User's Manual

Model 760122 Application Software WTViewer

YOKOGAWA
Yokogawa Meters & Instruments Corporation

IM 760122-01E
10th Edition

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Foreword

Thank you for purchasing WTViewer application software (Model 760122) for the WT210*/WT230*, WT500, WT1600, WT1800, and WT3000. 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.
* 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, WT500, WT1600, WT1800, and WT3000, 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

- 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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Notes about Using This Software

Storing the CD-ROM

Keep the original CD-ROM for this software in a safe place. To use this software, install it on a personal computer (hereinafter, PC) hard disk, and run it from the PC.

Using the Software

- In order to perform communications with a PC via a WT500, WT1800, or WT3000 with a USB interface, a USB driver must be installed in the PC. The driver can be downloaded from the Web page below. The installation procedure is also available on the same page.

  https://y-link.yokogawa.com/YL000.po

- 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.
- While using the software, do not perform the following operations. Doing so may cause errors.
  - Perform operation on software other than this software
  - Perform operation on the WT
- Disable the PC's standby mode or sleep mode. When a PC goes into standby mode or sleep mode, it may stop this software's operations.
- If a connection error disrupts the connection between the WT and the PC, turn the WT OFF and then ON again.

How to Use This Manual

Structure of the Manual

This user's manual consists of the following sections.

Chapter	Title	Description
1	**WT Communication Control Settings**	Explains how to connect the WT to a PC.
2	**Installing, and Running and Exiting the Software**	Explains how to install and start this software.
3	**Acquiring Measured Data and Settings**	Explains how to load measured data and setting information.
4	**Displaying Measured Data**	Explains how to display measured data.
5	**Saving and Transferring Data**	Explains how to save and transfer setting information and measured data.
6	**Entering Settings on the WT (On-Line Mode Only)**	Explains how to entering Settings on the WT.
7	**Communication Monitor**	Explains how to monitor the communication commands and data that are exchanged between a PC and the WT.
8	**Other Functions**	Explains how to arrange windows, use the help function, and display the software's version information.
9	**Troubleshooting**	Lists various error messages.
10	**Specifications**	Lists the specifications of the software.
	Index	

Software Versions That This Manual Applies To

This document covers version 8.11 of WTViewer. A WTViewer version upgrade is required to support all* of the WT210, WT230, and WT3000 models. The upgrade program can be downloaded from the Web page below.

* See page xii for the WT firmware versions supported by WTViewer.

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Product Overview

WTViewer allows you to use the following functions when a PC is connected to the WT.

- Load the data measured on the WT and settings into the PC and display and save the data.
- Display and transfer files on the WT (FTP client/server function).
- Remotely control the WT.

Up to four WTs (only one WT if the communication interface is RS-232) can be connected to the PC, and the measured data of multiple WTs can be loaded.

On-Line and Off-Line Modes

WTViewer operates in two different modes: On-Line and Off-Line.

On-Line Mode

In On-Line mode, you can use a communication interface in the table below 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*1
WT210	Y	Y	x	x
WT230	Y	Y	x	x
WT500	Y	x	Y(VXI11)	Y(USB-TMC)
WT1600	Y	Y	Y	x
WT1800	Y	x	Y(VXI11)	Y(USB-TMC)
WT3000	Y	Y	Y	Y

Y: Supported*2, X: Not supported

*1 In order to perform communications with a personal computer (hereinafter, PC) with a USB interface, a USB driver must be installed in the PC. The driver can be downloaded from the Web page below.
https://y-link.yokogawa.com/YL000.po

*2 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.

Off-Line Mode

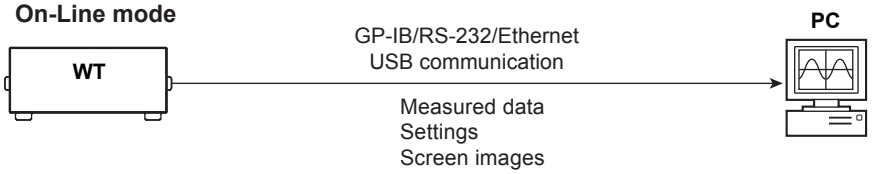
In Off-Line mode you can load and display various kinds of files on WTVewer that were saved by WTViewer* without the WT and PC being connected.

* For details on the data formats in which WTViewer can save, and the data formats that can be loaded by WTViewer, see page xi and xii.

Note

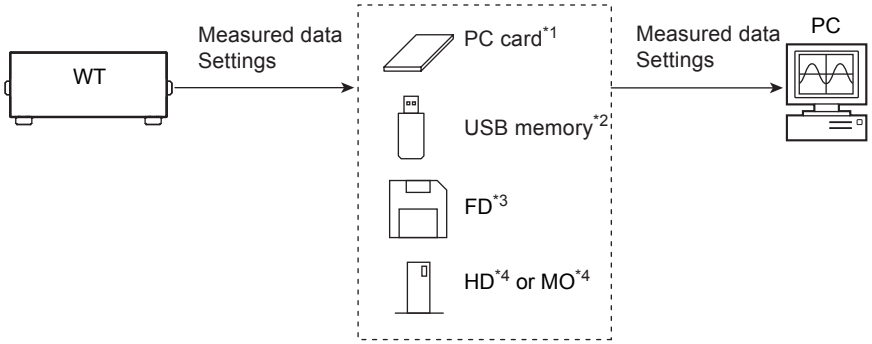
File data that were saved from the WT to the memory medium can be loaded onto the PC using the “File Reader” software program that starts automatically. The data can be displayed on the PC or saved in CSV format on the PC’s memory media.

On-Line mode



Loads measured data from the WT at the display update rate of the PC to be displayed on the screen and saved on a storage medium. Measured data, settings, and screen images can be transferred between the WT and the PC.

Off-Line mode



*1 WT3000 only.
*2 WT500, WT1800 and WT3000 only.
*3 WT1600 only.
*4 WT1600 only. Connect using SCSI.

Loads the data measured on the WT that has been saved to the storage medium and displays the data on the screen or saves the data to a storage medium on the PC.

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.

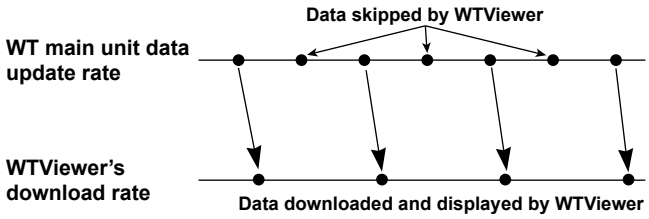
Numeric View Displays numeric data from the WT during normal measurement. On the WT500, WT1800 and WT3000, numeric harmonic data can also be displayed.
Harmonics List (WT1600) Numerically displays measured values from the WT during harmonic measurement. Select when using the WT1600.
Wave Displays waveform 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 .
High Speed Numeric (WT1800) Displays numeric data from the WT during high speed data capturing.
High Speed Trend (WT1800) Displays the trends of all measurement functions for the object being measured during high speed data capturing.
Waveform computation (WT3000) Display the result of various waveform computations performed on the waveform display data loaded from the WT.
FFT (WT3000) Displays the power spectrum of the input signal through FFT (Fast Fourier transform).
Cycle-by-cycle measurement (WT3000) Displays the voltage, current, power, and other parameters for each cycle of the AC input signal.
Numeric View (Synchronization Mode, WT1600, WT1800 and WT3000) This is the display when in Normal Mode (Synchronization Mode). You can display measured values from multiple WTs in a single window. Also, you can create (define) expressions by combining multiple measured values from multiple WTs, and display the results of computations using those expressions. For example, you can find total power by adding measured power values from two WTs, or divide them to find efficiency.

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.

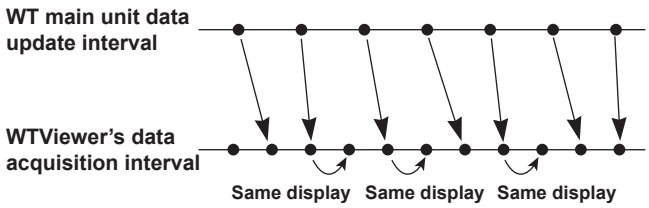
WT Data Update Rate < WTViewer Data Download Rate

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.

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	WT1600	WT500, WT1800	WT3000
Settings*1	CSV format (.csv) BIN format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data	CSV format (.csv) BIN format (.wta)	CSV format (.csv)	CSV format (.csv) WTN format (.wtn)*2
Waveform display data	CSV format (.csv) BIN format (.wta)	CSV format (.csv) WTW format (.wtw)	CSV format (.csv) WTW format (.wtw)
Harmonic data*3	CSV format (.csv) BIN format (.wta)	_	_
Waveform sampling data*4 (Math and FFT data)	_	_	CSV format (.csv) WVF format(.wvf) and (.hdr)*5
Cycle-by-cycle data*4	_	_	CSV format (.csv) CBC format (.cbc)

*1 If WTViewer is working with the WT500, WT1800 or WT3000, the function whereby settings are saved in CSV format is not available.

*2 This format is only available when WTViewer is controlling the WT3000. Numeric data cannot be saved to WTN format when WTViewer is controlling the WT500 or WT1800.

*3 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.

*4 This format is only available when WTViewer is controlling the WT3000. If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.

*5 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

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 4.1) cannot be loaded by WTViewer.

File Types and Extensions

Type	WT1600	WT500, WT1800	WT3000
Settings	SET format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data*1	WTViewer format (.wta)	_	WTN format (.wtn)
Waveform display data	WTViewer format (.wta) WT1600 format (.wvf) and (.hdr)*2,*3	WTW format (.wtw)	WTW format (.wtw)
Harmonic data*4	WTViewer format (.wta)	_	_
Waveform sampling data*5 (Math and FFT data)	_	_	WVF format(.wvf) and (.hdr)*2
Cycle-by-cycle data*5	_	_	CSV format (.csv) CBC format (.cbc)

*1 Numeric data (in WTN format) cannot be loaded when WTViewer is controlling the WT500 or WT1800.

*2 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

*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 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.

*5 This file type is only available when WTViewer is controlling the WT3000.f If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.

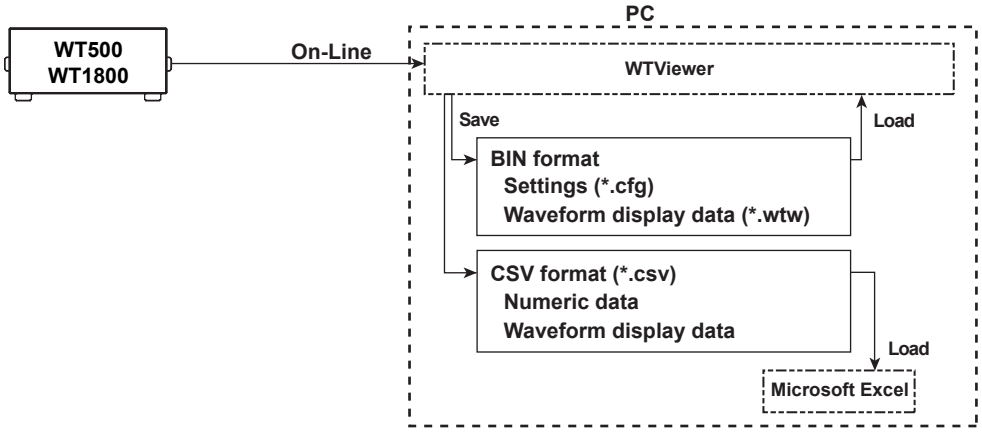
.wtd Files or .wts Files

Measured data files saved by the WT main unit. The WTFileReader program that starts from WTViewer can load files with the .wtd or .wts extension and display them. For details see section 3.4. "Various Load Inclusive of WTFileReader." Note that .wtd or .wts files cannot be loaded directly onto WTViewer.

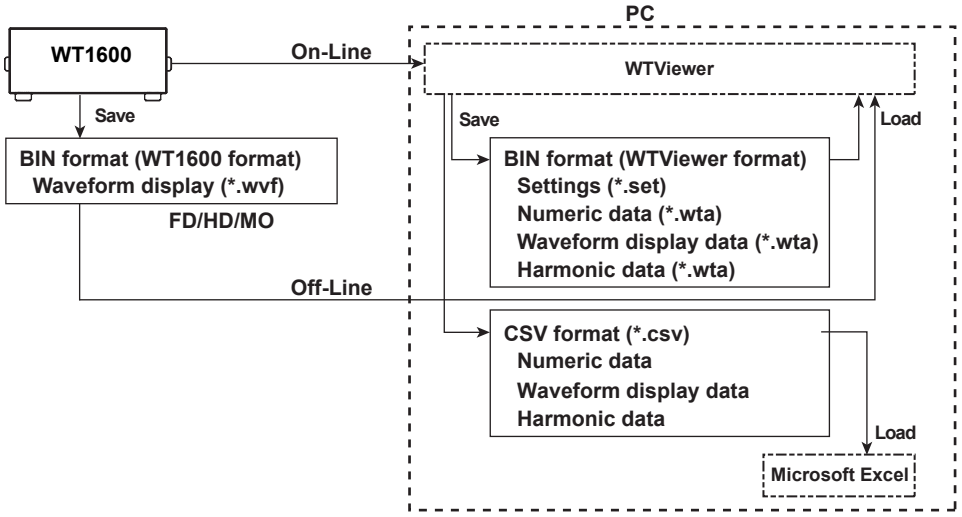
.udf Files

The .udf files contain definitions of expressions composed of combinations of measured values from the WT (WT user defined computation: WTV function). WTV functions are expressions that are defined and saved on WTViewer. They differ from the user-defined functions created on the WT main unit. For details, see section 4.13.

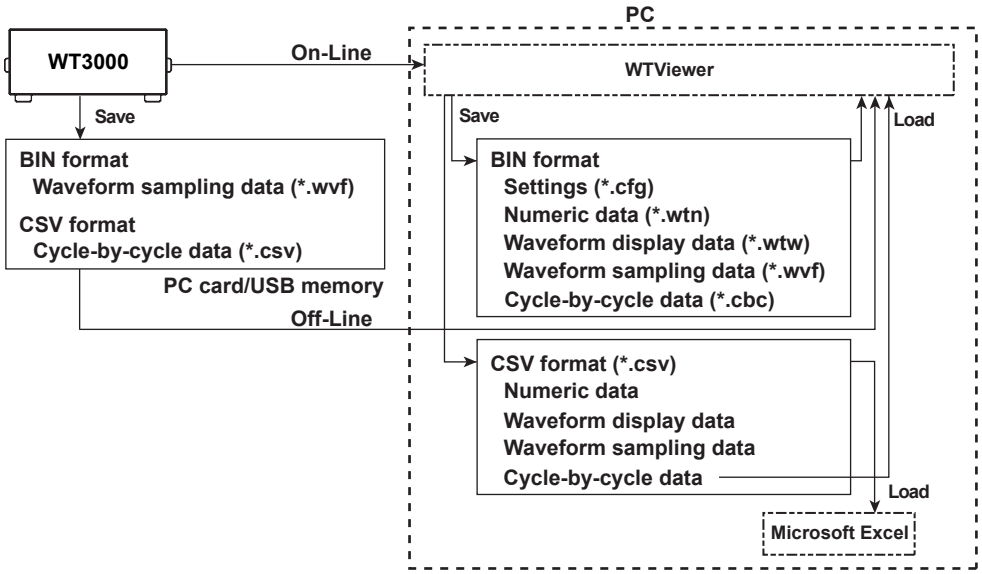
File types and extensions when connected to the WT500 and WT1800



File types and extensions when connected to the WT1600

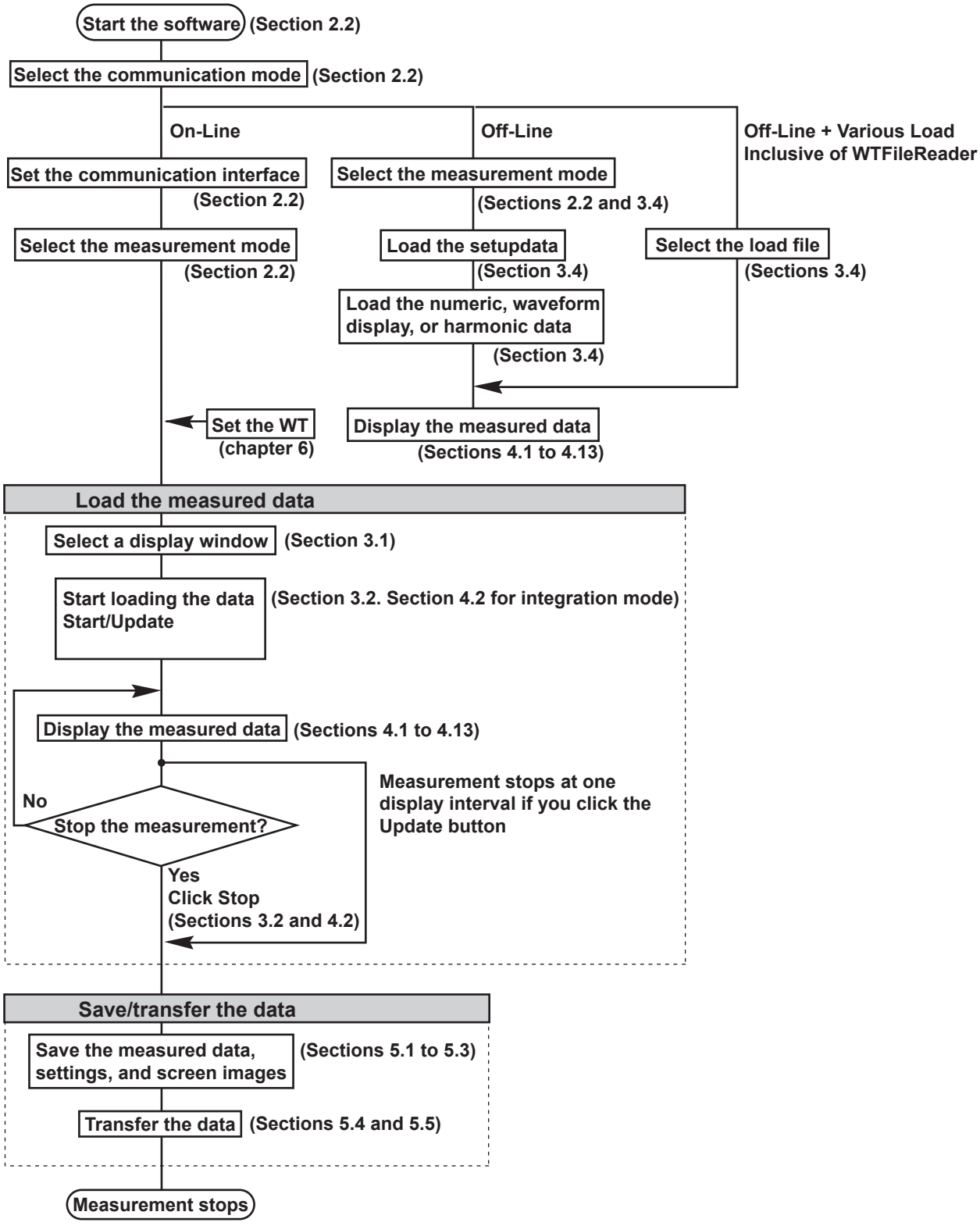


File types and extensions when connected to the WT3000



Flow of Operation

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



System Requirements

PC

- **CPU**
  Pentium 4 1.5 GHz or higher (recommended)
- **Memory**
  1 GB or more (recommended)
- **Hard Disk**
  500 MB or more of free space

Operating System

Microsoft Windows XP, Windows Vista, or Windows 7.

Communications Port

- **GP-IB**
  NI (National Instruments)
  - AT-GPIB, PCI-GPIB, PCI-GPIB+, PCMCIA-GPIB, PCMCIA-GPIB+, or PCIe-GPIB with driver NI-488.2 version 1.60 or later (however, version 2.3 is not supported).
  - GPIB-USB-HS with driver NI-488.2 version 2.8.1.
- **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

- **Screen Resolution**
  1024 x 768 pixels or higher
- **Applicable Operating Systems**
  Must be compaible with the operating systems listed above.

WT Main Unit

The WT types that support communication between the PC and WT using WTViewer are as follows:

WT Model	Firmware Version
WT210*	1.06 or later
WT230*	1.06 or later
WT500	1.01 or later
WT1600	2.01 or later
WT1800	1.01 or later
WT3000	4.01 or later

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

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.

For the communication interfaces that each WT model can use, see page vii.

GP-IB Based Control

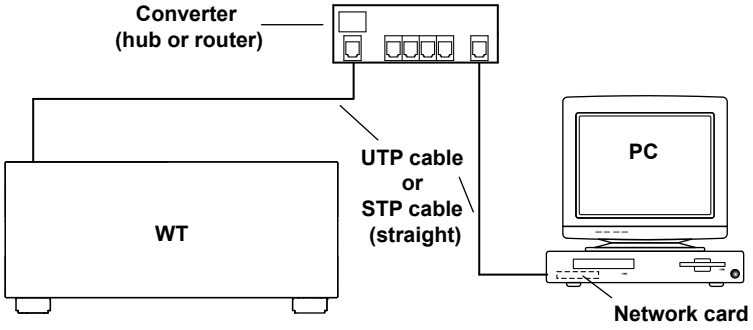
The GP-IB connector on the WT is a 24-pin IEEE Standard 488-1978 connector. Be sure to use a GP-IB cable that complies to the IEEE Standard.
Connect the cable to the GP-IB connector on the rear panel of the WT.
For connections to the PC, use a connector compatible with your PC.

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

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

Use the PC connection port (type B connector) on the rear panel of the WT to connect to the PC.

1.2 GP-IB Control Settings

Procedure

With the WT500 (for Products with the /C1 Suffix Code)

Set the GP-IB control according to the procedures given in section 2.5 in the WT500 Communication Interface User's Manual (IM760201-17E).

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

Set the GP-IB control according to the procedures given in section 1.5 in the WT1600 Communication Interface User's Manual (IM760101-11E).

With the WT1800

Set the GP-IB control according to the procedures given in section 3.4 in the WT1800 Communication Interface User's Manual (IMWT1801-17EN).

With the WT3000

Set the GP-IB control according to the procedures given in section 1.5 in the WT3000 Communication Interface User's Manual (IM760301-17E).

Explanation

Setting the Communication Interface

- With the WT1600 or WT3000
  When using the software in On-line mode via the GP-IB interface, select GP-IB on the WT main unit.
- With the WT500 or WT1800
  There is no need to select the communication interface.

Setting the Address

Set the address of the WT in the following range.
1 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 xv.
- 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)

Set the RS-232 control according to the procedures given in section 2.6 in the WT1600 Communication Interface User's Manual (IM760101-11E).

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

Set the RS-232 control according to the procedures given in section 2.6 in the WT3000 Communication Interface User's Manual (IM760301-17E).

Explanation

Setting the Communication Interface

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

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 WT500 (for Products with the /C7 Suffix Code)

Set the ethernet control according to the procedures given in section 11.3 in the WT500 User's Manual (IM760201-17E).

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

Set the ethernet control according to the procedures given in following sections.

- Section 13.2 in the WT1600 User's Manual (IM760101-01E).
- Section 3.2 in the WT1600 Communication Interface User's Manual (IM760101-11E)

With the WT1800

Set the ethernet control according to the procedures given in following sections.

- Section 19.2 in the WT1800 User's Manual (IMWT1801-02EN).
- Section 1.4 in the WT1800 Communication Interface User's Manual (IMWT1801-17EN)

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

Set the ethernet control according to the procedures given in following sections.

- Section 5.2 in the WT3000 Expansion Function User's Manual (IM760301-51E).
- Section 4.3 in the WT3000 Communication Interface User's Manual (IM760301-17E)

Explanation

Setting the Communication Interface

- With the WT1600 or WT3000
  When using the software in On-line mode via network, select Network on the WT main unit.
- With the WT500 or WT1800
  There is no need to select the communication interface.

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

A USB driver must be installed on the PC. Before beginning the procedure below, download the driver from the following Web page. The installation procedure is also available on the same page.

https://y-link.yokogawa.com/YL000.po

Procedure

With the WT500 or WT1800

The USB control setting item is not present.

With the WT3000 (for Products with the /C12 Suffix Code)

Set the USB control according to the procedures given in section 3.4 in the WT3000 Communication Interface User's Manual (IM760301-17E).

Explanation

Setting the Communication Interface

- With the WT3000
  When using the software in On-line mode via USB interface, select USB on the WT main unit.
- With the WT500 or WT1800
  There is no need to select the communication interface.

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 WT to a PC or other device, you must make sure not to enter the same ID for the WT as the other device.

Note

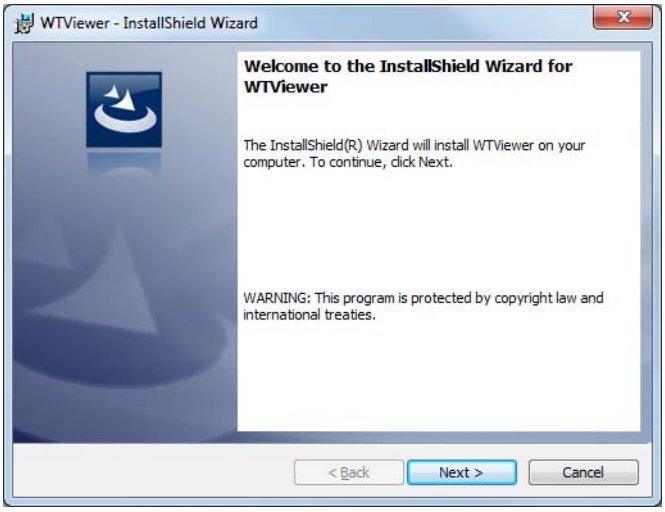
- Do not change the ID while using the USB.
- When connecting WTs to a single PC for control using WTViewer, multiple types of communication interfaces cannot be used at the same time.
- Only when the communication interfaces used are the same, the models are the same, and the specifications included 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 Installing/Uninstalling WTViewer

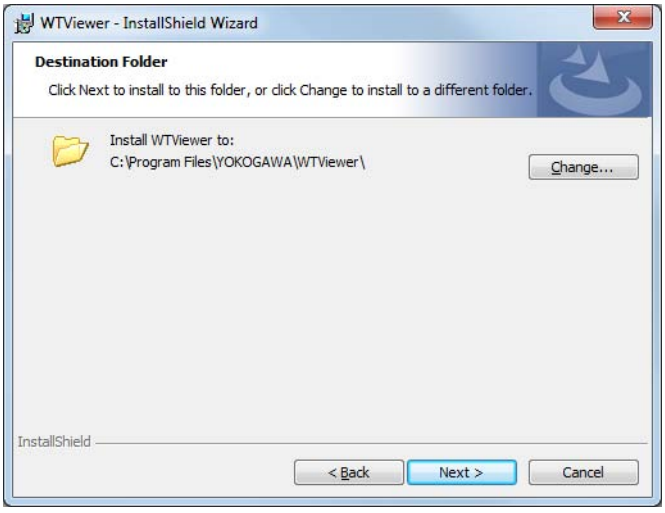
Installing WTViewer

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.
The steps below assume the use of Windows 7.

1. Turn on your PC, log on with the Administrator account, then wait for Windows to start up.
2. Place the installation CD-ROM containing the software into the CD-ROM drive.
3. Double-click **Computer**, then the **CD-ROM** icon.
4. Double-click **Setup.exe**. InstallShield Wizard starts. Follow the displayed instructions and then click **Next**.



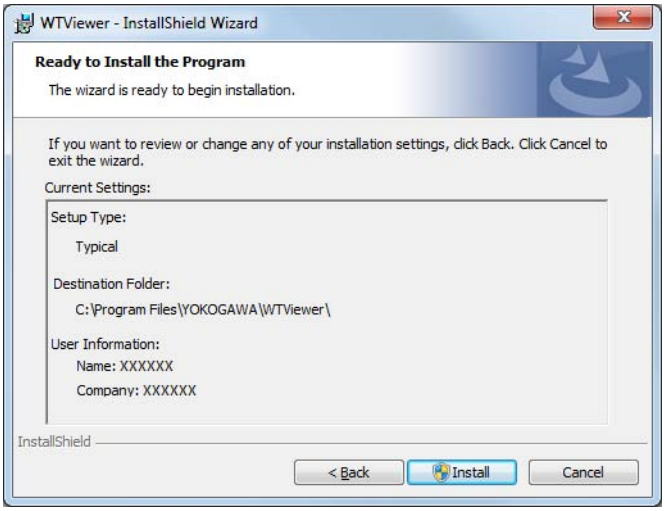
5. The installation folder screen is displayed. The default setting is C:\Program Files\YOKOGAWA\WTViewer. To specify a different installation folder, click **Change**. After specifying the installation folder, click **Next**.



6. The installation start screen is displayed. Click **Install** to start installing WTViewer. The Installer starts the installation of WTViewer.

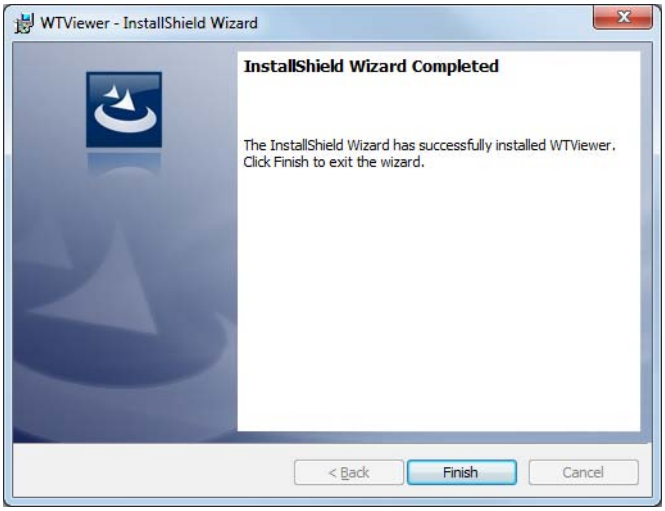
   To return to the previous screen and change installation settings, click **Back**.

   To cancel the installation, click **Cancel**.



7. If the PC's OS is Windows Vista or Windows 7, the User Account Control screen will appear part way through the installation. Click **Yes** to continue with the installation.

8. If the software installation finishes normally, the following screen appears. Click **Finish** to close the Installer. YOKOGAWA > WTViewer and WTFileReader selections will be available when you click Start > All Programs.



Uninstalling WTViewer

The steps below assume the use of Windows 7.

1. Select **Control Panel** from the **Start** menu.
2. Double-click **Uninstall a Program** on Control Panel.
3. Select **WTViewer** in the list displayed for Uninstall a Program, and then right-click, and then click **Uninstall**.
4. A screen appears asking you to confirm whether you want to uninstall WTViewer.

   Click **Yes** to proceed. WTViewer is uninstalled from your PC.

   Click **No** to cancel.
5. If the PC's OS is Windows Vista or Windows 7, the User Account Control screen will appear part way through the uninstallation. Click **Yes** to continue with the uninstallation.

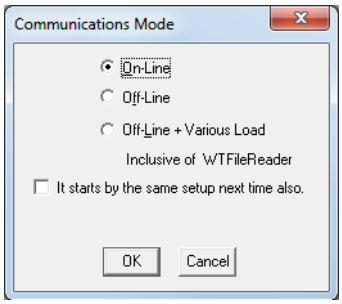
2.2 Running and Exiting the Software (Communication and Measurement Mode Settings)

Running the Software

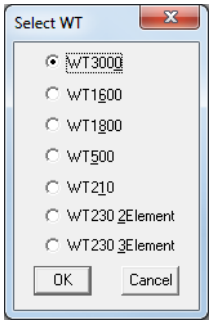
1. From the **Start** menu, choose **Programs** > **YOKOGAWA** > **WTViewer** > **WTViewer**. WTViewer starts. Upon startup, the Communications Mode dialog box is displayed.

Selecting the Communication Mode

2. Select the communication mode, 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.
   - If you select Off-Line + Various Load Inclusive of WTFileReader, various files saved on the WT and WTViewer are loaded after starting up in Off-Line mode. Stored files (*.wtd files or *.wts files) saved on the WT in Float format can be loaded on WTFileReader. Continue on to page 3-12, "Various Load Inclusive of WTFileReader."



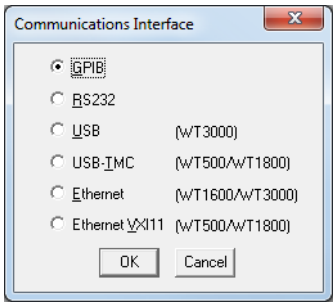
3. If you selected Off-Line in step 2, then select the target WT, and click the OK button. Proceed to step 6 (page 2-7).



Selecting the Communications Interface

4. If you selected On-Line in step 2, then select a communication interface, 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.

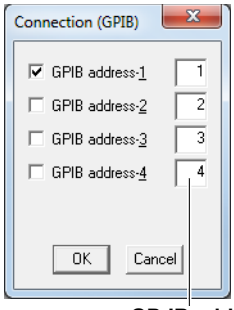


Entering Communications Interface Settings

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

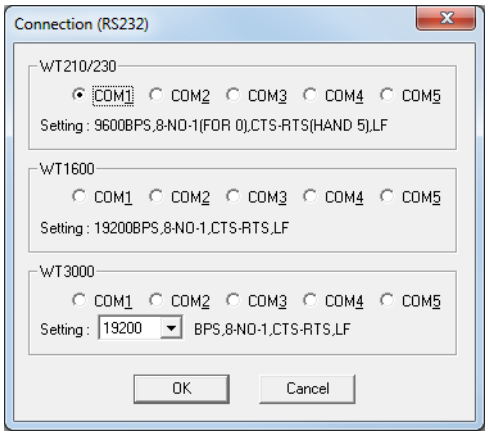
- Up to four units can be set for each WT model. Select the GP-IB address for the target WT. Communication is made with the selected addresses.
- Match the GP-IB address with the address set on the WT



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

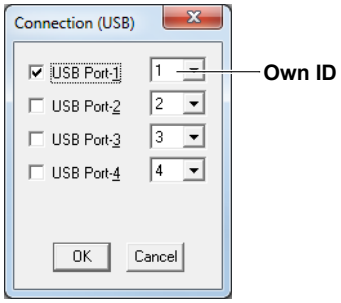
Data format
Fixed at 8-NO-1

Handshaking Method
Fixed at CTS-RTS

Terminator
Fixed at LF

When USB is Selected

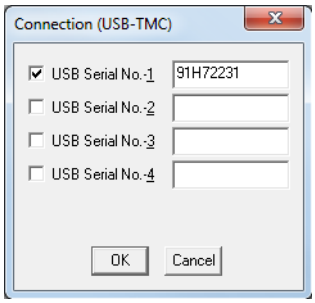
- Up to four WT3000s can be set. Select the target USB Ports. Communication is made with the selected IDs.
- Set Own ID to match that of the WT.



When USB-TMC is Selected

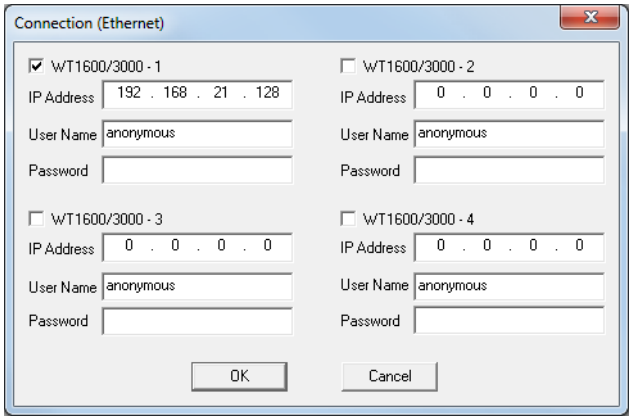
- Up to four WT500s or WT1800s can be set. Select the target USB Serial No. Communication is made with the selected USB Serial No.
- Set Own USB Serial No. to match that of the WT.
  To display the USB Serial No. of the WT, perform this operation:

  - With the WT500 MISC > Remote Control
  - With the WT1800 UTILITY > Remote Control > USB



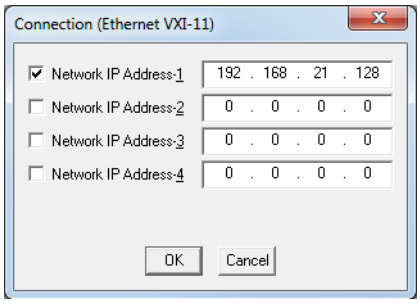
When Ethernet is Selected

- 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 Ethernet VXI-11 is Selected

- Up to four WT500s or WT1800s can be set. Select the target Network IP Address. Communication is made with the selected Network IP Address.
- Set the Network IP Address to match those of the WT.
  To display the Network IP Address (VXI-11) of the WT, perform this operation:
  - With the WT500 MISC > Remote Control
  - With the WT1800 UTILITY > Remote Control > Netword



Note

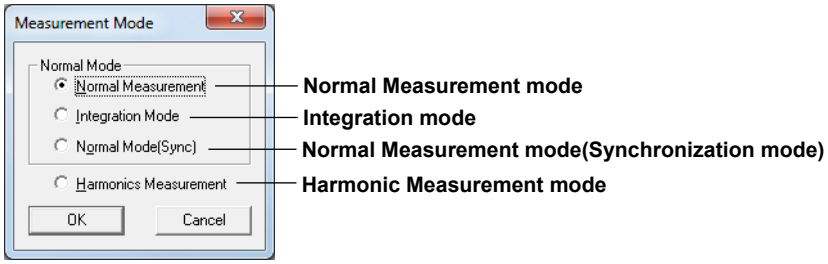
- For information on how to set the IP address, user name, and password on the WT when Ethernet is selected, see the WT main unit user's manual.
- When connecting a single WT to a single PC for WT control using WTViewer, multiple types of communication interfaces cannot be used at the same time. Also, 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**. The software starts.

With the WT1600

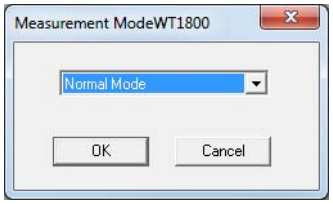
Select the measurement mode from the choices below.



With the WT1800

Select the measurement mode from the following:

- Normal Mode : normal measurement, integration, harmonic measurement
- Normal Mode (Sync) : Normal Measurement mode (Synchronization mode)

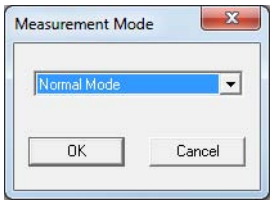


With the WT3000

Select the measurement mode from the following:

- Normal Mode : normal measurement, integration, harmonic measurement
- Wide Band Harmonics : wide bandwidth harmonic measurement
- Math : waveform computation
- FFT
- CycleByCycle : cycle-by-cycle measurement
- Normal Mode (Sync) : Normal Measurement mode (Synchronization mode)

For the details on the measurement modes, see the WT User's Manual. You cannot select IEC harmonic measurement mode on WTViewer.



Note

On the WT500, the selection of the measurement mode is not present.

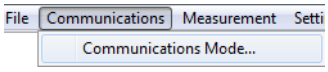
Changing the Communication Settings

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 2-5) appears.

WT1800 Display Example

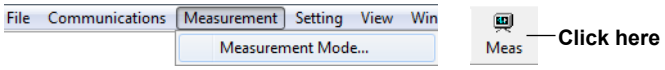


2. Select On-Line or Off-Line.

Changing the Measurement Mode

1. With the WT1600 or WT3000 : Choose **Setting** > **Measurement Mode** from the menu bar.
   With the WT1800 : Choose **Measurement** > **Measurement Mode** from the menu bar.
   Or click **Meas** on the toolbar.
   The Measurement Mode dialog box is displayed.

WT1800 Display Example



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

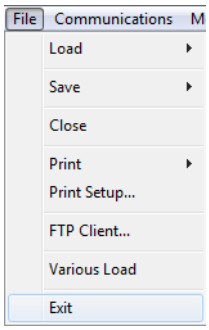
Note

On the WT500, the selection of the measurement mode is not present.

Exiting the Software

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

WT1800 Display Example



2.3 Basic Operations on the Main Window

Display Example:When the WT3000 is connected

Menu bar
Control the viewer window display and the connection to the WT

Toolbar
Load, save, print, and display the data.
Set the measurement mode*1 and WT.

Start/Stop bar
Start, stop, and update the measurement

Target bar
Select the communication target WT

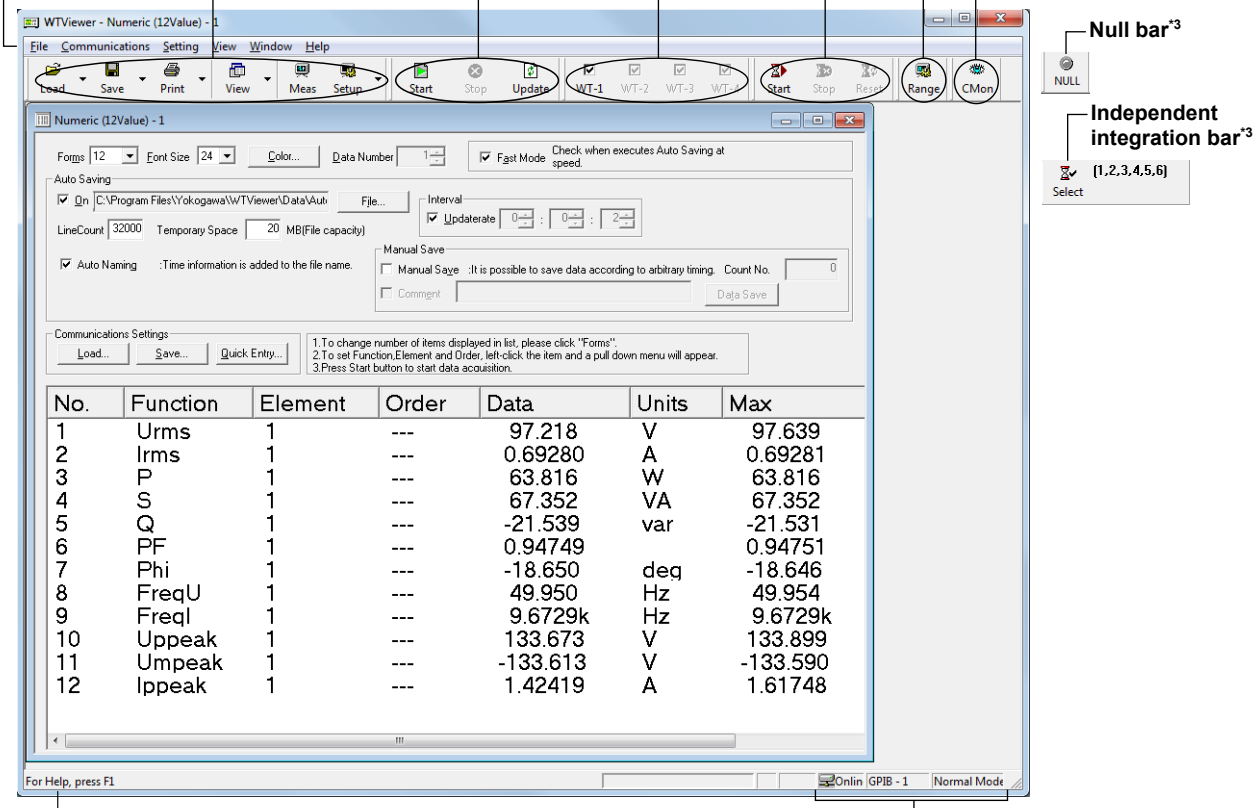
Integration bar*2
Start, stop, and reset the integration

Range setting bar*2

Communication monitor bar

Null bar*3

Independent integration bar*3



Toolbar text
Name of the buttons on the start/stop bar, tool bar, target bar, etc.

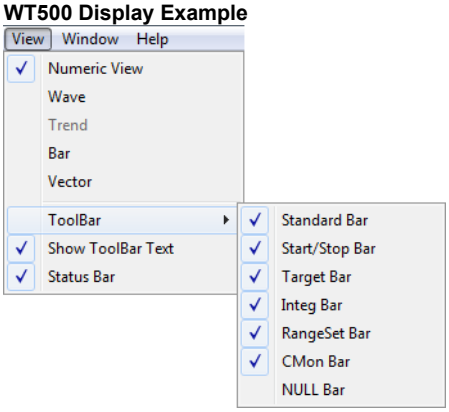
Status bar
Displays the software status such as the communication mode, communication interface, and measurement mode.

*1 Meas bar is not displayed when the WT500 is connected
*2 Displayed when the WT500, WT1800, or WT3000 is connected.
*3 Displayed when the WT500 or WT1800 is connected.
*4 Displayed when the WT1800 is connected.

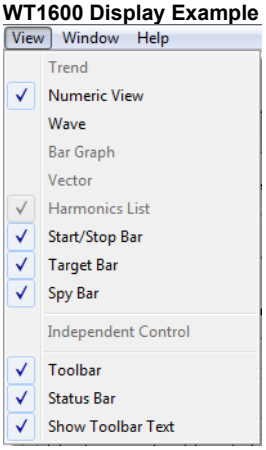
3.1 Selecting a Display Window

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

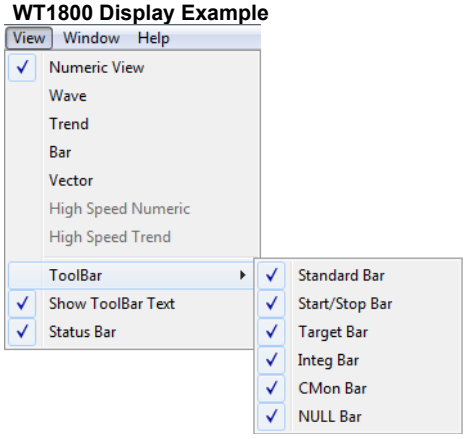
WT500 Display Example



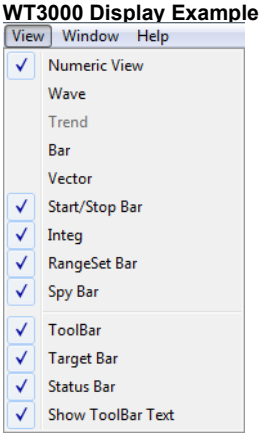
WT1600 Display Example



WT1800 Display Example



WT3000 Display Example



The menu commands that appear are as follows:

Model	WT500	WT1600	WT1800	WT3000
Numeric View	Yes	Yes	Yes	Yes
Wave	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes
Bar Graph	Yes (/G5)	Yes	Yes (/G5 or /G6)	Yes (/G5 or /G6)
Vector	Yes (/G5)	Yes	Yes (/G5 or /G6)	Yes (/G5 or /G6)
High Speed Numeric	No	No	Yes (/HS)	No
High Speed Wave	No	No	Yes (/HS)	No
Toolbar	Yes	Yes	Yes	Yes
Status Bar	Yes	Yes	Yes	Yes
Toolbar Text	Yes	Yes	Yes	Yes
Standard Bar	Yes*1	No	Yes*1	No
Start/Stop Bar	Yes*1	Yes	Yes*1	Yes
Target Bar	Yes*1	Yes	Yes*1	Yes
Harmonics List	No	Yes	No	No
Independent Integration Control	No	Yes	No	No
Integration Bar	Yes*1	No	Yes*1	Yes

The option that is necessary for the menu command to appear is indicated in parentheses.

*1 Available in the Toolbar sub menu

Model	WT500	WT1600	WT1800	WT3000
Range Settings Bar	Yes*1	No	No	Yes
Communication Monitor Bar (Spy Bar)	Yes*1	Yes	Yes*1	Yes
Null bar	Yes*1	No	Yes*1	No
Math waveform	No	No	No	Yes (/G6)*2
FFT waveform	No	No	No	Yes (/G6)*2
Cycle-by-cycle data	No	No	No	Yes (/CC)*2

The option that is necessary for the menu command to appear is indicated in parentheses.

*1 Available in the Toolbar sub menu

*2 Appears in the relevant measurement mode

Display Items Common to All Instruments

Numeric View
Displays a window for numeric data in normal measurement mode. On the WT500, WT1800 and WT3000, numeric harmonic measured data can also be displayed.

Wave
Displays the waveform display data screen.

Trend
Displays a trend window.

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 WT500, WT1800 and WT3000, harmonic measurement is also executed.

Communication Monitor Bar (Spy Bar)
Displays the button for starting the communication monitor function.

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

Target Bar
Check boxes for selecting WTs for communications.

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 WT500, WT1800 and 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.

WT1800-Specific Display Items

High Speed Numeric
Displays a window for numeric data in high speed data capturing mode.

High Speed Trend
Displays a trend window in high speed data capturing mode.

WT3000-Specific Display Items

Math waveform
Displays the Math waveform screen. Selectable in waveform computation (Math) mode.

FFT waveform
Displays the FFT waveform screen. Selectable in FFT mode.

Cycle-by-cycle data
Displays the cycle-by-cycle measurement data as numeric values and as a graph. Selectable in cycle-by-cycle measurement mode.

WT500, WT1800 and 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.

WT500 and WT3000-Specific Display Items

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

WT500 and WT1800-Specific Display Items

Standard bar
Displays the Load, Save, Print, View, Meas, and Setup buttons.

Null bar
Select on or off of the null function.

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.
- Some screens cannot be selected depending on the display mode for the WT1800.
  - Only high speed numeric screen or high speed trend screen can be selected if the display mode is set to High Speed Data Capturing.
- Some screens cannot be selected depending on the measurement mode for the WT1800.
  - Only numeric screen can be selected if the measurement mode is set to Normal Mode (Synchronization Mode).
- Some screens cannot be selected depending on the measurement mode for the WT3000.
  - Waveform and trend screens cannot be selected if the measurement mode is set to wide bandwidth harmonic measurement.
  - Only numeric and Math waveform screens can be selected if the measurement mode is set to waveform computation (Math) mode.
  - Only numeric and FFT waveform screens can be selected if the measurement mode is set to FFT mode.
  - Only numeric screens can be selected if the measurement mode is set to Normal Mode (Synchronization Mode).

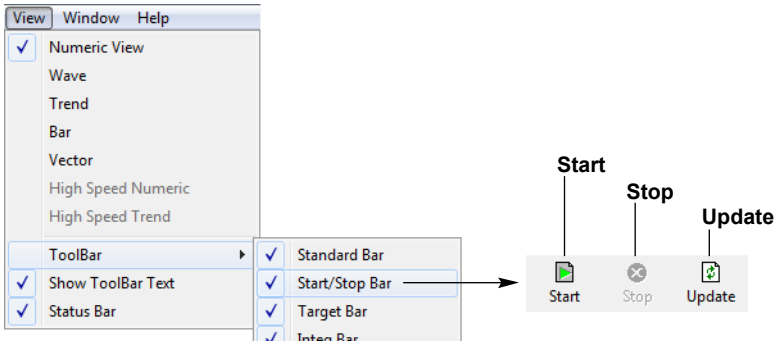
For details on the limitations regarding the measurement modes and displays, see the WT User's Manual.

3.2 Starting and Stopping Data Acquisition (On-Line Mode Only)

Starting Data Acquisition

1. With the WT1600 or WT3000 : Choose **View** > **Start/Stop Bar** from the menu bar.
   With the WT500 or WT1800 : Choose **View** > **Toolbar** > **Start/Stop Bar** from the menu bar.
   The Start, Stop, and Update operation buttons are displayed.

WT1800 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.
- If you click Update, WTViewer loads and displays the measured data from the WT once.

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 section 3.3). However, the synchronization of data updating will not be guaranteed.

Stopping Data Acquisition

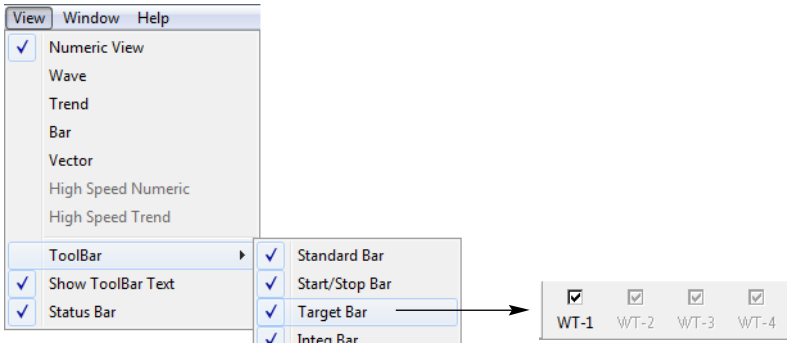
Click **Stop**. Downloading of measured data from the WT stops.

3.3 Selecting the WT for Communication (On-Line Mode Only)

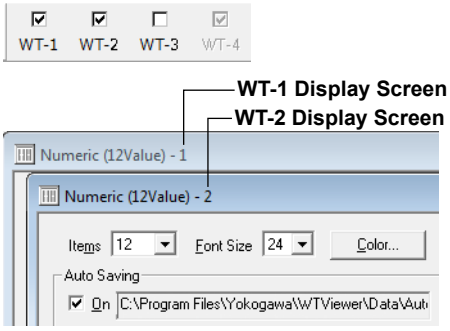
When WTViewer is connected to multiple WTs, select with which WTs you wish to carry out communications.

1. With the WT1600 or WT3000 : Choose **View > Target Bar** from the menu bar.
   With the WT500 or WT1800 : Choose **View** > **Toolbar** > **Target Bar** from the menu bar.
   The check boxes for selecting WTs for communications with the PC is displayed.

WT1800 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.



3.4 Loading Settings and Measured data Data (Off-Line Mode Only)

The file saved on WTViewer in the data formats (extension) given in the following table can be loaded. Data saved in CSV format using Auto Saving (described in section 4.1) cannot be loaded by WTViewer.

File Types and Extensions

Type	WT1600	WT500, WT1800	WT3000
Settings	SET format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data*1	WTViewer format (.wta)	_	WTN format (.wtn)
Waveform display data	WTViewer format (.wta) WT1600 format (.wvf) and (.hdr)*2,*3	WTW format (.wtw)	WTW format (.wtw)
Harmonic data*4	WTViewer format (.wta)	_	_
Waveform sampling data*5 (Math and FFT data)	_	_	WVF format(.wvf) and (.hdr)*2
Cycle-by-cycle data*5	_	_	CSV format (.csv) CBC format (.cbc)

*1 Numeric data (in WTN format) cannot be loaded when WTViewer is controlling the WT500 or WT1800.

*2 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

*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 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.

*5 This file type is only available when WTViewer is controlling the WT3000. If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.

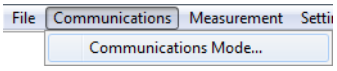
Loading Settings and Measured data Data

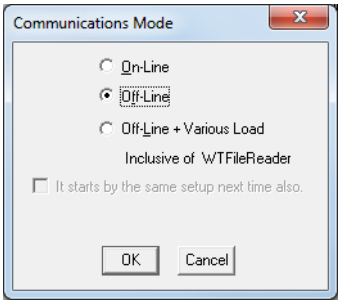
Select one of the following according to the WTViewer's current communication mode.

- If in On-Line mode, start with step 1.
- If in Off-Line Mode
  - To load settings or measured data after switching the measurement mode, start from step 4.
  - In the following case, select File > Various Load from the menu bar. Continue on to page 3-12, "Loading Settings and Measured Data in On-Line + Various Load Inclusive of WTFileReader."
    - Load settings or measured data. The measurement mode automatically switches according to the loaded settings.
    - Load files (*.wtd files or *.wts files) saved on the WT in Float format on WTFileReader.

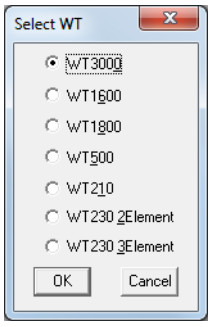
Selecting Off-Line

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** or **Off-Line + Various Load Inclusive of WTFileReader**, then click **OK**.
   - If you selected Off-Line, proceed to step 3.
   - If you selected Off-Line + Various Load Inclusive of WTFileReader, skip to page 3-12, "Loading Various Files, Settings, and Measured Data."





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

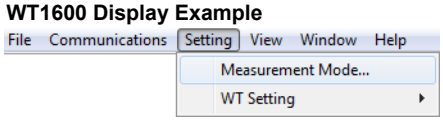


4. With the WT1600 or WT3000 : Choose **Setting > Measurement Mode** from the menu bar.

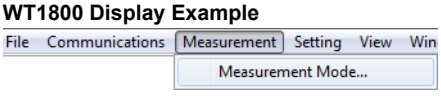
   With the WT1800 : Choose **Measurement** > **Measurement Mode** from the menu bar.

   The Measurement Mode dialog box is displayed.

