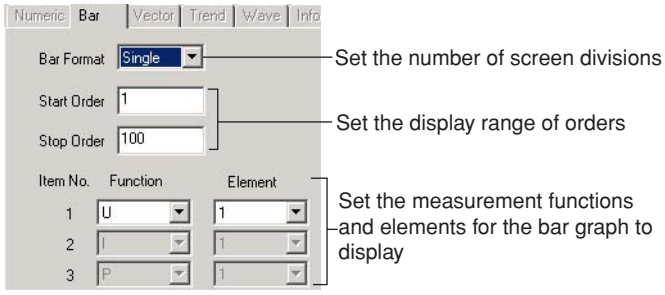


Setting the Display Format

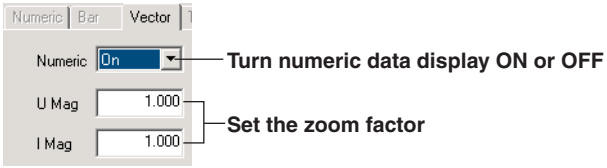
Numeric Value or Harmonics Data Display Format



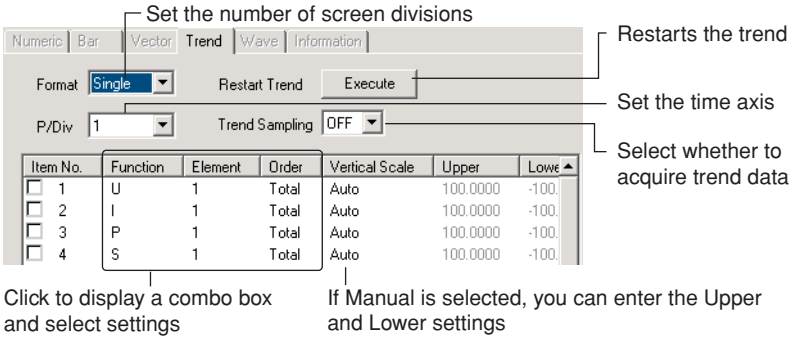
Bar Graph Display Format



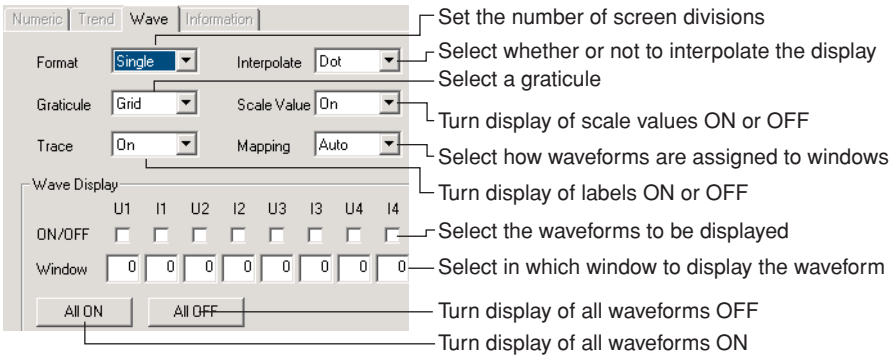
Vector Display Format



Trend Display Format



Waveform Display Format



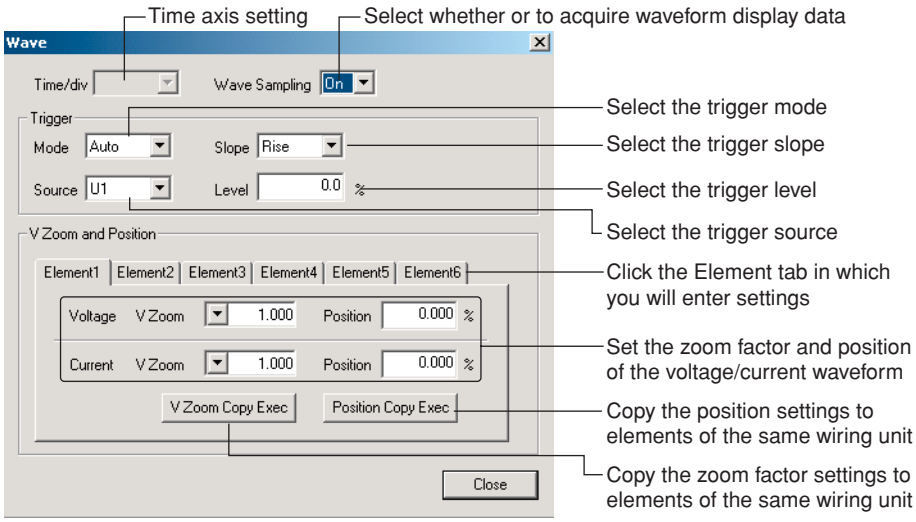
Setting Information List

Display list of settings in the WT screen

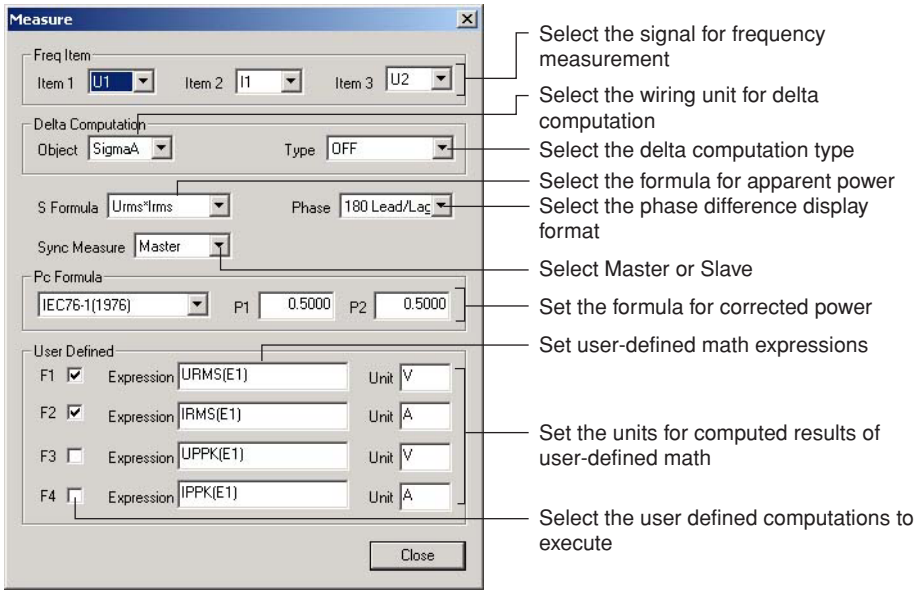
The list selected on the WT is displayed. You cannot select the list to be displayed using WTViewer. This is also true when controlling the WT through WTViewer. To select the list to be displayed, perform the following procedure.

1. Enter Off-Line mode on WTViewer, or execute Clear Remote on the WT.
2. Select a setting information list in the Display menu of the WT.
3. Open a connection again to the WT from WTViewer (On-Line mode).

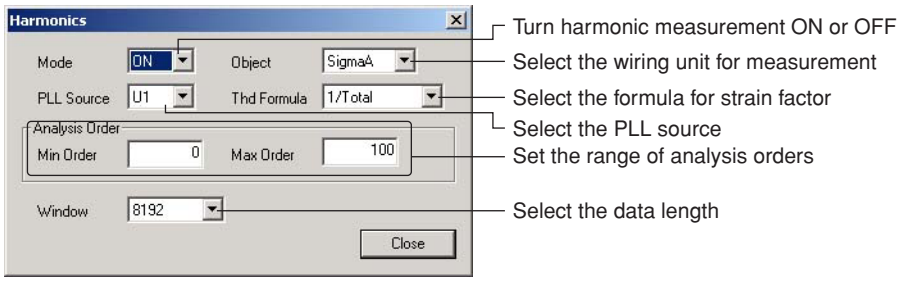
Entering Waveform Display Data Acquisition Conditions and Setting the VZoom and Vertical Position



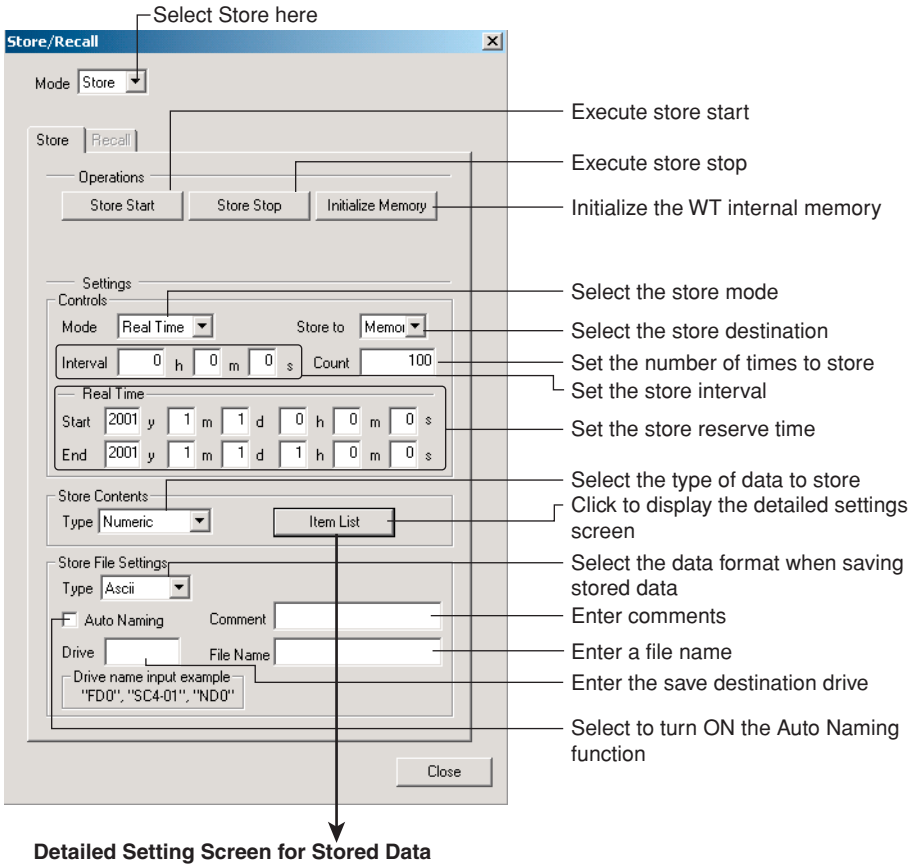
Entering Power Measurement and Computation Conditions



