
**User's
Manual**

**Model 761922
Voltage Fluctuation/Flicker
Measurement Software for the
WT3000**

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Thank you for purchasing the Harmonic/Flicker Measurement Software (Model 761922). This user's manual describes the handling precautions, functions, and operating procedures of the Voltage Fluctuation/Flicker Measurement Software within the Harmonic/Flicker Measurement Software. To ensure correct use, please read this manual thoroughly before beginning operation.

Keep this manual in a safe place for quick reference in the event a question arises.

For information about the handling precautions, functions, and operating procedures of WT3000 Precision Power Analyzer (models 760301, 760302, 760303, and 760304) and the Harmonic Measurement Software as well as the handling and operating procedures for Windows, see the manuals for those products.

Notes

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1.1 Explanation of Functions

This software application (761922) measures the voltage fluctuation and flicker of electrical equipment according to the IEC Standard (see section 1.3 for an overview) and indicates/saves the results of judgements made according to the standard.

Applicable Measurement Instruments

This software can be used with YOKOGAWA's measurement instruments listed below. This user's manual (IM761922-03E) describes the case when this software is used in combination with the WT3000. For information about the handling precautions, functions, and operating procedures of the WT3000, see the respective manuals.

Product	Model
WT3000	760301, 760302, 760303, and 760304

Applicable Standard

For the applicable standards, see section 1.3.

Retrieving and Loading of Measured Data to Be Judged

Setting the WT Measurement Conditions (When in On-Line Mode)

This software application can be used to set the same voltage fluctuation and flicker measurement conditions that you can enter using the front panel keys of the WT.

Retrieving Measured Data from the WT Connected On-Line (On-Line Mode)

The voltage fluctuation and flicker data that the WT is measuring can be retrieved online to your PC. The software application shows the numeric data and judgement, trend graph view,*1 and CPF graph view*1 using the retrieved measurement data and judges whether the data conforms to the standard.

Loading Measured Data Saved in the Past (Off-Line Mode)

The voltage fluctuation and flicker measurement data saved in the past can be loaded on your PC. The software application shows the numeric data and judgement, trend graph view,*1 and CPF graph view.*1 The software application cannot judge whether the measured data loaded offline conforms to the standard.

*1 Valid only for normal voltage fluctuation and flicker measurement.

On-Line and Off-Line Modes

On-Line Mode

The PC in which this software application is installed and the WT are connected using the GP-IB interface or Ethernet interface. When communication starts between the PC and the WT, the software application retrieves the measurement and judgement conditions of the voltage fluctuation and flicker of the WT. In On-Line mode, the software application retrieves the measured data while the voltage fluctuation and flicker are being measured on the WT and shows the numeric data and judgement, trend graph view,*1 and CPF graph view.*1 Then, the software application judges whether the measured data conforms to the standard. In addition, you can use the application to print screen images and reports as well as save the numeric judgement data, trend data,*1 CPF data,*1 and measured and setup data retrieved from the WT to your PC. It is also possible to change the WT settings from the PC.

Off-Line Mode

The voltage fluctuation and flicker measurement data saved in the past are loaded in the software application. Using the loaded measured data, the software application shows the numeric data and judgement, trend graph view,*1 and CPF graph view.*1 In addition, you can use the application to print screen images and reports as well as save the numeric judgement data, trend data,*1 CPF data,*1 and measured data loaded from the WT to your PC.

*1 Valid only for normal voltage fluctuation and flicker measurement.

Measurement Items

- Rated voltage Un
- Voltage frequency Freq
- Relative steady-state voltage change dc
- Maximum relative voltage change dmax
- Period during which relative voltage change exceeds the threshold level d(t)
- Short-term flicker value Pst
- Long-term flicker value Plt
- Instantaneous flicker sensation IFS*1
- Cumulative probability function CPF

*1 Displayed as PF on the trend graph

Measurement Modes

The following two voltage fluctuation and flicker measurement modes are available.

- **Normal Voltage Fluctuation and Flicker Measurement**
Calculates all the voltage fluctuation and flicker values of dc, dmax, d(t), Pst, and Plt, compares them to the preset limits, and indicates the total judgement.
- **Measurement of dmax Caused by Manual Switching**
Measures the maximum relative voltage change, dmax, when the EUT (Equipment under Test) switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit.

Setting WT Measurement Conditions

You can set the measurement conditions of the voltage fluctuation and flicker measurement that is defined in IEC61000-3-3 Edition 1.1. You also set the measurement method, normal voltage fluctuation and flicker measurement or measurement of dmax caused by manual switching.

Setting WT Judgement Conditions

You can set the judgement conditions of the voltage fluctuation and flicker measurement that is defined in IEC61000-3-3 Edition 1.1.

Setting the Title/Comment of Reports

You can set a title and comment for the reports that are printed with the data of the voltage fluctuation and flicker measurement.

Starting/Stopping Measurements

You can start the voltage fluctuation and flicker measurement on the WT from your PC when in On-Line mode. The measurement cannot be started when in Off-Line mode.

During Normal Voltage Fluctuation and Flicker Measurement

If the measurement is started from your PC, the measured data of the normal voltage fluctuation and flicker measurement on the WT is retrieved and stored in your PC.

When the measurement of an observation period is completed, the judgement result is displayed, and the measurement of the next observation period is started. When the specified count of measurements is completed, the measurement and data retrieval automatically stops. Then, the application displays the total judgement result from the data measured during all observation periods and judgement results. You can also abort the measurement from the PC before the specified measurement count is reached. However, if you do, all the measured data and judgement results up to that point are discarded.

During the Measurement of dmax Caused by Manual Switching

With this measurement method, you start the measurement from your PC, manually turn ON the EUT (Equipment under Test) switch, and turn OFF the switch before the measurement of an observation period (1 minute) is complete. The data of dmax caused by manual switching that the WT measures is retrieved and stored in your PC. When the measurement of an observation period is complete, the application enters the ready state. If you start the measurement again from your PC, the measurement of the next observation period is started. You can measure the selected observation period again if it is before the judgement. When 24 measurements are completed and you execute the judgement, the judgement result is displayed. You can also abort the measurement from the PC before the specified measurement count is reached. However, if you do, all the measured data and judgement results up to that point are discarded.

Display the Judgement Result and Measured Data

Numeric Data and Judgement

The application can display the judgement result indicating whether the measured data of normal voltage fluctuation and flicker measurement or measurement of dmax caused by manual switching is within the specified limits as well as the measured data. The numeric data and judgement can be displayed for each of the selected WT elements.

Trend Graph View

The application can display the trend graph of the normal voltage fluctuation and flicker measurement. The following parameters can be displayed: dc, dmax, d(t), idc, idmax, id(t), and PF.

CPF Graph View

The application can display the CPF graph of the normal voltage fluctuation and flicker measurement.

Saving and Loading the Setup and Measured Data

Saving and Loading the Setup Data

The setup data including the measurement conditions, judgement conditions, title and comments of reports (a sheet containing a summary of the numeric list of the measured data and judgement results) that have been specified using the software can be saved. The setup data saved to a file can also be loaded.

Saving and Loading the Measured Data

The voltage fluctuation and flicker measurement data retrieved from the WT into the PC using the software can be saved to a file. When the measured data is saved, the same information as the setup data described above is also saved. The voltage fluctuation and flicker measurement data and setup data saved to a file can also be loaded.

Saving the Numeric Judgement, Trend, and CPF Data in CSV Format

You can use the software to save the numeric judgement data, trend data,*¹ and CPF data*¹ to a file in CSV format. The software cannot load the data saved to a CSV file. Software applications installed on the PC that support files in CSV format can open the data.

*¹ Valid only for normal voltage fluctuation and flicker measurement.

Printing Screen Images and Reports

Screen images and reports can be printed.

- The active window among the displayed graph and list windows can be printed.
- A list of the voltage fluctuation and flicker measurement data can be printed as a report with a title or comment (see "Setting the Title/Comment of Reports" on page 1-3).

1.2 PC System Requirements

PC

CPU

Pentium III 1 GHz or equivalent or faster.

Memory

256 MB or more

Hard Disk

Free space of at least 2 GB.

Operating System

Windows 2000 Professional, Windows XP Home Edition, or Windows XP Professional.

Communication Card

GP-IB

PCI-GPIB/PCI-GPIB+/PCMCIA GPIB/PCMCIA-GPIB+ by National Instruments with NI-488.2M driver version 1.60 or later.

Ethernet

A 10BASE-T or 100BASE-TX Ethernet port.

CRT, Printer, and Mouse

Those compatible with Windows 2000 Professional, Windows XP Home Edition, or Windows XP Professional.

WT3000

WT3000 firmware version 4.01 or higher with the following functions.

- Flicker measurement function (/FL option)
- GP-IB interface (standard) or Ethernet interface (/C7 option)

1.3 Applicable Standards

The software application supports the following standards.

Voltage Fluctuation and Flicker Suppression Standards

- IEC 61000-3-3 Edition 1.1:2002, IEC 61000-3-3A2:2005
- EN 61000-3-3:1995, EN 61000-3-3A1:2001, EN 61000-3-3A2:2005

Flicker Meter Function and Design Specifications

- IEC 61000-4-15 Edition 1.1:2003
- EN 61000-4-15:1998, EN 61000-4-15A1:2003

This section gives an overview of the standards. For further details, see the actual text of the applicable standard.

Scope

The limits of the IEC61000-3-3 Voltage Fluctuation and Flicker Suppression Standard are applicable to electrical and electronic equipment having an input current up to and including 16 A per phase and intended to be connected to public low-voltage distribution systems of between 220 V and 250 V at 50 Hz line to neutral.

Limits

IEC 61000-3-3 Edition 1.1 specifies limits for a phase voltage of 230 V and a frequency of 50 Hz.

Note

The software supports the specifications of flicker meters for 230 V and 50 Hz in IEC 61000-4-15 Edition 1.1 as well as those for 120 V and 60 Hz. However, IEC 61000-3-3 does not specify limits for 120 V and 60 Hz.

Measurement Items and Limits in IEC 61000-3-3 Edition 1.1

Measurement Item	Limit
Relative steady-state voltage change dc	3.3% or less
Maximum relative voltage change dmax	4% or less (no conditions)* ¹ 6% or less (condition 1)* ¹ 7% or less (condition 2)* ¹
Period during which relative voltage change exceeds 3.3% d(t)	500 ms or less
Short-term flicker value Pst	1.0 or less
Long-term flicker value Plt	0.65 or less

*1 For the conditions, see the figure below.

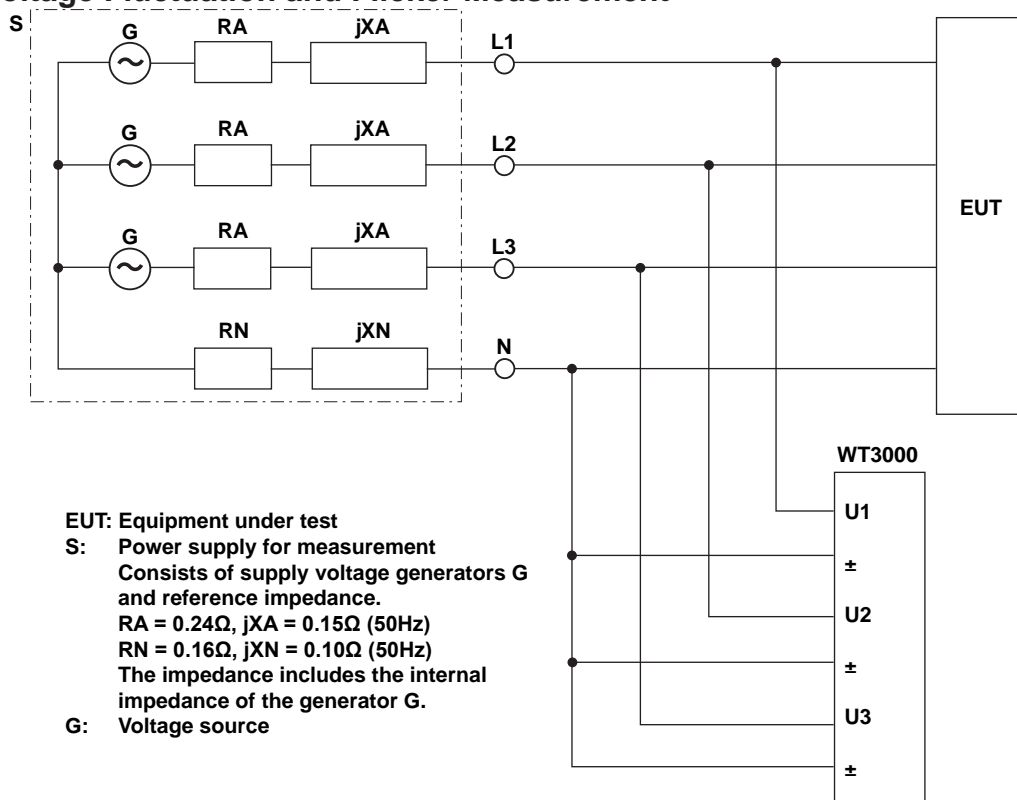
Conditions for the Limit on Maximum Relative Voltage Change dmax

No conditions	Condition 1	Condition 2
<ul style="list-style-type: none"> Devices that are not classified in condition 1 or 2 	<ul style="list-style-type: none"> Manual switching device Automatic switching devices that are estimated to switch OFF and ON more than two times per day that restart with a delay (delay of 20 to 30 s or more) after a power failure or devices that require manual restarting. 	<ul style="list-style-type: none"> Devices held by human hand (examples: hair driers, vacuum cleaners, cooking appliances such as a mixer, lawn mowers, portable tools such as a electric drill) Automatic switching devices that are estimated to switch two or less times per day or manual switching devices, which restart with a delay (delay of 20 to 30 s or more) after a power failure or require manual restarting.

Note

- The Pst and Plt limits are not applicable to the voltage fluctuation due to manual switching.
- The limits are not applicable to switching and interruptions in an emergency.
- The limits are not applicable on some measurement items depending on the EUT type.

Wiring for Voltage Fluctuation and Flicker Measurement



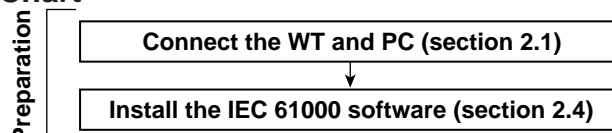
L2 and L3 are not connected if the wiring system is single-phase, two-wire.

1.4 Flow of Operation

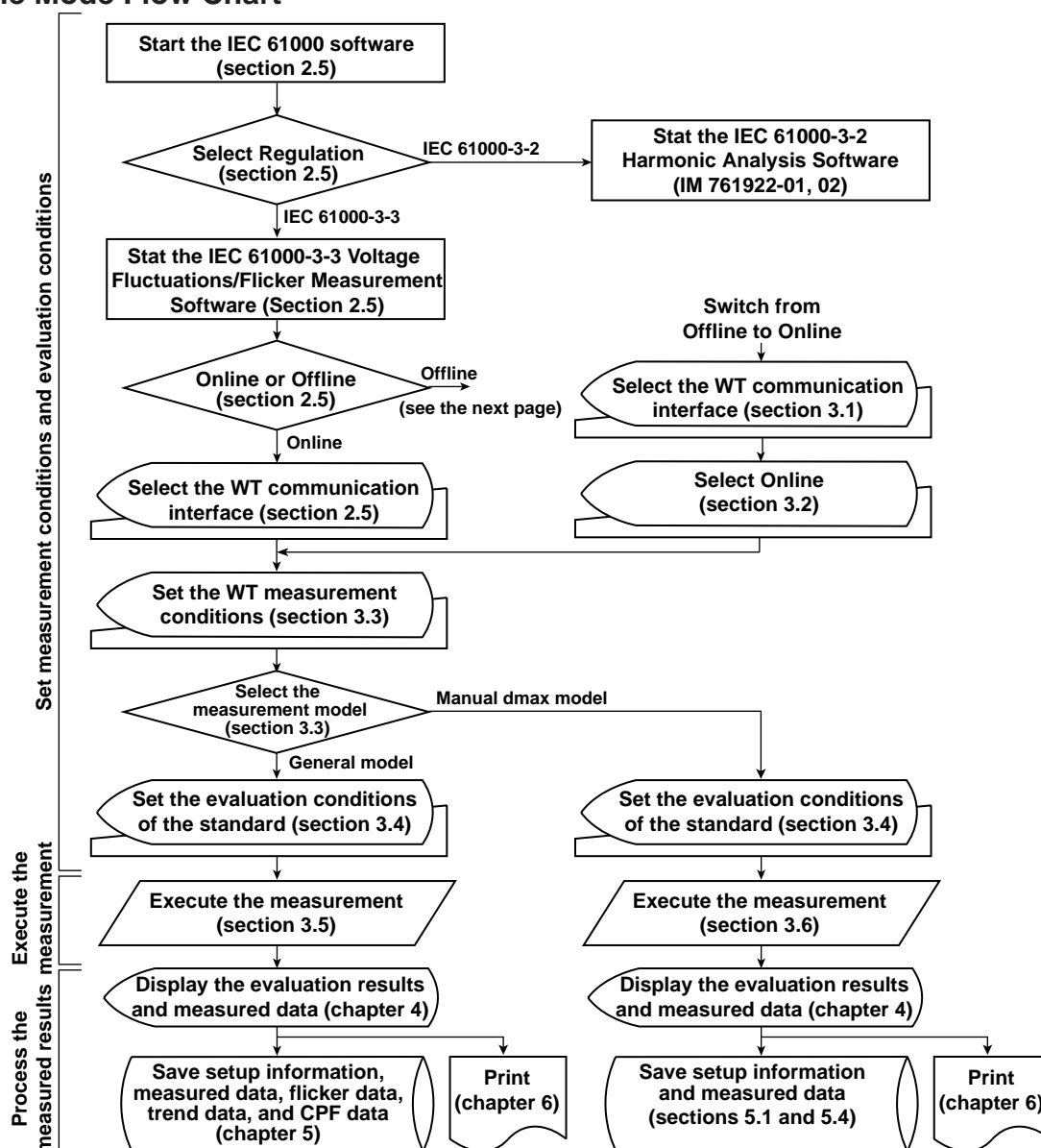
To display and judge the voltage fluctuation and flicker measurement data using this software, the WT and PC must be connected, the software must be installed, WT measurement conditions must be set, and judgement conditions of the applicable standard must be set. Follow the steps below.

There are two methods for connecting the PC and the WT: GP-IB and Ethernet (WT3000 option).

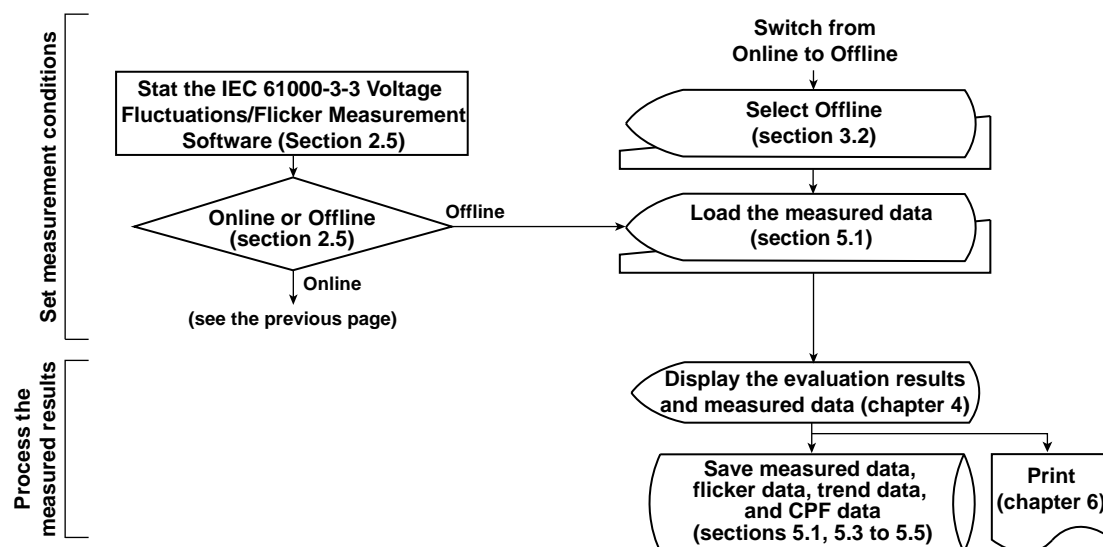
Preparation Flow Chart



On-Line Mode Flow Chart



Off-Line Mode Flow Chart



*1 The storage of trend and CPF data is valid for normal voltage fluctuation and flicker measurement.

1.5 Terminology Related to Flicker

Flicker

Flicker refers to the unstable impression perceived by the human eye that is induced by the fluctuating intensity or spectral distribution of light. It expresses the irritation that the people receive due to the fluctuation of brightness.

Steady-state Condition

A condition in which the rms voltage per half period is stable for 1 s or more.

Relative Steady-State Voltage Change dc

A value obtained by dividing the difference between two steady-state voltages before and after a single voltage fluctuation by the rated voltage expressed as a percentage. For example, for a power supply with a rated voltage of 230 V, the relative steady-state voltage change is as shown below if the steady-state voltage before the fluctuation is 231 V and that after the fluctuation is 232 V.

$$\frac{232-231}{230} \times 100(\%) = 0.43\%$$

Note

- If no voltage fluctuation occurs on the WT3000 in the measurement period, dc is zero.
- If a steady-state condition does not occur during the measurement period on the WT3000, it is considered to be a fluctuating condition. The measurement result of dc is displayed as Undef (undefined), and the judgement result of dc is displayed as Error.

Maximum Relative Voltage Change dmax

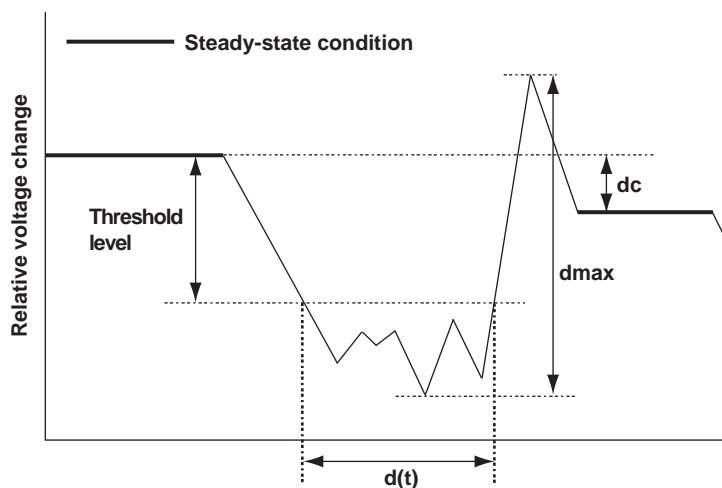
A value obtained by dividing the difference between the maximum and minimum values in a single voltage fluctuation*¹ by the rated voltage expressed as a percentage.

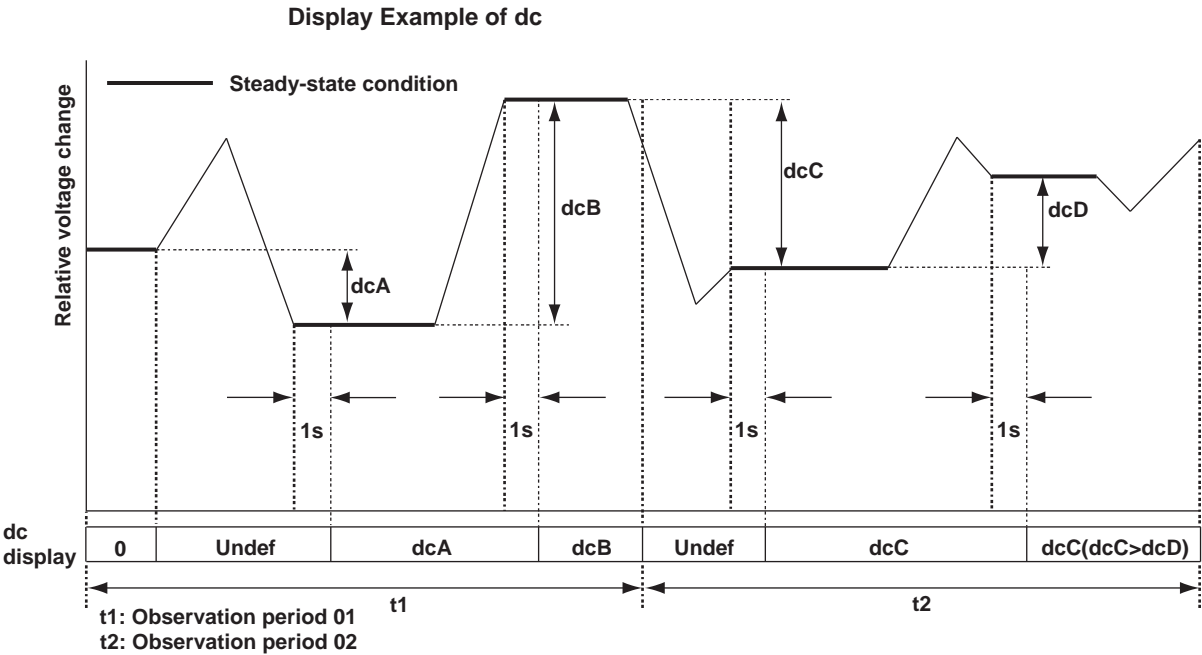
*¹ Condition between two steady-state conditions.

Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)

The time during which the relative voltage change during a voltage fluctuation period exceeds the threshold level.

Relationship between dc, dmax, and d(t)





Short-Term Flicker Value Pst

The method using the flicker meter is standard in IEC 61000-3-3. For details on the flicker meter, see IEC 61000-4-15. The normal observation period of Pst is 10 minutes.

Long-Term Flicker Value Plt

The long-term flicker value is normally determined from 12 Pst values using the equation below. The normal observation period is 2 hours.

$$Plt = \sqrt[3]{\frac{Pst_1^3 + Pst_2^3 + \dots + Pst_{12}^3}{12}}$$

Pst₁ :Pst of the 1th 10 minutes

Pst₂ :Pst of the 2th 10 minutes

:

Pst₁₂:Pst of the 12th 10 minutes

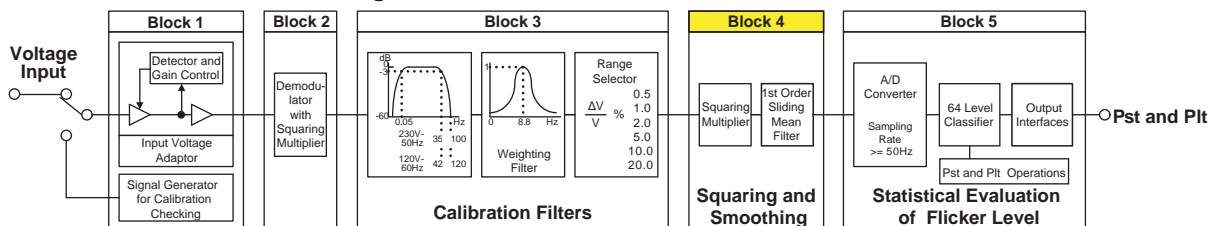
Note

If the number of observation periods is less than constant N (12) in the Plt equation, the Pst values that are not observed are computed as 0.0.

1.5 Terminology Related to Flicker

Instantaneous Flicker Sensation IFS

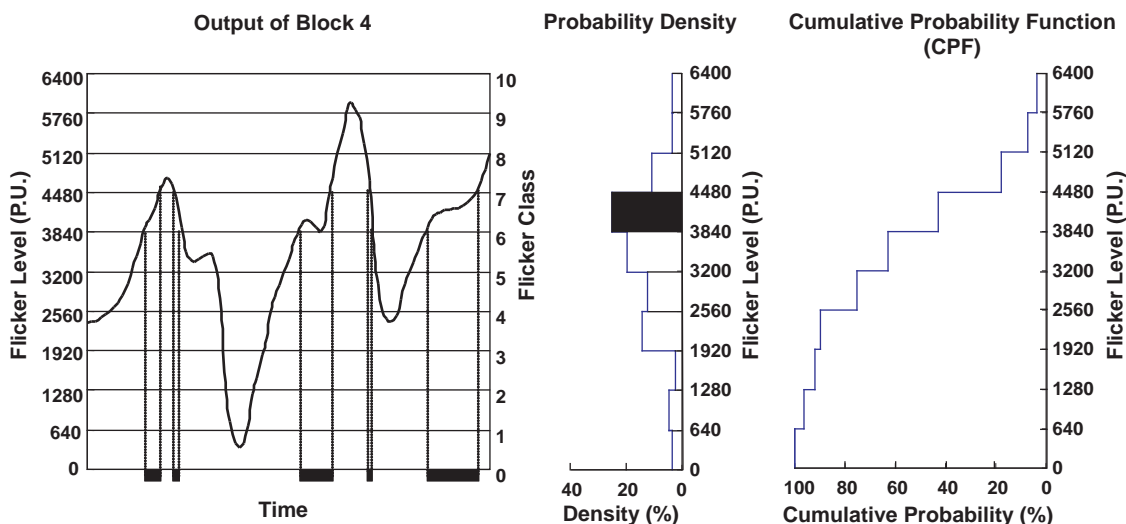
The output of block 4 of the flicker meter. For details on the flicker meter, see IEC 61000-4-15.

Block Diagram of the Flicker Meter in IEC 61000-4-15 Edition 1.1**Note**

This method does not necessarily match the processing method of the WT3000.

Cumulative Probability Function CPF

This function determines the probability density function of the flicker level from the instantaneous flicker sensation and accumulates the levels of the function from the highest level.

Example in Which Flicker Levels 0 to 6400 [P.U.] Are Divided into 10 Flicker Classes**Note**

The WT3000 performs processing different from the figure above to compute the CPF more accurately.

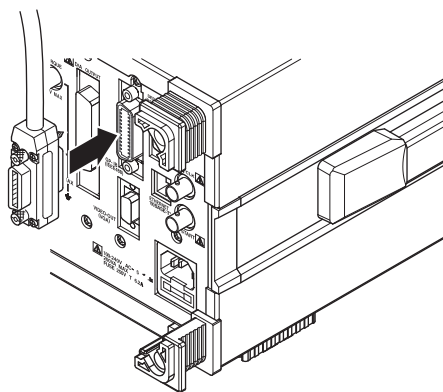
2.1 Connecting the WT3000 and the PC

CAUTION

When connecting or disconnecting communication cables, make sure to turn OFF the PC and the WT. Otherwise, erroneous operation or damage to the internal circuitry may result.

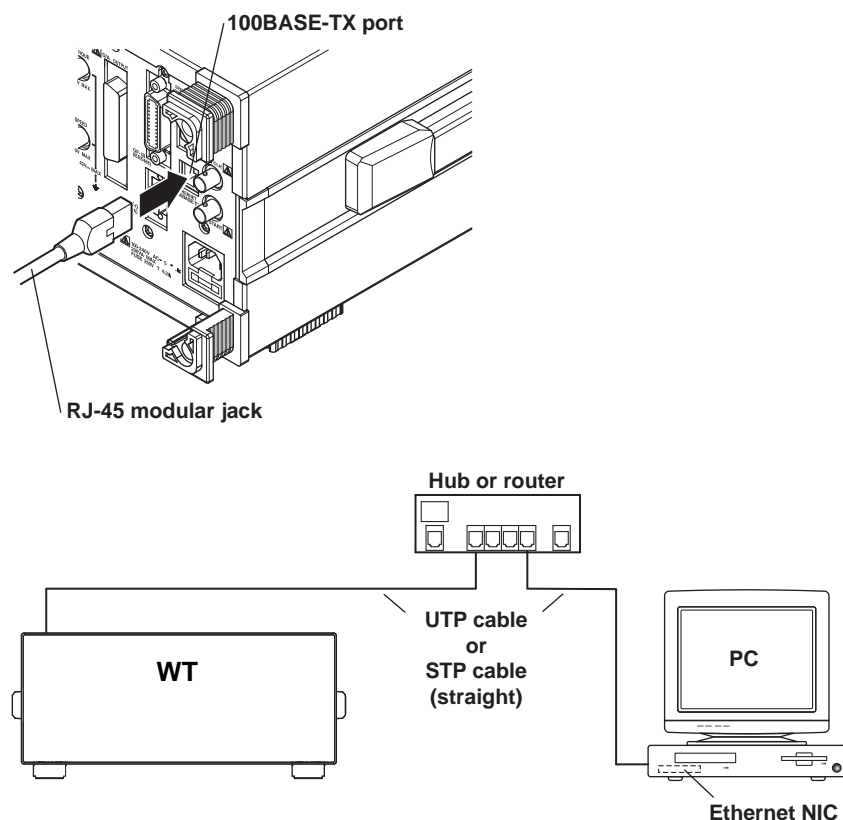
When Controlling the WT through the GP-IB

The GP-IB available on the WT is a 24-pin connector that conforms to the IEEE St'd 488-1978. Use a GP-IB cable that conforms to this standard. Connect the cable to the GP-IB connector on the rear panel of the WT. For details on the connection procedure and the specifications of the GP-IB interface, see the *WT3000 Communication Interface User's Manual IM760301-17E* on the CD-ROM. Use an appropriate connector for your PC to connect the other end of the GP-IB cable.



When Controlling the WT through the Ethernet Interface

Connect the WT and your PC through a hub using straight UTP (Unshielded Twisted-Pair) or STP (Shielded Twisted-Pair) cables. Connect the cable to the ETHERNET port on the rear panel of the WT. Use hubs, cables, and Ethernet NIC that are appropriate for the data rate. For details on the connection procedure and the specifications of the Ethernet interface, see the *Expansion Function User's Manual IM760301-51E* of the WT3000 and the *WT3000 Communication Interface User's Manual IM760301-17E* on the CD-ROM.



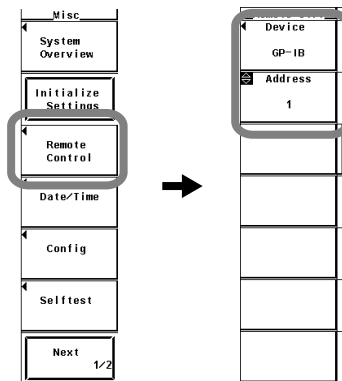
Note

- Use UTP (Unshielded Twisted-Pair) or STP (Shielded Twisted-Pair) cables of category 5 or better when connecting to a 100BASE-TX network.
 - Do not directly connect the WT to the PC without using a hub. Operations are not guaranteed for communications using direct connection.
-

2.2 Setting the GP-IB Control

Procedure

1. Press **MISC** to display the Misc menu.
2. Press the **Remote Control** soft key to display the Remote Ctrl menu.
3. Press the **Device** soft key to select GP-IB.
Only the communication interface selected here is enabled. The WT does not accept commands that are transmitted to other unselected communication interfaces.
4. Press the **cursor keys** to set the address.



Explanation

To use the software in On-Line mode through the GP-IB interface, operate the WT to select GP-IB.

Setting the Address

Set the WT address within the following range.

1 to 30

Each device that can be connected via GP-IB has a unique address within the GP-IB system. This address is used to distinguish the device from others. Therefore, make sure that the WT address does not overlap with other devices when connecting the WT to the PC.

Note

- Do not change the address while the controller (PC) or other devices are using the GP-IB system.
 - When connecting the WT to a single PC and controlling the WT using this software, multiple communication interfaces cannot be used simultaneously.
 - Use a GP-IB card by National Instruments on the PC end. For details, see section 1.2.
 - The software may not operate correctly, if an adapter is inserted in the middle of the connection between the WT and the PC (for example, GP-IB-to-USB adapter). For details, contact your nearest YOKOGAWA dealer.
-

2.3 Setting the Ethernet Control

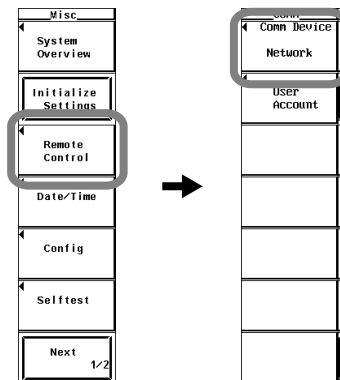
Procedure

2

Preparation before Use

Setting the Ethernet Interface

1. Press **MISC** to display the Misc menu.
2. Press the **Remote Control** soft key to display the Remote Ctrl menu.
3. Press the **Device** soft key to select Network.
Only the communication interface selected here is enabled. The WT does not accept commands that are transmitted to other unselected communication interfaces.

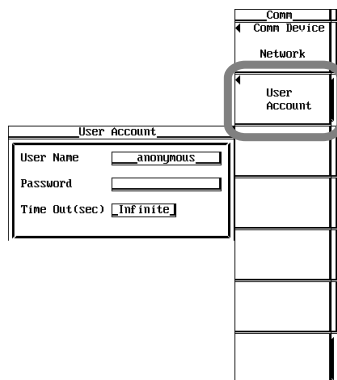


Setting the User Name and Password

4. Press the **User Account** soft key to display the User Account dialog box.
5. Press the **cursor keys** to select User Name.
6. Press **SET** to display the keyboard.
7. Use the **keyboard** on the WT to enter the user name.
For the keyboard operation of the WT, see the WT User's Manual.
8. Press the **cursor keys** to select Password.
9. Press **SET** to display the keyboard.
10. Use the **keyboard** on the WT to enter the password.
Enter the password twice for confirmation.
A password is not required if the login name is anonymous.
For the keyboard operation of the WT, see the WT User's Manual.

Setting the Timeout Value

11. Press the **cursor keys** to select Time Out.
12. Press **SET** to display the timeout time selection box.
13. Press the **cursor keys** to set the timeout value.
14. Press **SET** or **ESC** to close the box.



Setting TCP/IP

You must enter TCP/IP settings to control the WT from a PC through the network. For the setup procedure, see the *Expansion Function User's Manual IM760301-51E* of the WT3000.

Explanation

To use the software in On-Line mode through the network, operate the WT to select Network.

Setting the User Name

- Enter the user name to allow access to the WT.
- Enter up to 15 characters.
- The characters that can be used are 0-9, A-Z, %, _, () (parentheses), - (minus sign).
- If you specify anonymous, the WT can be accessed from the PC without a password.

Setting the Password

- Enter the password of the user name to allow access to the WT.
- Enter up to 15 characters.
- The characters that can be used are 0-9, A-Z, %, _, () (parentheses), - (minus sign).
- If you set the user name to anonymous, the WT can be accessed from the PC without a password.

Setting the Timeout Value

The WT closes the connection to the network if there is no access for a certain period of time (timeout value).

The available settings are 1 to 3600 s, or Infinite. The default value is Infinite.

Note

- To activate the settings, you must power cycle the WT.
- When connecting the WT to a single PC and controlling the WT using this software, multiple communication interfaces cannot be used simultaneously.
- The software may not operate correctly, if an adapter is inserted in the middle of the connection between the WT and the PC (for example, GP-IB-to-USB adapter). For details, contact your nearest YOKOGAWA dealer.

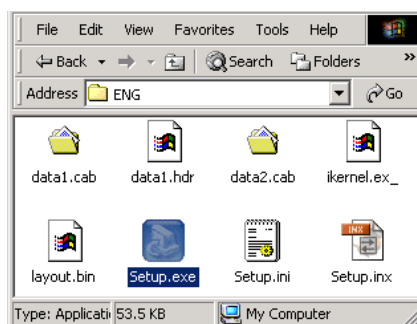
2.4 Installing the Software

Procedure

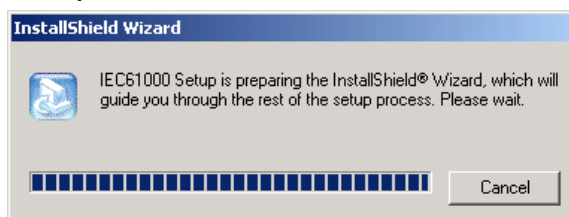
Have the CD-ROM containing the software ready. Exit all programs that are currently running before starting the installation. If an older version of the Harmonic/Flicker Measurement Software is installed, uninstall it first.

The following procedures are for installing the software on Windows 2000 Professional. The screens shown in the figure may vary depending on the OS that is running on the PC.

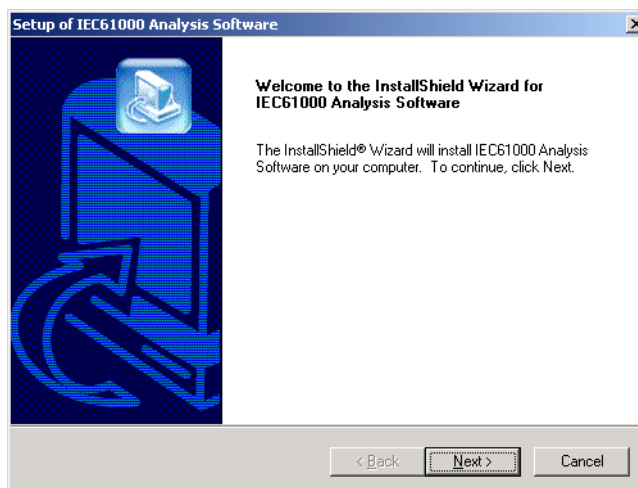
1. Start Windows.
When using Windows 2000, Windows XP Home Edition, or Windows XP Professional, set the user name to Administrator when starting up.
2. Place the installation CD-ROM containing the software into the CD-ROM drive.
3. Double-click My Computer, then the CD-ROM icon.
4. Double-click **Setup.exe**. InstallShield Wizard starts.



Startup window of the InstallShield Wizard

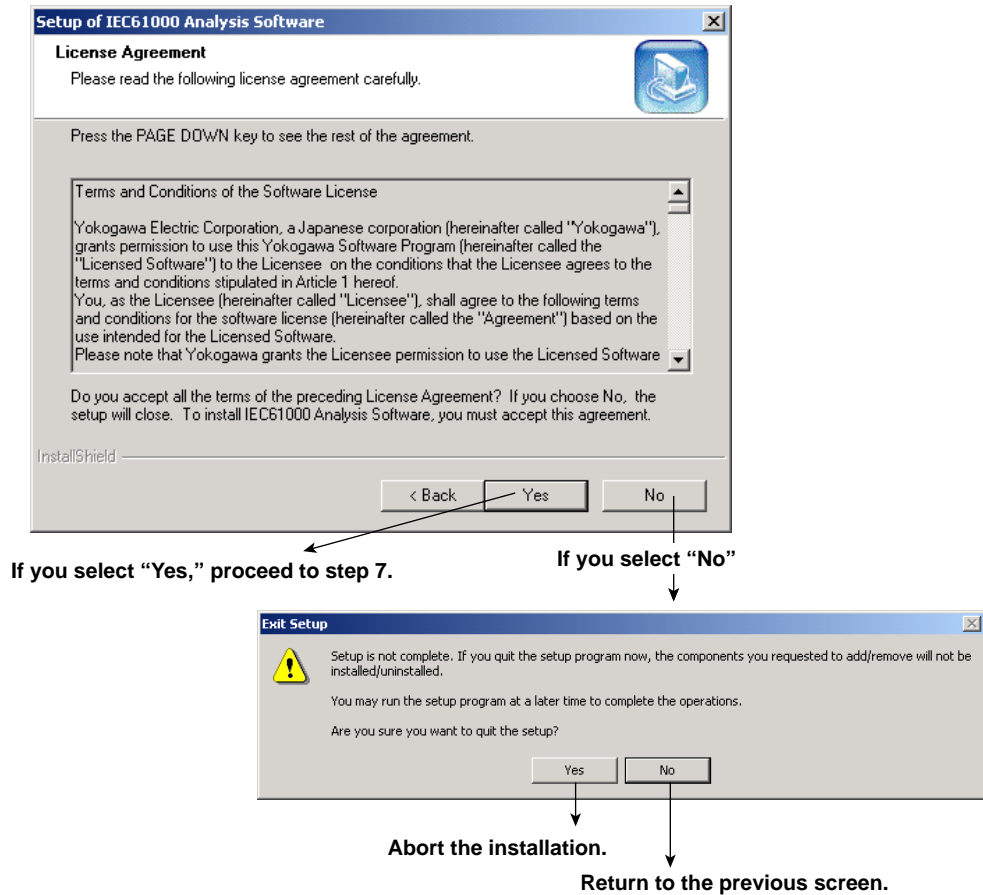


5. Click **Next**.

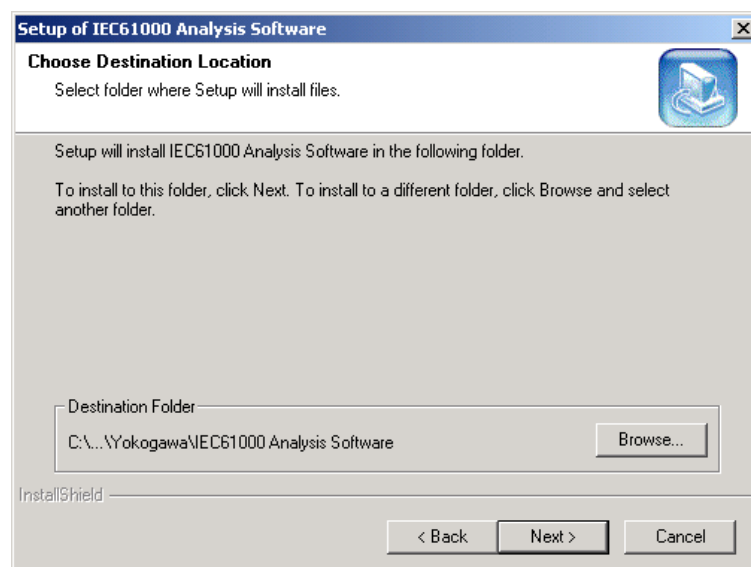


2.4 Installing the Software

6. If you accept the terms of with the license agreement, select **Yes**. If you do not, select **No**.

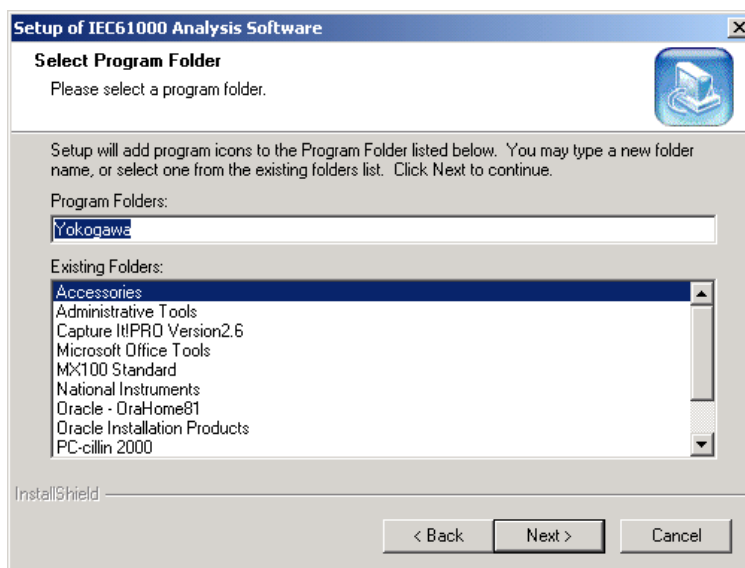


7. Select the installation destination, and click **Next**.
Click Browse to specify the installation destination. The default installation destination is set to "C:\Program Files\Yokogawa\IEC61000 Analysis Software."

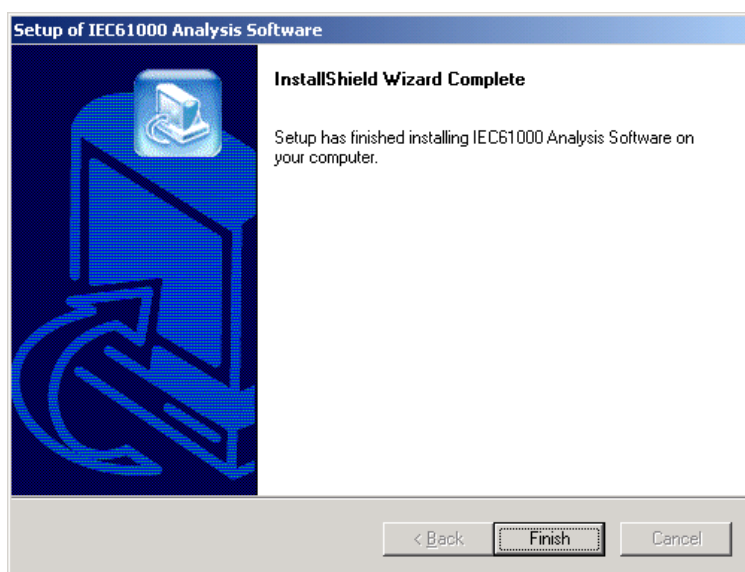


8. Select the program folder where the program icon is to be added and click **Next**. The installation starts.

The program icon (shortcut) of the software is added in the program menu of the Start menu. The destination is selected here. The default program folder is Yokogawa.



9. If the installation completes successfully, a message "Setup has finished installing" is displayed. Click **Finish**.



2.5 Starting and Closing the Software

Procedure

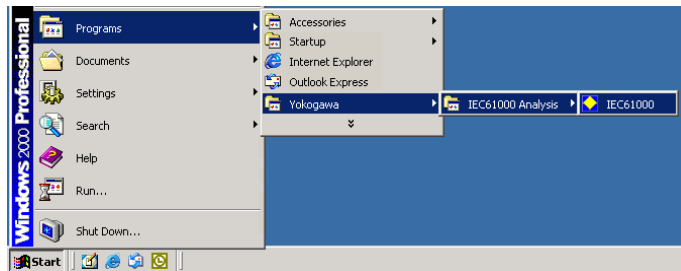
Starting the Software

Starting the Software

1. From the **Start** menu, choose **Programs > Yokogawa > IEC61000 Analysis > IEC61000**. The IEC 61000 software starts.