WT1600 Display Example



WT1800 Display Example



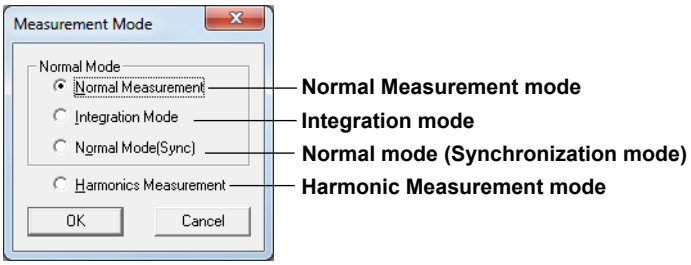
Note

There is no need to select the measurement mode (Procedure 4 and 5) on the WT500.

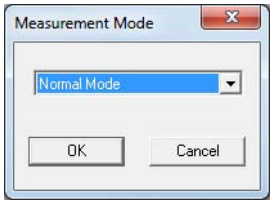
5. Select a measurement mode, then click **OK**.

   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



With the WT1800 or WT3000



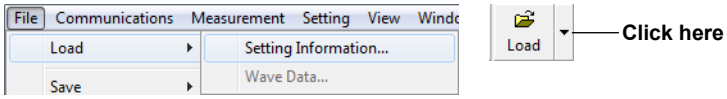
- To load the settings, proceed to step 6 on the next page.
- For loading WTV function definitions in Normal mode (Synchronization Mode), see section 4.13 (WT1600, WT1800, and WT3000).
- To load the following data saved on WTViewer, proceed to step 8 on page 3-10.
  - Numeric data*
  - Waveform display data
  - Harmonic data (WT1600)
  - Numeric data (Synchronization Mode, WT1600 and WT3000)*
  - Math data (WT3000)
  - FFT data (WT3000)
  - Cycle-by-cycle data (WT3000)

* Numeric data cannot be loaded when WTViewer is controlling the WT500 or WT1800.

Loading Settings

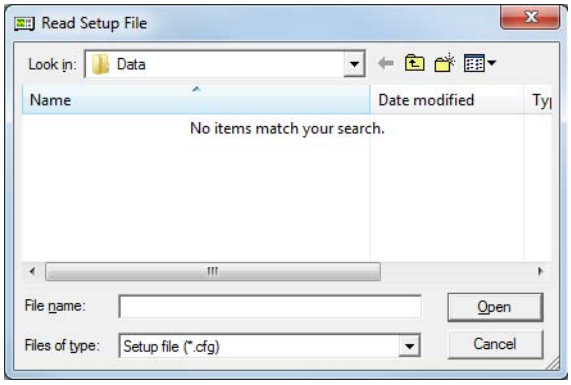
6. Choose **File > Load > Setting Information**, or click **Load** in the toolbar and select Setting Information. The Read setup file dialog box appears.

WT1800 Display Example



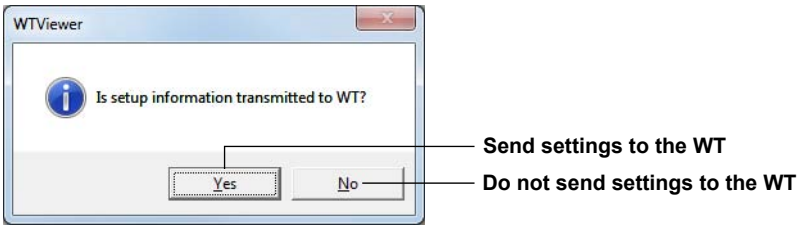
7. Select a settings file, then click **Open**. The setting data is loaded on WTViewer.

- On the WT500, WT1800, and WT3000, the settings file extension is .cfg. The file contains WTViewer's numeric data display settings (such as Forms), waveform data display settings, and other settings. It does not contain settings for the WT.
- On the WT1600, the settings file extension is .set. The file contains WTViewer settings and WT settings.



Note

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



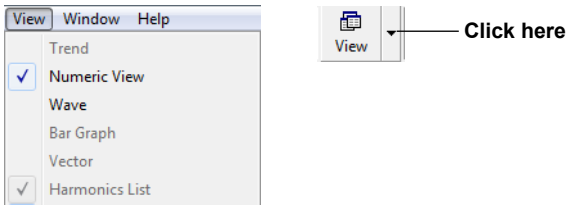
- If the communication target is the WT500, WT1800, or WT3000, there is no feature for sending settings to the WT.
- Settings and numeric data (or harmonic data) are saved in files with extension .wta, .wtn, and .wtw. When files of these extensions are loaded, settings and numeric data (or harmonic data) 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 Measured Data

For a list of the types of measured data that can be loaded, see page 3-6.

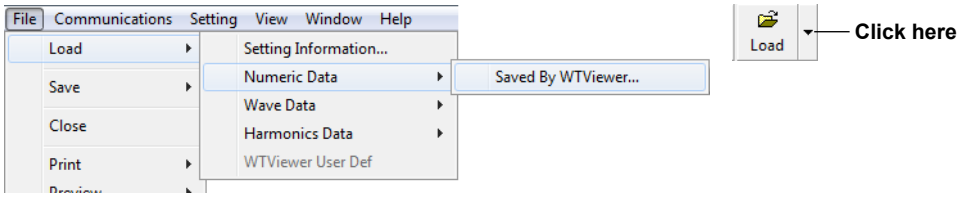
8. Click **View** on the menu bar or click **View** on the toolbar and select a display screen.

WT1600 Display Example

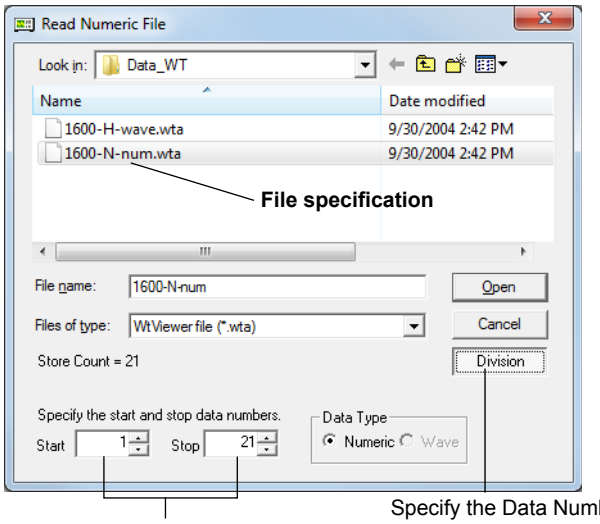


9. Choose **File > Load** in the menu bar or click Load and select a file type to load. A dialog box appears in which you can select a data file.

WT1600 Display Example



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



Click here to display a box for specifying the Store start and Stop numbers.

Specify the Data Number range to load as store numbers

Specify the start and stop data numbers.

When loading numeric data and harmonic data, you can specify a range of data numbers (see section 4.1 or 4.3) 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

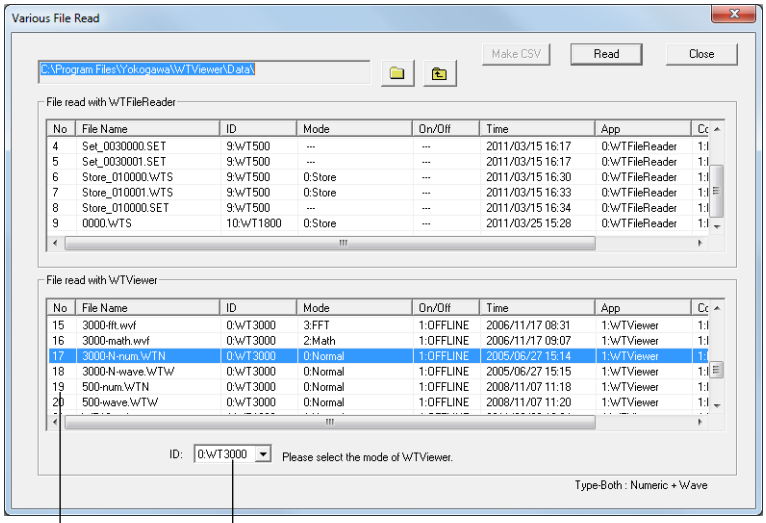
Displayed according to the type of file being loaded.

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.

Loading Settings and Measured Data under “Various File Read.”

1. Select **File read with WTFileReader** or **File read with WTViewer**, and select the files to load.
2. Click **Load**.



Specifying the WT’s ID When Saving Data(for the WT1600, WT210, or WT230)

File specification (a line highlighted in blue)

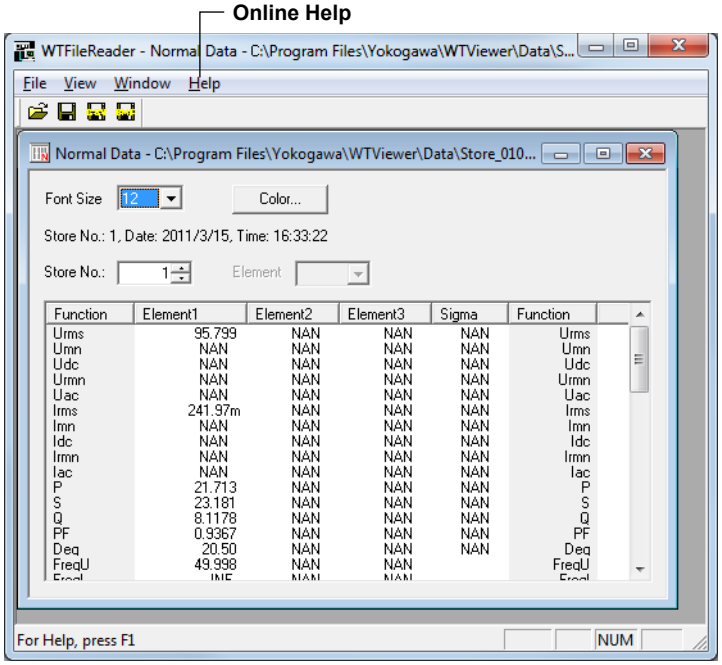
WTFileReader Target File

The WTFileReader program starts. The selected files are displayed on WTFileReader.
For information on operating WTFileReader, see the WTFileReader online help.

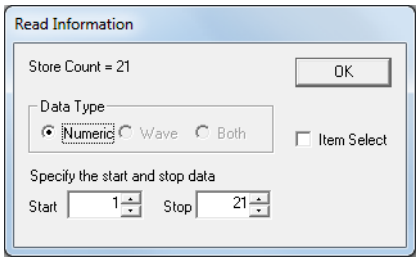
WTViewer Target File

The selected files are displayed on WTViewer. If you selected Numeric Data, proceed to step 3 on the next page.

Example of display on WTFileReader



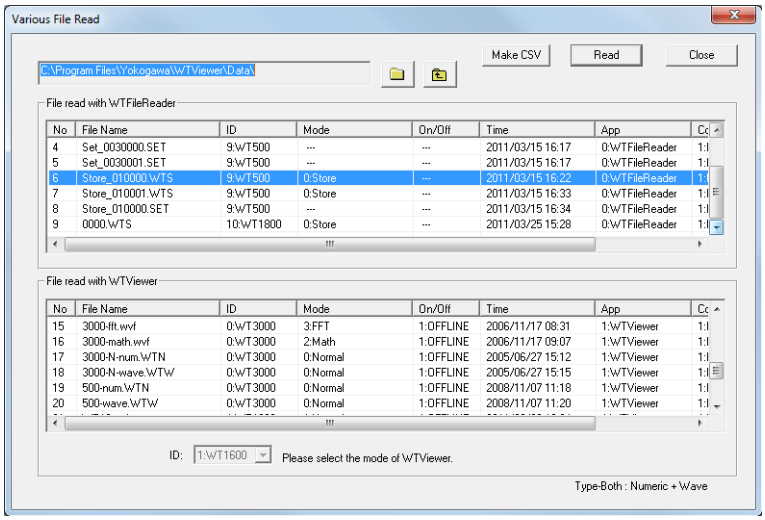
3. Specify the Data Number range to load as store numbers, then click OK.



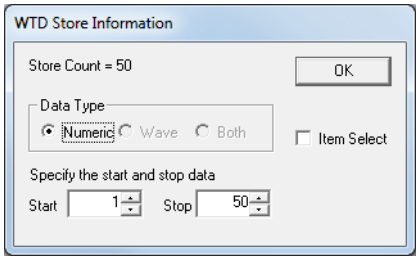
Converting *.wtd Files or *.wts Files to CSV Format under Loading Various Files

Files with .wtd and .wts extensions contain binary measured data that has been saved from the WT. You can load these files and convert them to CSV format.

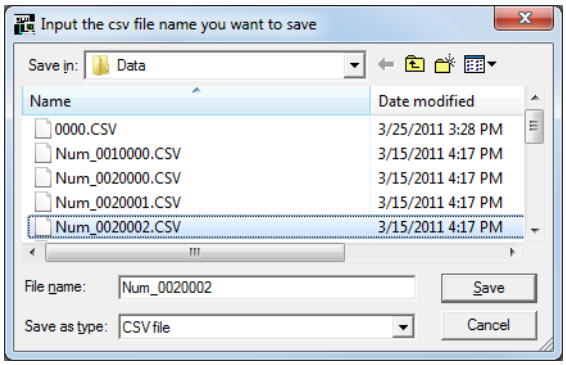
1. With **WTFileReader target files**, select the file to convert.
2. Click **Make CSV**.



3. Specify the range of Data Numbers to convert to CSV format as store numbers, then click **OK**.



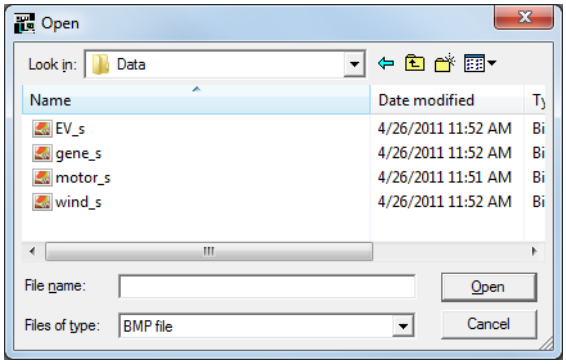
4. Enter a destination **file name** and **location** and click **Save**. The data is saved in CSV format.



Using WTFileReader to Resize a Bitmap File to an Appropriate Size for the Background of the WT1800 CUSTOM Display

You can resize a bitmap file to an appropriate size for the background of the WT1800 CUSTOM display.

1. From the **Start** menu, choose **All Programs** > **YOKOGAWA** > **WTFileReader**. WTFilereader starts.
2. Choose **File > Convert bitmap (.bmp) file tor CUSTOM Display...** from the menu bar. A dialog box appears in which you can select a file.



3. Select a file, then click **Open**. A bitmap file with an appropriate size is created and saved to a file. The file name will be the name of the file that you selected with "_c" appended to it.

Note

Bitmap files that can be converted are 24-bit color bitmaps. Other types of bitmaps cannot be converted.

4.1 Numeric Value Display Function

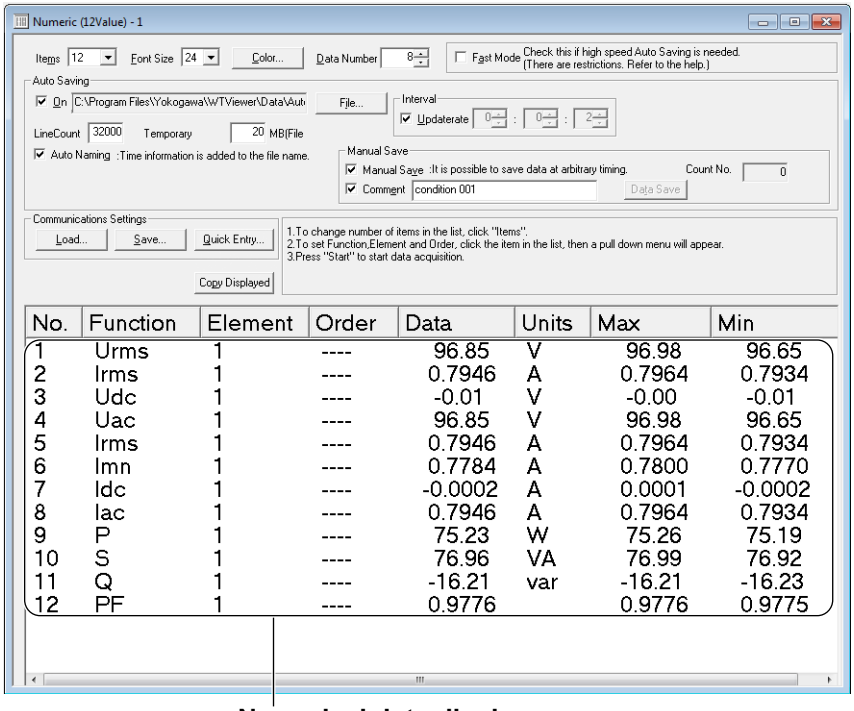
You can display trends and waveforms after setting up measurement functions and elements in the numeric value screen. Trend and waveform graphs cannot be displayed for items whose settings have not been entered.

With the WT500, WT1800, and 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.
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.

Displaying the Numeric Screen

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

WT1800 Display Example



Numerical data display area

Setting the Numerical Data Display Area

Forms

Select the number of numeric data to display.

- Select 12, 24, 48, or 250[*1].
- If you select 250, all of the currently downloadable numeric data of measurement functions and elements are displayed.

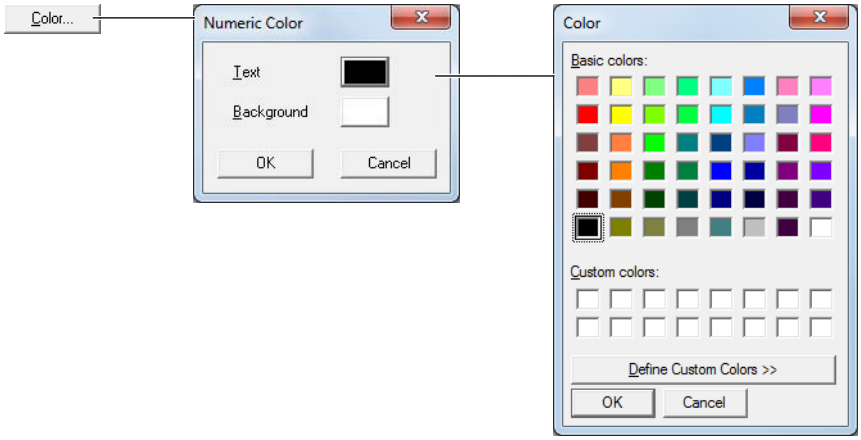
*1 100 when the measurement mode is synchronization mode (see section 4.13)

Items

This is displayed when WTViewer is controlling the WT1800. The feature is the same as Forms. You can select a number between 1 and 250.

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. When Fast Mode is selected, Data Number is fixed to 1.

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.

Setting the Display Item on the Numerical Data Display Area

Function
Shows the measurement function for each item.

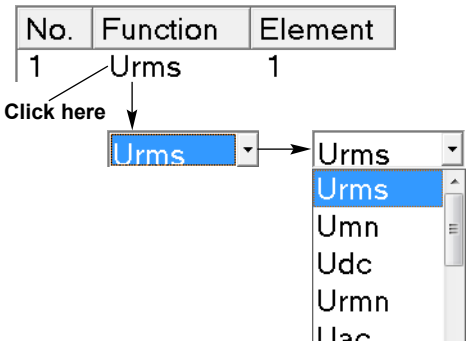
Element
Shows the elements for each item.

Order
This is displayed when WTViewer is controlling the WT500, WT1800, or WT3000. Displays the orders.

Max, Min
This is displayed when WTViewer is controlling the WT500, WT1800, or WT3000.
Displays the maximum and minimum values for each display item of the numeric data downloaded from the WT. When measurement is started, the Max and Min values are updated to reflect the first-measured data.

Setting the Display Item
When in On-Line mode, you can change the display items for Function, Element, and Order by carrying out the procedure below.

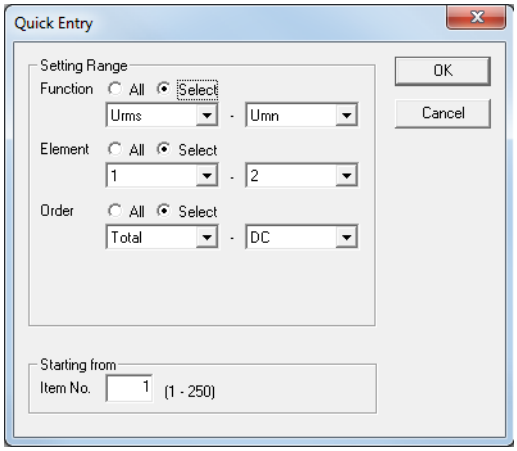
1. Click on the **Function**, **Element**, or **Order** column. A combo box opens.
2. Select the item in this column.



Quick Entry

This is displayed when WTViewer is controlling the WT500, WT1800, or WT3000.
When in On-Line mode, 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 50 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.



Note

On the WT1600, the Order, Max, and Min items are not included in the numeric data display area. The Quick Entry button appears only in the harmonic list display (see section 3.5) of harmonic measurement mode.

Copy Displayed

You can change the display items (measurement function, element, and order) on WTViewer to match those displayed on the WT.

- This function is only available for the WT1800. It is not available for the WT500, WT1600, or WT3000.
- You can use this function in On-Line mode when the WT1800 is in 4-value, 8-value, or 16-value numeric display mode.
- If the WT1800 display item is set to None, the item is not displayed in the WTViewer numeric list. Subsequent display items are shifted forward to fill up the empty space. If all the WT1800 display items are set to None, WTViewer does not update the display items or the numeric list.
- In synchronization mode (see section 4.13), the display items of the master unit with the smallest number in the range of WT-1 to WT-4 are displayed in WTViewer. If there is no master unit, the display items of the WT1800 with the smallest number in the range of WT-1 to WT-4 are displayed in WTViewer.

Saving Numeric Data While Downloading

Auto Saving

When in On-Line mode, 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 save's worth of the measured data is displayed on one row of the open sheet. This number of lines (corresponding to numbers of measurements in WTViewer) is set as the Line Count.
- For example, if you set Line Count to 10 and begin downloading measured data, 10 times worth of the measured data is saved to a single file, and the next ten times (11 to 20) are saved to the next file. This process continues until all measured data is downloaded.
- You can set the space in the range from 1 to 32000.

• 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

The following are the recommended interfaces for communication.

WT1600: GP-IB
WT3000: GP-IB, Ethernet

Note

WT500 and WT1800: Every interface is available to the Fast Mode.

- When using a communication interface other than the ones above, all data may not be able to be saved when the display update rate on the main unit is 50 ms. In this case, after setting the display update rate on the WT to 100 ms or higher, set the WTViewer Forms or Items (see 4-1 page) to 48 or less. When editing the display update rate setting of the WT or the setting for the number of Forms or Items 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 Pentium 3, 1 GHz, a WT display update rate of 50 ms, and WTViewer Forms or Items 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. Hence, Data Number is always 1.
- If the Auto Saving 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.
- On the WT3000, you cannot save numeric data acquired in Fast Mode to a file in CSV or WTN format.
- Display is not updated on the trend screen.

Saving/Loading Numeric Display Settings

Communications Settings

When in On-Line mode, the Function, Element, and Order settings on the numeric value display 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

When in On-Line mode, by carrying out the procedure described in “Starting Data Acquisition” in section 3.2, the data is loaded from the WT.

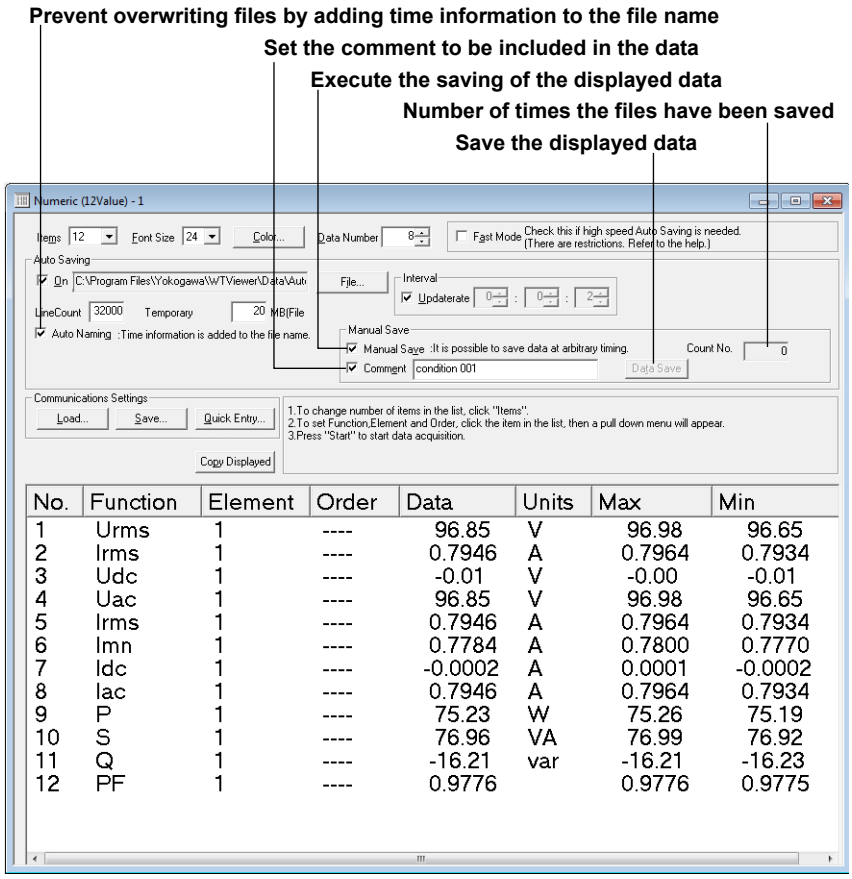
Note

- If numeric data is not downloaded from the WT to WTViewer, no measured values are displayed in the numeric value screen.
- There are setting items that cannot be changed while data is being downloaded.

Saving the Measured Data Currently Displayed While Retrieving the Numeric Data

Manual Save

When in On-Line mode, WTViewer saves the measured data currently displayed to a file in CSV format while retrieving numeric data from the WT. You can select only the measured data you want to save.



• Specifying the Manual Save Settings and Starting the Measurement

1. Select the **Auto Saving On** check box.
2. Select the **Manual Save** check box.
3. Check the **Updaterate** check box.

Note

The Updaterate check box is automatically selected when you select the Manual Save check box. Also, the Manual Save check box is automatically cleared when the Updaterate check box is cleared.

4. As necessary, select the **Auto Naming** check box.
5. As necessary, set the **Comment**.
6. Click **START**. The measurement starts, and WTViewer is ready to save the data. Count No. is set to zero.

• Saving the Measured Data Currently Displayed

7. Click **Data Save**. The numeric data displayed when you click Data Save is saved, and Count No. is incremented.
8. As necessary, change the Comment.

You can save only the measured data you want by repeating step 7 (and 8).

• Stopping the Measurement

9. Click STOP. The measurement stops, and data is saved in CSV format. The file name is set to the name specified in the File box under Auto Saving.

Preventing the Overwriting of Files

Auto Naming

You can prevent overwriting files by selecting the Auto Naming check box. If a file with a same name as that specified in the File box under Auto Saving already exists when you are saving a file, the file is saved with a different name by adding date and time information to the name. If the Auto Naming check box is not selected, a file with the same name is overwritten.

• Date and Time Added to the File Name

- Date
  YY/MM/DD (year/month/day), a six-digit number. The lowest two digits are used for the year.
- Time
  HH:MM:SS (hour/month/second), a six-digit number. The 24-hour clock is used for the hour.

If a file with the same name already exists, the file name that is used through the Auto Naming function is as follows.

File name specified in the File box under Auto Saving: dataABC
Time when the file was saved: 9 hours 50 minutes and 32 seconds on April 5, 2011
File name that is saved: dataABC110405095032.csv

The software has a function that saves files by adding a sequence number (_0000, _0001, and so on) to the file name when the number of lines of numeric data to be saved to a file exceeds the value specified by Line Count (see page 4-4). This function also works in manual saving.
If the number of lines of numeric data to be saved to a file exceeds the specified line count in the example above, the following files are saved sequentially.

dataABC110405095032_0000.csv
dataABC110405095032_0001.csv

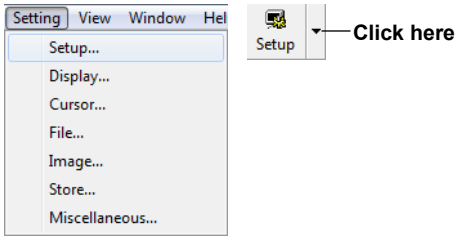
4.2 Starting, Stopping, Pausing, and Resetting Integration (On-Line Mode Only)

This section covers the WT500, WT1600, WT1800, and WT3000 separately.
For a description of setting a WT1600 as the target for communication, see page 4-11.
For a description of setting a WT1800 as the target for communication, see page 4-15.
For a description of setting a WT3000 as the target for communication, see page 4-18.

With the WT500

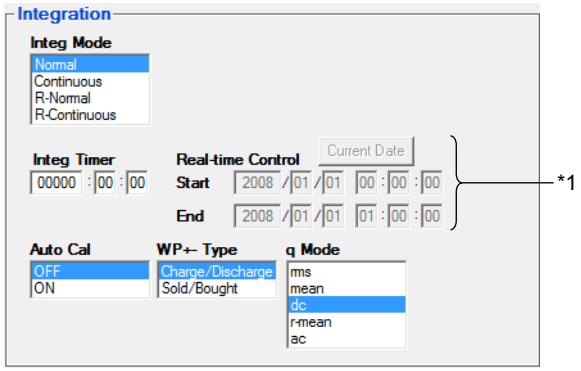
Integration Settings

1. Choose **Setting > Setup** from the menu bar, or click **Setup** and select **Setup**.
   The Measurement Conditions Setting dialog box is displayed.



2. Click the **Efficiency/Averaging/Integration** tab. Setting dialog box for each function is displayed.
3. Select the target WT.

4. In the Integration box, set the **Integ Mode** (integration mode), **Integ Timer** (integration time (integration timer)), **Start** (reserved time for integration start), **Stop** (reserved time for integration stop), **Auto Cal** (integration auto calibration), **WP+- Type** (integration type for power integration), and **q Mode** (current mode for current integration), and other settings.
   For details on each function, see the WT User's Manual.



*1 If real time counting integration mode, this box becomes active.

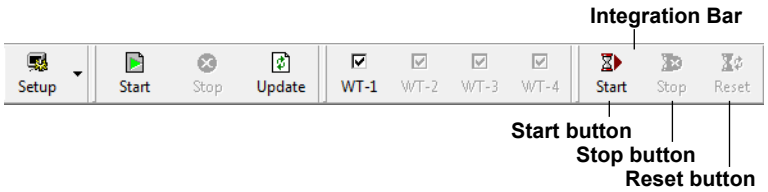
5. Click **OK**. The Measurement Conditions Setting dialog box closes.

Starting Integration

Check the following before starting integration.

- Set up the measurement function and elements (see section 4.1) 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 **Stop** 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.

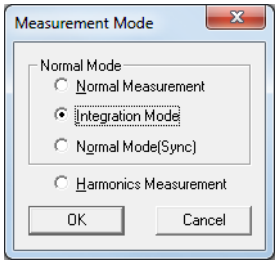
Note

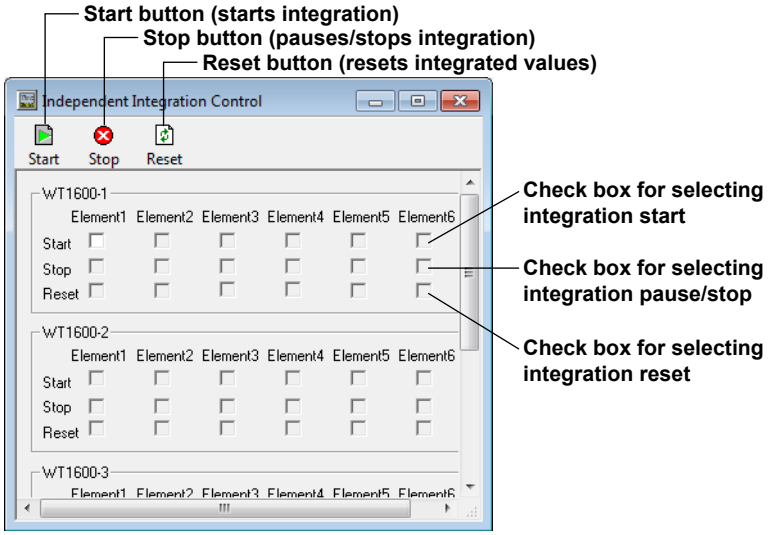
If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

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.

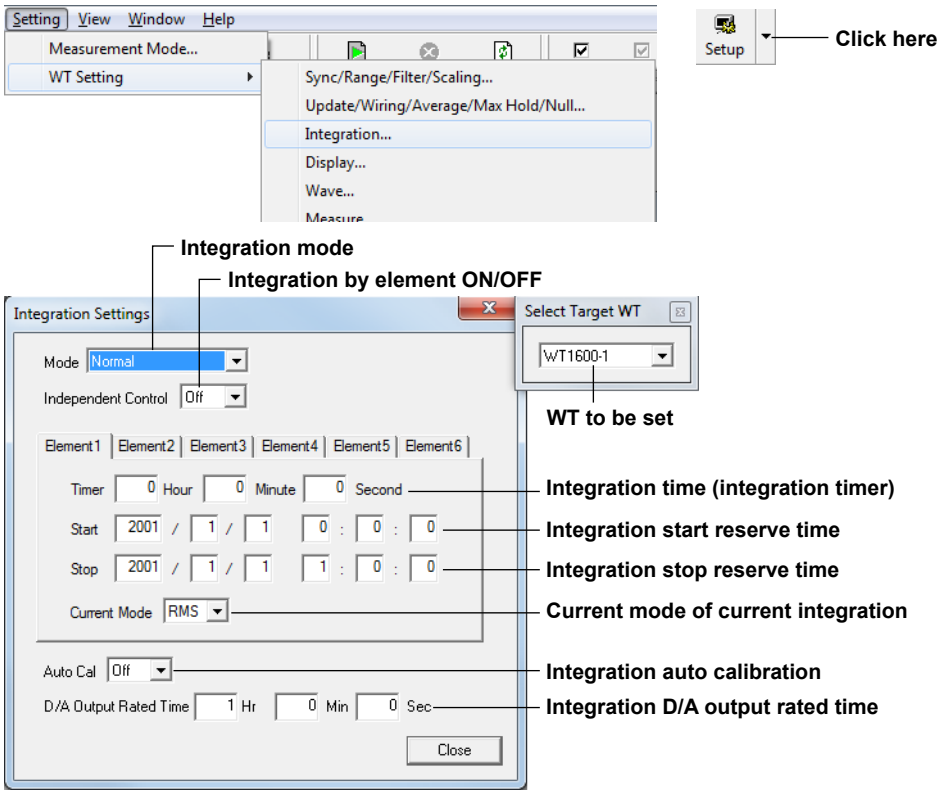




Note

- 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.

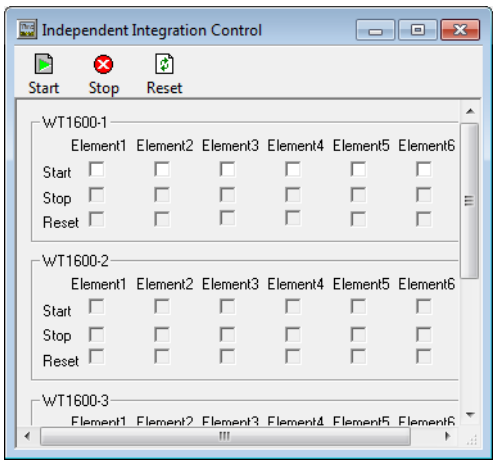
Starting Integration

Check the following before starting integration.

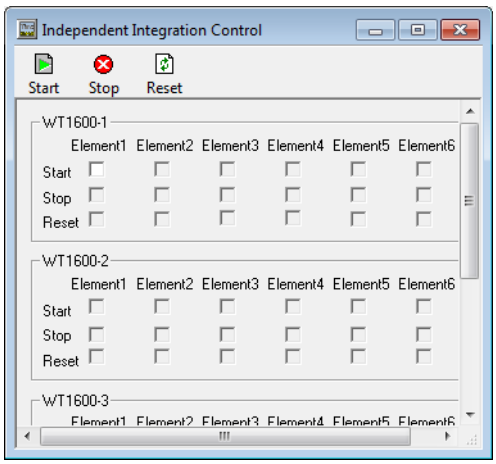
- Set up the measurement function and elements (see section 4.1) so that the integrated values are displayed in the numeric data display area.
- If integrated values are not downloaded from the WT to WTViewer, no integrated values are displayed even if integration is started. Start data download (see 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.

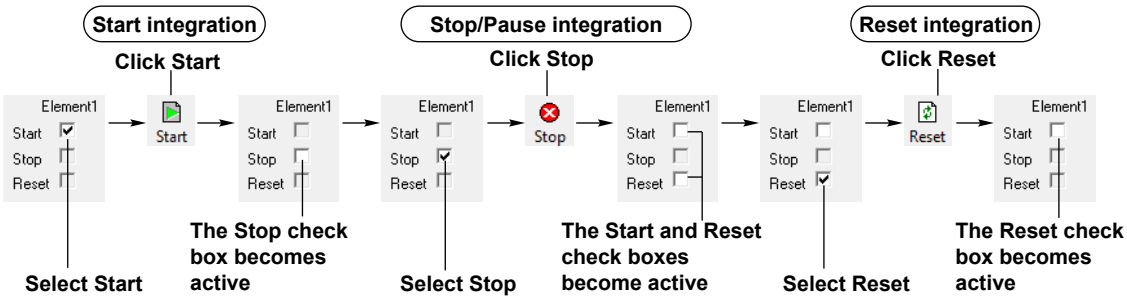
Resetting Integration

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.

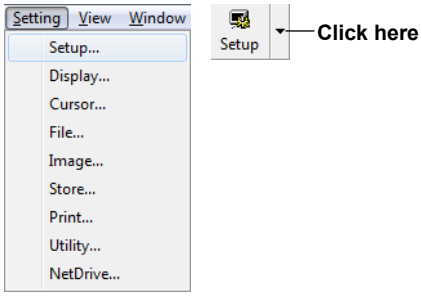
Example of Starting, Pausing, Stopping, and Resetting Integration



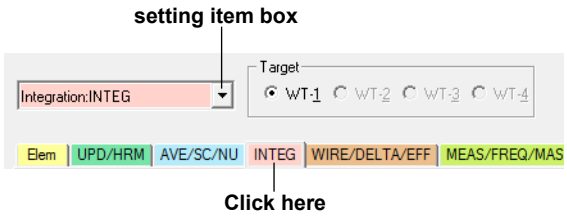
With the WT1800

Integration Settings

1. Choose **Setting > Setup** from the menu bar, or click **Setup** and select **Setup**.
   The Measurement Conditions Setting dialog box is displayed.

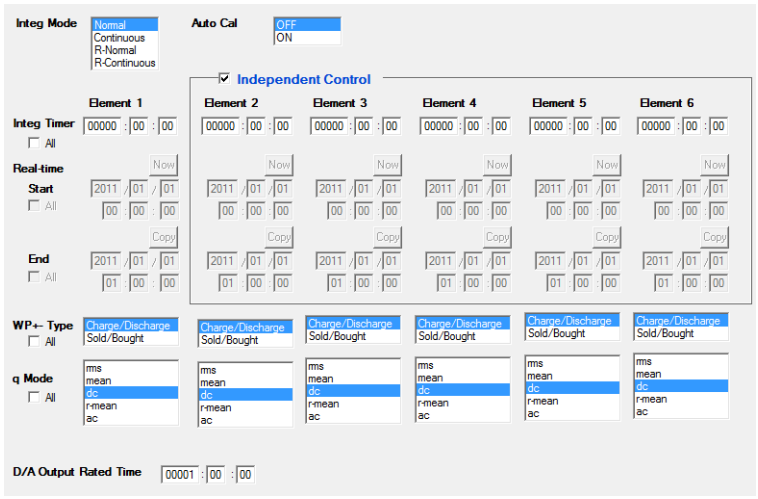


2. Click the **INTEG** tab or select the **Integration:INTEG** on the setting item box. The integration setting dialog box is displayed.



3. Select the target WT.

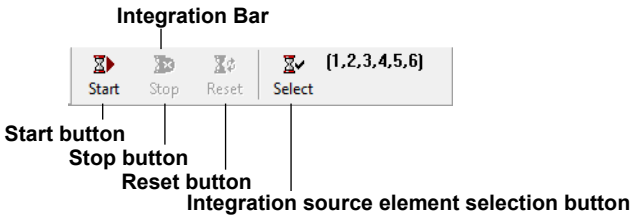
4. In the Integration box, set the **Integ Mode** (integration mode), **Integ Timer** (integration time (integration timer)), **Start** (reserved time for integration start), **Stop** (reserved time for integration stop), **Auto Cal** (integration auto calibration), **WP+- Type** (integration type for power integration), and **q Mode** (current mode for current integration), and other settings.
   For details on each function, see the WT User's Manual.



* If real time counting integration mode, Real-time Control setting box becomes active.

5. Click **Close**. The Measurement Conditions Setting dialog box closes.

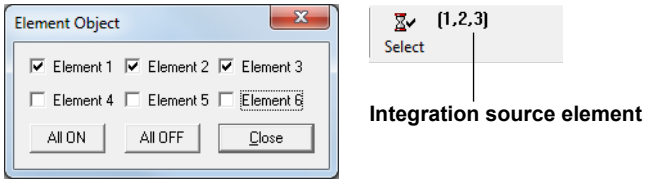
If you select Integration bar in the View menu, the Start, Stop, and Reset operation buttons are displayed in the same row as other tool bars.



Setting Which Elements to Perform Independent Integration On

In the Integration box shown on the previous page, if the Independent Control check box is selected, set which elements to perform independent integration on.

1. Click **Select**. The Element Object dialog box is displayed.



2. Select the elements on which you wish to perform integration.
3. Click **Close** to close the Element Object dialog box.

Starting Integration

Check the following before starting integration.

- Set up the measurement function and elements (see section 4.1) 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).

4. Click **Start**. Integration begins on the selected elements.

Stopping/Pausing Integration

5. In steps 1 to 3, select the elements on which you wish to pause or stop integration.
6. Click **Stop**. Integration pauses on the selected elements.

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 steps 1 to 3, select the elements on which you wish to reset integration.
2. Click **Reset**. Integration is reset on the selected elements.

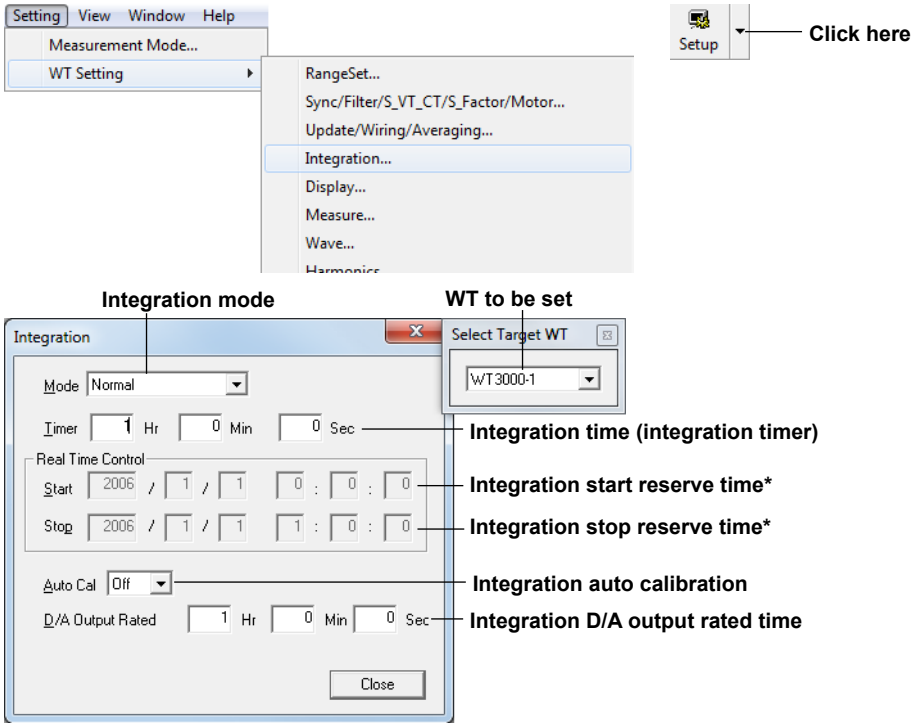
Note

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.

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 can only be used in Normal mode.
- 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.

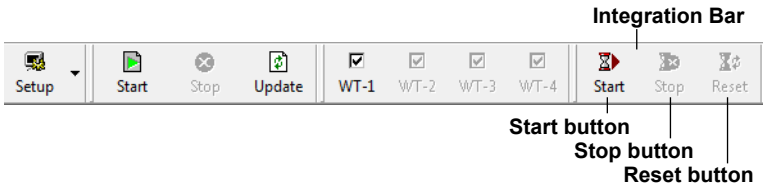
4. Click **Close**. The Integration and Select Target WT dialog boxes close.

Starting Integration

Check the following before starting integration.

- Set up the measurement function and elements (see section 4.1) 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 **Stop** 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

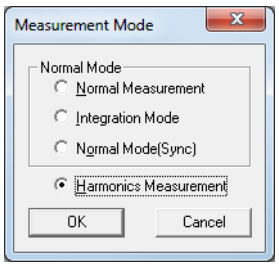
If you click Reset, the WT integration data disappears, but the integrated values remain on WTViewer. When displaying the integrated values in the numeric data display area on WTViewer, the integrated values remain displayed as-is. However, if you start integration again, the integrated values are updated.

4.3 Harmonics List Display Function (WT1600)

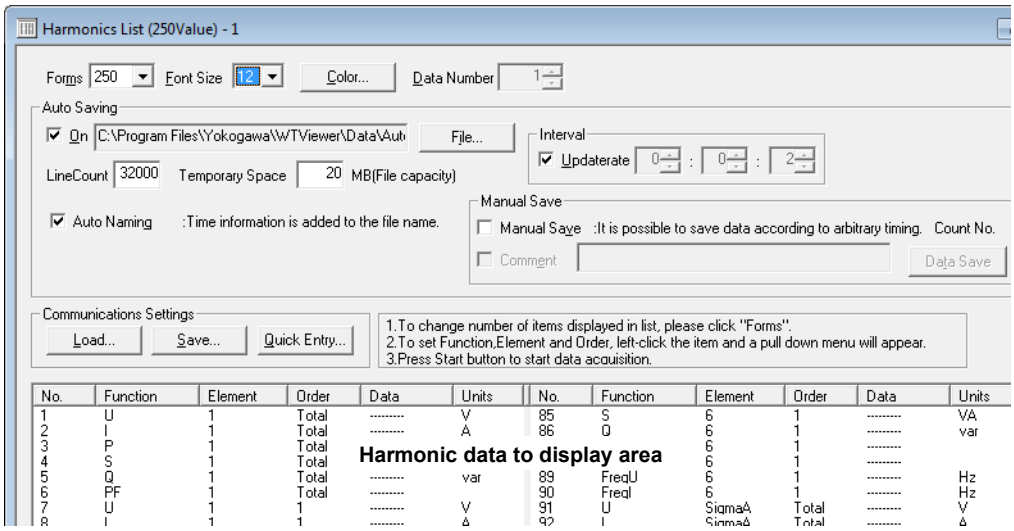
This section describes the WT1600.
On the WT1600, since you change to harmonic measurement mode to measure harmonics, there is a separate screen for displaying only harmonic data (harmonics list display). Therefore, the harmonics list display is explained separately in this section.
With the WT500, WT1800, and 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 4.1.

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.

Setting the Harmonic Data Display Area

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 4-2.

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.

Setting the Display Item on the Harmonic Data Display Area

Function

Shows the measurement function for each item.

Element

Shows the elements for each item.

Order

Displays the orders.

Setting the Display Item

When in On-Line mode, you can change the display items for Function, Element, and Order. For the procedure, see page 4-2.

Quick Entry

When in On-Line mode, 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 4-3).

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

When in On-Line mode, 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 save's worth of the measured data is displayed on one row of the open sheet. This number of lines (corresponding to numbers of measurements in WTViewer) is set as the Line Count.
- For example, if you set Line Count to 10 and begin downloading measured data, 10 times worth of the measured data is saved to a single file, and the next ten times (11 to 20) are saved to the next file. This process continues until all measured data is downloaded.
- You can set the space in the range from 1 to 32000.

• 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

When in On-Line mode, 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

When in On-Line mode, by carrying out the procedure described in "Starting Data Acquisition" in section 3.2, the data is loaded from the WT.

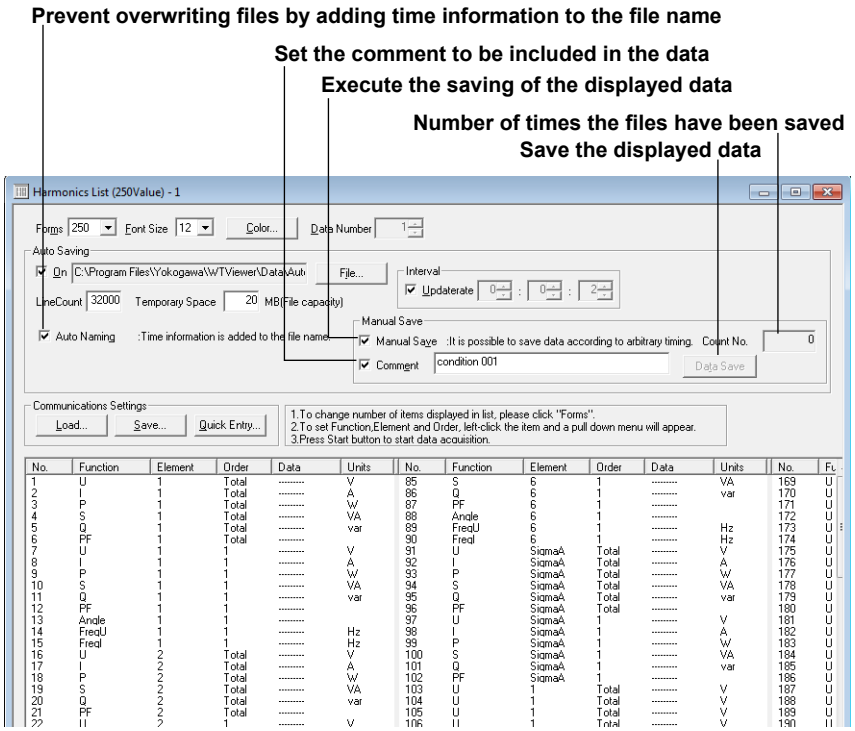
Note

- If harmonic data is not downloaded from the WT to WTViewer, no harmonic data are displayed in the harmonics list screen.
- There are setting items that cannot be changed while data is being downloaded.

Saving the Measured Data Currently Displayed While Retrieving the Numeric Data

Manual Save

When in On-Line mode, WTViewer saves the measured data currently displayed to a file in CSV format while retrieving numeric data from the WT. You can select only the measured data you want to save.



• Specifying the Manual Save Settings and Starting the Measurement

1. Select the **Auto Saving ON** check box.
2. Select the **Manual Save** check box.
3. Check the **Updaterate** check box.

Note

The Updaterate check box is automatically selected when you select the Manual Save check box. Also, the Manual Save check box is automatically cleared when the Updaterate check box is cleared.

4. As necessary, select the **Auto Naming** check box.
5. As necessary, set the **Comment**.
6. Click **START**. The measurement starts, and WTViewer is ready to save the data. Count No. is set to zero.

• Saving the Measured Data Currently Displayed

7. Click **Data Save**. The numeric data displayed when you click Data Save is saved, and Count No. is incremented.
8. As necessary, change the Comment.

You can save only the measured data you want by repeating step 7 (and 8).

• Stopping the Measurement

9. Click STOP. The measurement stops, and data is saved in CSV format. The file name is set to the name specified in the File box under Auto Saving.

Preventing the Overwriting of Files

Auto Naming

You can prevent overwriting files by selecting the Auto Naming check box. If a file with a same name as that specified in the File box under Auto Saving already exists when you are saving a file, the file is saved with a different name by adding date and time information to the name. If the Auto Naming check box is not selected, a file with the same name is overwritten.

Date and Time Added to the File Name

- Date
  YY/MM/DD (year/month/day), a six-digit number. The lowest two digits are used for the year.
- Time
  HH:MM:SS (hour/month/second), a six-digit number. The 24-hour clock is used for the hour.

If a file with the same name already exists, the file name that is used through the Auto Naming function is as follows.

File name specified in the File box under Auto Saving: dataABC
Time when the file was saved: 9 hours 50 minutes and 32 seconds on April 5, 2011
File name that is saved: dataABC110405095032.csv

The software has a function that saves files by adding a sequence number (_0000, _0001, and so on) to the file name when the number of lines of numeric data to be saved to a file exceeds the value specified by Line Count (see page 4-21). This function also works in manual saving.
If the number of lines of numeric data to be saved to a file exceeds the specified line count in the example above, the following files are saved sequentially.

dataABC110405095032_0000.csv
dataABC110405095032_0001.csv

4.4 Waveform Display Function

This section describes use of the WT1800. The WT3000 has four elements, so waveforms U5, I5, U6, and I6 are not displayed. Also, with the motor function of the WT, Speed and Torque waveforms are displayed. Also, with the auxiliary input of the WT1800, Aux1 and Aux2 waveforms are displayed.

On-Line mode

On the WT1800 or WT3000, set the measurement mode to Normal first by carrying out the procedure given in “Changing the Measurement Mode” on page 2-9 and then display the waveform.

Off-Line mode

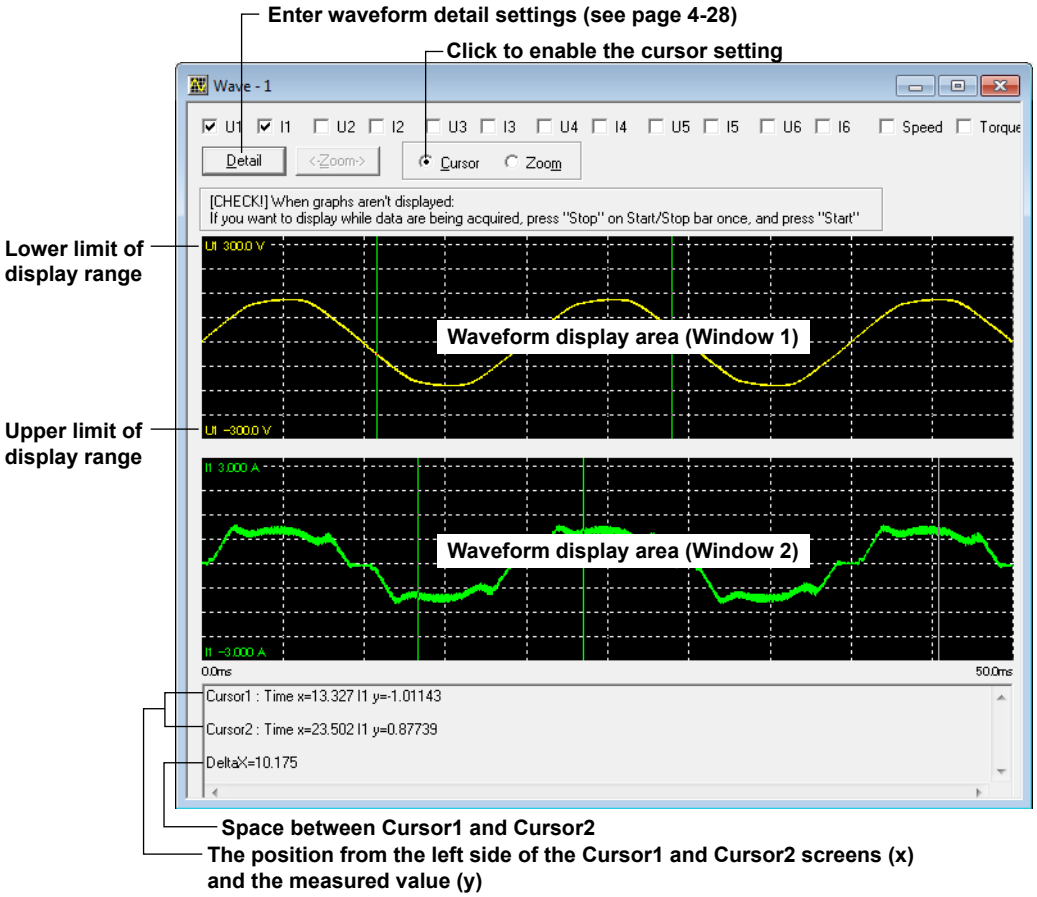
In steps 6 to 10 in section 3.4, waveform data is loaded and displayed.