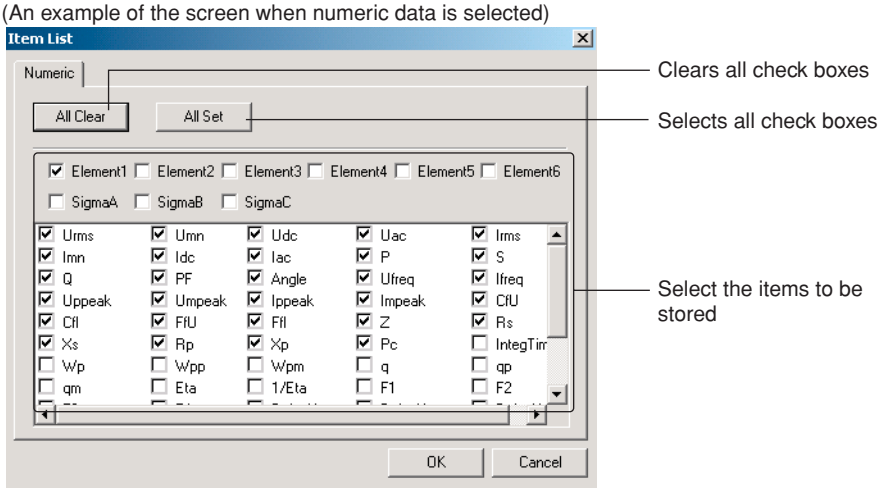
Harmonic Measurement Settings



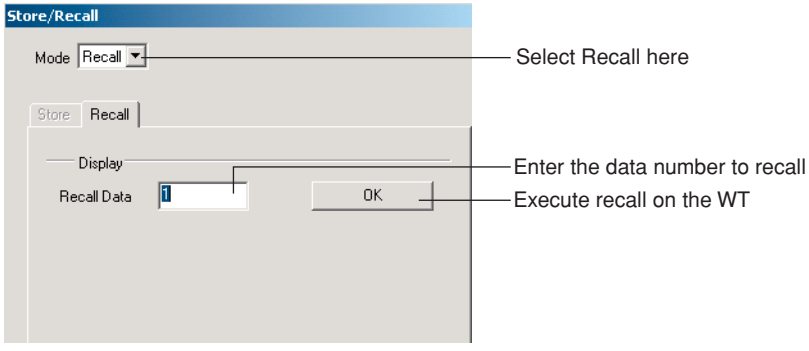
Store Settings



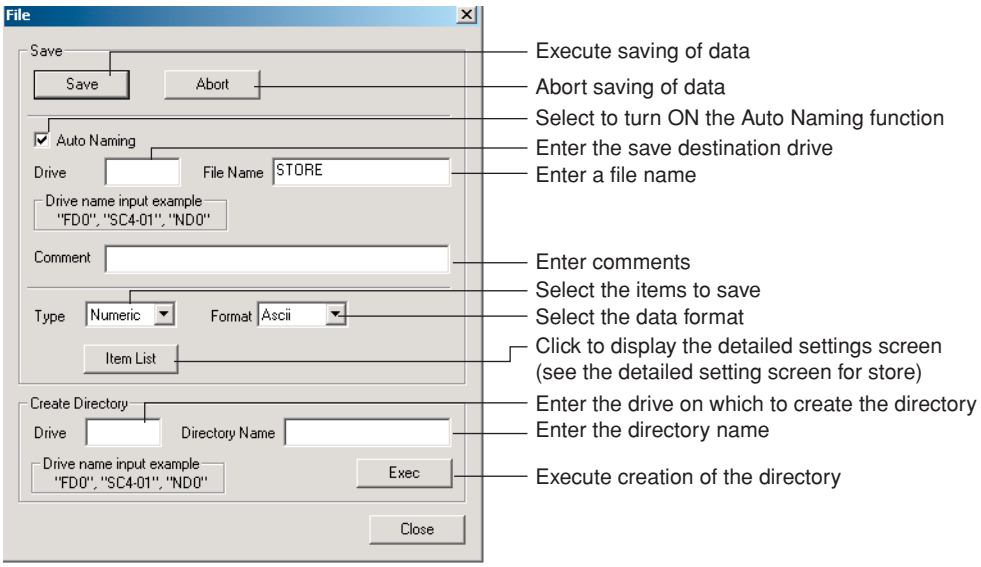
Detailed Setting Screen for Stored Data
(An example of the screen when numeric data is selected)



Recall Settings

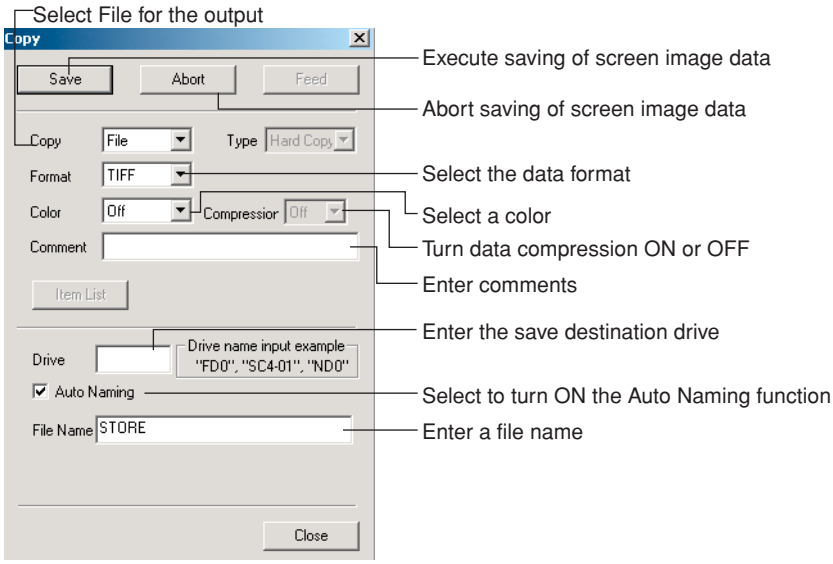


Data Save Settings

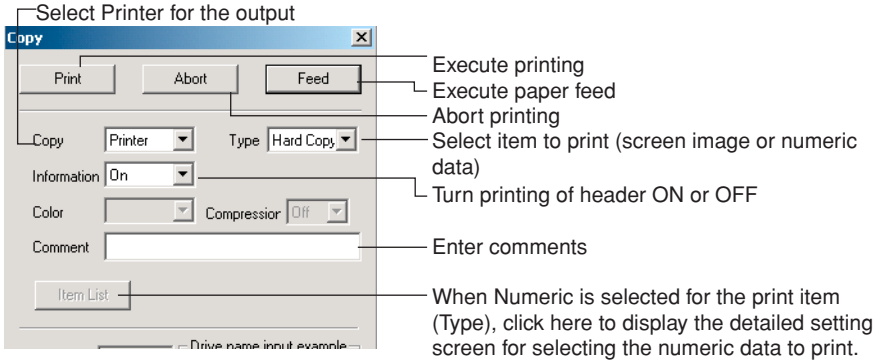


Saving Screen Images, Printing on the WT's Built-In Printer, and Setting Up Network Printers