The procedure above applies when the default software installation destination and program folder are used.

If you changed the installation destination or program folder at installation, select the corresponding location.



When you start the software, a dialog box appears for you to select the standard.

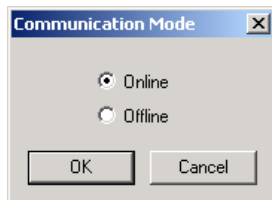
Selecting the Standard

2. Select **IEC61000-3-3**. The IEC 6100-3-3 measurement software (Voltage Fluctuation/Flicker Measurement Software) starts.



Selecting the Communication Mode

3. Select **Online** or **Offline**.



- If you selected Online, proceed to step 4.
- If you selected Offline, proceed to chapter 4.

Selecting the Communication Interface

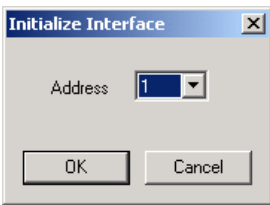
4. Select **GP-IB** or **Ethernet** according to the setting on the WT to be connected.



- If you selected GP-IB, proceed to step 5.
- If you selected Ethernet, proceed to step 7.

Selecting the Communication Address (GP-IB)

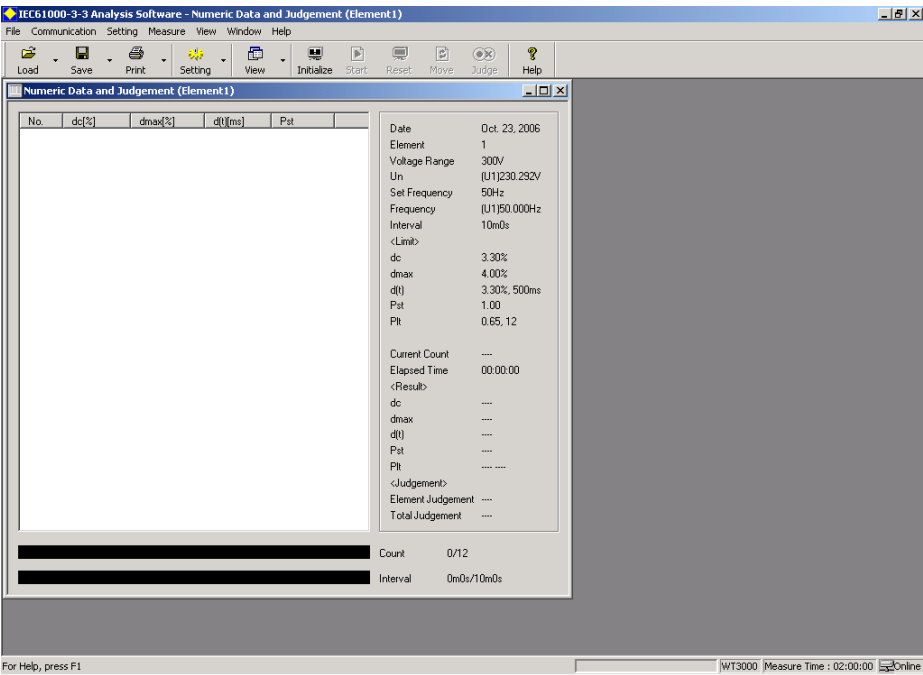
5. In the Initialize Interface dialog box that is displayed, select the GP-IB address of the target WT.



Note

GP-IB address 0 cannot be selected, because it is reserved for use by the PC.

6. Click **OK** to start communications with the target WT. The software automatically confirms that communication is possible, indicates online on the status bar, and displays the Numeric Data and Judgement window. Setup and execution of measurements are now possible.



2.5 Starting and Closing the Software

Numeric Data and Judgement window

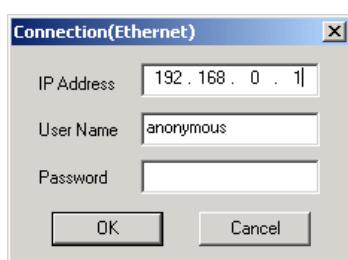
If an element is not selected on the WT, the Numeric Data and Judgement window does not open. For a detailed description of the Numeric Data and Judgement window, see section 4.1.

Note

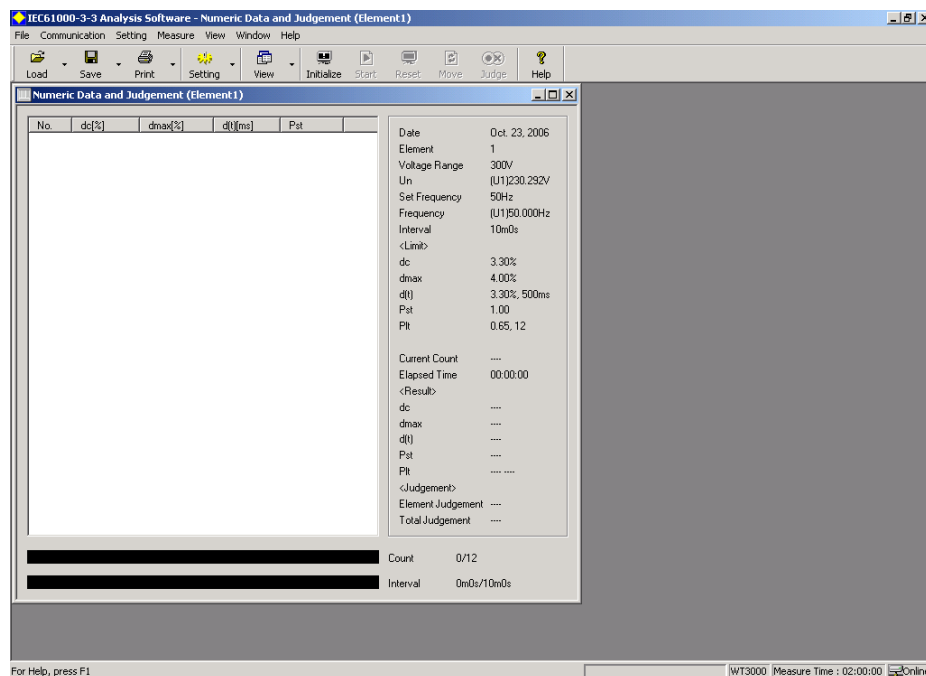
If the target WT is not ready to make measurements, a communication error occurs when communication is started after selecting the GP-IB address and clicking **OK**. A communication error also occurs if the GP-IB address is not correct or if there is no response from the target WT.

Setting the IP Address, User Name, and Password (Ethernet)

7. In the Connection dialog box, enter the IP address, user name, and password of the target WT.



8. Click **OK** to start communications with the target WT. The software automatically confirms that communication is possible, indicates online on the status bar, and displays the Numeric Data and Judgement window. Setup and execution of measurements are now possible.




Numeric Data and Judgement window

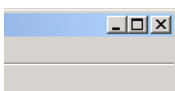
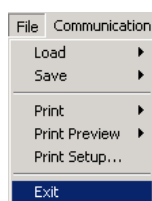
If an element is not selected on the WT, the Numeric Data and Judgement window does not open. For a detailed description of the Numeric Data and Judgement window, see section 4.1.

Note

If the target WT is not ready to make measurements, a communication error occurs when communication is started after setting the items in the connection dialog box and clicking **OK**. A communication error also occurs if the IP address, user name, or password is not correct or if there is no response from the target WT.

Closing the Software

Choose **Exit** from the **File** menu or click the  button in the upper right corner of the Voltage Fluctuation/Flicker Measurement Software window. The software program closes.



Explanation

You can start the software by clicking the shortcut located in the Programs folder of the Start menu. The software is saved to the installation destination that was specified during installation described earlier.

Selecting the Standard

To measure the voltage fluctuation and flicker, select IEC61000-3-3. The Voltage Fluctuation/Flicker Measurement Software starts.

If you select IEC61000-3-2, the Harmonic Analysis Software starts. For the operating procedure, see the respective Harmonic Analysis Software User's Manual (IM761922-01E for the WT1600/WT2000 and IM761922-02E for the WT3000).

Selecting the Communication Mode

Select Online or Offline.

- **Online**

If you selected Online, you must set the communication interface of the target WT.

- **Offline**

If you selected Offline, communications with the WT is not possible. You can load measured data that is already saved and display and print the data. Proceed to chapter 4 and continue the operation.

Note

For items in On-Line and Off-Line modes, see section 3.2.

Selecting the Communication Interface

- **GP-IB**

You must select the GP-IB address of the target WT.

- **Ethernet**

You must set the IP address, user name, and password of the target WT.

Selecting the Communication Address

- **GP-IB**

- Select the GP-IB address of the target WT.
The selectable range is 1 to 30.

- **Ethernet**

- Set the IP address of the target WT.
Selectable range: 0.0.0.0 to 255.255.255.255
- You can set the user name and password of the target WT.
Selectable characters: Characters that can be entered on the WT

Starting Communications

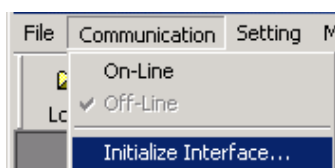
Select the communication address and click **OK** to start communications with the target WT.

3.1 Initializing the Communication Interface

The procedures described in this section and section 3.2 are not necessary immediately after starting the software with the communication mode set to On-Line. To change the communication mode from Off-Line to On-Line, follow the procedures given in this section and section 3.2.

Procedure

1. From the **Communications** menu, choose **Initialize Interface**. The Communication Interface dialog box opens.



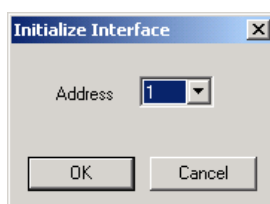
2. Select the communication interface according to the setting on the WT to be connected.



- If you selected GP-IB, proceed to step 3.
- If you selected Ethernet, proceed to step 4.

If GP-IB Is Selected

3. Select the GP-IB address of the target WT.

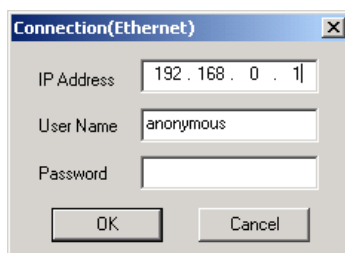


Note

GP-IB address 0 cannot be selected, because it is reserved for use by the PC.

If Ethernet Is Selected

4. Set the IP address, user name, and password of the target WT.



Explanation

When changing the communication mode from Off-Line to On-Line, the communication interface of the target WT must be selected.

Selecting the Communication Address

GP-IB

- Select the GP-IB address of the target WT.
The selectable range is 1 to 30.

Ethernet

- Set the IP address of the target WT.
Selectable range: 0.0.0.0 to 255.255.255.255
- Set the user name and password of the target WT.
Selectable characters: Characters that can be entered on the WT

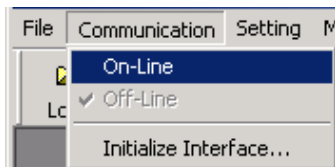
3.2 Switching between On-Line and Off-Line Modes

Procedure

Carry out the procedure below after entering the settings on the target instrument according to the procedures given in section 3.1.

Enabling On-Line Mode

From the **Communication** menu, choose **On-Line**. The communication with the target WT starts.

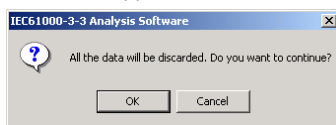


On the status bar of the window, check that Online is indicated.



Note

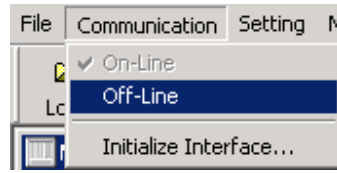
- If the data is already loaded, a message "All the data will be discarded. Do you want to continue?" appears.



- When starting communications, a communication error will occur if the target WT is not ready to make measurements. A communication error also occurs if the GP-IB address, IP address, user name, or password is incorrect or if there is no response from the target WT.
- Do not release the remote mode on the WT and change the WT settings while controlling the WT online. Doing so may impede voltage fluctuation and flicker measurements conforming to the IEC standard. If you release the remote mode of the WT, close the Voltage Fluctuation and Flicker Measurement Software. For the operating procedure, see section 2.5.

Enabling Off-Line Mode

From the **Communication** menu, choose **Off-Line**. The communication with the target WT is disconnected.



On the status bar of the window, check that Offline is indicated.



Explanation

On-Line Mode

When changing the communication mode from Offline to Online mode, choose Online from the menu after entering the communication interface settings of the target WT. When you choose Online from the menu, the communication with the target WT starts. When communication starts between the PC and the WT, the software application retrieves the measurement and judgement conditions of the voltage fluctuation and flicker of the WT. In On-Line mode, the software application retrieves the measured data while the voltage fluctuation and flicker are being measured on the WT and shows the numeric data and judgement, trend graph view,^{*1} and CPF graph view.^{*1} Then, the software application judges whether the measured data conforms to the standard. In addition, you can use the application to print screen images and reports as well as save the numeric judgement data, trend data,^{*1} CPF data,^{*1} and measured and setup data retrieved from the WT to your PC. It is also possible to change the WT settings from the PC.

Off-Line Mode

If the communication mode is changed from On-Line to Off-Line, the communication with the target WT is disconnected. In Off-Line mode, the voltage fluctuation and flicker measurement data saved in the past are loaded in the software application. Using the loaded measured data, the software application shows the numeric data and judgement, trend graph view,^{*1} and CPF graph view.^{*1} In addition, you can use the application to print display images and reports as well as save the numeric judgement data, trend data,^{*1} CPF data,^{*1} and measured data loaded from the WT to the PC.

^{*1} Valid only for normal voltage fluctuation and flicker measurement.

Items in On-Line and Off-Line Modes

Menu				On-Line Mode	Off-Line Mode	Reference Section
File	Load	Load Setting Information		Yes	No	5.2
		Load Measured Data		Yes ^{*1}	Yes	5.2
	Save	Save Setting Information		Yes	No	5.1
		Save Measured Data		Yes	Yes	5.1
		Save Numeric Data(CSV)	Element1, 2, 3, 4	Yes	Yes	5.3
		Save Trend Data(CSV)	Element1, 2, 3, 4	Yes ^{*2}	Yes ^{*2}	5.4
		Save CPF Data(CSV)	Element1, 2, 3, 4	Yes ^{*2}	Yes ^{*2}	5.5
	Print	Display Image		Yes	Yes	6.4
		Report	Element1, 2, 3, 4	Yes	Yes	6.4
	Print Preview	Display Image		Yes	Yes	6.3
Report		Element1, 2, 3, 4	Yes	Yes	6.3	
Print Setup			Yes	Yes	6.2	
Exit			Yes	Yes	2.5	
Communication						
	On-Line			No	Yes	3.2
	Off-Line			Yes	No	3.2
	Initialize Interface			Yes	Yes	3.1
Setting	Measurement Conditions Setting			Yes	No	3.3
	Judgement Conditions Setting			Yes	No	3.4
	Report Setting			Yes	Yes	6.1
Measure	Initialize			Yes	No	3.5, 3.6
	Start			Yes	No	3.5, 3.6
	Reset			Yes	No	3.5, 3.6
	Move			Yes ^{*3}	No	3.6
	Judge			Yes ^{*3}	No	3.6
View	Numeric Data and Judgement		Element1, 2, 3, 4	Yes	Yes	4.1
	Trend Graph View			Yes ^{*2}	Yes ^{*2}	4.2
	CPF Graph View			Yes ^{*2}	Yes ^{*2}	4.3
	Toolbar			Yes	Yes	
	Status Bar			Yes	Yes	
Window	Cascade			Yes	Yes	7.1
	Tile Horizontally			Yes	Yes	7.1
	Tile Vertically			Yes	Yes	7.1
	Arrange Icons			Yes	Yes	7.2
Help	Help Topics	User's Manual		Yes	Yes	7.3
		Alterations of User's Manual		Yes	Yes	7.3
	Command Line		Yes	No	7.4	
	About		Yes	Yes	7.5	

*1 If you load measured data in On-Line mode, the mode switches to Off-Line.

*2 Valid only for normal voltage fluctuation and flicker measurement.

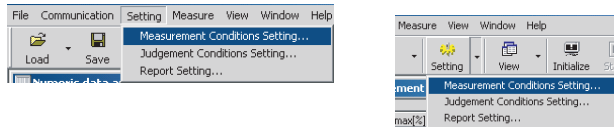
*3 Valid for the measurement of dmax caused by manual switching.

3.3 Setting the Measurement Conditions of the WT3000

Procedure

Check that the software is in On-Line mode and that the flicker measurement status is indicating Reset (condition in which the measured value is reset and initialization can be executed). If not, set the flicker measurement status to Reset according to the procedure in "Resetting the Measurement" on page 3-15.

1. On the **Setting** menu, choose **Measurement Conditions Setting** or click **Setting > Measurement Conditions Setting** on the toolbar. The Measurement Conditions Setting dialog box opens. You can set the measurement conditions of the target WT.



2. Set the measurement conditions of the WT in the Measurement Conditions Setting dialog box. When an item is changed on the dialog box, the corresponding measurement condition of the target WT is changed.

Select the line filter

Select the target element to be specified

Set the predefined rated voltage (valid when using SET)

Set the assignment method of the rated voltage (AUTO or SET)

Select the target element to be measured

Set the observation period
(Valid only for normal voltage fluctuation and flicker measurement)

Select the measurement target frequency

Select the measurement method
General Mode: Normal voltage fluctuation and flicker measurement
Manual dmax Mode: Measurement of dmax caused by manual switching

Measurement Conditions Setting

Measure Object: ☒ Element1 ☐ Element2 ☐ Element3 ☐ Element4

Frequency: ☒ 50Hz ☐ 60Hz

Measure Mode: ☒ General Mode ☐ Manual dmax Mode

Un: AUTO V

1 Observation Period: Min Sec

Count: Count %

Measure Time: 120 minutes 0 seconds

Element1 | Element2 | Element3 | Element4

Line Filter: Line Filter Copy Exec

Filter: Filter Copy Exec

Frequency Filter: Frequency Filter Copy Exec

Voltage Range: Voltage Range Copy Exec

Current Range: Current Range Copy Exec

Sensor Ratio(mV/A): Sensor Ratio Copy Exec

Scaling: VT Ratio: Scaling Factor: Scaling Copy Exec

CT Ratio: CT Ratio Copy Exec

Close

Sets the measurement count
(Valid only for normal voltage fluctuation and flicker measurement)

Set the steady-state range

Copy the line filter setting to all other elements

Copy the frequency filter setting to all other elements

Copy the range setting to all other elements

Set the VT ratio

Set the scaling factor

Copy the scaling setting to all other elements

Set the CT ratio

Select the scaling

Set the external current sensor transformation ratio when using the external current sensor

Select the current range

Select the voltage range

Select the frequency filter

Explanation

The measurement conditions of the WT can be set from the software via the GP-IB or Ethernet interface.

For an explanation of the terminology, see section 1.5.

Measure Mode

Select the voltage fluctuation and flicker measurement method from the two methods below.

- **General Mode** (normal voltage fluctuation and flicker measurement)
Judges whether values such as dc, dmax, d(t), and Pst are within the specified limits.
- **Manual dmax Mode** (measurement of dmax caused by manual switching)
You manually turn the EUT switch ON. The WT3000 measures the voltage fluctuation caused by the inrush current that flows when the power is turned ON, and judges whether the dmax average is within the specified limits.

Measure Object

Set the element on which to measure the voltage fluctuation and flicker. The installed elements are displayed as possible targets.

Rated Voltage (Un)

You can select the assignment method of the rated voltage.

- **AUTO**
Automatically retrieves the measured voltage at the start of the voltage fluctuation and flicker measurement as the rated voltage.
- **SET**
You can set the rated voltage in the range of 0.01 to 999.99 V.

Measurement Target Frequency

You can set the measurement target frequency to 50 Hz or 60 Hz.

Set the measurement source frequency appropriately as the transfer function of the flicker meter and other parameters change accordingly.

If the measurement mode is set to General Mode (normal voltage fluctuation and flicker measurement), you must set the single observation period, measurement count, and steady-state range.

1 Observation Period

You can set the single observation period of short-term flicker value Pst in unit of minutes and seconds in the following range.

00:30 to 15:00 (only even values can be specified for the seconds)

Measurement Count

You can set the measurement count of short-term flicker value Pst in the range of 1 to 99.

Steady-State Range (dmin: Allowable Range of Relative Voltage Change to Be Considered Steady-State)

You can set steady-state range dmin in the range of 0.10 to 9.99%.

Line Filter Copy Exec

You can copy the line filter setting to all other elements.

Filter Copy Exec

You can copy the frequency filter setting to all other elements.

3.3 Setting the Measurement Conditions of the WT3000

Range Copy Exec

You can copy the range setting to all other elements. The voltage and current ranges are copied.

Scaling Copy Exec

You can copy the scaling settings to all other elements. The external current sensor transformation ratio, scaling ON/OFF, VT ratio, CT ratio, and scaling factor are copied.

For the setting details and setup procedure on the WT of the following parameters, see the referenced section in the WT3000 User's Manual IM760301-01E.

Setup Item	Reference Section in the User's Manual
Line filter	Section 4.8
Frequency filter	Section 4.8
Measurement range of voltage/current	Sections 4.3 and 4.4
Scaling	Section 4.5

Note

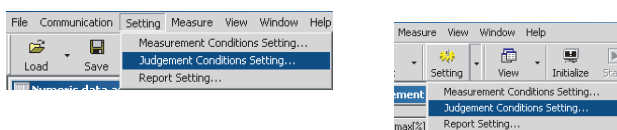
You can change the measurement conditions only in On-Line Mode when the flicker measurement status is Reset. For details on the flicker measurement status, see section 3.5 or 3.6.

3.4 Setting the Judgement Conditions of the WT3000

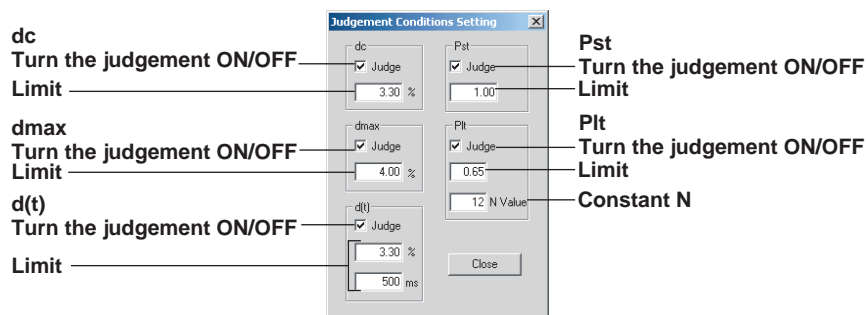
Procedure

Check that the software is in On-Line mode and that the flicker measurement status is indicating Reset (condition in which the measured value is reset and initialization can be executed) or Complete (in which the result and judgement are displayed). If the status is not Reset or Complete, set the flicker measurement status to Reset according to the procedure in "Resetting the Measurement" on page 3-15.

1. On the **Setting** menu, choose **Judgement Conditions Setting** or click **Setting > Judgement Conditions Setting** on the toolbar. The Judgement Conditions Setting dialog box opens. You can set the judgement conditions of the target WT.



2. Set the judgement conditions of the WT in the Judgement Conditions Setting dialog box. When an item is changed on the dialog box, the corresponding judgement condition of the target WT is changed.



Explanation

For an explanation of the terminology, see section 1.5.

Judgement Conditions for Relative Steady-State Voltage Change dc

- **Turning ON/OFF the Judgement of Relative Steady-State Voltage Change dc**
You can select whether to include relative steady-state voltage change dc in the flicker measurement judgement.
 - ON: Include dc.
 - OFF: Not include dc.
- **Limit on Relative Steady-State Voltage Change dc**
You can set the limit in the range of 1.00 to 99.99%.

Judgement Conditions for Maximum Relative Voltage Change dmax

- **Turning ON/OFF the Judgement of Maximum Relative Voltage Change dmax**
You can select whether to include maximum relative voltage change dmax in the flicker measurement judgement.
 - ON: Include dmax.
 - OFF: Not include dmax.
- **Limit on Maximum Relative Voltage Change dmax**
You can set the limit in the range of 1.00 to 99.99%.

Judgement Conditions for Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)

- **Turning ON/OFF the Judgement of Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)**
You can select whether to include the period during which the relative voltage change exceeds the threshold level d(t) in the flicker measurement judgement.
 - ON: Include d(t).
 - OFF: Not include d(t).
- **Threshold Level**
You can set the threshold level in the range of 1.00 to 99.99%.
- **Limit on the Period during Which Relative Voltage Change Exceeds the Threshold Level d(t)**
You can set the limit in the range of 1 to 99999 ms.