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 4-28.)



- **U1 to I6**

  (U1-I3 on the WT500. U1-I4 on the WT3000. Speed, Torque, Aux1, and Aux2 may also be displayed depending on the WT models and options.)
  Select the check box to select the waveform to be displayed. This is linked to the Ch from the Wave Detail dialog box (see page 4-27).

- **Cursor**

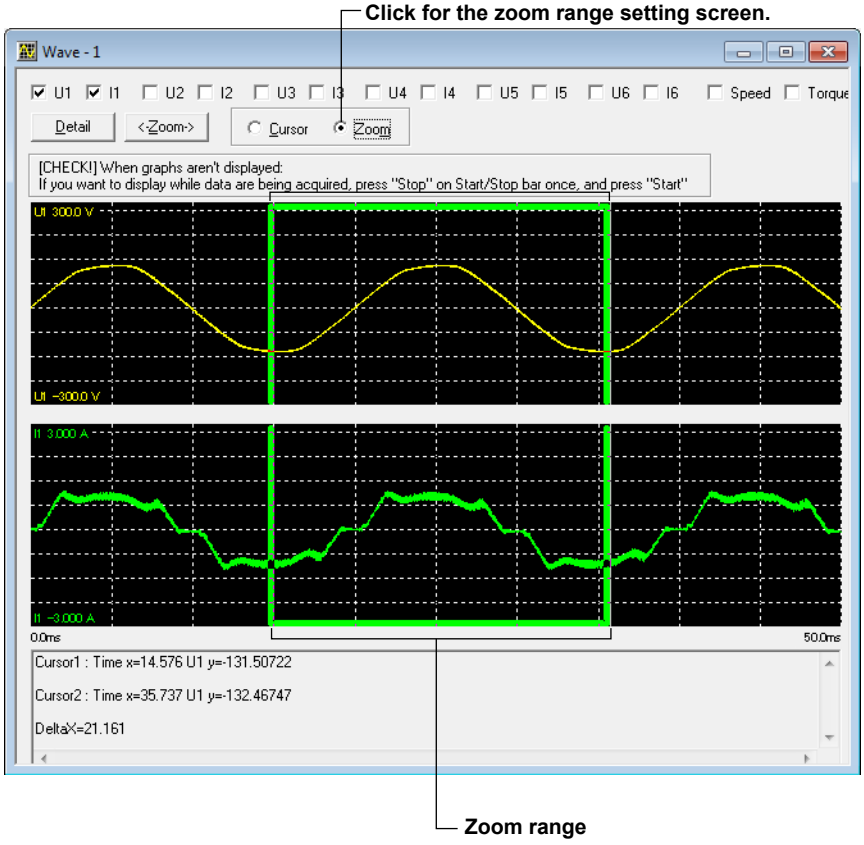
  Click here to set Cursor1 and Cursor2 in the waveform display area.

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

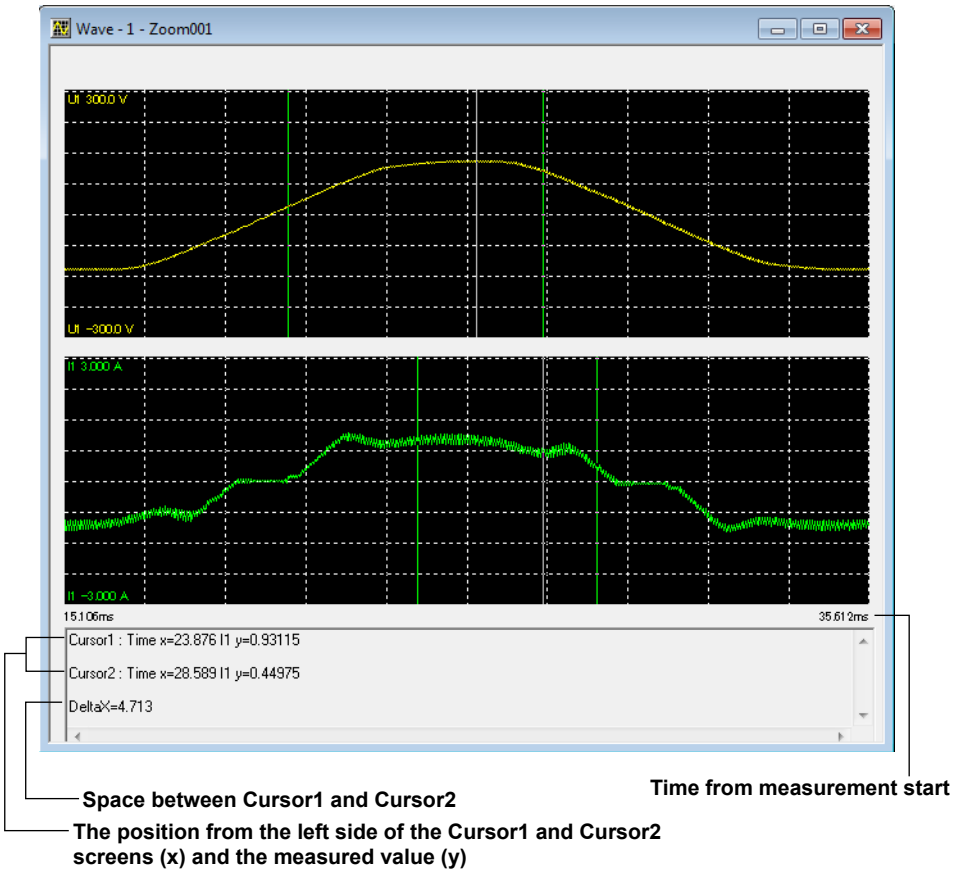


• Zoom (Time Axis Direction)

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

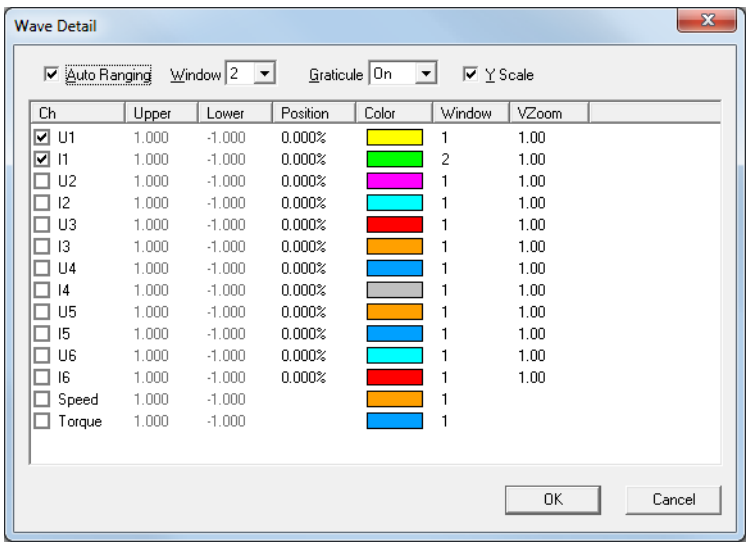
1. Drag the area to zoom in the waveform display area. The zoomed range is set simultaneously in all of the displayed waveform display areas.
2. Click **<-Zoom->**. A screen appears in which all waveforms in the waveform display area are zoomed.

   You can set Cursor1 and Cursor2 on these zoomed waveforms.



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 check box to select the waveform to be displayed. This is linked with the waveform display/do not display setting in the Wave dialog box (see page 4-25).

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.

Setting the X-Axis (Time Axis, On-Line Mode Only)

- WT500 and WT1800
  Set the X-axis in the Wave dialog box that opens when you select **Setting** > **Display** > **Wave**.
- WT1600 and WT3000
  Set the X-axis in the Wave dialog box that opens when you select **Setting** > **WT Setting** > **Wave**.

Note

The X-axis (time axis) setting is applied to the WT. If you load the data from the WT after changing the setting, the change is applied to the PC display.

Starting Downloading of Waveform Display Data (On-Line Mode Only)

When Connected to the WT500, WT1800, or WT3000

Load the waveform display data from the WT by carrying out the procedure described in “Starting Data Acquisition” in section 3.2.

Note

- If you start loading the waveform display data on WTViewer, the WT500 and WT3000 screen automatically switches to Wave. If you close the Wave dialog box on WTViewer and start measurement, the WT screen automatically returns to the original display.
- Waveform can be displayed only when the measurement mode is Normal for the WT1800 and WT3000.

When Connected to the WT1600

1. Turn ON Wave Sampling on the WT (section 6.3) and load the waveform display data on the WT.
2. Load the waveform display data from the WT by carrying out the procedure described in “Starting Data Acquisition” in section 3.2.

Note

WTViewer cannot display the waveform unless the waveform display data is loaded on the WT.

Note

Displayed Points on the Screen and Waveform Display

The number of data points sampled on the WT (waveform sampling data) and the number of data points displayed on the screen (waveform display data) are different.

The number of waveform sampling data is as follows.

- WT500: approximately 100,000 points per second for an input waveform.
- WT1600 and WT3000: approximately 200,000 points per second for an input waveform
- WT1800: approximately 2,000,000 points per second for an input waveform.

The number of waveform display data points on the screen is as follows due to the construction of the screen.

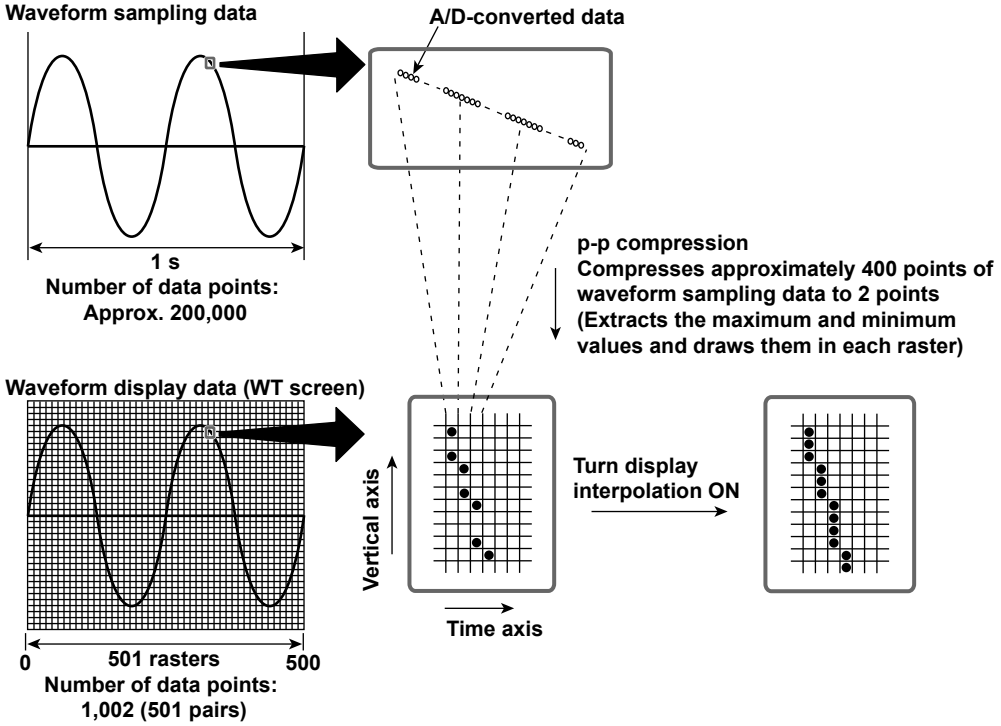
- WT500, WT1600 and WT3000: 1002 points
- WT1800: 1602 points

Because the number of waveform sampling data points is normally greater than that of the waveform display data on the screen, the waveform display data*1 obtained by P-P compressing*2 the waveform sampling data per given segment is displayed on the screen.

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

*2 The waveform display data can be saved. The original data of the waveform display data (sampling data before P-P compression) can be saved in waveform computation (Math) or FFT mode on the WT3000. The data cannot be saved on the WT500, WT1600, or WT1800.

How P-P Compression Works (Example of the WT1600 and WT3000)



When Displaying the Waveform Display Data on the WT Screen

The number of display segments (raster) in the time axis direction within one screen is as follows.

- WT500, WT1600 and WT3000: 501
- WT1800: 801

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. Therefore, the number of data points is as follows.

- WT500, WT1600 and WT3000: 1002 points
- WT1800: 1602 points

When Displaying the Waveform Display Data on the PC Monitor Using WTViewer

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 as follows.

- WT500, WT1600 and WT3000: 1002
- WT1800: 1602

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.

4.5 Bar Graph Display Function

Preparation to Display Bar Graphs

On-Line mode

- On the WT1800, set the measurement mode to Normal (see page 2-9).
- On the WT3000, set the measurement mode to Normal or Wide-Band Harmonics (see page 2-9).
- In the numeric list*1, select measurement functions, elements, and oders.

  *1 Harmonics list on the WT1600 (see section 4.3)

Off-Line mode

Numeric data on the WT3000 (or harmonic data on the WT1600) loaded in steps 6 to 10 in section 3.4 is displayed in bar graphs.

Displaying Bar Graphs

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

WT1800 Display Example

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.

Start Order / Stop Order(WT500 and WT1800 only)

Select the order of numeric data to display.*1

Type	WT500	WT1800
Start Order	0 to 40	0 to 490
Stop Order	10 to 50	10 to 500

*1 The difference between the start order and the end order must be greater than or equal to 10.

Changing the Displayed Bar Graph

You can change the Data Number in the numeric value screen on the WT500, WT1800, and WT3000 (or the harmonics list screen on the WT1600) to display the desired number of bar graphs.
However, on the WT1600, the harmonic data must contain the harmonic data of harmonic measurement functions and elements that is necessary for displaying bar graphs.

- When in On-Line mode, be sure to configure the harmonics display function (see section 4.3) to acquire this type of data.
- When in Off-Line mode, make sure that the data that you load contains this type of data.

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 WT500, WT1800, and WT3000, if you do not stop data acquisition, you cannot change the measurement functions and elements displayed in the bar graph screen.
- The bar graph screen can be displayed only in Normal mode on the WT1800.
- The bar graph screen can be displayed only in Normal or Wide-Band Harmonics mode on the WT3000.
- 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

When in On-Line mode, by carrying out the procedure described in “Starting Data Acquisition” in section 3.2, the data is loaded from the WT.

Note

- 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.
- There are setting items that cannot be changed while data is being downloaded.

4.6 Vector Display Function

Preparation to Display Vector

On-Line mode

- On the WT1800, set the measurement mode to Normal (see page 2-9).
- On the WT3000, set the measurement mode to Normal or Wide-Band Harmonics (see page 2-9).
- In the numeric list*1, select measurement functions, elements, and oders.
  *1 Harmonics list on the WT1600 (see section 4.3)

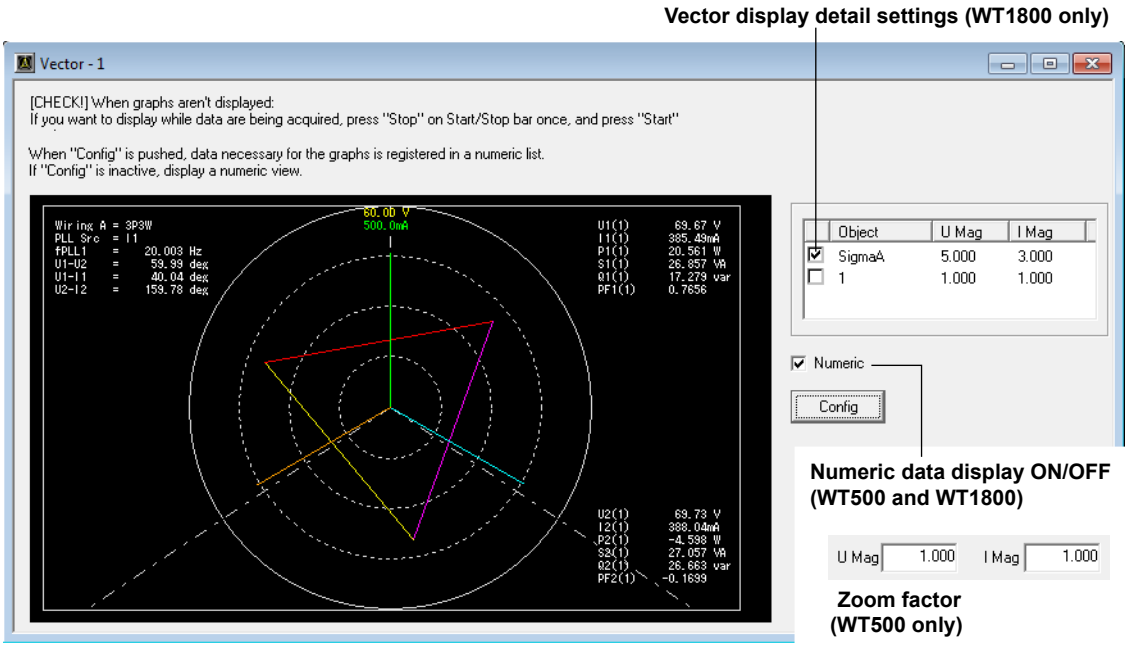
Off-Line mode

Numeric data on the WT3000 (or harmonic data on the WT1600) loaded in steps 6 to 10 in section 3.4 is displayed in 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.

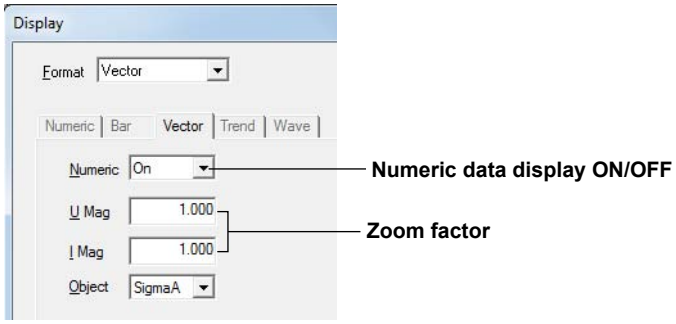
WT1800 Display Example



Setting the Vector Zoom Factor and Turning ON/OFF Numeric Data Display on the WT1600 and WT3000

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 numeric value screen on the WT500, WT1800, and WT3000 (or the harmonics list screen on the WT1600), to display the desired number of vectors.

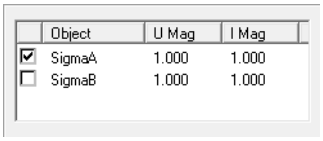
However, you must set the downloaded numeric data on the WT500, WT1800, and WT3000 (or harmonic data on the WT1600) in the numeric value display (see section 4.1) on the WT500, WT1800, and WT3000 or the harmonics list display (see section 4.3) on the WT1600 so that the harmonic data of the harmonic measurement 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.

Entering Vector Display Detail Settings (WT1800)

For the WT1800, you can configure detail settings of the vector display.



Number of Vector Display

Set the number of vector display windows to 1 or 2 by selecting the appropriate check box.

Object

Select the element/wiring unit to display.

1. Click the Object column. A combo box opens.
2. Select the element/wiring unit in this column.

U Mag, I Mag

Set the zoom factor (U Mag) of the fundamental wave component U(1) or the zoom factor (I Mag) of I(1).

1. Click the U Mag or I Mag column. A combo box opens.
2. Set the Zoom factor of the U(1) or I(1).

Starting Harmonic Data Acquisition

When in On-Line mode, on the numeric value display of the WT500, WT1800, and WT3000 (see section 4.1), or the harmonics list display of the WT1600 (see section 4.3), start data acquisition (see section 3.2) after setting up the harmonic measurement functions and elements in advance.

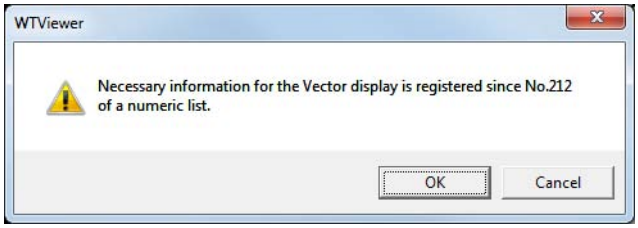
Note

- If harmonic data is not downloaded from the WT to WTViewer, no vector data are displayed in the vector screen.
- The vector screen can be displayed only in Normal mode on the WT1800.
- The vector screen can be displayed only in Normal or Wide-Band Harmonics mode on the WT3000.
- There are setting items that cannot be changed while data is being downloaded.

Registering the Information Required for Vector Display (Vector Display Data) in the Numeric List

1. Click **Config**. A message asking you to confirm the operation appears.

WT3000 Display Example



2. Click OK.

In the case of the WT3000, data required for vector display (vector display data) means the following 39*1 measured data.

- Measured values of the fundamental components U, I, P, S, Q, PF, and Phi of elements 1 to 4*2.
- ΣA and ΣB*3 of PhiUi_Uj, PhiUi_Uk, PhiUi_Ii, PhiUi_Ij, and PhiUi_Ik*4
- FreqU of element 1*5

For the WT500:
*1.: 27
*2.: Elements 1 to 3
*3.: ΣA

For the WT1600:
*1.: 58
*2.: Elements 1 to 6
*3.: ΣA, ΣB, and ΣC

For the WT1800:
*1.: 59
*2.: Elements 1 to 6
*3.: ΣA, ΣB, and ΣC
*4.: PhiUi_Uj, PhiUi_Uk, PhiUi_Ii, PhiUj_Ij, and PhiUk_Ik
*5.: PLL source frequency of the vector item

This is explained using the WT3000 as an example.
The number of measured data that can be acquired in one communication with the WT is 250 (see page 4-1). Therefore, if 212 or more data are acquired from the WT, a portion of the vector display data is lacking, and there are times when vectors cannot be displayed or numeric data on the vector display reads ------. For example, if harmonic data of orders 1 to 30 are acquired from the WT for U and I on elements 1 to 4, 240 data total are acquired. In this case, the vector display data is incomplete, and vectors cannot be displayed.

You can use this function in such cases where you wish to give precedence to vector display even if a portion of the harmonic data is lacking. If the function is used, vector display data is acquired as the 212th through 250th of the measured data acquired from the WT.
In the above example, vector display data is acquired from the WT in place of orders 3-30 of harmonic data for I on element 4.
On the WT500, vector display data is acquired for number 224 and after on the numeric list.
On the WT1600, vector display data is acquired for number 193 and after on the numeric list.
On the WT1800, vector display data is acquired for number 192 and after on the numeric list.

Note

Even if the communication mode is Off-Line, you can register the information required for vector display (vector display data) in the numeric list. However, the vector display uses measured data that is loaded, therefore even if you register vector display data in the numeric list it is not reflected in the numeric or vector displays.

4.7 Trend Display Function (On-Line Mode Only)

Preparation to Display Trend

- On the WT1800 and WT3000, set the measurement mode to Normal Mode(see page 2-9).
- In the numeric list*1, select measurement functions, elements, and oders.

  *1 Harmonics list on the WT1600 Harmonic Measurement mode (see section 3.5)

Note

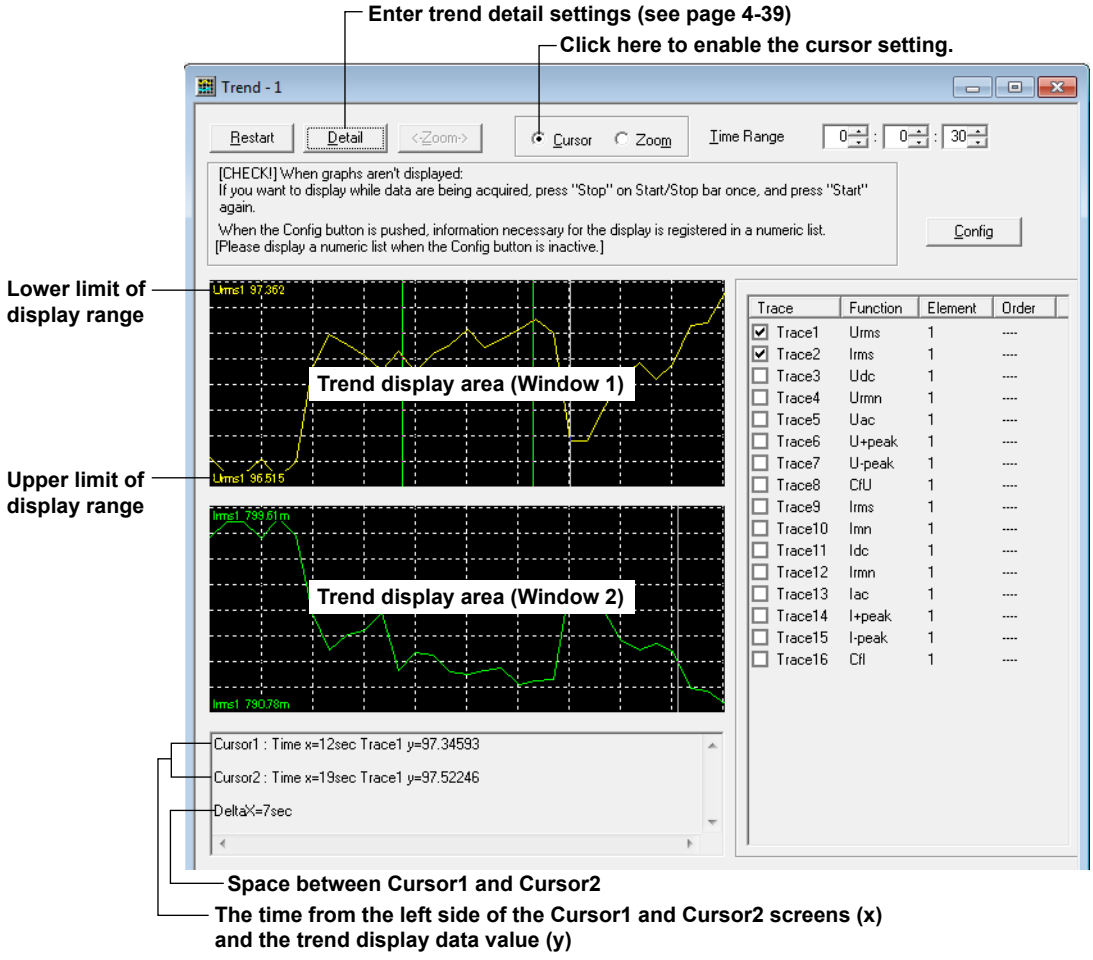
In Fast Mode (see page 4-5), the trend display is not updated.

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 4-39.)



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 4-41) 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 check box to select the waveform to be displayed. These are linked to Trace in the Trend Detail dialog box (see page 4-39).

• Cursor

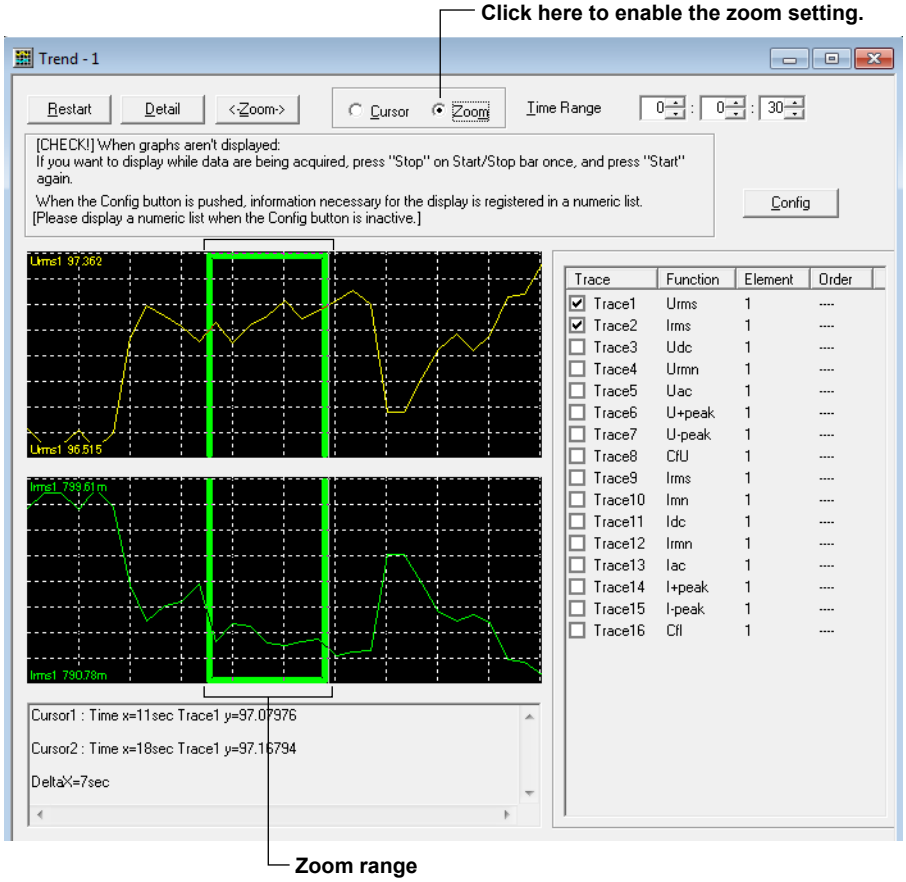
Click here to set Cursor1 and Cursor2 in the trend display area.

• 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



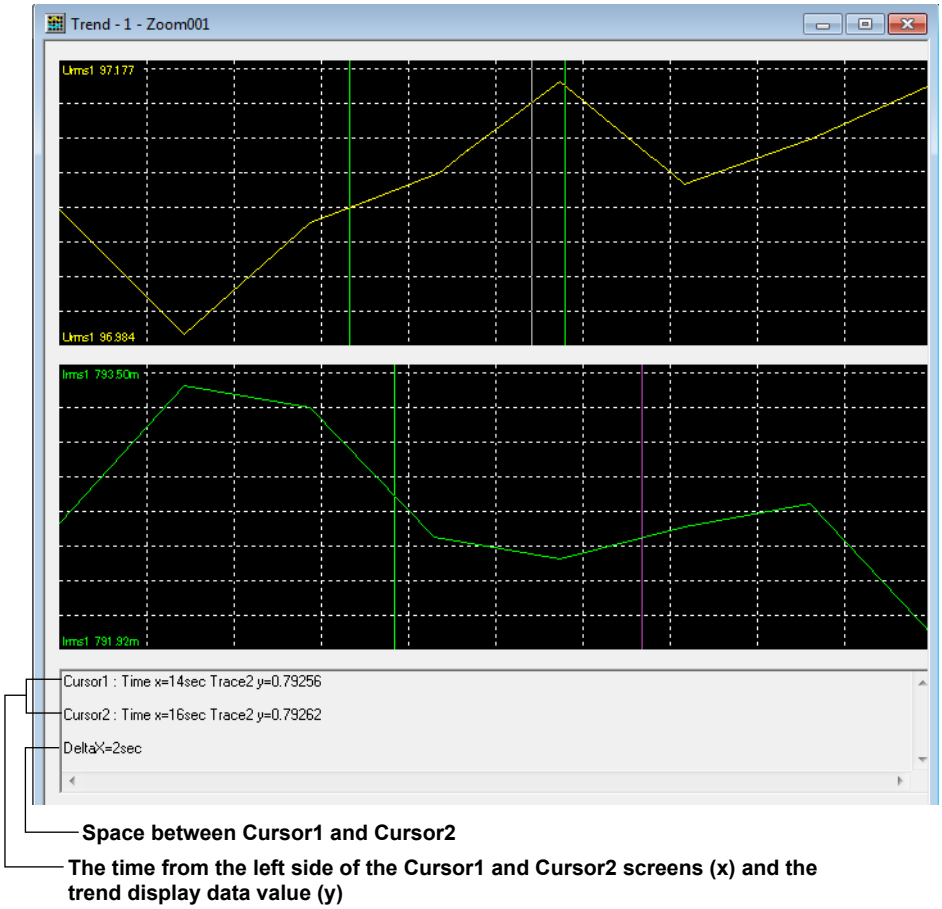
• Zoom (Time Axis Direction)

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

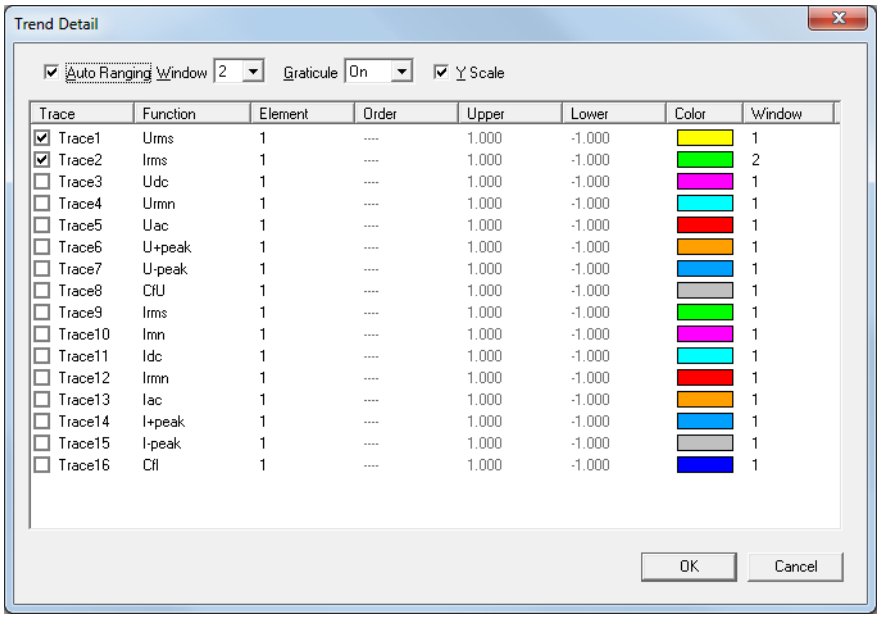


Space between Cursor1 and Cursor2

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 check box to select the trend to be displayed. These are linked to Trace in the Trend dialog box (see page 3-35).

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.

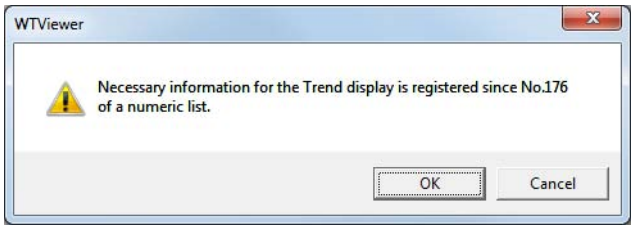
Note

The trend screen can only be displayed in Normal mode on the WT1800 and WT3000.

Registering the Information Required for Trend Display (Trend Display Data) in the Numeric List (WT500 and WT1800)

1. Click **Config**. A message asking you to confirm the operation appears.

WT1800 Display Example



2. Click OK.

This is explained using the WT1800 as an example.
The number of measured data that can be acquired in one communication with the WT is 250 (see page 4-1). Therefore, if 212 or more data are acquired from the WT, a portion of the trend display data is lacking, and there are times when trend cannot be displayed or numeric data on the trend display reads ------. For example, if harmonic data of orders 1 to 30 are acquired from the WT for U and I on elements 1 to 4, 240 data total are acquired. In this case, the trend display data is incomplete, and trend cannot be displayed.

You can use this function in such cases where you wish to give precedence to trend display even if a portion of the data is lacking. If the function is used, trend display data is acquired as the 176th to 191th through 250th of the measured data acquired from the WT.
In the above example, vector display data is acquired from the WT in place of orders 3-30 of harmonic On the WT500, trend display data is acquired for number from 208 to 223 on the numeric list.

Note

For the WT1600 and WT3000, in the display item settings of the numeric display, include the trend display data in the measured data to acquire from the WT (see page 4-2).

4.8 High Speed Data Capturing Numeric Display (WT1800) (On-Line Mode Only)

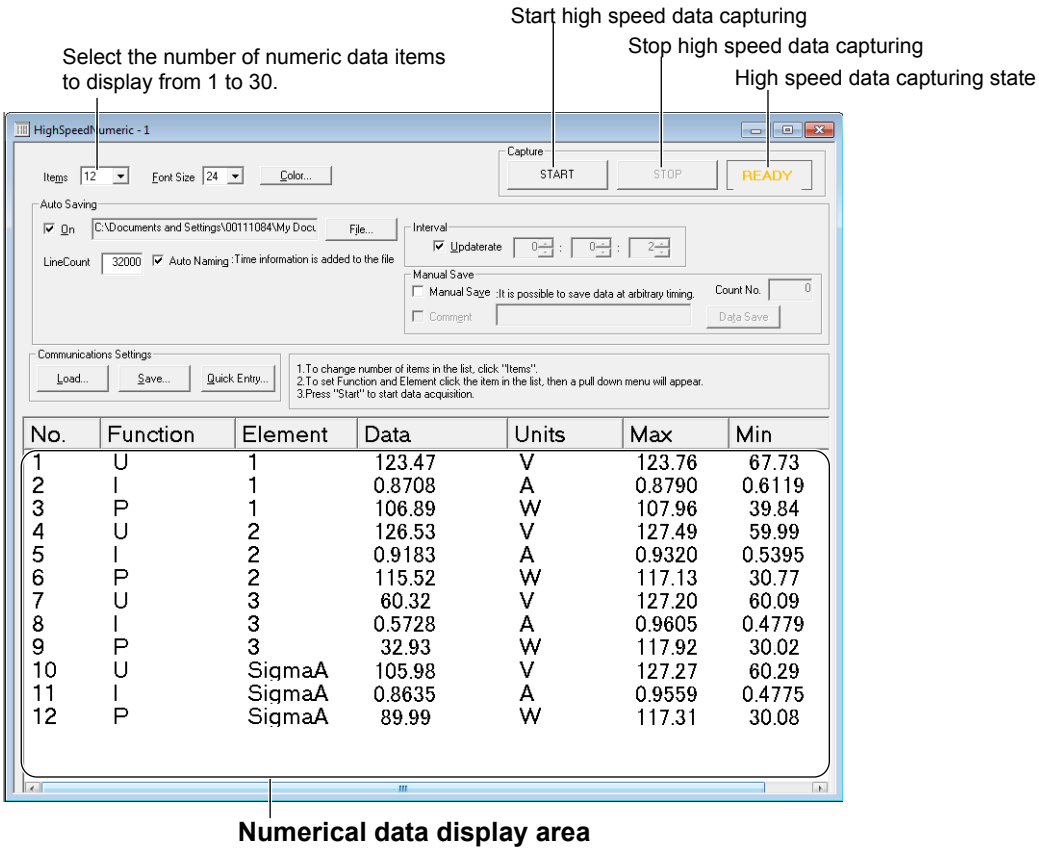
The functions explained in this section can be used when the high speed data capturing (/HS option) is installed in the WT1800.

Preparation to Display the Numeric Screen

- Set the measurement mode to Normal Mode(see page 2-9).
- Set the display mode to High Speed Data Capturing(see page 6-25 or 6-31).

Displaying the Numeric Screen

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



Numerical data display area

High Speed Data Capturing Numeric Screen Settings

The various functions on the high speed data capturing numeric screen and how to use them are the same as those of the numeric screen described in section 4.1, except for the following points.
For details, see section 4.1.

- Items: See the figure above for the available range.
- High speed data capturing start button
- High speed data capturing stop button
- High speed data capturing state display

The following boxes and buttons described in section 4.1 are not available on the high speed data capturing numeric screen.

- Data Number
- Temporary Space
- Order
- Copy Displayed
- Fast Mode

Displaying Measured Data on the High Speed Data Capturing Numeric Screen

To display measured data on the high speed data capturing numeric screen, perform the following two operations.

- Starting download of numeric data
- Starting high speed data capturing

Starting Download of Numeric Data

When in On-Line mode, by carrying out the procedure described in “Starting Data Acquisition” in section 3.2, the data is loaded from the WT.
If the AutoSaving function is on, a file will be created when you start downloading numeric data.

Note

- If numeric data is not downloaded from the WT to WTViewer, no measured values are displayed in the numeric value screen.
- There are setting items that cannot be changed while data is being downloaded.
- When the display mode is set to High Speed Data Capturing, the following screens cannot be displayed: numeric, waveform, trend, bar graph, and vector.

Starting High Speed Data Capturing

Click **Start** on the high speed data capturing numeric screen. High speed data capturing starts.

Like the display on the WT1800, the measured data displayed on WTViewer is updated every second. The data is actually measured at 5 ms intervals. So, every 200th measured data point is displayed. Measured data between display updates (for example, the 342nd data point) cannot be displayed on WTViewer.
To view such data points, save the data to a file using the AutoSaving function (see page 4-4), and open it using a commercial spreadsheet program (such as Excel).

Completing High Speed Data Capturing

Stopping High Speed Data Capturing

Click **Stop** on the high speed data capturing numeric screen. High speed data capturing stops.

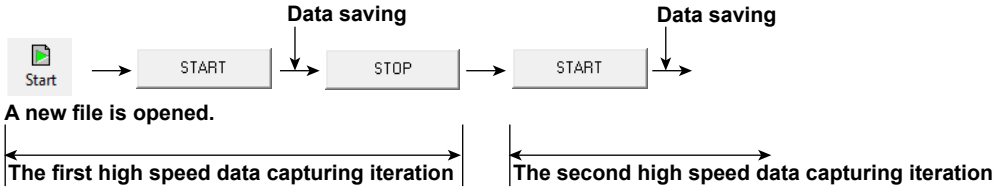
Stop Downloading Numeric Data

Stop downloading numeric data from the WT by performing the procedure for stopping data acquisition as described in section 3.2.
If measured data is being saved to a file using the AutoSaving function, the save operation will be stopped, and the file will be closed.

Numeric Data Files Created by the AutoSaving Function

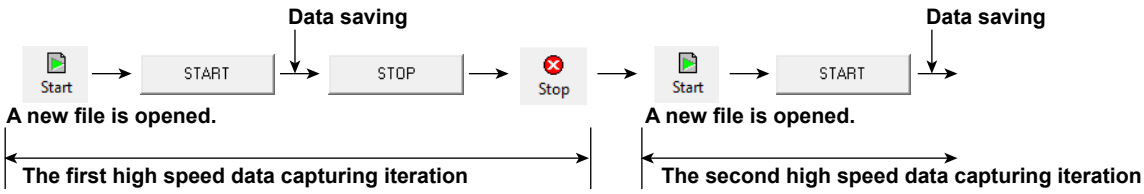
If measured data is being saved to a file by the AutoSaving function, unless you stop the downloading of numeric data, numeric data will be appended to the same file even if you repetitively start and stop high speed data capturing.

For example, if you perform the following operation, the second time high speed data capturing is started, the numeric data will be appended to the file that is created the first time high speed data capturing is performed.



To create a new file for every high speed data capturing iteration, start and stop the downloading of numeric data whenever you start and stop high speed data capturing.

For example, if you perform the following procedure, a new file will be created every time you start the downloading of numeric data.



Note

When you are using the GP-IB interface, if you turn External Sync on and capture data at a high rate such as by synchronizing to a 1 kHz external sync signal, data dropout may occur depending on the number of data points that WTViewer is set to capture.

Such data dropouts can be avoided in the following ways.

- Decrease the frequency of the external sync signal.
- Use a communication interface other than GP-IB.
- Reduce the number of data points (Items; see page 4-42) to around 10.

4.9 High Speed Data Capturing Trend Display (WT1800) (On-Line Mode Only)

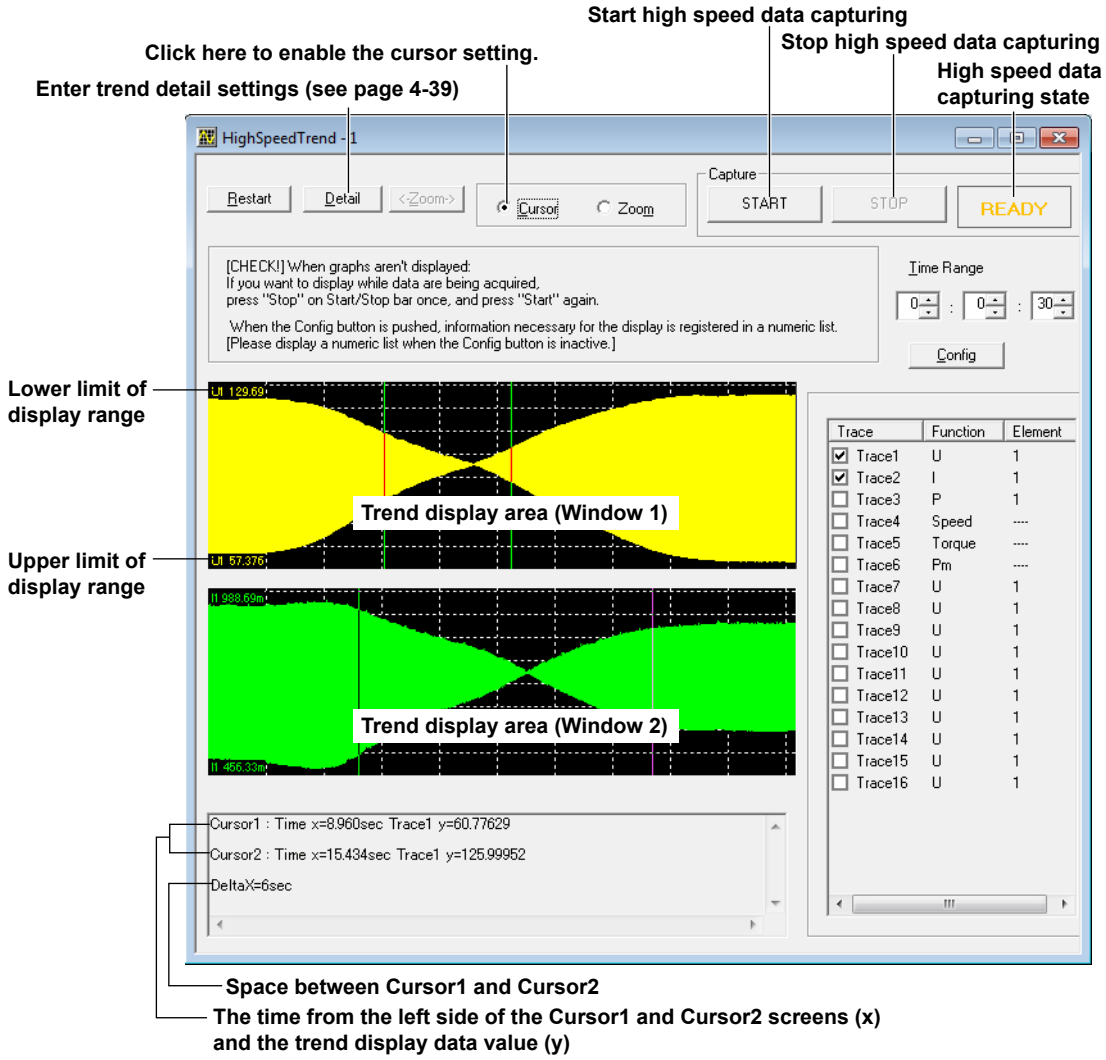
The functions explained in this section can be used when the high speed data capturing (/HS option) is installed in the WT1800.

Preparation to Display the Numeric Screen

- Set the measurement mode to Normal Mode(see page 2-9).
- Set the display mode to High Speed Data Capturing(see page 6-25 or 6-31).

Displaying Trends

Choose **View > High Speed Trend** in the menu bar.



High Speed Data Capturing Trend Screen Settings

The various functions on the high speed data capturing trend screen and how to use them are the same as those of the trend screen described in section 4.7, except for the following points.
For details, see section 4.7.

- High speed data capturing start button
- High speed data capturing stop button
- High speed data capturing state display

The following box described in section 4.7 are not available on the high speed data capturing trend screen.

- Order

Displaying Trend Data on the High Speed Data Capturing Trend Screen

To display trend data on the high speed data capturing trend screen, perform the following two operations.

- Starting download of numeric data
- Starting high speed data capturing

Starting Download of Trend Display Data

When in On-Line mode, by carrying out the procedure described in “Starting Data Acquisition” in section 3.2, the data is loaded from the WT.

Starting High Speed Data Capturing

Click **Start** on the high speed data capturing trend screen. High speed data capturing starts.

Restarting the Trend Display

If you start downloading trend display data and then click **Restart**, the trend display is restarted. Previous trends will be deleted.

Completing High Speed Data Capturing

Stopping High Speed Data Capturing

Click **Stop** on the high speed data capturing trend screen. High speed data capturing stops.

Note

- Even if you stop high speed data capturing, as long as numeric data is being downloaded, the trend graph display will continue on the basis of the measured data of the last 1 second. To stop the trend graph display, stop the downloading of numeric data.
- If you stop high speed data capturing without stopping the downloading of numeric data and then start high speed data capturing again, the trend graph will simply continue (it will not restart). To restart the trend graph from the left edge of the screen, click Restart.

Stop Downloading Numeric Data

Stop downloading numeric data from the WT by performing the procedure for stopping data acquisition as described in section 3.2.

4.10 Displaying the Computed Waveform (Math Waveform) (WT3000)

The functions explained in this section can be used when the advanced computation function (/G6 option) is installed in the WT3000.

Displaying the Computed Waveforms

On-Line mode

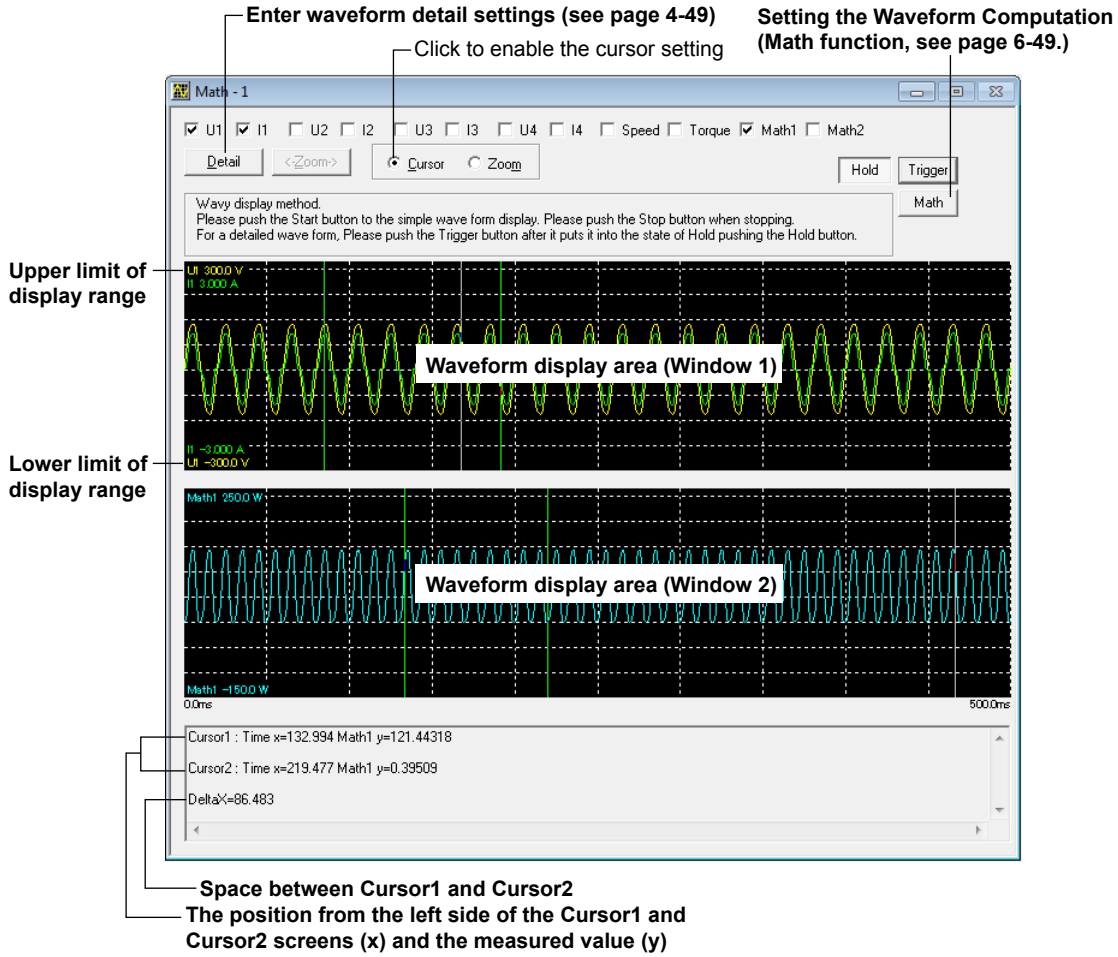
Set the measurement mode to Math by carrying out the procedure given in “Changing the Measurement Mode” on page 2-9. The computed waveform (Math) screen appears.

Off-Line mode

Load the waveform display data by carrying out steps 6 to 10 in section 3.4.

Cursor Setting Screen

(Example with two windows. To set the number of windows, see page 4-50.)



- **U1 to I4, Math1, and Math2**

(On the motor version of the WT3000, Speed and Torque are displayed.)
Select the waveforms you wish to display (select or clear the check boxes). This is linked to the Ch from the Wave Detail dialog box (see page 4-49).

Note

When in Off-Line mode, waveforms that are not saved are not displayed even if the check box is selected.

• Cursor

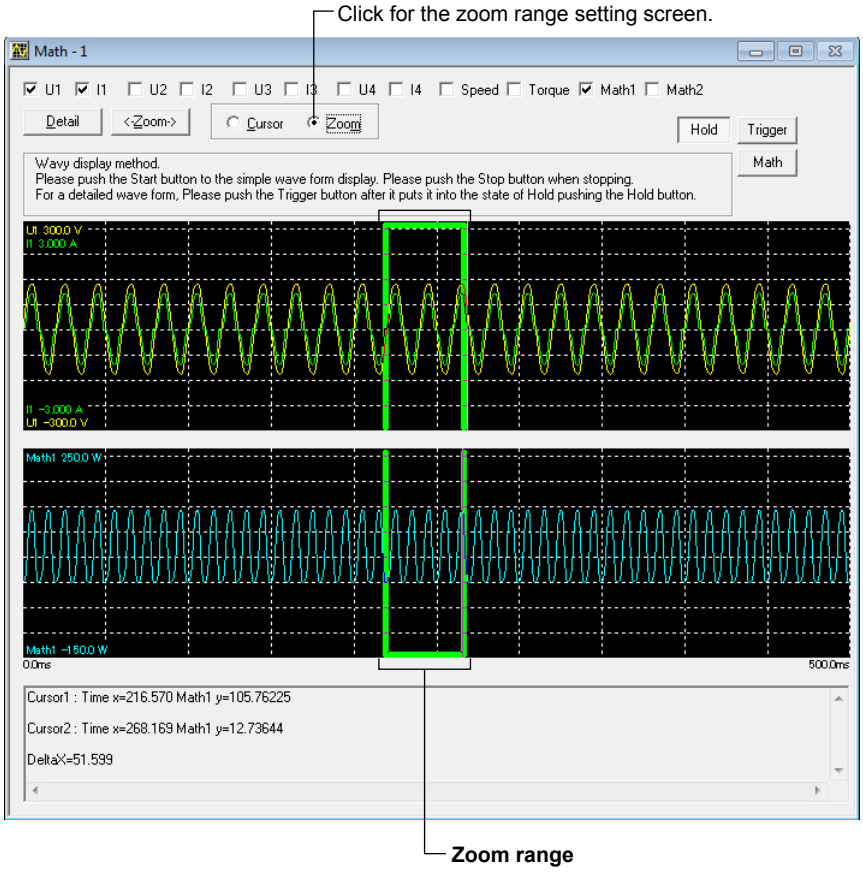
Click here to set Cursor1 and Cursor2 in the waveform display area.