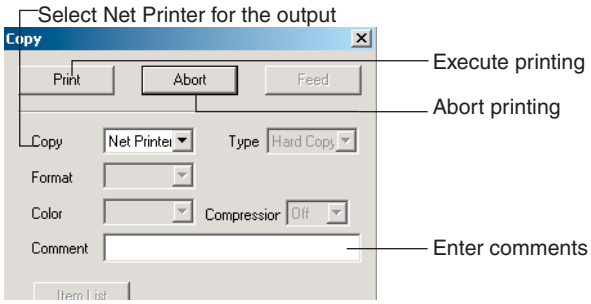
Screen Image Saving



Printing on the WT's Built-In Printer

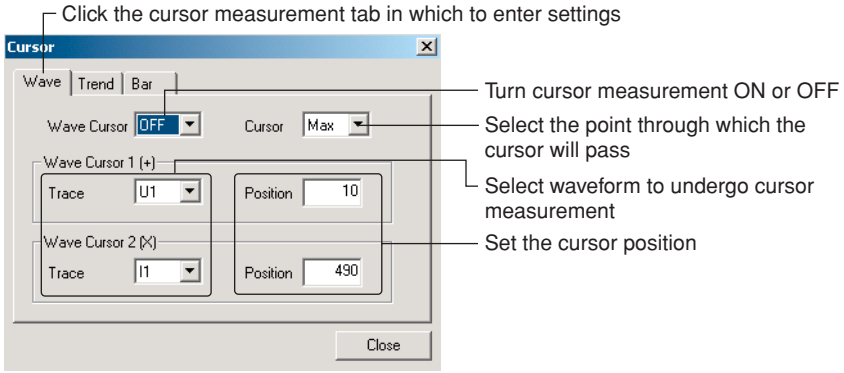


Printing on Network Printers

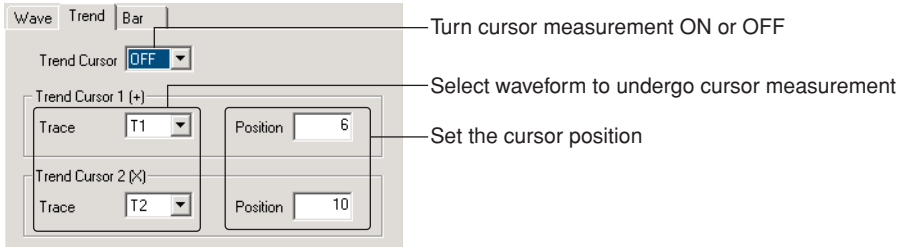


Cursor Measurement Settings

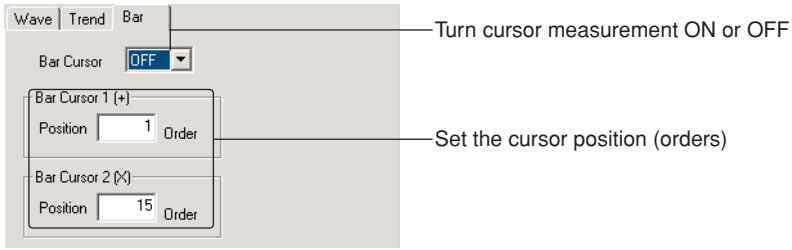
Waveform Cursor Measurement



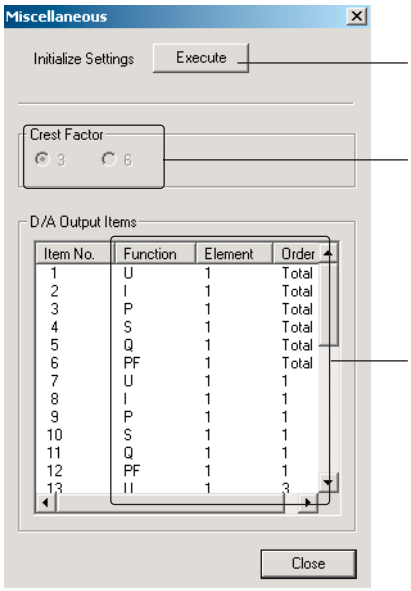
Trend Cursor Measurement



Bar Graph Cursor Measurement



Initializing the WT, Selecting the Crest Factor, and Entering D/A Output Settings



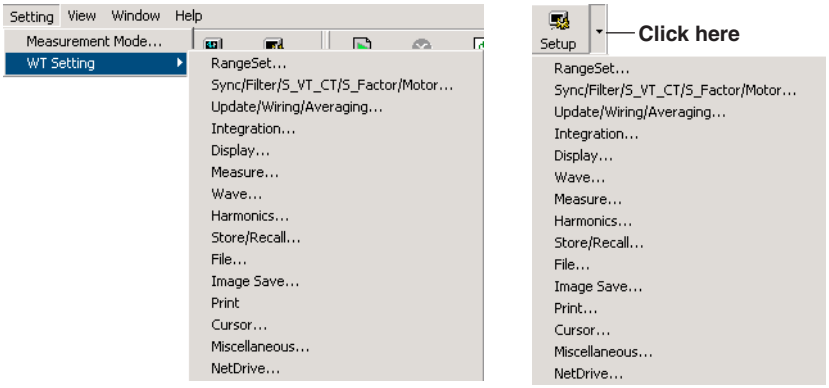
For information on initializing the WT, see the WT user's manual.

FTP Server Function Settings

For information on the WT Setting > Network Drive Setup command, see section 5.5, "FTP Server Function."

6.3 Settings Dialog Box (WT3000)

1. Choose **Setting > WT Setting** from the menu bar, or click **Setup**.

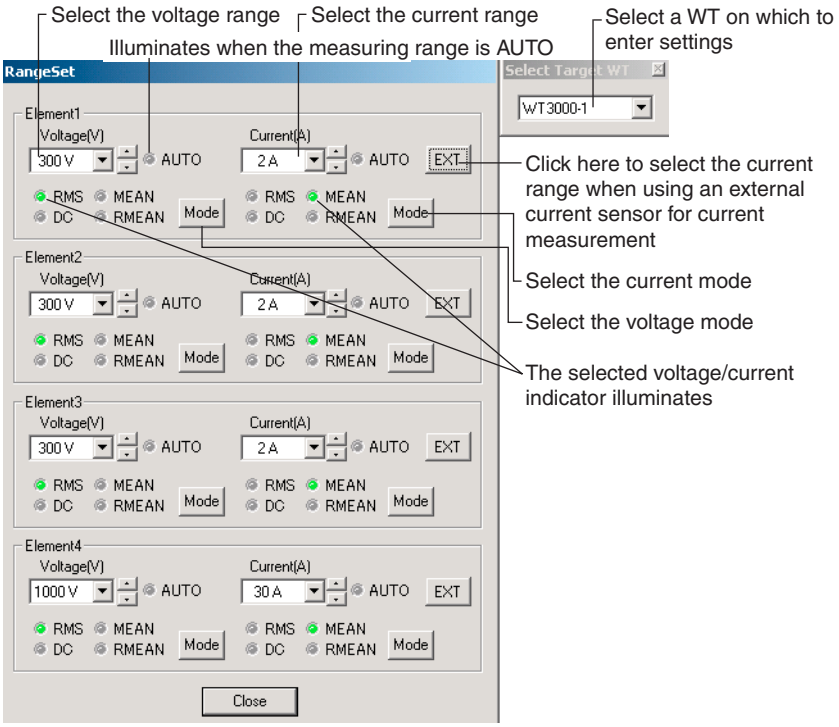


You can also display the dialog box for selecting the measuring range and voltage/current mode by clicking **Range** on the range setting bar.

2. Select the item for which you wish to enter settings. The dialog box for the selected item appears.
3. Change the settings as needed.

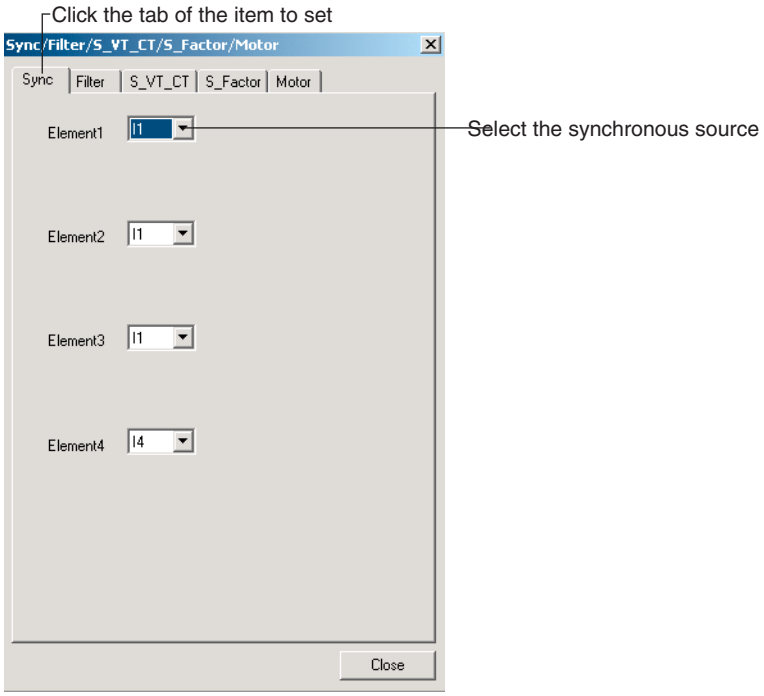
The following shows a display example of the settings dialog box. The Select Target WT dialog box is displayed simultaneously with all setting screens. Enter settings after selecting the target WT in the Select Target WT dialog box.

Selecting the Measuring Range and Voltage/Current Mode

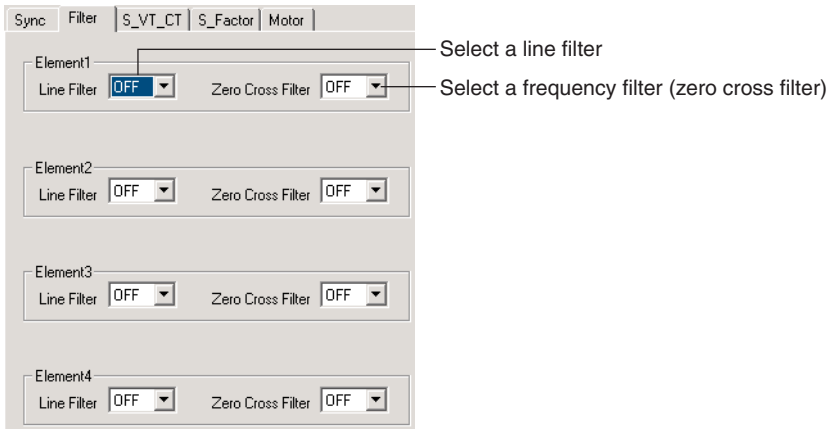


Synchronous Source, Input Filter, Scaling, External Current Sensor Conversion Ratio, and Motor Evaluation Function Settings