Judgement Conditions for Short-Term Flicker Value Pst

- **Turning ON/OFF the Judgement of Short-Term Flicker Value Pst**
You can select whether to include short-term flicker value Pst in the flicker measurement judgement.
 - ON: Include Pst.
 - OFF: Not include Pst.
- **Limit on Short-Term Flicker Value Pst**
You can set the limit in the range of 0.10 to 99.99.

Judgement Conditions for Long-Term Flicker Value Plt

- **Turning ON/OFF the Judgement of Long-Term Flicker Value Plt**

You can select whether to include long-term flicker value Plt in the flicker measurement judgement.

- ON: Include Plt.
- OFF: Not include Plt.

- **Limit on Long-Term Flicker Value Plt**

You can set the limit in the range of 0.10 to 99.99.

- **Constant N of the Calculating Equation of Long-Term Flicker Value Plt**

You can set constant N in the range of 1 to 99.

Note

- The long-term flicker value (Plt) is computed using the following equation.

$$Plt = \sqrt[3]{\frac{\sum_{i=1}^{Count} Psti^3}{N}}$$

The variable Count in the equation is the measurement count of short-term flicker value (Pst) that is set in section 3.3).

The variable N in the equation is the constant of the calculating equation of long-term flicker value (Plt).

In general, set Count and N to the same value.

If N is set greater than Count, the short-term flicker value is measured the number of times specified by Count. The short-term flicker values (Pst) that are not measured are substituted with zeroes in the above equation to calculate the long-term flicker value (Plt). N is set greater than Count such as when the measured source automatically stops within the specified observation time.

- You can change the judgement conditions only in On-Line Mode when the flicker measurement status is Reset or Complete. For details on the flicker measurement status, see section 3.5 or 3.6.
- You can set judgement conditions on items other than dmax during the measurement of dmax caused by manual switching, but judgement is not performed on them.

3.5 Executing the Normal Voltage Fluctuation and Flicker Measurement

A normal voltage fluctuation and flicker measurement complying with IEC 61000-3-3 is executed.


Calculates all the voltage fluctuation and flicker values of dc, dmax, d(t), Pst, and Plt, compares them to the preset limits, and indicates the total judgement.

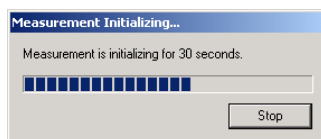
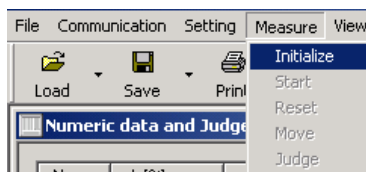
Procedure

Check that the software is in On-Line mode and that the flicker measurement status is indicating Reset (condition in which the measured value is reset and initialization can be executed). If not, set the flicker measurement status to Reset according to the procedure in “Resetting the Measurement” on page 3-15.

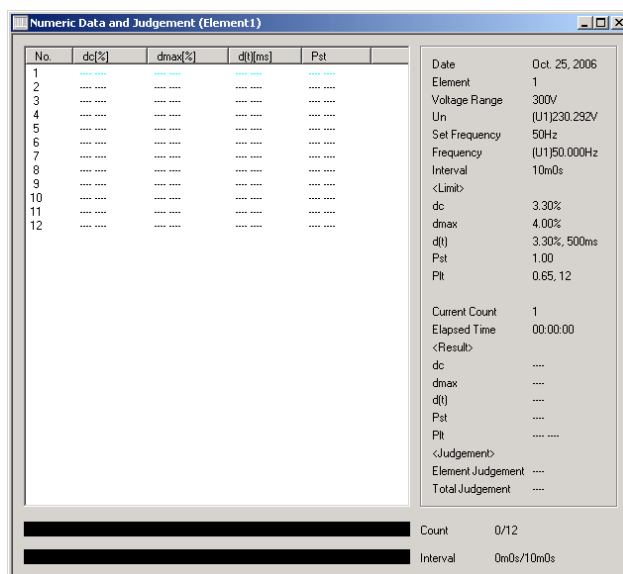
Set the measurement mode to General Mode (see section 3.3).

Initializing the Measurement

1. On the **Measure** menu, choose **Initialize** or click  on the toolbar. The Measurement Initializing dialog box opens, and the initialization starts.




When the initialization is complete, the dialog box automatically closes and all items in the Numeric Data and Judgement window displays ----.

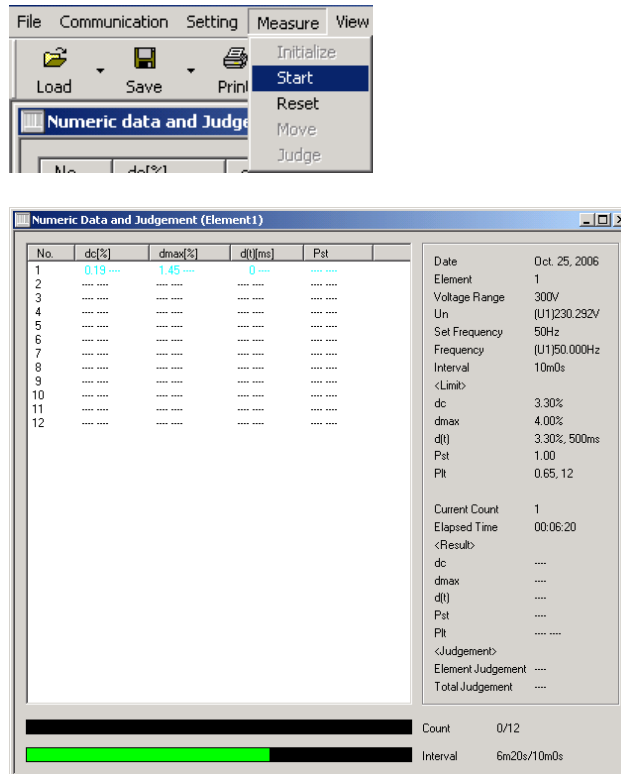


Note

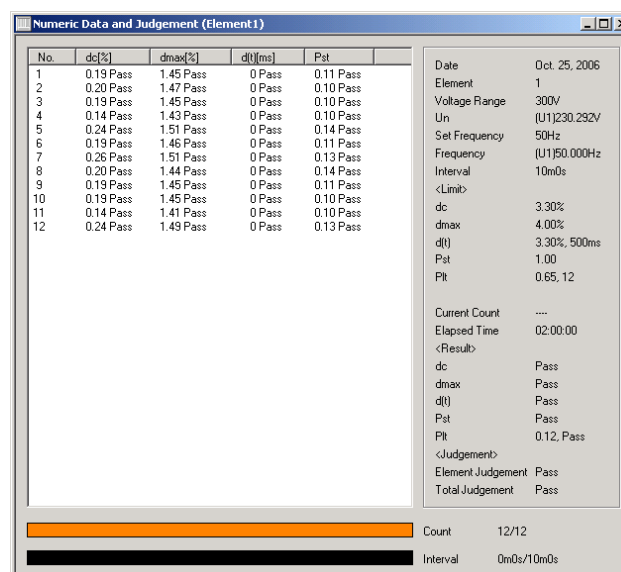
To abort the initialization, click **Stop**.

Starting the Measurement

2. On the **Measure** menu, choose **Start** or click  on the toolbar. The data of the observation period being measured turns light blue in the Numeric Data and Judgement window. In addition, Interval indicates the elapsed time numerically along with a bar graph and Count indicates the number of observation periods that have completed the measurement numerically along with a bar graph.


**Note**

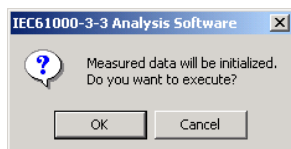
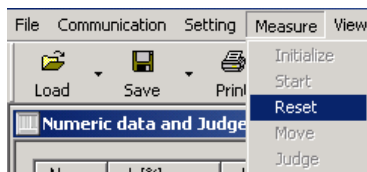
When the measurement of all observation periods is complete, the normal voltage fluctuation and flicker measurement automatically stops. The result and judgement are displayed.



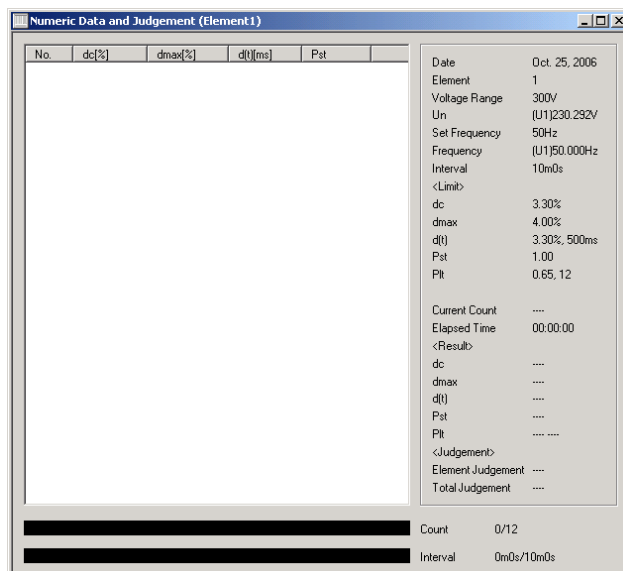
3.5 Executing the Normal Voltage Fluctuation and Flicker Measurement

Aborting the Measurement

3. On the **Measure** menu, choose **Reset** or click  on the toolbar. A dialog box containing the message “Measured data will be initialized. Do you want to execute?” opens.



4. Click **OK**. The dialog box closes, and the measurement is aborted. All the measured data and results up to that point are discarded. In addition, Interval and Count in the Numeric Data and Judgement window are cleared.




Note

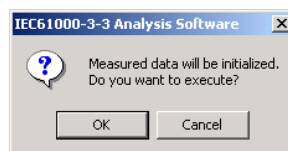
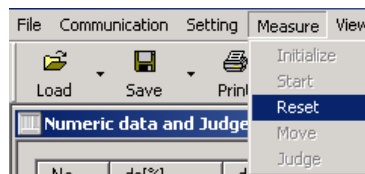
If you click **Cancel**, the dialog box closes, and the measurement continues.

Changing the Judgement Conditions and Re-judging the Measured Data

5. When the normal voltage fluctuation and flicker measurement is complete, change the judgement conditions according to the procedure given in “Setting the Judgement Conditions” in section 3.4. If you change the judgement conditions, the measured voltage fluctuation and flicker data is re-judged, and the judgement is updated.

Resetting the Measurement

6. On the **Measure** menu, choose **Reset** or click  on the toolbar. A dialog box containing the message “Measured data will be initialized. Do you want to execute?” opens.



7. Click **OK**. The dialog box closes, and the measurement is reset. All the measured data, results, and judgement up to that point are discarded. In addition, Interval and Count in the Numeric Data and Judgement window are cleared.

Note

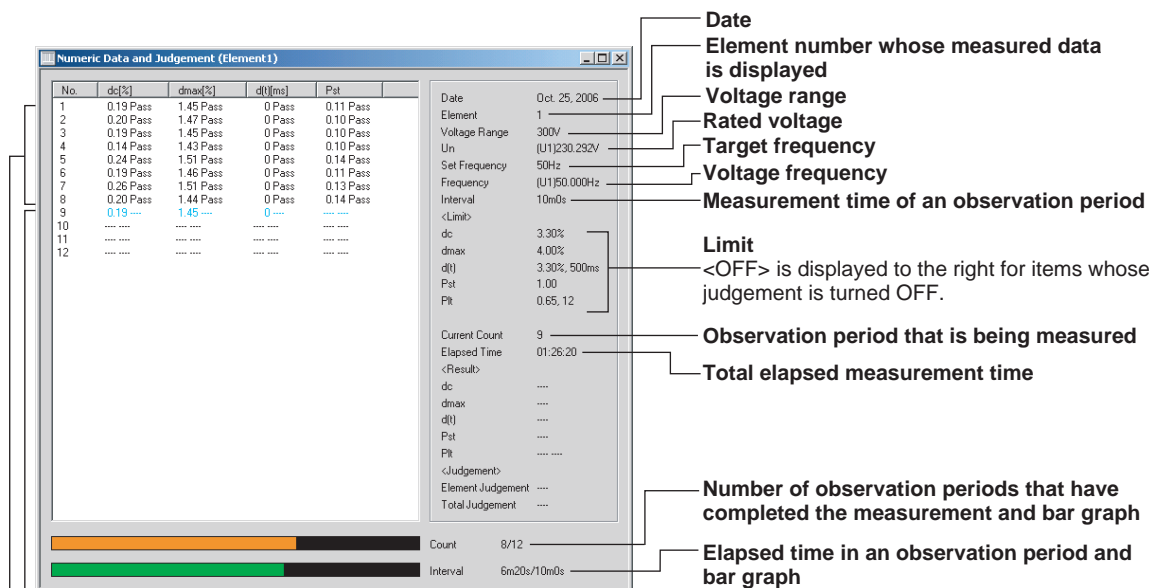
If you do not want to reset the measurement, click **Cancel**.

3.5 Executing the Normal Voltage Fluctuation and Flicker Measurement

Explanation

Display during Measurement

The figure below is a display example of normal voltage fluctuation and flicker measurement in progress.



Observation period being measured

The dc, dmax, and d(t) values being observed are displayed in light blue. The displayed value is the largest value up to that point.

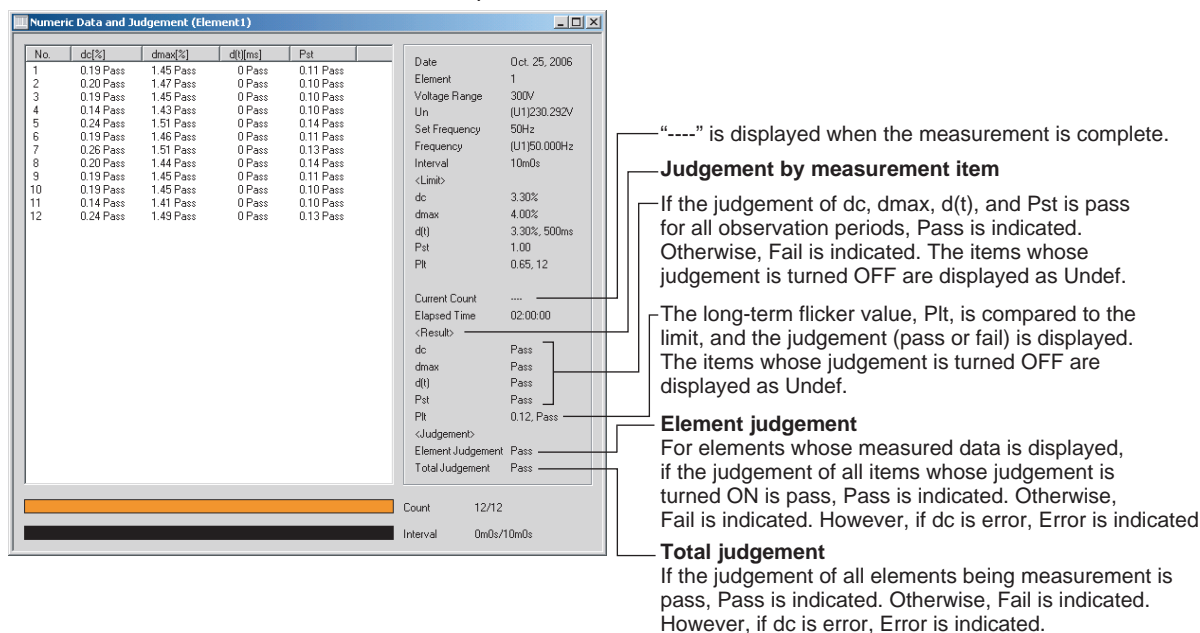
If the instantaneous value every 2 s exceeds the maximum value, the value is updated.

Observation periods that have finished the measurement

- The final values of dc, dmax, and d(t) are compared with the respective limits, and the judgement (pass or fail) is displayed to the right of the final value.
- If a steady-state condition does not occur during the measurement period, it is considered to be a fluctuating condition. The measurement result of dc is displayed as Undef (undefined), and the judgement of dc is displayed as Error.
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgement (pass or fail) is displayed.
- The judgement of items whose judgement is turned OFF is displayed as Undef.

Judgement Display When the Measurement Is Complete

The figure below is a display example when the normal voltage fluctuation and flicker measurement is complete.



“---” is displayed when the measurement is complete.

Judgement by measurement item

If the judgement of dc, dmax, d(t), and Pst is pass for all observation periods, Pass is indicated. Otherwise, Fail is indicated. The items whose judgement is turned OFF are displayed as Undef.

The long-term flicker value, Plt, is compared to the limit, and the judgement (pass or fail) is displayed. The items whose judgement is turned OFF are displayed as Undef.

Element judgement

For elements whose measured data is displayed, if the judgement of all items whose judgement is turned ON is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated.

Total judgement

If the judgement of all elements being measurement is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated.

Note

If an element that is not being measured is assigned to a display target element, Off is displayed by the element number, and all measured data are displayed as blank.

Initializing the Measurement

- The initialization takes approximately 30 s.
- Rms voltage Un and voltage frequency Freq are updated every 2 s while the initialization is in progress in the same manner as when the voltage fluctuation and flicker measurement is reset.
- Keep the voltage of the power supply to be measured in steady-state condition while the initialization is in progress.

Rated Voltage Un and Voltage Frequency Freq

- If the assignment method of rated voltage is AUTO, the rms voltage at the start of measurement is used as rated voltage Un. The measured data is calculated with respect to rated voltage Un.
- If the assignment method of rated voltage is SET, the rated voltage setting is displayed as Un(Set).
- Rated voltage Un and voltage frequency Freq are not updated after the flicker measurement is started.

Resetting the Measurement

To initialize and restart the measurement, reset the measurement after the normal voltage fluctuation and flicker measurement is complete and the flicker measurement status is indicating Complete. You cannot initialize or start the measurement in the Complete status.

In addition, reset the measurement to change the measurement conditions of the normal voltage fluctuation and flicker measurement (section 3.3).

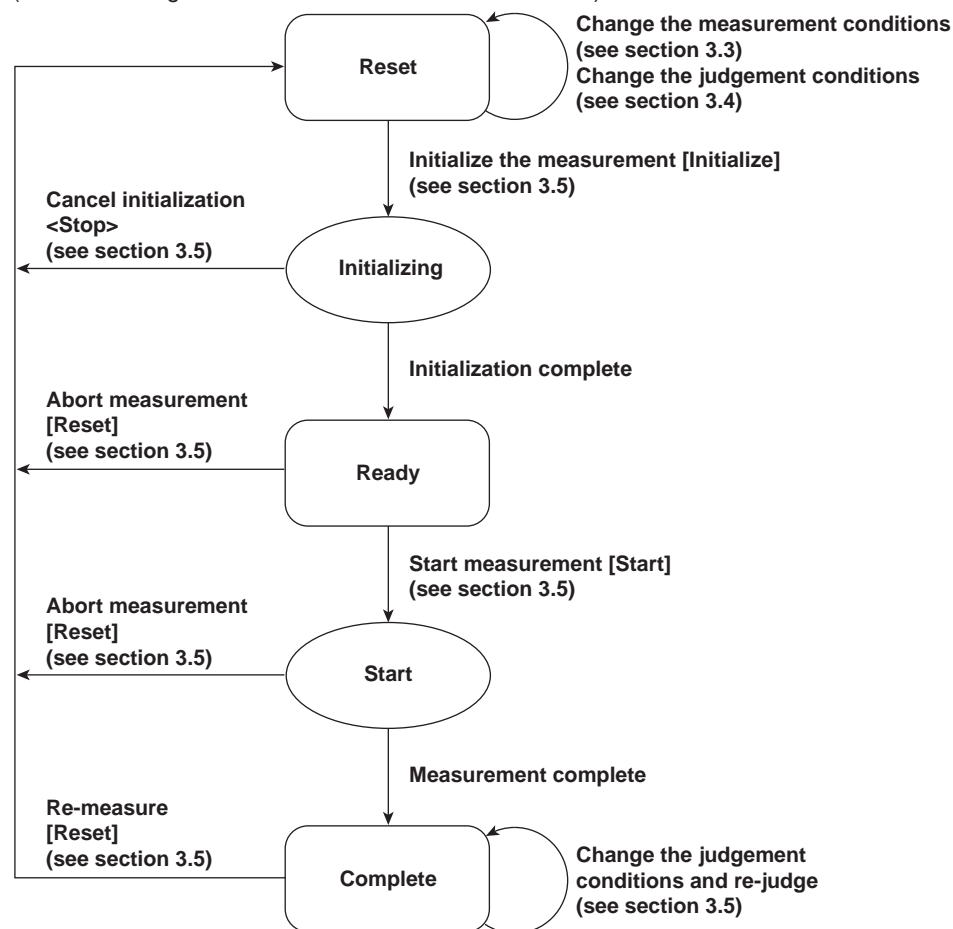
Flicker Measurement Status

The following five flicker measurement statuses are available.

Status	Meaning
Reset	Condition in which the measured value is reset and initialization can be executed.
Initializing	Initializing the measurement.
Ready	Initialized condition in which measurement can be started.
Start	Measurement in progress: Displays the elapsed time.
Complete	Displays the result (judgement by measurement item) and judgement (element judgement and total judgement).

Flow Chart of the Normal Voltage Fluctuation and Flicker Measurement

(Transition Diagram of the Flicker Measurement Status)



Reference sections are indicated in parentheses.

Icons that you use are indicated in brackets (you can also use the Measure menu).

Buttons that you use are enclosed in less than and greater than signs.

3.6 Executing the Measurement of dmax Caused by Manual Switching

Measurement of dmax caused by manual switching complying with IEC 61000-3-3 is executed.


Measures the maximum relative voltage change, dmax, when the EUT switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit.

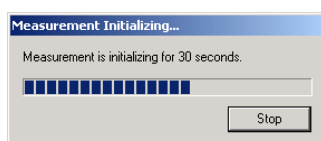
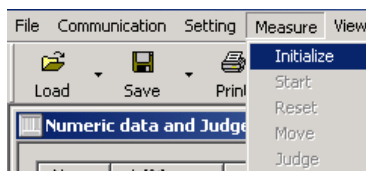
Procedure

Check that the software is in On-Line mode and that the flicker measurement status is indicating Reset (condition in which the measured value is reset and initialization can be executed). If not, set the flicker measurement status to Reset according to the procedure in "Resetting the Measurement" on page 3-24.

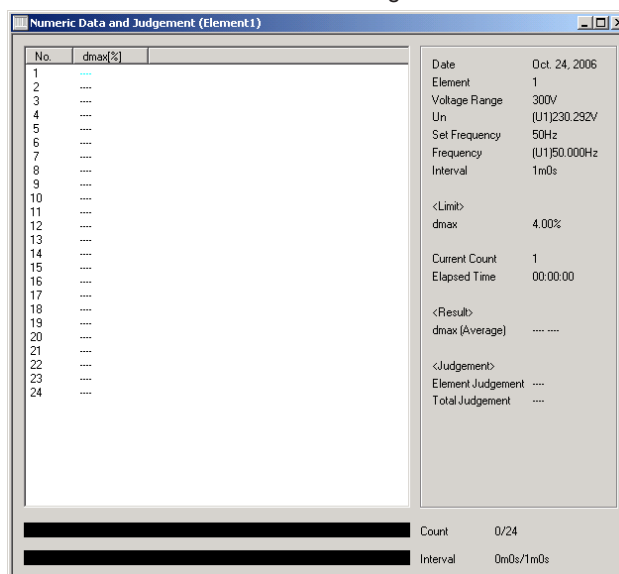
Set the measurement mode to Manual dmax Mode (see section 3.3).

Initializing the Measurement

1. On the **Measure** menu, choose **Initialize** or click  on the toolbar. The Measurement Initializing dialog box opens, and the initialization starts.



When the initialization is complete, the dialog box automatically closes and all measured results in the Numeric Data and Judgement window displays ----. The measurement result of No. 1 turns light blue.




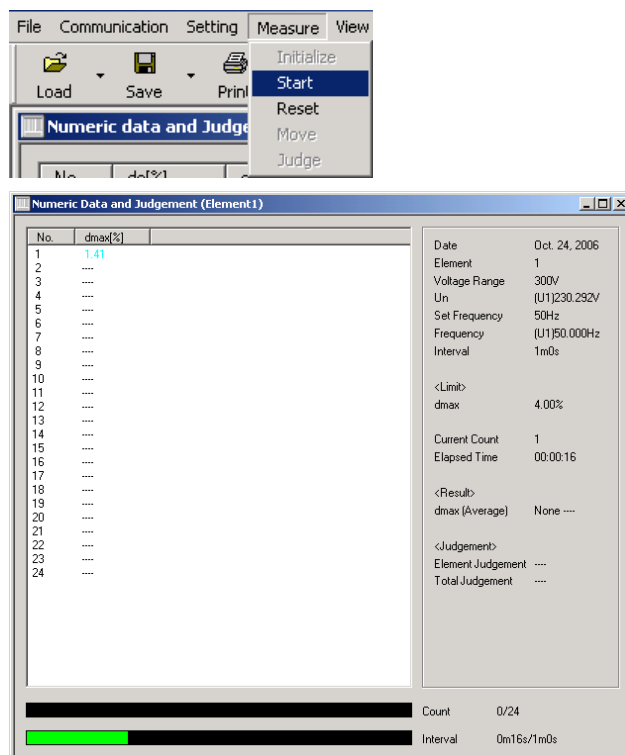
Note

To abort the initialization, click **Stop**.