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 Cursor2can 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

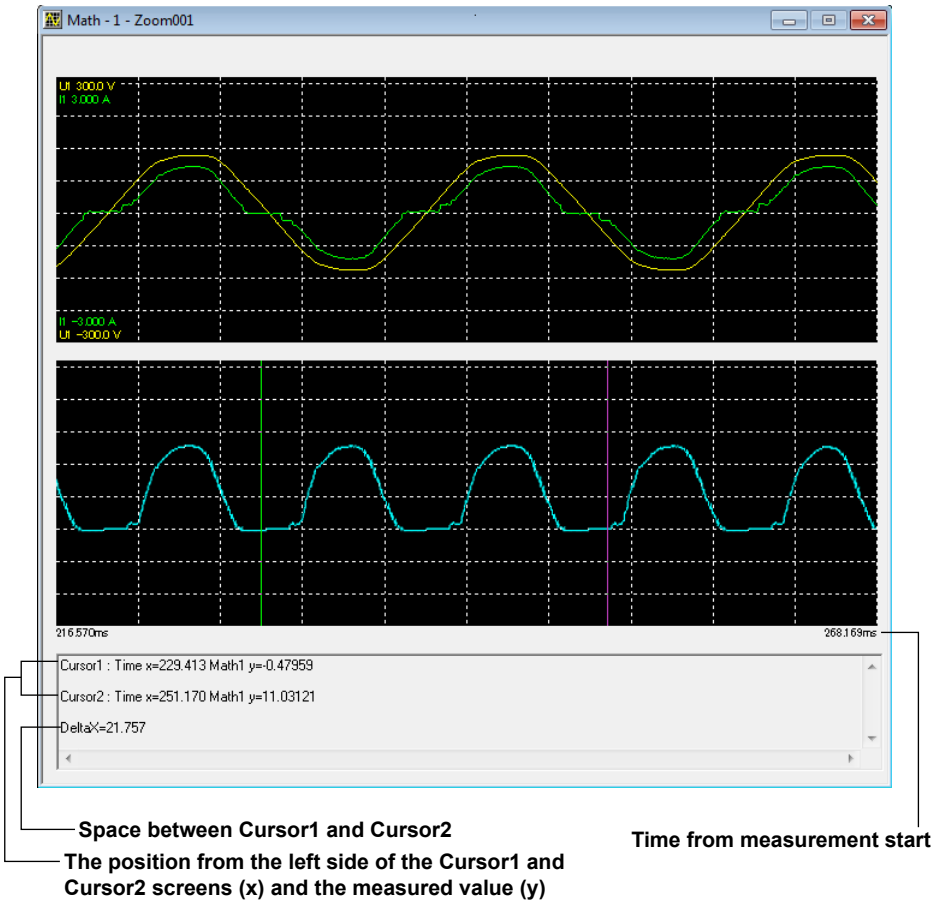


• Zoom (Time Axis Direction)

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

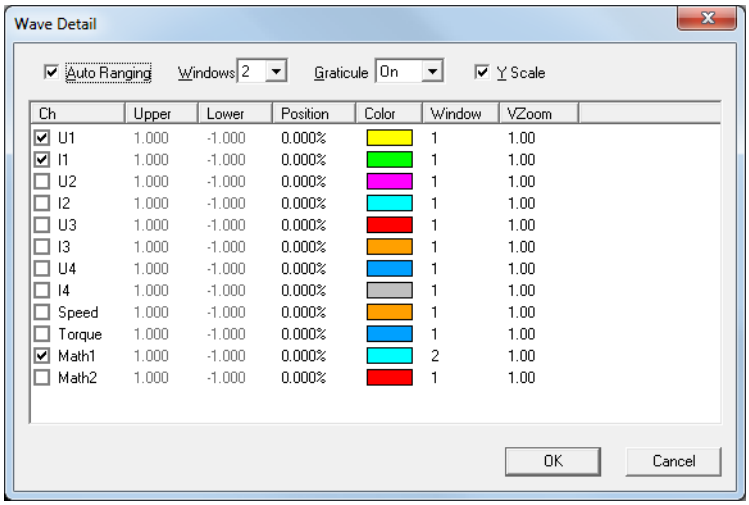
1. Drag the area to zoom in the waveform display area. The zoomed range is set simultaneously in all of the displayed waveform display areas.
2. Click **<-Zoom->**. A screen appears in which all waveforms in the waveform display area are zoomed.

   You can set Cursor1 and Cursor2 on these zoomed waveforms.



Entering Math Waveform Detail Settings

Click **Detail** in the Math dialog box. A Wave Detail dialog box opens.



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 you wish to display (select or cle ar the check boxes). This is linked with the waveform display/do not display setting in the Math dialog box (see page 4-47).

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 on 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 on 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 on the **VZoom** column. A combo box opens.
2. Set the vertical zoom factor.

Setting the X-Axis (Time Axis)

When in On-Line mode, set the X-axis (time axis) depending on the type of displayed data.

- **When Displaying the Waveform Sampling Data**
  The X-axis (time axis) is set to the display update rate on the WT. Set the value in the Update/Wiring/Averaging dialog box that opens by choosing **Setting** > **WT Setting** > **Update/Wiring/Averaging**.
- **When Displaying the Waveform Display Data**
  Set the X-axis in the Wave dialog box that opens by choosing **Setting** > **WT Setting** > **Wave**.

Setting the Equation, Scale, Unit, and Label of Computed Waveforms

When in On-Line mode, set the values in the Math dialog box that opens by choosing **Setting** > **WT Setting** > **Math**.

Note

- The settings of the X-axis (time axis) and the equation, scale, unit, and label of waveforms are applied to the WT. If you load the data from the WT after changing the setting, the change is applied to the display on the PC.
- The display scale of the computed waveform may not be stable if you select auto scaling in the cases described below. In such case, use manual scaling.
  - The amplitude of the input signal used in the waveform equation is not stable.
  - The amplitude of the computed waveform is near the threshold level used to switch the scaling setting.

Starting Downloading of Waveform Display Data (On-Line Mode Only)

The following two types of data related to waveforms are available in waveform computation (Math) mode.

Waveform Sampling Data

Data acquired at the WT3000's sample rate (approximately 200 kS/s).

Waveform Display Data

Waveform sampling data that has been P-P compressed (see the note on page 4-30) to a set of 1002 data points for displaying the waveform on the WT screen.

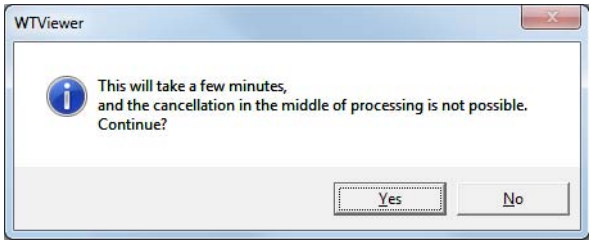
If you do not load either of the data above from the WT into WTViewer, the waveform is not displayed even if the measurement mode is set to waveform computation (Math) mode.

Loading the Waveform Sampling Data

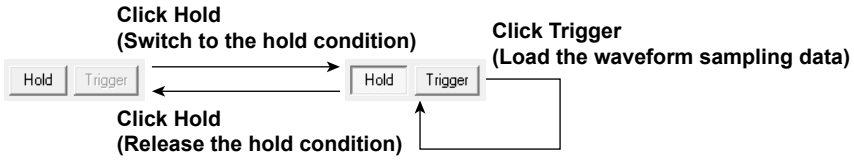
1. Click **Hold** to set the WT in the hold condition.
2. Click **Trigger**.
   If you click Trigger, the WT measures once and returns to the hold condition. The waveform sampling data that the WT acquired with this measurement is loaded into the PC.

- **When the Data Update Rate Is Less Than or Equal to 250 ms**
  The waveform sampling data is transmitted from the WT to the PC and displayed on the PC screen. Proceed to step 4.
- **When the Data Update Rate Is Greater Than or Equal to 500 ms**
  A message asking you to confirm the data loading operation appears. Proceed to step 3.

3. Click **Yes**. The waveform sampling data is transmitted from the WT to the PC and displayed on the PC screen.



4. To repeat the loading of the waveform sampling data, return to step 2. To release the hold condition, click Hold.



Loading the Waveform Display Data

Carry out the procedure described in “Starting Data Acquisition” in section 3.2 to load the waveform display data.

Note

- The waveform sampling data and waveform display data cannot be loaded simultaneously.
  - If you click Hold and the WT is in the hold condition, you cannot load the waveform display data by clicking Start. Release the hold condition, and then click Start.
  - If the waveform display data is being loaded by clicking Start, you cannot click Hold. Click Stop to stop the loading of the waveform display data, and then click Hold.
- Because the number of waveform sampling data points is greater than that of waveform display data points, it takes a long time to load the data from the WT. For details on the number of data points, see section 9.3 in the WT3000 User’s Manual. The number of data points is large in the following cases.
  - The number of waveforms that is loaded and displayed on the PC is large.
  - The data update rate is long.
- Because the waveform display on the WT screen and the waveform display on WTViewer are different in construction, the waveform trace may appear differently if you compare the waveforms in a condition in which each point of the waveform display data can be seen. For details, see the note in section 4.4.
- If the waveform sampling data is displayed, the size of the computed waveform (Math) screen cannot be changed.
- It may take a long time to display the zoom screen if you click the Zoom button and any of the following cases apply when the waveform sampling data is displayed.
  - The data update rate is long.
  - The zoom range is wide.

  To view the details of the waveform sampling data quickly in the case above, save the data to a file in CSV format according to the procedure in section 5.2, and draw the waveform on another application such as Excel.

4.11 Displaying the FFT (Power Spectrum Waveform) (WT3000)

The functions explained in this section can be used when the advanced computation function (/G6 option) is installed in the WT3000.

Displaying the Power Spectrum Waveform

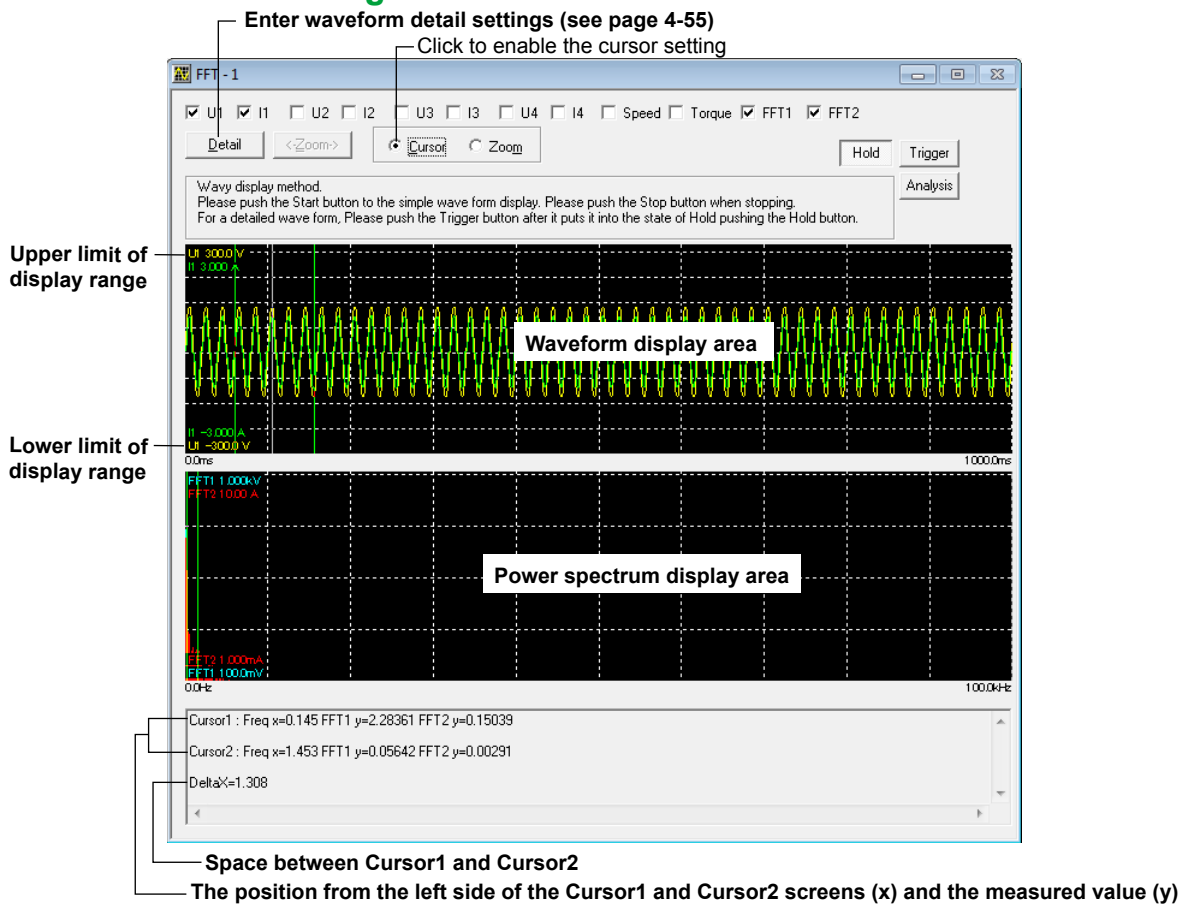
On-Line mode

Set the measurement mode to FFT by carrying out the procedure given in “Changing the Measurement Mode” on page 2-9. The input waveform and FFT waveform (power spectrum) are displayed on two windows.

Off-Line mode

Load the waveform display data by carrying out steps 6 to 10 in section 3.4.

Cursor Setting Screen



- **U1 to I4, FFT1, and FFT2**

(On the motor version of the WT3000, Speed and Torque are displayed.)
Select the waveforms you wish to display (select or clear the check boxes). This is linked to the Ch from the Wave Detail dialog box (see page 4-55).

Note

When in Off-Line mode, waveforms that are not saved are not displayed even if the check box is selected.

• Cursor

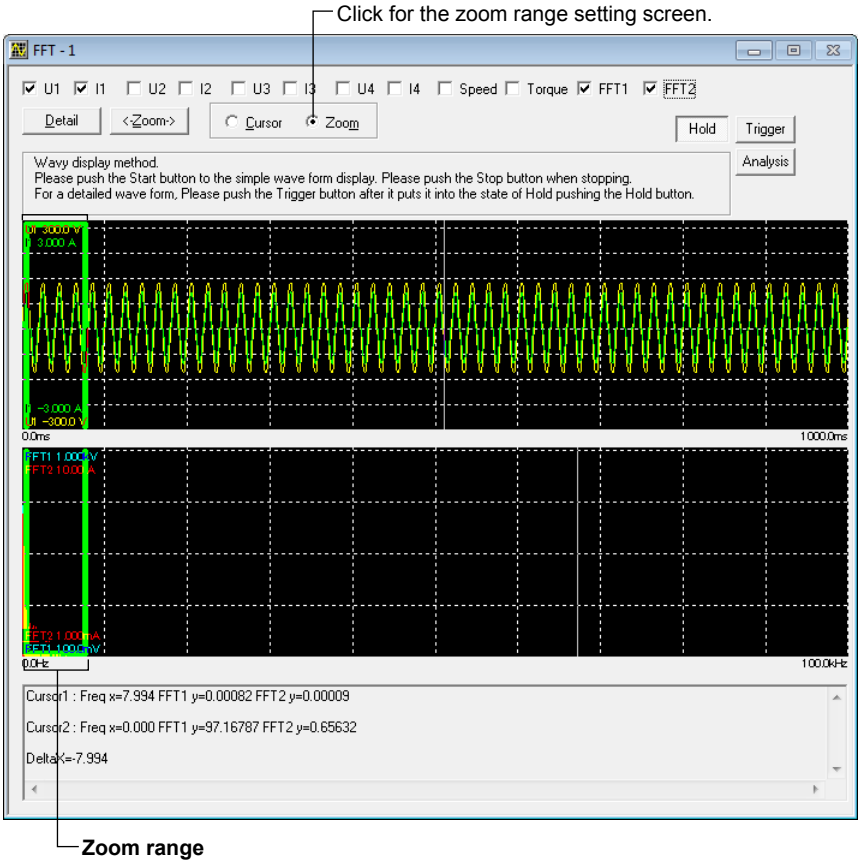
Click here to set Cursor1 and Cursor2 in the waveform display area.

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 Cursor2can 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

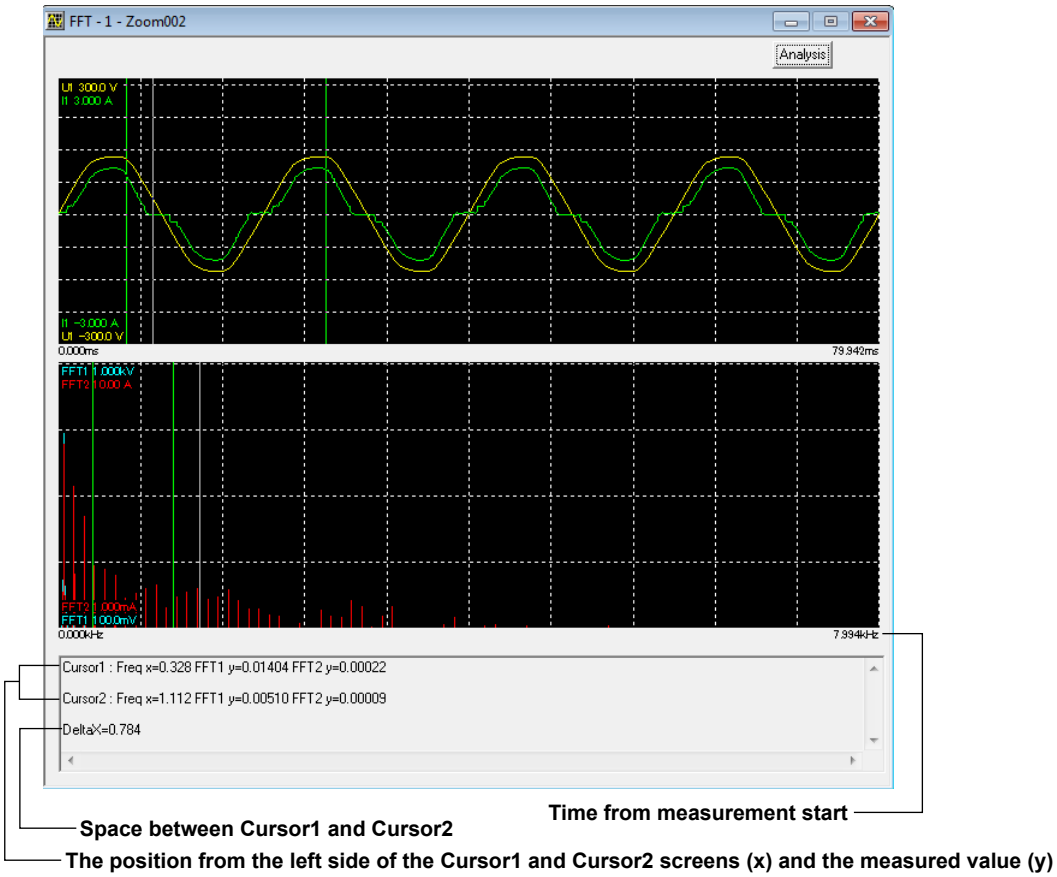


• Zoom (Time Axis Direction)

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

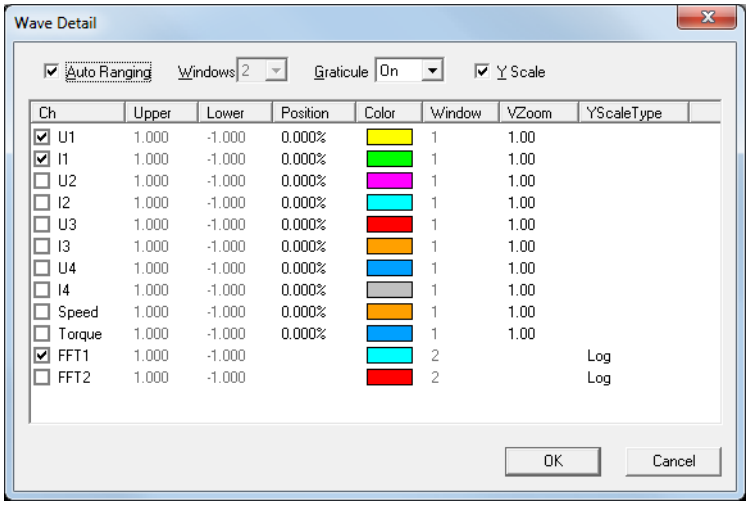
1. Drag the area to zoom in the waveform display area. The zoomed range is set simultaneously in all of the displayed waveform display areas.
2. Click **<-Zoom->**. A screen appears in which all waveforms in the waveform display area are zoomed.

   You can set Cursor1 and Cursor2 on these zoomed waveforms.



Entering Power Spectrum Waveform Detail Settings

Click **Detail** in the FFT dialog box. A Wave Detail dialog box opens.



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

The number of windows is fixed to 2. It cannot be changed.

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 you wish to display (select or clear the check boxes). This is linked with the waveform display/do not display setting in the FFT dialog box (see page 4-53).

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.

You cannot set the positions of power spectrum FFT1 and FFT2.

Color

Select the waveform display color.

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

Window

The mapping of the waveform display is as shown below. It cannot be changed.

Ch	Window
U1 to I4, Torque, and Speed	1
FFT1 and FFT2	2

VZoom (Vertical Zoom)

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

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

You cannot set the VZoom value of power spectrum FFT1 and FFT2.

YScale Type

Set the type of Y-axis scale of power spectrum FFT1 and FFT2.

1. Click on the **YScale Type** column. A combo box opens.
2. Select **Log** (logarithmic) or **Lin** (linear).

YScale Type of the input waveform (U1 to I4, Torque, and Speed) is fixed to Lin (linear).

Setting the FFT Source and Label

When in On-Line mode, set the FFT source and label in the FFT dialog box that opens by choosing **Setting** > **WT Setting** > **FFT**.

Setting the Number of FFT Points and Time Window

When in On-Line mode, set the number of FFT points and time window in the FFT dialog box that opens by choosing **Setting** > **WT Setting** > **Display** > **FFT**.

Note

- The FFT source, label, the number of FFT points, and time window settings are applied to the WT. If you load the data from the WT after changing the settings, the change is applied to the display on the PC.
- The X-axis (time axis) display range of the waveform screen on the PC screen is as follows:
  - When the number of FFT points is 20 k: 100 ms
  - When the number of FFT points is 200 k: 1000 ms
- The X-axis (frequency) display range of the FFT (power spectrum waveform) screen on the PC screen is fixed to 0 kHz to 100 kHz. If you wish to view the details of the power spectrum waveform, use the zoom function.

Starting Downloading of Waveform Display Data (On-Line Mode Only)

Two types of data related to the input waveforms (U1 to I4) are available in FFT mode as shown below. The data related to the power spectrum waveform is handled as waveform sampling data.

Waveform Sampling Data

Data acquired at the WT3000's sample rate (approximately 200 kS/s).

Waveform Display Data

Waveform sampling data that has been P-P compressed (see the note on page 4-30) to a set of 1002 data points for displaying the waveform on the WT screen.

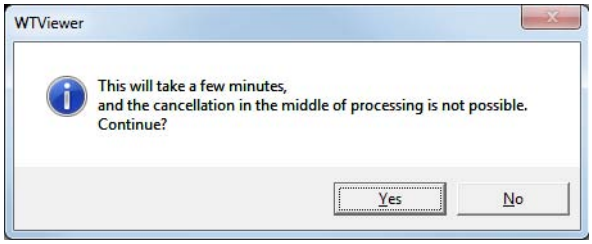
If you do not load either of the data above from the WT into WTViewer, the waveform is not displayed even if the measurement mode is set to FFT mode.

Loading the Waveform Sampling Data

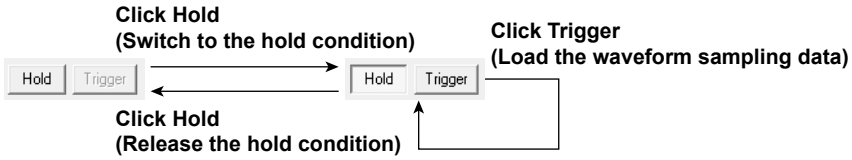
1. Click **Hold** to set the WT in hold condition.
2. Click **Trigger**.
   If you click Trigger, the WT measures once and returns to the hold condition. The waveform sampling data that the WT acquired with this measurement is loaded into the PC.

- **When the Number of FFT Points Is 20 k**
  The waveform sampling data is transmitted from the WT to the PC and displayed on the PC screen. Proceed to step 4.
- **When the Number of FFT Points Is 200 k**
  A message asking you to confirm the data loading operation appears. Proceed to step 3.

3. Click **Yes**. The waveform sampling data is transmitted from the WT to the PC and displayed on the PC screen.



4. To repeat the loading of the waveform sampling data, return to step 2. To release the hold condition, click Hold.



Loading the Waveform Display Data

Carry out the procedure described in “Starting Data Acquisition” in section 3.2 to load the waveform display data. Because the power spectrum waveform data is considered waveform sampling data, the data is not displayed when you carry out this procedure.

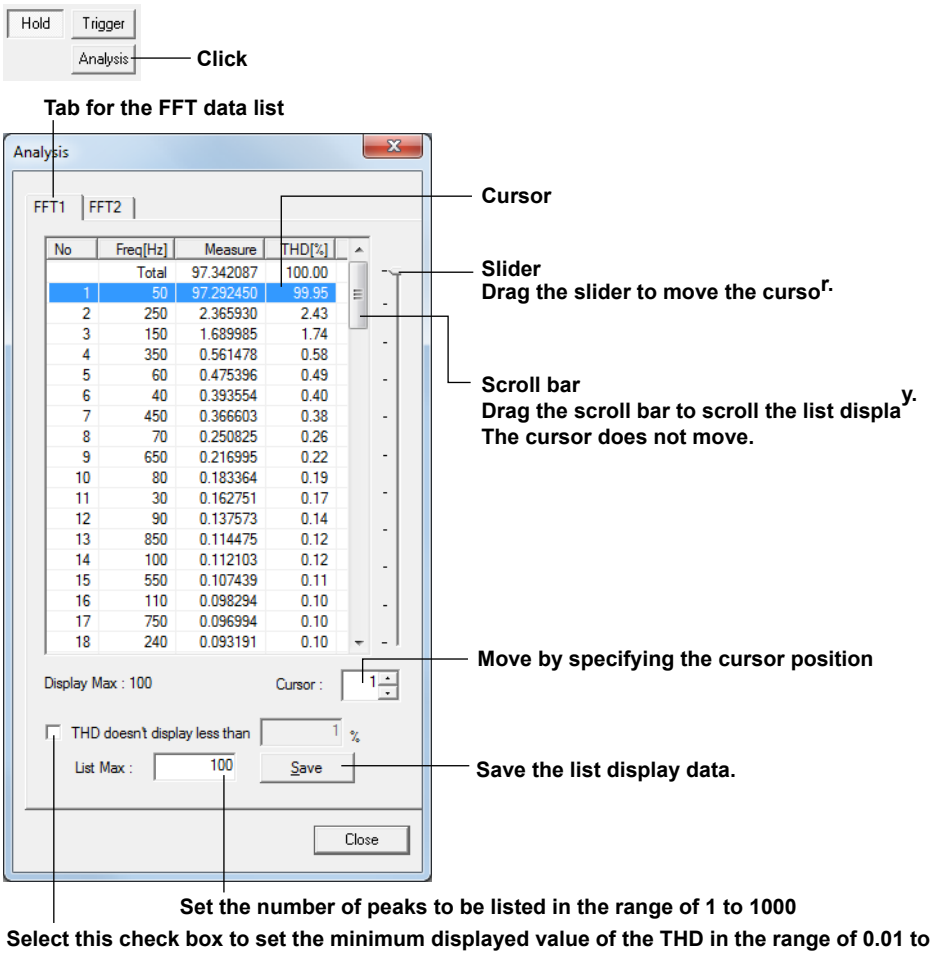
Note

- The waveform sampling data and waveform display data cannot be loaded simultaneously.
  - If you click Hold and the WT is in the hold condition, you cannot load the waveform display data by clicking Start. Release the hold condition, and then click Start.
  - If the waveform display data is being loaded by clicking Start, you cannot click Hold. Click Stop to stop the loading of the waveform display data, and then click Hold.
- Because the number of waveform sampling data points is greater than that of waveform display data points, it takes a long time to load the data from the WT. For details on the number of data points, see section 9.3 in the WT3000 User’s Manual.
- Because the waveform display on the WT screen and the waveform display on WTViewer are different in construction, the waveform trace may appear differently if you compare the waveforms in a condition in which each point of the waveform display data can be seen. For details, see the note in section 4.4.
- If the waveform sampling data is displayed, the size of the FFT screen cannot be changed.
- It may take a long time to display the zoom screen if you click the Zoom button and any of the following cases apply when the waveform sampling data is displayed.
  - The data update rate is long.
  - The zoom range is wide.

  To view the details of the waveform sampling data quickly in the case above, save the data to a file in CSV format according to the procedure in section 5.2, and draw the waveform on another application such as Excel.

Displaying or Saving the List of Peak Values of the Power Spectrum Waveform

When in On-Line mode, you can display or save the list of peak values of the power spectrum waveform that has been acquired through steps 1 to 3 on page 4-57.
Click Analysis to open the Analysis dialog box. The peak values are listed in descending order by THD value. A cursor (a line highlighted in blue) is displayed in the list. A white cursor is also displayed on the power spectrum waveform. This cursor is linked to the cursor in the list.

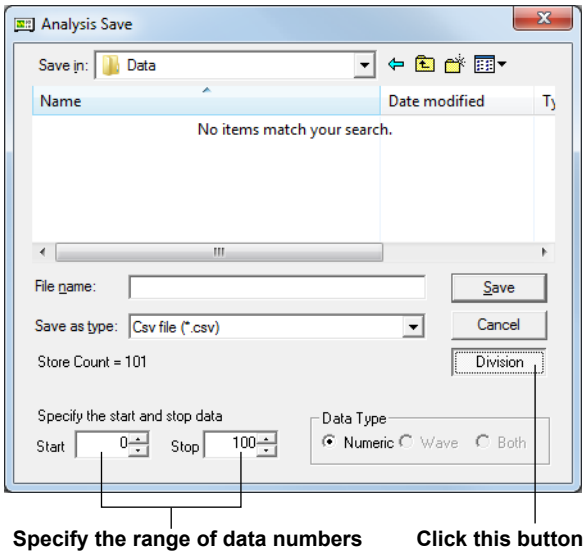


You can also display the list of peak values from the zoom window (see page 4-55) by clicking Analysis at the upper right of the screen. The range of data that is listed corresponds to the range displayed in the zoom window.

Saving the List Display Data

When in On-Line mode, you can save the data displayed in the list in CSV format.

1. Click **Save**. The Analysis Save dialog box opens.



Specify the range of data numbers to be saved using the store number

Click this button to display the Specify a change start and stop boxes.

2. Enter the **save destination** and the file name.
   - To save all the data, proceed to step 5.
   - To save a portion of the data, proceed to step 3.
3. Click **Division**. Text boxes for entering the start and end numbers appear.
4. Set the range of list numbers to be saved in the Specify a change start and stop boxes.
5. Click **Save** to save the data.

   The list display data of the FFT data (FFT1 or FFT2) that is displayed is saved. To save the FFT data that is not being displayed, switch the FFT data tab in the Analysis dialog box to display the list and then save the data.

4.12 Displaying the Cycle-by-Cycle Data (WT3000)

The functions explained in this section can be used when the cycle-by-cycle measurement function (/CC option) is installed in the WT3000.

Displaying the Cycle-by-Cycle Data

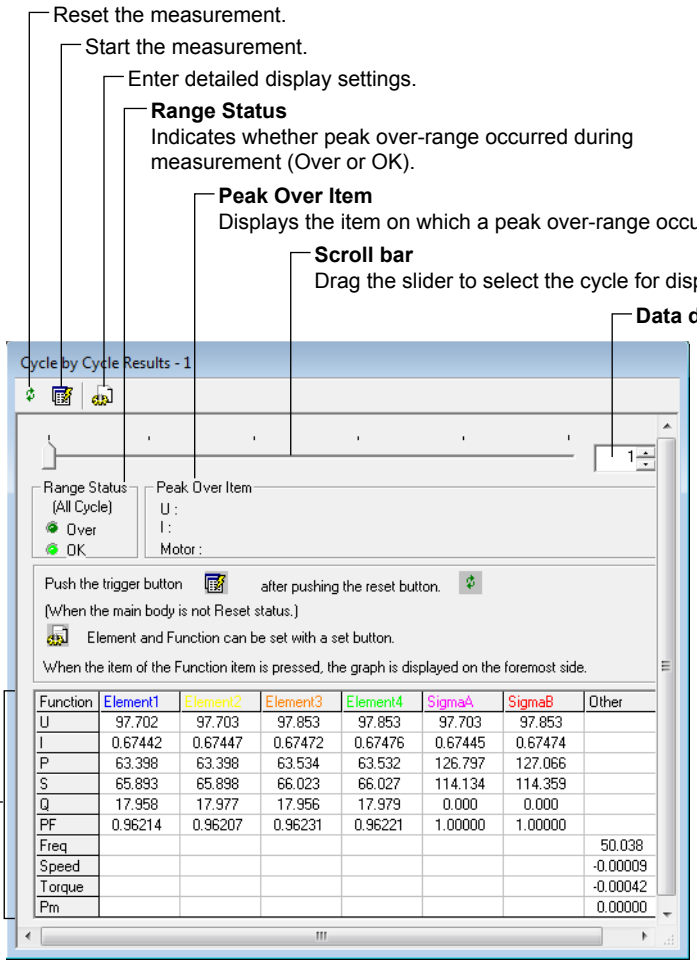
On-Line mode

Set the measurement mode to CycleByCycle by carrying out the procedure given in “Changing the Measurement Mode” on page 2-9. The Cycle by Cycle screen appears. The numeric list screen is always shown in the Cycle by Cycle screen. When the data is loaded, the graph of the measured data is displayed.

Off-Line mode

Load the cycle-by-cycle data (.cbc) by carrying out steps 6 to 10 in section 3.4.

Numeric List Screen



Data list

Displays the data of the cycle that is shown in the data display cycle number box.

- Freq is the synchronization source frequency.
- The cell is blank if the relevant data display is turned OFF in the detailed display settings or if there is no data.
- The data below is always blank.
  - U, I, P, S, Q, and PF in the Other column.
  - Freq, Speed, Torque, and Pm of the Element1 to SigmaB columns

Note

You cannot change the size of the numeric list screen.

Peak Over Item

There are two methods for displaying the peak over-range polarity depending on the detection method.

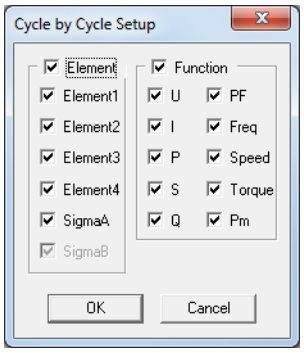
- Detection by data
  If peak over-range occurs in the data from the A/D converter during the measurement of the cycle for which the data is displayed, the peak over-range polarity is displayed as +, –, or ±.
- Detection by hardware
  If any hardware peak over-range is detected during the measurement of all cycles, HP (Hardware Peak) is displayed for the data. It detects peak over-range that cannot be detected using the “detection by data” method such as pulse noise with a peak width that is shorter than the sampling interval of the A/D converter.

Note

- If a peak over-range is detected, the data of the cycle-by-cycle measurement may not be correct. Increase the measurement range so that peak over-range does not occur.
- The hardware peak over-range detection circuit detects peak over-range before the input signal enters the line filter circuit of the WT. Therefore, a hardware peak over-range (HP) may be indicated even if high frequency noise is attenuated by turning the line filter ON.

Entering the Detailed Settings of the Numeric List Screen

Click  on the numeric list screen. The Setup dialog box opens.



Element

Select the elements or wiring units for displaying the data (select or clear the check boxes).

Function

Select the measurement functions for displaying the data (select or clear the check boxes).

Note

If you load the data from the WT after changing the element and function settings, the change is applied to the display on the PC.

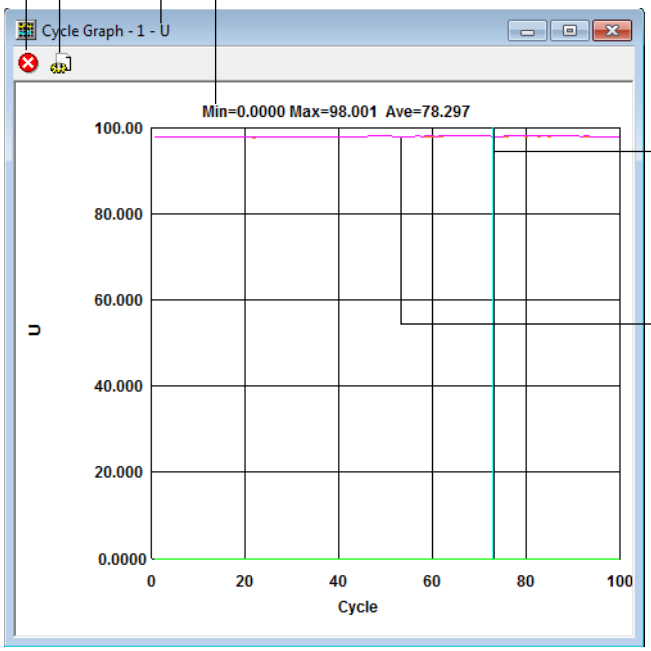
Graph Display of the Measured Data

Close the graph screen.

Set the vertical axis of the graph.

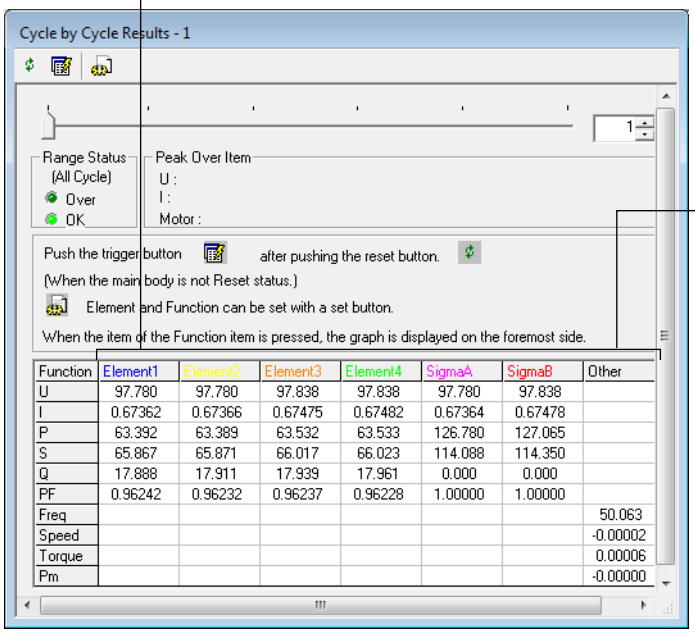
Measurement function

Minimum, maximum, and average values of the measured data

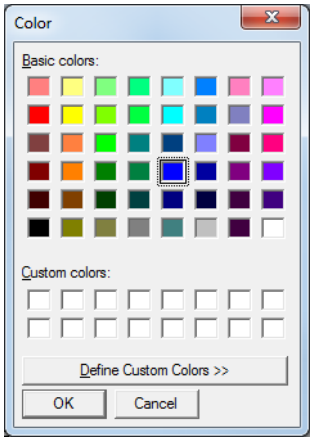


Cursor
Displayed at the position corresponding to the data display cycle number on the numeric list screen.

Graph color
The character colors of Element1 to Others on the data list of the numeric list screen are used for the graph colors. The graphs are drawn in order from Element1 to Others.
If the graphs overlap, the color of the overlapping graph is displayed.



Set the graph color
Set the graph color on the color setup dialog box that opens by clicking here.

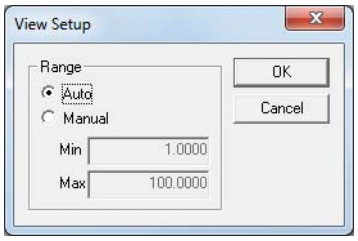


Note

If you load the data from the WT after changing the graph color, the change is applied to the display on the PC.

Setting the Vertical Axis of the Graph

Click on the graph screen. The View Setup dialog box opens.



Set the vertical axis setting of the graph to Auto or Manual.

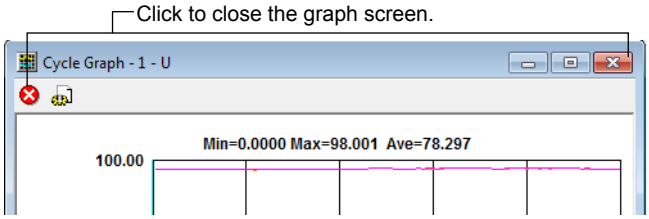
- **Auto**
  The vertical scale is automatically set according to the values loaded from the WT.

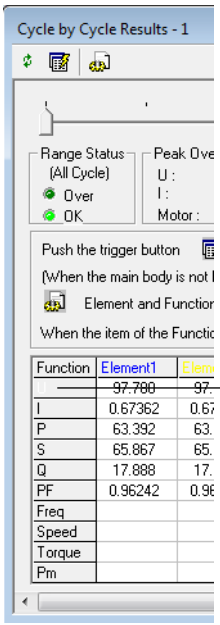
- **Manual**
  You can set the bottom edge (Min) and top edge (Max) of the graph.

Note

The grid on the graph screen is automatically set according to the size of the graph screen.

Closing/Redisplaying the Graph Screen



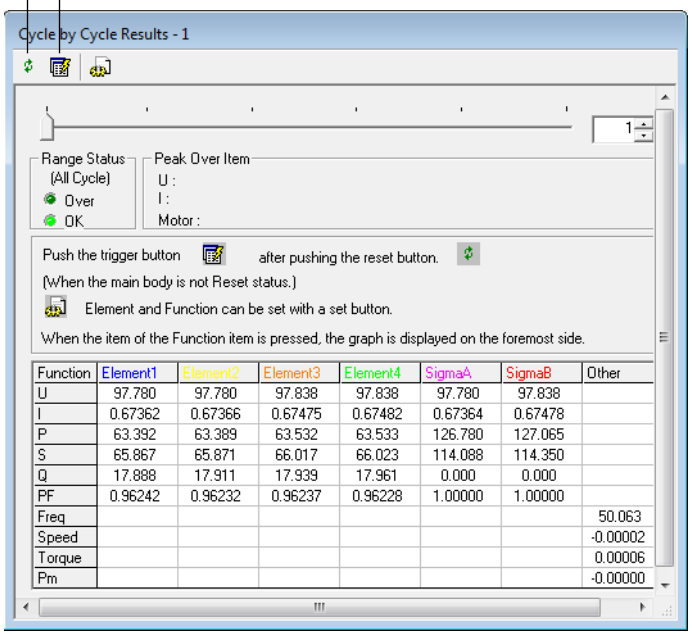


If you close the graph screen, the word “Function” on the numeric list screen turns white.
Click to redraw the graph screen.

Starting Downloading of Waveform Display Data (On-Line Mode Only)

RESET button

Data load button
Click to start loading the data.
To load the data again after loading the data once, click the RESET button to reset the measured data.



Function	Element1	Element2	Element3	Element4	SigmaA	SigmaB	Other
U	97.780	97.780	97.838	97.838	97.780	97.838	
I	0.67362	0.67366	0.67475	0.67482	0.67364	0.67478	
P	63.392	63.389	63.532	63.533	126.780	127.065	
S	65.867	65.871	66.017	66.023	114.088	114.350	
Q	17.888	17.911	17.939	17.961	0.000	0.000	
PF	0.96242	0.96232	0.96237	0.96228	1.00000	1.00000	
Freq							50.063
Speed							-0.00002
Torque							0.00006
Pm							-0.00000

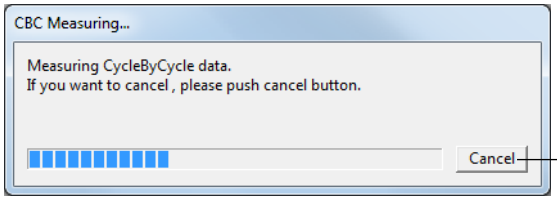
Note

It takes a long time to load the data from the WT in the following cases.

- The number of measurement cycles is large.
- The synchronization source frequency is low (the cycle is long).

Aborting the Data Download

If you start loading the data when the timeout value of the cycle-by-cycle measurement exceeds 10 s, the following screen appears. Click **Cancel** to cancel the data loading.



4.13 Numeric Value Display Function (Synchronization Mode)

You can display measured values from multiple WTs in a single window. Also, you can create expressions that combine measured values from multiple WTs (WTViewer user defined computation: WTV function), and display the results of computations using those expressions. For example, you can find total power by adding measured power values from two WTs, or divide them to find efficiency.The functions explained in this section can be used when connected to the WT1600, WT1800, or WT3000, can not be used when connected to the WT500.

In synchronization mode, if you want to acquire data from multiple WTs or use such data in the computation of WTV functions, to maintain synchronization between the data of each WT, synchronize the WTs by using the master/slave synchronization measurement feature. For details on the master/slave synchronization measurement feature, see the WT User's Manual.

Displaying the Numeric Screen(Synchronization Mode)

On-Line mode

Set the measurement mode to Normal Mode(Synchronization Mode) by carrying out the procedure given in “Changing the Measurement Mode” on page 2-9. Numeric Window(Synchronization Mode) is displayed.

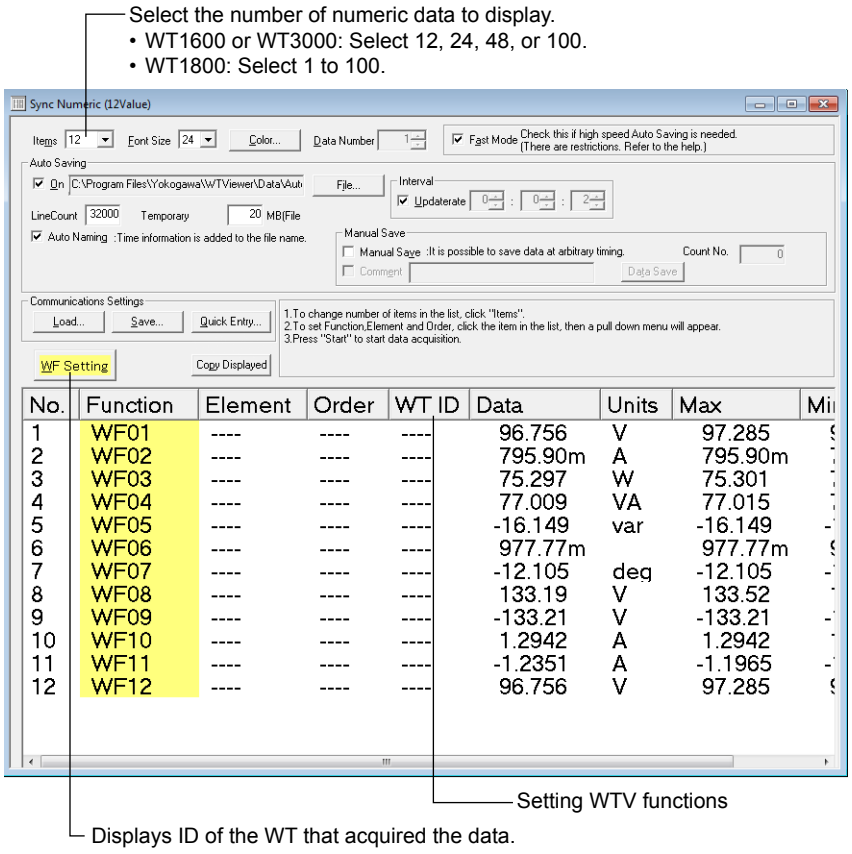
Off-Line mode

In steps 8 to 10 in section 3.4, numeric data is loaded and displayed.

Each function and operating procedure in the Numeric View (Synchronization Mode) screen except for the following are the same as the numeric display in section 4.1. For details, see section 4.1.

- Forms (with the WT1600 or WT3000) or Items (with the WT1800)
- WT ID
- WF Settings

WT1800 Display Example



Note

If WTV functions (WF01–WF15) are set as the displayed items for Function, the Element, Order, and WT ID boxes always display ---.

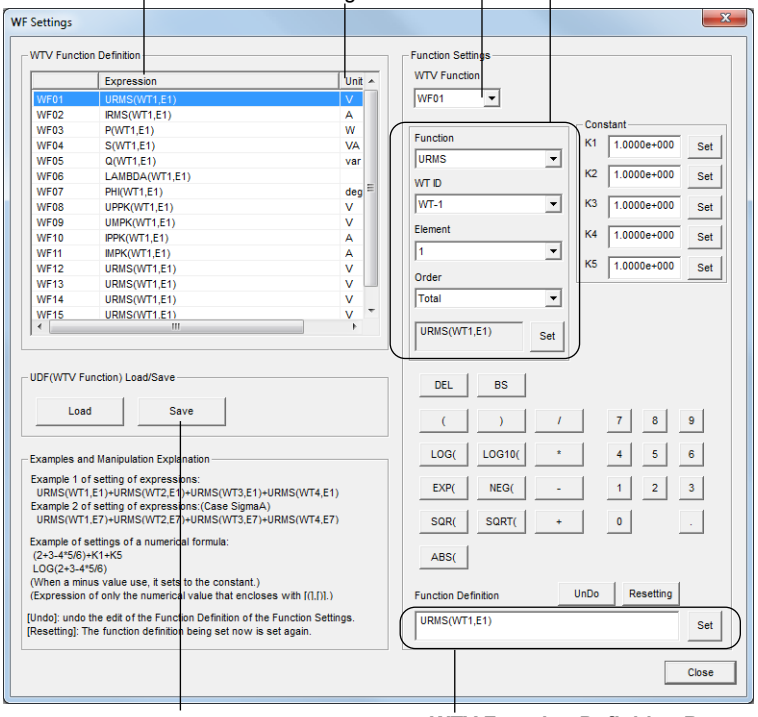
Setting the WTV Function (WF)

You can define 15 expressions (WF01–WF15).

Click the WTV function to be set.
Enter the expression using the menus and buttons in the right side of the dialog box.

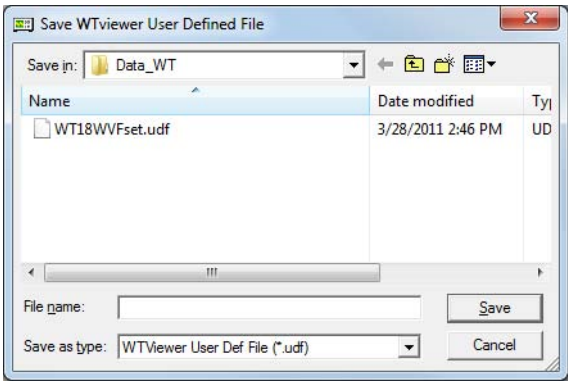
Entering Operands
The operands set for the Function, WT ID, Element, and Order are displayed in the lower area.
If you press the Settings button, the currently displayed operand is added to the WTV function definition box at the very bottom.

Setting the units



The WTV function definition is saved to a file called a *.udf file*.
Enter a destination file name and location and click Save.

WTV Function Definition Box
WTV functions can be defined by combining operands, constants, and computational symbols.
If you press the Set button, the WTV function is applied and added to the WTV function definition box in the left part of the dialog box.



Note

- Waveforms, trends, bar graphs, and vectors cannot be displayed in Numeric View (Synchronization Mode).
- The WTV function definition data is saved to the PC. The WTV function definition data is not saved on the WT main unit.

Loading a WTV Function Definition

You can load definitions in the following two ways.

• From the WF Settings Dialog Box

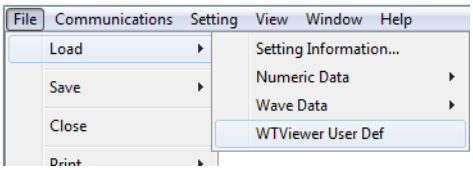
1. Click **Load**. The Load dialog box opens.

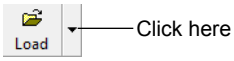
2. Enter a file name and location and click Load. The WTV function settings are loaded.

• From the Menu/Toolbar

For the WT1600 and WT3000, you can load WTV function definitions from the menu bar or toolbar.

1. Click **File > Load > WTViewer User Def** from the menu bar, or **Load > WTViewer User Def** from the toolbar. The Load dialog box opens.





2. Enter a file name and location and click **Load**. The WTV function settings are loaded.

Note

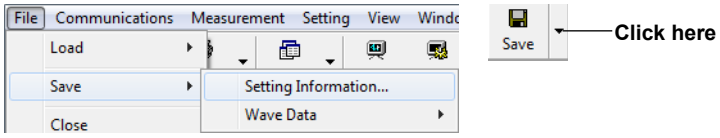
Even if the communication mode is Off-Line, you can change, save, or load the WTV function definitions. However, the numeric display uses measured data that is loaded, therefore even if you change the WTV function definition, it is not reflected in the numeric display.

5.1 Saving Settings

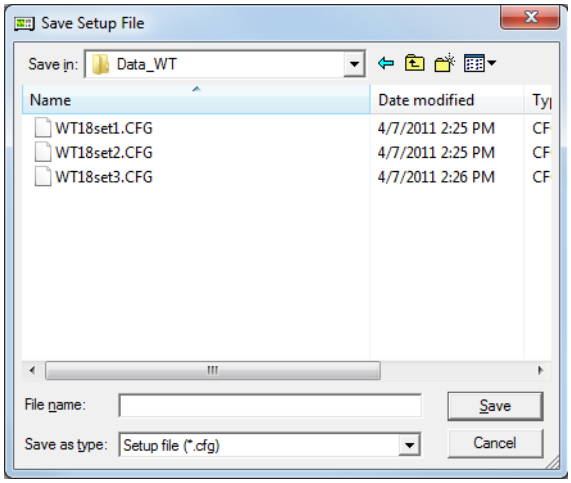
You can save WTViewer settings.
With the WT1600, You can also save WT settings that were entered in Off-Line mode. For details on the data format of settings, see section 5.2.

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 WT500, WT1800, and WT3000, CFG format can be selected. CFG is a format that can be loaded by WTViewer. The file contains WTViewer's numeric data display settings (such as Forms), waveform data display settings, and other settings. It does not contain settings for the WT.
   - 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). The file contains WTViewer settings and WT settings.

WT1800 Display Example



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



Note

With the WT1600

- 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]			
WiringSigm	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	5
	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.

With the WT500, WT1800 or WT3000

The feature explained in this section does not save the WT settings. You can use the dialog box shown on page 6-10 for the WT500, 6-36 for the WT1800, and 6-52 for the WT3000 to save the WT settings in a USB memory device or the PC (see section 5.5). You can use WTFileReader to convert the files containing the saved settings to files in CSV format. For details, the WTFileReader online help.

5.2 Saving Measured Data

You can save the data displayed on WTViewer in the data formats 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	WT1600	WT500, WT1800	WT3000
Settings*1	CSV format (.csv) BIN format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data	CSV format (.csv) BIN format (.wta)	CSV format (.csv)	CSV format (.csv) WTN format (.wtn)*2
Waveform display data	CSV format (.csv) BIN format (.wta)	CSV format (.csv) WTW format (.wtw)	CSV format (.csv) WTW format (.wtw)
Harmonic data*3	CSV format (.csv) BIN format (.wta)	_	_
Waveform sampling data*4 (Math and FFT data)	_	_	CSV format (.csv) WVF format(.wvf) and (.hdr)*5
Cycle-by-cycle data*4	_	_	CSV format (.csv) CBC format (.cbc)

*1 If WTViewer is working with the WT500, WT1800 or WT3000, the function whereby settings are saved in CSV format is not available.

*2 This format is only available when WTViewer is controlling the WT3000. Numeric data cannot be saved to WTN format when WTViewer is controlling the WT500 or WT1800.

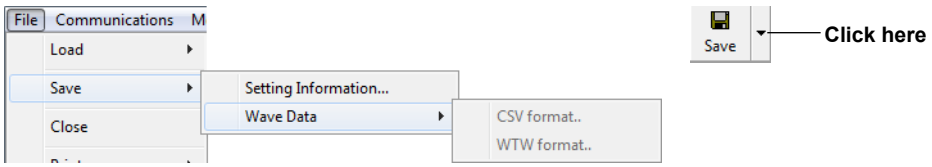
*3 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.

*4 This format is only available when WTViewer is controlling the WT3000. If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.

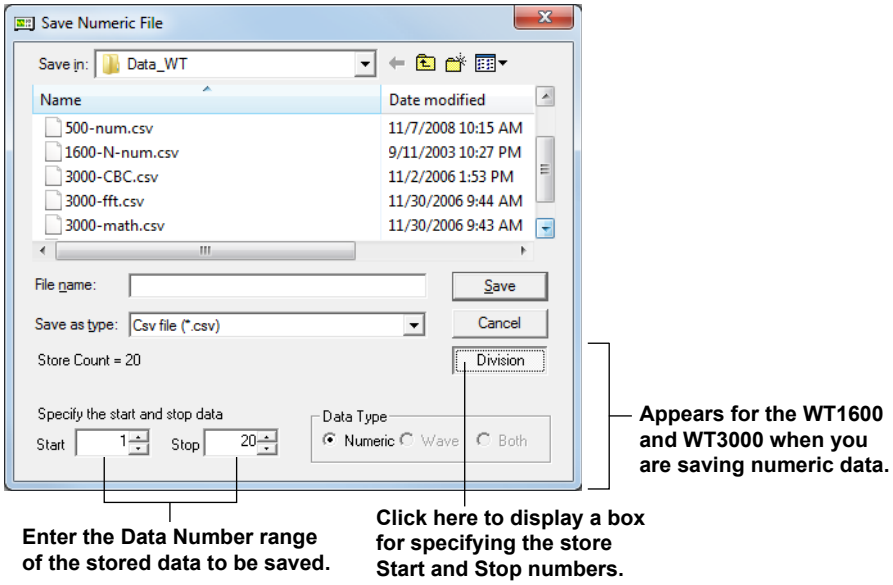
*5 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

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.