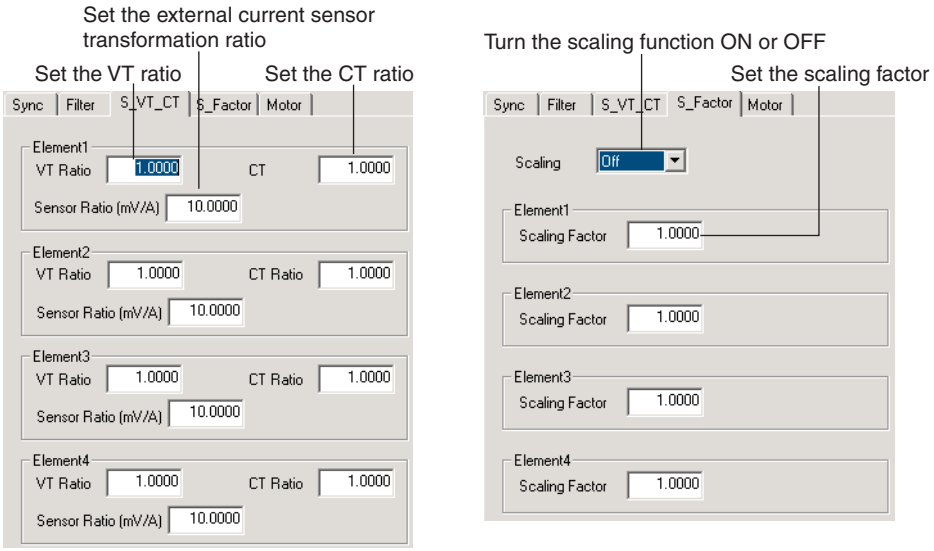
Selecting the Synchronous Source



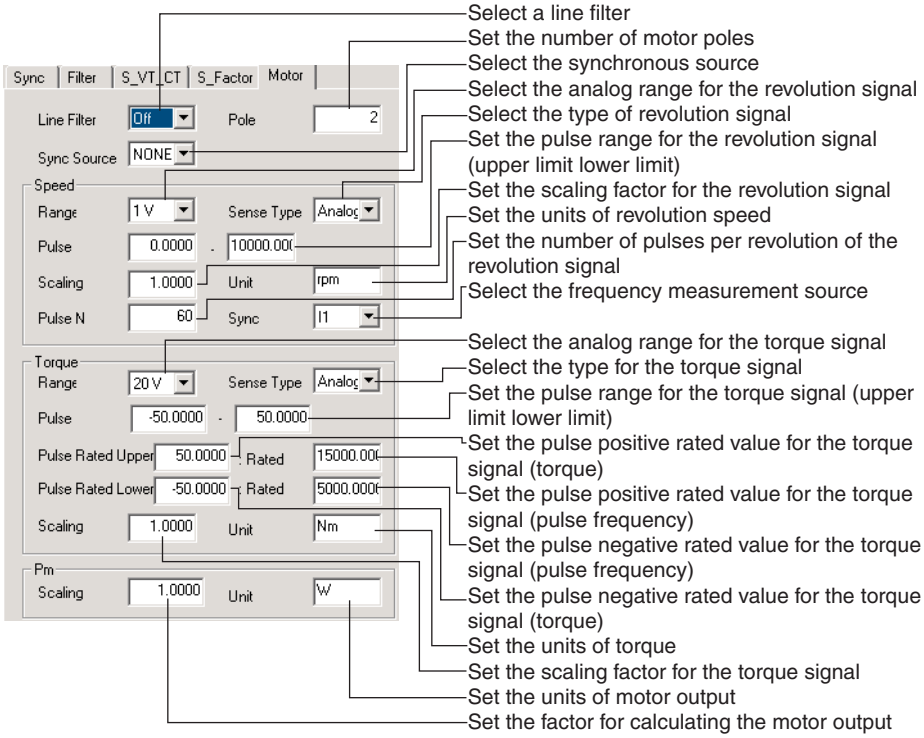
Selecting the Input Filter



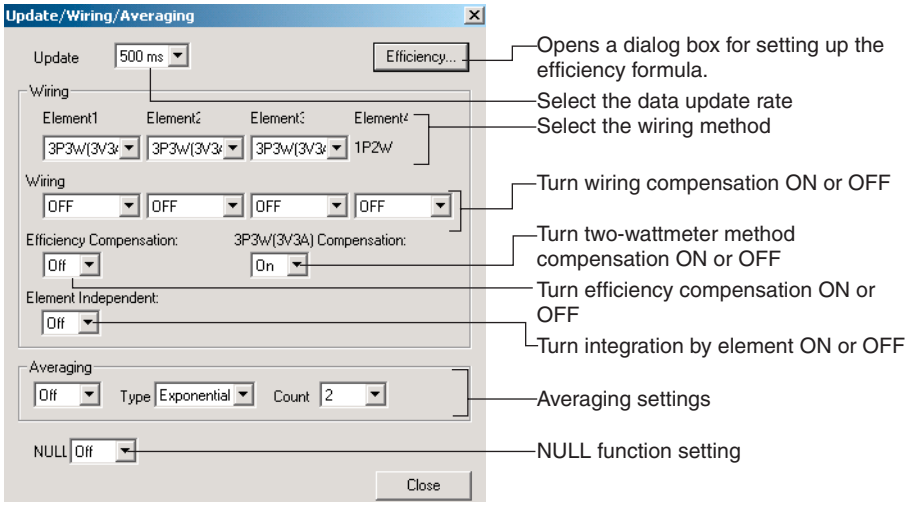
Scaling and External Current Sensor Transformation Ratio Settings



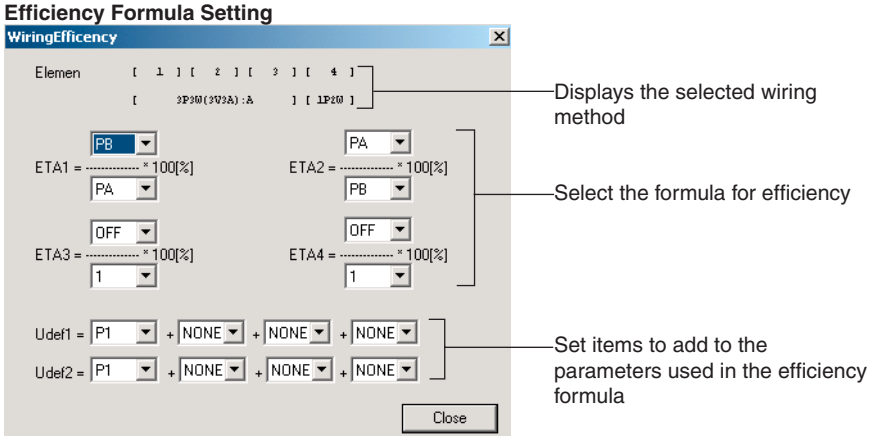
Motor Evaluation Function Settings



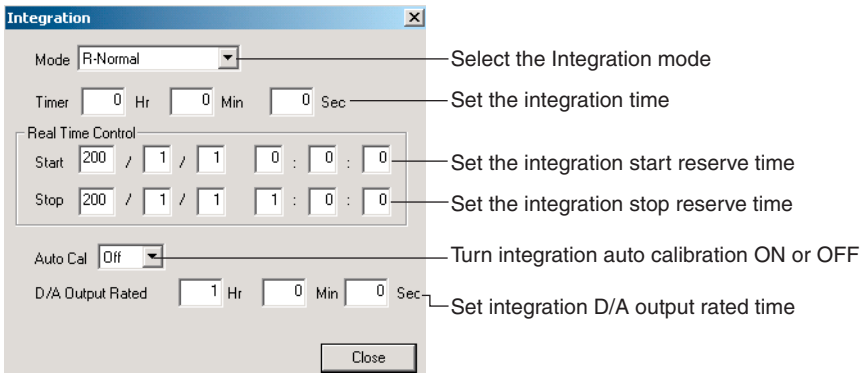
Data Update Rate, Wiring Method, Wiring Compensation, Efficiency Correction, Averaging, Efficiency Equation, and Null Function Settings



Efficiency Formula Setting

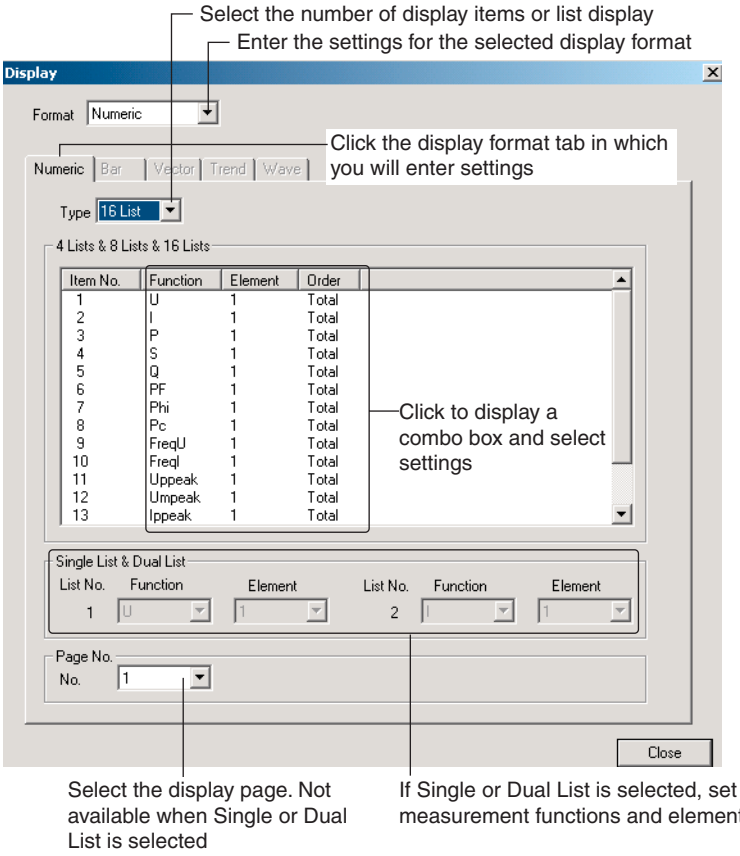


Integration Settings

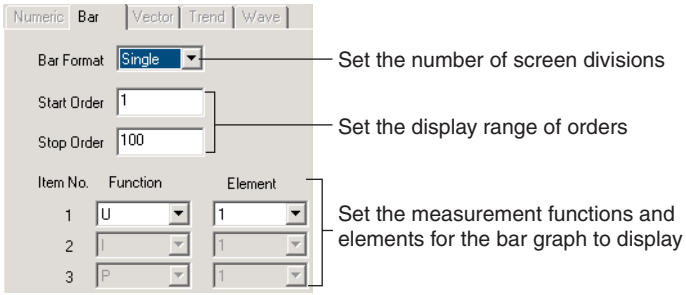


Setting the Display Format

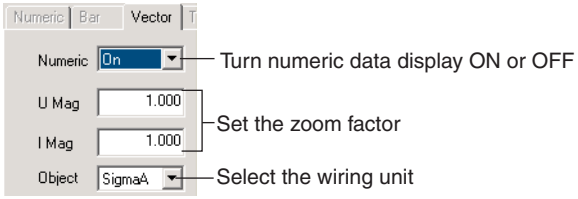
Numeric Value or Harmonics Data Display Format