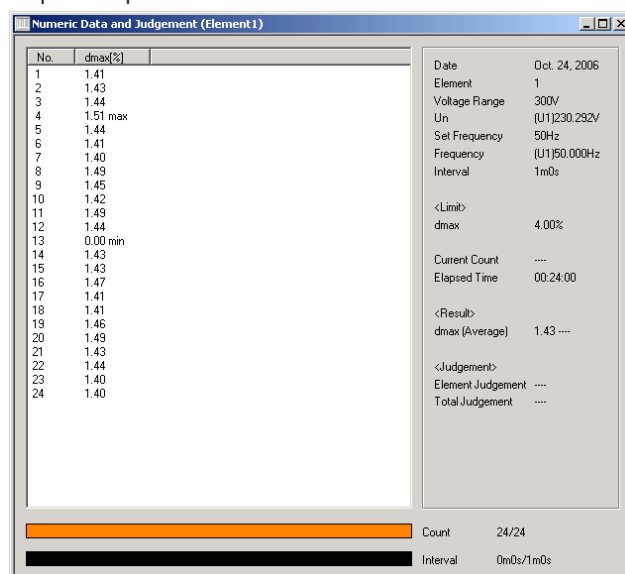
3.6 Executing the Measurement of dmax Caused by Manual Switching

Starting the Measurement

2. On the **Measure** menu, choose **Start** or click  on the toolbar. The data of the observation period being measured turns light blue in the Numeric Data and Judgement window. In addition, Interval indicates the elapsed time numerically along with a bar graph and Count indicates the number of observation periods that have completed the measurement numerically along with a bar graph.




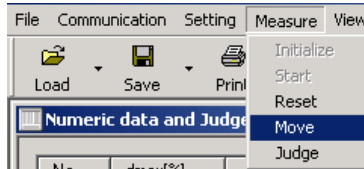
3. Turn the EUT ON to achieve normal operation. Operate the EUT in the normal condition as long as possible in the measurement period of one observation period (1 minute).
4. Turn the EUT OFF before the measurement of one observation period (1 minute) completes. When the measurement of an observation period is complete, the measured result of the next number turns light blue.
5. Repeat steps 2 and 4 to measure dmax 24 times.



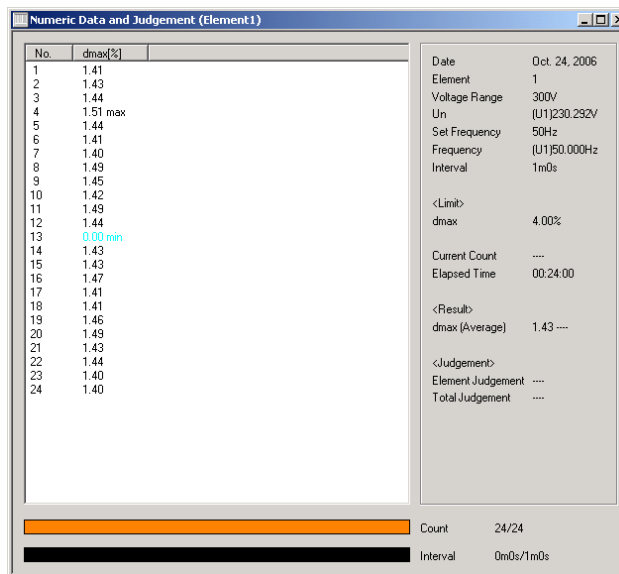
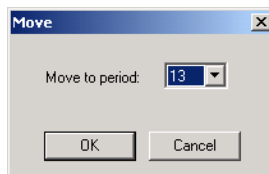
Re-measuring

If a measurement of a given observation period is not performed correctly, you can change the observation period to be measured by carrying out the procedure below and redo the measurement.

- On the **Measure** menu, choose **Move** or click  on the toolbar. The Move dialog box opens.




- Select the number of the observation period you want to re-measure. The measured result of the selected observation period number turns light blue.

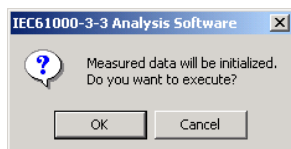
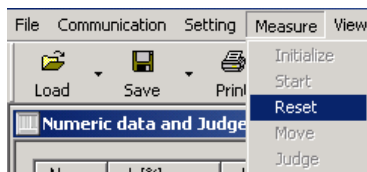


- Carry out steps 2 to 4 to measure dmax.
If you start the re-measurement, the measurement count and graph display shown in Count decrease by one. In addition, the total elapsed time of measurement decreases by one observation period. When the re-measurement is complete, the measured result of the observation period number that completed the measurement turns black.
- If you want to continue with the measurement, repeat steps 2 to 4. To change the observation period to be measured, return to step 6.

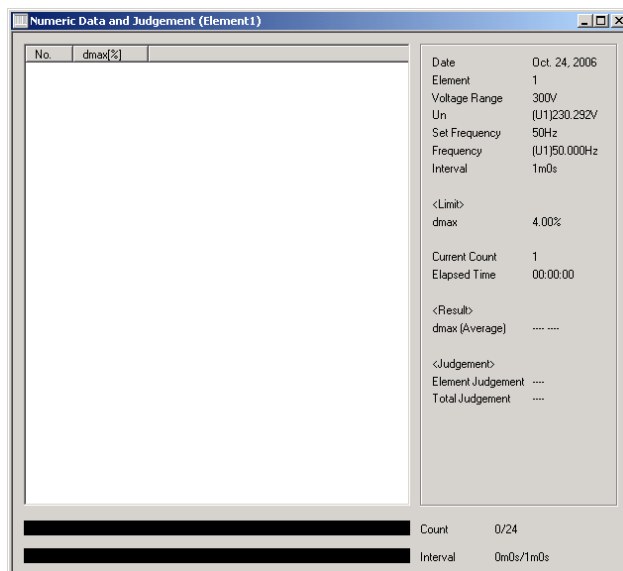
3.6 Executing the Measurement of dmax Caused by Manual Switching

Aborting the Measurement

10. On the **Measure** menu, choose **Reset** or click  on the toolbar. A dialog box containing the message “Measured data will be initialized. Do you want to execute?” opens.




11. Click **OK**. The dialog box closes, and the measurement is aborted. The measured data and judgement results up to that point are discarded. In addition, Interval and Count in the Numeric Data and Judgement window are cleared.

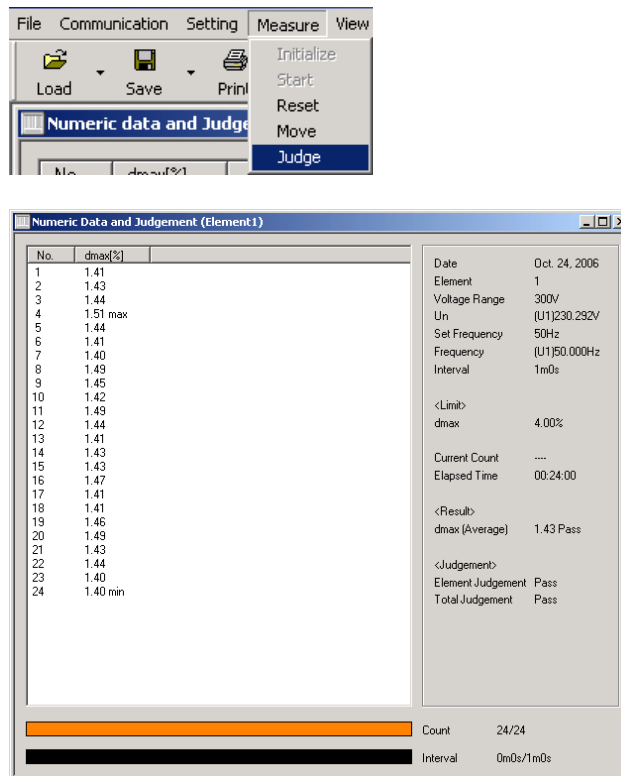


Note

If you click **Cancel**, the dialog box closes, and the measurement continues.

Completing the Measurement and Displaying the Judgement

12. Check that the measurement of all observation periods (24) is complete, and that the dmax data of each observation period is displayed.
13. On the **Measure** menu, choose **Judge** or click  on the toolbar. The dmax data of all observation periods is confirmed, and the measurement of dmax caused by manual switching is complete. The flicker measurement status changes to Complete, and the result and judgement of the average of the measured dmax are displayed.




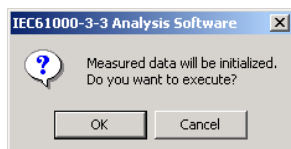
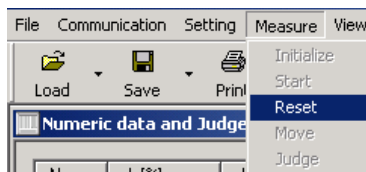
Changing the Judgement Conditions and Re-judging the Measured Data

14. When the measurement of dmax caused by manual switching is complete, change the judgement conditions according to the procedure given in "Setting the Judgement Conditions" in section 3.4. If you change the judgement conditions, the average data of the measured dmax is re-judged, and the judgement is updated.

3.6 Executing the Measurement of dmax Caused by Manual Switching

Resetting the Measurement

15. On the **Measure** menu, choose **Reset** or click  on the toolbar. A dialog box containing the message “Measured data will be initialized. Do you want to execute?” opens.



16. Click **OK**. The dialog box closes, and the measurement is reset. All the measured data, results, and judgement up to that point are discarded. In addition, Interval and Count in the Numeric Data and Judgement window are cleared.

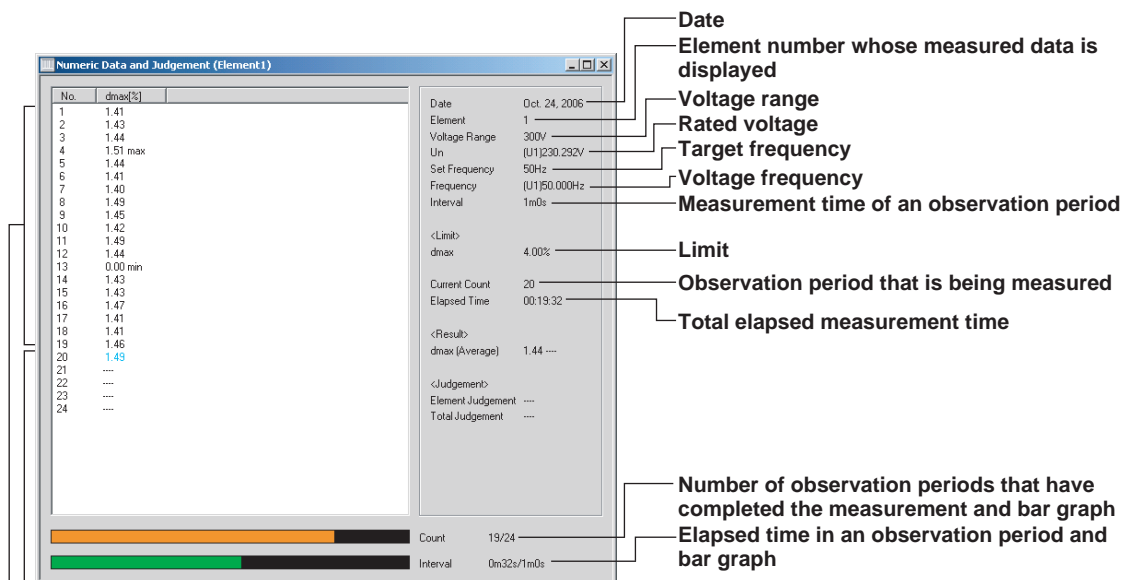
Note

If you do not want to reset the measurement, click **Cancel**.

Explanation

Display during Measurement

The figure below is a display example of the measurement of dmax caused by manual switching in progress.



Observation period being measured

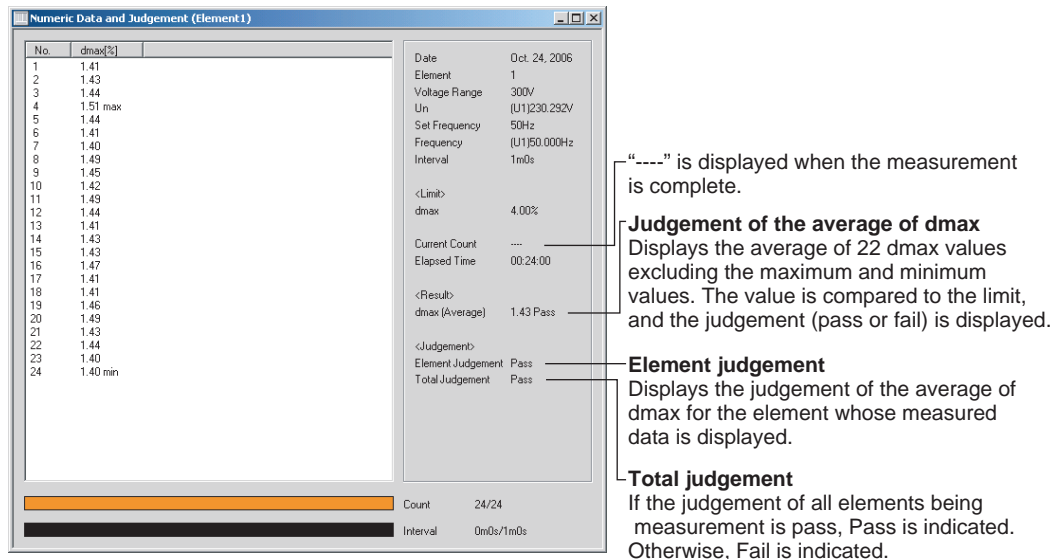
The dmax value being observed are displayed in light blue. The displayed value is the largest value up to that point. If the instantaneous value every 2 s exceeds the maximum value, the value is updated.

Observation periods that have finished the measurement

Displays the dmax value of each observation period for which the measurement has been completed. The maximum and minimum values over all observation periods are indicated as max and min, respectively.

Judgement Display When the Measurement Is Complete

The figure below is a display example when the measurement of dmax caused by manual switching is complete.



Note

If an element that is not being measured is assigned to a display target element, Off is displayed by the element number, and all measured data are displayed as blank.

Initializing the Measurement

- The initialization takes approximately 30 s.
- Rms voltage Un and voltage frequency Freq are updated every 2 s while the initialization is in progress in the same manner as when the voltage fluctuation and flicker measurement is reset.
- Keep the voltage of the power supply to be measured in steady-state condition while the initialization is in progress.

Rated Voltage Un and Voltage Frequency Freq

- If the assignment method of rated voltage is AUTO, the rms voltage at the start of the first measurement is used as rated voltage Un. The measured data is calculated with respect to rated voltage Un.
- If the assignment method of rated voltage is SET, the rated voltage setting is displayed as Un(Set).
- Rated voltage Un and voltage frequency Freq are fixed to the first measured values after the measurement of dmax caused by manual switching is started and are not updated.

Resetting the Measurement

To initialize and restart the measurement, reset the measurement after the measurement of dmax caused by manual switching is complete and the flicker measurement status is indicating Complete. You cannot initialize or start the measurement in the Complete status.

In addition, reset the measurement to change the measurement conditions of the the measurement of dmax caused by manual switching (section 3.3).

3.6 Executing the Measurement of dmax Caused by Manual Switching

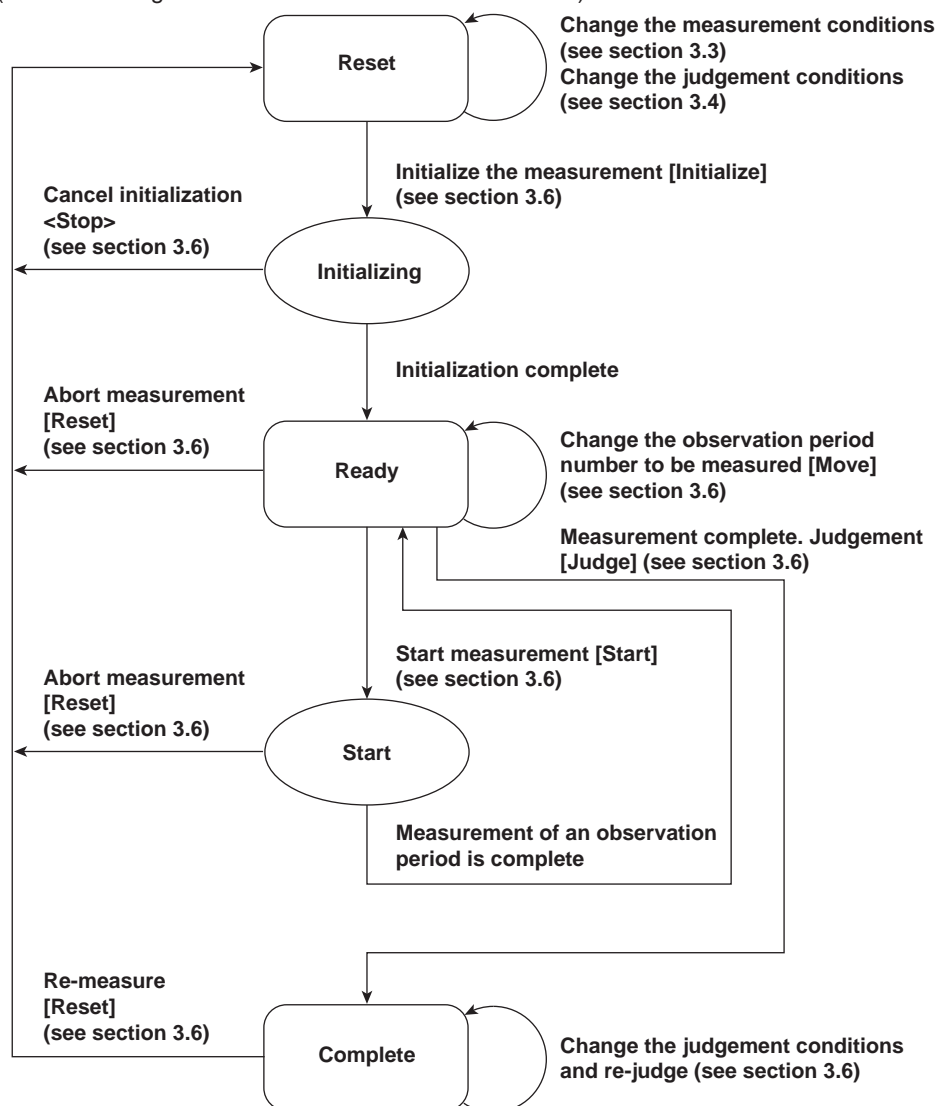
Flicker Measurement Status

The following five flicker measurement statuses are available.

Status	Meaning
Reset	Condition in which the measured value is reset and initialization can be executed.
Initializing	Initializing the measurement.
Ready	Initialized condition in which measurement can be started.
Start	Measurement in progress: Displays the elapsed time.
Complete	Displays the result (judgement by measurement item) and judgement (element judgement and total judgement).

Flow Chart of the Measurement of dmax Caused by Manual Switching

(Transition Diagram of the Flicker Measurement Status)



Reference sections are indicated in parentheses.

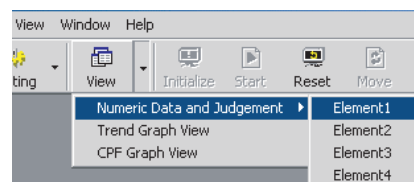
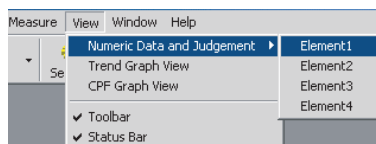
Icons that you use are indicated in brackets (you can also use the Measure menu).

Buttons that you use are enclosed in less than and greater than signs.

4.1 Displaying the Numeric Data and Judgement

Procedure

On the **View** menu, choose **Numeric Data and Judgement > Element1** (or **2**, **3**, or **4**) or click **View > Numeric Data and Judgement > Element1** (or **2**, **3**, or **4**). The Numeric Data and Judgement (Element1) (or Element2, 3, or 4) window opens.



Note

- You can only select Numeric Data and Judgement in Off-Line mode with the measured data loaded.
- In On-Line mode, the numeric data and judgement view is displayed for the element that is selected in the measurement conditions of the WT. Therefore, you do not have to carry out this procedure.

Normal Voltage Fluctuation and Flicker Measurement

Measured value and judgement for each observation period

The screenshot shows the 'Numeric Data and Judgement (Element1)' window. It contains a table of measured values and a summary of judgement results.

No.	dc[%]	dmax[%]	d(t)[ms]	Pat
1	0.19 Pass	1.45 Pass	0 Pass	0.11 Pass
2	0.20 Pass	1.47 Pass	0 Pass	0.10 Pass
3	0.19 Pass	1.45 Pass	0 Pass	0.10 Pass
4	0.14 Pass	1.43 Pass	0 Pass	0.10 Pass
5	0.24 Pass	1.51 Pass	0 Pass	0.14 Pass
6	0.19 Pass	1.46 Pass	0 Pass	0.11 Pass
7	0.26 Pass	1.51 Pass	0 Pass	0.13 Pass
8	0.20 Pass	1.44 Pass	0 Pass	0.14 Pass
9	0.19 Pass	1.45 Pass	0 Pass	0.11 Pass
10	0.19 Pass	1.45 Pass	0 Pass	0.10 Pass
11	0.14 Pass	1.41 Pass	0 Pass	0.10 Pass
12	0.24 Pass	1.49 Pass	0 Pass	0.13 Pass

Measurement conditions:

- Date: Oct. 25, 2006
- Element: 1
- Voltage Range: 300V
- Un: (U1)230.232V
- Set Frequency: 50Hz
- Frequency: (U1)50.000Hz
- Interval: 10m0s

Limit:

- dc: 3.30%
- dmax: 4.00%
- d(t): 3.30%, 500ms
- Pat: 1.00
- Pft: 0.65, 12

Judgement by measurement item:

- dc: Pass
- dmax: Pass
- d(t): Pass
- Pat: Pass
- Pft: 0.12, Pass

Element judgement:

- Element Judgement: Pass

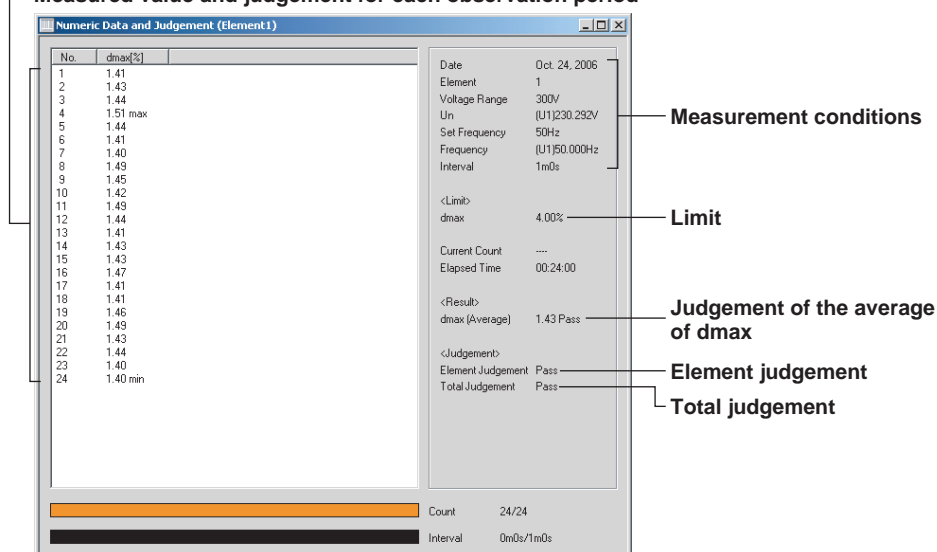
Total judgement:

- Total Judgement: Pass

Count: 12/12
Interval: 0m0s/10m0s

Measurement of dmax Caused by Manual Switching

Measured value and judgement for each observation period



Explanation

Measurement Conditions

The date, the element number for which the measured data is displayed, the voltage, the rated voltage (Un), the target frequency (specified frequency), the voltage frequency, and the measurement interval of each observation period are displayed.

Limit

- Displays dc, dmax, d(t), Pst, and Plt for normal voltage fluctuation and flicker measurement.
- Displays dmax for measurement of dmax caused by manual switching.

Current Count

Displays the number of the observation period currently being measured. When the measurement is complete, ---- is displayed.

Elapsed Time

Displays the total elapsed time of measurement.