WT1800 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 4.1 or 4.3) to save out of the data loaded on WTViewer.
7. Click **Save**. The data is saved.

Note

- 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. When saving using the AutoSaving function described in section 4.1 or 4.3, the time stamp of each data is the time at which WTViewer updated the data. 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.

Saving Data in Waveform Computation (Math) and FFT Modes on the WT3000

The saving of the data in waveform computation (Math) and FFT modes differ from other measurement modes.

In waveform computation (Math) or FFT mode, you can display waveform sampling data or waveform display data (see the note on page 4-29). The procedure to save the data for each type of data is explained below.

Saving the Waveform Sampling Data

1. Load the waveform sampling data from the WT3000 in waveform computation (Math) or FFT mode.
2. Like the waveform display data in other measurement modes explained on the previous page, choose **File** > **Save** and select the data format to save the file. If you are saving the data in CSV format, you can click the Detail button to set the save options (see the next page).

Note

- If the waveform display data is loaded after the waveform sampling data is loaded from the WT3000 in waveform computation (Math) or FFT mode, the waveform sampling data that was loaded in advance is held in the PC. (However, the data cannot be redisplayed on the PC screen.) It is possible to save the waveform sampling data by choosing File > Save while the waveform display data is being displayed.
- Even if you change to other measurements modes and load numeric or waveform display data after loading the waveform sampling data from the WT3000, the waveform sampling data is held in the PC (however, the data cannot be redisplayed on the PC screen). You can save the waveform sampling data by switching to waveform computation (Math) or FFT mode and choosing File > Save.
  If you load additional waveform sampling data from the WT3000 after changing to waveform computation (Math) or FFT mode, the waveform sampling data loaded previously is lost.

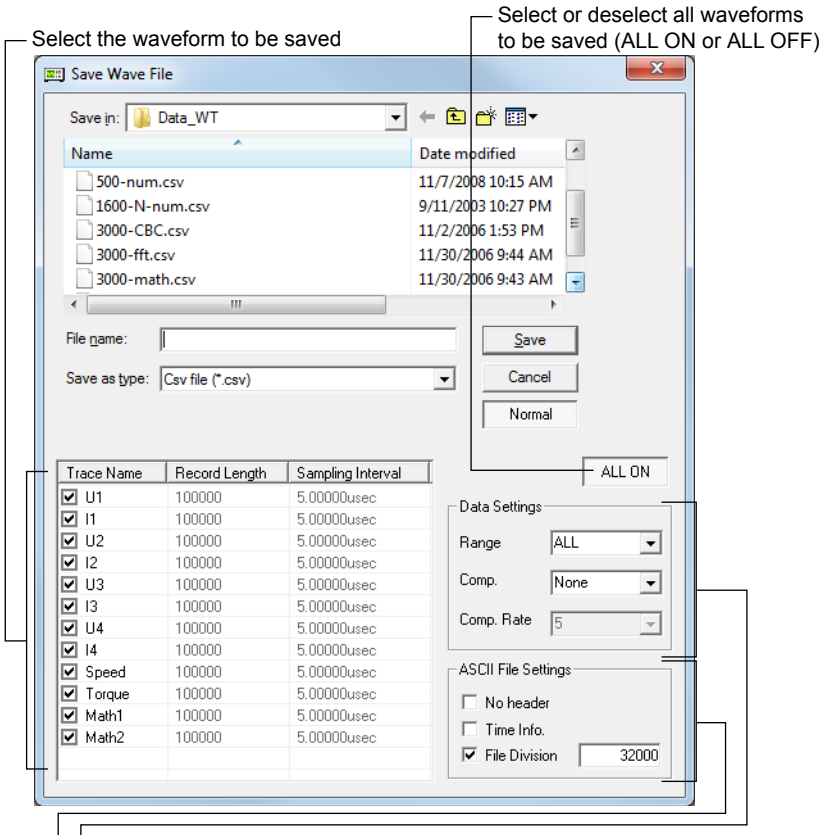
Saving the Data in CSV Format

- If you are saving the waveform sampling data in CSV format in waveform computation (Math) or FFT mode, and the number of data lines exceeds 32000, the data is divided into multiple files every 32000 lines. In this case, the files are saved with name containing an incrementing sequence number as follows: Data_001.csv, Data_002.csv, Data_003.csv, ..., and Data_999.csv.
- For details on the number of waveform sampling data points, see section 9.3 in the WT3000 User's Manual.

Saving the Data in WVF Format

If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

Detail Setting Screen



Data Settings

Range	ALL	All data
	Zoom	Data displayed in the active zoom window screen All data if there is no active zoom screen
	Cursor	Data in the cursor range of the waveform window All data if cursors are not set
Comp.	None	No compression
	PP	PP compression
	Simple	Simple decimation
Comp. Rate	Can be set if compression is set to PP or Simple	

ASCII File Settings

No Header Include or not include the header

Time Info. Include or not include time information

If both the No Header and Time Info. check boxes are not selected

Header

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Math Data												
2	Item	U1	I1	U2	I2	U3	I3	U4	I4	Speed	Torque	Math1	Math2
3	1	1.31E-01	2.66E-02	4.21E-01	1.87E-02	2.20E-02	6.421	1.32E-01	-1.53E-03	-6.59E-03	3.42E-04	3.48E-03	1.31E-01
4	2	1.31E-01	2.33E-02	3.08E-01	1.54E-02	8.88E-03	6.7601	1.32E-01	-8.07E-03	2.94E-03	3.42E-04	3.05E-03	1.31E-01
5	3	4.70E-01	2.66E-02	5.34E-01	2.20E-02	1.22E-02	6.9862	1.94E-02	-4.80E-03	1.99E-03	6.06E-03	1.25E-02	4.70E-01
6	4	5.83E-01	2.00E-02	5.34E-01	2.52E-02	1.54E-02	6.9862	1.32E-01	-4.80E-03	-6.59E-03	3.42E-04	1.17E-02	5.83E-01
7	5	1.4876	2.98E-02	8.73E-01	2.20E-02	2.52E-02	6.9862	1.94E-02	1.74E-03	-8.72E-04	1.30E-03	4.44E-02	1.4876
8	6	1.1485	2.33E-02	1.325	1.87E-02	8.88E-03	7.4383	1.94E-02	-8.07E-03	-4.69E-03	3.42E-04	2.67E-02	1.1485

Data number

If both the No Header and Time Info. check boxes are selected

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	0	1.31E-01	2.66E-02	4.21E-01	1.87E-02	2.20E-02	6.421	1.32E-01	-1.53E-03	-6.59E-03	3.42E-04	3.48E-03	1.31E-01
2	0.000005	1.31E-01	2.33E-02	3.08E-01	1.54E-02	8.88E-03	6.7601	1.32E-01	-8.07E-03	2.94E-03	3.42E-04	3.05E-03	1.31E-01
3	0.00001	4.70E-01	2.66E-02	5.34E-01	2.20E-02	1.22E-02	6.9862	1.94E-02	-4.80E-03	1.99E-03	6.06E-03	1.25E-02	4.70E-01
4	0.000015	5.83E-01	2.00E-02	5.34E-01	2.52E-02	1.54E-02	6.9862	1.32E-01	-4.80E-03	-6.59E-03	3.42E-04	1.17E-02	5.83E-01
5	0.00002	1.4876	2.98E-02	8.73E-01	2.20E-02	2.52E-02	6.9862	1.94E-02	1.74E-03	-8.72E-04	1.30E-03	4.44E-02	1.4876
6	0.000025	1.1485	2.33E-02	1.325	1.87E-02	8.88E-03	7.4383	1.94E-02	-8.07E-03	-4.69E-03	3.42E-04	2.67E-02	1.1485
7	0.00003	1.7136	2.66E-02	1.438	2.52E-02	8.88E-03	7.5514	-9.36E-02	-1.46E-02	1.99E-03	3.42E-04	4.55E-02	1.7136
8	0.000035	1.7136	1.35E-02	1.7771	3.18E-02	1.22E-02	7.6644	-2.07E-01	-8.07E-03	5.80E-03	-1.11E-02	2.31E-02	1.7136

Time Info.

Saving the Waveform Display Data

1. Load the waveform display data from the WT3000 in waveform computation (Math) or FFT mode.
2. Set the measurement mode to Normal.
3. From the View menu, choose Wave (see section 3.1).

   The waveform does not appear, but you can save the data in this condition.
4. Choose **File** > **Save** and select the data format to save the data.

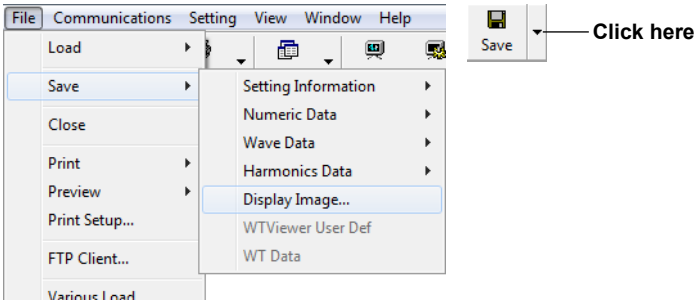
Note

The waveform display data of waveform computation or FFT is held in the PC even if the waveform is not displayed as a result of switching the measurement mode. The waveform display data is held until new waveform display data is loaded.

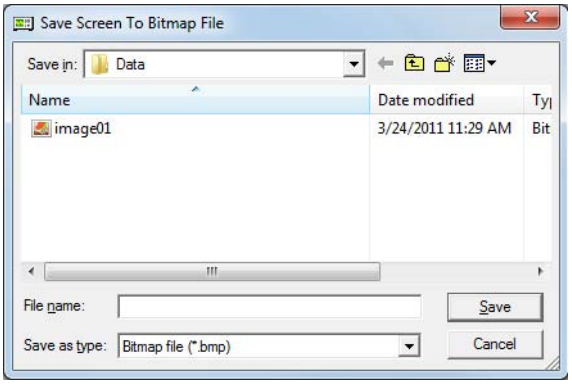
5.3 Saving PC Screen Image Data

When connected to the WT1600, 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.

Note

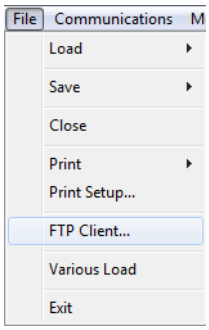
This function cannot be used when connected to the WT500, WT1800, or WT3000. Use the Windows print screen function.

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

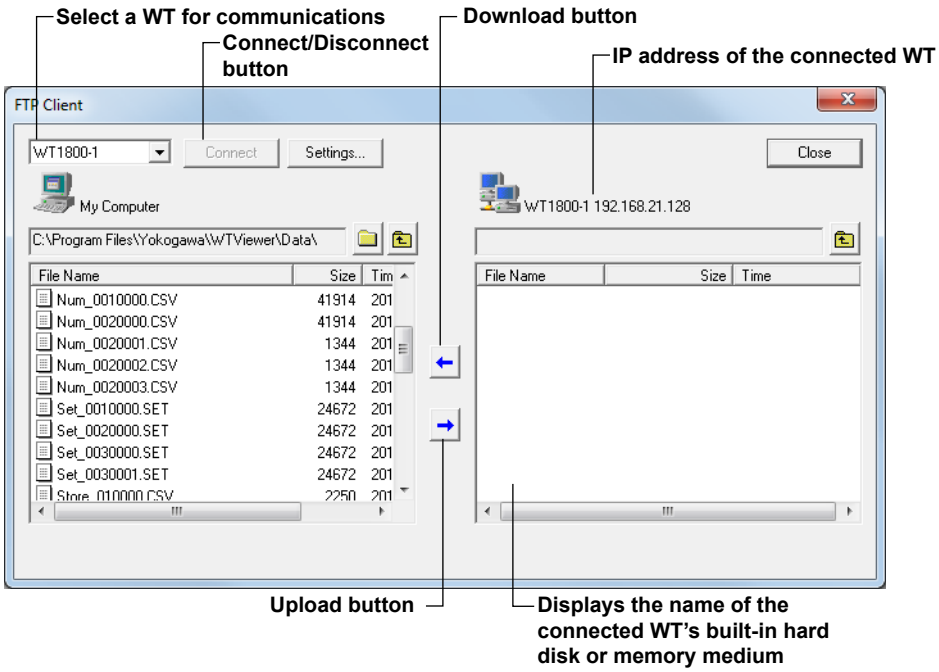
If the WT and PC are configured for Ethernet communications, files can be exchanged between the WT's and PC's internal hard disks and other memory media.

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.

WT1800 Display Example



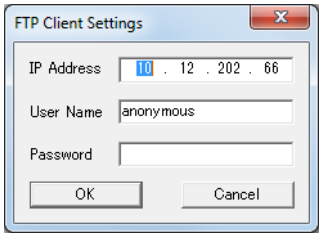
2. Click **Settings**. The FTP Client Settings dialog box is displayed.



Note

If the communication interface is not Ethernet, be sure to check the Ethernet settings in the FTP Client dialog box.

3. Select target WTs and enter the **IP address, user name**, and **password** for each of the WT, then click **OK**. The FTP Client Settings dialog box closes.



Note

- If you click OK, the communication interface (Ethernet, Ethernet VXI-11) settings will be changed.
- If you click OK, file transfer using Ethernet is enabled, but the communication interface (GP-IB and RS-232) settings cannot be changed.
- 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.

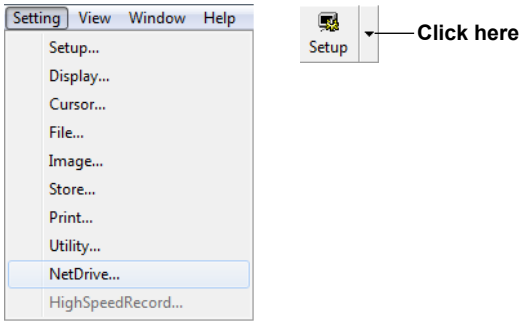
5.5 FTP Server Function

When the WT and PC are Ethernet communciation-enabled, you can connect a WT acting as the the FTP client to the PC and save data from the WT built-in hard disk or memory medium directly on the PC. The functions explained in this section can be used when conne+cted to the WT1600, WT1800, or WT3000, can not be used when connected to the WT500.

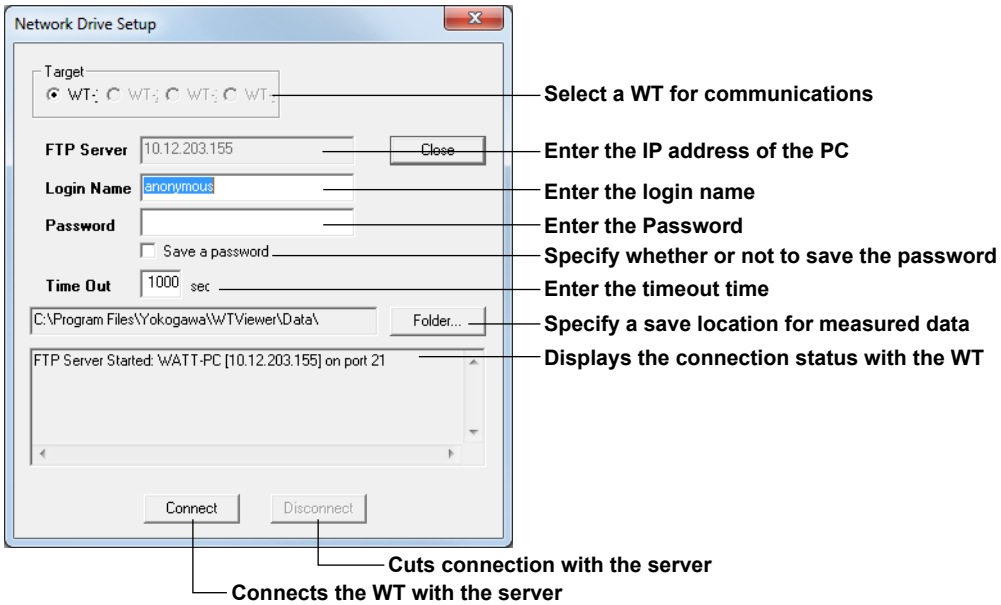
1. With the WT1600 or WT3000 : Choose **Setting > WT Setting > Network Drive Setup** from the menu bar.

   With the WT1800 : Choose **Setting > NetDrive** from the menu bar.
   Or click **Setup** on the toolbar.
   The Network Drive Setup dialog box is displayed.

WT1800 Display Example



2. Select the target WT in the Target box.
3. In the Network Drive Setup dialog box, set the PC **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**.

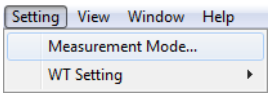
Note

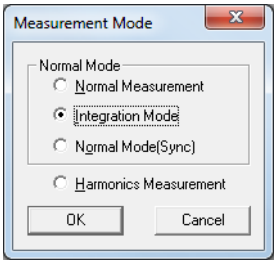
If you change the communication or measurement mode, the network drive is disconnected. Click Connect to reconnect the drive.

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.

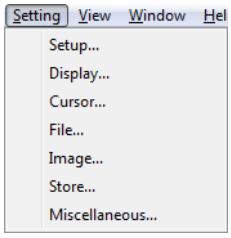


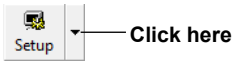


- Except for execution buttons such as Execute, Send, and Store Start, all settings are applied to the WT each time a setting is entered.
- Multiple setting dialog boxes cannot be displayed. Close the open settings dialog box then open a new settings dialog box.
- WTViewer cannot be used to enter display 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.

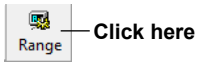
6.2 Settings Dialog Box (WT500)

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





You can also display the dialog box for selecting the measuring range by clicking Range on the range setting bar.

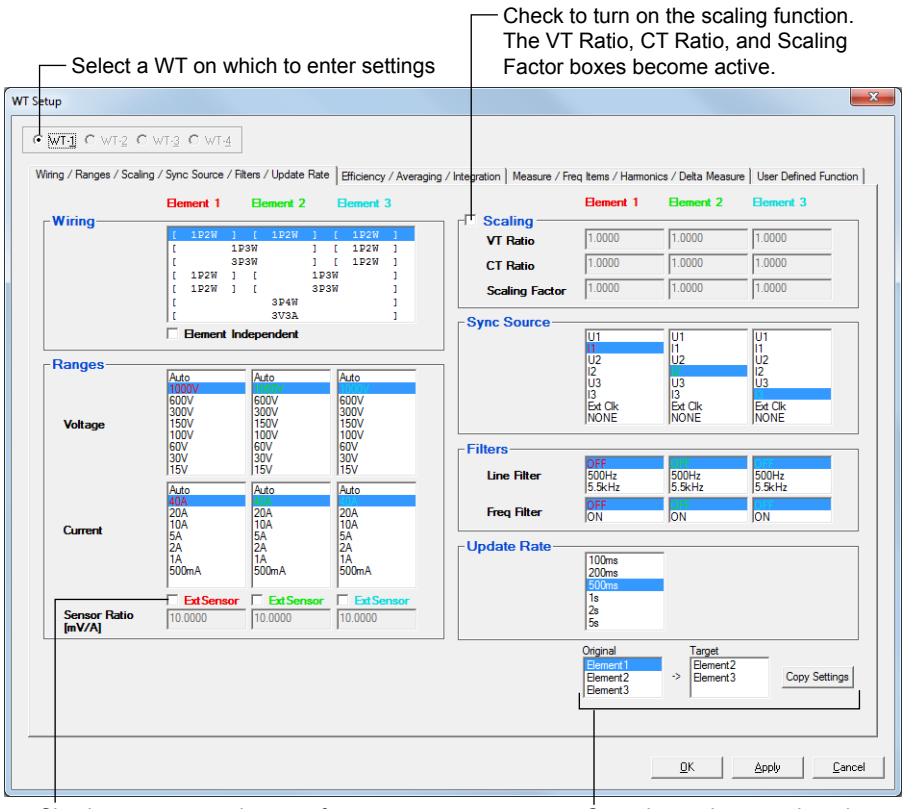


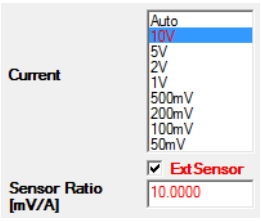
2. Select the item for which you wish to enter settings. The dialog box for the selected item appears.
3. Change the settings as needed.

The following shows a display example of the settings dialog box. Enter settings after selecting the target WT in the Select Target WT box.
For details on each function, see the WT User's Manual.

Select Target WT box

Wiring / Ranges / Scaling / Sync Source / Filters / Update Rate Settings

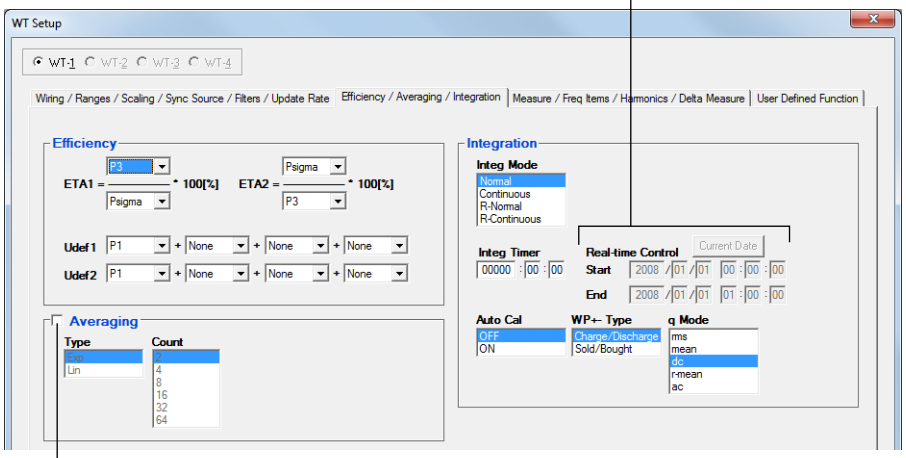




for Products with the external sensor input option

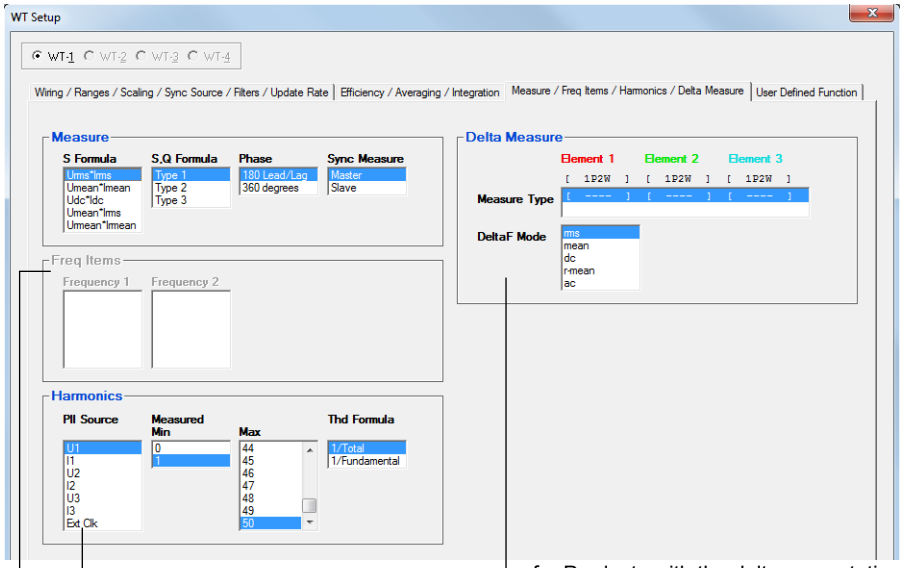
Efficiensy / Averaging / Integration Settings

These boxes become active when you select R-Normal (Real-Time Integratio) or R-Continuous (Real-Time Continuous Integration) in the Integ Mode box. Click Current Date to set curent time in the Start and End box



Check to turn on the averaging function.
The Type and Count boxes become active.

Measure / Frequency Items / Harmonics / Delta Measure Settings



for Products with the delta computation option
for Products with the harmonic measurement option
for Products without the frequency measurement add-on option

Null Function ON/OFF

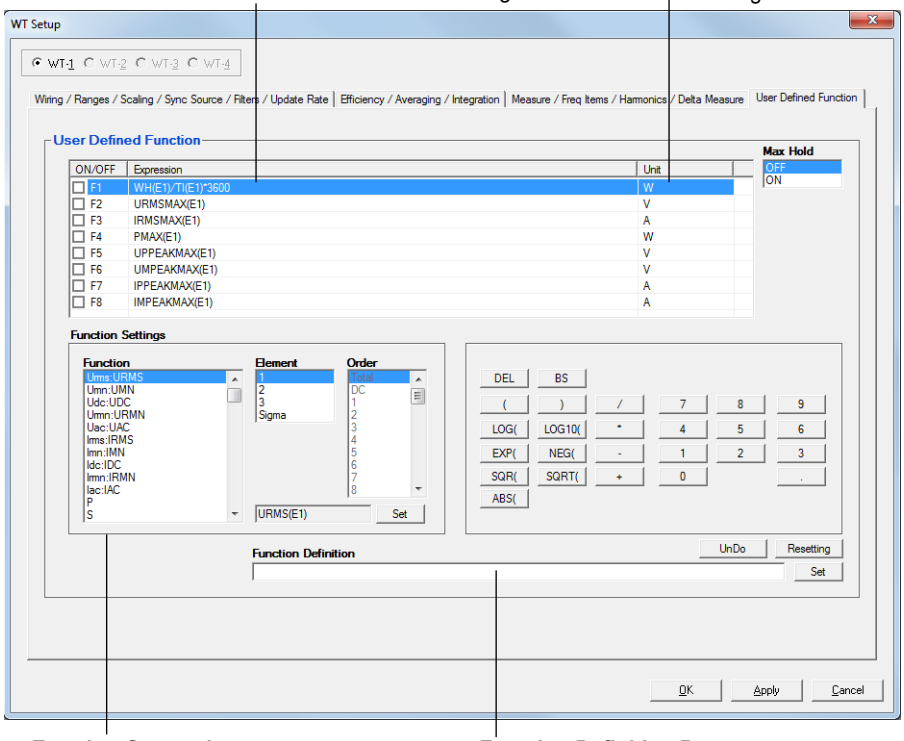
Click **NULL** on the toolbar. For the procedure to display the null bar, see section 3.1.

NULL ON **NULL OFF**

User Defined Function Setting

Click the user defined function to be set.
Enter the expression using the menus and buttons in the lower side of the dialog box.

Setting the units

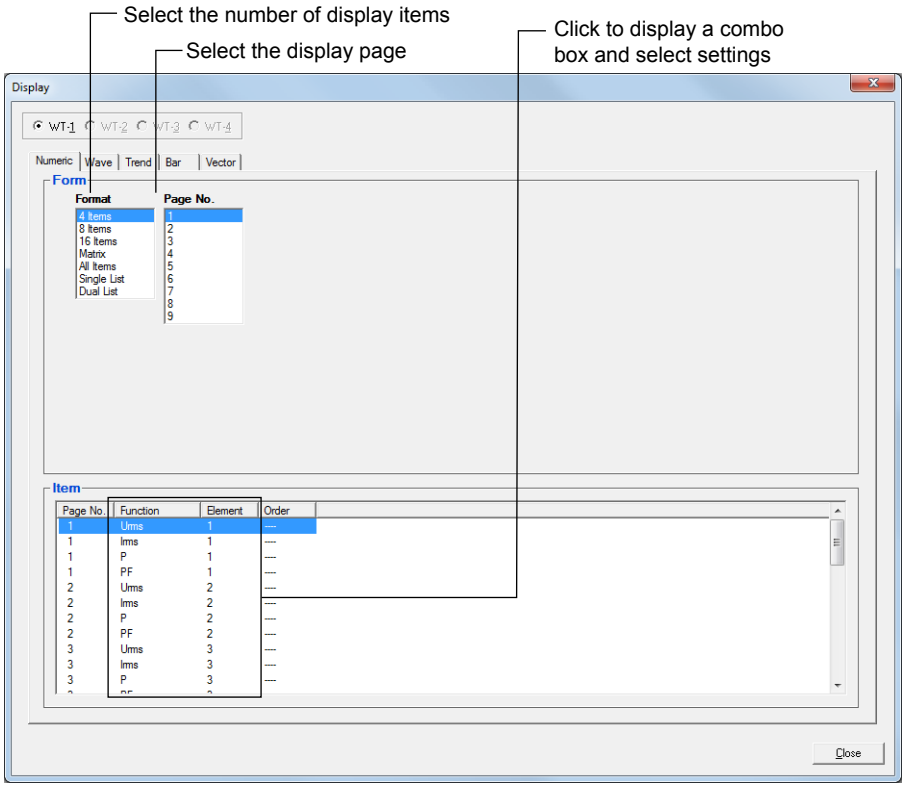


Entering Operands
The operands set for the Function, Element, and Order are displayed in the lower area. If you press the Settings button, the currently displayed operand is added to the function definition box at the very bottom.

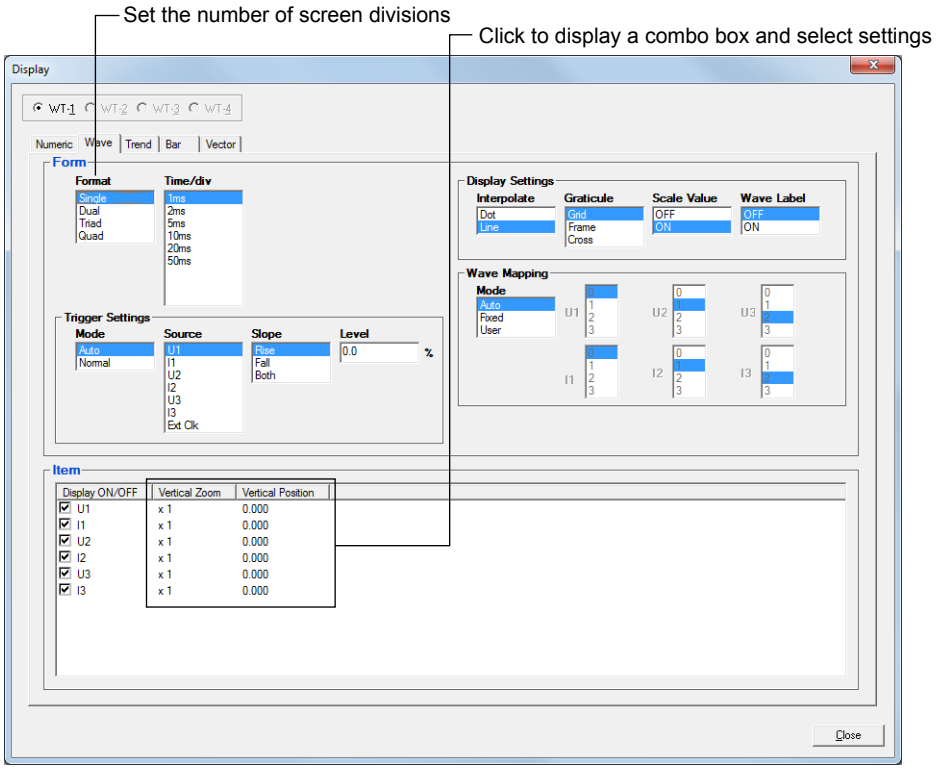
Function Definition Box
User defined functions can be defined by combining operands, and computational symbols. If you press the Set button, the user defined function is applied and added to the user defined function definition box in the upper side of the dialog box.

Setting the Display Format

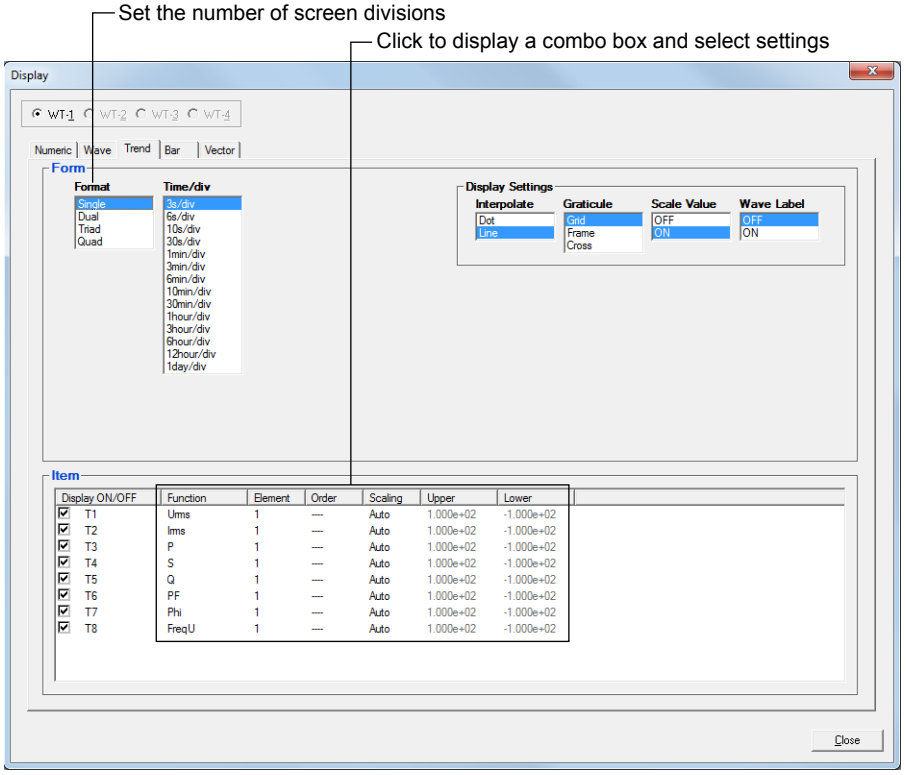
Numeric Value or Harmonics Data Display Format



Waveform Display Format

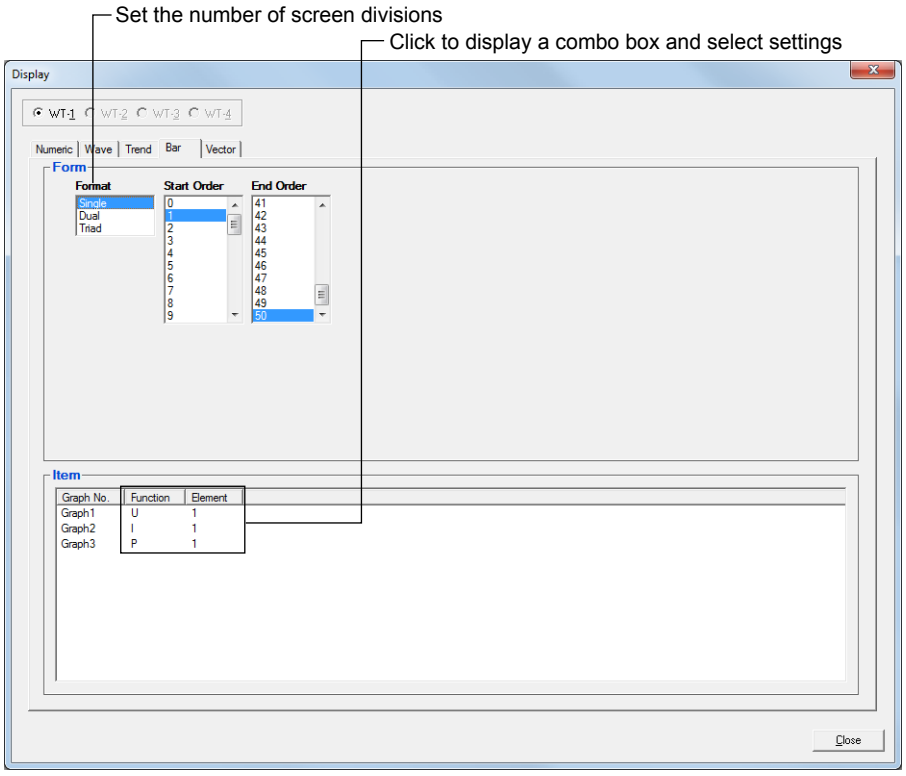


Trend Display Format



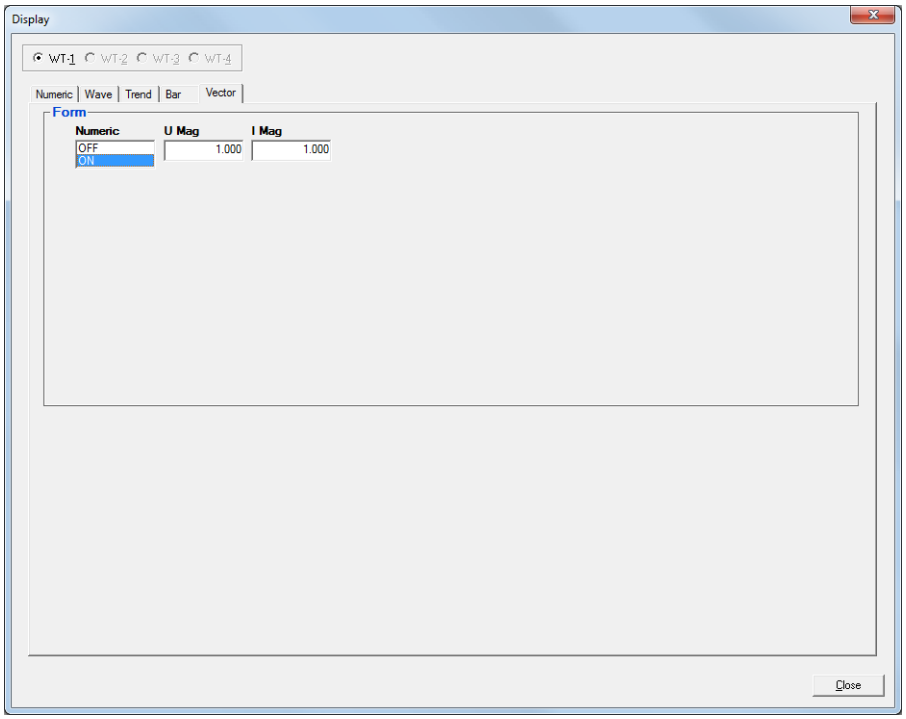
Bar Graph Display Format

(for Products with the harmonic measurement option)



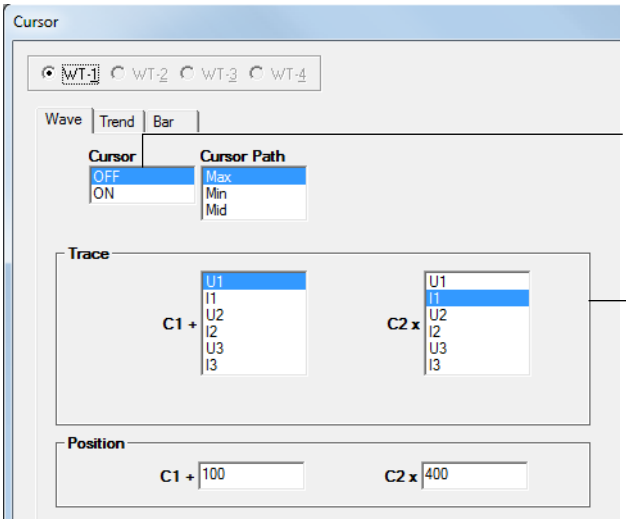
Vector Display Format

(for Products with the harmonic measurement option)

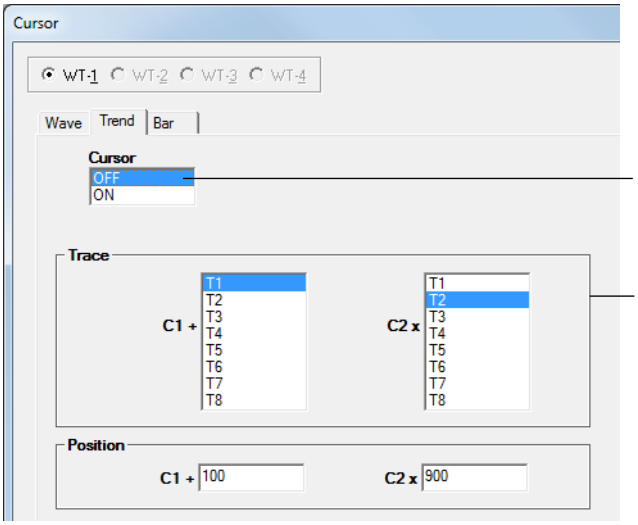


Cursor Measurement Settings

Waveform Cursor Measurement

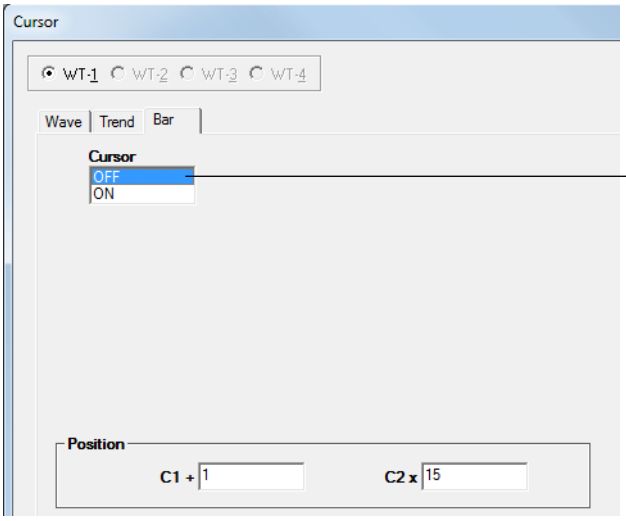


Trend Cursor Measurement

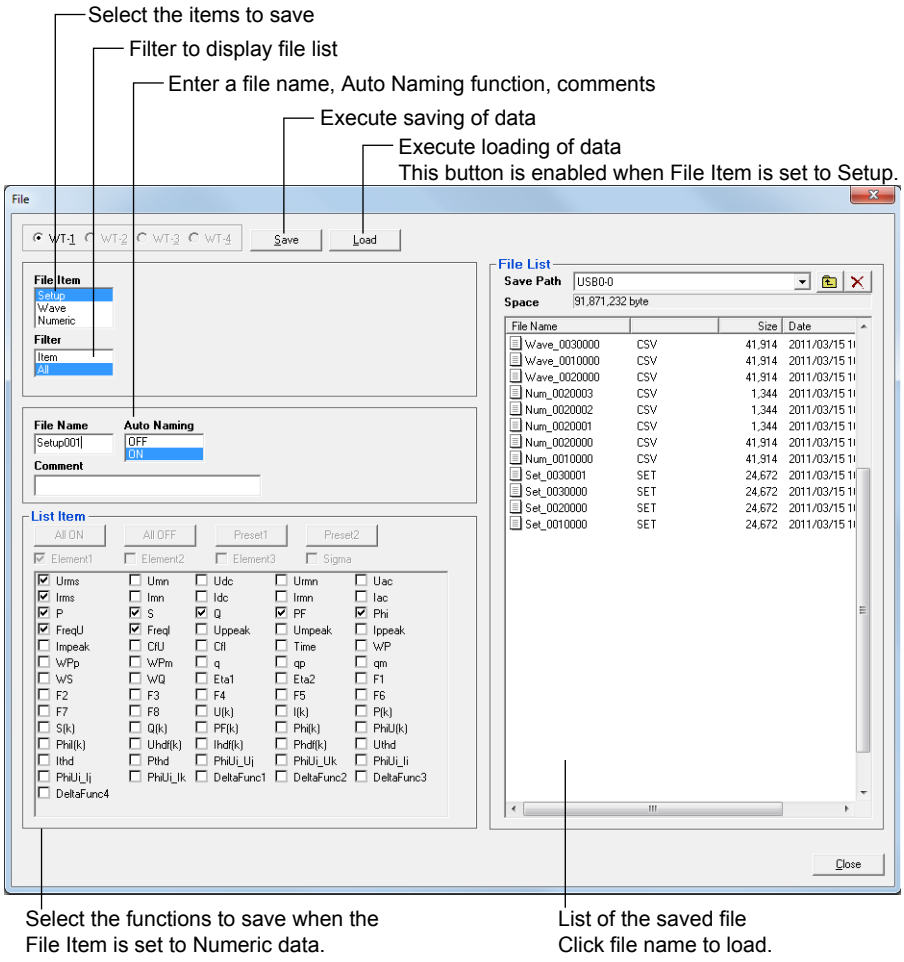


Bar Graph Cursor Measurement

(for Products with the harmonic measurement option)



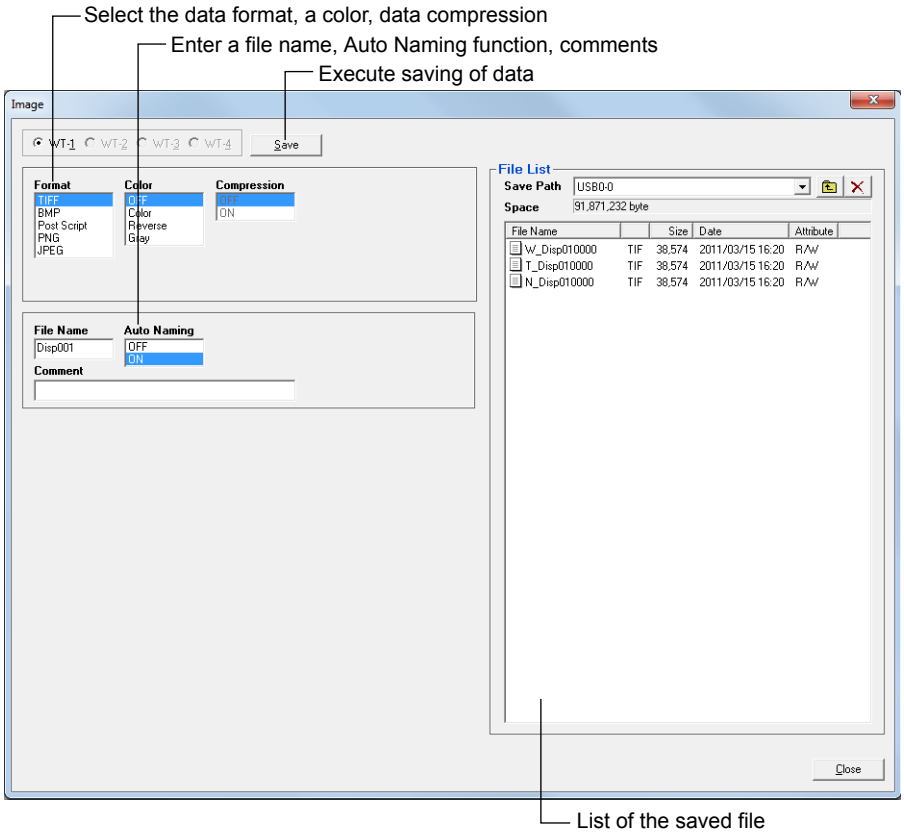
Data Save / Load Settings



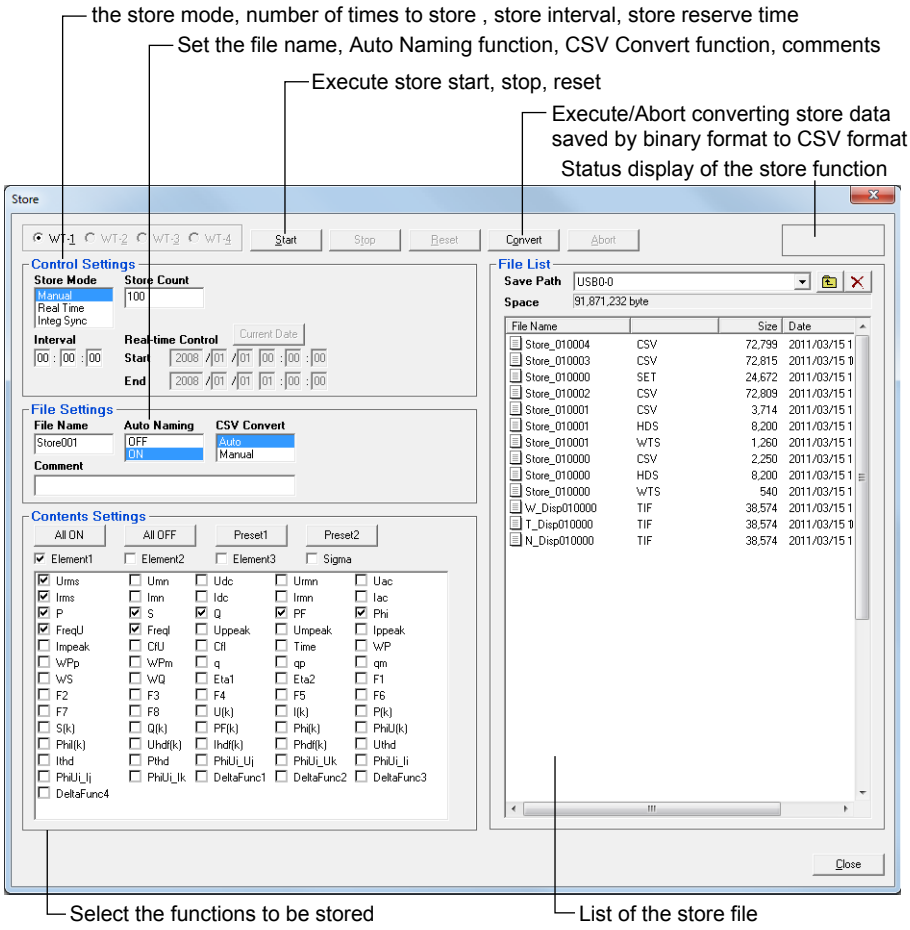
Note

- When the items to save are not selected, the saving of the data cannot be executed.
- When the file to load is not selected in the file list, the loading of the file cannot be executed.

Screen Image Saving Settings



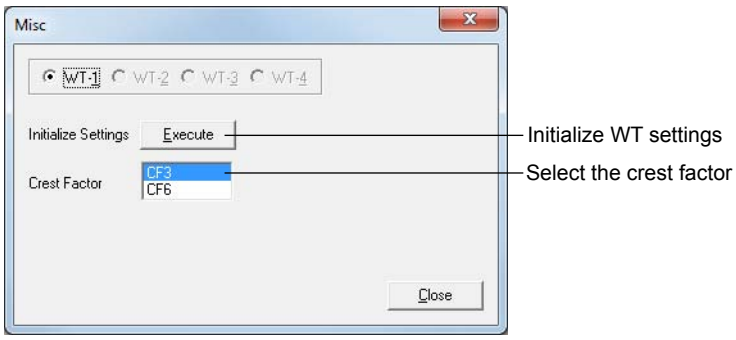
Store Settings



Note

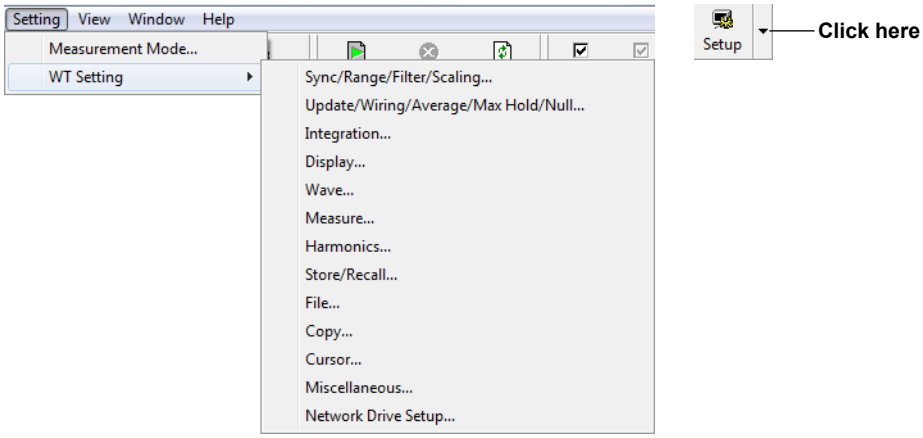
- Settings cannot be changed while the store function is in progress or has stopped or CSV converting.
- When the file to convert CSV format (*.WTS or *.HDS) is not selected in the file list, the CSV convert function cannot be executed.

Initializing the WT, Selecting the Crest Factor



6.3 Settings Dialog Box (WT1600)

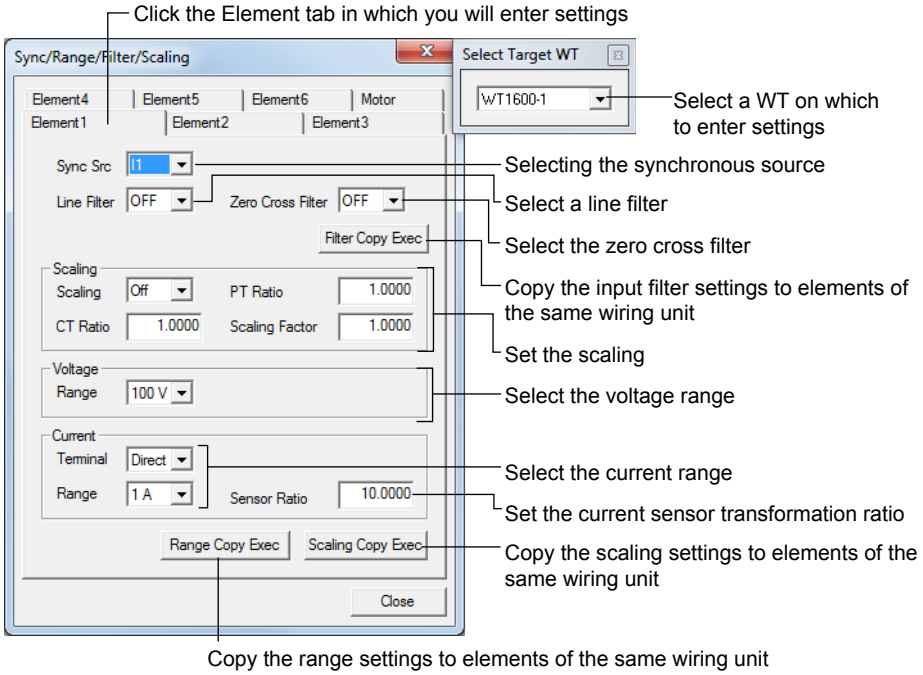
1. Choose **Setting > WT Setting** from the menu bar, or click **Setup**.



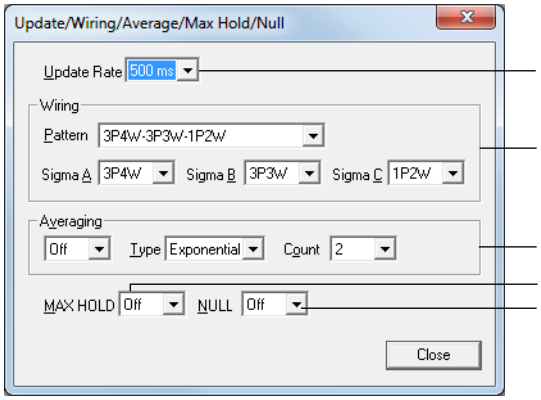
2. Select the item for which you wish to enter settings. The dialog box for the selected item appears.
3. Change the settings as needed.