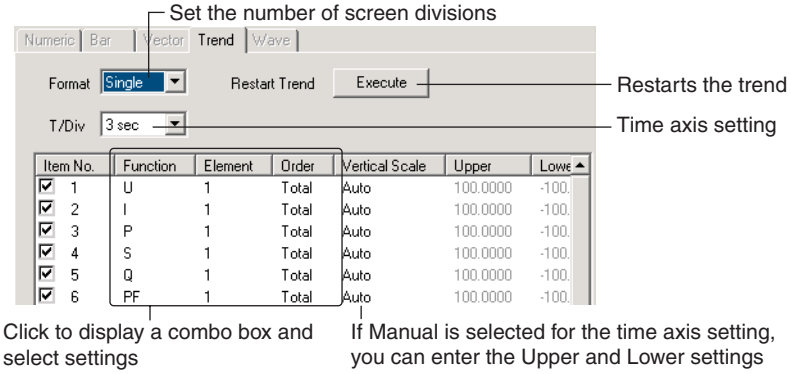
Bar Graph Display Format



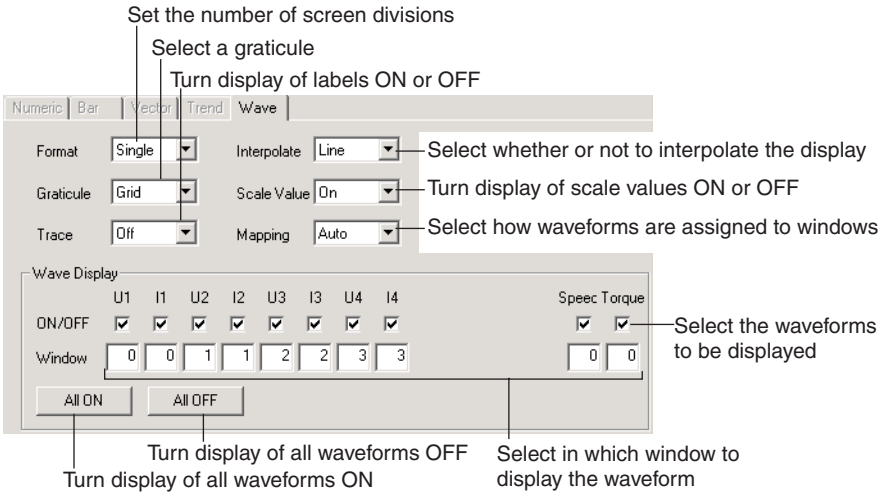
Vector Display Format



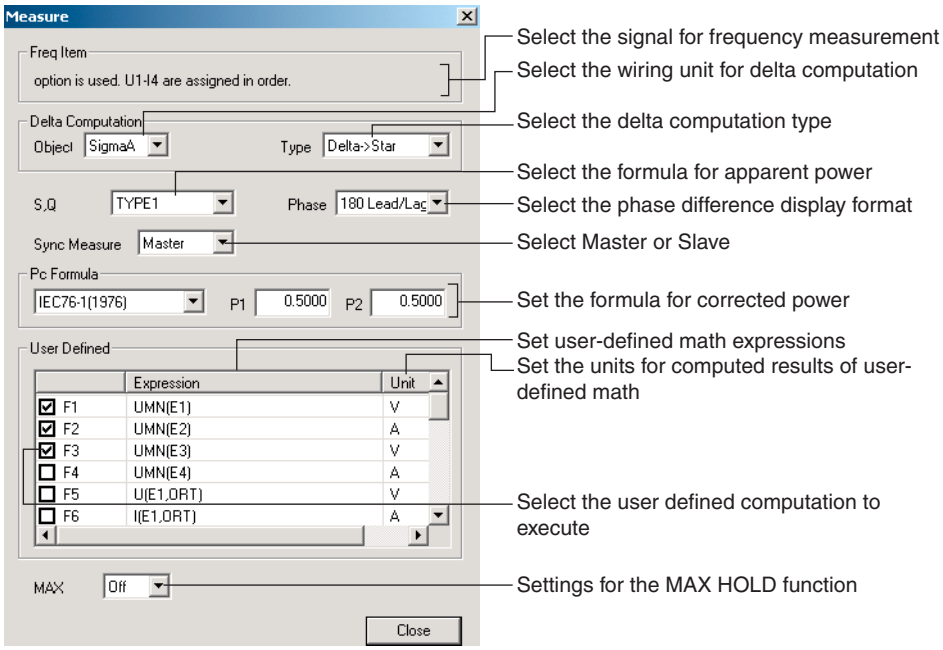
Trend Display Format



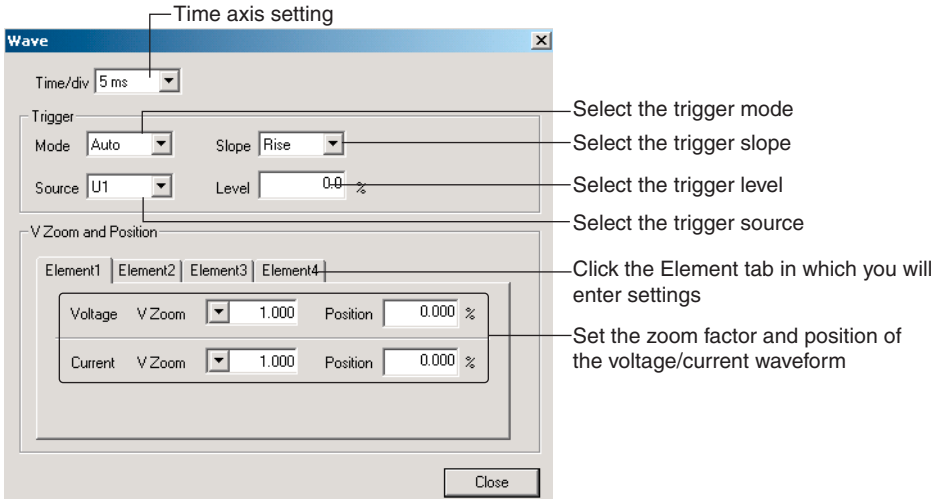
Waveform Display Format



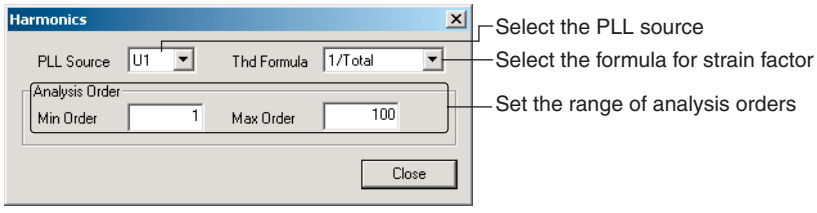
Entering Power Measurement and Computation Conditions



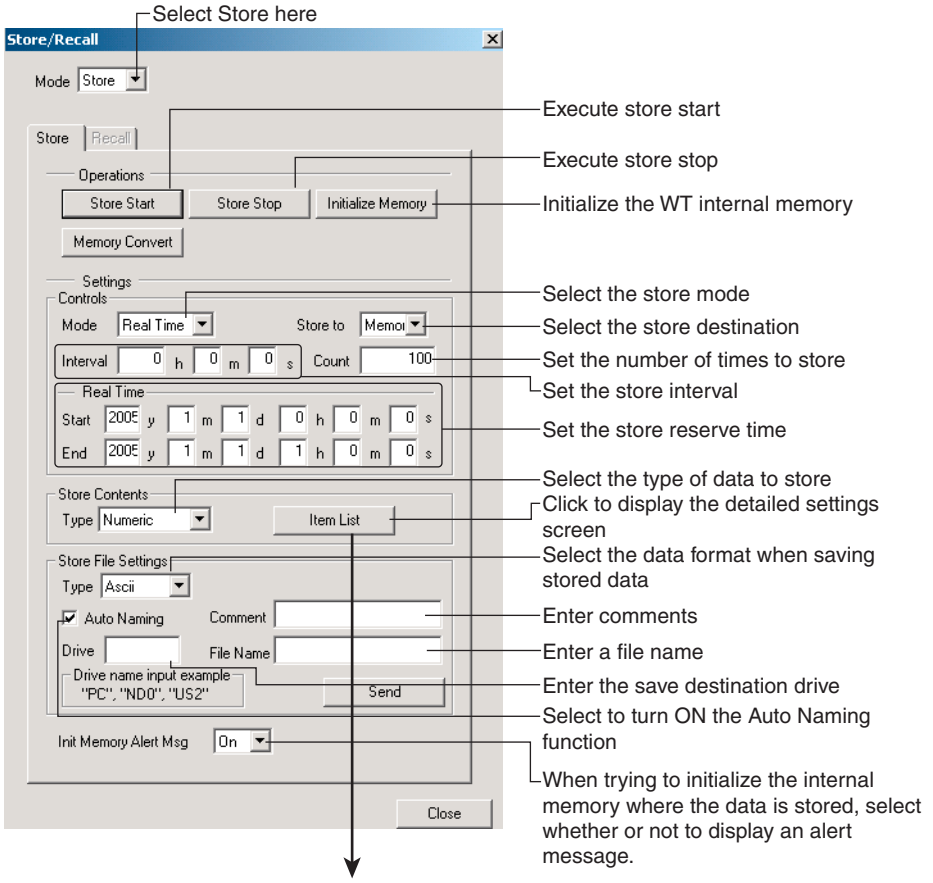
Entering Waveform Display Data Acquisition Conditions and Setting the VZoom and Vertical Position