Measured Value and Judgement for Each Observation Period

Normal Voltage Fluctuation and Flicker Measurement

- The final values of dc, dmax, and d(t) are compared with the respective limits, and the judgement (pass or fail) is displayed to the right of the final value.
- If a steady-state condition does not occur during the measurement period, it is considered to be a fluctuating condition. The measurement result of dc is displayed as Undef (undefined), and the judgement of dc is displayed as Error.
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgement (pass or fail) is displayed.
- The judgement of items whose judgement is turned OFF is displayed as Undef.

Measurement of dmax Caused by Manual Switching

The words max and min are indicated to the right of the maximum and minimum dmax values over all observation periods, respectively.

Judgement by Measurement Item (Normal Voltage Fluctuation and Flicker Measurement)

- If the judgement of dc, dmax, d(t), and Pst is pass for all observation periods, Pass is indicated. Otherwise, Fail is indicated. The items whose judgement is turned OFF are displayed as Undef.
- Compares the long-term flicker value, Plt, to the limit, and displays the judgement (pass or fail). The items whose judgement is turned OFF are displayed as Undef.

Judgement of the Average of dmax (Measurement of dmax Caused by Manual Switching)

Displays the average of 22 dmax values excluding the maximum and minimum values. The values are compared with limit, and the judgement (pass or fail) is displayed.

Element Judgement**Normal Voltage Fluctuation and Flicker Measurement**

For elements whose measured data is displayed, if the judgement of all items whose judgement is turned ON is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated.

Measurement of dmax Caused by Manual Switching

Displays the judgement of the average of dmax for the element whose measured data is displayed.

Total Judgement

If the judgement of all elements being measurement is pass, Pass is indicated. Otherwise, Fail is indicated. However, if dc is error, Error is indicated in normal voltage fluctuation and flicker measurement.

Count

Displays the number of observation periods that have completed the measurement and bar graph.

Interval

Displays the elapsed time within an observation period and bar graph.

Selecting the Element for Displaying the Measured Data

You can select the element from below. The selectable items vary depending on the installed elements.

Element1, Element2, Element3, and Element4

Note

If an element that is not being measured is assigned to a display target element, Off is displayed by the element number, and all measured data are displayed as blank.

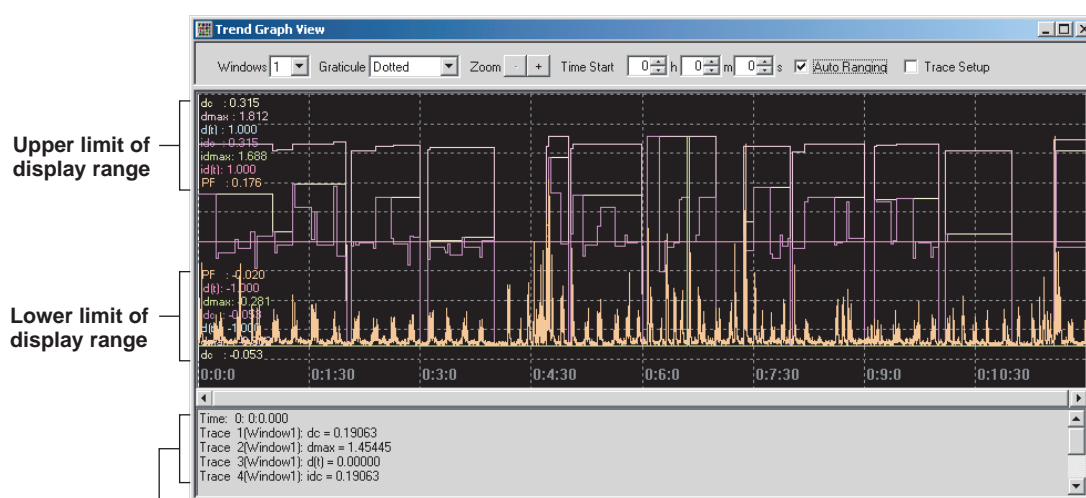
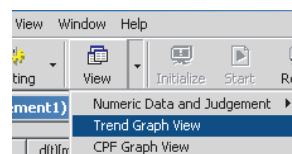
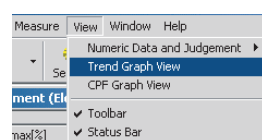
For the display in On-Line mode, see section 3.5 (normal voltage fluctuation and flicker measurement) and 3.6 (measurement of dmax caused by manual switching).

4.2 Displaying the Trend Graph

Procedure

Displaying the Trend Graph

On the **View** menu, choose **Trend Graph View** or click **View > Trend Graph View** on the toolbar. The Trend Graph View window opens.



Time: Time at the cursor position
Trace: Trend display data at the cursor position

Note

- This view is available only for normal voltage fluctuation and flicker measurement.
- You can only select Trend Graph View in Off-Line mode with the measured data loaded.
- If you change the size of the trend window while the trend graph is displayed, the size of the trend display area also changes.
- The data update interval of the Trend Graph View is 2 s.

Setting the Trend Graph

Windows

Select the number of displayed waveform windows between 1 and 4. 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 display the waveform.

Graticule

Select the grid type to be displayed in the trend display area (**Dotted**, **Line**, or **None**).

- Dotted: Use dotted lines for the grid.
- Line: Use lines for the grid.
- None: Not display the grid.

Auto Ranging

- **If the Auto Ranging Check Box Is Selected**

The range automatically switches according to the retrieved value.

- **If 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).

Cursor

Click in the trend display area to show the cursor at the clicked position. You can drag the displayed cursor.

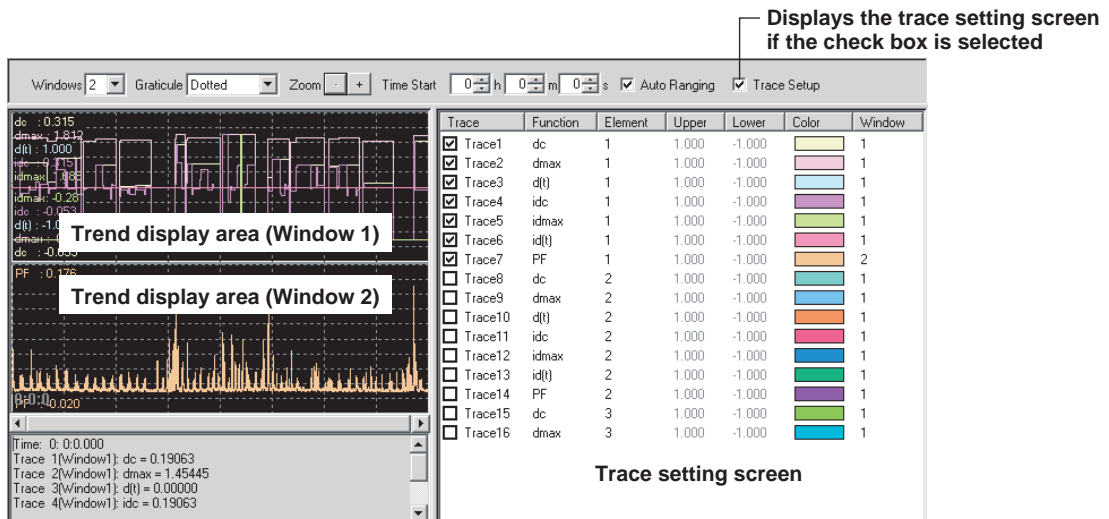
4.2 Displaying the Trend Graph

Setting the Trace

Select the **Trace Setup** check box. The trace setup screen appears to the right of the trend graph display.

Note

If you clear the **Trace Setup** check box, the trace setup screen disappears.



Trace

Select the trends you want to display (select or clear the check boxes). Up to 16 trends can be displayed.

Function

Select the measurement function to be displayed.

1. Click on the **Function** column. A combo box opens.
2. Select the measurement function.

Note

You can select from the following measurement functions.

- dc Relative steady-state voltage change
- dmax Maximum relative voltage change
- d(t) Period during which relative voltage change exceeds the threshold level
- idc Instantaneous relative steady-state voltage change
- idmax Instantaneous maximum relative voltage change
- id(t) Period during which instantaneous relative voltage change exceeds the threshold level
- PF Instantaneous flicker sensation (IFS)

Element

Select the element to be displayed.

1. Click on the **Element** column. A combo box opens.
2. Select the element.

Upper and 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 display color of the trend.

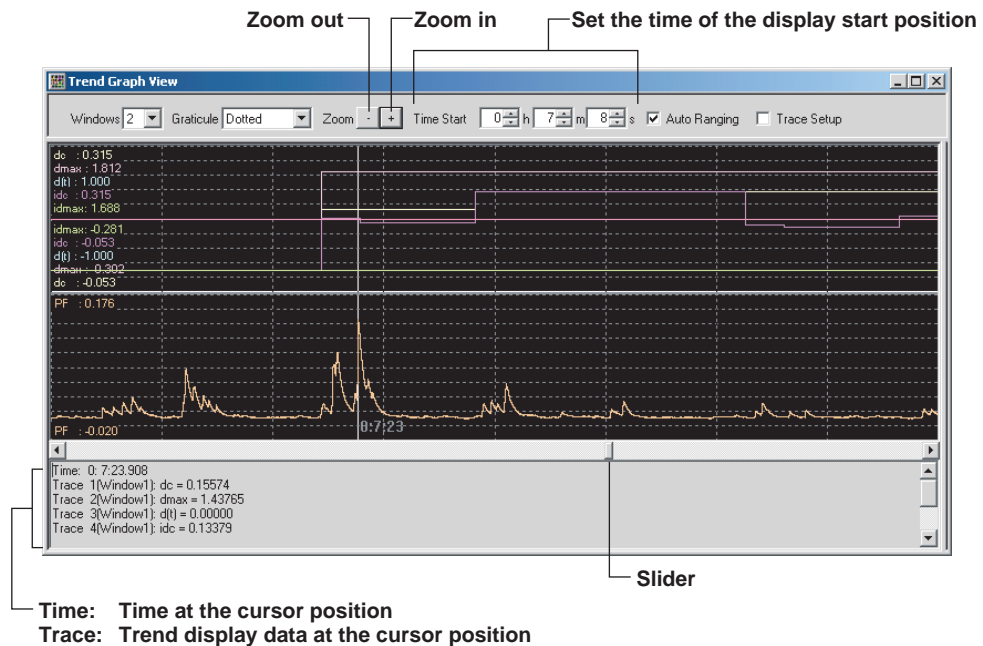
1. Click on the **Color** column. A combo box opens.
2. Select the display color of the trend.

Window

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

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

Zooming In/Out



Time: Time at the cursor position
Trace: Trend display data at the cursor position

Zoom – and +

You can zoom in or out of the time axis in the trend display area.

Zooming In

1. Click **Zoom+**. The waveform in the trend waveform area is magnified.
2. Drag the **slider** to the desired time position on the waveform. You can also set the **Time Start** value.

Zooming Out

3. Click **Zoom-**. The waveform in the trend waveform area is reduced.

Note

Each time you click **Zoom+**, the display is magnified by a factor of 2. You can zoom up to a display time of 2 s in the trend display area.

Each time you click **Zoom-**, the display is reduced by a factor of 2. You can zoom out to the elapsed time in the trend display area.

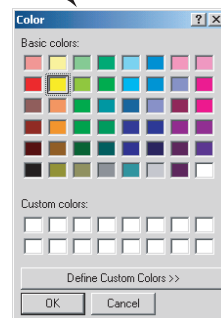
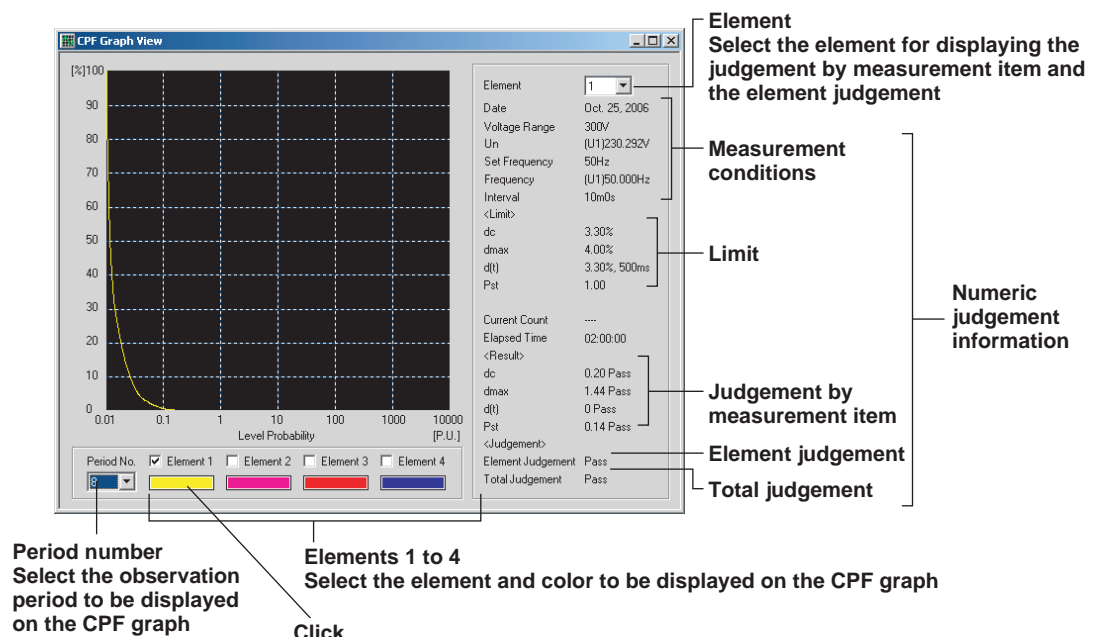
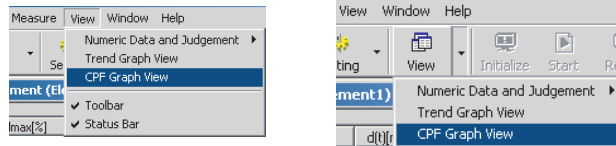
Time Start

Sets the time of the display start position of the trend display area. This is valid when you zoom in on the display. It is linked to the slider.

4.3 Displaying the CPF Graph

Procedure

On the **View** menu, choose **CPF Graph View** or click **View > CPF Graph View** on the toolbar. The CPF Graph View window opens.



Note

- This view is available only for normal voltage fluctuation and flicker measurement.
- You can only select CPF Graph View in Off-Line mode with the measured data loaded.
- The CPF graph is displayed for each observation period selected by the period number.
- You can display the CPF graph of an observation period that has finished the measurement even while the measurement is in progress. You cannot display the CPF graph of an observation period that is being measured.

Explanation

Period No.

Selects the observation period to be displayed on the CPF graph.

If you select a non-existing observation period, the waveform is not displayed.

Element1 to Element4

Selects the element and color to be displayed on the CPF graph.

Up to four elements can be displayed simultaneously.

You can set a separate color for each element.

Element

Selects the element for displaying the judgement by measurement item and the element judgement.

Numeric Data and Judgement Information

Displays the measurement conditions, limits, measurement count, elapsed time, results (judgement by measurement item) and judgement (element judgement and total judgement).

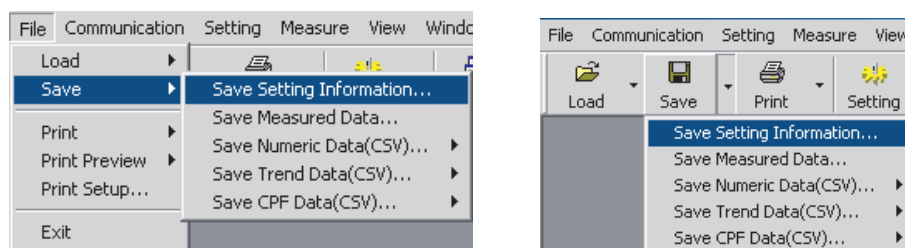
The contents are the same as those of numeric data and judgement. For details, see section 4.1.

5.1 Saving the Setting Information and Measured Data

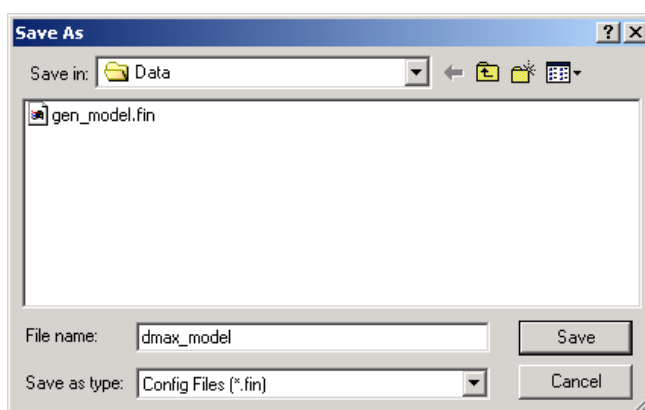
Procedure

Saving the Setting Information

1. On the **File** menu, choose **Save > Save Setting Information** or click **Save > Save Setting Information** on the toolbar. The Save As dialog box opens.



2. After selecting a folder in the **Save in** box, enter the name of the file you want to save in the **File name** box.
3. Click **Save** to save the setting information.



Note

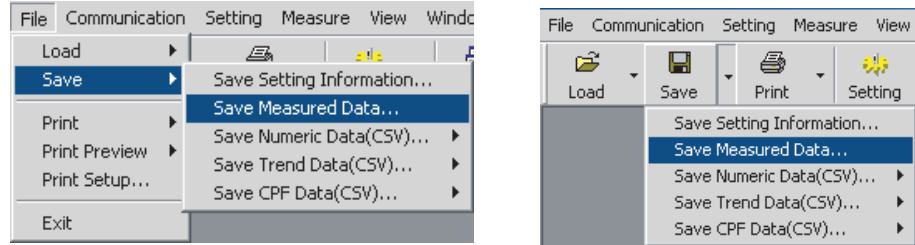
- You cannot save the setting information in Off-Line mode.
- You cannot save the setting information while the measurement is in progress.

5.1 Saving the Setting Information and Measured Data

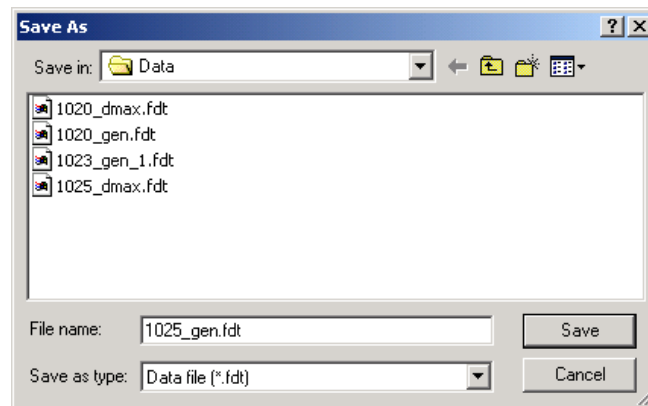
Saving the Measured Data

You can save the measured data when the measured data has been retrieved (or loaded).

1. On the **File** menu, choose **Save Measured Data** or click **Save > Save Measured Data** on the toolbar. The Save As dialog box opens.



2. After selecting a folder in the **Save in** box, enter the name of the file you want to save in the **File name** box.
3. Click **Save** to save the measured data.



Note

You cannot save the measured data while the measurement is in progress.

Explanation

Saving the Setting Information

When in On-Line mode, you can save various types of setting information including the measurement conditions (see section 3.3), judgement conditions (see section 3.4), graph view (sections 4.2 and 4.3), and title and comment of reports (see section 6.1) that you have set using the software.

File Name and Extension

- You can set any file name that is allowed by your PC.
- Extension: .fin

Saving the Measured Data

- The voltage fluctuation and flicker measurement data retrieved from the WT into the PC using the software can be saved to a file. When you save the measured data, the voltage fluctuation and flicker measurement conditions of the WT specified using the software and setting information described above are also saved.
- You can save the measured data when the measured data has been retrieved (or loaded).
- The measured data of all elements that have been retrieved (or loaded) is saved.

File Name and Extension

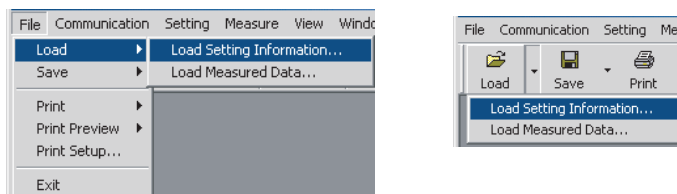
- You can set any file name that is allowed by your PC.
- Extension: .fdt

5.2 Loading Setting Information and Measured Data

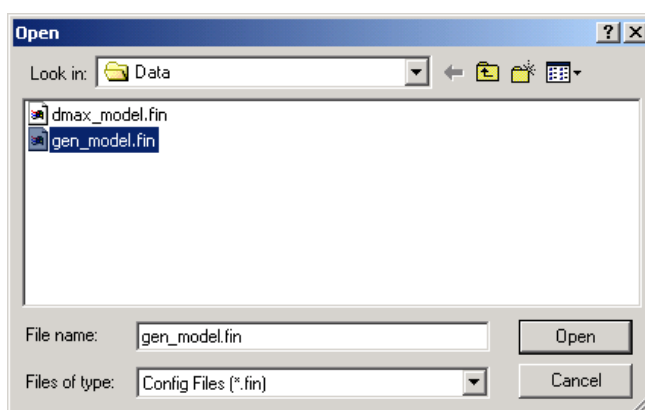
Procedure

Loading the Setting Information

1. On the **File** menu, choose **Load > Load Setting Information** or click **Load > Load Setting Information** on the toolbar. The Open dialog box opens.



2. Select a file and click **Open**. The setting information of the selected file is loaded.



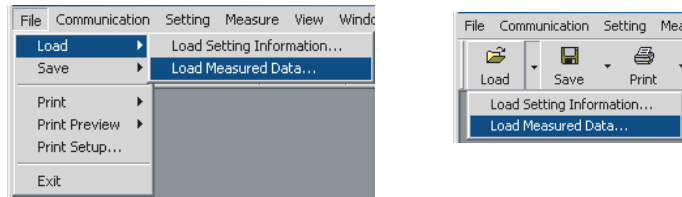
Note

- You cannot load the setting information in Off-Line mode.
- If an error occurs while loading the setting information, the settings are reset to their default values.
- If an error occurs while loading the setting information, measured data, or waveform data, the data may not be loaded properly. Check the file name and extension, and load the data again.
- You cannot load the setting information while the measurement is in progress.

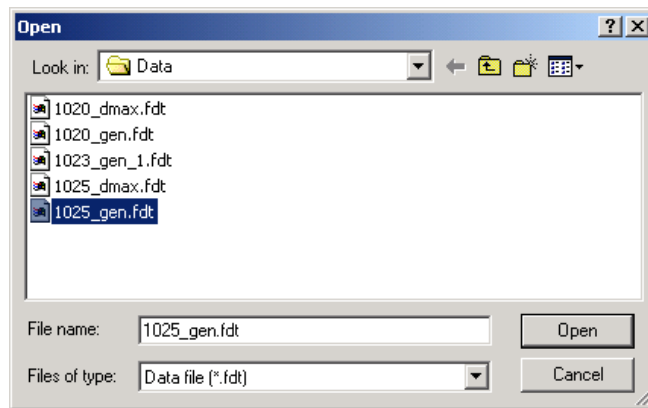
5.2 Loading Setting Information and Measured Data

Loading the Measured Data

1. On the **File** menu, choose **Load > Load Measured Data** or click **Load > Load Measured Data** on the toolbar. The Open dialog box opens.



2. Select a file and click **Open**. The measured data of the selected file is loaded.



Note

- If an error occurs while loading the measured data, the data may not be loaded properly. Check the file name and extension, and load the data again.
- You cannot load the measured data while the measurement is in progress.

Explanation

Loading the Setting Information

- The setting information saved in section 5.1 can be loaded.
- The extension of the loaded file is .fin.
- The details of the setting information are as follows:
 - Measurement conditions (see section 3.3)
 - Judgement conditions (see section 3.4)
 - Graph view (see sections 4.2 and 4.3)
 - Title and comment of reports (see section 6.1)Reports of measurement data retrieved from the WT or loaded from a file can be printed with the loaded title or comment. For details, see chapter 6.

Note

The setting information cannot be loaded if the flicker measurement status is not Reset. For details on the flicker measurement status, see section 3.5 or 3.6.

Loading the Measured Data

The measurement data and setting information saved in section 5.1 can be loaded.

Note

If you load measured data in On-Line mode, the mode switches to Off-Line.