   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



Select the data update rate

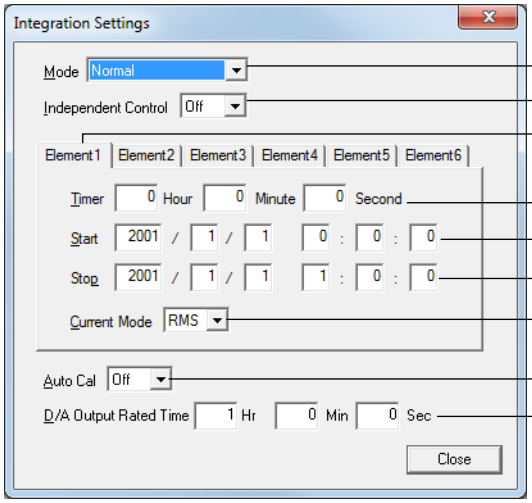
Select the wiring method

Averaging settings

Settings for the MAX HOLD function

NULL function setting

Integration Settings



Select the Integration mode

Turn integration by element ON or OFF

Click the Element tab in which you will enter settings

Set the integration time

Set the integration start reserve time

Set the integration stop reserve time

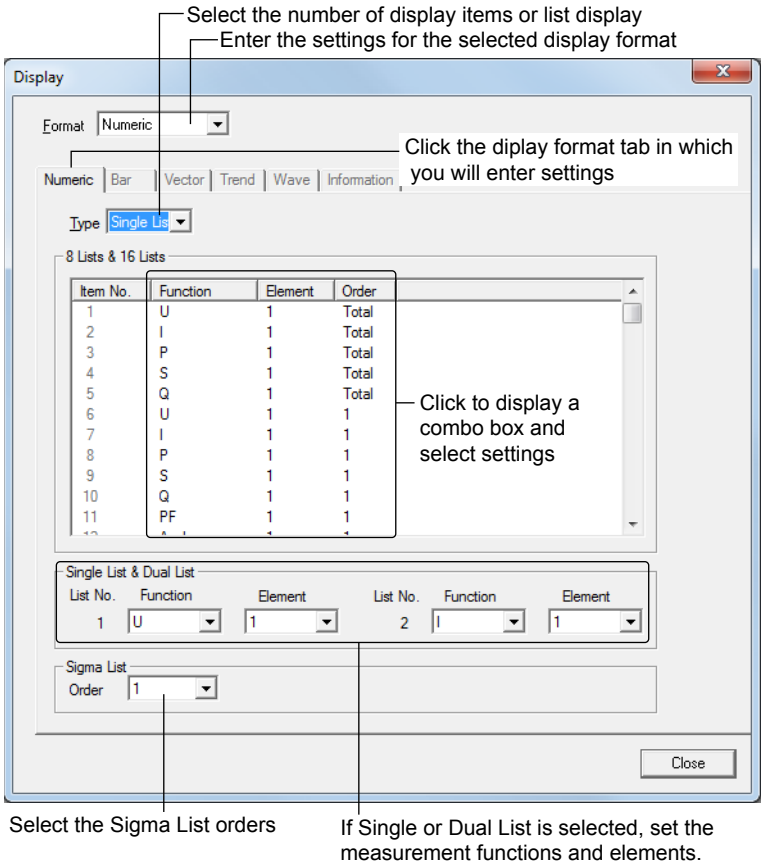
Select the current/integration mode of the current mode

Turn integration auto calibration ON or OFF

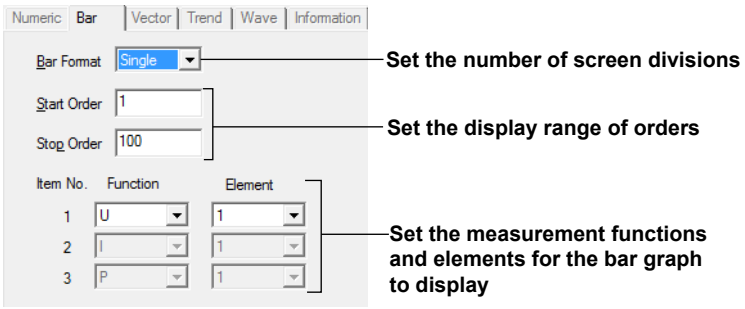
Set the integration D/A output rated time

Setting the Display Format

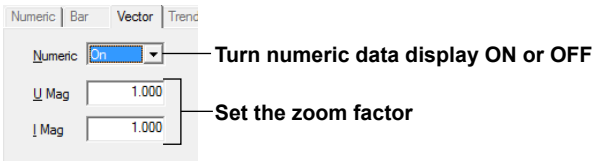
Numeric Value or Harmonics Data Display Format



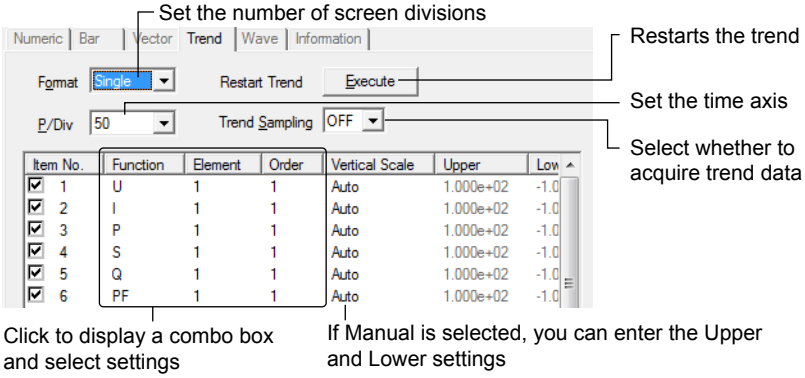
Bar Graph Display Format



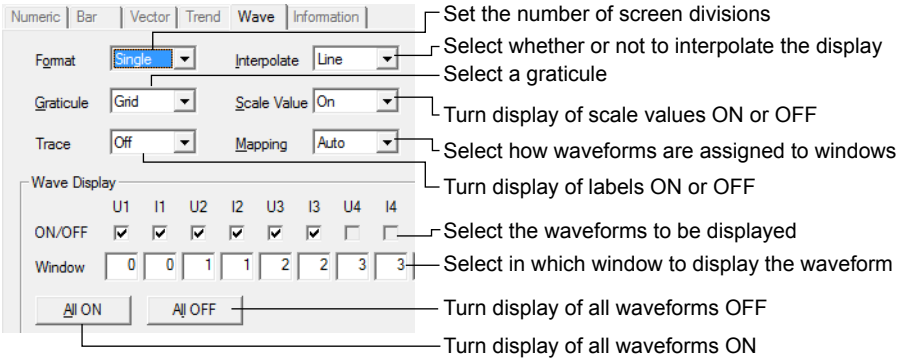
Vector Display Format



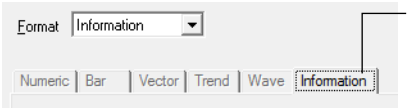
Trend Display Format



Waveform Display Format



Setting Information List

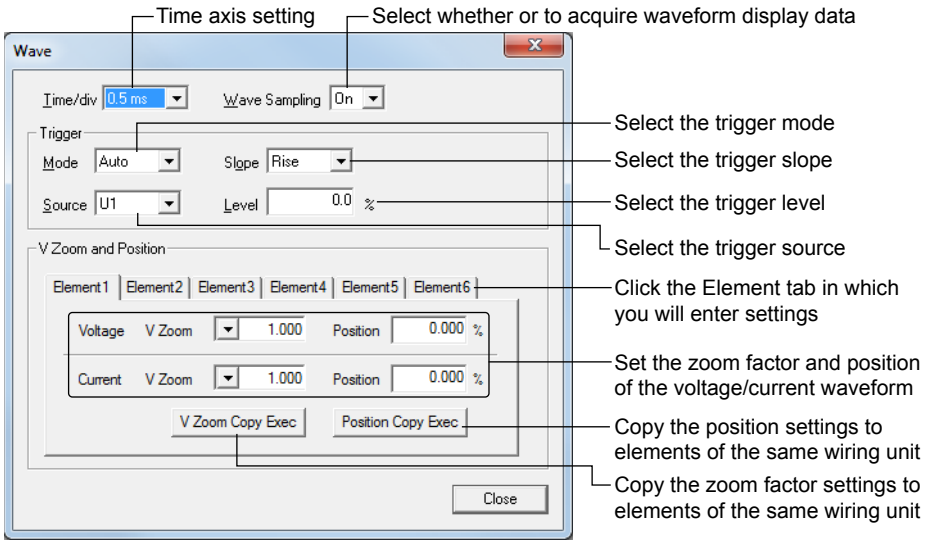


Display list of settings in the WT screen

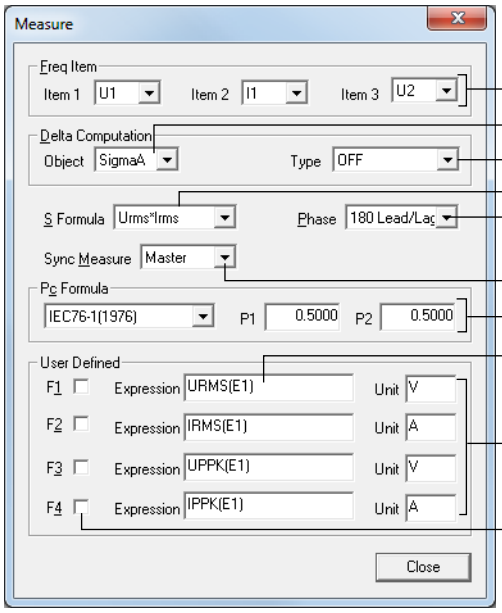
The list selected on the WT is displayed. You cannot select the list to be displayed using WTViewer. This is also true when controlling the WT through WTViewer. To select the list to be displayed, perform the following procedure.

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



Select the signal for frequency measurement

Select the wiring unit for delta computation

Select the delta computation type

Select the formula for apparent power

Select the phase difference display format

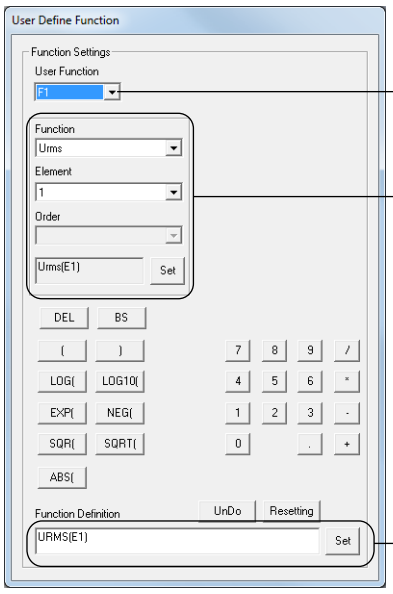
Select Master or Slave

Set the formula for corrected power

Set user-defined math expressions

Set the units for computed results of user-defined math

Select the user defined computations to execute

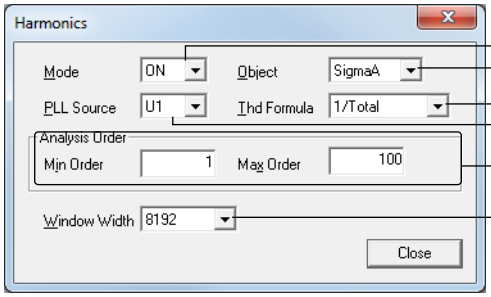


Select user-defined math number which you will enter settings

Entering Operands
The operands set for the Function, Element, and Order are displayed in the lower area. If you press the Set button, the currently displayed operand is added to the Function definition box at the bottom.

User Define Functions can be defined by combining operands, constants, and computational symbols.
If you press the Set button, the User Define Function is applied and added to the User Define Function definition box in the left part of the dialog box.

Harmonic Measurement Settings



Turn harmonic measurement ON or OFF

Select the wiring unit for measurement

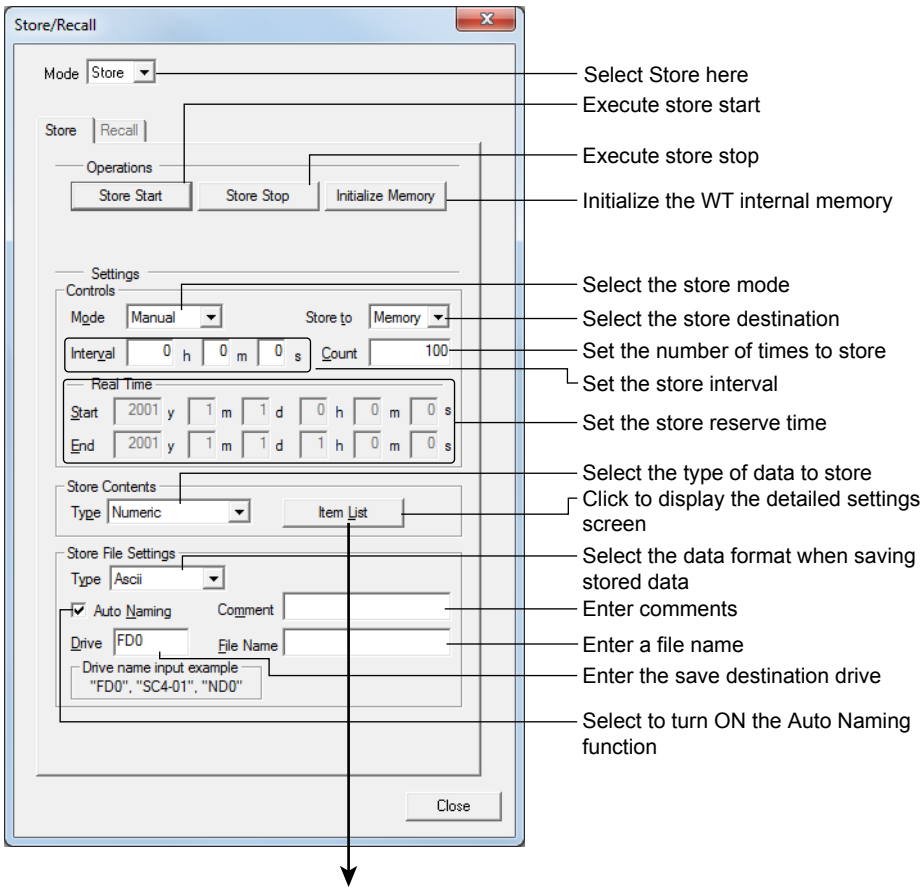
Select the formula for strain factor

Select the PLL source

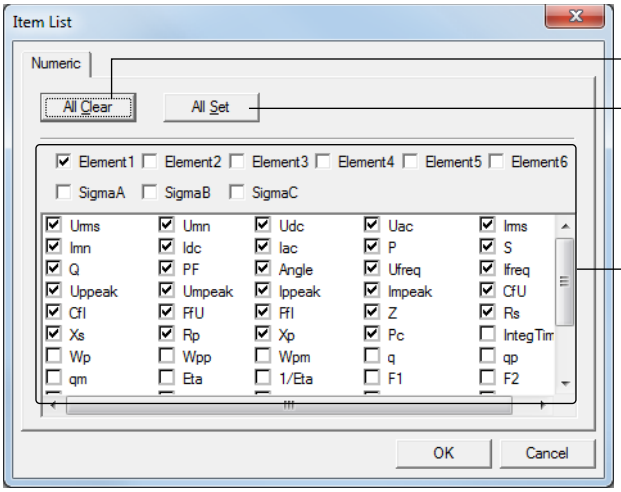
Set the range of analysis orders

Select the data length

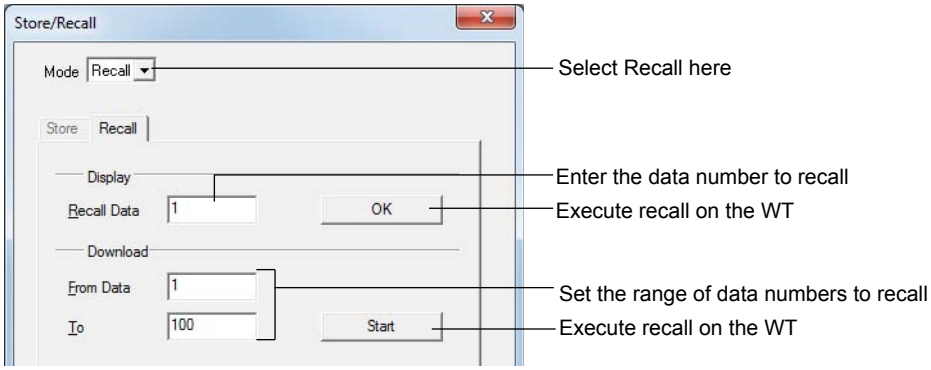
Store Settings



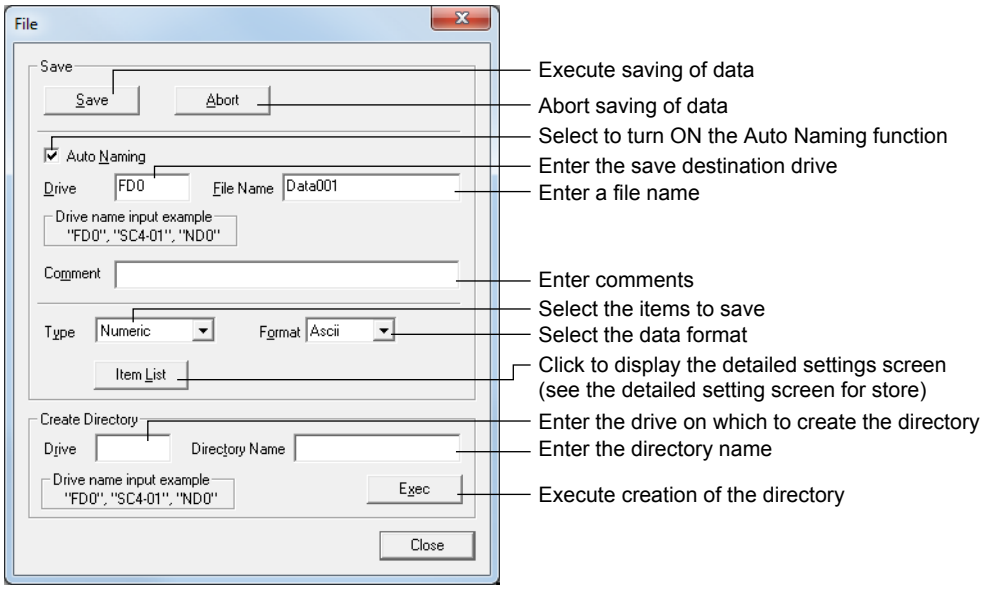
Detailed Setting Screen for Stored Data
(An example of the screen when numeric data is selected)



Recall Settings

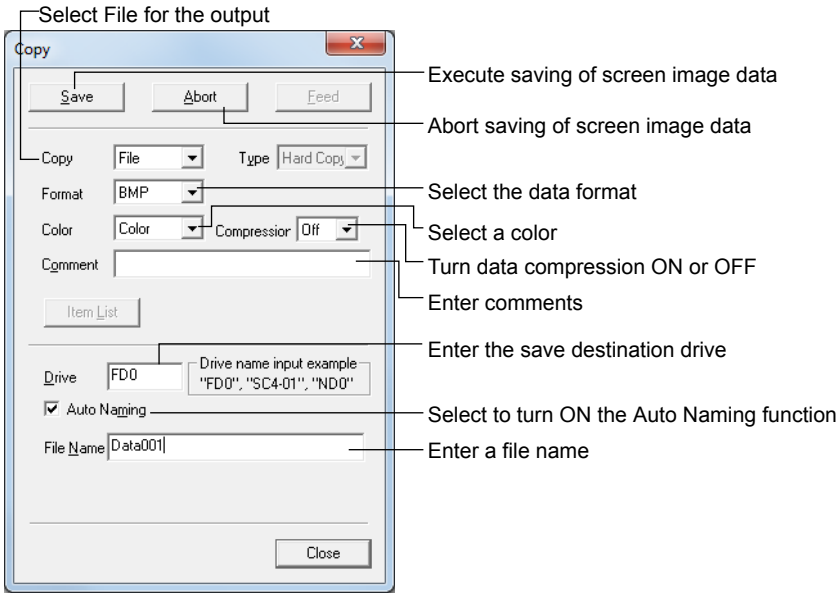


Data Save Settings

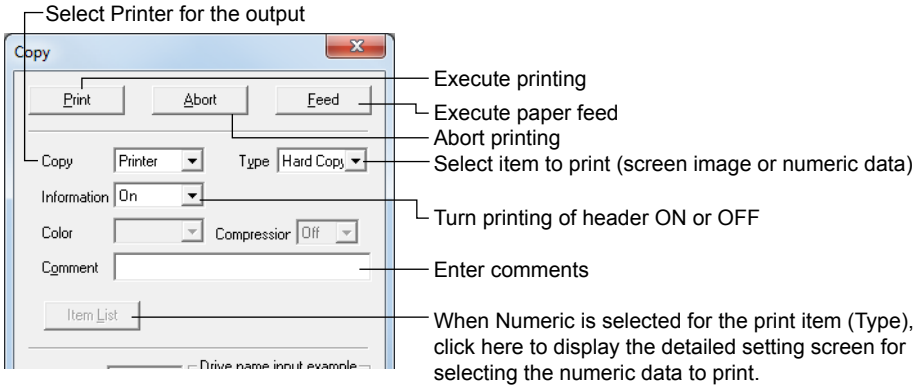


Saving Screen Images, Printing on the WT's Built-In Printer, and Setting Up Network Printers

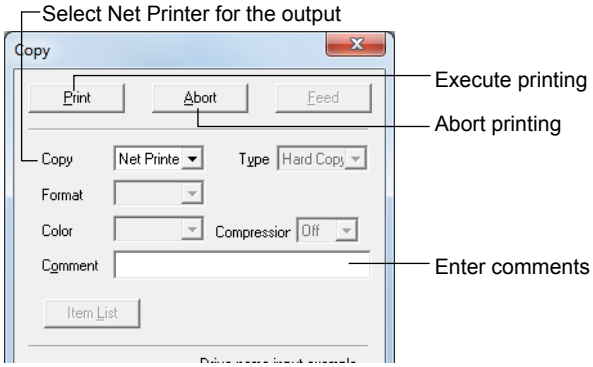
Screen Image Saving



Printing on the WT's Built-In Printer

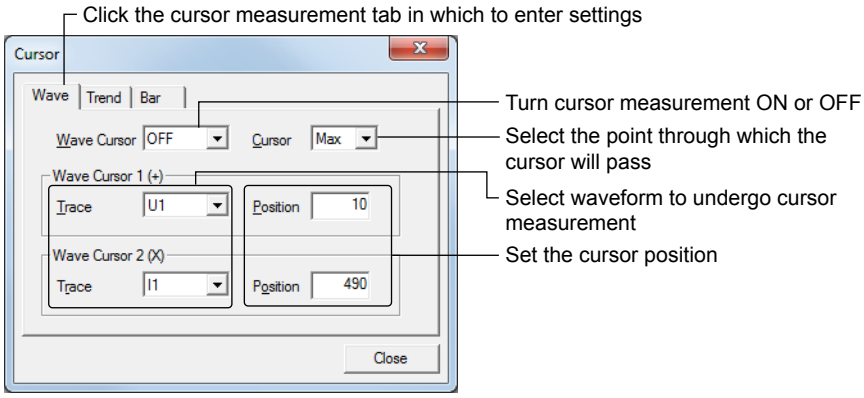


Printing on Network Printers

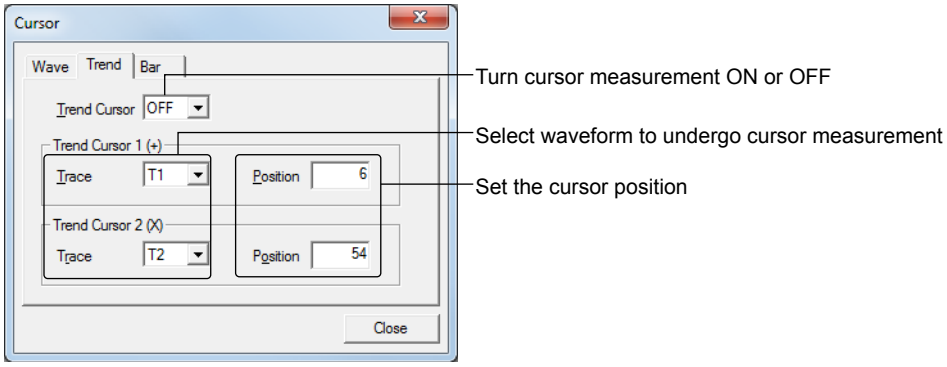


Cursor Measurement Settings

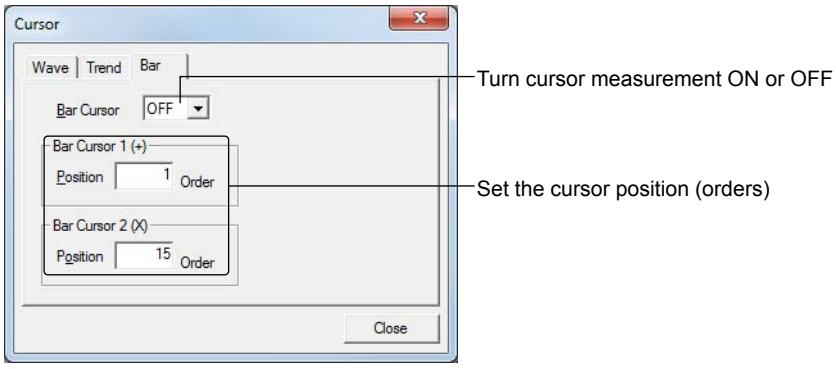
Waveform Cursor Measurement



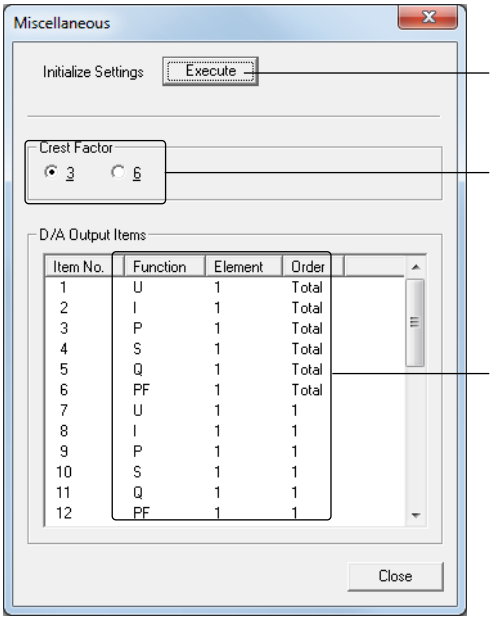
Trend Cursor Measurement



Bar Graph Cursor Measurement



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



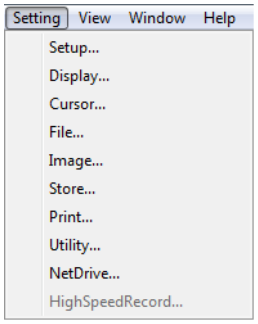
For information on initializing the WT, see the WT User's Manual.

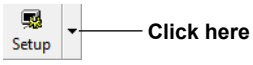
FTP Server Function Settings

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

6.4 Settings Dialog Box (WT1800)

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



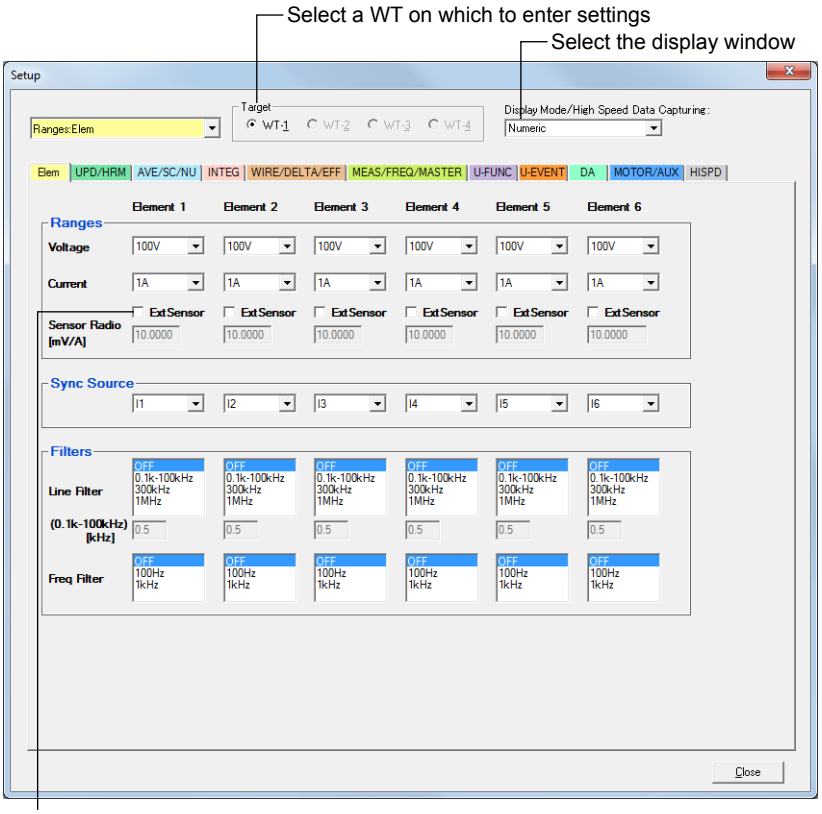


2. Select the item for which you wish to enter settings. The dialog box for the selected item appears.
3. Change the settings as needed.

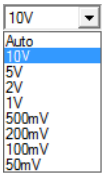
The following shows a display example of the settings dialog box. Enter settings after selecting the target WT in the Select Target WT box.
For details on each function, see the WT User's Manual.

Select Target WT box

Ranges / Sync Source / Filters Settings

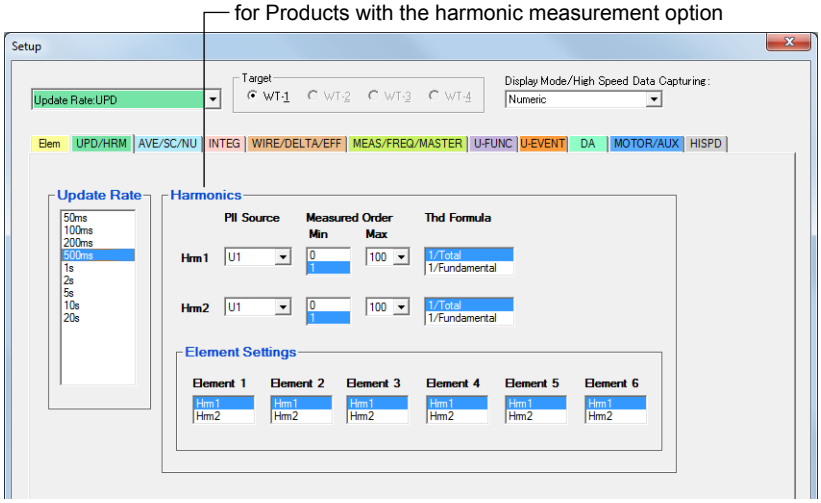


Check to use external sensor for current input. On the current range setting box, the external sensor range choices are displayed. The Sensor Ratio setting box becomes active.

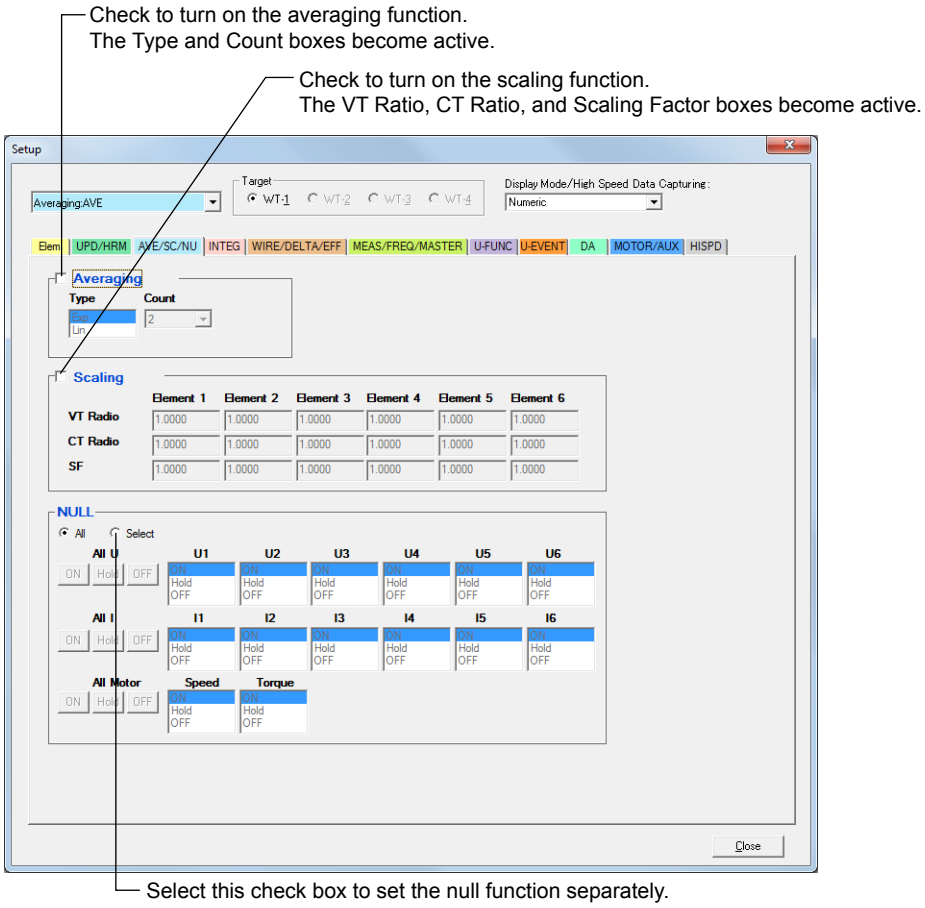


for Products with the external sensor input option

Update Rate / Harmonics Settings



Averaging / Scaling / Null Function Settings



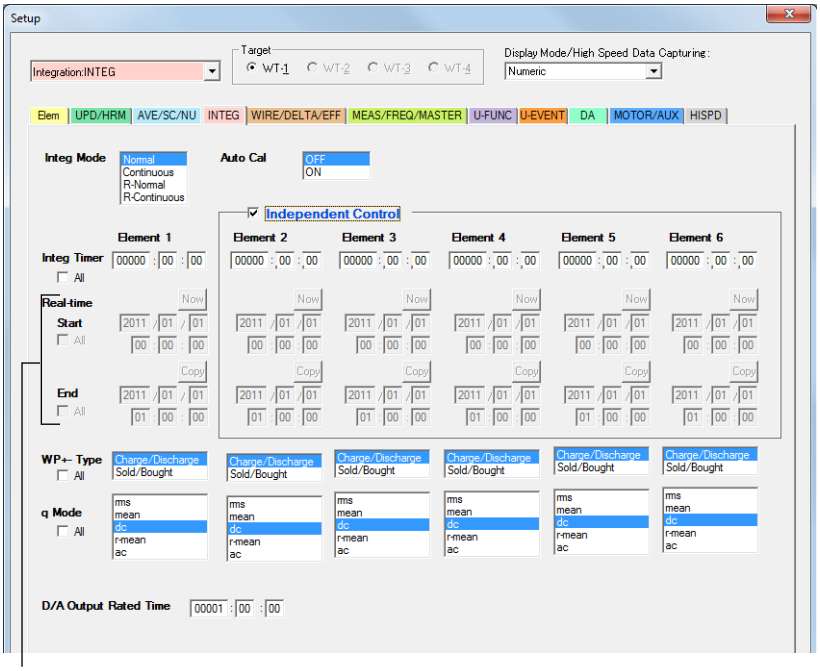
Null Function ON/OFF

Click **NULL** on the toolbar. For the procedure to display the null bar, see section 3.1.

NULL ON

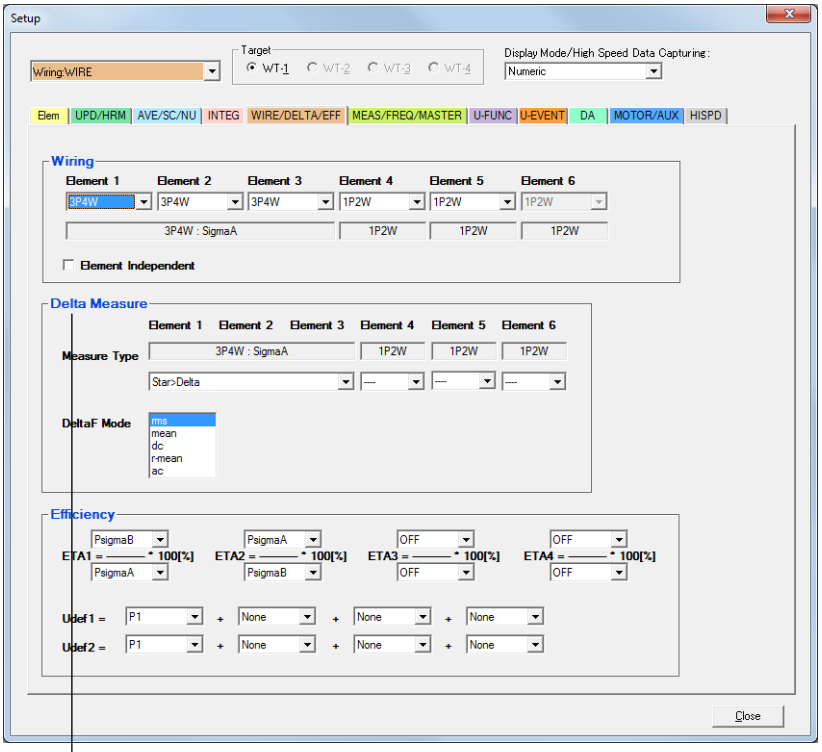
NULL OFF

Integration Settings



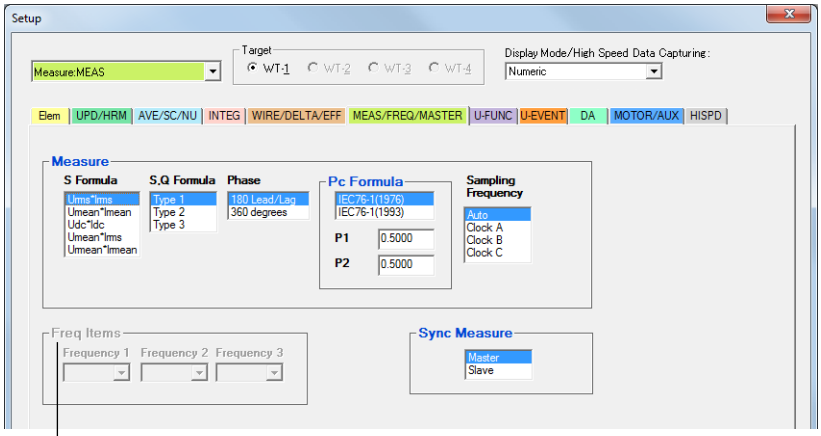
These boxes become active when you select R-Normal (Real-Time Integratio) or R-Continuous (Real-Time Continuous Integration) in the Integ Mode box.
Click Now to set curent time in the Start box.
Click Copy to copy start time to the End box.

Wiring / Delta Measure / Efficiensy Settings



for Products with the delta computation option

Measure / Frequency Items / Master or Slave Settings

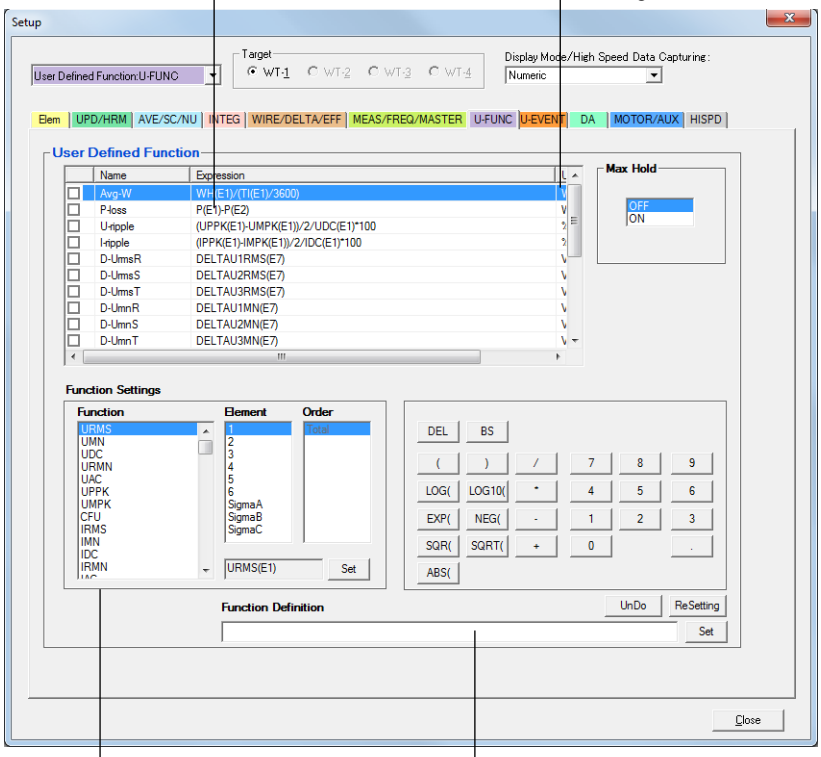


for Products without the frequency measurement add-on option

User Definded Function Setting

Click the user defined function to be set. Enter the expression using the menus and buttons in the lower side of the dialog box.

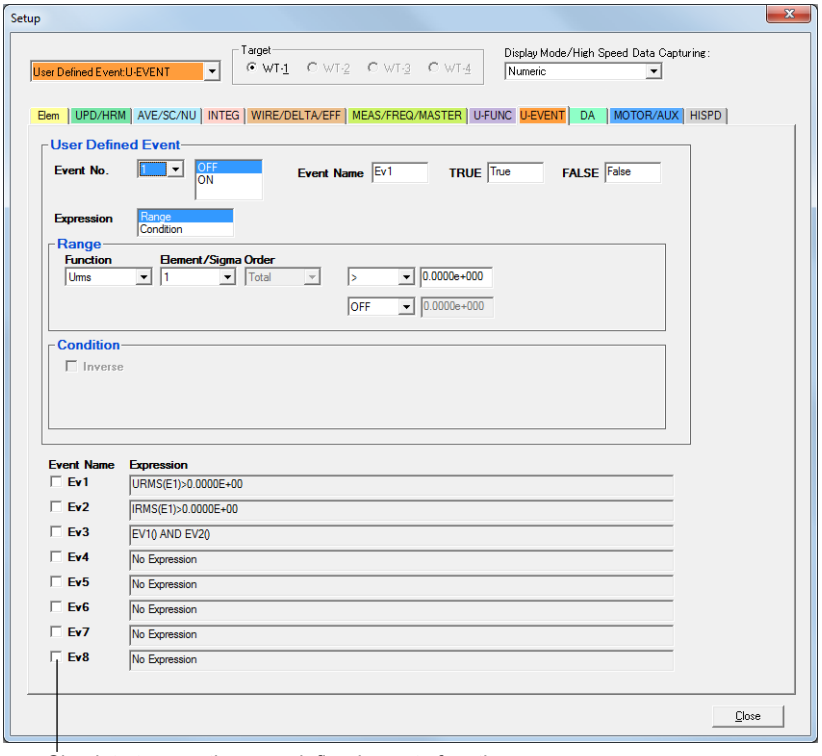
Setting the units



Entering Operands
The operands set for the Function, Element, and Order are displayed in the lower area. If you press the Settings button, the currently displayed operand is added to the function definition box at the very bottom.

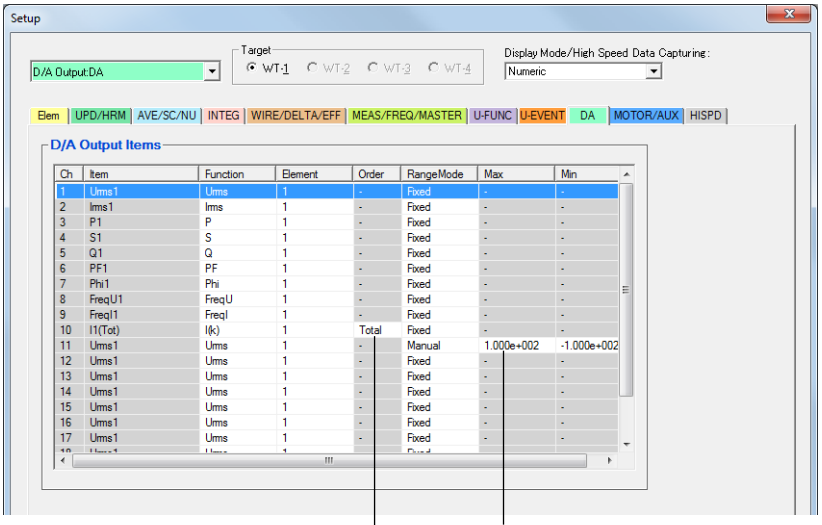
Function Definition Box
User defined functions can be defined by combining operands, and computational symbols. If you press the Set button, the user defined function is applied and added to the user defined function definition box in the upper side of the dialog box.

User Defined Event Setting



Check to turn on the user-defined events function.

D/A Output Settings



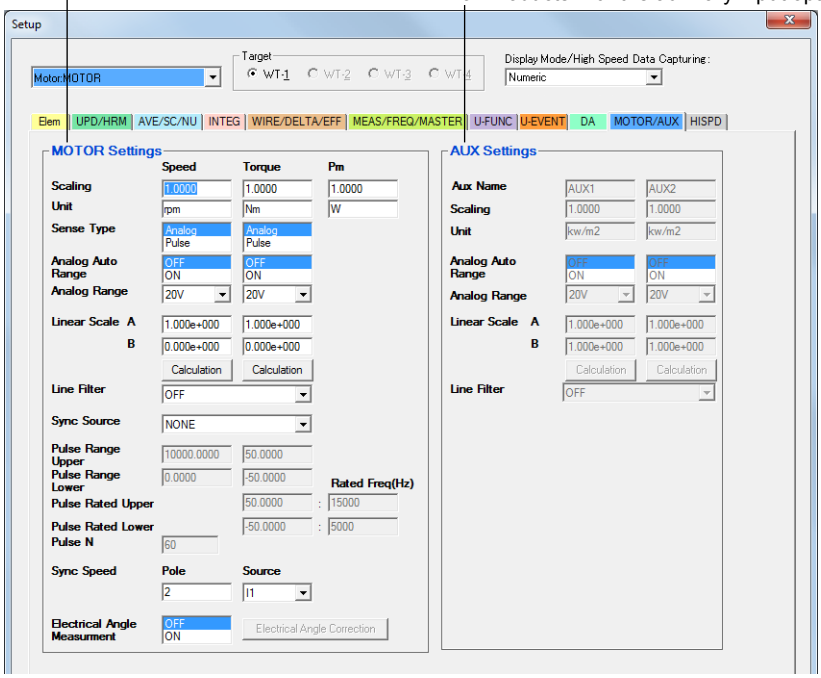
If you set RangeMode to Manual, you can set the Max and Min values.

If you set Function to a measurement function that you can set orders for, you can set the Order value.

Motor Evaluation Function or Auxiliary Input Settings

for Products with the motor evaluation function option

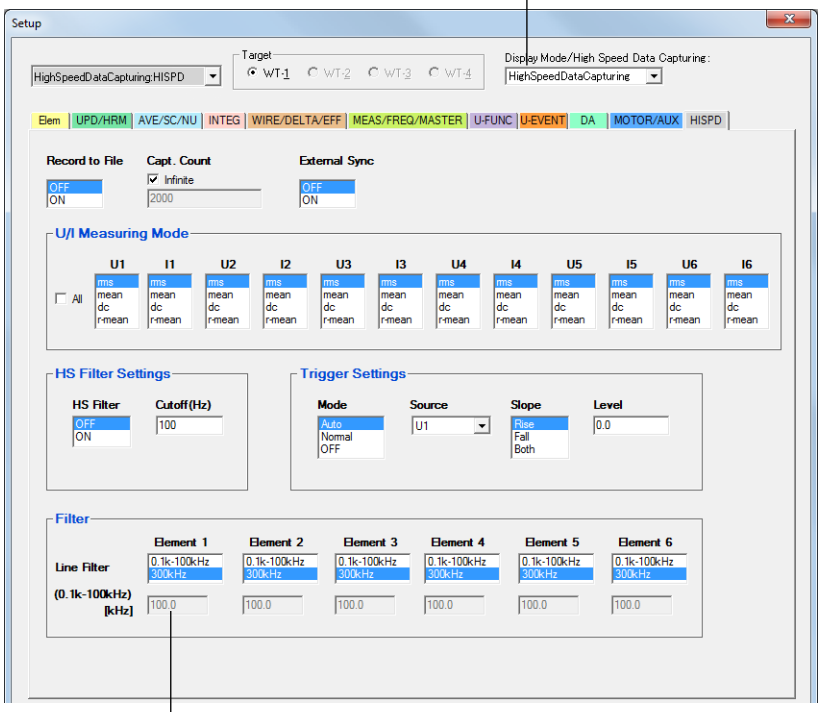
for Products with the auxiliary input option



High Speed Data Capturing Setting

If you set the display mode to High Speed Data Capturing, the following boxes are enabled.

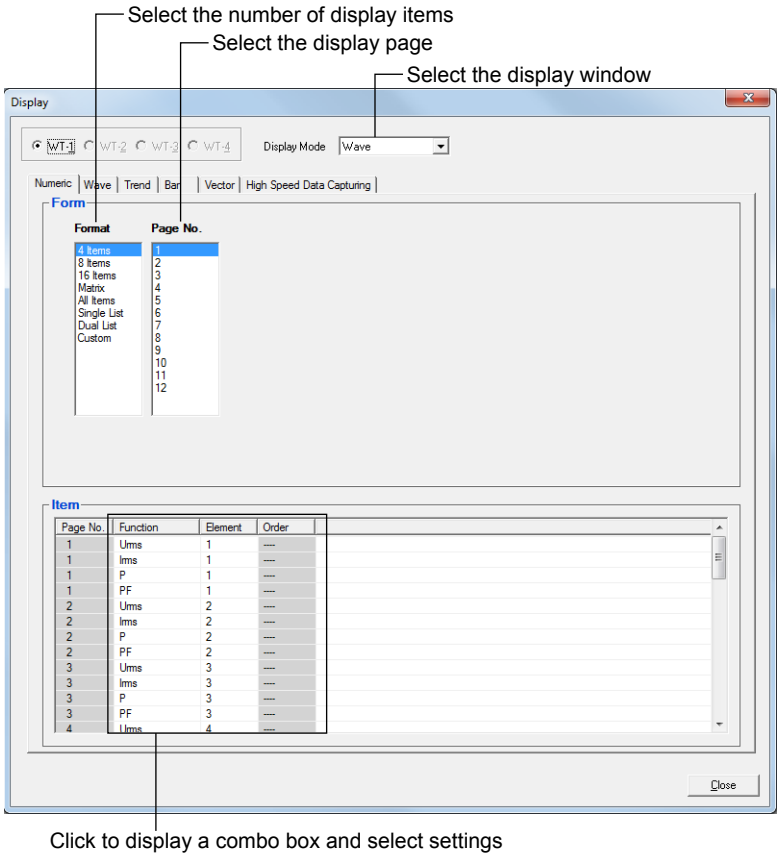
Display Mode : Select the display window



These boxes become active when you select 0.1k-100kHz in the Line Filter box. You can set the cutoff frequency.

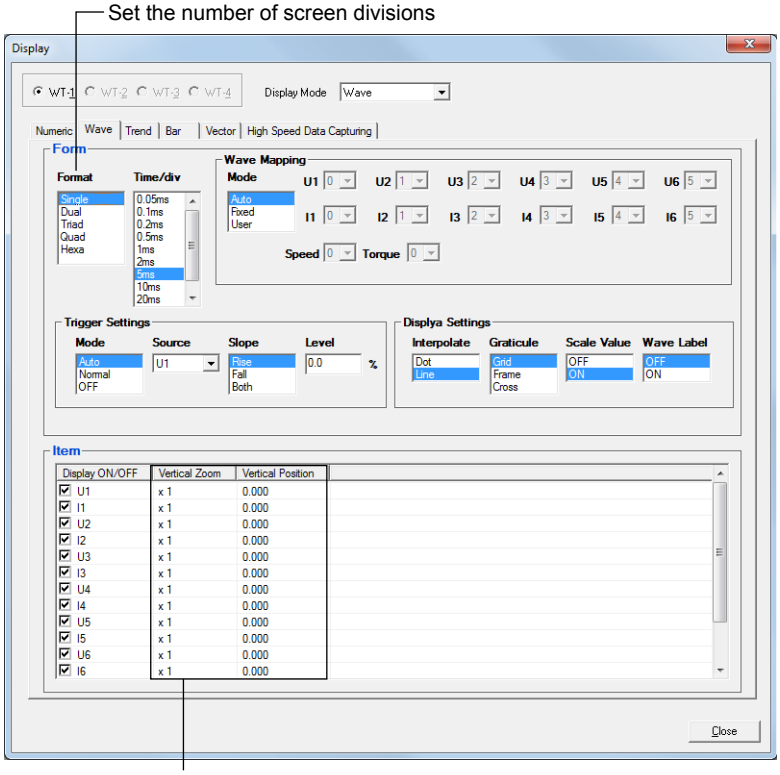
Setting the Display Format

Numeric Value or Harmonics Data Display Format

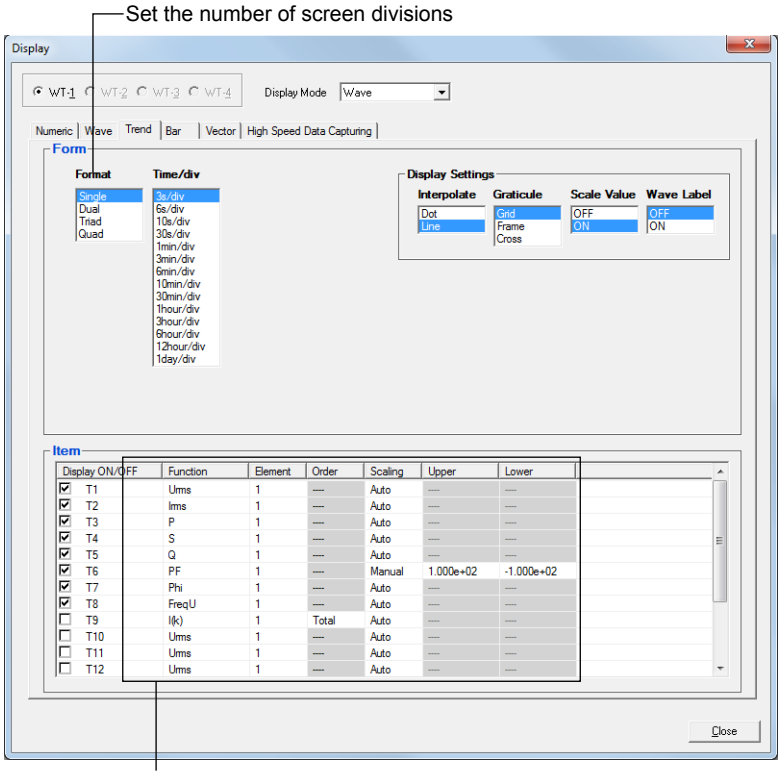


Click to display a combo box and select settings
If you set Function to a measurement function that you can set orders for, you can set the Order value.