Harmonic Measurement Settings

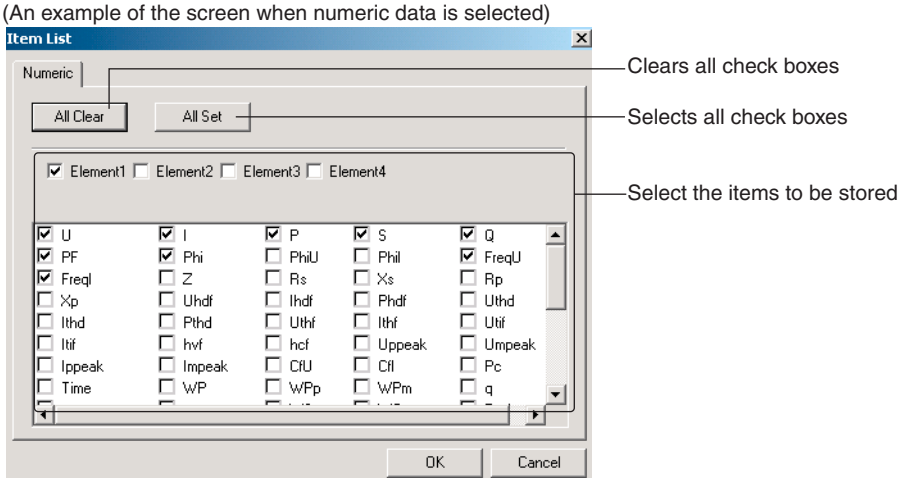


Store Settings

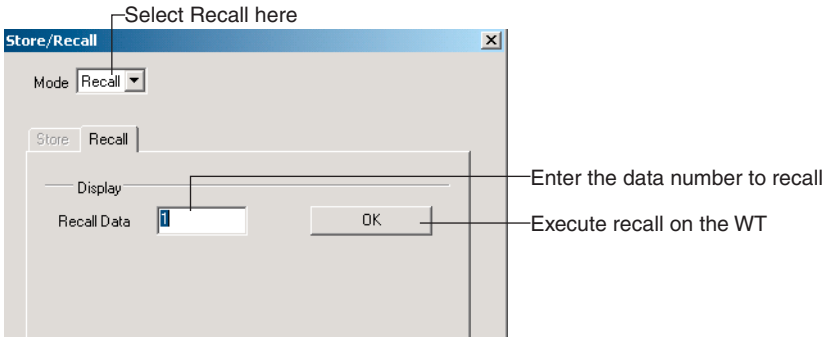


Detailed Setting Screen for Stored Data

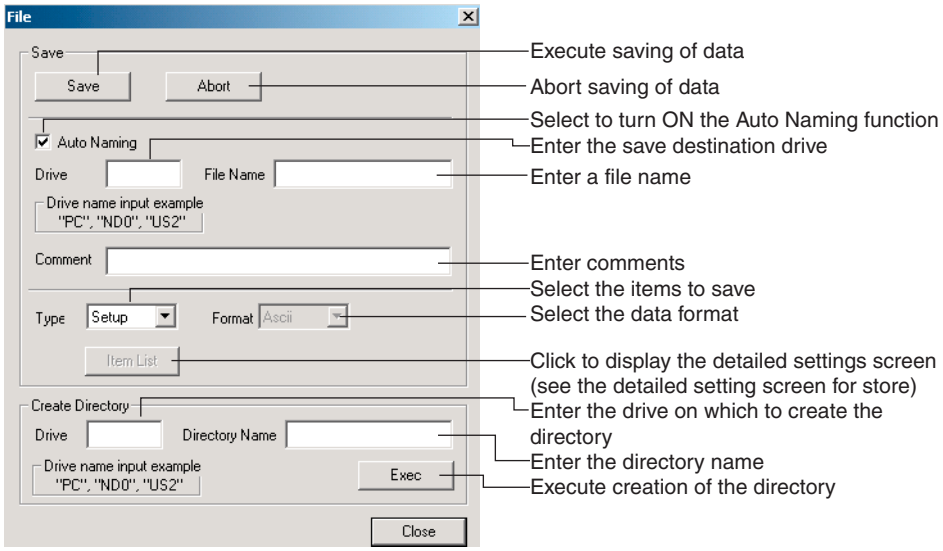
(An example of the screen when numeric data is selected)