5.3 Saving Numeric Data in CSV Format

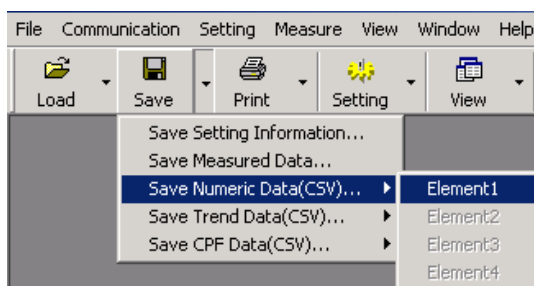
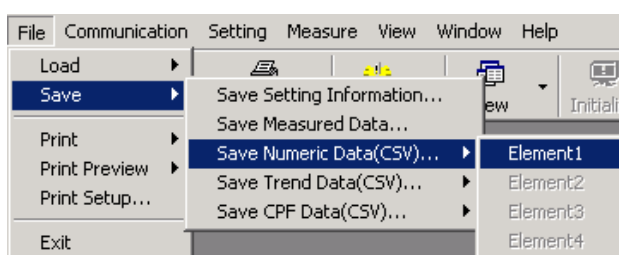
Procedure

You can save the numeric data to CSV format when the measured data has been retrieved (or loaded).

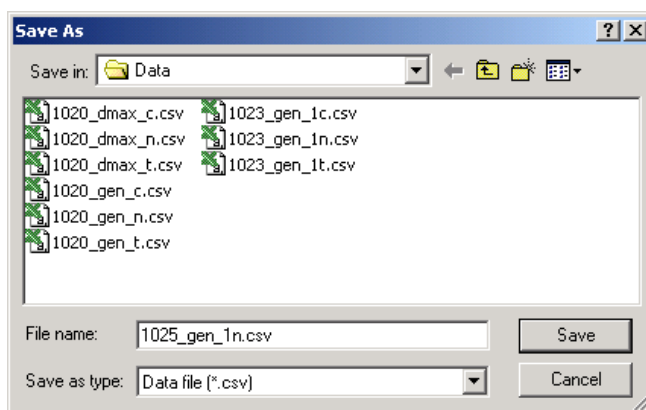
Note

- You cannot save the numeric data in CSV format if there is no measured data.
- You cannot save the numeric data in CSV format while the measurement is in progress.

1. On the **File** menu, choose **Save > Save Numeric Data(CSV) > Element1** (or **2**, **3**, or **4**). The Save As dialog box opens. You can also click **Save > Save Numeric Data(CSV) > Element1** (or **2**, **3**, or **4**) on the toolbar.



2. After selecting a folder in the **Save in** box, enter the name of the file you want to save in the **File name** box.
3. Click **Save** to save the numeric data in CSV format.



5.3 Saving Numeric Data in CSV Format

Explanation

You can save the numeric data to CSV format when the measured data has been retrieved (or loaded). A file in CSV format can be opened using a spreadsheet application (such as Microsoft Excel) on your PC.

File Name and Extension

You can set any file name that is allowed by your PC.

- Extension: .csv

Example When the Numeric Data Saved in CSV Format Is Opened Using Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE : Wed Oct 25 11:03:33 2006											
2	Element : 1											
3	Volt.Range (V) : 300.00											
4	Un U1 (V) : 230.35											
5	Set Freq (Hz) : 50											
6	Freq U1 (Hz) : 50.000											
7	Interval: 10m0s											
8	<Limit>											
9	dc (%) : 3.30											
10	dmax (%) : 4.00											
11	d(t) (ms/%) : 500/3.30											
12	Pst : 1.00											
13	Plt : 0.65/12											
14	<Result>											
15	Element Judgement : Pass											
16	Total Judgement : Pass											
17	(Element 1 2 3 4)											
18	Observation period ↓	dc		dmax		d(t)		Pst		Plt		
19		1	0.33 Pass	1.5 Pass	0 Pass	0.12 Pass						
20		2	0.23 Pass	1.41 Pass	0 Pass	0.1 Pass						
21		3	0.23 Pass	1.41 Pass	0 Pass	0.11 Pass						
22		4	0.23 Pass	1.41 Pass	0 Pass	0.12 Pass						
23		5	0.24 Pass			0.1 Pass						
24		6	0.25 Pass			0.12 Pass						
25		7	0.29 Pass			0.12 Pass						
26		8	0.29 Pass	1.45 Pass	0 Pass	0.14 Pass						
27		9	0.24 Pass	1.4 Pass	0 Pass	0.1 Pass						
28		10	0.29 Pass	1.46 Pass	0 Pass	0.12 Pass						
29		11	0.33 Pass	1.47 Pass	0 Pass	0.16 Pass						
30		12	0.34 Pass	1.49 Pass	0 Pass	0.15 Pass						
31	Result		Pass	Pass	Pass	Pass		0.12 Pass				
32												
33												
34												

Judgement by measurement item

5.4 Saving Trend Data in CSV Format

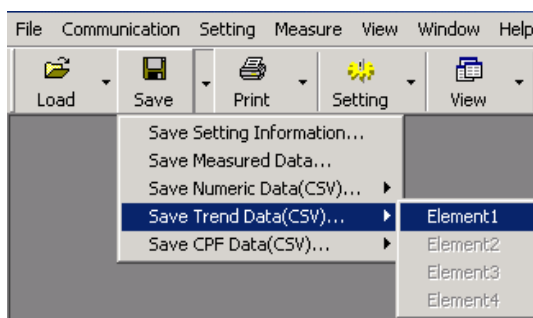
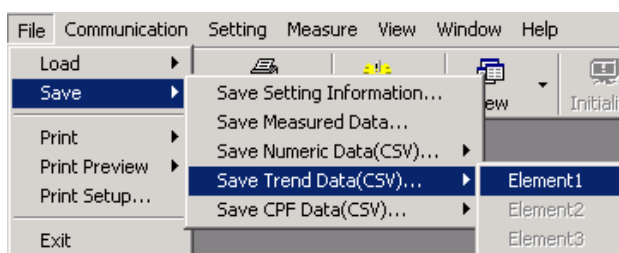
Procedure

In normal voltage fluctuation and flicker measurement, you can save the trend data to CSV format when the measured data has been retrieved (or loaded).

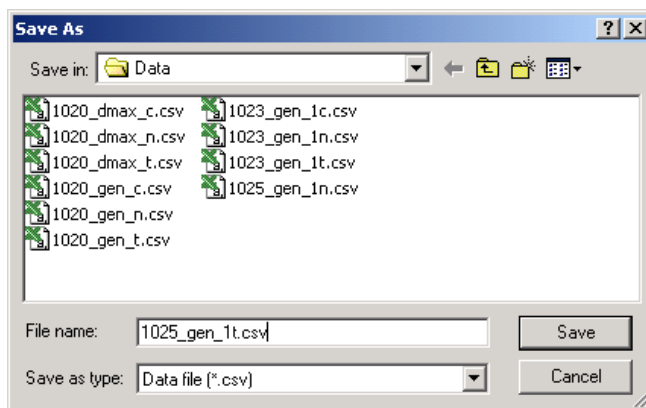
Note

- You cannot save the trend data in CSV format if there is no measured data.
- You cannot save the trend data in CSV format while the measurement is in progress.

1. On the **File** menu, choose **Save > Save Trend Data(CSV) > Element1** (or 2, 3, or 4). The Save As dialog box opens. You can also click **Save > Save Trend Data(CSV) > Element1** (or 2, 3, or 4) on the toolbar.



2. After selecting a folder in the **Save in** box, enter the name of the file you want to save in the **File name** box.
3. Click **Save** to save the trend data in CSV format.



5.4 Saving Trend Data in CSV Format

Explanation

In normal voltage fluctuation and flicker measurement, you can save the trend data to CSV format when the measured data has been retrieved (or loaded). A file in CSV format can be opened using a spreadsheet application (such as Microsoft Excel) on your PC.

File Name and Extension

You can set any file name that is allowed by your PC.

- Extension: .csv

Example When the Trend Data Saved in CSV Format Is Opened Using Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE : Wed Oct 25 11:03:33 2006											
2	Element : 1											
3	Volt. Range (V) : 300.00											
4	Un U1 (V) : 230.35											
5	Set Freq (Hz) : 50											
6	Freq U1 (Hz) : 50.000											
7	Interval: 10m0s											
8	<Limit>											
9	dc (%) : 3.30											
10	dmax (%) : 4.00											
11	d(t) (ms/%) : 500/3.30											
12	Pst : 1.00											
13	Plt : 0.65/12											
14	<Result>											
15	Element Judgement : Pass											
16	Total Judgement : Pass											
17	(Element 1 2 3 4)											
18												
19		dc[%]	dmax[%]	d(t)[ms]	instant dc[%]	instant dmax[%]	instant d(t)[ms]	pf1[%]	pf2[%]	pf3[%]	pf4[%]	pf5[%]
20	1	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
21	2	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
22	3	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
23	4	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
24	5	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
25	6	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
26	7	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
27	8	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
28	9	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
29	10	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
30	11	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
31	12	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
32	13	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
33	14	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01
34	15	0.33	1.5	0	0.22	0	0	0.01	0.01	0.01	0.01	0.01

5.5 Saving CPF Data in CSV Format

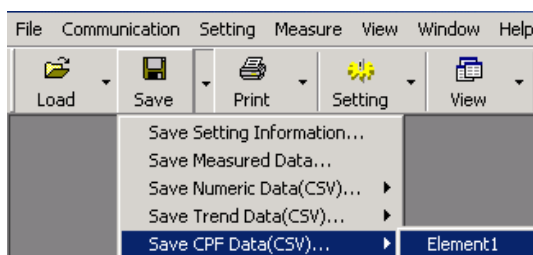
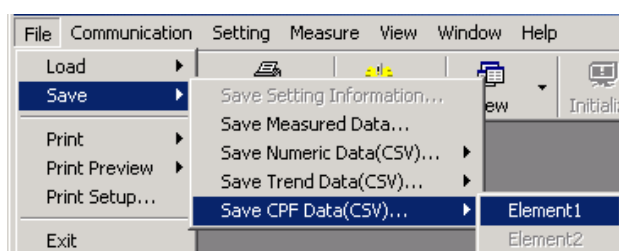
Procedure

In normal voltage fluctuation and flicker measurement, you can save the CPF data to CSV format when the measured data has been retrieved (or loaded).

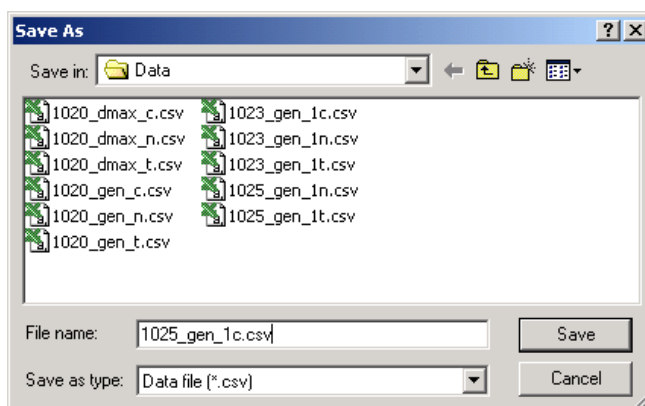
Note

- You cannot save the CPF data in CSV format if there is no measured data.
- You cannot save the CPF data in CSV format while the measurement is in progress.

1. On the **File** menu, choose **Save > Save CPF Data(CSV) > Element1** (or **2, 3, or 4**). The Save As dialog box opens. You can also click **Save > Save CPF Data(CSV) > Element1** (or **2, 3, or 4**) on the toolbar.



2. After selecting a folder in the **Save in** box, enter the name of the file you want to save in the **File name** box.
3. Click **Save**. The CPF data is saved in CSV format.



5.5 Saving CPF Data in CSV Format

Explanation

In normal voltage fluctuation and flicker measurement, you can save the CPF data to CSV format when the measured data has been retrieved (or loaded). A file in CSV format can be opened using a spreadsheet application (such as Microsoft Excel) on your PC.

File Name and Extension

You can set any file name that is allowed by your PC.

- Extension: .csv

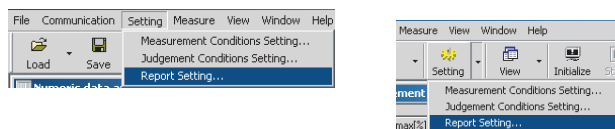
Example When the CPF Data Saved in CSV Format Is Opened Using Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE : Wed Oct 25 11:03:33 2006											
2	Element : 1											
3	Volt. Range (V) : 300.00											
4	Un U1 (V) : 230.35											
5	Set Freq (Hz) : 50											
6	Freq U1 (Hz) : 50.000											
7	Interval: 10mOs											
8	<Limit>											
9	dc (%) : 3.30											
10	dmax (%) : 4.00											
11	d(t) (ms/%) : 500/3.30											
12	Pst : 1.00											
13	Plt : 0.65/12											
14	<Result>											
15	Element Judgement : Pass											
16	Total Judgement : Pass											
17	(Element 1 2 3 4)											
18												
19	Flicker Class	Flicker Level	1	2	3	4	5	6	7	8	9	10
20	1	0.010131415	100	100	100	100	100	100	100	100	100	100
21	2	0.0	557	61.43	60.07	64.83	63.57	63.9	63.57	66.59	65.97	63.7
22	3	0.0	448	60.77	59.8	63.7	62.57	62.93	62.77	65.79	65.13	63
23	4	0.0	112	59.93	58.93	62.53	61.77	61.93	61.9	64.62	64.13	62.03
24	5	0.0	372	59.2	58.33	61.7	60.77	61.07	61.17	63.62	63.4	61.27
25	6	0.0	352	58.53	57.43	60.87	60.1	60	60.03	62.59	62.53	60.4
26	7	0.0	375	57.77	56.87	59.77	58.93	59.1	59.4	61.42	61.9	59.53
27	8	0.0	366	56.8	56.1				58.33	60.35	61.2	58.6
28	9	0.0	349	56	55.37				57.27	59.25	60.57	57.43
29	10	0.1	465	55.1	54.87	56.7	55.6	55.9	56.23	58.02	60.07	56.47
30	11	0.0	392	54.17	54.03	55.97	54.4	54.93	55	56.62	59.17	55.67
31	12	0.0	103	53.63	53.03	54.83	53.6	53.57	54	55.39	58.4	54.97
32	13	0.0	307	52.87	52.33	53.77	52.8	52.67	52.9	54.02	57.43	54.07
33	14	0.0	531	52.2	51.63	52.6	51.57	51.77	51.87	53.05	56.73	53.33
34	15	0.0	301	51.53	50.93	51.83	50.33	50.93	51.43	51.72	55.87	52.37

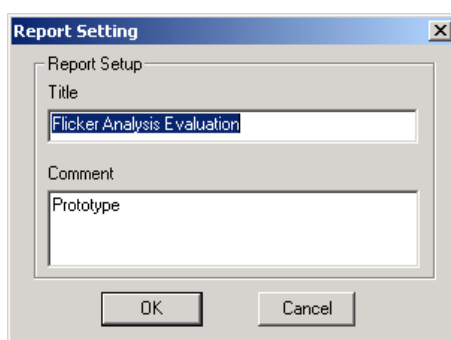
6.1 Setting the Title and Comment of Reports

Procedure

1. On the **Setting** menu, choose **Report Setting** or click **Setting > Report Setting** on the toolbar. The Report Setting dialog box opens.



2. Enter the title and comment in the corresponding boxes.
3. Click **OK**.



Note

You cannot set the title and comment of the report while the measurement is in progress.

Explanation

You can create reports using the data measured with the software.

Setting the Title and Comment of Reports

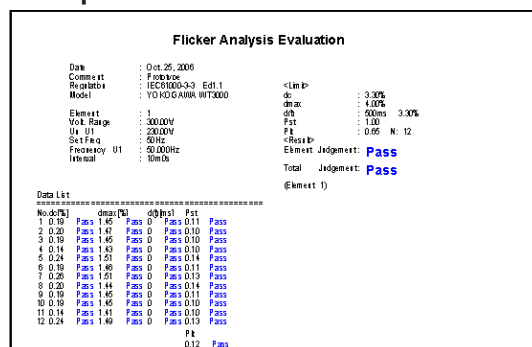
As necessary, you can set the title and comment of a report.

- **Number of Characters That Can Be Entered**

See the table below.

Item	Number of Characters That Can Be Entered
Title	Up to 40 characters.
Comment	Up to 70 characters.

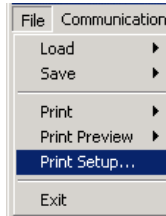
Example in Which a Title and Comment Has Been Set on the Report



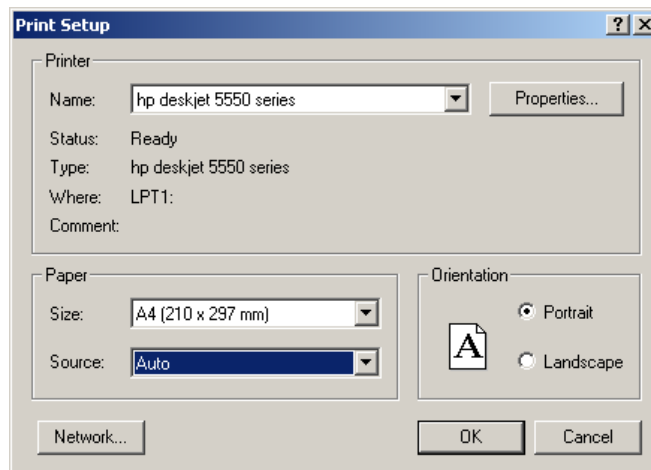
6.2 Setting the Printer

Procedure

1. On the **File** menu, choose **Print Setup**. The Print Setup dialog box opens.



2. Enter appropriate settings for **Printer**, **Size**, **Source**, and **Orientation**.
3. Click **OK**.



Explanation

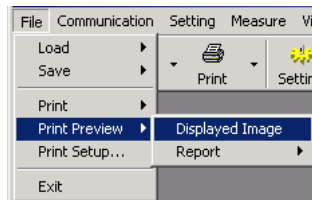
Set the printer according to the environment of the system that you are using.

6.3 Viewing the Print Preview

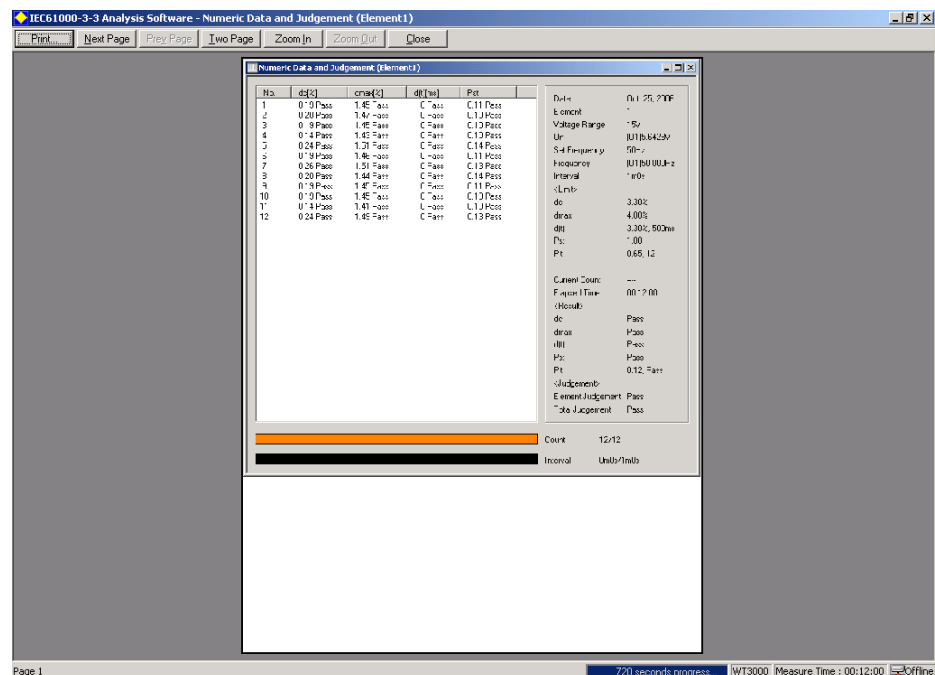
Procedure

Viewing the Print Preview of the Display Image

1. On the **File** menu, choose **Print Preview > Display Image**. The display image at the time when Display Image is selected is previewed.
The display image of the activated window (Numeric Data and Judgement, Trend Graph, CPF Graph, etc.) in the software is previewed.



2. You can perform various operations by clicking **Next Page**, **Prev Page**, **One Page/Two Page**, **Zoom In**, and **Zoom Out**. Click **Print** to print the display image (see section 6.4).



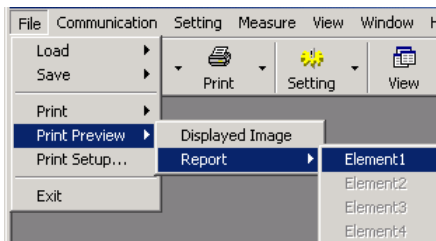
Note

You cannot view the print preview the display image if there is no measured data or if the Numeric Data and Judgement, Trend Graph, or CPF Graph is not displayed.

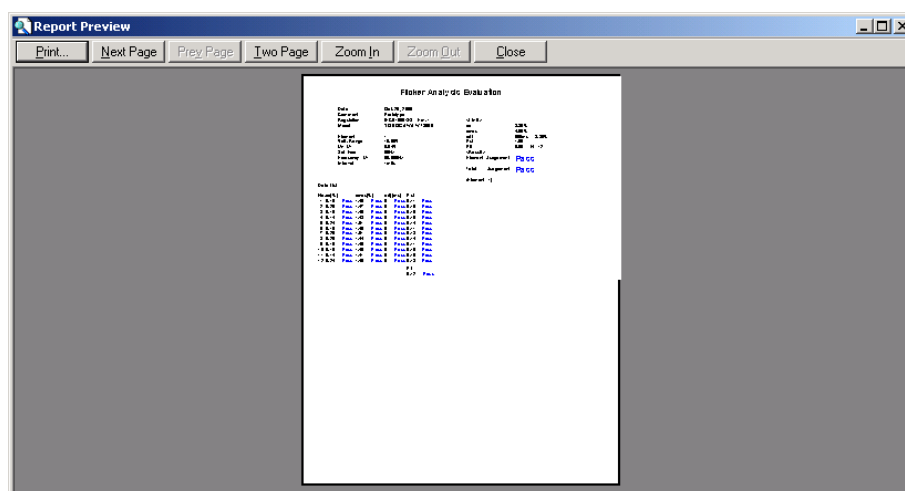
Viewing the Print Preview of Reports

You can view the print preview of the report when the measured data has been retrieved (or loaded).

1. On the **File** menu, choose **Print Preview > Report > Element1** (or **2, 3, or 4**). The report is previewed on the Print Preview window.



2. You can perform various operations by clicking **Next Page**, **Prev Page**, **One Page/Two Page**, **Zoom In**, and **Zoom Out**. Click **Print** to print the report (see section 6.4).



Note

- You cannot view the print preview the report if there is no measured data or if the Numeric Data and Judgement, Trend Graph, or CPF Graph is not displayed.
- Print preview of reports cannot be displayed when the measurement is in progress.

Explanation

You can preview the print image on the screen. Perform various operations on the print preview window according to the PC environment that you are using.

Print Preview of the Display Image

The display image of the activated window (Numeric Data and Judgement, Trend Graph, CPF Graph, etc.) in the software is previewed.

Print Preview of Reports

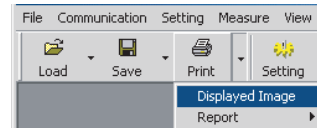
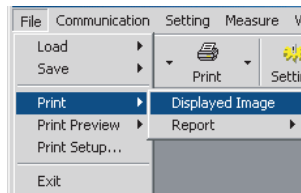
You can preview the report when the measured data has been retrieved (or loaded).
You can preview the report for each input element.

6.4 Printing

Procedure

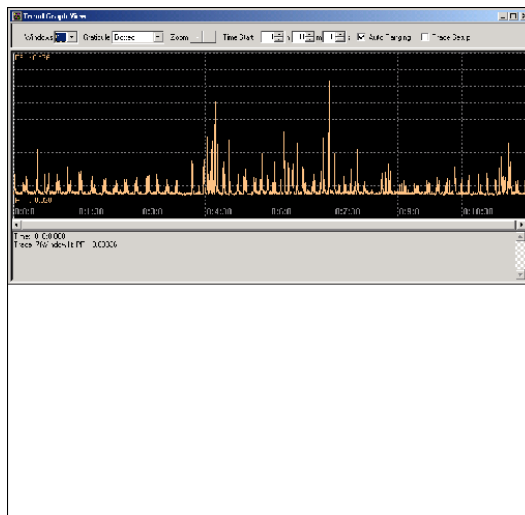
Printing Display Images

1. On the **File** menu, choose **Print > Display Image** or click **Print > Display Image** on the toolbar. The Print dialog box opens.



2. Enter appropriate settings for **Printer**, **Range**, **Copies**, etc.
3. Click **OK**. The display image at the time Display Image was selected in step 1 is printed.

The display image of the activated window (Numeric Data and Judgement, Trend Graph, CPF Graph, etc.) in the software is printed.