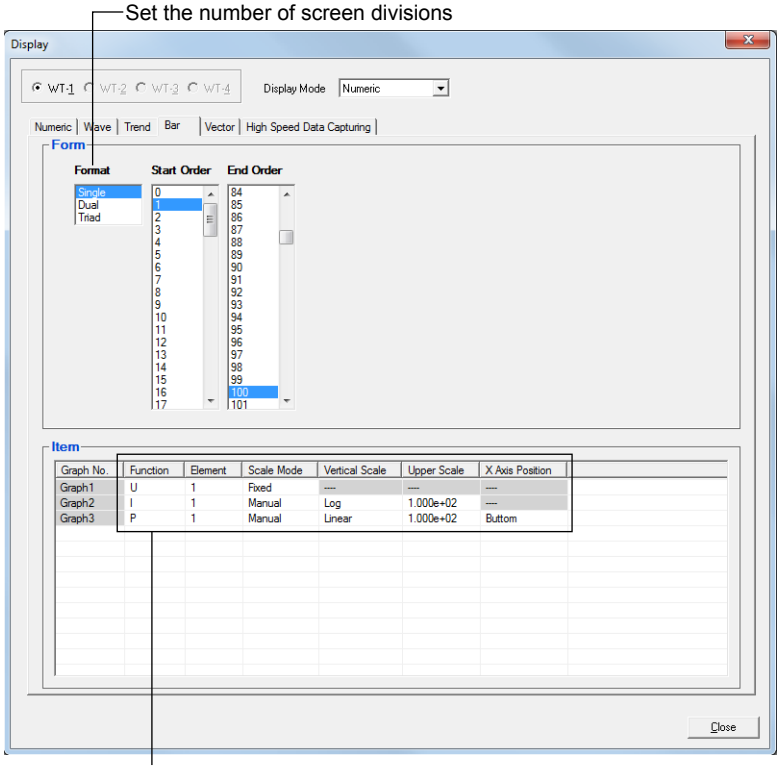
Waveform Display Format



Trend Display Format

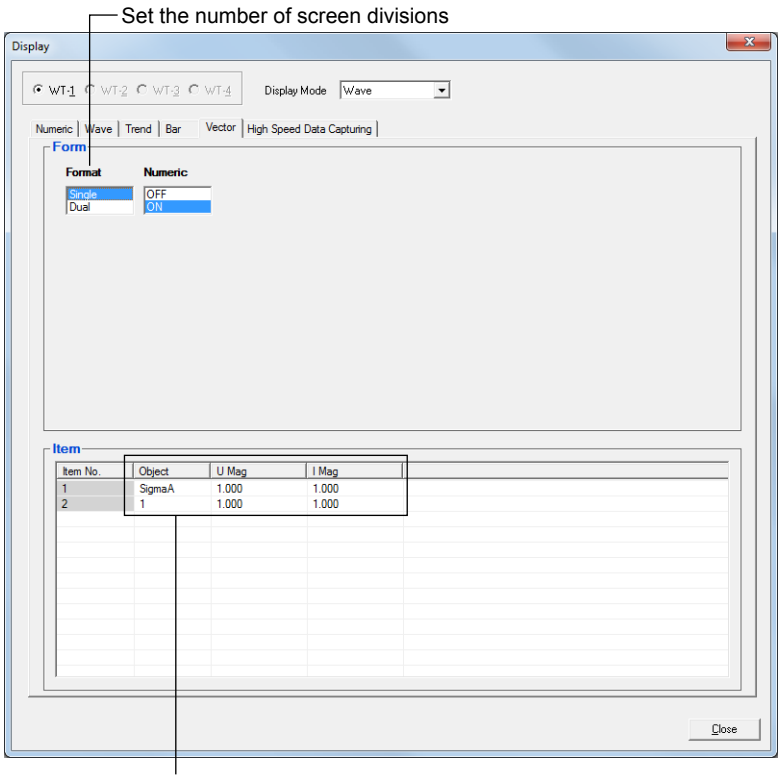


Bar Graph Display Format



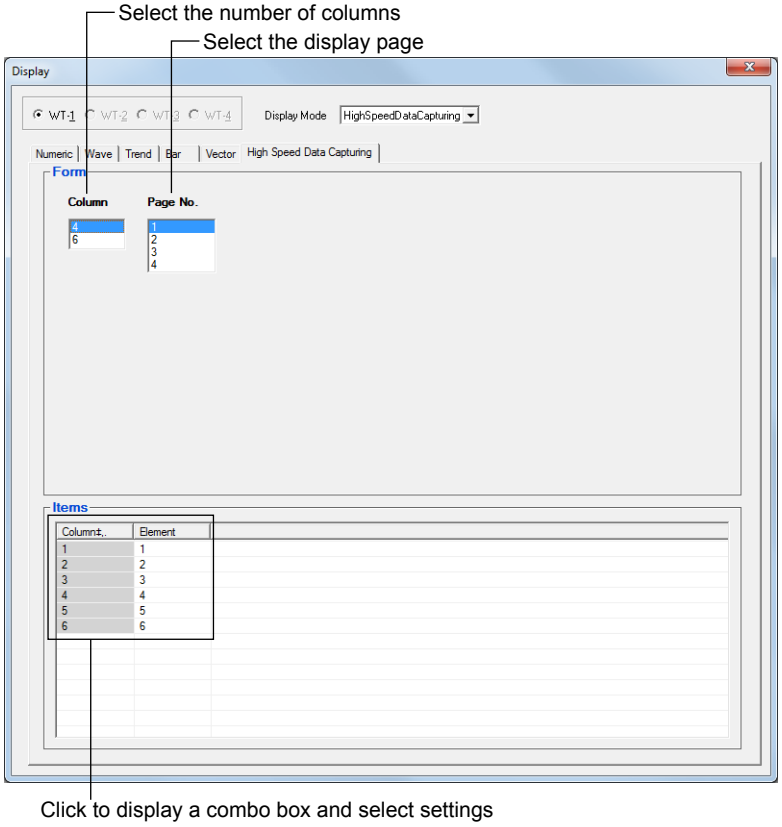
Click to display a combo box and select settings
If you set Scale Mode to Manual, you can set the vertical scale type and the scale upper limit.
If you set Vertical Scale to Linear, you can set the X-axis position.

Vector Display Format



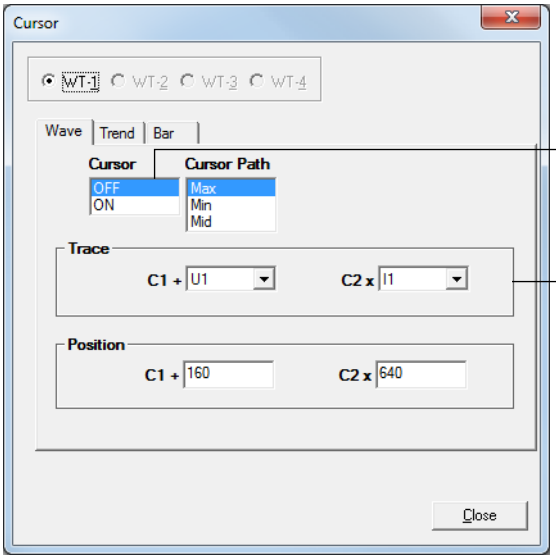
Click to display a combo box and select settings

High Speed Data Capturing Display Format

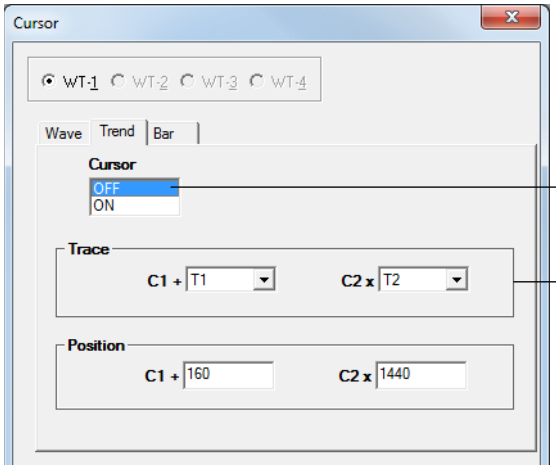


Cursor Measurement Settings

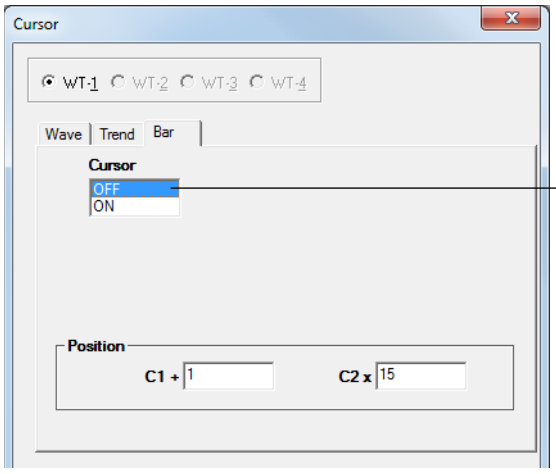
Waveform Cursor Measurement



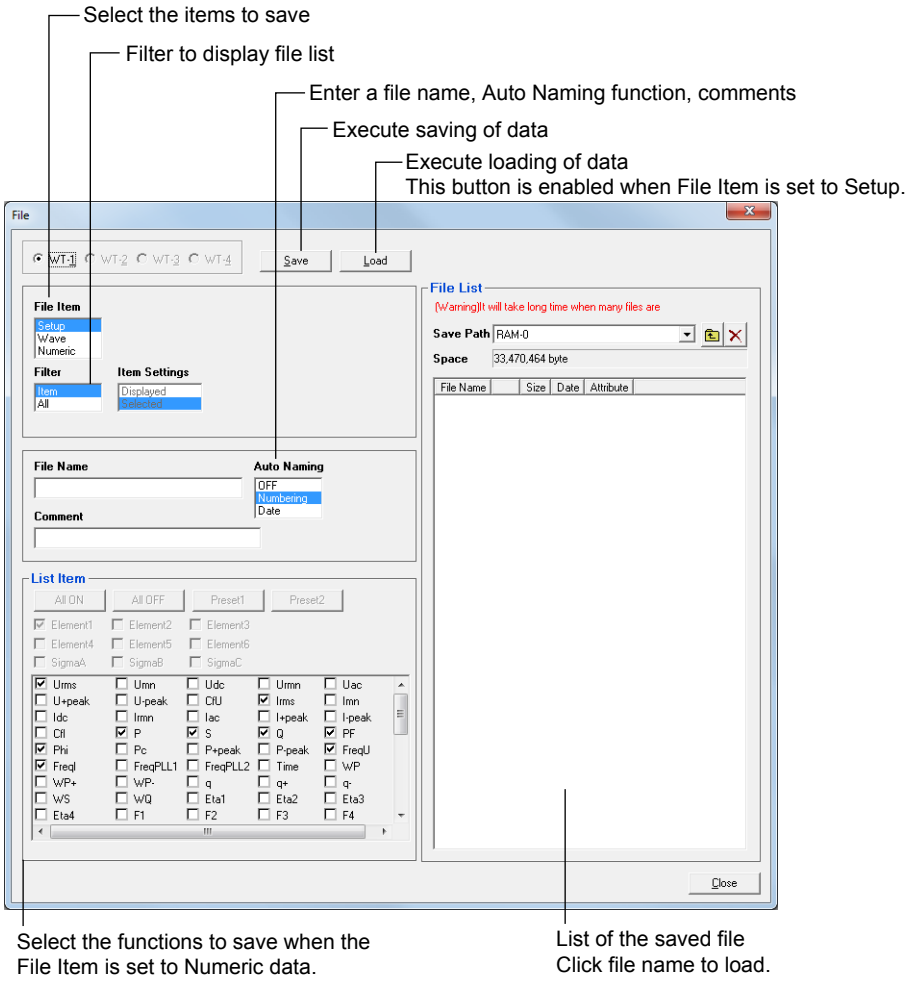
Trend Cursor Measurement



Bar Graph Cursor Measurement



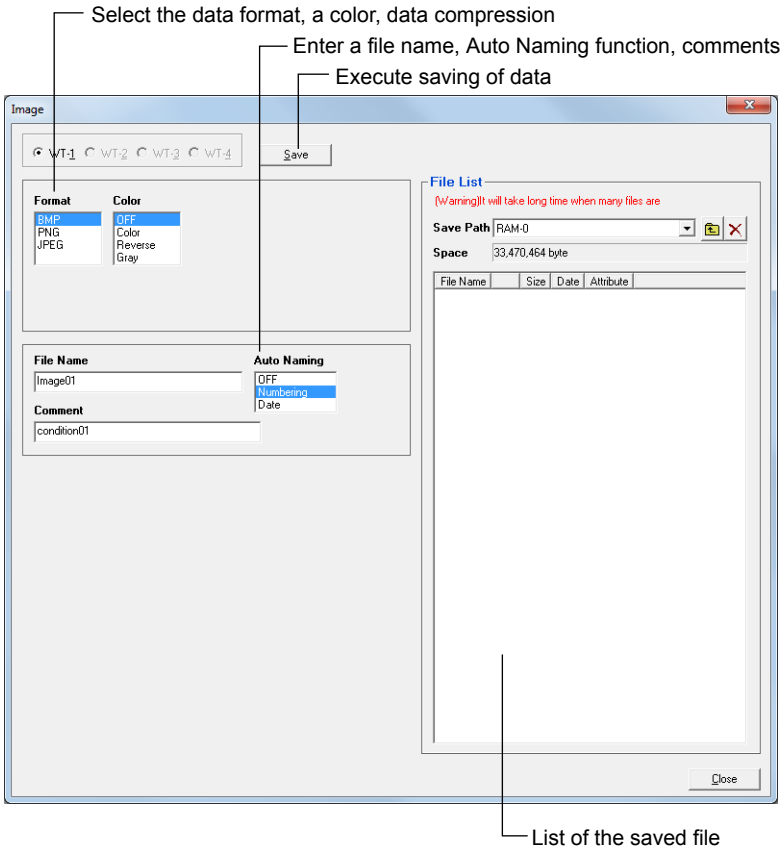
Data Save / Load Settings



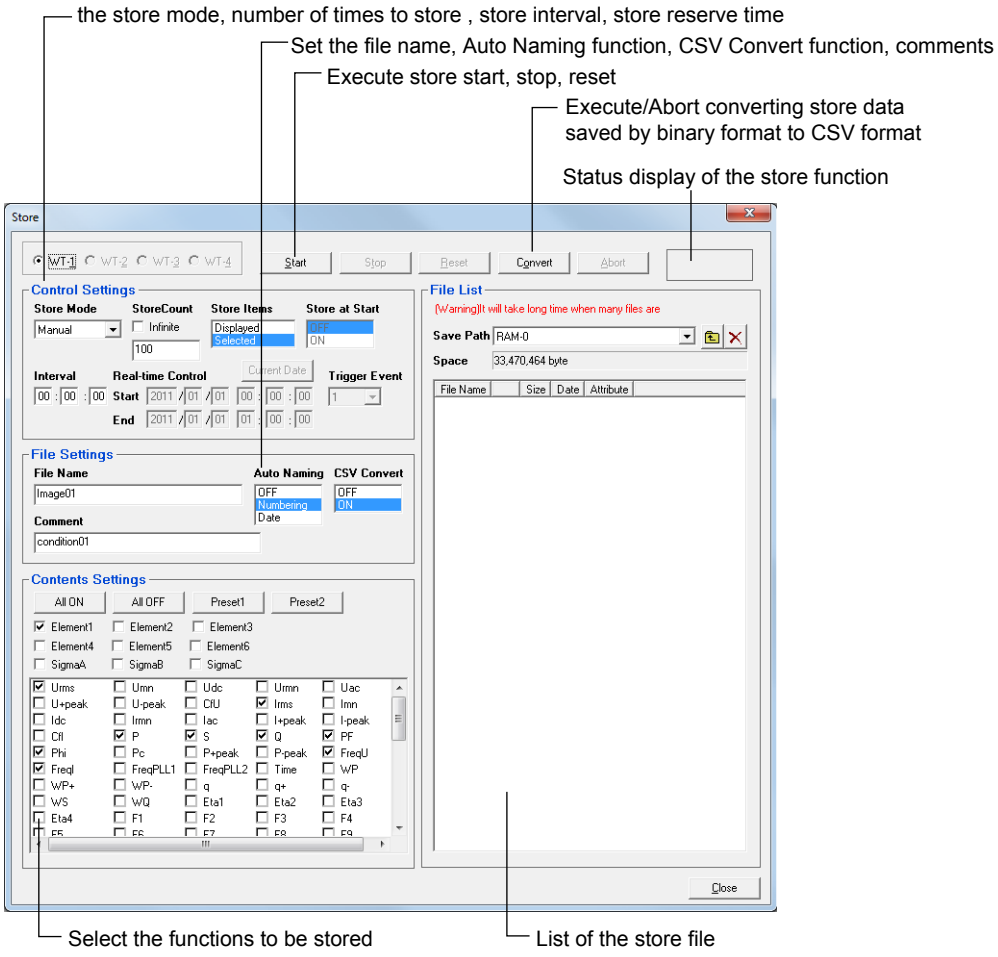
Note

- When the items to save are not selected, the saving of the data cannot be executed.
- When the file to load is not selected in the file list, the loading of the file cannot be executed.

Screen Image Saving Settings



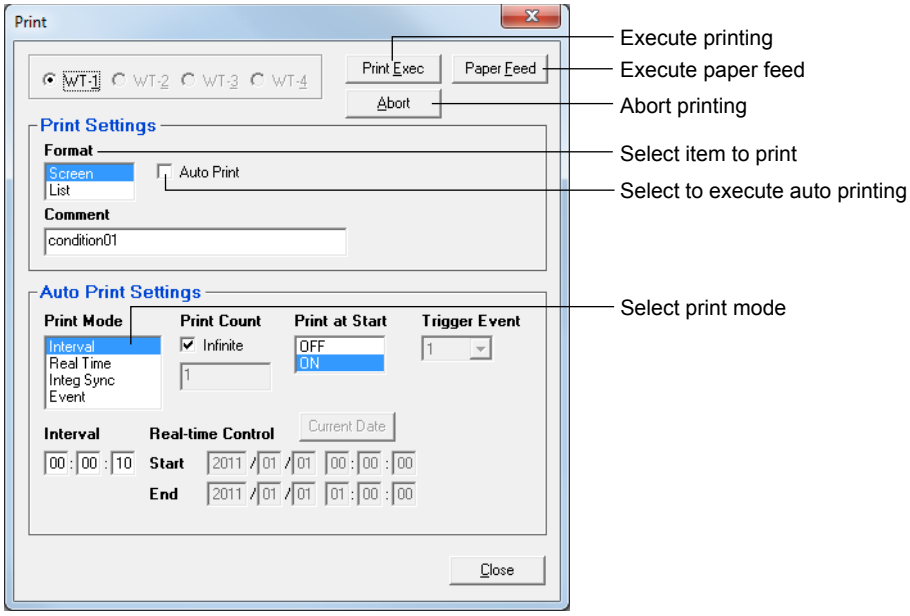
Store Settings



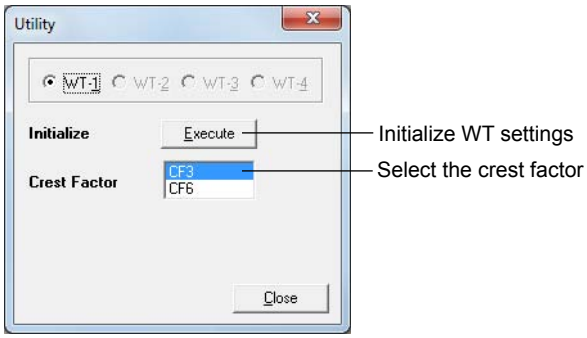
Note

- Settings cannot be changed while the store function is in progress or has stopped or CSV converting.
- When the file to convert CSV format (*.WTS or *.HDS) is not selected in the file list, the CSV convert function cannot be executed.

Printing Settings



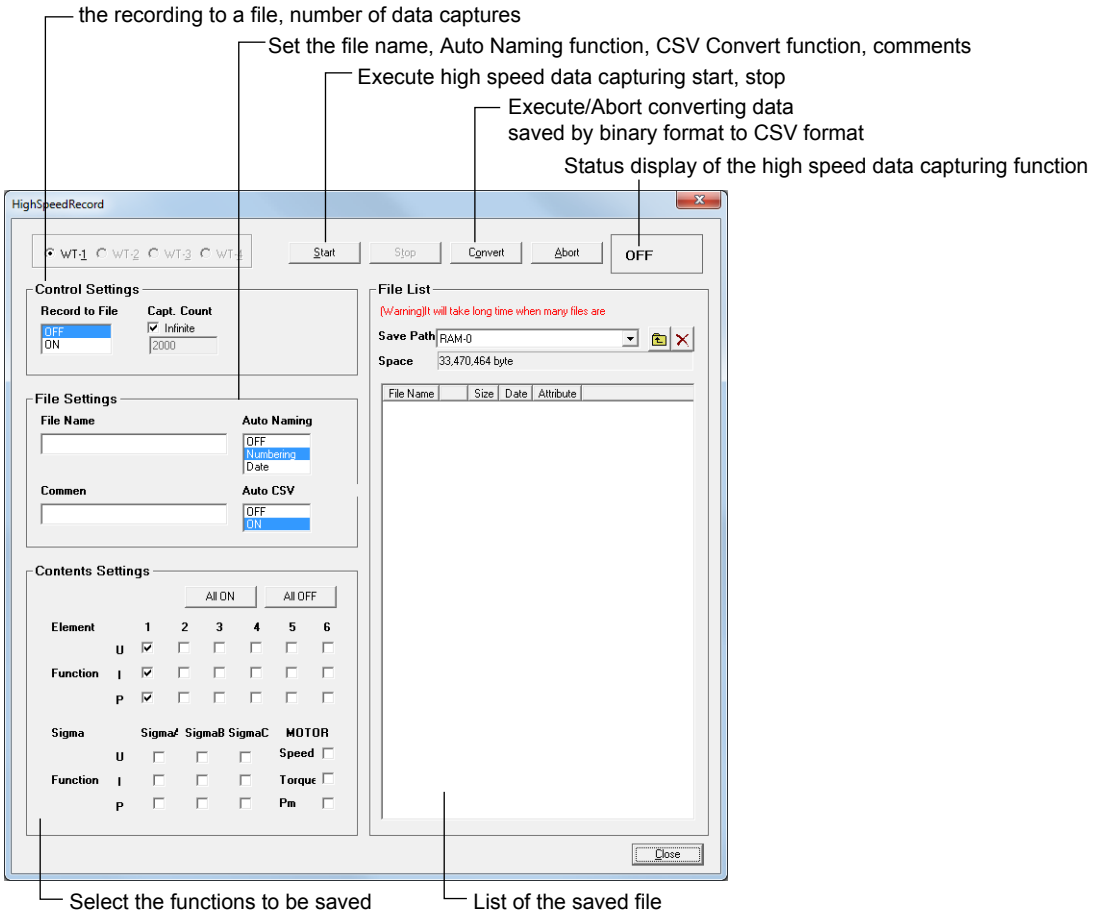
Initializing the WT, Selecting the Crest Factor



FTP Server Function Settings

For information on the **WT Setting** > **NetDrive (Network Drive Setup)** command, see section 5.5, “FTP Server Function.”

High Speed Data Capturing Settings

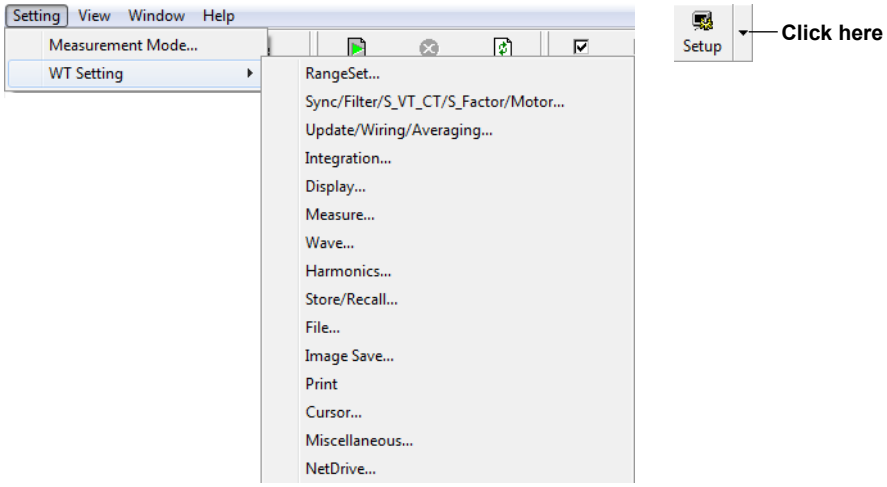


Note

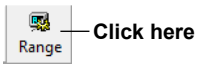
- Settings cannot be changed while the high speed data capturing is in progress or CSV converting.
- When the file to convert CSV format (*.WTS or *.HDS) is not selected in the file list, the CSV convert function cannot be executed.

6.5 Settings Dialog Box (WT3000)

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



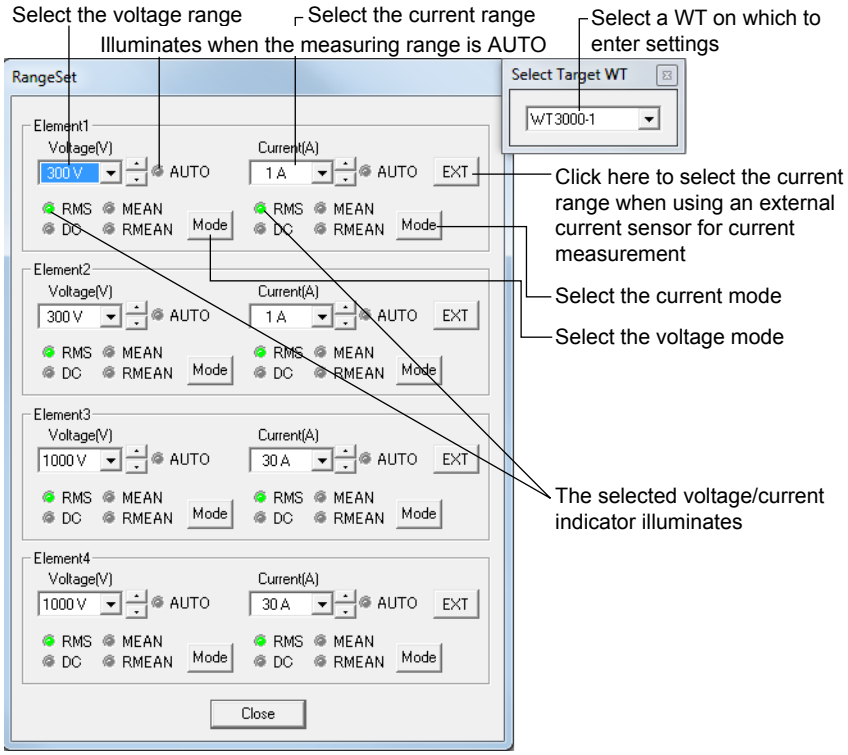
You can also display the dialog box for selecting the measuring range and voltage/current mode by clicking **Range** on the range setting bar.



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.

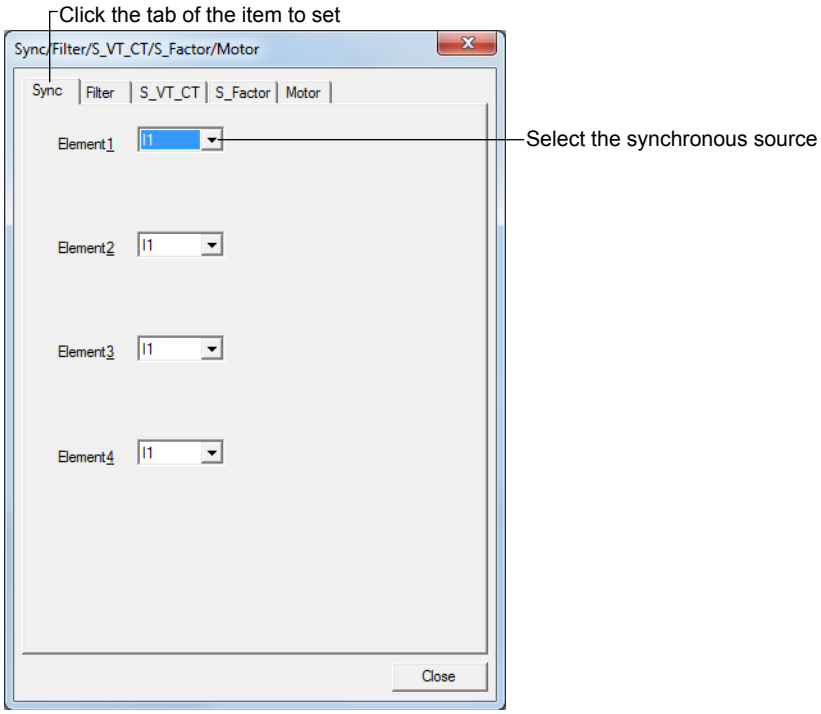
The following shows a display example of the settings dialog box. The Select Target WT dialog box is displayed simultaneously with all setting screens. Enter settings after selecting the target WT in the Select Target WT dialog box.

Selecting the Measuring Range and Voltage/Current Mode

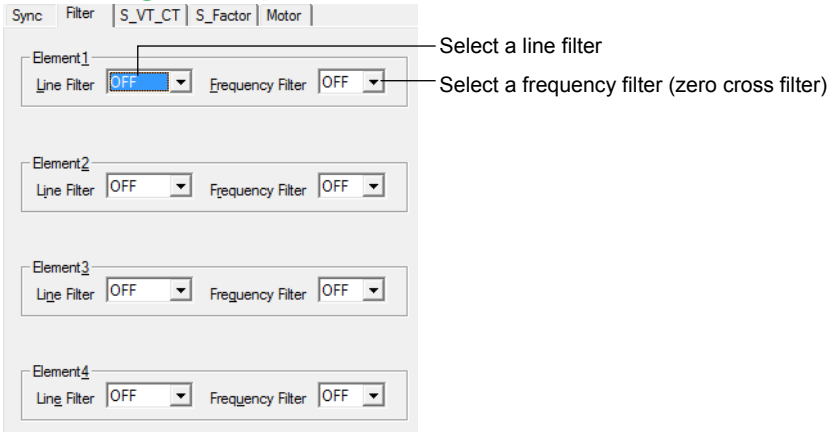


Synchronous Source, Input Filter, Scaling, External Current Sensor Conversion Ratio, and Motor Evaluation Function Settings

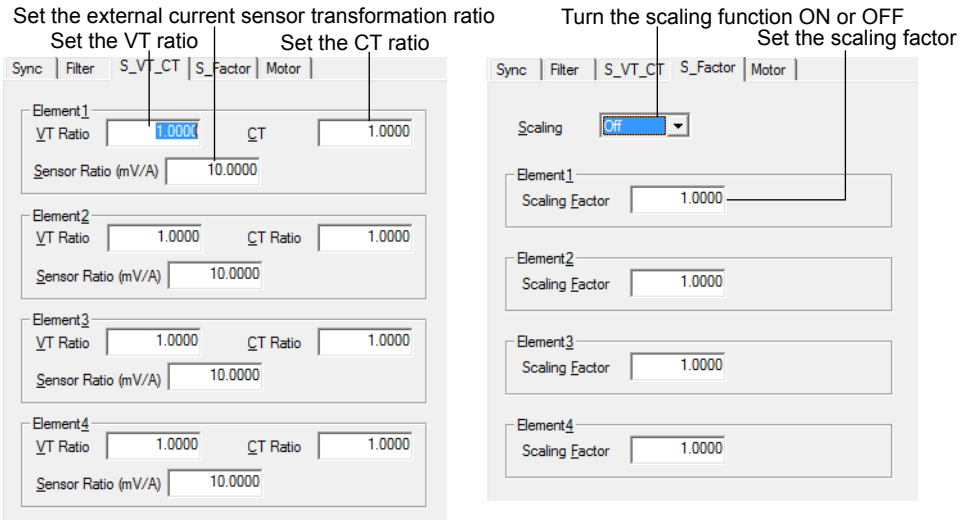
Selecting the Synchronous Source



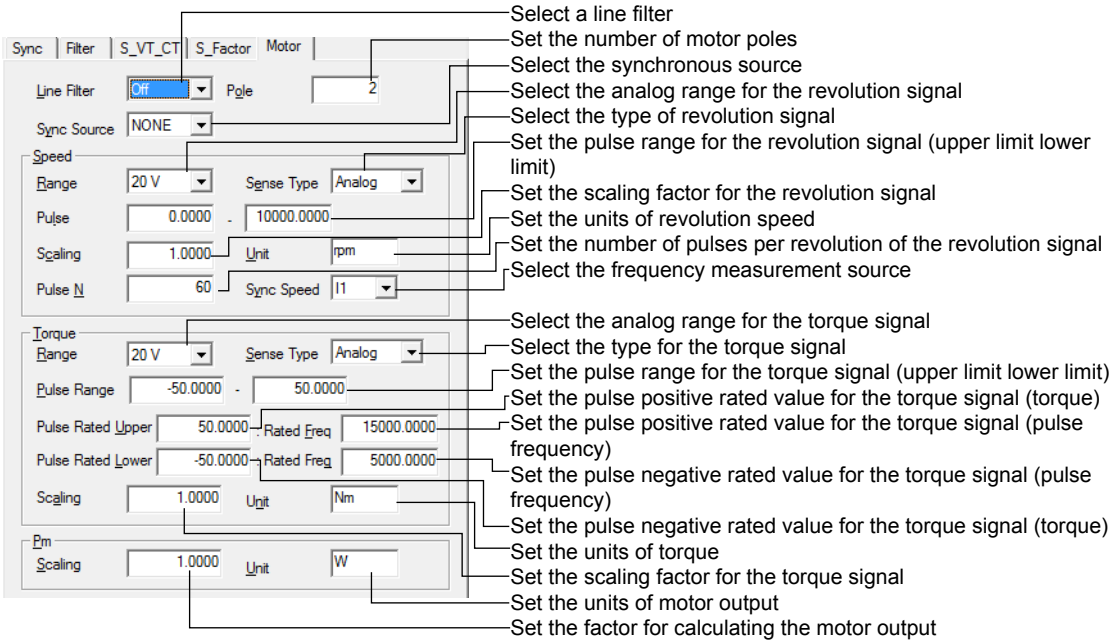
Selecting the Input Filter



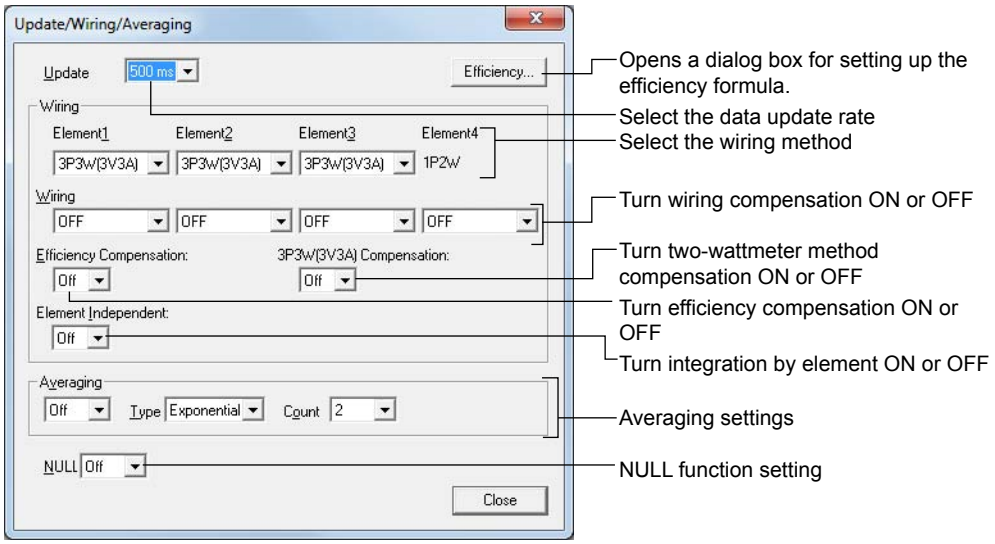
Scaling and External Current Sensor Transformation Ratio Settings



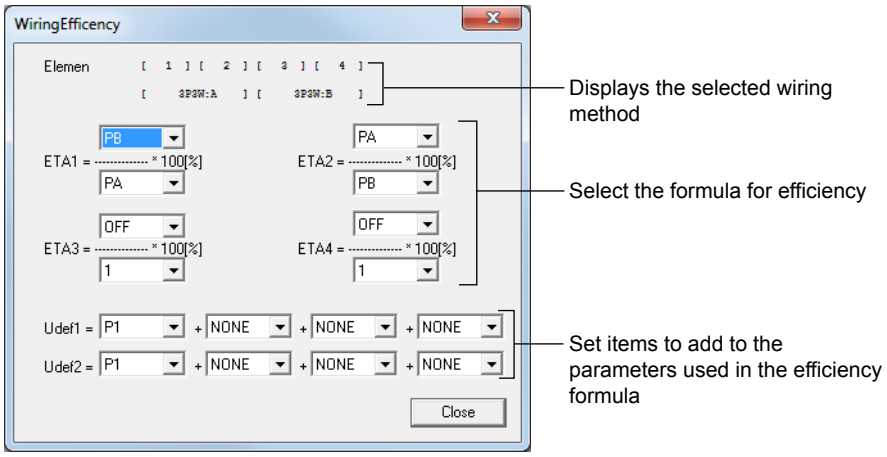
Motor Evaluation Function Settings



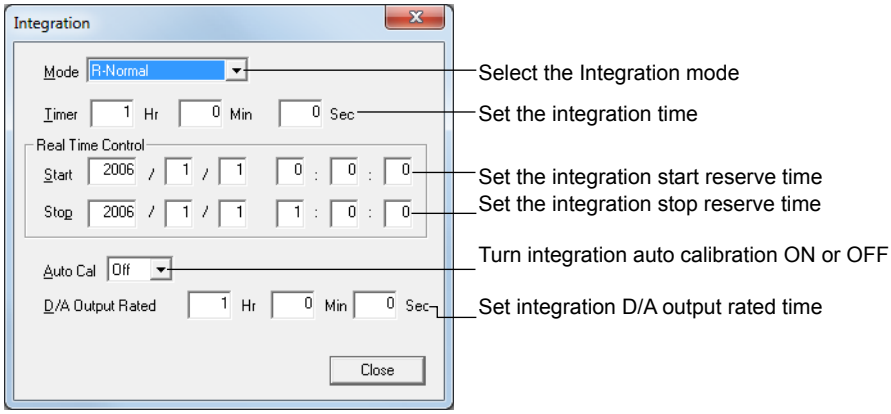
Data Update Rate, Wiring Method, Wiring Compensation, Efficiency Correction, Averaging, Efficiency Equation, and Null Function Settings



Efficiency Formula Setting

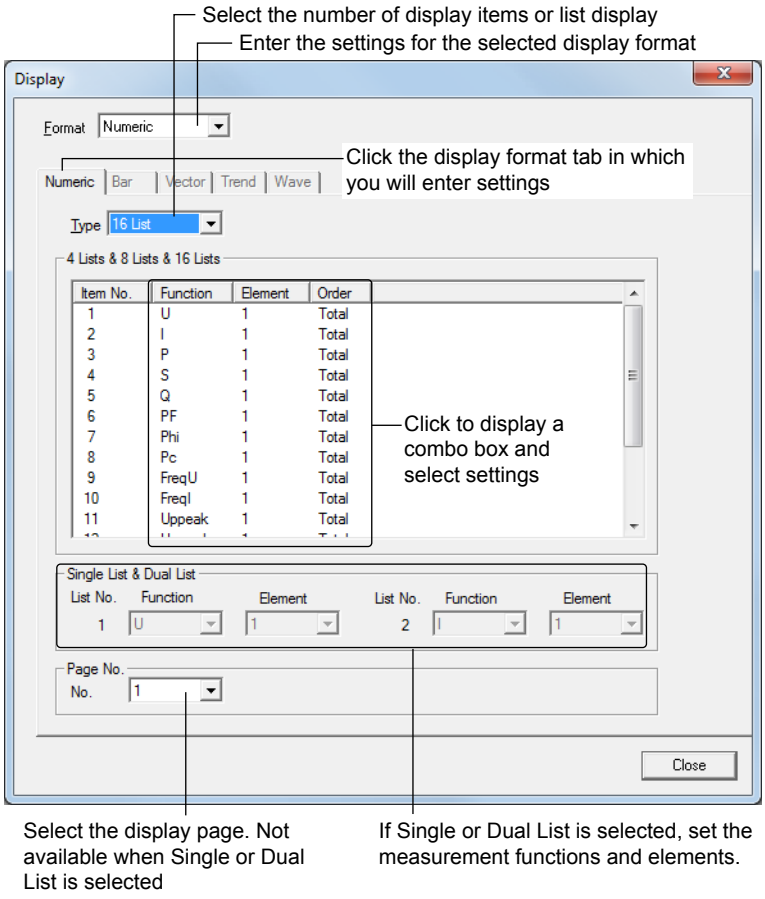


Integration Settings

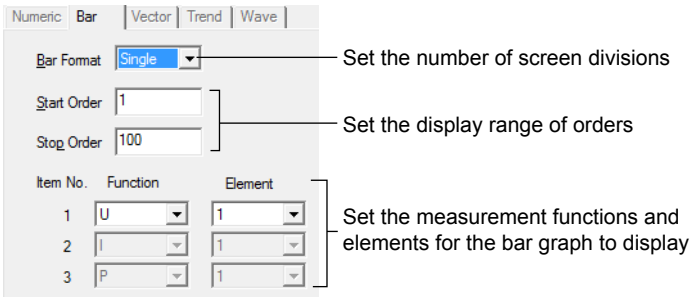


Setting the Display Format

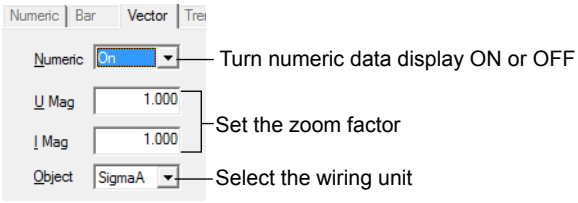
Numeric Value or Harmonics Data Display Format



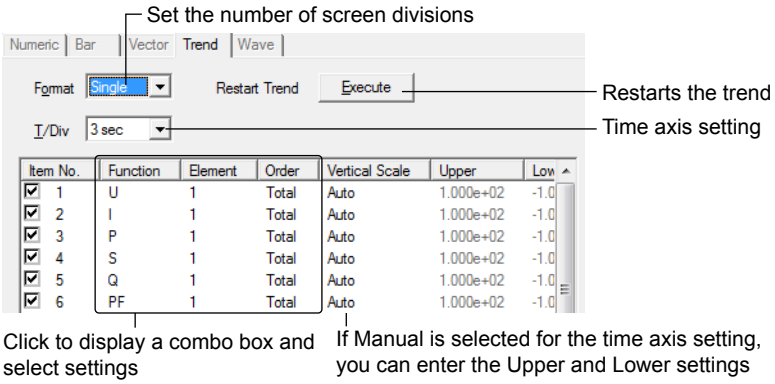
Bar Graph Display Format



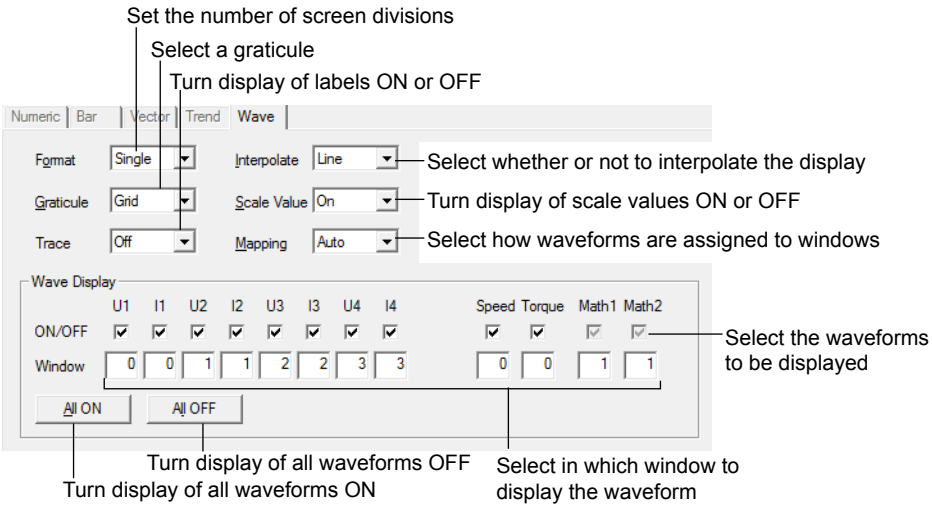
Vector Display Format



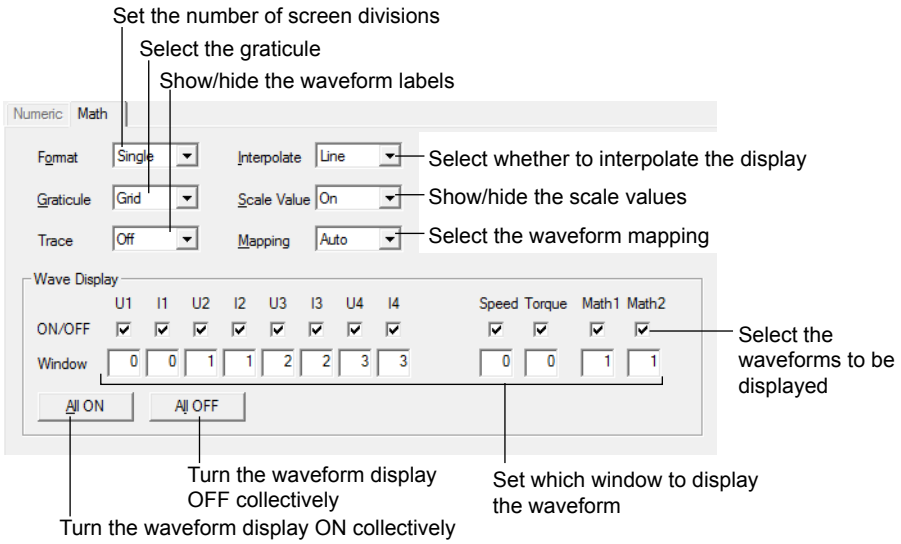
Trend Display Format



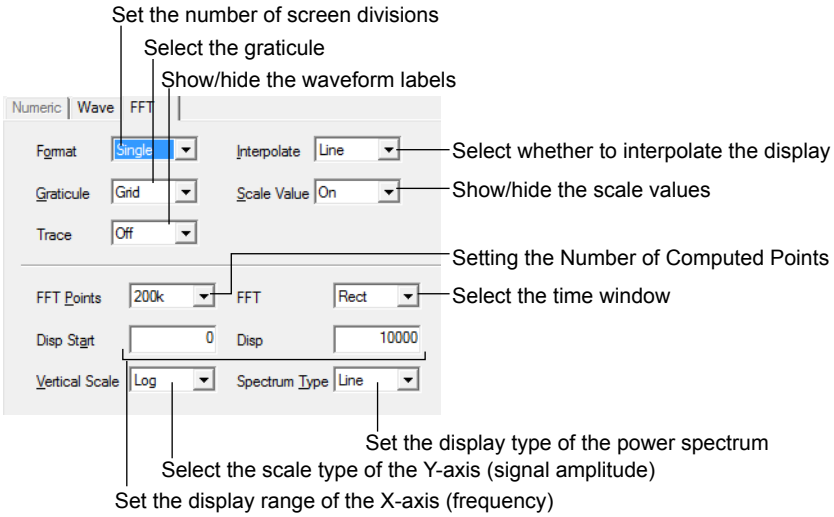
Waveform Display Format



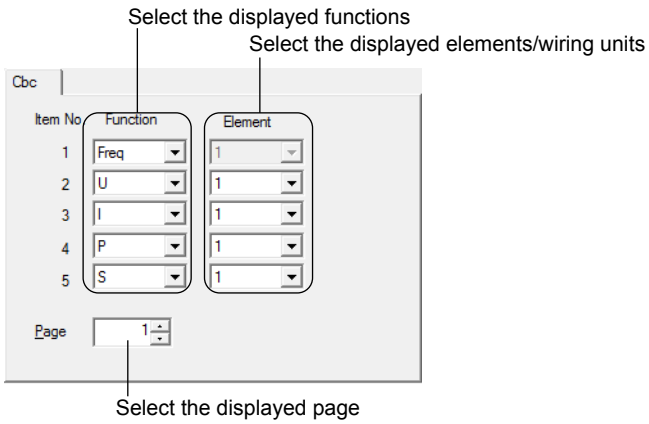
Display Format of the Computed Waveform (Math Waveform)



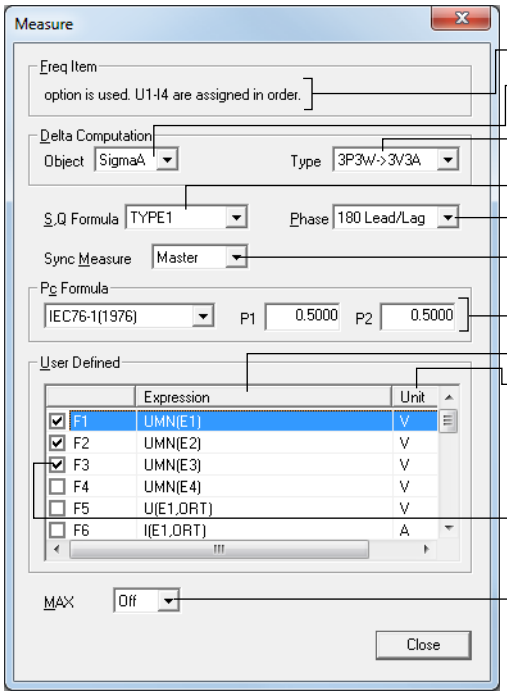
Display Format of the FFT



Display Format of the Cycle-by-Cycle Measurement



Entering Power Measurement and Computation Conditions



Select the signal for frequency measurement

Select the wiring unit for delta computation

Select the delta computation type

Select the formula for apparent power

Select the phase difference display format

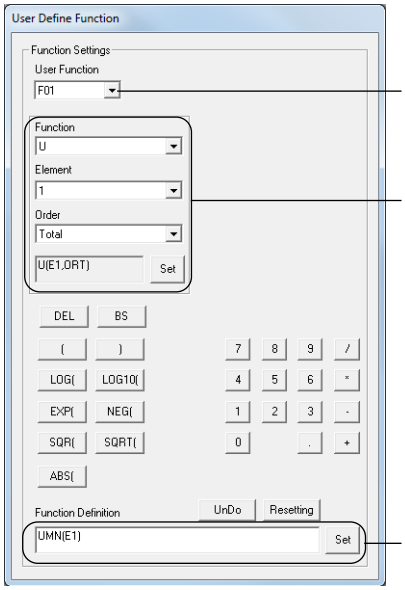
Select Master or Slave

Set the formula for corrected power

Set user-defined math expressions
Set the units for computed results of user-defined math

Select the user defined computation to execute

Settings for the MAX HOLD function

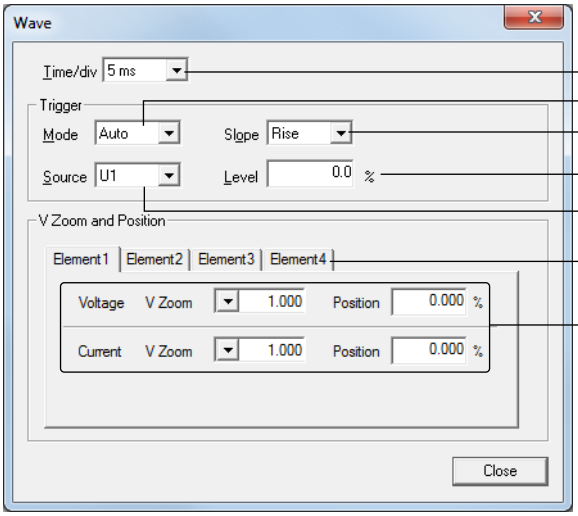


Select user-defined math number which you will enter settings

Entering Operands
The operands set for the Function, Element, and Order are displayed in the lower area. If you press the Set button, the currently displayed operand is added to the Function definition box at the bottom.

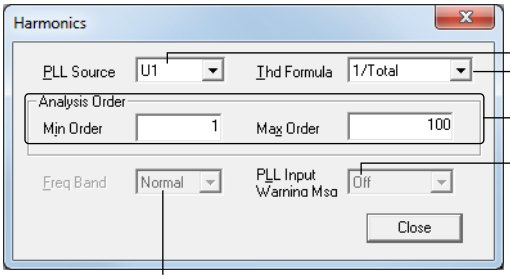
User Define Functions can be defined by combining operands, constants, and computational symbols. If you press the Set button, the User Define Function is applied and added to the User Define Function definition box in the left part of the dialog box.

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



Time axis setting
Select the trigger mode
Select the trigger slope
Select the trigger level
Select the trigger source
Click the Element tab in which you will enter settings
Set the zoom factor and position of the voltage/current waveform

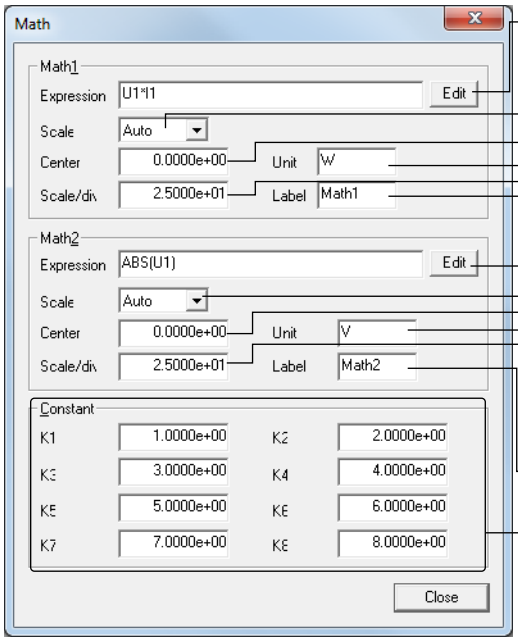
Harmonic Measurement Settings



Select the PLL source
Select the formula for strain factor
Set the range of analysis orders
Show/hide PLL lock timeout warning
• Selectable in Wide-Band Harmonics mode
• Not selectable in other measurement modes

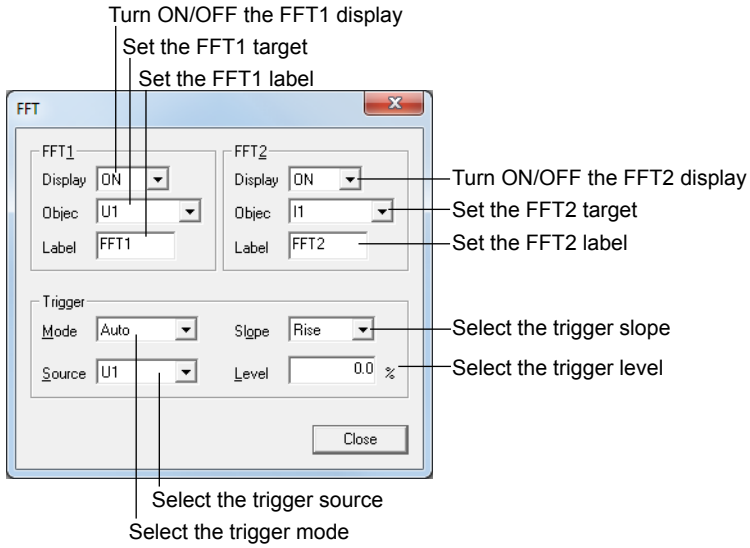
Displays Normal or Wide-Band Harmonics mode
To set the mode, see “Changing the Measurement Mode” on page 2-9.

Setting the Waveform Computation (Math)

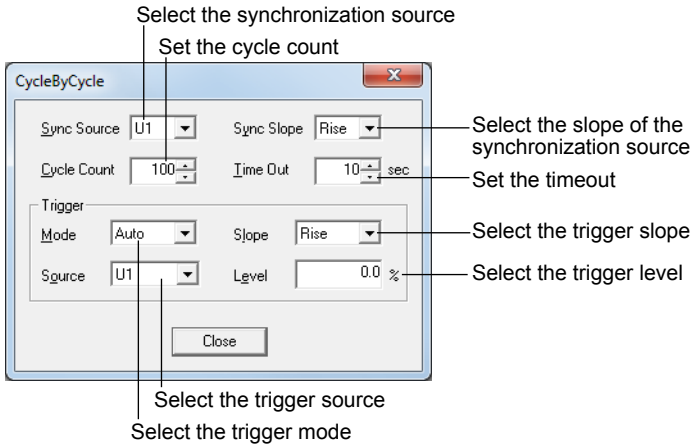


Set the equation of Math waveform 1
Select auto or manual scaling for Math waveform 1
Set the center value of Math waveform 1
Set the unit of Math waveform 1
Set the scale of Math waveform 1
Set the label of Math waveform 1
Set the equation of Math waveform 2
Select auto or manual scaling for Math waveform 2
Set the center value of Math waveform 2
Set the unit of Math waveform 2
Set the scale of Math waveform 2
Set the label of Math waveform 2
Set constants

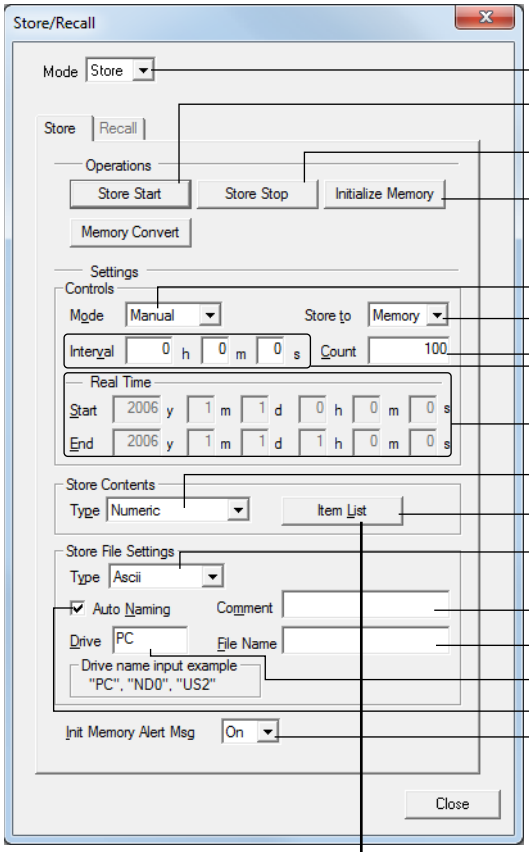
Setting the FFT



Setting the Cycle-by-Cycle Measurement

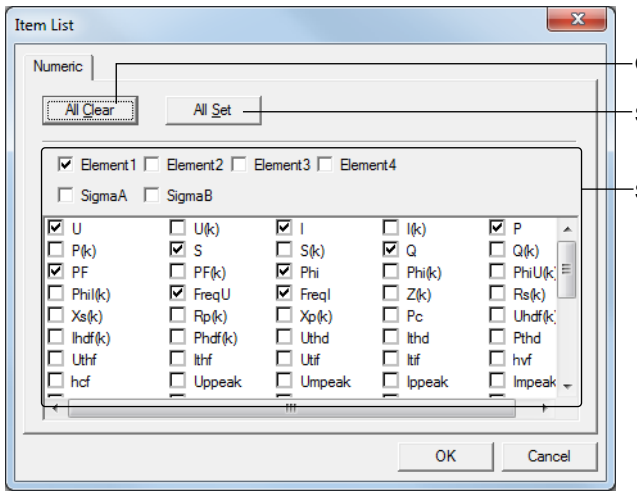


Store Settings



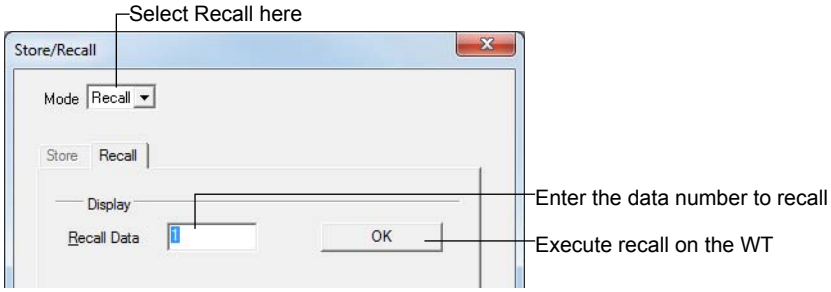
Select Store here
Execute store start
Execute store stop
Initialize the WT internal memory
Select the store mode
Select the store destination
Set the number of times to store
Set the store interval
Set the store reserve time
Select the type of data to store
Click to display the detailed settings screen
Select the data format when saving stored data
Enter comments
Enter a file name
Enter the save destination drive
Select to turn ON the Auto Naming function
When trying to initialize the internal memory where the data is stored, select whether or not to display an alert message.