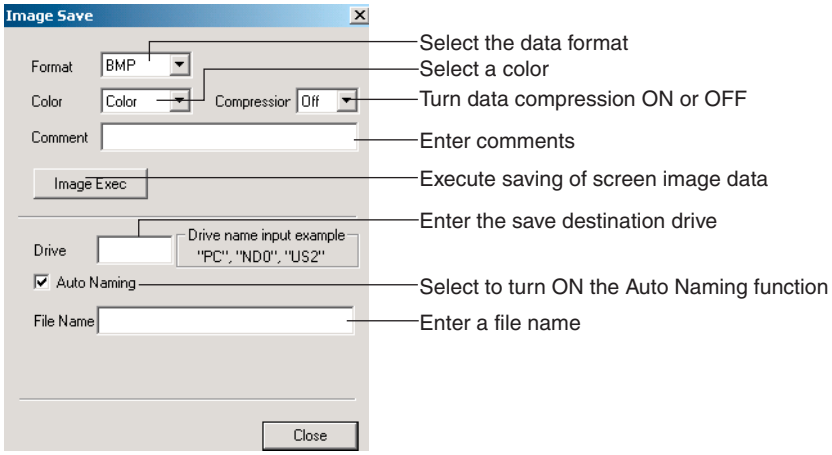
Recall Settings



Data Save Settings

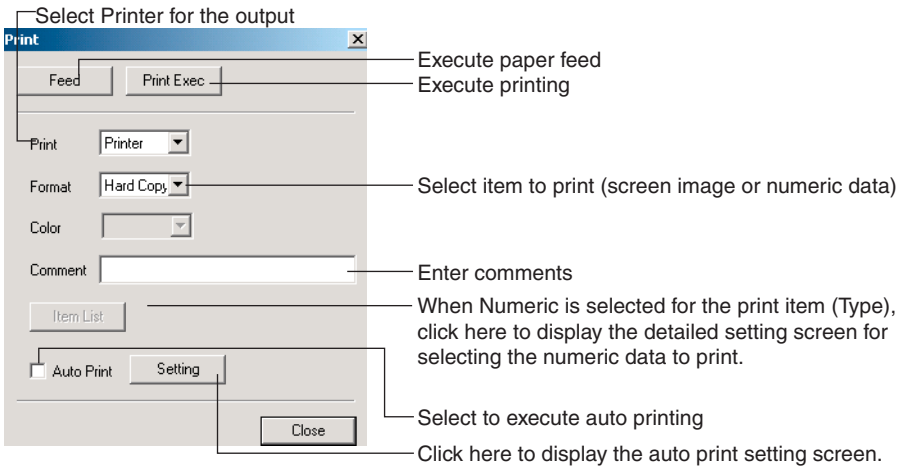


Screen Image Saving Settings

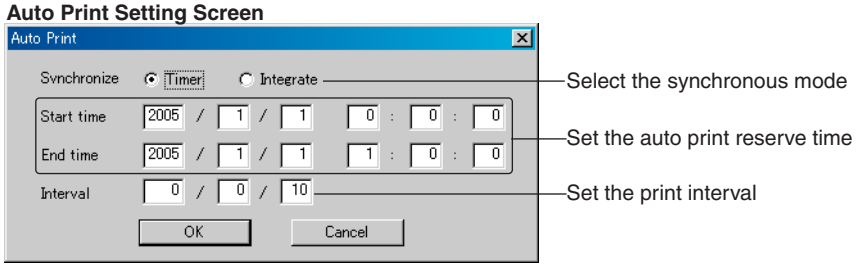


Settings for Printing on the WT's Built-In Printer and Network Printers

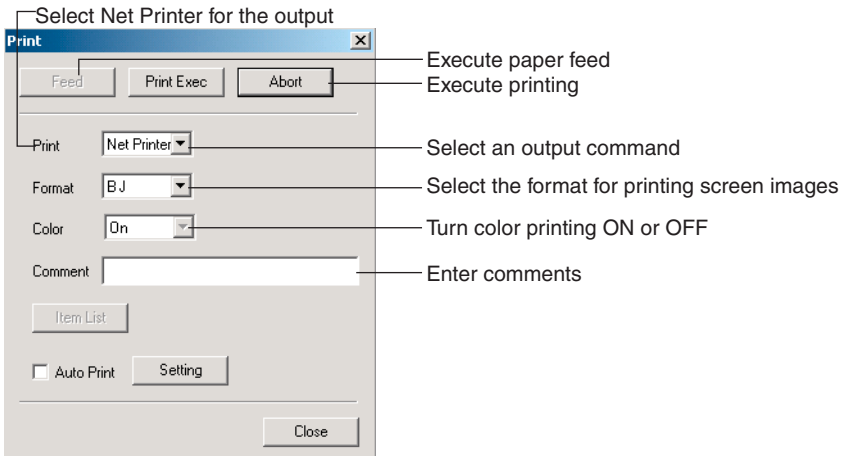
Printing on the WT's Built-In Printer



Auto Print Setting Screen

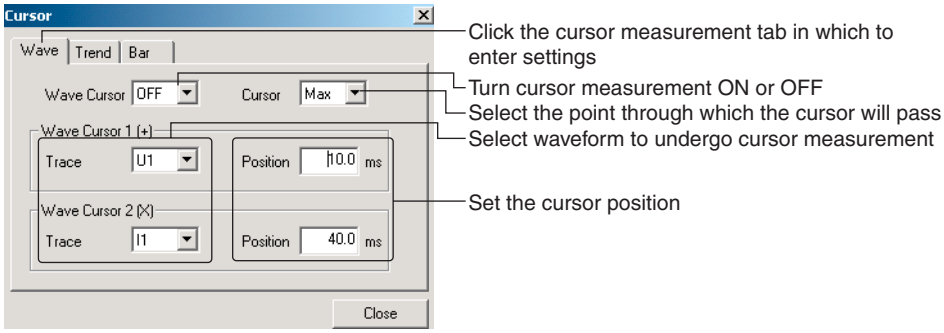


Printing on Network Printers

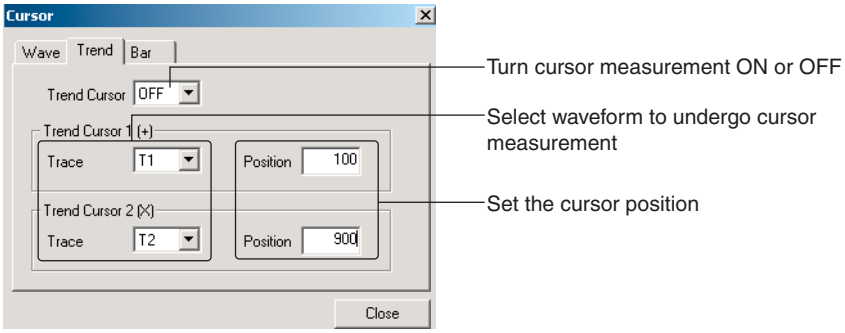


Cursor Measurement Settings

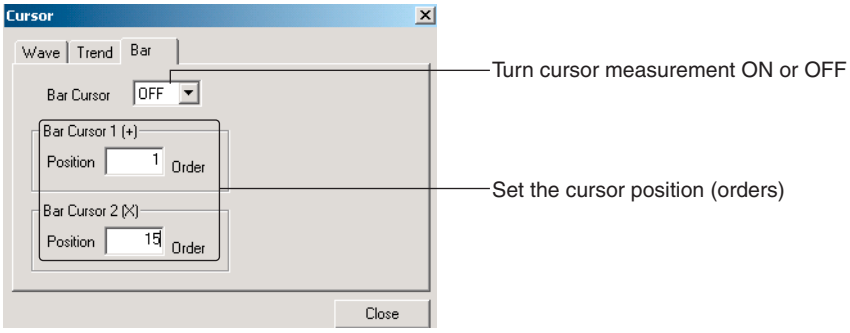
Waveform Cursor Measurement



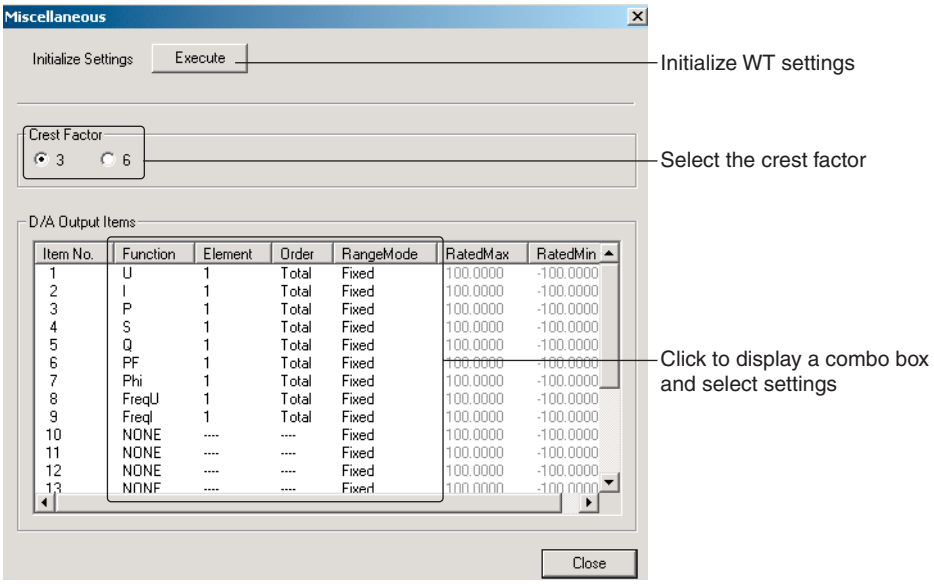
Trend Cursor Measurement



Bar Graph Cursor Measurement



Initializing the WT, Selecting the Crest Factor, and Entering D/A Output Settings



For information on initializing the WT, see the WT user's manual.

FTP Server Function Settings

For information on the WT Setting > Network Drive Setup command, see section 5.5, "FTP Server Function."

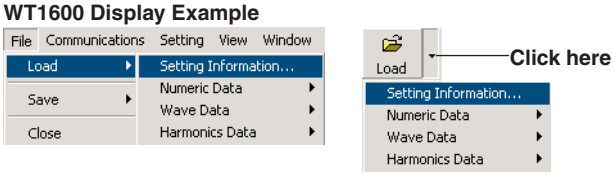
6.4 Sending Setting Files to the WT1600

If you load settings saved in the PC on WTViewer, you can send those settings to the WT1600. The following explains operations when WTViewer is in On-Line mode.

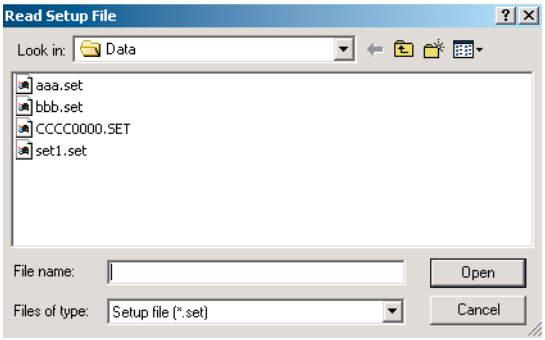
- After loading settings saved on the PC when WTViewer is in Off-Line mode, if you change to On-Line mode, the dialog box in step 3 below appears for you to select whether to send the settings to the WT1600.
- This function is not applicable to the WT3000.

1. Choose **File > Load > Setting Information**, or click **Load** and select Setting Information. The Read setup file dialog box appears.

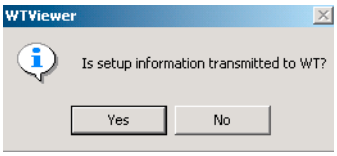
WT1600 Display Example



2. Select a settings file, then click **Open**.



3. Click **Yes**. The setting information is sent to the WT1600.



7.1 Malfunction? First, Investigate.

When messages appear on your PC screen, refer to section 7.2, “Error Messages.” If service is required, or if corrective actions fail to resolve the problem, contact your dealer or Yokogawa representative.

Symptoms and Corrective Actions
Unable to change settings for Function, Element, and Order in each dialog box. Unable to change settings for Function, Element, and Order in each dialog box. If you click in the Function, Element, or Order areas, a combo box appears. Select the necessary items.
Download is started, but waveforms, bar graphs, vector, and trends are not displayed. After stopping data downloading (see section 3.2), select the items you wish to display from the View menu, and after the display screen opens, begin the data download again.
The check box in the waveform display screen is selected and data download started, but the waveform is not displayed. • Click Detail. Change the Position and VZoom values in the Wave Detail dialog box (see section 3.6). • When in Harmonics mode, only the waveform of the element determined by the wiring settings is displayed. Check whether the wiring settings are correct.
If the wave or trend graph is displayed, it extends beyond the screen. Click the Details in the display screen, then select Auto Ranging or change the Upper, Lower, and V Zoom settings to appropriate values (see section 3.6 or 3.9).
Waveforms saved by the WT in Off-Line mode cannot be displayed. • Open the waveform screen from the View menu. • To display waveform data saved on the WT in Off-Line mode with the .wvf extension, you must load the setting information file for the WT from the time the data was saved. Load the setting information before loading the waveform data.
In Integration mode, integration starts on elements other than those selected. Independent Element Integration may be turned OFF. Choose Setting > WT Setting > Integration, then check that Independent Control is turned ON. Even when the Update Rate is changed using the Setting > WT Setting > Update/Wiring/Average/ Max Hold/Null command sequence, the WTViewer screen update rate does not change. The display update rate on WTViewer does not match that of the WT, and depends on the characteristics and communication interface (GP-IB, Ethernet, USB, RS-232) of the PC. If the WT is operating at a high setting such as 50 ms, WTViewer can not keep up, and some data gets skipped. If you want to match the display update rates of the WT and WTViewer, refer to the following items and make appropriate adjustments to your environment. • The WTViewer display update rate will be faster the fewer number of data that are downloaded from the WT to WTViewer. • The ranking of interfaces in terms of fastest to slowest is GP-IB, Ethernet, USB, and RS-232. • Use a PC with fast performance. Example: The WTViewer display update rate can possibly be matched under the following conditions: one unit of the WT, Fast Mode ON, using a communication interface of GP-IB, Ethernet, or USB, and a display update rate on the WT of 100 ms.
When measurement is complete and the measured data history is viewed, data with small numbers is not displayed. Because the number of measurements was large, old data was discarded and cannot be viewed. Change the Temporary Space setting (section 3.3 or 3.5) to increase the amount of temporary memory used. Temporary Space is set in the hard disk on which WTViewer was installed. If the disk is partitioned, set the partition on which WTViewer was installed. Check to make sure that there is sufficient space available on the hard disk or partition (Temporary Space + 200 MB or more).