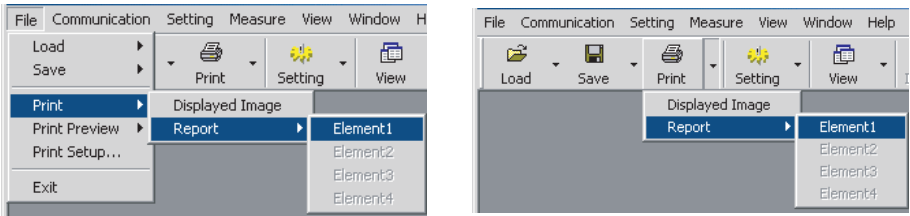
Note

You cannot print the display image if there is no measured data or if the Numeric Data and Judgement, Trend Graph, or CPF Graph is not displayed.

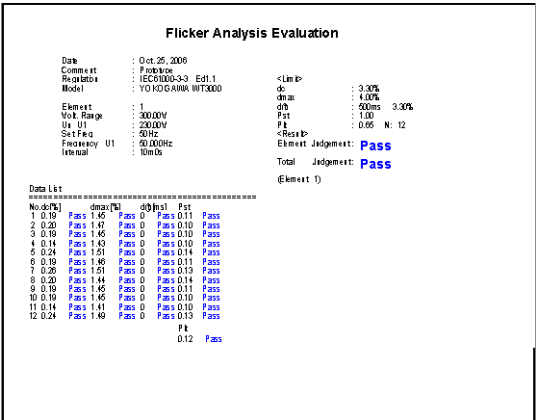
Printing Reports

You can print a report when the measured data has been retrieved (or loaded).

1. On the **File** menu, choose **Print > Report > Element1** (or **2, 3, or 4**) or click **Print > Report > Element1** (or **2, 3, or 4**) on the toolbar. The Print dialog box opens.



2. Enter appropriate settings for **Printer, Range, Copies**, etc.
3. Click **OK**. The report is printed.



Note

- You cannot print a report if there is no measured data or if the Numeric Data and Judgement, Trend Graph, or CPF Graph is not displayed.
- Reports cannot be printed when the measurement is in progress.

Explanation

Set the printer according to the environment of the system that you are using.

Printing Display Images

The display image of the activated window (Numeric Data and Judgement, Trend Graph, CPF Graph, etc.) in the software is printed.

Printing Reports

You can print a report when the measured data has been retrieved (or loaded).

You can print a report for each input element.

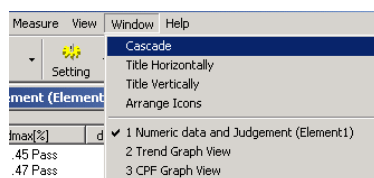
7.1 Cascading or Tiling Windows

Procedure

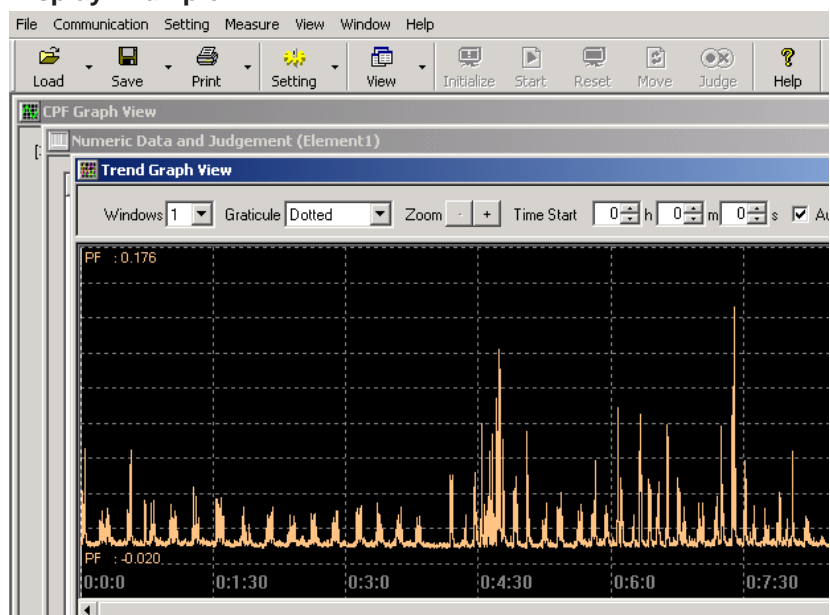
Cascading and tiling window functions are convenient for arranging the display.

Cascading Windows

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



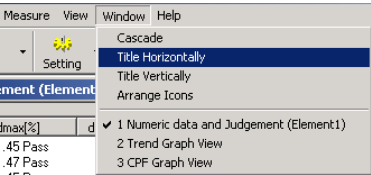
Display Example



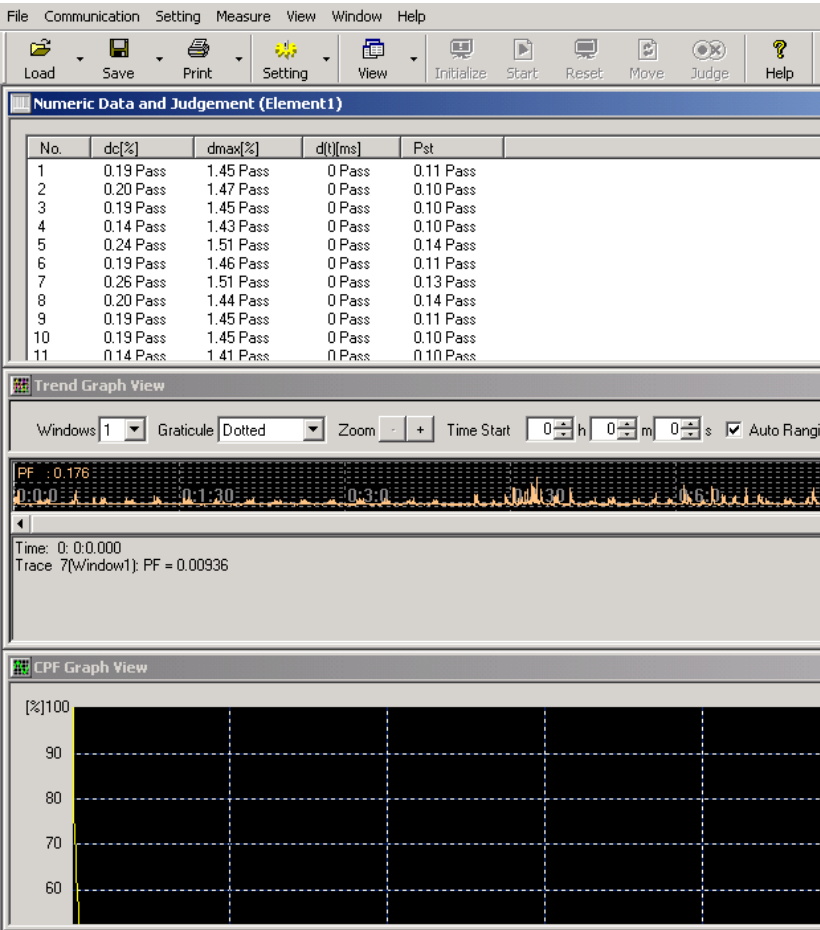
7.1 Cascading or Tiling Windows

Tile Horizontally

On the **Window** menu, choose **Tile Horizontally**. All the displayed windows are tiled so that the windows do not overlap each other.

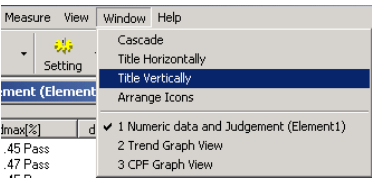


Display Example

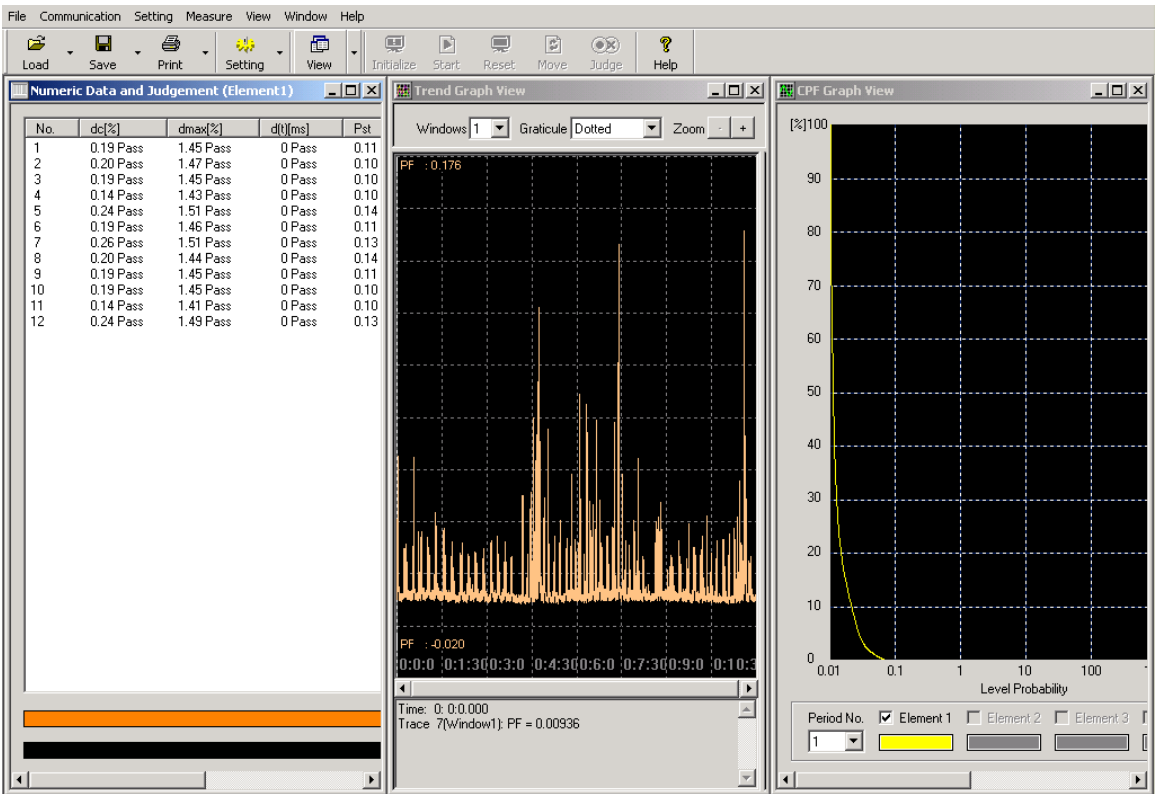


Tile Vertically

On the **Window** menu, choose **Tile Vertically**. All the displayed windows are tiled so that the windows do not overlap each other.



Display Example



Explanation

Window functions are useful, when the measured data is retrieved (or loaded), and multiple graphs or lists are displayed.

Cascade

- 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.

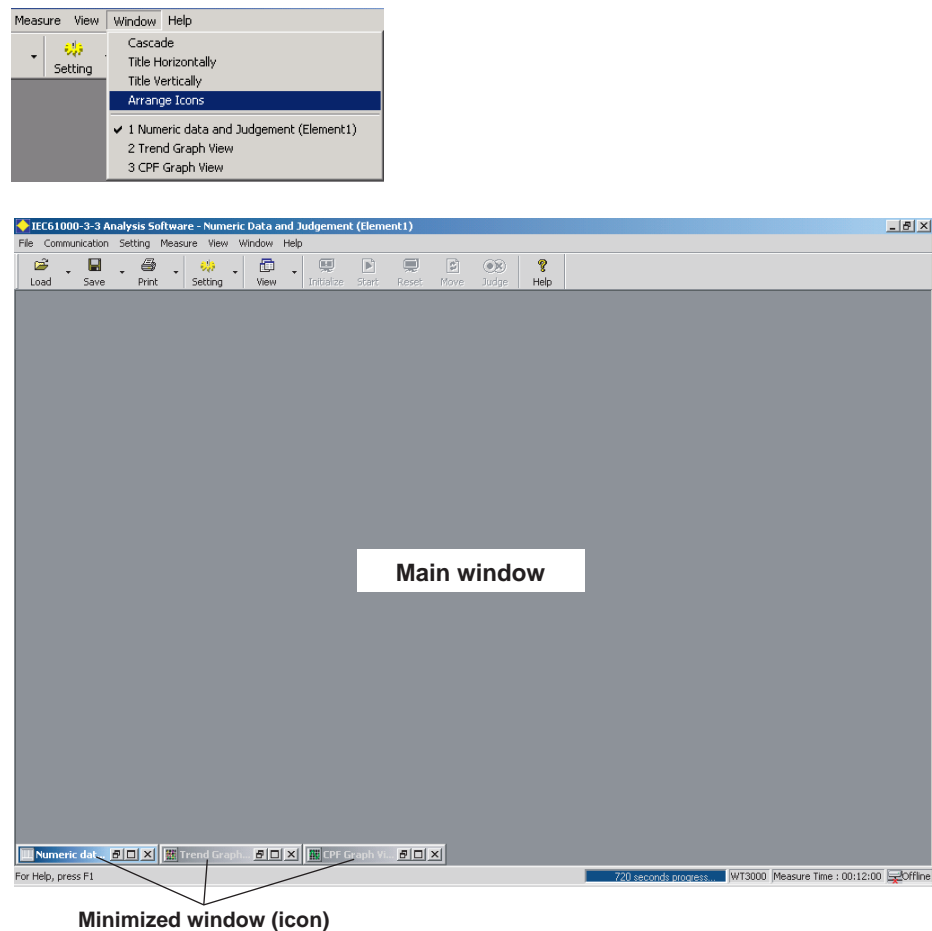
Tile Horizontally or Vertically

- All the displayed windows are tiled so that the windows do not overlap each other.
- The active graph or list becomes the active window after carrying out the tile operation.
- The arrangement order varies depending on the type of displayed windows.

7.2 Arranging Icons

Procedure

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.




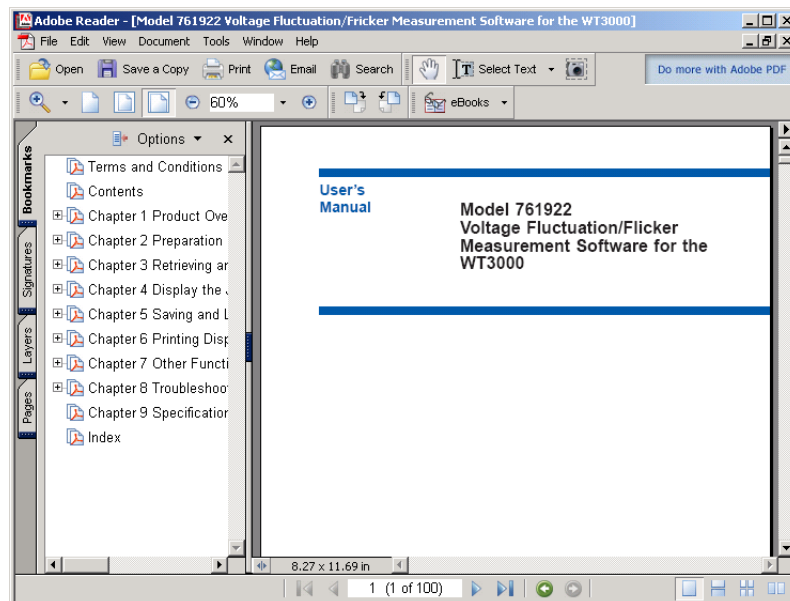
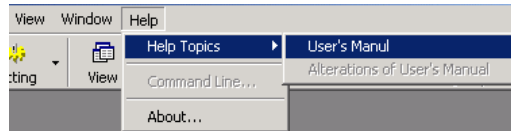
Explanation

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

7.3 Using the Help Function

Procedure

On the **Help** menu, choose **Help Topics > User's Manual** or click  on the toolbar. If Adobe Reader is installed in the PC, Adobe Reader starts and opens the PDF file of the software user's manual.



Explanation

Online Help

The user's manual 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 > Alterations of User's Manual** 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 users manual and alteration notice of this software program.

www.yokogawa.com/tm/wtpz/761922/tm-761922_01.htm

7.3 Using the Help Function

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 2-8. You will be able to view the most recent operating instructions by selecting the user's manual or alteration notice from the Help menu.

Product	User's Manual File Name	Alteration Notice File Name
WT3000	IM761922-03E.pdf	AlterationsEFlicker.pdf

Note

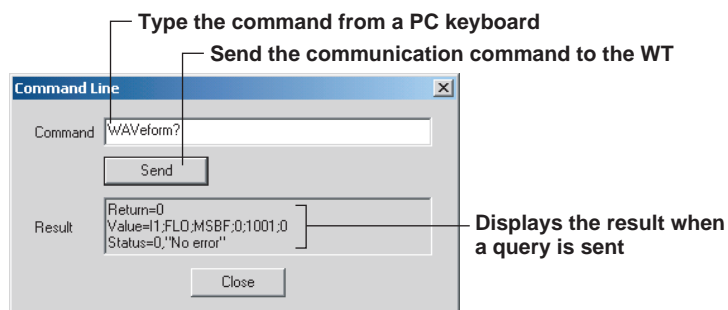
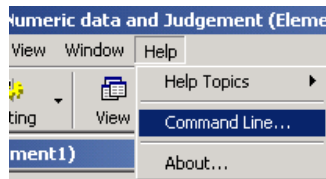
- You can download Adobe Reader from Adobe System's Web page.
 - The most recent users manual and alteration notice that you can download from YOKOGAWA's Web page correspond to the most recent version of this software program. Update the software program as necessary. The program for updating the software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

7.4 Using the Command Line

Procedure

You can communicate with the WT from the software using communication commands. For details on the communication commands, see the WT Communication Interface User's Manual.

1. On the **Help** menu, choose **Command Line**. The Command Line dialog box opens.

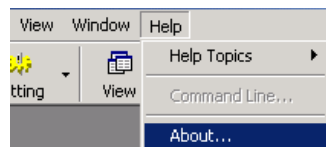


2. Enter communication commands in the Command box using your PC keyboard.
3. Click **Send** to send the command to the WT. If a query is sent, the result is displayed in the Result box.

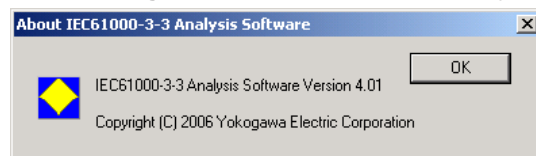
7.5 Viewing Version Information

Procedure

On the **Help** menu, choose **About**. The About dialog box of the IEC61000-3-3 Analysis Software (Voltage Fluctuation and Flicker Measurement Software) opens.



About Dialog Box of the IEC61000-3-3 Analysis Software



Explanation

The name and version information of the software is displayed.

Note

- The software version is different for each operation mode indicated below.
 - Harmonic measurement function
 - Voltage fluctuation and flicker measurement functionIf either function is updated, the version of the other function may not change.
- For the most recent version of the software, check the YOKOGAWA's Web page below.
www.yokogawa.com/tm/wtpz/761922/tm-761922_01.htm
The program for updating the software as well as the most recent user's manual and alteration notice (see section 7.3) can be downloaded from 's Web page above.

8.1 Troubleshooting

If a message is displayed on the PC display, see section 8.2, “Error Messages.” If servicing is necessary or if the software is not operating correctly after performing the corrective actions, contact your nearest YOKOGAWA dealer.

8.2 Error Messages

Message	Corrective Action
Measured data will be initialized. Do you want to execute?	Select OK to initialize the measured data. Otherwise, select Cancel.
Data was lost. Please check your settings and try again.	The communication may be disconnected. Check the cable, noise, etc.
Connection error. Please check your settings and try again.	Check the following items. <ul style="list-style-type: none"> • The WT is turned ON. • The GP-IB or Ethernet cable is connected properly. • For GP-IB, check that a unique GP-IB address is assigned within the system. Check that the GP-IB address specified on the WT matches the address specified on the software. Check that the GP-IB communication driver is installed correctly in the PC. • For Ethernet, check that the IP address, user name, and password specified on the WT match those specified on the software.
Peak over. Please check your settings and try again.	Check that the voltage or current range is appropriate.
Frequency error. Please check your settings and try again.	Check the frequency and voltage range.
Unrecognized error. Please check your settings and try again.	An unexpected error occurred. Contact your nearest YOKOGAWA dealer.
All the data will be discarded. Do you want to continue?	Select OK to discard the current data. Otherwise, select Cancel.
Write failed.	Check the destination medium. <ul style="list-style-type: none"> • Check that the storage medium is present. • Check that there is enough free space on the storage medium. • Check that the storage medium is formatted. • Check that the storage medium is not write-protected.
Please input a value from 0.0001 to 99999.9999. Please input a value from 0.01 to 999.99. Please input a value from 1.00 to 99.99. Please input a value from 0.10 to 99.99. Please input value from 0:30 to 15:00. Please input a value from 1 to 99999. Please input a value from 1 to 99. Please input a value from 0.10 to 9.99.	The value you tried to specify is out of range. Set the value within the allowed range.

Specifications

Item	Specifications
Software	The voltage fluctuation and flicker measurement software measures the voltage fluctuation and flicker of electrical or electronic equipment according to the IEC Standard and indicates/saves the results of judgements made according to the standard. The executable file name is IEC61000.exe.
Applicable instruments	WT3000 (models 760301, 760302, 760303, and 760304)
Applicable standards	<p>Voltage fluctuation and flicker suppression standards</p> <ul style="list-style-type: none"> • IEC 61000-3-3 Edition 1.1:2002, IEC 61000-3-3A2:2005 • EN 61000-3-3:1995, EN 61000-3-3A1:2001, EN 61000-3-3A2:2005 <p>Flicker meter function and design specifications</p> <ul style="list-style-type: none"> • IEC 61000-4-15 Edition 1.1:2003 • EN 61000-4-15:1998, EN 61000-4-15A1:2003
Functions	<p>Retrieve and load the measured data to be judged</p> <ul style="list-style-type: none"> • Set the WT measurement conditions • Retrieve measured data from the WT connected online (On-Line mode) • Load measured data already saved (Off-Line mode) <p>Measure mode</p> <ul style="list-style-type: none"> • Normal voltage fluctuation and flicker measurement Calculates all the voltage fluctuation and flicker values of dc, dmax, d(t), Pst, and Plt, compares them to the preset limits, and indicates the total judgement. • Measurement of dmax caused by manual switching Measures the maximum relative voltage change, dmax, when the EUT switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit. <p>Set the WT measurement conditions Set the measurement conditions of the voltage fluctuation and flicker measurement that is defined in IEC 61000-3-3 Edition 1.1.</p> <p>Set the WT judgement conditions Set the judgement conditions of the voltage fluctuation and flicker measurement that is defined in IEC 61000-3-3 Edition 1.1.</p> <p>Set the title and comment of reports Set the title/comment of reports. Printed along with the measured data.</p> <p>Start/stop the measurement Measurement can be started in On-Line mode.</p> <p>Numeric data and judgement Display the judgement result indicating whether the measured data of voltage fluctuation and flicker measurement is within the specified limits as well as the measured data.</p> <p>Trend graph view Display the trend graph of the normal voltage fluctuation and flicker measurement (dc, dmax, d(t), idc, idmax, id(t), and IFS).</p> <p>CPF graph view Display the CPF graph of the normal voltage fluctuation and flicker measurement.</p> <p>Save and load the setting information and measured data</p> <ul style="list-style-type: none"> • Save and load the setting information Save various types of setting information including measurement conditions, judgement conditions, title and comment of reports. Loading of the setting information is also possible. • Save and load the measured data Save the measured data of the voltage fluctuation and flicker to files. The setting information above is also saved. The voltage fluctuation and flicker measurement data and setting information saved to a file can also be loaded. <p>Save the numeric data, trend data, and CPF data in CSV format Save the numeric data, trend data,*1 CPF data*1 to a file in CSV format. The saved data can be loaded in a software application on the PC.</p> <p>Print display images and reports Print the display image and report.</p>

*1 Valid only for normal voltage fluctuation and flicker measurement.

Specifications

Item	Specifications
PC system requirements	PC
	<ul style="list-style-type: none">• CPU Pentium III 1 GHz or equivalent or faster
	<ul style="list-style-type: none">• Memory 256 MB or more
	<ul style="list-style-type: none">• Hard disk Free space of at least 2 GB
	Operating system Windows 2000 Professional, Windows XP Home Edition, or Windows XP Professional
	Communication card
	<ul style="list-style-type: none">• GP-IB PCI-GPIB/PCI-GPIB+/PCMCIA GPIB/PCMCIA-GPIB+ by National Instruments with NI-488.2M driver version 1.60 or later• Ethernet A 10BASE-T or 100BASE-TX Ethernet port
	CRT, printer, and mouse Those compatible with Windows 2000 Professional, Windows XP Home Edition, or Windows XP Professional
	WT3000
	WT3000 firmware version 4.01 or higher with the following functions. <ul style="list-style-type: none">• Flicker measurement function (/FL option)• GP-IB interface (standard) or Ethernet interface (/C7 option)

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