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

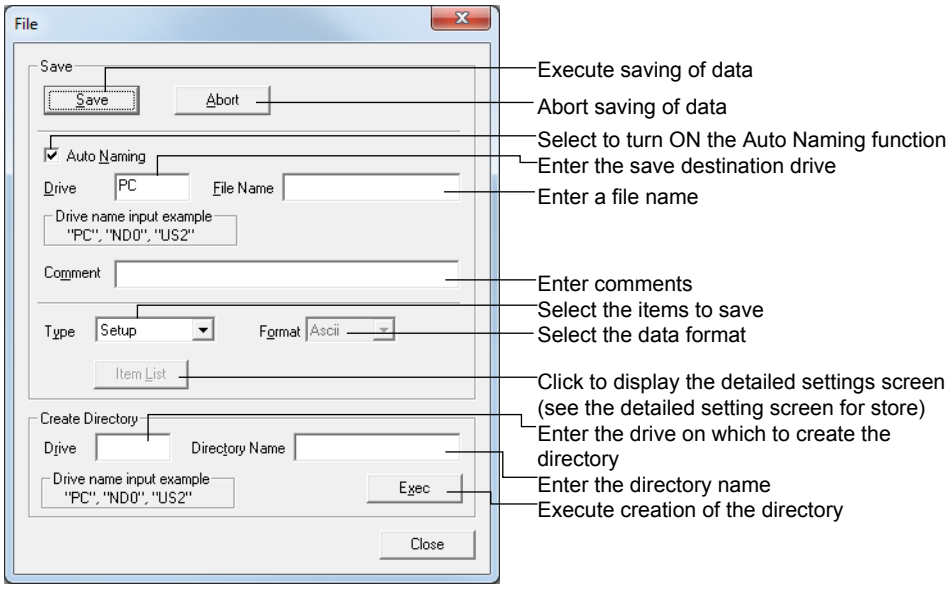


Clears all check boxes
Selects all check boxes
Select the items to be stored

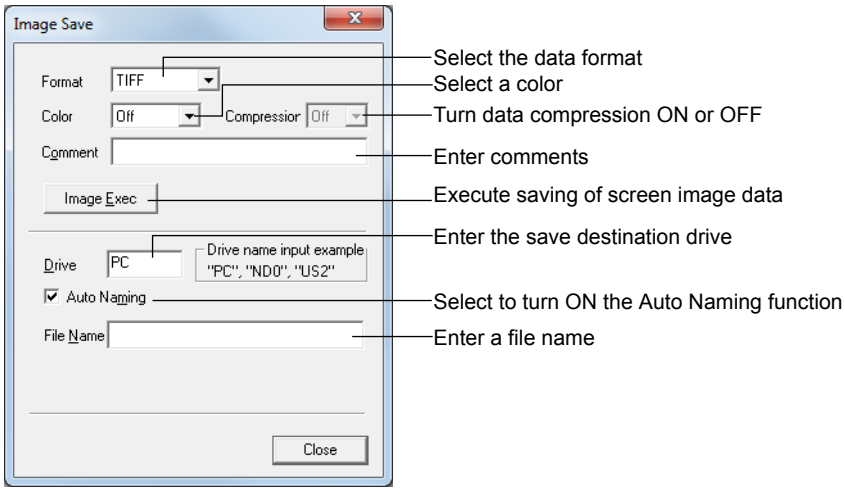
Recall Settings



Data Save Settings

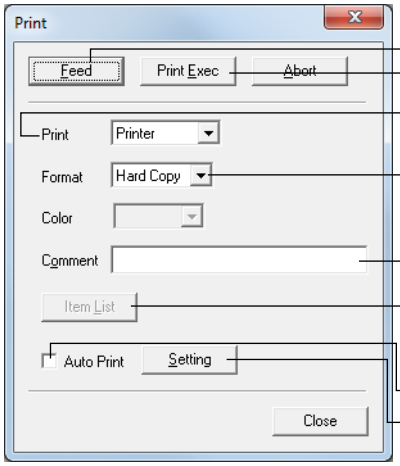


Screen Image Saving Settings



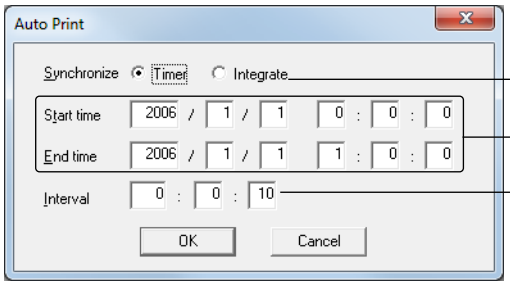
Settings for Printing on the WT's Built-In Printer and Network Printers

Printing on the WT's Built-In Printer



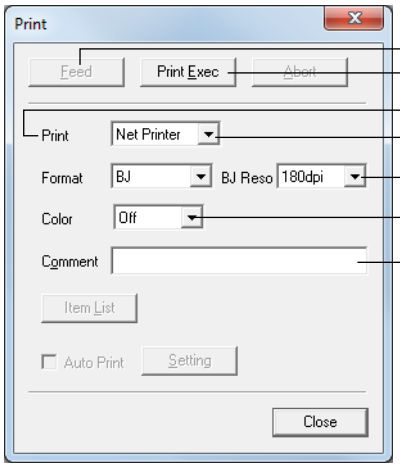
Execute paper feed
Execute printing
Select Printer for the output
Select item to print (screen image or numeric data)
Enter comments
When Numeric is selected for the print item (Type), click here to display the detailed setting screen for selecting the numeric data to print.
Select to execute auto printing
Click here to display the auto print setting screen.

Auto Print Setting Screen



Select the synchronous mode
Set the auto print reserve time
Set the print interval

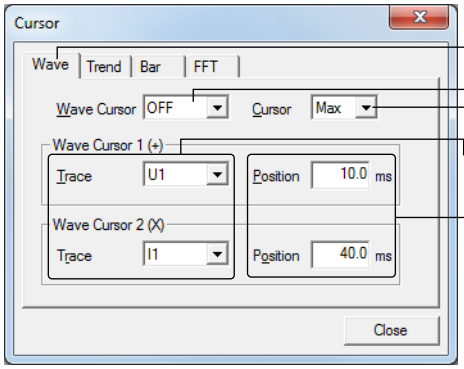
Printing on Network Printers



Execute paper feed
Execute printing
Select Net Printer for the output
Select an output command
Select the format for printing screen images
Turn color printing ON or OFF
Enter comments

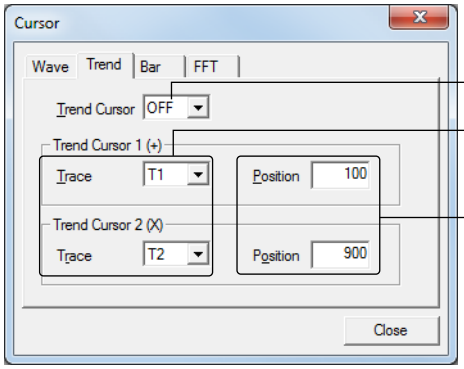
Cursor Measurement Settings

Waveform Cursor Measurement



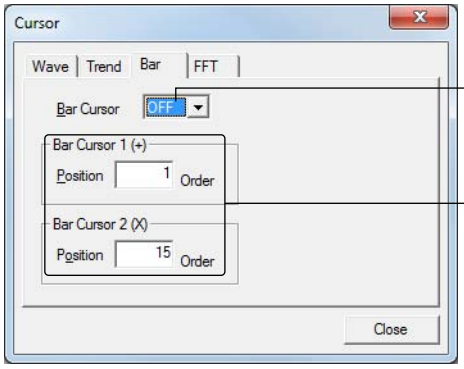
Click the cursor measurement tab in which to enter settings
Turn cursor measurement ON or OFF
Select the point through which the cursor will pass
Select waveform to undergo cursor measurement
Set the cursor position

Trend Cursor Measurement



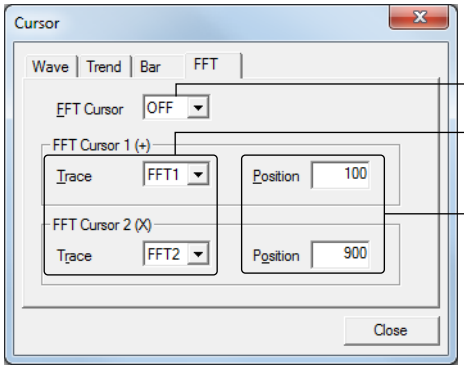
Turn cursor measurement ON or OFF
Select waveform to undergo cursor measurement
Set the cursor position

Bar Graph Cursor Measurement



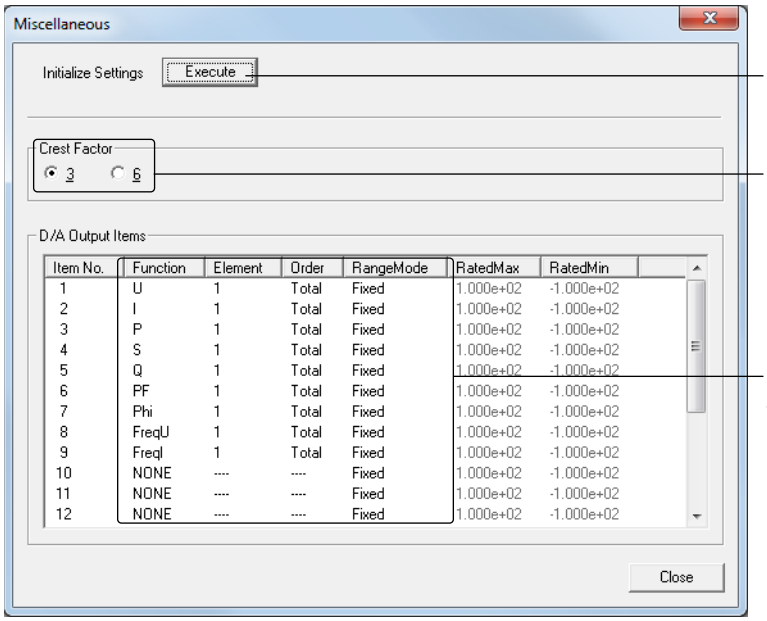
Turn cursor measurement ON or OFF
Set the cursor position (orders)

Cursor Measurement of the FFT



Turn cursor measurement ON or OFF
Select waveform to undergo cursor measurement
Set the cursor position

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

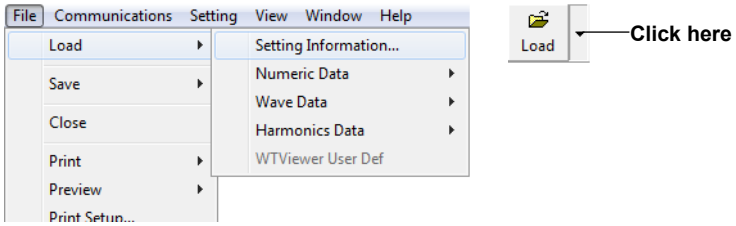
For information on the **WT Setting** > **Network Drive Setup** command, see section 5.5, "FTP Server Function."

6.6 Sending Setting Files to the WT1600

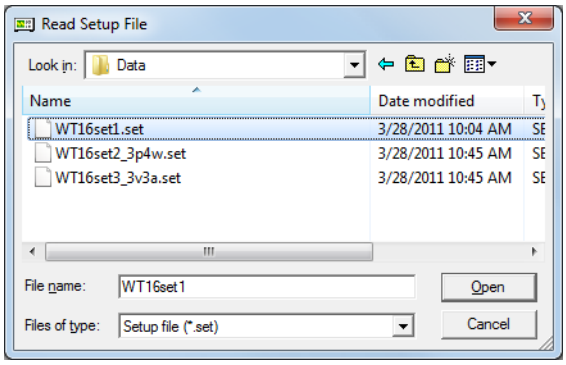
If you load settings saved in the PC on WTViewer, you can send those settings to the WT1600. The following explains operations when WTViewer is in On-Line mode.

- 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 WT500, WT1800, or WT3000. To save or load settings from these WT models, carry out the procedure explained in "Data Save/Load Settings" in the relevant sections in chapter 6.

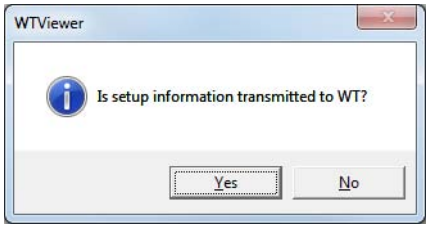
1. Choose **File > Load > Setting Information**, or click **Load** and select Setting Information. The Read setup file dialog box appears.



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



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



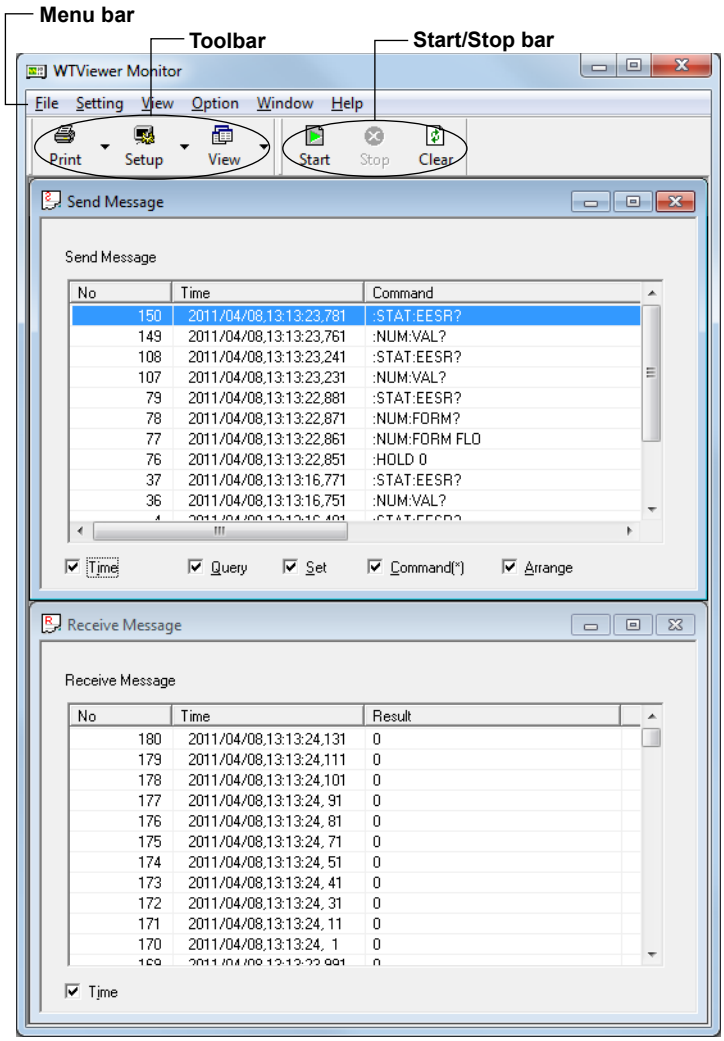
7.1 Launching, Starting, and Stopping the Communication Monitor

You can display and save the communication commands and data that are exchanged between this program and the WT.
If changing the WT settings, acquiring measured data, or in other cases, you can check whether certain kinds of commands or data are being sent or received.
You can reference this when creating your own software to control the WT, or copy communication commands for reuse.

Launching the Communication Monitor Function

Click **CMon** (communication monitor bar). The WTViewer Monitor window opens.
For the procedure to display CMon (communication monitor bar), see section 3.1.

The WTViewer Monitor window is always the active window.
To change this, see section 7.2.



Starting/Stopping the Communication Monitor

Click CMon to open the WTViewer Monitor. The communication monitor function starts automatically. With the monitor started, if you operate WTViewer to change WT settings or acquired measured data, the communication command, measured data, or other relevant information appears in the WTViewer Monitor.

To stop the communication monitor function, click **Stop**.

To restart the stopped communication monitor function, click **Start**.

To clear any send/receive messages that are displayed, click **Clear**.

7.2 Communication Monitor Display Settings

Selecting Display Items for the Send/Receive Message Window

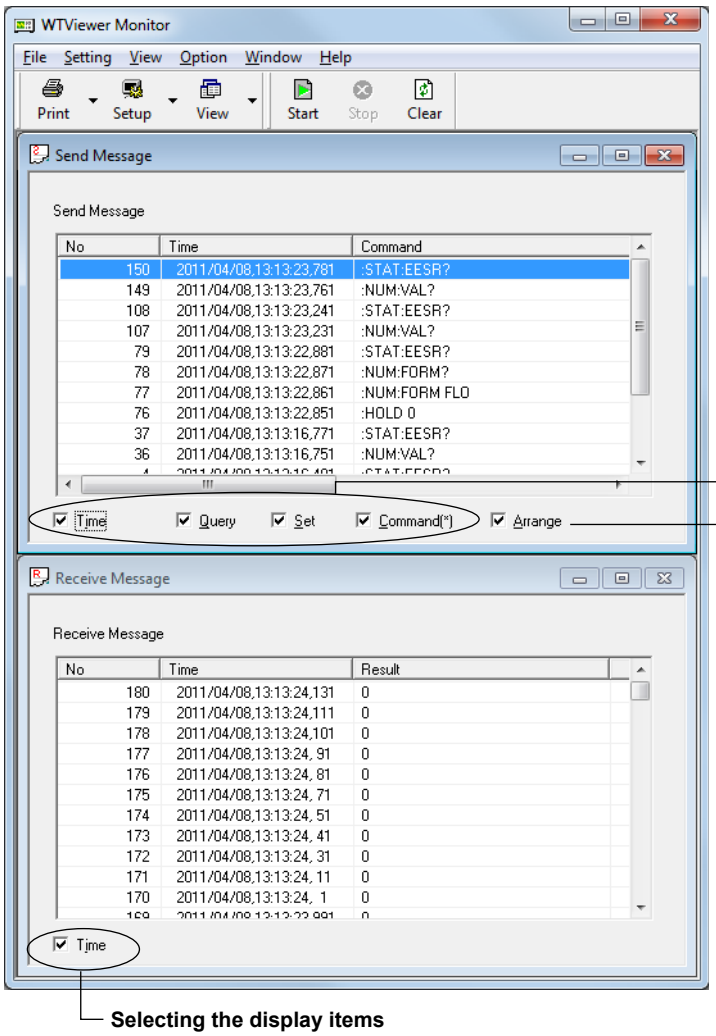
Select whether or not to display time, queries, settings, and commands in the send/receive message window by selecting or clearing the corresponding check boxes.

Selecting to Display or Not Display Repeated Commands of the Same Type

If the same communication command is sent more than once in succession, the command is only displayed once. For example, if the *CLS command[*1] is sent multiple times, *CLS appears only once in the sent message window.

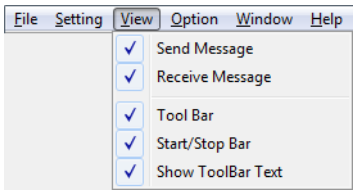
If the communication command syntax differs, the individual commands are displayed separately.

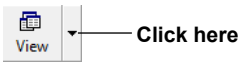
*1 Clears the standard event register, extended event register, and error queue.



Turning Display of the Send/Receive Message Window, Toolbar, and Start/Stop Bar ON/OFF

Click the menu bar **View** or click the toolbar **View** to turn each display ON or OFF.

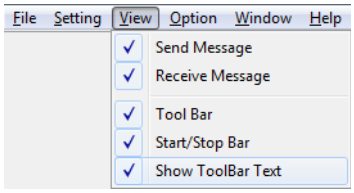


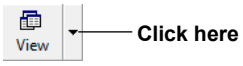


Changing the Size of the Toolbar

Click Menu bar **View > Show ToolBar Text**, or **Toolbar View > Show ToolBar Text**.

The toolbar and start/stop bar displays change from small to large.





large bar

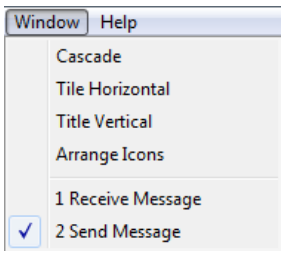
small bar

Making the WTViewer Monitor Window Always Active or Not Always Active

On the Menu bar, click **Option > Always On Top**.

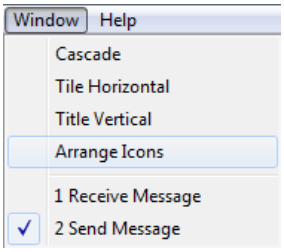
Selecting the Window Display: Cascade, Tile Vertically, or Tile Horizontally

Click **Window** on the menu bar and select the desired display format.



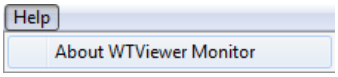
Arranging Icons

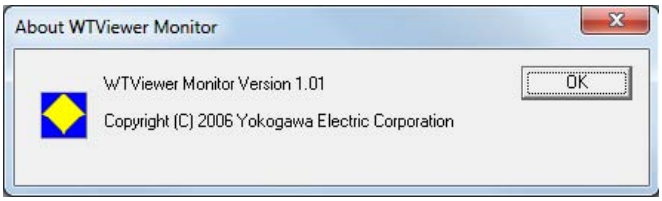
Click Menu bar **Window > Arrange Icons**. All the minimized windows (icons) are arranged in the lower left corner of the main window of the software.



Viewing Version Information of the WTViewer Monitor

On the Help menu, choose About WTViewer Monitor. The About WTViewer Monitor dialog box opens.

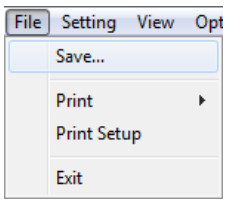


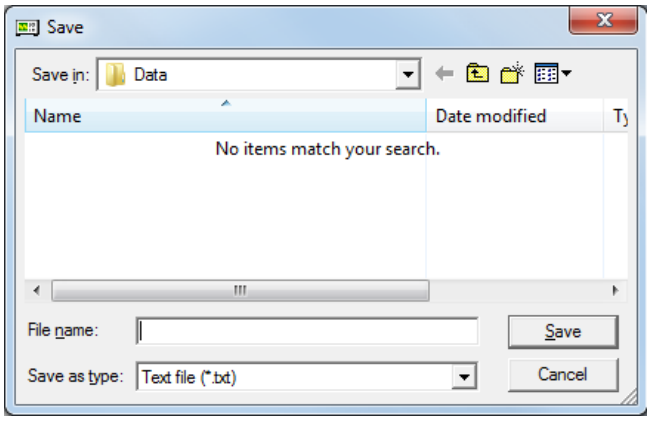


7.3 Saving and Printing Communication Data

Saving Communication Data

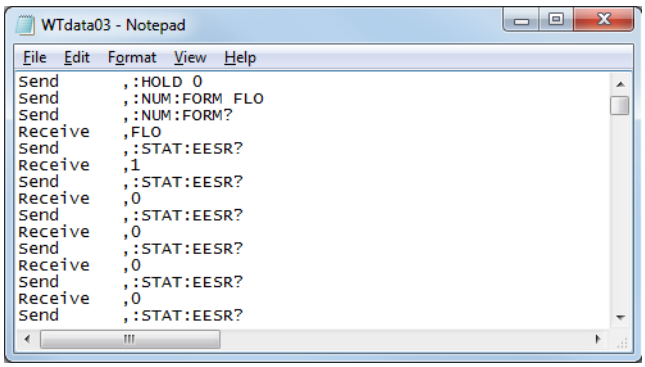
1. On the File menu, click **File > Save**. The Save dialog box opens.





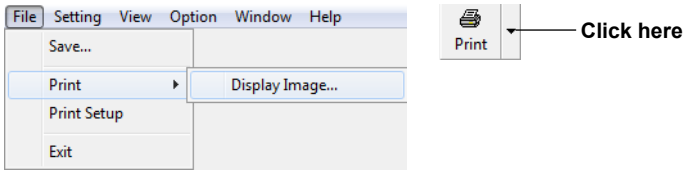
2. Enter a destination file name and location and click Save. The communication data are saved.

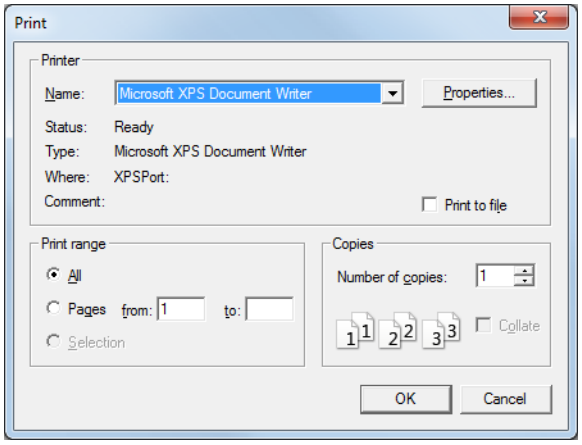
Communication data (both sent and received data) are saved to a single file in time series order. This is convenient for checking what kind of data was returned from the WT for which commands.
Even if the Arrange check box in the send message box is selected and the commands are displayed as one command, if communication data are saved, a file is registered each time the communication command is sent.



Printing Communication Data

1. From the send/receive message window, click the window to be printed to make it active.
2. On the menu bar, click **File > Print > Display image**, or click **Print > Display image** on the toolbar. The Print dialog box opens.





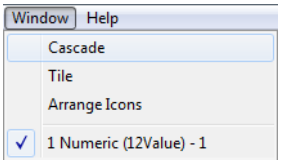
3. Select the printer to be used, print range, number of copies, and other necessary settings.
4. Click OK. An image of the screen as it appeared when Image Screen was selected in step 2 is printed.

8.1 Cascading or Tiling Windows

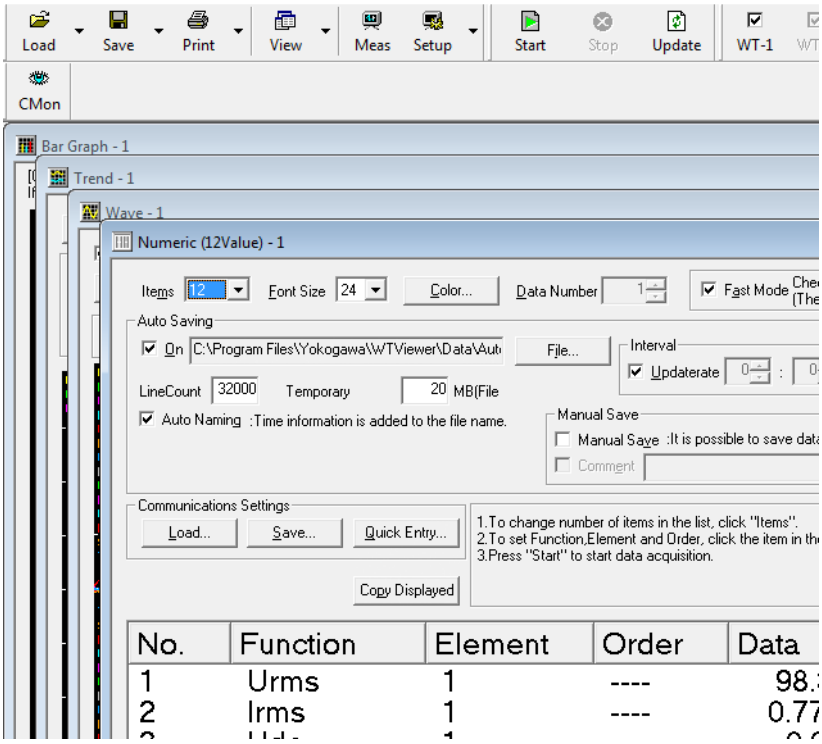
Window functions are useful for arranging the display, when multiple graphs or lists are displayed.

Cascading Windows

On the Window menu, choose Cascade. Windows are cascaded so that the title of all displayed windows can be seen.



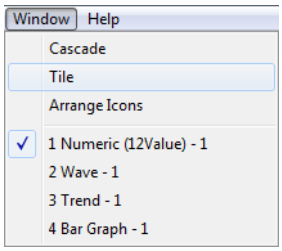
Display Example



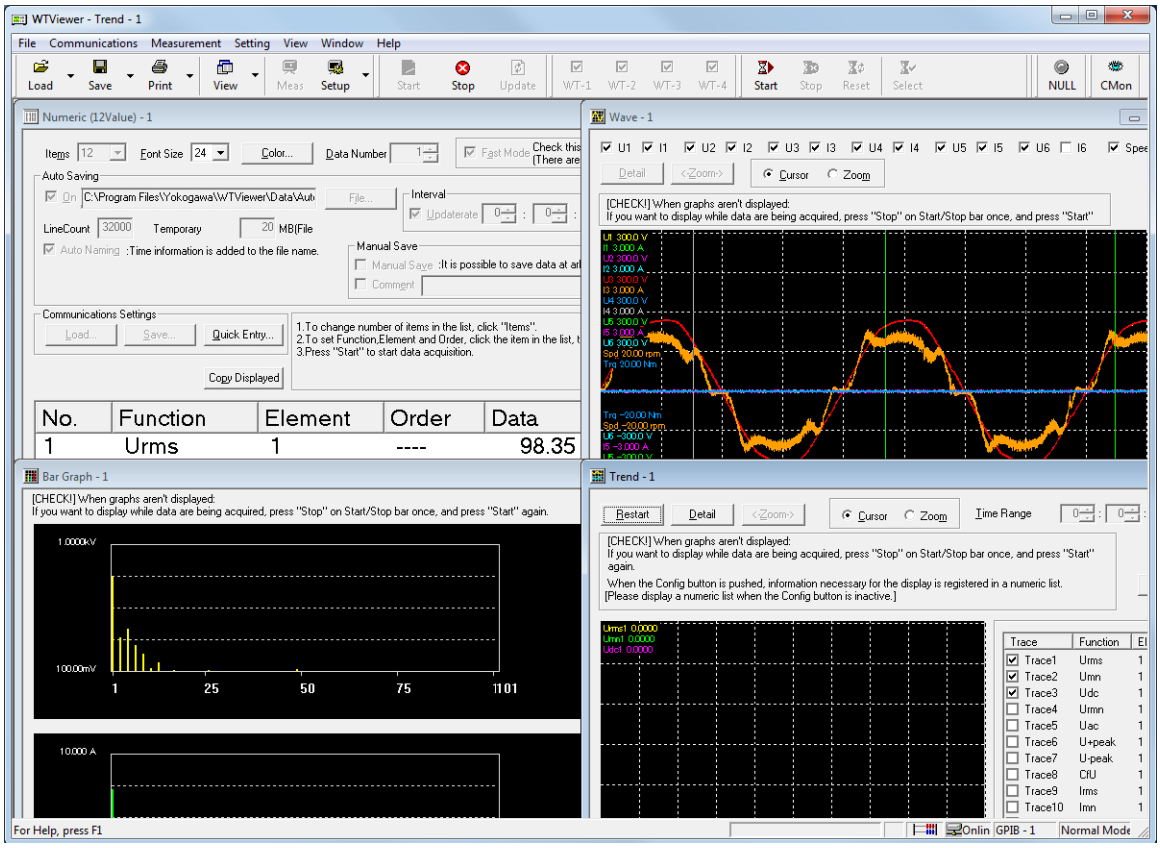
- Windows are cascaded so that the title of all displayed windows can be seen.
- The active graph or list window becomes the front window after the cascade operation.
- The cascade order varies depending on the type of displayed window.

Tiling Windows

On the Window menu, choose Tile. All the displayed windows are tiled.



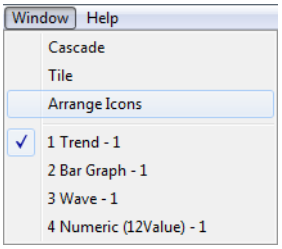
Display Example



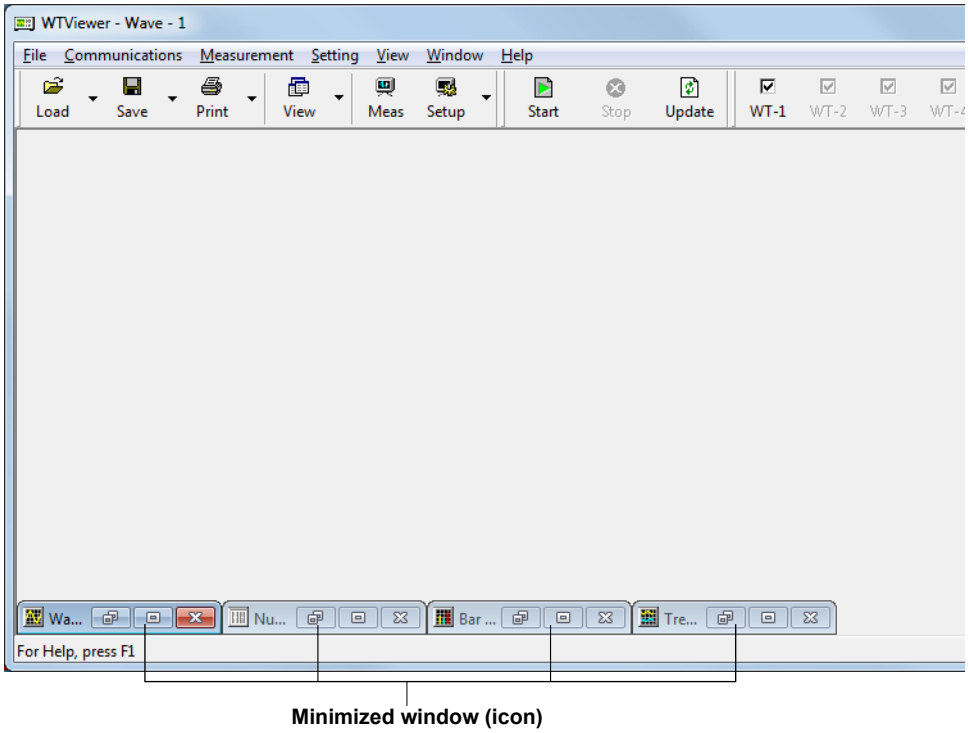
- The active graph or list window becomes the active window after the tile operation.
- The arrangement order varies depending on the type of displayed window.

8.2 Arranging Icons

On the Window menu, choose **Arrange Icons**. All the minimized windows (icons) are arranged in the lower left corner of the main window of the software.



Display Example

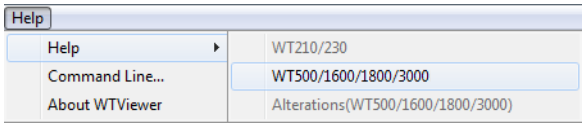


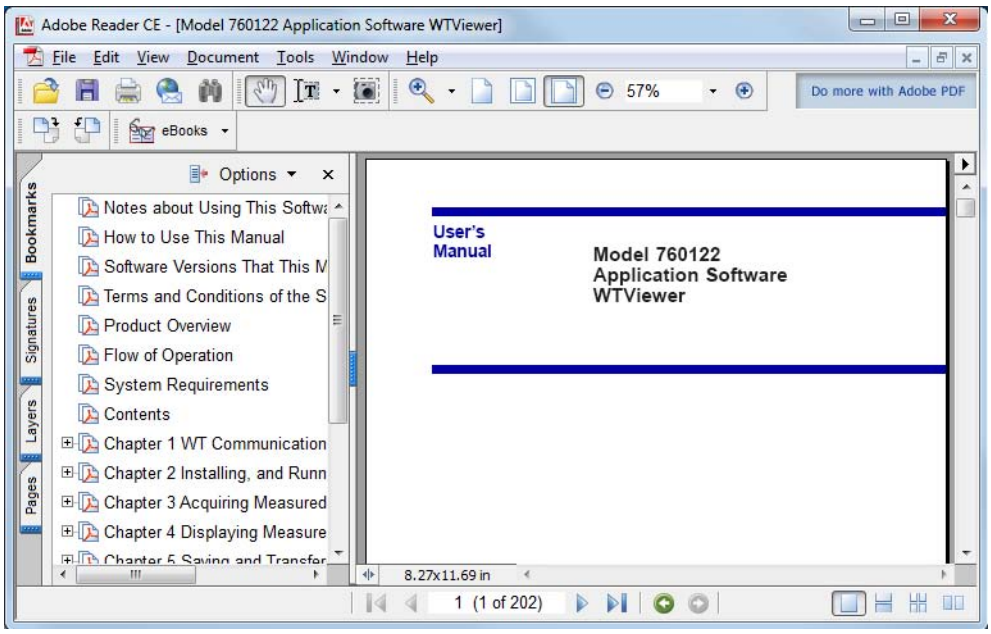
This function is useful when various windows have been minimized (icons) and the icons have been moved (within or outside the main window of the software).

8.3 Help Function

Procedure

From the Help m enu, choose Help > User's Manual. If Adobe Reader is installed in the PC, Adobe Reader starts and opens the PDF file of the software User's Manual. You can use the toolbar.





Explanation

Online Help

The User's Manual of the software is displayed as a help document in PDF (Portable Document Format). You can find information about operating procedures of this software and terminology. You can view PDF files using Adobe Reader, a freeware.

If there is an alteration notice, you can choose **Help** > **Help Topics** > **Alteration Notice** from the toolbar to view the PDF file of the alteration notice.

Viewing the Most Recent User's Manual or Alteration Notice

To obtain the most recent PDF files of the User's Manual and alteration notice, click "Manual Download" on the YOKOGAWA's Web page shown below. Then, download the User's Manual and alteration notice of this software program.

http://tmi.yokogawa.com/products/digital-power-analyzers/

Rename the downloaded User's Manual and alteration notice as indicated below according to the product that you are using, and copy (overwrite) the files in the software installation folder that you specified when you carried out the steps on page 2-2. You will be able to view the most recent operating instructions by selecting the User's Manual or alteration notice from the Help menu.

User's Manual File Name	Alteration Notice File Name
IM760122-01E.pdf	AlterationsE.pdf

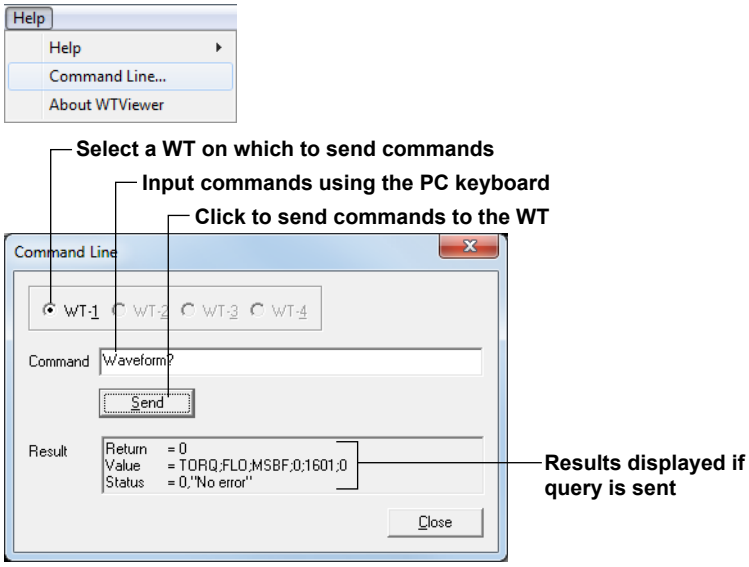
Note

- You can download Adobe Reader from Adobe System's Web page.
- The most recent User's Manual and alteration notice that you can download from YOKOGAWA's Web page correspond to the most recent version of this software program. Update the software program as necessary. The program for updating the software can be downloaded from YOKOGAWA's Web page above.

8.4 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.

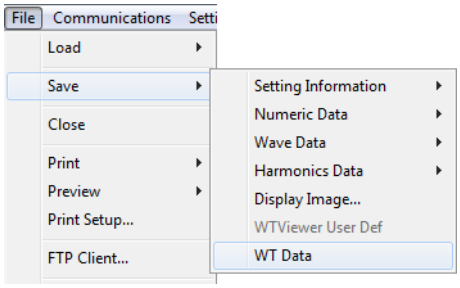


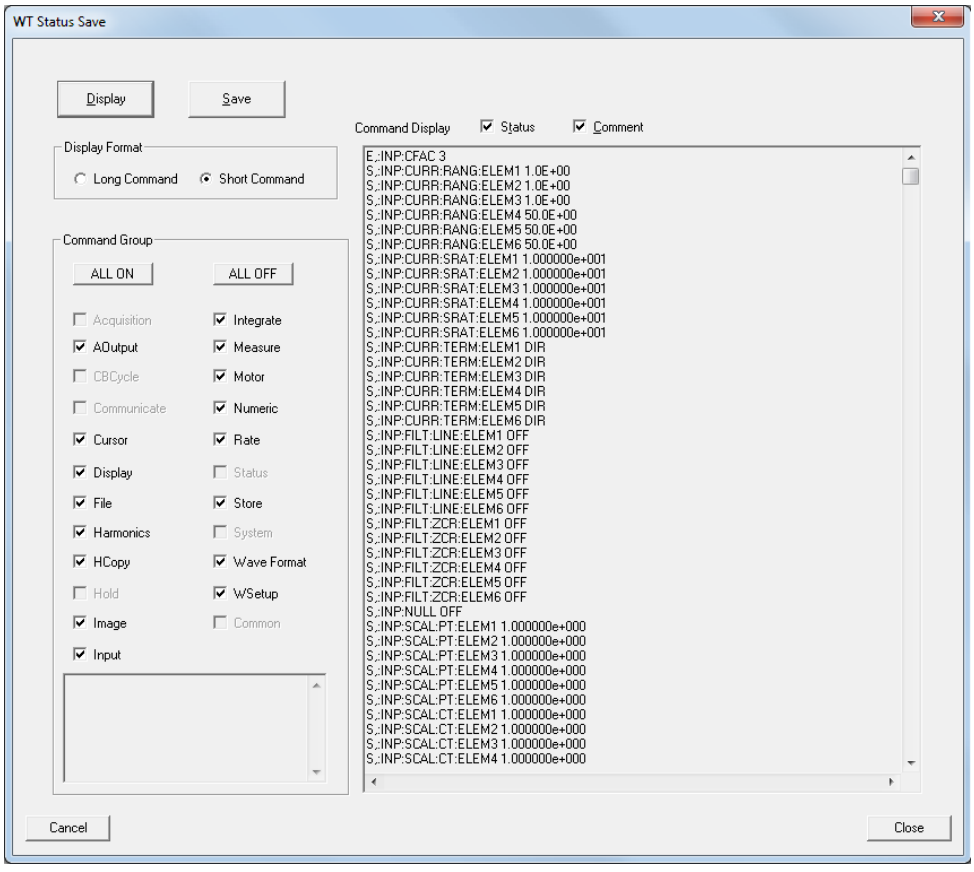
2. Enter communications commands in the Command field using the PC keyboard.
3. Click **Send**. The command is sent to the WT. If a query was sent, the results are displayed in the Result field.

8.5 Displaying/Saving WT Settings in Command Format

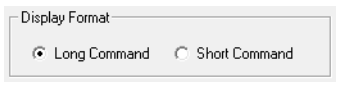
You can display or save the current WT settings in command format. When setting the WT to the current setup, this allows you to confirm which commands should be sent to the WT.
You can reference this when creating your own software to control the WT, or copy communication commands for reuse.
The functions explained in this section can be used when connected to the WT1600 or WT3000, can not be used when connected to the WT500 or WT1800.

1. Select **File > Save > WT Data**. The WT status save window is displayed.





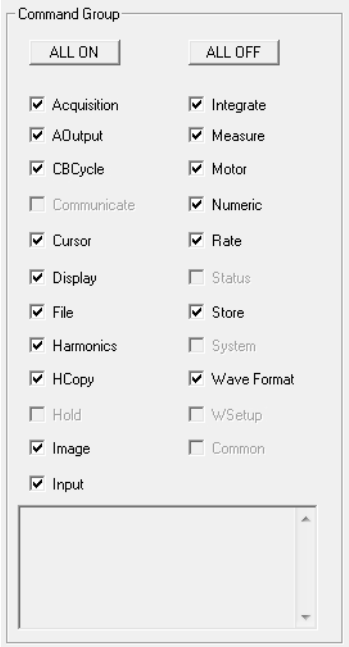
2. In the display format box, select Long command or Short command.



Long commands are written without abbreviations.
Short commands are abbreviated.
For details, see the WT Communications Interface User's Manual.

3. Select the command group to be displayed or saved in the command group box.

WT3000 Display Example



4. Select items to display in the command display box.

The following are the three statuses.

A: Settings that can be set any time
E: Settings that affect other settings
S: Settings that may not be available depending on the status (for example, the measuring range cannot be changed during computation).

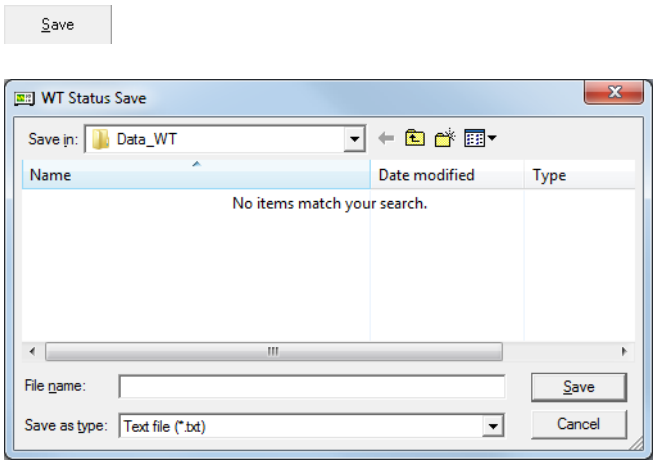
5. Click **View**. The change is reflected in the PC display.

Note

- If you press the View button after changing the settings for display format, command group, and command display, the change is reflected.
- Difference from the Communication Monitor Function (Section 7)
  - Using this function, you can display or save the current WT settings all together by command group. However when using the communication monitor function (chapter 7), if you change the WT settings, only the sent commands relating to those changes are displayed.
  - The commands that can be displayed or saved with this function are those relating to the WT settings. Commands requesting WT measured data, or measured data received from the WT cannot be displayed or saved.
    To display or save these commands or measured data, use the communication monitor function (chapter 7).

Saving WT settings

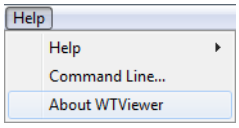
1. Click Save. The WT Status Save dialog box is displayed.

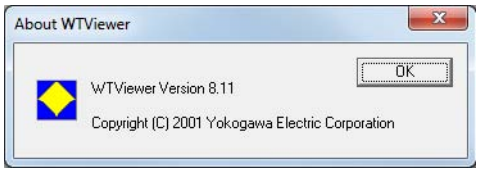


2. Enter a file name and save destination and click Save button. The displayed setting commands are saved.

8.6 Checking Version Information

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





9.1 Malfunction? First, Investigate.

When messages appear on your PC screen, refer to section 9.2, “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 communication with the WT using GP-IB. The communication function may not operate correctly if a GP-IB card other than those by National Instruments is used. Use a GP-IB card by NI (see page xv).
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 4.4). • 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 4.4 or 4.7).
Waveforms saved by the WT cannot be displayed in Off-Line mode. • Open the waveform screen from the View menu. • To display waveform data saved on the WT with the .wvf extension in Off-Line mode, 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. Check that Independent Control is turned ON in the Integration Settings from the Setting menu.
Even when the Update Rate is changed in the Setting menu, 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 4.1 or 4.3) 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).
The time stamps of all data are the same when the data is saved in CSV format. Turn auto saving ON and start the measurement (see section 5.2).

9.2 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 A and B.	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 4.1 or 4.3) 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.
The difference in start and end must be at least 10.	Set the difference between Disp Start and Disp End of the power spectrum waveform greater than or equal to 10.
The value that you were going to set is beyond the current max value that can set. Set the max value that can set?	
Please set different values to “Max” and “Min”.	Check that the Max and Min settings are not set to the same value.
Data of CycleByCycle not found.	
Acquisition data not found. Please retry after the data acquisition with “Trigger” button	
Check whether Hold of Acquisition data is Off. If On, execute again after releasing Hold.	
Cycle By Cycle measurement status became “Time Out”. Please reset measurement. And, execute again after doing an appropriate measure (for example setting “Time out” of “CycleByCycle dialog” to an appropriate value).	• Check that the timeout value is set longer than the result of (the period of the synchronization source signal x the number of measurement cycles). • Check that the period of the synchronization signal is not longer than expected. • Check that the synchronization source signal level is not too low.
Can not set, because Cycle By Cycle measurement status is “Complete”. Reset Cycle By Cycle measurement status?	
The file isn’t CBC file. Or, it is opening. Please close a file.	

Message	Corrective Action
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.	Check whether the store start and stop numbers are correct when numeric and harmonic data files are loaded.

10.1 Functions

Item	Specifications	
Measurement mode	WT500	The selection of the measurement mode is not present.
	WT1600	Normal Measurement mode, Integration Mode, Synchronization Mode, Harmonic Measurement mode
	WT1800	Normal Measurement mode, Synchronization Mode
	WT3000	Normal Measurement mode, Wide Bandwidth Harmonic Measurement mode, Waveform Computation (Math) mode, FFT mode, Cycle-by-Cycle mode, Synchronization Mode

Data Formats That Can Be Saved

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.

Type	WT1600	WT500, WT1800	WT3000
Settings*1	CSV format (.csv) BIN format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data	CSV format (.csv) BIN format (.wta)	CSV format (.csv)	CSV format (.csv) WTN format (.wtn)*2
Waveform display data	CSV format (.csv) BIN format (.wta)	CSV format (.csv) WTW format (.wtw)	CSV format (.csv) WTW format (.wtw)
Harmonic data*3	CSV format (.csv) BIN format (.wta)	–	–
Waveform sampling data*4 (Math and FFT data)	–	–	CSV format (.csv) WVF format*5 (.wvf) and (.hdr)
Cycle-by-cycle data*4	–	–	CSV format (.csv) CBC format (.cbc)

*1 If WTViewer is working with the WT500, WT1800 or WT3000, the function whereby settings are saved in CSV format is not available.
*2 This format is only available when WTViewer is controlling the WT3000. Numeric data cannot be saved to WTN format when WTViewer is controlling the WT500 or WT1800.
*3 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.
*4 This format is only available when WTViewer is controlling the WT3000.. If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.
*5 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.

Data Formats That Can Be Loaded

Files that can be loaded by WTViewer are given in the table below. Data saved using Auto Saving (described in section 4.1) cannot be loaded by WTViewer.

Type	WT1600	WT500, WT1800	WT3000
Settings	SET format (.set)	CFG format (.cfg)	CFG format (.cfg)
Numeric data*1	WTViewer format (.wta)	–	WTN format (.wtn)
Waveform display data	WTViewer format (.wta) WT1600 format*2,*3 (.wvf) and (.hdr)	WTW format (.wtw)	WTW format (.wtw)
Harmonic data*4	WTViewer format (.wta)	–	–
Waveform sampling data*5 (Math and FFT data)	–	–	WVF format*2 (.wvf) and (.hdr)
Cycle-by-cycle data*5	–	–	CSV format (.csv) CBC format (.cbc)

*1 Numeric data (in WTN format) cannot be loaded when WTViewer is controlling the WT500 or WT1800.
*2 If you save the data in WVF format, two files, .wvf and .hdr, are created. To load data in WVF format into WTViewer, place these files in the same directory. The two files make up a single set. Both files must be present to load the data.
*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 The WT500, WT1800 and WT3000 measures the numeric data of normal measurement and harmonic data simultaneously in normal measurement mode. Therefore, harmonic data is stored as numeric data. Unlike the WT1600 that measures and stores only the harmonic data, the WT500, WT1800 and WT3000 does not create files containing only harmonic data.
*5 This file type is only available when WTViewer is controlling the WT3000. If WTViewer is controlling the WT500, WT1800 or WT1600, the function for saving the waveform sampling data and cycle-by-cycle data is not available.

Item	Specifications
Data Display Update Rate	Differs depending on the PC processing speed, type of communication interface used, and number of data loaded from the WT to WTViewer.
Display Windows	Numeric View Displays numeric data acquired from the WT by WTViewer in normal measurement mode. On the WT500, WT1800, and WT3000, harmonic data can also be displayed. Harmonics List(WT1600) Displays harmonic data acquired from the WT by WTViewer in harmonic measurement mode. On the WT1600, harmonic measurement mode must be selected. On the WT500, WT1800, and WT3000, harmonic data is displayed together in the numeric display screen in normal measurement mode as above. Wave 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. High speed numeric Displays numeric data acquired from the WT by WTViewer in high speed data capturing. High speed trend Displays the trends of all measurement functions for the object being measured during high speed data capturing. Waveform computation (WT3000) Display the result of various waveform computations performed on the waveform display data loaded from the WT. FFT (WT3000) Displays the power spectrum of the input signal through FFT (Fast Fourier transform). Cycle-by-cycle measurement (WT3000) Displays the voltage, current, power, and other parameters for each cycle of the AC input signal. Numeric View (Synchronization Mode, WT1600, WT1800, and WT3000) This is the display when in Normal Mode (Synchronization Mode). Displays measured values from multiple WTs in a single window. Also, Creates (defines) expressions by combining measured values from multiple WTs. And displays the results of computations using those expressions.
Entering Settings on the WT	All functions that can be done with communication commands

10.2 System Configuration

Item	Specifications
PC	CPU Pentium 4 1.5 GHz or higher (recommended) Memory 1 GB or more (recommended) HDD 500 MB or more of free space
OS	Windows XP, Windows Vista, or Windows 7.
Screen Resolution	1024 x 768 pixels or higher
Communication Interface	GP-IB NI (National Instruments) • AT-GPIB, PCI-GPIB, PCI-GPIB+, PCMCIA-GPIB, PCMCIA-GPIB+, or PCIe-GPIB with driver NI-488.2 version 1.60 or later. (however, version 2.3 is not supported) • GPIB-USB-HS with driver NI-488.2 version 2.8.1. 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

WT Model	GP-IB	RS-232	ETHERNET	USB
WT210	Y	Y	x	x
WT230	Y	Y	x	x
WT500	Y	x	Y(VXI11)	Y(USB-TMC)*1
WT1600	Y	Y	Y	x
WT1800	Y	x	Y(VXI11)	Y(USB-TMC)*1
WT3000	Y	Y	Y	Y*1

Y: Supported*2, X: Not supported

*1 In order to perform communications with a personal computer (hereinafter, PC) via a WT500, WT1800, or WT3000 with a USB interface, a USB driver must be installed in the PC. https://y-link.yokogawa.com/YL000.po

*2 The installed communication interface type differs depending on the specifications of the WT.

WT Firmware (ROM) Versions Supported by WTViewer

WT Model	Firmware Version
WT210*3	1.06 or later
WT230*3	1.06 or later
WT500	1.01 or later
WT1600	3.01 or later
WT1800	1.01 or later
WT3000	4.01 or later

*3 For information about the WT210/WT230, see the WTViewer help menu.

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