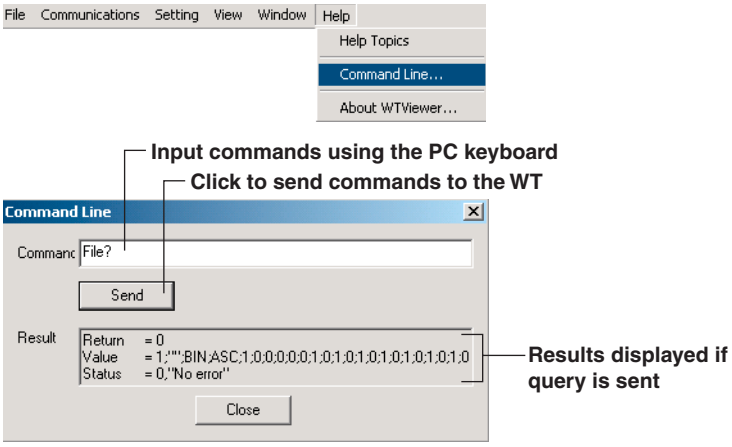
7.2 Error Messages

Message	Corrective Action
Failed to initialize communications. Select cancel. to enter Off-Line mode.	Check the following: • Whether the power to the WT is ON. • Whether the GP-IB/RS-232/Ethernet/USB cable is correctly connected. • For GP-IB, whether a unique GP-IB address is set in the same system. Or, whether the GP-IB address set for the WT and WTViewer are the same. Or, whether the GP-IB communication driver is correctly installed in the PC. • For RS-232, check whether the connection speed settings on the WT and WTViewer match • For Ethernet, check whether the IP address, user name, and password settings on the WT and WTViewer match • For USB, whether a unique ID is set in the same system. Or, whether the ID set for the WT and WTViewer are the same. Or, whether the USB communication driver is correctly installed in the PC.
Please input a value between 0.0001 and 99999.9999. Please input a value between 0.1 and 100. Please input a value between –1.000 and 100.000. Please input a value between –100.0 and 100.0. Please input a value between –130.000 and 130.000. Please input a value between 0 and 5.00. Please input a value between 0 and 500. Please input a value between 0 and 10.00. Please input a value between 0 and 20.00. Please input a value between 0 and 50.0. Please input a value between 0 and 100.0. Please input a value between 0 and 200.0. Please input a value between 0 and 0.500. Please input a value between 0 and 1,000. Please input a value between 0 and 2,000.	The entered value is outside the allowable range. Enter a value within the range.
Problem with the relationship between the start and stop date/time.	Confirm the start and stop time settings for integration and storing.
Please input a correct file name.	Reenter settings in the WT Setting menu such as turning Auto Naming ON, setting the file name, and keeping the file name within eight characters.
Please input a directory name.	Reenter settings in the WT Setting menu such as the directory name, and keep the directory name within eight characters.
Please input a drive name.	Reenter settings in the WT Setting menu such as the drive name, or set a correct drive name such as FD0 or SC4-01.
Failed to secure memory.	Check whether the hard disk has sufficient free space. Temporary Space, the temporary memory storage area (see section 3.3 or 3.5) is set in the hard disk on which WTViewer was installed. If the disk is partitioned, set the partition on which WTViewer was installed. Check to make sure that there is sufficient space available on the hard disk or partition (Temporary Space + 200 MB or more).
The difference in start and stop is 10 orders.	Set the difference in the Start Order and Stop Order for the bar graph to 10 or more.
There is no response from the WT. Switching to Off-Line mode.	Check whether the power to the WT is turned ON, or the cable connecting the PC and main unit is correctly connected.
An error occurred while transferring setting information to the WT. Restore settings prior to transfer?	Check whether the power to the WT is turned ON, or the cable connecting the PC and main unit is correctly connected.
Illegal value.	Numeric data and harmonic data, Check whether, when these files are loaded, the store start and stop numbers are correct.

7.3 Using the Command Line

Using communications commands, you can perform communication between the WT and WTViewer. For details on communications commands, see the WT Communications Interface User's Manual.

1. Choose **Help > Command Line** from the menu bar. The Command Line dialog box is displayed.



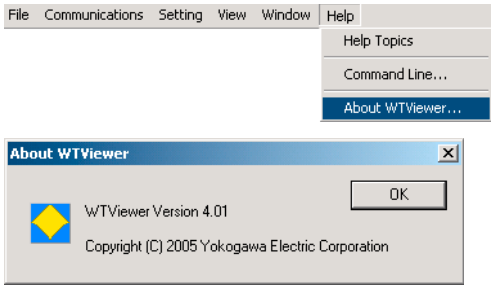
2. Enter communications commands in the Command field using the PC keyboard.
3. Click **Send**. The command is sent to the WT. If a query was sent, the results are displayed in the Result field.

Note

If you change a setting on the WT using the command line, those changes will not be reflected in the setting change dialog boxes accessed by choosing Setting > WT Setting in the menu bar (see section 6.2 or 6.3).

7.4 Checking Version Information

Choose **Help > About WTViewer** on the menu bar. The version of the software is displayed.



8.1 Functions

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Measurement mode</td><td>Normal Measurement mode, Harmonic Measurement mode (WT1600 only)</td></tr>
<tr><td>Data Formats That Can Be Saved</td><td>The data formats (extensions) that can be saved by WTViewer are given in the table below. Note that CSV format files cannot be read by WTViewer.
<table>
<tr><th>Type</th><th>Setting</th><th>Numerical Data</th><th>Waveform Data</th><th>Harmonic Data</th></tr>
<tr><td>WT1600</td><td>CSV frmt (.csv)
BIN frmt (.set)</td><td>CSV frmt (.csv)
BIN frmt (.wta)</td><td>CSV frmt (.csv)
BIN frmt (.wta)</td><td>CSV frmt (.csv)
BIN frmt (.wta)</td></tr>
<tr><td>WT3000</td><td>-*1
CFG frmt (.cfg)</td><td>CSV frmt (.csv)
WTN frmt (.wtn)</td><td>CSV frmt (.csv)
WTW frmt (.wtw)</td><td>-*2
-*2</td></tr>
</table>
*1 If WTViewer is working with the WT3000, the function whereby settings are saved in CSV format is not available.
*2 With the WT3000, since harmonics are also measured along with normally measured numerical data measured in normal measurement mode, harmonic data is also saved when saving numerical data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.</td></tr>
<tr><td>Data Formats That Can Be Loaded</td><td>Files that can be loaded by WTViewer are given in the table below. Data saved using Auto Saving (described in section 3.3) cannot be loaded by WTViewer.
<table>
<tr><th>Type</th><th>Setting</th><th>Numerical Data</th><th>Waveform Data</th><th>Harmonic Data</th></tr>
<tr><td>WT1600</td><td>SET frmt (.set)</td><td>WTViewer frmt (.wta)</td><td>WTViewer frmt (.wta)
WT1600 frmt (.wvf)*3</td><td>WTViewer frmt (.wta)</td></tr>
<tr><td>WT3000</td><td>CFG frmt (.cfg)</td><td>WTN frmt (.wtn)</td><td>WTW frmt (.wtw)</td><td>-*4</td></tr>
</table>
*3 Load the setting information (with the .set extension) before loading the waveform data in WT1600 format (with the .wvf extension). If the settings are not loaded, the waveform will not be displayed.
*4 With the WT3000, since harmonics are also measured along with normally measured numerical data measured in normal measurement mode, harmonic data is also saved when saving numerical data. This differs from the WT1600 in which harmonic data is measured and saved exclusively.</td></tr>
<tr><td>Data Display Update Rate</td><td>Differs depending on the PC processing speed, type of communication interface used, and number of data loaded from the WT to WTViewer.</td></tr>
<tr><td>Display Windows</td><td>Numeric View
Displays numeric data acquired from the WT by WTViewer in normal measurement mode. On the WT3000, harmonic data can also be displayed.
Harmonics List
Displays harmonic data acquired from the WT by WTViewer in harmonic measurement mode. On the WT1600, harmonic measurement mode must be selected. On the WT3000, other numeric data is displayed together in the numeric display screen in normal measurement mode as above.
Trace
Displays waveform data acquired from the WT by WTViewer.
Bar Graph
Displays a bar graph of harmonic components at each order during harmonic measurements. On the WT1600, harmonic measurement mode must be selected.
Vector
Displays the relationship between the phase difference of the fundamental wave of each element and the amplitude (RMS value) when performing harmonic measurements. On the WT1600, harmonic measurement mode must be selected.
Trend
Displays the trends of all measurement functions for the object being measured during normal and harmonic measurement</td></tr>
<tr><td>Entering Settings on the WT</td><td>All functions that can be done with communication commands</td></tr>
</table>

8.2 System Configuration

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>PC</td><td>CPU
Celeron 500 MHz or higher (recommended)
Memory
256 MB or more recommended
VRAM
4 MB or more
HDD
500 MB or more of free space</td></tr>
<tr><td>OS</td><td>Windows 98 SE, Windows ME, Windows NT, Windows 2000, or Windows XP.</td></tr>
<tr><td>Screen Resolution</td><td>1024 x 768 pixels or higher</td></tr>
<tr><td>Communication Interface</td><td>GP-IB
NI (National Instruments) AT-GPIB, PCI-GPIB, PCI-GPIB+, PCMCIA-GPIB, PCMCIA-GPIB+, with driver NI-488.2M version 1.60 or later.
RS-232
An available COM port on the PC
ETHERNET
10BASE-T or 100BASE-TX compatible Ethernet port
USB
A USB Rev. 1.1 or later USB port

Table of WT Compatibility
<table>
<tr><th>WT Model</th><th>GP-IB</th><th>RS-232</th><th>ETHERNET</th><th>USB</th></tr>
<tr><td>WT210</td><td>Y</td><td>Y</td><td>x</td><td>x</td></tr>
<tr><td>WT230</td><td>Y</td><td>Y</td><td>x</td><td>x</td></tr>
<tr><td>WT1600</td><td>Y</td><td>Y</td><td>Y</td><td>x</td></tr>
<tr><td>WT3000</td><td>Y</td><td>Y</td><td>Y</td><td>Y*1</td></tr>
</table>
Y: Supported*2, X: Not supported
*1 In order to perform communications with a personal computer (hereinafter, PC) via a WT3000 with a USB interface, a USB driver must be installed in the PC.
*2 The installed communication interface type differs depending on the specifications of the WT.</td></tr>
<tr><td>WT Firmware (ROM) Versions Supported by WTViewer</td><td>
<table>
<tr><th>WT Model</th><th>Firmware Version</th></tr>
<tr><td>WT210*3</td><td>1.06 or later</td></tr>
<tr><td>WT230*3</td><td>1.06 or later</td></tr>
<tr><td>WT1600</td><td>2.01 or later</td></tr>
<tr><td>WT3000</td><td>2.01 or later</td></tr>
</table>
*3 For information about the WT210/WT230, see the WTViewer help menu.</td></tr>
</table>

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